



**CONTRACT No GTC 626/2014A**

**CONSTRUCTION OF MEGA RESERVOIR PRPSs  
(PACKAGE A - UMM BIRKA)**

**CONTRACT DOCUMENTS  
(VOLUME 14 OF 19)**



**CONSOLIDATED CONTRACTORS GROUP S.A.L. (OFFSHORE) (CCC) &  
TEYSEER CONTRACTING COMPANY W.L.L.  
JOINT VENTURE**

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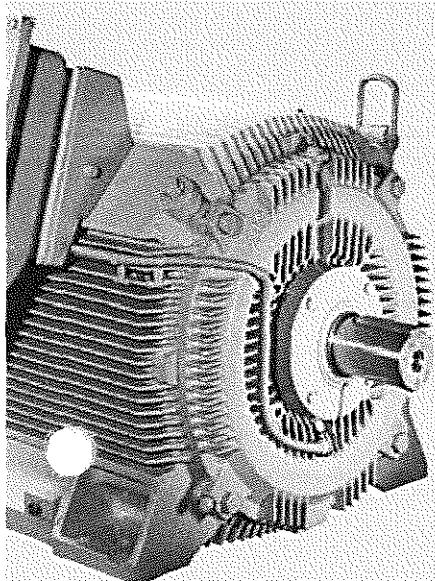
# Accessories SINAMICS GM150, SINAMICS SM150

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## Motors (b) converter operation



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### Overview

- 8/2 Air-cooled H-compact 1LA4 motors
- 8/2 Air-cooled H-compact 1PQ4 motors
- 8/3 Air-cooled H-compact PLUS 1RA4, 1RA6 and 1RP6 motors
- 8/3 Air-cooled H-compact PLUS 1RQ4 and 1RQ6 motors
- 8/4 Water-cooled H-compact 1LH4 motors
- 8/4 Water-cooled H-compact PLUS 1RN4 and 1RN6 motors

# Motors for converter operation

## H-compact and H-compact PLUS

### Overview

The use of variable-speed motors enables savings to be achieved in many applications through higher system efficiencies compared to fixed-speed operation.

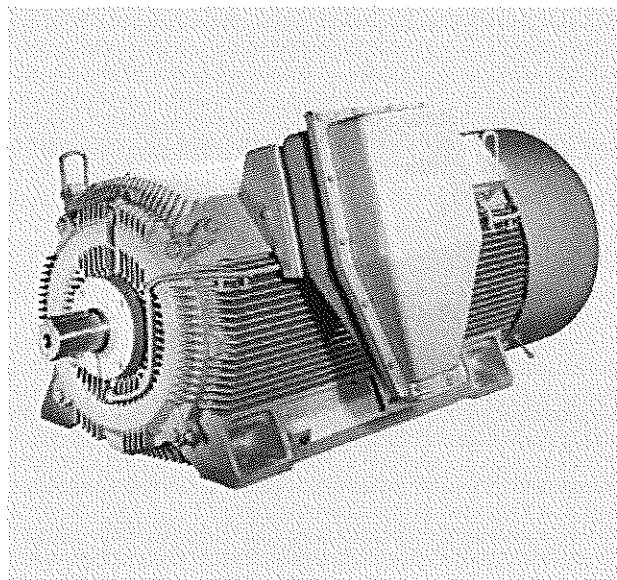
H-compact and H-compact PLUS motors have proven themselves many times over in variable-speed applications. For these motor series, special versions have been designed for operation with SINAMICS GM150 and SINAMICS SM150 medium-voltage converters.

These motor versions have, as standard, a reinforced stator winding insulation so that they can be fed from drive converters without requiring a sine-wave filter. Further, both bearings are electrically insulated and the shaft is equipped with a grounding system.

The motor insulation system corresponds to thermal class 155 (F) and they are generally utilized to thermal class 155 (F).

Catalog D 84.1 contains detailed technical data for the following motors.

### Air-cooled H-compact 1LA4 motors

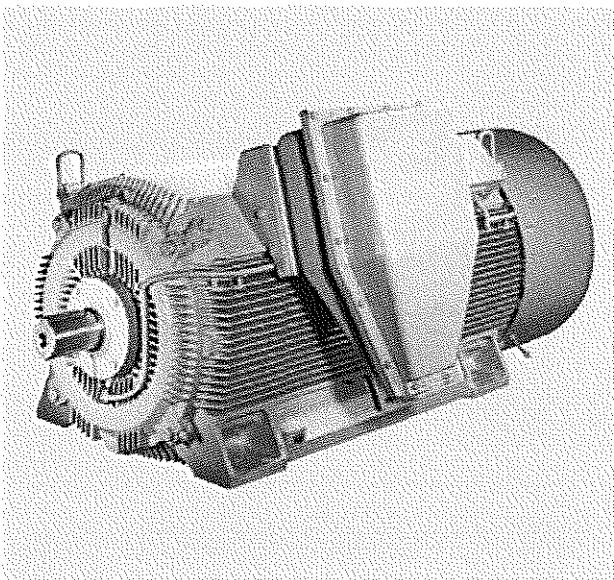


### Technical specification overview

#### H-compact 1LA4

<b>Rated voltage</b>	2.3 ... 6.6 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Cooling method</b>	IC411
<b>Stator winding insulation</b>	Insulation system, thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	450 ... 630 mm
<b>Bearings</b>	Roller bearings; sleeve bearings
<b>Cage material</b>	Die-cast aluminum or copper (dependent on the shaft height and number of poles)
<b>Standards</b>	IEC, EN
<b>Frame design</b>	Cast iron with cooling ribs

### Air-cooled H-compact 1PQ4 motors



### Technical specification overview

#### H-compact 1PQ4

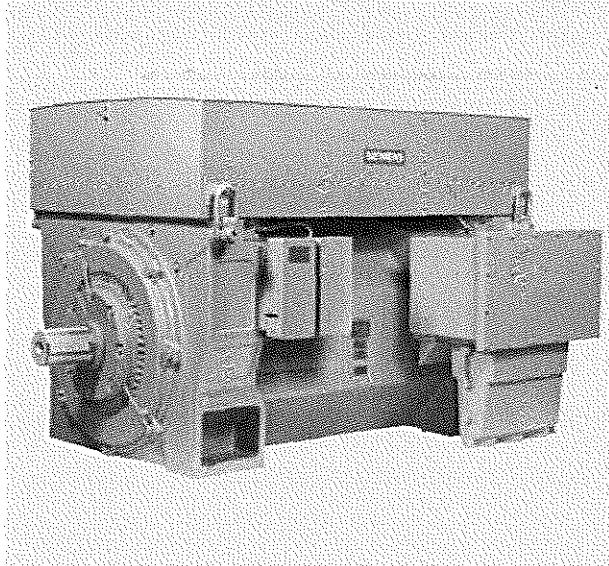
<b>Rated voltage</b>	2.3 ... 6.6 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Cooling method</b>	IC416
<b>Stator winding insulation</b>	Insulation system, thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	450 ... 630 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Die-cast aluminum or copper (dependent on the shaft height and number of poles)
<b>Standards</b>	IEC, EN
<b>Frame design</b>	Cast iron with cooling ribs

# Motors for converter operation

H-compact and H-compact PLUS

## Overview

### Air-cooled motors, H-compact PLUS 1RA4, 1RA6, 1RP6

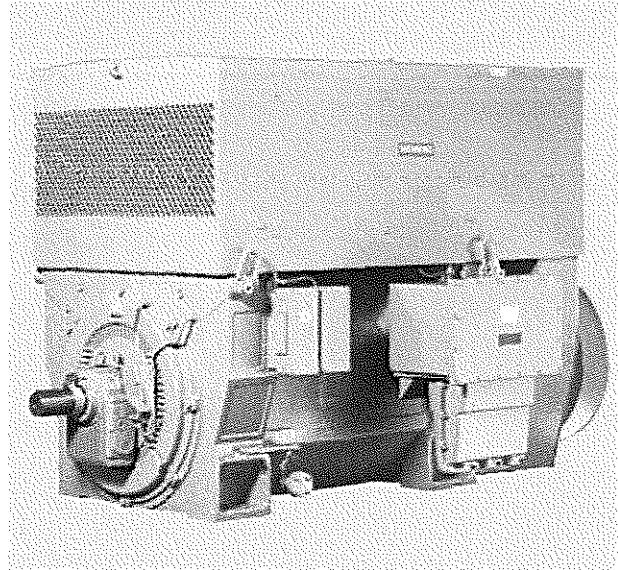


### Technical specification overview

#### H-compact PLUS 1RA4, 1RA6, 1RP6

<b>Rated voltage</b>	2.3 ... 6.6 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3; IM V1
<b>Degree of protection</b>	IP23
<b>Cooling method</b>	IC01
<b>Stator winding insulation</b>	Insulation system, thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	450 ... 630 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC, EN
<b>Frame design</b>	
• Shaft height 450 ... 560 mm	Frame: Cast iron Cooling enclosure: Steel
• Shaft height 630 mm	Frame: Steel Cooling enclosure: Steel

### Air-cooled H-compact PLUS 1RQ4 and 1RQ6 motors



### Technical specification overview

#### H-compact PLUS 1RQ4 and 1RQ6

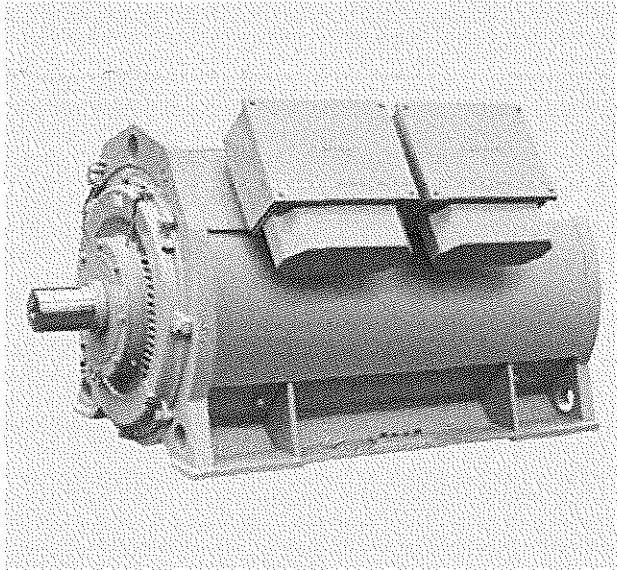
<b>Rated voltage</b>	2.3 ... 6.6 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Cooling method</b>	IC611/IC616
<b>Stator winding insulation</b>	Insulation system, thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	450 ... 630 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC, EN
<b>Frame design</b>	
• Shaft height 450 ... 560 mm	Frame: Cast iron Cooling enclosure: Steel
• Shaft height 630 mm	Frame: Steel Cooling enclosure: Steel

# Motors for converter operation

## H-compact and H-compact PLUS

### Overview

#### Water-cooled H-compact 1LH4 motors

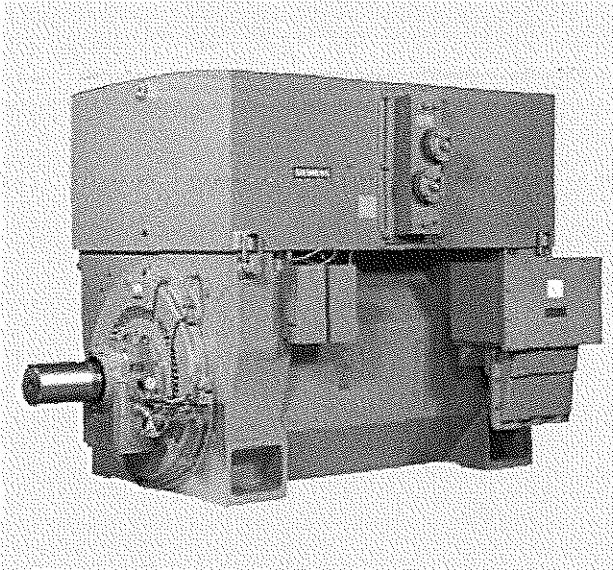


#### Technical specification overview

##### H-compact 1LH4

<b>Rated voltage</b>	2.3 ... 4.16 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM B35 and IM V1
<b>Degree of protection</b>	IP55
<b>Cooling method</b>	IC71W
<b>Stator winding insulation</b>	Insulation system, thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	500 mm
<b>Bearings</b>	Roller bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC, EN
<b>Frame design</b>	Steel frame with water jacket

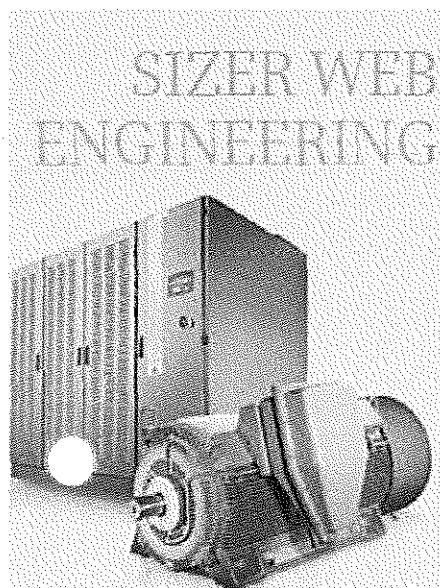
#### Water-cooled H-compact PLUS 1RN4 and 1RN6 motors



#### Technical specification overview

##### H-compact PLUS 1RN4 and 1RN6

<b>Rated voltage</b>	2.3 ... 6.6 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Cooling method</b>	IC81W
<b>Stator winding insulation</b>	Insulation system, thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	450 ... 630 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC, EN
<b>Frame design</b>	<ul style="list-style-type: none"> <li>• Shaft height 450 ... 560 mm</li> <li>• Shaft height 630 mm</li> </ul>
	Frame: Cast iron Cooling enclosure: Steel  Frame: Steel Cooling enclosure: Steel



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# Engineering information SINAMICS GM150, SINAMICS SM150

## SIZER WEB ENGINEERING

### Overview

#### Flexible, customized and user-friendly

With the web-based drive engineering tool you can quickly find the solution for your particular drive application: Menu-prompted workflows specifically guide you when you are selecting and dimensioning products and drive systems – including accessories.

Via an integrated query function, SIZER WEB ENGINEERING can also provide you with customized special solutions for applications that cannot be addressed using "Standard Products", i.e. where the focus is on flexibility and a customized solution

Currently the following product groups are supported:

- High-Voltage motors
- Low-Voltage motors
- Medium-Voltage converters
- Low-Voltage converters
- DC technology

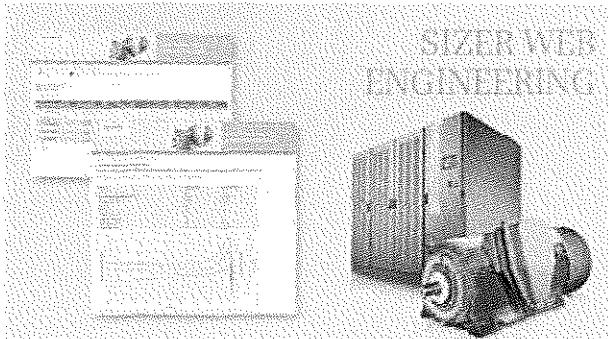
Comprehensive documentation such as data sheets, starting calculations, dimension drawings, quotation documentation – to name just a few – are a fixed component of this tool.

The result: customized solutions for your drive tasks.

### More information

Further information on the SIZER WEB ENGINEERING engineering tool is available at

[www.siemens.com/sizer-we](http://www.siemens.com/sizer-we)



For example Starting calculation

System requirements include Internet access as well as a standard browser (e.g. Internet Explorer from V7.0, Firefox from V3.0).

SIZER WEB ENGINEERING is available for use 24h/365 days after registration and release.

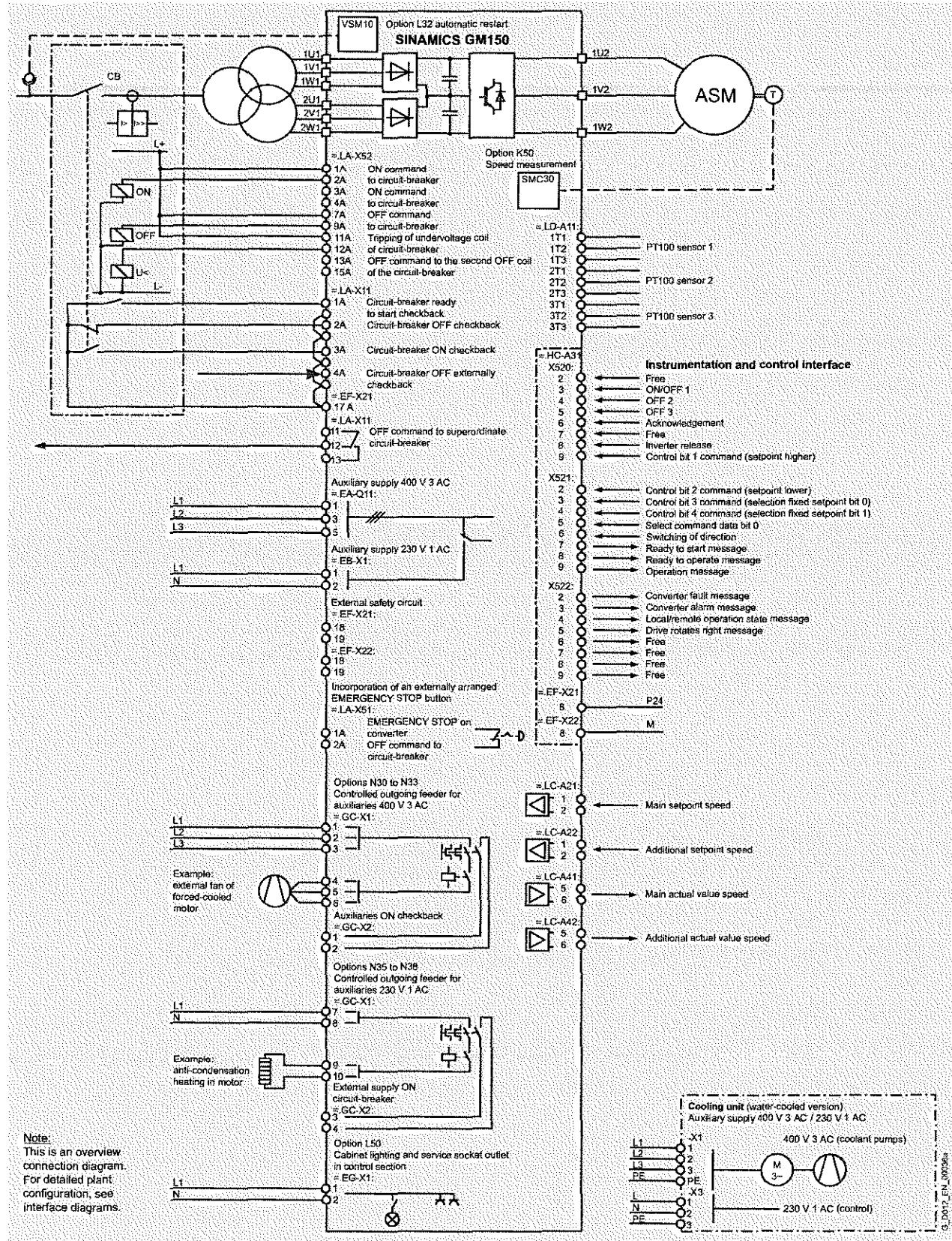


# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Overview of interfaces

#### Overview of connections for SINAMICS GM150



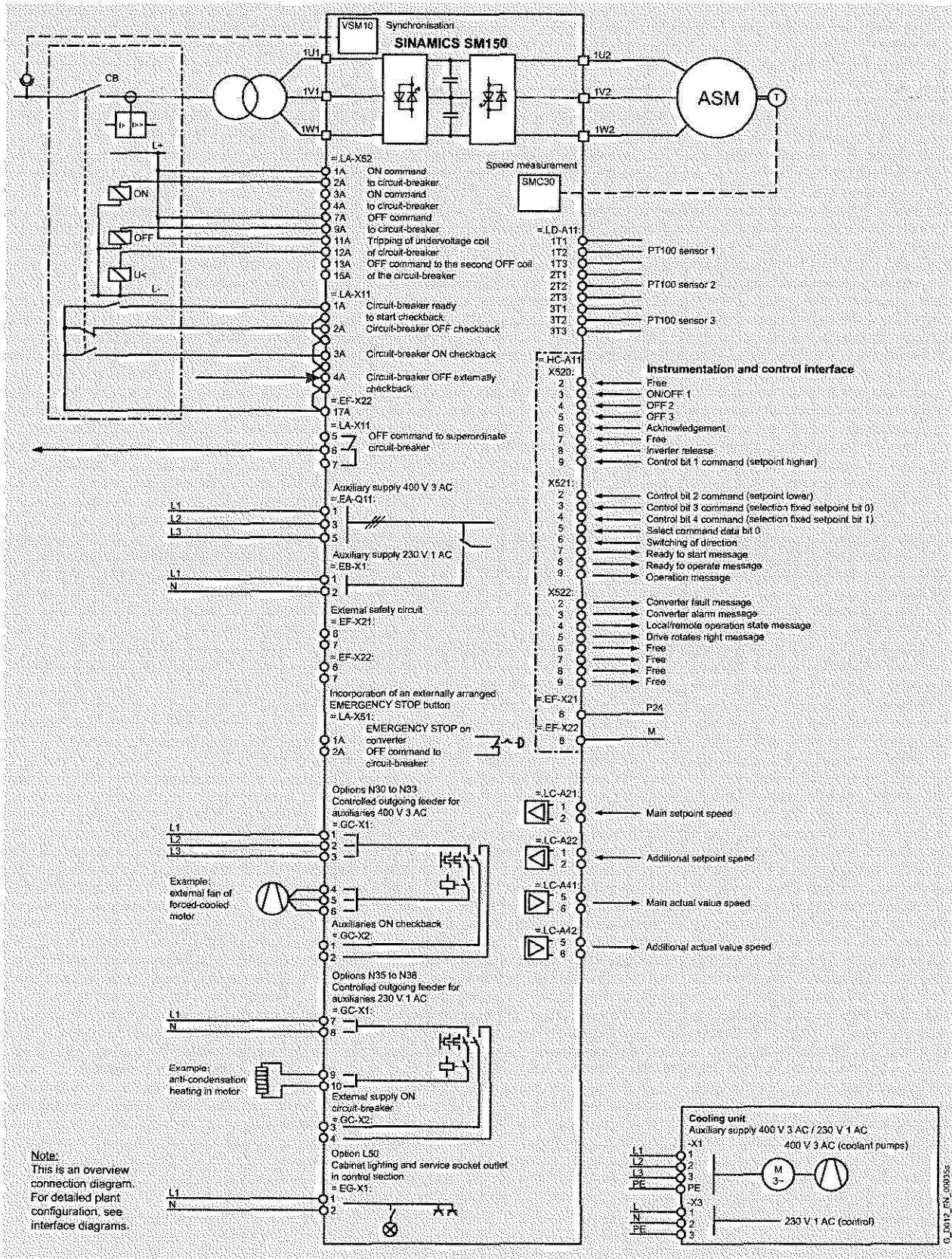
**Note:**  
This is an overview connection diagram.  
For detailed plant configuration, see interface diagrams.

# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Overview of Interfaces

#### Overview of connections for SINAMICS SM150



# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Overview of interfaces

#### Configuration

The interfaces of the TM31 and TM15 Terminal Modules are available for communication with the higher level. Additional terminal strips can be used to connect the circuit breaker or external protection and monitoring devices. The following tables give an overview of the type and preassignment of the interfaces in the standard version.

Note: For max. conductor cross-section and further technical data on TM31 and TM15 Terminal Modules, see Description of options **G61** and **G63**, Pages 6/16 and 6/20.

#### Terminal strip on TM31 (=HC-A51)

Terminal	Type	Preassignment	Comment
<b>Group 1</b>			
1-8	P24	24 V DC supply for inputs DI0 to DI7	—
<b>Group 2</b>			
1	DI0	Digital input electrically isolated via optocoupler	Preassigned internally
2	DI1		Preassigned internally
3	DI2		—
4	DI3		—
5	M1	Reference ground for digital inputs DI0 to DI3	—
6	M	Reference ground for P24; auxiliary voltage for digital inputs	—
<b>Group 3</b>			
1	DI4	Digital input electrically isolated via optocoupler	Preassigned internally
2	DI5		—
3	DI6		—
4	DI7		—
5	M2	Reference ground for digital inputs DI4 to DI7	—
6	M	Reference ground for P24; auxiliary voltage for digital inputs	—
<b>Group 4</b>			
1	P24	24 V DC supply for inputs/outputs DI/DO8 to DI/DO11	—
2	DI/DO8	Digital inputs/digital outputs non-isolated	Preassigned internally
3	DI/DO9		—
4	DI/DO10		—
5	DI/DO11		—
6	M	Reference ground for P24; ground of digital inputs/digital outputs	—

#### Terminal strip on TM31 (=HC-A51)

Terminal	Type	Preassignment	Comment
<b>Analog inputs</b>			
1	AI0+	Analog inputs set up as differential inputs for the following ranges: -10 ... +10 V +4 ... +20 mA 0 ... +20 mA -20 ... +20 mA	Main speed setpoint
2	AI0-		Isolating amplifiers are used here for electrical isolation (4 ... 20 mA, 0 ... 10 V, 0 ... 20 mA)
<b>Analog outputs</b>			
3	AI1+	The voltage input/current input is selected with a switch	Additional speed setpoint
4	AI1-		Isolating amplifiers are used here for electrical isolation (4 ... 20 mA, 0 ... 10 V, 0 ... 20 mA)
5	P10	Auxiliary voltage ± 10 V (10 mA) to connect a potentiometer to enter a setpoint via an analog input	—
6	M		—
7	N10		—
8	M		—
<b>Relay outputs</b>			
1	AO 0V+	Analog outputs for the following ranges: -10 ... +10 V +4 ... +20 mA 0 ... +20 mA -20 ... +20 mA	Main actual value (speed)
2	AO 0V-		Isolating amplifiers are used here for electrical isolation (4 ... 20 mA, 0 ... 10 V, 0 ... 20 mA)
3	AO0C+		Additional actual value (speed)
4	AO 1V+		Isolating amplifiers are used here for electrical isolation (4 ... 20 mA, 0 ... 10 V, 0 ... 20 mA)
5	AO 1V-		
6	AO 1C+		
7	KTY+	Temperature sensor KTY84 0 ... 200 °C	—
8	KTY-	or PTC ( $R_{cold} < 1.5 \text{ k}\Omega$ )	The sensor type must be parameterized
<b>Digital outputs</b>			
1	DO 0.NC	Relay output for changeover contact	—
2	DO 0.COM	Max. switching voltage: 250 V AC, 30 V DC	NC contact
3	DO 0.NO	Max. switching power at 250 V AC: 2000 VA	Basic
		Max. switching power at 30 V DC: 240 W	NO contact
4	DO 1.NC	Relay output for changeover contact	—
5	DO 1.COM	Max. switching voltage: 250 V AC, 30 V DC	NC contact
6	DO 1.NO	Max. switching power at 250 V AC: 2000 VA	Basic
		Max. switching power at 30 V DC: 240 W	NO contact

# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Overview of interfaces

#### Configuration

##### Terminal strip on TM15 (SINAMICS GM150: =HC-A31, SINAMICS SM150: =HC-A11)

Terminal	Type	Preassignment
2	<u>DI/DO0</u>	Bidirectional digital inputs and outputs <sup>1)</sup>
3	<u>DI/DO1</u>	Free
4	<u>DI/DO2</u>	ON / OFF1
5	<u>DI/DO3</u>	OUT2
6	<u>DI/DO4</u>	OUT3
7	<u>DI/DO5</u>	Acknowledgement
8	<u>DI/DO6</u>	Free
9	<u>DI/DO7</u>	Inverter enable
		Control bit 1 (increase setpoint)
2	<u>DI/DO8</u>	Bidirectional digital inputs and outputs <sup>1)</sup>
3	<u>DI/DO9</u>	Control bit 2 command (decrease setpoint)
4	<u>DI/DO10</u>	Control bit 3 command (select fixed setpoint bit 0)
5	<u>DI/DO11</u>	Control bit 4 command (select fixed setpoint bit 1)
6	<u>DI/DO12</u>	Select command data set bit 0
7	<u>DI/DO13</u>	Switchover of direction of rotation
8	<u>DI/DO14</u>	Ready to start message
9	<u>DI/DO15</u>	Ready to run message
		Operating message
2	<u>DI/DO16</u>	Bidirectional digital inputs and outputs <sup>1)</sup>
3	<u>DI/DO17</u>	Converter fault message
4	<u>DI/DO18</u>	Converter warning message
5	<u>DI/DO19</u>	Local/remote operating status message
6	<u>DI/DO20</u>	Drive rotates to the right (clockwise)
7	<u>DI/DO21</u>	Free
8	<u>DI/DO22</u>	Free
9	<u>DI/DO23</u>	Free
		The jumper must be removed according to the control mode (non-isolated/isolated).
8	P24	The jumper must be removed according to the control mode (non-isolated/isolated).
8	M	The jumper must be removed according to the control mode (non-isolated/isolated).

##### Terminal strip on isolation amplifier

Terminal	Preassignment	Comment
1	Main speed setpoint (4 ... 20 mA)	Signal level adjustable (0 ... 10 V; 0 ... 20 mA; 4 ... 20 mA)
2		
1	Supplementary speed setpoint (4 ... 20 mA)	Signal level adjustable (0 ... 10 V; 0 ... 20 mA; 4 ... 20 mA)
2		
1	Main speed actual value (4 ... 20 mA)	Signal level adjustable (0 ... 10 V; 0 ... 20 mA; 4 ... 20 mA)
2		
1	Supplementary speed actual value (4 ... 20 mA)	Signal level adjustable (0 ... 10 V; 0 ... 20 mA; 4 ... 20 mA)
2		

##### Temperature monitoring with Pt100 evaluation unit

Terminal	Type	Comment
1T1 to 1T3	Pt100	Sensor 1
2T1 to 2T3	Pt100	Sensor 2
3T1 to 3T3	Pt100	Sensor 3

The sensors can be connected to the Pt100 evaluation unit using either a two-wire or three-wire system. In the two-wire system, inputs xT1 and xT2 must be assigned and terminals xT2 and xT3 must be jumpered. The limit values for warning and shutdown must be set centrally for all three sensors.

The output relays are integrated into the internal fault and shutdown sequence of the converter. The signals can also be picked up in the plant side by means of two spare fault signaling relays.

##### Incorporating an external safety shutdown, SINAMICS GM150

Terminal	Type	Comment
18	External safety shutdown	Jumper = EF-X21:18-19 should be removed when incorporating the external safety shutdown.
19		
18	Reference ground	If the power supply is externally provided, then jumper = EF-X22:18-19 must be removed and the reference ground of the external supply must be connected with = EF-X22:19.
19		

<sup>1)</sup> The digital inputs/outputs can be parameterized individually as inputs or outputs (electrical isolation in three groups of eight channels each). The preassignment as an input or output is identified by underlining.

# Engineering information SINAMICS GM150, SINAMICS SM150

## Overview of interfaces

### Configuration

#### Incorporating an external safety shutdown, SINAMICS SM150

Terminal	Type	Comment
16	External safety shutdown	Jumper = EF-X21:16-17 should be removed when incorporating the external safety shutdown.
17		

Terminal	Type	Comment
16	Reference ground	If the power supply is externally provided, then jumper = EF-X22:16-17 must be removed and the reference ground of the external supply must be connected with = EF-X22:17.
17		

#### Incorporating the EMERGENCY-OFF button in a plant-side EMERGENCY-OFF circuit

Terminal	Type	Comment
1A	Button (NC contact)	EMERGENCY STOP on converter Permissible contact load DC-13 acc. to DIN EN 60947-5-1/VDE 0660-200 (IEC 60947-5-1): 24 V/3 A (min. 5 mA)
2A		

#### Control of circuit breaker on input side

Terminal	Type	Comment
1A	Isolated contact	ON command to the circuit breaker
2A		
3A	Isolated contact	ON command to the circuit breaker
4A		
7A	Isolated contact	OFF command to the circuit breaker
9A		
11A	Isolated contact	Tripping of low-voltage coil of circuit breaker
12A		
13A	Isolated contact	OFF command to the second OFF coil of the circuit breaker
15A		

#### Checkbacks from the circuit breaker on the input side

Terminal	Type	Comment
1A	Digital input	Circuit breaker ready to close checkback
2A	Digital input	Circuit breaker OFF checkback
3A	Digital input	Circuit breaker ON checkback
4A	Digital input	Circuit breaker switched OFF externally message

#### OFF command to the higher-level circuit breaker, SINAMICS GM150

Terminal	Type	Comment
11	Relay output for changeover contact	Basic
12	Permissible contact load DC-13 acc. to DIN EN 60947-5-1/VDE 0660-200 (IEC 60947-5-1): 24 V/10 A	NC contact
13		NO contact

#### OFF command to the higher-level circuit breaker, SINAMICS SM150

Terminal	Type	Comment
5	Relay output for changeover contact	Basic
6	Permissible contact load DC-13 acc. to DIN EN 60947-5-1/VDE 0660-200 (IEC 60947-5-1): 24 V/10 A	NC contact
7		NO contact

### Connection of the auxiliary voltage supply

#### Connection of the auxiliary voltage 3 AC 50 Hz 400 V or others

Terminal	Type	Comment
1	L1	e.g. fan, DC link precharging
3	L2	
5	L3	

#### Connection of the auxiliary voltage 1 AC 50 Hz 230 V or 1 AC 60 Hz 120 V

Terminal	Type	Comment
1	L1	e.g. open-loop and closed-loop control, protection and monitoring units
2	N	

### Connecting the cooling unit

#### Connection of the power supply for the cooling unit 3 AC 400 V

Terminal	Type	Comment
1	L1	Voltage supply for three coolant pumps
2	L2	
3	L3	
PE	PE	

#### Connection of the power supply for the cooling unit 1 AC 230 V

Terminal	Type	Comment
1	L	Voltage supply for the internal control system
2	N	
3	PE	

### Connections at the VSM10 Voltage Sensing Module

For interfaces, refer to the description of the options (L32).

# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Cooling unit

#### Overview

The cooling unit is used to dissipate the power loss from the converter. It consists of an inner fresh water circuit and an outer raw water circuit.

#### Mode of operation

The heated fresh water in the inner circuit of the converter passes through two redundant, maintenance-free circulation pumps into the water/water plate heat exchanger which is made of high-grade steel and connected to the untreated water circuit on the installation side. The fresh water is cooled by the untreated water of the outer circuit and flows back into the converter.

The closed inner fresh water circuit is filled with deionized water and vented by means of a compensating tank. This tank is situated at the highest point of the cooling circuit.

#### Function

##### Raw water specifications

The raw water must be chemically neutral, clean and free of solids. Other quality requirements to be met by the raw water are listed in the following table.

##### Raw water

Grain size of any entrained parts	< 0.5 mm
pH value	6.5 ... 8.0
Carbonate hardness	< 0.9 mMol/l (5 °dH)
Total hardness	< 1.7 mMol/l (9.5 °dH)
Chlorides	60 mg/l
Sulfates	80 mg/l
Nitrates	10 mg/l
Iron (Fe)	0.2 mg/l
Ammoniac	10 mg/l
Dissolved substances	< 3.4 mMol/l (340 ppm)

In case of deviations it is recommended to carry out an analysis of the water in order to ensure the heat exchanger's endurance strength. In case of aggressive cooling water (including sea water), plate-type heat exchangers made of titanium should be used (options **W11** and **W12**).

##### Avoiding condensation

To avoid condensation at excessively low raw water temperatures, a three-way valve for controlling the water temperature is installed as standard.

##### Specifications for the cooling water in the fresh water circuit

Clean water (battery water) should be used to fill and top-up the deionized water circuit

##### Deionized water

	In accordance with DIN EN 60993 (IEC 60993)
Specific conductivity when filled in	≤ 30 µS/cm <sup>1</sup>
Evaporation residue	< 20 mg/l
pH value	5 ... 9
Content of	Not detectable
• metals from the hydrogen sulfide group (lead, antimony, tin, bismuth, arsenic, copper, cadmium)	
• metals from the ammonium sulfide group (iron, cobalt, nickel, chrome, manganese)	
• sulfur and nitrogen chloride compounds	
Content of oxidizable, organic substances	Max. a quantity equivalent to the usage of 30 mg/l potassium permanganate KMnO <sub>4</sub>

#### Monitoring units in the fresh water circuit

To guarantee the self-protection of the converter, the deionized water is monitored by the converter:

- Conductivity measurement:  
The conductivity of the cooling water is constantly monitored in order to ensure that the leakage currents in the converter between different potentials and against ground remain small. An ion exchanger (in the cooling unit) holds the conductivity below the permitted maximum value of 1.0 µS/cm. If the conductivity is too high, the ion exchanger filling must be changed. After the first year, an ion exchanger filling must be changed at least every two years as a rule.
- Temperature monitoring
- Flow monitoring
- Leakage water monitoring

Other monitoring operations and the control of the electrical equipment are performed in the cooling unit:

- A compensating tank for the compensation of changes in the volume of cooling water due to evaporation or temperature changes
- Indication of pressure in the converter inlet

The operating status is signaled to the converter.

#### Piping

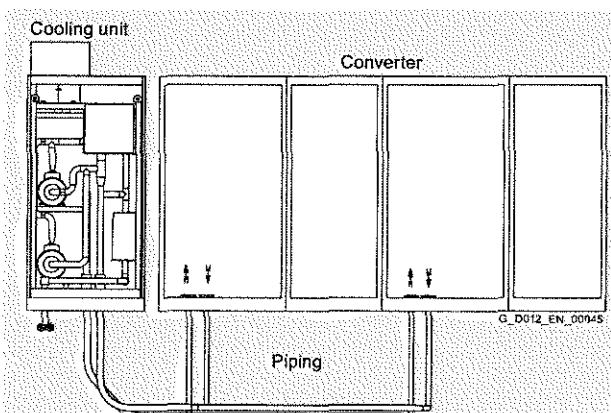
The cooling unit consists of one transport unit and is supplied without deionized water.

For SINAMICS GM150 in the IGBT version and SINAMICS SM150 in the IGBT version, a pipe-connecting element between the cooling unit and converter is included in the scope of delivery. As standard, the water connections are located on the side.

For SINAMICS GM150 in the IGCT version and SINAMICS SM150 in the IGCT version, the piping between the cooling unit and the basic unit is realized below the units (refer to example shown in following diagram). The necessary pipes and connection pieces are included in the scope of delivery and are supplied loose. Rigid pipes are used (stainless steel). The converter is connected to the stainless steel pipe using a flexible hose. The height of the vertical pipes can be adjusted.

Special installation conditions have not been taken into account and, where applicable, a separate inquiry is necessary (e.g. where the cooling unit is not mounted directly next to the basic unit).

The piping for the raw water supply on the plant side is not included.



Piping for SINAMICS GM150 in the IGCT version and for SINAMICS SM150 in IGCT version

<sup>1)</sup> After the converter is filled and before the converter is switched on, the conductivity value is reduced to the permitted operating value of < 1.0 µS/cm by the ion exchanger which is integrated in the cooling unit.

# Engineering information

## SINAMICS GM150, SINAMICS SM150

Cooling unit

### Function

#### Options

##### Redundancy (options W02 and W12)

On request, the cooling unit can be designed for fully redundant operation, i.e. two plate-type heat exchangers are provided. In this case, defective parts can be exchanged while the system continues to run.

##### Tube-nest heat exchanger (on request)

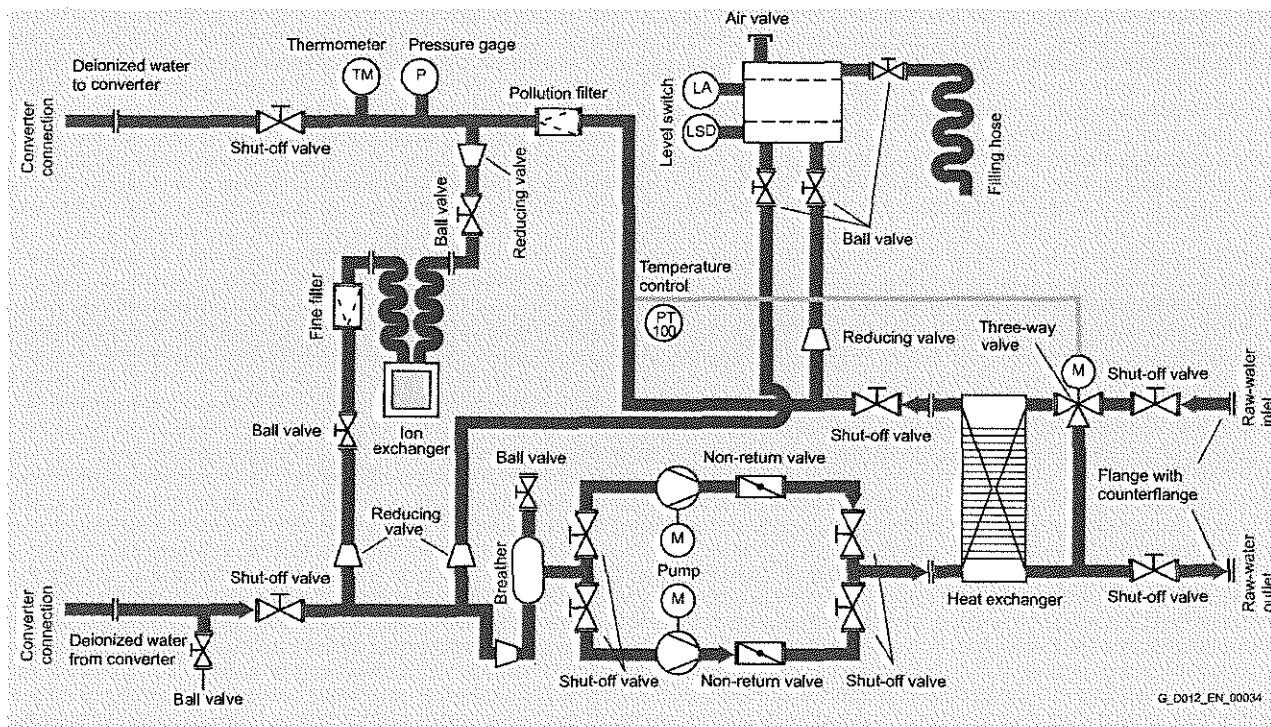
If the raw water quality deviates from the standard values specified above (e.g. the water contains suspended particles), on request, a tube-nest heat exchanger can be used.

Notice: A supplementary cabinet is required if a tube-nest heat exchanger is used.

The following additional options are available on request:

- External air-to-water heat exchanger (on request)  
An external air-to-water heat exchanger can be used on request if there is no process water available on the plant side. In this case, the ambient temperature may be a maximum of 35 °C.
- Chillers (on request)  
If there is no process water on the plant side and if the ambient temperature exceeds 35 °C, then on request, a so-called chiller (incl. compressor) can be used.
- Specification for the cooling unit (on request)  
When selecting option W14 (converter without cooling unit), specifications of the cooling unit are available on request.

### Flowchart of the cooling unit



G\_D012\_EN\_00034

### Technical specifications

#### Technical specifications of the cooling unit

##### Degree of protection

- Cabinet IP20
- All internal components IP54

##### Supply voltage

3/N/PE/AC 400 V ±10 %,  
50/60 Hz ±3 %

##### Raw water circuit

- Inlet temperature 5 ... 35 °C  
(for power derating of the converter max. +40 °C)
- Temperature rise in converter, max. 10 K (for minimum flow)
- Input pressure 2 ... 10 bar

##### Pressure drop

<1 bar

# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Circuit breakers

#### Configuration

The circuit breaker placed on the primary side of the input transformer on the plant side belongs to the safety system of the converter. If a fault occurs inside the converter, the energy that is effective at the fault location must be limited. This is realized as a result of the inductance of the incoming transformer, which limits the rate-of-rise and magnitude of the current and the circuit breaker that trips as quickly as possible.

For the above conditions to be satisfied, the circuit breaker used must have the following characteristics:

- The total opening time of the circuit breaker – from the command to actually opening – must not be more than 80 ms. This means that the opening time, specified in the technical documentation of the circuit breaker manufacturer, must not be longer than 80 ms. The converter monitors the total opening time.
- The converter monitors the TRIP coils (shunt releases) for wire breakage and failure of the control voltage in the switchgear installation.
- The circuit breaker must be fitted with an undervoltage trip unit. The undervoltage trip unit (low-voltage coil) is controlled by way of the tripping chain in which the "undervoltage trip unit" of the converter must also be integrated. The auxiliary voltage from the switchgear (this is a reliable supply) is used as the supply.
- Additional delay times in controlling the circuit breaker must be avoided. All commands from the converter to the circuit breaker must act directly, without recourse to any coupling relays.
- A separate check-back signal must exist for each of the circuit breaker states ON and OFF. The checkbacks must not be delayed, i.e. no coupling relays may be used.
- An additional, independently operating overcurrent protection for the circuit breaker must be provided on the plant side (transformer and cable protection).
- Under no circumstances may the circuit breaker be electrically or mechanically closed externally. A mechanical interlock of the manual ON command on the circuit breaker prevents destruction of the converter by uncoordinated switch-on.

### Transformers

#### Configuration

The SINAMICS GM150 and SINAMICS SM150 converters are always connected to the medium-voltage network through a converter transformer.

By using the transformer the drive (converter and motor) are disconnected from the network and electrically isolated:

- The short-circuit power is limited to a maximum permissible value.
- Converter and motor are operated ground-free.
- The line harmonics and the voltage ripple are limited.

An insulation monitor, integrated in the converter, monitors the insulation state of the transformer secondary winding up to the motor.

#### Configurations for SINAMICS GM150

For the 12-pulse Basic Line Module of the SINAMICS GM150 converter, a three-winding transformer is required. The secondary windings of the three-winding transformer have a phase shift around 30°el, resulting in a 12-pulse infeed with accordingly lower line harmonic distortions.

For the 24-pulse Basic Line Module, two three-winding transformers are required. Two transformers with primary windings offset through 15° are used.

In this case, it must be ensured that the individual secondary windings have the same voltage, in order to reduce the line harmonics and to ensure a symmetrical current distribution. In this case, a maximum deviation of 1 % is permissible for the two secondary windings connected in parallel.

Instead of the two three-winding transformers a five-winding transformer can also be used in consultation with the transformer manufacturer.

#### Configurations for SINAMICS SM150

A two-winding transformer is required for each Active Line Module. When two or three complete converter units are operated in parallel, it is also possible to use a three-winding or a four-winding transformer with offset windings to suppress line harmonics.

# Engineering information SINAMICS GM150, SINAMICS SM150

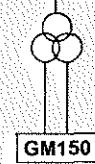
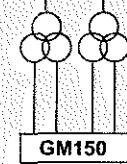
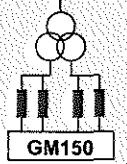
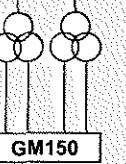
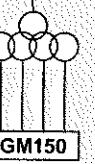
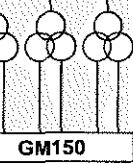
Transformers

## Configuration

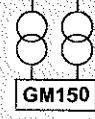
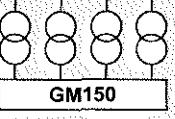
### Transformer secondary voltages

#### SINAMICS GM150

Transformer secondary voltages when using three-winding or five-winding transformers

<b>SINAMICS GM150 (IGBT) and SINAMICS GM150 (IGCT)</b>						
<b>Circuit</b>	Single connection of Motor Module		Parallel connection of Motor Modules			
<b>Infeed</b>	12-pulse	24-pulse	12-pulse	24-pulse	36-pulse	
<b>Circuit version (Fig. No.)</b>	1, 7	2, 8	—	3, 9	—	10
<b>Infeed transformers</b>	1 three-winding transformer	2 three-winding transformers	1 three-winding transformer, 4 line reactors	2 three-winding transformers	1 five-winding transformer	3 three-winding transformers
						
<b>Offset between the transformer secondary windings</b>	30 °	15 °	30 °	15 °	15 °	10 °
<b>Converter: V<sub>dc</sub>one in kV</b>	<b>Transformer: secondary voltage V<sub>2</sub>one in kV (no-load voltage)</b>					
2.3	2 × 1.2	2 × (2 × 1.2) <sup>1)</sup>	—	—	—	—
3.3 (IGBT)	2 × 1.7	2 × (2 × 1.7) <sup>1)</sup>	2 × 1.7	2 × (2 × 1.7)	4 × 1.7	—
3.3 (IGCT)	2 × 1.7	2 × (2 × 0.85) <sup>1)</sup>	—	2 × (2 × 1.7)	—	3 × (2 × 1.7)
4.16	2 × 2.2	2 × (2 × 2.2) <sup>1)</sup>	2 × 2.2	2 × (2 × 2.2)	4 × 2.2	—

Transformer secondary voltages when using two-winding transformers

<b>SINAMICS GM150 (IGBT) and SINAMICS GM150 (IGCT)</b>						
<b>Circuit</b>	Single connection of Motor Module		Parallel connection of Motor Modules			
<b>Infeed</b>	12-pulse	24-pulse	—			
<b>Circuit version (Fig. No.)</b>	—	—	—			
<b>Infeed transformers</b>	2 two-winding transformers	4 two-winding transformers	 			
<b>Offset between the transformer secondary windings</b>	30 °	15 °	15 °			
<b>Converter: V<sub>dc</sub>one in kV</b>	<b>Transformer: secondary voltage V<sub>2</sub>one in kV (no-load voltage)</b>					
2.3	2 × 1.2	4 × 1.2 <sup>1)</sup>	4 × 1.2			
3.3 (IGBT)	2 × 1.7	4 × 1.7 <sup>1)</sup>	4 × 1.7			
3.3 (IGCT)	2 × 1.7	4 × 0.85 <sup>1)</sup>	4 × 1.7			
4.16	2 × 2.2	4 × 2.2 <sup>1)</sup>	4 × 2.2			

<sup>1)</sup> Single connection with option N15.

# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Transformers

#### Configuration

##### SINAMICS SM150

Transformer secondary voltage (phase-to-phase, line to line):

- SINAMICS SM150 in the IGCT version: 3.3 kV
- SINAMICS SM150 in the IGBT version: 3.3 kV or 4.16 kV

If the converter is also to provide capacitive reactive power (a noticeable amount) to compensate for other inductive loads connected to the line supply, then the secondary no-load voltage of the transformer must be dimensioned lower, in order that the converter voltage of 3.3 kV or 4.16 kV is sufficient. As a consequence, the maximum power that can be transferred is reduced. For extremely high surge power levels, the secondary no-load voltage must also be dimensioned somewhat lower.

#### Transformer leakage reactances

The minimum required protection values for the leakage reactance of the various converter types can be found in the following table. These values include all the inductances between the line supply and converter line short-circuit inductance, transformer inductance, reactor inductance.

Converter	Transformer		
	Version	Rated output voltage	Secondary voltage per winding system $V_{\text{sec}}$
		kV	kV
<b>SINAMICS GM150</b>			
IGBT	2.3	1.2	0.068
	3.3	1.7	0.101
	4.16	2.2	0.143
IGCT	3.3	1.7	0.058
		0.85 <sup>2)</sup>	0.029 <sup>2)</sup>
<b>SINAMICS SM150</b>			
IGBT	3.3	3.3	0.314
IGCT	3.3	3.3	0.179

Transformer minimum leakage reactances (short-circuit impedance of the line supply of 1 % taken into account)

#### Transformer short-circuit voltage

The required relative short-circuit voltage  $u_K$  (for each secondary winding) depends on – for the selected leakage reactance  $X_S$  (see table) – the rated apparent power of the transformer  $S_{\text{NTrans}}$  (for each secondary winding) and can be defined using the following formula:

$$u_K = X_S \times S_{\text{NTrans}} / (V_{\text{sec}})^2$$

$X_S$  in  $\Omega$

$S_{\text{NTrans}}$  in MVA

$V_{\text{sec}}$  in kV

#### Taps for adjusting the voltage

The winding taps are usually located on the high voltage side of the transformer.

##### SINAMICS GM150

Recommended taps for the voltage adjustments:  
 $2 \times \pm 2.5\%$  or  $\pm 5\%$  for operation with a sine-wave filter

##### SINAMICS SM150

Recommended taps for the voltage adjustment:  
 $2 \times \pm 2.5\%$

<sup>1)</sup> The corresponding minimum leakage inductances  $L_{S,\min}$  can be calculated using the following formula:  $X_{S,\min} = 2\pi \times f_{\text{line}} \times L_{S,\min}$  (with  $f_{\text{line}}$  = line frequency).

<sup>2)</sup> Option N15.

# Engineering information

## SINAMICS GM150, SINAMICS SM150

Power cables

### Configuration

#### **Basic information**

The cable selection and cable dimensioning depend on various factors (e.g. temperature, routing type, cable type, EMC requirements, local regulations).

This is the reason that it should be noted that the following data represent recommendations only. The system integrator is responsible for dimensioning the cables.

#### **Motor cables**

If the SINAMICS GM150 and SINAMICS SM150 converters are operated without sine-wave filters, higher voltages arise on the motor terminals and hence on the cable due to the switching edges. Suitable cables must be selected, therefore, to meet the EMC and voltage endurance requirements. Different technical characteristics result in differences between the converters with IGBT power units and those with IGCT power units.

The correct cable cross-section depends not only on the motor current but also on the number of cables which are routed in parallel, the routing conditions and the ambient temperature. It must be determined for each individual case. Local installation regulations must be observed in addition.

A finely-stranded cable for equipotential bonding between the motor and converter should be installed parallel to the power cables. Local regulations must be observed in this case, too.

#### SINAMICS GM150 in the IGBT version and SINAMICS SM150 in the IGBT version (without sine-wave filter)

Shielded three-core medium-voltage cables must be used to connect the converter to the motor. For converters with an output voltage of 2.3 kV, cables for a minimum of 3.6/6 kV are adequate. For converters with output voltages of 3.3 kV and 4.16 kV, cables for a minimum of 6/10 kV are required. Symmetrical cables with individually shielded copper conductors are recommended. An additional common outer shield is an advantage for improving the EMC characteristics. The cable capacitances must not exceed the following values.

Cable cross-section	Cable capacitance
3 x 240 mm <sup>2</sup>	0.6 µF/km
3 x 95 ... 185 mm <sup>2</sup>	0.5 µF/km
3 x 70 mm <sup>2</sup>	0.4 µF/km

Single-core, shielded cables are permissible if three cables are routed in a triangular arrangement without clearance between the cables as cable bundle on the cable tray. The symmetrically arranged cable bundle comprises one cable for every phase (three-phase system). The cable bundles are arranged next to one another on the cable tray. The clearance between them corresponds to twice the outer diameter of a single-core cable. The cable bundles have alternating rotating fields – clockwise and counter-clockwise.

EMC-FC (Frequency Converter) cables should be used for increased requirements regarding EMC. Their EMC-optimized cable design reduces the radio interference radiation and radio interference voltage when compared to standard medium-voltage cables.

#### SINAMICS GM150 in the IGBT version and SINAMICS SM150 in the IGBT version (with sine-wave filter)

For operation with a sine-wave filter there are no special requirements to be met by the cables from the converter to the motor. When using unshielded medium-voltage cables, some type of cable armor is recommended in order to ensure the mechanical ruggedness of the cables. For a rated motor voltage of 3.3 kV and lower, the rated cable voltage is 3.6/6 kV. For a rated motor voltage above 3.3 kV, the rated cable voltage is 6/10 kV.

#### SINAMICS GM150 in IGCT version and SINAMICS SM150 in IGCT version

Shielded three-core medium-voltage cables for 6/10 kV must be used to connect the converter to the motor. Symmetrical cables with individually shielded copper conductors are recommended. An additional common outer shield is an advantage for improving the EMC characteristics.

Single-core, shielded cables are permissible if three cables are routed in a triangular arrangement without clearance between the cables as cable bundle on the cable tray. The symmetrically arranged cable bundle comprises one cable for every phase (three-phase system). The cable bundles are arranged next to one another on the cable tray. The clearance between them corresponds to twice the outer diameter of a single-core cable. The cable bundles have alternating rotating fields – clockwise and counter-clockwise.

EMC-FC (Frequency Converter) cables should be used for increased requirements regarding EMC. Their EMC-optimized cable design reduces the radio interference radiation and radio interference voltage when compared to standard medium-voltage cables.

#### **Cables between the transformer and the converter**

The same instructions apply as in the case of the motor cables.

# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Power cables

#### Configuration

##### Permissible cable lengths

In the case of long cables between the converter and the motor, reflection phenomena lead to overvoltages and recharging currents on the cables and at the motor terminals and, in turn, to a higher level of stress on the motor insulation. The motor insulation is additionally subject to stress as a result of the voltage rates of rise (voltage gradients).

The increased stress on the cables and motor as a result of reflection phenomena in the case of long cables can be significantly reduced using a sine-wave filter at the converter output (option **Y15**).

The recharging currents in the cables and in the motor can be significantly reduced by using reactors at the converter output (option **L08**).

##### Maximum cable lengths without and with output reactor

Converter	Max. cable lengths			
	Without output reactor (standard)		With output reactor <sup>1)</sup> (option <b>L08</b> )	
	Shielded	Un-shielded	Shielded	Un-shielded
<b>Output voltage 230 Vdc / 415 V</b>				
SINAMICS GM150 IGBT version and SINAMICS SM150 IGBT version	Up to 2 parallel cables: each 100 m	Not permitted	On request	Not permitted
	3 parallel cables: each 80 m			
	>3 parallel cables: Not permitted			
<b>Output voltage 330 V</b>				
SINAMICS GM150 as IGCT version	Up to 2 parallel cables: each 100 m	Not permitted	On request	Not permitted
	3 parallel cables: each 80 m			
	4 parallel cables: each 80 m			
Mechanically, up to six parallel cables are possible (on request).				
SINAMICS SM150 IGCT version	Up to 4 parallel cables: each 80 m	Not permitted	On request	Not permitted
Mechanically, up to six parallel cables are possible (on request).				

Data regarding cable lengths when using option **L08** (output reactor) can be obtained for specific systems from your local Siemens sales contact.

##### Maximum cable lengths without and with sine-wave filter

Converter	Max. cable lengths		With sine-wave filter <sup>1)</sup> (option <b>Y15</b> )	
	Without sine-wave filter (standard)	Shielded	Unshielded	Shielded
SINAMICS GM150 in IGBT version	Up to 2 parallel cables: each 100 m	Not permitted	1000 m	1000 m
	3 parallel cables: each 80 m			
	>3 parallel cables: Not permitted			

##### Maximum cable lengths between line-side transformer and converter

Converter	Max. cable lengths	
	Shielded	Unshielded
<b>Output voltage 230 Vdc / 415 V</b>		
SINAMICS GM150	300 m	300 m
<b>Output voltage 330 V</b>		
SINAMICS SM150	80 m	Not permitted

<sup>1)</sup> Distance between the converter and the motor depending on the current load for max. 6 three-wire EMC cables connected in parallel.

<sup>2)</sup> Armored cables recommended.

# Engineering information

## SINAMICS GM150, SINAMICS SM150

Motors

### Configuration

#### **General notes on operating high-voltage motors**

High-voltage motors can generate a voltage if they are driven by the load as a result of the inherent plant or system principle. The magnitude of this voltage essentially depends on the speed and the type of excitation of the high-voltage motor. The following must be noted in order to ensure that the converter power unit safely and reliably operates while the high-voltage motor is rotating:

- For permanent-magnet synchronous motors, options **L49** (make-proof grounding switch at the converter output) and **L52** (circuit breaker at the converter output) must be selected.
- For induction motors and separately-excited synchronous motors, if the motor is driven by the load, then options **L49** and **L51/L52** (depending on the particular application) should be selected.

#### **Operation of Siemens high-voltage motors**

A sine-wave filter is not required between the Siemens high-voltage motors H-compact, H-compact PLUS, H-modyn and special motors for e.g. marine, rolling mill and high-speed applications and the SINAMICS GM150 and SINAMICS SM150 converters. Reliable operation of the drive is assured by the following measures:

- The MICALASTIC VPI insulation system is optimally suited for the voltage stressing which occurs in converter operation.
- The protection concept for high voltage motors when fed from converters involves two insulating bearings to avoid damaging bearing currents. Further, shaft grounding is absolutely necessary so that no voltage can be established at the motor shaft with respect to ground. The shaft is either grounded using a rotary pulse encoder with integrated grounding track on the non-drive end or using a separate grounding brush on the motor drive end. In the first case, an insulated coupling must be used. This is because as a result of the shaft grounding at the non-drive end, circulating currents can flow through the driven load. In the second case, the rotary pulse encoder must be mounted at the non-drive end so that it is insulated; an insulated coupling is not required (see alongside figures).

Minimum motor rated frequency:

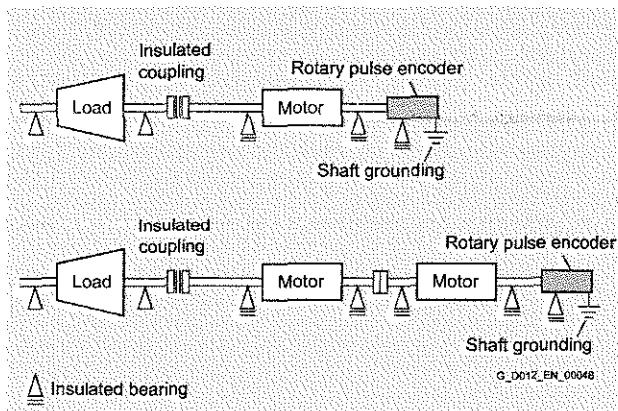
- SINAMICS GM150 in IGBT version and SINAMICS SM150 in IGBT version:  
20 Hz
- SINAMICS GM150 in IGCT version and SINAMICS SM150 in IGCT version:
  - 8.5 Hz for an output voltage of 3.3 kV
  - 5.0 Hz for a reduced voltage of 3.15 kV

Note:

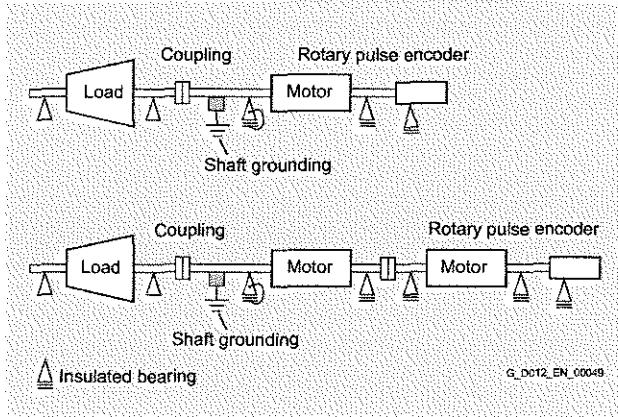
Please contact your regional Siemens sales partner in the case of different data.

Note:

For motors with rated frequency of less than 8.5 Hz, a reduced voltage of 3.15 kV should always be selected.



Shaft grounding at the non-drive end



Shaft grounding at the drive end

# Engineering information

## SINAMICS GM150, SINAMICS SM150

### Motors

#### Configuration

##### **Operation of motors with several winding systems**

To increase the output power of the converters it is possible to operate several power units in parallel. In this way, a maximum power rating of up to 13 MVA with an output voltage of 4.16 kV can be achieved by connecting two SINAMICS GM150 in the IGBT version converters in parallel. Using the same principle, a maximum power rating of 21 MVA or 31.5 MVA is achieved by connecting three SINAMICS GM150, in the IGCT version and SINAMICS SM150 converters in parallel.

To ensure a uniform division of current between the two subsystems, two or three electrically isolated but mutually non-displaced winding systems are required in the motor.

##### **Operation of two-pole motors**

High-speed converter drives with 2-pole motors require special measures regarding their mechanical design (limiting and critical speed, bearings, rotor design, foundation design). An inquiry is required for such applications.

In the case of retrofit applications it is necessary to ensure that the motors have no mechanical natural resonance in the provided setting range. Affected speed ranges can be suppressed by the converter if necessary.

##### **Operation of explosion-protected motors**

Motors from Siemens are also available in versions for use in areas subject to explosion hazard. Types of protection available for the motors are:

- Pressurized enclosure: Ex pe IIC T3  
acc. to EN 60079-2/VDE 0170/0171 T301 (IEC 60079-2)
- Non-sparking: Ex n AIIIC T3  
acc. to EN 60079-15/VDE 0170/0171 T16 (IEC 60079-15)

Apart from the measures required – also for fixed-speed motors – to increase the type of protection, for variable speed motors it is also necessary to have a shaft grounding device with type of protection type Ex d IIC T6 (without rotary pulse encoder) or Ex de IIC T6 (with rotary pulse encoder).

An inquiry is always necessary for motors with increased safety Ex e.

##### **Ex certification**

For motors with Ex n type of protection and converter operation it may be necessary to accept the complete system on a case-for-case basis in order to issue an Ex certificate. An inquiry is required for such cases.

An acceptance test of the complete drive system is not required for motors with Ex pe type of protection and converter operation.

9

##### **Drives for a square-law load torque**

Driven loads with a square-law load torque ( $M \sim n^2$ ) such as pumps and fans, require the full torque at rated speed. Increased starting torques or load surges do not usually occur. It is therefore unnecessary to provide an overload capability for the converter.

The following applies when selecting a suitable converter for driven loads with a square-law load torque: The rated current of the converter must be at least as large as the motor current at full torque in the required load point.

##### **Drives for a constant load torque**

Self-ventilated motors cannot provide their full rated torque in continuous operation over the complete speed range. The continuous permissible torque decreases as the speed decreases because of the reduced cooling effect. Depending on the speed range, the torque – and thus the power – must be reduced accordingly for self-cooled motors.

For frequencies above the rated frequency  $f_N$ , force-ventilated motors are operated in the field-weakening mode. In this case, the torque that can be utilized decreases with approx.  $f_N/f$ . The power remains constant. A sufficient interval of  $\geq 30\%$  from the breakdown torque must be observed, which is reduced by  $(f_N/f)^2$ .

##### **Drives with overload requirements**

The rated data of the converters specified in the Technical data provide no reserves for overload capability. The current rating of the converter must always be reduced if the specifications call for an increased overload capability of the converter. The required power reduction differs according to the application, operating mode and converter type. The derating can be determined on request if all of the boundary conditions are specified.

##### **Operating standard line motors (only SINAMICS GM150 in the IGBT version)**

In conjunction with the optional sine-wave filter (option Y15) the SINAMICS GM150 as IGBT version is ideal for the operation of line motors in applications with a quadratic load torque (e.g. pumps and fans). The near sinusoidal output voltages and currents rule out all loading of the insulating system and bearings. The sine-wave filters supply the motors with almost sinusoidal motor currents and voltages so that line motors can be operated. The sine-wave filter operates optimally for motors with a rated frequency of 50 Hz or 60 Hz. It should be noted that only driven loads with a square-law load torque may be operated (e.g. pumps, fans). The output frequencies used in operation can lie in the range between 30 Hz and 66 Hz.

A field weakening range of 1:1.1 is permissible (max. 55 Hz for 50 Hz motors and max. 66 Hz for 60 Hz motors).

The voltage harmonic distortion at an output frequency of 50 Hz is less than 5 % when using a sine-wave filter.

In order to optimally adapt the sine-wave filter to the motor, the rated motor current, the motor current at the rated point and the motor no-load current must be specified when ordering.

# Engineering information SINAMICS GM150, SINAMICS SM150

## Scope of delivery

### **Configuration**

The standard scope of delivery of the SINAMICS GM150 and SINAMICS SM150 comprises:

#### 1. Basic unit

The basic unit consists of the converter power unit including closed-loop control, in either an air-cooled or water-cooled version. One or more transport units are supplied depending on the converter type. Exact details are to be found in the dimension drawing for the specific order.

SINAMICS SM150 includes a VSM10 Voltage Sensing Module in the basic unit. The VSM10 detects the line supply voltage regarding phase position, frequency and amplitude. A voltage transformer, which should be provided on the primary side of the circuit breaker (plant-side) is used for this purpose.

#### 2. Cooling unit for water-cooled converters

The cooling unit consists of one transport unit and is supplied without deionized water.

For SINAMICS GM150 in the IGBT version, a pipe-connecting element between the cooling unit and converter is included in the scope of delivery.

For SINAMICS GM150 in the IGCT version and SINAMICS SM150 in the IGCT version, the piping between the cooling unit and the basic unit is routed below the units. The necessary pipes and connection pieces are included in the scope of delivery and are supplied loose.

Special installation conditions have not been taken into account and, where applicable, a separate inquiry is necessary (e.g. where the cooling unit is not mounted directly next to the basic unit).

The piping for the raw water supply on the plant side is not included.

#### 3. Optional components

Optional components, e.g. sine-wave filters or output reactors, are delivered as separate transport units. If necessary, cables for connecting the optional components to the power unit are delivered as well. For the DC bus configurations of SINAMICS SM150, the cabling between the basic unit and the option cabinets is routed below the units. The cables required are not included in the scope of delivery as they have to be selected according to the particular project.

#### 4. Static excitation unit

A static excitation unit is generally included in the scope of delivery for converters to supply synchronous motors. This must be ordered with a separate order number (see Accessories, Chapter 7).

**The following items are not included in the standard scope of delivery:**

- Cables between the transformer and the converter
- Motor cables
- Circuit breakers
- Transformer
- Motor
- Cable ducts
- Filter systems
- Piping for the raw water circuit of the cooling unit
- Voltage transformer for the synchronizing voltage of the VSM10
- Basic configuration for SINAMICS SM150

#### Basic configuration for SINAMICS SM150

For the SINAMICS SM150 converter system, it is absolutely necessary that the software is configured for the specific plant or system.

This involves:

- connection of the static excitation unit via PROFIBUS
- operation of the SIMATIC OP 177B operator panel
- signal marshaling to connect to the basic automation (e.g. ON/OFF or fault signals from Motor Modules)

Without this basic configuration, the SINAMICS SM150 converter system cannot function. The basic configuration should either be undertaken by a system integrator or option **S05** should be ordered.

Beyond this, in individual cases, application-specific engineering is required, which is not emulated in the product, but can be implemented in coordination with the system integrator.

This includes:

- power pre-control of several Motor Modules on a common infeed
- power monitoring
- control of auxiliaries with temperature/flow/bearings
- communication configuration to the PDA (Process Data Acquisition) via PROFINET
- integration of additional options

Engineering information  
SINAMICS GM150, SINAMICS SM150

三



## Service and documentation



<b>10/2</b>	<b>Training</b> Overview Benefits Application More information Design Description
<b>10/5</b>	<b>Training case</b> AOP30 cabinet operator panel training case
<b>10/6</b>	<b>Documentation</b>
<b>10/7</b>	<b>Perfectly setup for global service over the complete lifecycle</b> Overview Commissioning drive systems Customized training courses for drives Maintenance and inspection of drives Spare parts for drives Remote maintenance – expert knowledge close at hand Saving energy in drive technology Retrofitting drives Service portfolio Extension of the liability for defects
<b>10/14</b>	<b>Service &amp; Support</b> Unmatched complete service for the entire life cycle

# Services and documentation

## SINAMICS GM150, SINAMICS SM150

### Training

#### Overview

**Faster and more applicable know-how:  
Hands-on training from the manufacturer**

**SITRAIN** – Siemens Training for Industry – provides you with comprehensive support in solving your tasks.

The comprehensive range of training courses encompasses the product, system and solution range of Siemens Industry Sector.

#### Benefits

**Achieve more with SITRAIN**

Experience the advantages with SITRAIN:

- Shorter times for commissioning, maintenance and servicing
- Optimized production operations
- Reliable configuration and commissioning
- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

#### Application

**SITRAIN highlights**

Wide variety

With a total of about 300 local attendance courses, we train the complete range of products from Siemens Industry as well as interaction of the products in systems.

Practical experience

We place the highest emphasis on practical exercises, which make up to half of the course time. You can therefore immediately implement your new knowledge in practice.

Top trainers

Our trainers have a wealth of practical and didactic experience. Even complicated topics are taught so that they are easily understood.

Tailor-made training

On request, we perfectly harmonize the training course to individual requirements; to specifically address your demands and tailored to your team.

Blended learning

With blended learning, the combination of various learning media and sequences, for example, attending a course in a local training center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Reduced traveling costs and periods of absence through training sequences independent of location and time.

Available worldwide

You can find us at more than 50 locations in Germany, and in over 60 countries worldwide. Training can be carried out in our Training Centers or at your company.

#### More information

**Contact**

Training in Germany

All training facilities at a glance: Search in the range of courses at leisure, call up all course dates online, utilize the current list of vacant course spaces – and register directly.

Visit us on the Internet at  
[www.siemens.com/sitrain](http://www.siemens.com/sitrain)

You can obtain personal support in our training course offices under:

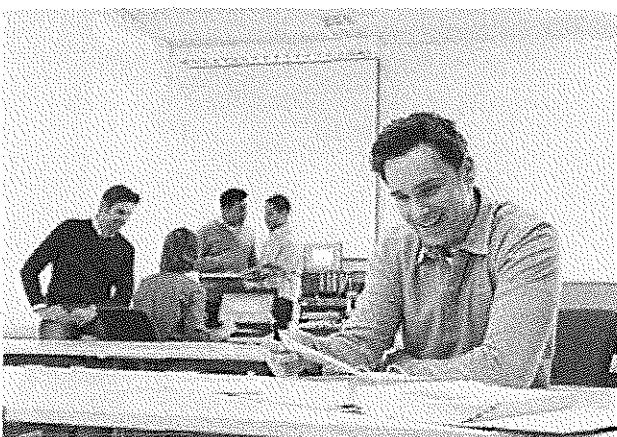
Phone: +49 (911) 895-7575

Fax: +49 (911) 895-7576

E-mail: [info@sitrain.com](mailto:info@sitrain.com)

Training worldwide

You can find the worldwide, country-specific range of training courses from our international homepage:  
[www.siemens.com/sitrain](http://www.siemens.com/sitrain)



# Services and documentation

## SINAMICS GM150, SINAMICS SM150

Training

### Design

#### **Range of training courses for SINAMICS GM150/SM150**

Here you will find an overview of the training courses available for SINAMICS GM150 and SINAMICS SM150.

The courses are modular in design and are intended for a variety of target groups as well as individual customer requirements.

The system overview will acquaint decision-makers and sales personnel with the system very quickly.

The configuration course provides all the information you need to configure the drive system.

The basic and follow-up courses are guaranteed to provide all of the technical knowledge service engineers will need for servicing/commissioning motion control applications, communication and cabinet units.

All modules contain as many practical exercises as possible, in order to facilitate intensive and direct training on the drive system and with the tools in small groups.

More information on course contents, dates and prices is available on the Internet at:  
[www.siemens.com/sitrain](http://www.siemens.com/sitrain)



Title	Project managers, project personnel	Programmers	Commissioning engineers, application engineers	Service personnel, maintenance technicians	Duration	Course code
SINAMICS GM150/SM150 engineering	✓	✓			3 days	DR-GMPH-PJ
SINAMICS GM150 commissioning and service			✓	✓	5 days	DR-GM150
SINAMICS SM150 commissioning and service			✓	✓	8 days	DR-SM150

### Description

#### **SINAMICS GM150/SM150 engineering (3 days)** **DR-GMPH-PJ**

##### Description/learning objective

The course addresses design engineers, application engineers and sales personnel who are involved in the application engineering for SINAMICS GM150 or SINAMICS SM150. Training covers the fundamental physical relationships for the design of a drive system. Using the self-explanatory SIZER for Siemens Drives engineering tool, different SINAMICS applications are calculated and consolidated using exercises on PCs. Control functions are explained, and their boundary conditions described. The various options for SINAMICS are also presented to permit derivation of their application.

##### Target group

Project managers, members of project teams, programmers

##### Requirements

Knowledge of drive and control technology

##### Content

- SINAMICS system overview
- Physical fundamentals for drive calculation
- Engineering SINAMICS GM150 and SINAMICS SM150 cabinet components together with background information: Line supplies, EMC, EMERGENCY-STOP, interfaces
- SIZER for Siemens Drives engineering tool with exercises for various applications
- Technical documentation: catalogs, engineering information, operating instructions
- Open-loop and closed-loop control functions
- Simple startup using the AOP30 operator panel
- Transformer/reactor
- Cooling unit
- High-voltage motor
- Medium-voltage cable

# Services and documentation

## SINAMICS GM150, SINAMICS SM150

### Training

#### Description

##### **SINAMICS GM150 commissioning and service (5 days)** **DR-GM150**

###### Description/learning objective

This training course provides you with the basics to understand the commissioning steps for the SINAMICS GM150 drive system. You know the closed-loop control structures and communication interfaces. You can diagnose the drive state and analyze fault messages. To do this, you use the AOP30 operator panel and the STARTER commissioning tool.

###### Target group

Commissioning engineers, application engineers, service engineers, maintenance technicians

###### Requirements

Basic knowledge of electrical engineering

###### Content

- Design and function of the SINAMICS GM150 converter components
- Power unit topology: Precharging, rectifier and inverter, actual value sensing
- Identifying the hardware and circuit diagrams
- Drive CLiQ topology, objects and components
- Parameterization, diagnostics and data backup using the AOP30 operator panel and STARTER commissioning tool
- Principle of operation and analysis of the setpoint channel and the closed-loop control
- Analysis of alarm and fault messages
- Configuration and analysis of PROFIBUS communication between SINAMICS GM150 and SIMATIC S7
- Detailed practical exercises for basic commissioning, engineering and analysis of the drive functions using the AOP30 operator panel and STARTER commissioning tool
- Detailed practical exercises to commission the Motor Module:
  - Execution of test and identification routines
  - Operation of the drive
  - Optimization and checking the current and speed controller

##### **SINAMICS SM150 commissioning and service (8 days)** **DR-SM150**

###### Description/learning objective

This training course provide you with the basics to understand the commissioning steps for the SiNAMICS SM150 drive system. You know the closed-loop control structures and communication interfaces. You can diagnose the drive state and analyze fault messages. To do this, you use the SIMOTION SCOUT software package and the STARTER commissioning tool.

###### Target group

Commissioning engineers, application engineers, service engineers, maintenance technicians

###### Requirements

Basic knowledge of electrical engineering

###### Content

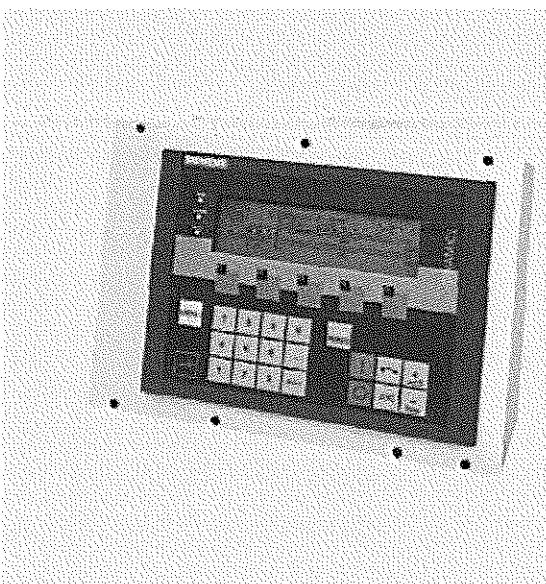
- Design and function of the SINAMICS SM150: D445 and CX32 control modules, Power Stack Adapter PSA, line-side and motor-side inverters, DC link, interfaces, circuit diagrams
- Layout and arrangement of the complete drive system: Circuit breaker, transformer, reactor, motor, cooling unit
- Parameterization, diagnostics and data backup using the SIMOTION SCOUT software package with integrated STARTER commissioning tool
- Procedure when commissioning
- Closed-loop control: Setpoint channel, vector control, function diagrams, interface to higher-level technology in SIMOTION
- Communication via PROFIBUS integrated to SIMOTION
- Alarms and fault messages
- Information on replacing components: IGBT phase module, AVT Combi, pre-charging
- Practical exercises using the SIMOTION SCOUT software package with integrated STARTER commissioning tool on training equipment

# Services and documentation

## SINAMICS GM150, SINAMICS SM150

### AOP30 cabinet operator panel training case

#### Application



This training case is used for training and marketing SINAMICS cabinet units.

When used as a stand-alone unit, it can be used to demonstrate commissioning and usability offline. Online operation is implemented by connecting to a SINAMICS cabinet unit or the SINAMICS S120 training case.

#### Design

- Cabinet operator panel with line connection
- Internal 24 V DC power supply
- Can be set upright for demonstration purposes
- Offline functions
- Online functions with SINAMICS CU320 Control Unit via RS232 PPI

#### Technical specifications

##### AOP30 cabinet operator panel training case

Degree of protection in accordance with DIN VDE 0470	IP00
------------------------------------------------------	------

##### Dimensions

• Width	377 mm
• Height	158 mm
• Depth	277 mm

##### Weight, approx.

7 kg
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#### Selection and ordering data

##### Description

**AOP30 cabinet operator panel training case**  
TG-SN-AOP

##### Order No.

**6ZB2480-0CA00**

# Services and documentation SINAMICS GM150, SINAMICS SM150

## Documentation

### Overview

The documentation is supplied with the converter in PDF format on a CD-ROM as standard.

It consists of the following sections:

- Operating Instructions
- List Manual (parameter lists and function diagrams)
- Equipment-specific documents such as circuit diagrams, dimension drawings, layout diagrams and terminal diagrams
- Additional operating instructions (comprehensive component descriptions)

The documentation is in English. Additional languages can be optionally ordered (see Description of options, Page 6/11).

#### Notice:

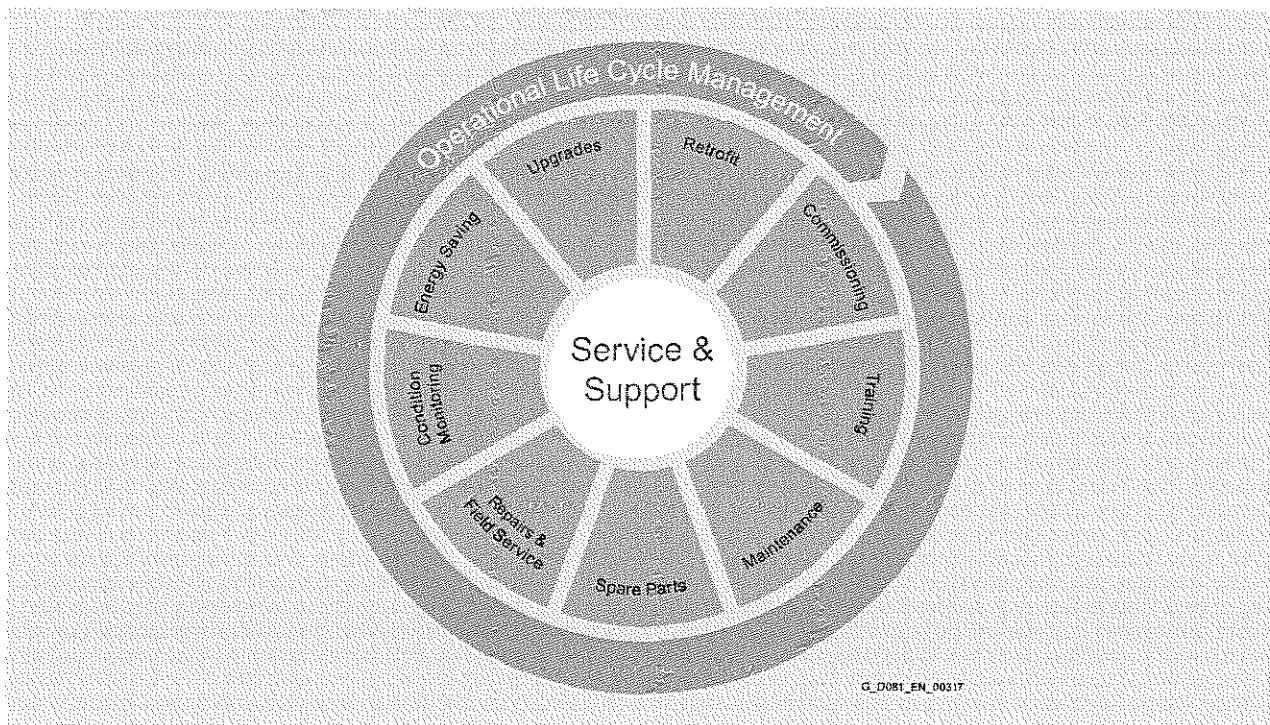
Due to US embargo restrictions, the documentation cannot be supplied on CD-ROM to countries such as Iran, Syria, Cuba, Sudan or Libya, as Adobe Acrobat Reader is not permitted in these countries for reading PDF documents. The documentation must be ordered in paper form when exporting converters to these countries (option **D15**).

# Services and documentation SINAMICS GM150, SINAMICS SM150

Perfectly setup for global service  
over the complete lifecycle

## Overview

Our service and support is available to you worldwide and supports you over the complete lifecycle of your machines and plants in all areas of Siemens drive technology – locally in over 100 countries and around the clock.



You will find our regional contact partner as well as further information under:  
[www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)  
[www.siemens.com/lv-service](http://www.siemens.com/lv-service)

The correct solution in every phase of the **product life cycle**

### Product Introduction

- Installation & Commissioning
- Training
- Support & Remote Services
- Spare Parts
- Product Support & Maintenance Contracts

### Operation

- Support & Remote Services
- Training
- Spare Parts & Repair Services
- Maintenance & Field Service
- Optimization Services

### Product Phase-Out

- Support & Remote Services
- Spare Parts & Repair Services
- Maintenance & Field Service
- Retrofit/Modernization Services
- Energy Optimization of Drive Systems

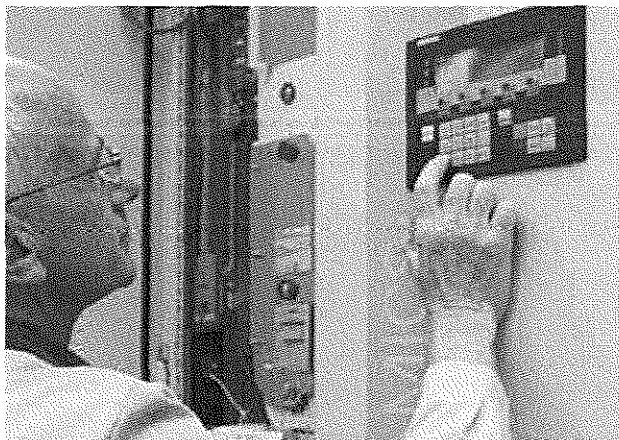
### Product Discontinuation

- Limited Availability of Spare Parts
- Repair Service is limited to Components
- Retrofit/Modernization Services
- Energy Optimization of Drive Systems

## Services and documentation SINAMICS GM150, SINAMICS SM150

Perfectly setup for global service  
over the complete lifecycle

### Commissioning drive systems



### Our services

In addition to commissioning plants and systems, we also provide the associated local service for motors, converters and auxiliary equipment for variable-speed drives in medium-voltage applications up to 60 MW.

We focus on the following sectors and segments:

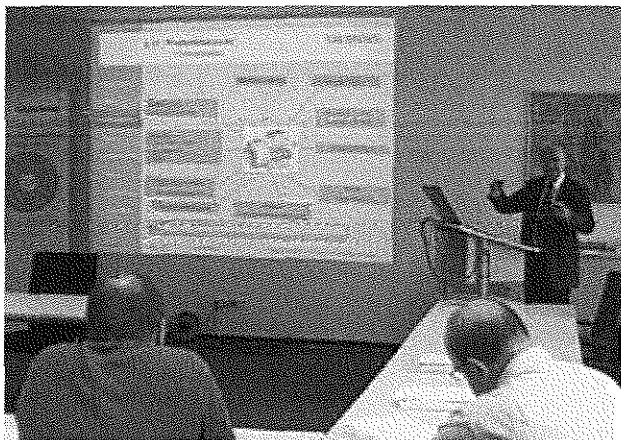
- Oil and gas
- Chemical industry
- Energy
- Steel
- Paper
- Marine engineering
- Mining
- Cement
- Water and wastewater
- Wind turbines
- Auxiliaries
  - Water cooling systems
  - Oil cooling systems
  - Higher-level control systems
  - Protective equipment
  - Static excitation units/excitation converters
  - Transformer protection

### Your advantages at a glance

- High degree of flexibility and cost advantages thanks to a global network of qualified service personnel
- Direct contact between customers and manufacturer, in close collaboration with local service centers
- Short communication paths across all organizational levels
- "Global resource management" for global service calls taking into account legal stipulations and tax regulations
- Cross-area drive know-how for the entire system
- Highly qualified specialists for variable-speed drives

For ordering information on our extensive range of services see Page 9/12.

### Customized training courses for drives



### Our services

We offer a wide range of individual training courses to expand existing know-how or to provide basic information on specific topics. These training courses can be designed as follows:

- local training courses at the customer's site in the form of a workshop, or
- training in the Siemens factory

The duration of the training course is adapted to the particular training-specific requirements and necessities. It goes without saying that we can support you in implementing individual training requirements and planning.

### Your advantages at a glance

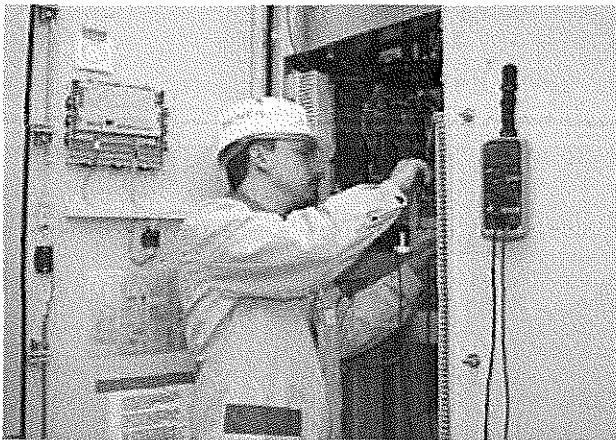
- Providing the customer's own maintenance and operating personnel with technical information
- Maintaining and correctly implementing drive-specific maintenance work to reduce internal costs and time
- Fast and competent recording and determination of fault causes (real-time troubleshooting)
- In case of a fault situation, the customer's own maintenance personnel are in a position to quickly and reliably make the correct decisions
- Targeted contact with the Siemens service organization with a competent description of the fault
- Providing information and know-how to correctly select and stock a range of important spare parts to ensure quick replacement and resumption of operation in the case of a plant failure

For ordering information on our extensive range of services see Page 9/12.

# Services and documentation SINAMICS GM150, SINAMICS SM150

Perfectly setup for global service  
over the complete lifecycle

## Maintenance and inspection of drives



## Spare parts for drives



### **Our services**

In addition to regular inspections, we also provide the option of entering into specific maintenance contracts. These can be individually tailored to your requirements and specifically expanded by the options that you require.

- Inspection
  - Determining and documenting the actual condition of electric motors and converters
  - Comprehensive plant or system assessment based on checklists that have been specifically developed for this purpose
  - Definition of additional measures required, including reporting
- Maintenance contracts
  - Definition of the required maintenance intervals
  - Remote support and availability of a technical contact person
  - Agreed fixed inspection dates
  - Spare parts, service materials and tools
  - Training the service and plant operating personnel of the customer

### **Your advantages at a glance**

- Inspection
  - Assessment of the actual situation, measurements and diagnostics corresponding to the checklist
  - Determination of the required maintenance work
  - Recommendation for an optimum range of spare parts to be stocked
  - Investigation of the possibilities for improving the operating conditions
- Maintenance
  - Maximizing the drive lifetime
  - Minimizing component wear
  - Avoiding non-scheduled production failures and the associated costs
  - Monitoring the product lifecycle and providing support on alternatives

For ordering information on our extensive range of services see Page 9/12.

### **Our services**

#### Spare parts/spare part packages on site:

For drives – especially in the medium-voltage range – which generally play an essential role as main drives, in addition to the general service requirements, the availability of spare parts is of crucial significance. In addition to ordering individual spare parts, this is the reason that we now also offer the option of requesting complete packages of spare parts. The essential basis for creating these packages is our extensive experience that we have gained over decades regarding maintenance activities in the drive and component area.

Various spare part packages are available for low and medium-voltage units:

- Basic spare part package  
Spare part package with the most important electronic components, for example for commissioning
- Advanced spare part package  
A spare part package that has been expanded to include additional electronic and power unit components in order to secure spare parts for the first operating years
- Premium spare part package  
Comprehensive spare part package, which includes spare parts to extend the period of usage  
The stock of spare parts can be checked every year as part of annual maintenance and can be individually adapted.

### **Your advantages at a glance**

- Minimization of fault-related downtimes
- In the case of a fault, no additional waiting times for spare parts to be delivered
- Increased availability of the drive unit
- Cost advantages by compiling spare part packages
- Individual package content corresponding to the customer and plant requirements over the complete lifecycle

By specifying the device-specific Siemens order number as well as the associated serial number, you can view our "SparesOnWeb" database to obtain spare parts information for almost all of our current drive products. The recommended spare part packages are displayed here with the corresponding content and ordering data. [www.siemens.com/sow](http://www.siemens.com/sow)

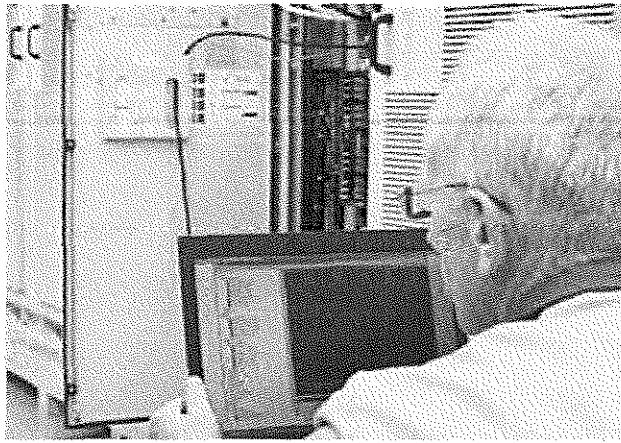
Spare part package	SINAMICS GM150	SINAMICS SM150
Order No.		
Basic spare package	<b>9LD1651-0AA10</b>	<b>9LD1652-0AA10</b>
Advanced spare package	<b>9LD1651-0AA20</b>	<b>9LD1652-0AA20</b>
Premium spare package	<b>9LD1651-0AA30</b>	<b>9LD1652-0AA30</b>

# Services and documentation

## SINAMICS GM150, SINAMICS SM150

Perfectly setup for global service  
over the complete lifecycle

### Remote maintenance – expert knowledge close at hand



#### **Our services**

Complex drive systems must have a high availability and when required demand competent and fast support. Specialist personnel cannot always be available locally. This is the reason that we offer you the option of remotely monitoring your plants or systems. Such remote maintenance can, for instance, include the following services:

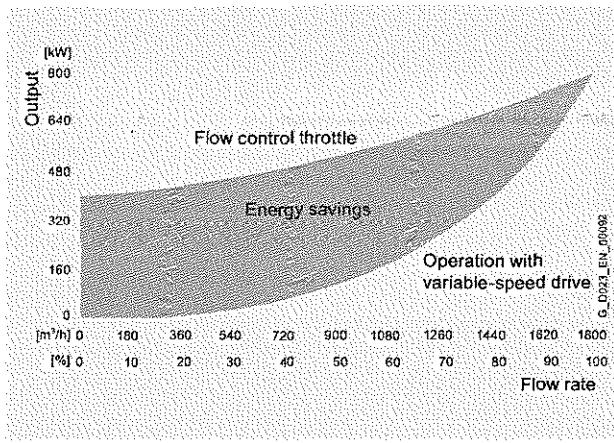
- Online condition monitoring
- Data is stored so that it cannot be lost in the event of a power failure
- Trend analysis, archiving and comparison of the saved data
- When required, expert support from the local service organization
- Video-based support for plant personnel
- Definition of additional measures required, including a report

#### **Your advantages at a glance**

- Leading edge technology for highly secure connections with the maximum availability
- High number of supported software applications
- Support service around-the-clock
- Transparency through monitoring and signaling all connections
- Minimizing non-scheduled plant downtimes and avoiding possible subsequent costs
- Increased plant availability
- Basis for condition-oriented maintenance
- Optimization and planning of service and maintenance work
- Careful use of valuable resources by reducing plant visits
- Optimization of the spare part inventory
- Graded, flexible hardware and software concepts can be adapted in a scaled fashion to the appropriate drive system

For ordering information on our extensive range of services  
see Page 9/12.

### Saving energy in drive technology



#### **Our services**

Drive technology represents about 2/3 of the industrial energy consumed. As a consequence, the efficient use of energy in the drives field plays a significant role and today represents high cost-saving potential. To optimize the energy usage, we have defined essential measures, which when requested, we can apply in your facility:

- Identification of energy-saving potential  
Determine the actual energy demand and subsequent calculation of the possible energy-saving potential
- Evaluation of the data determined  
By applying various methods, the identified energy-saving potential is evaluated, therefore providing a sound basis for making a decision
- Implementation of measures to optimize energy usage  
Selection of the appropriate products as well as performing specific implementation measures

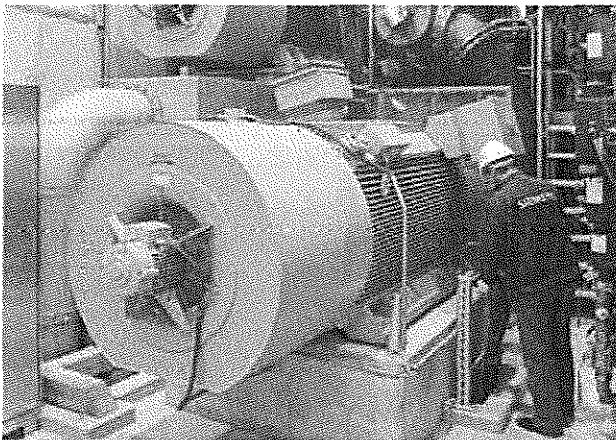
#### **Your advantages at a glance**

- Efficient use of energy by using state-of-the-art, energy-saving drive technology
- Efficient use of energy by changing over to variable-speed drives
- Reduction of the line-side reactive power demand
- Improvement in the starting behavior of motors
- Reduced line harmonics
- Noise reduction by applying state-of-the-art technology
- Optimization of production conditions
- Reduction of wear by adapting the speed

# Services and documentation SINAMICS GM150, SINAMICS SM150

Perfectly set up for global service  
over the complete lifecycle

## Retrofitting drives



### **Our services**

Retrofitting drives is one of the most important elements in the product lifecycle. You can only ensure that your production runs smoothly if your machines, converters and plants operate safely and reliably.

To support you here, we can replace old technology by state-of-the-art converters and motors from our current product portfolio. Generally, it is not necessary to expand functions or plants – or to modify the drive concept.

#### *Retrofit measures for drives:*

- Replacement of older converters by new state-of-the-art medium-voltage drives
- Service advantages
  - 100 % availability of spare parts
  - Availability of know-how
    - Diagnostic options according to state-of-the-art technology
    - Low maintenance costs
    - Availability of software updates

#### **Your advantages at a glance**

- Lower maintenance costs in later lifecycle phases
- Increased efficiency
- Process optimization
- Improved energy efficiency and adaptation to latest environmental legislation
- Reduced risk as a result of faults

For ordering information on our extensive range of services, see the right section.

## Service portfolio

The following services for medium-voltage converters can be directly ordered:

- Standard inspection of medium-voltage converters, for one unit:

Description	Duration	Order No.
<b>Standard inspection for</b>		
SINAMICS GM, air-cooled	2 days	<b>9LD1240-0AA12</b>
SINAMICS GM, water-cooled plus water-cooled heat exchanger	2 days	<b>9LD1240-0AA13</b>
SINAMICS SM, air-cooled	2 days	<b>9LD1240-0AA14</b>
SINAMICS SM, water-cooled plus water-cooled heat exchanger	2 days	<b>9LD1240-0AA15</b>
SINAMICS SM, air cooled plus excitation rectifier	2 days	<b>9LD1240-0AA16</b>
SINAMICS GM, water-cooled plus water-cooled heat exchanger plus excitation rectifier	3 days	<b>9LD1240-0AA17</b>

- Service products

Description	Order No.
<b>Repair order</b>	<b>9LD1040-0AF00</b>
<b>Product support &amp; maintenance contract</b>	<b>9LD1360-0AF00</b>
<b>Field service call</b> for commissioning and troubleshooting	<b>9LD1140-0AF00</b>
<b>Retrofit order</b>	<b>9LD1540-0AF00</b>

#### Notes:

All services and service products are invoiced according to the actual costs incurred.

Ordering information and inquiries regarding quotations should be addressed to the responsible Siemens sales contact.

When ordering, the product should be specified with the order number, the associated serial number and the quotation number in the ordering text.

You can find further information at:  
[www.siemens.com/d-service](http://www.siemens.com/d-service)



# Services and documentation

## SINAMICS GM150, SINAMICS SM150

**Perfectly set up for global service over the complete lifecycle**

### Extension of the liability for defects

For the products listed in this catalog, we also provide the option of extending the liability for defects period beyond the normal period. The standard liability for defects period, as listed in our standard conditions for the supply of services and products, is 12 months.

#### Extension of the liability for defects period when ordering new products

When ordering new products, the standard liability for defects period can be optionally extended for an additional price. Various extension periods can be selected.

#### Extension of the liability for defects

#### Order code

The suffix '-Z' should be added to the converter order number followed by the order code for the required option

**Q80**

Extension of the liability for defects period by 12 months to a total of 24 months (2 years) after being delivered

**Q81**

Extension of the liability for defects period by 18 months to a total of 30 months (2.5 years) after being delivered

**Q82**

Extension of the liability for defects period by 24 months to a total of 36 months (3 years) after being delivered

**Q83**

Extension of the liability for defects period by 30 months to a total of 42 months (3.5 years) after being delivered

**Q84**

Extension of the liability for defects period by 36 months to a total of 48 months (4 years) after being delivered

**Q85**

Extension of the liability for defects period by 48 months to a total of 60 months (5 years) after being delivered

#### Extension of the liability for defects period after the product has already been delivered

If a product has already been delivered, an extended liability for defects period can be ordered, if the original liability for defects period has still not expired. When ordering, in addition to the order number specified on the type plate, the serial number is also required.

#### Extension of the liability for defects

#### Order No.

**9LD1740-0AA24**

Extension of the liability for defects period by 12 months to a total of 24 months (2 years) after being delivered

**9LD1740-0AA30**

Extension of the liability for defects period by 18 months to a total of 30 months (2.5 years) after being delivered

**9LD1740-0AA36**

Extension of the liability for defects period by 24 months to a total of 36 months (3 years) after being delivered

**9LD1740-0AA42**

Extension of the liability for defects period by 30 months to a total of 42 months (3.5 years) after being delivered

**9LD1740-0AA48**

Extension of the liability for defects period by 36 months to a total of 48 months (4 years) after being delivered

**9LD1740-0AA60**

Extension of the liability for defects period by 48 months to a total of 60 months (5 years) after being delivered

For new order

For reorder

Z option

Order No.

(Order lines for individual options have to be ordered separately)

<b>Q80</b>	<b>9LD1740-0AA24</b>
<b>Q81</b>	<b>9LD1740-0AA30</b>
<b>Q82</b>	<b>9LD1740-0AA36</b>
<b>Q83</b>	<b>9LD1740-0AA42</b>
<b>Q84</b>	<b>9LD1740-0AA48</b>
<b>Q85</b>	<b>9LD1740-0AA60</b>

Standard period of liability for defects  
12 months

12 months

18 months

24 months

30 months

36 months

48 months

Product delivery by Siemens

Beginning of the extension of liability for defects following the standard period of liability for defects

G\_DTS\_EN\_000250

## Services and documentation SINAMICS GM150, SINAMICS SM150

Perfectly setup for global service  
over the complete lifecycle

### Extension of the liability for defects

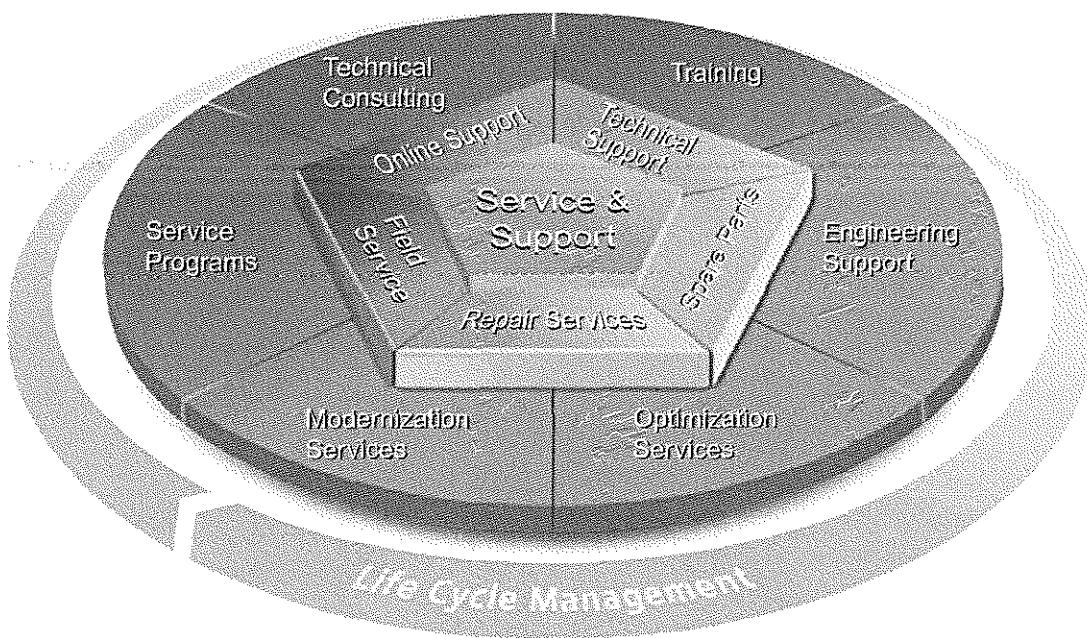
Conditions for an extension of the liability for defects:

- For all extension periods of liability for defects, for new and subsequent orders, the final destination of the product must be known.  
The EUNA process is available to obtain this information at [www.siemens.com/euna](http://www.siemens.com/euna), which must be performed by your local Siemens contact person.
  - For all 4 and 5 year extension periods of the liability for defects (Q84/9LD1740-0AA48, Q85/9LD1740-0AA60), this is only possible in conjunction with a corresponding maintenance contract with regular inspections. This maintenance contract must be signed and concluded with the responsible service department.  
This must be documented using the EUNA procedure at [www.siemens.com/euna](http://www.siemens.com/euna), which must be performed by your local Siemens contact person.
  - The general storage conditions described in the operating instructions must be adhered to, especially the specifications for long-term storage.
- Commissioning must be performed by appropriately qualified personnel. When making liability for defect claims, under certain circumstances, it may be necessary to submit the commissioning report to the department making the decision.
- Periodic maintenance must be performed in accordance with the specifications of the operating instructions. When making liability for defect claims, under certain circumstances, it may be necessary to submit the corresponding maintenance documentation and history.
- The operating conditions correspond to the specifications in the operating instructions, the installation instructions or specific conditions laid down in the contract.
- The extended liability for defects excludes wearing parts such as fans or filters. This does not apply if it can be clearly proven that the failure is a premature one.
- Otherwise, the general conditions regarding liability for defects applies as agreed in the delivery contract.

# Services and documentation

## Service & Support

**Unmatched complete service  
for the entire life cycle**



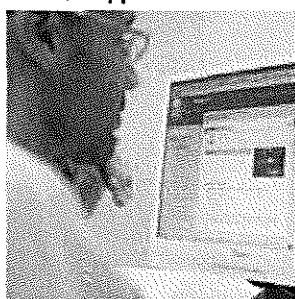
For machine constructors, solution providers and plant operators: The service offering from Siemens Industry, Automation and Drive Technologies includes comprehensive services for a wide range of different users in all sectors of the manufacturing and process industry

To accompany our products and systems, we offer integrated and structured services that provide valuable support in every phase of the life cycle of your machine or plant – from planning and implementation through commissioning as far as maintenance and modernization.

Our Service & Support accompanies you worldwide in all matters concerning automation and drives from Siemens. We provide direct on-site support in more than 100 countries through all phases of the life cycle of your machines and plants.

You have an experienced team of specialists at your side to provide active support and bundled know-how. Regular training courses and intensive contact among our employees – even across continents – ensure reliable service in the most diverse areas.

### Online Support



The comprehensive online information platform supports you in all aspects of our Service & Support at any time and from any location in the world.

[www.siemens.com/  
automation/service&support](http://www.siemens.com/automation/service&support)

### Technical Consulting



Support in planning and designing your project: From detailed actual-state analysis, definition of the goal and consulting on product and system questions right through to the creation of the automation solution.

10

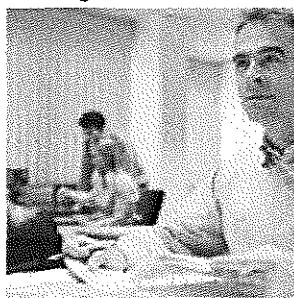
### Technical Support



Expert advice on technical questions with a wide range of demand-optimized services for all our products and systems.

[www.siemens.com/  
automation/support-request](http://www.siemens.com/automation/support-request)

### Training



Extend your competitive edge – through practical know-how directly from the manufacturer.

[www.siemens.com/sitrain](http://www.siemens.com/sitrain)

Contact information is available in the Internet at:  
[www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

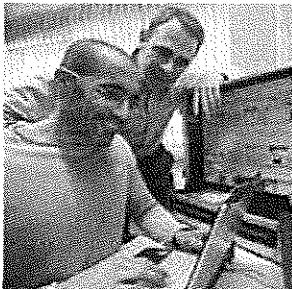


# Services and documentation

## Service & Support

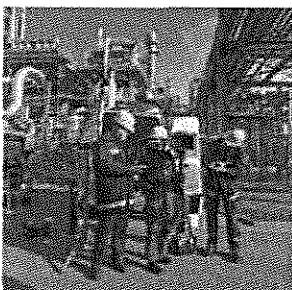
Unmatched complete service  
for the entire life cycle

### Engineering Support



Support during project engineering and development with services fine-tuned to your requirements, from configuration through to implementation of an automation project.

### Field Service



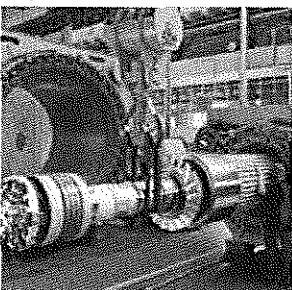
Our Field Service offers you services for commissioning and maintenance – to ensure that your machines and plants are always available.

### Spare parts



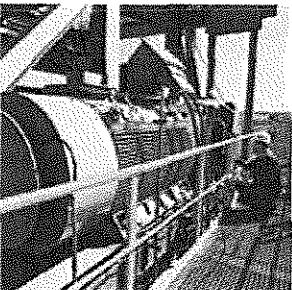
In every sector worldwide, plants and systems are required to operate with constantly increasing reliability. We will provide you with the support you need to prevent a standstill from occurring in the first place: with a worldwide network and optimum logistics chains.

### Repairs



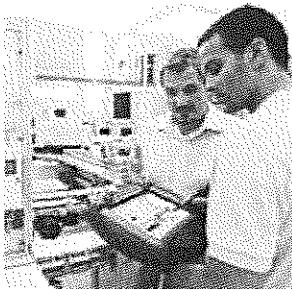
Downtimes cause problems in the plant as well as unnecessary costs. We can help you to reduce both to a minimum – with our worldwide repair facilities.

### Optimization



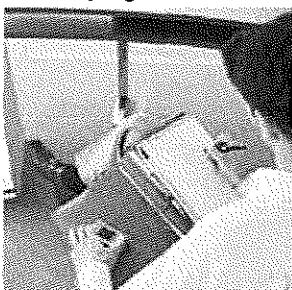
During the service life of machines and plants, there is often a great potential for increasing productivity or reducing costs. To help you achieve this potential, we are offering a complete range of optimization services.

### Modernization



You can also rely on our support when it comes to modernization – with comprehensive services from the planning phase all the way to commissioning.

### Service programs



Our service programs are selected service packages for an automation and drives system or product group. The individual services are coordinated with each other to ensure smooth coverage of the entire life cycle and support optimum use of your products and systems.

The services of a service program can be flexibly adapted at any time and used separately.

### Product registration

To ensure high service performance (availability of spare parts, hotline service, availability of personnel), you can register your SINAMICS drive units. We can ensure a timely service response by letting us know the final destination (site location) and nominating a contact partner. You can provide us with this information either using the feedback form (enclosed with each converter) or via Internet:

<http://www.siemens.com/reg>

Examples of service programs:

- Service contracts
- Plant IT Security Services
- Life Cycle Services for Drive Engineering
- SIMATIC PCS 7 Life Cycle Services
- SINUMERIK Manufacturing Excellence
- SIMATIC Remote Support Services

Advantages at a glance:

- Reduced downtimes for increased productivity
- Optimized maintenance costs due to a tailored scope of services
- Costs that can be calculated and therefore planned
- Service reliability due to guaranteed response times and spare part delivery times
- Customer service personnel will be supported and relieved of additional tasks
- Comprehensive service from a single source, fewer interfaces and greater expertise

Contact information is available in the Internet at:  
[www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

# Services and documentation

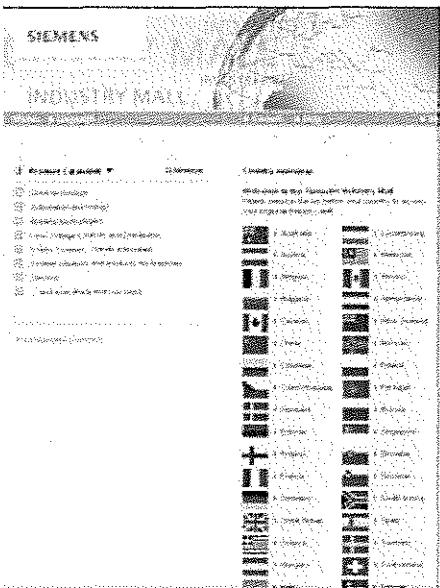
## Service & Support

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# Appendix

## SINAMICS GM150, SINAMICS SM150

### Glossary

### Overview

#### **Active infeed**

Overall functionality of an infeed with → Active Line Module, including the required additional components (filters, switching devices, computing power portion of a → Control Unit, voltage detection, etc.).

For cabinet-mounted units, a → Motor Module can be used instead of the → Active Line Module.

#### **Active Line Module**

A controlled, self-commutated infeed/regenerative feedback unit (with IGBTs in infeed/feedback direction) which supplies a constant DC link voltage for the → Motor Modules.

#### **Induction motor**

The induction motor is an AC motor, which runs at a speed "lagging behind" the synchronous speed.

Induction motors can be connected to the AC line both directly in a star or delta circuit and via a converter.

When combined with a converter, induction motors form a "variable-speed drive system".

Other commonly used terms: squirrel-cage motor, cage motor.

See also → Synchronous motor.

#### **Output reactor**

Reactor (inductance) at the converter or inverter output for reducing the capacitive charge/discharge currents in long power cables.

#### **Basic infeed**

Overall functionality of an infeed with → Basic Line Module including the required additional components (filters, switching devices, etc.).

#### **Basic Line Module**

Unregulated line infeed unit (diode bridge or thyristor bridge, without feedback) for rectifying the line voltage for the DC link.

#### **CompactFlash Card**

Memory card for non-volatile storage of the drive software and corresponding parameters. The memory card can be plugged into the → Control Unit from the outside.

#### **Control Unit**

The central control module, in which the open-loop and closed-loop control

functions for one or more SINAMICS → Line Modules and/or → Motor Modules are implemented.

#### **DRIVE-CLiQ**

Abbreviation for "Drive Component Link with IQ".

Communication system for connecting the various components of a SINAMICS drive system, e.g. → Control Unit, → Line Modules, → Motor Modules, motors and speed/position encoders.

From a hardware perspective, DRIVE-CLiQ is based on the standard Industrial Ethernet with twisted-pair cables. The DRIVE-CLiQ line provides the transmit and receive signals and also the +24 V power supply.

#### **Field weakening**

Field weakening describes the reducing of the magnetizing current of an electric motor in order that the speed can be increased further when the rated voltage is reached.

#### **Non-Siemens motor**

A motor is designated as a non-Siemens motor if its motor data is not known to the drive line-up, and it cannot be identified by means of its order number.

The motor data of an external motor is required for commissioning. It must be entered manually in the corresponding parameters.

#### **Kinetic buffering**

Kinetic buffering (KIP) is a software function, which can be used to bridge transient line failures (up to approx. 1 s or as long as the drive continues to turn). Kinetic buffering can usually only be used on drives that are primarily motor-driven. It requires a sufficiently large centrifugal mass, i.e., sufficient kinetic energy, on the part of the mechanical transmission element. During the line failure, KIP switches the machine to no-load operation or light regeneration (in order to cover the minor losses from the motor and inverter). Once the line supply has been restored, the machine switches back to standard motor-driven operation.

In order to use kinetic buffering, the technological conditions must be in place to allow the motor to coast or brakes for the duration of the line failure. In some applications with multi-motor drives, the speed ratios between the individual drives have to be maintained during kinetic buffering, in order to prevent the web from tearing or damage. In such cases, kinetic buffering may only be activated on one of the drives (usually the main drive). The reduced speed setpoint values must then be fed into the overall setpoint cascade.



# Appendix

## SINAMICS GM150, SINAMICS SM150

Glossary

### Overview

#### **Line Module**

A Line Module is a power component, which creates the DC link voltage for one or several → Motor Modules from a three-phase line supply voltage.

The following types of Line Module are used in the SINAMICS system:

→ Basic Line Module and → Active Line Module.

#### **Motor Module**

A Motor Module is a power unit (DC-AC inverter) that provides the power supply for the connected motor.

Power is supplied through the → DC link of the drive line-up.

A Motor Module must be connected to a → Control Unit via → DRIVE-CLiQ. The open-loop and closed-loop control functions of the Motor Module are stored in the Control Unit.

#### **PROFIBUS**

Standardized fieldbus according to IEC 61158, Parts 2 to 6.

#### **PROFIdrive**

PROFIBUS profile specified for speed and position-controlled drives by the PROFIBUS user organization (German: PNO).

The latest version is the PROFIdrive V3 profile.

#### **Sensor Module**

Hardware module for evaluating speed/position encoder signals.

#### **Synchronous motor**

Synchronous motors run at the same frequency with which they are operated: They have no slip (which is the case with → induction motors). Synchronous motors require different feed-forward and feedback control concepts depending on their design to ensure that they can be operated with converters.

Synchronous motors are distinguished by the following features:

- permanent-field/separately excited
- with/without damping cage
- with/without position encoder.

Synchronous motors are used for different reasons:

- high drive dynamic response
- high overload capability
- high speed accuracy with exactly specified frequency (SIEMOSYN motors).

#### **Terminal Module**

Terminal extension module for snapping onto the installation rail, for installation in the control cabinet.

In SINAMICS, the TM31 Terminal Module is available with analog and digital I/O terminals.

#### **DC link**

The component of the converter (or converter system) that connects the input converter (rectifier) and the output converter (one or more inverters).

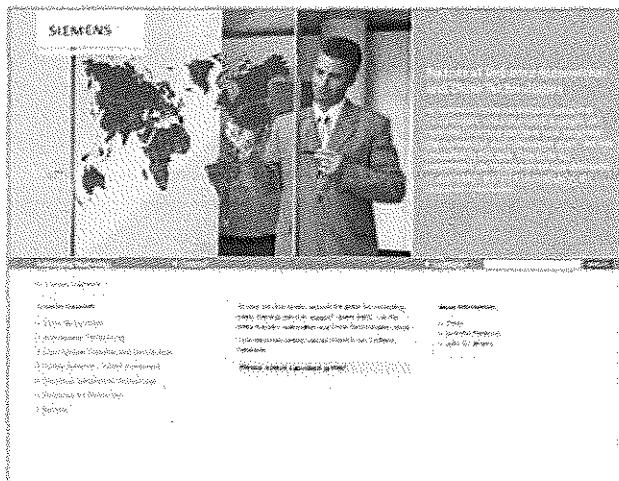
With voltage source DC link converters like SINAMICS, a constant DC voltage is present in the DC link (rectified line voltage).



## Appendix

### SINAMICS GM150, SINAMICS SM150

**Partners of Industry Automation and Drive Technologies**



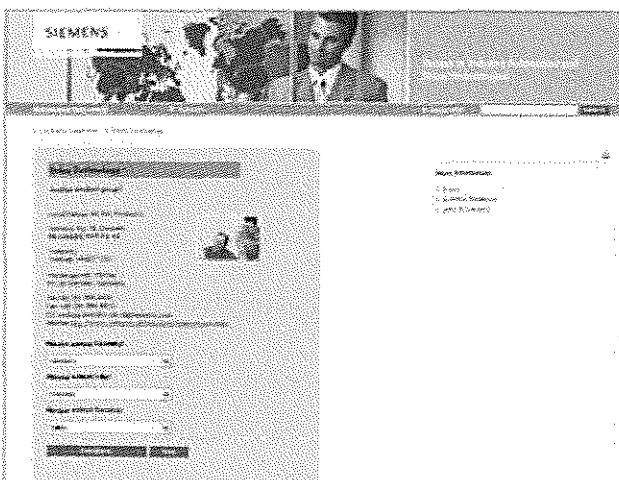
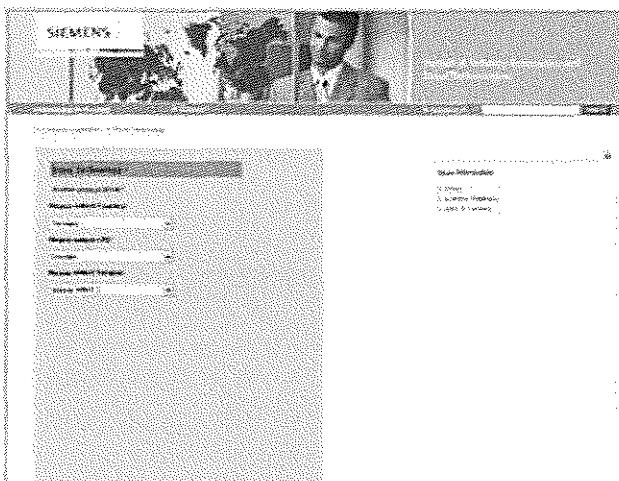
At Siemens Industry Automation and Drive Technologies, more than 85 000 people are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at:  
[www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

You start by selecting a

- Product group,
  - Country,
  - City,
  - Service.

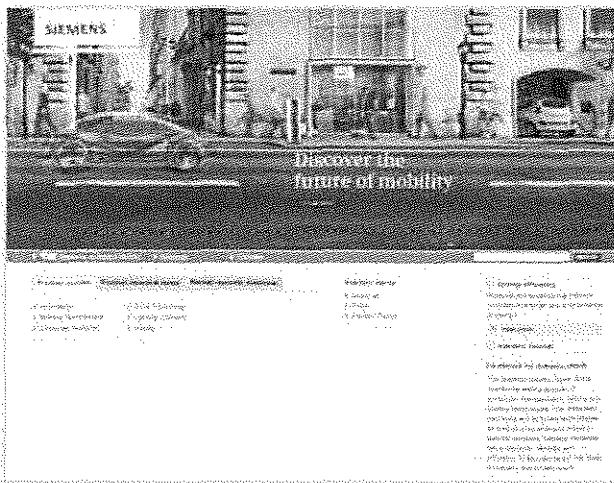


## Appendix

### SINAMICS GM150, SINAMICS SM150

**Online Services – Information and ordering  
in the Internet and on DVD**

#### **Siemens Industry Automation and Drive Technologies in the WWW**



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

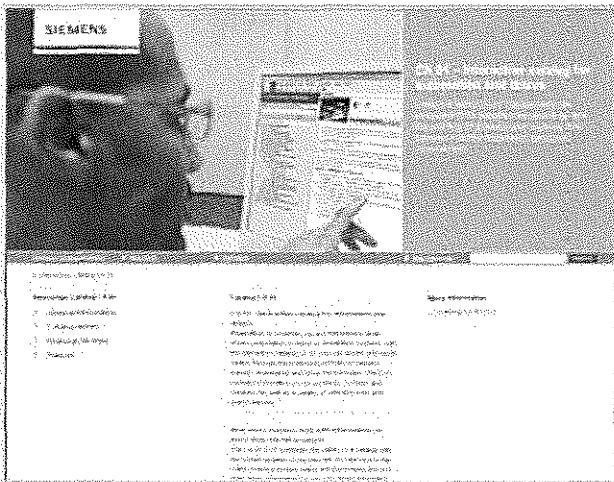
Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

[www.siemens.com/industry](http://www.siemens.com/industry)

you will find everything you need to know about products, systems and services.

#### **Product Selection Using the Interactive Catalog CA 01 of Industry**



Detailed information together with convenient interactive functions:

The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

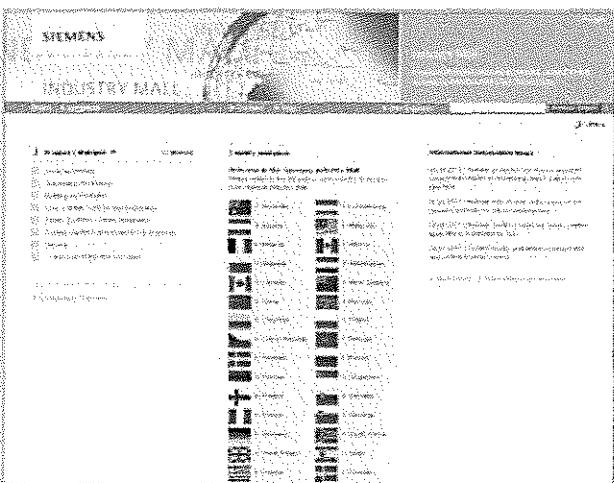
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

[www.siemens.com/automation/ca01](http://www.siemens.com/automation/ca01)

or on DVD.

#### **Easy Shopping with the Industry Mall**



The Industry Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

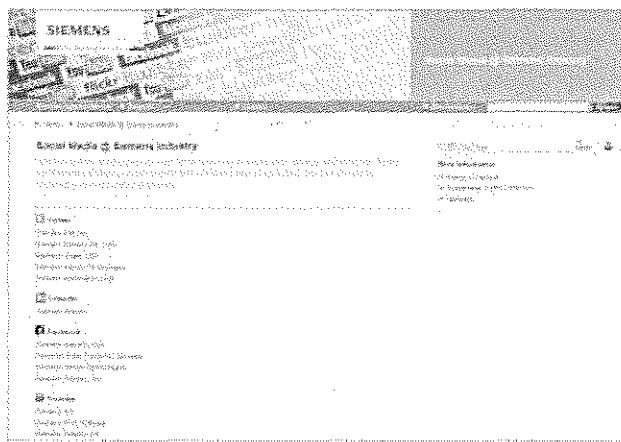
Please visit the Industry Mall on the Internet under:

[www.siemens.com/industrymall](http://www.siemens.com/industrymall)

## Appendix SINAMICS GM150, SINAMICS SM150

### Social Media Mobile Media

#### Social Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

[www.siemens.com/industry/socialmedia](http://www.siemens.com/industry/socialmedia)

Or via our product pages at:

[www.siemens.com/automation](http://www.siemens.com/automation)

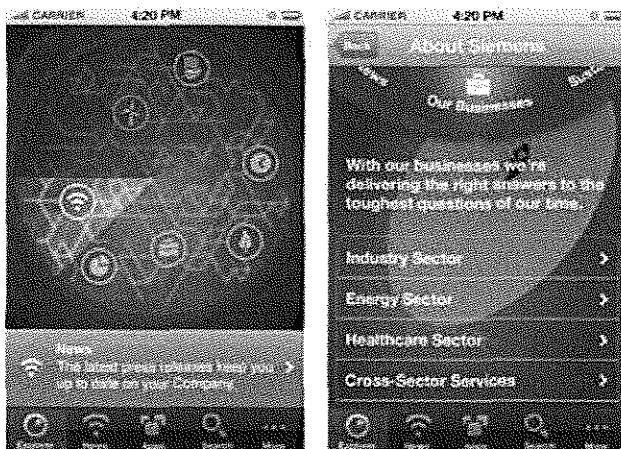
or

[www.siemens.com/drives](http://www.siemens.com/drives)

To find out more about Siemens' current social media activities visit us at:

[www.siemens.com/socialmedia](http://www.siemens.com/socialmedia)

#### Mobile Media



We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at your app store.

# Appendix

## SINAMICS GM150, SINAMICS SM150

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# Appendix

## SINAMICS GM150, SINAMICS SM150

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# Appendix

## SINAMICS GM150, SINAMICS SM150

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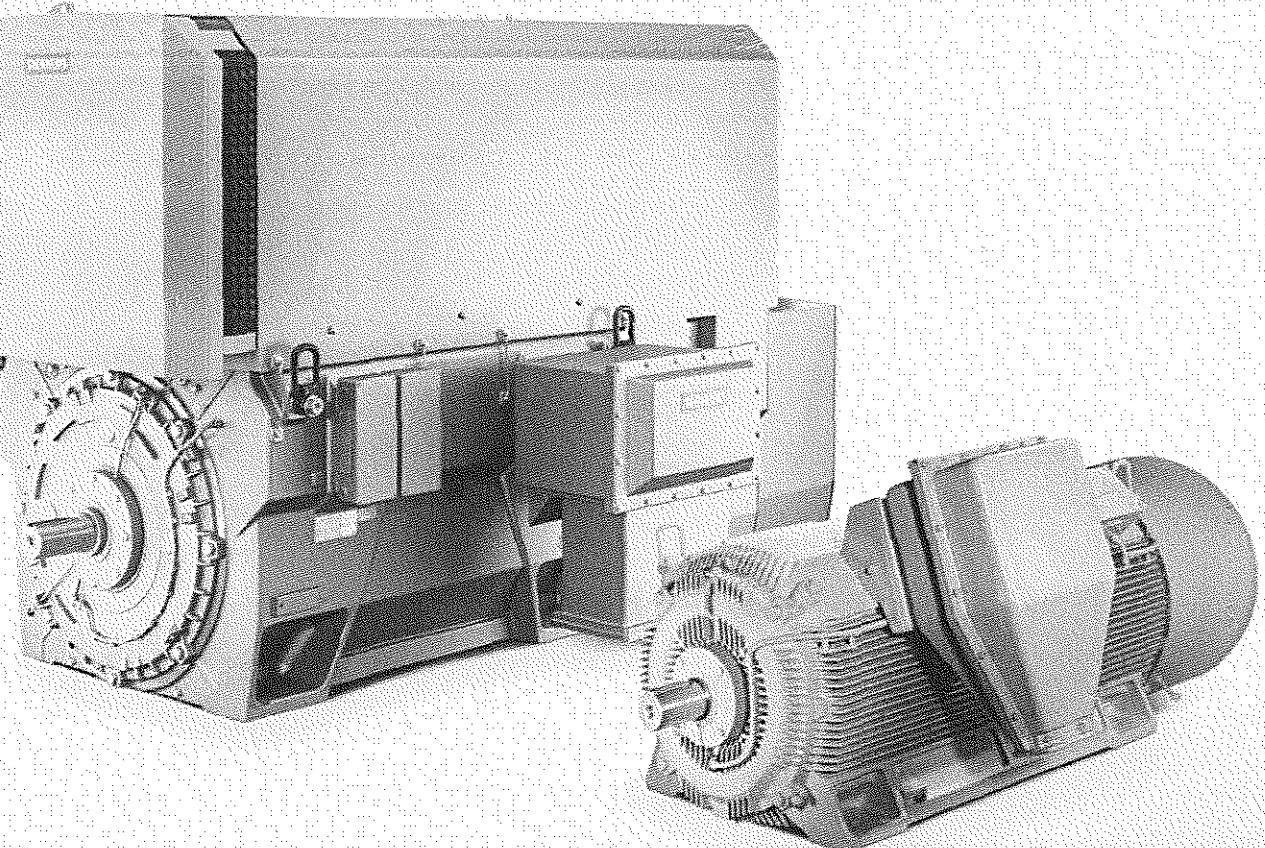
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## Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN

- Series H-compact
- Series H-compact PLUS

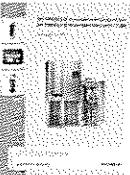
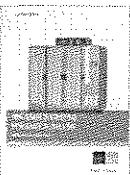
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Edition  
April  
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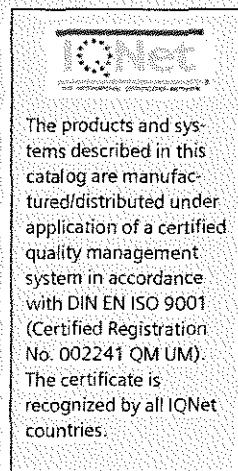
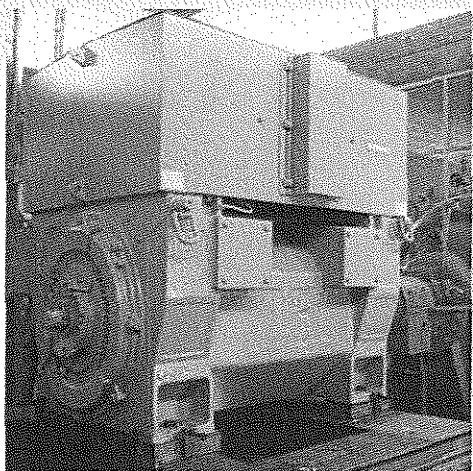
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# Motors

## Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN

- Series H-compact
- Series H-compact PLUS

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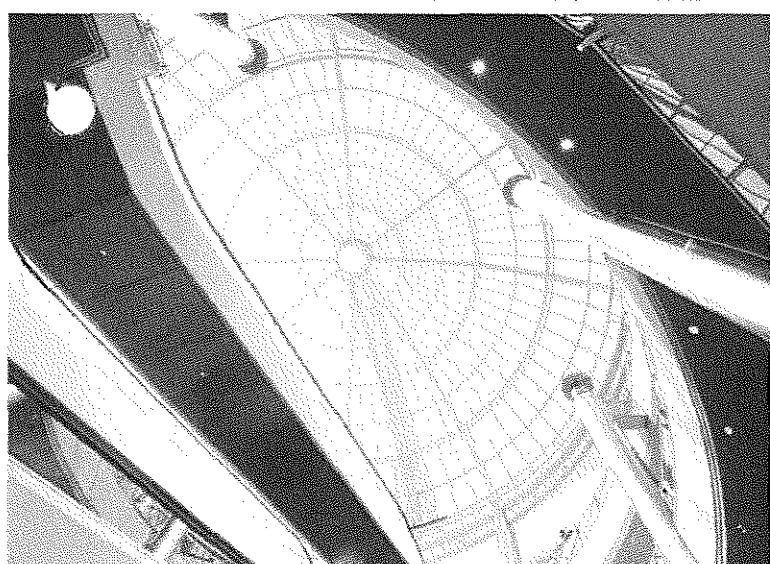
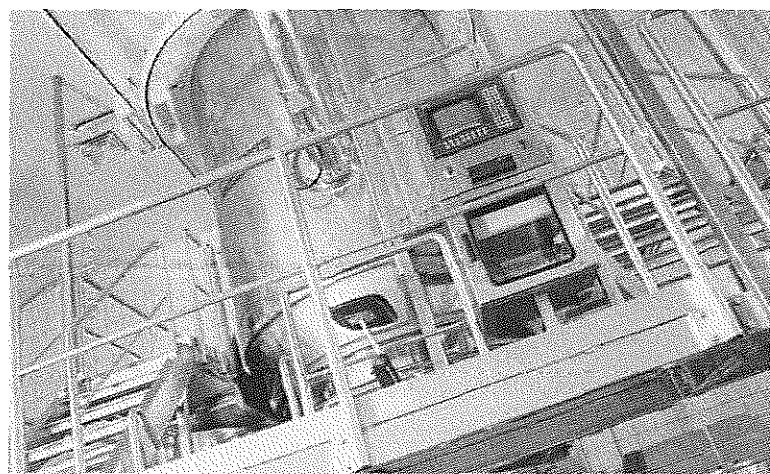
Orientation  
Ordering examples  
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### 6 Service & Support

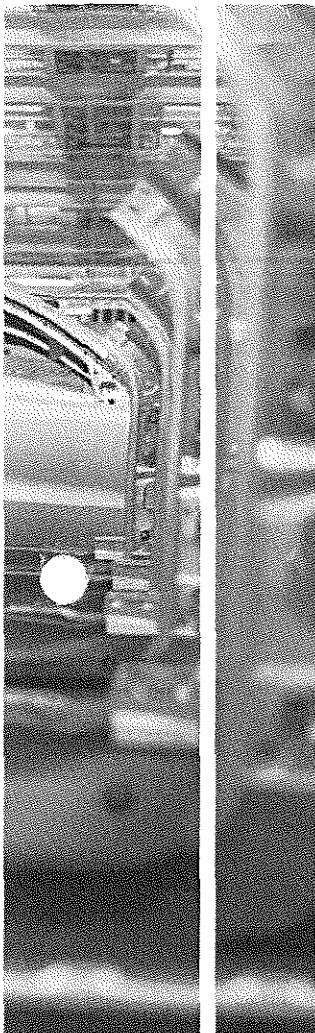
Industry Services

### 7 Appendix

Partners at Industry Automation and  
Drive Technologies  
Online Services  
Indexes  
Conditions of sale and delivery



## Answers for industry.



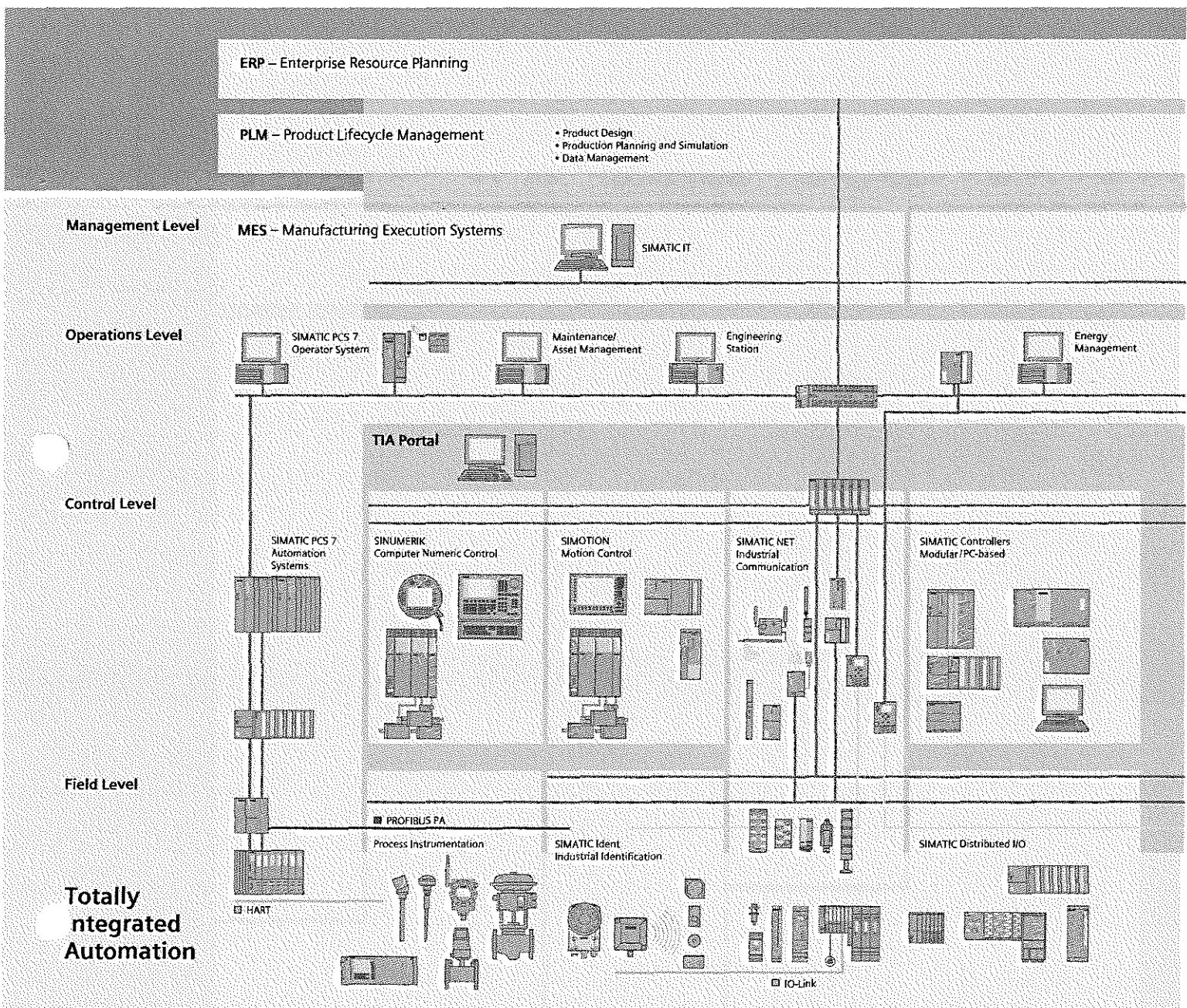
Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

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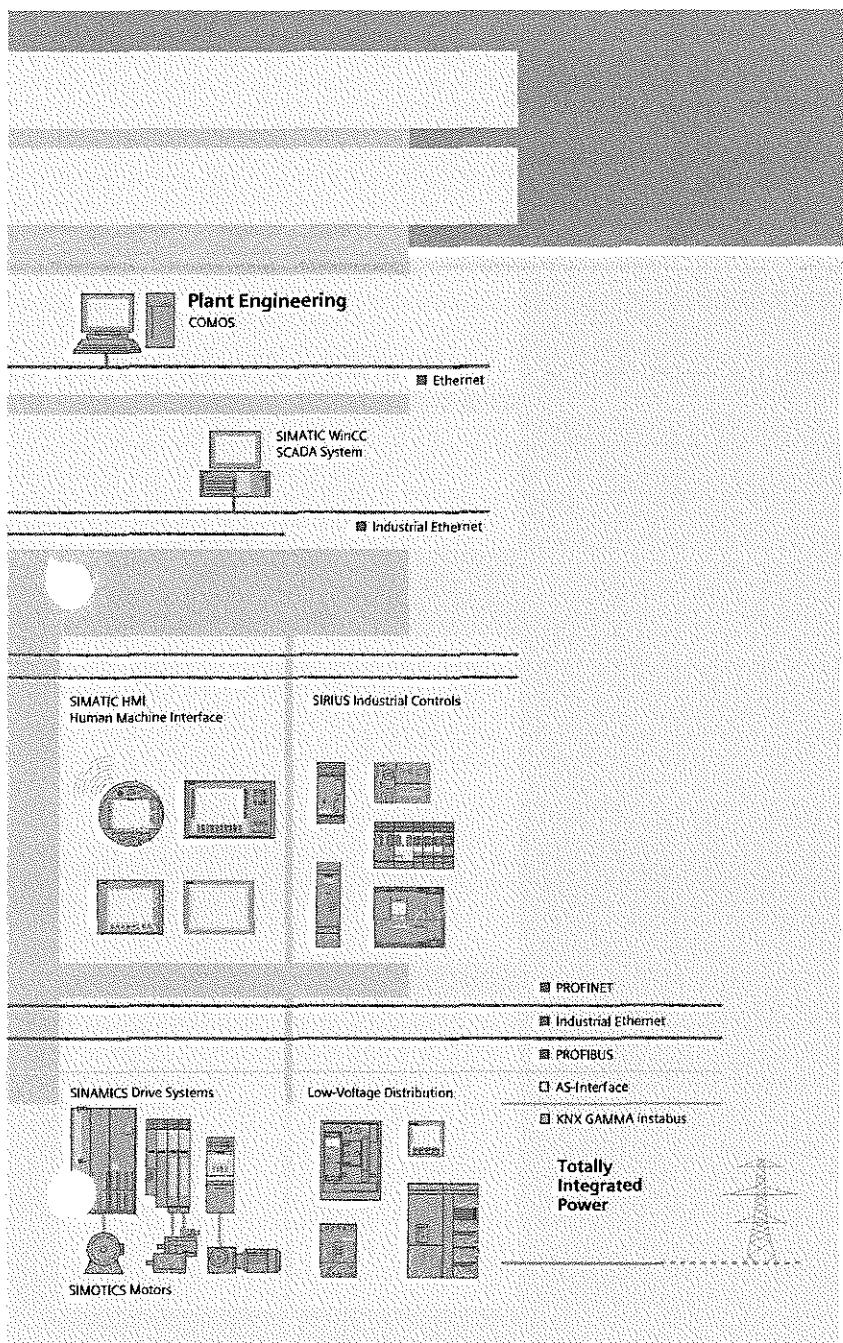
Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.





**Setting standards in productivity and competitiveness.**

**Totally Integrated Automation.**



Thanks to Totally Integrated Automation, Siemens provides an integrated basis for the implementation of customized automation solutions – in all industries from inbound to outbound.

### TIA is characterized by its unique continuity.

It provides maximum transparency at all levels with reduced interfacing requirements – covering the field level, production control level, up to the corporate management level. With TIA you also profit throughout the complete life cycle of your plant – starting with the initial planning steps through operation up to modernization, where we offer a high measure of investment security resulting from continuity in the further development of our products and from reducing the number of interfaces to a minimum.

The unique continuity is already a defined characteristic at the development stage of our products and systems.

The result: maximum interoperability – covering the controller, HMI, drives, up to the process control system. This reduces the complexity of the automation solution in your plant. You will experience this, for example, in the engineering phase of the automation solution in the form of reduced time requirements and cost, or during operation using the continuous diagnostics facilities of Totally Integrated Automation for increasing the availability of your plant.





## Introduction



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# Introduction Overview

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## Overview

In this catalog, the motor series H-compact and H-compact PLUS in the low-voltage version SIMOTICS TN and in the high-voltage version SIMOTICS HV are described.

In addition to the general technical data, this catalog includes detailed descriptions of the standard versions and the options that can be supplied by specifying order codes. It should be noted that certain order codes and combinations of order codes are not possible for all motor types. Customized solutions can be offered on request.

### **Order number code**

The Order No. comprises a combination of digits and letters.

For options, the Order No. is supplemented by an additional hyphen and the letter **Z**. In addition, the order codes for the corresponding options must be specified.

Example:

**1LA4 354-4AN60-Z H05 + K16 + L20**

#### Ordering data:

- Complete Order No. and order code(s).
- If a quotation is available, in addition to the Order No., the quotation number should also be specified.
- When ordering a complete motor as a spare part, please specify the factory serial No. of the previously supplied motor as well as the Order No.



# Introduction SIMOTICS HV/TN Series H-compact

Order number code



## Overview

The following overview explains the meaning of the individual positions of the Order No. The selection tables in Chapters 2 to 4 include the motors available as standard from this range.

### Structure of the Order No.:

#### 1st to 4th positions: Motor design

- Standard version
  - Self-ventilated
  - Force ventilated
  - Water-jacket-cooled
- Explosion-protected version
  - Ex e
  - Ex px
  - Ex na

Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	Z
-----------	---	---	---	---	---	---	---	---	---	---	----	----	----	---	---

1	<b>L</b>	<b>A</b>	<b>4</b>												
1	<b>P</b>	<b>Q</b>	<b>4</b>												
1	<b>L</b>	<b>H</b>	<b>4</b>												

#### 5th to 6th positions: Shaft height

- 315 mm
- 355 mm
- 400 mm
- 450 mm
- 500 mm
- 560 mm
- 630 mm

3	<b>1</b>
3	<b>5</b>
4	<b>0</b>
4	<b>5</b>
5	<b>0</b>
5	<b>6</b>
6	<b>3</b>

#### 7th position: Laminated core length

- Short
- Medium
- Long
- Extra long

0
2
4
6
8

#### 8th position: Pole number

- 2-pole
- 4-pole
- 6-pole
- 8-pole
- 10-pole
- 12-pole

2
4
6
8
3
5

#### 9th position: Rotor version

- Standard aluminum rotor
- Special aluminum rotor
- Standard copper rotor
- Special copper rotor
- Special version (CuSi,...)

A
B
C
D
E

#### 10th position: Character for operation with:

- Line supply, low voltage
- Line supply, high voltage
- LV drive converter
- MV drive converter
- Converters, others (e.g. Perfect Harmony)

A
N
M
V
W

#### 11th position: Voltage code

##### Line supply, high voltage:

- 3.3 kV, 50 Hz
- 6.6 kV, 60 Hz
- 
- 3.0 kV, 50 Hz
- 4.0 kV, 60 Hz
- 5.0 kV, 50 Hz
- 6.0 kV, 50 Hz
- 6.6 kV, 50 Hz
- 10 kV, 50 Hz

##### MV drive converter:

- 2.3 kV, 50 Hz
- 2.3 kV, 60 Hz
- 
- 3.3 kV, 50 Hz
- 3.3 kV, 60 Hz
- 4.16 kV, 50 Hz
- 4.16 kV, 60 Hz
- 6.0 kV, 50 Hz
- 6.6 kV, 50 Hz
- 
- 

##### LV drive converter:

- 690 V, 50 Hz
- 
- 
- 
- 
- 
- 
- 
- 
- 
- 
- 

0
1
2
3
4
5
6
7
8
9

##### Other voltage/frequency (additional text data):

- IM B3
- IM V1 with canopy
- IM V1 without canopy
- IM B35

Options: Additional order codes required.



# Introduction

## SIMOTICS HV/TN Series H-compact

1

### Performance features

#### Overview

##### Performance features of the H-compact series

The H-compact series of motors is characterized by:

- Extremely compact design
- Longest lifetime and highest reliability
- Globally proven Siemens MICALASTIC insulation system

- Proven over many years of use in the widest range of sectors
- Wide range of options, that allow the motor to be optimally adapted to customer requirements
- Various cooling concepts for every environment

#### Overview table of the H-compact series

Series	Version	Voltages	Powers	Degree of protection	Cooling method	Type of protection	Type of construction
1LA4	IEC	690 V	1150 ... 1650 kW <sup>1)</sup>	IP55	IC411	–	IM B3, IM B35, IM V1
		2.3 ... 11 kV	200 ... 3000 kW <sup>2)</sup>				
1LA4 Standardline		3.0; 3.3; 6.0; 6.6 kV	200 ... 800 kW <sup>3)</sup>				IM B3
1MS4		2.3 ... 11 kV	200 ... 3000 kW <sup>2)</sup>			Ex nA	IM B3, IM B35,
1MG4		2.3 ... 11 kV	200 ... 3000 kW <sup>2)</sup>			Ex px	IM V1
1MA4		3.4 ... 6.6 kV	170 ... 630 kW <sup>3)</sup>			Ex e	
1PQ4		690 V	1150 ... 1700 kW <sup>1)</sup>	IP55	IC416	–	IM B3, IM B35, IM V1
		2.3 ... 6.6 kV	1180 ... 2950 kW <sup>4)</sup>				
1LH4		690 V	1380 ... 1750 kW <sup>1)</sup>	IP55	IC71W	–	IM B3, IM B35, IM V1
		2.3 ... 6.6 kV	1224 ... 1488 kW <sup>3)</sup>				

#### Cooling method

IC411	Rib-cooled, self-ventilated
IC416	Rib-cooled, force-ventilated
IC71W	Water-jacket-cooled
<b>Type of protection</b>	
Ex nA Non-sparking motor, Zone 2	
Ex pe Pressurized motor enclosure, increased safety of the terminal box, Zone 1	
Ex e Increased safety of the motor, Zone 1	

#### Degree of protection

IP55	Enclosed, protected against dust and jet-water
<b>Type of construction</b>	
IM B3 Horizontal, with feet, without flange	
IM B35 Horizontal, with feet, with flange	
IM V1 Vertical, without feet, with flange	

#### 1LA4 Standardline version

The 1LA4 Standardline motors are self-ventilated, enclosed rib-cooled motors belonging to the H-compact series with a restricted range of options. Due to the fact that there are a restricted number of selectable options, they have significantly shorter delivery times as a result of the simplified order administration and the standardized production process. The compact and rugged design guarantees a high degree of reliability and availability for small frame sizes.

With Standardline, a defined range of motors (pole number, power rating) are available for line operation. See Catalog D 86.1.

<sup>1)</sup> Only for converter operation. Values apply for 50 Hz, 4-pole version, insulation system, thermal class 155 (F), utilized to 155 (F).

<sup>2)</sup> Values apply for 2.3 to 6.6 kV, 50 Hz, 4-pole version, insulation system, thermal class 155 (F), utilized to 130 (B).

<sup>3)</sup> Values apply for 50 Hz, 4-pole version, insulation system, thermal class 155 (F), utilized to 130 (B).

<sup>4)</sup> Values apply for 6 to 6.6 kV, 50 Hz, 4-pole version, insulation system, thermal class 155 (F), utilized to 155 (F).

# Introduction

## SIMOTICS HV/TN Series H-compact

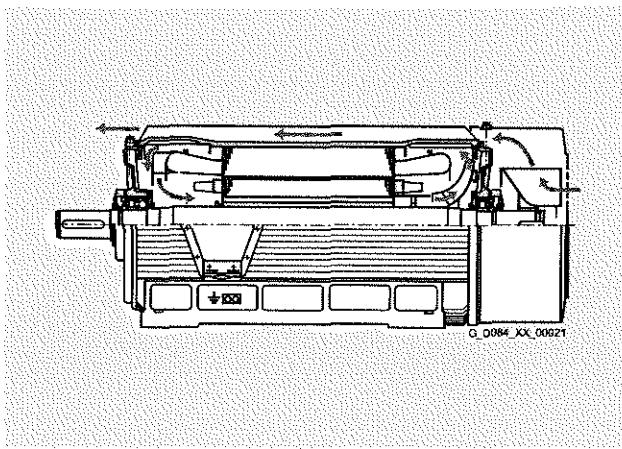
### Cooling concepts

#### Mode of operation

##### **Self-ventilated, IC411 cooling type, 1LA4, 1MA4, 1MS4, 1MG4 series**

Self-ventilated, rib-cooled motors have a technically sophisticated cooling concept that corresponds to cooling type IC411 according to DIN EN 60034-6/VDE 0530-6 (IEC 60034-6) with an additional, inner cooling air circuit with fan. As can be seen in the diagram, a fan is located at the non-drive end, which draws in the air from outside and blows it axially over the outer cooling ribs of the frame. Heat is exchanged with the inner cooling circuit at this location, which guarantees a uniform temperature distribution in the active motor and bearing areas.

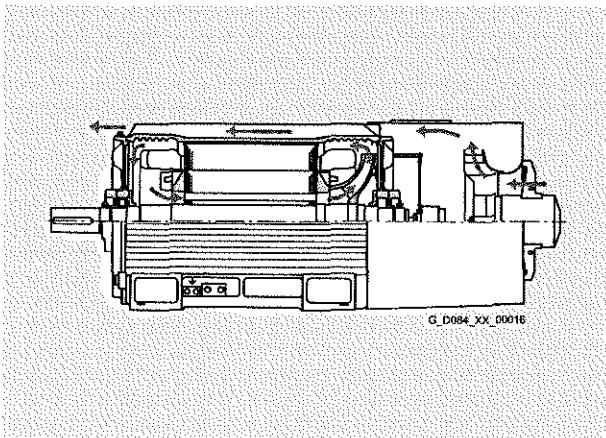
The fan impellers for the inner and outer cooling air flow are mounted on the motor shaft and play a role in achieving the significantly reduced noise level thanks to their optimized aerodynamic design.



##### **Force-ventilated, IC416 cooling type, 1PQ4 series**

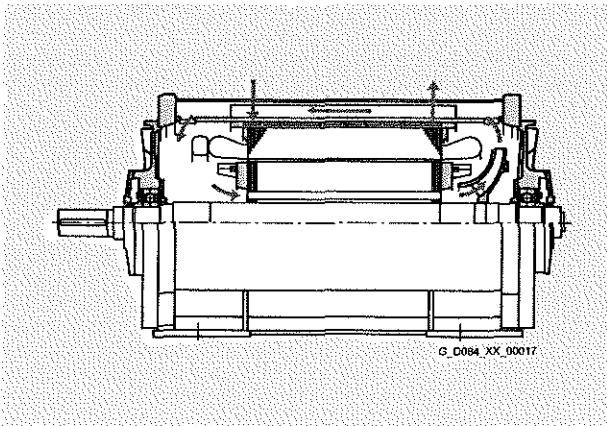
For the force-ventilated motors, a fan unit is located at the non-drive end, which draws in the air from outside and blows it axially over the outer cooling ribs of the frame. Heat is exchanged with the inner cooling circuit at this location, which guarantees a uniform temperature distribution in the active motor and bearing areas.

The fan impeller for the inner cooling circuit is mounted on the motor shaft and is bidirectional. Further, the outer cooling air flow is generated from a separately-driven fan that guarantees a constant cooling power in every operating state. This means that the motor can always be operated over its complete speed control range and in both directions of rotation.



##### **Water-jacket-cooled, IC71W cooling type, 1LH4 series**

The water-jacket-cooled motors have a double wall frame jacket with a spiral cooling water duct and, in addition, an inner cooling air circuit. The cooling water inlet is at the drive end, the outlet is at the non-drive end. Intensive heat exchange takes place through the cooling water. The inner air cooling circuit guarantees a uniform temperature distribution in the active motor and bearing areas.



# Introduction

## SIMOTICS HV/TN Series H-compact PLUS

### Order number code

#### Overview

The following overview explains the meaning of the individual positions of the Order No. The selection tables in Parts 2 to 4 include the motors available as standard from this range.

#### Structure of the Order No.:

1st to 4th position: Standard version  
Motor version

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - Z

#### Degree of protection/cooling

##### IEC NEMA

Open-circuit ventilated IP23/IC01 — 1 R A 4

Air/air cooling IP55/IC611 or IC616 — 1 R Q 4

Air/water cooling IP55/IC81W or IC86W — 1 R N 4

Open-circuit ventilated IP23/IC01 — 1 R A 6

Open-circuit ventilated IP24W/IC01 WPII 1 R P 6

Air/air cooling IP55/IC611 or IC616 TEAAC 1 R Q 6

Air/water cooling IP55/IC81W or IC86W TEWAC 1 R N 6

#### Ex e version

Air/air cooling IP55/IC611 or IC616 — 1 S J 4

Air/water cooling IP55/IC81W or IC86W — 1 S N 4

Air/air cooling IP55/IC611 or IC616 — 1 S J 6

Air/water cooling IP55/IC81W or IC86W — 1 S N 6

#### Ex nA version

Air/air cooling IP55/IC611 or IC616 — 1 S G 4

Air/water cooling IP55/IC81W or IC86W — 1 S L 4

Air/air cooling IP55/IC611 or IC616 — 1 S G 6

Air/water cooling IP55/IC81W or IC86W — 1 S L 6

#### Ex px version

Air/air cooling IP55/IC611 or IC616 — 1 S B 4

Air/water cooling IP55/IC81W or IC86W — 1 S Q 4

Air/air cooling IP55/IC611 or IC616 — 1 S B 6

Air/water cooling IP55/IC81W or IC86W — 1 S Q 6

5th to 6th position:  
Shaft height

4 5

5 0

5 6

6 3

7 1

7th position:  
Laminated core length

The laminated core length is coded in digits 0 to 9  
(without fixed assignment)

2

4

6

8

3

5

7

9

8th position:  
Pole number

- 2-pole
- 4-pole
- 6-pole
- 8-pole
- 10-pole
- 12-pole
- 14-pole
- 16-pole

Additional order code H1A



# Introduction SIMOTICS HV/TN Series H-compact PLUS

Order number code

1

## Overview (continued)

Structure of the Order No.:	Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	Z
9th position: Cooling method for:	<b>IEC version:</b>															
	With shaft-mounted fan (basic version) or shaft-mounted fan for the inner and separately-driven fan for the outer cooling circuit	IC01/IC81W								H						
	With shaft-mounted fan for the inner and outer cooling circuits	IC616								H						
	With separately-driven fan for the inner or for the inner and outer cooling circuits	IC611								J						
	IC86W/IC666									F						
10th position: Rotor version or drive converter type	<b>NEMA version</b> <b>(only available for 1R.6 motors with shaft height 710; other shaft heights on request)</b>															
	With separately-driven fan for the inner and outer cooling circuits	TEAAC								A						
	With shaft-mounted fan	WPII or TEWAC								B						
	With shaft-mounted fan for the inner and separately-driven fan for the outer cooling circuit	TEAAC								B						
	With shaft-mounted fan for the inner and outer cooling circuits	TEAAC								C						
11th position: Voltage code	<b>Line operation</b>	<b>Letter</b>	<b>Converter operation</b>	<b>Letter</b>												
	1R.4: Standard rotor with E-Cu	E	1R.4: MV drive converter	V												
	1R.4: Standard rotor with Si-Cu	S	1R.4: LV drive converter	M												
	1R.6: Standard rotor with E-Cu	JKL (power-dependent)	1R.6: LV drive converter; copper rotor	P (SINAMICS G/ SINAMCIS S)												
	1R.6: Standard rotor with Si-Cu	MN (power-dependent)	1R.6: MV drive converter; copper rotor	S (SINAMICS GM/ SINAMICS SM)												
				T (Perfect Harmony)												
				U (other converters)												
	1R.4 and 1R.6: Special rotor with E-Cu	X														
	1R.4 and 1R.6: Special rotor with Si-Cu	Y														
12th position: Type of construction	<b>1R.4:</b> <b>Line operation:</b>	<b>1R.4:</b> <b>Operation with MV drive converter:</b>	<b>1R.4:</b> <b>Operation with LV drive converter</b>	<b>1R.6:</b> <b>Line operation</b>	<b>1R.6:</b> <b>Converter operation</b>											
	3.3 kV, 50 Hz	2.3 kV, 50 Hz	690 V, 50 Hz, on request	3.3 kV, 50 Hz	690 V, 50 Hz	0										
	6.6 kV, 60 Hz	2.3 kV, 60 Hz	—	6.6 kV, 60 Hz	690 V, 60 Hz	1										
	—	3.3 kV, 50 Hz	—	13.2 kV, 60 Hz	2.3 kV, 50 Hz	2										
	3.0 kV, 50 Hz	3.3 kV, 60 Hz	—	4.16 kV, 60 Hz	4.16 kV, 60 Hz	3										
	4.0 kV, 60 Hz	4.16 kV, 50 Hz	—	4.0 kV, 60 Hz	4.16 kV, 50 Hz	4										
	5.0 kV, 50 Hz	4.16 kV, 60 Hz	—	2.3 kV, 60 Hz	3.3 kV, 50 Hz	5										
	6.0 kV, 50 Hz	6.0 kV, 50 Hz	—	6.0 kV, 50 Hz	6.0 kV, 50 Hz	6										
	6.6 kV, 50 Hz	6.6 kV, 50 Hz	—	6.6 kV, 50 Hz	6.6 kV, 50 Hz	7										
	10 kV, 50 Hz	—	—	10 kV, 50 Hz	6.6 kV, 60 Hz	8										
	Other voltage/frequency (additional text data)					9										
	• IM B3					0										
	• IM V1 with canopy (for shaft height 630 mm, only in type of construction IM V10)					4										
	• IM V1 without canopy (for shaft height 630 mm, only in type of construction IM V10)					8										

Options: Additional order code required. Refer to section Options and tests in Chapter 2, Chapter 3 and Chapter 4.

# Introduction

## SIMOTICS HV/TN Series H-compact PLUS

### Performance features

#### Overview

##### **Performance features of the H compact PLUS series**

The H-compact PLUS motors have a modular design (basic enclosure and cover).

This means that the following cooling methods can be implemented:

- Air/water cooling
- Air/air cooling
- Open-circuit cooling

The new 1R.6/1S.6 series is the second generation of the H-compact PLUS motors. They offer higher power ratings (for two-pole motors), permit a higher external moment of inertia, sport an innovative design as well as an extended range of options.

#### **Overview table of the H-compact PLUS series**

Series	Version	Voltages	Powers	Degree of protection	Cooling method	Type of protection	Type of construction
1RA4	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP23	IC01	No	IM B3, IM V1, (shaft height 630 only V10)
1RA6	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP55	IC81W	No	
1RN4	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP55	IC611/IC616	No	
1RN6	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP55	IC81W	Ex nA, Ex tc	
1RQ4	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1090 ... 2400 kW <sup>2)</sup> 1090 ... 8700 kW <sup>3)</sup>	IP55	IC611/IC616	No	
1RQ6	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1090 ... 2400 kW <sup>2)</sup> 1090 ... 8700 kW <sup>3)</sup>	IP55	IC81W	Ex nA, Ex tc	
1SG4	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1090 ... 2400 kW <sup>2)</sup> 1090 ... 8700 kW <sup>3)</sup>	IP55	IC611/IC616	Ex px	
1SG6	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1090 ... 2400 kW <sup>2)</sup> 1090 ... 8700 kW <sup>3)</sup>	IP55	IC81W	Ex px	
1SL4	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP55	IC611/IC616	Ex e	
1SL6	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP55	IC81W	Ex e	
1SB4	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1090 ... 2400 kW <sup>2)</sup> 1090 ... 8700 kW <sup>3)</sup>	IP55	IC611/IC616	Ex px	
1SB6	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1090 ... 2400 kW <sup>2)</sup> 1090 ... 8700 kW <sup>3)</sup>	IP55	IC611/IC616	Ex px	
1SQ4	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP55	IC81W	Ex px	
1SQ6	IEC	690 V 3.3 ... 11 kV <sup>1)</sup>	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP55	IC81W	Ex px	
1SJ4, 1SJ6	IEC	On request	On request	IP55	IC611/IC616	Ex e	
1SN4, 1SN6	IEC				IC81W		
1RP6	IEC	690 V 3.3 ... 11 kV	1370 ... 2800 kW <sup>2)</sup> 1370 ... 11700 kW <sup>3)</sup>	IP24W	IC01	No	IM B3, IM V1
	NEMA	3.3 ... 13.8 kV	11000 ... 18000 hp <sup>4)</sup>	WP II	Open	No	
1RN6	NEMA	3.3 ... 13.8 kV	11000 ... 18000 hp <sup>4)</sup>	TEWAC	Air/water	No	
1RQ6	NEMA	3.3 ... 13.8 kV	11000 ... 18000 hp <sup>4)</sup>	TEAAC	Air/air	No	
1SG6	NEMA	3.3 ... 13.8 kV	11000 ... 18000 hp <sup>4)</sup>	TEAAC	Air/air	Class 1, Div 2	
1SL6	NEMA	3.3 ... 13.8 kV	11000 ... 18000 hp <sup>4)</sup>	TEWAC	Air/water	Class 1, Div 2	

<sup>1)</sup> 13.8 kV on request.

<sup>2)</sup> Power rating values apply for 690 V, 50 Hz, 4-pole version, insulation system thermal class 155 (F), utilized to 155 (F).

<sup>3)</sup> Power rating values apply for 6 kV, 50 Hz, 4-pole version, insulation system thermal class 155 (F), utilized to 130 (B).

<sup>4)</sup> Power rating values apply for 6.6 kV, 60 Hz, 4-pole version, insulation system thermal class 155 (F), utilized to 130 (B).

# Introduction SIMOTICS HV/TN Series H-compact PLUS

## Performance features

1

### **Overview (continued)**

<b>Cooling method</b>		<b>Degree of protection</b>
IC01	Air-cooled, self-ventilated	IP23 Protected against the ingress of solid foreign bodies with a diameter greater than 12 mm and water spray.
IC81W	Air/water cooler, inner cooling circuit self-ventilated	IP24W Protected against the ingress of solid foreign bodies with a diameter greater than 12 mm and splashwater. Weather-protected version.
IC86W	Air/water cooler, inner cooling circuit force-ventilated	IP55 Protected against dust and jet-water.
IC611	Air/air cooler, inner cooling circuit self-ventilated, outer cooling circuit self-ventilated	WPII Weather-protected motor with air intake baffles
IC616	Air/air cooler, inner cooling circuit self-ventilated, outer cooling circuit force-ventilated	TEWAC Closed motor with air/water cooler
IC666	Air/air cooler, inner cooling circuit force-ventilated, outer cooling circuit force-ventilated	TEAAC Closed motor with air/air cooler
TEWAC	Closed motor with air/water cooler	<b>Type of construction</b>
TEAAC	Closed motor with air/air cooler	IM B3 Horizontal, with feet, without flange
<b>Type of protection</b>		IM V1 Vertical, without feet, with flanged bearing shield
Ex nA	Non-sparking motor, Zone 2	IM V10 Vertical, without feet, with flange at the enclosure
Ex px	Pressurized motor enclosure, increased safety of the terminal box, Zone 1	
Class I, Div 2	Non-sparking motor	

# Introduction

## SIMOTICS HV/TN Series H-compact PLUS

1

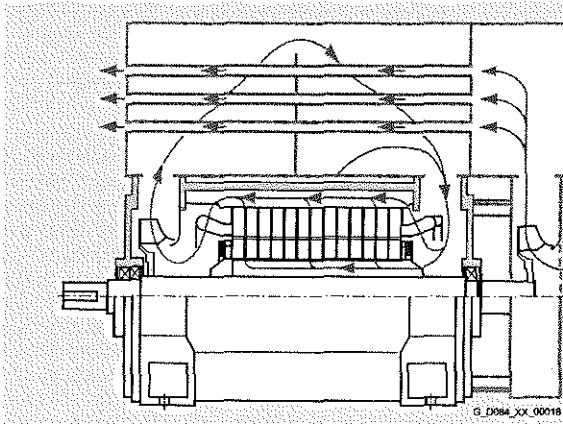
### Cooling concepts

#### Mode of operation

The following diagrams show the general mode of operation of the cooling. They do not include any design details.

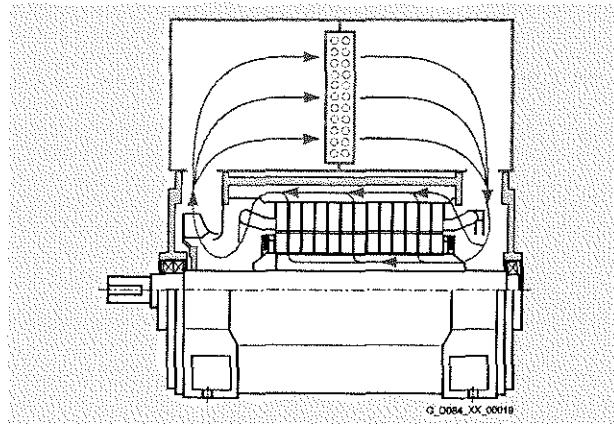
##### Air/air heat exchanger (IC611)

###### 1RQ. series with one-sided ventilation (Z ventilation)

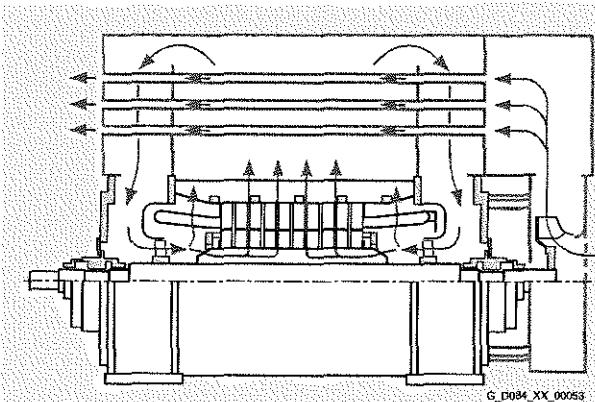


##### Air/water heat exchanger (IC81W)

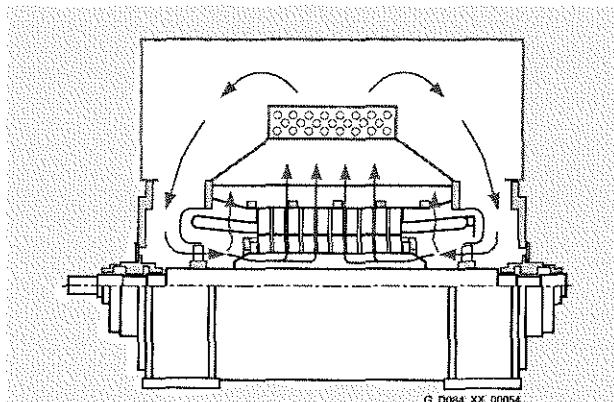
###### 1RN. series with one-sided ventilation (Z ventilation)



###### 1RQ. series with two-sided ventilation (X ventilation)



###### 1RN. series with two-sided ventilation (X ventilation)



# Introduction

## SIMOTICS HV/TN Series H-compact PLUS

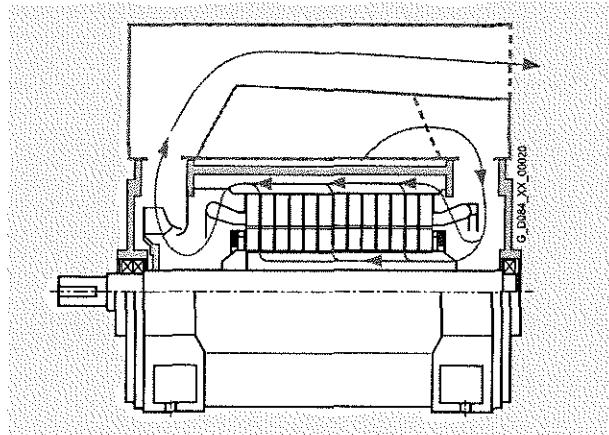
Cooling concepts

1

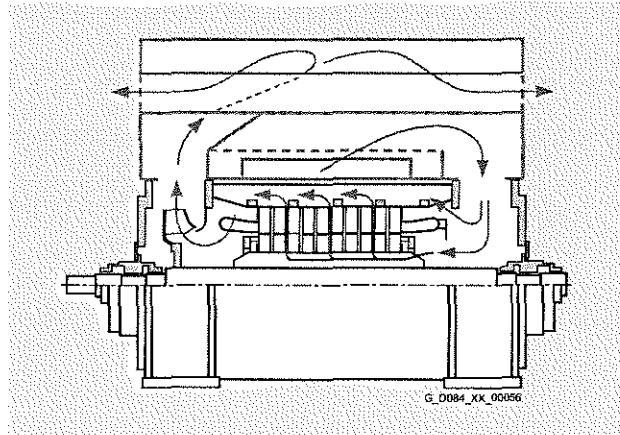
### Mode of operation (continued)

#### **Open-circuit ventilation (IC01)**

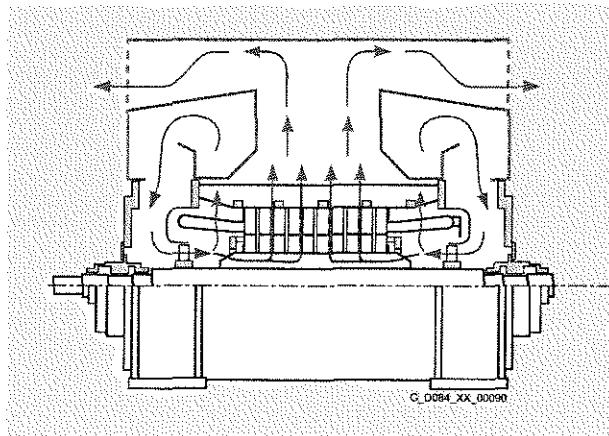
##### 1RA. series with one-sided ventilation (Z ventilation)



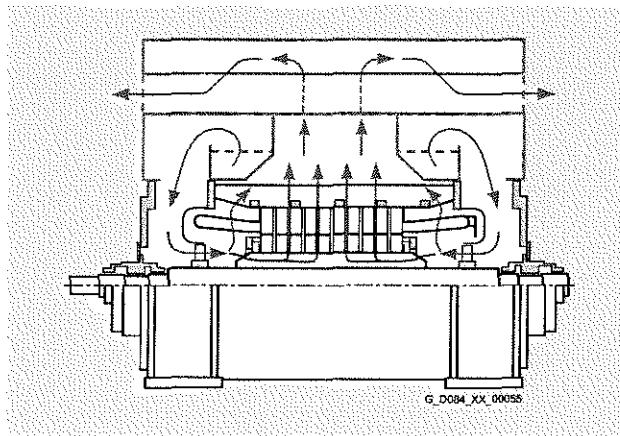
##### 1RP. series with one-sided ventilation (Z ventilation)



##### 1RA. series with two-sided ventilation (X ventilation)



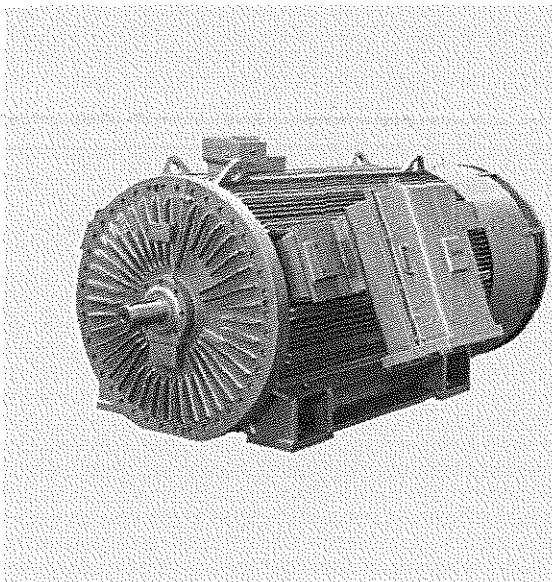
##### 1RP. series with two-sided ventilation (X ventilation)



# Introduction

## LOHER Vario and LOHER Vario PLUS

### Overview



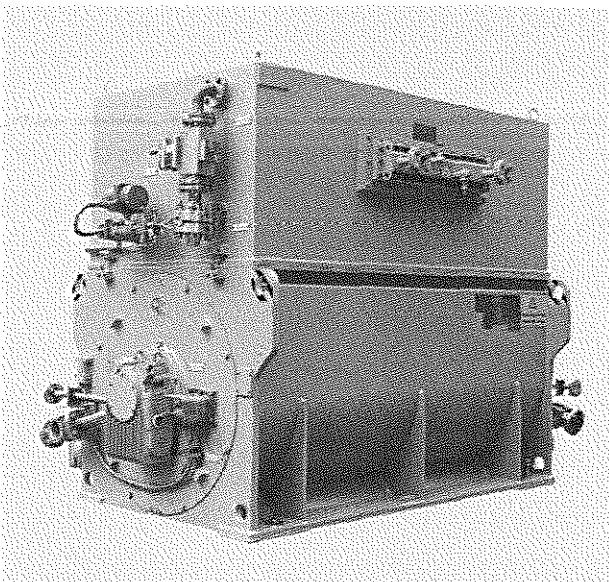
Motor of the LOHER Vario series

#### **LOHER Vario**

For applications with rib or water-jacket cooled motors and an extended range of options or special requirements on project management, the LOHER Vario series of motors is available on request.

They have the following performance features:

- High degree of variability as a result of the welded steel enclosure (dimensions can be adapted, instrumentation, bearing concepts)
- Flexible production processes and customized documentation
- High-pole machines up to 16-pole, higher pole numbers are available on request
- Anti-corrosion protection using special paint finishes according to the manufacturers standard or customer specifications
- Water-jacket cooling IC71W in the extended power range with up to 60 % higher power density; compact and quiet, admirably suited for converter operation with constant load torque and wide field-weakening range
- Optimized starting and operating parameters, coordinated and harmonized to meet customer applications
- Complies with almost all application requirements and specifications
- High degree of sector-specific adaptation options
- For safe area applications and types of protection Ex n, Ex p and Ex d in rib and water-jacket cooled versions
- Low-voltage and high-voltage versions up to 11 kV



LOHER Vario PLUS motor in a water-cooled version (cooling type IC81W)

#### **LOHER Vario PLUS**

For applications with modular-cooled motors and an extended range of options or special requirements on project management, the LOHER Vario PLUS series of motors is available on request.

They have the following performance features:

- High degree of variability as a result of the platform-based enclosure (dimensions can be adapted, mounted components)
- Customized machines, also for special installation locations and applications
- Flexible production processes and customized documentation
- High-pole machines up to 16-pole, higher pole numbers are available on request
- Anti-corrosion protection using special paint finishes according to the manufacturers standard or customer specifications
- Widest range of connection systems fulfill special requirements (e.g. requirements relating to short-circuit strength, cable cross-sections, phase-segregated version)
- Optimized starting and operating parameters, coordinated and harmonized to meet customer applications
- Complies with almost all application requirements and specifications
- High degree of sector-specific adaptation options
- For safe area applications and types of protection Ex n and Ex p in special versions
- Low-voltage and high-voltage versions up to 11 kV

# Introduction

## General technical versions

Overview

### Overview

#### **Motor protection**

A series of standard and optional monitoring and protective devices are available for motor protection.

Protective device	Description
Stator winding monitoring	6 PT100 resistance thermometers for temperature monitoring as standard.
Roller bearing monitoring	Measuring nipple for shock pulse measurement as standard. Optional PT100 resistance thermometer for temperature monitoring.
Sleeve bearing monitoring	Optional PT100 resistance thermometer for temperature monitoring. Optional for circulating oil cooling. Throttle valves, manometer and flowmeter in the oil intake line. Optional holes in the oil discharge line to mount a thermometer or a sight glass to monitor the oil flow.
Shaft vibration monitoring	Optional for motors with sleeve bearings.
Air temperature monitoring in the cooling circuit	Optional using a thermometer in the cooler assembly on the air intake and air discharge side for H-compact PLUS motors.
Leakage water monitoring	Optional using sensors in the cooler housing for water-cooled H-compact PLUS motors.
Starting and speed monitoring	Optional rotary pulse encoder for motors for converter operation.
Anti-condensation heating	Standard for H-compact PLUS motors. Optional for H-compact motors.

#### **Electrical design**

High voltage motors have the Siemens MICALASTIC insulation system according to thermal class 155 (F).

The rotor windings of H-compact motors are manufactured out of die cast aluminum or copper:

Shaft height mm	Rotor design with number of poles					
mm	2	4	6	8	10	12
315	Al	Al	Al	—	—	—
355	Al	Al	Al	Al	—	—
400	Al	Al	Al	Al	—	—
450	Cu	Al/Cu	Al	Al	Al	Cu
500	Cu	Al	Cu	Cu	Cu	Cu
560	Cu	Cu	Cu	Cu	Cu	Cu
630	Cu	Cu	Cu	Cu	Cu	Cu

H-compact PLUS motors always have copper rotors.

#### **Motor connection and terminal boxes for high voltage motors**

The motor terminal boxes are generously dimensioned. This design allows cables, which are generally used worldwide, to be simply and quickly connected up as well as to accommodate all of the generally used cable entry fittings.

Arrangement of the motor terminal box (standard version):

When viewing the drive side, the motor terminal box is mounted at the righthand side of the stator frame with cable entry from the bottom. When requested, it can be mounted on the lefthand side. However, it must be specified when ordering. When requested, the terminal box can be mounted, rotated through 90° or through 180° if the spatial situation at the machine permits this (except for terminal boxes with cast cable entry glands).

Terminal arrangement according to DIN 42962.

Degree of protection of the motor terminal box: IP55, IP56, IP66 – depending on the terminal box type (refer to the table).

The motor terminal boxes comprise a lower section or housing, bolted to the stator frame, and a removable cover. The 1XA8711, 1XB8911 and 1XB8751 terminal boxes that are normally used have bushings manufactured out of casting resin. All of the other terminal boxes have cast-resin post insulators with bolted bushings (exception: cable connector connection).

All motor terminal boxes are short-circuit proof. If a short-circuit occurs in the motor, all of the forces generated by the short-circuit current are reliably handled by the components in the terminal box (e.g. cast-resin post insulators).

Further, all motor terminal boxes are short-circuit proof. If arcs occur in the motor terminal box, the pressure generated is immediately dissipated using a pressure relief mechanism.

Short-circuit strength and short-circuit proof of the motor terminal boxes used as standard:

- 400 MVA at 6 kV; 0.2 s
- 700 MVA at 10 kV; 0.2 s

These values correspond to a rated peak withstand current of approx. 100 kA.

Motor connecting cable and cable entry fittings are not supplied with the motor.



# Introduction

## General technical versions

### Motor terminal boxes

#### Overview

##### **Overview of the generally used motor terminal boxes**

Terminal box	Rated voltage kV	Current A	Cable entries Number	Cable entry diameter, max. mm
1XB1 631	1	1230	4	75
1XA8 711	6.6	315	1	75
1XB8 751	6.6	630 (for parallel connection)	2	75
1XB8 911	11	315	1	75
1XD1 543-3AA	11	1200	—	—
1XD1 643-3AA	13.2	800	—	—

Cable connector connection on request.

#### **Connection options**

Terminal box	Terminal element	Number of cables	Cable cross-section (Cu or Al), max. that can be introduced mm <sup>2</sup>	Weight kg	Degree of protection to DIN EN 60529
1XB1 631	Cable lug	4 cables, 3-conductor	240	83	IP55
1XA8 711	Connecting terminal on M16 studs	1 cable, 3-conductor	1 x 3 x 240	42	IP66
	Connection with cable lug and two hexagon nuts				
1XB8 751	Connecting terminal on M16 studs	2 cables, 3-conductor	2 x 3 x 240	131	IP56
	Connection with cable lug and two hexagon nuts				
1XB8 911	Connecting terminal on M16 studs	1 cable, 3-conductor	1 x 3 x 240	93	IP56
	Connection with cable lug and two hexagon nuts				
1XD1 543-3AA	Cable lug on busbar	6 cables, 1-conductor	300	230	IP55
1XD1 643-3AA	Cable lug on busbar	4 cables, 1-conductor	300	500	IP55



# Introduction

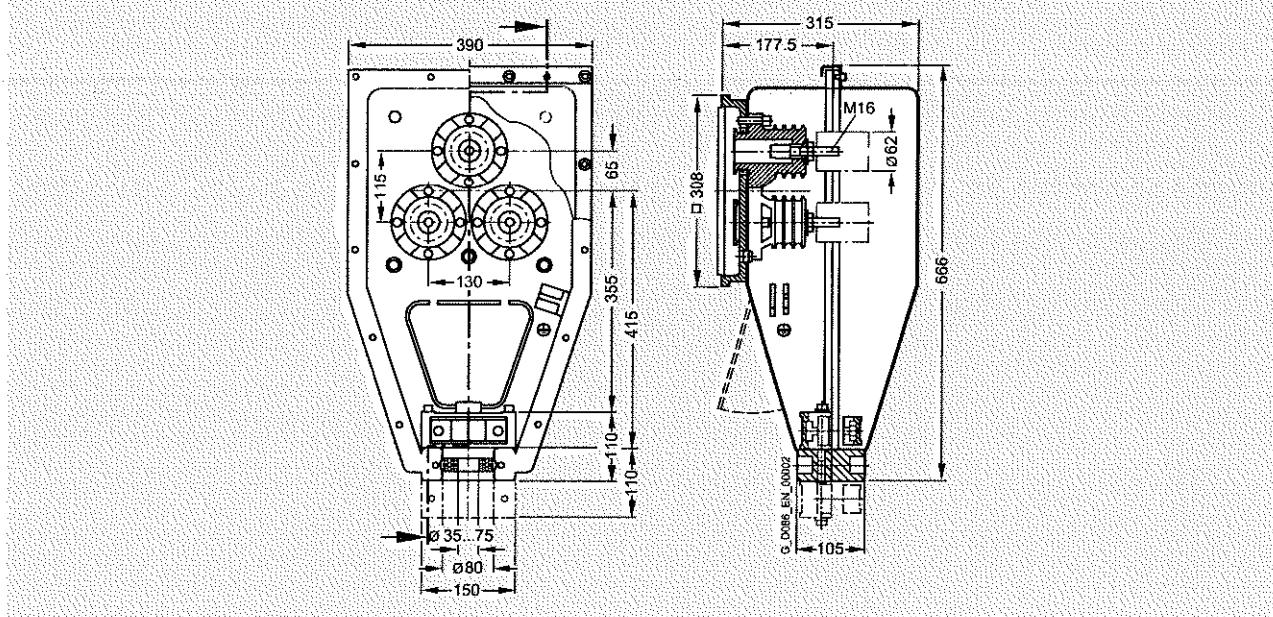
## General technical versions

Motor terminal boxes

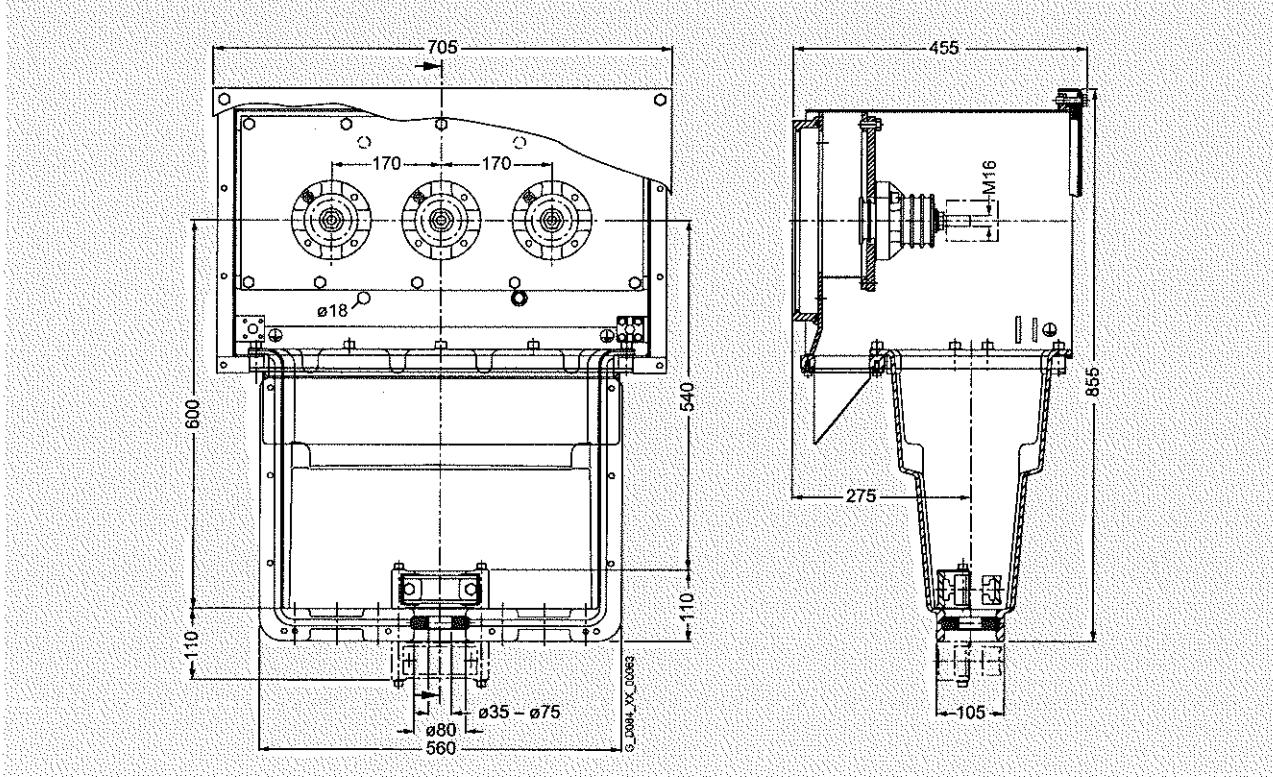
1

### Dimension drawings

Terminal box type 1XA8 711 (up to 6.6 kV, 3 terminals)



Terminal box type 1XB8 911 (up to 11 kV)



# Introduction

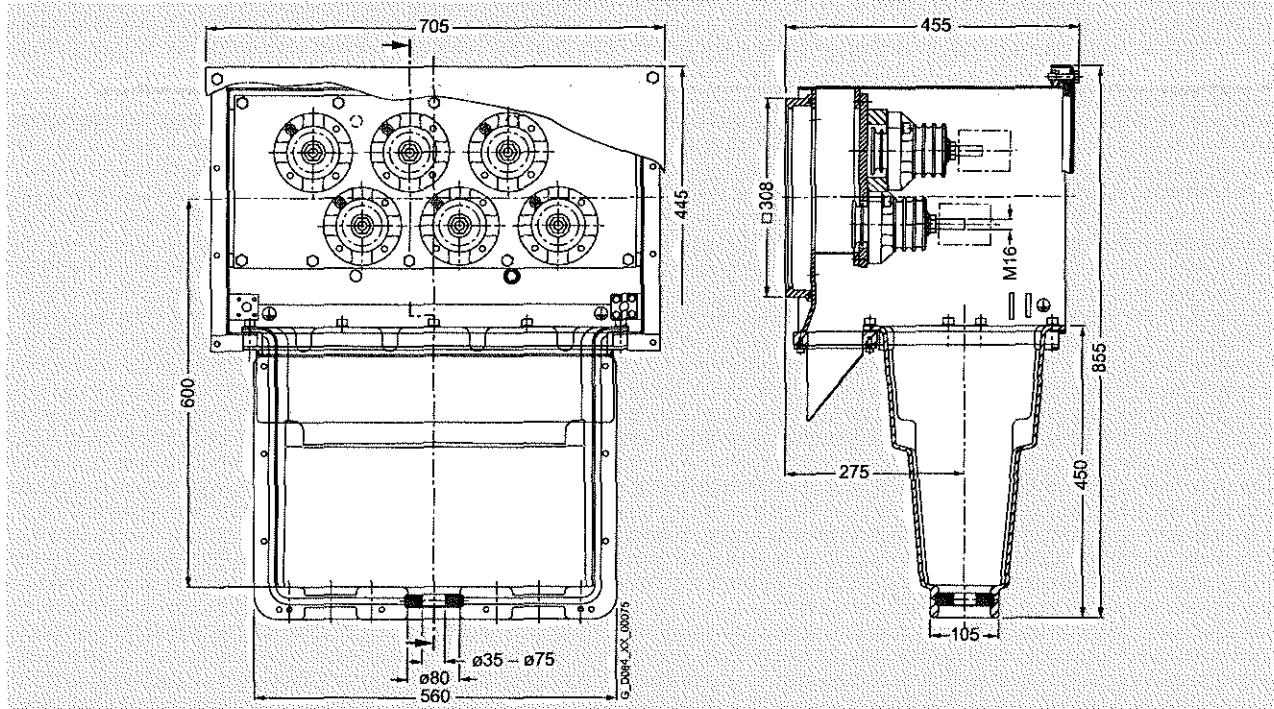
## General technical versions

1

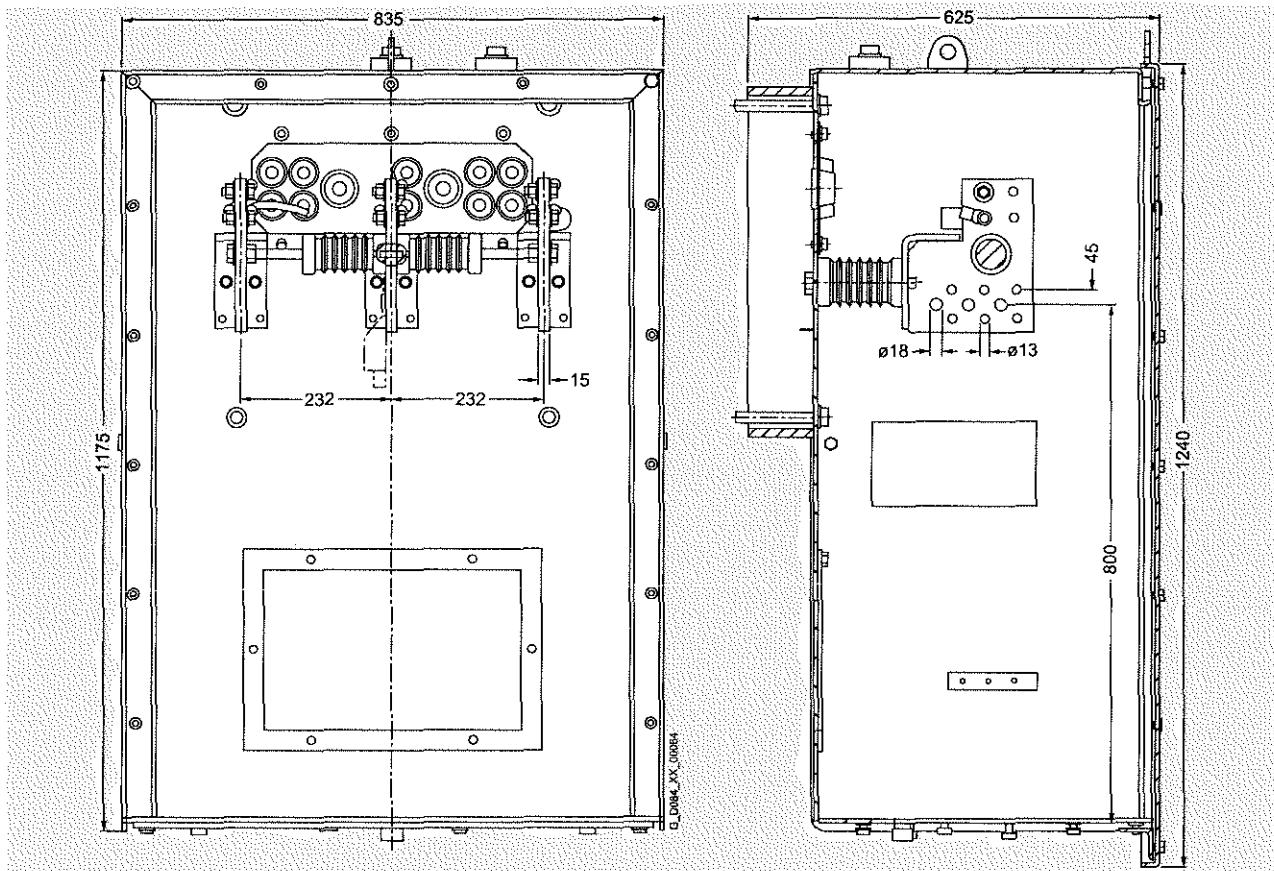
### Motor terminal boxes

#### Dimension drawings (continued)

**Terminal box type 1XB8 751 (up to 6.6 kV, 6 terminals)**



**Terminal box type 1XD1 543-3AA up to 11 kV IEC and 6.6 kV NEMA**



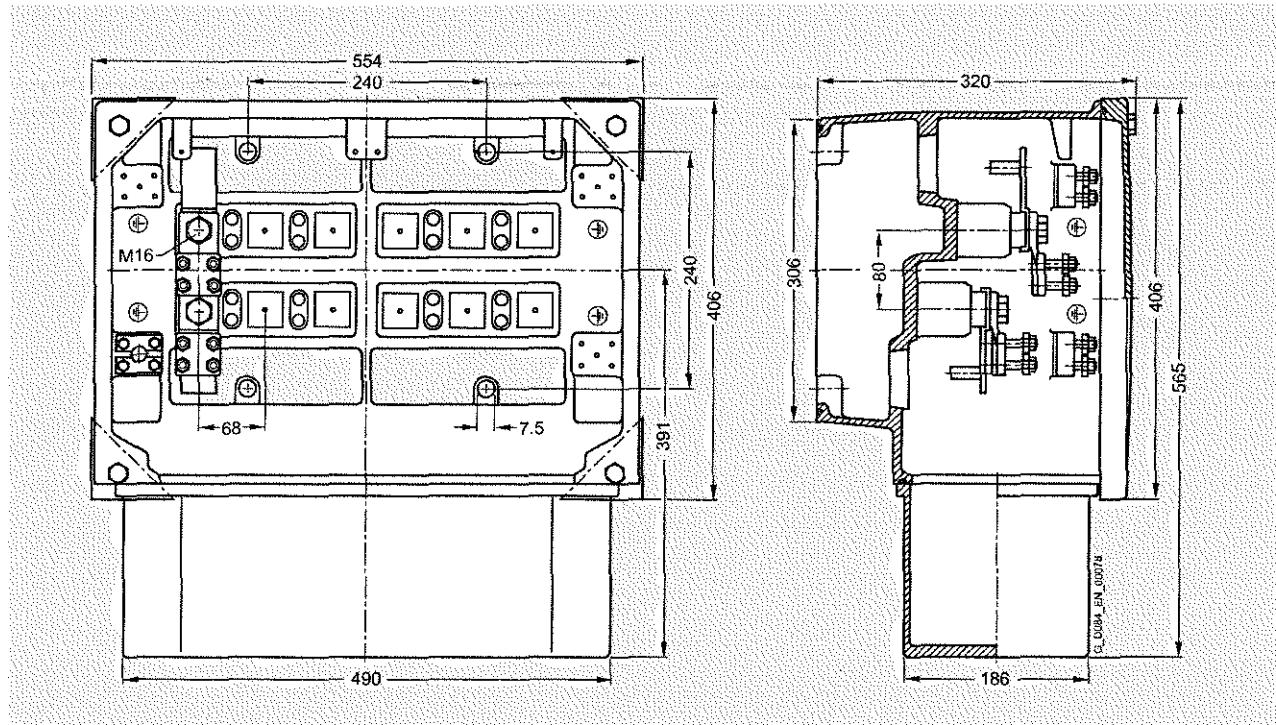
# Introduction

## General technical versions

Motor terminal boxes

1

### Dimension drawings (continued)

**Terminal box type 1XB1 631 (up to 1 kV, 12 terminals)**

# Introduction

## General technical versions

### 1 Motor terminal boxes

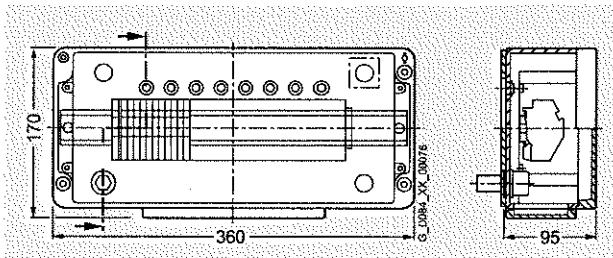
#### Dimension drawings (continued)

##### **Neutral point terminal box**

The motor terminal box is also used to form the neutral point of winding ends.

##### **Auxiliary terminal box to connect monitoring elements, anti-condensation heating**

The standard version 1XB9 014 comprises an aluminum enclosure.  
Max. cable cross-section that can be connected, 4 mm<sup>2</sup>.



Terminal boxes manufactured out of cast iron (1XB9 016) and stainless steel (1XB9 015) can be optionally ordered.

# Introduction

## General technical versions

Mechanical design

1

### Overview

#### Bearing version

Motors for connection to the line supply have roller bearings or sleeve bearings as standard according to the following overview.

The bearing concepts for motors for converter operation depend on the speed control range.

#### Overview, bearing versions

Motor type	Bearing version IM B3, IM B35 <sup>1)</sup>		IM V1 <sup>2)</sup>			
	Number of poles 2		Number of poles 4		Number of poles ≥ 6	
	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
1LA4/1M.4 31.	Roller bearings (sleeve bearings optional)	Roller bearings (sleeve bearings optional)	Roller bearings (sleeve bearings optional)	Roller bearings (sleeve bearings optional)	Roller bearings (sleeve bearings not available)	Roller bearings (sleeve bearings not available)
1LA4/1M.4 35.						
1LA4/1M.4 40.						
1LA4/1M.4 45.		Sleeve bearing			Roller bearings (sleeve bearings optional)	Roller bearings (sleeve bearings optional)
1LA4/1M.4 50.	Sleeve bearing					
1LA4/1M.4 56.						
1LA4 63.	Not available	Not available		Sleeve bearing		
1R.6/1S.6 45.	Roller bearings (sleeve bearings optional)	Sleeve bearing	Roller bearings (sleeve bearings optional)	Roller bearings (sleeve bearings optional)	Roller bearings (sleeve bearings optional)	Roller bearings (sleeve bearings not available)
1R.6/1S.6 50.						
1R.6/1S.6 56.	Sleeve bearing					
1R.4/1S.4 63.				Sleeve bearing		
1R.6/1S.6 71.						

#### Assignment, type of construction and roller bearing type

Motor series	Type of construction	Shaft height mm	Drive end	Non-drive end
1LA4/1M.4	IM B3	315 ... 450	Deep-groove ball bearings (locating bearing)	Deep-groove ball bearings (floating bearing)
		500 ... 560 (converter version)	Deep-groove ball bearings (locating bearing)	Deep-groove ball bearings (floating bearing)
		500 ... 560 (line version)	Twin bearings: Deep-groove ball bearing and cylindrical- roller bearing (locating bearing)	Cylindrical-roller bearings (floating bearing)
		630	Twin bearings: Deep-groove ball bearing and cylindrical- roller bearing (locating bearing)	Cylindrical-roller bearings (floating bearing)
	IM V1	315 ... 560	Double bearings: Deep-groove ball bearings and angular- contact ball bearings (thrust bearing)	Deep-groove ball bearings (floating bearing)
		630	Deep-groove ball bearings (floating bearing)	Pair of angular-contact ball bearings (thrust bearing)
1R.1S.	IM B3	450	Deep-groove ball bearings (locating bearing)	Deep-groove ball bearings (floating bearing)
		500 ... 710	Double bearings: Deep-groove ball bearings and cylindrical- roller bearings (locating bearing)	Cylindrical-roller bearings (floating bearing)
	IM V1	450	Deep-groove ball bearings (floating bearing)	Double-row ball bearings: Deep-groove ball bearings and angular- contact ball bearings (thrust bearing)
		500 ... 560	Deep-groove ball bearings (floating bearing)	Angular-contact ball bearings (thrust bearing)
		710	Deep-groove ball bearings (floating bearing)	Pair of angular-contact ball bearings (thrust bearing)
	IM V10	630	Deep-groove ball bearings (floating bearing)	Pair of angular-contact ball bearings (thrust bearing)

For motors with sleeve bearings, lateral flange or (for shaft heights 450, 500 and 710 mm), center flange sleeve bearings are used. Generally, these motors are equipped with two floating bearings. This means that the rotor must be axially guided by the

bearings of the driven machine through a coupling with limited axial play. An appropriate sleeve bearing can be installed at the drive end if the motor rotor is to be axially guided.

<sup>1)</sup> IM B35 only for motor types 1L. and 1M.; not available with sleeve bearings.

<sup>2)</sup> Motor type 1R.4 / 1S.4 63. only in type of construction IM V10.

# Introduction

## General technical versions

### Mechanical design

#### Overview (continued)

##### Vibration response

Horizontal motors up to 3600 rpm fulfill, as standard, vibration severity level A according to IEC 60034-14. Vibration severity level B is optionally possible; but not for 2-pole H-compact PLUS motors with roller bearings. Values for vertical motors on request.

##### Balancing quality

The motor rotors are balanced dynamically with half feather key (but without mounted coupling halves). The balancing quality according to ISO 1940 is, up to and including 1500 rpm, G 1.5 and beyond this, G1.

##### Direction of rotation, fan

The direction of rotation must be specified in every order.

2-pole H-compact motors have an external unidirectional fan. For higher-pole motors, for shaft heights 315 to 450 mm, external bidirectional fans are used and for shaft heights 500 to 630 mm, unidirectional external fans.

H-compact PLUS motors have unidirectional inner and outer fans. In particular, this means that for motors with two-sided ventilation bidirectional fan design is not possible.

##### Paint finish

Unless otherwise specified in the order, the motors are supplied in the standard paint finish color RAL 7030 (stone gray). Other colors are available on request at an additional cost. Motors can be optionally supplied with a special paint finish.

The standard paint finish is classified in the "Moderate" climate group according to IEC 721-2-1. It is suitable for:

- Installed indoors or outdoors under a roof, where the motors are not exposed to any direct effects of the weather.
- Temperatures, continuously up to +100 °C, briefly up to +120 °C
- Relative air humidity up to 85 % at +25 °C continuously; briefly up to +100 % at +30 °C

The **special paint finish** is classified in the "Worldwide" climate group acc. to IEC 721-2-1. It is suitable for:

- Installed outdoors, where motors are directly exposed to the effects of the weather, e.g. direct solar radiation
- Additional temperature and humidity ranges
- Temperatures, continuously up to +120 °C, briefly up to +140 °C

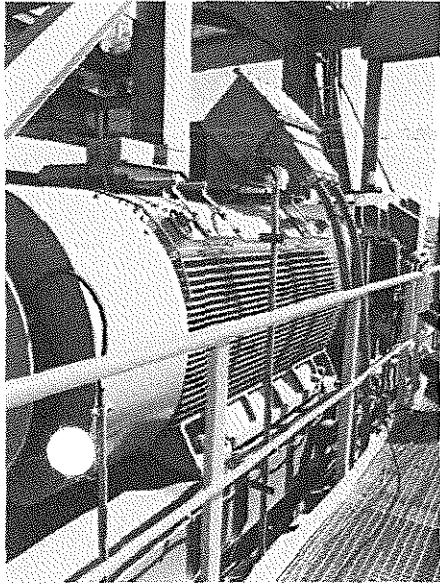
Typical installation locations are industrial environments and coastal areas. For outdoor applications in salt laden atmospheres, one of the options E81, E82 or E83 should be selected.

##### Standards and regulations

The motors comply with the appropriate standards and regulations, especially those listed in the table below.

Title	IEC	DIN/EN/ISO
General specifications for rotating electrical machinery	IEC 60034-1	DIN EN 60034-1
Degrees of protection for rotating electrical machinery (IP code)	IEC 60034-5	DIN EN 60034-5
Cooling methods for rotating electrical machinery (IC code)	IEC 60034-6	DIN EN 60034-6
Types of construction, mounting types and terminal box positions for rotating electrical machinery (IM code)	IEC 60034-7	DIN EN 60034-7
Terminal designations and direction of rotation for rotating electrical machinery	IEC 60034-8	DIN EN 60034-8
Mechanical vibration of rotating electrical machinery	IEC 60034-14	DIN EN 60034-14
Rated impulse voltages for rotating electrical machinery	IEC 60034-15	DIN EN 60034-15
Electrical insulation – thermal classification	IEC 60085	DIN EN 60085
Mechanical vibration – requirements on the balancing quality of rotors	–	DIN ISO 1940-1
Determining the losses and efficiency from tests	IEC 60034-2-1	DIN EN 60034-2-1

## Motors for line operation



<b>2/2</b>	<b>Overview</b>	<b>2/124</b>	<b>Water-cooled motors</b>
<b>2/3</b>	<b>Air-cooled motors</b>	<b>2/124</b>	<u>H-compact PLUS 1RN4 and 1RN6</u>
<b>2/3</b>	<u>H-compact 1LA4</u>		Selection and ordering data
<b>2/5</b>	Selection and ordering data	<b>2/126</b>	3.3 to 6.6 kV, 50 Hz
<b>2/8</b>	2 to 6.6 kV, 50 Hz	<b>2/130</b>	9 to 11 kV, 50 Hz
<b>2/10</b>	9 to 11 kV, 50 Hz	<b>2/134</b>	4 to 6.6 kV, 60 Hz
<b>2/13</b>	2 to 6.6 kV, 60 Hz	<b>2/138</b>	12.5 to 13.8 kV, 60 Hz
<b>2/19</b>	Dimension drawings	<b>2/139</b>	4 to 6.6 kV, 60 Hz NEMA version
<b>2/24</b>	IM B3 type of construction, roller bearings	<b>2/140</b>	12.5 to 13.8 kV, 60 Hz NEMA version
<b>2/30</b>	IM B3 type of construction, sleeve bearings		Dimension drawings
<b>2/32</b>	IM V1 type of construction, roller bearings	<b>2/141</b>	IM B3 type of construction, roller bearings (1RN4, 1RN6)
<b>2/36</b>	<u>H-compact PLUS 1RQ4 and 1RQ6</u>	<b>2/148</b>	IM B3 type of construction, sleeve bearings (1RN4, 1RN6)
<b>2/40</b>	Selection and ordering data	<b>2/155</b>	IM V1 type of construction, roller bearings (1RN4, 1RN6)
<b>2/44</b>	3.3 to 6.6 kV, 50 Hz	<b>2/162</b>	IM B3 type of construction, roller bearings (1RN6)
<b>2/45</b>	9 to 11 kV, 50 Hz	<b>2/165</b>	IM B3 type of construction, sleeve bearings (1RN6)
<b>2/46</b>	4 to 6.6 kV, 60 Hz	<b>2/168</b>	IM V1 type of construction, roller bearings (1RN6)
<b>2/47</b>	12.5 to 13.8 kV, 60 Hz		
<b>2/54</b>	NEMA version	<b>2/170</b>	<b>Options and tests</b>
<b>2/62</b>	Dimension drawings	<b>2/170</b>	<u>Description of options</u>
<b>2/70</b>	IM B3 type of construction, roller bearings (1RQ4, 1RQ6)		
<b>2/72</b>	IM B3 type of construction, sleeve bearings (1RQ4, 1RQ6)		
<b>2/75</b>	IM V1 type of construction, roller bearings (1RQ4, 1RQ6)		
<b>2/77</b>	<u>H-compact PLUS 1RA4, 1RA6 and 1RP6</u>		
<b>2/79</b>	Selection and ordering data		
<b>2/83</b>	3.3 to 6.6 kV, 50 Hz		
<b>2/87</b>	9 to 11 kV, 50 Hz		
<b>2/91</b>	4 to 6.6 kV, 60 Hz		
<b>2/92</b>	12.5 to 13.8 kV, 60 Hz		
<b>2/93</b>	4 to 6.6 kV, 60 Hz NEMA version		
<b>2/94</b>	12.5 to 13.8 kV, 60 Hz NEMA version		
<b>2/101</b>	Dimension drawings		
<b>2/109</b>	IM B3 type of construction, roller bearings (1RA4, 1RA6)		
<b>2/116</b>	IM B3 type of construction, sleeve bearings (1RA4, 1RA6)		
<b>2/119</b>	IM V1 type of construction, roller bearings (1RA4, 1RA6)		
<b>2/122</b>	IM B3 type of construction, roller bearings (1RP6)		
	IM B3 type of construction, sleeve bearings (1RP6)		
	IM V1 type of construction, roller bearings (1RP6)		

# Motors for line operation

## Overview

### Overview

#### **Normal conditions**

Selection and ordering data included in this chapter are valid for standard operating and installation conditions:

- Installation altitude of the motor  $\leq 1000$  m above sea level
- Ambient temperature (= coolant temperature for air-cooled motors) =  $40^{\circ}\text{C}$
- Coolant temperature for water-cooled motors =  $25^{\circ}\text{C}$
- Thermal class 155 (F) utilized to 130 (B)
- Continuous duty S1
- Permissible tolerances in compliance with IEC/EN 60034-1:
  - Rated voltage  $V_{\text{rated}} \pm 5\%$
  - Rated frequency  $f_{\text{rated}} \pm 2\%$

The H-compact and H-compact PLUS series are designed to be directly switched-on when certain starting conditions are maintained.

Motor starting does not have to be separately checked if the following criteria are maintained:

- The voltage when starting does not drop below  $0.9 \times V_{\text{rated}}$ .
- The load torque increases approximately with the square of the speed ( $T \sim n^2$ ).
- The maximum load torque does not exceed the corresponding value in the following table:

Shaft height	315		350		400		450		500		560		630		710	
Number of poles	2	4...	2	4...	2	4...	2	4...	2	4...	2	4...	2	4...	2	4...
<b>H-compact</b>																
max. load torque = $T_{\text{rated}} \times$	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
<b>H-compact PLUS</b>																
max. load torque = $T_{\text{rated}} \times$	—	—	—	—	—	—	0.75	0.9	0.7	0.9	0.6	0.9	0.6	0.9	0.5	0.9

Start-up with max. permissible inertia according to "selection and ordering data" is possible either for three times from cold or two times from warm motor condition (natural coast down between consecutive starts assumed).

If limits of load characteristic and/or inertia are exceeded, the motor start-up calculation has to be checked. In this case, please contact your Siemens sales representative.

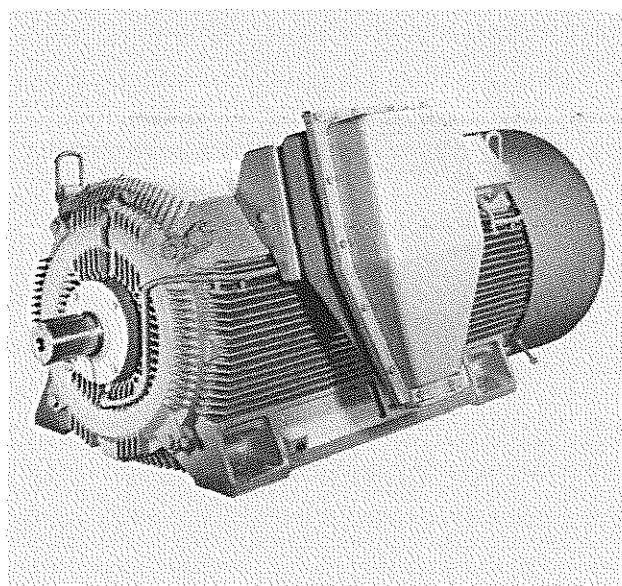


# Motors for line operation

## Air-cooled motors

H-compact 1LA4

### Overview



### Technical data

#### Overview of technical data

H-compact 1LA4	
Rated voltage	2.0 ... 11 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3, IM V1
Degree of protection	IP55
Cooling method	IC411
Stator winding insulation	Thermal class 155 (F), utilized to 130 (B)
Shaft height	315 ... 630 mm
Bearings	Roller bearings, sleeve bearings
Cage material	Die-cast aluminum or copper (dependent on the shaft height and number of poles)
Standards	IEC, EN

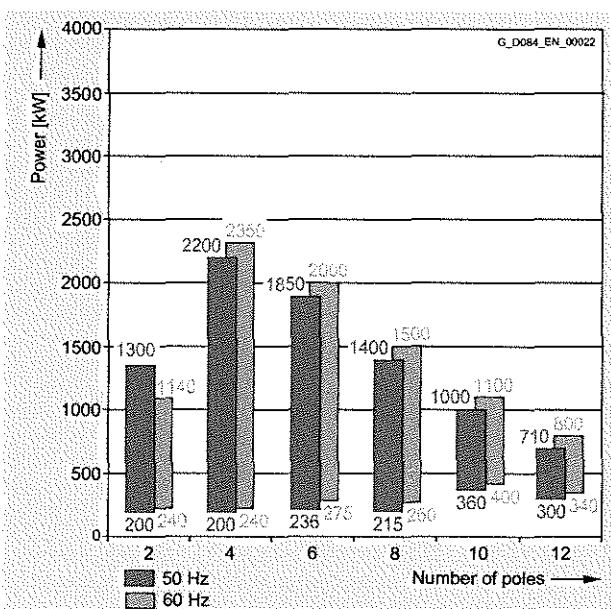
#### Power range for IEC motors for line operation

1LA4, 1MS4 (Ex nA), 1MG4 (Ex px) series

Insulation system, thermal class 155 (F), utilized to 130 (B).

Ambient temperature up to 40 °C, installation altitude up to 1000 m.

2.0 to 3.3 kV; 50 and 60 Hz



# Motors for line operation

## Air-cooled motors

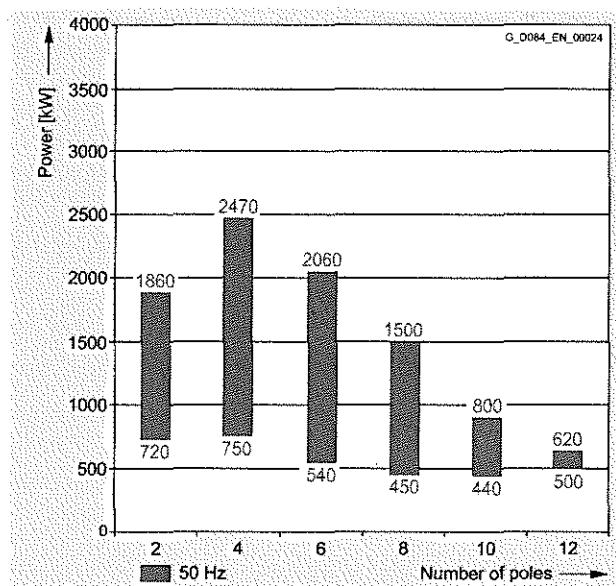
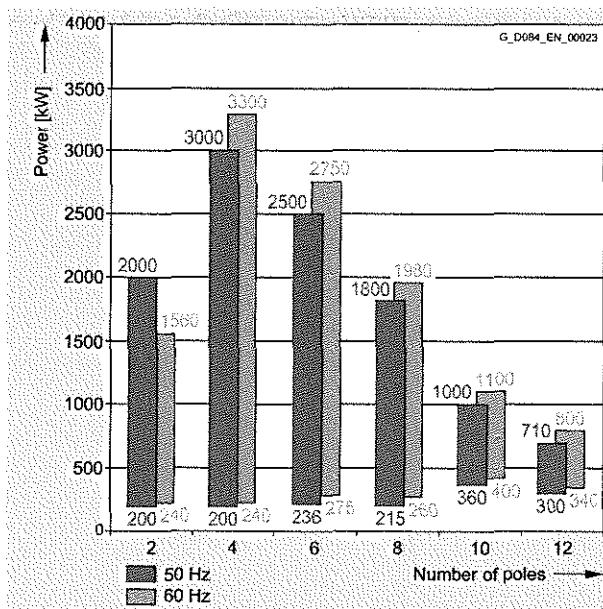
### H-compact II A4

#### Technical data (continued)

##### **Power range for IEC motors for line operation** (continued)

3.4 to 6.6 kV; 50 and 60 Hz

9 to 11 kV; 50 Hz



# Motors for line operation

## Air-cooled motors

H-compact 1LA4

### Selection and ordering data

The 1LA4 data also apply to explosion-protected 1MG4 (Ex px) and 1MS4 (Ex nA) motors.

Rated power kW	High voltage motor H-compact	Speed rpm	Rated current $I_{\text{rated}}$ at 6 kV	Efficiency		Power factor		Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{\text{LR}}/T_{\text{rated}}$	Locked- rotor current $I_{\text{R}}/I_{\text{rated}}$	Moment of inertia Motor kgm <sup>2</sup>	External max. <sup>1)</sup> kgm <sup>2</sup>									
				4/4 load	3/4 load	4/4 load	3/4 load															
<b>2.0 ... 6.6 kV, 50 Hz</b>																						
<b>2-pole</b>																						
200	<b>1LA4 310-2AN■■■</b>	2970	23.5	94.7	94.9	0.87	0.86	643	2.30	0.90	5.0	2.2	28									
236	<b>1LA4 312-2AN■■■</b>	2967	27.5	94.5	94.8	0.87	0.85	760	2.30	0.90	5.0	2.2	26									
300	<b>1LA4 314-2AN■■■</b>	2972	34.5	95.2	95.4	0.88	0.86	964	2.40	1.05	5.2	2.7	30									
355	<b>1LA4 316-2AN■■■</b>	2974	40.5	95.7	95.8	0.88	0.87	1140	2.50	1.10	5.3	3.1	35									
400	<b>1LA4 350-2AN■■■</b>	2978	45.5	95.6	95.8	0.88	0.86	1283	2.30	1.05	5.2	4.3	38									
450	<b>1LA4 352-2AN■■■</b>	2978	51.0	95.9	96.0	0.88	0.87	1443	2.50	1.20	5.5	4.8	43									
500	<b>1LA4 354-2AN■■■</b>	2980	57.0	96.1	96.3	0.88	0.87	1602	2.50	1.20	5.5	5.2	46									
560	<b>1LA4 400-2AN■■■</b>	2984	64.0	96.0	96.0	0.88	0.86	1792	2.50	0.85	5.4	7.8	26									
650	<b>1LA4 402-2AN■■■</b>	2985	74.0	96.3	96.3	0.88	0.87	2079	2.60	0.90	5.6	8.7	27									
750	<b>1LA4 404-2AN■■■</b>	2985	84.0	96.5	96.5	0.89	0.88	2399	2.60	0.95	5.6	9.9	30									
820	<b>1LA4 450-2CN■■■</b>	2983	92.0	96.2	96.2	0.89	0.87	2625	2.40	0.80	5.5	17.0	68									
940	<b>1LA4 452-2CN■■■</b>	2984	106	96.5	96.4	0.89	0.87	3008	2.50	0.80	5.8	19.0	76									
1030	<b>1LA4 454-2CN■■■</b>	2984	114	96.6	96.6	0.90	0.89	3296	2.40	0.75	5.7	21.0	79									
1200	<b>1LA4 500-2CN■■■</b>	2985	132	96.7	96.6	0.90	0.89	3839	2.30	0.65	5.3	29.0	93									
1300	<b>1LA4 502-2CN■■■</b>	2986	144	96.8	96.7	0.90	0.89	4157	2.30	0.65	5.3	32.0	98									
1420 <sup>2)</sup>	<b>1LA4 504-2CN■■■</b>	2986	154	96.9	96.9	0.91	0.90	4541	2.40	0.70	5.5	35.0	125									
1680 <sup>2)</sup>	<b>1LA4 560-2CN■■■</b>	2990	184	96.9	96.7	0.91	0.90	5365	2.50	0.45	5.4	53.0	104									
1900 <sup>2)</sup>	<b>1LA4 562-2CN■■■</b>	2991	205	97.0	96.9	0.91	0.90	6066	2.60	0.50	5.7	58.0	131									
2000 <sup>2)</sup>	<b>1LA4 564-2CN■■■</b>	2990	220	97.2	97.1	0.91	0.90	6387	2.50	0.45	5	64.0	136									
<b>4-pole</b>																						
200	<b>1LA4 310-4AN■■■</b>	1480	25.5	93.8	94.0	0.81	0.77	1290	2.30	1.15	5.2	2.8	159									
250	<b>1LA4 312-4AN■■■</b>	1480	30.5	94.5	94.8	0.84	0.81	1613	2.30	1.15	5.3	3.5	201									
300	<b>1LA4 314-4AN■■■</b>	1480	36.0	94.7	95.0	0.85	0.82	1936	2.40	1.25	5.5	4.0	222									
365	<b>1LA4 316-4AN■■■</b>	1481	43.5	95.2	95.5	0.86	0.82	2353	2.40	1.25	5.5	4.8	297									
400	<b>1LA4 350-4AN■■■</b>	1485	48.0	95.2	95.4	0.84	0.81	2572	2.50	1.25	5.5	6.0	224									
470	<b>1LA4 352-4AN■■■</b>	1484	56.0	95.4	95.6	0.85	0.82	3024	2.35	1.20	5.3	6.9	247									
560	<b>1LA4 354-4AN■■■</b>	1485	65.0	95.7	95.9	0.86	0.84	3601	2.40	1.30	5.5	8.1	296									
600	<b>1LA4 400-4AN■■■</b>	1489	71.0	95.4	95.4	0.85	0.81	3848	2.60	1.25	5.70	11.6	288									
680	<b>1LA4 402-4AN■■■</b>	1489	80.0	95.7	95.6	0.85	0.82	4361	2.60	1.25	5.70	12.9	330									
750	<b>1LA4 404-4AN■■■</b>	1489	88.0	95.8	95.7	0.86	0.83	4810	2.65	1.30	5.80	14.5	381									
900	<b>1LA4 450-4AN■■■</b>	1489	108	96.0	96.0	0.84	0.82	5772	2.25	0.95	5.20	22.0	438									
950	<b>1LA4 452-4AN■■■</b>	1489	112	96.0	96.1	0.85	0.83	6093	2.25	0.95	5.20	24.0	556									

### Voltage code:

3 kV, 50 Hz	<b>3</b>
3.3 kV, 50 Hz	<b>0</b>
5 kV, 50 Hz	<b>5</b>
6 kV, 50 Hz	<b>6</b>
6.6 kV, 50 Hz	<b>7</b>
Other voltage	<b>9</b>

### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Not available for ≤ 3.3 kV.



# Motors for line operation

## Air-cooled motors

H-compact (1LA4)

### Selection and ordering data (continued)

Rated power kW	<b>High voltage motor H-compact</b>	Speed rpm	Rated current A	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{rated}$	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia								
				rated at 6 kV	4/4 load	3/4 load	4/4 load					Motor kgm <sup>2</sup>	External max. <sup>1)</sup> kgm <sup>2</sup>							
<b>2.0 ... 6.6 kV, 50 Hz</b>																				
4-pole (continued)																				
1050	<b>1LA4 454-4AN■■■</b>	1489	124	96.2	96.3	0.85	0.83	6734	2.30	0.95	5.25	27.0	653							
1200	<b>1LA4 500-4AN■■■</b>	1492	140	96.5	96.3	0.85	0.83	7680	2.4	0.90	5.5	33.0	447							
1300	<b>1LA4 502-4AN■■■</b>	1492	150	96.6	96.4	0.86	0.84	8320	2.4	0.90	5.5	37.0	538							
1450	<b>1LA4 504-4AN■■■</b>	1492	166	96.7	96.7	0.87	0.86	9280	2.4	0.90	5.5	42.0	628							
1700	<b>1LA4 560-4CN■■■</b>	1494	196	96.7	96.6	0.86	0.83	10866	2.5	0.60	5.5	79.0	551							
1900	<b>1LA4 562-4CN■■■</b>	1494	215	96.9	96.8	0.88	0.85	12144	2.5	0.60	5.5	92.0	698							
2200	<b>1LA4 564-4CN■■■</b>	1494	250	97.2	97.1	0.88	0.86	14061	2.5	0.60	5.5	104.0	761							
2400 <sup>2)</sup>	<b>1LA4 632-4CN■■■</b>	1494	265	97.3	97.2	0.89	0.87	15341	2.3	0.55	5.5	157.0	845							
2700 <sup>2)</sup>	<b>1LA4 634-4CN■■■</b>	1495	300	97.4	97.3	0.89	0.87	17184	2.3	0.55	5.5	171.0	940							
3000 <sup>2)</sup>	<b>1LA4 636-4CN■■■</b>	1495	335	97.5	97.4	0.89	0.87	19164	2.3	0.55	5.5	186.2	1020							
6-pole																				
236	<b>1LA4 314-6AN■■■</b>	986	29.5	94.1	94.5	0.82	0.78	2286	2.50	1.25	5.3	5.3	375							
270	<b>1LA4 316-6AN■■■</b>	985	33.5	94.3	94.8	0.82	0.80	2617	2.40	1.25	5.5	6.4	431							
315	<b>1LA4 350-6AN■■■</b>	989	39.0	94.8	95.1	0.82	0.79	3041	2.30	1.10	5.3	10.8	541							
365	<b>1LA4 352-6AN■■■</b>	989	44.5	95.1	95.4	0.83	0.80	3524	2.20	1.10	5.3	12.7	667							
425	<b>1LA4 354-6AN■■■</b>	990	52.0	95.3	95.5	0.82	0.79	4099	2.40	1.25	5.5	15.0	841							
490	<b>1LA4 400-6AN■■■</b>	991	59.0	95.4	95.6	0.84	0.81	4722	2.30	1.05	5.5	21.2	740							
570	<b>1LA4 402-6AN■■■</b>	992	68.0	95.7	95.9	0.84	0.81	5487	2.30	1.10	5.5	24.2	1193							
630	<b>1LA4 404-6AN■■■</b>	991	77.0	95.8	95.9	0.82	0.80	6071	2.40	1.20	5.5	27.3	1233							
700	<b>1LA4 450-6AN■■■</b>	992	84.0	95.8	95.9	0.84	0.81	6738	2.30	1.10	5.4	33.0	1417							
750	<b>1LA4 452-6AN■■■</b>	993	90.0	96.4	96.4	0.84	0.81	7212	2.30	1.10	5.4	37.0	1813							
800	<b>1LA4 454-6AN■■■</b>	993	94.0	96.0	96.1	0.85	0.82	7693	2.30	1.10	5.4	41.0	1789							
1040	<b>1LA4 500-6CN■■■</b>	994	120	96.5	96.6	0.87	0.85	9992	2.10	0.75	5.30	82.0	1668							
1160	<b>1LA4 502-6CN■■■</b>	994	132	96.6	96.7	0.88	0.86	11145	2.10	0.75	5.30	92.0	1858							
1270	<b>1LA4 504-6CN■■■</b>	994	144	96.8	96.9	0.88	0.86	12202	2.15	0.75	5.40	102.0	2048							
1470	<b>1LA4 560-6CN■■■</b>	995	168	96.9	96.9	0.87	0.85	14109	2.25	0.65	5.25	138.0	2105							
1720	<b>1LA4 562-6CN■■■</b>	995	196	97.0	97.1	0.87	0.85	16509	2.25	0.65	5.30	158.0	2470							
1900	<b>1LA4 564-6CN■■■</b>	995	215	97.1	97.2	0.88	0.86	18236	2.30	0.65	5.35	183.0	2890							
2050 <sup>2)</sup>	<b>1LA4 632-6CN■■■</b>	995	230	97.0	96.8	0.89	0.87	19676	2.3	0.50	5.5	269.1	2230							
2300 <sup>2)</sup>	<b>1LA4 634-6CN■■■</b>	995	255	97.1	97.0	0.90	0.88	22075	2.3	0.50	5.5	297.4	2450							
2500 <sup>2)</sup>	<b>1LA4 636-6CN■■■</b>	995	275	97.2	97.1	0.90	0.88	23995	2.3	0.50	5.5	323.0	2680							
8-pole																				
215	<b>1LA4 350-8AN■■■</b>	738	27.0	93.8	94.2	0.81	0.78	2782	2.30	1.00	5.1	10.6	826							
250	<b>1LA4 352-8AN■■■</b>	739	31.5	94.0	94.4	0.81	0.78	3230	2.40	1.00	5.3	12.5	986							
300	<b>1LA4 354-8AN■■■</b>	739	38.0	94.2	94.7	0.81	0.78	3876	2.40	1.10	5.3	14.8	1107							
370	<b>1LA4 400-8AN■■■</b>	741	45.5	95.0	95.3	0.82	0.79	4768	2.40	1.05	5.1	21.3	1110							

**Voltage code:**

3 kV, 50 Hz	<b>3</b>
3.3 kV, 50 Hz	<b>0</b>
5 kV, 50 Hz	<b>5</b>
6 kV, 50 Hz	<b>6</b>
6.6 kV, 50 Hz	<b>7</b>
Other voltage	<b>9</b>

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

**Type of construction:**

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Not available for ≤ 3.3 kV.

# Motors for line operation

## Air-cooled motors

H-compact II A4

### Selection and ordering data (continued)

Rated power kW	High voltage motor H-compact	Speed rpm	Rated current $I_{rated}$ at 6 kV A	Efficiency 4/4 load %	Efficiency 3/4 load %	Power factor 4/4 load $\cos \varphi$	Power factor 3/4 load $\cos \varphi$	Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{LR}/T_{rated}$ [-]	Locked- rotor current $I_{LR}/I_{rated}$ [-]	Moment of inertia Motor kgm <sup>2</sup>	Moment of inertia External, max. <sup>1)</sup> kgm <sup>2</sup>
<b>2.0 ... 6.6 kV, 50 Hz</b>													
8-pole (continued)													
420	<b>1LA4 402-8AN■■■</b>	741	52.0	95.2	95.5	0.82	0.79	5412	2.40	1.10	5.4	24.4	1402
465	<b>1LA4 404-8AN■■■</b>	741	57.0	95.2	95.5	0.82	0.79	5992	2.40	1.00	5.4	27.4	1589
530	<b>1LA4 450-8AN■■■</b>	742	67.0	95.4	95.6	0.80	0.77	6821	2.50	1.00	5.4	34.0	2016
600	<b>1LA4 452-8AN■■■</b>	742	75.0	95.6	95.7	0.81	0.76	7722	2.50	1.00	5.4	37.0	2563
670	<b>1LA4 454-8AN■■■</b>	742	83.0	95.7	95.9	0.81	0.78	8622	2.50	1.00	5.4	42.0	2778
800	<b>1LA4 500-8CN■■■</b>	746	98	96.1	96.1	0.82	0.78	10241	2.15	0.75	5.10	82.0	2820
850	<b>1LA4 502-8CN■■■</b>	746	106	96.1	96.1	0.81	0.78	10881	2.20	0.80	5.25	92.0	2470
980	<b>1LA4 504-8CN■■■</b>	746	122	96.2	96.2	0.81	0.78	12546	2.20	0.75	5.20	102.0	3582
1100	<b>1LA4 560-8CN■■■</b>	746	132	96.4	96.4	0.83	0.80	14082	2.30	0.70	5.10	138.0	3672
1260	<b>1LA4 562-8CN■■■</b>	746	152	96.6	96.6	0.83	0.81	16130	2.30	0.70	5.05	158.0	4692
1430	<b>1LA4 564-8CN■■■</b>	746	172	96.7	96.7	0.83	0.80	18306	2.35	0.70	5.20	183.0	4582
1630 <sup>2)</sup>	<b>1LA4 634-8CN■■■</b>	746	192	96.7	96.5	0.84	0.81	20867	2.4	0.50	5.5	294.0	4100
1800 <sup>2)</sup>	<b>1LA4 636-8CN■■■</b>	746	210	96.8	96.6	0.84	0.81	23043	2.4	0.50	5.5	320.1	4440
10-pole													
360	<b>1LA4 450-3AN■■■</b>	591	48.5	94.3	94.6	0.76	0.71	5817	2.30	1.00	4.5	34.0	3266
400	<b>1LA4 452-3AN■■■</b>	591	54.0	94.6	94.9	0.76	0.71	6463	2.30	1.00	4.5	37.0	4063
450	<b>1LA4 454-3AN■■■</b>	592	60.0	94.8	95.0	0.76	0.71	7259	2.30	1.00	4.5	42.0	4458
530	<b>1LA4 500-3CN■■■</b>	593	68.0	95.2	95.4	0.79	0.75	8535	2.30	0.95	4.8	82.0	5280
590	<b>1LA4 502-3CN■■■</b>	593	75.0	95.4	95.6	0.79	0.74	9501	2.30	0.95	4.8	92.0	6200
650	<b>1LA4 504-3CN■■■</b>	593	83.0	95.5	95.6	0.79	0.74	10467	2.30	0.95	4.8	102.0	6770
770	<b>1LA4 560-3CN■■■</b>	595	98.0	95.8	95.9	0.79	0.75	12358	2.20	0.75	5.0	138.0	3902
850	<b>1LA4 562-3CN■■■</b>	596	108	95.9	96.0	0.79	0.75	13619	2.20	0.75	5.0	158.0	4102
1000	<b>1LA4 564-3CN■■■</b>	595	126	96.1	96.2	0.80	0.75	16049	2.20	0.75	5.0	183.0	5717
12-pole													
300	<b>1LA4 450-5CN■■■</b>	492	43.0	93.6	93.7	0.72	0.66	5823	2.10	0.75	4.2	34.0	3166
325	<b>1LA4 452-5CN■■■</b>	492	47.0	93.7	93.7	0.71	0.64	6308	2.10	0.75	4.2	37.0	3063
350	<b>1LA4 454-5CN■■■</b>	493	45.0	93.8	93.8	0.72	0.65	6779	2.10	0.75	4.2	42.0	3158
420	<b>1LA4 500-5CN■■■</b>	494	59.0	94.6	94.6	0.72	0.67	8119	2.00	0.65	4.2	82.0	4500
460	<b>1LA4 502-5CN■■■</b>	494	64.0	94.7	94.7	0.73	0.68	8892	2.00	0.65	4.2	92.0	5360
500	<b>1LA4 504-5CN■■■</b>	494	71.0	94.7	94.7	0.72	0.67	9665	2.00	0.65	4.2	102.0	4640
580	<b>1LA4 560-5CN■■■</b>	495	81.0	95.1	95.0	0.72	0.65	11189	2.00	0.65	4.4	138.0	7284
640	<b>1LA4 562-5CN■■■</b>	495	90.0	95.3	95.1	0.72	0.65	12346	2.00	0.65	4.4	158.0	8862
710	<b>1LA4 564-5CN■■■</b>	495	99.0	95.4	95.2	0.72	0.65	13697	2.00	0.65	4.4	183.0	10478

#### Voltage code:

3 kV, 50 Hz	<b>3</b>
3.3 kV, 50 Hz	<b>0</b>
5 kV, 50 Hz	<b>5</b>
6 kV, 50 Hz	<b>6</b>
6.6 kV, 50 Hz	<b>7</b>
Other voltage	<b>9</b>

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

Higher pole numbers are available on request.

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Not available for ≤ 3.3 kV.



# Motors for line operation

## Air-cooled motors

### H-compact 1LA4

#### Selection and ordering data

Rated power IEC	High voltage motor H-compact	Speed kW	Rated current Order No.	Efficiency rpm	Power factor A	Torque %	Break-down torque Nm	Locked- down torque [-]	Locked- rotor current [-]	Moment of inertia kgm <sup>2</sup>	Motor kgm <sup>2</sup>	External max. <sup>1)</sup>	
<b>9 ... 11 kV, 50 Hz</b>													
<b>2-pole</b>													
720	<b>1LA4 450-2CN■■■</b>	2983	48.5	95.9	95.9	0.89	0.88	2305	2.30	0.70	5.5	17.0	73
820	<b>1LA4 452-2CN■■■</b>	2984	55.0	96.2	96.1	0.90	0.88	2624	2.40	0.75	5.7	19.0	81
900	<b>1LA4 454-2CN■■■</b>	2984	60.0	96.3	96.3	0.90	0.89	2880	2.40	0.75	5.8	21.0	94
1120	<b>1LA4 500-2CN■■■</b>	2986	75.0	96.4	96.4	0.90	0.89	3582	2.50	0.70	5.6	29.0	102
1170	<b>1LA4 502-2CN■■■</b>	2987	78.0	96.5	96.5	0.90	0.89	3740	2.50	0.70	5.9	32.0	123
1290	<b>1LA4 504-2CN■■■</b>	2988	85.0	96.7	96.6	0.91	0.90	4123	2.60	0.75	6.0	35.0	147
1550	<b>1LA4 560-2CN■■■</b>	2991	102	96.7	96.6	0.91	0.90	4948	2.50	0.50	5.5	53.0	118
1700	<b>1LA4 562-2CN■■■</b>	2991	112	96.9	96.8	0.91	0.90	5427	2.50	0.50	5.5	58.0	138
1860	<b>1LA4 564-2CN■■■</b>	2991	122	97.0	96.9	0.91	0.90	5938	2.50	0.50	5.5	64.0	147
<b>4-pole</b>													
800	<b>1LA4 450-4AN■■■</b>	1489	57	95.6	95.6	0.85	0.83	5131	2.25	0.95	5.15	22.0	528
850	<b>1LA4 452-4AN■■■</b>	1489	60	95.8	95.8	0.86	0.85	5452	2.25	0.95	5.15	24.0	626
900	<b>1LA4 454-4AN■■■</b>	1489	63	95.9	96.0	0.86	0.84	5772	2.25	0.95	5.20	27.0	803
1060	<b>1LA4 500-4AN■■■</b>	1492	74	96.2	96.1	0.86	0.84	6784	2.4	0.90	5.5	33.0	477
1180	<b>1LA4 502-4AN■■■</b>	1492	82	96.3	96.4	0.86	0.85	7552	2.4	0.90	5.5	37.0	568
1320	<b>1LA4 504-4AN■■■</b>	1492	91	96.5	96.5	0.87	0.86	8448	2.4	0.90	5.5	42.0	703
1500	<b>1LA4 560-4CN■■■</b>	1494	104	96.6	96.4	0.86	0.83	9587	2.6	0.60	5.5	79.0	600
1700	<b>1LA4 562-4CN■■■</b>	1494	116	96.8	96.7	0.88	0.85	10866	2.5	0.60	5.4	92.0	713
2000	<b>1LA4 564-4CN■■■</b>	1494	136	97.0	96.9	0.88	0.85	12783	2.6	0.60	5.5	104.0	841
2210	<b>1LA4 634-4CN■■■</b>	1495	148	97.2	97.0	0.89	0.87	14117	2.3	0.5	5.5	171.0	1030
2470	<b>1LA4 636-4CN■■■</b>	1495	164	97.3	97.2	0.89	0.87	15778	2.3	0.5	5.5	186.2	1120
<b>6-pole</b>													
540	<b>1LA4 450-6AN■■■</b>	993	38.5	95.3	95.4	0.85	0.82	5193	2.30	1.10	5.4	33.0	947
590	<b>1LA4 452-6AN■■■</b>	993	42.0	95.4	95.5	0.85	0.82	5674	2.40	1.20	5.5	37.0	843
630	<b>1LA4 454-6AN■■■</b>	993	45.0	95.5	95.6	0.85	0.83	6058	2.40	1.20	5.5	41.0	1039
950	<b>1LA4 500-6CN■■■</b>	995	66	96.3	96.5	0.86	0.85	9118	2.10	0.65	5.10	82.0	1018
1050	<b>1LA4 502-6CN■■■</b>	995	72	96.4	96.7	0.87	0.85	10078	2.10	0.65	5.15	92.0	1158
1170	<b>1LA4 504-6CN■■■</b>	995	80	96.6	96.8	0.87	0.85	11230	2.20	0.75	5.25	102.0	1298
1250	<b>1LA4 560-6CN■■■</b>	996	86.0	96.7	96.8	0.87	0.85	11984	2.45	0.65	5.6	138.0	1680
1450	<b>1LA4 562-6CN■■■</b>	996	99.0	96.8	96.9	0.87	0.85	13902	2.45	0.65	5.6	158.0	2025
1650	<b>1LA4 564-6CN■■■</b>	996	112	96.9	97.0	0.87	0.85	15819	2.45	0.65	5.6	183.0	2035
1860	<b>1LA4 634-6CN■■■</b>	995	124	96.5	96.4	0.90	0.88	17852	2.3	0.5	5.5	297.4	1800
2060	<b>1LA4 636-6CN■■■</b>	995	136	96.7	96.6	0.90	0.88	19772	2.3	0.5	5.5	323.0	2090

#### Voltage code:

10 kV, 50 Hz  
Other voltage

8

9

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

#### Type of construction:

IM B3  
IM V1 (with canopy)

0

4

IM V1 (without canopy)

8

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

# Motors for line operation

## Air-cooled motors

H-compact 11-A4

### Selection and ordering data (continued)

Rated power kW	High voltage motor H-compact	Speed rpm	Rated current $I_{\text{rated}}$ at 10 kV	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{\text{rated}}$	Locked- rotor torque $T_{LR}/T_{\text{rated}}$	Locked- rotor current $I_{LR}/I_{\text{rated}}$	Moment of inertia kgm <sup>2</sup>	Motor External, max. <sup>1)</sup> kgm <sup>2</sup>									
				4/4 load	3/4 load	4/4 load	3/4 load															
<b>9 ... 11 kV, 50 Hz</b>																						
8-pole																						
450	<b>1LA4 450-8AN■■■</b>	743	34.0	94.8	95.0	0.80	0.76	5783	2.60	1.00	5.5	34.0	1286									
480	<b>1LA4 452-8AN■■■</b>	743	36.0	95.0	95.2	0.81	0.77	6169	2.60	1.00	5.5	37.0	1383									
560	<b>1LA4 454-8AN■■■</b>	743	42.0	95.3	95.4	0.81	0.77	7197	2.60	1.00	5.5	42.0	1788									
700	<b>1LA4 500-8CN■■■</b>	746	52.0	95.8	95.8	0.81	0.77	8960	2.20	0.75	5.5	82.0	1740									
750	<b>1LA4 502-8CN■■■</b>	746	55.0	95.9	95.9	0.82	0.78	9600	2.20	0.75	5.5	92.0	2020									
800	<b>1LA4 504-8CN■■■</b>	746	59.0	96.0	96.0	0.82	0.78	10240	2.20	0.75	5.5	102.0	2240									
950	<b>1LA4 560-8CN■■■</b>	746	70.0	96.2	96.1	0.81	0.77	12160	2.40	0.65	5.3	138.0	2562									
1050	<b>1LA4 562-8CN■■■</b>	746	77.0	96.2	96.2	0.82	0.78	13440	2.40	0.65	5.3	158.0	2282									
1250	<b>1LA4 564-8CN■■■</b>	746	92.0	96.5	96.3	0.81	0.77	16000	2.50	0.70	5.5	183.0	3217									
1350	<b>1LA4 634-8CN■■■</b>	746	96	96.2	96.0	0.84	0.81	17282	2.4	0.50	5.5	294.0	O. R. <sup>2)</sup>									
1500	<b>1LA4 636-8CN■■■</b>	746	106	96.3	96.1	0.84	0.81	19202	2.4	0.50	5.5	320.1	O. R. <sup>2)</sup>									
10-pole																						
440	<b>1LA4 500-3CN■■■</b>	593	33.5	94.7	95.0	0.80	0.76	7085	2.20	0.85	4.7	82.0	3080									
500	<b>1LA4 502-3CN■■■</b>	593	38.0	95.0	95.2	0.80	0.75	8051	2.20	0.90	4.7	92.0	3770									
530	<b>1LA4 504-3CN■■■</b>	593	40.0	95.1	95.3	0.80	0.75	8535	2.20	0.90	4.7	102.0	4070									
630	<b>1LA4 560-3CN■■■</b>	595	47.5	95.4	95.6	0.80	0.75	10111	2.20	0.75	5.0	138.0	2382									
690	<b>1LA4 562-3CN■■■</b>	596	52.0	95.4	95.6	0.80	0.75	11055	2.20	0.80	5.1	158.0	2317									
800	<b>1LA4 564-3CN■■■</b>	596	61.0	95.6	95.7	0.79	0.75	12817	2.25	0.80	5.2	183.0	2807									
12-pole																						
500	<b>1LA4 560-5CN■■■</b>	496	43.0	94.8	94.6	0.71	0.65	9626	2.00	0.65	4.4	138.0	4655									
560	<b>1LA4 562-5CN■■■</b>	496	48.0	95.0	94.8	0.71	0.64	10781	2.00	0.65	4.4	158.0	5533									
620	<b>1LA4 564-5CN■■■</b>	496	52.0	95.1	94.9	0.72	0.65	11936	2.00	0.65	4.4	183.0	5774									

**Voltage code:**

10 kV, 50 Hz

8

Other voltage

9

**Type of construction:**

IM B3

0

IM V1 (with canopy)

4

IM V1 (without canopy)

8

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> On request.



# Motors for line operation

## Air-cooled motors

### H-compact 1LA4

#### Selection and ordering data

The 1LA4 data also apply to explosion-protected 1MG4 (Ex px) and 1MS4 (Ex nA) motors.

Rated power kW	<b>High voltage motor H-compact</b> Order No.	Speed rpm	Rated current I <sub>rated</sub> at 4.16 kV A	Efficiency		Power factor		Torque Nm	Break-down torque T <sub>B</sub> / T <sub>rated</sub> [-]	Locked- rotor torque T <sub>LR</sub> / T <sub>rated</sub> [-]	Locked- rotor current I <sub>LR</sub> / I <sub>rated</sub> [-]	Moment of inertia kgm <sup>2</sup>	
				4/4 load %	3/4 load %	4/4 load cos ϕ	3/4 load cos ϕ					Motor kgm <sup>2</sup>	External max. <sup>1)</sup> kgm <sup>2</sup>
<b>2.0 ... 6.6 kV, 60 Hz</b>													
<b>2-pole</b>													
240	<b>1LA4 310-2AN■■■</b>	3572	40.5	94.7	94.7	0.87	0.86	642	2.3	0.95	5.0	2.2	18
285	<b>1LA4 312-2AN■■■</b>	3569	48.0	94.7	94.7	0.87	0.85	763	2.2	0.85	5.0	2.2	16
350	<b>1LA4 314-2AN■■■</b>	3572	59.0	95.2	95.2	0.87	0.86	936	2.4	1.00	5.3	2.7	18
410	<b>1LA4 316-2AN■■■</b>	3574	68.0	95.6	95.6	0.88	0.87	1095	2.5	1.10	5.4	3.1	26
460	<b>1LA4 350-2AN■■■</b>	3578	76.0	95.6	95.6	0.88	0.86	1228	2.5	1.05	5.4	4.3	25
510	<b>1LA4 352-2AN■■■</b>	3580	84.0	95.9	95.8	0.88	0.87	1360	2.6	1.20	5.6	4.8	29
560	<b>1LA4 354-2AN■■■</b>	3579	91.0	96.0	96.0	0.89	0.88	1494	2.5	1.25	5.6	5.2	31
630	<b>1LA4 400-2AN■■■</b>	3583	104	95.9	95.6	0.88	0.87	1679	2.3	0.80	5.3	7.8	14
730	<b>1LA4 402-2AN■■■</b>	3585	120	96.1	95.9	0.88	0.87	1944	2.5	0.85	5.5	8.7	16
830	<b>1LA4 404-2AN■■■</b>	3585	134	96.3	96.1	0.89	0.88	2211	2.6	0.90	5.5	9.9	19
920	<b>1LA4 450-2CN■■■</b>	3583	150	96.1	95.8	0.89	0.88	2452	2.40	0.70	5.5	17.0	43
1000	<b>1LA4 452-2CN■■■</b>	3584	160	96.2	95.8	0.90	0.88	2664	2.45	0.70	5.7	19.0	46
1140	<b>1LA4 454-2CN■■■</b>	3585	182	96.6	96.4	0.90	0.88	3037	2.55	0.75	5.9	21.0	54
1330 <sup>2)</sup>	<b>1LA4 500-2CN■■■</b>	3586	215	96.3	95.9	0.90	0.89	3542	2.4	0.65	5.5	29.0	52
1380 <sup>2)</sup>	<b>1LA4 502-2CN■■■</b>	3586	220	96.3	96.0	0.91	0.90	3675	2.4	0.65	5.5	32.0	58
1560 <sup>2)</sup>	<b>1LA4 504-2CN■■■</b>	3586	245	96.7	96.3	0.91	0.90	4154	2.5	0.70	5.6	35.0	72
<b>4-pole</b>													
240	<b>1LA4 310-4AN■■■</b>	1780	44.5	93.8	93.7	0.80	0.76	1288	2.40	1.15	5.3	2.8	104
300	<b>1LA4 312-4AN■■■</b>	1780	52.0	94.6	94.6	0.84	0.81	1609	2.30	1.20	5.2	3.5	133
360	<b>1LA4 314-4AN■■■</b>	1780	62.0	94.9	95.0	0.85	0.82	1931	2.30	1.25	5.3	4.0	145
440	<b>1LA4 316-4AN■■■</b>	1780	75.0	95.3	95.4	0.85	0.82	2360	2.40	1.30	5.5	4.8	200
470	<b>1LA4 350-4AN■■■</b>	1783	81.0	95.2	95.2	0.85	0.83	2517	2.30	1.15	5.2	6.0	144
550	<b>1LA4 352-4AN■■■</b>	1783	93.0	95.5	95.5	0.86	0.84	2946	2.20	1.15	5.2	6.9	159
640	<b>1LA4 354-4AN■■■</b>	1784	106	95.6	95.6	0.87	0.85	3426	2.30	1.20	5.5	8.1	195
680	<b>1LA4 400-4AN■■■</b>	1788	116	95.1	94.8	0.86	0.83	3632	2.55	1.20	5.80	11.6	174
750	<b>1LA4 402-4AN■■■</b>	1788	126	95.4	95.2	0.87	0.84	4006	2.55	1.25	5.80	12.9	206
830	<b>1LA4 404-4AN■■■</b>	1789	138	96.6	95.3	0.87	0.85	4431	2.55	1.20	5.90	14.5	243
1000	<b>1LA4 450-4AN■■■</b>	1789	172	95.6	95.1	0.84	0.82	5338	2.40	0.95	5.25	22.0	298

#### Voltage code:

4 kV, 60 Hz  
6.6 kV, 60 Hz  
Other voltage

4  
1  
9

Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

#### Type of construction:

IM B3  
IM V1 (with canopy)  
IM V1 (without canopy)

0  
4  
8

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Not available for ≤ 3.3 kV.



# Motors for line operation

## Air-cooled motors

H-compact 11 A4

### Selection and ordering data (continued)

Rated power kW	<b>High voltage motor H-compact</b>	Speed rpm	Rated current $I_{rated}$ at 4.16 kV	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{rated}$	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia kgm <sup>2</sup>	Motor External, max. <sup>1)</sup> kgm <sup>2</sup>									
				4/4 load	3/4 load	4/4 load	3/4 load															
<b>2.0 ... 6.6 kV, 60 Hz</b>																						
'4-pole (continued)																						
1050	<b>1LA4 452-4AN</b>	1789	178	95.7	95.4	0.86	0.84	5605	2.30	0.95	5.20	24.0	366									
1150	<b>1LA4 454-4AN</b>	1789	194	95.9	95.6	0.86	0.84	6139	2.30	0.95	5.25	27.0	443									
1350	<b>1LA4 500-4AN</b>	1792	230	96.1	95.8	0.85	0.83	7194	2.40	0.90	5.5	33.0	277									
1450	<b>1LA4 502-4AN</b>	1792	245	96.2	95.9	0.86	0.84	7727	2.40	0.90	5.5	37.0	348									
1600	<b>1LA4 504-4AN</b>	1792	260	96.3	96.2	0.88	0.86	8526	2.40	0.90	5.5	42.0	413									
1870	<b>1LA4 560-4CN</b>	1794	315	96.4	96.0	0.86	0.84	9954	2.50	0.55	5.5	79.0	356									
2090	<b>1LA4 562-4CN</b>	1794	345	96.6	96.3	0.87	0.84	11125	2.60	0.60	5.6	92.0	458									
2350	<b>1LA4 564-4CN</b>	1794	385	96.8	96.6	0.88	0.85	12508	2.60	0.60	5.6	104.0	540									
2640 <sup>2)</sup>	<b>1LA4 632-4CN</b>	1793	425	96.9	96.7	0.89	0.87	14068	2.3	0.55	5.5	157.0	O. R. <sup>3)</sup>									
2970 <sup>2)</sup>	<b>1LA4 634-4CN</b>	1794	475	97.1	96.9	0.89	0.87	15758	2.3	0.55	5.5	171.0	O. R. <sup>3)</sup>									
3300 <sup>2)</sup>	<b>1LA4 636-4CN</b>	1794	530	97.3	97.1	0.89	0.87	17573	2.3	0.55	5.5	186.2	O. R. <sup>3)</sup>									
6-pole																						
275	<b>1LA4 314-6AN</b>	1184	49.0	94.3	94.5	0.83	0.80	2218	2.40	1.20	5.2	5.3	247									
325	<b>1LA4 316-6AN</b>	1185	58.0	94.7	95.0	0.82	0.80	2619	2.40	1.20	5.5	6.4	360									
380	<b>1LA4 350-6AN</b>	1190	68.0	95.1	95.1	0.82	0.79	3049	2.40	1.15	5.3	10.8	498									
430	<b>1LA4 352-6AN</b>	1190	75.0	95.3	95.4	0.83	0.80	3450	2.20	1.10	5.5	12.7	615									
510	<b>1LA4 354-6AN</b>	1189	90.0	95.5	95.6	0.82	0.80	4096	2.30	1.15	5.5	15.0	689									
560	<b>1LA4 400-6AN</b>	1192	98.0	95.6	95.5	0.83	0.80	4486	2.50	1.10	5.5	21.2	740									
670	<b>1LA4 402-6AN</b>	1192	116	95.8	95.8	0.83	0.81	5367	2.40	1.10	5.5	24.2	780									
690	<b>1LA4 404-6AN</b>	1191	120	95.8	95.8	0.83	0.82	5532	2.30	1.10	5.5	27.3	925									
800	<b>1LA4 450-6AN</b>	1192	138	95.8	95.7	0.84	0.81	6409	2.30	1.10	5.4	33.0	947									
850	<b>1LA4 452-6AN</b>	1192	144	95.9	95.9	0.85	0.83	6809	2.30	1.10	5.4	37.0	1083									
900	<b>1LA4 454-6AN</b>	1192	154	96.0	96.0	0.85	0.83	7210	2.30	1.10	5.4	41.0	1489									
1160	<b>1LA4 500-6CN</b>	1195	192	96.5	96.6	0.87	0.86	9270	2.10	0.75	5.30	82.0	1168									
1290	<b>1LA4 502-6CN</b>	1195	210	96.7	96.7	0.88	0.86	10309	2.15	0.75	5.35	92.0	1308									
1380	<b>1LA4 504-6CN</b>	1195	225	96.8	96.8	0.88	0.86	11028	2.15	0.75	5.40	102.0	1598									
1570	<b>1LA4 560-6CN</b>	1195	260	96.7	96.7	0.87	0.86	12547	2.20	0.60	5.15	138.0	1425									
1870	<b>1LA4 562-6CN</b>	1195	310	97.0	96.9	0.87	0.85	14944	2.25	0.65	5.30	158.0	1640									
2050	<b>1LA4 564-6CN</b>	1195	335	97.1	97.1	0.88	0.86	16383	2.25	0.60	5.25	183.0	1980									
2255 <sup>2)</sup>	<b>1LA4 632-6CN</b>	1194	360	96.8	96.6	0.89	0.87	18043	2.3	0.50	5.5	269.1	O. R. <sup>3)</sup>									
2530 <sup>2)</sup>	<b>1LA4 634-6CN</b>	1194	400	96.9	96.7	0.90	0.88	20243	2.3	0.50	5.5	297.4	O. R. <sup>3)</sup>									
2750 <sup>2)</sup>	<b>1LA4 636-6CN</b>	1194	435	97.0	96.9	0.90	0.88	22003	2.3	0.50	5.5	323.0	O. R. <sup>3)</sup>									

**Voltage code:**

 4 kV, 60 Hz  
 6.6 kV, 60 Hz  
 Other voltage

4

1

9

**Note:**

 Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements.

**Type of construction:**

 IM B3  
 IM V1 (with canopy)  
 IM V1 (without canopy)

0

4

8

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Not available for ≤ 3.3 kV.

<sup>3)</sup> On request.


# Motors for line operation

## Air-cooled motors

### H-compact 1LA4

#### Selection and ordering data (continued)

Rated power kW	<b>High voltage motor H-compact</b>	Speed rpm	Rated current <i>I<sub>rated</sub></i> at 4.16 kV A	Efficiency		Power factor		Torque Nm	Break-down torque <i>T<sub>B</sub></i> / <i>T<sub>rated</sub></i> [-]	Locked- rotor torque <i>T<sub>LR</sub></i> / <i>T<sub>rated</sub></i> [-]	Locked- rotor current <i>I<sub>LR</sub></i> / <i>I<sub>rated</sub></i> [-]	Moment of inertia kgm <sup>2</sup>								
				4/4 load %	3/4 load %	4/4 load cos φ	3/4 load cos φ					Motor kgm <sup>2</sup>	External, max. <sup>1)</sup> kgm <sup>2</sup>							
<b>2.0 ... 6.6 kV, 60 Hz</b>																				
<b>8-pole</b>																				
260	<b>1LA4 350-8AN</b>	889	47.5	94.2	94.4	0.81	0.78	2793	2.30	0.95	5.1	10.6	683							
300	<b>1LA4 352-8AN</b>	889	54.0	94.5	94.6	0.81	0.78	3222	2.40	1.00	5.2	12.5	824							
360	<b>1LA4 354-8AN</b>	890	65.0	94.7	94.9	0.81	0.78	3863	2.50	1.05	5.4	14.8	879							
445	<b>1LA4 400-8AN</b>	892	80.0	95.3	95.3	0.81	0.79	4764	2.40	1.05	5.3	21.3	1044							
490	<b>1LA4 402-8AN</b>	891	86.0	95.3	95.3	0.83	0.80	5251	2.30	1.00	5.2	24.4	1069							
540	<b>1LA4 404-8AN</b>	892	96.0	95.6	95.6	0.82	0.80	5781	2.40	1.05	5.4	27.4	1446							
600	<b>1LA4 450-8AN</b>	891	108	95.4	95.5	0.81	0.78	6430	2.50	1.00	5.4	34.0	1466							
670	<b>1LA4 452-8AN</b>	892	120	95.6	95.7	0.81	0.76	7172	2.60	1.00	5.5	37.0	1843							
770	<b>1LA4 454-8AN</b>	892	138	95.8	95.9	0.81	0.78	8243	2.60	1.00	5.5	42.0	1958							
900	<b>1LA4 500-8CN</b>	896	160	96.1	95.9	0.81	0.77	9593	2.35	0.75	5.25	82.0	2290							
950	<b>1LA4 502-8CN</b>	896	170	96.1	96.0	0.81	0.78	10126	2.20	0.70	5.25	92.0	2050							
1040	<b>1LA4 504-8CN</b>	896	182	96.2	96.2	0.82	0.81	11085	2.10	0.70	5.10	102.0	2290							
1250	<b>1LA4 560-8CN</b>	896	220	96.4	96.2	0.82	0.78	13323	2.50	0.70	5.30	138.0	2487							
1400	<b>1LA4 562-8CN</b>	896	240	96.6	96.5	0.83	0.81	14922	2.30	0.65	5.10	158.0	3012							
1530	<b>1LA4 564-8CN</b>	896	265	96.7	96.5	0.83	0.79	16307	2.55	0.70	5.40	183.0	3687							
1793 <sup>2)</sup>	<b>1LA4 634-8CN</b>	895	305	96.5	96.1	0.84	0.81	19135	2.4	0.50	5.5	294.0	O. R. <sup>3)</sup>							
1980 <sup>2)</sup>	<b>1LA4 636-8CN</b>	895	340	96.7	96.2	0.84	0.81	21130	2.4	0.50	5.5	320.1	O. R. <sup>3)</sup>							
<b>10-pole</b>																				
400	<b>1LA4 450-3AN</b>	711	77.0	94.5	94.7	0.76	0.73	5372	2.20	1.00	4.8	34.0	2416							
450	<b>1LA4 452-3AN</b>	711	87.0	94.7	94.8	0.76	0.72	6044	2.30	1.00	4.8	37.0	2513							
500	<b>1LA4 454-3AN</b>	711	96.0	94.8	95.0	0.76	0.73	6715	2.30	1.00	4.8	42.0	2488							
610	<b>1LA4 500-3CN</b>	713	112	95.4	95.5	0.79	0.75	8170	2.20	0.90	4.8	82.0	3700							
670	<b>1LA4 502-3CN</b>	713	124	95.4	95.6	0.79	0.75	8973	2.20	0.90	4.8	92.0	4170							
710	<b>1LA4 504-3CN</b>	714	132	95.6	95.5	0.78	0.74	9496	2.40	0.95	5.1	102.0	4840							
870	<b>1LA4 560-3CN</b>	715	160	95.9	95.9	0.79	0.74	11619	2.30	0.75	5.1	138.0	2862							
950	<b>1LA4 562-3CN</b>	716	176	96.0	95.9	0.78	0.73	12670	2.50	0.80	5.5	158.0	3377							
1100	<b>1LA4 564-3CN</b>	716	200	96.1	96.1	0.79	0.75	14670	2.30	0.75	5.3	183.0	3517							
<b>12-pole</b>																				
340	<b>1LA4 450-5CN</b>	593	71.0	94.0	93.8	0.71	0.64	5475	2.00	0.70	4.3	34.0	2286							
375	<b>1LA4 452-5CN</b>	592	78.0	94.2	94.1	0.71	0.66	6049	2.00	0.70	4.3	37.0	2723							
410	<b>1LA4 454-5CN</b>	592	84.0	94.2	94.1	0.72	0.66	6613	2.00	0.70	4.3	42.0	2428							
460	<b>1LA4 500-5CN</b>	595	95.0	94.6	94.4	0.71	0.65	7382	2.00	0.65	4.2	82.0	3200							
500	<b>1LA4 502-5CN</b>	594	102	94.8	94.7	0.72	0.67	8038	2.00	0.65	4.2	92.0	3880							
540	<b>1LA4 504-5CN</b>	594	110	94.9	94.8	0.72	0.67	8681	2.00	0.65	4.2	102.0	3850							
650	<b>1LA4 560-5CN</b>	595	134	95.2	94.9	0.71	0.64	10432	2.00	0.65	4.4	138.0	5636							
710	<b>1LA4 562-5CN</b>	596	144	95.3	95.0	0.72	0.65	11375	2.00	0.65	4.4	158.0	6123							
800	<b>1LA4 564-5CN</b>	596	164	95.4	95.1	0.71	0.65	12817	2.00	0.65	4.4	183.0	7377							

**Voltage code:**

 4 kV, 60 Hz  
 6.6 kV, 60 Hz  
 Other voltage

**Note:**

 Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements.

**Type of construction:**

 IM B3  
 IM V1 (with canopy)  
 IM V1 (without canopy)

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Not available for ≤ 3.3 kV.

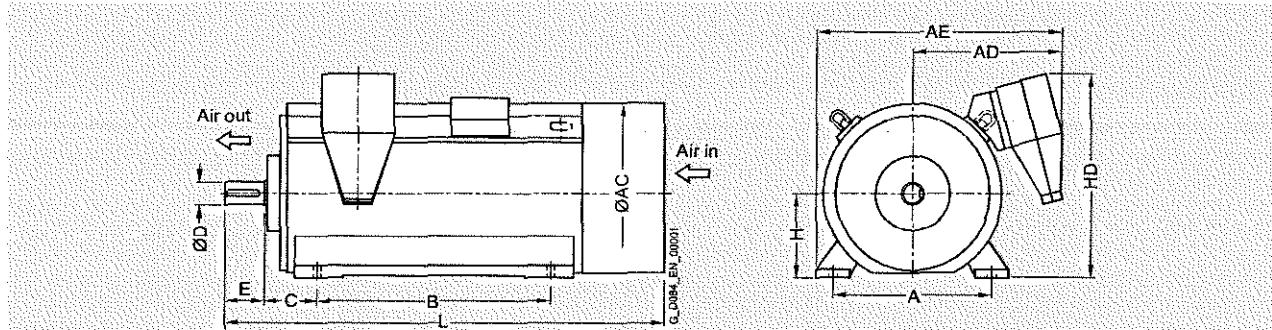
<sup>3)</sup> On request.


# Motors for line operation

## Air-cooled motors

H-compact 1LA4

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm
<b>2-pole</b>											
1LA4 310-2AN.0	1550	610	700	710	1075	710	200	70	105	315	860
1LA4 312-2AN.0	1550	610	700	710	1075	710	200	70	105	315	860
1LA4 314-2AN.0	1850	610	700	710	1075	900	200	70	105	315	860
1LA4 316-2AN.0	2000	610	700	710	1075	900	200	70	105	315	860
1LA4 350-2AN.0	2300	686	780	740	1155	1000	224	75	105	355	930
1LA4 352-2AN.0	2400	686	780	740	1155	1000	224	75	105	355	930
1LA4 354-2AN.0	2550	686	780	740	1155	1000	224	75	105	355	930
1LA4 400-2AN.0	3150	750	870	775	1225	1120	254	85	130	400	1010
1LA4 402-2AN.0	3300	750	870	775	1225	1120	254	85	130	400	1010
1LA4 404-2AN.0	3550	750	870	775	1225	1120	254	85	130	400	1010
1LA4 450-2CN.0 <sup>4)</sup>	4600	850	960	825	1340	1250	280	95	130	450	1100
1LA4 452-2CN.0 <sup>4)</sup>	4900	850	960	825	1340	1250	280	95	130	450	1100
1LA4 454-2CN.0 <sup>4)</sup>	5200	850	960	825	1340	1250	280	95	130	450	1100
<b>4-pole</b>											
1LA4 310-4AN.0	1500	610	700	710	1075	710	200	90	130	315	860
1LA4 312-4AN.0	1650	610	700	710	1075	710	200	90	130	315	860
1LA4 314-4AN.0	1900	610	700	710	1075	900	200	90	130	315	860
1LA4 316-4AN.0	2050	610	700	710	1075	900	200	90	130	315	860
1LA4 350-4AN.0	2350	686	780	740	1155	1000	224	100	165	355	930
1LA4 352-4AN.0	2550	686	780	740	1155	1000	224	100	165	355	930
1LA4 354-4AN.0	2750	686	780	740	1155	1000	224	100	165	355	930
1LA4 400-4AN.0	3400	750	870	775	1225	1120	254	120	165	400	1010
1LA4 402-4AN.0	3600	750	870	775	1225	1120	254	120	165	400	1010
1LA4 404-4AN.0	3800	750	870	775	1225	1120	254	120	165	400	1010
1LA4 450-4AN.0	4700	850	960	825	1340	1250	280	130	200	450	1100
1LA4 452-4AN.0	5000	850	960	825	1340	1250	280	130	200	450	1100
1LA4 454-4AN.0	5300	850	960	825	1340	1250	280	130	200	450	1100
1LA4 500-4AN.0	5900	950	1070	875	1440	1320	315	140	200	500	1200
1LA4 502-4AN.0	6300	950	1070	875	1440	1320	315	140	200	500	1200

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 140 mm (for  $H = 500$ ), by + 145 mm (for  $H = 560$ ) or by + 155 mm (for  $H = 630$ ).

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

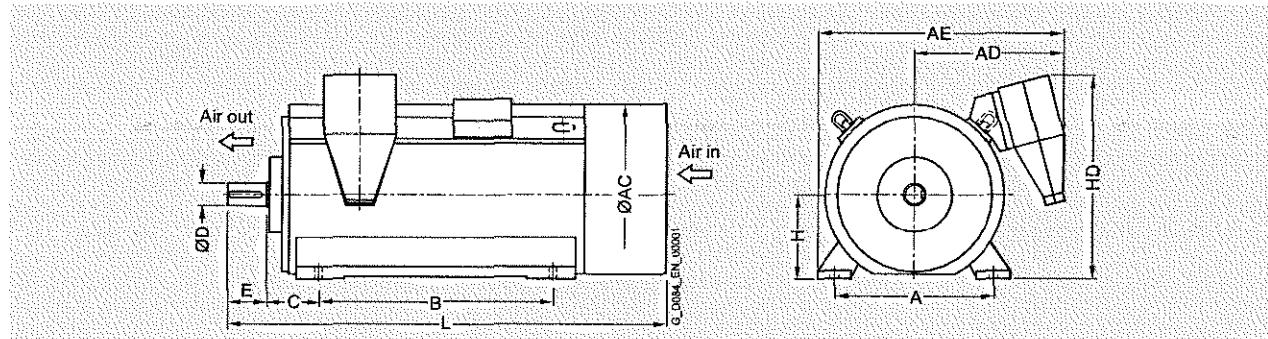
<sup>4)</sup> Roller bearings only for 50 Hz operation.

# Motors for line operation

## Air-cooled motors

H-compact (1LA4)

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions										
		A mm	AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm	
<b>Up to 6.6 kV (IM 3-1-type of construction, roller bearings)</b>												
4-pole												
1LA4 504-4AN.0	6800	950	1070	875	1440	1320	315	140	200	500	1200	
1LA4 560-4CN.0	8200	1060	1210	925	1560	1400	335	160	240	560	1310	
1LA4 562-4CN.0	8900	1060	1210	925	1560	1400	335	160	240	560	1310	
1LA4 564-4CN.0	9700	1060	1210	925	1560	1400	335	160	240	560	1310	
1LA4 632-4CN.0 <sup>4)</sup>	12200	1120	1350	945	1560	1600	335	170	240	630	1410	
1LA4 634-4CN.0 <sup>4)</sup>	12800	1120	1350	945	1560	1600	335	170	240	630	1410	
1LA4 636-4CN.0 <sup>4)</sup>	13600	1120	1350	945	1560	1600	335	170	240	630	1410	
6-pole												
1LA4 314-6AN.0	1950	610	700	710	1075	900	200	90	130	315	860	
1LA4 316-6AN.0	2150	610	700	710	1075	900	200	90	130	315	860	
1LA4 350-6AN.0	2400	686	780	740	1155	1000	224	100	165	355	930	
1LA4 352-6AN.0	2600	686	780	740	1155	1000	224	100	165	355	930	
1LA4 354-6AN.0	2850	686	780	740	1155	1000	224	100	165	355	930	
1LA4 400-6AN.0	3500	750	870	775	1225	1120	254	120	165	400	1010	
1LA4 402-6AN.0	3750	750	870	775	1225	1120	254	120	165	400	1010	
1LA4 404-6AN.0	4000	750	870	775	1225	1120	254	120	165	400	1010	
1LA4 450-6AN.0	4600	850	960	825	1340	1250	280	130	200	450	1100	
1LA4 452-6AN.0	4900	850	960	825	1340	1250	280	130	200	450	1100	
1LA4 454-6AN.0	5200	850	960	825	1340	1250	280	130	200	450	1100	
1LA4 500-6CN.0	6400	950	1070	875	1440	1320	315	140	200	500	1200	
1LA4 502-6CN.0	6800	950	1070	875	1440	1320	315	140	200	500	1200	
1LA4 504-6CN.0	7300	950	1070	875	1440	1320	315	140	200	500	1200	
1LA4 560-6CN.0	8500	1060	1210	925	1560	1400	335	160	240	560	1310	
1LA4 562-6CN.0	9300	1060	1210	925	1560	1400	335	160	240	560	1310	
1LA4 564-6CN.0	10100	1060	1210	925	1560	1400	335	160	240	560	1310	
1LA4 632-6CN.0	12700	1120	1350	945	1560	1600	335	180	240	630	1410	
1LA4 634-6CN.0	13400	1120	1350	945	1560	1600	335	180	240	630	1410	
1LA4 636-6CN.0	14100	1120	1350	945	1560	1600	335	180	240	630	1410	

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 140 mm (for H = 500), by + 145 mm (for H = 560) or by + 155 mm (for H = 630).

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

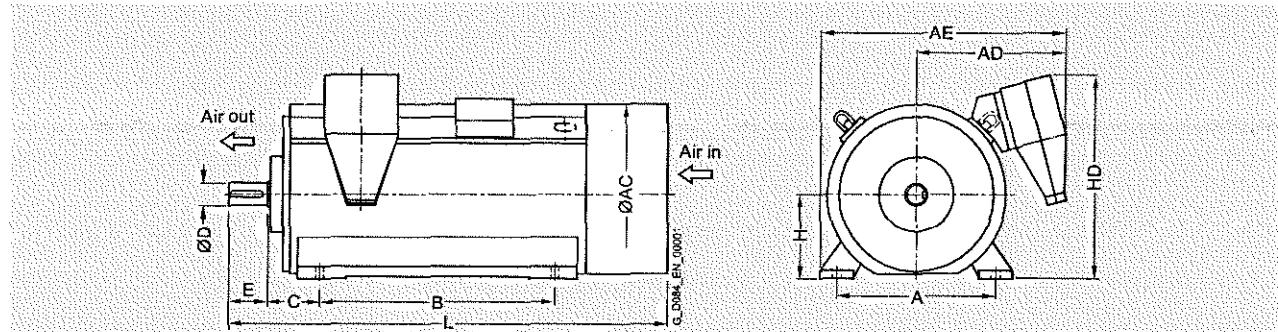
<sup>4)</sup> Roller bearings only for 50 Hz operation.

# Motors for line operation

## Air-cooled motors

H-compact 1LA4

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm
<b>Dimensions (mm) for construction code 00000</b>											
8-pole											
1LA4 350-8AN.0	2400	686	780	740	1155	1000	224	100	165	355	930
1LA4 352-8AN.0	2600	686	780	740	1155	1000	224	100	165	355	930
1LA4 354-8AN.0	2800	686	780	740	1155	1000	224	100	165	355	930
1LA4 400-8AN.0	3450	750	870	775	1225	1120	254	120	165	400	1010
1LA4 402-8AN.0	3700	750	870	775	1225	1120	254	120	165	400	1010
1LA4 404-8AN.0	3950	750	870	775	1225	1120	254	120	165	400	1010
1LA4 450-8AN.0	4600	850	960	825	1340	1250	280	130	200	450	1100
1LA4 452-8AN.0	4900	850	960	825	1340	1250	280	130	200	450	1100
1LA4 454-8AN.0	5200	850	960	825	1340	1250	280	130	200	450	1100
1LA4 500-8CN.0	6400	950	1070	875	1440	1320	315	140	200	500	1200
1LA4 502-8CN.0	6700	950	1070	875	1440	1320	315	140	200	500	1200
1LA4 504-8CN.0	7200	950	1070	875	1440	1320	315	140	200	500	1200
1LA4 560-8CN.0	8500	1060	1210	925	1560	1400	335	160	240	560	1310
1LA4 562-8CN.0	9200	1060	1210	925	1560	1400	335	160	240	560	1310
1LA4 564-8CN.0	10000	1060	1210	925	1560	1400	335	160	240	560	1310
1LA4 634-8CN.0	13300	1120	1350	945	1560	1600	335	180	240	630	1410
1LA4 636-8CN.0	14000	1120	1350	945	1560	1600	335	180	240	630	1410
10-pole											
1LA4 450-3AN.0	4600	850	960	825	1340	1250	280	130	200	450	1100
1LA4 452-3AN.0	4900	850	960	825	1340	1250	280	130	200	450	1100
1LA4 454-3AN.0	5200	850	960	825	1340	1250	280	130	200	450	1100
1LA4 500-3CN.0	6400	950	1070	875	1440	1320	315	140	200	500	1200
1LA4 502-3CN.0	6700	950	1070	875	1440	1320	315	140	200	500	1200
1LA4 504-3CN.0	7200	950	1070	875	1440	1320	315	140	200	500	1200
1LA4 560-3CN.0	8500	1060	1210	925	1560	1400	335	160	240	560	1310
1LA4 562-3CN.0	9200	1060	1210	925	1560	1400	335	160	240	560	1310
1LA4 564-3CN.0	10000	1060	1210	925	1560	1400	335	160	240	560	1310

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 140 mm (for H = 500), by + 145 mm (for H = 560) or by + 155 mm (for H = 630).

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

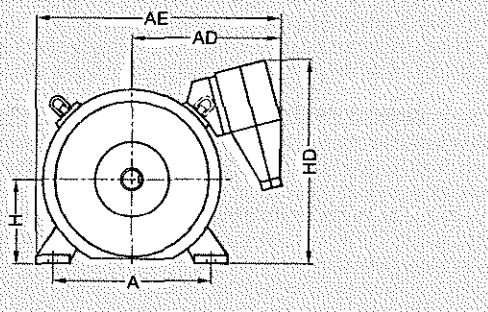
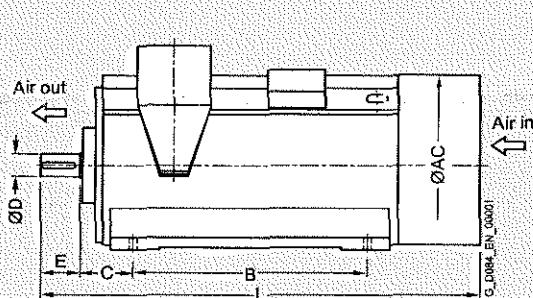
<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

# Motors for line operation

## Air-cooled motors

### H-compact 1LA4

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions										
		A mm	AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm	
<sup>1)</sup> Rated 6 kV (inert type or construction) roller bearings												
1LA4 450-5CN.0	4600	850	960	825	1340	1250	280	130	200	450	1100	2390
1LA4 452-5CN.0	4900	850	960	825	1340	1250	280	130	200	450	1100	2390
1LA4 454-5CN.0	5200	850	960	825	1340	1250	280	130	200	450	1100	2390
1LA4 500-5CN.0	6400	950	1070	875	1440	1320	315	140	200	500	1200	2525
1LA4 502-5CN.0	6700	950	1070	875	1440	1320	315	140	200	500	1200	2525
1LA4 504-5CN.0	7200	950	1070	875	1440	1320	315	140	200	500	1200	2525
1LA4 560-5CN.0	8500	1060	1210	925	1560	1400	335	160	240	560	1310	2775
1LA4 562-5CN.0	9200	1060	1210	925	1560	1400	335	160	240	560	1310	2775
1LA4 564-5CN.0	10000	1060	1210	925	1560	1400	335	160	240	560	1310	2775

Note:

Higher pole numbers are available on request.

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 140 mm (for H = 500), by + 145 mm (for H = 560) or by + 155 mm (for H = 630).

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

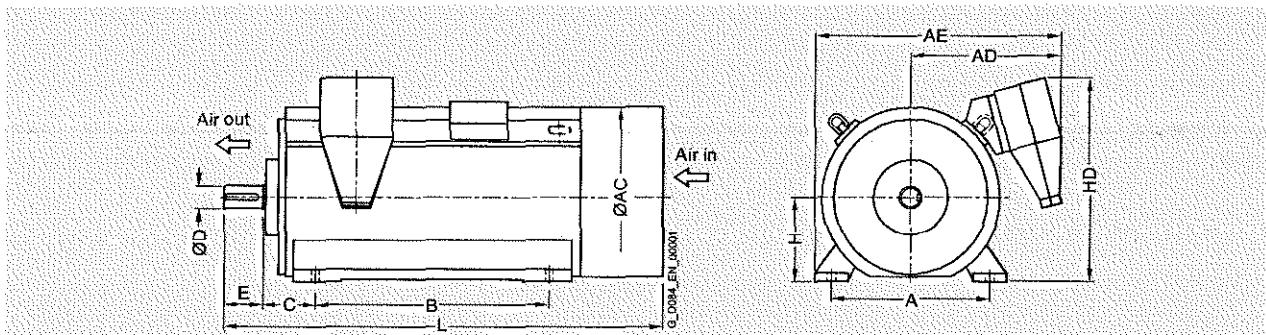
<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

# Motors for line operation

## Air-cooled motors

H-compact 1LA4

### Dimension drawings



Motor type	Weight kg	Dimensions										
		A mm	AC mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Standard dimensions, plot construction, oil bearings</b>												
2-pole												
1LA4 450-2CN.0 <sup>2)</sup>	4600	850	960	970	1485	1250	280	95	130	450	1170	2320
1LA4 452-2CN.0 <sup>2)</sup>	4900	850	960	970	1485	1250	280	95	130	450	1170	2320
1LA4 454-2CN.0 <sup>2)</sup>	5200	850	960	970	1485	1250	280	95	130	450	1170	2320
4-pole												
1LA4 450-4AN.0	4600	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 452-4AN.0	4900	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 454-4AN.0	5200	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 500-4AN.0	5900	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 502-4AN.0	6200	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 504-4AN.0	6700	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 560-4CN.0	8100	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 562-4CN.0	8800	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 564-4CN.0	9600	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 634-4CN.0 <sup>2)</sup>	12800	1120	1350	1100	1675	1600	335	170	240	630	1480	3015
1LA4 636-4CN.0 <sup>2)</sup>	13600	1120	1350	1100	1675	1600	335	170	240	630	1480	3015
6-pole												
1LA4 450-6AN.0	4600	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 452-6AN.0	4800	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 454-6AN.0	5200	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 500-6CN.0	6300	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 502-6CN.0	6800	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 504-6CN.0	7200	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 560-6CN.0	8500	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 562-6CN.0	9100	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 564-6CN.0	10000	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 634-6CN.0	13400	1120	1350	1100	1675	1600	335	180	240	630	1480	3015
1LA4 636-6CN.0	14100	1120	1350	1100	1675	1600	335	180	240	630	1480	3015

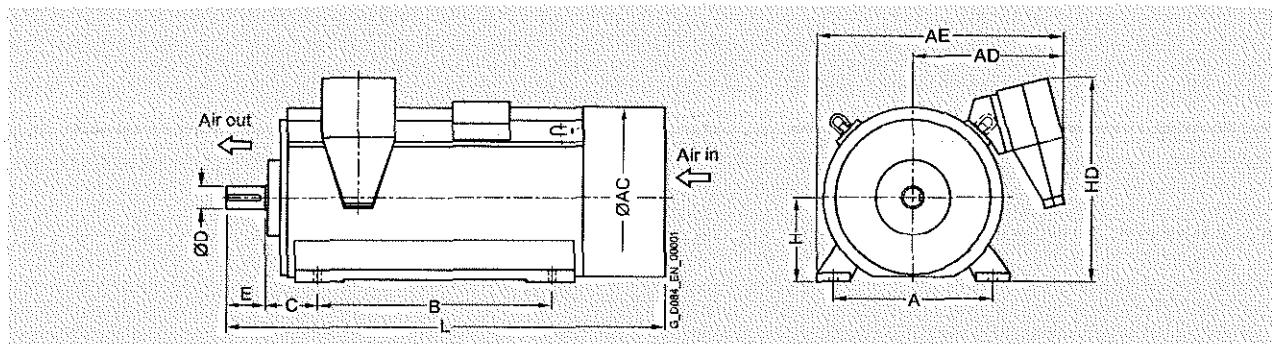
<sup>1)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.<sup>2)</sup> Roller bearings only for 50 Hz operation.

# Motors for line operation

## Air-cooled motors

H-compact 1LA4

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions										
		A mm	AC mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	
<b>Standard types of construction with bearings</b>												
8-pole												
1LA4 450-8AN.0	4600	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 452-8AN.0	4800	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 454-8AN.0	5200	850	960	970	1485	1250	280	130	200	450	1170	2390
1LA4 500-8CN.0	6300	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 502-8CN.0	6700	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 504-8CN.0	7100	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 560-8CN.0	8400	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 562-8CN.0	9100	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 564-8CN.0	10000	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 634-8CN.0	13300	1120	1350	1100	1675	1600	335	180	240	630	1480	3015
1LA4 636-8CN.0	14000	1120	1350	1100	1675	1600	335	180	240	630	1480	3015
10-pole												
1LA4 500-3CN.0	6300	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 502-3CN.0	6700	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 504-3CN.0	7100	950	1070	1015	1580	1320	315	140	200	500	1270	2525
1LA4 560-3CN.0	8400	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 562-3CN.0	9100	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 564-3CN.0	10000	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
12-pole												
1LA4 560-5CN.0	8400	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 562-5CN.0	9100	1060	1210	1070	1705	1400	335	160	240	560	1380	2775
1LA4 564-5CN.0	10000	1060	1210	1070	1705	1400	335	160	240	560	1380	2775

Note:

Higher pole numbers are available on request.

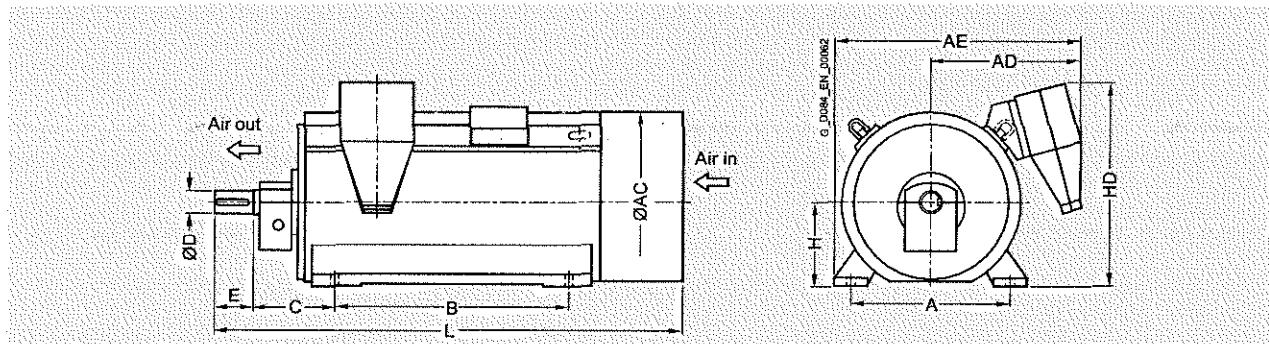
<sup>1)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

# Motors for line operation

## Air-cooled motors

H-compact 11 A4

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm

#### Dimensions for types & construction in sleeve bearings

##### 2-pole

1LA4 310-2AN.0-Z K96	1650	610	700	710	1075	710	375	70	105	315	860	1980
1LA4 312-2AN.0-Z K96	1650	610	700	710	1075	710	375	70	105	315	860	1980
1LA4 314-2AN.0-Z K96	1950	610	700	710	1075	900	375	70	105	315	860	2180
1LA4 316-2AN.0-Z K96	2100	610	700	710	1075	900	375	70	105	315	860	2180
1LA4 350-2AN.0-Z K96	2400	686	780	740	1155	1000	400	75	105	355	930	2340
1LA4 352-2AN.0-Z K96	2500	686	780	740	1155	1000	400	75	105	355	930	2340
1LA4 354-2AN.0-Z K96	2600	686	780	740	1155	1000	400	75	105	355	930	2340
1LA4 400-2AN.0-Z K96	3200	750	870	775	1225	1120	425	85	130	400	1010	2510
1LA4 402-2AN.0-Z K96	3350	750	870	775	1225	1120	425	85	130	400	1010	2510
1LA4 404-2AN.0-Z K96	3600	750	870	775	1225	1120	425	85	130	400	1010	2510
1LA4 450-2CN.0-Z K96 <sup>4)</sup>	4700	850	960	825	1340	1250	475	95	130	450	1100	2515
1LA4 452-2CN.0-Z K96 <sup>4)</sup>	5000	850	960	825	1340	1250	475	95	130	450	1100	2515
1LA4 454-2CN.0-Z K96 <sup>4)</sup>	5200	850	960	825	1340	1250	475	95	130	450	1100	2515
1LA4 500-2CN.0	6100	950	1070	875	1440	1320	500	110	165	500	1200	2675
1LA4 502-2CN.0	6300	950	1070	875	1440	1320	500	110	165	500	1200	2675
1LA4 504-2CN.0	6700	950	1070	875	1440	1320	500	110	165	500	1200	2675
1LA4 560-2CN.0	8200	1060	1210	925	1560	1400	500	120	165	560	1310	2865
1LA4 562-2CN.0	8600	1060	1210	925	1560	1400	500	120	165	560	1310	2865
1LA4 564-2CN.0	9100	1060	1210	925	1560	1400	500	120	165	560	1310	2865

##### 4-pole

1LA4 310-4AN.0-Z K96	1600	610	700	710	1075	710	375	90	130	315	860	2010
1LA4 312-4AN.0-Z K96	1750	610	700	710	1075	710	375	90	130	315	860	2010
1LA4 314-4AN.0-Z K96	2000	610	700	710	1075	900	375	90	130	315	860	2210
1LA4 316-4AN.0-Z K96	2150	610	700	710	1075	900	375	90	130	315	860	2210
1LA4 350-4AN.0-Z K96	2450	686	780	740	1155	1000	400	100	165	355	930	2400
1LA4 352-4AN.0-Z K96	2600	686	780	740	1155	1000	400	100	165	355	930	2400
1LA4 354-4AN.0-Z K96	2850	686	780	740	1155	1000	400	100	165	355	930	2400
1LA4 400-4AN.0-Z K96	3450	750	870	775	1225	1120	450	120	165	400	1010	2570
1LA4 402-4AN.0-Z K96	3650	750	870	775	1225	1120	450	120	165	400	1010	2570

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 140 mm (for H = 500), by + 145 mm (for H = 560) or by + 155 mm (for H = 630).

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

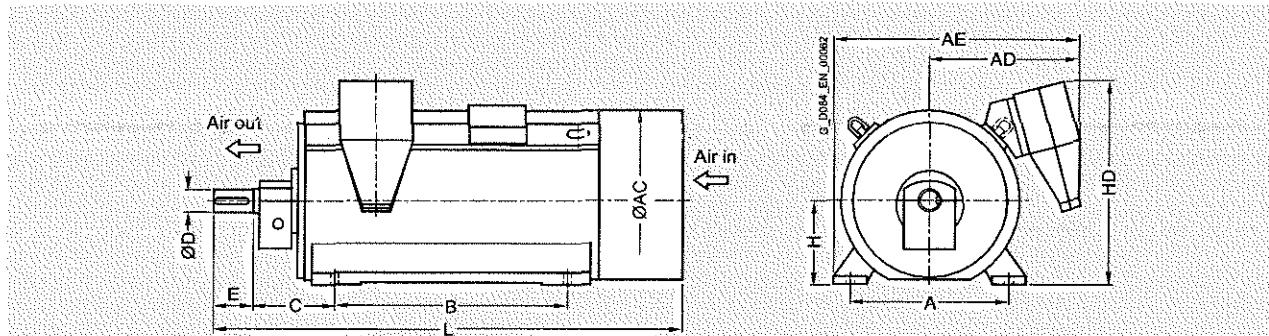
<sup>4)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

### H-compact 1LA4

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm
<b>Optional sleeve bearing construction (sleeve bearings)</b>											
4-pole											
1LA4 404-4AN.0-Z K96	3850	750	870	775	1225	1120	450	120	165	400	1010
1LA4 450-4AN.0-Z K96	4800	850	960	825	1340	1250	475	130	200	450	1100
1LA4 452-4AN.0-Z K96	5100	850	960	825	1340	1250	475	130	200	450	1100
1LA4 454-4AN.0-Z K96	5400	850	960	825	1340	1250	475	130	200	450	1100
1LA4 500-4AN.0-Z K96	6100	950	1070	875	1440	1320	500	140	200	500	1200
1LA4 502-4AN.0-Z K96	6500	950	1070	875	1440	1320	500	140	200	500	1200
1LA4 504-4AN.0-Z K96	7000	950	1070	875	1440	1320	500	140	200	500	1200
1LA4 560-4CN.0-Z K96	8500	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4 562-4CN.0-Z K96	9200	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4 564-4CN.0-Z K96	10000	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4 632-4CN.0-Z K96 <sup>4)</sup>	12500	1120	1350	945	1560	1600	560	170	240	630	1410
1LA4 634-4CN.0-Z K96 <sup>4)</sup>	13100	1120	1350	945	1560	1600	560	170	240	630	1410
1LA4 636-4CN.0-Z K96 <sup>4)</sup>	13900	1120	1350	945	1560	1600	560	170	240	630	1410
6-pole											
1LA4 450-6AN.0-Z K96	4800	850	960	825	1340	1250	475	130	200	450	1100
1LA4 452-6AN.0-Z K96	5000	850	960	825	1340	1250	475	130	200	450	1100
1LA4 454-6AN.0-Z K96	5300	850	960	825	1340	1250	475	130	200	450	1100
1LA4 500-6CN.0-Z K96	6600	950	1070	875	1440	1320	530	140	200	500	1200
1LA4 502-6CN.0-Z K96	7000	950	1070	875	1440	1320	530	140	200	500	1200
1LA4 504-6CN.0-Z K96	7500	950	1070	875	1440	1320	530	140	200	500	1200
1LA4 560-6CN.0-Z K96	8800	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4 562-6CN.0-Z K96	9500	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4 564-6CN.0-Z K96	10400	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4 632-6CN.0-Z K96	13000	1120	1350	945	1560	1600	560	180	240	630	1410
1LA4 634-6CN.0-Z K96	13700	1120	1350	945	1560	1600	560	180	240	630	1410
1LA4 636-6CN.0-Z K96	14500	1120	1350	945	1560	1600	560	180	240	630	1410

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 140 mm (for H = 500), by + 145 mm (for H = 560) or by + 155 mm (for H = 630).

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

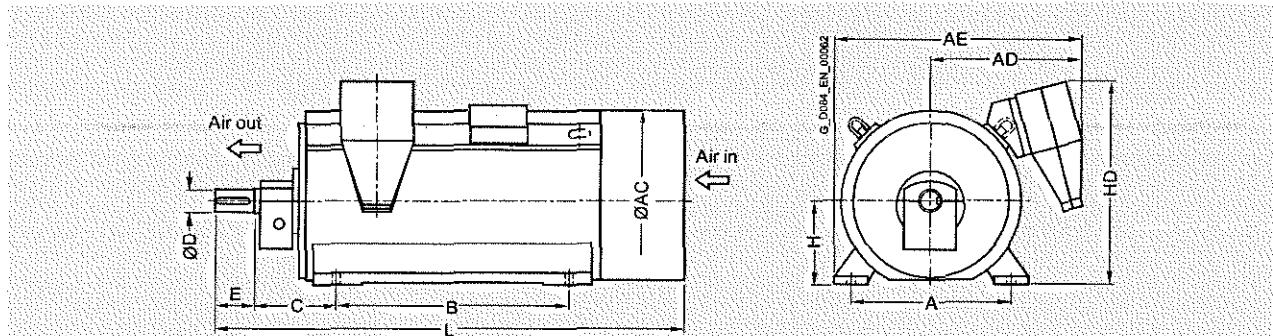
<sup>4)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

H-compact 11 A4

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm
<b>Standard types of construction, sleeve bearings</b>											
8-pole											
1LA4 450-8AN.0-Z K96	4700	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 452-8AN.0-Z K96	5000	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 454-8AN.0-Z K96	5300	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 500-8CN.0-Z K96	6600	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 502-8CN.0-Z K96	6900	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 504-8CN.0-Z K96	7400	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 560-8CN.0-Z K96	8800	1060	1210	925	1560	1400	560	160	240	560	1310 3170
1LA4 562-8CN.0-Z K96	9500	1060	1210	925	1560	1400	560	160	240	560	1310 3170
1LA4 564-8CN.0-Z K96	10300	1060	1210	925	1560	1400	560	160	240	560	1310 3170
1LA4 634-8CN.0-Z K96	13600	1120	1350	945	1560	1600	560	180	240	630	1410 3450
1LA4 636-8CN.0-Z K96	14400	1120	1350	945	1560	1600	560	180	240	630	1410 3450
10-pole											
1LA4 450-3AN.0-Z K96	4700	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 452-3AN.0-Z K96	5000	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 454-3AN.0-Z K96	5300	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 500-3CN.0-Z K96	6600	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 502-3CN.0-Z K96	6900	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 504-3CN.0-Z K96	7400	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 560-3CN.0-Z K96	8800	1060	1210	925	1560	1400	560	160	240	560	1310 3170
1LA4 562-3CN.0-Z K96	9500	1060	1210	925	1560	1400	560	160	240	560	1310 3170
1LA4 564-3CN.0-Z K96	10300	1060	1210	925	1560	1400	560	160	240	560	1310 3170
12-pole											
1LA4 450-5CN.0-Z K96	4700	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 452-5CN.0-Z K96	5000	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 454-5CN.0-Z K96	5300	850	960	825	1340	1250	475	130	200	450	1100 2745
1LA4 500-5CN.0-Z K96	6600	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 502-5CN.0-Z K96	6900	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 504-5CN.0-Z K96	7400	950	1070	875	1440	1320	530	140	200	500	1200 2900
1LA4 560-5CN.0-Z K96	8800	1060	1210	925	1560	1400	560	160	240	560	1310 3170
1LA4 562-5CN.0-Z K96	9500	1060	1210	925	1560	1400	560	160	240	560	1310 3170
1LA4 564-5CN.0-Z K96	10300	1060	1210	925	1560	1400	560	160	240	560	1310 3170

### Note:

Higher pole numbers are available on request.

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 140 mm (for H = 500), by + 145 mm (for H = 560) or by + 155 mm (for H = 630).

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

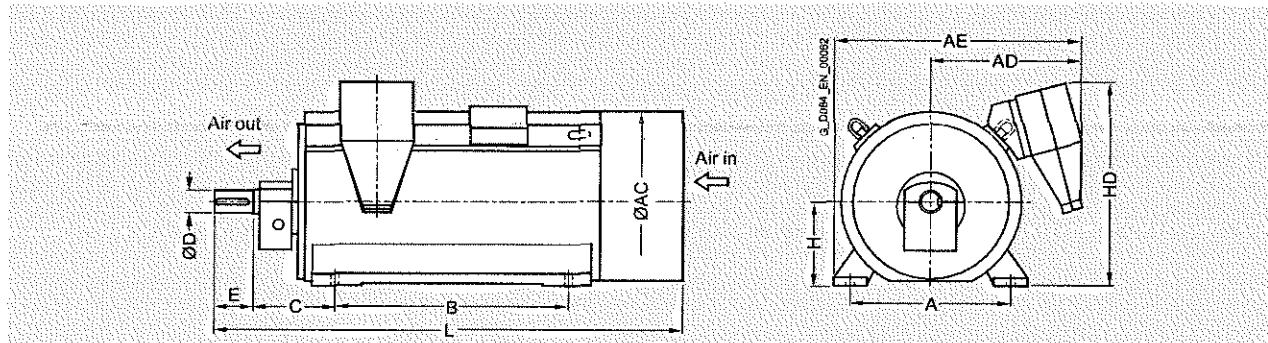


# Motors for line operation

## Air-cooled motors

### H-compact 1LA4

#### Dimension drawings



Motor type	Weight kg	Dimensions										
		A mm	AC mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1LA4 110V/110V/110V/110V/110V/110V/110V/110V/110V/110V/110V/110V/110V</b> Motor types & construction: sleeve bearings <sup>1)</sup>												
2-pole												
1LA4 450-2CN.0-Z K96 <sup>2)</sup>	4600	850	960	970	1485	1250	475	95	130	450	1170	2515
1LA4 452-2CN.0-Z K96 <sup>2)</sup>	4900	850	960	970	1485	1250	475	95	130	450	1170	2515
1LA4 454-2CN.0-Z K96 <sup>2)</sup>	5200	850	960	970	1485	1250	475	95	130	450	1170	2515
1LA4 500-2CN.0	6000	950	1070	1015	1580	1320	500	110	165	500	1270	2675
1LA4 502-2CN.0	6300	950	1070	1015	1580	1320	500	110	165	500	1270	2675
1LA4 504-2CN.0	6700	950	1070	1015	1580	1320	500	110	165	500	1270	2675
1LA4 560-2CN.0	8100	1060	1210	1070	1705	1400	500	120	165	560	1380	2865
1LA4 562-2CN.0	8600	1060	1210	1070	1705	1400	500	120	165	560	1380	2865
1LA4 564-2CN.0	9100	1060	1210	1070	1705	1400	500	120	165	560	1380	2865
4-pole												
1LA4 450-4AN.0-Z K96	4700	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 452-4AN.0-Z K96	5000	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 454-4AN.0-Z K96	5300	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 500-4AN.0-Z K96	6100	950	1070	1015	1580	1320	500	140	200	500	1270	2870
1LA4 502-4AN.0-Z K96	6400	950	1070	1015	1580	1320	500	140	200	500	1270	2870
1LA4 504-4AN.0-Z K96	6900	950	1070	1015	1580	1320	500	140	200	500	1270	2870
1LA4 560-4CN.0-Z K96	8400	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 562-4CN.0-Z K96	9100	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 564-4CN.0-Z K96	9800	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 634-4CN.0-Z K96 <sup>2)</sup>	13100	1120	1350	945	1560	1600	560	170	240	630	1410	3450
1LA4 636-4CN.0-Z K96 <sup>2)</sup>	13900	1120	1350	945	1560	1600	560	170	240	630	1410	3450
6-pole												
1LA4 450-6AN.0-Z K96	4700	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 452-6AN.0-Z K96	5000	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 454-6AN.0-Z K96	5300	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 500-6CN.0-Z K96	6500	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 502-6CN.0-Z K96	7000	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 504-6CN.0-Z K96	7400	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 560-6CN.0-Z K96	8800	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 562-6CN.0-Z K96	9400	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 564-6CN.0-Z K96	10300	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 634-6CN.0-Z K96	13700	1120	1350	945	1560	1600	560	180	240	630	1410	3450
1LA4 636-6CN.0-Z K96	14500	1120	1350	945	1560	1600	560	180	240	630	1410	3450

<sup>1)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

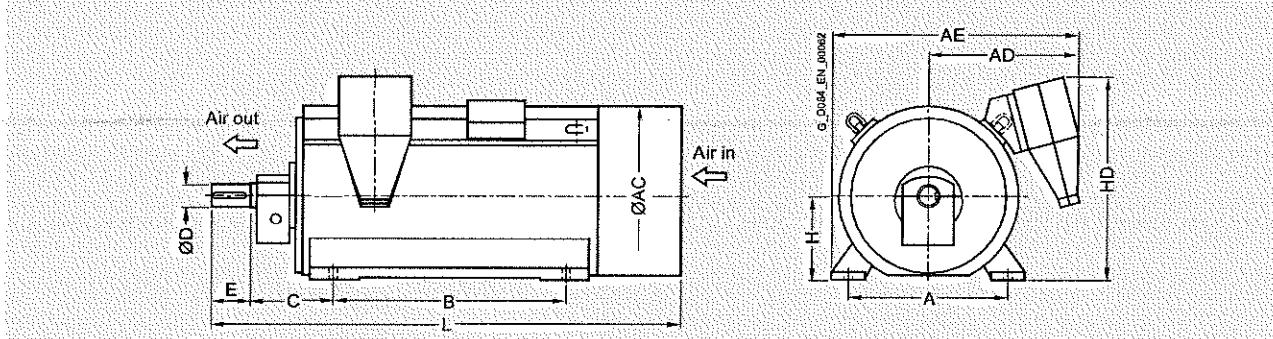
<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

H-compact 1LA4

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions										
		A mm	AC mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1LA4 1M 3: Type of construction sleeve bearings<sup>1)</sup></b>												
<b>8-pole</b>												
1LA4 450-8AN.0-Z K96	4700	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 452-8AN.0-Z K96	4900	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 454-8AN.0-Z K96	5300	850	960	970	1485	1250	475	130	200	450	1170	2745
1LA4 500-8CN.0-Z K96	6500	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 502-8CN.0-Z K96	6900	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 504-8CN.0-Z K96	7400	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 560-8CN.0-Z K96	8700	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 562-8CN.0-Z K96	9300	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 564-8CN.0-Z K96	10300	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 634-8CN.0-Z K96	13600	1120	1350	945	1560	1600	560	180	240	630	1410	3450
1LA4 636-8CN.0-Z K96	14400	1120	1350	945	1560	1600	560	180	240	630	1410	3450
<b>10-pole</b>												
1LA4 500-3CN.0-Z K96	6500	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 502-3CN.0-Z K96	6900	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 504-3CN.0-Z K96	7400	950	1070	1015	1580	1320	530	140	200	500	1270	2900
1LA4 560-3CN.0-Z K96	8700	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 562-3CN.0-Z K96	9300	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 564-3CN.0-Z K96	10300	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
<b>12-pole</b>												
1LA4 560-5CN.0-Z K96	8700	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 562-5CN.0-Z K96	9300	1060	1210	1070	1705	1400	560	160	240	560	1380	3170
1LA4 564-5CN.0-Z K96	10300	1060	1210	1070	1705	1400	560	160	240	560	1380	3170

### Note:

Higher pole numbers are available on request.

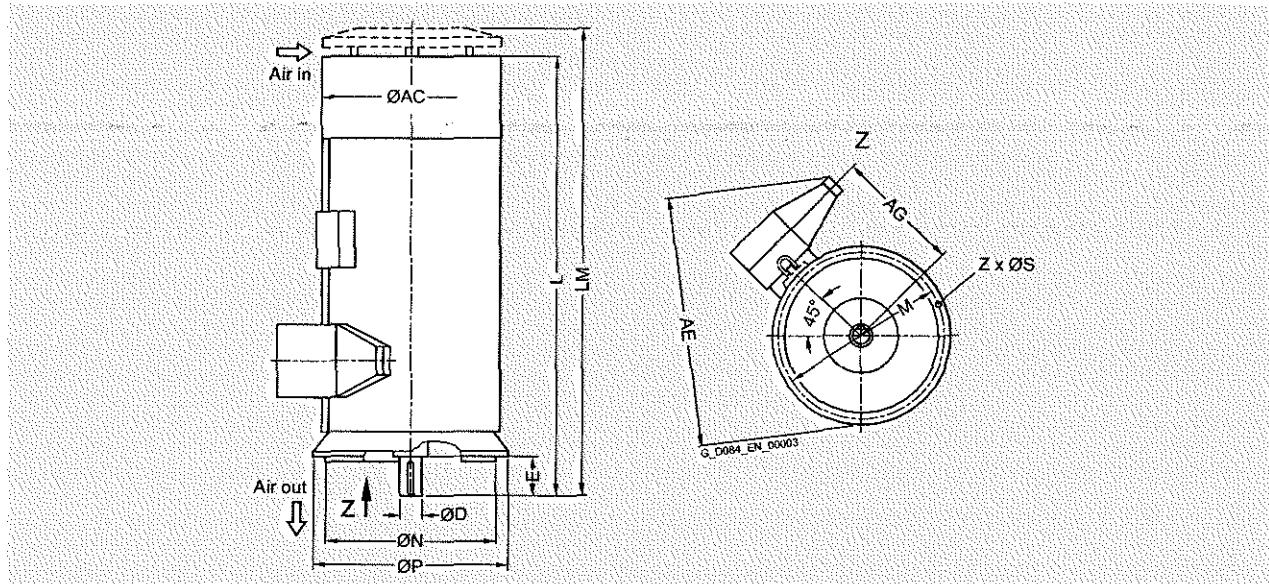
<sup>1)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

# Motors for line operation

## Air-cooled motors

### H-compact 1LA4

#### Dimension drawings



Motor type	Weight kg	Dimensions													Quantity
		AC mm	AG <sup>1)</sup> mm	AE <sup>2)</sup> mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z		
<b>Up to 6.5 kW, IM V1 type of construction, roller bearings<sup>3)</sup></b>															
2-pole															
1LA4 310-2AN..	1600	700	620	1225	70	105	1590	1720	800	680	740	22	8		
1LA4 312-2AN..	1600	700	620	1225	70	105	1590	1720	800	680	740	22	8		
1LA4 314-2AN..	1850	700	620	1225	70	105	1790	1920	800	680	740	22	8		
1LA4 316-2AN..	2000	700	620	1225	70	105	1790	1920	800	680	740	22	8		
1LA4 350-2AN.. <sup>4)</sup>	2350	780	660	1310	75	105	1930	2070	900	780	840	22	8		
1LA4 352-2AN.. <sup>4)</sup>	2450	780	660	1310	75	105	1930	2070	900	780	840	22	8		
1LA4 354-2AN.. <sup>4)</sup>	2550	780	660	1310	75	105	1930	2070	900	780	840	22	8		
1LA4 400-2AN.. <sup>4)</sup>	3100	870	710	1400	85	130	2095	2245	1000	880	940	22	8		
1LA4 402-2AN.. <sup>4)</sup>	3300	870	710	1400	85	130	2095	2245	1000	880	940	22	8		
1LA4 404-2AN.. <sup>4)</sup>	3550	870	710	1400	85	130	2095	2245	1000	880	940	22	8		
4-pole															
1LA4 310-4AN..	1500	700	620	1225	90	130	1610	1740	800	680	740	22	8		
1LA4 312-4AN..	1650	700	620	1225	90	130	1610	1740	800	680	740	22	8		
1LA4 314-4AN..	1900	700	620	1225	90	130	1810	1940	800	680	740	22	8		
1LA4 316-4AN..	2050	700	620	1225	90	130	1810	1940	800	680	740	22	8		
1LA4 350-4AN..	2400	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 352-4AN..	2600	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 354-4AN..	2800	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 400-4AN..	3400	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 402-4AN..	3600	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 404-4AN..	3800	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 450-4AN..	4700	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 45 mm.

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 185 mm (for AC = 1070), by + 180 mm (for AC = 1210) or by + 130 mm (for AC = 1350).

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

<sup>4)</sup> Only in the 50 Hz version.

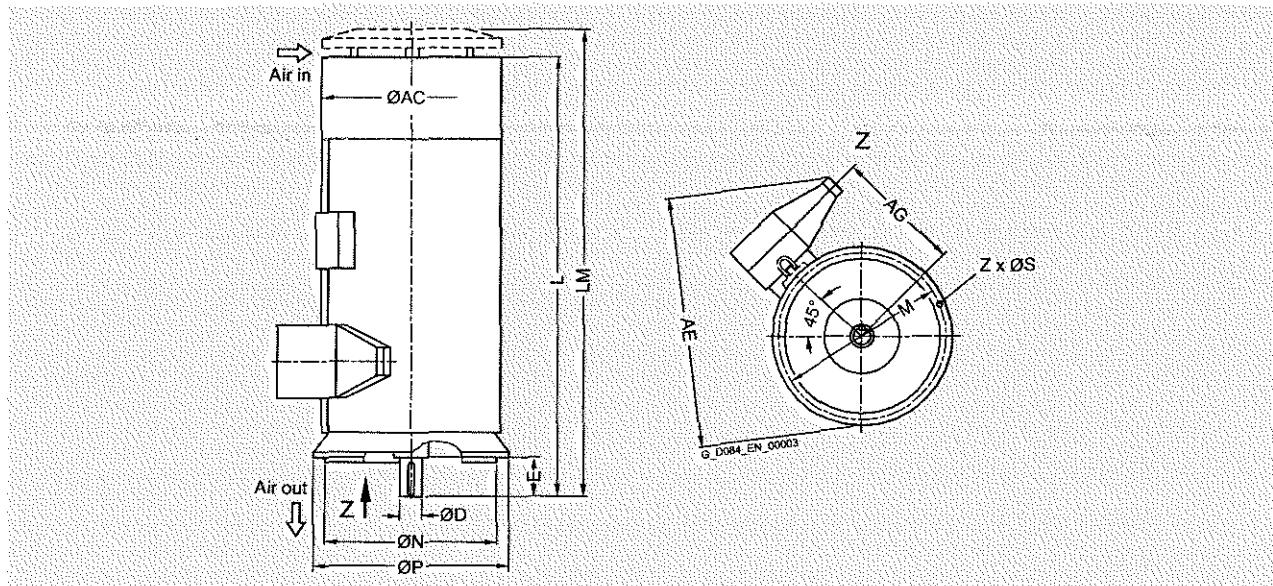


# Motors for line operation

## Air-cooled motors

H-compact II A4

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions													Quantity
		AC mm	AG <sup>1)</sup> mm	AE <sup>2)</sup> mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z		
<b>Up to 0.6 kW, IMV1 type of construction, roller bearings</b>															
<b>4-pole</b>															
1LA4 452-4AN..	5000	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 454-4AN..	5200	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 500-4AN..	5900	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 502-4AN..	6300	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 504-4AN..	6800	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 560-4CN..	8300	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 562-4CN..	9000	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 564-4CN..	9700	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
<b>6-pole</b>															
1LA4 314-6AN..	1950	700	620	1225	90	130	1810	1940	800	680	740	22	8		
1LA4 316-6AN..	2150	700	620	1225	90	130	1810	1940	800	680	740	22	8		
1LA4 350-6AN..	2450	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 352-6AN..	2650	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 354-6AN..	2900	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 400-6AN..	3500	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 402-6AN..	3750	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 404-6AN..	4000	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 450-6AN..	4600	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 452-6AN..	4900	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 454-6AN..	5200	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 500-6CN..	6400	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 502-6CN..	6800	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 504-6CN..	7300	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 560-6CN..	8500	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 562-6CN..	9300	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		

<sup>1)</sup> For currents  $I_{\text{rated}} > 315 \text{ A}$ , the dimension changes by + 45 mm.

<sup>2)</sup> For currents  $I_{\text{rated}} > 315 \text{ A}$ , the dimension changes by + 185 mm (for AC = 1070), by + 180 mm (for AC = 1210) or by + 130 mm (for AC = 1350).

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

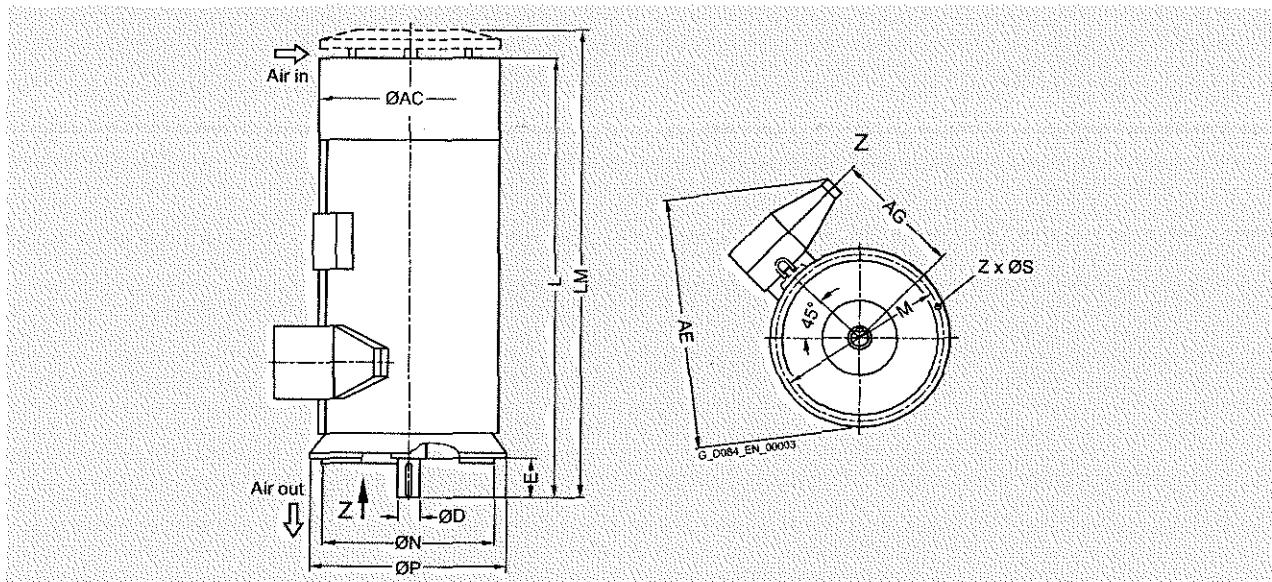


# Motors for line operation

## Air-cooled motors

### H-compact 1LA4

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions													Quantity
		AC mm	AG <sup>1)</sup> mm	AE <sup>2)</sup> mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z		
<b>Dimensions 115 kV, IM 104 type of construction, roller bearings</b>															
6-pole															
1LA4 564-6CN..	10100	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 632-6CN..	12700	1350	O. R. <sup>4)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4 634-6CN..	13400	1350	O. R. <sup>4)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4 636-6CN..	14100	1350	O. R. <sup>4)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
8-pole															
1LA4 350-8AN..	2450	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 352-8AN..	2650	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 354-8AN..	2850	780	660	1310	100	165	1985	2125	900	780	840	22	8		
1LA4 400-8AN..	3450	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 402-8AN..	3700	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 404-8AN..	3950	870	710	1400	120	165	2125	2275	1000	880	940	22	8		
1LA4 450-8AN..	4600	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 452-8AN..	4900	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 454-8AN..	5200	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 500-8CN..	6400	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 502-8CN..	6800	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 504-8CN..	7200	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 560-8CN..	8500	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 562-8CN..	9200	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 564-8CN..	10000	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 632-8CN..	12500	1350	O. R. <sup>4)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4 634-8CN..	13300	1350	O. R. <sup>4)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4 636-8CN..	14000	1350	O. R. <sup>4)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		

<sup>1)</sup> For currents  $I_{\text{rated}} > 315 \text{ A}$ , the dimension changes by + 45 mm.

<sup>2)</sup> For currents  $I_{\text{rated}} > 315 \text{ A}$ , the dimension changes by + 185 mm (for AC = 1070), by + 180 mm (for AC = 1210) or by + 130 mm (for AC = 1350).

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

<sup>4)</sup> On request.

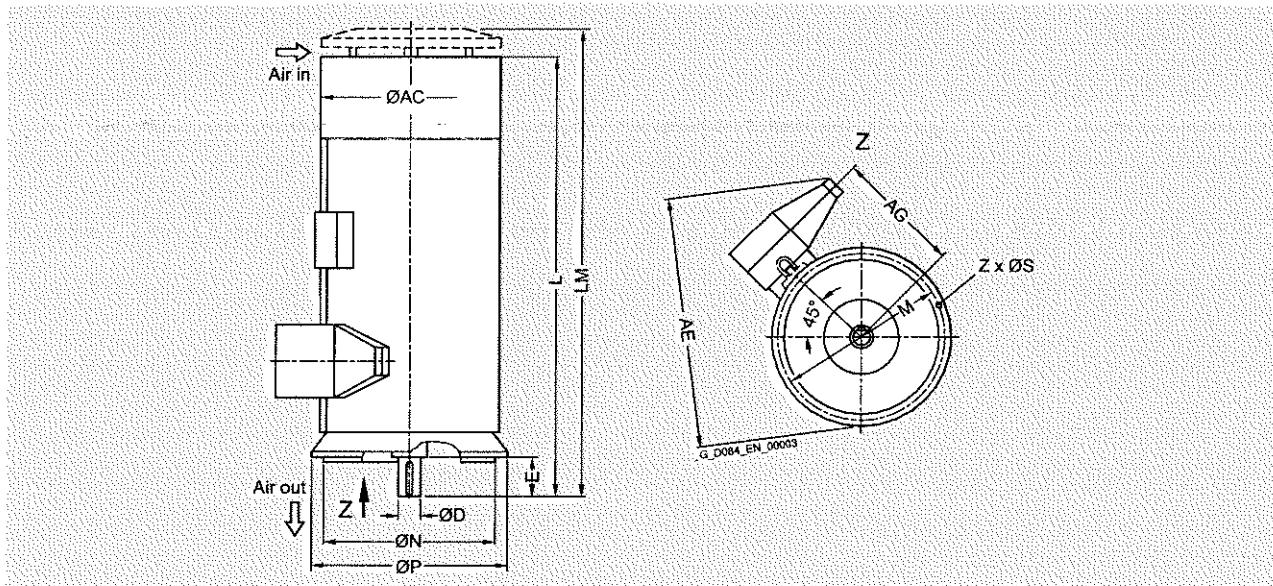
# Motors for line operation

## Air-cooled motors

H-compact (1LA4)

2

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions													Quantity
		AC mm	AG <sup>1)</sup> mm	AE <sup>2)</sup> mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z		

#### 10 to 65 kW IM V1 type of construction, roller bearings<sup>3)</sup>

##### 10-pole

1LA4 450-3AN..	4600	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8
1LA4 452-3AN..	4900	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8
1LA4 454-3AN..	5200	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8
1LA4 500-3CN..	6400	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16
1LA4 502-3CN..	6800	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16
1LA4 504-3CN..	7200	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16
1LA4 560-3CN..	8500	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16
1LA4 562-3CN..	9200	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16
1LA4 564-3CN..	10000	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16

##### 12-pole

1LA4 450-5CN..	4600	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8
1LA4 452-5CN..	4900	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8
1LA4 454-5CN..	5200	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8
1LA4 500-5CN..	6400	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16
1LA4 502-5CN..	6800	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16
1LA4 504-5CN..	7200	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16
1LA4 560-5CN..	8500	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16
1LA4 562-5CN..	9200	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16
1LA4 564-5CN..	10000	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 45 mm.

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 185 mm (for AC = 1070), by + 180 mm (for AC = 1210) or by + 130 mm (for AC = 1350).

<sup>3)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

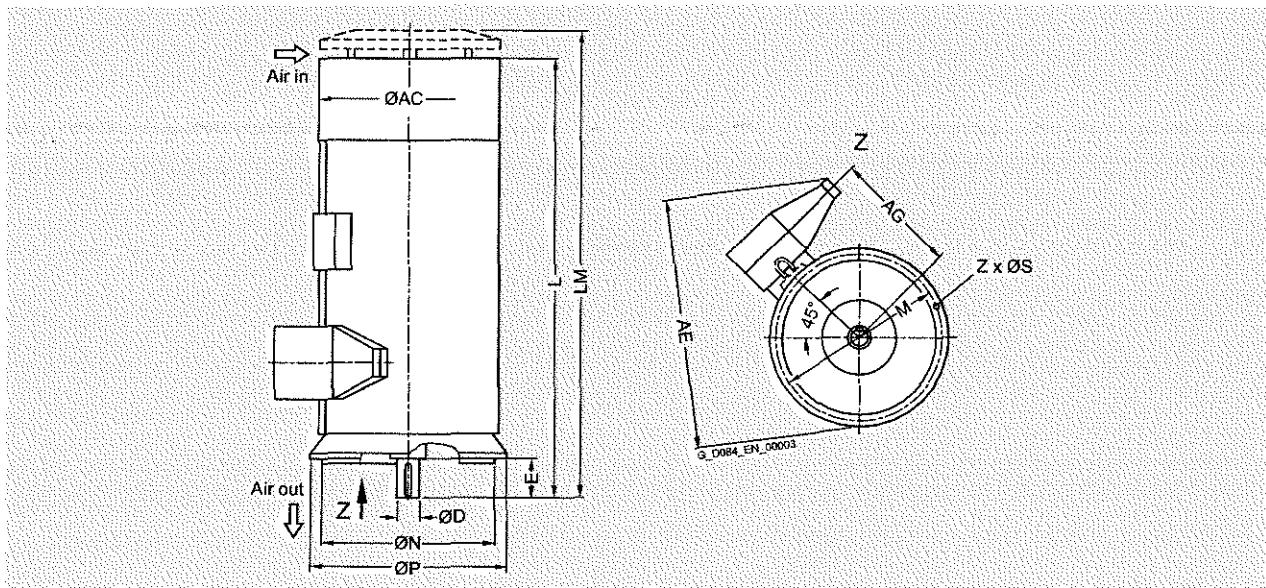


# Motors for line operation

## Air-cooled motors

H-compact 1LA4

## Dimension drawings



Motor type	Weight kg	Dimensions													Quantity
		AC mm	AG mm	AE mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z		
<b>9 - 110V - M1 type of construction, roller bearings</b>															
4-pole															
1LA4 450-4AN..	4600	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 452-4AN..	4900	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 454-4AN..	5200	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 500-4AN..	5900	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 502-4AN..	6300	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 504-4AN..	6700	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 560-4CN..	8100	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 562-4CN..	8900	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 564-4CN..	9600	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
6-pole															
1LA4 450-6AN..	4600	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 452-6AN..	4800	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 454-6AN..	5100	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 500-6CN..	6400	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 502-6CN..	6800	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 504-6CN..	7200	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 560-6CN..	8500	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 562-6CN..	9200	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 564-6CN..	10000	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 634-6CN..	13400	1350	O. R. <sup>2)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4 636-6CN..	14100	1350	O. R. <sup>2)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
8-pole															
1LA4 450-8AN..	4600	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 452-8AN..	4800	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 454-8AN..	5100	960	865	1740	130	200	2390	2550	1150	1000	1080	26	8		
1LA4 500-8CN..	6300	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		

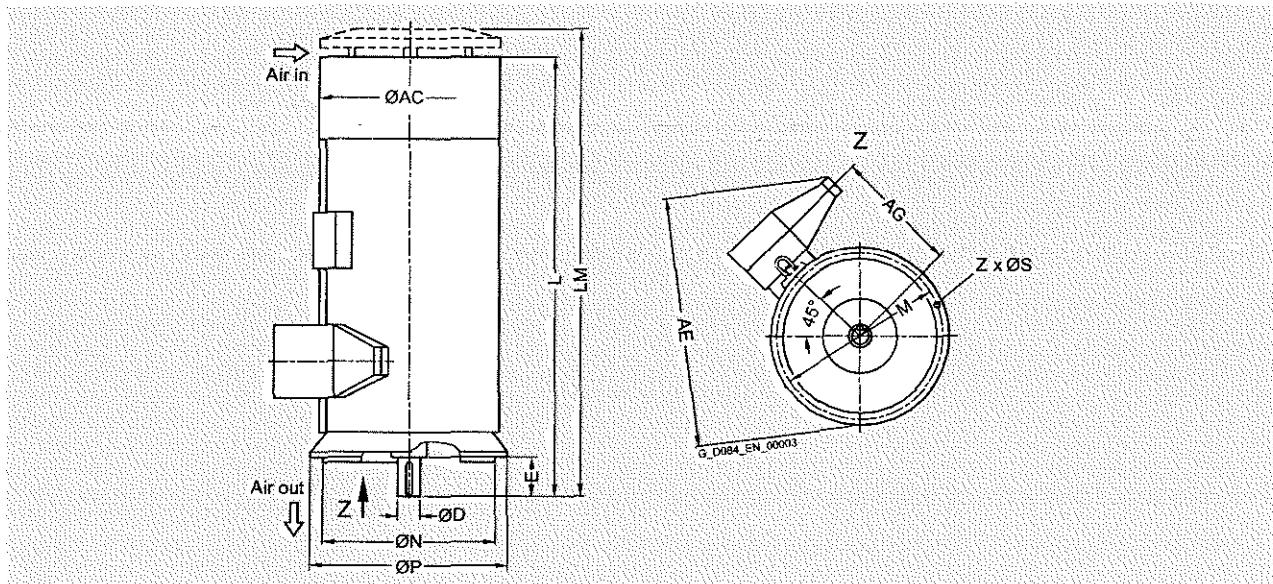
<sup>1)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.<sup>2)</sup> On request.

# Motors for line operation

## Air-cooled motors

H-compact 1LA4

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions													Quantity
		AC mm	AG mm	AE mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z		
<b>1LA4 1000-1600 V1 Type of construction: roller bearing</b>															
8-pole															
1LA4 502-8CN..	6800	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 504-8CN..	7200	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 560-8CN..	8400	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 562-8CN..	9100	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 564-8CN..	10000	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 634-8CN..	13300	1350	O. R. <sup>2)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4 636-8CN..	14000	1350	O. R. <sup>2)</sup>	1820	180	240	3115	3305	1400	1250	1320	26	16		
10-pole															
1LA4 500-3CN..	6300	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 502-3CN..	6800	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 504-3CN..	7200	1070	940	1845	140	200	2525	2695	1250	1120	1180	26	16		
1LA4 560-3CN..	8400	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 562-3CN..	9100	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 564-3CN..	10000	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
12-pole															
1LA4 560-5CN..	8400	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 562-5CN..	9100	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		
1LA4 564-5CN..	10000	1210	1010	1980	160	240	2775	2955	1400	1250	1320	26	16		

### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions also apply for the 1MA4 and 1MS4 series.

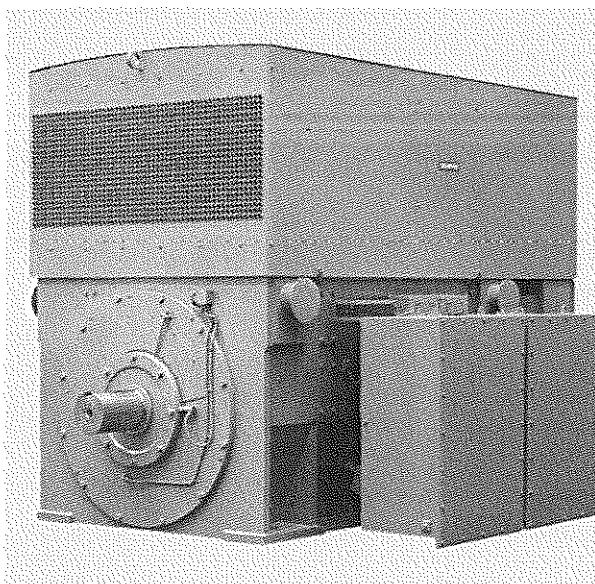
<sup>2)</sup> On request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Overview



#### Technical data

##### Overview of technical data

###### H-compact PLUS 1RQ4/1RQ6

Rated voltage	3.3 ... 13.8 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3, IM V1
Degree of protection	IP55
Cooling method	IC611/IC616
Stator winding insulation	Thermal class 155 (F), utilized to 130 (B)
Shaft height	450 ... 710 mm
Bearings	Roller bearings, sleeve bearings
Cage material	Copper
Standards	IEC, EN, NEMA
Frame design for shaft heights 450 ... 560 mm	Frame: Cast iron Cooling enclosure: Steel
Frame design for shaft heights 630 ... 710 mm	Frame: Steel Cooling enclosure: Steel

#### Technical data (continued)

##### Power ranges for IEC motors for line operation

###### 1RQ4, 1SG4 (Ex nA), 1SB4 (Ex px) series

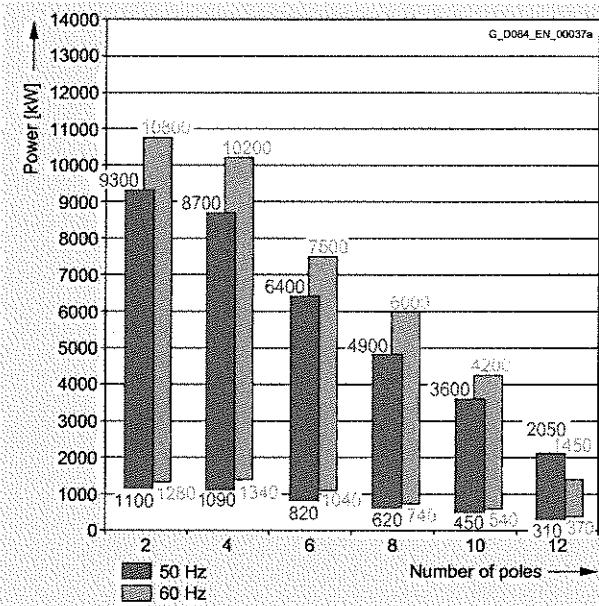
###### 1RQ6, 1SG6 (Ex nA), 1SB6 (Ex px) series

Insulation system, thermal class 155 (F), utilized to 130 (B).

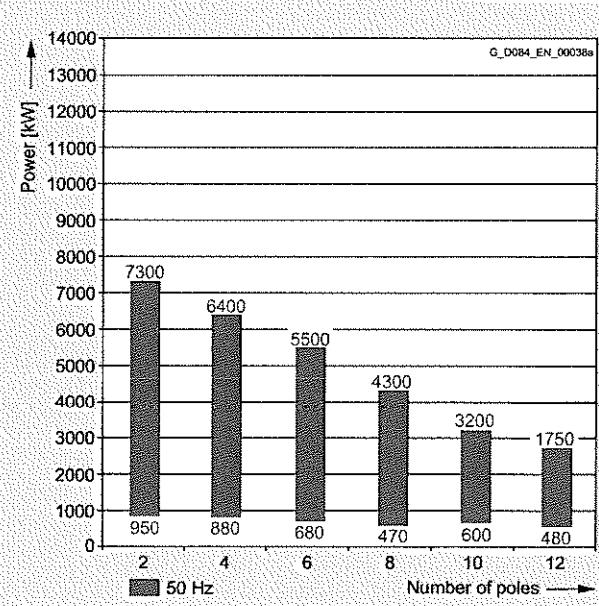
Ambient temperature up to 40 °C, installation altitude up to 1000 m.

3.3 to 6.6 kV; 50 Hz

4.0 to 6.6 kV; 60 Hz



9 to 11 kV; 50 Hz



# Motors for line operation

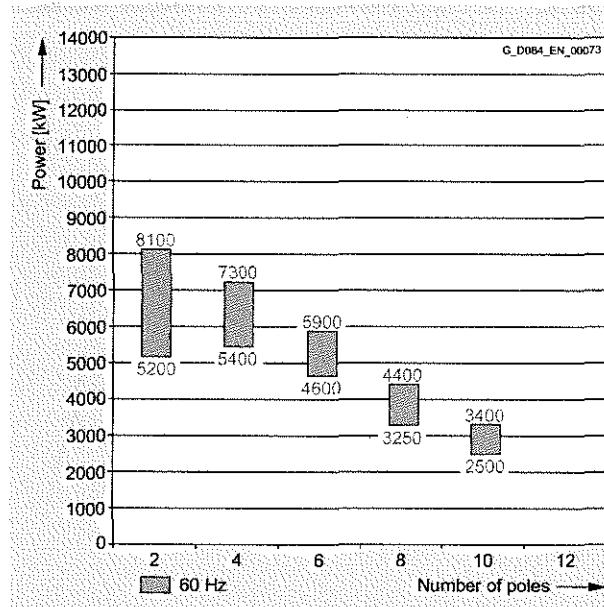
## Air-cooled motors

H-compact PLUS 1R04 and 1R06

### Technical data (continued)

#### **Power ranges for IEC motors for line operation (continued)**

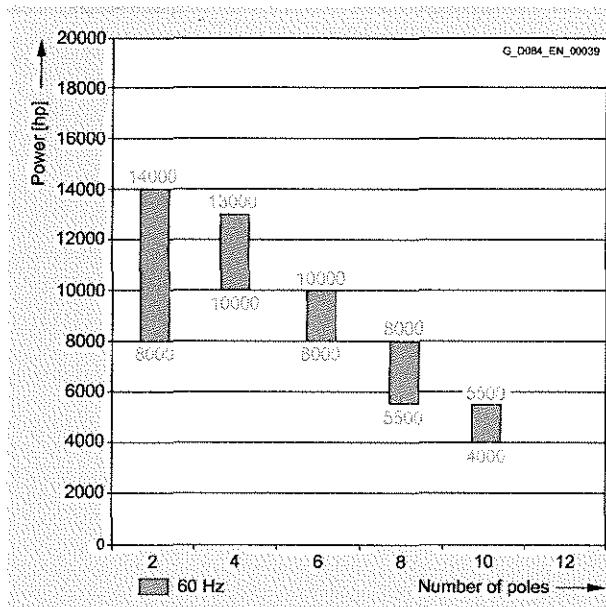
12.5 to 13.8 kV; 60 Hz



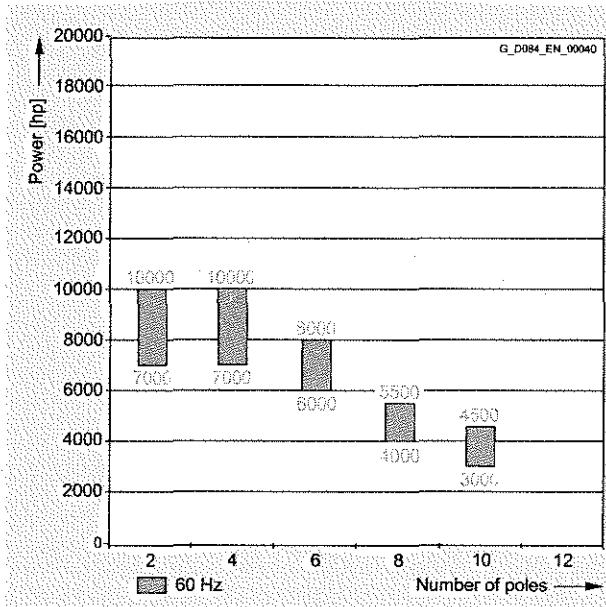
#### **Power ranges for NEMA motors for line operation**

Insulation system, thermal class 155 (F), utilized to 130 (B).

4 to 6.6 kV; 60 Hz



12.5 to 13.8 kV; 60 Hz



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data

The following data also apply to explosion-protected motors 1SB4/1SB6 (Ex px) and 1SG4/1SG6 (Ex nA).

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency			Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia
IEC			$I_{\text{rated}}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load	$T_B/T_{\text{rated}}$	$T_{LR}/T_{\text{rated}}$	$I_{LR}/I_{\text{rated}}$		Motor	External max. <sup>1)</sup>
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>3.3 ... 6.6 kV, 50 Hz</b>													
2-pole													
1100	<b>1RQ6 450-2JJ■0</b>	2978	124	95.6	95.6	0.90	0.89	3529	2.40	0.65	5.50	13	74
1220	<b>1RQ6 452-2JJ■0</b>	2980	136	95.9	95.9	0.90	0.89	3912	2.40	0.60	5.50	14	76
1350	<b>1RQ6 454-2JJ■0</b>	2982	150	96.0	96.1	0.90	0.89	4325	2.50	0.55	5.50	15	78
1490	<b>1RQ6 456-2JJ■0</b>	2982	164	96.2	96.3	0.91	0.91	4774	2.40	0.50	5.50	17	81
1850	<b>1RQ6 500-2JJ■0</b>	2979	205	96.4	96.6	0.91	0.90	5930	2.50	0.65	5.50	19	71
2050	<b>1RQ6 502-2JJ■0</b>	2977	225	96.5	96.7	0.91	0.91	6576	2.35	0.70	5.50	21	79
2300	<b>1RQ6 504-2JJ■0</b>	2978	250	96.7	96.9	0.92	0.92	7375	2.40	0.65	5.50	25	88
2500	<b>1RQ6 506-2JJ■0</b>	2979	270	96.8	97.1	0.93	0.92	8014	2.40	0.70	5.50	26	98
2900	<b>1RQ6 560-2JJ■0</b>	2980	315	96.6	96.8	0.91	0.91	9293	2.10	0.60	4.70	39	170
3200	<b>1RQ6 562-2JJ■0</b>	2982	350	96.8	96.9	0.91	0.91	10247	2.25	0.60	5.10	43	190
3700	<b>1RQ6 564-2JJ■0</b>	2982	400	97.0	97.1	0.92	0.92	11849	2.25	0.60	5.20	49	210
4000	<b>1RQ6 566-2JJ■0</b>	2983	430	97.1	97.2	0.92	0.92	12805	2.30	0.55	5.30	54	230
4000	<b>1RQ4 630-2JE■0</b>	2984	450	96.6	96.5	0.89	0.89	12802	2.40	0.35	4.60	80	150
4500	<b>1RQ4 632-2JE■0</b>	2986	495	96.9	96.8	0.90	0.88	14392	2.70	0.42	5.40	85	200
5300	<b>1RQ4 634-2JE■0</b>	2986	580	97.3	97.2	0.90	0.89	16951	2.70	0.44	5.40	95	280
6000	<b>1RQ4 636-2JE■0</b>	2987	660	97.5	97.4	0.90	0.89	19183	2.70	0.45	5.50	105	320
4-pole													
1090	<b>1RQ6 450-4JJ■■</b>	1487	124	95.5	95.6	0.88	0.85	7002	2.30	0.70	5.50	20	315
1200	<b>1RQ6 452-4JJ■■</b>	1488	138	95.6	95.7	0.88	0.85	7704	2.30	0.70	5.50	21	350
1290	<b>1RQ6 454-4JJ■■</b>	1487	146	95.7	95.9	0.89	0.88	8286	2.20	0.70	5.50	25	390
1420	<b>1RQ6 456-4JJ■■</b>	1487	158	96.0	96.2	0.90	0.90	9123	2.30	0.70	5.50	28	435
1800 <sup>2)</sup>	<b>1RQ6 500-4JJ■0</b>	1486	198	96.0	96.3	0.91	0.91	11567	2.35	0.65	5.10	43	400
2000 <sup>2)</sup>	<b>1RQ6 502-4JJ■0</b>	1486	215	96.2	96.4	0.92	0.91	12852	2.45	0.65	5.30	46	450
2200 <sup>2)</sup>	<b>1RQ6 504-4JJ■0</b>	1488	240	96.4	96.6	0.92	0.91	14119	2.45	0.65	5.30	52	500
2400 <sup>2)</sup>	<b>1RQ6 506-4JJ■0</b>	1488	260	96.5	96.7	0.92	0.91	15402	2.50	0.65	5.40	56	550
3000 <sup>2)</sup>	<b>1RQ6 560-4JJ■0</b>	1491	330	96.7	96.9	0.91	0.90	19214	2.35	0.70	5.30	84	790
3300 <sup>2)</sup>	<b>1RQ6 562-4JJ■0</b>	1492	360	96.9	97.0	0.91	0.89	21121	2.25	0.60	5.10	94	870
3700 <sup>2)</sup>	<b>1RQ6 564-4JJ■0</b>	1491	405	97.0	97.2	0.91	0.90	23697	2.30	0.65	5.10	104	960
4000 <sup>2)</sup>	<b>1RQ6 566-4JJ■0</b>	1492	430	97.2	97.3	0.92	0.90	25601	2.35	0.65	5.30	115	1060
4400	<b>1RQ4 630-4JE■■</b>	1490	490	96.8	96.9	0.89	0.89	28201	2.30	0.62	5.20	150	920
4900	<b>1RQ4 632-4JE■■</b>	1491	550	97.0	97.1	0.89	0.88	31385	2.45	0.65	5.50	170	1150
5300	<b>1RQ4 634-4JE■■</b>	1492	590	97.3	97.2	0.89	0.88	33924	2.40	0.62	5.50	185	1350
5800	<b>1RQ4 636-4JE■■</b>	1492	650	97.3	97.3	0.88	0.87	37125	2.40	0.61	5.50	200	1200

#### Voltage code:

3.3 kV, 50 Hz	0
6 kV, 50 Hz	6
6.6 kV, 50 Hz	7
Other voltage	9
IM B3	0
IM V1 (with canopy)	4

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.  
Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Data of vertical motors (IM V1) on request.



# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

## Selection and ordering data (continued)

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{\text{rated}}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{\text{rated}}$	$T_{LR}/T_{\text{rated}}$	$I_{LR}/I_{\text{rated}}$	Motor	
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>380 - 66 kV, 50 Hz</b>													
<b>6-pole</b>													
820	<b>1RQ6 450-6JJ■■■</b>	989	96	95.4	95.9	0.86	0.85	7923	2.10	0.95	5.50	26	780
910	<b>1RQ6 452-6JJ■■■</b>	990	106	95.6	96.0	0.86	0.84	8782	2.20	1.00	5.50	29	880
1020	<b>1RQ6 454-6JJ■■■</b>	991	120	95.7	96.0	0.86	0.84	9839	2.20	0.90	5.50	32	990
1130	<b>1RQ6 456-6JJ■■■</b>	992	134	96.0	96.3	0.85	0.81	10882	2.30	0.85	5.50	37	1160
1400	<b>1RQ4 500-6JE■■■</b>	990	162	95.7	95.8	0.87	0.86	13505	2.20	0.85	5.40	62	1050
1600	<b>1RQ4 502-6JE■■■</b>	990	184	95.9	96.0	0.87	0.86	15434	2.20	0.85	5.40	70	1150
1780	<b>1RQ4 504-6JE■■■</b>	990	205	96.0	96.1	0.87	0.86	17171	2.20	0.85	5.50	77	1350
1950	<b>1RQ4 506-6JE■■■</b>	991	225	96.2	96.2	0.87	0.86	18792	2.20	0.85	5.50	85	1600
2250	<b>1RQ4 560-6JE■■■</b>	992	260	96.3	96.5	0.87	0.85	21661	2.10	0.72	5.10	108	1300
2550	<b>1RQ4 562-6JE■■■</b>	993	295	96.5	96.6	0.86	0.84	24524	2.20	0.75	5.40	123	1600
2800	<b>1RQ4 564-6JE■■■</b>	993	320	96.6	96.7	0.87	0.85	26928	2.20	0.75	5.40	137	1800
3000	<b>1RQ4 566-6JE■■■</b>	993	345	96.7	96.8	0.87	0.85	28852	2.20	0.75	5.40	149	2000
3550	<b>1RQ4 630-6JE■■■</b>	993	410	96.8	96.7	0.86	0.85	34141	2.15	0.63	5.00	188	2400
3850	<b>1RQ4 632-6JE■■■</b>	993	440	96.9	96.8	0.87	0.85	37027	2.20	0.66	5.20	207	2800
4100	<b>1RQ4 634-6JE■■■</b>	994	475	96.9	96.9	0.86	0.84	39391	2.30	0.68	5.50	228	2500
4400	<b>1RQ4 636-6JE■■■</b>	994	510	97.1	97.1	0.86	0.84	42274	2.40	0.68	5.50	251	3200
<b>8-pole</b>													
620	<b>1RQ6 450-8JJ■■■</b>	743	77	94.9	95.2	0.82	0.78	7968	2.30	0.80	5.50	32	960
675	<b>1RQ6 452-8JJ■■■</b>	744	83	95.1	95.3	0.82	0.77	8669	2.30	0.80	5.50	36	1060
750	<b>1RQ6 454-8JJ■■■</b>	742	92	95.2	95.5	0.82	0.78	9657	2.20	0.80	5.50	41	1160
810	<b>1RQ6 456-8JJ■■■</b>	744	100	95.3	95.5	0.82	0.78	10397	2.50	0.85	5.50	46	1300
1040	<b>1RQ4 500-8JE■■■</b>	743	126	95.3	95.4	0.83	0.80	13367	2.30	0.90	5.50	74	1600
1160	<b>1RQ4 502-8JE■■■</b>	743	140	95.5	95.6	0.83	0.80	14910	2.30	0.90	5.50	84	1900
1280	<b>1RQ4 504-8JE■■■</b>	743	154	95.8	95.8	0.84	0.81	16452	2.30	0.90	5.50	92	1900
1400	<b>1RQ4 506-8JE■■■</b>	743	166	95.8	95.9	0.85	0.82	17995	2.20	0.90	5.50	103	2200
1650	<b>1RQ4 560-8JE■■■</b>	744	198	95.9	96.0	0.84	0.81	21179	2.10	0.78	5.30	128	2500
1850	<b>1RQ4 562-8JE■■■</b>	744	220	96.1	96.2	0.85	0.82	23747	2.10	0.78	5.40	146	3000
2000	<b>1RQ4 564-8JE■■■</b>	744	235	96.3	96.3	0.85	0.82	25672	2.10	0.80	5.50	163	3500
2200	<b>1RQ4 566-8JE■■■</b>	745	260	96.4	96.4	0.85	0.82	28201	2.20	0.80	5.50	178	3700
2650	<b>1RQ4 630-8JE■■■</b>	744	315	96.4	96.4	0.84	0.81	34015	2.40	0.75	5.10	246	3300
2850	<b>1RQ4 632-8JE■■■</b>	745	340	96.5	96.5	0.83	0.79	36534	2.50	0.81	5.50	272	3600
3000	<b>1RQ4 634-8JE■■■</b>	745	355	96.5	96.6	0.84	0.81	38456	2.50	0.81	5.50	300	3800
3200	<b>1RQ4 636-8JE■■■</b>	745	375	96.7	96.6	0.85	0.82	41020	2.50	0.80	5.50	331	4200

**Voltage code:**

0      3.3 kV, 50 Hz  
 6      6 kV, 50 Hz  
 6.6 kV, 50 Hz  
 Other voltage  
 9

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements. NEMA version on request.  
 Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note  
 the 10th and 11th position of the order code.

**Type of construction:**

IM B3  
 IM V1 (with canopy)  
 0      4

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or  
 two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data (continued)

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC		$I_{rated}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$		Motor External max. <sup>1)</sup>	
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>3.3 ... 6.6 kV, 50 Hz</b>													
10-pole:													
450	<b>1RQ6 450-3JJ■■■</b>	592	59	93.7	93.6	0.78	0.72	7259	2.30	1.00	5.40	39	1250
500	<b>1RQ6 452-3JJ■■■</b>	592	66	93.9	93.8	0.78	0.72	8066	2.40	1.00	5.50	43	1500
560	<b>1RQ6 454-3JJ■■■</b>	592	74	94.1	94.0	0.77	0.71	9034	2.40	1.00	5.50	48	1650
610	<b>1RQ6 456-3JJ■■■</b>	593	82	94.2	94.0	0.76	0.69	9824	2.50	1.00	5.50	54	1950
740	<b>1RQ4 500-3JE■■■</b>	593	94	94.6	94.6	0.80	0.76	11917	2.20	0.83	5.20	74	1600
820	<b>1RQ4 502-3JE■■■</b>	593	104	94.8	94.8	0.80	0.76	13206	2.30	0.85	5.40	84	1950
900	<b>1RQ4 504-3JE■■■</b>	593	114	94.9	94.9	0.80	0.76	14494	2.30	0.90	5.40	92	2500
1020	<b>1RQ4 506-3JE■■■</b>	593	128	95.1	95.1	0.80	0.74	16427	2.30	0.90	5.50	103	3100
1220	<b>1RQ4 560-3JE■■■</b>	594	156	95.2	95.1	0.79	0.74	19614	2.30	0.85	5.20	128	3000
1400	<b>1RQ4 562-3JE■■■</b>	594	176	95.5	95.4	0.80	0.75	22508	2.30	0.85	5.40	146	4600
1550	<b>1RQ4 564-3JE■■■</b>	594	194	95.6	95.6	0.80	0.75	24920	2.40	0.85	5.50	163	5100
1660	<b>1RQ4 566-3JE■■■</b>	595	215	95.7	95.7	0.78	0.72	26644	2.40	0.85	5.50	178	5700
2000	<b>1RQ4 630-3JE■■■</b>	593	240	96.0	96.2	0.84	0.81	32209	2.10	0.74	4.80	246	5000
2200	<b>1RQ4 632-3JE■■■</b>	594	260	96.1	96.3	0.84	0.81	35370	2.20	0.76	4.90	272	5700
2400	<b>1RQ4 634-3JE■■■</b>	594	285	96.3	96.5	0.84	0.81	38586	2.20	0.77	4.90	300	6600
2600	<b>1RQ4 636-3JE■■■</b>	594	315	96.4	96.6	0.83	0.79	41801	2.50	0.88	5.50	331	7300
12-pole:													
310	<b>1RQ6 450-5JJ■■■</b>	493	46.0	92.7	92.5	0.71	0.64	6005	2.00	0.72	4.60	39	1250
350	<b>1RQ6 452-5JJ■■■</b>	493	52	93.1	92.7	0.70	0.62	6780	2.20	0.78	4.90	43	1600
400	<b>1RQ6 454-5JJ■■■</b>	493	58	93.4	93.2	0.71	0.66	7748	2.00	0.72	4.60	48	1800
450	<b>1RQ6 456-5JJ■■■</b>	493	64	93.6	93.4	0.72	0.66	8717	2.10	0.75	4.80	54	1950
540	<b>1RQ4 500-5JE■■■</b>	492	76	94.0	93.9	0.73	0.67	10482	2.10	0.70	4.60	74	2200
610	<b>1RQ4 502-5JE■■■</b>	493	85	94.3	94.2	0.73	0.67	11816	2.20	0.75	4.80	84	3000
670	<b>1RQ4 504-5JE■■■</b>	493	95	94.4	94.3	0.72	0.65	12979	2.30	0.78	5.00	91	3700
740	<b>1RQ4 506-5JE■■■</b>	493	104	94.6	94.4	0.72	0.65	14335	2.30	0.78	5.20	102	4400
920	<b>1RQ4 560-5JE■■■</b>	494	128	94.7	94.8	0.73	0.67	17785	2.00	0.67	4.50	128	4100
1020	<b>1RQ4 562-5JE■■■</b>	495	144	94.9	94.9	0.72	0.65	19679	2.10	0.72	4.60	146	4700
1120	<b>1RQ4 564-5JE■■■</b>	495	158	95.0	95.0	0.72	0.65	21608	2.20	0.72	4.80	163	5300
1220	<b>1RQ4 566-5JE■■■</b>	495	172	95.2	95.1	0.72	0.65	23537	2.30	0.75	4.80	178	5900
1600	<b>1RQ4 630-5JE■■■</b>	494	205	95.5	95.8	0.78	0.72	30931	2.25	0.83	5.00	246	5700
1800	<b>1RQ4 632-5JE■■■</b>	494	230	95.8	96.0	0.78	0.73	34798	2.30	0.85	5.10	272	7500
1950	<b>1RQ4 634-5JE■■■</b>	494	250	96.0	96.1	0.78	0.73	37697	2.30	0.87	5.20	300	8800
2050	<b>1RQ4 636-5JE■■■</b>	495	265	96.2	96.3	0.78	0.72	39551	2.45	0.92	5.40	331	10500

**Voltage code:**

3.3 kV, 50 Hz

0

6 kV, 50 Hz

6

6.6 kV, 50 Hz

7

Other voltage

9

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

**Type of construction:**

IM B3

0

IM V1 (with canopy)

4

Higher pole numbers are available on request.  
Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Selection and ordering data

The following data also apply to explosion-protected motors 1SB4/1SB6 (Ex px) and 1SG4/1SG6 (Ex nA).

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor External, max. <sup>1)</sup>	
kW	Order No.	rpm	A	%	%	cos φ	cos φ	Nm	[-]	[-]	[-]	kgm <sup>2</sup>	kgm <sup>2</sup>
<b>3.3 ... 6.6 kV, 50 Hz</b>													
<b>2-pole</b>													
5400 <sup>2)</sup>	<b>1RQ6 710-2HJ■■0</b>	2991	600	96.9	96.7	0.89	0.88	17245	2.40	0.51	5.50	134	166
7000 <sup>2)</sup>	<b>1RQ6 712-2HJ■■0</b>	2990	770	97.1	97.0	0.90	0.90	22362	2.20	0.49	5.20	148	172
8100 <sup>2)</sup>	<b>1RQ6 714-2HJ■■0</b>	2991	880	97.3	97.1	0.91	0.90	25871	2.40	0.55	5.50	163	182
9300 <sup>2)</sup>	<b>1RQ6 716-2HJ■■0</b>	2990	1000	97.4	97.3	0.92	0.91	29710	2.30	0.54	5.50	180	200
<b>4-pole</b>													
6100 <sup>2)</sup>	<b>1RQ6 710-4JJ■■0</b>	1493	660	97.3	97.4	0.91	0.90	39025	2.20	0.58	5.50	278	772
7000 <sup>2)</sup>	<b>1RQ6 712-4JJ■■0</b>	1493	760	97.4	97.5	0.91	0.90	44773	2.20	0.58	5.50	305	815
7400 <sup>2)</sup>	<b>1RQ6 714-4JJ■■0</b>	1493	790	97.4	97.5	0.92	0.92	47357	2.10	0.60	5.50	341	989
8700 <sup>2)</sup>	<b>1RQ6 716-4JJ■■0</b>	1493	930	97.6	97.6	0.92	0.91	55655	2.20	0.61	5.50	374	1066
<b>6-pole</b>													
4900	<b>1RQ6 710-6JJ■■■</b>	994	560	97.0	97.3	0.86	0.85	47091	2.10	0.68	5.20	338	2362
5300	<b>1RQ6 712-6JJ■■■</b>	994	600	97.2	97.4	0.87	0.86	50929	2.10	0.75	5.50	375	2725
5800	<b>1RQ6 714-6JJ■■■</b>	994	650	97.3	97.4	0.88	0.86	55713	2.20	0.80	5.50	427	3373
6400	<b>1RQ6 716-6JJ■■■</b>	995	730	97.4	97.5	0.87	0.86	61459	2.30	0.83	5.50	476	3924
<b>8-pole</b>													
3650	<b>1RQ6 710-8JJ■■■</b>	745	425	96.8	97.1	0.85	0.83	46798	1.90	0.77	5.20	426	5374
4000	<b>1RQ6 712-8JJ■■■</b>	745	465	96.9	97.2	0.85	0.84	51282	1.90	0.78	5.20	476	6124
4400	<b>1RQ6 714-8JJ■■■</b>	746	510	97.0	97.2	0.85	0.83	56368	2.10	0.89	5.50	542	7308
4900	<b>1RQ6 716-8JJ■■■</b>	746	570	97.1	97.3	0.85	0.83	62760	2.20	0.93	5.50	608	8492
<b>10-pole</b>													
2750	<b>1RQ6 710-3JJ■■■</b>	596	340	96.3	96.9	0.81	0.78	44099	2.10	0.72	5.10	426	8974
3000	<b>1RQ6 712-3JJ■■■</b>	596	370	96.6	97.0	0.81	0.77	48083	2.20	0.76	5.40	476	10324
3300	<b>1RQ6 714-3JJ■■■</b>	596	405	96.8	97.0	0.81	0.77	52867	2.30	0.82	5.50	542	12458
3600	<b>1RQ6 716-3JJ■■■</b>	596	440	96.8	97.0	0.81	0.77	57653	2.40	0.85	5.50	609	14691

### Voltage code:

3.3 kV, 50 Hz

0

6 kV, 50 Hz

6

6.6 kV, 50 Hz

7

Other voltage

9

### Type of construction:

IM B3

0

IM V1 (with canopy)

4

### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup>  $V_{rated} < 6 \text{ kV}$  on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data

Rated power kW	High voltage motor H-compact PLUS	Speed rpm	Rated current $I_{rated}$ at 10 kV A	Efficiency		Power factor		Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia kgm <sup>2</sup>	Motor External, max. <sup>1)</sup> kgm <sup>2</sup>
				4/4 load %	3/4 load %	4/4 load $\cos \phi$	3/4 load $\cos \phi$						
				9.0 ... 11 kV, 50 Hz	Order No.								
<b>2-pole</b>													
950	<b>1RQ6 450-2JJ■0</b>	2979	65	95.2	95.3	0.89	0.89	3048	2.20	0.55	5.50	13	32
1050	<b>1RQ6 452-2JJ■0</b>	2981	71	95.5	95.6	0.90	0.90	3365	2.40	0.55	5.50	14	34
1150	<b>1RQ6 454-2JJ■0</b>	2981	76	95.6	95.7	0.91	0.91	3686	2.30	0.50	5.50	15	35
1250	<b>1RQ6 456-2JJ■0</b>	2982	82	95.9	96.0	0.92	0.92	4006	2.40	0.50	5.50	17	38
1600	<b>1RQ6 500-2JJ■0</b>	2980	106	96.1	96.3	0.91	0.90	5127	2.50	0.60	5.50	19	53
1730	<b>1RQ6 502-2JJ■0</b>	2980	112	96.3	96.5	0.92	0.91	5544	2.50	0.70	5.50	21	59
1930	<b>1RQ6 504-2JJ■0</b>	2979	124	96.4	96.7	0.93	0.92	6187	2.45	0.70	5.50	25	66
2050	<b>1RQ6 506-2JJ■0</b>	2980	132	96.6	96.8	0.93	0.93	6569	2.50	0.75	5.50	26	73
2600	<b>1RQ6 560-2JJ■0</b>	2983	170	96.5	96.6	0.91	0.90	8323	2.35	0.55	5.30	39	105
2800	<b>1RQ6 562-2JJ■0</b>	2983	184	96.6	96.7	0.91	0.91	8963	2.15	0.55	4.90	43	115
3200	<b>1RQ6 564-2JJ■0</b>	2983	205	96.8	96.9	0.92	0.92	10244	2.20	0.55	5.00	49	130
3400	<b>1RQ6 566-2JJ■0</b>	2983	220	96.9	97.0	0.93	0.93	10884	2.25	0.60	5.20	54	145
3600	<b>1RQ4 630-2JE■0</b>	2986	240	96.5	96.2	0.89	0.88	11514	2.60	0.39	5.10	61	100
4100	<b>1RQ4 632-2JE■0</b>	2987	270	96.8	96.7	0.90	0.89	13108	2.70	0.42	5.50	68	140
4600	<b>1RQ4 634-2JE■0</b>	2987	305	97.1	96.9	0.90	0.89	14707	2.70	0.42	5.50	77	160
5200	<b>1RQ4 636-2JE■0</b>	2987	340	97.3	97.1	0.91	0.90	16625	2.60	0.43	5.50	87	200
<b>4-pole</b>													
880	<b>1RQ6 450-4JJ■■</b>	1485	59	94.9	95.2	0.90	0.90	5662	2.10	0.70	5.50	20	154
940	<b>1RQ6 452-4JJ■■</b>	1486	63	95.2	95.5	0.90	0.90	6043	2.20	0.70	5.50	22	194
1080	<b>1RQ6 454-4JJ■■</b>	1487	73	95.4	95.7	0.90	0.90	6939	2.20	0.70	5.50	25	250
1160	<b>1RQ6 456-4JJ■■</b>	1486	77	95.6	95.9	0.91	0.91	7455	2.20	0.70	5.50	28	310
1520 <sup>2)</sup>	<b>1RQ6 500-4JJ■0</b>	1487	100	95.7	95.9	0.92	0.91	9761	2.45	0.70	5.40	43	200
1640 <sup>2)</sup>	<b>1RQ6 502-4JJ■0</b>	1487	108	95.8	96.0	0.91	0.91	10532	2.30	0.60	5.10	46	220
1820 <sup>2)</sup>	<b>1RQ6 504-4JJ■0</b>	1487	120	96.0	96.2	0.92	0.91	11688	2.30	0.60	5.00	52	250
2000 <sup>2)</sup>	<b>1RQ6 506-4JJ■0</b>	1489	130	96.2	96.4	0.92	0.91	12826	2.50	0.60	5.50	56	280
2500 <sup>2)</sup>	<b>1RQ6 560-4JJ■0</b>	1492	164	96.5	96.6	0.91	0.89	16001	2.40	0.60	5.40	84	460
2800 <sup>2)</sup>	<b>1RQ6 562-4JJ■0</b>	1492	184	96.7	96.8	0.91	0.90	17921	2.35	0.60	5.30	94	510
3100 <sup>2)</sup>	<b>1RQ6 564-4JJ■0</b>	1492	200	96.8	96.9	0.92	0.91	19841	2.35	0.60	5.30	104	560
3350 <sup>2)</sup>	<b>1RQ6 566-4JJ■0</b>	1493	215	96.9	97.0	0.92	0.91	21427	2.45	0.65	5.50	115	620
3800	<b>1RQ4 630-4JE■■</b>	1491	255	96.7	96.6	0.89	0.88	24339	2.40	0.62	5.40	139	600
4250	<b>1RQ4 632-4JE■■</b>	1491	280	96.8	96.9	0.90	0.90	27222	2.40	0.64	5.50	154	720
4700	<b>1RQ4 634-4JE■■</b>	1492	310	97.0	97.0	0.90	0.89	30084	2.40	0.63	5.50	174	850
5100	<b>1RQ4 636-4JE■■</b>	1492	340	97.2	97.1	0.89	0.88	32644	2.45	0.60	5.50	186	850

**Voltage code:**

10 kV, 50 Hz

8

Other voltage

9

**Type of construction:**

IM B3

0

IM V1 (with canopy)

4

**Note:**

Efficiencies according to IEC 60034-2-1:2007;

stray load losses determined by statical evaluation of measurements. NEMA version on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Data of vertical motors (IM V1) on request.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data (continued)

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
			$I_{rated}$ at 10 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>9.0...11 kW, 50 Hz</b>													
<b>6-pole</b>													
680	<b>1RQ6 450-6JJ■■■</b>	991	48.5	94.8	95.2	0.85	0.82	6558	2.20	0.85	5.50	26	380
760	<b>1RQ6 452-6JJ■■■</b>	991	54	95.1	95.5	0.86	0.84	7332	2.20	0.90	5.50	29	435
820	<b>1RQ6 454-6JJ■■■</b>	991	57	95.2	95.7	0.87	0.85	7909	2.20	0.85	5.50	32	490
960	<b>1RQ6 456-6JJ■■■</b>	992	67	95.5	95.8	0.86	0.83	9246	2.20	0.80	5.50	37	570
1120	<b>1RQ4 500-6JE■■■</b>	991	78	95.1	95.2	0.87	0.85	10793	2.20	0.80	5.50	62	500
1280	<b>1RQ4 502-6JE■■■</b>	992	89	95.5	95.6	0.87	0.85	12323	2.20	0.80	5.50	70	600
1400	<b>1RQ4 504-6JE■■■</b>	992	98	95.7	95.7	0.86	0.84	13478	2.20	0.75	5.50	77	650
1550	<b>1RQ4 506-6JE■■■</b>	992	108	95.8	95.8	0.86	0.84	14922	2.30	0.75	5.50	85	720
1950	<b>1RQ4 560-6JE■■■</b>	993	136	96.1	96.1	0.86	0.84	18754	2.20	0.75	5.50	108	900
2150	<b>1RQ4 562-6JE■■■</b>	994	150	96.3	96.2	0.86	0.83	20656	2.20	0.70	5.50	123	950
2400	<b>1RQ4 564-6JE■■■</b>	994	170	96.4	96.4	0.85	0.82	23058	2.30	0.70	5.50	137	1100
2600	<b>1RQ4 566-6JE■■■</b>	994	182	96.5	96.5	0.85	0.82	24980	2.30	0.70	5.50	149	1350
3100	<b>1RQ4 630-6JE■■■</b>	994	215	96.6	96.5	0.86	0.84	29784	2.30	0.66	5.40	188	1400
3400	<b>1RQ4 632-6JE■■■</b>	994	235	96.7	96.7	0.87	0.85	32666	2.30	0.68	5.50	207	1700
3700	<b>1RQ4 634-6JE■■■</b>	994	255	96.8	96.8	0.86	0.85	35548	2.30	0.67	5.50	228	2000
4000	<b>1RQ4 636-6JE■■■</b>	994	275	96.9	96.9	0.86	0.84	38431	2.40	0.67	5.50	251	2400
<b>8-pole</b>													
470	<b>1RQ6 450-8JJ■■■</b>	743	34.5	94.0	94.5	0.84	0.81	6045	2.20	0.75	5.50	32	250
495	<b>1RQ6 452-8JJ■■■</b>	743	35.5	94.2	94.8	0.85	0.82	6365	2.30	0.75	5.50	36	320
520	<b>1RQ6 454-8JJ■■■</b>	743	37.0	94.1	94.7	0.86	0.83	6688	2.20	0.75	5.50	41	390
540	<b>1RQ6 456-8JJ■■■</b>	745	40.5	94.3	94.6	0.82	0.77	6923	2.40	0.70	5.50	45	495
830	<b>1RQ4 500-8JE■■■</b>	744	62	94.7	94.8	0.82	0.78	10654	2.20	0.75	5.50	74	580
930	<b>1RQ4 502-8JE■■■</b>	744	67	95.1	95.1	0.84	0.81	11938	2.20	0.80	5.50	84	750
1020	<b>1RQ4 504-8JE■■■</b>	744	74	95.2	95.2	0.84	0.81	13093	2.20	0.80	5.50	92	850
1120	<b>1RQ4 506-8JE■■■</b>	744	81	95.3	95.5	0.84	0.82	14376	2.20	0.80	5.50	103	1000
1380	<b>1RQ4 560-8JE■■■</b>	745	99	95.6	95.6	0.84	0.81	17690	2.20	0.75	5.40	128	1150
1550	<b>1RQ4 562-8JE■■■</b>	745	112	95.9	95.8	0.83	0.80	19869	2.20	0.75	5.50	146	1550
1700	<b>1RQ4 564-8JE■■■</b>	745	124	95.9	95.9	0.83	0.80	21792	2.20	0.72	5.50	163	1450
1900	<b>1RQ4 566-8JE■■■</b>	746	138	96.1	96.0	0.83	0.80	24323	2.20	0.72	5.50	178	1600
2300	<b>1RQ4 630-8JE■■■</b>	744	164	96.1	96.1	0.84	0.81	29523	2.40	0.76	5.30	246	2000
2500	<b>1RQ4 632-8JE■■■</b>	745	180	96.2	96.2	0.83	0.79	32047	2.60	0.81	5.50	272	2100
2700	<b>1RQ4 634-8JE■■■</b>	745	194	96.3	96.3	0.83	0.79	34611	2.60	0.80	5.50	300	2400
2900	<b>1RQ4 636-8JE■■■</b>	745	205	96.5	96.5	0.84	0.80	37174	2.60	0.80	5.50	331	2900

**Voltage code:**
10 kV, 50 Hz  
Other voltage
**Note:**
Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.
**Type of construction:**  
IM B3  
IM V1 (with canopy)
0  
4

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data (continued)

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{\text{rated}}$ at 10 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{\text{rated}}$	$T_{LR}/T_{\text{rated}}$	$I_{LR}/I_{\text{rated}}$	Motor External max. <sup>1)</sup>	
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>9.0 ... 11 kV, 50 Hz</b>													
10-pole													
600	<b>1RQ4 500-3JE■■■</b>	595	48.0	93.8	93.6	0.77	0.71	9630	2.40	0.85	5.50	74	900
680	<b>1RQ4 502-3JE■■■</b>	594	51	94.2	94.2	0.81	0.76	10933	2.30	0.90	5.50	84	1150
750	<b>1RQ4 504-3JE■■■</b>	594	57	94.3	94.3	0.81	0.76	12058	2.30	0.90	5.50	92	1300
820	<b>1RQ4 506-3JE■■■</b>	594	61	94.5	94.5	0.82	0.77	13184	2.30	0.90	5.50	103	1600
1050	<b>1RQ4 560-3JE■■■</b>	594	81	94.7	94.7	0.79	0.73	16881	2.40	0.85	5.50	128	1850
1180	<b>1RQ4 562-3JE■■■</b>	594	90	95.0	95.0	0.80	0.75	18971	2.30	0.85	5.50	146	2300
1300	<b>1RQ4 564-3JE■■■</b>	595	100	95.2	95.1	0.79	0.74	20866	2.40	0.82	5.50	163	2600
1400	<b>1RQ4 566-3JE■■■</b>	595	112	95.3	95.0	0.76	0.69	22471	2.60	0.82	5.50	178	2750
1800	<b>1RQ4 630-3JE■■■</b>	594	132	95.8	95.9	0.82	0.78	28939	2.40	0.85	5.40	246	2600
1950	<b>1RQ4 632-3JE■■■</b>	595	146	96.0	96.0	0.80	0.74	31298	2.60	0.88	5.50	272	3100
2100	<b>1RQ4 634-3JE■■■</b>	595	156	96.1	96.1	0.81	0.76	33706	2.60	0.89	5.50	300	3200
2250	<b>1RQ4 636-3JE■■■</b>	595	166	96.2	96.1	0.81	0.76	36113	2.60	0.85	5.50	331	3500
12-pole													
480	<b>1RQ4 502-5JE■■■</b>	494	42.0	93.4	93.4	0.70	0.62	9279	2.40	0.85	5.40	84	1500
530	<b>1RQ4 504-5JE■■■</b>	494	46.0	93.5	93.5	0.70	0.62	10246	2.40	0.85	5.40	91	1650
580	<b>1RQ4 506-5JE■■■</b>	494	50	93.7	93.9	0.72	0.64	11213	2.50	0.85	5.40	102	1800
720	<b>1RQ4 560-5JE■■■</b>	495	60	94.0	94.4	0.74	0.67	13891	2.10	0.70	4.80	128	1950
840	<b>1RQ4 562-5JE■■■</b>	495	71	94.4	94.7	0.72	0.65	16206	2.30	0.78	5.00	146	2500
920	<b>1RQ4 564-5JE■■■</b>	495	77	94.6	94.9	0.73	0.66	17749	2.30	0.75	5.00	163	2950
1000	<b>1RQ4 566-5JE■■■</b>	495	83	94.8	95.1	0.73	0.67	19293	2.30	0.75	5.00	178	3400
1400	<b>1RQ4 630-5JE■■■</b>	495	110	95.2	95.7	0.77	0.71	27010	2.50	0.91	5.40	246	3100
1500	<b>1RQ4 632-5JE■■■</b>	495	116	95.3	95.9	0.79	0.73	28939	2.35	0.86	5.30	272	3300
1630	<b>1RQ4 634-5JE■■■</b>	495	124	95.5	96.1	0.79	0.75	31447	2.30	0.84	5.20	300	4100
1750	<b>1RQ4 636-5JE■■■</b>	496	138	95.7	96.0	0.76	0.69	33695	2.70	1.00	5.50	331	4300

#### Voltage code:

10 kV, 50 Hz  
Other voltage

8  
9

#### Type of construction:

IM B3  
IM V1 (with canopy)

0  
4

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC		$f_{\text{rated}}$ at 10 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{\text{rated}}$	$T_{LR}/T_{\text{rated}}$	$I_{LR}/I_{\text{rated}}$	$I_{LP}/I_{\text{rated}}$	Motor External, max. <sup>1)</sup>	
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>9.0 ... 11 kW, 50 Hz</b>													
2-pole													
5100	<b>1RQ6 710-2HJ■0</b>	2991	340	96.8	96.6	0.89	0.87	16284	2.50	0.53	5.50	134	176
6000	<b>1RQ6 712-2HJ■0</b>	2991	395	96.9	96.7	0.91	0.90	19164	2.30	0.51	5.50	148	202
6600	<b>1RQ6 714-2HJ■0</b>	2991	425	96.9	96.8	0.92	0.91	21081	2.30	0.53	5.50	163	217
7300	<b>1RQ6 716-2HJ■0</b>	2990	470	97.0	96.8	0.92	0.92	23317	2.40	0.55	5.50	180	250
4-pole													
5100	<b>1RQ6 710-4JJ■0</b>	1494	335	97.1	97.1	0.91	0.90	32613	2.30	0.57	5.50	278	822
5500	<b>1RQ6 712-4JJ■0</b>	1493	355	97.1	97.2	0.92	0.91	35180	2.20	0.58	5.50	305	945
6100	<b>1RQ6 714-4JJ■0</b>	1493	395	97.1	97.3	0.92	0.91	39020	2.20	0.60	5.50	341	1109
6400	<b>1RQ6 716-4JJ■0</b>	1494	415	97.2	97.3	0.92	0.91	40924	2.30	0.60	5.50	374	1326
6-pole													
4200	<b>1RQ6 710-6JJ■0</b>	994	290	96.9	97.1	0.87	0.85	40353	2.10	0.69	5.40	338	2212
4600	<b>1RQ6 712-6JJ■0</b>	994	315	97.0	97.2	0.87	0.86	44186	2.20	0.73	5.50	375	2525
5000	<b>1RQ6 714-6JJ■0</b>	995	340	97.1	97.3	0.88	0.86	48018	2.30	0.79	5.50	427	3073
5500	<b>1RQ6 716-6JJ■0</b>	995	375	97.2	97.3	0.87	0.86	52802	2.30	0.79	5.50	476	3474
8-pole													
3150	<b>1RQ6 710-8JJ■0</b>	745	220	96.6	96.9	0.85	0.84	40379	2.00	0.76	5.30	426	5924
3450	<b>1RQ6 712-8JJ■0</b>	745	240	96.7	97.0	0.86	0.84	44216	2.00	0.80	5.40	476	6774
3850	<b>1RQ6 714-8JJ■0</b>	746	270	96.8	97.1	0.85	0.83	49317	2.10	0.86	5.50	542	7958
4300	<b>1RQ6 716-8JJ■0</b>	746	300	96.9	97.2	0.85	0.83	55059	2.20	0.89	5.50	608	9292
10-pole													
2300	<b>1RQ6 710-3JJ■0</b>	596	172	96.3	96.6	0.80	0.76	36841	2.40	0.82	5.50	426	8174
2550	<b>1RQ6 712-3JJ■0</b>	596	188	96.4	96.7	0.81	0.77	40851	2.30	0.79	5.50	476	9424
2900	<b>1RQ6 714-3JJ■0</b>	596	215	96.6	96.9	0.81	0.77	46442	2.40	0.83	5.50	542	13308
3200	<b>1RQ6 716-3JJ■0</b>	597	235	96.7	96.9	0.81	0.77	51238	2.50	0.86	5.50	609	14591

**Voltage code:**

 10 kV, 50 Hz  
 Other voltage

**8**  
**9**
**Note:**  
 Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements. NEMA version on request.

**Type of construction:**

 IM B3  
 IM V1 (with canopy)

**0**  
**4**

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data

The following data also apply to explosion-protected motors 1SB4/1SB6 (Ex px) and 1SG4/1SG6 (Ex nA).

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6.6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor External, max. <sup>1)</sup>	
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>4.0 ... 5.6 kW, 60 Hz</b>													
<b>2-pole</b>													
1280	<b>1RQ6 450-2JJ■0</b>	3575	130	95.3	95.2	0.90	0.90	3420	2.00	0.50	5.30	13	44
1420	<b>1RQ6 452-2JJ■0</b>	3577	142	95.6	95.6	0.91	0.91	3795	2.20	0.55	5.50	14	46
1580	<b>1RQ6 454-2JJ■0</b>	3579	158	95.9	95.8	0.91	0.91	4218	2.30	0.55	5.50	15	48
1740	<b>1RQ6 456-2JJ■0</b>	3582	174	96.1	96.0	0.91	0.91	4641	2.40	0.50	5.50	17	51
2200	<b>1RQ6 500-2JJ■0</b>	3580	220	96.4	96.3	0.91	0.90	5868	2.40	0.60	5.50	20	63
2350	<b>1RQ6 502-2JJ■0</b>	3580	230	96.5	96.4	0.92	0.91	6268	2.40	0.70	5.50	22	70
2650	<b>1RQ6 504-2JJ■0</b>	3579	260	96.7	96.7	0.93	0.92	7071	2.45	0.60	5.50	26	78
2900	<b>1RQ6 506-2JJ■0</b>	3579	280	96.9	96.9	0.93	0.93	7738	2.35	0.70	5.50	27	86
3400	<b>1RQ6 560-2JJ■0</b>	3581	340	96.6	96.5	0.90	0.90	9067	2.05	0.55	4.80	39	130
3800	<b>1RQ6 562-2JJ■0</b>	3582	380	96.7	96.6	0.91	0.90	10130	2.15	0.55	5.00	43	145
4100	<b>1RQ6 564-2JJ■0</b>	3582	400	96.9	96.8	0.92	0.92	10930	2.25	0.55	5.20	49	160
4500	<b>1RQ6 566-2JJ■0</b>	3583	440	97.0	97.0	0.92	0.92	11993	2.20	0.55	5.10	54	180
4300	<b>1RQ4 630-2JE■0</b>	3584	435	96.1	95.8	0.90	0.89	11458	2.30	0.33	4.70	61	80
4900	<b>1RQ4 632-2JE■0</b>	3585	495	96.5	96.2	0.90	0.89	13053	2.50	0.37	5.10	68	110
5600	<b>1RQ4 634-2JE■0</b>	3586	560	96.9	96.6	0.90	0.90	14914	2.60	0.38	5.30	77	160
6300	<b>1RQ4 636-2JE■0</b>	3587	620	97.1	96.8	0.91	0.90	16773	2.60	0.40	5.50	87	190
<b>4-pole</b>													
1340	<b>1RQ6 450-4JJ■■</b>	1786	138	95.5	95.5	0.89	0.87	7168	2.20	0.70	5.50	20	200
1410	<b>1RQ6 452-4JJ■■</b>	1788	146	95.5	95.4	0.88	0.86	7535	2.30	0.65	5.50	22	240
1590	<b>1RQ6 454-4JJ■■</b>	1787	162	95.8	95.9	0.90	0.89	8502	2.20	0.65	5.50	25	295
1740	<b>1RQ6 456-4JJ■■</b>	1787	176	96.0	96.1	0.90	0.90	9304	2.20	0.65	5.50	28	355
2150 <sup>2)</sup>	<b>1RQ6 500-4JJ■0</b>	1786	215	96.0	96.1	0.92	0.91	11496	2.30	0.60	5.00	43	250
2350 <sup>2)</sup>	<b>1RQ6 502-4JJ■0</b>	1787	235	96.2	96.2	0.92	0.91	12558	2.40	0.60	5.30	46	290
2700 <sup>2)</sup>	<b>1RQ6 504-4JJ■0</b>	1788	265	96.4	96.4	0.92	0.91	14420	2.45	0.60	5.30	52	320
2950 <sup>2)</sup>	<b>1RQ6 506-4JJ■0</b>	1788	290	96.6	96.6	0.92	0.91	15755	2.50	0.60	5.40	56	360
3500 <sup>2)</sup>	<b>1RQ6 560-4JJ■0</b>	1791	350	96.7	96.6	0.91	0.90	18661	2.30	0.60	5.20	84	660
3900 <sup>2)</sup>	<b>1RQ6 562-4JJ■0</b>	1792	390	96.8	96.8	0.90	0.89	20783	2.30	0.55	5.20	94	730
4400 <sup>2)</sup>	<b>1RQ6 564-4JJ■0</b>	1792	435	97.0	97.0	0.91	0.90	23447	2.35	0.55	5.30	104	800
4700 <sup>2)</sup>	<b>1RQ6 566-4JJ■0</b>	1792	465	97.1	97.0	0.91	0.90	25046	2.35	0.55	5.30	115	880
5000	<b>1RQ4 630-4JE■0</b>	1791	500	96.8	96.6	0.90	0.89	26661	2.40	0.60	5.30	139	650
5500	<b>1RQ4 632-4JE■0</b>	1791	551	96.9	96.8	0.90	0.90	29327	2.40	0.62	5.30	154	750
6100	<b>1RQ4 634-4JE■0</b>	1791	610	97.1	96.9	0.90	0.90	32527	2.40	0.65	5.50	174	800
6700	<b>1RQ4 636-4JE■0</b>	1791	670	97.2	97.1	0.90	0.90	35726	2.40	0.65	5.50	186	820

#### Voltage code:

4 kV, 60 Hz  
6.6 kV, 60 Hz  
Other voltage

4  
1  
9  
0  
4

#### Note:

Efficiencies according to IEC 60034-2-1:2007; stray load losses determined by statical evaluation of measurements. NEMA version on request.

#### Type of construction:

IM B3  
IM V1 (with canopy)

0  
4

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Data of vertical motors (IM V1) on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data (continued)

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia
IEC			$I_{rated}$ at 6.6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor kgm <sup>2</sup>
kW	Order No.	rpm	A	%	%	cos φ	cos φ	Nm	[-]	[-]	[-]	External max. <sup>1)</sup> kgm <sup>2</sup>
<b>4.0 ... 6.6 kW, 60 Hz</b>												
<b>6-pole</b>												
1040	<b>1RQ6 450-6JJ■■■</b>	1189	110	95.5	95.8	0.86	0.84	8360	2.10	0.80	5.50	26 530
1130	<b>1RQ6 452-6JJ■■■</b>	1191	122	95.7	95.9	0.85	0.83	9070	2.10	0.80	5.50	29 600
1270	<b>1RQ6 454-6JJ■■■</b>	1190	134	95.9	96.1	0.86	0.84	10197	2.10	0.80	5.50	32 660
1360	<b>1RQ6 456-6JJ■■■</b>	1191	144	96.0	96.1	0.86	0.84	10911	2.20	0.85	5.50	37 770
1700	<b>1RQ4 500-6JE■■■</b>	1190	176	95.8	95.7	0.88	0.86	13643	2.20	0.80	5.50	62 650
1920	<b>1RQ4 502-6JE■■■</b>	1191	200	96.1	95.9	0.87	0.85	15395	2.30	0.85	5.50	70 750
2100	<b>1RQ4 504-6JE■■■</b>	1190	215	96.2	96.0	0.88	0.86	16853	2.20	0.80	5.40	77 850
2300	<b>1RQ4 506-6JE■■■</b>	1191	235	96.3	96.2	0.88	0.86	18442	2.20	0.80	5.50	85 1000
2700	<b>1RQ4 560-6JE■■■</b>	1192	280	96.3	96.3	0.87	0.85	21632	2.00	0.65	5.00	108 800
3050	<b>1RQ4 562-6JE■■■</b>	1193	320	96.5	96.4	0.86	0.83	24415	2.20	0.70	5.50	123 950
3350	<b>1RQ4 564-6JE■■■</b>	1193	350	96.7	96.5	0.87	0.84	26817	2.20	0.75	5.50	137 1100
3600	<b>1RQ4 566-6JE■■■</b>	1194	380	96.8	96.6	0.86	0.83	28794	2.20	0.70	5.50	149 1250
4250	<b>1RQ4 630-6JE■■■</b>	1193	445	96.8	96.7	0.86	0.84	34021	2.30	0.62	5.20	188 1850
4550	<b>1RQ4 632-6JE■■■</b>	1193	480	96.8	96.8	0.86	0.85	36423	2.20	0.62	5.20	207 1700
4900	<b>1RQ4 634-6JE■■■</b>	1194	510	97.0	96.9	0.87	0.85	39192	2.30	0.66	5.40	228 2300
5200	<b>1RQ4 636-6JE■■■</b>	1194	540	97.2	97.0	0.87	0.85	41591	2.40	0.67	5.50	251 2600
<b>8-pole</b>												
740	<b>1RQ6 450-8JJ■■■</b>	892	81	95.1	95.4	0.84	0.82	7928	1.90	0.65	5.50	32 660
820	<b>1RQ6 452-8JJ■■■</b>	892	90	95.3	95.5	0.84	0.82	8781	2.00	0.65	5.50	36 770
910	<b>1RQ6 454-8JJ■■■</b>	893	100	95.1	95.5	0.84	0.81	9736	2.20	0.70	5.50	41 890
1000	<b>1RQ6 456-8JJ■■■</b>	894	108	95.6	95.7	0.84	0.80	10690	2.30	0.75	5.50	47 1080
1250	<b>1RQ4 500-8JE■■■</b>	892	136	95.6	95.5	0.84	0.82	13383	2.10	0.80	5.40	74 1000
1400	<b>1RQ4 502-8JE■■■</b>	893	154	95.8	95.6	0.83	0.80	14972	2.30	0.82	5.50	84 1200
1550	<b>1RQ4 504-8JE■■■</b>	893	170	95.9	95.8	0.83	0.80	16576	2.30	0.85	5.50	92 1350
1700	<b>1RQ4 506-8JE■■■</b>	893	184	96.0	95.9	0.84	0.81	18180	2.30	0.85	5.50	103 1600
2000	<b>1RQ4 560-8JE■■■</b>	894	215	96.1	95.9	0.84	0.81	21365	2.10	0.75	5.30	128 1750
2200	<b>1RQ4 562-8JE■■■</b>	895	240	96.2	96.1	0.84	0.81	23475	2.20	0.75	5.50	146 2100
2400	<b>1RQ4 564-8JE■■■</b>	894	255	96.3	96.3	0.85	0.82	25638	2.10	0.75	5.50	163 2500
2650	<b>1RQ4 566-8JE■■■</b>	895	285	96.4	96.4	0.84	0.82	28277	2.20	0.75	5.50	178 2800

**Voltage code:**

4 kV, 60 Hz      **4**  
 6.6 kV, 60 Hz    **1**  
 Other voltage    **9**

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements. NEMA version on request.

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

**Type of construction:**

IM B3              **0**  
 IM V1 (with canopy)    **4**

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data (continued)

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6.6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor External, max. <sup>1)</sup>	
kW	Order No.	rpm	A	%	%	cos φ	cos φ	Nm	[-]	[-]	[-]	kgm <sup>2</sup>	kgm <sup>2</sup>
<b>4.0 ... 6.6 kW, 60 Hz</b>													
10-pole													
540	<b>1RQ6 450-3JJ■■■</b>	711	63	93.9	93.8	0.80	0.75	7253	2.20	0.88	5.30	39	700
600	<b>1RQ6 452-3JJ■■■</b>	712	71	94.2	94.1	0.79	0.73	8048	2.30	0.90	5.50	43	900
670	<b>1RQ6 454-3JJ■■■</b>	712	80	94.3	94.2	0.78	0.73	8987	2.40	1.00	5.50	48	950
730	<b>1RQ6 456-3JJ■■■</b>	713	88	94.5	94.3	0.77	0.72	9778	2.40	0.90	5.50	54	1100
900	<b>1RQ4 500-3JE■■■</b>	713	104	94.9	94.7	0.80	0.76	12055	2.10	0.78	5.20	74	1400
1000	<b>1RQ4 502-3JE■■■</b>	713	114	95.1	94.9	0.80	0.75	13394	2.20	0.82	5.30	84	1700
1100	<b>1RQ4 504-3JE■■■</b>	713	126	95.1	94.9	0.80	0.76	14734	2.20	0.82	5.30	92	1700
1250	<b>1RQ4 506-3JE■■■</b>	713	144	95.4	95.1	0.80	0.75	16743	2.30	0.88	5.50	103	2250
1460	<b>1RQ4 560-3JE■■■</b>	714	172	95.4	95.2	0.78	0.72	19528	2.40	0.85	5.40	128	2400
1680	<b>1RQ4 562-3JE■■■</b>	714	196	95.7	95.5	0.78	0.72	22471	2.40	0.85	5.50	146	2800
1820	<b>1RQ4 564-3JE■■■</b>	714	210	95.7	95.6	0.80	0.76	24343	2.30	0.80	5.40	163	3200
1930	<b>1RQ4 566-3JE■■■</b>	715	225	95.9	95.6	0.79	0.73	25778	2.40	0.80	5.50	178	3600
12-pole													
370	<b>1RQ6 450-5JJ■■■</b>	592	48.0	93.1	92.9	0.72	0.66	5969	2.00	0.68	4.60	39	700
425	<b>1RQ6 452-5JJ■■■</b>	593	57	93.5	93.0	0.70	0.63	6844	2.20	0.72	4.80	43	1000
480	<b>1RQ6 454-5JJ■■■</b>	593	63	94.0	93.7	0.71	0.65	7730	2.10	0.72	4.80	48	1300
540	<b>1RQ6 456-5JJ■■■</b>	593	69	94.1	93.9	0.73	0.68	8696	2.00	0.68	4.70	54	1500
650	<b>1RQ4 500-5JE■■■</b>	593	84	94.3	94.1	0.72	0.66	10468	2.20	0.70	4.80	74	1600
730	<b>1RQ4 502-5JE■■■</b>	593	91	94.5	94.3	0.74	0.70	11756	2.10	0.65	4.70	84	1800
820	<b>1RQ4 504-5JE■■■</b>	593	104	94.7	94.4	0.73	0.68	13206	2.20	0.70	4.80	91	2100
900	<b>1RQ4 506-5JE■■■</b>	593	116	94.8	94.5	0.72	0.66	14494	2.30	0.75	5.20	102	2400
1100	<b>1RQ4 560-5JE■■■</b>	594	138	95.0	94.9	0.73	0.67	17685	2.00	0.62	4.50	128	2400
1220	<b>1RQ4 562-5JE■■■</b>	594	152	95.2	95.1	0.74	0.68	19614	2.10	0.65	4.50	146	3000
1320	<b>1RQ4 564-5JE■■■</b>	595	166	95.3	95.1	0.73	0.67	21187	2.20	0.68	4.60	163	3300
1450	<b>1RQ4 566-5JE■■■</b>	595	180	95.4	95.3	0.74	0.68	23273	2.20	0.68	4.60	178	3800

#### Voltage code:

4 kV, 60 Hz      4  
 6.6 kV, 60 Hz      1  
 Other voltage      9

#### Type of construction:

IM B3      0  
 IM V1 (with canopy)      4

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data

The following data also apply to explosion-protected motors 1SB4/1SB6 (Ex px) and 1SG4/1SG6 (Ex nA).

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia
IEC			$I_{\text{rated}}$ at 6.6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{\text{rated}}$	$T_{LR}/T_{\text{rated}}$	$I_{LR}/I_{\text{rated}}$	Motor
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	kgm <sup>2</sup>
<b>4.0...6.6 kW, 60 Hz</b>												
2-pole												
6100 <sup>2)</sup>	<b>1RQ6 710-2HJ■■0</b>	3591	610	96.6	96.2	0.90	0.88	16226	2.40	0.48	5.50	134
7700 <sup>2)</sup>	<b>1RQ6 712-2HJ■■0</b>	3590	760	96.9	96.6	0.91	0.90	20485	2.30	0.48	5.50	148
9500 <sup>2)</sup>	<b>1RQ6 714-2HJ■■0</b>	3590	940	97.2	96.9	0.91	0.91	25277	2.20	0.46	5.30	163
10800 <sup>2)</sup>	<b>1RQ6 716-2HJ■■0</b>	3590	1060	97.3	97.0	0.92	0.91	28734	2.40	0.52	5.50	180
4-pole												
6900 <sup>2)</sup>	<b>1RQ6 710-4JJ■■0</b>	1794	690	97.1	97.0	0.90	0.88	36736	2.50	0.57	5.50	278
8400 <sup>2)</sup>	<b>1RQ6 712-4JJ■■0</b>	1793	830	97.4	97.3	0.91	0.90	44743	2.30	0.60	5.50	305
9200 <sup>2)</sup>	<b>1RQ6 714-4JJ■■0</b>	1793	900	97.4	97.3	0.92	0.91	49006	2.30	0.61	5.50	341
10200 <sup>2)</sup>	<b>1RQ6 716-4JJ■■0</b>	1793	990	97.5	97.4	0.92	0.91	54328	2.30	0.62	5.50	374
6-pole												
5700	<b>1RQ6 710-6JJ■■■</b>	1194	590	97.1	97.1	0.87	0.85	45593	2.20	0.71	5.50	338
6400	<b>1RQ6 712-6JJ■■■</b>	1194	660	97.2	97.2	0.87	0.85	51190	2.20	0.69	5.50	375
6800	<b>1RQ6 714-6JJ■■■</b>	1195	710	97.3	97.3	0.86	0.84	54356	2.30	0.72	5.50	427
7500	<b>1RQ6 716-6JJ■■■</b>	1195	770	97.3	97.3	0.87	0.85	59959	2.30	0.75	5.50	476
8-pole												
4400	<b>1RQ6 710-8JJ■■■</b>	895	475	96.9	97.1	0.84	0.82	46939	2.10	0.82	5.50	426
4900	<b>1RQ6 712-8JJ■■■</b>	895	520	96.9	97.1	0.85	0.83	52270	2.10	0.84	5.50	476
5400	<b>1RQ6 714-8JJ■■■</b>	896	580	97.1	97.2	0.84	0.82	57577	2.20	0.85	5.50	542
6000	<b>1RQ6 716-8JJ■■■</b>	896	650	97.2	97.2	0.83	0.80	63953	2.20	0.82	5.50	608
10-pole												
3000	<b>1RQ6 710-3JJ■■■</b>	716	340	96.6	96.8	0.80	0.75	40008	2.40	0.77	5.50	426
3350	<b>1RQ6 712-3JJ■■■</b>	716	375	96.8	96.9	0.81	0.77	44683	2.30	0.74	5.50	476
3750	<b>1RQ6 714-3JJ■■■</b>	716	425	96.9	97.0	0.80	0.76	49999	2.40	0.80	5.50	542
4200	<b>1RQ6 716-3JJ■■■</b>	717	475	96.9	97.0	0.80	0.76	55987	2.40	0.79	5.50	609
Voltage code:												
4 kV, 60 Hz		4	Note:									
4.16 kV, 60 Hz		3	Efficiencies according to IEC 60034-2-1:2007;									
6.6 kV, 60 Hz		1	stray load losses determined by statical evaluation of measurements.									
Other voltage		9										
Type of construction:												
IM B3		0	Higher pole numbers are available on request.									
IM V1 (with canopy)		4										

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup>  $V_{\text{rated}} < 6$  kV on request.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data

Rated power kW	High voltage motor H-compact PLUS	Speed rpm	Rated current <i>I<sub>rated</sub></i> at 13.2 kV	Efficiency		Power factor		Torque Nm	Break-down torque <i>T<sub>B</sub></i> / <i>T<sub>rated</sub></i>	Locked- rotor torque <i>T<sub>LR</sub></i> / <i>T<sub>rated</sub></i>	Locked- rotor current <i>I<sub>LR</sub></i> / <i>I<sub>rated</sub></i>	Moment of inertia								
				4/4 load	3/4 load	4/4 load	3/4 load					Motor	External, max. <sup>1)</sup>							
				A	%	%	cos φ					kNm <sup>2</sup>	kgm <sup>2</sup>							
<b>12.5 ... 13.8 kV, 60 Hz</b>																				
<b>2-pole</b>																				
5200	<b>1RQ6 710-2HJ■■0</b>	3591	260	96.2	95.7	0.91	0.89	13830	2.50	0.49	5.50	134	76							
6400	<b>1RQ6 712-2HJ■■0</b>	3591	320	96.4	96.1	0.91	0.90	17024	2.40	0.48	5.50	148	87							
7100	<b>1RQ6 714-2HJ■■0</b>	3591	350	96.4	96.1	0.92	0.92	18888	2.30	0.48	5.50	163	92							
8100	<b>1RQ6 716-2HJ■■0</b>	3590	395	96.7	96.3	0.93	0.93	21552	2.30	0.50	5.50	180	105							
<b>4-pole</b>																				
5400	<b>1RQ6 710-4JJ■■0</b>	1794	270	96.6	96.5	0.91	0.90	28752	2.40	0.57	5.50	278	452							
6200	<b>1RQ6 712-4JJ■■0</b>	1794	310	96.8	96.7	0.91	0.90	33007	2.40	0.57	5.50	305	515							
6600	<b>1RQ6 714-4JJ■■0</b>	1794	325	96.8	96.7	0.92	0.91	35144	2.40	0.60	5.50	341	619							
7300	<b>1RQ6 716-4JJ■■0</b>	1794	360	96.9	96.8	0.92	0.91	38870	2.40	0.60	5.50	374	706							
<b>6-pole</b>																				
4600	<b>1RQ6 710-6JJ■■■</b>	1195	240	96.7	96.7	0.86	0.83	36768	2.40	0.70	5.50	338	1602							
5000	<b>1RQ6 712-6JJ■■■</b>	1195	260	96.9	96.8	0.87	0.85	39972	2.30	0.71	5.50	375	1825							
5400	<b>1RQ6 714-6JJ■■■</b>	1195	285	96.9	96.9	0.86	0.84	43153	2.40	0.69	5.50	427	2273							
5900	<b>1RQ6 716-6JJ■■■</b>	1195	305	97.0	96.9	0.87	0.84	47144	2.40	0.69	5.50	476	2674							
<b>8-pole</b>																				
3250	<b>1RQ6 710-8JJ■■■</b>	896	174	96.4	96.5	0.85	0.82	34652	2.30	0.82	5.50	426	3574							
3600	<b>1RQ6 712-8JJ■■■</b>	896	192	96.5	96.6	0.85	0.83	38384	2.30	0.83	5.50	476	4124							
3950	<b>1RQ6 714-8JJ■■■</b>	896	210	96.6	96.7	0.86	0.84	42116	2.20	0.83	5.50	542	5008							
4400	<b>1RQ6 716-8JJ■■■</b>	896	235	96.6	96.8	0.85	0.82	46894	2.30	0.79	5.50	608	5392							
<b>10-pole</b>																				
2500	<b>1RQ6 710-3JJ■■■</b>	717	142	96.2	96.3	0.80	0.76	33330	2.40	0.76	5.50	426	4374							
2750	<b>1RQ6 712-3JJ■■■</b>	716	154	96.3	96.5	0.81	0.78	36668	2.30	0.73	5.50	476	5174							
3100	<b>1RQ6 714-3JJ■■■</b>	717	176	96.5	96.5	0.80	0.75	41311	2.50	0.75	5.50	542	5658							
3400	<b>1RQ6 716-3JJ■■■</b>	717	192	96.6	96.6	0.80	0.76	45308	2.50	0.74	5.50	609	6791							

**Voltage code:**

13.2 kV, 60 Hz  
Other voltage

2

9

**Type of construction:**

IM B3  
IM V1 (with canopy)

0

4

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Selection and ordering data

#### NEMA version

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
NEMA			$I_{rated}$ at 6.6 kV	4/4 load	3/4 load	4/4 load	3/4 load	$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	External, max. <sup>1)</sup>	
hp	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[ - ]	[ - ]	[ - ]	$\text{kgm}^2$	$\text{kgm}^2$
<b>4.0...6.6 kV, 60 Hz</b>													
<b>2-pole</b>													
8000	<b>1RQ6 710-2BM<del>00</del><b>0</b></b>	3588	603	96.1	95.7	0.90	0.88	15881	2.50	0.60	5.70	134	41
9000	<b>1RQ6 712-2BM<del>00</del><b>0</b></b>	3587	664	96.1	95.8	0.92	0.91	17868	2.40	0.60	5.60	148	43
10000	<b>1RQ6 712-2BN<del>00</del><b>0</b></b>	3588	742	96.3	96.0	0.91	0.90	19852	2.60	0.62	6.10	148	44
11000	<b>1RQ6 714-2BM<del>00</del><b>0</b></b>	3587	807	96.4	96.0	0.92	0.91	21841	2.50	0.60	5.80	163	46
12000	<b>1RQ6 714-2BN<del>00</del><b>0</b></b>	3587	883	96.5	96.2	0.92	0.91	23827	2.40	0.60	5.70	163	47
13000	<b>1RQ6 716-2BM<del>00</del><b>0</b></b>	3587	948	96.5	96.3	0.92	0.92	25815	2.40	0.60	5.80	180	48
14000	<b>1RQ6 716-2BN<del>00</del><b>0</b></b>	3587	1021	96.6	96.4	0.92	0.92	27801	2.50	0.65	6.00	180	49
<b>4-pole</b>													
10000	<b>1RQ6 710-4CJ<del>00</del><b>0</b></b>	1794	745	97.0	96.9	0.90	0.88	39707	2.40	0.60	6.30	278	555
11000	<b>1RQ6 712-4CJ<del>00</del><b>0</b></b>	1793	805	97.1	97.0	0.91	0.90	43690	2.40	0.61	6.20	305	661
12000	<b>1RQ6 714-4CJ<del>00</del><b>0</b></b>	1793	873	97.1	97.0	0.92	0.91	47659	2.40	0.63	6.30	341	679
13000	<b>1RQ6 716-4CJ<del>00</del><b>0</b></b>	1794	948	97.2	97.1	0.91	0.91	51626	2.30	0.60	6.10	374	695
<b>6-pole</b>													
8000	<b>1RQ6 710-6CJ<del>00</del><b>0</b></b>	1194	626	96.9	96.9	0.86	0.83	47715	2.20	0.71	5.70	338	1847
9000	<b>1RQ6 714-6CJ<del>00</del><b>0</b></b>	1195	703	97.0	97.0	0.86	0.83	53642	2.30	0.73	6.00	427	1954
10000	<b>1RQ6 716-6CJ<del>00</del><b>0</b></b>	1195	770	97.1	97.1	0.87	0.85	59613	2.30	0.76	6.00	476	2043
<b>8-pole</b>													
5500	<b>1RQ6 710-8CJ<del>00</del><b>0</b></b>	896	440	96.7	96.8	0.84	0.81	43733	2.30	0.86	6.00	426	3235
6000	<b>1RQ6 712-8CJ<del>00</del><b>0</b></b>	896	481	96.7	96.8	0.84	0.81	47703	2.20	0.83	6.00	476	3437
7000	<b>1RQ6 714-8CJ<del>00</del><b>0</b></b>	896	561	96.9	96.9	0.84	0.81	55649	2.20	0.83	6.00	542	3817
8000	<b>1RQ6 716-8CJ<del>00</del><b>0</b></b>	896	645	96.9	97.0	0.83	0.80	63590	2.20	0.80	6.00	608	4154
<b>10-pole</b>													
4000	<b>1RQ6 710-3CJ<del>00</del><b>0</b></b>	716	339	96.5	96.5	0.80	0.75	39780	2.40	0.77	5.80	426	4563
4500	<b>1RQ6 712-3CJ<del>00</del><b>0</b></b>	716	375	96.6	96.7	0.81	0.77	44763	2.30	0.73	5.60	476	5006
5000	<b>1RQ6 714-3CJ<del>00</del><b>0</b></b>	716	418	96.7	96.7	0.80	0.76	49717	2.40	0.80	6.00	542	5428
5500	<b>1RQ6 716-3CJ<del>00</del><b>0</b></b>	717	464	96.7	96.7	0.80	0.75	54660	2.50	0.79	6.00	609	5833

#### Voltage code:

4 kV, 60 Hz      4  
 4.16 kV, 60 Hz    3  
 6.6 kV, 60 Hz     1  
 Other voltage     9

#### Note:

Higher pole numbers are available on request.

#### Type of construction:

IM B3      0  
 IM V1 (with canopy)    4

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Selection and ordering data

##### NEMA version

Rated power NEMA hp	High voltage motor H-compact PLUS	Speed Order No.	Rated current rpm	Efficiency A	4/4 load %	3/4 load %	Power factor $\cos \varphi$	Torque $\cos \varphi$	Break-down torque Nm	$T_B/T_{rated}$ [-]	Locked-rotor torque $T_{LR}/T_{rated}$	Locked-rotor current $I_{LR}/I_{rated}$	Moment of inertia kgm <sup>2</sup>	Motor External, max. <sup>1)</sup> kgm <sup>2</sup>
<b>12.5 ... 13.8 kV, 60 Hz</b>														
2-pole														
7000	<b>1RQ6 710-2BM■■0</b>	3589	263	95.7	95.2	0.91	0.89	13894	2.50	0.60	5.70	134	40	
8000	<b>1RQ6 712-2BM■■0</b>	3589	298	95.8	95.3	0.91	0.90	15879	2.60	0.60	6.00	148	41	
9000	<b>1RQ6 714-2BM■■0</b>	3588	332	95.9	95.4	0.92	0.91	17865	2.50	0.60	5.80	163	43	
10000	<b>1RQ6 716-2BM■■0</b>	3588	365	95.9	95.6	0.93	0.93	19854	2.50	0.60	5.90	180	44	
4-pole														
7000	<b>1RQ6 710-4CJ■■0</b>	1794	258	96.4	96.2	0.91	0.90	27791	2.40	0.60	6.30	278	520	
8000	<b>1RQ6 714-4CJ■■0</b>	1794	291	96.5	96.4	0.92	0.92	31772	2.30	0.60	6.10	341	541	
9000	<b>1RQ6 714-4CK■■0</b>	1794	328	96.6	96.5	0.92	0.91	35738	2.40	0.60	6.20	341	552	
10000	<b>1RQ6 716-4CJ■■0</b>	1794	364	96.7	96.6	0.92	0.91	39707	2.40	0.60	6.30	374	555	
6-pole														
6000	<b>1RQ6 710-6CJ■■■</b>	1195	237	96.5	96.4	0.85	0.83	35757	2.40	0.69	6.00	338	1571	
7000	<b>1RQ6 714-6CJ■■■</b>	1195	274	96.7	96.6	0.86	0.83	41709	2.40	0.67	6.00	427	1720	
8000	<b>1RQ6 716-6CJ■■■</b>	1195	310	96.7	96.7	0.87	0.84	47674	2.40	0.68	6.00	476	1846	
8-pole														
4000	<b>1RQ6 710-8CJ■■■</b>	896	160	96.2	96.2	0.85	0.82	31800	2.30	0.79	6.00	426	2560	
4500	<b>1RQ6 712-8CJ■■■</b>	896	179	96.3	96.3	0.85	0.83	35780	2.20	0.79	5.90	476	2796	
5000	<b>1RQ6 714-8CJ■■■</b>	896	197	96.4	96.5	0.86	0.84	39760	2.20	0.79	5.90	542	3024	
5500	<b>1RQ6 716-8CJ■■■</b>	896	216	96.4	96.5	0.86	0.84	43719	2.20	0.81	6.00	608	3235	
10-pole														
3000	<b>1RQ6 710-3CJ■■■</b>	716	125	96.0	96.1	0.81	0.78	29829	2.30	0.70	5.70	426	3619	
3500	<b>1RQ6 712-3CJ■■■</b>	717	147	96.2	96.2	0.81	0.77	34792	2.50	0.77	6.00	476	4104	
4000	<b>1RQ6 714-3CJ■■■</b>	717	167	96.2	96.2	0.81	0.77	39763	2.40	0.76	6.00	542	4563	
4500	<b>1RQ6 716-3CJ■■■</b>	717	190	96.4	96.4	0.80	0.76	44718	2.50	0.74	6.00	609	5006	

##### Voltage code:

13.2 kV, 60 Hz  
Other voltage

##### Note:

Higher pole numbers are available on request.

##### Type of construction:

IM B3  
IM V1 (with canopy)

2  
9  
0  
4

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

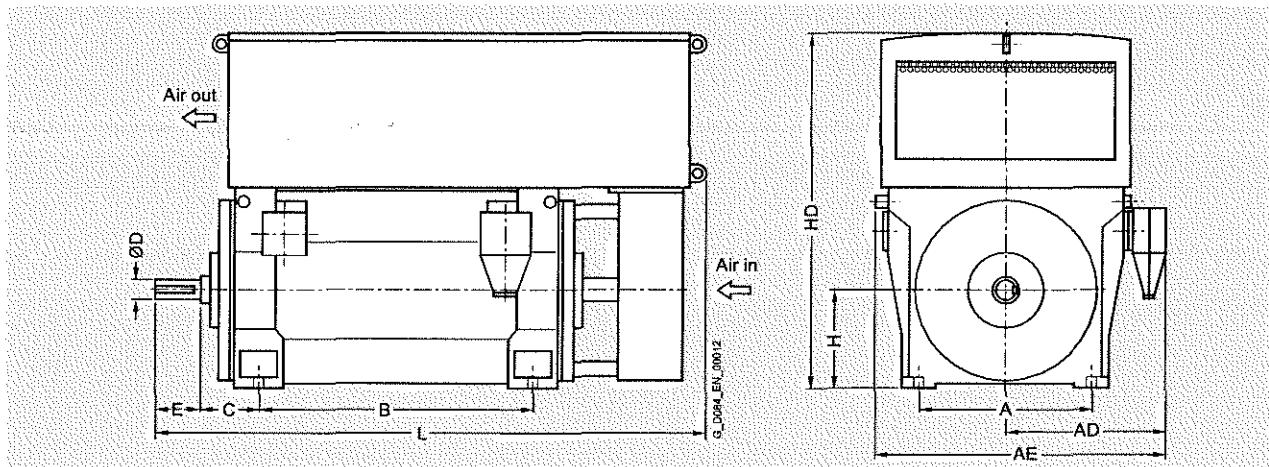


# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Up to 6 kV, IM B3 type of construction, roller bearings – series 1RQ4, 1RQ6</b>											
2-pole											
1RQ6 450-2JJ.0 <sup>3)</sup>	4250	850	930	1620	1180	280	95	130	450	1842	2425 <sup>4)</sup>
1RQ6 452-2JJ.0 <sup>3)</sup>	4450	850	930	1620	1180	280	95	130	450	1842	2425 <sup>4)</sup>
1RQ6 454-2JJ.0 <sup>3)</sup>	4800	850	930	1620	1400	280	95	130	450	1842	2635 <sup>4)</sup>
1RQ6 456-2JJ.0 <sup>3)</sup>	5050	850	930	1620	1400	280	95	130	450	1842	2635 <sup>4)</sup>
1RQ6 500-2JJ.0 <sup>3)</sup>	6400	950	1135	1835	1320	315	110	165	500	2040	3403 <sup>4)</sup>
1RQ6 502-2JJ.0 <sup>3)</sup>	6550	950	1135	1835	1320	315	110	165	500	2040	3403 <sup>4)</sup>
4-pole											
1RQ6 450-4JJ.0	4550	850	930	1620	1180	250	130	200	450	1842	2455
1RQ6 452-4JJ.0	4750	850	930	1620	1180	250	130	200	450	1842	2455
1RQ6 454-4JJ.0	5200	850	930	1620	1400	250	130	200	450	1842	2665
1RQ6 456-4JJ.0	5450	850	930	1620	1400	250	130	200	450	1842	2665
1RQ6 500-4JJ.0	6900	950	1135	1835	1320	280	150	200	500	2040	2856
1RQ6 502-4JJ.0	7150	950	1135	1835	1320	280	150	200	500	2040	2856
1RQ6 504-4JJ.0	7900	950	1135	1835	1500	280	150	200	500	2040	3036
1RQ6 506-4JJ.0	8200	950	1135	1835	1500	280	150	200	500	2040	3036
1RQ6 560-4JJ.0	8800	1060	1205	1975	1400	315	170	240	560	2288	2985
1RQ6 562-4JJ.0	9200	1060	1205	1975	1400	315	170	240	560	2288	2985
1RQ6 564-4JJ.0	10200	1060	1205	1975	1600	315	170	240	560	2288	3215
1RQ6 566-4JJ.0	10750	1060	1205	1975	1600	315	170	240	560	2288	3215
1RQ4 630-4JE.0 <sup>3)</sup>	11100	1320	1330	2210	1600	335	190	280	630	2340	3140
1RQ4 632-4JE.0 <sup>3)</sup>	11800	1320	1330	2210	1600	335	190	280	630	2340	3140
1RQ4 634-4JE.0 <sup>3)</sup>	12900	1320	1330	2210	1800	335	200	280	630	2340	3380
1RQ4 636-4JE.0 <sup>3)</sup>	13450	1320	1330	2210	1800	335	200	280	630	2340	3380

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

<sup>3)</sup> Roller bearings only for 50 Hz operation.

<sup>4)</sup> Including air inlet silencer.

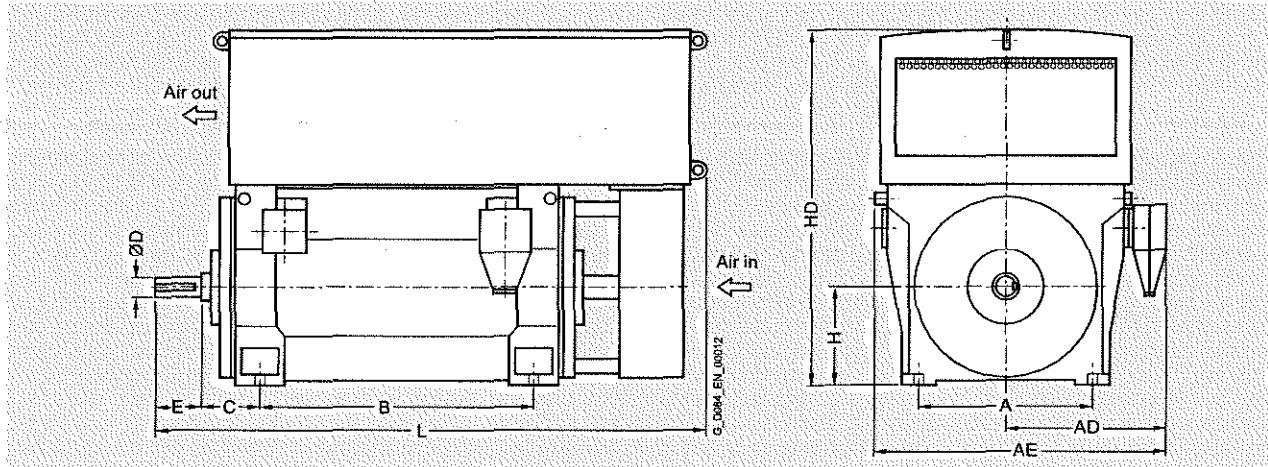


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<sup>1)</sup> Dimensions apply to 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.											
6-pole											
1RQ6 450-6JJ.0	4650	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6 452-6JJ.0	4900	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6 454-6JJ.0	5300	850	930	1620	1400	280	140	200	450	1842	2665
1RQ6 456-6JJ.0	5650	850	930	1620	1400	280	140	200	450	1842	2665
1RQ4 500-6JE.0	6000	950	1000	1760	1320	280	150	200	500	2000	2660
1RQ4 502-6JE.0	6400	950	1000	1760	1320	280	150	200	500	2000	2660
1RQ4 504-6JE.0	6950	950	1000	1760	1500	280	160	240	500	2000	2910
1RQ4 506-6JE.0	7350	950	1000	1760	1500	280	160	240	500	2000	2910
1RQ4 560-6JE.0	8100	1060	1070	1900	1400	315	170	240	560	2260	2950
1RQ4 562-6JE.0	8650	1060	1070	1900	1400	315	170	240	560	2260	2950
1RQ4 564-6JE.0	9600	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 566-6JE.0	10050	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 630-6JE.0	11400	1320	1330	2210	1600	335	200	280	630	2340	3140
1RQ4 632-6JE.0	12000	1320	1330	2210	1600	335	200	280	630	2340	3140
1RQ4 634-6JE.0	12900	1320	1330	2210	1800	335	200	280	630	2340	3380
1RQ4 636-6JE.0	13750	1320	1330	2210	1800	335	200	280	630	2340	3380
8-pole											
1RQ6 450-8JJ.0	4650	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6 452-8JJ.0	4950	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6 454-8JJ.0	5350	850	930	1620	1400	280	140	200	450	1842	2665
1RQ6 456-8JJ.0	5700	850	930	1620	1400	280	140	200	450	1842	2665
1RQ4 500-8JE.0	6050	950	1000	1760	1320	280	150	200	500	2000	2660
1RQ4 502-8JE.0	6400	950	1000	1760	1320	280	150	200	500	2000	2660
1RQ4 504-8JE.0	6950	950	1000	1760	1500	280	160	240	500	2000	2910
1RQ4 506-8JE.0	7350	950	1000	1760	1500	280	160	240	500	2000	2910
1RQ4 560-8JE.0	8100	1060	1070	1900	1400	315	170	240	560	2260	2950
1RQ4 562-8JE.0	8650	1060	1070	1900	1400	315	170	240	560	2260	2950
1RQ4 564-8JE.0	9500	1060	1070	1900	1600	315	180	240	560	2260	3180
1RQ4 566-8JE.0	9950	1060	1070	1900	1600	315	180	240	560	2260	3180

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

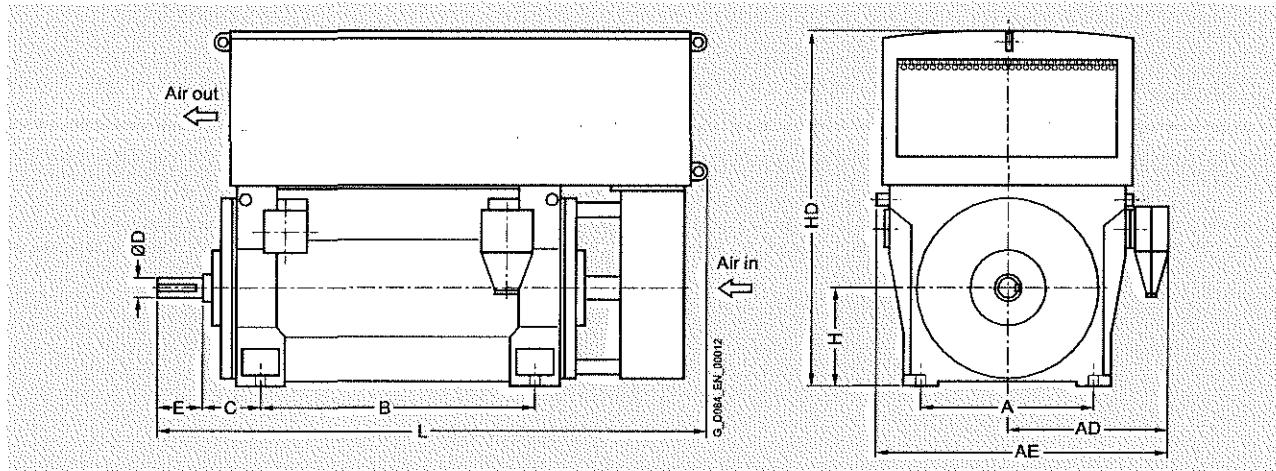
<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Standard variants (Type of construction roller bearings)</b> (see table above)											
<b>8-pole</b>											
1RQ4 630-8JE 0 <sup>3)</sup>	11200	1320	1180	2060	1600	335	200	280	630	2340	3140
1RQ4 632-8JE 0 <sup>3)</sup>	11950	1320	1330	2210	1600	335	200	280	630	2340	3140
1RQ4 634-8JE 0 <sup>3)</sup>	12900	1320	1330	2210	1800	335	200	280	630	2340	3380
1RQ4 636-8JE 0 <sup>3)</sup>	13650	1320	1330	2210	1800	335	200	280	630	2340	3380
<b>10-pole</b>											
1RQ6 450-3JJ 0	4650	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6 452-3JJ 0	4950	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6 454-3JJ 0	5350	850	930	1620	1400	280	140	200	450	1842	2665
1RQ6 456-3JJ 0	5700	850	930	1620	1400	280	140	200	450	1842	2665
1RQ4 500-3JE 0	6000	950	1000	1760	1320	280	150	200	500	2000	2660
1RQ4 502-3JE 0	6300	950	1000	1760	1320	280	150	200	500	2000	2660
1RQ4 504-3JE 0	6900	950	1000	1760	1500	280	160	240	500	2000	2910
1RQ4 506-3JE 0	7300	950	1000	1760	1500	280	160	240	500	2000	2910
1RQ4 560-3JE 0	8000	1060	1070	1900	1400	315	170	240	560	2260	2950
1RQ4 562-3JE 0	8600	1060	1070	1900	1400	315	170	240	560	2260	2950
1RQ4 564-3JE 0	9450	1060	1070	1900	1600	315	180	240	560	2260	3180
1RQ4 566-3JE 0	9900	1060	1070	1900	1600	315	180	240	560	2260	3180
1RQ4 630-3JE 0 <sup>3)</sup>	11200	1320	1180	2060	1600	335	200	280	630	2340	3140
1RQ4 632-3JE 0 <sup>3)</sup>	11800	1320	1180	2060	1600	335	200	280	630	2340	3140
1RQ4 634-3JE 0 <sup>3)</sup>	12900	1320	1180	2060	1800	335	200	280	630	2340	3380
1RQ4 636-3JE 0 <sup>3)</sup>	13550	1320	1180	2060	1800	335	200	280	630	2340	3380

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

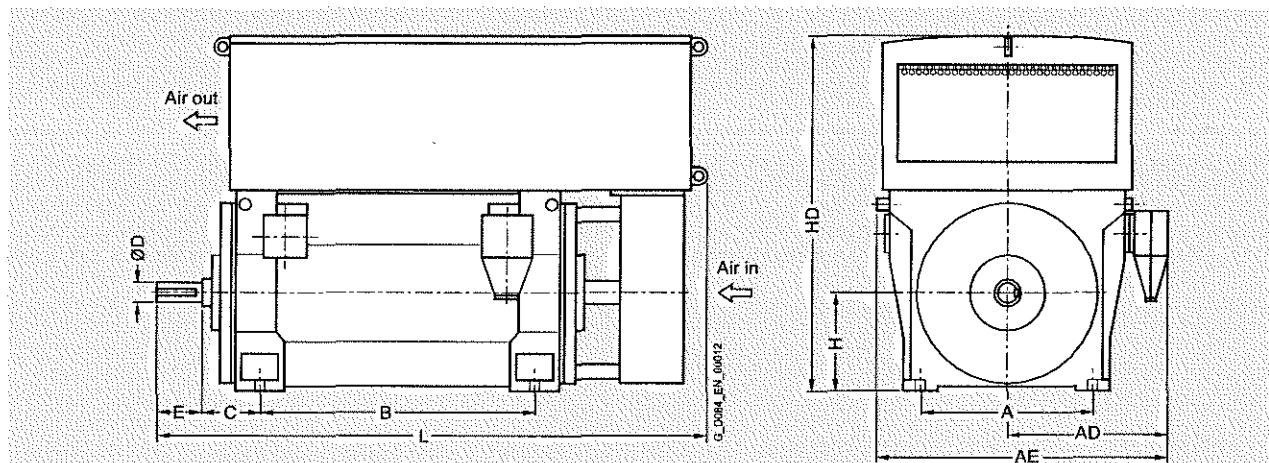
<sup>3)</sup> Roller bearings only for 50 Hz operation.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<i>Standard setting of clearance for roller bearings - refer to table 10-2</i>											
12-pole											
1RQ6 450-5JJ.0	4650	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6 452-5JJ.0	4950	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6 454-5JJ.0	5350	850	930	1620	1400	280	140	200	450	1842	2665
1RQ6 456-5JJ.0	5700	850	930	1620	1400	280	140	200	450	1842	2665
1RQ4 500-5JE.0	6000	950	1000	1760	1320	280	150	200	500	2000	2660
1RQ4 502-5JE.0	6300	950	1000	1760	1320	280	150	200	500	2000	2660
1RQ4 504-5JE.0	6900	950	1000	1760	1500	280	160	240	500	2000	2910
1RQ4 506-5JE.0	7300	950	1000	1760	1500	280	160	240	500	2000	2910
1RQ4 560-5JE.0	8050	1060	1070	1900	1400	315	170	240	560	2260	2950
1RQ4 562-5JE.0	8600	1060	1070	1900	1400	315	170	240	560	2260	2950
1RQ4 564-5JE.0	9400	1060	1070	1900	1600	315	180	240	560	2260	3180
1RQ4 566-5JE.0	9900	1060	1070	1900	1600	315	180	240	560	2260	3180
1RQ4 630-5JE.0 <sup>3)</sup>	11100	1320	1180	2060	1600	335	200	280	630	2340	3140
1RQ4 632-5JE.0 <sup>3)</sup>	11750	1320	1180	2060	1600	335	200	280	630	2340	3140
1RQ4 634-5JE.0 <sup>3)</sup>	12800	1320	1180	2060	1800	335	200	280	630	2340	3380
1RQ4 636-5JE.0 <sup>3)</sup>	13500	1320	1180	2060	1800	335	200	280	630	2340	3380

Note: Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

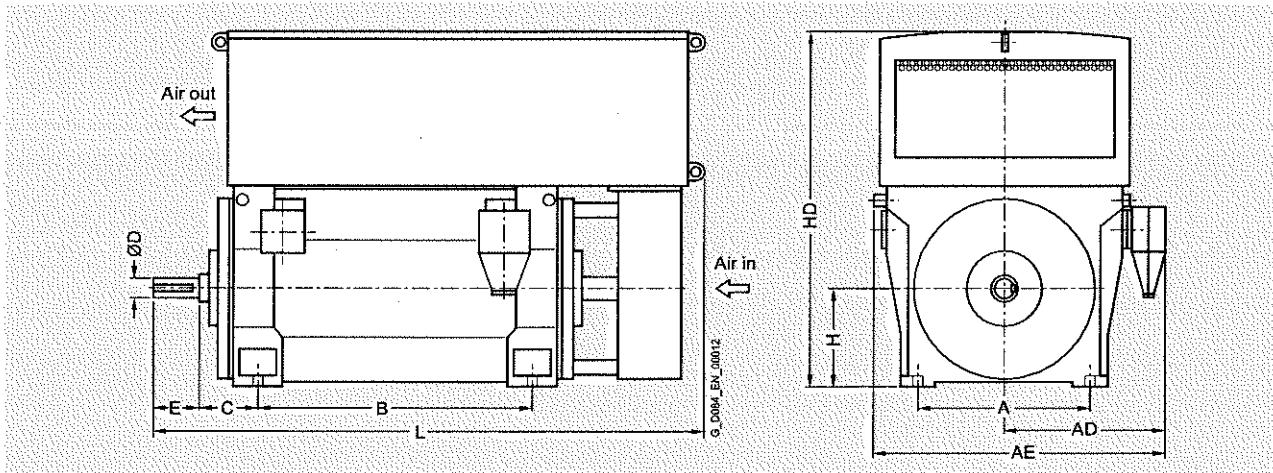
<sup>3)</sup> Roller bearings only for 50 Hz operation.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Table 114: Dimensional data of construction roller bearings - semi-enclosed type</b>											
2-pole											
1RQ6 450-2JJ.0 <sup>2)</sup>	4250	850	1070	1840	1180	280	95	130	450	1842	2425 <sup>3)</sup>
1RQ6 452-2JJ.0 <sup>2)</sup>	4450	850	1070	1840	1180	280	95	130	450	1842	2425 <sup>3)</sup>
1RQ6 454-2JJ.0 <sup>2)</sup>	4800	850	1070	1840	1400	280	95	130	450	1842	2635 <sup>3)</sup>
1RQ6 456-2JJ.0 <sup>2)</sup>	5050	850	1070	1840	1400	280	95	130	450	1842	2635 <sup>3)</sup>
1RQ6 500-2JJ.0 <sup>2)</sup>	6400	950	1270	1970	1320	315	110	165	500	2040	3403 <sup>3)</sup>
1RQ6 502-2JJ.0 <sup>2)</sup>	6550	950	1270	1970	1320	315	110	165	500	2040	3403 <sup>3)</sup>
4-pole											
1RQ6 450-4JJ.0	4550	850	1070	1840	1180	250	130	200	450	1842	2455
1RQ6 452-4JJ.0	4750	850	1070	1840	1180	250	130	200	450	1842	2455
1RQ6 454-4JJ.0	5200	850	1070	1840	1400	250	130	200	450	1842	2665
1RQ6 456-4JJ.0	5450	850	1070	1840	1400	250	130	200	450	1842	2665
1RQ6 500-4JJ.0	6900	950	1270	1970	1320	280	150	200	500	2040	2856
1RQ6 502-4JJ.0	7150	950	1270	1970	1320	280	150	200	500	2040	2856
1RQ6 504-4JJ.0	7900	950	1270	1970	1500	280	150	200	500	2040	3036
1RQ6 506-4JJ.0	8200	950	1270	1970	1500	280	150	200	500	2040	3036
1RQ6 560-4JJ.0	8800	1060	1340	2110	1400	315	170	240	560	2288	2985
1RQ6 562-4JJ.0	9200	1060	1340	2110	1400	315	170	240	560	2288	2985
1RQ6 564-4JJ.0	10200	1060	1340	2110	1600	315	170	240	560	2288	3215
1RQ6 566-4JJ.0	10750	1060	1340	2110	1600	315	170	240	560	2288	3215
1RQ4 630-4JE.0 <sup>2)</sup>	11100	1320	1320	2200	1600	335	190	280	630	2340	3140
1RQ4 632-4JE.0 <sup>2)</sup>	11800	1320	1320	2200	1600	335	190	280	630	2340	3140
1RQ4 634-4JE.0 <sup>2)</sup>	12900	1320	1320	2200	1800	335	200	280	630	2340	3380
1RQ4 636-4JE.0 <sup>2)</sup>	13450	1320	1330	2210	1800	335	200	280	630	2340	3380
6-pole											
1RQ6 450-6JJ.0	4650	850	1070	1840	1180	250	140	200	450	1842	2455
1RQ6 452-6JJ.0	4900	850	1070	1840	1180	250	140	200	450	1842	2455
1RQ6 454-6JJ.0	5300	850	1070	1840	1400	280	140	200	450	1842	2665
1RQ6 456-6JJ.0	5650	850	1070	1840	1400	280	140	200	450	1842	2665

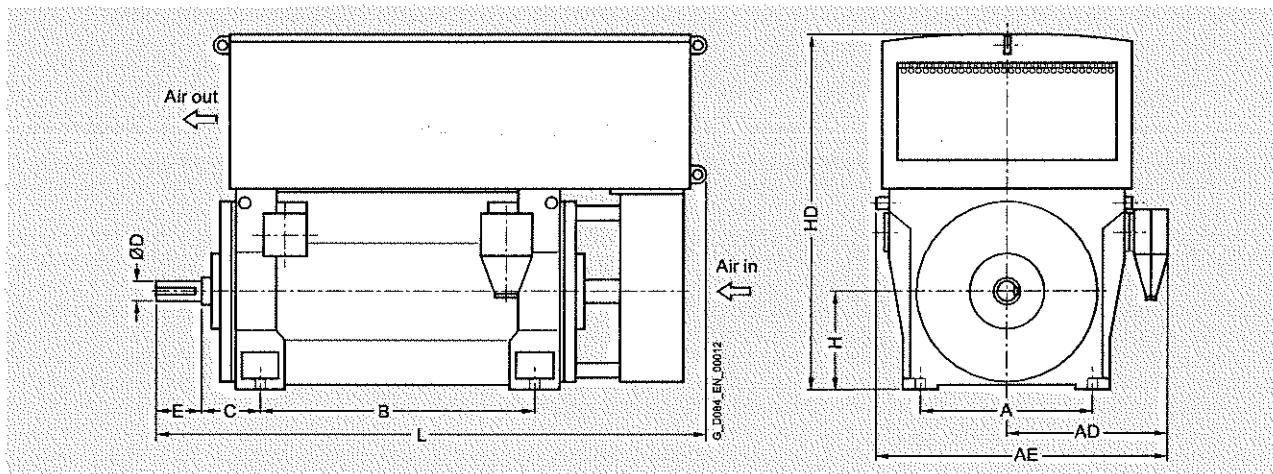
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.<sup>2)</sup> Roller bearings only for 50 Hz operation.<sup>3)</sup> Including air inlet silencer.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>6-pole</b>											
1RQ4 500-6JE.0	6000	950	1220	1980	1320	280	150	200	500	2000	2660
1RQ4 502-6JE.0	6400	950	1220	1980	1320	280	150	200	500	2000	2660
1RQ4 504-6JE.0	6950	950	1220	1980	1500	280	160	240	500	2000	2910
1RQ4 506-6JE.0	7350	950	1220	1980	1500	280	160	240	500	2000	2910
1RQ4 560-6JE.0	8050	1060	1210	2040	1400	315	170	240	560	2260	2950
1RQ4 562-6JE.0	8600	1060	1210	2040	1400	315	170	240	560	2260	2950
1RQ4 564-6JE.0	9400	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 566-6JE.0	9900	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 630-6JE.0	11400	1320	1320	2200	1600	335	200	280	630	2340	3140
1RQ4 632-6JE.0	12000	1320	1320	2200	1600	335	200	280	630	2340	3140
1RQ4 634-6JE.0	12900	1320	1320	2200	1800	335	200	280	630	2340	3380
1RQ4 636-6JE.0	13750	1320	1320	2200	1800	335	200	280	630	2340	3380
<b>8-pole</b>											
1RQ6 450-8JJ.0	4650	850	1070	1840	1180	250	140	200	450	1842	2455
1RQ6 452-8JJ.0	4950	850	1070	1840	1180	250	140	200	450	1842	2455
1RQ6 454-8JJ.0	5350	850	1070	1840	1400	280	140	200	450	1842	2665
1RQ6 456-8JJ.0	5700	850	1070	1840	1400	280	140	200	450	1842	2665
1RQ4 500-8JE.0	6050	950	1220	1980	1320	280	150	200	500	2000	2660
1RQ4 502-8JE.0	6400	950	1220	1980	1320	280	150	200	500	2000	2660
1RQ4 504-8JE.0	6950	950	1220	1980	1500	280	160	240	500	2000	2910
1RQ4 506-8JE.0	7300	950	1220	1980	1500	280	160	240	500	2000	2910
1RQ4 560-8JE.0	8050	1060	1210	2040	1400	315	170	240	560	2260	2950
1RQ4 562-8JE.0	8600	1060	1210	2040	1400	315	170	240	560	2260	2950
1RQ4 564-8JE.0	9450	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 566-8JE.0	9850	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 630-8JE.0	11200	1320	1320	2200	1600	335	200	280	630	2340	3140
1RQ4 632-8JE.0	11950	1320	1320	2200	1600	335	200	280	630	2340	3140
1RQ4 634-8JE.0	12900	1320	1320	2200	1800	335	200	280	630	2340	3380
1RQ4 636-8JE.0	13650	1320	1320	2200	1800	335	200	280	630	2340	3380

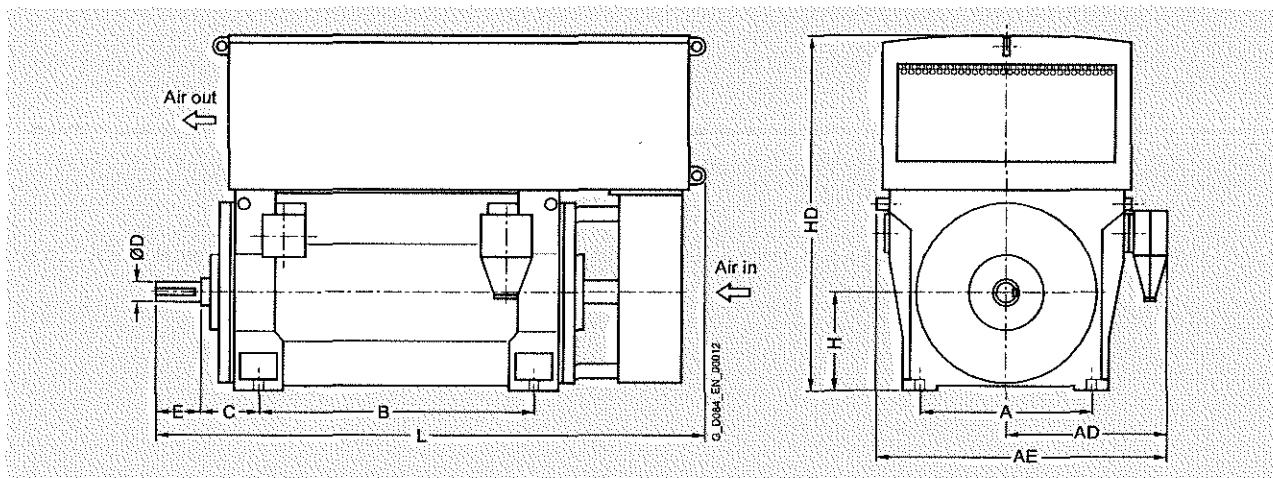
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm.	AD mm.	AE mm.	B mm.	C mm.	D mm.	E mm.	H mm.	HD mm.	L mm.
<b>Table IV: Motor type construction,oller bearings, 170 °C oil bath</b>											
10-pole											
1RQ4 500-3JE.0	6000	950	1220	1980	1320	280	150	200	500	2000	2660
1RQ4 502-3JE.0	6300	950	1220	1980	1320	280	150	200	500	2000	2660
1RQ4 504-3JE.0	6850	950	1220	1980	1500	280	160	240	500	2000	2910
1RQ4 506-3JE.0	7250	950	1220	1980	1500	280	160	240	500	2000	2910
1RQ4 560-3JE.0	8200	1060	1210	2040	1400	315	170	240	560	2260	2950
1RQ4 562-3JE.0	8900	1060	1210	2040	1400	315	170	240	560	2260	2950
1RQ4 564-3JE.0	9700	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 566-3JE.0	10100	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 630-3JE.0	11200	1320	1320	2200	1600	335	200	280	630	2340	3140
1RQ4 632-3JE.0	11800	1320	1320	2200	1600	335	200	280	630	2340	3140
1RQ4 634-3JE.0	12900	1320	1320	2200	1800	335	200	280	630	2340	3380
1RQ4 636-3JE.0	13550	1320	1320	2200	1800	335	200	280	630	2340	3380
12-pole											
1RQ4 502-5JE.0	6350	950	1220	1980	1320	280	150	200	500	2000	2660
1RQ4 504-5JE.0	6850	950	1220	1980	1500	280	160	240	500	2000	2910
1RQ4 506-5JE.0	7250	950	1220	1980	1500	280	160	240	500	2000	2910
1RQ4 560-5JE.0	8000	1060	1210	2040	1400	315	170	240	560	2260	2950
1RQ4 562-5JE.0	8550	1060	1210	2040	1400	315	170	240	560	2260	2950
1RQ4 564-5JE.0	9400	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 566-5JE.0	9850	1060	1210	2040	1600	315	180	240	560	2260	3180
1RQ4 630-5JE.0	11100	1320	1320	2200	1600	335	200	280	630	2340	3140
1RQ4 632-5JE.0	11750	1320	1320	2200	1600	335	200	280	630	2340	3140
1RQ4 634-5JE.0	12800	1320	1320	2200	1800	335	200	280	630	2340	3380
1RQ4 636-5JE.0	13500	1320	1320	2200	1800	335	200	280	630	2340	3380

### Note:

Higher pole numbers are available on request.

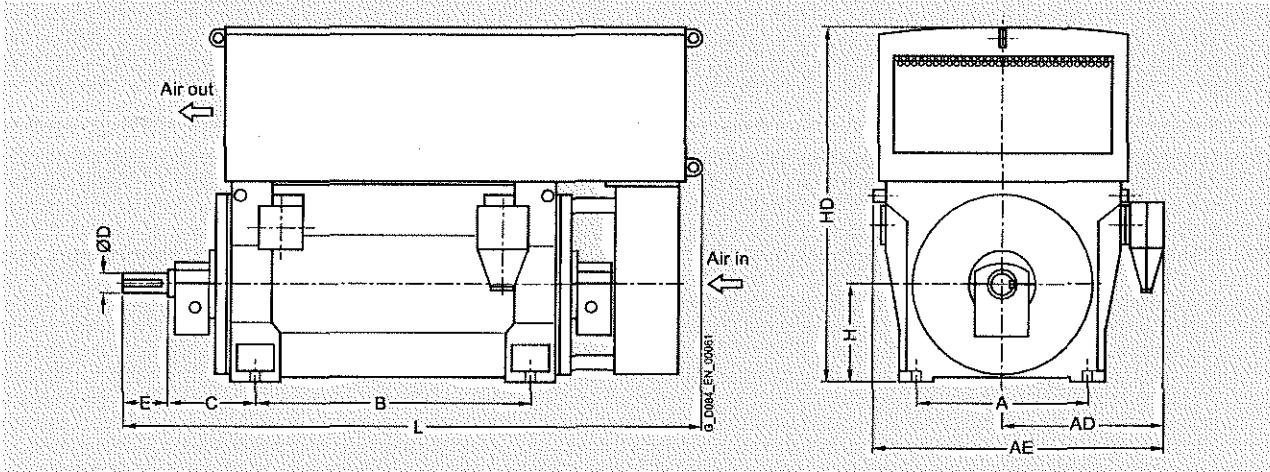
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>2-pole</b>											
1RQ6 450-2JJ 0-Z K96 <sup>3)</sup>	4250	850	930	1620	1180	425	95	130	450	1842	2575 <sup>4)</sup>
1RQ6 452-2JJ 0-Z K96 <sup>3)</sup>	4500	850	930	1620	1180	425	95	130	450	1842	2575 <sup>4)</sup>
1RQ6 454-2JJ 0-Z K96 <sup>3)</sup>	4850	850	930	1620	1400	425	95	130	450	1842	2790 <sup>4)</sup>
1RQ6 456-2JJ 0-Z K96 <sup>3)</sup>	5100	850	930	1620	1400	425	95	130	450	1842	2790 <sup>4)</sup>
1RQ6 500-2JJ 0-Z K96 <sup>3)</sup>	6400	950	1135	1835	1320	450	110	165	500	2040	3538 <sup>4)</sup>
1RQ6 502-2JJ 0-Z K96 <sup>3)</sup>	6550	950	1135	1835	1320	450	110	165	500	2040	3538 <sup>4)</sup>
1RQ6 504-2JJ 0	7450	950	1135	1835	1500	450	110	165	500	2040	3718 <sup>4)</sup>
1RQ6 506-2JJ 0	7700	950	1135	1835	1500	450	110	165	500	2040	3718 <sup>4)</sup>
1RQ6 560-2JJ 0	8800	1060	1205	1975	1400	600	130	200	560	2288	3900 <sup>4)</sup>
1RQ6 562-2JJ 0	9200	1060	1205	1975	1400	600	130	200	560	2288	3900 <sup>4)</sup>
1RQ6 564-2JJ 0	10200	1060	1205	1975	1600	600	130	200	560	2288	4130 <sup>4)</sup>
1RQ6 566-2JJ 0	10700	1060	1205	1975	1600	600	130	200	560	2288	4130 <sup>4)</sup>
1RQ4 630-2JE 0	10900	1320	1330	2210	1600	560	140	200	630	2340	3840 <sup>4)</sup>
1RQ4 632-2JE 0	11550	1320	1330	2210	1600	560	140	200	630	2340	3840 <sup>4)</sup>
1RQ4 634-2JE 0	12750	1320	1330	2210	1800	560	150	200	630	2340	4080 <sup>4)</sup>
1RQ4 636-2JE 0	13600	1320	1330	2210	1800	560	150	200	630	2340	4080 <sup>4)</sup>
<b>4-pole</b>											
1RQ6 450-4JJ 0-Z K96	4650	850	930	1620	1180	500	130	200	450	1842	2705
1RQ6 452-4JJ 0-Z K96	4900	850	930	1620	1180	500	130	200	450	1842	2705
1RQ6 454-4JJ 0-Z K96	5300	850	930	1620	1400	500	130	200	450	1842	2915
1RQ6 456-4JJ 0-Z K96	5550	850	930	1620	1400	500	130	200	450	1842	2915
1RQ6 500-4JJ 0-Z K96	7200	950	1135	1835	1320	560	150	200	500	2040	3136
1RQ6 502-4JJ 0-Z K96	7450	950	1135	1835	1320	560	150	200	500	2040	3136
1RQ6 504-4JJ 0-Z K96	8150	950	1135	1835	1500	560	150	200	500	2040	3316
1RQ6 506-4JJ 0-Z K96	8500	950	1135	1835	1500	560	150	200	500	2040	3316

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, "Z K96" not necessary.

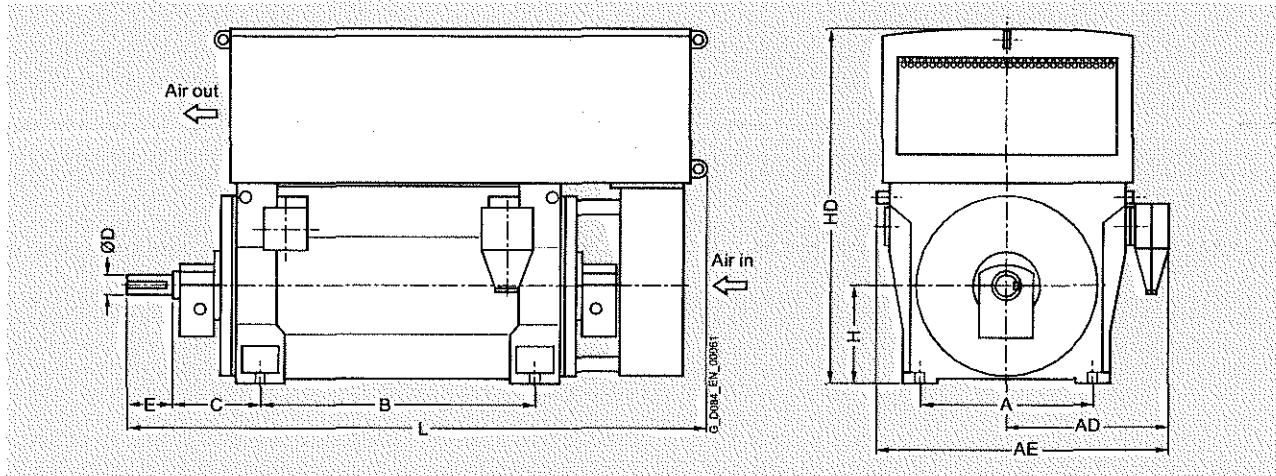
<sup>4)</sup> Including air inlet silencer.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<sup>1)</sup> Dimensions in mm. Values apply to standard sleeve bearings. For sleeve bearing options, see chapter "Technical data".											
4-pole											
1RQ6 560-4JJ-0-Z K96	8950	1060	1205	1975	1400	600	170	240	560	2288	3270
1RQ6 562-4JJ-0-Z K96	9350	1060	1205	1975	1400	600	170	240	560	2288	3270
1RQ6 564-4JJ-0-Z K96	10350	1060	1205	1975	1600	600	170	240	560	2288	3500
1RQ6 566-4JJ-0-Z K96	10900	1060	1205	1975	1600	600	170	240	560	2288	3500
1RQ4 630-4JE-0-Z K96 <sup>3)</sup>	11350	1320	1330	2210	1600	600	190	280	630	2340	3400
1RQ4 632-4JE-0-Z K96 <sup>3)</sup>	12050	1320	1330	2210	1600	600	190	280	630	2340	3400
1RQ4 634-4JE-0-Z K96 <sup>3)</sup>	13150	1320	1330	2210	1800	600	200	280	630	2340	3640
1RQ4 636-4JE-0-Z K96 <sup>3)</sup>	13700	1320	1330	2210	1800	600	200	280	630	2340	3640
6-pole											
1RQ6 450-6JJ-0-Z K96	4800	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6 452-6JJ-0-Z K96	5050	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6 454-6JJ-0-Z K96	5450	850	930	1620	1400	500	140	200	450	1842	2915
1RQ6 456-6JJ-0-Z K96	5800	850	930	1620	1400	500	140	200	450	1842	2915
1RQ4 500-6JE-0-Z K96	6200	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4 502-6JE-0-Z K96	6500	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4 504-6JE-0-Z K96	7150	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4 506-6JE-0-Z K96	7550	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4 560-6JE-0-Z K96	8250	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4 562-6JE-0-Z K96	8800	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4 564-6JE-0-Z K96	9750	1060	1070	2040	1600	530	180	240	560	2260	3400
1RQ4 566-6JE-0-Z K96	10200	1060	1070	2040	1600	530	180	240	560	2260	3400
1RQ4 630-6JE-0-Z K96	11650	1320	1330	2210	1600	600	200	280	630	2340	3400
1RQ4 632-6JE-0-Z K96	12250	1320	1330	2210	1600	600	200	280	630	2340	3400
1RQ4 634-6JE-0-Z K96	13150	1320	1330	2210	1800	600	200	280	630	2340	3640
1RQ4 636-6JE-0-Z K96	14000	1320	1330	2210	1800	600	200	280	630	2340	3640

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

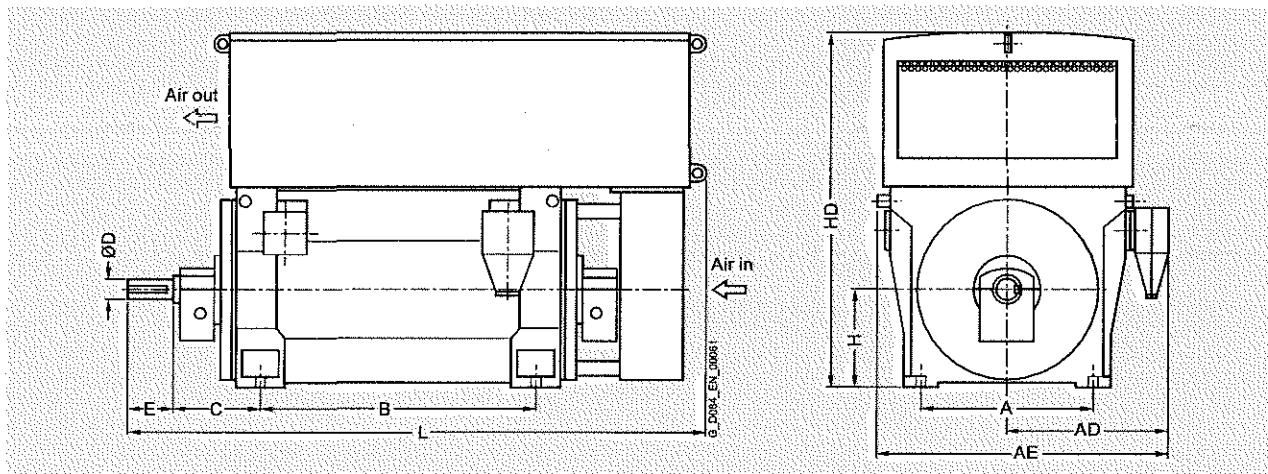
<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>8-pole</b>											
1RQ6 450-8JJ.0-Z K96	4800	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6 452-8JJ.0-Z K96	5100	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6 454-8JJ.0-Z K96	5500	850	930	1620	1400	500	140	200	450	1842	2915
1RQ6 456-8JJ.0-Z K96	5850	850	930	1620	1400	500	140	200	450	1842	2915
1RQ4 500-8JE.0-Z K96	6200	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4 502-8JE.0-Z K96	6550	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4 504-8JE.0-Z K96	7050	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4 506-8JE.0-Z K96	7450	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4 560-8JE.0-Z K96	8250	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4 562-8JE.0-Z K96	8800	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4 564-8JE.0-Z K96	9650	1060	1070	1900	1600	530	180	240	560	2260	3400
1RQ4 566-8JE.0-Z K96	10100	1060	1070	1900	1600	530	180	240	560	2260	3400
1RQ4 630-8JE.0-Z K96 <sup>3)</sup>	11450	1320	1180	2060	1600	600	200	280	630	2340	3400
1RQ4 632-8JE.0-Z K96 <sup>3)</sup>	12200	1320	1330	2210	1600	600	200	280	630	2340	3400
1RQ4 634-8JE.0-Z K96 <sup>3)</sup>	13150	1320	1330	2210	1800	600	200	280	630	2340	3640
1RQ4 636-8JE.0-Z K96 <sup>3)</sup>	13900	1320	1330	2210	1800	600	200	280	630	2340	3640
<b>10-pole</b>											
1RQ6 450-3JJ.0-Z K96	4800	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6 452-3JJ.0-Z K96	5100	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6 454-3JJ.0-Z K96	5500	850	930	1620	1400	500	140	200	450	1842	2915
1RQ6 456-3JJ.0-Z K96	5850	850	930	1620	1400	500	140	200	450	1842	2915
1RQ4 500-3JE.0-Z K96	6100	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4 502-3JE.0-Z K96	6500	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4 504-3JE.0-Z K96	7050	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4 506-3JE.0-Z K96	7400	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4 560-3JE.0-Z K96	8150	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4 562-3JE.0-Z K96	8750	1060	1070	1900	1400	530	170	240	560	2260	3170

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

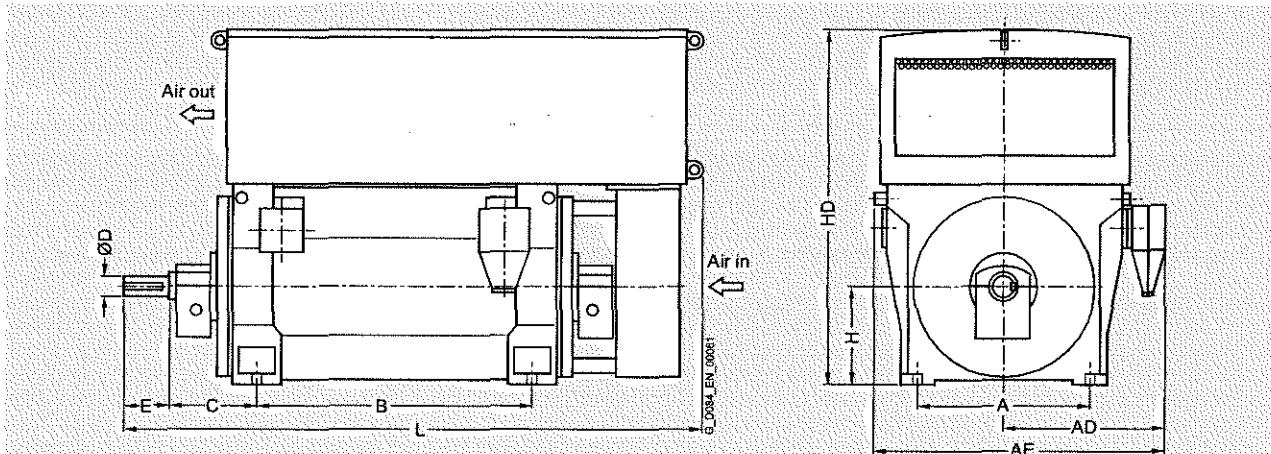
<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>10-pole</b>											
1RQ4 564-3JE.0-Z K96	9600	1060	1070	1900	1600	530	180	240	560	2260	3400
1RQ4 566-3JE.0-Z K96	10050	1060	1070	1900	1600	530	180	240	560	2260	3400
1RQ4 630-3JE.0-Z K96 <sup>3)</sup>	11450	1320	1180	2060	1600	600	200	280	630	2340	3400
1RQ4 632-3JE.0-Z K96 <sup>3)</sup>	12050	1320	1180	2060	1600	600	200	280	630	2340	3400
1RQ4 634-3JE.0-Z K96 <sup>3)</sup>	13150	1320	1180	2060	1800	600	200	280	630	2340	3640
1RQ4 636-3JE.0-Z K96 <sup>3)</sup>	13800	1320	1180	2060	1800	600	200	280	630	2340	3640
<b>12-pole</b>											
1RQ6 450-5JJ.0-Z K96	4800	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6 452-5JJ.0-Z K96	5100	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6 454-5JJ.0-Z K96	5500	850	930	1620	1400	500	140	200	450	1842	2915
1RQ6 456-5JJ.0-Z K96	5850	850	930	1620	1400	500	140	200	450	1842	2915
1RQ4 500-5JE.0-Z K96	6100	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4 502-5JE.0-Z K96	6500	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4 504-5JE.0-Z K96	7050	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4 506-5JE.0-Z K96	7450	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4 560-5JE.0-Z K96	8200	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4 562-5JE.0-Z K96	8750	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4 564-5JE.0-Z K96	9550	1060	1070	1900	1600	530	180	240	560	2260	3400
1RQ4 566-5JE.0-Z K96	10050	1060	1070	1900	1600	530	180	240	560	2260	3400
1RQ4 630-5JE.0-Z K96 <sup>3)</sup>	11350	1320	1180	2060	1600	600	200	280	630	2340	3400
1RQ4 632-5JE.0-Z K96 <sup>3)</sup>	12000	1320	1180	2060	1600	600	200	280	630	2340	3400
1RQ4 634-5JE.0-Z K96 <sup>3)</sup>	13050	1320	1180	2060	1800	600	200	280	630	2340	3640
1RQ4 636-5JE.0-Z K96 <sup>3)</sup>	13750	1320	1180	2060	1800	600	200	280	630	2340	3640

## Note:

Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

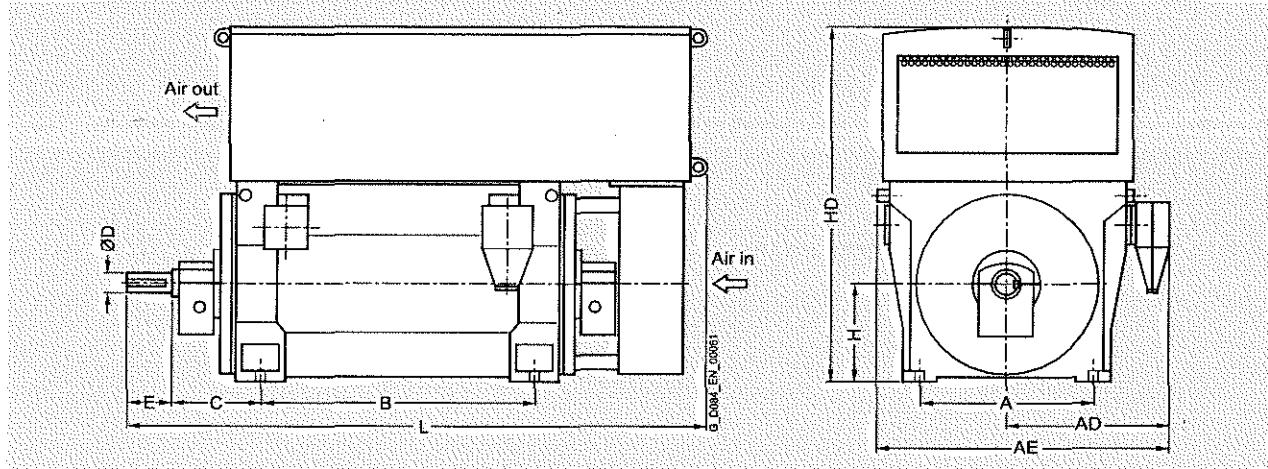
<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>General data: Motor type, construction, sleeve bearings, insulation class, protection class 1RQ6<sup>1)</sup></b>											
2-pole											
1RQ6 450-2JJ.0-Z K96 <sup>2)</sup>	4250	850	1070	1840	1180	425	95	130	450	1842	2575 <sup>3)</sup>
1RQ6 452-2JJ.0-Z K96 <sup>2)</sup>	4500	850	1070	1840	1180	425	95	130	450	1842	2575 <sup>3)</sup>
1RQ6 454-2JJ.0-Z K96 <sup>2)</sup>	4850	850	1070	1840	1400	425	95	130	450	1842	2790 <sup>3)</sup>
1RQ6 456-2JJ.0-Z K96 <sup>2)</sup>	5100	850	1070	1840	1400	425	95	130	450	1842	2790 <sup>3)</sup>
1RQ6 500-2JJ.0-Z K96 <sup>2)</sup>	6400	950	1270	1970	1320	450	110	165	500	2040	3538 <sup>3)</sup>
1RQ6 502-2JJ.0-Z K96 <sup>2)</sup>	6550	950	1270	1970	1320	450	110	165	500	2040	3538 <sup>3)</sup>
1RQ6 504-2JJ.0	7450	950	1270	1970	1500	450	110	165	500	2040	3718 <sup>3)</sup>
1RQ6 506-2JJ.0	7700	950	1270	1970	1500	450	110	165	500	2040	3718 <sup>3)</sup>
1RQ6 560-2JJ.0	8800	1060	1340	2110	1400	600	130	200	560	2288	3900 <sup>3)</sup>
1RQ6 562-2JJ.0	9200	1060	1340	2110	1400	600	130	200	560	2288	3900 <sup>3)</sup>
1RQ6 564-2JJ.0	10200	1060	1340	2110	1600	600	130	200	560	2288	4130 <sup>3)</sup>
1RQ6 566-2JJ.0	10700	1060	1340	2110	1600	600	130	200	560	2288	4130 <sup>3)</sup>
1RQ4 630-2JE.0	10800	1320	1320	2200	1600	560	140	200	630	2340	3840 <sup>3)</sup>
1RQ4 632-2JE.0	11450	1320	1320	2200	1600	560	140	200	630	2340	3840 <sup>3)</sup>
1RQ4 634-2JE.0	12600	1320	1320	2200	1800	560	150	200	630	2340	4080 <sup>3)</sup>
1RQ4 636-2JE.0	13400	1320	1330	2210	1800	560	150	200	630	2340	4080 <sup>3)</sup>
4-pole											
1RQ6 450-4JJ.0-Z K96	4650	850	1070	1840	1180	500	130	200	450	1842	2705
1RQ6 452-4JJ.0-Z K96	4850	850	1070	1840	1180	500	130	200	450	1842	2705
1RQ6 454-4JJ.0-Z K96	5300	850	1070	1840	1400	500	130	200	450	1842	2915
1RQ6 456-4JJ.0-Z K96	5550	850	1070	1840	1400	500	130	200	450	1842	2915
1RQ6 500-4JJ.0-Z K96	7200	950	1270	1970	1320	560	150	200	500	2040	3136
1RQ6 502-4JJ.0-Z K96	7450	950	1270	1970	1320	560	150	200	500	2040	3136
1RQ6 504-4JJ.0-Z K96	8150	950	1270	1970	1500	560	150	200	500	2040	3316
1RQ6 506-4JJ.0-Z K96	8500	950	1270	1970	1500	560	150	200	500	2040	3316
1RQ6 560-4JJ.0-Z K96	8950	1060	1340	2110	1400	600	170	240	560	2288	3270
1RQ6 562-4JJ.0-Z K96	9350	1060	1340	2110	1400	600	170	240	560	2288	3270
1RQ6 564-4JJ.0-Z K96	10350	1060	1340	2110	1600	600	170	240	560	2288	3500
1RQ6 566-4JJ.0-Z K96	10900	1060	1340	2110	1600	600	170	240	560	2288	3500

<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

<sup>3)</sup> Including air inlet silencer.

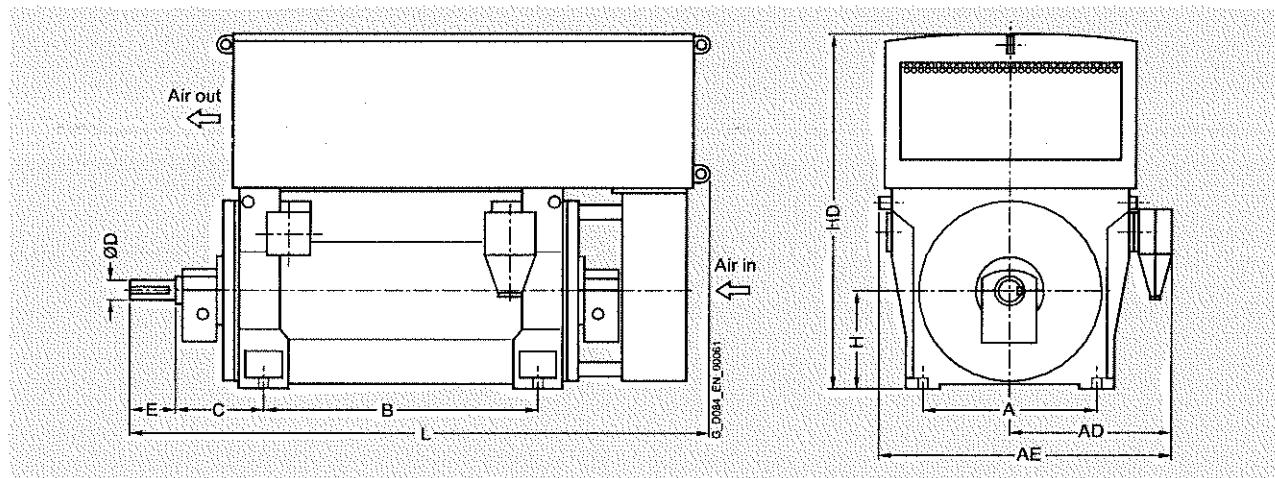
<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>General information: construction sleeve bearings series 1S04 - 1SG6</b>											
4-pole											
1RQ4 630-4JE.0-Z K96 <sup>2)</sup>	11250	1320	1320	2200	1600	600	190	280	630	2340	3400
1RQ4 632-4JE.0-Z K96 <sup>2)</sup>	11950	1320	1320	2200	1600	600	190	280	630	2340	3400
1RQ4 634-4JE.0-Z K96 <sup>2)</sup>	13000	1320	1320	2200	1800	600	200	280	630	2340	3640
1RQ4 636-4JE.0-Z K96 <sup>2)</sup>	13600	1320	1330	2210	1800	600	200	280	630	2340	3640
6-pole											
1RQ6 450-6JJ.0-Z K96	4800	850	1070	1840	1180	500	140	200	450	1842	2705
1RQ6 452-6JJ.0-Z K96	5050	850	1070	1840	1180	500	140	200	450	1842	2705
1RQ6 454-6JJ.0-Z K96	5450	850	1070	1840	1400	500	140	200	450	1842	2915
1RQ6 456-6JJ.0-Z K96	5800	850	1070	1840	1400	500	140	200	450	1842	2915
1RQ4 500-6JE.0-Z K96	6200	950	1140	1980	1320	500	150	200	500	2000	2880
1RQ4 502-6JE.0-Z K96	6550	950	1140	1980	1320	500	150	200	500	2000	2880
1RQ4 504-6JE.0-Z K96	7100	950	1140	1980	1500	500	160	240	500	2000	3130
1RQ4 506-6JE.0-Z K96	7500	950	1140	1980	1500	500	160	240	500	2000	3130
1RQ4 560-6JE.0-Z K96	8200	1060	1210	2040	1400	530	170	240	560	2260	3170
1RQ4 562-6JE.0-Z K96	8750	1060	1210	2040	1400	530	170	240	560	2260	3170
1RQ4 564-6JE.0-Z K96	9550	1060	1210	2040	1600	530	180	240	560	2260	3400
1RQ4 566-6JE.0-Z K96	10050	1060	1210	2040	1600	530	180	240	560	2260	3400
1RQ4 630-6JE.0-Z K96	11450	1320	1320	2200	1600	600	200	280	630	2340	3400
1RQ4 632-6JE.0-Z K96	12100	1320	1320	2200	1600	600	200	280	630	2340	3400
1RQ4 634-6JE.0-Z K96	13150	1320	1320	2200	1800	600	200	280	630	2340	3640
1RQ4 636-6JE.0-Z K96	13850	1320	1320	2200	1800	600	200	280	630	2340	3640
8-pole											
1RQ6 450-8JJ.0-Z K96	4800	850	1070	1840	1180	500	140	200	450	1842	2705
1RQ6 452-8JJ.0-Z K96	5100	850	1070	1840	1180	500	140	200	450	1842	2705
1RQ6 454-8JJ.0-Z K96	5500	850	1070	1840	1400	500	140	200	450	1842	2915
1RQ6 456-8JJ.0-Z K96	5850	850	1070	1840	1400	500	140	200	450	1842	2915
1RQ4 500-8JE.0-Z K96	6150	950	1140	1980	1320	500	150	200	500	2000	2880
1RQ4 502-8JE.0-Z K96	6500	950	1140	1980	1320	500	150	200	500	2000	2880
1RQ4 504-8JE.0-Z K96	7050	950	1140	1980	1500	500	160	240	500	2000	3130
1RQ4 506-8JE.0-Z K96	7450	950	1140	1980	1500	500	160	240	500	2000	3130

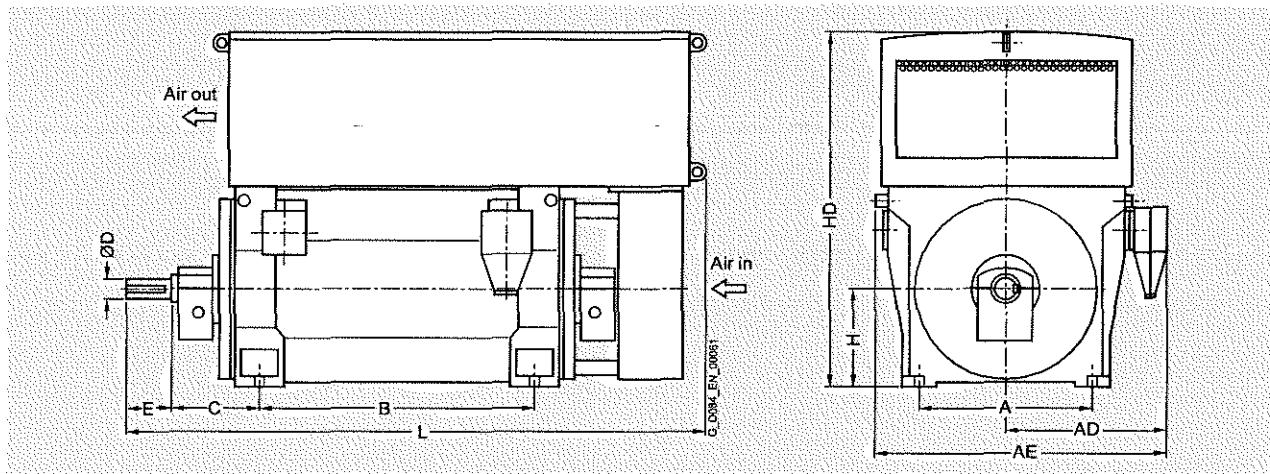
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions										
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm	
<i>Dimensions valid for construction "degree of protection IP23" series<sup>1)</sup></i>												
<i>8-pole</i>												
1RQ4 560-8JE-0-Z K96	8200	1060	1210	2040	1400	530	170	240	560	2260	3170	
1RQ4 562-8JE-0-Z K96	8750	1060	1210	2040	1400	530	170	240	560	2260	3170	
1RQ4 564-8JE-0-Z K96	9550	1060	1210	2040	1600	530	180	240	560	2260	3400	
1RQ4 566-8JE-0-Z K96	10000	1060	1210	2040	1600	530	180	240	560	2260	3400	
1RQ4 630-8JE-0-Z K96	11450	1320	1320	2200	1600	600	200	280	630	2340	3400	
1RQ4 632-8JE-0-Z K96	12000	1320	1320	2200	1600	600	200	280	630	2340	3400	
1RQ4 634-8JE-0-Z K96	13050	1320	1320	2200	1800	600	200	280	630	2340	3640	
1RQ4 636-8JE-0-Z K96	13800	1320	1320	2200	1800	600	200	280	630	2340	3640	
<i>10-pole</i>												
1RQ4 500-3JE-0-Z K96	6100	950	1140	1980	1320	500	150	200	500	2000	2880	
1RQ4 502-3JE-0-Z K96	6450	950	1140	1980	1320	500	150	200	500	2000	2880	
1RQ4 504-3JE-0-Z K96	7050	950	1140	1980	1500	500	160	240	500	2000	3130	
1RQ4 506-3JE-0-Z K96	7400	950	1140	1980	1500	500	160	240	500	2000	3130	
1RQ4 560-3JE-0-Z K96	8400	1060	1210	2040	1400	530	170	240	560	2260	3170	
1RQ4 562-3JE-0-Z K96	9400	1060	1210	2040	1400	530	170	240	560	2260	3170	
1RQ4 564-3JE-0-Z K96	9900	1060	1210	2040	1600	530	180	240	560	2260	3400	
1RQ4 566-3JE-0-Z K96	13000	1060	1210	2040	1600	530	180	240	560	2260	3400	
1RQ4 630-3JE-0-Z K96	11400	1320	1320	2200	1600	600	200	280	630	2340	3400	
1RQ4 632-3JE-0-Z K96	12000	1320	1320	2200	1600	600	200	280	630	2340	3400	
1RQ4 634-3JE-0-Z K96	13000	1320	1320	2200	1800	600	200	280	630	2340	3640	
1RQ4 636-3JE-0-Z K96	13750	1320	1320	2200	1800	600	200	280	630	2340	3640	

<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

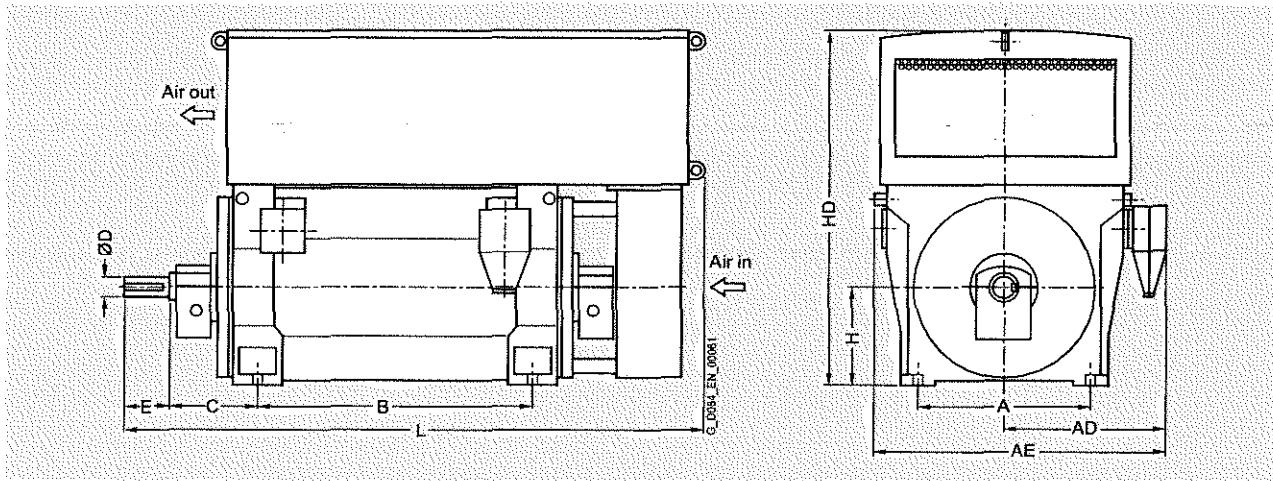
<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<i>Dimensions in millimetres, standard construction, sleeve bearings, TIGC series<sup>1)</sup></i>											
12-pole											
1RQ4 502-5JE 0-Z K96	6500	950	1140	1980	1320	500	150	200	500	2000	2880
1RQ4 504-5JE 0-Z K96	7050	950	1140	1980	1500	500	160	240	500	2000	3130
1RQ4 506-5JE 0-Z K96	7400	950	1140	1980	1500	500	160	240	500	2000	3130
1RQ4 560-5JE 0-Z K96	8150	1060	1210	2040	1400	530	170	240	560	2260	3170
1RQ4 562-5JE 0-Z K96	8700	1060	1210	2040	1400	530	170	240	560	2260	3170
1RQ4 564-5JE 0-Z K96	9550	1060	1210	2040	1600	530	180	240	560	2260	3400
1RQ4 566-5JE 0-Z K96	10000	1060	1210	2040	1600	530	180	240	560	2260	3400
1RQ4 630-5JE 0-Z K96	11350	1320	1320	2200	1600	600	200	280	630	2340	3400
1RQ4 632-5JE 0-Z K96	11900	1320	1320	2200	1600	600	200	280	630	2340	3400
1RQ4 634-5JE 0-Z K96	12950	1320	1320	2200	1800	600	200	280	630	2340	3640
1RQ4 636-5JE 0-Z K96	13650	1320	1320	2200	1800	600	200	280	630	2340	3640

#### Note:

Higher pole numbers are available on request.

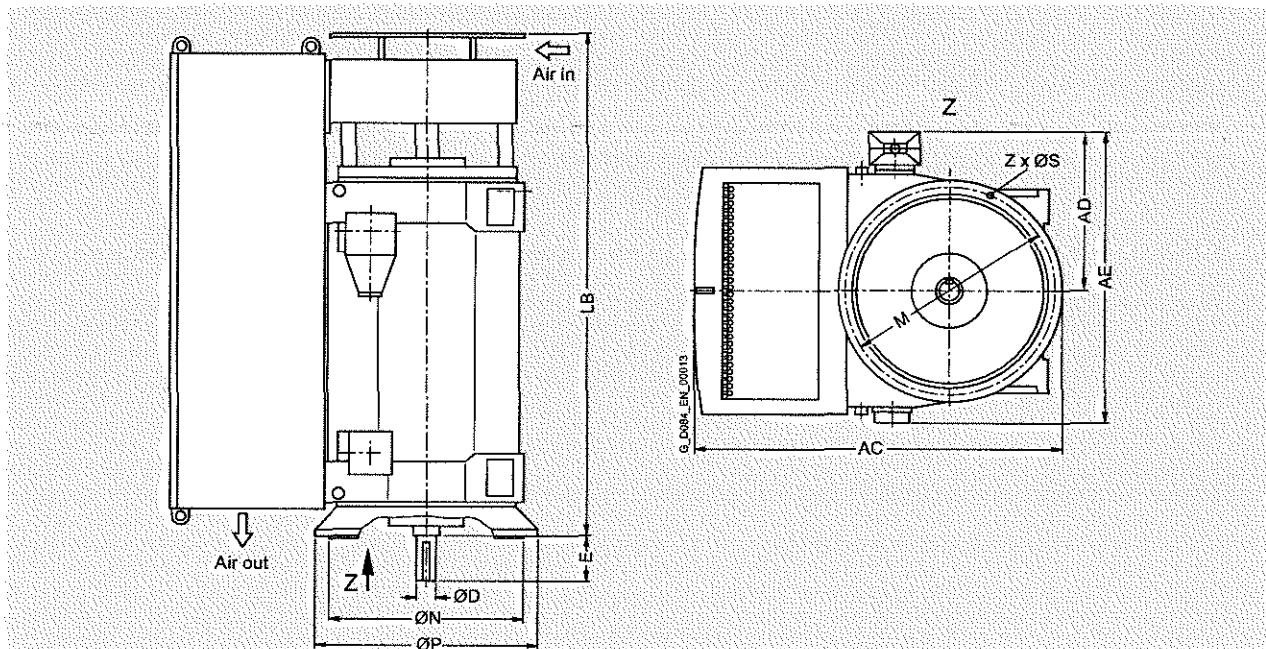
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings



Motor type	Weight kg	Dimensions											
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z Quantity	

Up to 3.6 kV, IM V1 type of construction, roller bearings - series 1RQ4-1RQ6<sup>2)</sup>

#### 4-pole

1RQ6 450-4JJ.4	4750	1967	930	1620	130	200	2730	1150	1000	1080	26	8
1RQ6 452-4JJ.4	5000	1967	930	1620	130	200	2730	1150	1000	1080	26	8
1RQ6 454-4JJ.4	5400	1967	930	1620	130	200	2940	1150	1000	1080	26	8
1RQ6 456-4JJ.4	5700	1967	930	1620	130	200	2940	1150	1000	1080	26	8
1RQ4 500-4JE.4	6050	2130	1000	1810	140	200	2560	1250	1120	1180	26	8
1RQ4 502-4JE.4	6250	2130	1000	1810	140	200	2560	1250	1120	1180	26	8
1RQ4 504-4JE.4	6950	2130	1000	1810	150	200	2770	1250	1120	1180	26	8
1RQ4 506-4JE.4	7300	2130	1000	1810	150	200	2770	1250	1120	1180	26	8
1RQ4 560-4JE.4	8200	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 562-4JE.4	8600	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 564-4JE.4 <sup>3)</sup>	9500	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 566-4JE.4 <sup>3)</sup>	9950	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 630-4JE.4 <sup>3)</sup>	12750	2840	1330	2300	200	280	3170	2000	1800	1900	33	8
1RQ4 632-4JE.4 <sup>3)</sup>	13450	2840	1330	2300	200	280	3170	2000	1800	1900	33	8
1RQ4 634-4JE.4 <sup>3)</sup>	14550	2840	1330	2300	200	280	3410	2000	1800	1900	33	8
1RQ4 636-4JE.4 <sup>3)</sup>	15100	2840	1330	2300	200	280	3410	2000	1800	1900	33	8

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

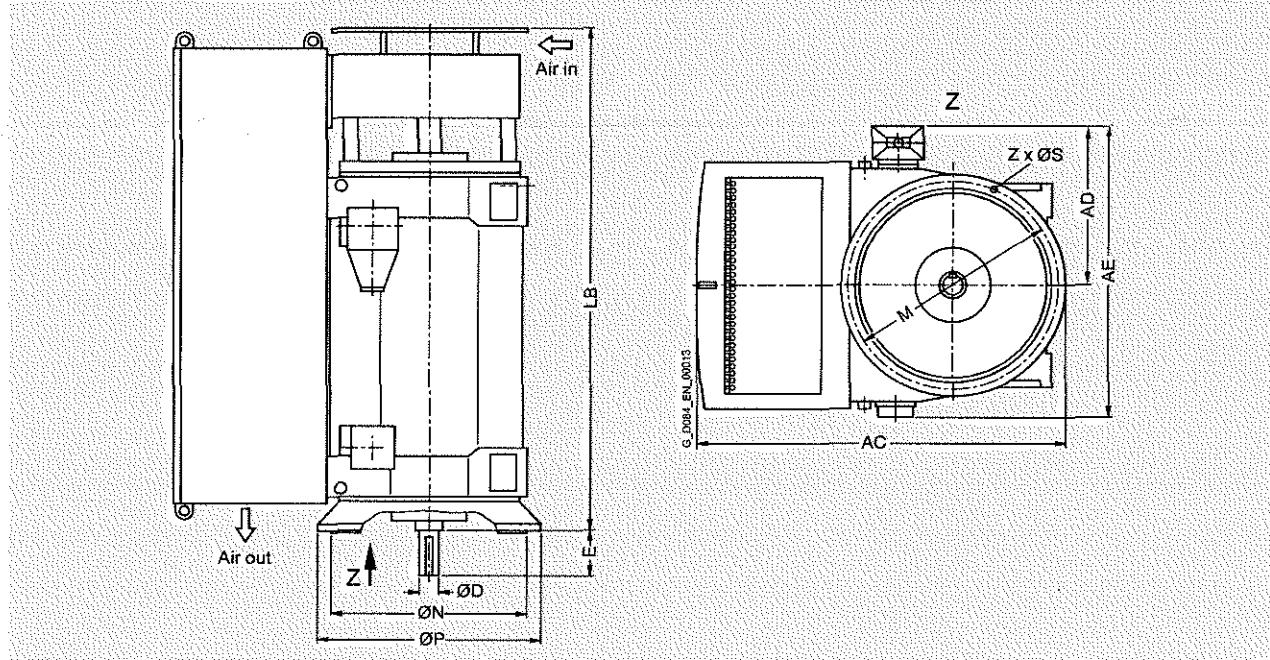
<sup>3)</sup> Vertical type of construction, only in the 50 Hz version.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions											
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z Quantity	

Up to 5.5 kW, IM W1 type of construction, roller bearings, series 1RQ4, 1RQ6<sup>2)</sup>

## 6-pole

1RQ6 450-6JJ.4	4850	1967	930	1620	140	200	2730	1150	1000	1080	26	8
1RQ6 452-6JJ.4	5150	1967	930	1620	140	200	2730	1150	1000	1080	26	8
1RQ6 454-6JJ.4	5500	1967	930	1620	140	200	2940	1150	1000	1080	26	8
1RQ6 456-6JJ.4	5850	1967	930	1620	140	200	2940	1150	1000	1080	26	8
1RQ4 500-6JE.4	6200	2130	1000	1810	150	200	2560	1250	1120	1180	26	8
1RQ4 502-6JE.4	6550	2130	1000	1810	150	200	2560	1250	1120	1180	26	8
1RQ4 504-6JE.4	7100	2130	1000	1810	160	240	2770	1250	1120	1180	26	8
1RQ4 506-6JE.4	7500	2130	1000	1810	160	240	2770	1250	1120	1180	26	8
1RQ4 560-6JE.4	8300	2400	1070	1960	170	240	2800	1400	1250	1320	26	8
1RQ4 562-6JE.4	8800	2400	1070	1960	170	240	2800	1400	1250	1320	26	8
1RQ4 564-6JE.4	9750	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 566-6JE.4	10200	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 630-6JE.4	13050	2840	1330	2300	200	280	3170	2000	1800	1900	33	8
1RQ4 632-6JE.4	13650	2840	1330	2300	200	280	3170	2000	1800	1900	33	8
1RQ4 634-6JE.4	14550	2840	1330	2300	200	280	3410	2000	1800	1900	33	8
1RQ4 636-6JE.4	15400	2840	1330	2300	200	280	3410	2000	1800	1900	33	8

## 8-pole

1RQ6 450-8JJ.4	4850	1967	930	1620	140	200	2730	1150	1000	1080	26	8
1RQ6 452-8JJ.4	5150	1967	930	1620	140	200	2730	1150	1000	1080	26	8
1RQ6 454-8JJ.4	5550	1967	930	1620	140	200	2940	1150	1000	1080	26	8
1RQ6 456-8JJ.4	5900	1967	930	1620	140	200	2940	1150	1000	1080	26	8
1RQ4 500-8JE.4	6200	2130	1000	1810	150	200	2560	1250	1120	1180	26	8
1RQ4 502-8JE.4	6600	2130	1000	1810	150	200	2560	1250	1120	1180	26	8
1RQ4 504-8JE.4	7100	2130	1000	1810	160	240	2770	1250	1120	1180	26	8

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

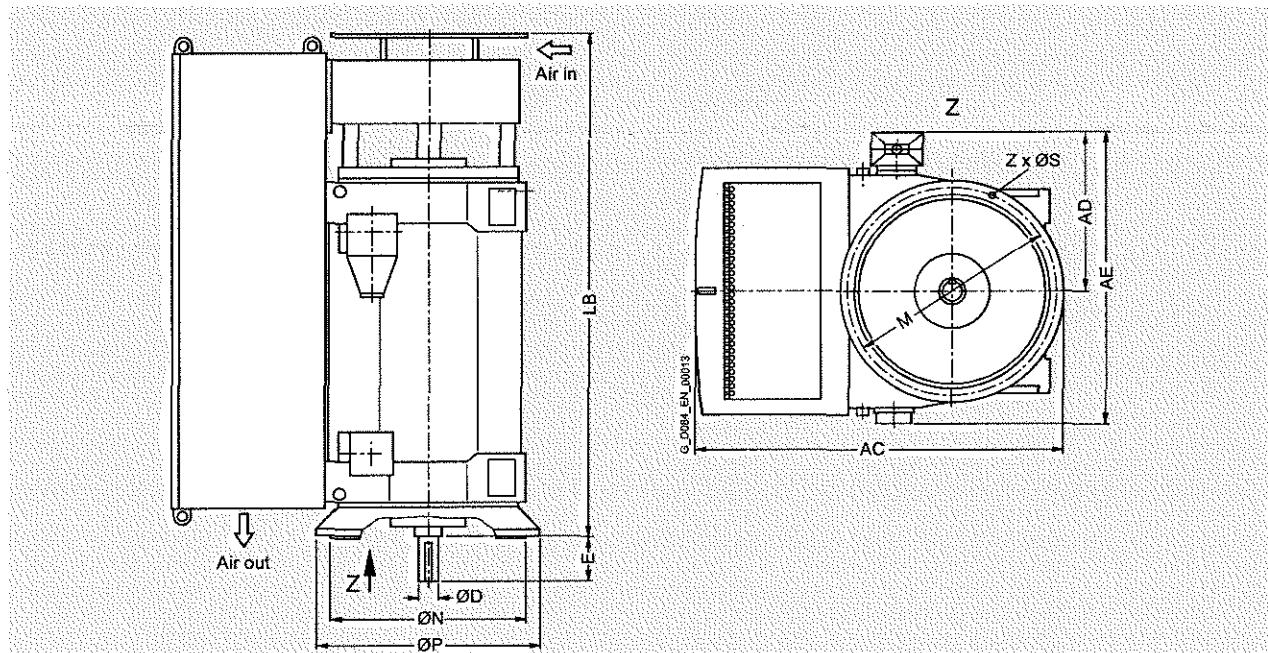


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings (continued)

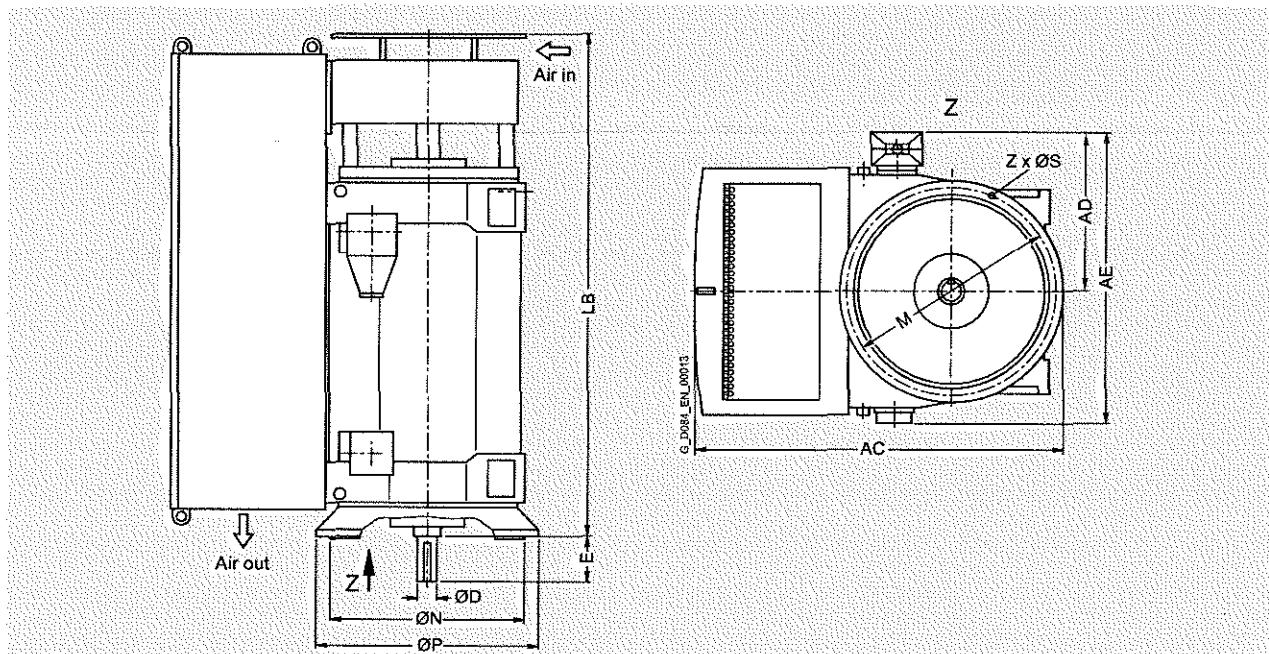


Motor type	Weight kg	Dimensions											
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z Quantity	
<b>Up to 6 kV, (M) V1 type of construction, roller bearings, Series 1RQ4, 1RQ6</b>													
8-pole													
1RQ4 506-8JE.4	7500	2130	1000	1810	160	240	2770	1250	1120	1180	26	8	
1RQ4 560-8JE.4	8250	2400	1070	1960	170	240	2800	1400	1250	1320	26	8	
1RQ4 562-8JE.4	8800	2400	1070	1960	170	240	2800	1400	1250	1320	26	8	
1RQ4 564-8JE.4	9650	2400	1070	1960	180	240	3030	1400	1250	1320	26	8	
1RQ4 566-8JE.4	10100	2400	1070	1960	180	240	3030	1400	1250	1320	26	8	
1RQ4 630-8JE.4 <sup>3)</sup>	12850	2840	1180	2150	200	280	3170	2000	1800	1900	33	8	
1RQ4 632-8JE.4 <sup>3)</sup>	13600	2840	1330	2300	200	280	3170	2000	1800	1900	33	8	
1RQ4 634-8JE.4 <sup>3)</sup>	14550	2840	1330	2300	200	280	3410	2000	1800	1900	33	8	
1RQ4 636-8JE.4 <sup>3)</sup>	15300	2840	1330	2300	200	280	3410	2000	1800	1900	33	8	
10-pole													
1RQ6 450-3JJ.4	4850	1967	930	1620	140	200	2730	1150	1000	1080	26	8	
1RQ6 452-3JJ.4	5150	1967	930	1620	140	200	2730	1150	1000	1080	26	8	
1RQ6 454-3JJ.4	5550	1967	930	1620	140	200	2940	1150	1000	1080	26	8	
1RQ6 456-3JJ.4	5900	1967	930	1620	140	200	2940	1150	1000	1080	26	8	
1RQ4 500-3JE.4	6150	2130	1000	1810	150	200	2560	1250	1120	1180	26	8	
1RQ4 502-3JE.4	6450	2130	1000	1810	150	200	2560	1250	1120	1180	26	8	
1RQ4 504-3JE.4	7050	2130	1000	1810	160	240	2770	1250	1120	1180	26	8	
1RQ4 506-3JE.4	7450	2130	1000	1810	160	240	2770	1250	1120	1180	26	8	
1RQ4 560-3JE.4	8200	2400	1070	1960	170	240	2800	1400	1250	1320	26	8	
1RQ4 562-3JE.4	8750	2400	1070	1960	170	240	2800	1400	1250	1320	26	8	
1RQ4 564-3JE.4	9600	2400	1070	1960	180	240	3030	1400	1250	1320	26	8	
1RQ4 566-3JE.4	10050	2400	1070	1960	180	240	3030	1400	1250	1320	26	8	

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

<sup>3)</sup> Vertical type of construction, only in the 50 Hz version.

**Dimension drawings (continued)**


Motor type	Weight kg	Dimensions											
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z Quantity	
<b>1RQ4-6 kV IM 11 type of construction, radial bearings - series 1RQ4-1RQ6<sup>2)</sup></b>													
10-pole													
1RQ4 630-3JE.4 <sup>3)</sup>	12850	2840	1180	2150	200	280	3170	2000	1800	1900	33	8	
1RQ4 632-3JE.4 <sup>3)</sup>	13450	2840	1180	2150	200	280	3170	2000	1800	1900	33	8	
1RQ4 634-3JE.4 <sup>3)</sup>	14550	2840	1180	2150	200	280	3410	2000	1800	1900	33	8	
1RQ4 636-3JE.4 <sup>3)</sup>	15200	2840	1180	2150	200	280	3410	2000	1800	1900	33	8	
12-pole													
1RQ6 450-5JJ.4	4850	1967	930	1620	140	200	2730	1150	1000	1080	26	8	
1RQ6 452-5JJ.4	5150	1967	930	1620	140	200	2730	1150	1000	1080	26	8	
1RQ6 454-5JJ.4	5550	1967	930	1620	140	200	2940	1150	1000	1080	26	8	
1RQ6 456-5JJ.4	5900	1967	930	1620	140	200	2940	1150	1000	1080	26	8	
1RQ4 500-5JE.4	6150	2130	1000	1810	150	200	2560	1250	1120	1180	26	8	
1RQ4 502-5JE.4	6500	2130	1000	1810	150	200	2560	1250	1120	1180	26	8	
1RQ4 504-5JE.4	7050	2130	1000	1810	160	240	2770	1250	1120	1180	26	8	
1RQ4 506-5JE.4	7500	2130	1000	1810	160	240	2770	1250	1120	1180	26	8	
1RQ4 560-5JE.4	8200	2400	1070	1960	170	240	2800	1400	1250	1320	26	8	
1RQ4 562-5JE.4	8750	2400	1070	1960	170	240	2800	1400	1250	1320	26	8	
1RQ4 564-5JE.4	9550	2400	1070	1960	180	240	3030	1400	1250	1320	26	8	
1RQ4 566-5JE.4	10050	2400	1070	1960	180	240	3030	1400	1250	1320	26	8	
1RQ4 630-5JE.4 <sup>3)</sup>	12750	2840	1180	2150	200	280	3170	2000	1800	1900	33	8	
1RQ4 632-5JE.4 <sup>3)</sup>	13400	2840	1180	2150	200	280	3170	2000	1800	1900	33	8	
1RQ4 634-5JE.4 <sup>3)</sup>	14450	2840	1180	2150	200	280	3410	2000	1800	1900	33	8	
1RQ4 636-5JE.4 <sup>3)</sup>	15150	2840	1180	2150	200	280	3410	2000	1800	1900	33	8	

**Note:**

Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

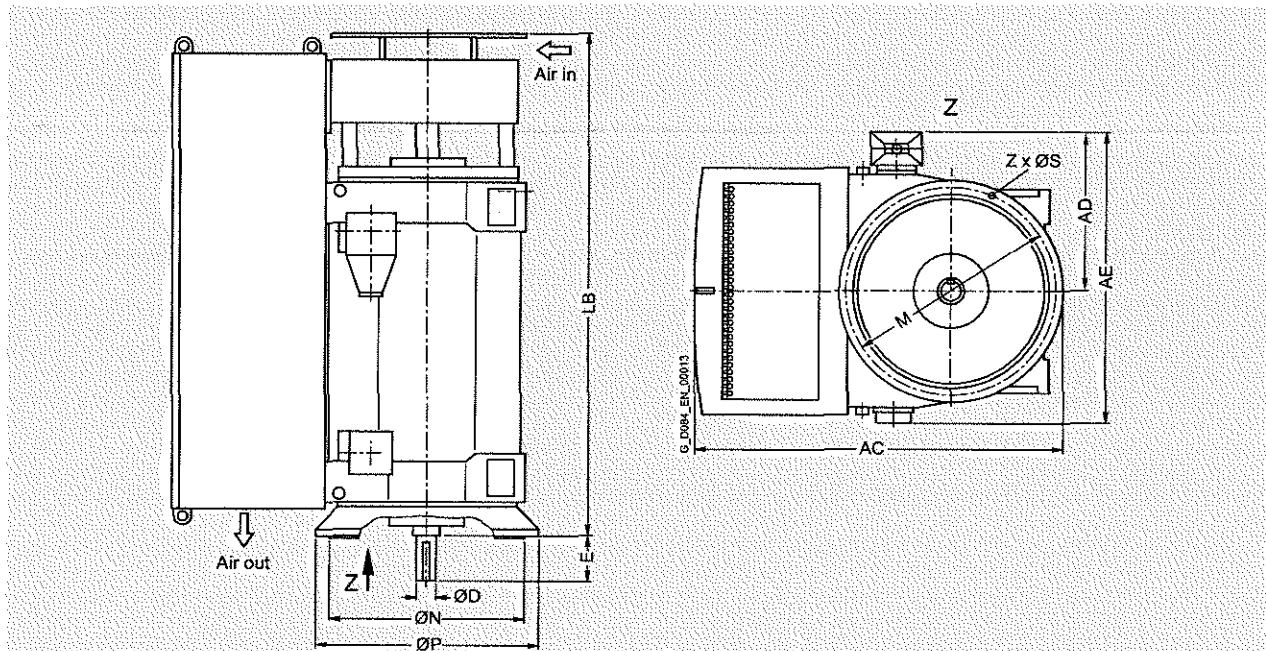
<sup>3)</sup> Vertical type of construction, only in the 50 Hz version.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RC6

#### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		

#### 3.11 KV, IM VI, type of construction: roller bearings – series 1RQ4, 1RC6<sup>1)</sup>

##### 4-pole

1RQ6 450-4JJ.4	4750	1967	1070	1840	130	200	2730	1150	1000	1080	26	8
1RQ6 452-4JJ.4	5000	1967	1070	1840	130	200	2730	1150	1000	1080	26	8
1RQ6 454-4JJ.4	5400	1967	1070	1840	130	200	2940	1150	1000	1080	26	8
1RQ6 456-4JJ.4	5700	1967	1070	1840	130	200	2940	1150	1000	1080	26	8
1RQ4 500-4JE.4	6050	2130	1140	1950	140	200	2560	1250	1120	1180	26	8
1RQ4 502-4JE.4	6250	2130	1140	1950	140	200	2560	1250	1120	1180	26	8
1RQ4 504-4JE.4	6950	2130	1140	1950	150	200	2770	1250	1120	1180	26	8
1RQ4 506-4JE.4	7300	2130	1140	1950	150	200	2770	1250	1120	1180	26	8
1RQ4 580-4JE.4	8050	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 582-4JE.4	8500	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 584-4JE.4	9400	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 586-4JE.4	9800	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 630-4JE.4	12750	2840	1320	2290	200	280	3170	2000	1800	1900	33	8
1RQ4 632-4JE.4	13450	2840	1320	2290	200	280	3170	2000	1800	1900	33	8
1RQ4 634-4JE.4	14550	2840	1320	2290	200	280	3410	2000	1800	1900	33	8
1RQ4 636-4JE.4	15100	2840	1330	2300	200	280	3410	2000	1800	1900	33	8

##### 6-pole

1RQ6 450-6JJ.4	4850	1967	1070	1840	140	200	2730	1150	1000	1080	26	8
1RQ6 452-6JJ.4	5150	1967	1070	1840	140	200	2730	1150	1000	1080	26	8
1RQ6 454-6JJ.4	5500	1967	1070	1840	140	200	2940	1150	1000	1080	26	8
1RQ6 456-6JJ.4	5850	1967	1070	1840	140	200	2940	1150	1000	1080	26	8
1RQ4 500-6JE.4	6150	2130	1140	1950	150	200	2560	1250	1120	1180	26	8

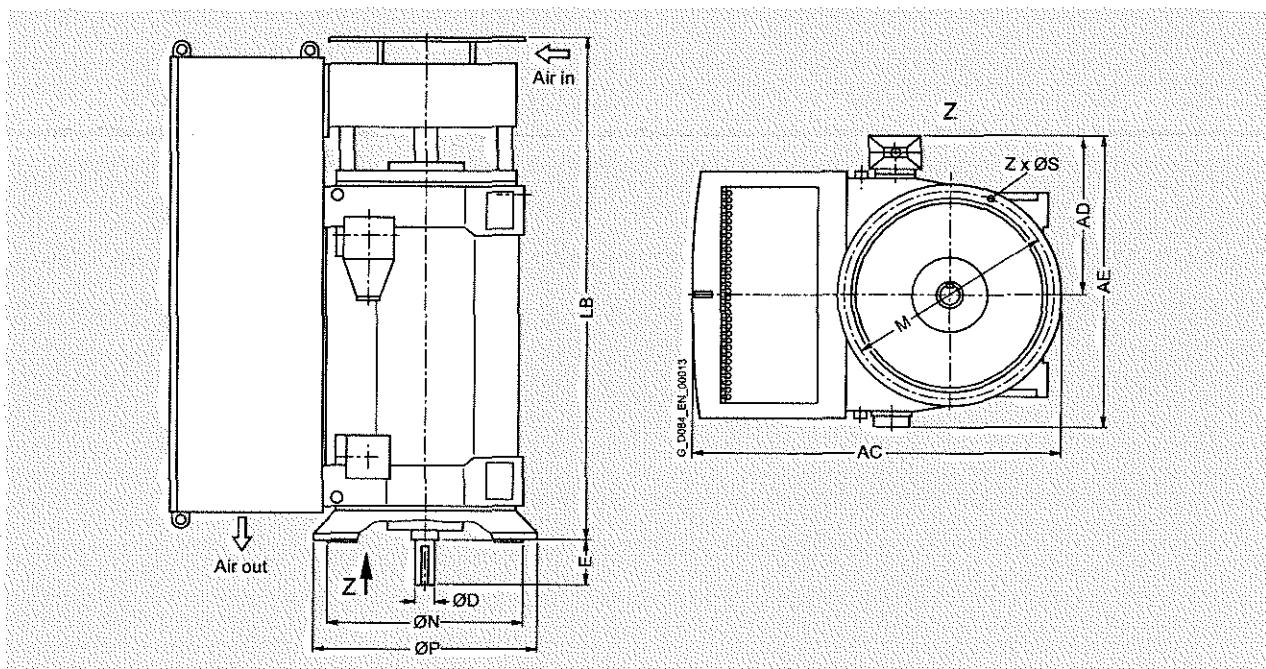
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions											
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z	Quantity

3...11 kW, IM 3450, type of construction - roller bearings - codes - 1RQ4 - (not 1RQ6)

#### 6-pole

1RQ4 502-6JE.4	6550	2130	1140	1950	150	200	2560	1250	1120	1180	26	8
1RQ4 504-6JE.4	7100	2130	1140	1950	160	240	2770	1250	1120	1180	26	8
1RQ4 506-6JE.4	7500	2130	1140	1950	160	240	2770	1250	1120	1180	26	8
1RQ4 560-6JE.4	8250	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 562-6JE.4	8750	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 564-6JE.4	9600	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 566-6JE.4	10050	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 630-6JE.4	13050	2840	1320	2290	200	280	3170	2000	1800	1900	33	8
1RQ4 632-6JE.4	13650	2840	1320	2290	200	280	3170	2000	1800	1900	33	8
1RQ4 634-6JE.4	14550	2840	1320	2290	200	280	3410	2000	1800	1900	33	8
1RQ4 636-6JE.4	15400	2840	1320	2290	200	280	3410	2000	1800	1900	33	8

#### 8-pole

1RQ6 450-8JJ.4	4850	1967	1070	1840	140	200	2730	1150	1000	1080	26	8
1RQ6 452-8JJ.4	5150	1967	1070	1840	140	200	2730	1150	1000	1080	26	8
1RQ6 454-8JJ.4	5550	1967	1070	1840	140	200	2940	1150	1000	1080	26	8
1RQ6 456-8JJ.4	5900	1967	1070	1840	140	200	2940	1150	1000	1080	26	8
1RQ4 500-8JE.4	6200	2130	1140	1950	150	200	2560	1250	1120	1180	26	8
1RQ4 502-8JE.4	6550	2130	1140	1950	150	200	2560	1250	1120	1180	26	8
1RQ4 504-8JE.4	7100	2130	1140	1950	160	240	2770	1250	1120	1180	26	8
1RQ4 506-8JE.4	7500	2130	1140	1950	160	240	2770	1250	1120	1180	26	8
1RQ4 560-8JE.4	8200	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 562-8JE.4	8750	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 564-8JE.4	9600	2400	1210	2100	180	240	3030	1400	1250	1320	26	8

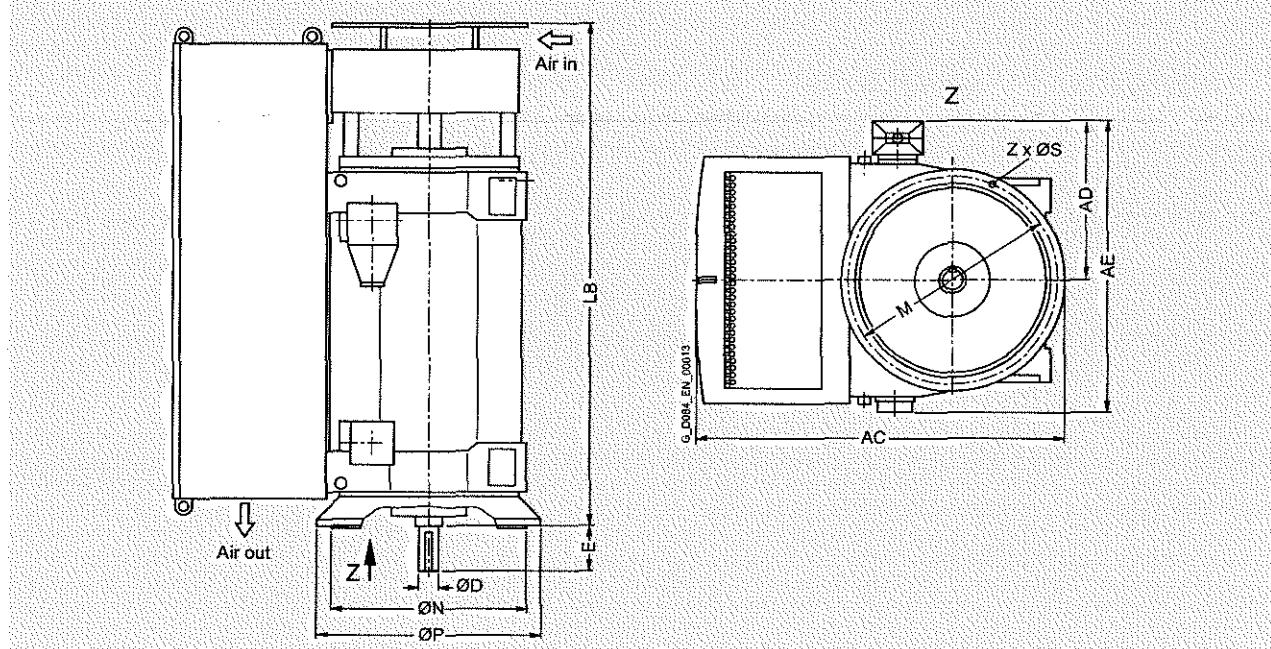
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z mm		
<b>3) 1RQ4/1RQ6 type of construction, roller bearings – 1SG6 series<sup>1)</sup></b>														
8-pole														
1RQ4 566-8JE.4	10000	2400	1210	2100	180	240	3030	1400	1250	1320	26	8		
1RQ4 630-8JE.4	12850	2840	1320	2290	200	280	3170	2000	1800	1900	33	8		
1RQ4 632-8JE.4	13600	2840	1320	2290	200	280	3170	2000	1800	1900	33	8		
1RQ4 634-8JE.4	14550	2840	1320	2290	200	280	3410	2000	1800	1900	33	8		
1RQ4 636-8JE.4	15300	2840	1320	2290	200	280	3410	2000	1800	1900	33	8		
10-pole														
1RQ4 500-3JE.4	6150	2130	1140	1950	150	200	2560	1250	1120	1180	26	8		
1RQ4 502-3JE.4	6450	2130	1140	1950	150	200	2560	1250	1120	1180	26	8		
1RQ4 504-3JE.4	7000	2130	1140	1950	160	240	2770	1250	1120	1180	26	8		
1RQ4 506-3JE.4	7450	2130	1140	1950	160	240	2770	1250	1120	1180	26	8		
1RQ4 560-3JE.4	8700	2400	1210	2100	170	240	2800	1400	1250	1320	26	8		
1RQ4 562-3JE.4	9350	2400	1210	2100	170	240	2800	1400	1250	1320	26	8		
1RQ4 564-3JE.4	10150	2400	1210	2100	180	240	3030	1400	1250	1320	26	8		
1RQ4 566-3JE.4	10600	2400	1210	2100	180	240	3030	1400	1250	1320	26	8		
1RQ4 630-3JE.4	12850	2840	1320	2290	200	280	3170	2000	1800	1900	33	8		
1RQ4 632-3JE.4	13450	2840	1320	2290	200	280	3170	2000	1800	1900	33	8		
1RQ4 634-3JE.4	14550	2840	1320	2290	200	280	3410	2000	1800	1900	33	8		
1RQ4 636-3JE.4	15200	2840	1320	2290	200	280	3410	2000	1800	1900	33	8		

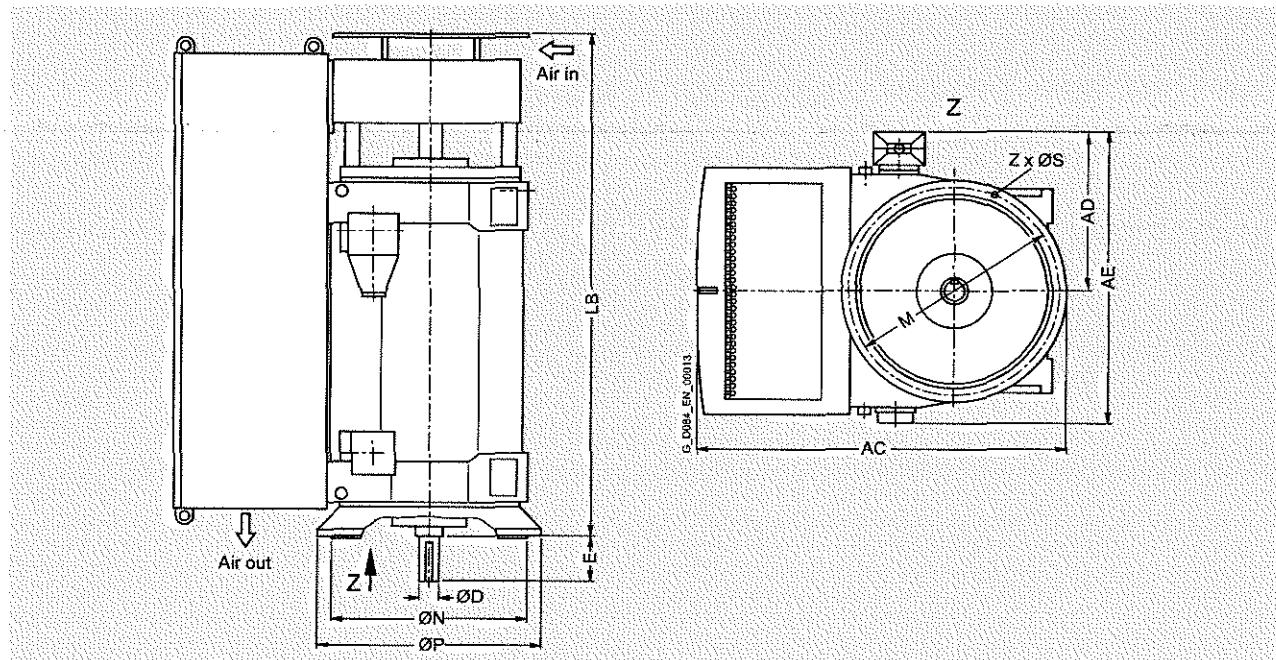
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions											
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z Quantity	

### Dimensions for V-type construction, roller bearing - 1RQ2 series<sup>1)</sup>

#### 12-pole

1RQ4 502-5JE.4	6500	2130	1140	1950	150	200	2560	1250	1120	1180	26	8
1RQ4 504-5JE.4	7000	2130	1140	1950	160	240	2770	1250	1120	1180	26	8
1RQ4 506-5JE.4	7450	2130	1140	1950	160	240	2770	1250	1120	1180	26	8
1RQ4 560-5JE.4	8200	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 562-5JE.4	8700	2400	1210	2100	170	240	2800	1400	1250	1320	26	8
1RQ4 564-5JE.4	9550	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 566-5JE.4	10000	2400	1210	2100	180	240	3030	1400	1250	1320	26	8
1RQ4 630-5JE.4	12750	2840	1320	2290	200	280	3170	2000	1800	1900	33	8
1RQ4 632-5JE.4	13400	2840	1320	2290	200	280	3170	2000	1800	1900	33	8
1RQ4 634-5JE.4	14450	2840	1320	2290	200	280	3410	2000	1800	1900	33	8
1RQ4 636-5JE.4	15150	2840	1320	2290	200	280	3410	2000	1800	1900	33	8

#### Note:

Higher pole numbers are available on request.

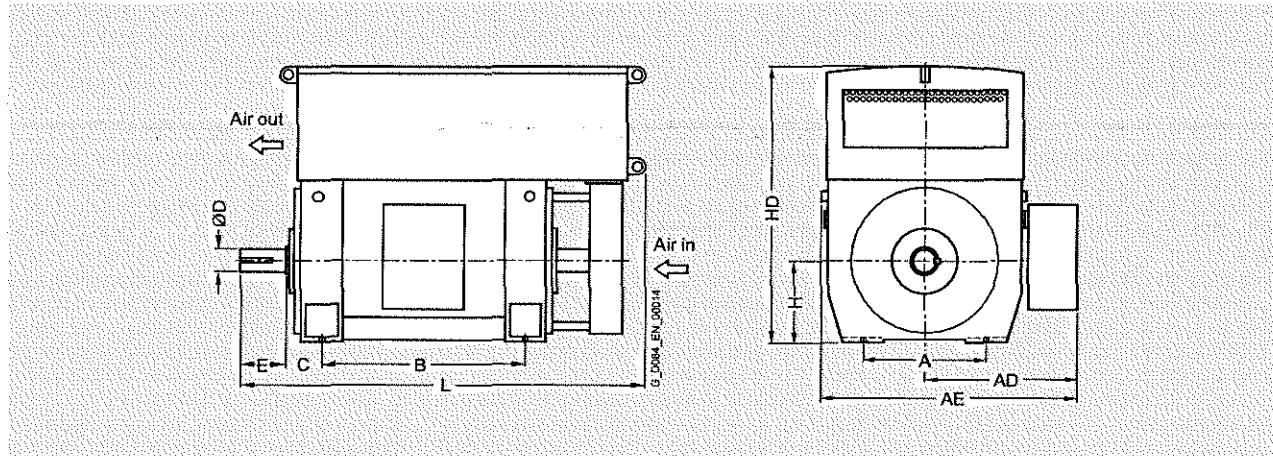
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings



Motor type	Weight kg	Dimensions										
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm	
<b>Up to 5.5 kW (1.5 kW of continuous load bearing capacity)</b> 1RQ6 series <sup>1)</sup>												
<b>4-pole</b>												
1RQ6 710-4JJ.0 <sup>2)</sup>	21100	1500	1500	2530	2000	355	220	280	710	2820	4720	
1RQ6 712-4JJ.0 <sup>2)</sup>	21900	1500	1500	2530	2000	355	220	280	710	2820	4720	
1RQ6 714-4JJ.0 <sup>2)</sup>	23400	1500	1500	2530	2240	355	220	280	710	2820	4960	
1RQ6 716-4JJ.0 <sup>2)</sup>	24400	1500	1500	2530	2240	355	220	280	710	2820	4960	
<b>6-pole</b>												
1RQ6 710-6JJ.0	20400	1500	1500	2530	2000	355	240	330	710	2810	3890	
1RQ6 712-6JJ.0	21100	1500	1500	2530	2000	355	240	330	710	2810	3890	
1RQ6 714-6JJ.0	22800	1500	1500	2530	2240	355	240	330	710	2810	4130	
1RQ6 716-6JJ.0	24000	1500	1500	2530	2240	355	240	330	710	2810	4130	
<b>8-pole</b>												
1RQ6 710-8JJ.0	20200	1500	1500	2530	2000	355	240	330	710	2810	3890	
1RQ6 712-8JJ.0	21000	1500	1500	2530	2000	355	240	330	710	2810	3890	
1RQ6 714-8JJ.0	22600	1500	1500	2530	2240	355	240	330	710	2810	4130	
1RQ6 716-8JJ.0	23700	1500	1500	2530	2240	355	240	330	710	2810	4130	
<b>10-pole</b>												
1RQ6 710-3JJ.0	20000	1500	1500	2530	2000	355	240	330	710	2810	3890	
1RQ6 712-3JJ.0	20900	1500	1500	2530	2000	355	240	330	710	2810	3890	
1RQ6 714-3JJ.0	22500	1500	1500	2530	2240	355	240	330	710	2810	4130	
1RQ6 716-3JJ.0	23600	1500	1500	2530	2240	355	240	330	710	2810	4130	

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

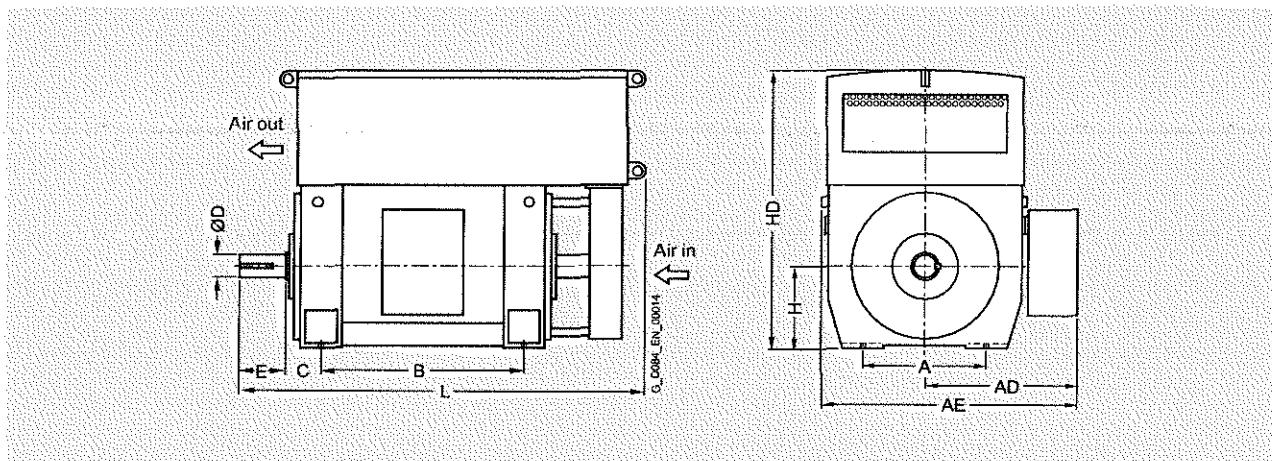
<sup>2)</sup> Roller bearings only for 50 Hz operation.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Direct drive with integrated construction roller bearings (1RQ6)</b>											
<b>4-pole</b>											
1RQ6 710-4JJ.0 <sup>2)</sup>	20800	1500	1500	2530	2000	355	220	280	710	2820	4720
1RQ6 712-4JJ.0 <sup>2)</sup>	21600	1500	1500	2530	2000	355	220	280	710	2820	4720
1RQ6 714-4JJ.0 <sup>2)</sup>	23100	1500	1500	2530	2240	355	220	280	710	2820	4960
1RQ6 716-4JJ.0 <sup>2)</sup>	24000	1500	1500	2530	2240	355	220	280	710	2820	4960
<b>6-pole</b>											
1RQ6 710-6JJ.0	20200	1500	1500	2530	2000	355	240	330	710	2810	3890
1RQ6 712-6JJ.0	21000	1500	1500	2530	2000	355	240	330	710	2810	3890
1RQ6 714-6JJ.0	22600	1500	1500	2530	2240	355	240	330	710	2810	4130
1RQ6 716-6JJ.0	23700	1500	1500	2530	2240	355	240	330	710	2810	4130
<b>8-pole</b>											
1RQ6 710-8JJ.0	20100	1500	1500	2530	2000	355	240	330	710	2810	3890
1RQ6 712-8JJ.0	20800	1500	1500	2530	2000	355	240	330	710	2810	3890
1RQ6 714-8JJ.0	22400	1500	1500	2530	2240	355	240	330	710	2810	4130
1RQ6 716-8JJ.0	23600	1500	1500	2530	2240	355	240	330	710	2810	4130
<b>10-pole</b>											
1RQ6 710-3JJ.0	19900	1500	1500	2530	2000	355	240	330	710	2810	3890
1RQ6 712-3JJ.0	20700	1500	1500	2530	2000	355	240	330	710	2810	3890
1RQ6 714-3JJ.0	22400	1500	1500	2530	2240	355	240	330	710	2810	4130
1RQ6 716-3JJ.0	23500	1500	1500	2530	2240	355	240	330	710	2810	4130

### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

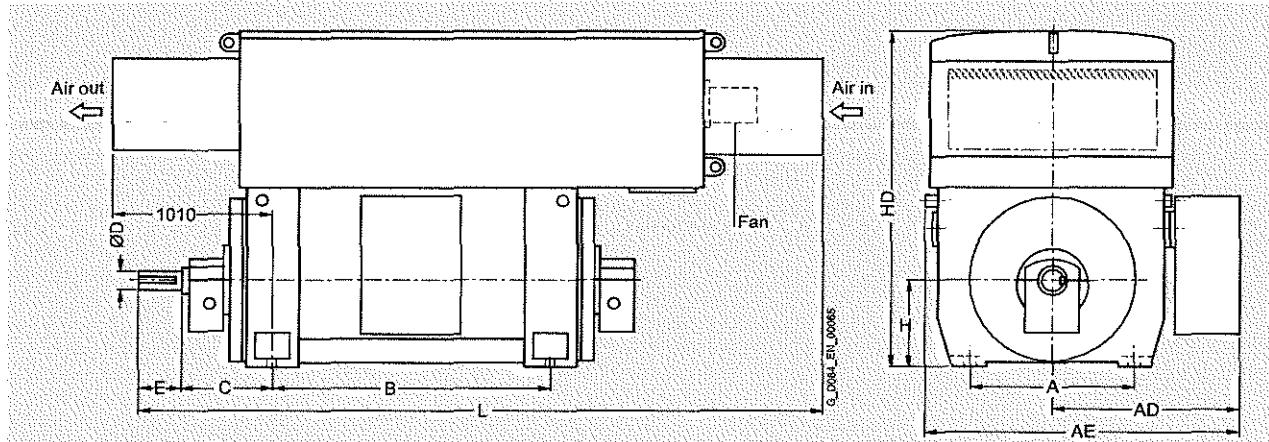
<sup>2)</sup> Roller bearings only for 50 Hz operation.

# Motors for line operation

## Air-cooled motors

### H-Compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings



Motor type	Weight	Dimensions									
		A	AD	AE	B	C	D	E	H	HD	L
kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm

#### 10 kV, IM D2 type of construction, sleeve bearings - (1RQ6 series)

2-pole

1RQ6 710-2HJ.0	19300	1500	1500	2530	2000	600	180	240	710	2820	4940
1RQ6 712-2HJ.0	20100	1500	1500	2530	2000	600	180	240	710	2820	4940
1RQ6 714-2HJ.0	21400	1500	1500	2530	2240	600	180	240	710	2820	5180
1RQ6 716-2HJ.0	22400	1500	1500	2530	2240	600	180	240	710	2820	5180

Motor type	Weight	Dimensions									
		A	AD	AE	B	C	D	E	H	HD	L
kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm

#### 11 kV, IM D2 type of construction, sleeve bearings - (1RQ6 series)

2-pole

1RQ6 710-2HJ.0	19100	1500	1500	2530	2000	600	180	240	710	2820	4940
1RQ6 712-2HJ.0	19900	1500	1500	2530	2000	600	180	240	710	2820	4940
1RQ6 714-2HJ.0	21200	1500	1500	2530	2240	600	180	240	710	2820	5180
1RQ6 716-2HJ.0	22200	1500	1500	2530	2240	600	180	240	710	2820	5180

<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

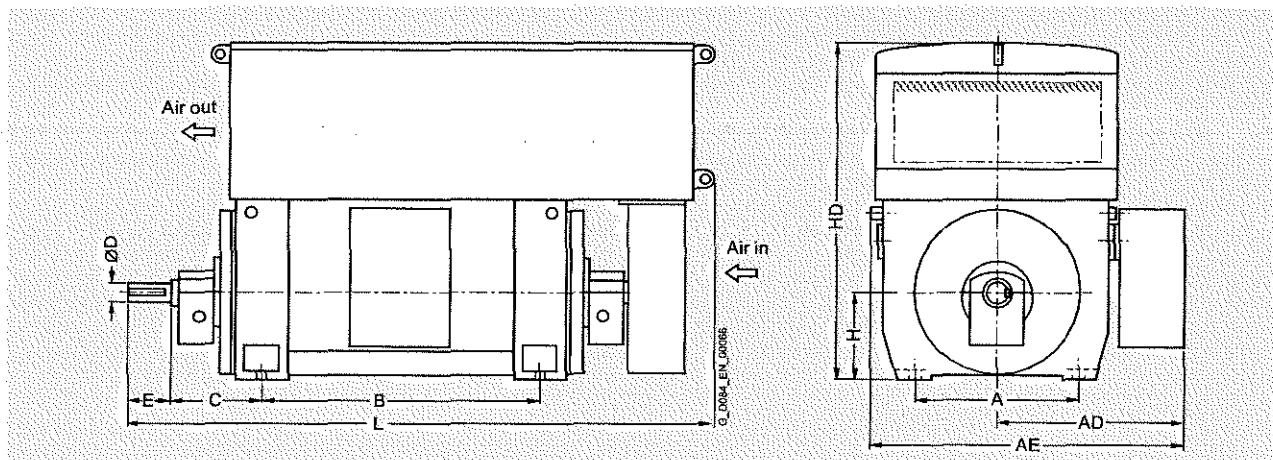


# Motors for line operation

## Air-cooled motors

L-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

Table 1: L-compact PLUS 1RQ4 and 1RQ6 air-cooled motors (1 pole pitch = 10 mm)

#### 4-pole

1RQ6 710-4JJ-0-Z K96 <sup>2)</sup>	21100	1500	1500	2530	2000	530	220	280	710	2820	4890
1RQ6 712-4JJ-0-Z K96 <sup>2)</sup>	21900	1500	1500	2530	2000	530	220	280	710	2820	4890
1RQ6 714-4JJ-0-Z K96 <sup>2)</sup>	23400	1500	1500	2530	2240	530	220	280	710	2820	5130
1RQ6 716-4JJ-0-Z K96 <sup>2)</sup>	24400	1500	1500	2530	2240	530	220	280	710	2820	5130

#### 6-pole

1RQ6 710-6JJ-0-Z K96	21300	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 712-6JJ-0-Z K96	22000	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 714-6JJ-0-Z K96	23700	1500	1500	2530	2240	670	240	330	710	2810	4440
1RQ6 716-6JJ-0-Z K96	24900	1500	1500	2530	2240	670	240	330	710	2810	4440

#### 8-pole

1RQ6 710-8JJ-0-Z K96	21100	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 712-8JJ-0-Z K96	21900	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 714-8JJ-0-Z K96	23500	1500	1500	2530	2240	670	240	330	710	2810	4440
1RQ6 716-8JJ-0-Z K96	24600	1500	1500	2530	2240	670	240	330	710	2810	4440

#### 10-pole

1RQ6 710-3JJ-0-Z K96	20900	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 712-3JJ-0-Z K96	21800	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 714-3JJ-0-Z K96	23400	1500	1500	2530	2240	670	240	330	710	2810	4440
1RQ6 716-3JJ-0-Z K96	24500	1500	1500	2530	2240	670	240	330	710	2810	4440

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

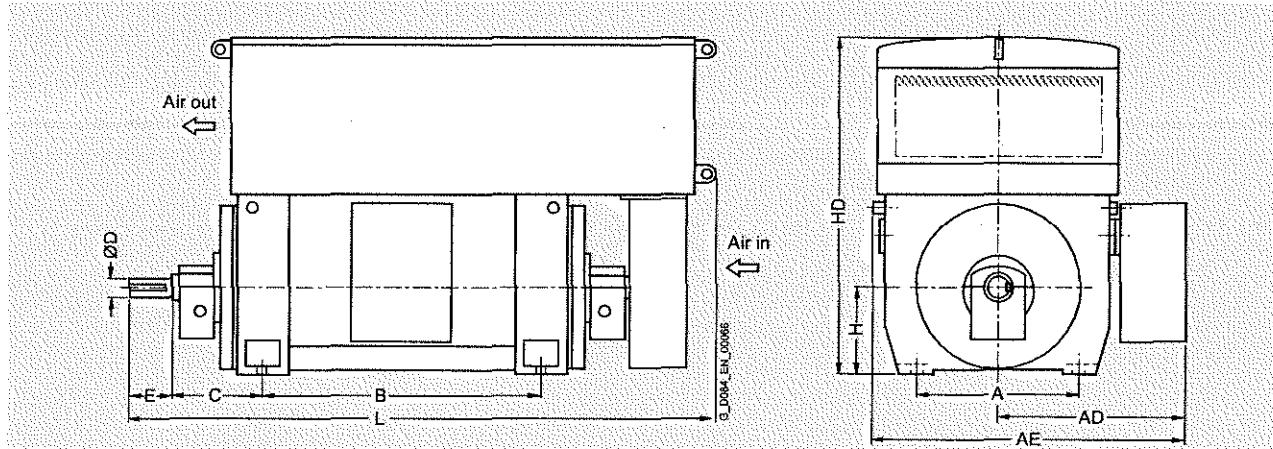


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RQ4 and 1RQ6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>4-pole</b>											
1RQ6 710-4JJ.0-Z K96 <sup>2)</sup>	20800	1500	1500	2530	2000	530	220	280	710	2820	4890
1RQ6 712-4JJ.0-Z K96 <sup>2)</sup>	21600	1500	1500	2530	2000	530	220	280	710	2820	4890
1RQ6 714-4JJ.0-Z K96 <sup>2)</sup>	23100	1500	1500	2530	2240	530	220	280	710	2820	5130
1RQ6 716-4JJ.0-Z K96 <sup>2)</sup>	24000	1500	1500	2530	2240	530	220	280	710	2820	5130
<b>6-pole</b>											
1RQ6 710-6JJ.0-Z K96	21100	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 712-6JJ.0-Z K96	21900	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 714-6JJ.0-Z K96	23500	1500	1500	2530	2240	670	240	330	710	2810	4440
1RQ6 716-6JJ.0-Z K96	24600	1500	1500	2530	2240	670	240	330	710	2810	4440
<b>8-pole</b>											
1RQ6 710-8JJ.0-Z K96	21000	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 712-8JJ.0-Z K96	21700	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 714-8JJ.0-Z K96	23300	1500	1500	2530	2240	670	240	330	710	2810	4440
1RQ6 716-8JJ.0-Z K96	24500	1500	1500	2530	2240	670	240	330	710	2810	4440
<b>10-pole</b>											
1RQ6 710-3JJ.0-Z K96	20800	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 712-3JJ.0-Z K96	21600	1500	1500	2530	2000	670	240	330	710	2810	4200
1RQ6 714-3JJ.0-Z K96	23300	1500	1500	2530	2240	670	240	330	710	2810	4440
1RQ6 716-3JJ.0-Z K96	24400	1500	1500	2530	2240	670	240	330	710	2810	4440

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

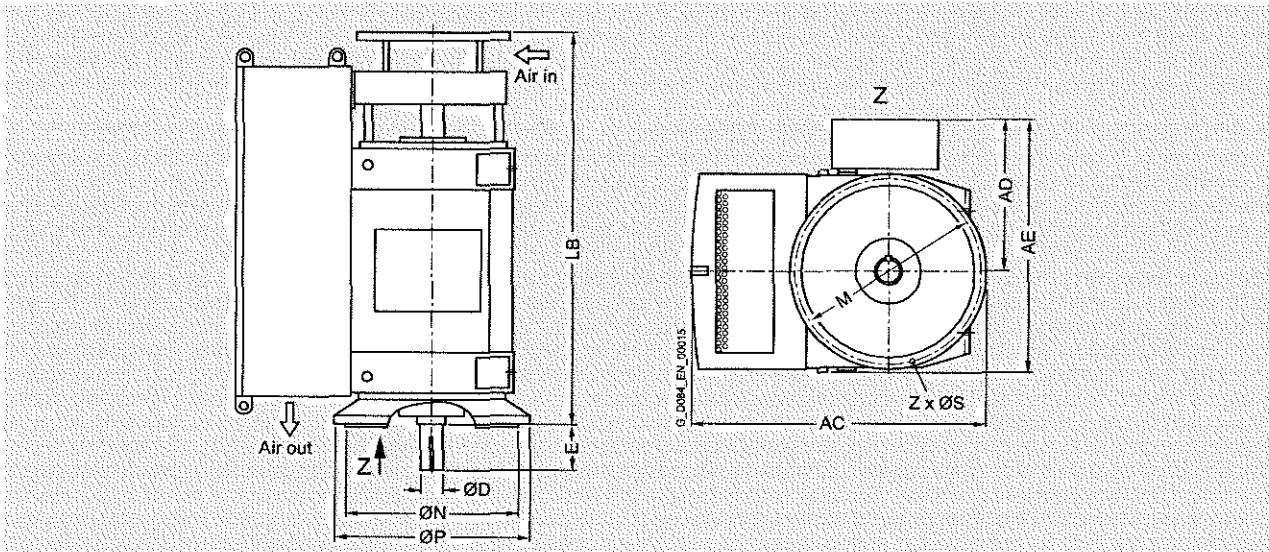


# Motors for line operation

## Air-cooled motors

E-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>Unloaded IV, III, VI type of construction, roller bearings – 1RQ6 series<sup>1)</sup></b>														
<b>6-pole</b>														
1RQ6 710-6JJ.4	22500	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 712-6JJ.4	23200	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 714-6JJ.4	24900	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
1RQ6 716-6JJ.4	26100	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
<b>8-pole</b>														
1RQ6 710-8JJ.4	22300	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 712-8JJ.4	23100	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 714-8JJ.4	24700	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
1RQ6 716-8JJ.4	25800	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
<b>10-pole</b>														
1RQ6 710-3JJ.4	22100	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 712-3JJ.4	23000	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 714-3JJ.4	24600	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
1RQ6 716-3JJ.4	25700	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		

#### Note:

Higher pole numbers are available on request.

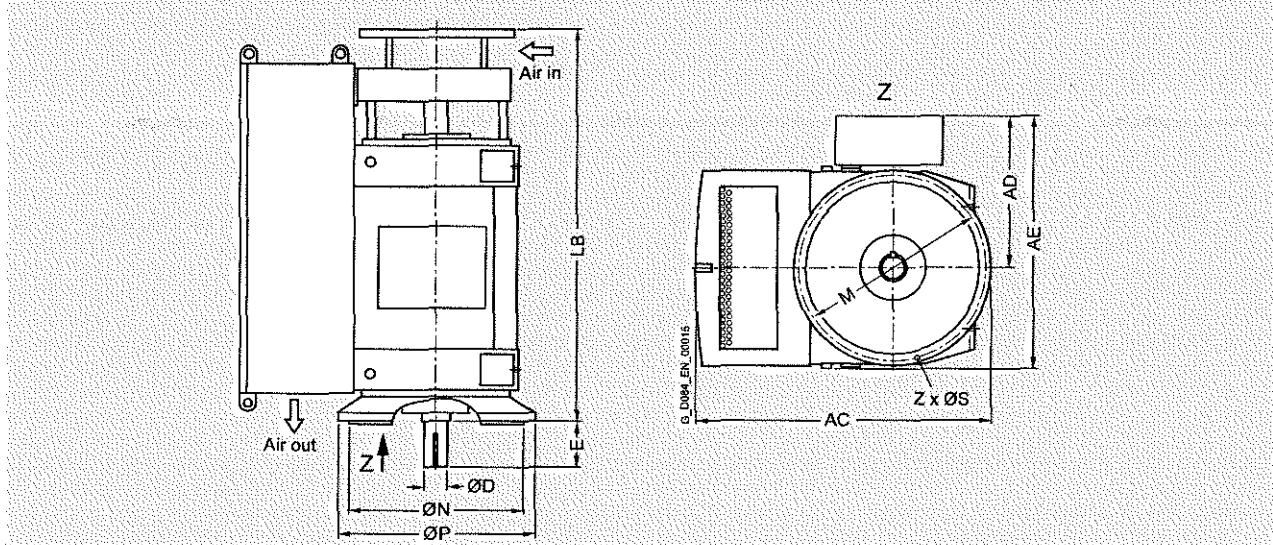
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS (1RQ4 and 1RQ6)

#### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>Dimensions for 1RQ6 (H-compact PLUS) type of construction, collar bearings (1RQ6-6JJ, 1RQ6-8JJ, 1RQ6-10JJ)</b>														
6-pole														
1RQ6 710-6JJ.4	22300	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 712-6JJ.4	23100	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 714-6JJ.4	24700	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
1RQ6 716-6JJ.4	25800	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
8-pole														
1RQ6 710-8JJ.4	22200	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 712-8JJ.4	23000	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 714-8JJ.4	24500	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
1RQ6 716-8JJ.4	25700	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
10-pole														
1RQ6 710-3JJ.4	22000	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 712-3JJ.4	22800	3100	1500	2530	240	330	3920	2000	1800	1900	33	24		
1RQ6 714-3JJ.4	24500	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		
1RQ6 716-3JJ.4	25600	3100	1500	2530	240	330	4160	2000	1800	1900	33	24		

#### Note:

Higher pole numbers are available on request.

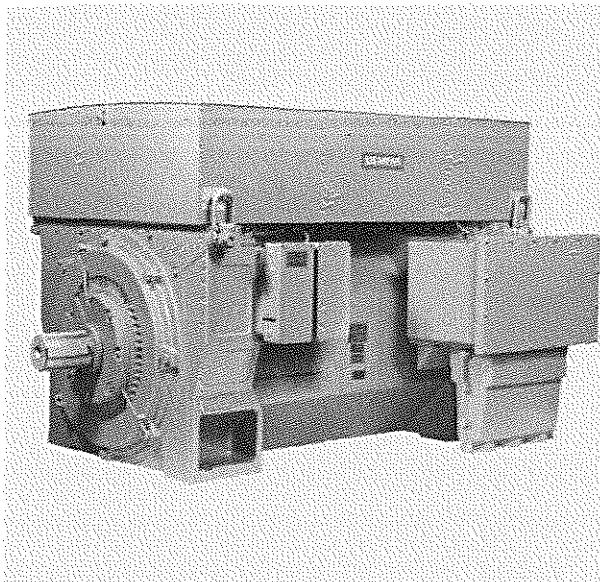
<sup>1)</sup> The dimensions are also valid for the 1SB4/1SB6 and 1SG4/1SG6 series.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Overview



### Technical data

#### Overview of technical data

##### H-compact PLUS 1RA4/1RA6/1RP6

<b>Rated voltage</b>	3.3 ... 13.8 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP23/IP24W
<b>Cooling method</b>	IC 01
<b>Stator winding insulation</b>	Thermal class 155 (F), utilized to 130 (B)
<b>Shaft height</b>	450 ... 710 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC, EN, NEMA
<b>Frame design for shaft heights 450 ... 560 mm</b>	Frame: Cast iron Cooling enclosure: Steel
<b>Frame design for shaft heights 630 ... 710 mm</b>	Frame: Steel Cooling enclosure: Steel

### Technical data (continued)

#### Power ranges for IEC motors for line operation

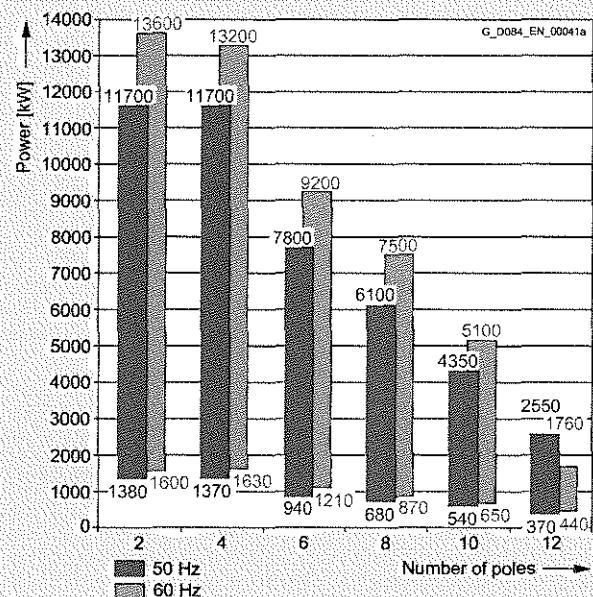
##### 1RA4, 1RA6, 1RP6 series

Insulation system, thermal class 155 (F), utilized to 130 (B).

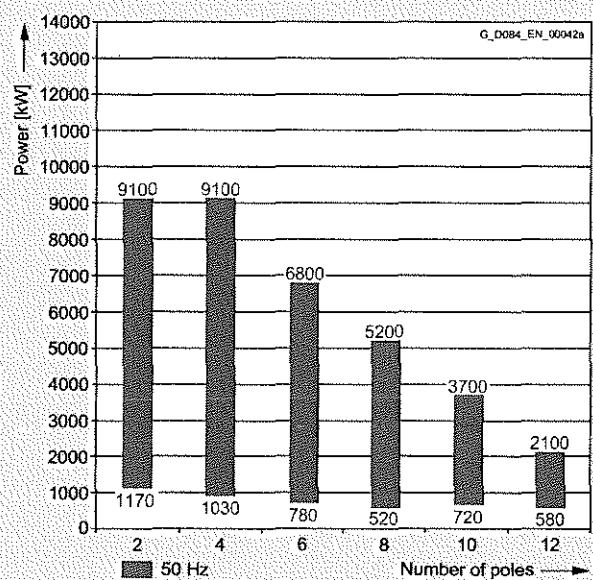
Ambient temperature up to 40 °C, installation altitude up to 1000 m.

3.3 to 6.6 kV; 50 Hz

4.0 to 6.6 kV; 60 Hz



9 to 11 kV; 50 Hz



# Motors for line operation

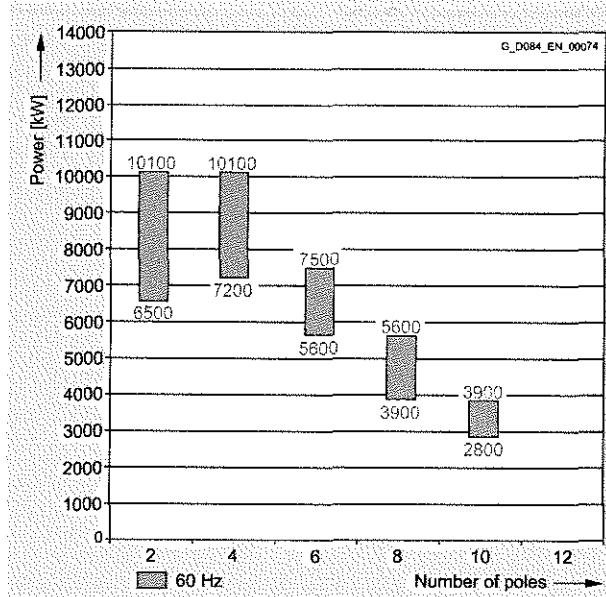
## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Technical data (continued)

##### **Power ranges for IEC motors for line operation** (continued)

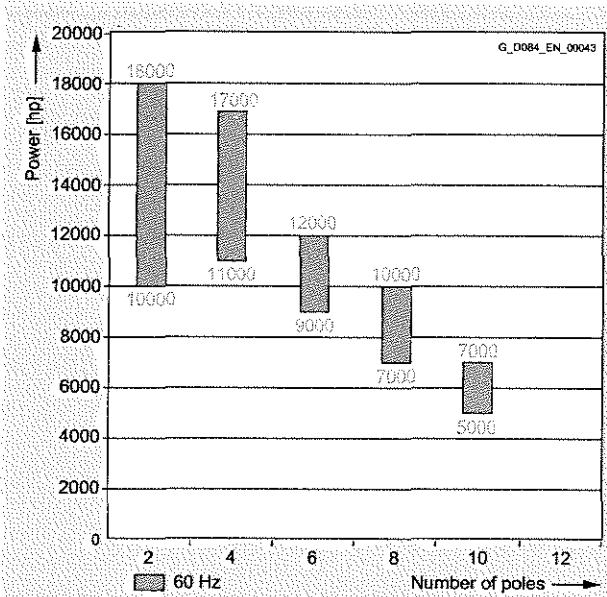
12.5 to 13.8 kV; 60 Hz



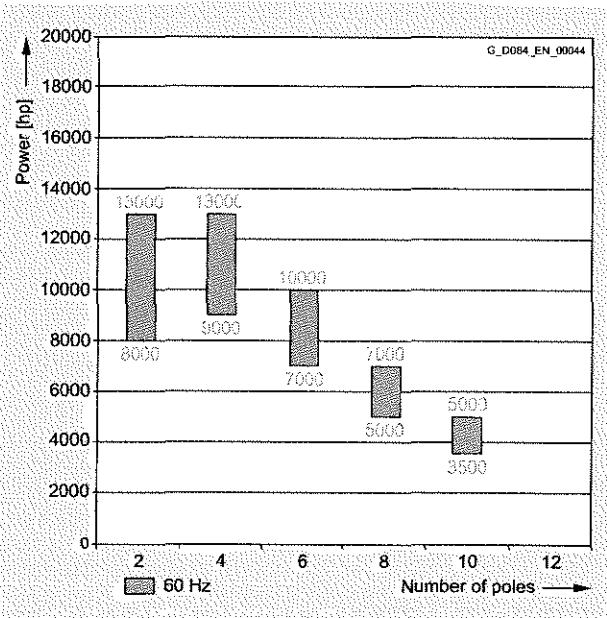
##### **Power ranges for NEMA motors for line operation**

Insulation system, thermal class 155 (F), utilized to 130 (B)

4 to 6.6 kV; 60 Hz



12.5 to 13.8 kV; 60 Hz



# Motors for line operation

## Air-cooled motors

H-compact PLUS (RA4, RA6 and RP6)

### Selection and ordering data

Rated power kW	Order No.	Speed rpm	Rated current $I_{rated}$ at 6 kV A	Efficiency		Power factor		Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia Motor kgm <sup>2</sup>	External max. <sup>1)</sup> kgm <sup>2</sup>									
				4/4 load %	3/4 load %	4/4 load $\cos \varphi$	3/4 load $\cos \varphi$															
<b>3.3 ... 6.6 kV, 50 Hz</b>																						
2-pole																						
1380	<b>1RA6 450-2HJ■0</b>	2972	156	95.9	96.3	0.89	0.90	4436	1.90	0.50	4.80	13	64									
1570	<b>1RA6 452-2HJ■0</b>	2973	174	96.1	96.6	0.90	0.91	5043	2.00	0.55	5.20	14	70									
1750	<b>1RA6 454-2HJ■0</b>	2977	192	96.3	96.7	0.91	0.91	5618	2.30	0.60	5.50	16	74									
1950	<b>1RA6 456-2HJ■0</b>	2980	215	96.5	96.9	0.91	0.91	6252	2.40	0.60	5.50	17	81									
2350	<b>1RA6 500-2HJ■0</b>	2975	260	96.6	97.0	0.90	0.89	7543	2.10	0.60	5.10	19	83									
2500	<b>1RA6 502-2HJ■0</b>	2976	275	96.6	97.0	0.91	0.90	8022	2.25	0.55	5.30	21	93									
3050	<b>1RA6 504-2HJ■0</b>	2979	330	97.0	97.3	0.92	0.91	9777	2.45	0.65	5.50	25	103									
3250	<b>1RA6 506-2HJ■0</b>	2977	350	97.0	97.4	0.92	0.92	10425	2.30	0.65	5.50	26	115									
3700	<b>1RA6 560-2HJ■0</b>	2977	410	96.8	97.1	0.90	0.90	11868	1.90	0.55	4.30	39	160									
4300	<b>1RA6 562-2HJ■0</b>	2978	470	97.0	97.3	0.91	0.91	13788	1.95	0.55	4.40	43	180									
4900	<b>1RA6 564-2HJ■0</b>	2980	530	97.2	97.5	0.92	0.92	15702	2.10	0.60	4.80	49	200									
5400	<b>1RA6 566-2HJ■0</b>	2982	580	97.3	97.5	0.92	0.92	17292	2.30	0.60	5.30	54	220									
4900	<b>1RA4 630-2HE■0</b>	2982	550	96.9	97.1	0.88	0.88	15692	2.10	0.31	4.00	60	110									
5700	<b>1RA4 632-2HE■0</b>	2983	630	97.3	97.3	0.89	0.89	18248	2.20	0.34	4.30	67	150									
6500	<b>1RA4 634-2HE■0</b>	2985	710	97.5	97.6	0.90	0.89	20796	2.50	0.41	5.00	77	190									
7500	<b>1RA4 636-2HE■0</b>	2986	820	97.7	97.8	0.90	0.89	23987	2.60	0.46	5.40	86	240									
4-pole																						
1370	<b>1RA6 450-4HJ■■</b>	1483	154	95.6	96.1	0.89	0.88	8822	2.00	0.70	5.50	20	340									
1500	<b>1RA6 452-4HJ■■</b>	1485	170	95.8	96.2	0.89	0.88	9650	2.60	0.70	5.50	22	385									
1640	<b>1RA6 454-4HJ■■</b>	1486	184	96.0	96.3	0.89	0.88	10544	2.20	0.70	5.50	25	440									
1860	<b>1RA6 456-4HJ■■</b>	1487	210	96.2	96.5	0.89	0.87	11948	2.30	0.70	5.50	28	500									
2100 <sup>2)</sup>	<b>1RA6 500-4HJ■0</b>	1486	230	96.6	97.0	0.91	0.90	13495	2.30	0.60	5.00	43	410									
2300 <sup>2)</sup>	<b>1RA6 502-4HJ■0</b>	1487	250	96.8	97.1	0.91	0.90	14770	2.45	0.65	5.30	46	460									
2650 <sup>2)</sup>	<b>1RA6 504-4HJ■0</b>	1487	290	96.9	97.2	0.91	0.90	17018	2.30	0.60	5.00	52	510									
3000 <sup>2)</sup>	<b>1RA6 506-4HJ■0</b>	1488	325	96.9	97.2	0.91	0.90	19253	2.40	0.65	5.20	56	560									
3600 <sup>2)</sup>	<b>1RA6 560-4HJ■0</b>	1490	390	97.0	97.3	0.91	0.90	23072	2.25	0.70	5.00	84	730									
4000 <sup>2)</sup>	<b>1RA6 562-4HJ■0</b>	1490	435	97.1	97.5	0.91	0.90	25636	2.25	0.70	4.90	94	800									
4500 <sup>2)</sup>	<b>1RA6 564-4HJ■0</b>	1491	490	97.3	97.6	0.91	0.91	28821	2.25	0.70	5.00	105	880									
4900 <sup>2)</sup>	<b>1RA6 566-4HJ■0</b>	1492	530	97.4	97.6	0.91	0.90	31362	2.30	0.65	5.20	115	970									
5300	<b>1RA4 630-4HE■■</b>	1489	590	97.1	97.3	0.89	0.89	33993	2.00	0.54	4.60	134	780									
6000	<b>1RA4 632-4HE■■</b>	1490	670	97.3	97.4	0.89	0.89	38456	2.15	0.60	4.90	150	1050									
6600	<b>1RA4 634-4HE■■</b>	1490	720	97.4	97.6	0.90	0.90	42302	2.20	0.63	5.10	168	1200									
7100	<b>1RA4 636-4HE■■</b>	1491	780	97.6	97.6	0.90	0.89	45476	2.40	0.70	5.50	197	1100									

**Voltage code:**

3.3 kV, 50 Hz      0  
6 kV, 50 Hz      6  
6.6 kV, 50 Hz      7  
Other voltage      9

**Type of construction:**

IM B3      0  
IM V1 (without canopy)      8

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Data of vertical motors (IM V1) on request.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Selection and ordering data (continued)

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>3.3 ... 6.6 kV, 50 Hz</b>													
<b>6-pole</b>													
940	<b>1RA6 450-6HJ■■■</b>	989	110	95.3	95.9	0.86	0.85	9068	2.10	0.90	5.50	26	660
1040	<b>1RA6 452-6HJ■■■</b>	990	122	95.6	96.1	0.86	0.84	10044	2.10	0.90	5.50	29	770
1180	<b>1RA6 454-6HJ■■■</b>	990	136	95.7	96.3	0.87	0.85	11394	2.20	0.95	5.50	33	870
1330	<b>1RA6 456-6HJ■■■</b>	990	156	96.0	96.5	0.86	0.84	12832	2.20	0.90	5.50	37	1040
1700	<b>1RA4 500-6HE■■■</b>	989	196	95.8	96.4	0.87	0.85	16416	2.00	0.75	5.00	57	900
1920	<b>1RA4 502-6HE■■■</b>	989	220	96.0	96.5	0.87	0.86	18540	2.00	0.80	5.10	65	950
2150	<b>1RA4 504-6HE■■■</b>	990	245	96.2	96.6	0.87	0.85	20740	2.00	0.80	5.20	72	1200
2350	<b>1RA4 506-6HE■■■</b>	990	270	96.3	96.7	0.87	0.85	22669	2.00	0.80	5.20	81	1400
2750	<b>1RA4 560-6HE■■■</b>	991	315	96.3	96.8	0.87	0.85	26501	1.90	0.72	4.90	105	1250
3100	<b>1RA4 562-6HE■■■</b>	992	355	96.6	97.0	0.87	0.85	29844	2.00	0.75	5.10	120	1500
3450	<b>1RA4 564-6HE■■■</b>	992	395	96.8	97.1	0.87	0.86	33213	2.00	0.75	5.10	135	1700
3750	<b>1RA4 566-6HE■■■</b>	992	430	96.9	97.2	0.87	0.85	36101	2.00	0.75	5.10	147	1900
4200	<b>1RA4 630-6HE■■■</b>	992	490	96.8	97.2	0.85	0.84	40433	2.00	0.57	4.50	183	2000
4700	<b>1RA4 632-6HE■■■</b>	993	540	97.0	97.3	0.86	0.85	45201	2.10	0.62	4.80	202	2100
5100	<b>1RA4 634-6HE■■■</b>	993	590	97.2	97.4	0.86	0.84	49048	2.25	0.69	5.20	223	2800
5600	<b>1RA4 636-6HE■■■</b>	994	640	97.3	97.4	0.86	0.84	53803	2.30	0.70	5.30	246	3300
<b>8-pole</b>													
680	<b>1RA6 450-8HJ■■■</b>	742	82	94.7	95.3	0.84	0.82	8758	2.10	0.70	5.50	32	730
750	<b>1RA6 452-8HJ■■■</b>	742	91	94.9	95.5	0.84	0.81	9657	2.10	0.70	5.50	36	890
880	<b>1RA6 454-8HJ■■■</b>	743	108	95.1	95.6	0.83	0.80	11314	2.10	0.75	5.50	41	1040
970	<b>1RA6 456-8HJ■■■</b>	743	116	95.3	95.7	0.84	0.81	12475	2.20	0.80	5.50	47	1300
1250	<b>1RA4 500-8HE■■■</b>	741	150	95.4	95.7	0.84	0.82	16110	1.90	0.75	4.90	70	1350
1400	<b>1RA4 502-8HE■■■</b>	742	166	95.6	95.8	0.85	0.83	18019	2.00	0.80	5.10	80	1650
1550	<b>1RA4 504-8HE■■■</b>	742	184	95.7	95.9	0.85	0.83	19949	2.00	0.80	5.10	88	1750
1700	<b>1RA4 506-8HE■■■</b>	742	200	95.8	96.0	0.85	0.83	21880	2.10	0.85	5.30	99	1800
1950	<b>1RA4 560-8HE■■■</b>	744	235	96.0	96.3	0.84	0.82	25030	2.00	0.72	4.90	123	2300
2200	<b>1RA4 562-8HE■■■</b>	744	260	96.2	96.3	0.84	0.82	28239	2.00	0.72	5.00	141	2400
2400	<b>1RA4 564-8HE■■■</b>	744	285	96.3	96.5	0.84	0.82	30806	2.00	0.75	5.10	158	2800
2600	<b>1RA4 566-8HE■■■</b>	744	305	96.3	96.6	0.85	0.84	33374	1.95	0.75	5.00	173	3500
3200	<b>1RA4 630-8HE■■■</b>	743	375	96.5	96.7	0.85	0.83	41131	1.90	0.60	4.30	239	3100
3500	<b>1RA4 632-8HE■■■</b>	743	410	96.7	96.8	0.85	0.82	44987	2.10	0.67	4.60	265	3400
3750	<b>1RA4 634-8HE■■■</b>	743	440	96.7	96.9	0.85	0.84	48200	2.00	0.65	4.60	293	3600
4100	<b>1RA4 636-8HE■■■</b>	744	485	96.9	96.9	0.84	0.81	52628	2.30	0.76	5.30	324	3800

#### Voltage code:

3.3 kV, 50 Hz  
6 kV, 50 Hz  
6.6 kV, 50 Hz  
Other voltage

0  
6  
7  
9

Note:  
Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

#### Type of construction:

IM B3  
IM V1 (without canopy)

0  
8

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

## Selection and ordering data (continued)

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
			$I_{rated}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load	$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor Ext- max. <sup>1)</sup>		
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>3.3 ... 6.6 kV, 50 Hz</b>													
10-pole													
540	<b>1RA6 450-3HJ■■■</b>	590	70	93.4	93.7	0.80	0.76	8741	2.00	0.80	4.60	37	1150
600	<b>1RA6 452-3HJ■■■</b>	590	76	93.7	93.9	0.81	0.76	9712	2.00	0.80	4.70	41	1350
670	<b>1RA6 454-3HJ■■■</b>	591	86	93.9	94.1	0.80	0.75	10827	2.10	0.82	4.90	46	1450
760	<b>1RA6 456-3HJ■■■</b>	591	97	94.1	94.2	0.80	0.75	12281	2.20	0.90	5.20	52	1800
900	<b>1RA4 500-3HE■■■</b>	591	112	94.4	94.7	0.82	0.80	14543	1.90	0.68	4.30	70	1400
1000	<b>1RA4 502-3HE■■■</b>	592	122	95.7	94.9	0.83	0.80	16132	1.90	0.70	4.50	80	1700
1100	<b>1RA4 504-3HE■■■</b>	592	134	94.8	95.0	0.83	0.80	17745	1.90	0.72	4.60	88	2200
1250	<b>1RA4 506-3HE■■■</b>	592	152	95.0	95.1	0.83	0.80	20165	1.90	0.75	4.70	99	2600
1480	<b>1RA4 560-3HE■■■</b>	593	184	95.1	95.4	0.81	0.77	23835	2.00	0.70	4.50	123	2700
1700	<b>1RA4 562-3HE■■■</b>	593	210	95.4	95.7	0.82	0.78	27378	2.00	0.70	4.50	141	4100
1880	<b>1RA4 564-3HE■■■</b>	593	230	95.6	95.7	0.82	0.78	30277	2.00	0.72	4.70	158	4400
2050	<b>1RA4 566-3HE■■■</b>	593	255	95.7	95.8	0.81	0.76	33014	2.10	0.78	5.00	173	5200
2400	<b>1RA4 630-3HE■■■</b>	592	285	95.8	96.4	0.84	0.83	38716	1.80	0.62	4.00	239	4700
2650	<b>1RA4 632-3HE■■■</b>	592	315	96.0	96.5	0.84	0.83	42749	1.80	0.65	4.20	265	5300
2900	<b>1RA4 634-3HE■■■</b>	593	345	96.2	96.6	0.84	0.82	46703	2.00	0.70	4.50	293	6300
3150	<b>1RA4 636-3HE■■■</b>	593	375	96.4	96.7	0.84	0.82	50729	2.00	0.73	4.60	324	7500
12-pole													
370	<b>1RA6 450-5HJ■■■</b>	491	53	92.4	92.7	0.73	0.68	7197	1.80	0.60	4.00	37	1100
425	<b>1RA6 452-5HJ■■■</b>	492	60	92.8	93.0	0.73	0.67	8249	1.80	0.63	4.20	41	1400
475	<b>1RA6 454-5HJ■■■</b>	491	66	93.1	93.3	0.74	0.69	9239	1.80	0.60	4.00	46	1600
540	<b>1RA6 456-5HJ■■■</b>	492	77	93.5	93.5	0.72	0.65	10482	2.00	0.68	4.40	52	2000
680	<b>1RA4 500-5HE■■■</b>	491	94	93.9	94.0	0.74	0.69	13226	1.90	0.62	4.10	70	2350
760	<b>1RA4 502-5HE■■■</b>	491	102	94.1	94.2	0.76	0.71	14782	1.80	0.60	4.00	79	2600
840	<b>1RA4 504-5HE■■■</b>	491	112	94.3	94.4	0.76	0.71	16338	1.90	0.62	4.10	87	3100
930	<b>1RA4 506-5HE■■■</b>	492	128	94.5	94.6	0.74	0.69	18052	1.90	0.62	4.30	98	3700
1100	<b>1RA4 560-5HE■■■</b>	493	150	94.5	94.8	0.75	0.71	21308	1.80	0.57	3.90	123	3600
1230	<b>1RA4 562-5HE■■■</b>	493	168	94.9	95.0	0.74	0.68	23827	1.80	0.60	4.00	141	4100
1350	<b>1RA4 564-5HE■■■</b>	494	184	95.0	95.1	0.74	0.68	26098	2.00	0.63	4.30	158	4700
1470	<b>1RA4 566-5HE■■■</b>	494	198	95.1	95.2	0.75	0.69	28418	2.00	0.65	4.30	173	5200
1900	<b>1RA4 630-5HE■■■</b>	493	245	95.4	95.8	0.79	0.76	36805	1.90	0.70	4.30	239	5500
2150	<b>1RA4 632-5HE■■■</b>	493	270	95.6	96.0	0.80	0.76	41648	1.90	0.71	4.30	265	7000
2350	<b>1RA4 634-5HE■■■</b>	493	295	95.8	96.3	0.80	0.77	45522	1.90	0.72	4.40	293	8300
2550	<b>1RA4 636-5HE■■■</b>	493	320	95.9	96.4	0.80	0.77	49397	2.00	0.74	4.50	324	9800

**Voltage code:**

3.3 kV, 50 Hz      0  
 6 kV, 50 Hz      6  
 6.6 kV, 50 Hz      7  
 Other voltage      9

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements. NEMA version on request.

**Type of construction:**

IM B3      0  
 IM V1 (without canopy)      8

Higher pole numbers are available on request.  
 Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Selection and ordering data

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_Ln/T_{rated}$	$I_{LR}/I_{rated}$		
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>3.3 ... 6.6 kV, 50 Hz</b>													
2-pole													
6700 <sup>2)</sup>	<b>1RP6 710-2HJ■■0</b>	2989	740	97.0	96.8	0.90	0.90	21414	2.00	0.43	4.60	132	108
8700 <sup>2)</sup>	<b>1RP6 712-2HJ■■0</b>	2987	960	97.2	97.1	0.90	0.91	27818	1.80	0.42	4.30	147	158
10100 <sup>2)</sup>	<b>1RP6 714-2HJ■■0</b>	2988	1100	97.4	97.2	0.91	0.91	32286	2.00	0.46	4.70	162	158
11700 <sup>2)</sup>	<b>1RP6 716-2HJ■■0</b>	2988	1260	97.5	97.3	0.91	0.91	37396	2.00	0.49	4.90	179	171
4-pole													
7600 <sup>2)</sup>	<b>1RP6 710-4HJ■■0</b>	1493	840	97.7	97.9	0.89	0.87	48609	2.30	0.60	5.50	273	627
8900 <sup>2)</sup>	<b>1RP6 712-4HJ■■0</b>	1493	970	97.8	98.0	0.90	0.89	56954	2.10	0.59	5.50	300	700
10100 <sup>2)</sup>	<b>1RP6 714-4HJ■■0</b>	1493	1100	97.8	98.0	0.91	0.90	64636	2.10	0.62	5.50	337	803
11700 <sup>2)</sup>	<b>1RP6 716-4HJ■■0</b>	1492	1260	97.9	98.0	0.91	0.91	74886	2.10	0.63	5.50	369	881
6-pole													
5700	<b>1RP6 710-6HJ■■■</b>	994	660	97.3	97.6	0.86	0.84	54792	2.00	0.68	5.10	330	1720
6400	<b>1RP6 712-6HJ■■■</b>	994	730	97.4	97.6	0.87	0.85	61526	2.00	0.72	5.20	367	1933
7100	<b>1RP6 714-6HJ■■■</b>	994	810	97.5	97.7	0.87	0.85	68225	2.10	0.79	5.50	419	2361
7800	<b>1RP6 716-6HJ■■■</b>	994	880	97.5	97.7	0.87	0.85	74930	2.20	0.82	5.50	468	3032
8-pole													
4550	<b>1RP6 710-8HJ■■■</b>	745	540	96.9	97.3	0.84	0.82	58354	1.90	0.76	5.00	415	4735
5000	<b>1RP6 712-8HJ■■■</b>	745	590	97.1	97.4	0.84	0.82	64111	1.90	0.79	5.20	465	5335
5500	<b>1RP6 714-8HJ■■■</b>	745	640	97.1	97.4	0.85	0.83	70512	1.90	0.80	5.20	531	6469
6100	<b>1RP6 716-8HJ■■■</b>	745	710	97.3	97.5	0.85	0.83	78174	2.00	0.85	5.50	597	7503
10-pole													
3050	<b>1RP6 710-3HJ■■■</b>	596	380	96.4	96.9	0.80	0.77	48916	2.10	0.72	5.00	415	8485
3450	<b>1RP6 712-3HJ■■■</b>	596	430	96.7	97.0	0.80	0.77	55318	2.10	0.73	5.10	465	10335
3850	<b>1RP6 714-3HJ■■■</b>	596	480	96.8	97.1	0.80	0.77	61707	2.20	0.78	5.40	531	11469
4350	<b>1RP6 716-3HJ■■■</b>	596	530	96.6	97.2	0.81	0.77	69716	2.20	0.80	5.50	598	13202

**Voltage code:**

3.3 kV, 50 Hz

**0**

6 kV, 50 Hz

**6**

6.6 kV, 50 Hz

**7**

Other voltage

**9**
**Type of construction:**

IM B3

**0**

IM V1 (with canopy)

**4**
**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup>  $V_{rated} < 6 \text{ kV}$  on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS IRA4, IRA6 and IRP6

**Selection and ordering data**

Rated power kW	High voltage motor H-compact PLUS Order No.	Speed rpm	Rated current $I_{\text{rated}}$ at 10 kV A	Efficiency		Power factor		Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{\text{LR}}/I_{\text{rated}}$ [-]	Locked- rotor current $I_{\text{LR}}/I_{\text{rated}}$ [-]	Moment of inertia kgm <sup>2</sup>	Motor External, max. <sup>1)</sup> kgm <sup>2</sup>					
				4/4 load %	3/4 load %	4/4 load $\cos \phi$	3/4 load $\cos \phi$											
				9 ... 11 kV, 50 Hz														
<b>2-pole</b>																		
1170	<b>1RA6 450-2HJ■0</b>	2976	79	95.6	96.1	0.90	0.90	3755	2.10	0.55	5.50	13	31					
1330	<b>1RA6 452-2HJ■0</b>	2978	88	95.9	96.3	0.91	0.91	4268	2.30	0.60	5.50	14	33					
1450	<b>1RA6 454-2HJ■0</b>	2980	96	96.1	96.4	0.91	0.91	4649	2.30	0.55	5.50	15	36					
1630	<b>1RA6 456-2HJ■0</b>	2981	106	96.3	96.7	0.92	0.92	5224	2.40	0.55	5.50	17	39					
2050	<b>1RA6 500-2HJ■0</b>	2979	136	96.5	96.8	0.91	0.90	6571	2.35	0.65	5.50	19	37					
2250	<b>1RA6 502-2HJ■0</b>	2978	148	96.5	96.8	0.91	0.91	7215	2.30	0.65	5.50	21	41					
2550	<b>1RA6 504-2HJ■0</b>	2979	166	96.7	97.0	0.92	0.92	8174	2.40	0.55	5.50	25	45					
2650	<b>1RA6 506-2HJ■0</b>	2980	170	96.8	97.2	0.93	0.93	8492	2.40	0.65	5.50	26	51					
3300	<b>1RA6 560-2HJ■0</b>	2979	220	96.7	97.0	0.90	0.90	10578	1.90	0.55	4.40	39	115					
3700	<b>1RA6 562-2HJ■0</b>	2983	240	96.9	97.1	0.91	0.90	11845	2.30	0.65	5.30	43	130					
4300	<b>1RA6 564-2HJ■0</b>	2982	280	97.0	97.3	0.92	0.92	13770	2.20	0.60	5.10	49	145					
5100	<b>1RA6 566-2HJ■0</b>	2984	330	97.3	97.4	0.92	0.91	16321	2.40	0.60	5.50	54	160					
4300	<b>1RA4 630-2HE■0</b>	2984	290	96.8	96.9	0.89	0.88	13762	2.30	0.34	4.50	60	75					
5000	<b>1RA4 632-2HE■0</b>	2985	330	97.3	97.3	0.9	0.89	15997	2.50	0.39	4.90	67	100					
5700	<b>1RA4 634-2HE■0</b>	2986	375	97.4	97.4	0.90	0.89	18230	2.60	0.42	5.20	77	110					
6700	<b>1RA4 636-2HE■0</b>	2987	440	97.6	97.7	0.90	0.89	21421	2.60	0.45	5.50	86	160					
<b>4-pole</b>																		
1030	<b>1RA6 450-4HJ■■</b>	1485	69	95.2	95.7	0.90	0.89	6627	2.10	0.75	5.50	20	170					
1190	<b>1RA6 452-4HJ■■</b>	1484	80	95.4	95.9	0.90	0.90	7658	2.10	0.70	5.50	22	194					
1340	<b>1RA6 454-4HJ■■</b>	1486	90	95.6	96.1	0.90	0.90	8619	2.10	0.70	5.50	25	225					
1520	<b>1RA6 456-4HJ■■</b>	1487	102	95.9	96.2	0.90	0.89	9764	2.20	0.70	5.50	28	260					
1900 <sup>2)</sup>	<b>1RA6 500-4HJ■0</b>	1487	124	96.4	96.8	0.92	0.91	12202	2.40	0.70	5.30	43	200					
2100 <sup>2)</sup>	<b>1RA6 502-4HJ■0</b>	1487	136	96.5	96.9	0.92	0.91	13486	2.40	0.65	5.30	46	220					
2350 <sup>2)</sup>	<b>1RA6 504-4HJ■0</b>	1488	154	96.6	97.0	0.91	0.91	15081	2.40	0.60	5.30	52	250					
2550 <sup>2)</sup>	<b>1RA6 506-4HJ■0</b>	1488	166	96.7	97.1	0.92	0.91	16365	2.40	0.60	5.30	56	280					
3000 <sup>2)</sup>	<b>1RA6 560-4HJ■0</b>	1491	196	96.9	97.2	0.91	0.90	19214	2.30	0.70	5.20	84	420					
3400 <sup>2)</sup>	<b>1RA6 562-4HJ■0</b>	1491	220	97.0	97.3	0.92	0.91	21776	2.30	0.70	5.20	94	460					
3800 <sup>2)</sup>	<b>1RA6 564-4HJ■0</b>	1492	250	97.2	97.4	0.91	0.90	24321	2.35	0.60	5.30	104	510					
4200 <sup>2)</sup>	<b>1RA6 566-4HJ■0</b>	1493	275	97.2	97.4	0.91	0.90	26863	2.35	0.60	5.40	115	560					
4500	<b>1RA4 630-4HE■■</b>	1490	300	96.9	97.1	0.89	0.89	28842	2.10	0.57	4.90	134	550					
5000	<b>1RA4 632-4HE■■</b>	1490	330	97.1	97.2	0.90	0.90	32047	2.15	0.59	5.00	150	650					
5600	<b>1RA4 634-4HE■■</b>	1490	370	97.3	97.4	0.90	0.90	35893	2.20	0.63	5.30	168	750					
6200	<b>1RA4 636-4HE■■</b>	1491	410	97.4	97.5	0.90	0.90	39712	2.40	0.68	5.50	197	780					

**Voltage code:**

10 kV, 50 Hz

8

Other voltage

9

Type of construction:

0

IM B3

8

IM V1 (without canopy)

8

**Note:**

Efficiencies according to IEC 60034-2-1:2007; stray load losses determined by statical evaluation of measurements. NEMA version on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.<sup>2)</sup> Data of vertical motors (IM V1) on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Selection and ordering data (continued)

Rated power kW	High voltage motor H-compact PLUS	Speed rpm	Rated current $I_{rated}$ at 10 kV A	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{rated}$	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LP}/I_{rated}$	Moment of inertia Motor kgm <sup>2</sup>	External, max. <sup>1)</sup> kgm <sup>2</sup>									
				4/4 load	3/4 load	4/4 load	3/4 load															
				cos φ	cos φ	[ - ]	[ - ]															
<b>9 ... 11 kV, 50 Hz</b>																						
<b>6-pole</b>																						
780	<b>1RA6 450-6HJ■■■</b>	990	55	95.0	95.5	0.86	0.83	7528	2.10	0.90	5.50	26	340									
850	<b>1RA6 452-6HJ■■■</b>	990	59	95.1	95.7	0.87	0.85	8205	2.20	0.95	5.50	29	400									
930	<b>1RA6 454-6HJ■■■</b>	990	65	95.3	95.9	0.87	0.86	8977	2.10	0.95	5.50	32	460									
1080	<b>1RA6 456-6HJ■■■</b>	992	75	95.6	96.1	0.87	0.85	10403	2.20	0.83	5.50	37	560									
1350	<b>1RA4 500-6HE■■■</b>	991	94	95.4	95.7	0.87	0.85	13010	2.20	0.80	5.40	57	430									
1520	<b>1RA4 502-6HE■■■</b>	991	106	95.6	95.9	0.87	0.86	14648	2.10	0.80	5.20	65	540									
1700	<b>1RA4 504-6HE■■■</b>	991	118	95.8	96.0	0.87	0.85	16382	2.10	0.80	5.40	72	590									
1900	<b>1RA4 506-6HE■■■</b>	991	132	96.0	96.1	0.87	0.85	18310	2.20	0.80	5.50	81	710									
2400	<b>1RA4 560-6HE■■■</b>	992	168	96.3	96.5	0.86	0.85	23105	2.10	0.75	5.30	105	950									
2650	<b>1RA4 562-6HE■■■</b>	992	182	96.3	96.6	0.87	0.86	25512	2.10	0.75	5.20	120	980									
2950	<b>1RA4 564-6HE■■■</b>	993	205	96.5	96.7	0.87	0.85	28371	2.20	0.75	5.50	135	1250									
3200	<b>1RA4 566-6HE■■■</b>	993	220	96.7	96.8	0.87	0.85	30775	2.10	0.75	5.40	147	1300									
3600	<b>1RA4 630-6HE■■■</b>	993	250	96.7	96.9	0.86	0.84	34622	2.20	0.63	5.00	183	1200									
4000	<b>1RA4 632-6HE■■■</b>	993	275	96.8	97.0	0.87	0.85	38469	2.10	0.64	5.00	202	1500									
4400	<b>1RA4 634-6HE■■■</b>	993	300	97.0	97.1	0.87	0.86	42316	2.20	0.66	5.20	223	1750									
4800	<b>1RA4 636-6HE■■■</b>	994	330	97.1	97.2	0.87	0.86	46117	2.30	0.71	5.50	246	2000									
<b>8-pole</b>																						
520	<b>1RA6 450-8HJ■■■</b>	742	37.5	94.0	94.6	0.85	0.82	6688	2.10	0.75	5.50	32	215									
560	<b>1RA6 452-8HJ■■■</b>	742	40.5	94.1	94.9	0.85	0.84	7206	2.10	0.65	5.50	36	290									
580	<b>1RA6 454-8HJ■■■</b>	742	41.5	94.1	94.9	0.86	0.83	7463	2.20	0.75	5.50	41	365									
750	<b>1RA6 456-8HJ■■■</b>	743	55	94.7	95.1	0.83	0.79	9649	2.30	0.80	5.50	47	485									
1000	<b>1RA4 500-8HE■■■</b>	743	72	94.9	95.1	0.84	0.81	12853	2.10	0.85	5.40	70	600									
1160	<b>1RA4 502-8HE■■■</b>	744	85	95.3	95.3	0.83	0.80	14890	2.20	0.85	5.50	80	750									
1280	<b>1RA4 504-8HE■■■</b>	744	93	95.4	95.5	0.83	0.80	16430	2.20	0.80	5.50	88	800									
1400	<b>1RA4 506-8HE■■■</b>	744	102	95.5	95.6	0.83	0.80	17970	2.10	0.80	5.50	99	870									
1650	<b>1RA4 560-8HE■■■</b>	744	118	95.8	96.0	0.84	0.81	21179	2.10	0.75	5.30	123	1350									
1900	<b>1RA4 562-8HE■■■</b>	744	134	96.0	96.1	0.85	0.82	24388	2.00	0.75	5.30	141	1400									
2050	<b>1RA4 564-8HE■■■</b>	745	144	96.2	96.2	0.85	0.82	26279	2.20	0.80	5.50	158	1800									
2250	<b>1RA4 566-8HE■■■</b>	745	158	96.2	96.2	0.85	0.82	28842	2.10	0.80	5.50	173	1700									
2600	<b>1RA4 630-8HE■■■</b>	744	186	96.3	96.4	0.84	0.81	33374	2.40	0.75	5.20	239	1800									
2900	<b>1RA4 632-8HE■■■</b>	744	205	96.4	96.5	0.84	0.81	37224	2.30	0.75	5.20	265	2000									
3200	<b>1RA4 634-8HE■■■</b>	744	225	96.6	96.7	0.85	0.82	41075	2.30	0.74	5.10	293	2200									
3500	<b>1RA4 636-8HE■■■</b>	744	245	96.7	96.8	0.86	0.83	44926	2.30	0.75	5.20	324	2600									

**Voltage code:**

10 kV, 50 Hz

8

Other voltage

9

**Type of construction:**

IM B3

0

IM V1 (without canopy)

8

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Selection and ordering data (continued)

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 10 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor External, max. <sup>1)</sup>	
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>9 ... 11 kV, 50 Hz</b>													
10-pole													
720	<b>1RA4 500-3HE■■■</b>	593	55	93.8	93.9	0.80	0.76	11595	2.20	0.82	5.20	70	900
830	<b>1RA4 502-3HE■■■</b>	594	64	94.2	94.2	0.79	0.74	13344	2.20	0.82	5.30	80	1100
920	<b>1RA4 504-3HE■■■</b>	594	71	94.3	94.3	0.79	0.74	14791	2.20	0.82	5.30	88	1200
1020	<b>1RA4 506-3HE■■■</b>	594	79	94.5	94.5	0.79	0.75	16399	2.20	0.80	5.30	99	1400
1250	<b>1RA4 560-3HE■■■</b>	593	94	94.8	94.9	0.81	0.77	20131	2.10	0.72	4.70	123	1650
1420	<b>1RA4 562-3HE■■■</b>	593	106	94.9	95.2	0.82	0.78	22868	2.00	0.70	4.70	141	2050
1570	<b>1RA4 564-3HE■■■</b>	593	116	95.1	95.4	0.82	0.78	25284	2.00	0.72	5.00	158	2500
1700	<b>1RA4 566-3HE■■■</b>	595	128	95.3	95.4	0.80	0.75	27286	2.40	0.85	5.50	173	2700
2100	<b>1RA4 630-3HE■■■</b>	593	152	95.8	96.1	0.83	0.80	33820	2.10	0.73	4.70	239	2500
2350	<b>1RA4 632-3HE■■■</b>	594	172	96.0	96.2	0.82	0.78	37782	2.30	0.82	5.10	265	2900
2550	<b>1RA4 634-3HE■■■</b>	594	184	96.0	96.3	0.83	0.79	40997	2.30	0.80	5.10	293	3000
2750	<b>1RA4 636-3HE■■■</b>	594	196	96.2	96.5	0.84	0.80	44213	2.30	0.83	5.20	324	3500
12-pole													
580	<b>1RA4 502-5HE■■■</b>	493	48.0	93.3	93.3	0.74	0.68	11235	2.00	0.70	4.70	79	1350
640	<b>1RA4 504-5HE■■■</b>	493	53	93.5	93.6	0.74	0.68	12398	2.00	0.70	4.80	87	1500
700	<b>1RA4 506-5HE■■■</b>	493	58	93.6	93.7	0.75	0.69	13560	2.10	0.70	4.80	98	1600
850	<b>1RA4 560-5HE■■■</b>	494	69	93.8	94.1	0.76	0.71	16432	1.85	0.60	4.20	123	1750
1000	<b>1RA4 562-5HE■■■</b>	494	82	94.4	94.6	0.75	0.69	19332	1.95	0.65	4.50	141	2200
1100	<b>1RA4 564-5HE■■■</b>	494	88	94.5	94.7	0.76	0.71	21265	1.95	0.63	4.40	158	2500
1200	<b>1RA4 566-5HE■■■</b>	494	96	94.8	94.8	0.76	0.71	23198	1.95	0.63	4.40	173	2900
1650	<b>1RA4 630-5HE■■■</b>	494	126	95.1	95.5	0.79	0.74	31898	2.10	0.75	4.60	239	3000
1800	<b>1RA4 632-5HE■■■</b>	494	142	95.4	95.7	0.77	0.71	34798	2.40	0.88	5.20	265	3500
1950	<b>1RA4 634-5HE■■■</b>	494	152	95.5	95.7	0.78	0.73	37697	2.30	0.85	5.10	293	3400
2100	<b>1RA4 636-5HE■■■</b>	495	162	95.7	95.9	0.78	0.73	40515	2.35	0.88	5.30	324	4000

#### Voltage code:

10 kV, 50 Hz  
Other voltage

8

9

#### Type of construction:

IM B3  
IM V1 (without canopy)

0

8

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Selection and ordering data

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency			Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia
<b>IEC</b>			$f_{\text{rated}}$ at 10 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{\text{rated}}$	$T_L/R/T_{\text{rated}}$	$I_{L/R}/I_{\text{rated}}$	Motor	
kW	Order No.	rpm	A	%	%	cos φ	cos φ	Nm	[ - ]	[ - ]	[ - ]	$\text{kgm}^2$	$\text{kgm}^2$
<b>9 ... 11 kV, 50 Hz</b>													
2-pole													
6400	<b>1RP6 710-2HJ■0</b>	2989	425	96.9	96.8	0.90	0.89	20451	2.10	0.45	4.80	132	138
7500	<b>1RP6 712-2HJ■0</b>	2990	495	97.0	96.9	0.90	0.89	23961	2.20	0.48	5.10	147	163
8200	<b>1RP6 714-2HJ■0</b>	2990	540	97.2	97.0	0.91	0.91	26197	2.20	0.51	5.30	162	188
9100	<b>1RP6 716-2HJ■0</b>	2990	590	97.2	97.1	0.92	0.92	29072	2.30	0.53	5.40	179	221
4-pole													
6700	<b>1RP6 710-4HJ■0</b>	1493	440	97.5	97.7	0.90	0.88	42853	2.30	0.61	5.50	273	697
7500	<b>1RP6 712-4HJ■0</b>	1493	485	97.6	97.8	0.91	0.90	47979	2.20	0.59	5.50	300	800
8200	<b>1RP6 714-4HJ■0</b>	1493	530	97.7	97.8	0.91	0.90	52456	2.20	0.61	5.50	337	933
9100	<b>1RP6 716-4HJ■0</b>	1493	590	97.7	97.8	0.91	0.90	58205	2.20	0.62	5.50	369	1031
6-pole													
5000	<b>1RP6 710-6HJ■■</b>	994	345	97.2	97.4	0.86	0.85	48051	2.10	0.69	5.30	330	2520
5500	<b>1RP6 712-6HJ■■</b>	994	375	97.3	97.5	0.87	0.85	52847	2.10	0.74	5.50	367	2133
6100	<b>1RP6 714-6HJ■■</b>	994	415	97.4	97.6	0.87	0.85	58591	2.20	0.78	5.50	419	2561
6800	<b>1RP6 716-6HJ■■</b>	995	465	97.4	97.6	0.87	0.86	65303	2.30	0.82	5.50	468	2982
8-pole													
3850	<b>1RP6 710-8HJ■■</b>	745	270	96.7	97.2	0.85	0.83	49372	1.90	0.71	4.90	415	5185
4200	<b>1RP6 712-8HJ■■</b>	745	295	96.8	97.2	0.85	0.83	53835	2.00	0.78	5.30	465	5935
4650	<b>1RP6 714-8HJ■■</b>	746	325	97.0	97.3	0.85	0.82	59562	2.20	0.93	5.50	531	7019
5200	<b>1RP6 716-8HJ■■</b>	746	365	97.1	97.3	0.85	0.82	66595	2.20	0.93	5.50	597	8203
10-pole													
2800	<b>1RP6 710-3HJ■■</b>	596	210	96.4	96.8	0.80	0.77	44889	2.10	0.72	5.20	415	8485
3100	<b>1RP6 712-3HJ■■</b>	596	230	96.6	96.9	0.81	0.78	49700	2.10	0.71	5.10	465	10335
3400	<b>1RP6 714-3HJ■■</b>	596	250	96.7	97.0	0.81	0.77	54475	2.30	0.78	5.50	531	11369
3700	<b>1RP6 716-3HJ■■</b>	596	275	96.7	97.0	0.81	0.77	59266	2.30	0.82	5.50	598	12702

**Voltage code:**

10 kV, 50 Hz

**8**

Other voltage

**9**
**Type of construction:**

IM B3

**0**

IM V1 (with canopy)

**4**
**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA6, 1RA6 and 1RP6

## Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Speed rpm	Rated current $I_{rated}$ at 6.6 kV	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{rated}$	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia	
				4/4 load	3/4 load	4/4 load	3/4 load					Motor kgm <sup>2</sup>	External max. <sup>1)</sup> kgm <sup>2</sup>
				Order No.	A	%	%					[ $\text{-}$ ]	[ $\text{-}$ ]
<b>4 ... 6.6 kV, 60 Hz</b>													
1600	<b>1RA6 450-2HJ■0</b>	3572	162	96.0	96.2	0.90	0.90	4279	2.00	0.55	5.10	13	34
1850	<b>1RA6 452-2HJ■0</b>	3573	184	96.2	96.5	0.91	0.91	4946	2.10	0.55	5.40	14	40
2060	<b>1RA6 454-2HJ■0</b>	3577	205	96.4	96.6	0.91	0.91	5504	2.20	0.55	5.50	16	45
2300	<b>1RA6 456-2HJ■0</b>	3580	230	96.6	96.8	0.91	0.91	6137	2.40	0.55	5.50	17	52
2800	<b>1RA6 500-2HJ■0</b>	3575	280	96.6	96.9	0.90	0.90	7479	2.10	0.50	5.10	20	64
3000	<b>1RA6 502-2HJ■0</b>	3577	300	96.8	96.9	0.91	0.90	8009	2.20	0.50	5.40	22	72
3650	<b>1RA6 504-2HJ■0</b>	3580	355	97.1	97.2	0.92	0.91	9736	2.50	0.55	5.50	26	80
3900	<b>1RA6 506-2HJ■0</b>	3580	375	97.2	97.3	0.93	0.92	10403	2.50	0.70	5.50	27	88
4400	<b>1RA6 560-2HJ■0</b>	3578	440	96.8	97.0	0.90	0.90	11743	1.90	0.50	4.40	39	145
5000	<b>1RA6 562-2HJ■0</b>	3579	495	97.0	97.2	0.91	0.91	13341	2.10	0.55	4.80	43	160
5700	<b>1RA6 564-2HJ■0</b>	3580	560	97.2	97.3	0.92	0.92	15204	2.10	0.60	4.90	49	180
6500	<b>1RA6 566-2HJ■0</b>	3582	630	97.4	97.4	0.92	0.92	17328	2.30	0.60	5.40	54	200
5700	<b>1RA4 630-2HE■0</b>	3583	580	97.0	96.9	0.88	0.87	15193	2.10	0.30	4.20	60	95
6500	<b>1RA4 632-2HE■0</b>	3584	660	97.2	97.2	0.89	0.89	17320	2.30	0.34	4.60	67	140
7500	<b>1RA4 634-2HE■0</b>	3585	750	97.5	97.5	0.90	0.89	19979	2.60	0.41	5.30	77	150
8200	<b>1RA4 636-2HE■0</b>	3585	820	97.6	97.6	0.90	0.90	21844	2.60	0.42	5.40	86	110
<b>4-pole</b>													
1630	<b>1RA6 450-4HJ■■</b>	1783	168	95.8	96.1	0.89	0.88	8733	2.10	0.70	5.50	20	178
1750	<b>1RA6 452-4HJ■■</b>	1785	180	95.9	96.1	0.89	0.88	9362	2.20	0.70	5.50	22	225
2070	<b>1RA6 454-4HJ■■</b>	1785	210	96.1	96.3	0.90	0.89	11078	2.20	0.70	5.50	25	285
2310	<b>1RA6 456-4HJ■■</b>	1787	235	96.3	96.4	0.89	0.88	12350	2.20	0.70	5.50	28	355
2500 <sup>2)</sup>	<b>1RA6 500-4HJ■0</b>	1787	245	96.9	97.1	0.92	0.90	13359	2.45	0.65	5.40	43	250
2750 <sup>2)</sup>	<b>1RA6 502-4HJ■0</b>	1788	270	96.9	97.1	0.92	0.90	14687	2.55	0.70	5.60	46	280
3200 <sup>2)</sup>	<b>1RA6 504-4HJ■0</b>	1788	315	97.0	97.2	0.92	0.90	17090	2.35	0.60	5.20	52	310
3600 <sup>2)</sup>	<b>1RA6 506-4HJ■0</b>	1787	355	97.1	97.4	0.92	0.91	19238	2.40	0.65	5.20	56	350
4300 <sup>2)</sup>	<b>1RA6 560-4HJ■0</b>	1791	425	97.2	97.3	0.91	0.90	22927	2.30	0.70	5.10	84	550
4800 <sup>2)</sup>	<b>1RA6 562-4HJ■0</b>	1791	475	97.3	97.5	0.91	0.90	25593	2.30	0.65	5.10	94	610
5400 <sup>2)</sup>	<b>1RA6 564-4HJ■0</b>	1791	530	97.4	97.5	0.91	0.90	28792	2.25	0.60	5.10	105	670
5600 <sup>2)</sup>	<b>1RA6 566-4HJ■0</b>	1792	550	97.5	97.6	0.91	0.90	29842	2.30	0.60	5.20	115	740
6500	<b>1RA4 630-4HE■0</b>	1789	660	97.2	97.3	0.88	0.88	34698	2.10	0.52	4.80	134	600
7300	<b>1RA4 632-4HE■0</b>	1789	740	97.3	97.5	0.89	0.89	38969	2.10	0.54	4.80	150	650
8000	<b>1RA4 634-4HE■0</b>	1790	810	97.5	97.6	0.89	0.89	42682	2.20	0.59	5.20	168	680
8600	<b>1RA4 636-4HE■0</b>	1791	870	97.7	97.7	0.89	0.88	45857	2.40	0.61	5.50	197	800

**Voltage code:**

4 kV, 60 Hz

**4**

6.6 kV, 60 Hz

**1**

Other voltage

**9**

IM B3

**0**

IM V1 (without canopy)

**8****Note:**

Efficiencies according to IEC 60034-2-1:2007; stray load losses determined by statical evaluation of measurements. NEMA version on request.

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.<sup>2)</sup> Data of vertical motors (IM V1) on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Selection and ordering data (continued)

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Speed rpm	Rated current $I_{\text{rated}}$ at 6.6 kV	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{\text{rated}}$	Locked- rotor torque $T_{LR}/T_{\text{rated}}$	Locked- rotor current $I_{LR}/I_{\text{rated}}$	Moment of inertia Motor kgm <sup>2</sup>	External, max. <sup>1)</sup> kgm <sup>2</sup>
				4/4 load	3/4 load	4/4 load	3/4 load						
<b>4 ... 6.6 kV, 60 Hz</b>													
1210	<b>1RA6 450-6HJ■■■</b>	1188	128	95.7	96.2	0.86	0.85	9734	1.90	0.80	5.50	26	550
1350	<b>1RA6 452-6HJ■■■</b>	1188	144	95.9	96.3	0.86	0.85	10858	2.00	0.75	5.50	29	610
1480	<b>1RA6 454-6HJ■■■</b>	1189	156	96.0	96.5	0.86	0.85	11894	2.00	0.85	5.50	33	660
1620	<b>1RA6 456-6HJ■■■</b>	1190	170	96.3	96.6	0.87	0.85	13006	2.20	0.95	5.50	38	730
2050	<b>1RA4 500-6HE■■■</b>	1189	215	96.1	96.1	0.87	0.85	16466	2.00	0.72	5.10	57	600
2300	<b>1RA4 502-6HE■■■</b>	1189	240	96.3	96.4	0.87	0.86	18474	2.00	0.70	5.00	65	650
2600	<b>1RA4 504-6HE■■■</b>	1189	270	96.4	96.6	0.87	0.86	20883	2.00	0.72	5.10	72	800
2850	<b>1RA4 506-6HE■■■</b>	1190	295	96.5	96.6	0.87	0.85	22872	2.00	0.75	5.30	81	950
3300	<b>1RA4 560-6HE■■■</b>	1191	345	96.6	96.6	0.87	0.86	26461	2.00	0.65	4.90	105	750
3750	<b>1RA4 562-6HE■■■</b>	1192	390	96.8	96.9	0.87	0.85	30044	2.00	0.70	5.10	120	900
4150	<b>1RA4 564-6HE■■■</b>	1192	430	96.9	97.0	0.87	0.86	33249	2.00	0.75	5.30	135	1050
4500	<b>1RA4 566-6HE■■■</b>	1192	465	97.0	97.1	0.87	0.86	36053	2.00	0.70	5.20	147	1200
5100	<b>1RA4 630-6HE■■■</b>	1192	530	97.1	97.2	0.86	0.85	40860	1.90	0.51	4.30	183	1700
5700	<b>1RA4 632-6HE■■■</b>	1193	600	97.2	97.2	0.85	0.84	45629	2.00	0.56	4.70	202	2100
6200	<b>1RA4 634-6HE■■■</b>	1193	650	97.3	97.3	0.86	0.85	49631	2.10	0.61	4.90	223	2000
6700	<b>1RA4 636-6HE■■■</b>	1193	700	97.4	97.4	0.86	0.84	53634	2.30	0.64	5.20	246	2600
<b>8-pole</b>													
870	<b>1RA6 450-8HJ■■■</b>	890	95	95.1	95.6	0.84	0.82	9333	1.80	0.60	5.30	32	475
960	<b>1RA6 452-8HJ■■■</b>	892	106	95.2	95.6	0.84	0.81	10285	1.90	0.65	5.40	36	570
1050	<b>1RA6 454-8HJ■■■</b>	892	114	95.3	95.7	0.84	0.82	11254	2.00	0.65	5.50	41	670
1180	<b>1RA6 456-8HJ■■■</b>	892	128	95.6	95.9	0.85	0.83	12637	1.90	0.65	5.50	47	820
1500	<b>1RA4 500-8HE■■■</b>	892	164	95.7	95.7	0.84	0.81	16059	2.00	0.75	5.20	70	750
1700	<b>1RA4 502-8HE■■■</b>	892	182	95.9	95.9	0.85	0.83	18201	2.00	0.75	5.20	80	1050
1860	<b>1RA4 504-8HE■■■</b>	892	200	96.0	96.0	0.85	0.83	19914	2.00	0.78	5.10	88	1200
2050	<b>1RA4 506-8HE■■■</b>	893	220	96.2	96.1	0.84	0.81	21923	2.10	0.82	5.50	99	1300
2350	<b>1RA4 560-8HE■■■</b>	893	255	96.2	96.3	0.84	0.81	25132	1.90	0.65	4.90	123	1600
2700	<b>1RA4 562-8HE■■■</b>	894	290	96.4	96.4	0.84	0.82	28842	2.00	0.70	5.10	141	1650
2900	<b>1RA4 564-8HE■■■</b>	894	315	96.4	96.6	0.84	0.82	30979	2.00	0.70	5.00	158	2300
3100	<b>1RA4 566-8HE■■■</b>	894	330	96.6	96.7	0.85	0.84	33115	2.00	0.70	5.00	173	2500

**Voltage code:**

4 kV, 60 Hz      **4**  
 6.6 kV, 60 Hz      **1**  
 Other voltage      **9**

**Type of construction:**

IM B3      **0**  
 IM V1 (without canopy)      **8**

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements. NEMA version on request.  
 Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note  
 the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or  
 two starts from warm under the conditions described on Page 2/2.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Selection and ordering data (continued)

Rated power kW	High voltage motor H-compact PLUS	Speed rpm	Rated current $I_{rated}$ at 6.6 kV	Efficiency		Power factor		Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia Motor kgm <sup>2</sup>	External max. <sup>1)</sup> kgm <sup>2</sup>									
				4/4 load	3/4 load	4/4 load	3/4 load															
				A	%	%	$\cos \phi$															
<b>4 ... 6.6 kV, 60 Hz</b>																						
10-pole																						
650	<b>1RA6 450-3HJ</b>	710	74	93.7	94.0	0.82	0.78	8743	1.90	0.72	4.50	37	650									
720	<b>1RA6 452-3HJ</b>	710	83	94.1	94.3	0.81	0.77	9685	2.00	0.75	4.70	41	850									
800	<b>1RA6 454-3HJ</b>	711	92	94.3	94.4	0.81	0.76	10745	2.10	0.80	4.90	46	900									
910	<b>1RA6 456-3HJ</b>	711	104	94.5	94.6	0.81	0.77	12223	2.10	0.80	5.00	52	1100									
1080	<b>1RA4 500-3HE</b>	711	122	94.8	95.0	0.82	0.80	14506	1.80	0.65	4.40	70	1200									
1200	<b>1RA4 502-3HE</b>	712	134	95.2	95.2	0.82	0.80	16096	1.90	0.68	4.70	80	1500									
1320	<b>1RA4 504-3HE</b>	712	146	95.1	95.2	0.83	0.80	17705	1.90	0.70	4.70	88	1450									
1500	<b>1RA4 506-3HE</b>	712	166	95.4	95.5	0.83	0.79	20119	2.00	0.72	4.90	99	1900									
1780	<b>1RA4 560-3HE</b>	713	205	95.5	95.6	0.80	0.76	23842	2.00	0.70	4.60	123	2100									
2040	<b>1RA4 562-3HE</b>	713	235	95.8	95.8	0.80	0.76	27324	2.00	0.70	4.80	141	2600									
2200	<b>1RA4 564-3HE</b>	713	245	95.9	95.8	0.82	0.79	29467	2.00	0.68	4.60	158	2800									
2400	<b>1RA4 566-3HE</b>	713	270	96.0	96.0	0.81	0.77	32146	2.10	0.75	5.00	173	3300									
12-pole																						
440	<b>1RA6 450-5HJ</b>	591	56	92.9	93.1	0.74	0.71	7110	1.80	0.56	4.00	37	630									
510	<b>1RA6 452-5HJ</b>	591	65	93.3	93.3	0.73	0.68	8241	1.80	0.60	4.20	41	850									
570	<b>1RA6 454-5HJ</b>	592	73	93.9	93.9	0.73	0.68	9195	1.80	0.60	4.20	46	1150									
650	<b>1RA6 456-5HJ</b>	592	82	94.0	93.9	0.74	0.68	10486	1.90	0.60	4.30	52	1300									
820	<b>1RA4 500-5HE</b>	592	102	94.4	94.3	0.74	0.68	13228	2.00	0.62	4.50	70	1650									
920	<b>1RA4 502-5HE</b>	592	114	94.6	94.6	0.75	0.70	14841	1.90	0.62	4.40	79	2000									
1020	<b>1RA4 504-5HE</b>	592	128	94.8	94.7	0.74	0.68	16454	2.00	0.65	4.70	87	2400									
1120	<b>1RA4 506-5HE</b>	592	136	94.8	94.8	0.76	0.71	18068	1.90	0.60	4.40	98	2200									
1300	<b>1RA4 560-5HE</b>	593	160	95.0	95.1	0.75	0.70	20936	1.80	0.53	3.90	123	2050									
1470	<b>1RA4 562-5HE</b>	593	182	95.2	95.3	0.74	0.69	23674	1.80	0.55	4.00	141	2500									
1620	<b>1RA4 564-5HE</b>	594	205	95.4	95.4	0.73	0.67	26045	2.00	0.63	4.30	158	3500									
1760	<b>1RA4 566-5HE</b>	594	220	95.5	95.5	0.73	0.68	28296	2.00	0.63	4.40	173	3900									

**Voltage code:****4**

4 kV, 60 Hz

**1**

6.6 kV, 60 Hz

**9**

Other voltage

**0**

IM B3

**8**

IM V1 (without canopy)

**Note:**

Efficiencies according to IEC 60034-2-1:2007; stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS, 1RA4, 1RA6 and 1RP6

#### Selection and ordering data

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6.6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[ - ]	[ - ]	[ - ]	$\text{kgm}^2$	$\text{kgm}^2$
<b>4 ... 6.6 kV, 60 Hz</b>													
2-pole													
7600 <sup>2)</sup>	<b>1RP6 710-2HJ■■■</b>	3589	760	96.8	96.6	0.90	0.90	20229	2.00	0.40	4.60	132	48
9700 <sup>2)</sup>	<b>1RP6 712-2HJ■■■</b>	3589	970	97.1	96.9	0.90	0.89	25813	2.20	0.47	5.20	147	43
11900 <sup>2)</sup>	<b>1RP6 714-2HJ■■■</b>	3589	1180	97.3	97.1	0.91	0.91	31672	2.20	0.49	5.20	162	38
13600 <sup>2)</sup>	<b>1RP6 716-2HJ■■■</b>	3590	1340	97.4	97.2	0.91	0.91	36190	2.30	0.52	5.50	179	41
4-pole													
8700 <sup>2)</sup>	<b>1RP6 710-4HJ■■■</b>	1793	860	97.8	97.8	0.90	0.88	46340	2.30	0.59	5.50	273	297
10400 <sup>2)</sup>	<b>1RP6 712-4HJ■■■</b>	1793	1040	97.9	97.9	0.90	0.89	55399	2.30	0.60	5.50	300	310
11900 <sup>2)</sup>	<b>1RP6 714-4HJ■■■</b>	1793	1160	97.9	98.0	0.91	0.90	63396	2.20	0.61	5.50	337	353
13200 <sup>2)</sup>	<b>1RP6 716-4HJ■■■</b>	1793	1300	98.0	98.0	0.91	0.89	70311	2.30	0.62	5.50	369	406
6-pole													
6900	<b>1RP6 710-6HJ■■■</b>	1194	720	97.4	97.6	0.86	0.84	55212	2.10	0.69	5.40	330	970
7600	<b>1RP6 712-6HJ■■■</b>	1194	790	97.5	97.6	0.86	0.84	60797	2.10	0.70	5.50	367	1083
8400	<b>1RP6 714-6HJ■■■</b>	1194	860	97.7	97.7	0.87	0.85	67196	2.10	0.73	5.50	419	1311
9200	<b>1RP6 716-6HJ■■■</b>	1194	940	97.7	97.7	0.88	0.87	73603	2.10	0.74	5.50	468	1572
8-pole													
5400	<b>1RP6 710-8HJ■■■</b>	895	590	97.2	97.4	0.83	0.81	57627	2.00	0.76	5.30	415	2835
6100	<b>1RP6 712-8HJ■■■</b>	895	660	97.2	97.4	0.83	0.81	65089	2.00	0.78	5.40	465	3185
6800	<b>1RP6 714-8HJ■■■</b>	895	730	97.3	97.5	0.84	0.81	72542	2.10	0.82	5.50	531	3769
7500	<b>1RP6 716-8HJ■■■</b>	896	810	97.4	97.5	0.83	0.80	79967	2.20	0.88	5.50	597	4453
10-pole													
3700	<b>1RP6 710-3HJ■■■</b>	716	425	96.8	97.0	0.79	0.75	49369	2.20	0.73	5.40	415	5185
4050	<b>1RP6 712-3HJ■■■</b>	716	455	96.9	97.1	0.80	0.76	54035	2.20	0.73	5.40	465	5935
4500	<b>1RP6 714-3HJ■■■</b>	716	510	96.9	97.1	0.80	0.77	60031	2.20	0.74	5.50	531	7119
5100	<b>1RP6 716-3HJ■■■</b>	716	570	97.1	97.2	0.80	0.77	68021	2.30	0.79	5.50	598	8202

#### Voltage code:

4 kV, 60 Hz      4  
 4.16 kV, 60 Hz    3  
 6.6 kV, 60 Hz     1  
 Other voltage     9

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements.

Higher pole numbers are available on request.

IM B3  
IM V1 (with canopy)

0  
4

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup>  $V_{rated} < 6$  kV on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

**Selection and ordering data**

Rated power kW	High voltage motor H-compact PLUS	Speed rpm	Rated current $I_{\text{rated}}$ at 13.2 kV	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{\text{rated}}$	Locked- rotor torque $T_{LR}/T_{\text{rated}}$	Locked- rotor current $I_{LR}/I_{\text{rated}}$	Moment of inertia $\text{kgm}^2$	Motor External, max. <sup>1)</sup> $\text{kgm}^2$									
				4/4 load	3/4 load	4/4 load	3/4 load															
				A	%	%	$\cos \varphi$															
<b>12.5 ... 13.8 kV, 60 Hz</b>																						
<b>2-pole</b>																						
6500	<b>1RP6 710-2HJ■0</b>	3590	330	96.4	96.1	0.90	0.89	17293	2.30	0.44	5.20	132	58									
8000	<b>1RP6 712-2HJ■0</b>	3591	405	96.8	96.4	0.89	0.88	21278	2.50	0.50	5.50	147	53									
8800	<b>1RP6 714-2HJ■0</b>	3591	435	96.8	96.4	0.91	0.89	23406	2.50	0.53	5.50	162	78									
10100	<b>1RP6 716-2HJ■0</b>	3591	495	96.9	96.6	0.92	0.91	26867	2.40	0.53	5.50	179	111									
<b>4-pole</b>																						
7200	<b>1RP6 710-4HJ■0</b>	1794	365	97.4	97.5	0.89	0.88	38335	2.40	0.58	5.50	273	367									
8000	<b>1RP6 712-4HJ■0</b>	1794	395	97.5	97.6	0.91	0.90	42606	2.30	0.59	5.50	300	427									
8800	<b>1RP6 714-4HJ■0</b>	1793	435	97.6	97.6	0.91	0.91	46869	2.30	0.59	5.50	337	503									
10100	<b>1RP6 716-4HJ■0</b>	1793	490	97.6	97.7	0.92	0.91	53794	2.30	0.61	5.50	369	546									
<b>6-pole</b>																						
5600	<b>1RP6 710-6HJ■■</b>	1195	295	97.2	97.3	0.85	0.83	44775	2.30	0.70	5.50	330	1105									
6200	<b>1RP6 712-6HJ■■</b>	1195	325	97.3	97.4	0.86	0.83	49566	2.30	0.73	5.50	367	1253									
6800	<b>1RP6 714-6HJ■■</b>	1195	355	97.3	97.4	0.86	0.84	54357	2.30	0.72	5.50	419	1535									
7500	<b>1RP6 716-6HJ■■</b>	1195	390	97.4	97.5	0.86	0.84	59945	2.30	0.72	5.50	468	1782									
<b>8-pole</b>																						
3900	<b>1RP6 710-8HJ■■</b>	896	210	96.6	96.8	0.84	0.80	41582	2.20	0.79	5.50	415	3485									
4400	<b>1RP6 712-8HJ■■</b>	896	235	96.7	97.0	0.84	0.81	46912	2.20	0.81	5.50	465	3935									
5000	<b>1RP6 714-8HJ■■</b>	896	270	96.9	97.0	0.83	0.80	53295	2.20	0.78	5.50	531	4669									
5600	<b>1RP6 716-8HJ■■</b>	896	305	97.0	97.0	0.83	0.79	59674	2.30	0.76	5.50	597	5303									
<b>10-pole</b>																						
2800	<b>1RP6 710-3HJ■■</b>	716	160	96.2	96.5	0.80	0.75	37334	2.40	0.76	5.50	415	3985									
3200	<b>1RP6 712-3HJ■■</b>	716	182	96.5	96.6	0.80	0.75	42664	2.40	0.78	5.50	465	4785									
3550	<b>1RP6 714-3HJ■■</b>	716	198	96.6	96.8	0.81	0.78	47340	2.30	0.74	5.50	531	5569									
3900	<b>1RP6 716-3HJ■■</b>	716	215	96.7	96.9	0.82	0.79	52006	2.30	0.75	5.50	598	6552									

**Voltage code:**

13.2 kV, 60 Hz

2

Other voltage

9

**Type of construction:**

IM B3

0

IM V1 (with canopy)

4

**Note:**Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Selection and ordering data

##### NEMA version

Rated power hp	High voltage motor H-compact PLUS	Speed rpm	Rated current $I_{rated}$ at 13.2 kV	Efficiency %	Efficiency %	Power factor $\cos \phi$	Power factor $\cos \phi$	Torque Nm	Break-down torque $T_B/T_{rated}$	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia kgm <sup>2</sup>	Motor kgm <sup>2</sup>	External max. <sup>1)</sup> kgm <sup>2</sup>
<b>4 ... 6.6 kV, 60 Hz</b>														
<b>2-pole</b>														
10000 <sup>2)</sup>	<b>1RP6 710-2BM■0</b>	3586	747	96.4	96.2	0.90	0.89	19861	2.20	0.60	5.20	132	56	
11000 <sup>2)</sup>	<b>1RP6 712-2BM■0</b>	3588	828	96.5	96.2	0.89	0.88	21837	2.50	0.60	5.80	147	55	
12000 <sup>2)</sup>	<b>1RP6 712-2BN■0</b>	3587	898	96.6	96.4	0.90	0.89	23827	2.30	0.60	5.40	147	54	
13000 <sup>2)</sup>	<b>1RP6 714-2BM■0</b>	3587	956	96.6	96.4	0.92	0.91	25814	2.50	0.64	6.00	162	54	
14000 <sup>2)</sup>	<b>1RP6 714-2BN■0</b>	3587	1036	96.7	96.5	0.91	0.90	27801	2.40	0.60	5.70	162	53	
16000 <sup>2)</sup>	<b>1RP6 716-2BM■0</b>	3586	1166	96.8	96.7	0.92	0.92	31777	2.40	0.62	5.80	179	51	
17000 <sup>2)</sup>	<b>1RP6 716-2BN■0</b>	3587	1251	96.9	96.8	0.91	0.90	33759	2.40	0.60	5.80	179	49	
<b>4-pole</b>														
11000 <sup>2)</sup>	<b>1RP6 710-4BJ■0</b>	1793	815	97.4	97.6	0.90	0.89	43695	2.30	0.60	5.90	273	603	
12000 <sup>2)</sup>	<b>1RP6 712-4BJ■0</b>	1793	880	97.5	97.6	0.91	0.90	47668	2.20	0.60	5.90	300	637	
13000 <sup>2)</sup>	<b>1RP6 712-4BK■0</b>	1793	962	97.5	97.6	0.90	0.89	51635	2.30	0.60	5.90	300	620	
14000 <sup>2)</sup>	<b>1RP6 714-4BJ■0</b>	1793	1021	97.4	97.6	0.91	0.91	55625	2.20	0.60	5.80	337	651	
15000 <sup>2)</sup>	<b>1RP6 714-4BK■0</b>	1793	1104	97.5	97.7	0.91	0.89	59583	2.30	0.60	6.00	337	665	
16000 <sup>2)</sup>	<b>1RP6 716-4BJ■0</b>	1793	1161	97.5	97.7	0.92	0.91	63575	2.20	0.61	5.80	369	678	
17000 <sup>2)</sup>	<b>1RP6 716-4BK■0</b>	1792	1238	97.5	97.7	0.92	0.91	67557	2.10	0.60	5.60	369	691	
18000 <sup>2)</sup>	<b>1RP6 716-4BL■0</b>	1793	1324	97.6	97.7	0.91	0.90	71504	2.20	0.61	5.90	369	702	
<b>6-pole</b>														
9000	<b>1RP6 710-6BJ■■</b>	1194	702	97.1	97.3	0.86	0.84	53690	2.10	0.71	5.50	330	1954	
10000	<b>1RP6 712-6BJ■■</b>	1194	781	97.2	97.4	0.86	0.83	59647	2.20	0.71	5.60	367	2043	
11000	<b>1RP6 714-6BJ■■</b>	1194	846	97.3	97.4	0.87	0.85	65612	2.20	0.75	5.70	419	2113	
12000	<b>1RP6 716-6BJ■■</b>	1194	915	97.2	97.3	0.88	0.86	71577	2.20	0.77	5.70	468	2168	
<b>8-pole</b>														
7000	<b>1RP6 710-8BJ■■</b>	895	566	96.9	97.1	0.83	0.80	55695	2.10	0.79	5.50	415	3817	
8000	<b>1RP6 712-8BJ■■</b>	895	646	97.0	97.1	0.83	0.81	63651	2.00	0.80	5.50	465	4154	
9000	<b>1RP6 714-8BJ■■</b>	895	721	97.1	97.2	0.84	0.81	71587	2.10	0.83	5.70	531	4458	
10000	<b>1RP6 716-8BJ■■</b>	896	810	97.1	97.2	0.83	0.80	79506	2.20	0.87	6.00	597	4732	
<b>10-pole</b>														
5000	<b>1RP6 710-3BJ■■</b>	716	427	96.6	96.7	0.79	0.75	49758	2.20	0.73	5.30	415	5006	
5500	<b>1RP6 712-3BJ■■</b>	716	464	96.7	96.9	0.80	0.76	54720	2.20	0.72	5.30	465	5428	
6000	<b>1RP6 714-3BJ■■</b>	716	502	96.8	96.9	0.80	0.77	59682	2.20	0.74	5.50	531	6221	
7000	<b>1RP6 716-3BJ■■</b>	716	584	96.9	97.0	0.80	0.77	69631	2.20	0.77	5.60	598	6955	

##### Voltage code:

4 kV, 60 Hz      4  
 4.16 kV, 60 Hz      3  
 6.6 kV, 60 Hz      1  
 Other voltage      9

##### Type of construction:

IM B3      0  
 IM V1 (with canopy)      4

##### Note:

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup>  $V_{rated} < 6 \text{ kV}$  on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Selection and ordering data

#### NEMA version

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency			Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
NEMA			$I_{rated}$ at 13.2 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	External max. <sup>1)</sup>	
hp	Order No.	rpm	A	%	%	cos φ	cos φ	Nm	[-]	[-]	[-]	[-]	kgm <sup>2</sup>	kgm <sup>2</sup>
<b>12.5 ... 13.8 kW, 60 Hz</b>														
2-pole														
8000	<b>1RP6 710-2BM■■0</b>	3588	301	96.0	95.6	0.90	0.89	15881	2.50	0.60	5.60	132	52	
9000	<b>1RP6 712-2BM■■0</b>	3588	334	96.0	95.6	0.91	0.90	17884	2.60	0.60	6.00	147	51	
10000	<b>1RP6 712-2BN■■0</b>	3588	375	96.2	95.9	0.90	0.89	19849	2.60	0.60	6.00	147	49	
11000	<b>1RP6 714-2BM■■0</b>	3588	407	96.2	95.9	0.91	0.90	21837	2.50	0.60	6.00	162	48	
12000	<b>1RP6 716-2BM■■0</b>	3587	437	96.3	96.0	0.93	0.92	23827	2.40	0.60	5.80	179	47	
13000	<b>1RP6 716-2BN■■0</b>	3588	478	96.4	96.2	0.92	0.91	25806	2.50	0.60	6.00	179	45	
4-pole														
9000	<b>1RP6 710-4BJ■■0</b>	1794	337	97.1	97.2	0.89	0.88	35727	2.40	0.60	6.20	273	553	
10000	<b>1RP6 712-4BJ■■0</b>	1794	368	97.1	97.3	0.91	0.90	39708	2.30	0.60	6.20	300	555	
11000	<b>1RP6 714-4BJ■■0</b>	1794	403	97.2	97.3	0.91	0.90	43682	2.30	0.60	6.20	337	603	
12000	<b>1RP6 716-4BJ■■0</b>	1793	436	97.2	97.3	0.92	0.92	47662	2.30	0.63	6.20	369	620	
13000	<b>1RP6 716-4BK■■0</b>	1794	475	97.2	97.4	0.91	0.91	51625	2.30	0.60	6.10	369	637	
6-pole														
7000	<b>1RP6 710-6BJ■■■</b>	1195	278	96.9	97.0	0.85	0.82	41723	2.40	0.72	6.00	330	1722	
8000	<b>1RP6 712-6BJ■■■</b>	1195	315	97.0	97.1	0.85	0.82	47688	2.40	0.73	6.00	367	1849	
9000	<b>1RP6 714-6BJ■■■</b>	1195	350	97.0	97.1	0.86	0.84	53642	2.30	0.73	6.00	419	1954	
10000	<b>1RP6 716-6BJ■■■</b>	1195	388	97.1	97.2	0.86	0.84	59600	2.30	0.72	6.00	468	2042	
8-pole														
5000	<b>1RP6 710-8BJ■■■</b>	896	201	96.5	96.6	0.84	0.81	39760	2.20	0.79	5.90	415	3024	
5500	<b>1RP6 712-8BJ■■■</b>	896	220	96.6	96.7	0.84	0.81	43721	2.20	0.80	6.00	465	3235	
6000	<b>1RP6 714-8BJ■■■</b>	896	239	96.6	96.7	0.84	0.82	47691	2.30	0.80	6.00	531	3438	
7000	<b>1RP6 716-8BJ■■■</b>	896	279	96.7	96.8	0.85	0.82	55642	2.20	0.79	6.00	597	3817	
10-pole														
3500	<b>1RP6 710-3BJ■■■</b>	717	151	96.2	96.2	0.79	0.74	34788	2.50	0.78	6.00	415	4104	
4000	<b>1RP6 712-3BJ■■■</b>	717	172	96.3	96.3	0.79	0.74	39757	2.50	0.78	6.00	465	4564	
4500	<b>1RP6 714-3BJ■■■</b>	717	188	96.4	96.5	0.81	0.77	44739	2.40	0.79	6.00	531	5006	
5000	<b>1RP6 716-3BJ■■■</b>	717	207	96.5	96.6	0.82	0.78	49713	2.40	0.78	6.00	598	5428	

#### Voltage code:

13.2 kV, 60 Hz

2

Other voltage

9

#### Note:

Higher pole numbers are available on request.

#### Type of construction:

IM B3

0

IM V1 (with canopy)

4

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

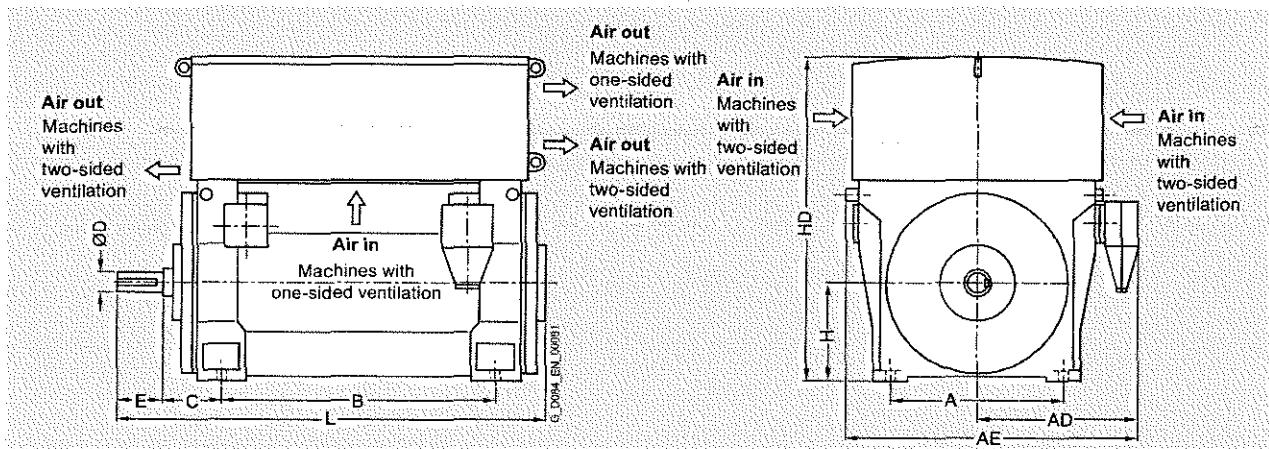


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm
<b>1RA6 450-2HJ 0<sup>2)</sup> to 1RA6 502-2HJ 0<sup>2)</sup> (IP23) with integrated ball bearings - 1RA4, 1RA6 series</b>											
2-pole											
1RA6 450-2HJ 0 <sup>2)</sup>	3700	850	930	1620	1180	280	95	130	450	1628	1843
1RA6 452-2HJ 0 <sup>2)</sup>	3900	850	930	1620	1180	280	95	130	450	1628	1843
1RA6 454-2HJ 0 <sup>2)</sup>	4300	850	930	1620	1400	280	95	130	450	1628	2053
1RA6 456-2HJ 0 <sup>2)</sup>	4550	850	930	1620	1400	280	95	130	450	1628	2053
1RA6 500-2HJ 0 <sup>2)</sup>	5700	950	1135	1835	1320	315	110	165	500	1845	2103
1RA6 502-2HJ 0 <sup>2)</sup>	5850	950	1135	1835	1320	315	110	165	500	1845	2103
4-pole											
1RA6 450-4HJ 0	4050	850	930	1620	1180	250	130	200	450	1408	1896
1RA6 452-4HJ 0	4250	850	930	1620	1180	250	130	200	450	1408	1896
1RA6 454-4HJ 0	4650	850	930	1620	1400	250	130	200	450	1408	2106
1RA6 456-4HJ 0	4950	850	930	1620	1400	250	130	200	450	1408	2106
1RA6 500-4HJ 0	6250	950	1135	1835	1320	280	150	200	500	1845	2109
1RA6 502-4HJ 0	6450	950	1135	1835	1320	280	150	200	500	1845	2109
1RA6 504-4HJ 0	7150	950	1135	1835	1500	280	150	200	500	1845	2289
1RA6 506-4HJ 0	7450	950	1135	1835	1500	280	150	200	500	1845	2289
1RA6 560-4HJ 0	7950	1060	1205	1975	1400	315	170	240	560	2098	2300
1RA6 562-4HJ 0	8350	1060	1205	1975	1400	315	170	240	560	2098	2300
1RA6 564-4HJ 0	9300	1060	1205	1975	1600	315	170	240	560	2098	2530
1RA6 566-4HJ 0	9900	1060	1205	1975	1600	315	170	240	560	2098	2530
1RA4 630-4HE 0 <sup>2)</sup>	9950	1320	1330	2210	1600	335	200	280	630	2400	2500
1RA4 632-4HE 0 <sup>2)</sup>	10650	1320	1330	2210	1600	335	200	280	630	2400	2500
1RA4 634-4HE 0 <sup>2)</sup>	11700	1320	1330	2210	1800	335	220	280	630	2400	2740
1RA4 636-4HE 0 <sup>2)</sup>	12250	1320	1330	2210	1800	335	220	280	630	2400	2740

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> Roller bearings only for 50 Hz operation.

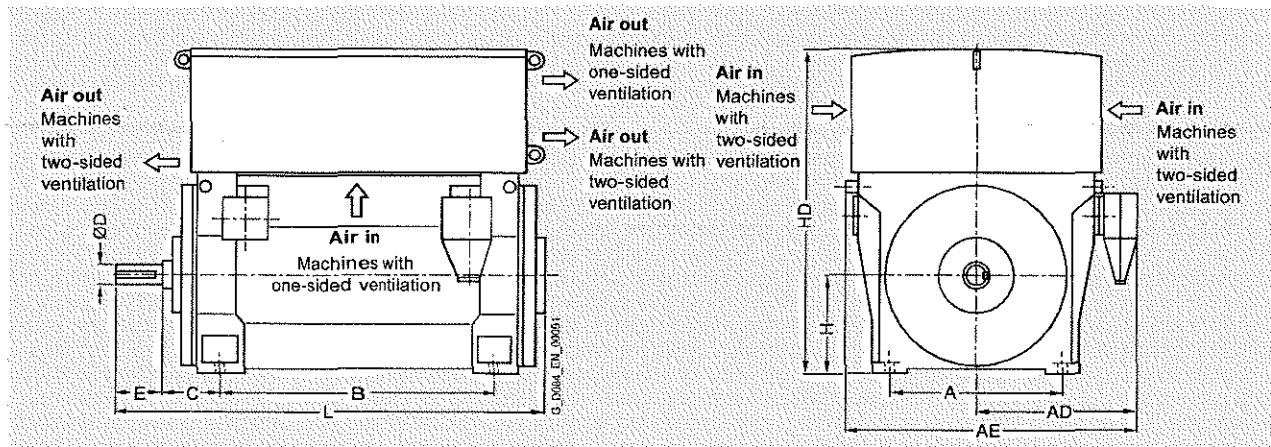
<sup>3)</sup> Dimension HD for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm

Technical data for motor construction details, bearings, and dimensions

## 6-pole

1RA6 450-6HJ.0	4150	850	930	1620	1180	250	140	200	450	1408	1896
1RA6 452-6HJ.0	4400	850	930	1620	1180	250	140	200	450	1408	1896
1RA6 454-6HJ.0	4750	850	930	1620	1400	280	140	200	450	1408	2136
1RA6 456-6HJ.0	5100	850	930	1620	1400	280	140	200	450	1408	2136
1RA4 500-6HE.0	5250	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4 502-6HE.0	5650	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4 504-6HE.0	6200	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4 506-6HE.0	6550	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4 560-6HE.0	7200	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 562-6HE.0	7850	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 564-6HE.0	8650	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 566-6HE.0	9100	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 630-6HE.0	10250	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4 632-6HE.0	10800	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4 634-6HE.0	11800	1320	1330	2210	1800	335	220	280	630	2400	2740
1RA4 636-6HE.0	12550	1320	1330	2210	1800	335	220	280	630	2400	2740

## 8-pole

1RA6 450-8HJ.0	4150	850	930	1620	1180	250	140	200	450	1408	1896
1RA6 452-8HJ.0	4450	850	930	1620	1180	250	140	200	450	1408	1896
1RA6 454-8HJ.0	4800	850	930	1620	1400	280	140	200	450	1408	2136
1RA6 456-8HJ.0	5150	850	930	1620	1400	280	140	200	450	1408	2136
1RA4 500-8HE.0	5300	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4 502-8HE.0	5700	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4 504-8HE.0	6200	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4 506-8HE.0	6550	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4 560-8HE.0	7200	1060	1070	1900	1400	315	180	240	560	1750	2300
1RA4 562-8HE.0	7700	1060	1070	1900	1400	315	180	240	560	1750	2300
1RA4 564-8HE.0	8550	1060	1070	1900	1600	315	190	280	560	1750	2570
1RA4 566-8HE.0	9000	1060	1070	1900	1600	315	190	280	560	1750	2570

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> Roller bearings only for 50 Hz operation.

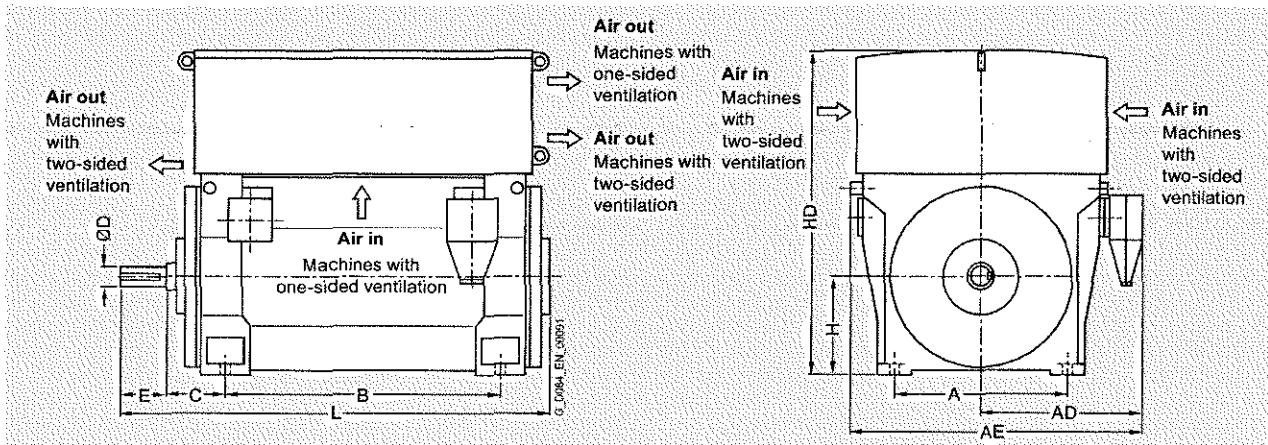
<sup>3)</sup> Dimension HD for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm
<b>8-pole</b>											
1RA4 630-8HE.0 <sup>2)</sup>	10150	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4 632-8HE.0 <sup>2)</sup>	10800	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4 634-8HE.0 <sup>2)</sup>	11700	1320	1330	2210	1800	335	220	280	630	2400	2740
1RA4 636-8HE.0 <sup>2)</sup>	12450	1320	1330	2210	1800	335	220	280	630	2400	2740
<b>10-pole</b>											
1RA6 450-3HJ.0	4150	850	930	1620	1180	250	140	200	450	1408	1896
1RA6 452-3HJ.0	4450	850	930	1620	1180	250	140	200	450	1408	1896
1RA6 454-3HJ.0	4800	850	930	1620	1400	280	140	200	450	1408	2136
1RA6 456-3HJ.0	5150	850	930	1620	1400	280	140	200	450	1408	2136
1RA4 500-3HE.0	5250	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4 502-3HE.0	5600	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4 504-3HE.0	6150	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4 506-3HE.0	6550	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4 560-3HE.0	7100	1060	1070	1900	1400	315	180	240	560	1750	2300
1RA4 562-3HE.0	7700	1060	1070	1900	1400	315	180	240	560	1750	2300
1RA4 564-3HE.0	8500	1060	1070	1900	1600	315	190	280	560	1750	2570
1RA4 566-3HE.0	8950	1060	1070	1900	1600	315	190	280	560	1750	2570
1RA4 630-3HE.0 <sup>2)</sup>	10050	1320	1180	2060	1600	335	220	280	630	2400	2500
1RA4 632-3HE.0 <sup>2)</sup>	10750	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4 634-3HE.0 <sup>2)</sup>	11750	1320	1330	2210	1800	335	220	280	630	2400	2740
1RA4 636-3HE.0 <sup>2)</sup>	12450	1320	1330	2210	1800	335	220	280	630	2400	2740

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> Roller bearings only for 50 Hz operation.

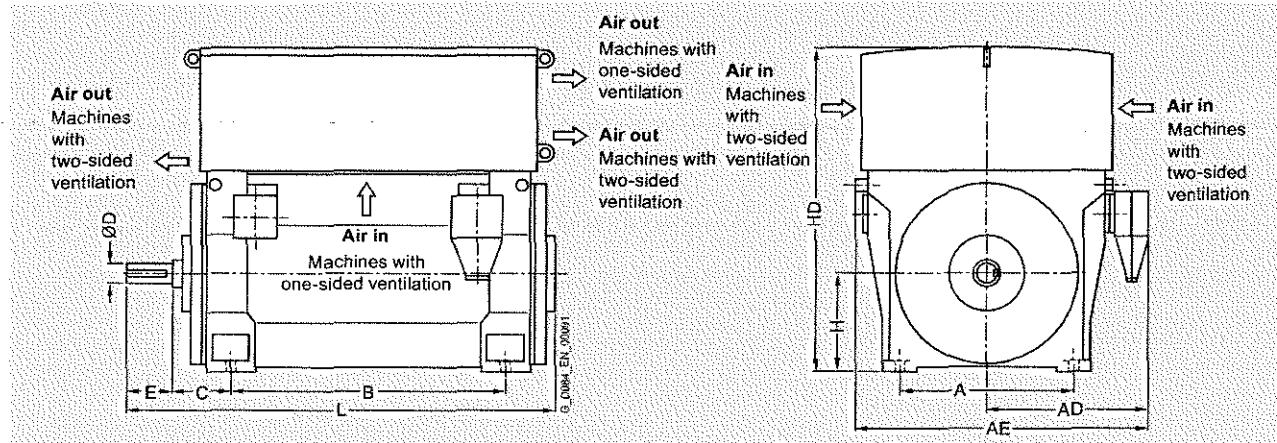
<sup>3)</sup> Dimension HD for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm
<b>12-pole</b>											
1RA6 450-5HJ.0	4150	850	930	1620	1180	250	140	200	450	1408	1896
1RA6 452-5HJ.0	4450	850	930	1620	1180	250	140	200	450	1408	1896
1RA6 454-5HJ.0	4800	850	930	1620	1400	280	140	200	450	1408	2136
1RA6 456-5HJ.0	5150	850	930	1620	1400	280	140	200	450	1408	2136
1RA4 500-5HE.0	5250	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4 502-5HE.0	5650	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4 504-5HE.0	6100	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4 506-5HE.0	6550	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4 560-5HE.0	7150	1060	1070	1900	1400	315	180	240	560	1750	2300
1RA4 562-5HE.0	7700	1060	1070	1900	1400	315	180	240	560	1750	2300
1RA4 564-5HE.0	8500	1060	1070	1900	1600	315	190	280	560	1750	2570
1RA4 566-5HE.0	8950	1060	1070	1900	1600	315	190	280	560	1750	2570
1RA4 630-5HE.0 <sup>2)</sup>	9950	1320	1180	2060	1600	335	220	280	630	2400	2500
1RA4 632-5HE.0 <sup>2)</sup>	10600	1320	1180	2060	1600	335	220	280	630	2400	2500
1RA4 634-5HE.0 <sup>2)</sup>	11600	1320	1180	2060	1800	335	220	280	630	2400	2740
1RA4 636-5HE.0 <sup>2)</sup>	12400	1320	1330	2210	1800	335	220	280	630	2400	2740

Note: Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> Roller bearings only for 50 Hz operation.

<sup>3)</sup> Dimension HD for 1RP6 on request.

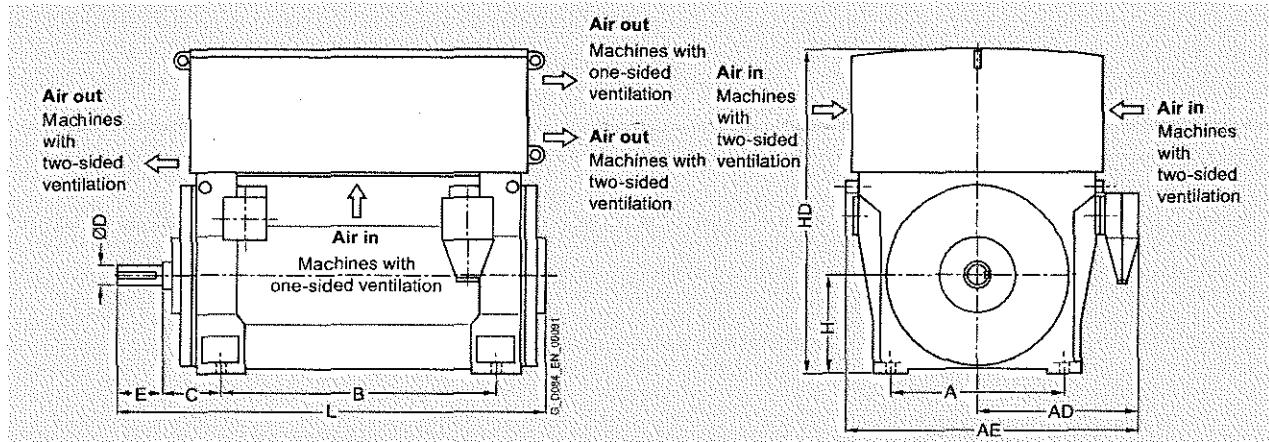


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	HD <sup>2)</sup> mm	L mm	
<b>2-pole</b>											
1RA6 450-2HJ.0 <sup>1)</sup>	3700	850	1070	1840	1180	280	95	130	450	1628	1875
1RA6 452-2HJ.0 <sup>1)</sup>	3900	850	1070	1840	1180	280	95	130	450	1628	1875
1RA6 454-2HJ.0 <sup>1)</sup>	4300	850	1070	1840	1400	280	95	130	450	1628	2085
1RA6 456-2HJ.0 <sup>1)</sup>	4550	850	1070	1840	1400	280	95	130	450	1628	2085
1RA6 500-2HJ.0 <sup>1)</sup>	5700	950	1270	1970	1320	315	110	165	500	1845	2103
1RA6 502-2HJ.0 <sup>1)</sup>	5850	950	1270	1970	1320	315	110	165	500	1845	2103
<b>4-pole</b>											
1RA6 450-4HJ.0	4050	850	1070	1840	1180	250	130	200	450	1408	1896
1RA6 452-4HJ.0	4250	850	1070	1840	1180	250	130	200	450	1408	1896
1RA6 454-4HJ.0	4650	850	1070	1840	1400	250	130	200	450	1408	2106
1RA6 456-4HJ.0	4950	850	1070	1840	1400	250	130	200	450	1408	2106
1RA6 500-4HJ.0	6250	950	1270	1970	1320	280	150	200	500	1845	2109
1RA6 502-4HJ.0	6450	950	1270	1970	1320	280	150	200	500	1845	2109
1RA6 504-4HJ.0	7150	950	1270	1970	1500	280	150	200	500	1845	2289
1RA6 506-4HJ.0	7450	950	1270	1970	1500	280	150	200	500	1845	2289
1RA6 560-4HJ.0	7950	1060	1340	2110	1400	315	170	240	560	2098	2300
1RA6 562-4HJ.0	8350	1060	1340	2110	1400	315	170	240	560	2098	2300
1RA6 564-4HJ.0	9300	1060	1340	2110	1600	315	170	240	560	2098	2530
1RA6 566-4HJ.0	9900	1060	1340	2110	1600	315	170	240	560	2098	2530
1RA4 630-4HE.0 <sup>1)</sup>	9850	1320	1320	2200	1600	335	200	280	630	2400	2500
1RA4 632-4HE.0 <sup>1)</sup>	10500	1320	1330	2210	1600	335	200	280	630	2400	2500
1RA4 634-4HE.0 <sup>1)</sup>	11550	1320	1330	2210	1800	335	220	280	630	2400	2740
1RA4 636-4HE.0 <sup>1)</sup>	12150	1320	1330	2210	1800	335	220	280	630	2400	2740

<sup>1)</sup> Roller bearings only for 50 Hz operation.

<sup>2)</sup> Dimension HD for 1RP6 on request.

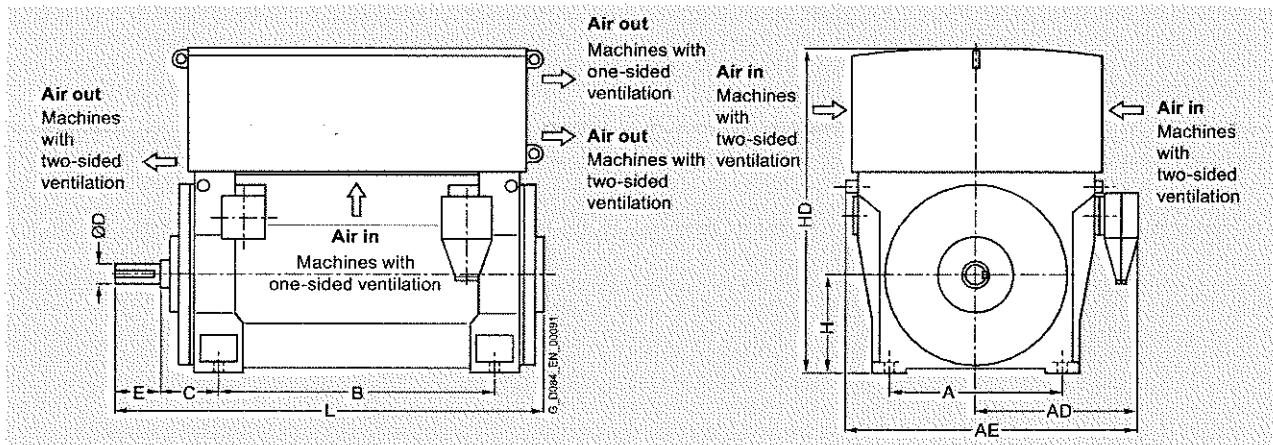


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions								
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD <sup>1)</sup> mm

Table 11401M1B3: Dimensions of combination, roller bearing motor 1RA4, 1RA6 series

#### 6-pole:

1RA6 450-6HJ.0	4150	850	1070	1840	1180	250	140	200	450	1408	1896
1RA6 452-6HJ.0	4400	850	1070	1840	1180	250	140	200	450	1408	1896
1RA6 454-6HJ.0	4750	850	1070	1840	1400	280	140	200	450	1408	2136
1RA6 456-6HJ.0	5100	850	1070	1840	1400	280	140	200	450	1408	2136
1RA4 500-6HE.0	5250	950	1220	1980	1320	280	160	240	500	1520	2270
1RA4 502-6HE.0	5650	950	1220	1980	1320	280	160	240	500	1520	2270
1RA4 504-6HE.0	6150	950	1220	1980	1500	280	170	240	500	1520	2480
1RA4 506-6HE.0	6550	950	1220	1980	1500	280	170	240	500	1520	2480
1RA4 560-6HE.0	7200	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 562-6HE.0	7700	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 564-6HE.0	8500	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 566-6HE.0	8950	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 630-6HE.0	10200	1320	1320	2200	1600	335	220	280	630	2400	2500
1RA4 632-6HE.0	10750	1320	1320	2200	1600	335	220	280	630	2400	2500
1RA4 634-6HE.0	11800	1320	1320	2200	1800	335	220	280	630	2400	2740
1RA4 636-6HE.0	12550	1320	1330	2210	1800	335	220	280	630	2400	2740

#### 8-pole:

1RA6 450-8HJ.0	4150	850	1070	1840	1180	250	140	200	450	1408	1896
1RA6 452-8HJ.0	4450	850	1070	1840	1180	250	140	200	450	1408	1896
1RA6 454-8HJ.0	4800	850	1070	1840	1400	280	140	200	450	1408	2136
1RA6 456-8HJ.0	5150	850	1070	1840	1400	280	140	200	450	1408	2136
1RA4 500-8HE.0	5300	950	1220	1980	1320	280	160	240	500	1520	2270
1RA4 502-8HE.0	5650	950	1220	1980	1320	280	160	240	500	1520	2270
1RA4 504-8HE.0	6150	950	1220	1980	1500	280	170	240	500	1520	2480
1RA4 506-8HE.0	6550	950	1220	1980	1500	280	170	240	500	1520	2480
1RA4 560-8HE.0	7150	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 562-8HE.0	7700	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 564-8HE.0	8550	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 566-8HE.0	8950	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 630-8HE.0	10050	1320	1320	2200	1600	335	220	280	630	2400	2500
1RA4 632-8HE.0	10600	1320	1320	2200	1600	335	220	280	630	2400	2500
1RA4 634-8HE.0	11600	1320	1320	2200	1800	335	220	280	630	2400	2740
1RA4 636-8HE.0	12350	1320	1320	2200	1800	335	220	280	630	2400	2740

<sup>1)</sup> Dimension HD for 1RP6 on request.

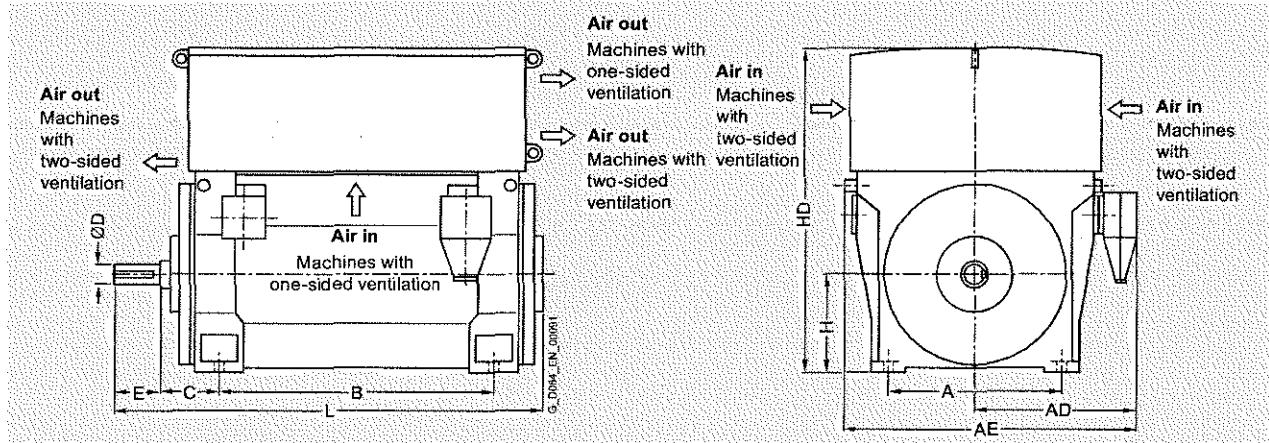


# Motors for line operation

## Air-cooled motors

### H-compact Plus 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD <sup>1)</sup> mm	L mm
<b>10-pole</b>											
1RA4 500-3HE.0	5250	950	1220	1980	1320	280	160	240	500	1520	2270
1RA4 502-3HE.0	5600	950	1220	1980	1320	280	160	240	500	1520	2270
1RA4 504-3HE.0	6150	950	1220	1980	1500	280	170	240	500	1520	2480
1RA4 506-3HE.0	6500	950	1220	1980	1500	280	170	240	500	1520	2480
1RA4 560-3HE.0	7350	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 562-3HE.0	7950	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 564-3HE.0	8750	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 566-3HE.0	9200	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 630-3HE.0	10000	1320	1320	2200	1600	335	220	280	630	2400	2500
1RA4 632-3HE.0	10600	1320	1320	2200	1600	335	220	280	630	2400	2500
1RA4 634-3HE.0	11550	1320	1320	2200	1800	335	220	280	630	2400	2740
1RA4 636-3HE.0	12300	1320	1320	2200	1800	335	220	280	630	2400	2740
<b>12-pole</b>											
1RA4 502-5HE.0	5650	950	1220	1980	1320	280	160	240	500	1520	2270
1RA4 504-5HE.0	6100	950	1220	1980	1500	280	170	240	500	1520	2480
1RA4 506-5HE.0	6500	950	1220	1980	1500	280	170	240	500	1520	2480
1RA4 560-5HE.0	7100	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 562-5HE.0	7650	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4 564-5HE.0	8450	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 566-5HE.0	8900	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4 630-5HE.0	10050	1320	1320	2200	1600	335	220	280	630	2400	2500
1RA4 632-5HE.0	10650	1320	1320	2200	1600	335	220	280	630	2400	2500
1RA4 634-5HE.0	11650	1320	1320	2200	1800	335	220	280	630	2400	2740
1RA4 636-5HE.0	12400	1320	1320	2200	1800	335	220	280	630	2400	2740

#### Note:

Higher pole numbers are available on request.

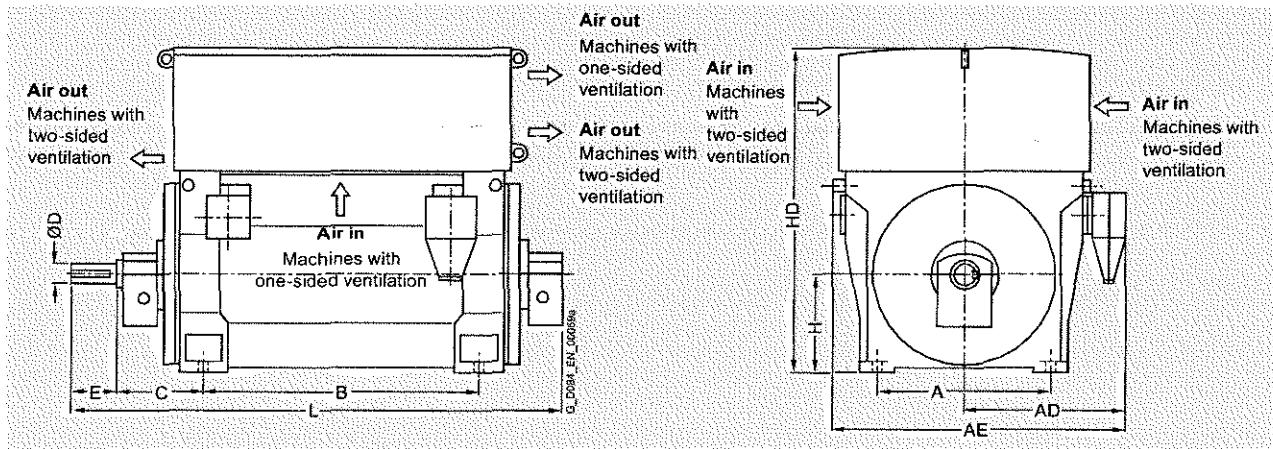
<sup>1)</sup> Dimension HD for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS (1RA1, 1RA6 and 1RP6)

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm	L mm

Table 1: Technical data of constructional details for bearings - 1RA4, 1RA6 series

#### 2-pole

1RA6 450-2HJ 0-Z K96 <sup>3)</sup>	3750	850	930	1620	1180	425	95	130	450	1628	2218
1RA6 452-2HJ 0-Z K96 <sup>3)</sup>	3950	850	930	1620	1180	425	95	130	450	1628	2218
1RA6 454-2HJ 0-Z K96 <sup>3)</sup>	4300	850	930	1620	1400	425	95	130	450	1628	2428
1RA6 456-2HJ 0-Z K96 <sup>3)</sup>	4550	850	930	1620	1400	425	95	130	450	1628	2428
1RA6 500-2HJ 0-Z K96 <sup>3)</sup>	5800	950	1135	1835	1320	450	110	165	500	1845	2455
1RA6 502-2HJ 0-Z K96 <sup>3)</sup>	5950	950	1135	1835	1320	450	110	165	500	1845	2455
1RA6 504-2HJ 0	6750	950	1135	1835	1500	450	110	165	500	1845	2635
1RA6 506-2HJ 0	7050	950	1135	1835	1500	450	110	165	500	1845	2635
1RA6 560-2HJ 0	7950	1060	1205	1975	1400	600	130	200	560	2098	2830
1RA6 562-2HJ 0	8350	1060	1205	1975	1400	600	130	200	560	2098	2830
1RA6 564-2HJ 0	9350	1060	1205	1975	1600	600	130	200	560	2098	3060
1RA6 566-2HJ 0	9800	1060	1205	1975	1600	600	130	200	560	2098	3060
1RA4 630-2HE 0	9700	1320	1330	2210	1600	560	150	200	630	2400	2820
1RA4 632-2HE 0	10350	1320	1330	2210	1600	560	150	200	630	2400	2820
1RA4 634-2HE 0	11450	1320	1330	2210	1800	560	160	240	630	2400	3100
1RA4 636-2HE 0	12250	1320	1330	2210	1800	560	160	240	630	2400	3100

#### 4-pole

1RA6 450-4HJ 0-Z K96	4100	850	930	1620	1180	500	130	200	450	1408	2438
1RA6 452-4HJ 0-Z K96	4350	850	930	1620	1180	500	130	200	450	1408	2438
1RA6 454-4HJ 0-Z K96	4750	850	930	1620	1400	500	130	200	450	1408	2648
1RA6 456-4HJ 0-Z K96	5000	850	930	1620	1400	500	130	200	450	1408	2648
1RA6 500-4HJ 0-Z K96	6550	950	1135	1835	1320	560	150	200	500	1845	2700
1RA6 502-4HJ 0-Z K96	6800	950	1135	1835	1320	560	150	200	500	1845	2700
1RA6 504-4HJ 0-Z K96	7500	950	1135	1835	1500	560	150	200	500	1845	2880
1RA6 506-4HJ 0-Z K96	7800	950	1135	1835	1500	560	150	200	500	1845	2880
1RA6 560-4HJ 0-Z K96	8150	1060	1205	1975	1400	600	170	240	560	2098	2870
1RA6 562-4HJ 0-Z K96	8550	1060	1205	1975	1400	600	170	240	560	2098	2870
1RA6 564-4HJ 0-Z K96	9500	1060	1205	1975	1600	600	170	240	560	2098	3100
1RA6 566-4HJ 0-Z K96	10050	1060	1205	1975	1600	600	170	240	560	2098	3100

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> Dimension HD for 1RP6 on request.

<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, '-Z K96' not necessary.

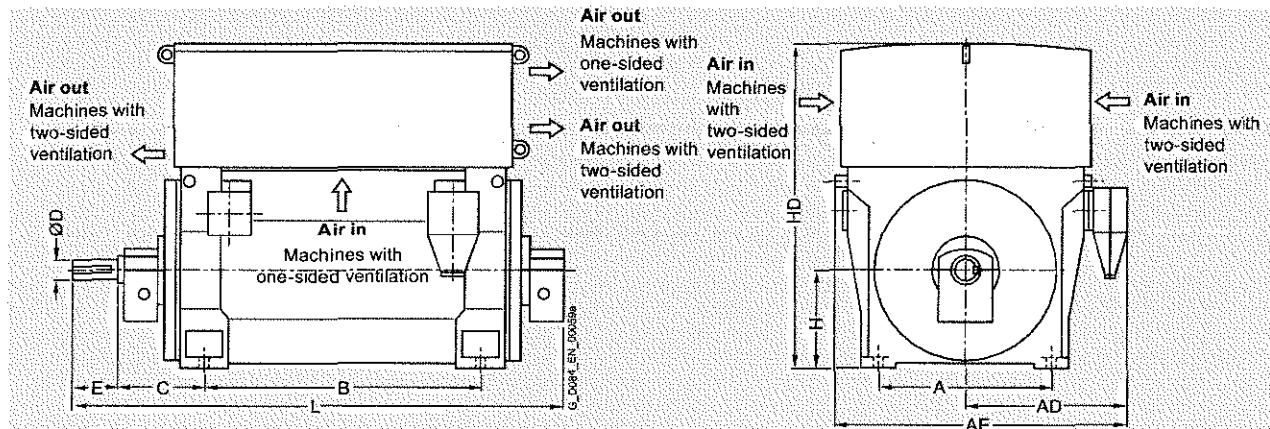


# Motors for line operation

## Air-cooled motors

### H-compact PLUS (1RA4, 1RA6 and 1RP6)

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm
<b>4-pole</b>											
1RA4 630-4HE.0-Z K96 <sup>2)</sup>	10250	1320	1330	2210	1600	600	200	280	630	2400	2970
1RA4 632-4HE.0-Z K96 <sup>2)</sup>	10950	1320	1330	2210	1600	600	200	280	630	2400	2970
1RA4 634-4HE.0-Z K96 <sup>2)</sup>	11950	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4 636-4HE.0-Z K96 <sup>2)</sup>	12500	1320	1330	2210	1800	600	220	280	630	2400	3210
<b>6-pole</b>											
1RA6 450-6HJ.0-Z K96	4200	850	930	1620	1180	500	140	200	450	1408	2438
1RA6 452-6HJ.0-Z K96	4500	850	930	1620	1180	500	140	200	450	1408	2438
1RA6 454-6HJ.0-Z K96	4850	850	930	1620	1400	500	140	200	450	1408	2648
1RA6 456-6HJ.0-Z K96	5200	850	930	1620	1400	500	140	200	450	1408	2648
1RA4 500-6HE.0-Z K96	5450	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4 502-6HE.0-Z K96	5800	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4 504-6HE.0-Z K96	6350	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4 506-6HE.0-Z K96	6750	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4 560-6HE.0-Z K96	7450	1060	1210	2040	1400	530	180	240	560	1750	2670
1RA4 562-6HE.0-Z K96	8050	1060	1210	2040	1400	530	180	240	560	1750	2670
1RA4 564-6HE.0-Z K96	8850	1060	1210	2040	1600	530	190	280	560	1750	2940
1RA4 566-6HE.0-Z K96	9300	1060	1210	2040	1600	530	190	280	560	1750	2940
1RA4 630-6HE.0-Z K96	10500	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4 632-6HE.0-Z K96	11050	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4 634-6HE.0-Z K96	12100	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4 636-6HE.0-Z K96	12850	1320	1330	2210	1800	600	220	280	630	2400	3210
<b>8-pole</b>											
1RA6 450-8HJ.0-Z K96	4250	850	930	1620	1180	500	140	200	450	1408	2438
1RA6 452-8HJ.0-Z K96	4550	850	930	1620	1180	500	140	200	450	1408	2438
1RA6 454-8HJ.0-Z K96	4900	850	930	1620	1400	500	140	200	450	1408	2648
1RA6 456-8HJ.0-Z K96	5250	850	930	1620	1400	500	140	200	450	1408	2648
1RA4 500-8HE.0-Z K96	5500	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4 502-8HE.0-Z K96	5850	950	1000	1760	1320	500	160	240	500	1520	2620

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

<sup>3)</sup> Dimension HD for 1RP6 on request.

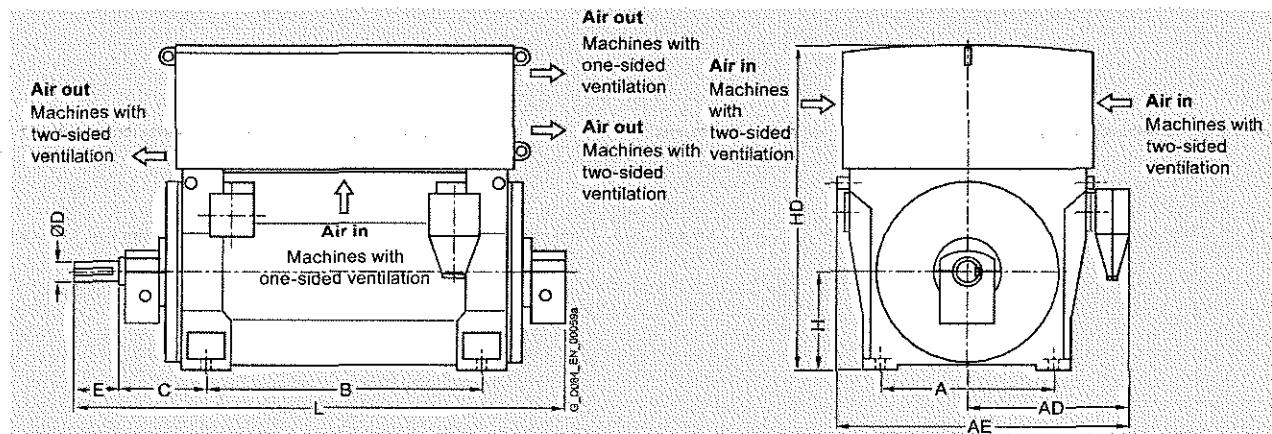


# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm
<b>Universal dimensions for construction with sleeve bearing - 1RA4, 1RA6 and 1RP6</b>											
8-pole											
1RA4 504-8HE 0-Z K96	6350	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4 506-8HE 0-Z K96	6700	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4 560-8HE 0-Z K96	7400	1060	1070	1900	1400	530	180	240	560	1750	2670
1RA4 562-8HE 0-Z K96	7950	1060	1070	1900	1400	530	180	240	560	1750	2670
1RA4 564-8HE 0-Z K96	8750	1060	1070	1900	1600	530	190	280	560	1750	2940
1RA4 566-8HE 0-Z K96	9250	1060	1070	1900	1600	530	190	280	560	1750	2940
1RA4 630-8HE 0-Z K96 <sup>2)</sup>	10400	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4 632-8HE 0-Z K96 <sup>2)</sup>	11050	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4 634-8HE 0-Z K96 <sup>2)</sup>	12000	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4 636-8HE 0-Z K96 <sup>2)</sup>	12700	1320	1330	2210	1800	600	220	280	630	2400	3210
10-pole											
1RA6 450-3HJ 0-Z K96	4250	850	930	1620	1180	500	140	200	450	1408	2438
1RA6 452-3HJ 0-Z K96	4550	850	930	1620	1180	500	140	200	450	1408	2438
1RA6 454-3HJ 0-Z K96	4900	850	930	1620	1400	500	140	200	450	1408	2648
1RA6 456-3HJ 0-Z K96	5250	850	930	1620	1400	500	140	200	450	1408	2648
1RA6 500-3HE 0-Z K96	5400	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4 502-3HE 0-Z K96	5800	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4 504-3HE 0-Z K96	6350	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4 506-3HE 0-Z K96	6700	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4 560-3HE 0-Z K96	7350	1060	1070	1900	1400	530	180	240	560	1750	2670
1RA4 562-3HE 0-Z K96	7900	1060	1070	1900	1400	530	180	240	560	1750	2670
1RA4 564-3HE 0-Z K96	8700	1060	1070	1900	1600	530	190	280	560	1750	2940
1RA4 566-3HE 0-Z K96	9200	1060	1070	1900	1600	530	190	280	560	1750	2940
1RA4 630-3HE 0-Z K96 <sup>2)</sup>	10350	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4 632-3HE 0-Z K96 <sup>2)</sup>	11000	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4 634-3HE 0-Z K96 <sup>2)</sup>	12050	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4 636-3HE 0-Z K96 <sup>2)</sup>	12750	1320	1330	2210	1800	600	220	280	630	2400	3210

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

<sup>3)</sup> Dimension HD for 1RP6 on request.

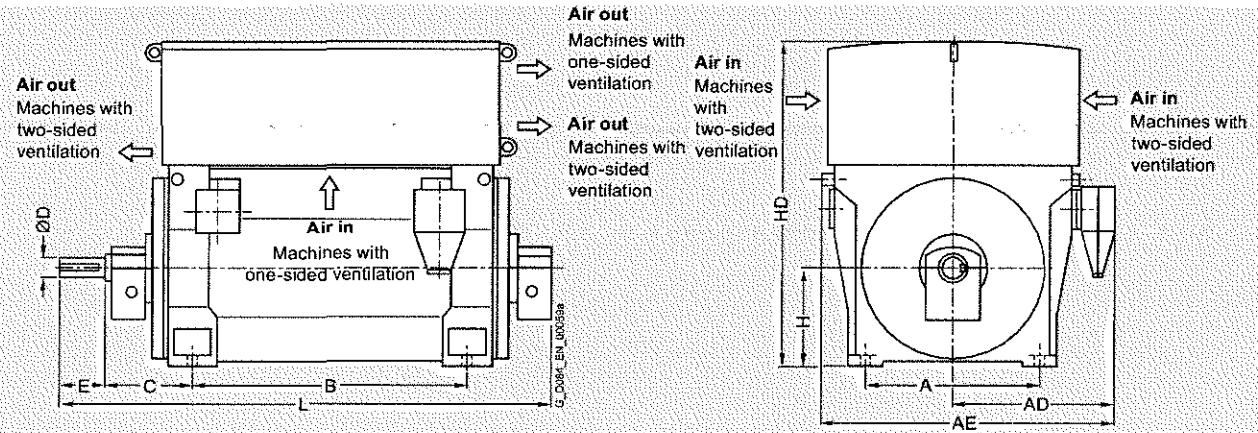


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm
<b>12-pole</b>											
1RA6 450-5HJ.0-Z K96	4250	850	930	1620	1180	500	140	200	450	1408	2438
1RA6 452-5HJ.0-Z K96	4550	850	930	1620	1180	500	140	200	450	1408	2438
1RA6 454-5HJ.0-Z K96	4900	850	930	1620	1400	500	140	200	450	1408	2648
1RA6 456-5HJ.0-Z K96	5250	850	930	1620	1400	500	140	200	450	1408	2648
1RA4 500-5HE.0-Z K96	5450	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4 502-5HE.0-Z K96	5800	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4 504-5HE.0-Z K96	6250	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4 506-5HE.0-Z K96	6700	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4 560-5HE.0-Z K96	7350	1060	1070	1900	1400	530	180	240	560	1750	2670
1RA4 562-5HE.0-Z K96	7950	1060	1070	1900	1400	530	180	240	560	1750	2670
1RA4 564-5HE.0-Z K96	8700	1060	1070	1900	1600	530	190	280	560	1750	2940
1RA4 566-5HE.0-Z K96	9150	1060	1070	1900	1600	530	190	280	560	1750	2940
1RA4 630-5HE.0-Z K96 <sup>2)</sup>	10250	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4 632-5HE.0-Z K96 <sup>2)</sup>	10850	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4 634-5HE.0-Z K96 <sup>2)</sup>	11850	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4 636-5HE.0-Z K96 <sup>2)</sup>	12700	1320	1330	2210	1800	600	220	280	630	2400	3210

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

<sup>3)</sup> Dimension HD for 1RP6 on request.

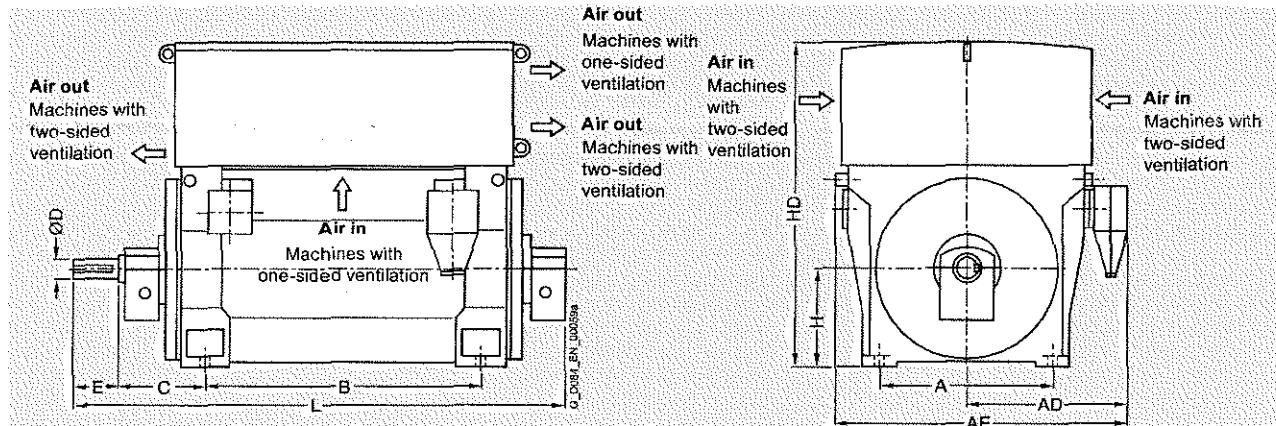


# Motors for line operation

## Air-cooled motors

Hcompact PLUS / RA6, 1RA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD <sup>1</sup> mm	L mm
<b>General dimensions for construction, cover versions: 1RA6, 1RP6 series</b>											
<b>2-pole</b>											
1RA6 450-2HJ.0-Z K96 <sup>2)</sup>	3750	850	1070	1840	1180	425	95	130	450	1628	2218
1RA6 452-2HJ.0-Z K96 <sup>2)</sup>	3950	850	1070	1840	1180	425	95	130	450	1628	2218
1RA6 454-2HJ.0-Z K96 <sup>2)</sup>	4300	850	1070	1840	1400	425	95	130	450	1628	2428
1RA6 456-2HJ.0-Z K96 <sup>2)</sup>	4550	850	1070	1840	1400	425	95	130	450	1628	2428
1RA6 500-2HJ.0-Z K96 <sup>2)</sup>	5800	950	1270	1970	1320	450	110	165	500	1845	2455
1RA6 502-2HJ.0-Z K96 <sup>2)</sup>	5950	950	1270	1970	1320	450	110	165	500	1845	2455
1RA6 504-2HJ.0	6750	950	1270	1970	1500	450	110	165	500	1845	2635
1RA6 506-2HJ.0	7050	950	1270	1970	1500	450	110	165	500	1845	2635
1RA6 560-2HJ.0	7950	1060	1340	2110	1400	600	130	200	560	2098	2830
1RA6 562-2HJ.0	8350	1060	1340	2110	1400	600	130	200	560	2098	2830
1RA6 564-2HJ.0	9350	1060	1340	2110	1600	600	130	200	560	2098	3060
1RA6 566-2HJ.0	9800	1060	1340	2110	1600	600	130	200	560	2098	3060
1RA4 630-2HE.0	9600	1320	1330	2200	1600	560	150	200	630	2400	2820
1RA4 632-2HE.0	10250	1320	1330	2210	1600	560	150	200	630	2400	2820
1RA4 634-2HE.0	11300	1320	1330	2210	1800	560	160	240	630	2400	3100
1RA4 636-2HE.0	12150	1320	1330	2210	1800	560	160	240	630	2400	3100
<b>4-pole</b>											
1RA6 450-4HJ.0-Z K96	4100	850	1070	1840	1180	500	130	200	450	1408	2438
1RA6 452-4HJ.0-Z K96	4350	850	1070	1840	1180	500	130	200	450	1408	2438
1RA6 454-4HJ.0-Z K96	4750	850	1070	1840	1400	500	130	200	450	1408	2645
1RA6 456-4HJ.0-Z K96	5000	850	1070	1840	1400	500	130	200	450	1408	2645
1RA6 500-4HJ.0-Z K96	6550	950	1270	1970	1320	560	150	200	500	1845	2700
1RA6 502-4HJ.0-Z K96	6800	950	1270	1970	1320	560	150	200	500	1845	2700
1RA6 504-4HJ.0-Z K96	7500	950	1270	1970	1500	560	150	200	500	1845	2880
1RA6 506-4HJ.0-Z K96	7800	950	1270	1970	1500	560	150	200	500	1845	2880
1RA6 560-4HJ.0-Z K96	8150	1060	1340	2110	1400	600	170	240	560	2098	2870
1RA6 562-4HJ.0-Z K96	8550	1060	1340	2110	1400	600	170	240	560	2098	2870
1RA6 564-4HJ.0-Z K96	9500	1060	1340	2110	1600	600	170	240	560	2098	3100
1RA6 566-4HJ.0-Z K96	10050	1060	1340	2110	1600	600	170	240	560	2098	3100

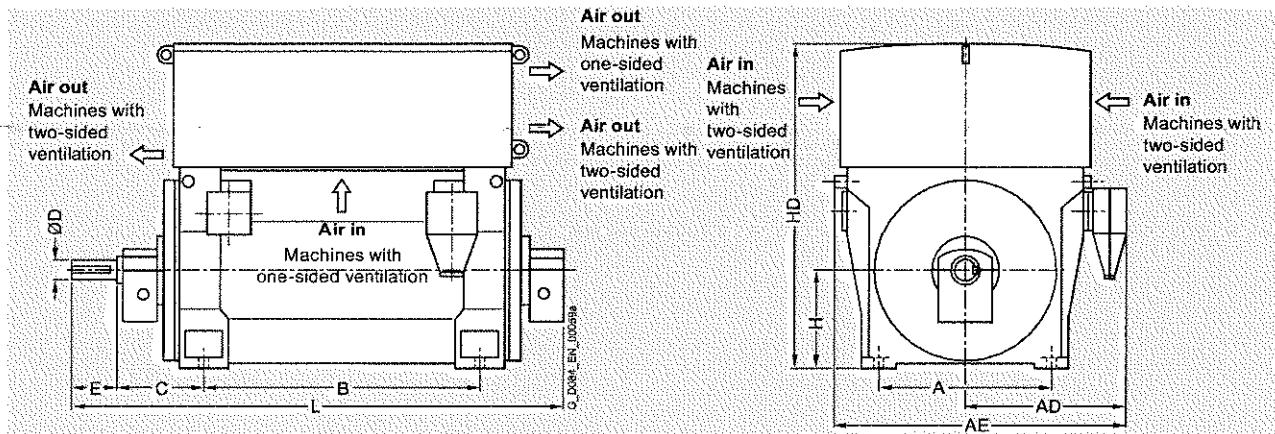
<sup>1)</sup> Dimension HD for 1RP6 on request.<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "Z K96" not necessary.

# Motors for line operation

## Air-cooled motors

### H-compact PI US 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm	L mm
<b>DIN IEC 60034-5-6 type of construction, sleeve bearings - 1RA4, 1RA6 series</b>											
4-pole											
1RA4 630-4HE.0-Z K96 <sup>1)</sup>	10150	1320	1320	2200	1600	600	200	280	630	2400	2970
1RA4 632-4HE.0-Z K96 <sup>1)</sup>	10800	1320	1330	2210	1600	600	200	280	630	2400	2970
1RA4 634-4HE.0-Z K96 <sup>1)</sup>	11800	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4 636-4HE.0-Z K96 <sup>1)</sup>	12400	1320	1330	2210	1800	600	220	280	630	2400	3210
6-pole											
1RA6 450-6HJ.0-Z K96	4200	850	1070	1840	1180	500	140	200	450	1408	2438
1RA6 452-6HJ.0-Z K96	4500	850	1070	1840	1180	500	140	200	450	1408	2438
1RA6 454-6HJ.0-Z K96	4850	850	1070	1840	1400	500	140	200	450	1408	2648
1RA6 456-6HJ.0-Z K96	5200	850	1070	1840	1400	500	140	200	450	1408	2648
1RA4 500-6HE.0-Z K96	5450	950	1150	1980	1320	500	160	240	500	1520	2430
1RA4 502-6HE.0-Z K96	5800	950	1150	1980	1320	500	160	240	500	1520	2430
1RA4 504-6HE.0-Z K96	6300	950	1150	1980	1500	500	170	240	500	1520	2680
1RA4 506-6HE.0-Z K96	6700	950	1150	1980	1500	500	170	240	500	1520	2680
1RA4 560-6HE.0-Z K96	7400	1060	1220	2040	1400	530	180	240	560	1750	2670
1RA4 562-6HE.0-Z K96	7900	1060	1220	2040	1400	530	180	240	560	1750	2670
1RA4 564-6HE.0-Z K96	8700	1060	1220	2040	1600	530	190	280	560	1750	2960
1RA4 566-6HE.0-Z K96	9150	1060	1220	2040	1600	530	190	280	560	1750	2960
1RA4 630-6HE.0-Z K96	10500	1320	1320	2200	1600	600	220	280	630	2400	2970
1RA4 632-6HE.0-Z K96	11050	1320	1320	2200	1600	600	220	280	630	2400	2970
1RA4 634-6HE.0-Z K96	12100	1320	1320	2200	1800	600	220	280	630	2400	3210
1RA4 636-6HE.0-Z K96	12850	1320	1330	2210	1800	600	220	280	630	2400	3210

<sup>1)</sup> For the 60 Hz version, sleeve bearings are standard, "Z K96" not necessary.

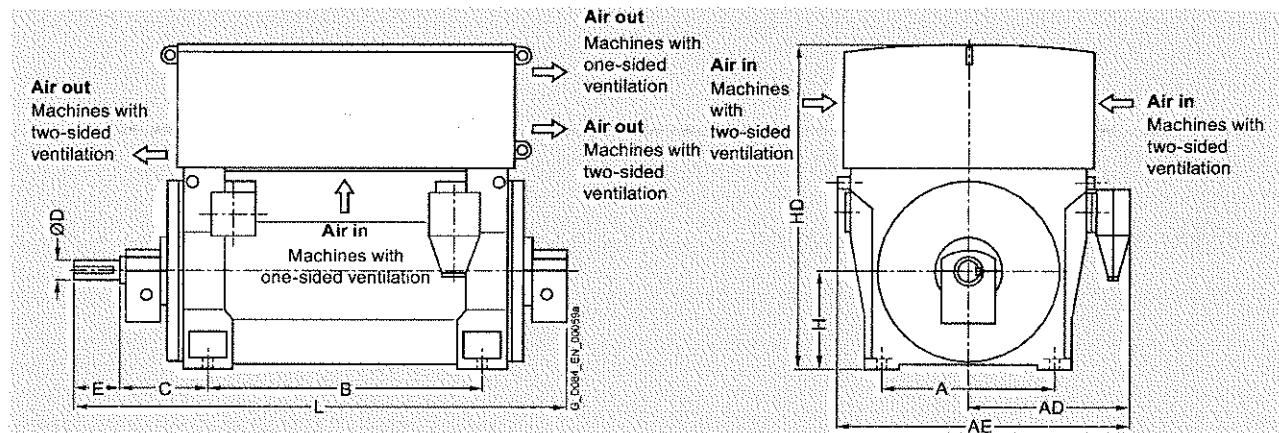
<sup>2)</sup> Dimension HD for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD <sup>1</sup> mm	L mm
<b>1RA4 1RA6 1RP6: types of construction, sleeve bearings, 1RA4/1RA6 series</b>											
8-pole											
1RA6 450-8HJ-0-Z K96	4250	850	1070	1840	1180	500	140	200	450	1408	2438
1RA6 452-8HJ-0-Z K96	4550	850	1070	1840	1180	500	140	200	450	1408	2438
1RA6 454-8HJ-0-Z K96	4900	850	1070	1840	1400	500	140	200	450	1408	2648
1RA6 456-8HJ-0-Z K96	5250	850	1070	1840	1400	500	140	200	450	1408	2648
1RA4 500-8HE-0-Z K96	5450	950	1150	1980	1320	500	160	240	500	1520	2430
1RA4 502-8HE-0-Z K96	5850	950	1150	1980	1320	500	160	240	500	1520	2430
1RA4 504-8HE-0-Z K96	6350	950	1150	1980	1500	500	170	240	500	1520	2680
1RA4 506-8HE-0-Z K96	6700	950	1150	1980	1500	500	170	240	500	1520	2680
1RA4 560-8HE-0-Z K96	7400	1060	1220	2040	1400	530	180	240	560	1750	2670
1RA4 562-8HE-0-Z K96	7950	1060	1220	2040	1400	530	180	240	560	1750	2670
1RA4 564-8HE-0-Z K96	8750	1060	1220	2040	1600	530	190	280	560	1750	2960
1RA4 566-8HE-0-Z K96	9150	1060	1220	2040	1600	530	190	280	560	1750	2960
1RA4 630-8HE-0-Z K96	10300	1320	1320	2200	1600	600	220	280	630	2400	2970
1RA4 632-8HE-0-Z K96	10900	1320	1320	2200	1600	600	220	280	630	2400	2970
1RA4 634-8HE-0-Z K96	11900	1320	1320	2200	1800	600	220	280	630	2400	3210
1RA4 636-8HE-0-Z K96	12600	1320	1320	2200	1800	600	220	280	630	2400	3210
10-pole											
1RA4 500-3HE-0-Z K96	5400	950	1150	1980	1320	500	160	240	500	1520	2430
1RA4 502-3HE-0-Z K96	5800	950	1150	1980	1320	500	160	240	500	1520	2430
1RA4 504-3HE-0-Z K96	6300	950	1150	1980	1500	500	170	240	500	1520	2680
1RA4 506-3HE-0-Z K96	6650	950	1150	1980	1500	500	170	240	500	1520	2680
1RA4 560-3HE-0-Z K96	7550	1060	1220	2040	1400	530	180	240	560	1750	2670
1RA4 562-3HE-0-Z K96	8150	1060	1220	2040	1400	530	180	240	560	1750	2670
1RA4 564-3HE-0-Z K96	8950	1060	1220	2040	1600	530	190	280	560	1750	2960
1RA4 566-3HE-0-Z K96	9400	1060	1220	2040	1600	530	190	280	560	1750	2960
1RA4 630-3HE-0-Z K96	10300	1320	1320	2200	1600	600	220	280	630	2400	2970
1RA4 632-3HE-0-Z K96	10900	1320	1320	2200	1600	600	220	280	630	2400	2970
1RA4 634-3HE-0-Z K96	11850	1320	1320	2200	1800	600	220	280	630	2400	3210
1RA4 636-3HE-0-Z K96	12550	1320	1320	2200	1800	600	220	280	630	2400	3210

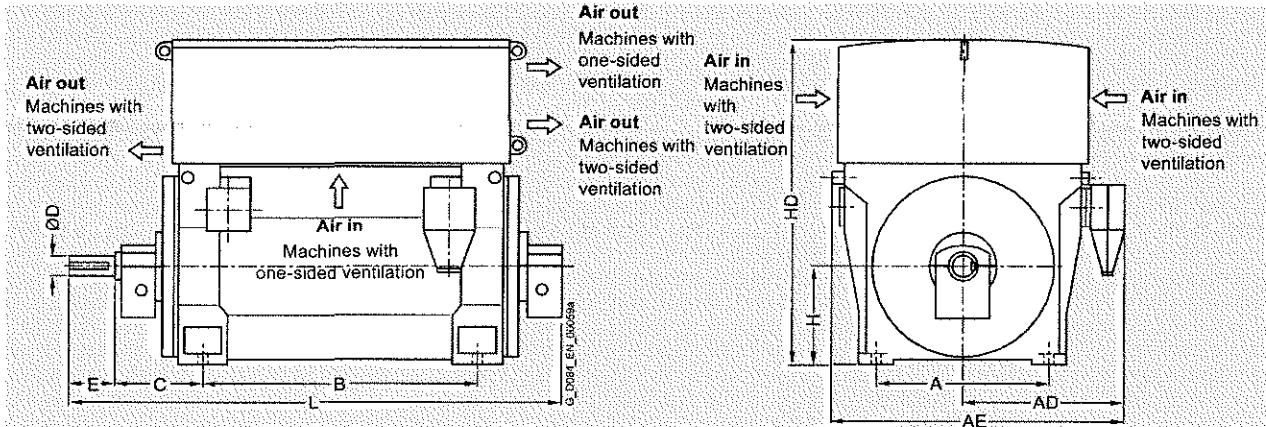
<sup>1</sup>) Dimension HD for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD <sup>1)</sup> mm	L mm
<b>1. 1RA4/Motor construction sleeve bearing (1RA4-1RP6)</b>											
12-pôle											
1RA4 502-5HE-0-Z K96	5800	950	1150	1980	1320	500	160	240	500	1520	2430
1RA4 504-5HE-0-Z K96	6250	950	1150	1980	1500	500	170	240	500	1520	2680
1RA4 506-5HE-0-Z K96	6650	950	1150	1980	1500	500	170	240	500	1520	2680
1RA4 560-5HE-0-Z K96	7350	1060	1220	2040	1400	530	180	240	560	1750	2670
1RA4 562-5HE-0-Z K96	7850	1060	1220	2040	1400	530	180	240	560	1750	2670
1RA4 564-5HE-0-Z K96	8650	1060	1220	2040	1600	530	190	280	560	1750	2960
1RA4 566-5HE-0-Z K96	9150	1060	1220	2040	1600	530	190	280	560	1750	2960
1RA4 630-5HE-0-Z K96	10300	1320	1320	2200	1600	600	220	280	630	2400	2970
1RA4 632-5HE-0-Z K96	10950	1320	1320	2200	1600	600	220	280	630	2400	2970
1RA4 634-5HE-0-Z K96	11950	1320	1320	2200	1800	600	220	280	630	2400	3210
1RA4 636-5HE-0-Z K96	12650	1320	1320	2200	1800	600	220	280	630	2400	3210

Note:

Higher pole numbers are available on request.

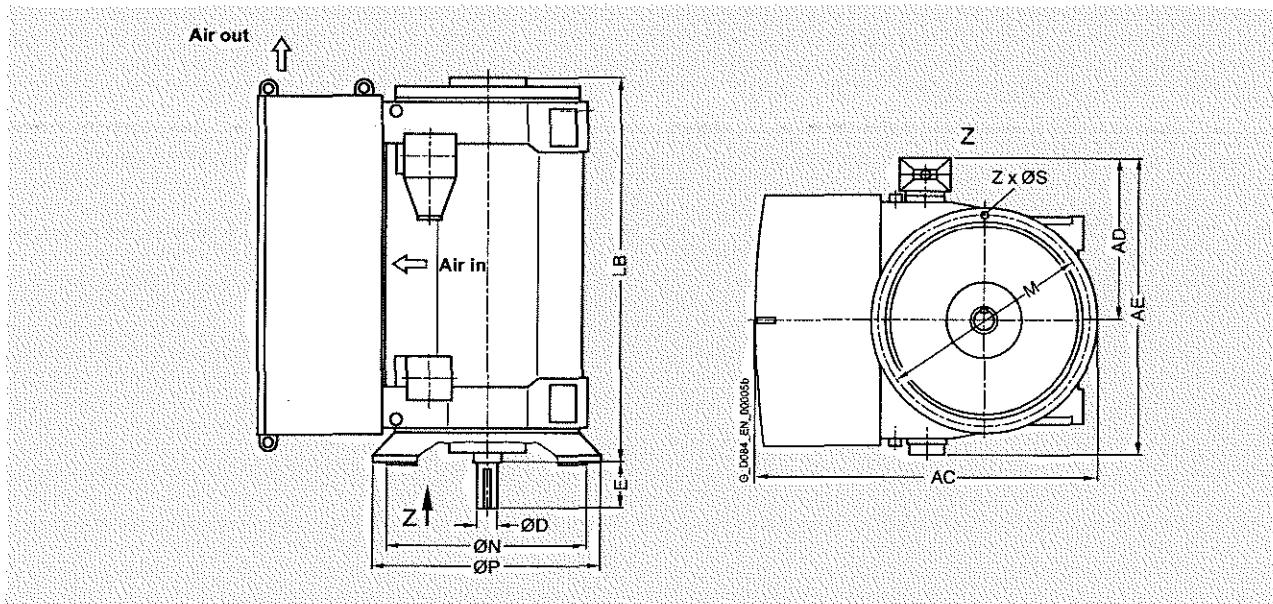
<sup>1)</sup> Dimension HD for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

E-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions												Z Quantity
		AC <sup>3)</sup> mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>Up to 5.5 kV, IM V1 type of construction, roller bearings - 1RA4, 1RA6 series</b>														
<b>4-pole</b>														
1RA6 450-4HJ.8	4250	1533	930	1620	130	200	1720	1150	1000	1080	26	8		
1RA6 452-4HJ.8	4450	1533	930	1620	130	200	1720	1150	1000	1080	26	8		
1RA6 454-4HJ.8	4850	1533	930	1620	130	200	1930	1150	1000	1080	26	8		
1RA6 456-4HJ.8	5150	1533	930	1620	130	200	1930	1150	1000	1080	26	8		
1RA4 500-4HE.8	5250	1640	1000	1810	150	200	1910	1250	1120	1180	26	16		
1RA4 502-4HE.8	5450	1640	1000	1810	150	200	1910	1250	1120	1180	26	16		
1RA4 504-4HE.8	6150	1640	1000	1810	160	240	2120	1250	1120	1180	26	16		
1RA4 506-4HE.8	6550	1640	1000	1810	160	240	2120	1250	1120	1180	26	16		
1RA4 560-4HE.8	7250	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 562-4HE.8 <sup>2)</sup>	7700	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 564-4HE.8 <sup>2)</sup>	8600	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 566-4HE.8 <sup>2)</sup>	9050	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 630-4HE.8 <sup>2)</sup>	11600	2430	1330	2300	200	280	2470	2000	1800	1900	33	16		
1RA4 632-4HE.8 <sup>2)</sup>	12300	2430	1330	2300	200	280	2470	2000	1800	1900	33	16		
1RA4 634-4HE.8 <sup>2)</sup>	13350	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
1RA4 636-4HE.8 <sup>2)</sup>	13900	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
<b>6-pole</b>														
1RA6 450-6HJ.8	4350	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6 452-6HJ.8	4600	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6 454-6HJ.8	4950	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA6 456-6HJ.8	5300	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA4 500-6HE.8	5400	1640	1000	1810	160	240	1910	1250	1120	1180	26	16		
1RA4 502-6HE.8	5750	1640	1000	1810	160	240	1910	1250	1120	1180	26	16		

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> Vertical type of construction, only in the 50 Hz version.

<sup>3)</sup> Dimension AC for 1RP6 on request.

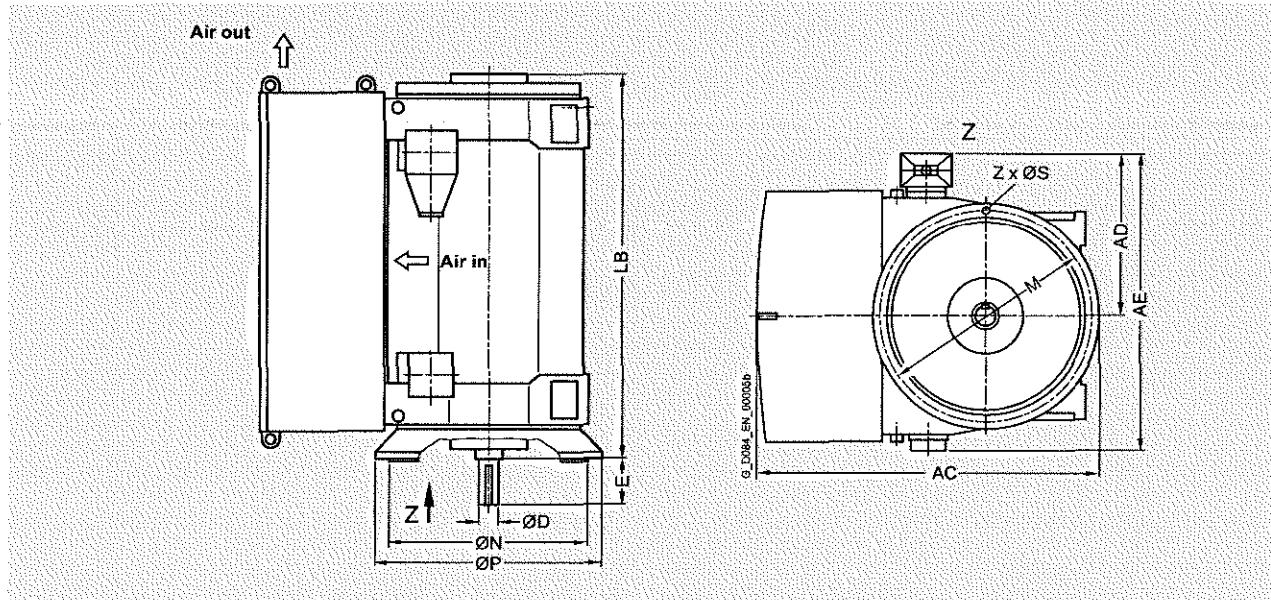


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions	AC <sup>2)</sup> mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z Quantity	
<b>Up to 6 kV, IM VI type of construction, roller bearings – 1RA4, 1RA6 series</b>														
<b>6-pole</b>														
1RA4 504-6HE.8	6300	1640	1000	1810	170	240	2120	1250	1120	1180	26	16		
1RA4 506-6HE.8	6700	1640	1000	1810	170	240	2120	1250	1120	1180	26	16		
1RA4 560-6HE.8	7400	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 562-6HE.8	8000	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 564-6HE.8	8800	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 566-6HE.8	9300	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 630-6HE.8	11900	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4 632-6HE.8	12450	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4 634-6HE.8	13450	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
1RA4 636-6HE.8	14200	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
<b>8-pole</b>														
1RA6 450-8HJ.8	4350	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6 452-8HJ.8	4650	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6 454-8HJ.8	5000	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA6 456-8HJ.8	5350	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA4 500-8HE.8	5450	1640	1000	1810	160	240	1910	1250	1120	1180	26	16		
1RA4 502-8HE.8	5800	1640	1000	1810	160	240	1910	1250	1120	1180	26	16		
1RA4 504-8HE.8	6300	1640	1000	1810	170	240	2120	1250	1120	1180	26	16		
1RA4 506-8HE.8	6700	1640	1000	1810	170	240	2120	1250	1120	1180	26	16		
1RA4 560-8HE.8	7350	1890	1070	1960	180	240	2090	1400	1250	1320	26	16		
1RA4 562-8HE.8	7900	1890	1070	1960	180	240	2090	1400	1250	1320	26	16		
1RA4 564-8HE.8	8700	1890	1070	1960	190	280	2320	1400	1250	1320	26	16		
1RA4 566-8HE.8	9200	1890	1070	1960	190	280	2320	1400	1250	1320	26	16		

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

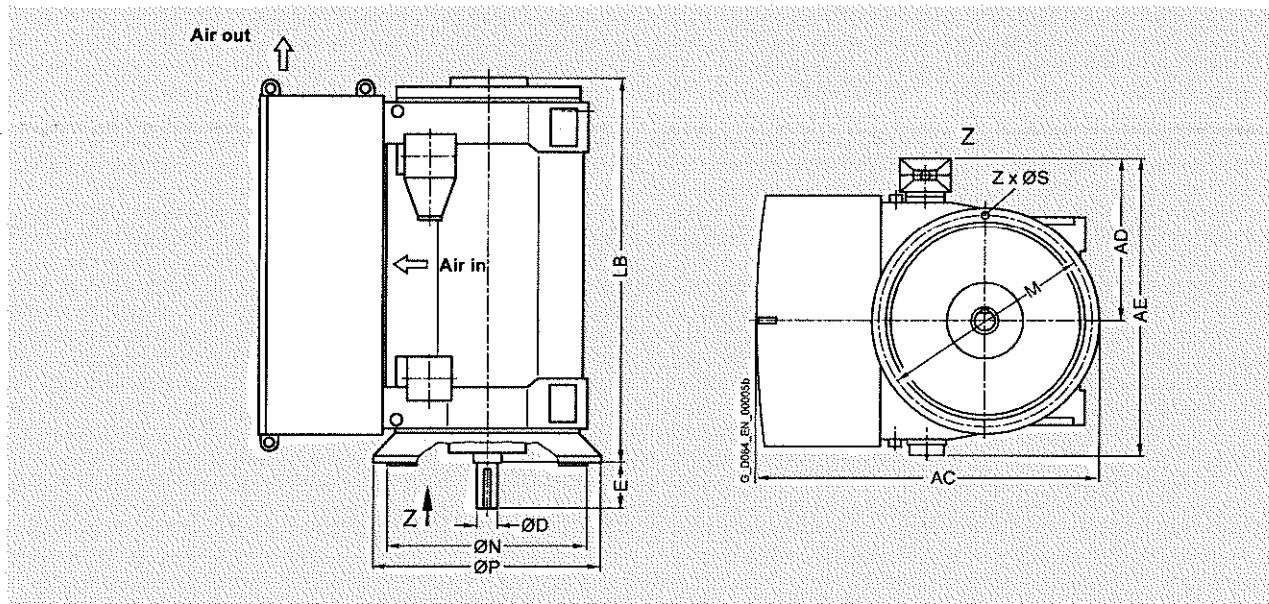
<sup>2)</sup> Dimension AC for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												
		AC <sup>3)</sup> mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z	Quantity	
<b>Up to 6 kV, IM VI type of construction, roller bearings – 1RA4, 1RA6 series</b>														
8-pole														
1RA4 630-8HE 8 <sup>2)</sup>	11800	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4 632-8HE 8 <sup>2)</sup>	12450	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4 634-8HE 8 <sup>2)</sup>	13350	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
1RA4 636-8HE 8 <sup>2)</sup>	14100	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
10-pole														
1RA6 450-3HJ 8	4350	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6 452-3HJ 8	4650	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6 454-3HJ 8	5000	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA6 456-3HJ 8	5350	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA4 500-3HE 8	5350	1640	1000	1810	160	240	1910	1250	1120	1180	26	16		
1RA4 502-3HE 8	5750	1640	1000	1810	160	240	1910	1250	1120	1180	26	16		
1RA4 504-3HE 8	6300	1640	1000	1810	170	240	2120	1250	1120	1180	26	16		
1RA4 506-3HE 8	6650	1640	1000	1810	170	240	2120	1250	1120	1180	26	16		
1RA4 560-3HE 8	7300	1890	1070	1960	180	240	2090	1400	1250	1320	26	16		
1RA4 562-3HE 8	7900	1890	1070	1960	180	240	2090	1400	1250	1320	26	16		
1RA4 564-3HE 8	8700	1890	1070	1960	190	280	2320	1400	1250	1320	26	16		
1RA4 566-3HE 8	9150	1890	1070	1960	190	280	2320	1400	1250	1320	26	16		
1RA4 630-3HE 8 <sup>2)</sup>	11700	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4 632-3HE 8 <sup>2)</sup>	12400	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4 634-3HE 8 <sup>2)</sup>	13400	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
1RA4 636-3HE 8 <sup>2)</sup>	14100	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> Vertical type of construction, only in the 50 Hz version.

<sup>3)</sup> Dimension AC for 1RP6 on request.

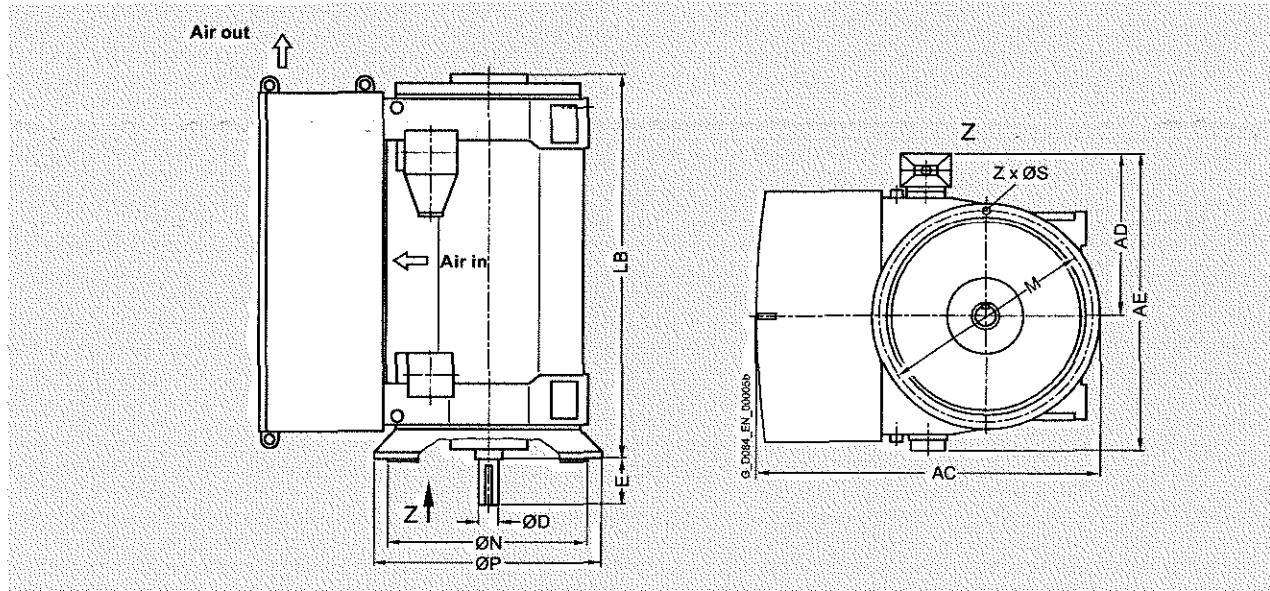


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions AC <sup>3)</sup> mm	Dimensions AD <sup>1)</sup> mm	Dimensions AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z Quantity
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#### Up to 5 kV, H- V1 type of construction, roller bearings – 1RM1, 1RA6 series

12-pole												
1RA6 450-5HJ.8	4350	1533	930	1620	140	200	1720	1150	1000	1080	26	8
1RA6 452-5HJ.8	4650	1533	930	1620	140	200	1720	1150	1000	1080	26	8
1RA6 454-5HJ.8	5000	1533	930	1620	140	200	1930	1150	1000	1080	26	8
1RA6 456-5HJ.8	5350	1533	930	1620	140	200	1930	1150	1000	1080	26	8
1RA4 500-5HE.8	5400	1640	1000	1810	160	240	1910	1250	1120	1180	26	16
1RA4 502-5HE.8	5750	1640	1000	1810	160	240	1910	1250	1120	1180	26	16
1RA4 504-5HE.8	6250	1640	1000	1810	170	240	2120	1250	1120	1180	26	16
1RA4 506-5HE.8	6650	1640	1000	1810	170	240	2120	1250	1120	1180	26	16
1RA4 560-5HE.8	7350	1890	1070	1960	180	240	2090	1400	1250	1320	26	16
1RA4 562-5HE.8	7900	1890	1070	1960	180	240	2090	1400	1250	1320	26	16
1RA4 564-5HE.8	8650	1890	1070	1960	190	280	2320	1400	1250	1320	26	16
1RA4 566-5HE.8	9150	1890	1070	1960	190	280	2320	1400	1250	1320	26	16
1RA4 630-5HE.8 <sup>2)</sup>	11600	2430	1180	2150	220	280	2470	2000	1800	1900	33	16
1RA4 632-5HE.8 <sup>2)</sup>	12250	2430	1180	2150	220	280	2470	2000	1800	1900	33	16
1RA4 634-5HE.8 <sup>2)</sup>	13250	2430	1180	2150	220	280	2710	2000	1800	1900	33	16
1RA4 636-5HE.8 <sup>2)</sup>	14050	2430	1180	2150	220	280	2710	2000	1800	1900	33	16

Note:

Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> Vertical type of construction, only in the 50 Hz version.

<sup>3)</sup> Dimension AC for 1RP6 on request.

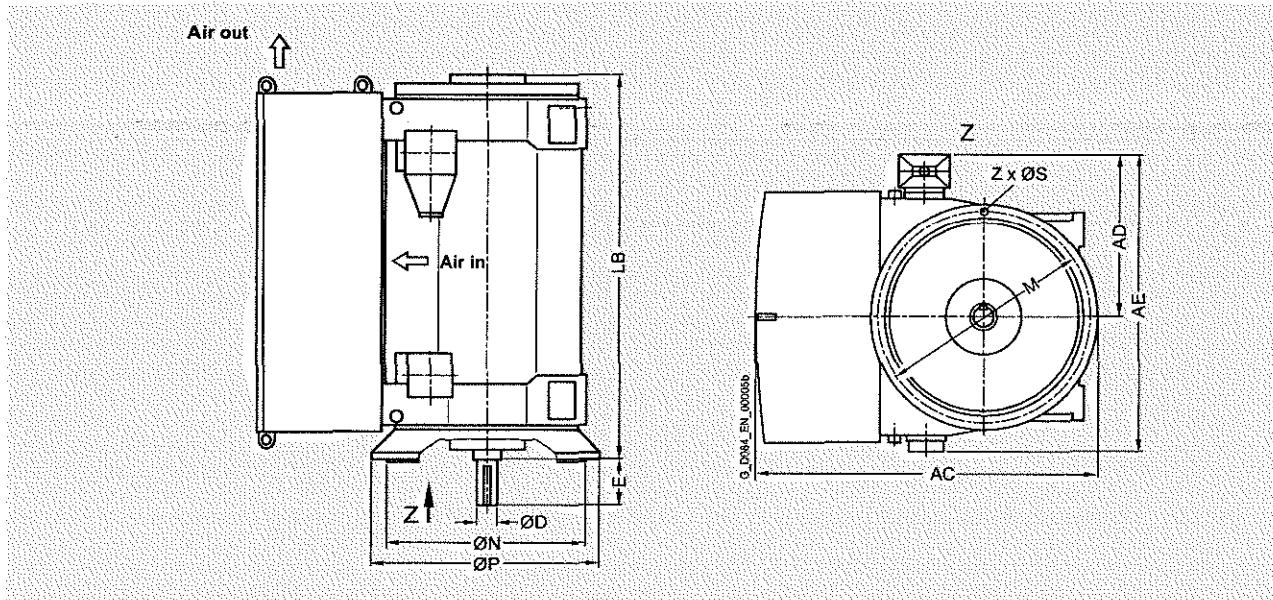


# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA1, 1RA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions												Z Quantity
		AC <sup>1)</sup> mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm			
<b>G 11 EV IM V1 type of construction, roller bearings – 1RA1, 1RA6 series</b>														
4-pole														
1RA6 450-4HJ.8	4250	1533	1070	1840	130	200	1720	1150	1000	1080	26	8		
1RA6 452-4HJ.8	4450	1533	1070	1840	130	200	1720	1150	1000	1080	26	8		
1RA6 454-4HJ.8	4850	1533	1070	1840	130	200	1930	1150	1000	1080	26	8		
1RA6 456-4HJ.8	5150	1533	1070	1840	130	200	1930	1150	1000	1080	26	8		
1RA4 500-4HE.8	5250	1640	1140	1950	150	200	1910	1250	1120	1180	26	16		
1RA4 502-4HE.8	5450	1640	1140	1950	150	200	1910	1250	1120	1180	26	16		
1RA4 504-4HE.8	6100	1640	1140	1950	160	240	2120	1250	1120	1180	26	16		
1RA4 506-4HE.8	6450	1640	1140	1950	160	240	2120	1250	1120	1180	26	16		
1RA4 560-4HE.8	7150	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 562-4HE.8	7600	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 564-4HE.8	8450	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 566-4HE.8	8900	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 630-4HE.8	11500	2430	1320	2290	200	280	2470	2000	1800	1900	33	16		
1RA4 632-4HE.8	12150	2430	1330	2300	200	280	2470	2000	1800	1900	33	16		
1RA4 634-4HE.8	13200	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
1RA4 636-4HE.8	13800	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
6-pole														
1RA6 450-6HJ.8	4350	1533	1070	1840	140	200	1720	1150	1000	1080	26	8		
1RA6 452-6HJ.8	4600	1533	1070	1840	140	200	1720	1150	1000	1080	26	8		
1RA6 454-6HJ.8	4950	1533	1070	1840	140	200	1930	1150	1000	1080	26	8		
1RA6 456-6HJ.8	5300	1533	1070	1840	140	200	1930	1150	1000	1080	26	8		
1RA4 500-6HE.8	5400	1640	1140	1950	160	240	1910	1250	1120	1180	26	16		
1RA4 502-6HE.8	5800	1640	1140	1950	160	240	1910	1250	1120	1180	26	16		
1RA4 504-6HE.8	6250	1640	1140	1950	170	240	2120	1250	1120	1180	26	16		
1RA4 506-6HE.8	6650	1640	1140	1950	170	240	2120	1250	1120	1180	26	16		

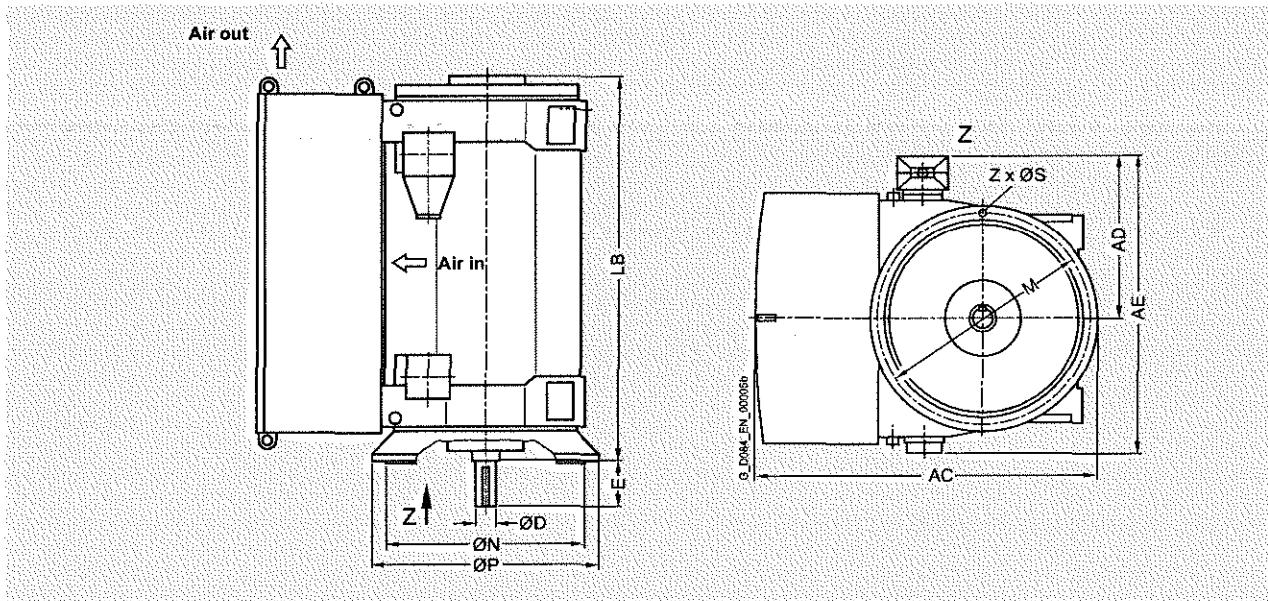
<sup>1)</sup> Dimension AC for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Z Quantity
		AC <sup>1)</sup> mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm			
<b>0.37 kW / 0.47 kW type of construction, roller bearings – 1RA6 – 1RA6 series</b>														
6-pole														
1RA4 560-6HE.8	7400	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 562-6HE.8	7850	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 564-6HE.8	8700	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 566-6HE.8	9150	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 630-6HE.8	11850	2430	1320	2290	220	280	2470	2000	1800	1900	33	16		
1RA4 632-6HE.8	12400	2430	1320	2290	220	280	2470	2000	1800	1900	33	16		
1RA4 634-6HE.8	13450	2430	1320	2290	220	280	2710	2000	1800	1900	33	16		
1RA4 636-6HE.8	14200	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
8-pole														
1RA6 450-8HJ.8	4350	1533	1070	1840	140	200	1720	1150	1000	1080	26	8		
1RA6 452-8HJ.8	4650	1533	1070	1840	140	200	1720	1150	1000	1080	26	8		
1RA6 454-8HJ.8	5000	1533	1070	1840	140	200	1930	1150	1000	1080	26	8		
1RA6 456-8HJ.8	5350	1533	1070	1840	140	200	1930	1150	1000	1080	26	8		
1RA4 500-8HE.8	5400	1640	1140	1950	160	240	1910	1250	1120	1180	26	16		
1RA4 502-8HE.8	5800	1640	1140	1950	160	240	1910	1250	1120	1180	26	16		
1RA4 504-8HE.8	6300	1640	1140	1950	170	240	2120	1250	1120	1180	26	16		
1RA4 506-8HE.8	6650	1640	1140	1950	170	240	2120	1250	1120	1180	26	16		
1RA4 560-8HE.8	7350	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 562-8HE.8	7900	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 564-8HE.8	8700	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 566-8HE.8	9100	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 630-8HE.8	11700	2430	1320	2290	220	280	2470	2000	1800	1900	33	16		
1RA4 632-8HE.8	12250	2430	1320	2290	220	280	2470	2000	1800	1900	33	16		
1RA4 634-8HE.8	13250	2430	1320	2290	220	280	2710	2000	1800	1900	33	16		
1RA4 636-8HE.8	14000	2430	1320	2290	220	280	2710	2000	1800	1900	33	16		

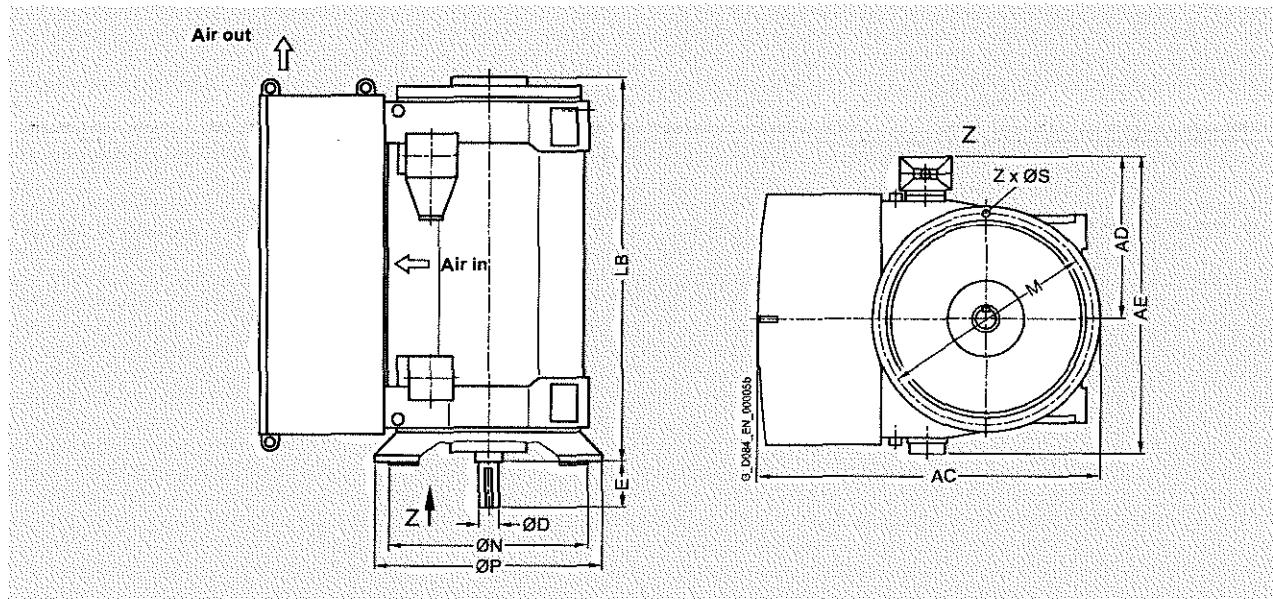
<sup>1)</sup> Dimension AC for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions													Quantity
		AC <sup>1)</sup> mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z			

#### 10-pole/12-pole type of construction, roller bearings – 1RA4 series

10-pole														
1RA4 500-3HE.8	5350	1640	1140	1950	160	240	1910	1250	1120	1180	26	16		
1RA4 502-3HE.8	5750	1640	1140	1950	160	240	1910	1250	1120	1180	26	16		
1RA4 504-3HE.8	6250	1640	1140	1950	170	240	2120	1250	1120	1180	26	16		
1RA4 506-3HE.8	6600	1640	1140	1950	170	240	2120	1250	1120	1180	26	16		
1RA4 560-3HE.8	7450	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 562-3HE.8	8000	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 564-3HE.8	8750	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 566-3HE.8	9250	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 630-3HE.8	11650	2430	1320	2290	220	280	2470	2000	1800	1900	33	16		
1RA4 632-3HE.8	12250	2430	1320	2290	220	280	2470	2000	1800	1900	33	16		
1RA4 634-3HE.8	13200	2430	1320	2290	220	280	2710	2000	1800	1900	33	16		
1RA4 636-3HE.8	13950	2430	1320	2290	220	280	2710	2000	1800	1900	33	16		
12-pole														
1RA4 502-5HE.8	5750	1640	1140	1950	160	240	1910	1250	1120	1180	26	16		
1RA4 504-5HE.8	6200	1640	1140	1950	170	240	2120	1250	1120	1180	26	16		
1RA4 506-5HE.8	6600	1640	1140	1950	170	240	2120	1250	1120	1180	26	16		
1RA4 560-5HE.8	7300	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 562-5HE.8	7850	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4 564-5HE.8	8650	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 566-5HE.8	9100	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4 630-5HE.8	11700	2430	1320	2290	220	280	2470	2000	1800	1900	33	16		
1RA4 632-5HE.8	12300	2430	1320	2290	220	280	2470	2000	1800	1900	33	16		
1RA4 634-5HE.8	13300	2430	1320	2290	220	280	2710	2000	1800	1900	33	16		
1RA4 636-5HE.8	14050	2430	1320	2290	220	280	2710	2000	1800	1900	33	16		

#### Note:

Higher pole numbers are available on request.

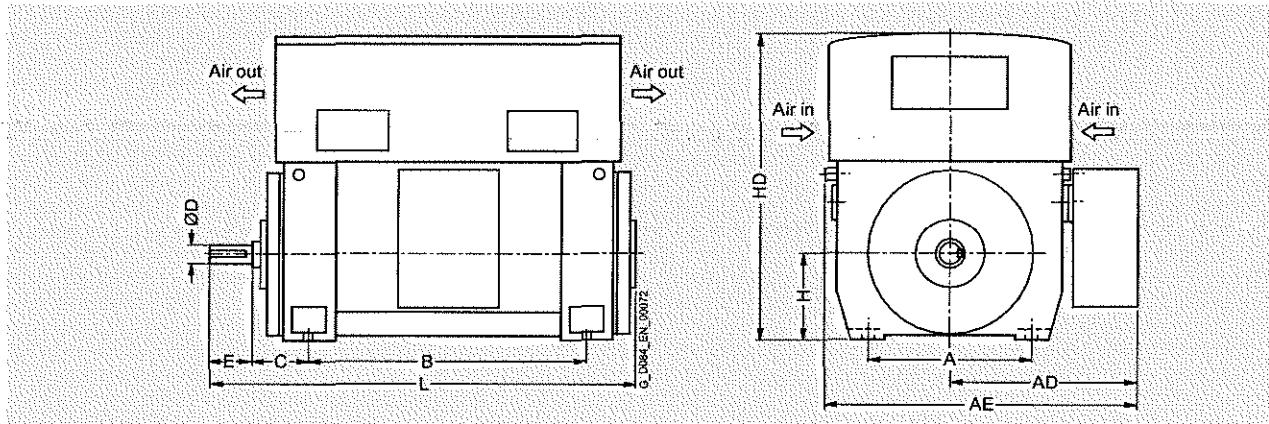
<sup>1)</sup> Dimension AC for 1RP6 on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS (RA4, RA6 and RP6)

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<i>9 = 11 kV, IM B3, type of construction: roller bearings, X ventilation – RP6 series</i>											
4-pole											
1RP6 710-4HJ.0 <sup>1)</sup>	18100	1500	1500	2530	2000	355	220	280	710	3030	2980
1RP6 712-4HJ.0 <sup>1)</sup>	18900	1500	1500	2530	2000	355	220	280	710	3030	2980
1RP6 714-4HJ.0 <sup>1)</sup>	20300	1500	1500	2530	2240	355	220	280	710	3030	3220
1RP6 716-4HJ.0 <sup>1)</sup>	21300	1500	1500	2530	2240	355	220	280	710	3030	3220

Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<i>9 = 11 kV, IM B3, type of construction: roller bearings, X ventilation – RP6 series</i>											
4-pole											
1RP6 710-4HJ.0 <sup>1)</sup>	17800	1500	1500	2530	2000	355	220	280	710	3030	2980
1RP6 712-4HJ.0 <sup>1)</sup>	18600	1500	1500	2530	2000	355	220	280	710	3030	2980
1RP6 714-4HJ.0 <sup>1)</sup>	20100	1500	1500	2530	2240	355	220	280	710	3030	3220
1RP6 716-4HJ.0 <sup>1)</sup>	21000	1500	1500	2530	2240	355	220	280	710	3030	3220

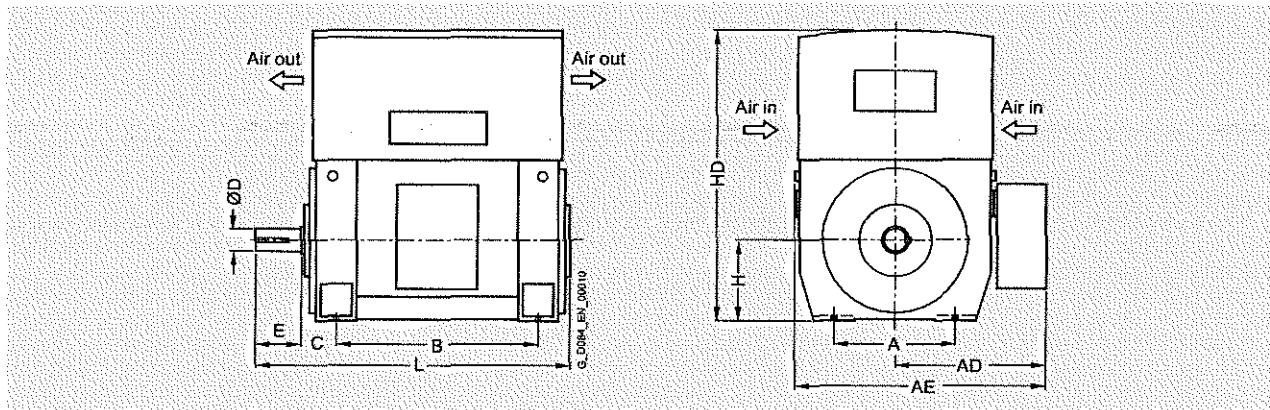
<sup>1)</sup> Roller bearings only for 50 Hz operation.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions:									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>U-1 RA 600 W / IMB2 types of construction, roller bearings, 7 ventilation - 1RH6 codes</b>											
<b>6-pole</b>											
1RP6 710-6HJ.0	17200	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 712-6HJ.0	17900	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 714-6HJ.0	19600	1500	1500	2530	2240	355	240	330	710	3040	3270
1RP6 716-6HJ.0	20800	1500	1500	2530	2240	355	240	330	710	3040	3270
<b>8-pole</b>											
1RP6 710-8HJ.0	17000	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 712-8HJ.0	17800	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 714-8HJ.0	19400	1500	1500	2530	2240	355	240	330	710	3040	3270
1RP6 716-8HJ.0	20500	1500	1500	2530	2240	355	240	330	710	3040	3270
<b>10-pole</b>											
1RP6 710-3HJ.0	16800	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 712-3HJ.0	17600	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 714-3HJ.0	19300	1500	1500	2530	2240	355	240	330	710	3040	3270
1RP6 716-3HJ.0	20400	1500	1500	2530	2240	355	240	330	710	3040	3270

### Note:

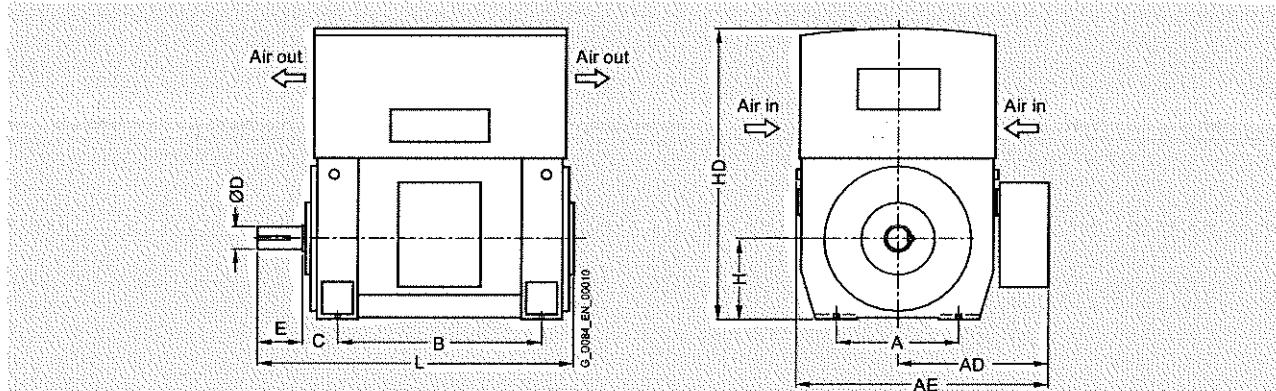
Higher pole numbers are available on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1PA4, 1BA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<del>Dimensions shown are for construction without bearing housing ventilation</del>											
6-pole:											
1RP6 710-6HJ.0	17000	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 712-6HJ.0	17700	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 714-6HJ.0	19500	1500	1500	2530	2240	355	240	330	710	3040	3270
1RP6 716-6HJ.0	20500	1500	1500	2530	2240	355	240	330	710	3040	3270
8-pole:											
1RP6 710-8HJ.0	16900	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 712-8HJ.0	17600	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 714-8HJ.0	19300	1500	1500	2530	2240	355	240	330	710	3040	3270
1RP6 716-8HJ.0	20300	1500	1500	2530	2240	355	240	330	710	3040	3270
10-pole:											
1RP6 710-3HJ.0	16800	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 712-3HJ.0	17500	1500	1500	2530	2000	355	240	330	710	3040	3030
1RP6 714-3HJ.0	19200	1500	1500	2530	2240	355	240	330	710	3040	3270
1RP6 716-3HJ.0	20300	1500	1500	2530	2240	355	240	330	710	3040	3270

### Note:

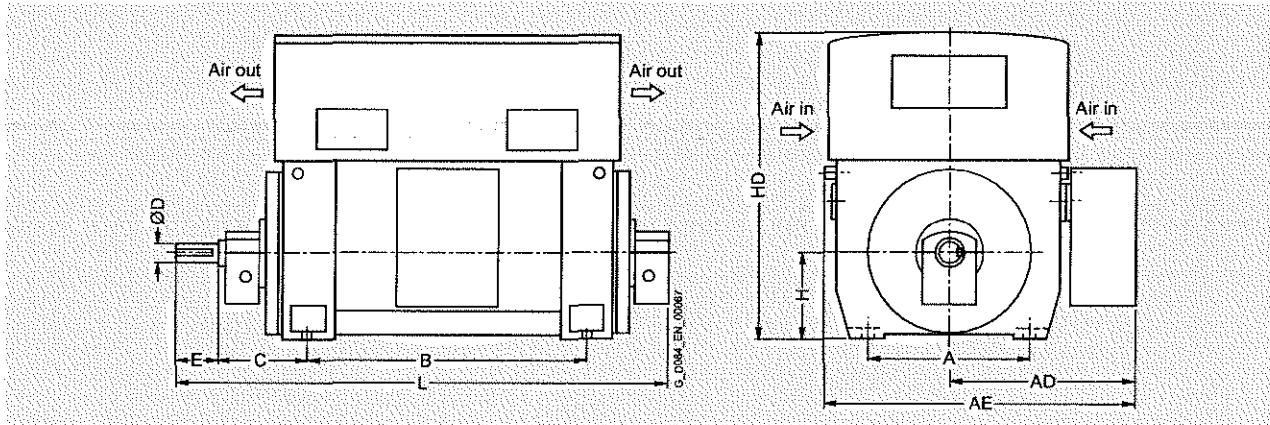
Higher pole numbers are available on request.

# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions								
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm

1RA4, 1RA6 type of construction sleeve bearings, X ventilation – 1RP6 series

## 2-pole

1RP6 710-2HJ.0	16300	1500	1500	2530	2000	600	180	240	710	3030	3370
1RP6 712-2HJ.0	17100	1500	1500	2530	2000	600	180	240	710	3030	3370
1RP6 714-2HJ.0	18400	1500	1500	2530	2240	600	180	240	710	3030	3610
1RP6 716-2HJ.0	19400	1500	1500	2530	2240	600	180	240	710	3030	3610

## 4-pole

1RP6 710-4HJ.0-Z K96 <sup>1)</sup>	18100	1500	1500	2530	2000	530	220	280	710	3030	3260
1RP6 712-4HJ.0-Z K96 <sup>1)</sup>	18900	1500	1500	2530	2000	530	220	280	710	3030	3260
1RP6 714-4HJ.0-Z K96 <sup>1)</sup>	20300	1500	1500	2530	2240	530	220	280	710	3030	3500
1RP6 716-4HJ.0-Z K96 <sup>1)</sup>	21300	1500	1500	2530	2240	530	220	280	710	3030	3500

Motor type	Weight kg	Dimensions								
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm

1RA4, 1RA6 type of construction sleeve bearings, X ventilation – 1RP6 series

## 2-pole

1RP6 710-2HJ.0	16200	1500	1500	2530	2000	600	180	240	710	3030	3370
1RP6 712-2HJ.0	17000	1500	1500	2530	2000	600	180	240	710	3030	3370
1RP6 714-2HJ.0	18200	1500	1500	2530	2240	600	180	240	710	3030	3610
1RP6 716-2HJ.0	19200	1500	1500	2530	2240	600	180	240	710	3030	3610

## 4-pole

1RP6 710-4HJ.0-Z K96 <sup>1)</sup>	17800	1500	1500	2530	2000	530	220	280	710	3030	3260
1RP6 712-4HJ.0-Z K96 <sup>1)</sup>	18600	1500	1500	2530	2000	530	220	280	710	3030	3260
1RP6 714-4HJ.0-Z K96 <sup>1)</sup>	20100	1500	1500	2530	2240	530	220	280	710	3030	3500
1RP6 716-4HJ.0-Z K96 <sup>1)</sup>	21000	1500	1500	2530	2240	530	220	280	710	3030	3500

<sup>1)</sup> For the 60 Hz version, sleeve bearings are standard, "Z K96" not necessary.

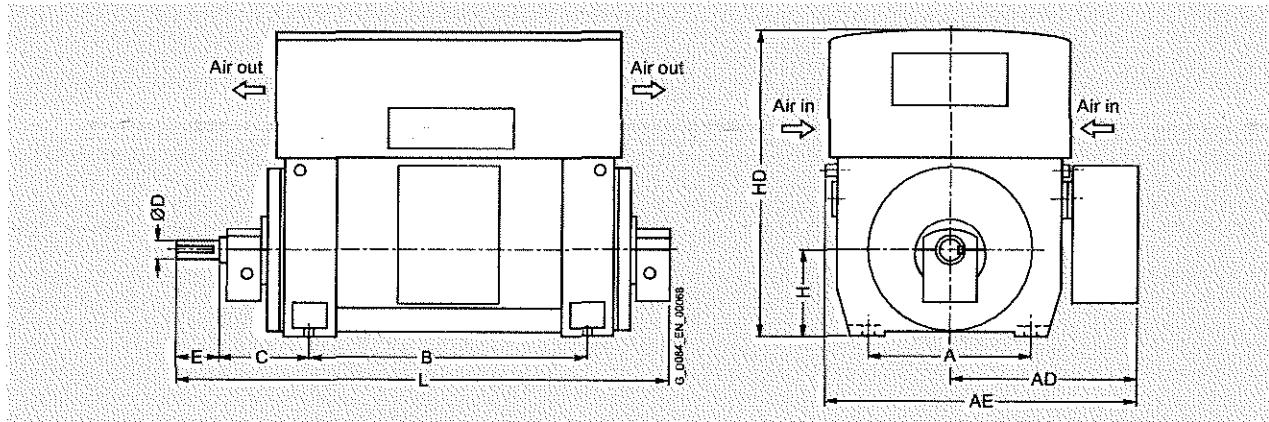


# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Standardized standard construction sleeve bearing ventilation (1RP6 series)</b>											
6-pole											
1RP6 710-6HJ.0-Z K96	18200	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 712-6HJ.0-Z K96	18900	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 714-6HJ.0-Z K96	20700	1500	1500	2530	2240	670	240	330	710	3040	3840
1RP6 716-6HJ.0-Z K96	21800	1500	1500	2530	2240	670	240	330	710	3040	3840
8-pole											
1RP6 710-8HJ.0-Z K96	18000	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 712-8HJ.0-Z K96	18800	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 714-8HJ.0-Z K96	20500	1500	1500	2530	2240	670	240	330	710	3040	3840
1RP6 716-8HJ.0-Z K96	21600	1500	1500	2530	2240	670	240	330	710	3040	3840
10-pole											
1RP6 710-3HJ.0-Z K96	17800	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 712-3HJ.0-Z K96	18700	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 714-3HJ.0-Z K96	20300	1500	1500	2530	2240	670	240	330	710	3040	3840
1RP6 716-3HJ.0-Z K96	21500	1500	1500	2530	2240	670	240	330	710	3040	3840

#### Note:

Higher pole numbers are available on request.

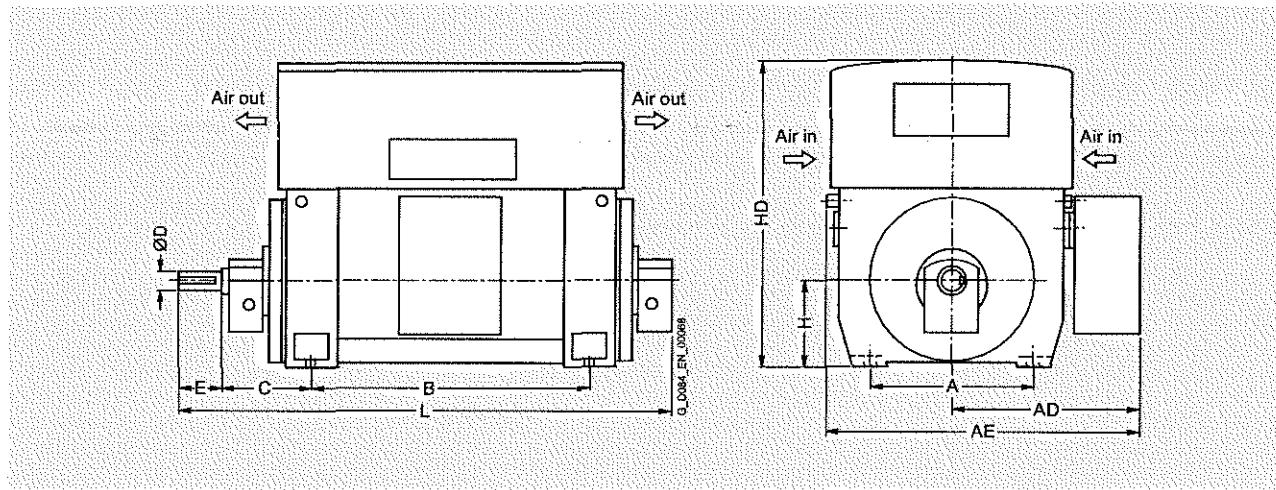


# Motors for line operation

## Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

9 ... 11 kV, IM 34 type of construction, sleeve bearings, Z ventilation – 1RP6 series

#### 6-pole

1RP6 710-6HJ.0-Z K96	18000	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 712-6HJ.0-Z K96	18800	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 714-6HJ.0-Z K96	20500	1500	1500	2530	2240	670	240	330	710	3040	3840
1RP6 716-6HJ.0-Z K96	21600	1500	1500	2530	2240	670	240	330	710	3040	3840

#### 8-pole

1RP6 710-8HJ.0-Z K96	17900	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 712-8HJ.0-Z K96	18700	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 714-8HJ.0-Z K96	20300	1500	1500	2530	2240	670	240	330	710	3040	3840
1RP6 716-8HJ.0-Z K96	21400	1500	1500	2530	2240	670	240	330	710	3040	3840

#### 10-pole

1RP6 710-3HJ.0-Z K96	17800	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 712-3HJ.0-Z K96	18600	1500	1500	2530	2000	670	240	330	710	3040	3600
1RP6 714-3HJ.0-Z K96	20200	1500	1500	2530	2240	670	240	330	710	3040	3840
1RP6 716-3HJ.0-Z K96	21300	1500	1500	2530	2240	670	240	330	710	3040	3840

#### Note:

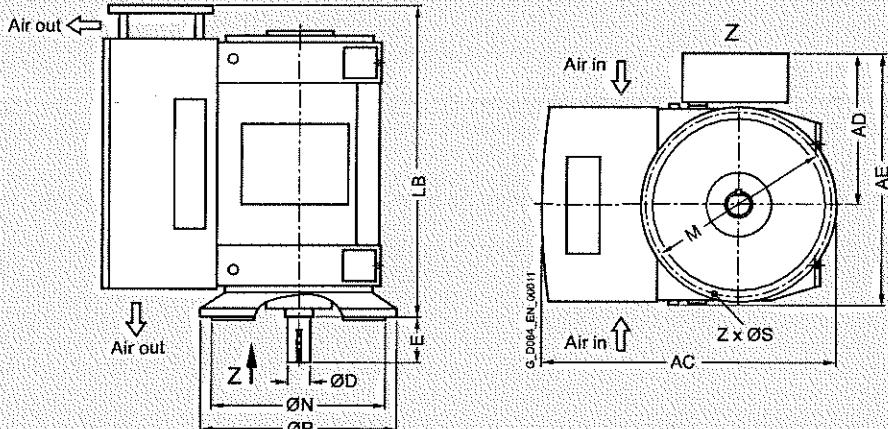
Higher pole numbers are available on request.

# Motors for line operation

## Air-cooled motors

### H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<u>Unloaded 6 kV, IM 3040 type of construction, roller bearings, 2 ventilation, 1RP6 series</u>														
6-pole														
1RP6 710-6HE.4	18400	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 712-6HE.4	19100	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 714-6HE.4	20800	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
1RP6 716-6HE.4	22000	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
8-pole														
1RP6 710-8HE.4	18200	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 712-8HE.4	19000	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 714-8HE.4	20600	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
1RP6 716-8HE.4	21800	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
10-pole														
1RP6 710-3HE.4	18000	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 712-3HE.4	18900	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 714-3HE.4	20500	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
1RP6 716-3HE.4	21600	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		

#### Note:

Higher pole numbers are available on request.

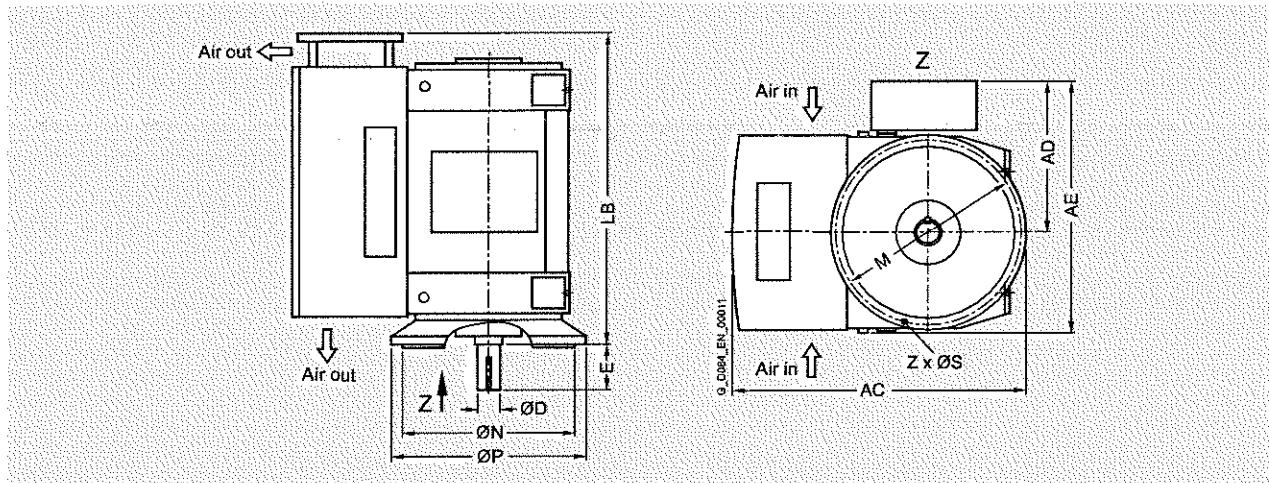


# Motors for line operation

## Air-cooled motors

H-compact PLUS (1RA4, 1RA6 and 1RP6)

### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>11 kV / 1100 V type of construction, roller bearings, Z ventilation - 1 pole pairs</b>														
6-pole														
1RP6 710-6HE.4	18200	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 712-6HE.4	19000	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 714-6HE.4	20700	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
1RP6 716-6HE.4	21800	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
8-pole														
1RP6 710-8HE.4	18100	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 712-8HE.4	18900	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 714-8HE.4	20500	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
1RP6 716-8HE.4	21600	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
10-pole														
1RP6 710-3HE.4	18000	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 712-3HE.4	18800	3330	1500	2530	240	330	3065	2000	1800	1900	33	24		
1RP6 714-3HE.4	20400	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		
1RP6 716-3HE.4	21500	3330	1500	2530	240	330	3305	2000	1800	1900	33	24		

### Note:

Higher pole numbers are available on request.

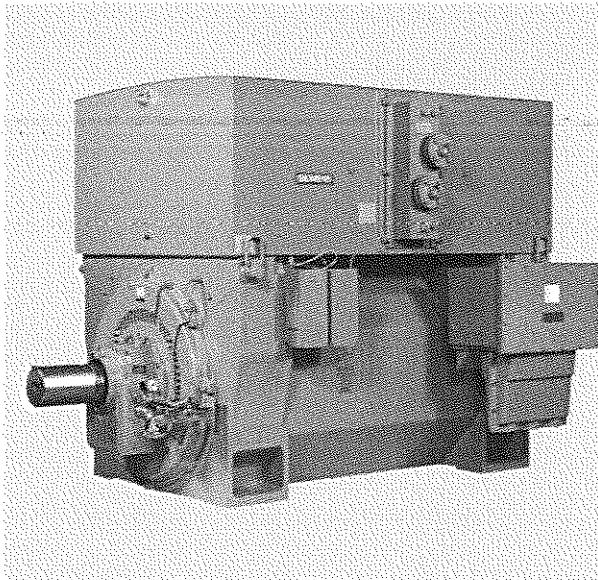


# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Overview



#### Technical data

##### Overview of technical data

###### H-compact PLUS 1RN4/1RN6

Rated voltage	3.3 ... 13.8 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3, IM V1
Degree of protection	IP55
Cooling method	IC81W
Stator winding insulation	Thermal class 155 (F), utilized to 130 (B)
Shaft height	450 ... 710 mm
Bearings	Roller bearings, sleeve bearings
Cage material	Copper
Standards	IEC, EN, NEMA
Frame design for shaft heights 450 ... 560 mm	Frame: Cast iron Cooling enclosure: Steel
Frame design for shaft heights 630 ... 710 mm	Frame: Steel Cooling enclosure: Steel

#### Technical data (continued)

##### Power ranges for IEC motors for line operation

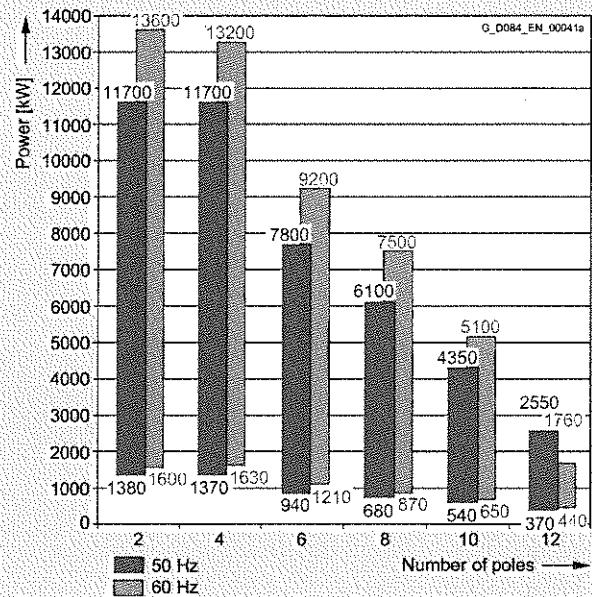
###### 1RN4, 1SL4 (Ex nA), 1SQ4 (Ex px) series

###### 1RN6, 1SL6 (Ex nA), 1SQ6 (Ex px) series

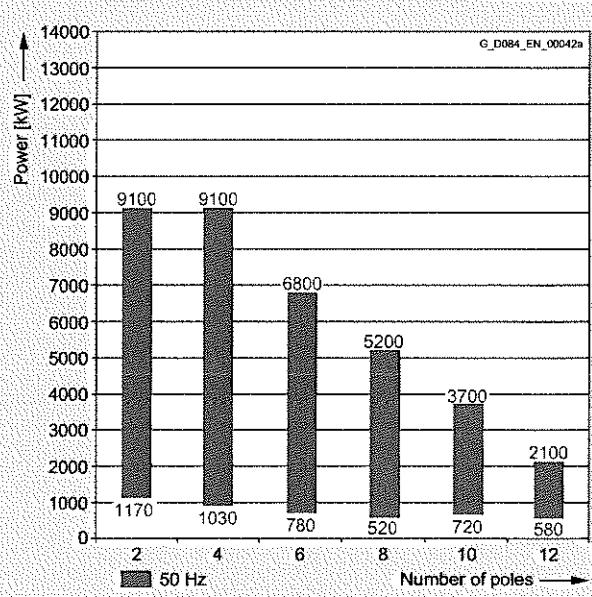
Insulation system, thermal class 155 (F), utilized to 130 (B). Coolant temperature up to 25 °C, installation altitude up to 1000 m.

3.3 to 6.6 kV; 50 Hz

4.0 to 6.6 kV; 60 Hz



9 to 11 kV; 50 Hz



# Motors for line operation

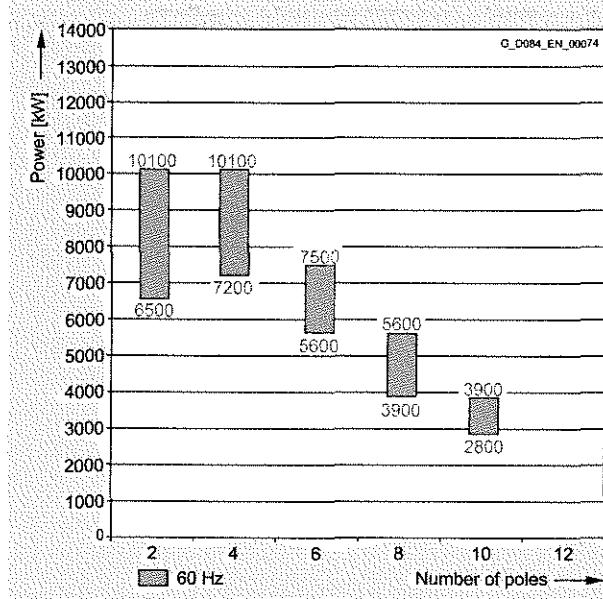
## Water-cooled motors

H-compact PLUS IRN4 and IRN6

### Technical data (continued)

#### Power ranges for IEC motors for line operation (continued)

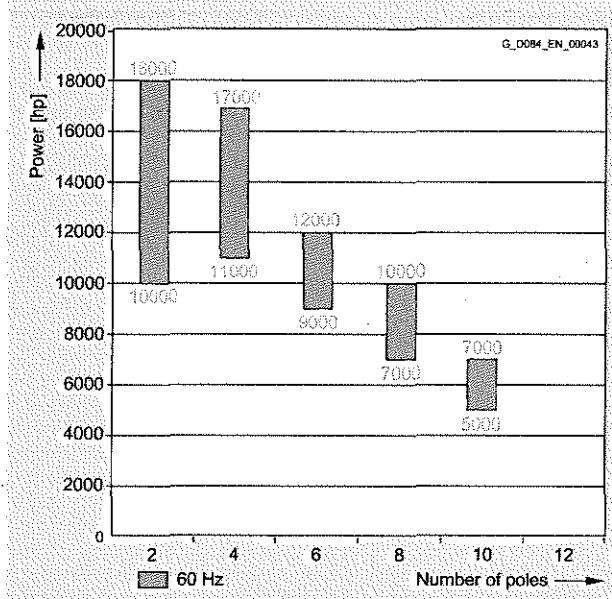
12.5 to 13.8 kV; 60 Hz



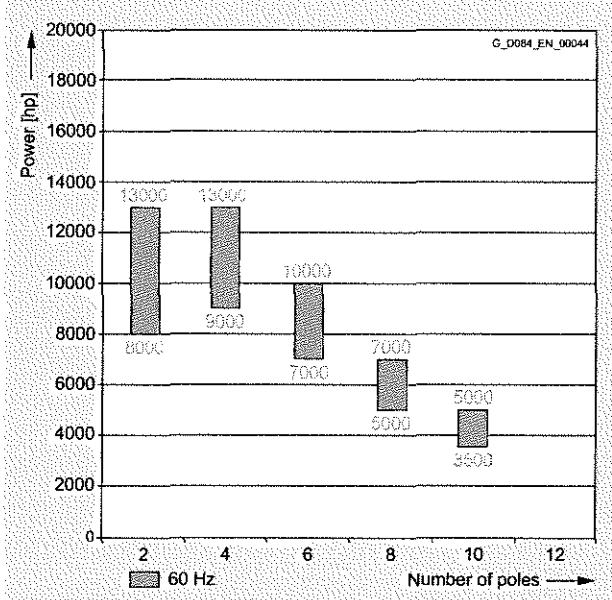
#### Power ranges for NEMA motors for line operation

Insulation system, thermal class 155 (F), utilized to 130 (B)

4 to 6.6 kV; 60 Hz



12.5 to 13.8 kV; 60 Hz



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Selection and ordering data

##### IEC version

The following data also apply to explosion-protected motors 1SL4/1SL6 (Ex nA) and 1SQ4/1SQ6 (Ex px).

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[ - ]	[ - ]	[ - ]	$\text{kgm}^2$	$\text{kgm}^2$
<b>3.3 ... 6.6 kV, 50 Hz</b>													
2-pole													
1380	<b>1RN6 450-2HJ■0</b>	2972	156	95.9	96.3	0.89	0.90	4436	1.90	0.50	4.80	13	64
1570	<b>1RN6 452-2HJ■0</b>	2973	174	96.1	96.6	0.90	0.91	5043	2.00	0.55	5.20	14	70
1750	<b>1RN6 454-2HJ■0</b>	2977	192	96.3	96.7	0.91	0.91	5618	2.30	0.60	5.50	16	74
1950	<b>1RN6 456-2HJ■0</b>	2980	215	96.5	96.9	0.91	0.91	6252	2.40	0.60	5.50	17	81
2350	<b>1RN6 500-2HJ■0</b>	2975	260	96.6	97.0	0.90	0.89	7543	2.10	0.60	5.10	19	83
2500	<b>1RN6 502-2HJ■0</b>	2976	275	96.6	97.0	0.91	0.90	8022	2.25	0.55	5.30	21	93
3050	<b>1RN6 504-2HJ■0</b>	2979	330	97.0	97.3	0.92	0.91	9777	2.45	0.65	5.50	25	103
3250	<b>1RN6 506-2HJ■0</b>	2977	350	97.0	97.4	0.92	0.92	10425	2.30	0.65	5.50	26	115
3700	<b>1RN6 560-2HJ■0</b>	2977	410	96.8	97.1	0.90	0.90	11868	1.90	0.55	4.30	39	160
4300	<b>1RN6 562-2HJ■0</b>	2978	470	97.0	97.3	0.91	0.91	13788	1.95	0.55	4.40	43	180
4900	<b>1RN6 564-2HJ■0</b>	2980	530	97.2	97.5	0.92	0.92	15702	2.10	0.60	4.80	49	200
5400	<b>1RN6 566-2HJ■0</b>	2982	580	97.3	97.5	0.92	0.92	17292	2.30	0.60	5.30	54	220
4900	<b>1RN4 630-2HE■0</b>	2982	550	96.9	97.1	0.88	0.88	15692	2.10	0.31	4.00	75	110
5700	<b>1RN4 632-2HE■0</b>	2983	630	97.3	97.3	0.89	0.89	18248	2.20	0.34	4.30	85	150
6500	<b>1RN4 634-2HE■0</b>	2985	710	97.5	97.6	0.90	0.89	20796	2.50	0.41	5.00	90	190
7500	<b>1RN4 636-2HE■0</b>	2986	820	97.7	97.8	0.90	0.89	23987	2.60	0.46	5.40	100	240
4-pole													
1370	<b>1RN6 450-4HJ■■</b>	1483	154	95.6	96.1	0.89	0.88	8822	2.00	0.70	5.50	20	340
1500	<b>1RN6 452-4HJ■■</b>	1485	170	95.8	96.2	0.89	0.88	9650	2.60	0.70	5.50	22	385
1640	<b>1RN6 454-4HJ■■</b>	1486	184	96.0	96.3	0.89	0.88	10544	2.20	0.70	5.50	25	440
1860	<b>1RN6 456-4HJ■■</b>	1487	210	96.2	96.5	0.89	0.87	11948	2.30	0.70	5.50	28	500
2100 <sup>2)</sup>	<b>1RN6 500-4HJ■0</b>	1486	230	96.6	97.0	0.91	0.90	13495	2.30	0.60	5.00	43	410
2300 <sup>2)</sup>	<b>1RN6 502-4HJ■0</b>	1487	250	96.8	97.1	0.91	0.90	14770	2.45	0.65	5.30	46	460
2650 <sup>2)</sup>	<b>1RN6 504-4HJ■0</b>	1487	290	96.9	97.2	0.91	0.90	17018	2.30	0.60	5.00	52	510
3000 <sup>2)</sup>	<b>1RN6 506-4HJ■0</b>	1488	325	96.9	97.2	0.91	0.90	19253	2.40	0.65	5.20	56	560
3600 <sup>2)</sup>	<b>1RN6 560-4HJ■0</b>	1490	390	97.0	97.3	0.91	0.90	23072	2.25	0.70	5.00	84	730
4000 <sup>2)</sup>	<b>1RN6 562-4HJ■0</b>	1490	435	97.1	97.5	0.91	0.90	25636	2.25	0.70	4.90	94	800
4500 <sup>2)</sup>	<b>1RN6 564-4HJ■0</b>	1491	490	97.3	97.6	0.91	0.91	28821	2.25	0.70	5.00	105	880
4900 <sup>2)</sup>	<b>1RN6 566-4HJ■0</b>	1492	530	97.4	97.6	0.91	0.90	31362	2.30	0.65	5.20	115	970
5300	<b>1RN4 630-4HE■■</b>	1489	590	97.1	97.3	0.89	0.89	33993	2.00	0.54	4.60	150	780
6000	<b>1RN4 632-4HE■■</b>	1490	670	97.3	97.4	0.89	0.89	38456	2.15	0.60	4.90	165	1050
6600	<b>1RN4 634-4HE■■</b>	1490	720	97.4	97.6	0.90	0.90	42302	2.20	0.63	5.10	180	1200
7100	<b>1RN4 636-4HE■■</b>	1491	780	97.6	97.6	0.90	0.89	45476	2.40	0.70	5.50	195	1100

##### Voltage code:

3.3 kV, 50 Hz

0

6 kV, 50 Hz

6

6.6 kV, 50 Hz

7

Other voltage

9

##### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

**Type of construction:**  
IM B3  
IM V1 (without canopy)

0

8

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Data of vertical motors (IM V1) on request.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS (1RN4 and 1RN6)

#### Selection and ordering data (continued)

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load	$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	External, max. <sup>1)</sup>	
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>3.3 ... 6.6 kV, 50 Hz</b>													
<b>6-pole</b>													
940	<b>1RN6 450-6HJ■■■</b>	989	110	95.3	95.9	0.86	0.85	9088	2.10	0.90	5.50	26	660
1040	<b>1RN6 452-6HJ■■■</b>	990	122	95.6	96.1	0.86	0.84	10044	2.10	0.90	5.50	29	770
1180	<b>1RN6 454-6HJ■■■</b>	990	136	95.7	96.3	0.87	0.85	11394	2.20	0.95	5.50	33	870
1330	<b>1RN6 456-6HJ■■■</b>	990	156	96.0	96.5	0.86	0.84	12832	2.20	0.90	5.50	37	1040
1700	<b>1RN4 500-6HE■■■</b>	989	196	95.8	96.4	0.87	0.85	16416	2.00	0.75	5.00	57	900
1920	<b>1RN4 502-6HE■■■</b>	989	220	96.0	96.5	0.87	0.86	18540	2.00	0.80	5.10	65	950
2150	<b>1RN4 504-6HE■■■</b>	990	245	96.2	96.6	0.87	0.85	20740	2.00	0.80	5.20	72	1200
2350	<b>1RN4 506-6HE■■■</b>	990	270	96.3	96.7	0.87	0.85	22669	2.00	0.80	5.20	81	1400
2750	<b>1RN4 560-6HE■■■</b>	991	315	96.3	96.8	0.87	0.85	26501	1.90	0.72	4.90	105	1250
3100	<b>1RN4 562-6HE■■■</b>	992	355	96.6	97.0	0.87	0.85	29844	2.00	0.75	5.10	120	1500
3450	<b>1RN4 564-6HE■■■</b>	992	395	96.8	97.1	0.87	0.86	33213	2.00	0.75	5.10	135	1700
3750	<b>1RN4 566-6HE■■■</b>	992	430	96.9	97.2	0.87	0.85	36101	2.00	0.75	5.10	147	1900
4200	<b>1RN4 630-6HE■■■</b>	992	490	96.8	97.2	0.85	0.84	40433	2.00	0.57	4.50	190	2000
4700	<b>1RN4 632-6HE■■■</b>	993	540	97.0	97.3	0.86	0.85	45201	2.10	0.62	4.80	210	2100
5100	<b>1RN4 634-6HE■■■</b>	993	590	97.2	97.4	0.86	0.84	49048	2.25	0.69	5.20	230	2800
5600	<b>1RN4 636-6HE■■■</b>	994	640	97.3	97.4	0.86	0.84	53803	2.30	0.70	5.30	255	3300
<b>8-pole</b>													
680	<b>1RN6 450-8HJ■■■</b>	742	82	94.7	95.3	0.84	0.82	8758	2.10	0.70	5.50	32	730
750	<b>1RN6 452-8HJ■■■</b>	742	91	94.9	95.5	0.84	0.81	9657	2.10	0.70	5.50	36	890
880	<b>1RN6 454-8HJ■■■</b>	743	108	95.1	95.6	0.83	0.80	11314	2.10	0.75	5.50	41	1040
970	<b>1RN6 456-8HJ■■■</b>	743	116	95.3	95.7	0.84	0.81	12475	2.20	0.80	5.50	47	1300
1250	<b>1RN4 500-8HE■■■</b>	741	150	95.4	95.7	0.84	0.82	16110	1.90	0.75	4.90	70	1350
1400	<b>1RN4 502-8HE■■■</b>	742	166	95.6	95.8	0.85	0.83	18019	2.00	0.80	5.10	80	1650
1550	<b>1RN4 504-8HE■■■</b>	742	184	95.7	95.9	0.85	0.83	19949	2.00	0.80	5.10	88	1750
1700	<b>1RN4 506-8HE■■■</b>	742	200	95.8	96.0	0.85	0.83	21880	2.10	0.85	5.30	99	1800
1950	<b>1RN4 560-8HE■■■</b>	744	235	96.0	96.3	0.84	0.82	25030	2.00	0.72	4.90	123	2300
2200	<b>1RN4 562-8HE■■■</b>	744	260	96.2	96.3	0.84	0.82	28239	2.00	0.72	5.00	141	2400
2400	<b>1RN4 564-8HE■■■</b>	744	285	96.3	96.5	0.84	0.82	30806	2.00	0.75	5.10	158	2800
2600	<b>1RN4 566-8HE■■■</b>	744	305	96.3	96.6	0.85	0.84	33374	1.95	0.75	5.00	173	3500
3200	<b>1RN4 630-8HE■■■</b>	743	375	96.5	96.7	0.85	0.83	41131	1.90	0.60	4.30	255	3100
3500	<b>1RN4 632-8HE■■■</b>	743	410	96.7	96.8	0.85	0.82	44987	2.10	0.67	4.60	280	3400
3750	<b>1RN4 634-8HE■■■</b>	743	440	96.7	96.9	0.85	0.84	48200	2.00	0.65	4.60	310	3600
4100	<b>1RN4 636-8HE■■■</b>	744	485	96.9	96.9	0.84	0.81	52628	2.30	0.76	5.30	340	3800

#### Voltage code:

3.3 kV, 50 Hz  
6 kV, 50 Hz  
6.6 kV, 50 Hz  
Other voltage

0  
6  
7  
9  
0  
8

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

Type of construction:  
IM B3  
IM V1 (without canopy)

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1FN4 and 1RN6

#### Selection and ordering data (continued)

Rated power kW	High voltage motor H-compact PLUS	Speed rpm	Rated current $I_{\text{rated}}$ at 6 kV A	Efficiency		Power factor		Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{\text{LR}}/I_{\text{rated}}$ [-]	Locked- rotor current $I_{\text{LR}}/I_{\text{rated}}$ [-]	Moment of inertia kgm <sup>2</sup>	Motor External, max. <sup>1)</sup> kgm <sup>2</sup>
IEC				4/4 load %	3/4 load %	4/4 load cos φ	3/4 load cos φ						
<b>3.3 ... 6.6 kV, 50 Hz</b>													
<b>10-pole</b>													
540	<b>1RN6 450-3HJ■■■</b>	590	70	93.4	93.7	0.80	0.76	8741	2.00	0.80	4.60	37	1150
600	<b>1RN6 452-3HJ■■■</b>	590	76	93.7	93.9	0.81	0.76	9712	2.00	0.80	4.70	41	1350
670	<b>1RN6 454-3HJ■■■</b>	591	86	93.9	94.1	0.80	0.75	10827	2.10	0.82	4.90	46	1450
760	<b>1RN6 456-3HJ■■■</b>	591	97	94.1	94.2	0.80	0.75	12281	2.20	0.90	5.20	52	1800
900	<b>1RN4 500-3HE■■■</b>	591	112	94.4	94.7	0.82	0.80	14543	1.90	0.68	4.30	70	1400
1000	<b>1RN4 502-3HE■■■</b>	592	122	95.7	94.9	0.83	0.80	16132	1.90	0.70	4.50	80	1700
1100	<b>1RN4 504-3HE■■■</b>	592	134	94.8	95.0	0.83	0.80	17745	1.90	0.72	4.60	88	2200
1250	<b>1RN4 506-3HE■■■</b>	592	152	95.0	95.1	0.83	0.80	20165	1.90	0.75	4.70	99	2600
1480	<b>1RN4 560-3HE■■■</b>	593	184	95.1	95.4	0.81	0.77	23835	2.00	0.70	4.50	123	2700
1700	<b>1RN4 562-3HE■■■</b>	593	210	95.4	95.7	0.82	0.78	27378	2.00	0.70	4.50	141	4100
1880	<b>1RN4 564-3HE■■■</b>	593	230	95.6	95.7	0.82	0.78	30277	2.00	0.72	4.70	158	4400
2050	<b>1RN4 566-3HE■■■</b>	593	255	95.7	95.8	0.81	0.76	33014	2.10	0.78	5.00	173	5200
2400	<b>1RN4 630-3HE■■■</b>	592	285	95.8	96.4	0.84	0.83	38716	1.80	0.62	4.00	250	4700
2650	<b>1RN4 632-3HE■■■</b>	592	315	96.0	96.5	0.84	0.83	42749	1.80	0.65	4.20	280	5300
2900	<b>1RN4 634-3HE■■■</b>	593	345	96.2	96.6	0.84	0.82	46703	2.00	0.70	4.50	305	6300
3150	<b>1RN4 636-3HE■■■</b>	593	375	96.4	96.7	0.84	0.82	50729	2.00	0.73	4.60	335	7500
<b>12-pole</b>													
370	<b>1RN6 450-5HJ■■■</b>	491	53	92.4	92.7	0.73	0.68	7197	1.80	0.60	4.00	37	1100
425	<b>1RN6 452-5HJ■■■</b>	492	60	92.8	93.0	0.73	0.67	8249	1.80	0.63	4.20	41	1400
475	<b>1RN6 454-5HJ■■■</b>	491	66	93.1	93.3	0.74	0.69	9239	1.80	0.60	4.00	46	1600
540	<b>1RN6 456-5HJ■■■</b>	492	77	93.5	93.5	0.72	0.65	10482	2.00	0.68	4.40	52	2000
680	<b>1RN4 500-5HE■■■</b>	491	94	93.9	94.0	0.74	0.69	13226	1.90	0.62	4.10	70	2350
760	<b>1RN4 502-5HE■■■</b>	491	102	94.1	94.2	0.76	0.71	14782	1.80	0.60	4.00	79	2600
840	<b>1RN4 504-5HE■■■</b>	491	112	94.3	94.4	0.76	0.71	16338	1.90	0.62	4.10	87	3100
930	<b>1RN4 506-5HE■■■</b>	492	128	94.5	94.6	0.74	0.69	18052	1.90	0.62	4.30	98	3700
1100	<b>1RN4 560-5HE■■■</b>	493	150	94.5	94.8	0.75	0.71	21308	1.80	0.57	3.90	123	3600
1230	<b>1RN4 562-5HE■■■</b>	493	168	94.9	95.0	0.74	0.68	23827	1.80	0.60	4.00	141	4100
1350	<b>1RN4 564-5HE■■■</b>	494	184	95.0	95.1	0.74	0.68	26098	2.00	0.63	4.30	158	4700
1470	<b>1RN4 566-5HE■■■</b>	494	198	95.1	95.2	0.75	0.69	28418	2.00	0.65	4.30	173	5200
1900	<b>1RN4 630-5HE■■■</b>	493	245	95.4	95.8	0.79	0.76	36805	1.90	0.70	4.30	250	5500
2150	<b>1RN4 632-5HE■■■</b>	493	270	95.6	96.0	0.80	0.76	41648	1.90	0.71	4.30	275	7000
2350	<b>1RN4 634-5HE■■■</b>	493	295	95.8	96.3	0.80	0.77	45522	1.90	0.72	4.40	305	8300
2550	<b>1RN4 636-5HE■■■</b>	493	320	95.9	96.4	0.80	0.77	49397	2.00	0.74	4.50	335	9800

**Voltage code:**

3.3 kV, 50 Hz      0  
 6 kV, 50 Hz      6  
 6.6 kV, 50 Hz      7  
 Other voltage      9

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

**Type of construction:**

IM B3      0  
 IM V1 (without canopy)      8

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Selection and ordering data

The following data also apply to explosion-protected motors 1SL4/1SL6 (Ex nA) and 1SQ4/1SQ6 (Ex px).

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LP}/I_{rated}$	Motor kgm <sup>2</sup>	External max. <sup>1)</sup> kgm <sup>2</sup>
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[ - ]	[ - ]	[ - ]	kgm <sup>2</sup>	kgm <sup>2</sup>
<b>3.3 ... 6.6 kV, 50 Hz</b>													
2-pole													
6700 <sup>2)</sup>	<b>1RN6 710-2HJ■0</b>	2989	740	97.0	96.8	0.90	0.90	21414	2.00	0.43	4.60	132	108
8700 <sup>2)</sup>	<b>1RN6 712-2HJ■0</b>	2987	960	97.2	97.1	0.90	0.91	27818	1.80	0.42	4.30	147	158
10100 <sup>2)</sup>	<b>1RN6 714-2HJ■0</b>	2988	1100	97.4	97.2	0.91	0.91	32286	2.00	0.46	4.70	162	158
11700 <sup>2)</sup>	<b>1RN6 716-2HJ■0</b>	2988	1260	97.5	97.3	0.91	0.91	37396	2.00	0.49	4.90	179	171
4-pole													
7600 <sup>2)</sup>	<b>1RN6 710-4HJ■0</b>	1493	840	97.7	97.9	0.89	0.87	48609	2.30	0.60	5.50	273	627
8900 <sup>2)</sup>	<b>1RN6 712-4HJ■0</b>	1493	970	97.8	98.0	0.90	0.89	56954	2.10	0.59	5.50	300	700
10100 <sup>2)</sup>	<b>1RN6 714-4HJ■0</b>	1493	1100	97.8	98.0	0.91	0.90	64636	2.10	0.62	5.50	337	803
11700 <sup>2)</sup>	<b>1RN6 716-4HJ■0</b>	1492	1260	97.9	98.0	0.91	0.91	74886	2.10	0.63	5.50	369	881
6-pole													
5700	<b>1RN6 710-6HJ■■</b>	994	660	97.3	97.6	0.86	0.84	54792	2.00	0.68	5.10	330	1720
6400	<b>1RN6 712-6HJ■■</b>	994	730	97.4	97.6	0.87	0.85	61526	2.00	0.72	5.20	367	1933
7100	<b>1RN6 714-6HJ■■</b>	994	810	97.5	97.7	0.87	0.85	68225	2.10	0.79	5.50	419	2361
7800	<b>1RN6 716-6HJ■■</b>	994	880	97.5	97.7	0.87	0.85	74930	2.20	0.82	5.50	468	3032
8-pole													
4550	<b>1RN6 710-8HJ■■</b>	745	540	96.9	97.3	0.84	0.82	58354	1.90	0.76	5.00	415	4735
5000	<b>1RN6 712-8HJ■■</b>	745	590	97.1	97.4	0.84	0.82	64111	1.90	0.79	5.20	465	5335
5500	<b>1RN6 714-8HJ■■</b>	745	640	97.1	97.4	0.85	0.83	70512	1.90	0.80	5.20	531	6469
6100	<b>1RN6 716-8HJ■■</b>	745	710	97.3	97.5	0.85	0.83	78174	2.00	0.85	5.50	597	7503
10-pole													
3050	<b>1RN6 710-3HJ■■</b>	596	380	96.4	96.9	0.80	0.77	48916	2.10	0.72	5.00	415	8485
3450	<b>1RN6 712-3HJ■■</b>	596	430	96.7	97.0	0.80	0.77	55318	2.10	0.73	5.10	465	10335
3850	<b>1RN6 714-3HJ■■</b>	596	480	96.8	97.1	0.80	0.77	61707	2.20	0.78	5.40	531	11469
4350	<b>1RN6 716-3HJ■■</b>	596	530	96.6	97.2	0.81	0.77	69716	2.20	0.80	5.50	598	13202

#### Voltage code:

3.3 kV, 50 Hz  
6 kV, 50 Hz  
6.6 kV, 50 Hz  
Other voltage

**0**  
**6**  
**7**  
**9**

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

#### Type of construction:

IM B3  
IM V1 (without canopy)

**0**  
**8**

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup>  $V_{rated} < 6$  kV on request.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1FN4 and 1FN6

#### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b> <b>Order No.</b>	Speed rpm	Rated current $I_{rated}$ at 10 kV A	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{rated}$	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia Motor kgm <sup>2</sup>	External, max. <sup>1)</sup> kgm <sup>2</sup>
				4/4 load %	3/4 load %	4/4 load $\cos \phi$	3/4 load $\cos \phi$						
<b>9 ... 11 kV, 50 Hz</b>													
2-pole													
1170	<b>1RN6 450-2HJ■0</b>	2976	79	95.6	96.1	0.90	0.90	3755	2.10	0.55	5.50	13	31
1330	<b>1RN6 452-2HJ■0</b>	2978	88	95.9	96.3	0.91	0.91	4268	2.30	0.60	5.50	14	33
1450	<b>1RN6 454-2HJ■0</b>	2980	96	96.1	96.4	0.91	0.91	4649	2.30	0.55	5.50	15	36
1630	<b>1RN6 456-2HJ■0</b>	2981	106	96.3	96.7	0.92	0.92	5224	2.40	0.55	5.50	17	39
2050	<b>1RN6 500-2HJ■0</b>	2979	136	96.5	96.8	0.91	0.90	6571	2.35	0.65	5.50	19	37
2250	<b>1RN6 502-2HJ■0</b>	2978	148	96.5	96.8	0.91	0.91	7215	2.30	0.65	5.50	21	41
2550	<b>1RN6 504-2HJ■0</b>	2979	166	96.7	97.0	0.92	0.92	8174	2.40	0.55	5.50	25	45
2650	<b>1RN6 506-2HJ■0</b>	2980	170	96.8	97.2	0.93	0.93	8492	2.40	0.65	5.50	26	51
3300	<b>1RN6 560-2HJ■0</b>	2979	220	96.7	97.0	0.90	0.90	10578	1.90	0.55	4.40	39	115
3700	<b>1RN6 562-2HJ■0</b>	2983	240	96.9	97.1	0.91	0.90	11845	2.30	0.65	5.30	43	130
4300	<b>1RN6 564-2HJ■0</b>	2982	280	97.0	97.3	0.92	0.92	13770	2.20	0.60	5.10	49	145
5100	<b>1RN6 566-2HJ■0</b>	2984	330	97.3	97.4	0.92	0.91	16321	2.40	0.60	5.50	54	160
4300	<b>1RN4 630-2HE■0</b>	2984	290	96.8	96.9	0.89	0.88	13762	2.30	0.34	4.50	75	75
5000	<b>1RN4 632-2HE■0</b>	2985	330	97.3	97.3	0.90	0.89	15997	2.50	0.39	4.90	85	100
5700	<b>1RN4 634-2HE■0</b>	2986	375	97.4	97.4	0.90	0.89	18230	2.60	0.42	5.20	90	110
6700	<b>1RN4 636-2HE■0</b>	2987	440	97.6	97.7	0.90	0.89	21421	2.60	0.45	5.50	100	160
4-pole													
1030	<b>1RN6 450-4HJ■■■</b>	1485	69	95.2	95.7	0.90	0.89	6627	2.10	0.75	5.50	20	170
1190	<b>1RN6 452-4HJ■■■</b>	1484	80	95.4	95.9	0.90	0.90	7658	2.10	0.70	5.50	22	194
1340	<b>1RN6 454-4HJ■■■</b>	1486	90	95.6	96.1	0.90	0.90	8619	2.10	0.70	5.50	25	225
1520	<b>1RN6 456-4HJ■■■</b>	1487	102	95.9	96.2	0.90	0.89	9764	2.20	0.70	5.50	28	260
1900 <sup>2)</sup>	<b>1RN6 500-4HJ■0</b>	1487	124	96.4	96.8	0.92	0.91	12202	2.40	0.70	5.30	43	200
2100 <sup>2)</sup>	<b>1RN6 502-4HJ■0</b>	1487	136	96.5	96.9	0.92	0.91	13486	2.40	0.65	5.30	46	220
2350 <sup>2)</sup>	<b>1RN6 504-4HJ■0</b>	1488	154	96.6	97.0	0.91	0.91	15081	2.40	0.60	5.30	52	250
2550 <sup>2)</sup>	<b>1RN6 506-4HJ■0</b>	1488	166	96.7	97.1	0.92	0.91	16365	2.40	0.60	5.30	56	280
3000 <sup>2)</sup>	<b>1RN6 560-4HJ■0</b>	1491	196	96.9	97.2	0.91	0.90	19214	2.30	0.70	5.20	84	420
3400 <sup>2)</sup>	<b>1RN6 562-4HJ■0</b>	1491	220	97.0	97.3	0.92	0.91	21776	2.30	0.70	5.20	94	460
3800 <sup>2)</sup>	<b>1RN6 564-4HJ■0</b>	1492	250	97.2	97.4	0.91	0.90	24321	2.35	0.60	5.30	104	510
4200 <sup>2)</sup>	<b>1RN6 566-4HJ■0</b>	1493	275	97.2	97.4	0.91	0.90	26863	2.35	0.60	5.40	115	560
4500	<b>1RN4 630-4HE■■■</b>	1490	300	96.9	97.1	0.89	0.89	28842	2.10	0.57	4.90	150	550
5000	<b>1RN4 632-4HE■■■</b>	1490	330	97.1	97.2	0.90	0.90	32047	2.15	0.59	5.00	165	650
5600	<b>1RN4 634-4HE■■■</b>	1490	370	97.3	97.4	0.90	0.90	35893	2.20	0.63	5.30	180	750
6200	<b>1RN4 636-4HE■■■</b>	1491	410	97.4	97.5	0.90	0.90	39712	2.40	0.68	5.50	195	780

**Voltage code:**

10 kV, 50 Hz  
Other voltage

8

9

**Type of construction:**

IM B3  
IM V1 (without canopy)

0

8

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> Data of vertical motors (IM V1) on request.



# Motors for line operation

## Water-cooled motors

H-compact PLUS, 1RN4 and 1RN6



### Selection and ordering data (continued)

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Speed rpm	Rated current $I_{rated}$ at 10 kV A	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{rated}$	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia Motor kgm <sup>2</sup>	External, max. <sup>1)</sup> kgm <sup>2</sup>									
				4/4 load %	3/4 load %	4/4 load $\cos \varphi$	3/4 load $\cos \varphi$															
<b>9 ... 11 kV, 50 Hz</b>																						
6-pole																						
780	<b>1RN6 450-6HJ■■■</b>	990	55	95.0	95.5	0.86	0.83	7528	2.10	0.90	5.50	26	340									
850	<b>1RN6 452-6HJ■■■</b>	990	59	95.1	95.7	0.87	0.85	8205	2.20	0.95	5.50	29	400									
930	<b>1RN6 454-6HJ■■■</b>	990	65	95.3	95.9	0.87	0.86	8977	2.10	0.95	5.50	32	460									
1080	<b>1RN6 456-6HJ■■■</b>	992	75	95.6	96.1	0.87	0.85	10403	2.20	0.83	5.50	37	560									
1350	<b>1RN4 500-6HE■■■</b>	991	94	95.4	95.7	0.87	0.85	13010	2.20	0.80	5.40	57	430									
1520	<b>1RN4 502-6HE■■■</b>	991	106	95.6	95.9	0.87	0.86	14648	2.10	0.80	5.20	65	540									
1700	<b>1RN4 504-6HE■■■</b>	991	118	95.8	96.0	0.87	0.85	16382	2.10	0.80	5.40	72	590									
1900	<b>1RN4 506-6HE■■■</b>	991	132	96.0	96.1	0.87	0.85	18310	2.20	0.80	5.50	81	710									
2400	<b>1RN4 560-6HE■■■</b>	992	168	96.3	96.5	0.86	0.85	23105	2.10	0.75	5.30	105	950									
2650	<b>1RN4 562-6HE■■■</b>	992	182	96.3	96.6	0.87	0.86	25512	2.10	0.75	5.20	120	980									
2950	<b>1RN4 564-6HE■■■</b>	993	205	96.5	96.7	0.87	0.85	28371	2.20	0.75	5.50	135	1250									
3200	<b>1RN4 566-6HE■■■</b>	993	220	96.7	96.8	0.87	0.85	30775	2.10	0.75	5.40	147	1300									
3600	<b>1RN4 630-6HE■■■</b>	993	250	96.7	96.9	0.86	0.84	34622	2.20	0.63	5.00	190	1200									
4000	<b>1RN4 632-6HE■■■</b>	993	275	96.8	97.0	0.87	0.09	38469	2.10	0.64	5.00	210	1500									
4400	<b>1RN4 634-6HE■■■</b>	993	300	97.0	97.1	0.87	0.86	42316	2.20	0.66	5.20	230	1750									
4800	<b>1RN4 636-6HE■■■</b>	994	330	97.1	97.2	0.87	0.86	46117	2.30	0.71	5.50	255	2000									
8-pole																						
520	<b>1RN6 450-8HJ■■■</b>	742	37.5	94.0	94.6	0.85	0.82	6688	2.10	0.75	5.50	32	215									
560	<b>1RN6 452-8HJ■■■</b>	742	40.5	94.1	94.9	0.85	0.84	7206	2.10	0.65	5.50	36	290									
580	<b>1RN6 454-8HJ■■■</b>	742	41.5	94.1	94.9	0.86	0.83	7463	2.20	0.75	5.50	41	365									
750	<b>1RN6 456-8HJ■■■</b>	743	55	94.7	95.1	0.83	0.79	9649	2.30	0.80	5.50	47	485									
1000	<b>1RN4 500-8HE■■■</b>	743	72	94.9	95.1	0.84	0.81	12853	2.10	0.85	5.40	70	600									
1160	<b>1RN4 502-8HE■■■</b>	744	85	95.3	95.3	0.83	0.80	14890	2.20	0.85	5.50	80	750									
1280	<b>1RN4 504-8HE■■■</b>	744	93	95.4	95.5	0.83	0.80	16430	2.20	0.80	5.50	88	800									
1400	<b>1RN4 506-8HE■■■</b>	744	102	95.5	95.6	0.83	0.80	17970	2.10	0.80	5.50	99	870									
1650	<b>1RN4 560-8HE■■■</b>	744	118	95.8	96.0	0.84	0.81	21179	2.10	0.75	5.30	123	1350									
1900	<b>1RN4 562-8HE■■■</b>	744	134	96.0	96.1	0.85	0.82	24388	2.00	0.75	5.30	141	1400									
2050	<b>1RN4 564-8HE■■■</b>	745	144	96.2	96.2	0.85	0.82	26279	2.20	0.80	5.50	158	1800									
2250	<b>1RN4 566-8HE■■■</b>	745	158	96.2	96.2	0.85	0.82	28842	2.10	0.80	5.50	173	1700									
2600	<b>1RN4 630-8HE■■■</b>	744	186	96.3	96.4	0.84	0.81	33374	2.40	0.75	5.20	255	1800									
2900	<b>1RN4 632-8HE■■■</b>	744	205	96.4	96.5	0.84	0.81	37224	2.30	0.75	5.20	280	2000									
3200	<b>1RN4 634-8HE■■■</b>	744	225	96.6	96.7	0.85	0.82	41075	2.30	0.74	5.10	310	2200									
3500	<b>1RN4 636-8HE■■■</b>	744	245	96.7	96.8	0.86	0.83	44926	2.30	0.75	5.20	340	2600									

**Voltage code:**
10 kV, 50 Hz  
Other voltage8  
9
**Type of construction:**
IM B3  
IM V1 (without canopy)0  
8
**Note:**
Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.
<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.


# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Selection and ordering data (continued)

Rated power IEC kW	High voltage motor H-compact PLUS Order No.	Speed rpm	Rated current $I_{rated}$ at 10 kV A	Efficiency 4/4 load %	Efficiency 3/4 load %	Power factor 4/4 load $\cos \phi$	Power factor 3/4 load $\cos \phi$	Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{LR}/T_{rated}$ [-]	Locked- rotor current $I_{LR}/I_{rated}$ [-]	Moment of inertia Motor kgm <sup>2</sup>	External, max. <sup>1)</sup> kgm <sup>2</sup>
<b>9 ... 11 kW, 50 Hz</b>													
10-pole													
720	<b>1RN4 500-3HE■■■</b>	593	55	93.8	93.9	0.80	0.76	11595	2.20	0.82	5.20	70	900
830	<b>1RN4 502-3HE■■■</b>	594	64	94.2	94.2	0.79	0.74	13344	2.20	0.82	5.30	80	1100
920	<b>1RN4 504-3HE■■■</b>	594	71	94.3	94.3	0.79	0.74	14791	2.20	0.82	5.30	88	1200
1020	<b>1RN4 506-3HE■■■</b>	594	79	94.5	94.5	0.79	0.75	16399	2.20	0.80	5.30	99	1400
1250	<b>1RN4 560-3HE■■■</b>	593	94	94.8	94.9	0.81	0.77	20131	2.10	0.72	4.70	123	1650
1420	<b>1RN4 562-3HE■■■</b>	593	106	94.9	95.2	0.82	0.78	22868	2.00	0.70	4.70	141	2050
1570	<b>1RN4 564-3HE■■■</b>	593	116	95.1	95.4	0.82	0.78	25284	2.00	0.72	5.00	158	2500
1700	<b>1RN4 566-3HE■■■</b>	595	128	95.3	95.4	0.80	0.75	27286	2.40	0.85	5.50	173	2700
2100	<b>1RN4 630-3HE■■■</b>	593	152	95.8	96.1	0.83	0.80	33820	2.10	0.73	4.70	250	2500
2350	<b>1RN4 632-3HE■■■</b>	594	172	96.0	96.2	0.82	0.78	37782	2.30	0.82	5.10	280	2900
2550	<b>1RN4 634-3HE■■■</b>	594	184	96.0	96.3	0.83	0.79	40997	2.30	0.80	5.10	305	3000
2750	<b>1RN4 636-3HE■■■</b>	594	196	96.2	96.5	0.84	0.80	44213	2.30	0.83	5.20	335	3500
12-pole													
580	<b>1RN4 502-5HE■■■</b>	493	48.0	93.3	93.3	0.74	0.68	11235	2.00	0.70	4.70	79	1350
640	<b>1RN4 504-5HE■■■</b>	493	53	93.5	93.6	0.74	0.68	12398	2.00	0.70	4.80	87	1500
700	<b>1RN4 506-5HE■■■</b>	493	58	93.6	93.7	0.75	0.69	13560	2.10	0.70	4.80	98	1600
850	<b>1RN4 560-5HE■■■</b>	494	69	93.8	94.1	0.76	0.71	16432	1.85	0.60	4.20	123	1750
1000	<b>1RN4 562-5HE■■■</b>	494	82	94.4	94.6	0.75	0.69	19332	1.95	0.65	4.50	141	2200
1100	<b>1RN4 564-5HE■■■</b>	494	88	94.5	94.7	0.76	0.71	21265	1.95	0.63	4.40	158	2500
1200	<b>1RN4 566-5HE■■■</b>	494	96	94.8	94.8	0.76	0.71	23198	1.95	0.63	4.40	173	2900
1650	<b>1RN4 630-5HE■■■</b>	494	126	95.1	95.5	0.79	0.74	31898	2.10	0.75	4.60	250	3000
1800	<b>1RN4 632-5HE■■■</b>	494	142	95.4	95.7	0.77	0.71	34798	2.40	0.88	5.20	275	3500
1950	<b>1RN4 634-5HE■■■</b>	494	152	95.5	95.7	0.78	0.73	37697	2.30	0.85	5.10	305	3400
2100	<b>1RN4 636-5HE■■■</b>	495	162	95.7	95.9	0.78	0.73	40515	2.35	0.88	5.30	335	4000

**Voltage code:**

10 kV, 50 Hz  
Other voltage

**8**

**9**

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

**Type of construction:**

IM B3  
IM V1 (without canopy)

**0**

**8**

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

2

#### Selection and ordering data

Rated power kW	High voltage motor H-compact PLUS Order No.	Speed rpm	Rated current $I_{rated}$ at 10 kV A	Efficiency		Power factor		Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{LR}/T_{rated}$ [-]	Locked- rotor current $I_{LR}/I_{rated}$ [-]	Moment of inertia kgm <sup>2</sup>	Motor External, max. <sup>1)</sup> kgm <sup>2</sup>
				4/4 load %	3/4 load %	4/4 load $\cos \varphi$	3/4 load $\cos \varphi$						
				9 ... 11 kV, 50 Hz	9 ... 11 kV, 50 Hz	9 ... 11 kV, 50 Hz	9 ... 11 kV, 50 Hz						
<b>2-pole</b>													
6400	<b>1RN6 710-2HJ■■0</b>	2989	425	96.9	96.8	0.90	0.89	20451	2.10	0.45	4.80	132	138
7500	<b>1RN6 712-2HJ■■0</b>	2990	495	97.0	96.9	0.90	0.89	23961	2.20	0.48	5.10	147	163
8200	<b>1RN6 714-2HJ■■0</b>	2990	540	97.2	97.0	0.91	0.91	26197	2.20	0.51	5.30	162	188
9100	<b>1RN6 716-2HJ■■0</b>	2990	590	97.2	97.1	0.92	0.92	29072	2.30	0.53	5.40	179	221
<b>4-pole</b>													
6700	<b>1RN6 710-4HJ■■0</b>	1493	440	97.5	97.7	0.90	0.88	42853	2.30	0.61	5.50	273	697
7500	<b>1RN6 712-4HJ■■0</b>	1493	485	97.6	97.8	0.91	0.90	47979	2.20	0.59	5.50	300	800
8200	<b>1RN6 714-4HJ■■0</b>	1493	530	97.7	97.8	0.91	0.90	52456	2.20	0.61	5.50	337	933
9100	<b>1RN6 716-4HJ■■0</b>	1493	590	97.7	97.8	0.91	0.90	58205	2.20	0.62	5.50	369	1031
<b>6-pole</b>													
5000	<b>1RN6 710-6HJ■■■</b>	994	345	97.2	97.4	0.86	0.85	48051	2.10	0.69	5.30	330	2520
5500	<b>1RN6 712-6HJ■■■</b>	994	375	97.3	97.5	0.87	0.85	52847	2.10	0.74	5.50	367	2133
6100	<b>1RN6 714-6HJ■■■</b>	994	415	97.4	97.6	0.87	0.85	58591	2.20	0.78	5.50	419	2561
6800	<b>1RN6 716-6HJ■■■</b>	995	465	97.4	97.6	0.87	0.86	65303	2.30	0.82	5.50	468	2982
<b>8-pole</b>													
3850	<b>1RN6 710-8HJ■■■</b>	745	270	96.7	97.2	0.85	0.83	49372	1.90	0.71	4.90	415	5185
4200	<b>1RN6 712-8HJ■■■</b>	745	295	96.8	97.2	0.85	0.83	53835	2.00	0.78	5.30	465	5935
4650	<b>1RN6 714-8HJ■■■</b>	746	325	97.0	97.3	0.85	0.82	59562	2.20	0.93	5.50	531	7019
5200	<b>1RN6 716-8HJ■■■</b>	746	365	97.1	97.3	0.85	0.82	66595	2.20	0.93	5.50	597	8203
<b>10-pole</b>													
2800	<b>1RN6 710-3HJ■■■</b>	596	210	96.4	96.8	0.80	0.77	44889	2.10	0.72	5.20	415	8485
3100	<b>1RN6 712-3HJ■■■</b>	596	230	96.6	96.9	0.81	0.78	49700	2.10	0.71	5.10	465	10335
3400	<b>1RN6 714-3HJ■■■</b>	596	250	96.7	97.0	0.81	0.77	54475	2.30	0.78	5.50	531	11369
3700	<b>1RN6 716-3HJ■■■</b>	596	275	96.7	97.0	0.81	0.77	59266	2.30	0.82	5.50	598	12702

**Voltage code:**
10 kV, 50 Hz  
Other voltage8  
9
**Type of construction:**
IM B3  
IM V1 (without canopy)0  
8
**Note:**
Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Selection and ordering data

The following data also apply to explosion-protected motors 1SL4/1SL6 (Ex nA) and 1SQ4/1SQ6 (Ex px).

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
			$I_{rated}$ at 6.6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/I_{rated}$	$T_{LR}/I_{rated}$	$I_{LR}/I_{rated}$	Motor	
kW	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>4 ... 6.6 kV, 60 Hz</b>													
2-pole													
1600	<b>1RN6 450-2HJ■0</b>	3572	162	96.0	96.2	0.90	0.90	4279	2.00	0.55	5.10	13	34
1850	<b>1RN6 452-2HJ■0</b>	3573	184	96.2	96.5	0.91	0.91	4946	2.10	0.55	5.40	14	40
2060	<b>1RN6 454-2HJ■0</b>	3577	205	96.4	96.6	0.91	0.91	5504	2.20	0.55	5.50	16	45
2300	<b>1RN6 456-2HJ■0</b>	3580	230	96.6	96.8	0.91	0.91	6137	2.40	0.55	5.50	17	52
2800	<b>1RN6 500-2HJ■0</b>	3575	280	96.6	96.9	0.90	0.90	7479	2.10	0.50	5.10	20	64
3000	<b>1RN6 502-2HJ■0</b>	3577	300	96.8	96.9	0.91	0.90	8009	2.20	0.50	5.40	22	72
3650	<b>1RN6 504-2HJ■0</b>	3580	355	97.1	97.2	0.92	0.91	9736	2.50	0.55	5.50	26	80
3900	<b>1RN6 506-2HJ■0</b>	3580	375	97.2	97.3	0.93	0.92	10403	2.50	0.70	5.50	27	88
4400	<b>1RN6 560-2HJ■0</b>	3578	440	96.8	97.0	0.90	0.90	11743	1.90	0.50	4.40	39	145
5000	<b>1RN6 562-2HJ■0</b>	3579	495	97.0	97.2	0.91	0.91	13341	2.10	0.55	4.80	43	160
5700	<b>1RN6 564-2HJ■0</b>	3580	560	97.2	97.3	0.92	0.92	15204	2.10	0.60	4.90	49	180
6500	<b>1RN6 566-2HJ■0</b>	3582	630	97.4	97.4	0.92	0.92	17328	2.30	0.60	5.40	54	200
5700	<b>1RN4 630-2HE■0</b>	3583	580	97.0	96.9	0.88	0.87	15193	2.10	0.30	4.20	75	95
6500	<b>1RN4 632-2HE■0</b>	3584	660	97.2	97.2	0.89	0.89	17320	2.30	0.34	4.60	85	140
7500	<b>1RN4 634-2HE■0</b>	3585	750	97.5	97.5	0.90	0.89	19979	2.60	0.41	5.30	90	150
8200	<b>1RN4 636-2HE■0</b>	3585	820	97.6	97.6	0.90	0.90	21844	2.60	0.42	5.40	100	110
4-pole													
1630	<b>1RN6 450-4HJ■■■</b>	1783	168	95.8	96.1	0.89	0.88	8733	2.10	0.70	5.50	20	178
1750	<b>1RN6 452-4HJ■■■</b>	1785	180	95.9	96.1	0.89	0.88	9362	2.20	0.70	5.50	22	225
2070	<b>1RN6 454-4HJ■■■</b>	1785	210	96.1	96.3	0.90	0.89	11078	2.20	0.70	5.50	25	285
2310	<b>1RN6 456-4HJ■■■</b>	1787	235	96.3	96.4	0.89	0.88	12350	2.20	0.70	5.50	28	355
2500 <sup>(2)</sup>	<b>1RN6 500-4HJ■0</b>	1787	245	96.9	97.1	0.92	0.90	13359	2.45	0.65	5.40	43	250
2750 <sup>(2)</sup>	<b>1RN6 502-4HJ■0</b>	1788	270	96.9	97.1	0.92	0.90	14687	2.55	0.70	5.60	46	280
3200 <sup>(2)</sup>	<b>1RN6 504-4HJ■0</b>	1788	315	97.0	97.2	0.92	0.90	17090	2.35	0.60	5.20	52	310
3600 <sup>(2)</sup>	<b>1RN6 506-4HJ■0</b>	1787	355	97.1	97.4	0.92	0.91	19238	2.40	0.65	5.20	56	350
4300 <sup>(2)</sup>	<b>1RN6 560-4HJ■0</b>	1791	425	97.2	97.3	0.91	0.90	22927	2.30	0.70	5.10	84	550
4800 <sup>(2)</sup>	<b>1RN6 562-4HJ■0</b>	1791	475	97.3	97.5	0.91	0.90	25593	2.30	0.65	5.10	94	610
5400 <sup>(2)</sup>	<b>1RN6 564-4HJ■0</b>	1791	530	97.4	97.5	0.91	0.90	28792	2.25	0.60	5.10	105	670
5600 <sup>(2)</sup>	<b>1RN6 566-4HJ■0</b>	1792	550	97.5	97.6	0.91	0.90	29842	2.30	0.60	5.20	115	740
6500	<b>1RN4 630-4HE■0</b>	1789	660	97.2	97.3	0.88	0.88	34698	2.10	0.52	4.80	150	600
7300	<b>1RN4 632-4HE■0</b>	1789	740	97.3	97.5	0.89	0.89	38969	2.10	0.54	4.80	165	650
8000	<b>1RN4 634-4HE■0</b>	1790	810	97.5	97.6	0.89	0.89	42682	2.20	0.59	5.20	180	680
8600	<b>1RN4 636-4HE■0</b>	1791	870	97.7	97.7	0.89	0.88	45857	2.40	0.61	5.50	195	800

#### Voltage code:

4 kV, 60 Hz	4
6.6 kV, 60 Hz	1
Other voltage	9
<b>Type of construction:</b>	
IM B3	0
IM V1 (without canopy)	8

#### Note:

Efficiencies according to IEC 60034-2-1:2007; stray load losses determined by statical evaluation of measurements. NEMA version on request. Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>(1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>(2)</sup> Data of vertical motors (IM V1) on request.



# Motors for line operation

## Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

### Selection and ordering data (continued)

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
IEC			$I_{rated}$ at 6.6 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	
kW	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[·]	[·]	[·]	$\text{kgm}^2$	$\text{kgm}^2$

#### 4 ... 6.6 kV, 60 Hz

##### 6-pole

1210	<b>1RN6 450-6HJ■■■</b>	1188	128	95.7	96.2	0.86	0.85	9734	1.90	0.80	5.50	26	550
1350	<b>1RN6 452-6HJ■■■</b>	1188	144	95.9	96.3	0.86	0.85	10858	2.00	0.75	5.50	29	610
1480	<b>1RN6 454-6HJ■■■</b>	1189	156	96.0	96.5	0.86	0.85	11894	2.00	0.85	5.50	33	660
1620	<b>1RN6 456-6HJ■■■</b>	1190	170	96.3	96.6	0.87	0.85	13006	2.20	0.95	5.50	38	730
2050	<b>1RN4 500-6HE■■■</b>	1189	215	96.1	96.1	0.87	0.85	16466	2.00	0.72	5.10	57	600
2300	<b>1RN4 502-6HE■■■</b>	1189	240	96.3	96.4	0.87	0.86	18474	2.00	0.70	5.00	65	650
2600	<b>1RN4 504-6HE■■■</b>	1189	270	96.4	96.6	0.87	0.86	20883	2.00	0.72	5.10	72	800
2850	<b>1RN4 506-6HE■■■</b>	1190	295	96.5	96.6	0.87	0.85	22872	2.00	0.75	5.30	81	950
3300	<b>1RN4 560-6HE■■■</b>	1191	345	96.6	96.6	0.87	0.86	26461	2.00	0.65	4.90	105	750
3750	<b>1RN4 562-6HE■■■</b>	1192	390	96.8	96.9	0.87	0.85	30044	2.00	0.70	5.10	120	900
4150	<b>1RN4 564-6HE■■■</b>	1192	430	96.9	97.0	0.87	0.86	33249	2.00	0.75	5.30	135	1050
4500	<b>1RN4 566-6HE■■■</b>	1192	465	97.0	97.1	0.87	0.86	36053	2.00	0.70	5.20	147	1200
5100	<b>1RN4 630-6HE■■■</b>	1192	530	97.1	97.2	0.86	0.85	40860	1.90	0.51	4.30	190	1700
5700	<b>1RN4 632-6HE■■■</b>	1193	600	97.2	97.2	0.85	0.84	45629	2.00	0.56	4.70	210	2100
6200	<b>1RN4 634-6HE■■■</b>	1193	650	97.3	97.3	0.86	0.85	49631	2.10	0.61	4.90	230	2000
6700	<b>1RN4 636-6HE■■■</b>	1193	700	97.4	97.4	0.86	0.84	53634	2.30	0.64	5.20	255	2600

##### 8-pole

870	<b>1RN6 450-8HJ■■■</b>	890	95	95.1	95.6	0.84	0.82	9333	1.80	0.60	5.30	32	475
960	<b>1RN6 452-8HJ■■■</b>	892	106	95.2	95.6	0.84	0.81	10285	1.90	0.65	5.40	36	570
1050	<b>1RN6 454-8HJ■■■</b>	892	114	95.3	95.7	0.84	0.82	11254	2.00	0.65	5.50	41	670
1180	<b>1RN6 456-8HJ■■■</b>	892	128	95.6	95.9	0.85	0.83	12637	1.90	0.65	5.50	47	820
1500	<b>1RN4 500-8HE■■■</b>	892	164	95.7	95.7	0.84	0.81	16059	2.00	0.75	5.20	70	750
1700	<b>1RN4 502-8HE■■■</b>	892	182	95.9	95.9	0.85	0.83	18201	2.00	0.75	5.20	80	1050
1860	<b>1RN4 504-8HE■■■</b>	892	200	96.0	96.0	0.85	0.83	19914	2.00	0.78	5.10	88	1200
2050	<b>1RN4 506-8HE■■■</b>	893	220	96.2	96.1	0.84	0.81	21923	2.10	0.82	5.50	99	1300
2350	<b>1RN4 560-8HE■■■</b>	893	255	96.2	96.3	0.84	0.81	25132	1.90	0.65	4.90	123	1600
2700	<b>1RN4 562-8HE■■■</b>	894	290	96.4	96.4	0.84	0.82	28842	2.00	0.70	5.10	141	1650
2900	<b>1RN4 564-8HE■■■</b>	894	315	96.4	96.6	0.84	0.82	30979	2.00	0.70	5.00	158	2300
3100	<b>1RN4 566-8HE■■■</b>	894	330	96.6	96.7	0.85	0.84	33115	2.00	0.70	5.00	173	2500

##### Voltage code:

4 kV, 60 Hz	<b>4</b>
6.6 kV, 60 Hz	<b>1</b>
Other voltage	<b>9</b>

##### Type of construction:

IM B3	<b>0</b>
IM V1 (without canopy)	<b>8</b>

##### Note:

Efficiencies according to IEC 60034-2-1:2007; stray load losses determined by statical evaluation of measurements. NEMA version on request.

Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS, 1RN4 and 1RN6

#### Selection and ordering data (continued)

Rated power IEC kW	High voltage motor H-compact PLUS Order No.	Speed rpm	Rated current $I_{rated}$ at 6.6 kV A	Efficiency 4/4 load %	Efficiency 3/4 load %	Power factor 4/4 load $\cos \varphi$	Power factor 3/4 load $\cos \varphi$	Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{LR}/T_{rated}$ [-]	Locked- rotor current $I_{LR}/I_{rated}$ [-]	Moment of inertia Motor kgm <sup>2</sup>	External, max. <sup>1)</sup> kgm <sup>2</sup>
<b>4 ... 6.6 kV, 60 Hz</b>													
10-pole													
650	<b>1RN6 450-3HJ■■■</b>	710	74	93.7	94.0	0.82	0.78	8743	1.90	0.72	4.50	37	650
720	<b>1RN6 452-3HJ■■■</b>	710	83	94.1	94.3	0.81	0.77	9685	2.00	0.75	4.70	41	850
800	<b>1RN6 454-3HJ■■■</b>	711	92	94.3	94.4	0.81	0.76	10745	2.10	0.80	4.90	46	900
910	<b>1RN6 456-3HJ■■■</b>	711	104	94.5	94.6	0.81	0.77	12223	2.10	0.80	5.00	52	1100
1080	<b>1RN4 500-3HE■■■</b>	711	122	94.8	95.0	0.82	0.80	14506	1.80	0.65	4.40	70	1200
1200	<b>1RN4 502-3HE■■■</b>	712	134	95.2	95.2	0.82	0.80	16096	1.90	0.68	4.70	80	1500
1320	<b>1RN4 504-3HE■■■</b>	712	146	95.1	95.2	0.83	0.80	17705	1.90	0.70	4.70	88	1450
1500	<b>1RN4 506-3HE■■■</b>	712	166	95.4	95.5	0.83	0.79	20119	2.00	0.72	4.90	99	1900
1780	<b>1RN4 560-3HE■■■</b>	713	205	95.5	95.6	0.80	0.76	23842	2.00	0.70	4.60	123	2100
2040	<b>1RN4 562-3HE■■■</b>	713	235	95.8	95.8	0.80	0.76	27324	2.00	0.70	4.80	141	2600
2200	<b>1RN4 564-3HE■■■</b>	713	245	95.9	95.8	0.82	0.79	29467	2.00	0.68	4.60	158	2800
2400	<b>1RN4 566-3HE■■■</b>	713	270	96.0	96.0	0.81	0.77	32146	2.10	0.75	5.00	173	3300
12-pole													
440	<b>1RN6 450-5HJ■■■</b>	591	56	92.9	93.1	0.74	0.71	7110	1.80	0.56	4.00	37	630
510	<b>1RN6 452-5HJ■■■</b>	591	65	93.3	93.3	0.73	0.68	8241	1.80	0.60	4.20	41	850
570	<b>1RN6 454-5HJ■■■</b>	592	73	93.9	93.9	0.73	0.68	9195	1.80	0.60	4.20	46	1150
650	<b>1RN6 456-5HJ■■■</b>	592	82	94.0	93.9	0.74	0.68	10486	1.90	0.60	4.30	52	1300
820	<b>1RN4 500-5HE■■■</b>	592	102	94.4	94.3	0.74	0.68	13228	2.00	0.62	4.50	70	1650
920	<b>1RN4 502-5HE■■■</b>	592	114	94.6	94.6	0.75	0.70	14841	1.90	0.62	4.40	79	2000
1020	<b>1RN4 504-5HE■■■</b>	592	128	94.8	94.7	0.74	0.68	16454	2.00	0.65	4.70	87	2400
1120	<b>1RN4 506-5HE■■■</b>	592	136	94.8	94.8	0.76	0.71	18068	1.90	0.60	4.40	98	2200
1300	<b>1RN4 560-5HE■■■</b>	593	160	95.0	95.1	0.75	0.70	20936	1.80	0.53	3.90	123	2050
1470	<b>1RN4 562-5HE■■■</b>	593	182	95.2	95.3	0.74	0.69	23674	1.80	0.55	4.00	141	2500
1620	<b>1RN4 564-5HE■■■</b>	594	205	95.4	95.4	0.73	0.67	26045	2.00	0.63	4.30	158	3500
1760	<b>1RN4 566-5HE■■■</b>	594	220	95.5	95.5	0.73	0.68	28296	2.00	0.63	4.40	173	3900

**Voltage code:**

4 kV, 60 Hz  
6.6 kV, 60 Hz  
Other voltage

**4****1****9**
**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements. NEMA version on request.

**Type of construction:**

IM B3  
IM V1 (without canopy)

**0****8**

Higher pole numbers are available on request.  
Electrical data is also valid for operation with Perfect Harmony drives. For ordering, please note the 10th and 11th position of the order code.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Water-cooled motors

H-compact PLUS IEN4 and IRN6

### Selection and ordering data

The following data also apply to explosion-protected motors 1SL4/1SL6 (Ex nA) and 1SQ4/1SQ6 (Ex px).

Rated power	<b>High voltage motor H-compact PLUS</b>	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
				<i>I<sub>rated</sub></i> at 6.6 kV	4/4 load	3/4 load	4/4 load						
kW	Order No.	rpm	A	%	%	cos φ	cos φ	Nm	[ - ]	[ - ]	[ - ]	kgm <sup>2</sup>	kgm <sup>2</sup>
<b>4 ... 6.6 kV, 60 Hz</b>													
2-pole													
7600 <sup>2)</sup>	<b>1RN6 710-2HJ■■0</b>	3589	760	96.8	96.6	0.90	0.90	20229	2.00	0.40	4.60	132	48
9700 <sup>2)</sup>	<b>1RN6 712-2HJ■■0</b>	3589	970	97.1	96.9	0.90	0.89	25813	2.20	0.47	5.20	147	43
11900 <sup>2)</sup>	<b>1RN6 714-2HJ■■0</b>	3589	1180	97.3	97.1	0.91	0.91	31672	2.20	0.49	5.20	162	38
13600 <sup>2)</sup>	<b>1RN6 716-2HJ■■0</b>	3590	1340	97.4	97.2	0.91	0.91	36190	2.30	0.52	5.50	179	41
4-pole													
8700 <sup>2)</sup>	<b>1RN6 710-4HJ■■0</b>	1793	860	97.8	97.8	0.90	0.88	46340	2.30	0.59	5.50	273	297
10400 <sup>2)</sup>	<b>1RN6 712-4HJ■■0</b>	1793	1040	97.9	97.9	0.90	0.89	55399	2.30	0.60	5.50	300	310
11900 <sup>2)</sup>	<b>1RN6 714-4HJ■■0</b>	1793	1160	97.9	98.0	0.91	0.90	63396	2.20	0.61	5.50	337	353
13200 <sup>2)</sup>	<b>1RN6 716-4HJ■■0</b>	1793	1300	98.0	98.0	0.91	0.89	70311	2.30	0.62	5.50	369	406
6-pole													
6900	<b>1RN6 710-6HJ■■■</b>	1194	720	97.4	97.6	0.86	0.84	55212	2.10	0.69	5.40	330	970
7600	<b>1RN6 712-6HJ■■■</b>	1194	790	97.5	97.6	0.86	0.84	60797	2.10	0.70	5.50	367	1083
8400	<b>1RN6 714-6HJ■■■</b>	1194	860	97.7	97.7	0.87	0.85	67196	2.10	0.73	5.50	419	1311
9200	<b>1RN6 716-6HJ■■■</b>	1194	940	97.7	97.7	0.88	0.87	73603	2.10	0.74	5.50	468	1572
8-pole													
5400	<b>1RN6 710-8HJ■■■</b>	895	590	97.2	97.4	0.83	0.81	57627	2.00	0.76	5.30	415	2835
6100	<b>1RN6 712-8HJ■■■</b>	895	660	97.2	97.4	0.83	0.81	65089	2.00	0.78	5.40	465	3185
6800	<b>1RN6 714-8HJ■■■</b>	895	730	97.3	97.5	0.84	0.81	72542	2.10	0.82	5.50	531	3769
7500	<b>1RN6 716-8HJ■■■</b>	896	810	97.4	97.5	0.83	0.80	79967	2.20	0.88	5.50	597	4453
10-pole													
3700	<b>1RN6 710-3HJ■■■</b>	716	425	96.8	97.0	0.79	0.75	49369	2.20	0.73	5.40	415	5185
4050	<b>1RN6 712-3HJ■■■</b>	716	455	96.9	97.1	0.80	0.76	54035	2.20	0.73	5.40	465	5935
4500	<b>1RN6 714-3HJ■■■</b>	716	510	96.9	97.1	0.80	0.77	60031	2.20	0.74	5.50	531	7119
5100	<b>1RN6 716-3HJ■■■</b>	716	570	97.1	97.2	0.80	0.77	68021	2.30	0.79	5.50	598	8202

#### Voltage code:

4 kV, 60 Hz      **4**  
 4.16 kV, 60 Hz    **3**  
 6.6 kV, 60 Hz     **1**  
 Other voltage     **9**

#### Note:

Efficiencies according to IEC 60034-2-1:2007;  
 stray load losses determined by statical evaluation of measurements.

Higher pole numbers are available on request.

#### Type of construction:

IM B3              **0**  
 IM V1 (without canopy)    **8**

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

<sup>2)</sup> *V<sub>rated</sub>* < 6 kV on request.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Selection and ordering data

Rated power kW	High voltage motor H-compact PLUS	Speed rpm	Rated current $I_{\text{rated}}$ at 13.2 kV A	Efficiency		Power factor		Torque Nm	Break-down torque [-]	Locked- rotor torque $T_{\text{LR}}/T_{\text{rated}}$	Locked- rotor current $I_{\text{LR}}/I_{\text{rated}}$	Moment of inertia kgm <sup>2</sup>	Motor kgm <sup>2</sup>	External, max. <sup>1)</sup> kgm <sup>2</sup>
				4/4 load %	3/4 load %	4/4 load $\cos \phi$	3/4 load $\cos \phi$							
<b>125 ... 13.8 kV, 60 Hz</b>														
2-pole														
6500	<b>1RN6 710-2HJ■■0</b>	3590	330	96.4	96.1	0.90	0.89	17293	2.30	0.44	5.20	132	58	
8000	<b>1RN6 712-2HJ■■0</b>	3591	405	96.8	96.4	0.89	0.88	21278	2.50	0.50	5.50	147	53	
8800	<b>1RN6 714-2HJ■■0</b>	3591	435	96.8	96.4	0.91	0.89	23406	2.50	0.53	5.50	162	78	
10100	<b>1RN6 716-2HJ■■0</b>	3591	495	96.9	96.6	0.92	0.91	26867	2.40	0.53	5.50	179	111	
4-pole														
7200	<b>1RN6 710-4HJ■■0</b>	1794	365	97.4	97.5	0.89	0.88	38335	2.40	0.58	5.50	273	367	
8000	<b>1RN6 712-4HJ■■0</b>	1794	395	97.5	97.6	0.91	0.90	42606	2.30	0.59	5.50	300	427	
8800	<b>1RN6 714-4HJ■■0</b>	1793	435	97.6	97.6	0.91	0.91	46869	2.30	0.59	5.50	337	503	
10100	<b>1RN6 716-4HJ■■0</b>	1793	490	97.6	97.7	0.92	0.91	53794	2.30	0.61	5.50	369	546	
6-pole														
5600	<b>1RN6 710-6HJ■■■</b>	1195	295	97.2	97.3	0.85	0.83	44775	2.30	0.70	5.50	330	1105	
6200	<b>1RN6 712-6HJ■■■</b>	1195	325	97.3	97.4	0.86	0.83	49566	2.30	0.73	5.50	367	1253	
6800	<b>1RN6 714-6HJ■■■</b>	1195	355	97.3	97.4	0.86	0.84	54357	2.30	0.72	5.50	419	1535	
7500	<b>1RN6 716-6HJ■■■</b>	1195	390	97.4	97.5	0.86	0.84	59945	2.30	0.72	5.50	468	1782	
8-pole														
3900	<b>1RN6 710-8HJ■■■</b>	896	210	96.6	96.8	0.84	0.80	41582	2.20	0.79	5.50	415	3485	
4400	<b>1RN6 712-8HJ■■■</b>	896	235	96.7	97.0	0.84	0.81	46912	2.20	0.81	5.50	465	3935	
5000	<b>1RN6 714-8HJ■■■</b>	896	270	96.9	97.0	0.83	0.80	53295	2.20	0.78	5.50	531	4669	
5600	<b>1RN6 716-8HJ■■■</b>	896	305	97.0	97.0	0.83	0.79	59674	2.30	0.76	5.50	597	5303	
10-pole														
2800	<b>1RN6 710-3HJ■■■</b>	716	160	96.2	96.5	0.80	0.75	37334	2.40	0.76	5.50	415	3985	
3200	<b>1RN6 712-3HJ■■■</b>	716	182	96.5	96.6	0.80	0.75	42664	2.40	0.78	5.50	465	4785	
3550	<b>1RN6 714-3HJ■■■</b>	716	198	96.6	96.8	0.81	0.78	47340	2.30	0.74	5.50	531	5569	
3900	<b>1RN6 716-3HJ■■■</b>	716	215	96.7	96.9	0.82	0.79	52006	2.30	0.75	5.50	598	6552	

**Voltage code:**

13.2 kV, 60 Hz  
Other voltage

2

9

**Type of construction:**

IM B3  
IM V1 (without canopy)

**Note:**

Efficiencies according to IEC 60034-2-1:2007;  
stray load losses determined by statical evaluation of measurements.

Higher pole numbers are available on request.

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Selection and ordering data

##### NEMA version

Rated power	<b>High voltage motor</b> H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked-rotor torque	Locked-rotor current	Moment of inertia	
NEMA			$I_{rated}$ at 13.2 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	
hp	Order No.	rpm	A	%	%	$\cos \phi$	$\cos \phi$	Nm	[ - ]	[ - ]	[ - ]	$\text{kgm}^2$	External, max. <sup>1)</sup> $\text{kgm}^2$
<b>4 ... 6.6 kV, 60 Hz</b>													
2-pole													
10000	<b>1RN6 710-2BM■■0</b>	3586	747	96.4	96.2	0.90	0.89	19861	2.20	0.60	5.20	132	56
11000	<b>1RN6 712-2BM■■0</b>	3588	828	96.5	96.2	0.89	0.88	21837	2.50	0.60	5.80	147	55
12000	<b>1RN6 712-2BN■■0</b>	3587	898	96.6	96.4	0.90	0.89	23827	2.30	0.60	5.40	147	54
13000	<b>1RN6 714-2BM■■0</b>	3587	956	96.6	96.4	0.92	0.91	25814	2.50	0.64	6.00	162	54
14000	<b>1RN6 714-2BN■■0</b>	3587	1036	96.7	96.5	0.91	0.90	27801	2.40	0.60	5.70	162	53
16000	<b>1RN6 716-2BM■■0</b>	3586	1166	96.8	96.7	0.92	0.92	31777	2.40	0.62	5.80	179	51
17000	<b>1RN6 716-2BN■■0</b>	3587	1251	96.9	96.8	0.91	0.90	33759	2.40	0.60	5.80	179	49
4-pole													
11000	<b>1RN6 710-4BJ■■0</b>	1793	815	97.4	97.6	0.90	0.89	43695	2.30	0.60	5.90	273	603
12000	<b>1RN6 712-4BJ■■0</b>	1793	880	97.5	97.6	0.91	0.90	47668	2.20	0.60	5.90	300	637
13000	<b>1RN6 712-4BK■■0</b>	1793	962	97.5	97.6	0.90	0.89	51635	2.30	0.60	5.90	300	620
14000	<b>1RN6 714-4BJ■■0</b>	1793	1021	97.4	97.6	0.91	0.91	55625	2.20	0.60	5.80	337	651
15000	<b>1RN6 714-4BK■■0</b>	1793	1104	97.5	97.7	0.91	0.89	59583	2.30	0.60	6.00	337	665
16000	<b>1RN6 716-4BJ■■0</b>	1793	1161	97.5	97.7	0.92	0.91	63575	2.20	0.61	5.80	369	678
17000	<b>1RN6 716-4BK■■0</b>	1792	1238	97.5	97.7	0.92	0.91	67557	2.10	0.60	5.60	369	691
18000	<b>1RN6 716-4BL■■0</b>	1793	1324	97.6	97.7	0.91	0.90	71504	2.20	0.61	5.90	369	702
6-pole													
9000	<b>1RN6 710-6BJ■■■</b>	1194	702	97.1	97.3	0.86	0.84	53690	2.10	0.71	5.50	330	1954
10000	<b>1RN6 712-6BJ■■■</b>	1194	781	97.2	97.4	0.86	0.83	59647	2.20	0.71	5.60	367	2043
11000	<b>1RN6 714-6BJ■■■</b>	1194	846	97.3	97.4	0.87	0.85	65612	2.20	0.75	5.70	419	2113
12000	<b>1RN6 716-6BJ■■■</b>	1194	915	97.2	97.3	0.88	0.86	71577	2.20	0.77	5.70	468	2168
8-pole													
7000	<b>1RN6 710-8BJ■■■</b>	895	566	96.9	97.1	0.83	0.80	55695	2.10	0.79	5.50	415	3817
8000	<b>1RN6 712-8BJ■■■</b>	895	646	97.0	97.1	0.83	0.81	63651	2.00	0.80	5.50	465	4154
9000	<b>1RN6 714-8BJ■■■</b>	895	721	97.1	97.2	0.84	0.81	71587	2.10	0.83	5.70	531	4458
10000	<b>1RN6 716-8BJ■■■</b>	896	810	97.1	97.2	0.83	0.80	79506	2.20	0.87	6.00	597	4732
10-pole													
5000	<b>1RN6 710-3BJ■■■</b>	716	427	96.6	96.7	0.79	0.75	49758	2.20	0.73	5.30	415	5006
5500	<b>1RN6 712-3BJ■■■</b>	716	464	96.7	96.9	0.80	0.76	54720	2.20	0.72	5.30	465	5428
6000	<b>1RN6 714-3BJ■■■</b>	716	502	96.8	96.9	0.80	0.77	59682	2.20	0.74	5.50	531	6221
7000	<b>1RN6 716-3BJ■■■</b>	716	584	96.9	97.0	0.80	0.77	69631	2.20	0.77	5.60	598	6955

##### Voltage code:

4 kV, 60 Hz      **4**  
 4.16 kV, 60 Hz    **3**  
 6.6 kV, 60 Hz     **1**  
 Other voltage     **9**

##### Note:

Higher pole numbers are available on request.

##### Type of construction:

IM B3                **0**  
 IM V1 (without canopy)    **8**

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.



# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Selection and ordering data

##### NEMA version

Rated power	High voltage motor H-compact PLUS	Speed	Rated current	Efficiency		Power factor		Torque	Break-down torque	Locked rotor torque	Locked rotor current	Moment of inertia	
NEMA			$I_{rated}$ at 13.2 kV	4/4 load	3/4 load	4/4 load	3/4 load		$T_B/T_{rated}$	$T_{LR}/T_{rated}$	$I_{LR}/I_{rated}$	Motor	
hp	Order No.	rpm	A	%	%	$\cos \varphi$	$\cos \varphi$	Nm	[-]	[-]	[-]	$\text{kgm}^2$	$\text{kgm}^2$
<b>12.5 ... 13.8 kW, 60 Hz</b>													
<b>2-pole</b>													
8000	<b>1RN6 710-2BM00</b>	3588	301	96.0	95.6	0.90	0.89	15881	2.50	0.60	5.60	132	52
9000	<b>1RN6 712-2BM00</b>	3588	334	96.0	95.6	0.91	0.90	17864	2.60	0.60	6.00	147	51
10000	<b>1RN6 712-2BN00</b>	3588	375	96.2	95.9	0.90	0.89	19849	2.60	0.60	6.00	147	49
11000	<b>1RN6 714-2BM00</b>	3588	407	96.2	95.9	0.91	0.90	21837	2.50	0.60	6.00	162	48
12000	<b>1RN6 716-2BM00</b>	3587	437	96.3	96.0	0.93	0.92	23827	2.40	0.60	5.80	179	47
13000	<b>1RN6 716-2BN00</b>	3588	478	96.4	96.2	0.92	0.91	25806	2.50	0.60	6.00	179	45
<b>4-pole</b>													
9000	<b>1RN6 710-4BJ00</b>	1794	337	97.1	97.2	0.89	0.88	35727	2.40	0.60	6.20	273	553
10000	<b>1RN6 712-4BJ00</b>	1794	368	97.1	97.3	0.91	0.90	39708	2.30	0.60	6.20	300	555
11000	<b>1RN6 714-4BJ00</b>	1794	403	97.2	97.3	0.91	0.90	43682	2.30	0.60	6.20	337	603
12000	<b>1RN6 716-4BJ00</b>	1793	436	97.2	97.3	0.92	0.92	47662	2.30	0.63	6.20	369	620
13000	<b>1RN6 716-4BK00</b>	1794	475	97.2	97.4	0.91	0.91	51625	2.30	0.60	6.10	369	637
<b>6-pole</b>													
7000	<b>1RN6 710-6BJ00</b>	1195	278	96.9	97.0	0.85	0.82	41723	2.40	0.72	6.00	330	1722
8000	<b>1RN6 712-6BJ00</b>	1195	315	97.0	97.1	0.85	0.82	47688	2.40	0.73	6.00	367	1849
9000	<b>1RN6 714-6BJ00</b>	1195	350	97.0	97.1	0.86	0.84	53642	2.30	0.73	6.00	419	1954
10000	<b>1RN6 716-6BJ00</b>	1195	388	97.1	97.2	0.86	0.84	59600	2.30	0.72	6.00	468	2042
<b>8-pole</b>													
5000	<b>1RN6 710-8BJ00</b>	896	201	96.5	96.6	0.84	0.81	39760	2.20	0.79	5.90	415	3024
5500	<b>1RN6 712-8BJ00</b>	896	220	96.6	96.7	0.84	0.81	43721	2.20	0.80	6.00	465	3235
6000	<b>1RN6 714-8BJ00</b>	896	239	96.6	96.7	0.84	0.82	47691	2.30	0.80	6.00	531	3438
7000	<b>1RN6 716-8BJ00</b>	896	279	96.7	96.8	0.85	0.82	55642	2.20	0.79	6.00	597	3817
<b>10-pole</b>													
3500	<b>1RN6 710-3BJ00</b>	717	151	96.2	96.2	0.79	0.74	34788	2.50	0.78	6.00	415	4104
4000	<b>1RN6 712-3BJ00</b>	717	172	96.3	96.3	0.79	0.74	39757	2.50	0.78	6.00	465	4564
4500	<b>1RN6 714-3BJ00</b>	717	188	96.4	96.5	0.81	0.77	44739	2.40	0.79	6.00	531	5006
5000	<b>1RN6 716-3BJ00</b>	717	207	96.5	96.6	0.82	0.78	49713	2.40	0.78	6.00	598	5428

##### Voltage code:

13.2 kV, 60 Hz  
Other voltage

##### Note:

Higher pole numbers are available on request.

##### Type of construction:

IM B3  
IM V1 (without canopy)

0

8

<sup>1)</sup> Max. permissible external moment of inertia for three starts from cold or two starts from warm under the conditions described on Page 2/2.

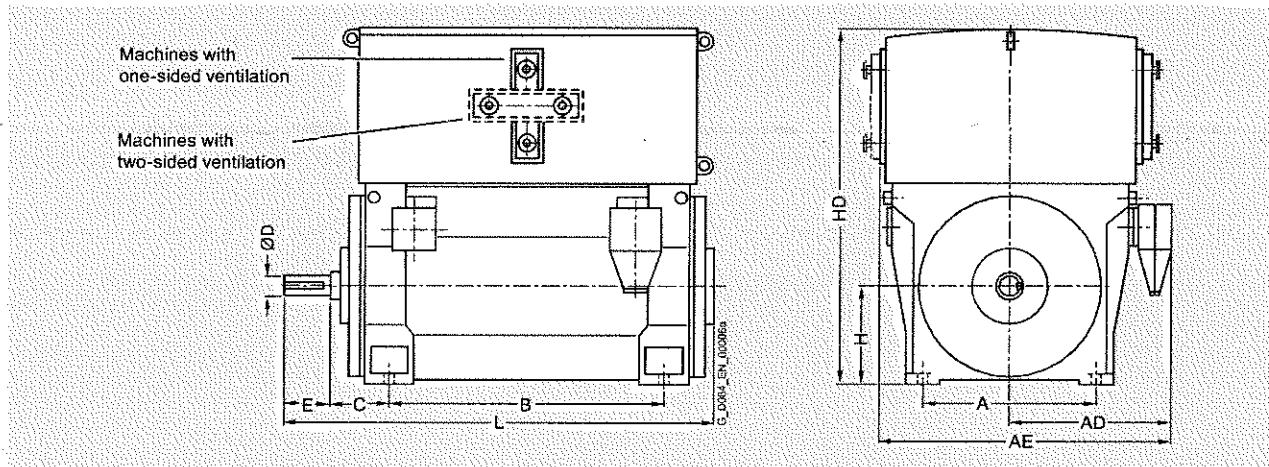


# Motors for line operation

## Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Universal 2-pole</b>											
1RN6 450-2HJ.0 <sup>3)</sup>	4050	850	930	1620	1180	280	95	130	450	1725	1843
1RN6 452-2HJ.0 <sup>3)</sup>	4250	850	930	1620	1180	280	95	130	450	1725	1843
1RN6 454-2HJ.0 <sup>3)</sup>	4550	850	930	1620	1400	280	95	130	450	1725	2053
1RN6 456-2HJ.0 <sup>3)</sup>	4850	850	930	1620	1400	280	95	130	450	1725	2053
1RN6 500-2HJ.0 <sup>3)</sup>	6150	950	1135	1835	1320	315	110	165	500	1971	2103
1RN6 502-2HJ.0 <sup>3)</sup>	6300	950	1135	1835	1320	315	110	165	500	1971	2103
<b>4-pole</b>											
1RN6 450-4HJ.0	4350	850	930	1620	1180	250	130	200	450	1715	1896
1RN6 452-4HJ.0	4250	850	930	1620	1180	250	130	200	450	1715	1896
1RN6 454-4HJ.0	4950	850	930	1620	1400	250	130	200	450	1715	2106
1RN6 456-4HJ.0	5250	850	930	1620	1400	250	130	200	450	1715	2106
1RN6 500-4HJ.0	6650	950	1135	1835	1320	280	150	200	500	1971	2109
1RN6 502-4HJ.0	6850	950	1135	1835	1320	280	150	200	500	1971	2109
1RN6 504-4HJ.0	7550	950	1135	1835	1500	280	150	200	500	1971	2289
1RN6 506-4HJ.0	7900	950	1135	1835	1500	280	150	200	500	1971	2289
1RN6 560-4HJ.0	8150	1060	1205	1975	1400	315	170	240	560	2124	2300
1RN6 562-4HJ.0	8550	1060	1205	1975	1400	315	170	240	560	2124	2300
1RN6 564-4HJ.0	9500	1060	1205	1975	1600	315	170	240	560	2124	2530
1RN6 566-4HJ.0	10050	1060	1205	1975	1600	315	170	240	560	2124	2530
1RN4 630-4HE.0 <sup>3)</sup>	10400	1320	1330	2290	1600	335	200	280	630	2400	2500
1RN4 632-4HE.0 <sup>3)</sup>	11100	1320	1330	2290	1600	335	200	280	630	2400	2500
1RN4 634-4HE.0 <sup>3)</sup>	12150	1320	1330	2290	1800	335	220	280	630	2400	2740
1RN4 636-4HE.0 <sup>3)</sup>	12700	1320	1330	2290	1800	335	220	280	630	2400	2740

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

<sup>3)</sup> Roller bearings only for 50 Hz version.

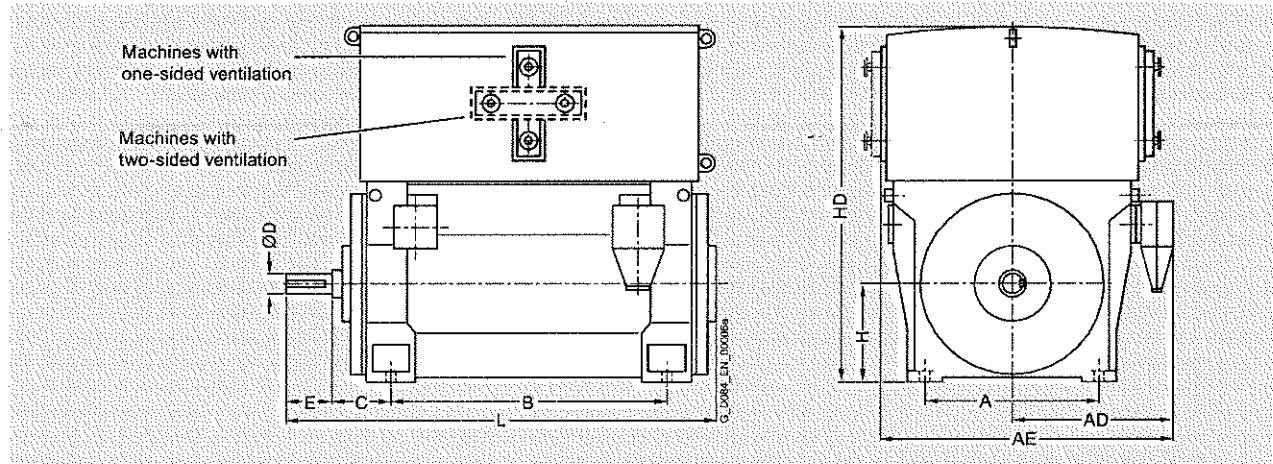


# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1BN4 and 1RN6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1) up to 6 kV / IM 3000 type of construction, roller bearings – series 1BN4/1RN6</b>											
<b>6-pole</b>											
1RN6 450-6HJ.0	4450	850	930	1620	1180	250	140	200	450	1715	1896
1RN6 452-6HJ.0	4750	850	930	1620	1180	250	140	200	450	1715	1896
1RN6 454-6HJ.0	5100	850	930	1620	1400	280	140	200	450	1715	2136
1RN6 456-6HJ.0	5450	850	930	1620	1400	280	140	200	450	1715	2136
1RN4 500-6HE.0	5550	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4 502-6HE.0	5900	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4 504-6HE.0	6450	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4 506-6HE.0	6850	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4 560-6HE.0	7500	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 562-6HE.0	8150	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 564-6HE.0	8950	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 566-6HE.0	9400	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 630-6HE.0	10650	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4 632-6HE.0	11200	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4 634-6HE.0	12300	1320	1330	2290	1800	335	220	280	630	2400	2740
1RN4 636-6HE.0	13000	1320	1330	2290	1800	335	220	280	630	2400	2740
<b>8-pole</b>											
1RN6 450-8HJ.0	4450	850	930	1620	1180	250	140	200	450	1715	1896
1RN6 452-8HJ.0	4750	850	930	1620	1180	250	140	200	450	1715	1896
1RN6 454-8HJ.0	5150	850	930	1620	1400	280	140	200	450	1715	2136
1RN6 456-8HJ.0	5450	850	930	1620	1400	280	140	200	450	1715	2136
1RN4 500-8HE.0	5550	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4 502-8HE.0	5950	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4 504-8HE.0	6450	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4 506-8HE.0	6800	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4 560-8HE.0	7500	1060	1070	1920	1400	315	180	240	560	2040	2300
1RN4 562-8HE.0	8000	1060	1070	1920	1400	315	180	240	560	2040	2300
1RN4 564-8HE.0	8850	1060	1070	1920	1600	315	190	280	560	2040	2570
1RN4 566-8HE.0	9350	1060	1070	1920	1600	315	190	280	560	2040	2570

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

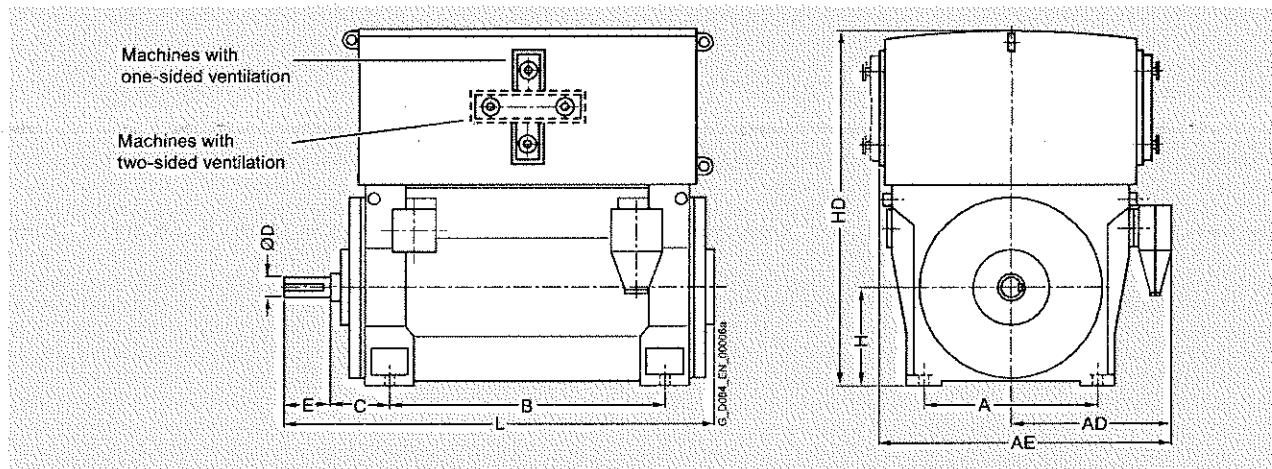
<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

# Motors for line operation

## Water-cooled motors

ii-compact PLUS 1RN4 and 1RN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1RN4/1RN6 series (one-sided ventilation)</b>											
8-pole											
1RN4 630-8HE.0 <sup>3)</sup>	10600	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4 632-8HE.0 <sup>3)</sup>	11200	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4 634-8HE.0 <sup>3)</sup>	12150	1320	1330	2290	1800	335	220	280	630	2400	2740
1RN4 636-8HE.0 <sup>3)</sup>	12900	1320	1330	2290	1800	335	220	280	630	2400	2740
10-pole											
1RN6 450-3HJ.0	4450	850	930	1620	1180	250	140	200	450	1715	1896
1RN6 452-3HJ.0	4750	850	930	1620	1180	250	140	200	450	1715	1896
1RN6 454-3HJ.0	5150	850	930	1620	1400	280	140	200	450	1715	2136
1RN6 456-3HJ.0	5450	850	930	1620	1400	280	140	200	450	1715	2136
1RN4 500-3HE.0	5500	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4 502-3HE.0	5850	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4 504-3HE.0	6450	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4 506-3HE.0	6800	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4 560-3HE.0	7450	1060	1070	1920	1400	315	180	240	560	2040	2300
1RN4 562-3HE.0	8000	1060	1070	1920	1400	315	180	240	560	2040	2300
1RN4 564-3HE.0	8800	1060	1070	1920	1600	315	190	280	560	2040	2570
1RN4 566-3HE.0	9300	1060	1070	1920	1600	315	190	280	560	2040	2570
1RN4 630-3HE.0 <sup>3)</sup>	10500	1320	1180	2290	1600	335	220	280	630	2400	2500
1RN4 632-3HE.0 <sup>3)</sup>	11200	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4 634-3HE.0 <sup>3)</sup>	12200	1320	1330	2290	1800	335	220	280	630	2400	2740
1RN4 636-3HE.0 <sup>3)</sup>	12900	1320	1330	2290	1800	335	220	280	630	2400	2740

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

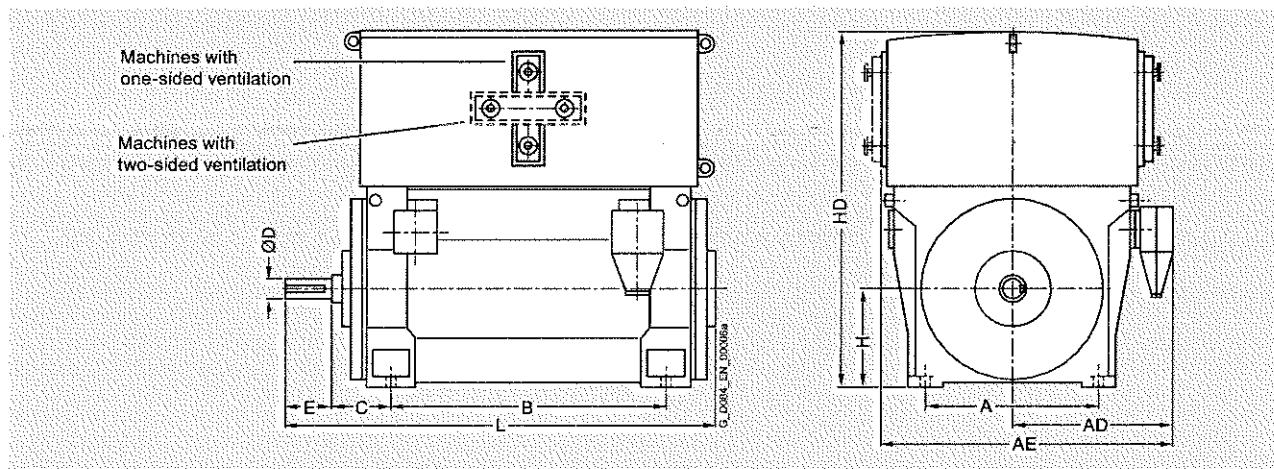
<sup>3)</sup> Roller bearings only for 50 Hz version.

# Motors for line operation

## Water-cooled motors

### H-compact Plus 1RN4 and 1RN6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1 pole pitch KV IM B3 type of construction - ball bearings - Schaffner frame 1RN6</b>											
12-pole											
1RN6 450-5HJ.0	4450	850	930	1620	1180	250	140	200	450	1715	1896
1RN6 452-5HJ.0	4750	850	930	1620	1180	250	140	200	450	1715	1896
1RN6 454-5HJ.0	5150	850	930	1620	1400	280	140	200	450	1715	2136
1RN6 456-5HJ.0	5450	850	930	1620	1400	280	140	200	450	1715	2136
1RN4 500-5HE.0	5550	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4 502-5HE.0	5900	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4 504-5HE.0	6350	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4 506-5HE.0	6800	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4 560-5HE.0	7450	1060	1070	1920	1400	315	180	240	560	2040	2300
1RN4 562-5HE.0	8000	1060	1070	1920	1400	315	180	240	560	2040	2300
1RN4 564-5HE.0	8800	1060	1070	1920	1600	315	190	280	560	2040	2570
1RN4 566-5HE.0	9250	1060	1070	1920	1600	315	190	280	560	2040	2570
1RN4 630-5HE.0 <sup>3)</sup>	10400	1320	1180	2140	1600	335	220	280	630	2400	2500
1RN4 632-5HE.0 <sup>3)</sup>	11000	1320	1180	2140	1600	335	220	280	630	2400	2500
1RN4 634-5HE.0 <sup>3)</sup>	12050	1320	1180	2140	1800	335	220	280	630	2400	2740
1RN4 636-5HE.0 <sup>3)</sup>	12850	1320	1180	2140	1800	335	220	280	630	2400	2740

Note: Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

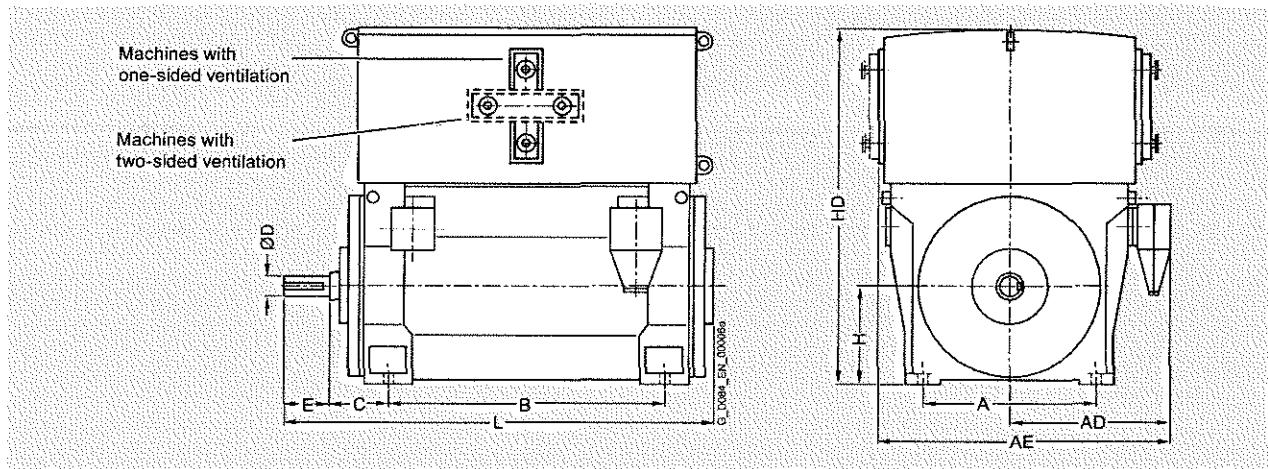
<sup>3)</sup> Roller bearings only for 50 Hz version.

# Motors for line operation

## Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1.1kV insulation class bearings</b>											
<b>2-pole</b>											
1RN6 450-2HJ.0 <sup>2)</sup>	4050	850	1070	1840	1180	280	95	130	450	1725	1875
1RN6 452-2HJ.0 <sup>2)</sup>	4250	850	1070	1840	1180	280	95	130	450	1725	1875
1RN6 454-2HJ.0 <sup>2)</sup>	4550	850	1070	1840	1400	280	95	130	450	1725	2085
1RN6 456-2HJ.0 <sup>2)</sup>	4850	850	1070	1840	1400	280	95	130	450	1725	2085
1RN6 500-2HJ.0 <sup>2)</sup>	6150	950	1270	1970	1320	315	110	165	500	1971	2103
1RN6 502-2HJ.0 <sup>2)</sup>	6300	950	1270	1970	1320	315	110	165	500	1971	2103
<b>4-pole</b>											
1RN6 450-4HJ.0	4350	850	1070	1840	1180	250	130	200	450	1715	1896
1RN6 452-4HJ.0	4250	850	1070	1840	1180	250	130	200	450	1715	1896
1RN6 454-4HJ.0	4950	850	1070	1840	1400	250	130	200	450	1715	2106
1RN6 456-4HJ.0	5250	850	1070	1840	1400	250	130	200	450	1715	2106
1RN6 500-4HJ.0	6650	950	1270	1970	1320	280	150	200	500	1971	2109
1RN6 502-4HJ.0	6850	950	1270	1970	1320	280	150	200	500	1971	2109
1RN6 504-4HJ.0	7550	950	1270	1970	1500	280	150	200	500	1971	2289
1RN6 506-4HJ.0	7900	950	1270	1970	1500	280	150	200	500	1971	2289
1RN6 560-4HJ.0	8150	1060	1340	2110	1400	315	170	240	560	2124	2300
1RN6 562-4HJ.0	8550	1060	1340	2110	1400	315	170	240	560	2124	2300
1RN6 564-4HJ.0	9500	1060	1340	2110	1600	315	170	240	560	2124	2530
1RN6 566-4HJ.0	10050	1060	1340	2110	1600	315	170	240	560	2124	2530
1RN6 630-4HE.0	10300	1320	1320	2280	1600	335	200	280	630	2400	2500
1RN6 632-4HE.0	10950	1320	1330	2290	1600	335	200	280	630	2400	2500
1RN6 634-4HE.0	12000	1320	1330	2290	1800	335	220	280	630	2400	2740
1RN6 636-4HE.0	12600	1320	1330	2290	1800	335	220	280	630	2400	2740
<b>6-pole</b>											
1RN6 450-6HJ.0	4450	850	1070	1840	1180	250	140	200	450	1715	1896
1RN6 452-6HJ.0	4750	850	1070	1840	1180	250	140	200	450	1715	1896
1RN6 454-6HJ.0	5100	850	1070	1840	1400	280	140	200	450	1715	2136
1RN6 456-6HJ.0	5450	850	1070	1840	1400	280	140	200	450	1715	2136

<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

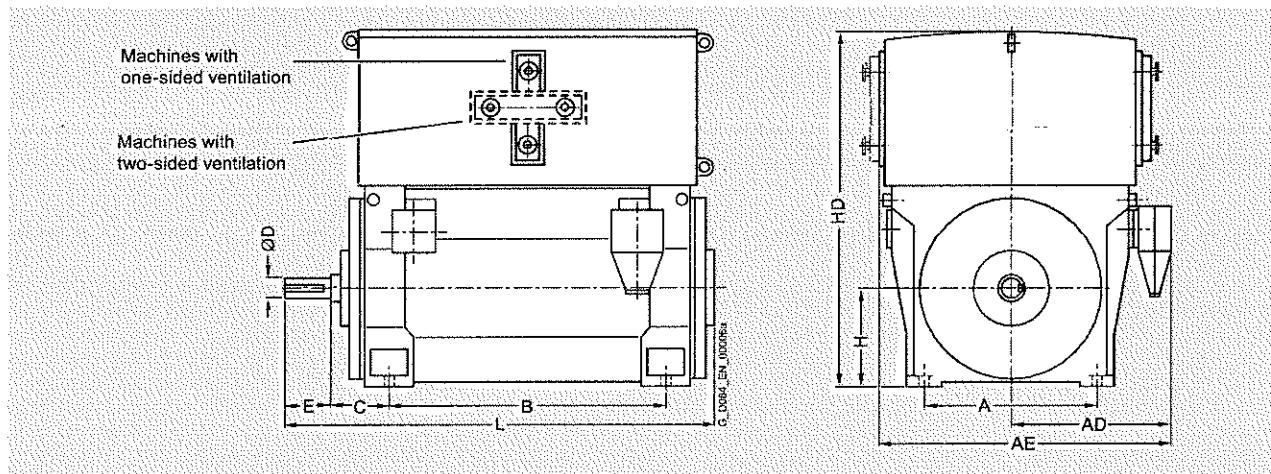
<sup>2)</sup> Roller bearings only for 50 Hz version.

# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>6-pole</b>											
1RN4 500-6HE.0	5500	950	1220	2010	1320	280	160	240	500	1830	2270
1RN4 502-6HE.0	5900	950	1220	2010	1320	280	160	240	500	1830	2270
1RN4 504-6HE.0	6400	950	1220	2010	1500	280	170	240	500	1830	2480
1RN4 506-6HE.0	6800	950	1220	2010	1500	280	170	240	500	1830	2480
1RN4 560-6HE.0	7500	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 562-6HE.0	8000	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 564-6HE.0	8850	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 566-6HE.0	9250	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 630-6HE.0	10650	1320	1320	2280	1600	335	220	280	630	2400	2500
1RN4 632-6HE.0	11200	1320	1320	2280	1600	335	220	280	630	2400	2500
1RN4 634-6HE.0	12250	1320	1320	2280	1800	335	220	280	630	2400	2740
1RN4 636-6HE.0	13000	1320	1330	2290	1800	335	220	280	630	2400	2740
<b>8-pole</b>											
1RN6 450-8HJ.0	4450	850	1070	1840	1180	250	140	200	450	1715	1896
1RN6 452-8HJ.0	4750	850	1070	1840	1180	250	140	200	450	1715	1896
1RN6 454-8HJ.0	5150	850	1070	1840	1400	280	140	200	450	1715	2136
1RN6 456-8HJ.0	5450	850	1070	1840	1400	280	140	200	450	1715	2136
1RN4 500-8HE.0	5550	950	1220	2010	1320	280	160	240	500	1830	2270
1RN4 502-8HE.0	5900	950	1220	2010	1320	280	160	240	500	1830	2270
1RN4 504-8HE.0	6450	950	1220	2010	1500	280	170	240	500	1830	2480
1RN4 506-8HE.0	6800	950	1220	2010	1500	280	170	240	500	1830	2480
1RN4 560-8HE.0	7500	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 562-8HE.0	8000	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 564-8HE.0	8850	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 566-8HE.0	9250	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 630-8HE.0	10450	1320	1320	2280	1600	335	220	280	630	2400	2500
1RN4 632-8HE.0	11050	1320	1320	2280	1600	335	220	280	630	2400	2500
1RN4 634-8HE.0	12050	1320	1320	2280	1800	335	220	280	630	2400	2740
1RN4 636-8HE.0	12800	1320	1320	2280	1800	335	220	280	630	2400	2740

<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

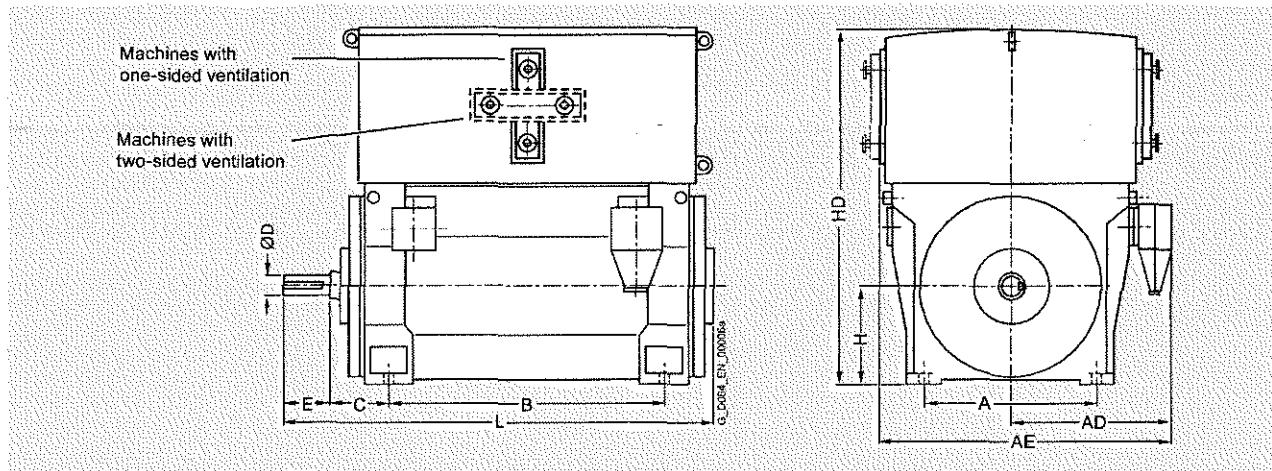


# Motors for line operation

## Water-cooled motors

H-compact PLUS 1RN4 and 1FN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>General dimensions (see also notes)</b>											
<b>10-pole</b>											
1RN4 500-3HE.0	5500	950	1220	2010	1320	280	160	240	500	1830	2270
1RN4 502-3HE.0	5850	950	1220	2010	1320	280	160	240	500	1830	2270
1RN4 504-3HE.0	6400	950	1220	2010	1500	280	170	240	500	1830	2480
1RN4 506-3HE.0	6750	950	1220	2010	1500	280	170	240	500	1830	2480
1RN4 560-3HE.0	7850	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 562-3HE.0	8350	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 564-3HE.0	8950	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 566-3HE.0	9350	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 630-3HE.0	10450	1320	1320	2280	1600	335	220	280	630	2400	2500
1RN4 632-3HE.0	11050	1320	1320	2280	1600	335	220	280	630	2400	2500
1RN4 634-3HE.0	12000	1320	1320	2280	1800	335	220	280	630	2400	2740
1RN4 636-3HE.0	12750	1320	1320	2280	1800	335	220	280	630	2400	2740
<b>12-pole</b>											
1RN4 502-5HE.0	5900	950	1220	2010	1320	280	160	240	500	1830	2270
1RN4 504-5HE.0	6350	950	1220	2010	1500	280	170	240	500	1830	2480
1RN4 506-5HE.0	6750	950	1220	2010	1500	280	170	240	500	1830	2480
1RN4 560-5HE.0	7450	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 562-5HE.0	7950	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4 564-5HE.0	8800	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 566-5HE.0	9250	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4 630-5HE.0	10450	1320	1320	2280	1600	335	220	280	630	2400	2500
1RN4 632-5HE.0	11100	1320	1320	2280	1600	335	220	280	630	2400	2500
1RN4 634-5HE.0	12100	1320	1320	2280	1800	335	220	280	630	2400	2740
1RN4 636-5HE.0	12850	1320	1320	2280	1800	335	220	280	630	2400	2740

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

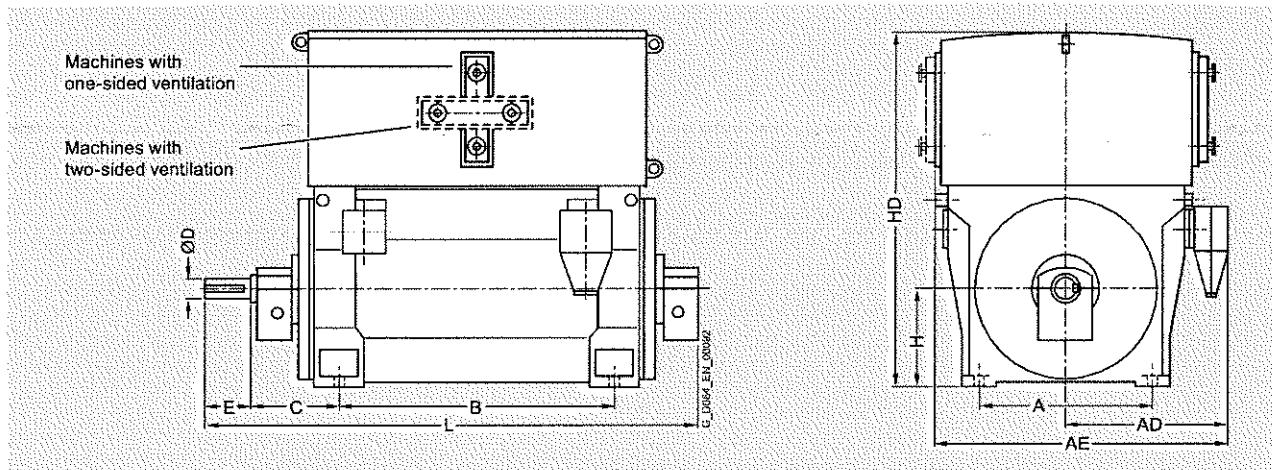


# Motors for line operation

## Water-cooled motors

### H-compact PLUS (IRN4 and IRN6)

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>General data valid for all types of construction, sleeve bearings - Series IRN4, IRN6</b>											
2-pole											
IRN6 450-2HJ-0-Z-K96 <sup>3)</sup>	4050	850	930	1620	1180	425	95	130	450	1725	2218
IRN6 452-2HJ-0-Z-K96 <sup>3)</sup>	4300	850	930	1620	1180	425	95	130	450	1725	2218
IRN6 454-2HJ-0-Z-K96 <sup>3)</sup>	4600	850	930	1620	1400	425	95	130	450	1725	2428
IRN6 456-2HJ-0-Z-K96 <sup>3)</sup>	4900	850	930	1620	1400	425	95	130	450	1725	2428
IRN6 500-2HJ-0-Z-K96 <sup>3)</sup>	6200	950	1135	1835	1320	450	110	165	500	1971	2455
IRN6 502-2HJ-0-Z-K96 <sup>3)</sup>	6350	950	1135	1835	1320	450	110	165	500	1971	2455
IRN6 504-2HJ-0	7150	950	1135	1835	1500	450	110	165	500	1971	2635
IRN6 506-2HJ-0	7450	950	1135	1835	1500	450	110	165	500	1971	2635
IRN6 560-2HJ-0	8100	1060	1205	1975	1400	600	130	200	560	2124	2830
IRN6 562-2HJ-0	8550	1060	1205	1975	1400	600	130	200	560	2124	2830
IRN6 564-2HJ-0	9500	1060	1205	1975	1600	600	130	200	560	2124	3060
IRN6 566-2HJ-0	10000	1060	1205	1975	1600	600	130	200	560	2124	3060
IRN4 630-2HE-0	10150	1320	1330	2290	1600	560	150	200	630	2400	2820
IRN4 632-2HE-0	10800	1320	1330	2290	1600	560	150	200	630	2400	2820
IRN4 634-2HE-0	11900	1320	1330	2290	1800	560	160	240	630	2400	3100
IRN4 636-2HE-0	12750	1320	1330	2290	1800	560	160	240	630	2400	3100
4-pole											
IRN6 450-4HJ-0-Z-K96	4400	850	930	1620	1180	500	130	200	450	1715	2438
IRN6 452-4HJ-0-Z-K96	4650	850	930	1620	1180	500	130	200	450	1715	2438
IRN6 454-4HJ-0-Z-K96	5050	850	930	1620	1400	500	130	200	450	1715	2648
IRN6 456-4HJ-0-Z-K96	5350	850	930	1620	1400	500	130	200	450	1715	2648
IRN6 500-4HJ-0-Z-K96	6950	950	1135	1835	1320	560	150	200	500	1971	2700
IRN6 502-4HJ-0-Z-K96	7200	950	1135	1835	1320	560	150	200	500	1971	2700
IRN6 504-4HJ-0-Z-K96	7900	950	1135	1835	1500	560	150	200	500	1971	2880
IRN6 506-4HJ-0-Z-K96	8200	950	1135	1835	1500	560	150	200	500	1971	2880
IRN6 560-4HJ-0-Z-K96	8300	1060	1205	1975	1400	600	170	240	560	2124	2870
IRN6 562-4HJ-0-Z-K96	8750	1060	1205	1975	1400	600	170	240	560	2124	2870
IRN6 564-4HJ-0-Z-K96	9700	1060	1205	1975	1600	600	170	240	560	2124	3100
IRN6 566-4HJ-0-Z-K96	10250	1060	1205	1975	1600	600	170	240	560	2124	3100

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

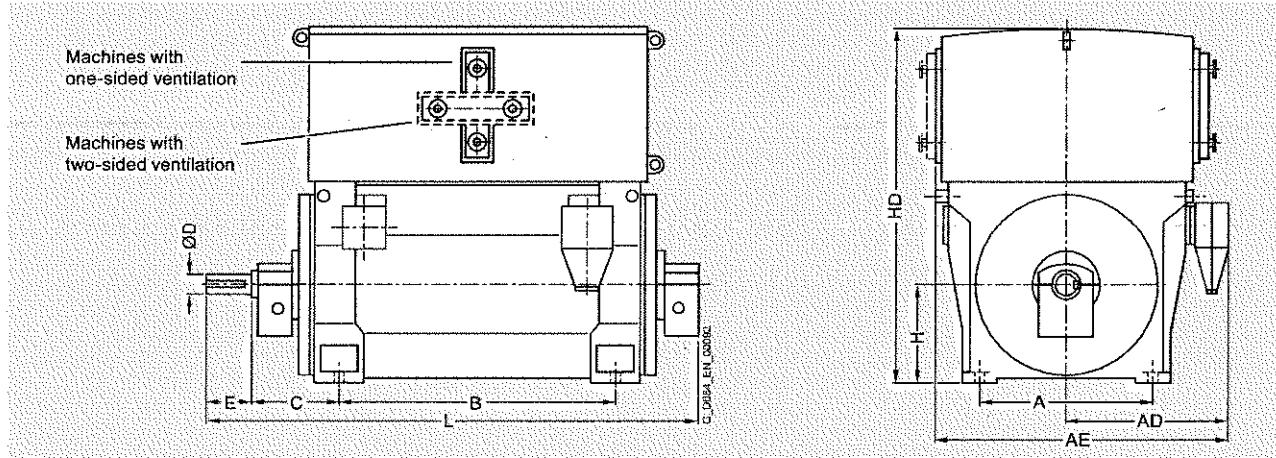


# Motors for line operation

## Water-cooled motors

H-compact PLUS IRN4 and IRN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Unrated 3.6 kV, IM380 type of construction, sleeve bearings - series IRN4/IRN6<sup>2)</sup></b>											
4-pole											
1RN4 630-4HE.0-Z K96 <sup>3)</sup>	10650	1320	1330	2290	1600	600	200	280	630	2400	2970
1RN4 632-4HE.0-Z K96 <sup>3)</sup>	11350	1320	1330	2290	1600	600	200	280	630	2400	2970
1RN4 634-4HE.0-Z K96 <sup>3)</sup>	12400	1320	1330	2290	1800	600	220	280	630	2400	3210
1RN4 636-4HE.0-Z K96 <sup>3)</sup>	13000	1320	1330	2290	1800	600	220	280	630	2400	3210
6-pole											
1RN6 450-6HJ.0-Z K96	4550	850	930	1620	1180	500	140	200	450	1715	2438
1RN6 452-6HJ.0-Z K96	4800	850	930	1620	1180	500	140	200	450	1715	2438
1RN6 454-6HJ.0-Z K96	5150	850	930	1620	1400	500	140	200	450	1715	2648
1RN6 456-6HJ.0-Z K96	5500	850	930	1620	1400	500	140	200	450	1715	2648
1RN4 500-6HE.0-Z K96	5700	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4 502-6HE.0-Z K96	6100	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4 504-6HE.0-Z K96	6600	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4 506-6HE.0-Z K96	7000	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4 560-6HE.0-Z K96	7750	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4 562-6HE.0-Z K96	8350	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4 564-6HE.0-Z K96	9150	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 566-6HE.0-Z K96	9650	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 630-6HE.0-Z K96	10950	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4 632-6HE.0-Z K96	11500	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4 634-6HE.0-Z K96	12550	1320	1330	2290	1800	600	220	280	630	2400	3210
1RN4 636-6HE.0-Z K96	13300	1320	1330	2290	1800	600	220	280	630	2400	3210
8-pole											
1RN6 450-8HJ.0-Z K96	4550	850	930	1620	1180	500	140	200	450	1715	2438
1RN6 452-8HJ.0-Z K96	4850	850	930	1620	1180	500	140	200	450	1715	2438
1RN6 454-8HJ.0-Z K96	5200	850	930	1620	1400	500	140	200	450	1715	2648
1RN6 456-8HJ.0-Z K96	5550	850	930	1620	1400	500	140	200	450	1715	2648

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

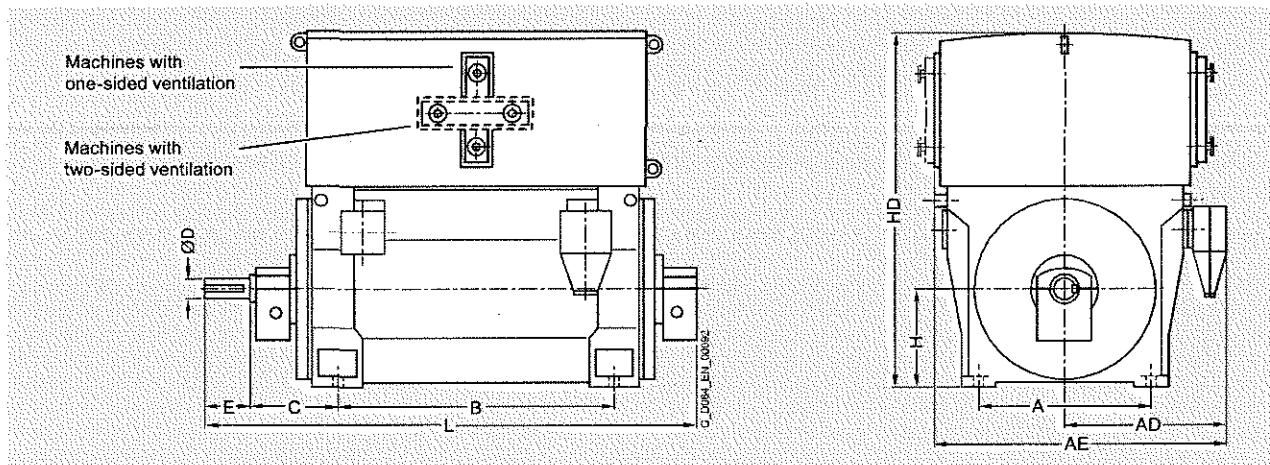
<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, "Z K96" not necessary.

# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>8-pole</b>											
1RN4 500-8HE-0-Z K96	5750	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4 502-8HE-0-Z K96	6100	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4 504-8HE-0-Z K96	6600	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4 506-8HE-0-Z K96	7000	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4 560-8HE-0-Z K96	7700	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4 562-8HE-0-Z K96	8250	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4 564-8HE-0-Z K96	9050	1060	1070	1920	1600	530	190	280	560	2040	2940
1RN4 566-8HE-0-Z K96	9550	1060	1070	1920	1600	530	190	280	560	2040	2940
1RN4 630-8HE-0-Z K96 <sup>3)</sup>	10850	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4 632-8HE-0-Z K96 <sup>3)</sup>	11500	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4 634-8HE-0-Z K96 <sup>3)</sup>	12450	1320	1330	2290	1800	600	220	280	630	2400	3210
1RN4 636-8HE-0-Z K96 <sup>3)</sup>	13150	1320	1330	2290	1800	600	220	280	630	2400	3210
<b>10-pole</b>											
1RN6 450-3HJ-0-Z K96	4550	850	930	1620	1180	500	140	200	450	1715	2438
1RN6 452-3HJ-0-Z K96	4850	850	930	1620	1180	500	140	200	450	1715	2438
1RN6 454-3HJ-0-Z K96	5200	850	930	1620	1400	500	140	200	450	1715	2648
1RN6 456-3HJ-0-Z K96	5550	850	930	1620	1400	500	140	200	450	1715	2648
1RN4 500-3HE-0-Z K96	5700	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4 502-3HE-0-Z K96	6050	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4 504-3HE-0-Z K96	6600	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4 506-3HE-0-Z K96	6950	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4 560-3HE-0-Z K96	7650	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4 562-3HE-0-Z K96	8200	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4 564-3HE-0-Z K96	9050	1060	1070	1920	1600	530	190	280	560	2040	2940
1RN4 566-3HE-0-Z K96	9500	1060	1070	1920	1600	530	190	280	560	2040	2940
1RN4 630-3HE-0-Z K96 <sup>3)</sup>	10750	1320	1180	2140	1600	600	220	280	630	2400	2970
1RN4 632-3HE-0-Z K96 <sup>3)</sup>	11450	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4 634-3HE-0-Z K96 <sup>3)</sup>	12500	1320	1330	2290	1800	600	220	280	630	2400	3210
1RN4 636-3HE-0-Z K96 <sup>3)</sup>	13200	1320	1330	2290	1800	600	220	280	630	2400	3210

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

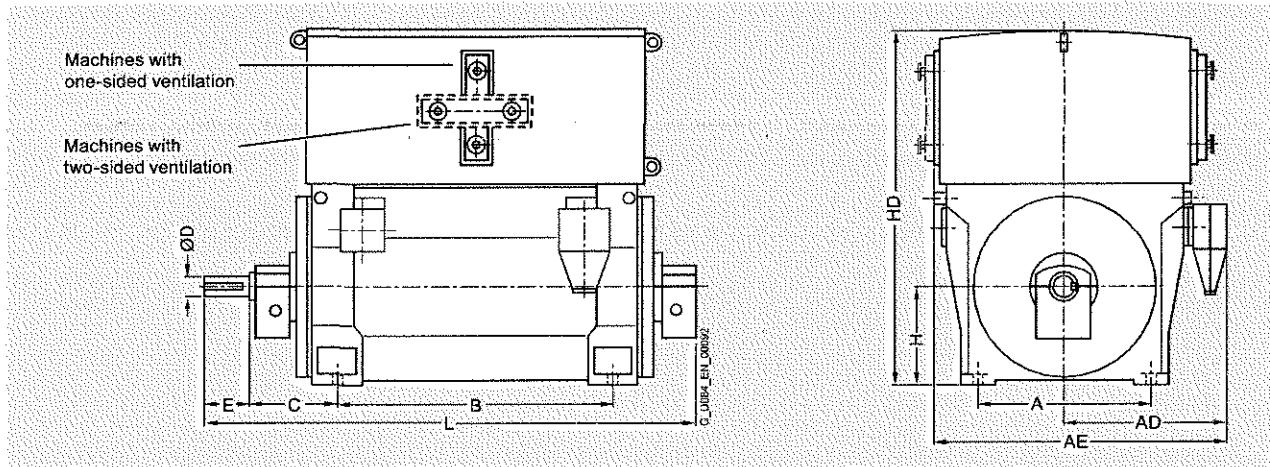


# Motors for line operation

## Water-cooled motors

Hcompact PLUS 1RN4 and 1RN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>12-pole</b>											
1RN6 450-5HJ.0-Z K96	4550	850	930	1620	1180	500	140	200	450	1715	2438
1RN6 452-5HJ.0-Z K96	4850	850	930	1620	1180	500	140	200	450	1715	2438
1RN6 454-5HJ.0-Z K96	5200	850	930	1620	1400	500	140	200	450	1715	2648
1RN6 456-5HJ.0-Z K96	5550	850	930	1620	1400	500	140	200	450	1715	2648
1RN4 500-5HE.0-Z K96	5700	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4 502-5HE.0-Z K96	6050	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4 504-5HE.0-Z K96	6550	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4 506-5HE.0-Z K96	6950	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4 560-5HE.0-Z K96	7650	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4 562-5HE.0-Z K96	8250	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4 564-5HE.0-Z K96	9000	1060	1070	1920	1600	530	190	280	560	2040	2940
1RN4 566-5HE.0-Z K96	9500	1060	1070	1920	1600	530	190	280	560	2040	2940
1RN4 630-5HE.0-Z K96 <sup>3)</sup>	10650	1320	1180	2140	1600	600	220	280	630	2400	2970
1RN4 632-5HE.0-Z K96 <sup>3)</sup>	11300	1320	1180	2140	1600	600	220	280	630	2400	2970
1RN4 634-5HE.0-Z K96 <sup>3)</sup>	12300	1320	1180	2140	1800	600	220	280	630	2400	3210
1RN4 636-5HE.0-Z K96 <sup>3)</sup>	13150	1320	1330	2290	1800	600	220	280	630	2400	3210

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

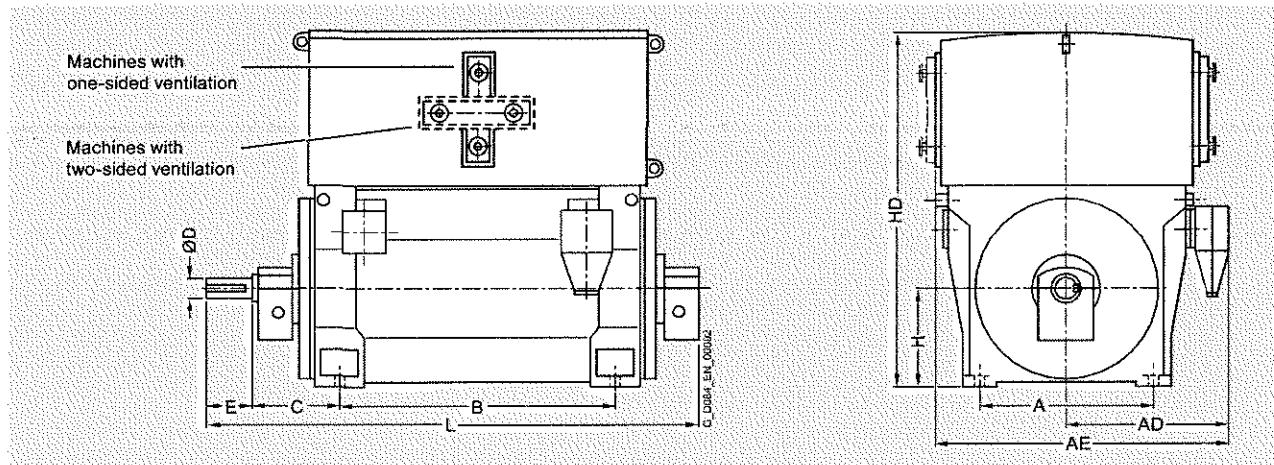
<sup>3)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<small>1) All dimensions are valid for the standard construction (leaves, ratings, etc.). Dimensions in mm.</small>											
2-pole											
1RN6 450-2HJ 0-Z K96 <sup>2)</sup>	4050	850	1070	1840	1180	425	95	130	450	1725	2218
1RN6 452-2HJ 0-Z K96 <sup>2)</sup>	4300	850	1070	1840	1180	425	95	130	450	1725	2218
1RN6 454-2HJ 0-Z K96 <sup>2)</sup>	4600	850	1070	1840	1400	425	95	130	450	1725	2428
1RN6 456-2HJ 0-Z K96 <sup>2)</sup>	4900	850	1070	1840	1400	425	95	130	450	1725	2428
1RN6 500-2HJ 0-Z K96 <sup>2)</sup>	6200	950	1270	1970	1320	450	110	165	500	1971	2455
1RN6 502-2HJ 0-Z K96 <sup>2)</sup>	6350	950	1270	1970	1320	450	110	165	500	1971	2455
1RN6 504-2HJ 0	7150	950	1270	1970	1500	450	110	165	500	1971	2635
1RN6 506-2HJ 0	7450	950	1270	1970	1500	450	110	165	500	1971	2635
1RN6 560-2HJ 0	8100	1060	1340	2110	1400	600	130	200	560	2124	2830
1RN6 562-2HJ 0	8550	1060	1340	2110	1400	600	130	200	560	2124	2830
1RN6 564-2HJ 0	9500	1060	1340	2110	1600	600	130	200	560	2124	3060
1RN6 566-2HJ 0	10000	1060	1340	2110	1600	600	130	200	560	2124	3060
1RN4 630-2HE 0	10050	1320	1320	2280	1600	560	150	200	630	2400	2820
1RN4 632-2HE 0	10700	1320	1330	2290	1600	560	150	200	630	2400	2820
1RN4 634-2HE 0	11750	1320	1330	2290	1800	560	160	240	630	2400	3100
1RN4 636-2HE 0	12600	1320	1330	2290	1800	560	160	240	630	2400	3100
4-pole											
1RN6 450-4HJ 0-Z K96	4400	850	1070	1840	1180	500	130	200	450	1715	2438
1RN6 452-4HJ 0-Z K96	4650	850	1070	1840	1180	500	130	200	450	1715	2438
1RN6 454-4HJ 0-Z K96	5050	850	1070	1840	1400	500	130	200	450	1715	2645
1RN6 456-4HJ 0-Z K96	5350	850	1070	1840	1400	500	130	200	450	1715	2645
1RN6 500-4HJ 0-Z K96	6950	950	1270	1970	1320	560	150	200	500	1971	2700
1RN6 502-4HJ 0-Z K96	7200	950	1270	1970	1320	560	150	200	500	1971	2700
1RN6 504-4HJ 0-Z K96	7900	950	1270	1970	1500	560	150	200	500	1971	2880
1RN6 506-4HJ 0-Z K96	8200	950	1270	1970	1500	560	150	200	500	1971	2880
1RN6 560-4HJ 0-Z K96	8300	1060	1340	2110	1400	600	170	240	560	2124	2870
1RN6 562-4HJ 0-Z K96	8750	1060	1340	2110	1400	600	170	240	560	2124	2870
1RN6 564-4HJ 0-Z K96	9700	1060	1340	2110	1600	600	170	240	560	2124	3100
1RN6 566-4HJ 0-Z K96	10250	1060	1340	2110	1600	600	170	240	560	2124	3100

<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

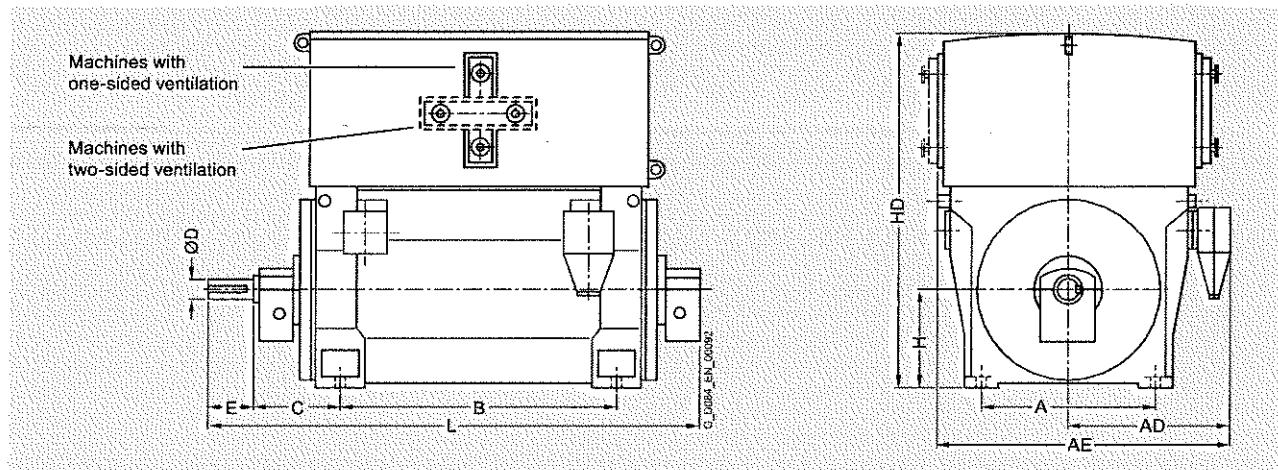


# Motors for line operation

## Water-cooled motors

H-compact PLUS (IRN4 and IRN6)

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1) 1 KV, IM 30 Type of construction sleeve bearings series IRN4, IRN6</b>											
4-pole											
1RN4 630-4HE.0-Z K96	10550	1320	1320	2280	1600	600	200	280	630	2400	2970
1RN4 632-4HE.0-Z K96	11250	1320	1330	2290	1600	600	200	280	630	2400	2970
1RN4 634-4HE.0-Z K96	12250	1320	1330	2290	1800	600	220	280	630	2400	3210
1RN4 636-4HE.0-Z K96	12900	1320	1330	2290	1800	600	220	280	630	2400	3210
6-pole											
1RN6 450-6HJ.0-Z K96	4550	850	1070	1840	1180	500	140	200	450	1715	2438
1RN6 452-6HJ.0-Z K96	4800	850	1070	1840	1180	500	140	200	450	1715	2438
1RN6 454-6HJ.0-Z K96	5150	850	1070	1840	1400	500	140	200	450	1715	2648
1RN6 456-6HJ.0-Z K96	5500	850	1070	1840	1400	500	140	200	450	1715	2648
1RN4 500-6HE.0-Z K96	5700	950	1220	2010	1320	500	160	240	500	1830	2620
1RN4 502-6HE.0-Z K96	6100	950	1220	2010	1320	500	160	240	500	1830	2620
1RN4 504-6HE.0-Z K96	6550	950	1220	2010	1500	500	170	240	500	1830	2830
1RN4 506-6HE.0-Z K96	6950	950	1220	2010	1500	500	170	240	500	1830	2830
1RN4 560-6HE.0-Z K96	7700	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4 562-6HE.0-Z K96	8200	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4 564-6HE.0-Z K96	9050	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 566-6HE.0-Z K96	9450	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 630-6HE.0-Z K96	10900	1320	1320	2280	1600	600	220	280	630	2400	2970
1RN4 632-6HE.0-Z K96	11500	1320	1320	2280	1600	600	220	280	630	2400	2970
1RN4 634-6HE.0-Z K96	12550	1320	1320	2280	1800	600	220	280	630	2400	3210
1RN4 636-6HE.0-Z K96	13300	1320	1330	2290	1800	600	220	280	630	2400	3210
8-pole											
1RN6 450-8HJ.0-Z K96	4550	850	1070	1840	1180	500	140	200	450	1715	2438
1RN6 452-8HJ.0-Z K96	4850	850	1070	1840	1180	500	140	200	450	1715	2438
1RN6 454-8HJ.0-Z K96	5200	850	1070	1840	1400	500	140	200	450	1715	2648
1RN6 456-8HJ.0-Z K96	5550	850	1070	1840	1400	500	140	200	450	1715	2648
1RN4 500-8HE.0-Z K96	5700	950	1220	2010	1320	500	160	240	500	1830	2620
1RN4 502-8HE.0-Z K96	6100	950	1220	2010	1320	500	160	240	500	1830	2620
1RN4 504-8HE.0-Z K96	6600	950	1220	2010	1500	500	170	240	500	1830	2830
1RN4 506-8HE.0-Z K96	6950	950	1220	2010	1500	500	170	240	500	1830	2830
1RN4 560-8HE.0-Z K96	7700	1060	1210	2060	1400	530	180	240	560	2040	2670

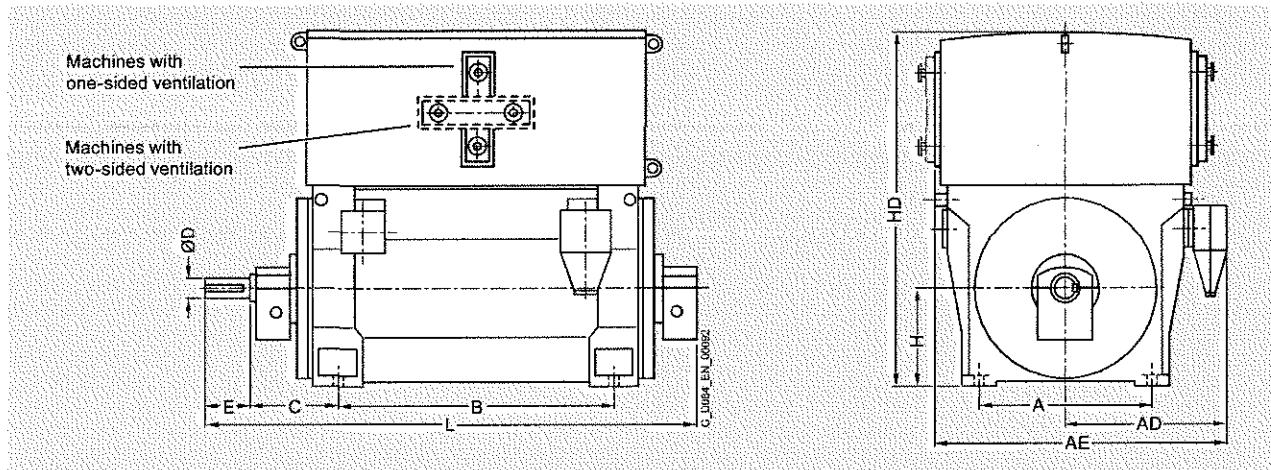
<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

# Motors for line operation

## Water-cooled motors

### H-compact PLUS (1RN4 and 1RN6)

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<sup>1)</sup> 1RN4 1SL4/1SQ4 (1SL6/1SQ6) - computation sleeve bearing (1SL4/1SQ4)											
8-pole											
1RN4 562-8HE.0-Z K96	8250	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4 564-8HE.0-Z K96	9050	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 566-8HE.0-Z K96	9450	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 630-8HE.0-Z K96	10750	1320	1320	2280	1600	600	220	280	630	2400	2970
1RN4 632-8HE.0-Z K96	11350	1320	1320	2280	1600	600	220	280	630	2400	2970
1RN4 634-8HE.0-Z K96	12350	1320	1320	2280	1800	600	220	280	630	2400	3210
1RN4 636-8HE.0-Z K96	13050	1320	1320	2280	1800	600	220	280	630	2400	3210
10-pole											
1RN4 500-3HE.0-Z K96	5700	950	1220	2010	1320	500	160	240	500	1830	2620
1RN4 502-3HE.0-Z K96	6050	950	1220	2010	1320	500	160	240	500	1830	2620
1RN4 504-3HE.0-Z K96	6550	950	1220	2010	1500	500	170	240	500	1830	2830
1RN4 506-3HE.0-Z K96	6900	950	1220	2010	1500	500	170	240	500	1830	2830
1RN4 560-3HE.0-Z K96	8050	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4 562-3HE.0-Z K96	8550	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4 564-3HE.0-Z K96	9150	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 566-3HE.0-Z K96	9550	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 630-3HE.0-Z K96	10700	1320	1320	2280	1600	600	220	280	630	2400	2970
1RN4 632-3HE.0-Z K96	11350	1320	1320	2280	1600	600	220	280	630	2400	2970
1RN4 634-3HE.0-Z K96	12300	1320	1320	2280	1800	600	220	280	630	2400	3210
1RN4 636-3HE.0-Z K96	13000	1320	1320	2280	1800	600	220	280	630	2400	3210
12-pole											
1RN4 502-5HE.0-Z K96	6050	950	1220	2010	1320	500	160	240	500	1830	2620
1RN4 504-5HE.0-Z K96	6500	950	1220	2010	1500	500	170	240	500	1830	2830
1RN4 506-5HE.0-Z K96	6900	950	1220	2010	1500	500	170	240	500	1830	2830
1RN4 560-5HE.0-Z K96	7650	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4 562-5HE.0-Z K96	8200	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4 564-5HE.0-Z K96	9000	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 566-5HE.0-Z K96	9450	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4 630-5HE.0-Z K96	10750	1320	1320	2280	1600	600	220	280	630	2400	2970
1RN4 632-5HE.0-Z K96	11350	1320	1320	2280	1600	600	220	280	630	2400	2970
1RN4 634-5HE.0-Z K96	12400	1320	1320	2280	1800	600	220	280	630	2400	3210
1RN4 636-5HE.0-Z K96	13100	1320	1320	2280	1800	600	220	280	630	2400	3210

Note: Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6, 1SL4/1SL6 and 1SQ4/1SQ6 series.

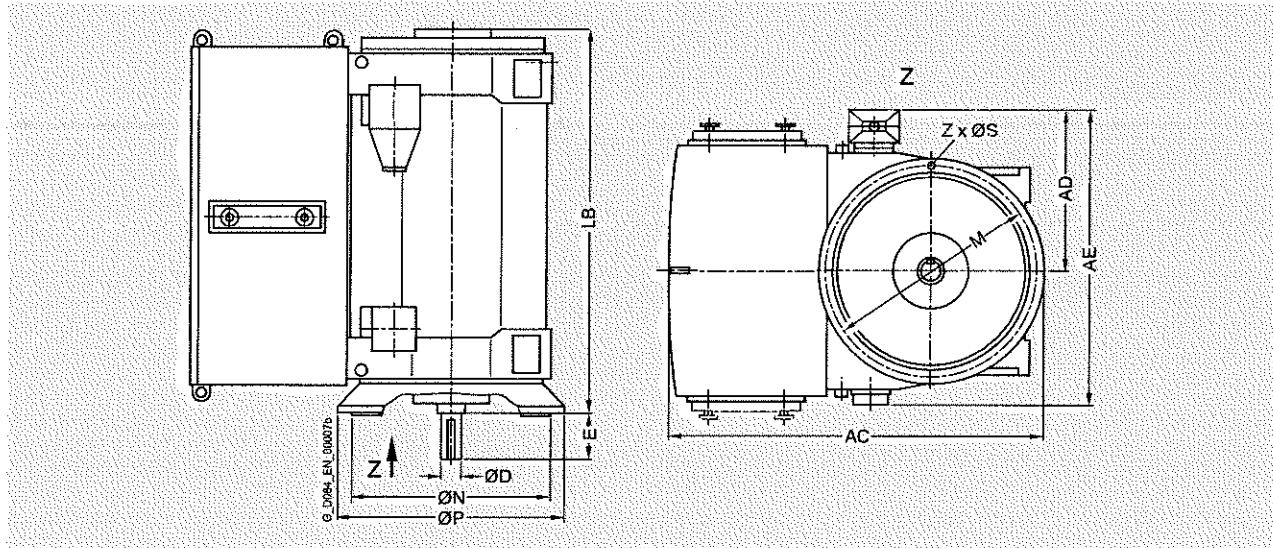


# Motors for line operation

## Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>Vertical type of construction, roller bearings – series 1RN4 / 1RN6<sup>2)</sup></b>														
<b>4-pole</b>														
1RN6 450-4HJ 8	4550	1840	930	1620	130	200	1720	1150	1000	1080	26	8		
1RN6 452-4HJ 8	4750	1840	930	1620	130	200	1720	1150	1000	1080	26	8		
1RN6 454-4HJ 8	5150	1840	930	1620	130	200	1930	1150	1000	1080	26	8		
1RN6 456-4HJ 8	5450	1840	930	1620	130	200	1930	1150	1000	1080	26	8		
1RN4 500-4HE 8	5500	1960	1000	1810	150	200	1910	1250	1120	1180	26	8		
1RN4 502-4HE 8	5700	1960	1000	1810	150	200	1910	1250	1120	1180	26	8		
1RN4 504-4HE 8	6400	1960	1000	1810	160	240	2120	1250	1120	1180	26	8		
1RN4 506-4HE 8	6800	1960	1000	1810	160	240	2120	1250	1120	1180	26	8		
1RN4 560-4HE 8	7550	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 562-4HE 8	8000	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 564-4HE 8 <sup>3)</sup>	8900	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 566-4HE 8 <sup>3)</sup>	9350	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 630-4HE 8 <sup>3)</sup>	12050	2875	1330	2300	200	280	2400	2000	1800	1900	33	8		
1RN4 632-4HE 8 <sup>3)</sup>	12750	2875	1330	2300	200	280	2400	2000	1800	1900	33	8		
1RN4 634-4HE 8 <sup>3)</sup>	13800	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
1RN4 636-4HE 8 <sup>3)</sup>	14350	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
<b>6-pole</b>														
1RN6 450-6HJ 8	4650	1840	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6 452-6HJ 8	4950	1840	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6 454-6HJ 8	5300	1840	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN6 456-6HJ 8	5650	1840	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN4 500-6HE 8	5650	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4 502-6HE 8	6050	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

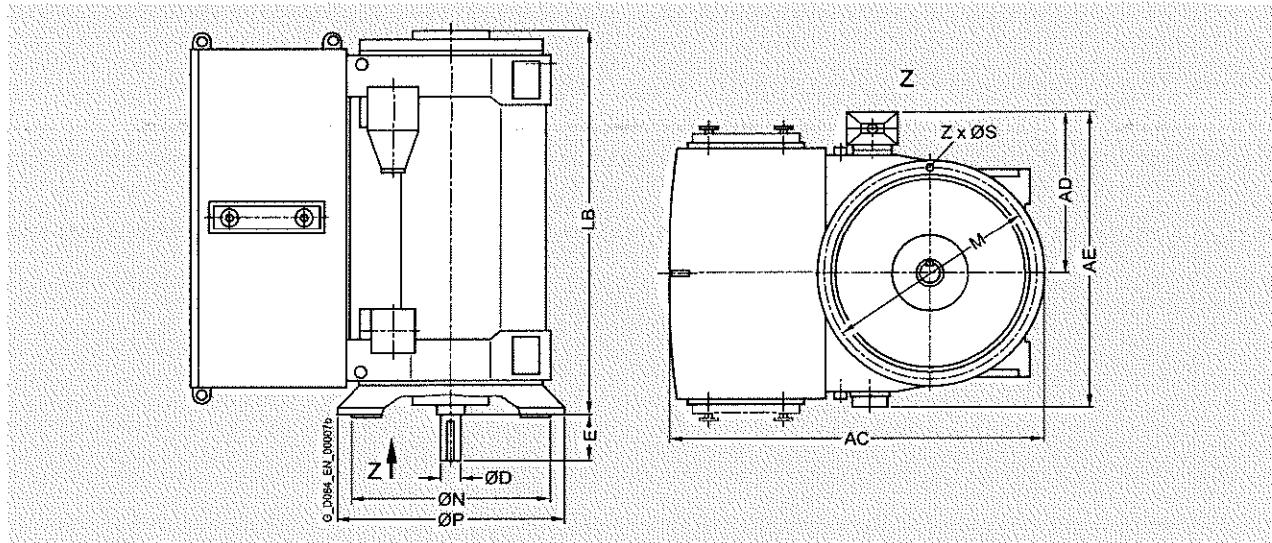
<sup>3)</sup> Vertical type of construction, only in the 50 Hz version.

# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z mm		
<b>Up to 6 kV - Vertical type of construction, radial bearings - series 1RN4/1RN6</b>														
6-pole														
1RN4 504-6HE.8	6550	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4 506-6HE.8	6950	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4 560-6HE.8	7650	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 562-6HE.8	8250	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 564-6HE.8	9100	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 566-6HE.8	9550	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 630-6HE.8	12300	2875	1330	2300	220	280	2400	2000	1800	1900	33	8		
1RN4 632-6HE.8	12850	2875	1330	2300	220	280	2400	2000	1800	1900	33	8		
1RN4 634-6HE.8	13950	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
1RN4 636-6HE.8	14650	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
8-pole														
1RN6 450-8HJ.8	4650	1840	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6 452-8HJ.8	4950	1840	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6 454-8HJ.8	5350	1840	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN6 456-8HJ.8	5650	1840	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN4 500-8HE.8	5700	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4 502-8HE.8	6050	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4 504-8HE.8	6550	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4 506-8HE.8	6950	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4 560-8HE.8	7650	2180	1070	1960	180	240	2090	1400	1250	1320	26	8		
1RN4 562-8HE.8	8150	2180	1070	1960	180	240	2090	1400	1250	1320	26	8		
1RN4 564-8HE.8	9000	2180	1070	1960	190	280	2320	1400	1250	1320	26	8		
1RN4 566-8HE.8	9450	2180	1070	1960	190	280	2320	1400	1250	1320	26	8		
1RN4 630-8HE. <sup>3)</sup>	12250	2875	1330	2300	220	280	2400	2000	1800	1900	33	8		
1RN4 632-8HE. <sup>3)</sup>	12850	2875	1330	2300	220	280	2400	2000	1800	1900	33	8		
1RN4 634-8HE. <sup>3)</sup>	13800	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
1RN4 636-8HE. <sup>3)</sup>	14550	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

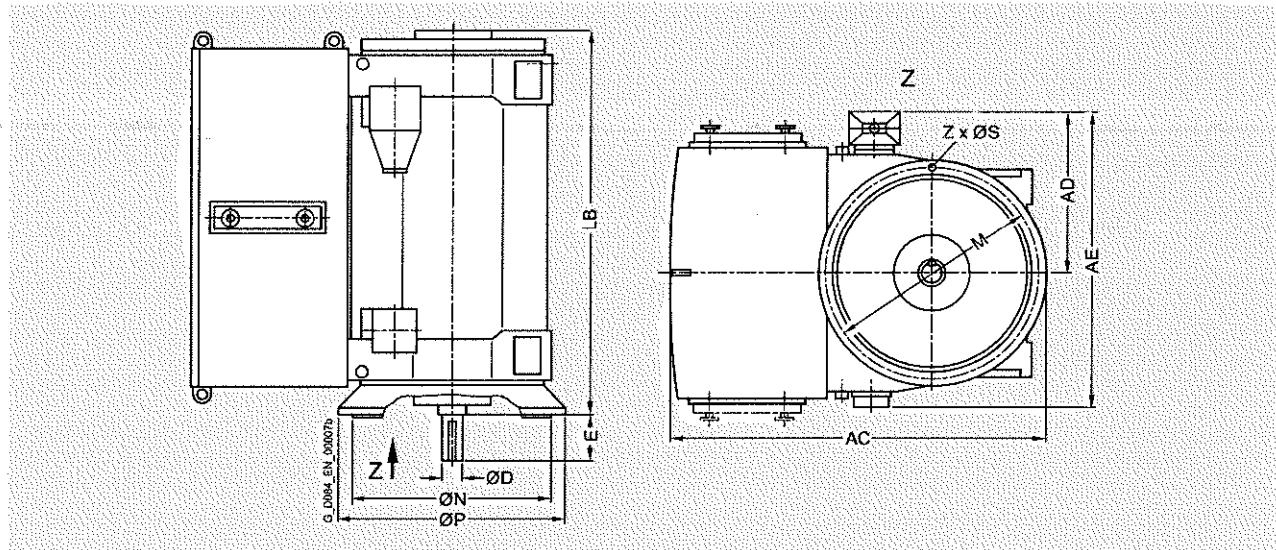
<sup>3)</sup> Vertical type of construction, only in the 50 Hz version.

# Motors for line operation

## Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z mm		
<b>Vertical type of construction (solid bearing) - series 1RN4/1RN6<sup>2)</sup></b>														
10-pole														
1RN6 450-3HJ 8	4650	1840	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6 452-3HJ 8	4950	1840	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6 454-3HJ 8	5350	1840	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN6 456-3HJ 8	5650	1840	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN4 500-3HE 8	5650	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4 502-3HE 8	6000	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4 504-3HE 8	6550	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4 506-3HE 8	6900	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4 560-3HE 8	7550	2180	1070	1960	180	240	2090	1400	1250	1320	26	8		
1RN4 562-3HE 8	8150	2180	1070	1960	180	240	2090	1400	1250	1320	26	8		
1RN4 564-3HE 8	8950	2180	1070	1960	190	280	2320	1400	1250	1320	26	8		
1RN4 566-3HE 8	9400	2180	1070	1960	190	280	2320	1400	1250	1320	26	8		
1RN4 630-3HE 8 <sup>3)</sup>	12150	2875	1180	2150	220	280	2400	2000	1800	1900	33	8		
1RN4 632-3HE 8 <sup>3)</sup>	12850	2875	1330	2300	220	280	2400	2000	1800	1900	33	8		
1RN4 634-3HE 8 <sup>3)</sup>	13850	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
1RN4 636-3HE 8 <sup>3)</sup>	14550	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

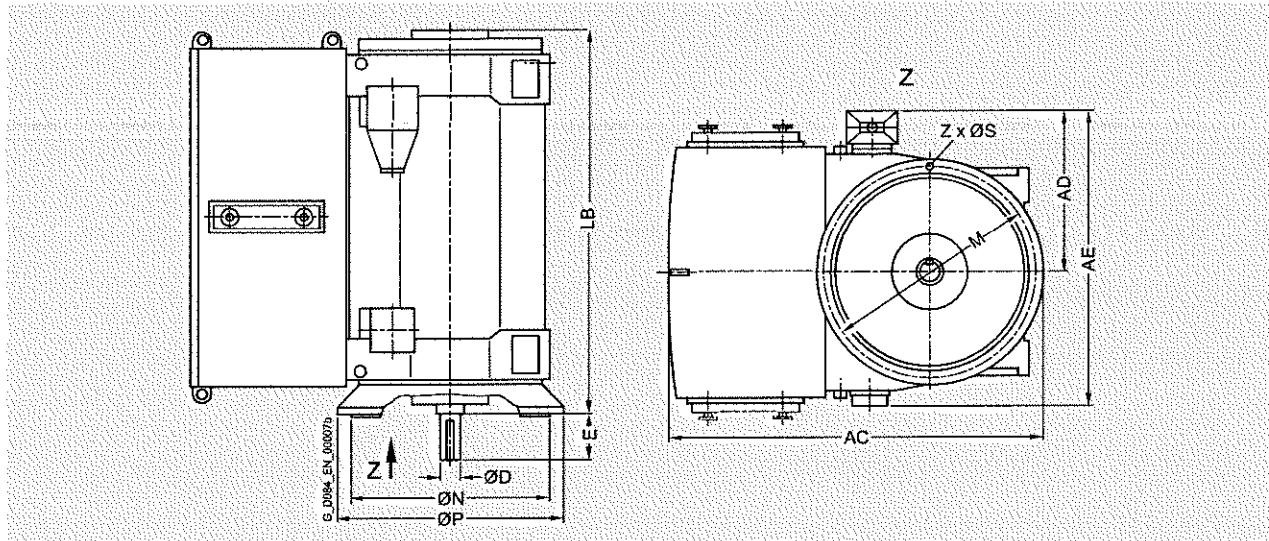
<sup>3)</sup> Vertical type of construction, only in the 50 Hz version.

# Motors for line operation

## Water-cooled motors

### E-compact PLUS 1RN4 and 1RN5

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Z Quantity
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm			

#### Vertical type of construction, cold bearings - series 1RN4/1RN5

##### 12-pole

1RN6 450-5HJ.8	4650	1840	930	1620	140	200	1720	1150	1000	1080	26	8
1RN6 452-5HJ.8	4950	1840	930	1620	140	200	1720	1150	1000	1080	26	8
1RN6 454-5HJ.8	5350	1840	930	1620	140	200	1930	1150	1000	1080	26	8
1RN6 456-5HJ.8	5650	1840	930	1620	140	200	1930	1150	1000	1080	26	8
1RN4 500-5HE.8	5650	1960	1000	1810	160	240	1910	1250	1120	1180	26	8
1RN4 502-5HE.8	6000	1960	1000	1810	160	240	1910	1250	1120	1180	26	8
1RN4 504-5HE.8	6500	1960	1000	1810	170	240	2120	1250	1120	1180	26	8
1RN4 506-5HE.8	6950	1960	1000	1810	170	240	2120	1250	1120	1180	26	8
1RN4 560-5HE.8	7600	2180	1070	1960	180	240	2090	1400	1250	1320	26	8
1RN4 562-5HE.8	8150	2180	1070	1960	180	240	2090	1400	1250	1320	26	8
1RN4 564-5HE.8	8950	2180	1070	1960	190	280	2320	1400	1250	1320	26	8
1RN4 566-5HE.8	9400	2180	1070	1960	190	280	2320	1400	1250	1320	26	8
1RN4 630-5HE.8 <sup>3)</sup>	12050	2875	1180	2150	220	280	2400	2000	1800	1900	33	8
1RN4 632-5HE.8 <sup>3)</sup>	12650	2875	1180	2150	220	280	2400	2000	1800	1900	33	8
1RN4 634-5HE.8 <sup>3)</sup>	13700	2875	1180	2150	220	280	2640	2000	1800	1900	33	8
1RN4 636-5HE.8 <sup>3)</sup>	14500	2875	1330	2300	220	280	2640	2000	1800	1900	33	8

##### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The value applies for 6 kV. When a lower voltage is selected, the rated current increases. For rated currents above 315 A, the dimension increases by 140 mm.

<sup>2)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

<sup>3)</sup> Vertical type of construction, only in the 50 Hz version.

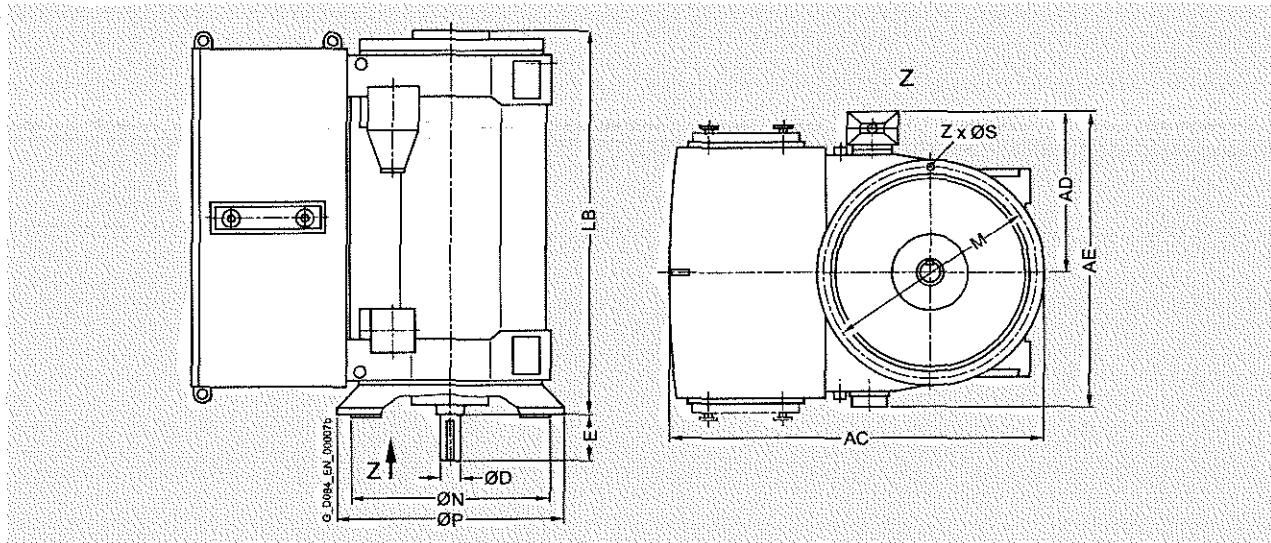


# Motors for line operation

## Water-cooled motors

E-compact PLUS 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z mm		
<b>4-pole</b>														
1RN6 450-4HJ.8	4550	1840	1070	1840	130	200	1720	1150	1000	1080	26	8		
1RN6 452-4HJ.8	4750	1840	1070	1840	130	200	1720	1150	1000	1080	26	8		
1RN6 454-4HJ.8	5150	1840	1070	1840	130	200	1930	1150	1000	1080	26	8		
1RN6 456-4HJ.8	5450	1840	1070	1840	130	200	1930	1150	1000	1080	26	8		
1RN4 500-4HE.8	5550	1960	1140	1950	150	200	1910	1250	1120	1180	26	8		
1RN4 502-4HE.8	5700	1960	1140	1950	150	200	1910	1250	1120	1180	26	8		
1RN4 504-4HE.8	6350	1960	1140	1950	160	240	2120	1250	1120	1180	26	8		
1RN4 506-4HE.8	6700	1960	1140	1950	160	240	2120	1250	1120	1180	26	8		
1RN4 560-4HE.8	7400	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 562-4HE.8	7900	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 564-4HE.8	8750	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 566-4HE.8	9200	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 630-4HE.8 <sup>2)</sup>	11950	2875	1320	2290	200	280	2400	2000	1800	1900	33	8		
1RN4 632-4HE.8 <sup>2)</sup>	12600	2875	1330	2300	200	280	2400	2000	1800	1900	33	8		
1RN4 634-4HE.8 <sup>2)</sup>	13650	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
1RN4 636-4HE.8 <sup>2)</sup>	14250	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
<b>6-pole</b>														
1RN6 450-6HJ.8	4650	1840	1070	1840	140	200	1720	1150	1000	1080	26	8		
1RN6 452-6HJ.8	4950	1840	1070	1840	140	200	1720	1150	1000	1080	26	8		
1RN6 454-6HJ.8	5300	1840	1070	1840	140	200	1930	1150	1000	1080	26	8		
1RN6 456-6HJ.8	5650	1840	1070	1840	140	200	1930	1150	1000	1080	26	8		
1RN4 500-6HE.8	5650	1960	1140	1950	160	240	1910	1250	1120	1180	26	8		
1RN4 502-6HE.8	6050	1960	1140	1950	160	240	1910	1250	1120	1180	26	8		
1RN4 504-6HE.8	6550	1960	1140	1950	170	240	2120	1250	1120	1180	26	8		
1RN4 506-6HE.8	6950	1960	1140	1950	170	240	2120	1250	1120	1180	26	8		
1RN4 560-6HE.8	7650	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 562-6HE.8	8150	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 564-6HE.8	8950	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 566-6HE.8	9400	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		

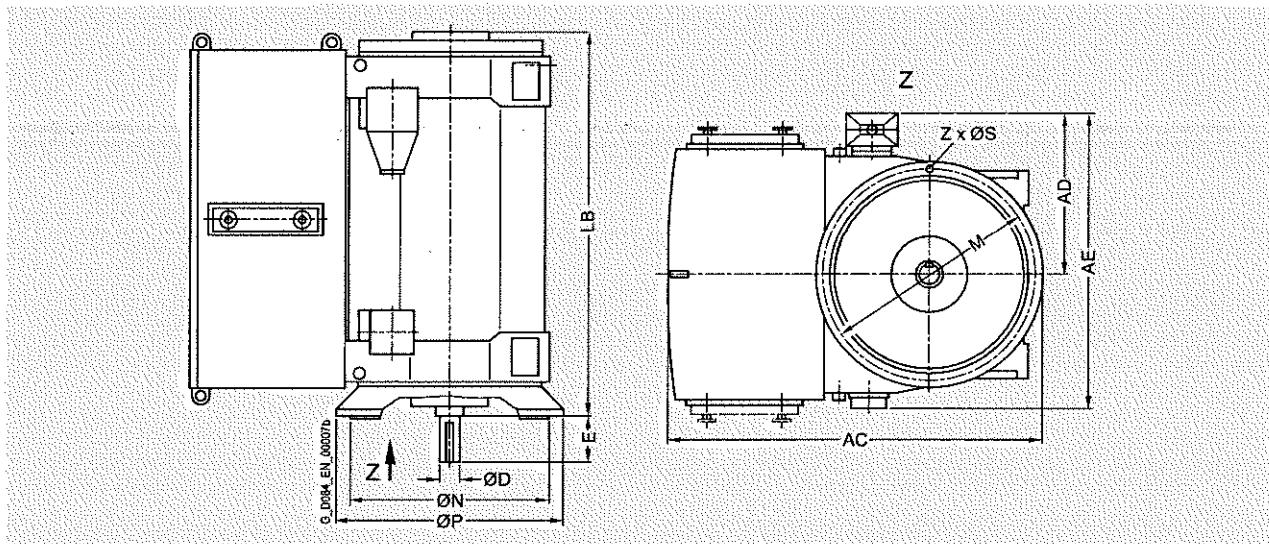
<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.<sup>2)</sup> Vertical type of construction, only in the 50 Hz version.

# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1BN6

#### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>6-pole</b>														
1RN4 630-6HE.8	12300	2875	1320	2290	220	280	2400	2000	1800	1900	33	8		
1RN4 632-6HE.8	12850	2875	1320	2290	220	280	2400	2000	1800	1900	33	8		
1RN4 634-6HE.8	13900	2875	1320	2290	220	280	2640	2000	1800	1900	33	8		
1RN4 636-6HE.8	14650	2875	1330	2300	220	280	2640	2000	1800	1900	33	8		
<b>8-pole</b>														
1RN6 450-8HJ.8	4650	1840	1070	1840	140	200	1720	1150	1000	1080	26	8		
1RN6 452-8HJ.8	4950	1840	1070	1840	140	200	1720	1150	1000	1080	26	8		
1RN6 454-8HJ.8	5350	1840	1070	1840	140	200	1930	1150	1000	1080	26	8		
1RN6 456-8HJ.8	5650	1840	1070	1840	140	200	1930	1150	1000	1080	26	8		
1RN4 500-8HE.8	5700	1960	1140	1950	160	240	1910	1250	1120	1180	26	8		
1RN4 502-8HE.8	6050	1960	1140	1950	160	240	1910	1250	1120	1180	26	8		
1RN4 504-8HE.8	6550	1960	1140	1950	170	240	2120	1250	1120	1180	26	8		
1RN4 506-8HE.8	6950	1960	1140	1950	170	240	2120	1250	1120	1180	26	8		
1RN4 560-8HE.8	7600	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 562-8HE.8	8150	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 564-8HE.8	9000	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 566-8HE.8	9400	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 630-8HE.8	12100	2875	1320	2290	220	280	2400	2000	1800	1900	33	8		
1RN4 632-8HE.8	12700	2875	1320	2290	220	280	2400	2000	1800	1900	33	8		
1RN4 634-8HE.8	13700	2875	1320	2290	220	280	2640	2000	1800	1900	33	8		
1RN4 636-8HE.8	14450	2875	1320	2290	220	280	2640	2000	1800	1900	33	8		

<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

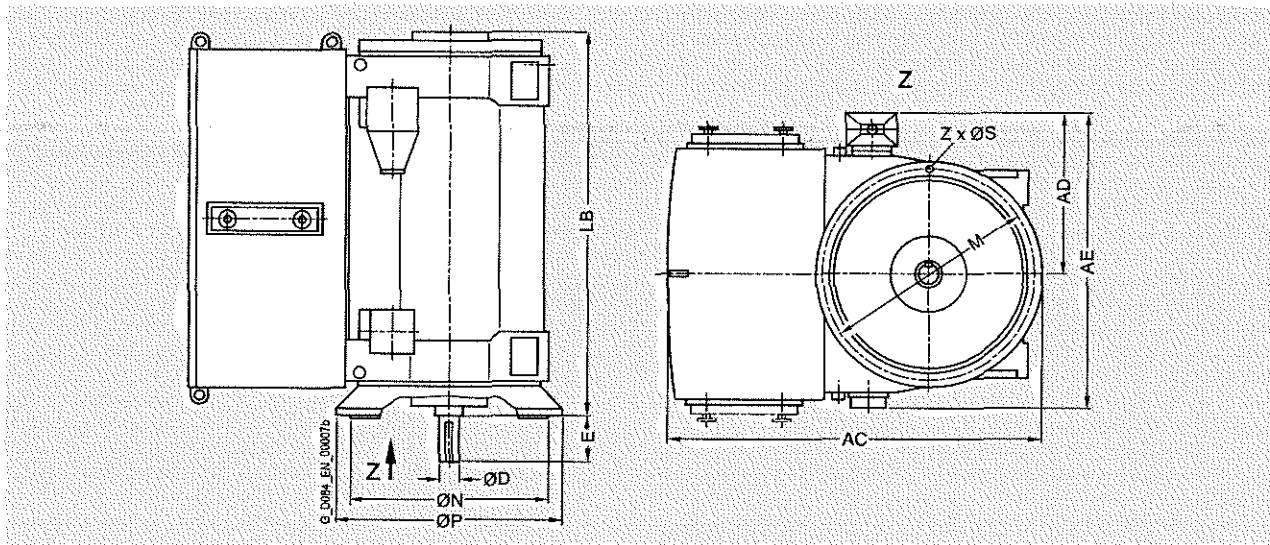


# Motors for line operation

## Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		

Dimensions for 1RN4/1RN6 series														
Type of construction: roller bearings (1RN4 series)														
<b>10-pole</b>														
1RN4 500-3HE.8	5650	1960	1140	1950	160	240	1910	1250	1120	1180	26	8		
1RN4 502-3HE.8	6000	1960	1140	1950	160	240	1910	1250	1120	1180	26	8		
1RN4 504-3HE.8	6500	1960	1140	1950	170	240	2120	1250	1120	1180	26	8		
1RN4 506-3HE.8	6900	1960	1140	1950	170	240	2120	1250	1120	1180	26	8		
1RN4 560-3HE.8	7900	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 562-3HE.8	8550	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 564-3HE.8	9400	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 566-3HE.8	10000	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 630-3HE.8	12100	2875	1320	2290	220	280	2400	2000	1800	1900	33	8		
1RN4 632-3HE.8	12700	2875	1320	2290	220	280	2400	2000	1800	1900	33	8		
1RN4 634-3HE.8	13650	2875	1320	2290	220	280	2640	2000	1800	1900	33	8		
1RN4 636-3HE.8	14400	2875	1320	2290	220	280	2640	2000	1800	1900	33	8		
<b>12-pole</b>														
1RN4 502-5HE.8	6050	1960	1140	1950	160	240	1910	1250	1120	1180	26	8		
1RN4 504-5HE.8	6450	1960	1140	1950	170	240	2120	1250	1120	1180	26	8		
1RN4 506-5HE.8	6900	1960	1140	1950	170	240	2120	1250	1120	1180	26	8		
1RN4 560-5HE.8	7550	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 562-5HE.8	8100	2180	1210	2100	180	240	2090	1400	1250	1320	26	8		
1RN4 564-5HE.8	8900	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 566-5HE.8	9350	2180	1210	2100	190	280	2320	1400	1250	1320	26	8		
1RN4 630-5HE.8	12100	2875	1320	2290	220	280	2400	2000	1800	1900	33	8		
1RN4 632-5HE.8	12750	2875	1320	2290	220	280	2400	2000	1800	1900	33	8		
1RN4 634-5HE.8	13750	2875	1320	2290	220	280	2640	2000	1800	1900	33	8		
1RN4 636-5HE.8	14500	2875	1320	2290	220	280	2640	2000	1800	1900	33	8		

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SN4/1SN6 and 1SL4/1SL6 series.

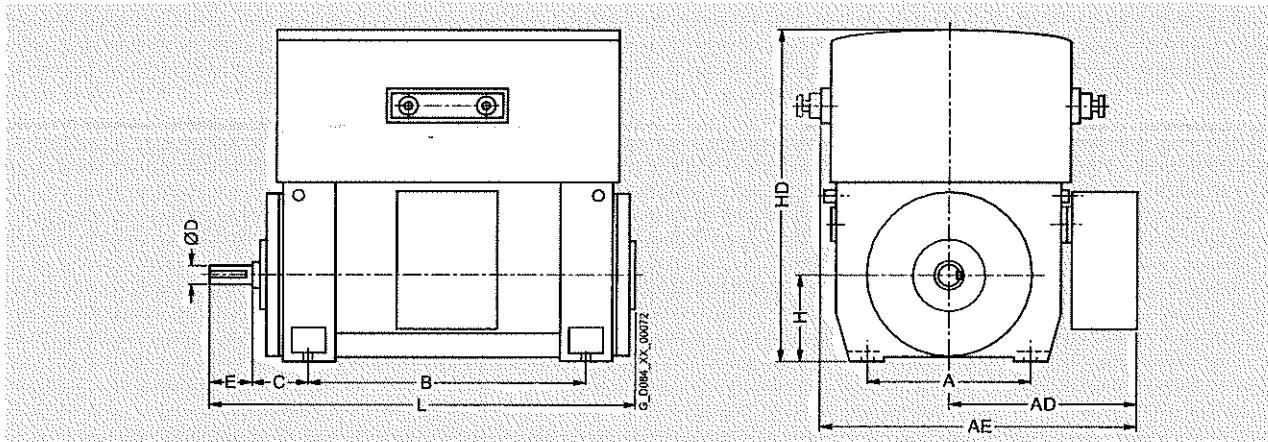


# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1RN6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

#### Up to 16 kW, IM B4 type of construction, roller bearings X ventilation – (1RN6 series)

##### 4-pole

1RN6 710-4HJ.0 <sup>2)</sup>	17700	1500	1500	2560	2000	355	220	280	710	2510	2980
1RN6 712-4HJ.0 <sup>2)</sup>	18500	1500	1500	2560	2000	355	220	280	710	2510	2980
1RN6 714-4HJ.0 <sup>2)</sup>	19900	1500	1500	2560	2240	355	220	280	710	2510	3220
1RN6 716-4HJ.0 <sup>2)</sup>	20900	1500	1500	2560	2240	355	220	280	710	2510	3220

Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

#### Up to 16 kW, IM B3 type of construction, roller bearings X ventilation – (1RN6 series)

##### 4-pole

1RN6 710-4HJ.0 <sup>2)</sup>	17400	1500	1500	2560	2000	355	220	280	710	2510	2980
1RN6 712-4HJ.0 <sup>2)</sup>	18200	1500	1500	2560	2000	355	220	280	710	2510	2980
1RN6 714-4HJ.0 <sup>2)</sup>	19700	1500	1500	2560	2240	355	220	280	710	2510	3220
1RN6 716-4HJ.0 <sup>2)</sup>	20600	1500	1500	2560	2240	355	220	280	710	2510	3220

<sup>1)</sup> The dimensions are also valid for the 1SN6 and 1SL6 series.

<sup>2)</sup> Roller bearings only for 50 Hz version.

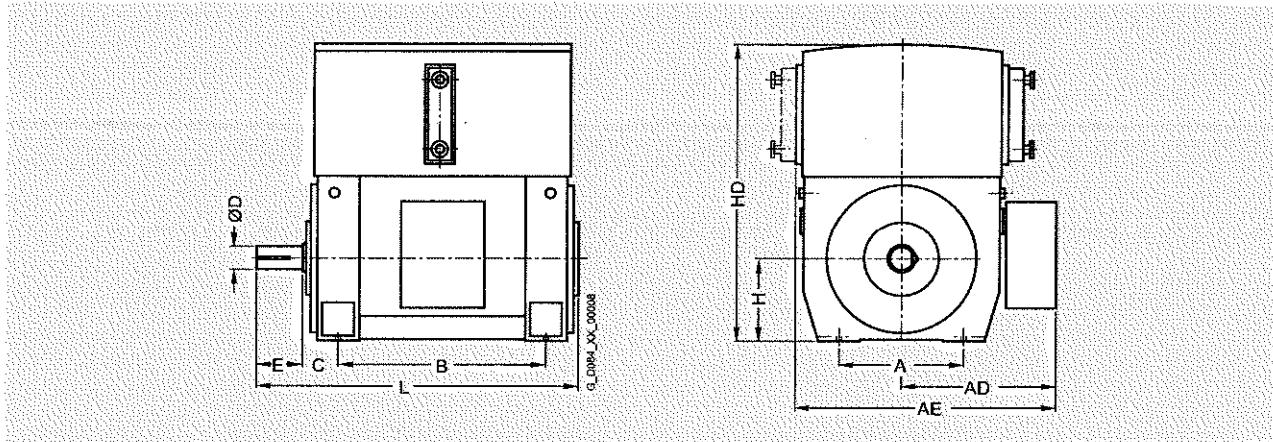


# Motors for line operation

## Water-cooled motors

H-compact PLUS, 1RN4 and 1RN6

### Dimension drawings



2

Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Dimensions valid for type of construction: roller bearings, 2 ventilation, 1 (1RN6 series)</b>											
<b>6-pole</b>											
1RN6 710-6HJ.0	16700	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 712-6HJ.0	17400	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 714-6HJ.0	19100	1500	1500	2560	2240	355	240	330	710	2600	3270
1RN6 716-6HJ.0	20200	1500	1500	2560	2240	355	240	330	710	2600	3270
<b>8-pole</b>											
1RN6 710-8HJ.0	16500	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 712-8HJ.0	17300	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 714-8HJ.0	18900	1500	1500	2560	2240	355	240	330	710	2600	3270
1RN6 716-8HJ.0	20000	1500	1500	2560	2240	355	240	330	710	2600	3270
<b>10-pole</b>											
1RN6 710-3HJ.0	16300	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 712-3HJ.0	17100	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 714-3HJ.0	18700	1500	1500	2560	2240	355	240	330	710	2600	3270
1RN6 716-3HJ.0	19900	1500	1500	2560	2240	355	240	330	710	2600	3270

### Note:

Higher pole numbers are available on request.

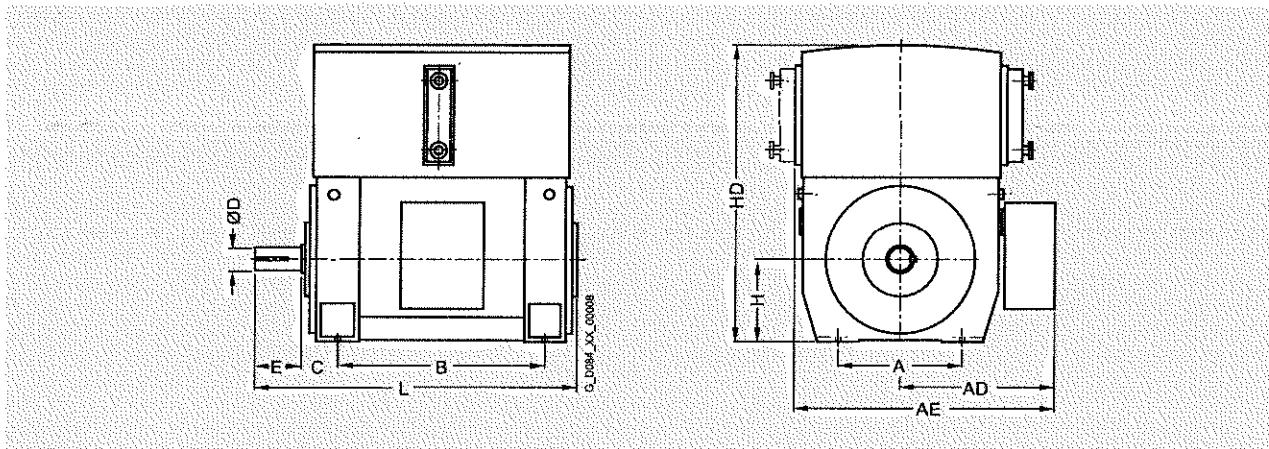
<sup>1)</sup> The dimensions are also valid for the 1SN6 and 1SL6 series.

# Motors for line operation

## Water-cooled motors

### H-compact PLUS IPM4 and IPN6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<i>General dimensions, types of construction, roller bearings, Z ventilation, little series</i>											
6-pole											
1RN6 710-6HJ.0	16500	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 712-6HJ.0	17200	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 714-6HJ.0	18900	1500	1500	2560	2240	355	240	330	710	2600	3270
1RN6 716-6HJ.0	20000	1500	1500	2560	2240	355	240	330	710	2600	3270
8-pole											
1RN6 710-8HJ.0	16400	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 712-8HJ.0	17100	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 714-8HJ.0	18800	1500	1500	2560	2240	355	240	330	710	2600	3270
1RN6 716-8HJ.0	19800	1500	1500	2560	2240	355	240	330	710	2600	3270
10-pole											
1RN6 710-3HJ.0	16200	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 712-3HJ.0	17000	1500	1500	2560	2000	355	240	330	710	2600	3030
1RN6 714-3HJ.0	18700	1500	1500	2560	2240	355	240	330	710	2600	3270
1RN6 716-3HJ.0	19800	1500	1500	2560	2240	355	240	330	710	2600	3270

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SN6 and 1SL6 series.

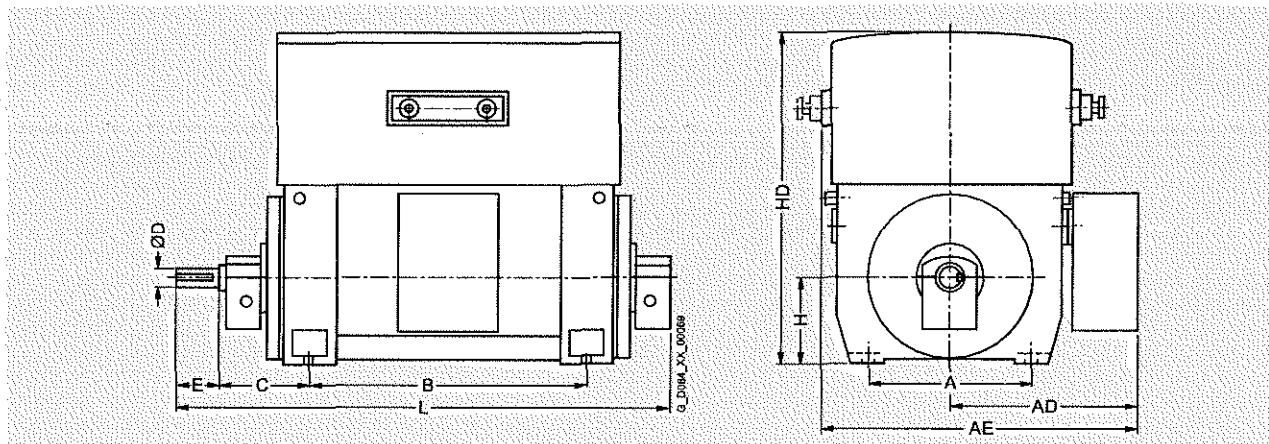


# Motors for line operation

## Water-cooled motors

E-compact PLUS 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1RN4/1RN6-4HJ0-Z K96 (construction with sleeve bearings, ventilation = 1RN6 series)</b>											
2-pole											
1RN6 710-2HJ.0	15900	1500	1500	2560	2000	600	180	240	710	2510	3370
1RN6 712-2HJ.0	16800	1500	1500	2560	2000	600	180	240	710	2510	3370
1RN6 714-2HJ.0	18000	1500	1500	2560	2240	600	180	240	710	2510	3610
1RN6 716-2HJ.0	19000	1500	1500	2560	2240	600	180	240	710	2510	3610
4-pole											
1RN6 710-4HJ.0-Z K96 <sup>2)</sup>	17700	1500	1500	2560	2000	530	220	280	710	2510	3260
1RN6 712-4HJ.0-Z K96 <sup>2)</sup>	18500	1500	1500	2560	2000	530	220	280	710	2510	3260
1RN6 714-4HJ.0-Z K96 <sup>2)</sup>	19900	1500	1500	2560	2240	530	220	280	710	2510	3500
1RN6 716-4HJ.0-Z K96 <sup>2)</sup>	20900	1500	1500	2560	2240	530	220	280	710	2510	3500

Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1RN4/1RN6-4HJ0-Z K96 (construction with sleeve bearings, ventilation = 1RN6 series)</b>											
2-pole											
1RN6 710-2HJ.0	15800	1500	1500	2560	2000	600	180	240	710	2510	3370
1RN6 712-2HJ.0	16600	1500	1500	2560	2000	600	180	240	710	2510	3370
1RN6 714-2HJ.0	17800	1500	1500	2560	2240	600	180	240	710	2510	3610
1RN6 716-2HJ.0	18800	1500	1500	2560	2240	600	180	240	710	2510	3610
4-pole											
1RN6 710-4HJ.0-Z K96 <sup>2)</sup>	17400	1500	1500	2560	2000	530	220	280	710	2510	3260
1RN6 712-4HJ.0-Z K96 <sup>2)</sup>	18200	1500	1500	2560	2000	530	220	280	710	2510	3260
1RN6 714-4HJ.0-Z K96 <sup>2)</sup>	19700	1500	1500	2560	2240	530	220	280	710	2510	3500
1RN6 716-4HJ.0-Z K96 <sup>2)</sup>	20600	1500	1500	2560	2240	530	220	280	710	2510	3500

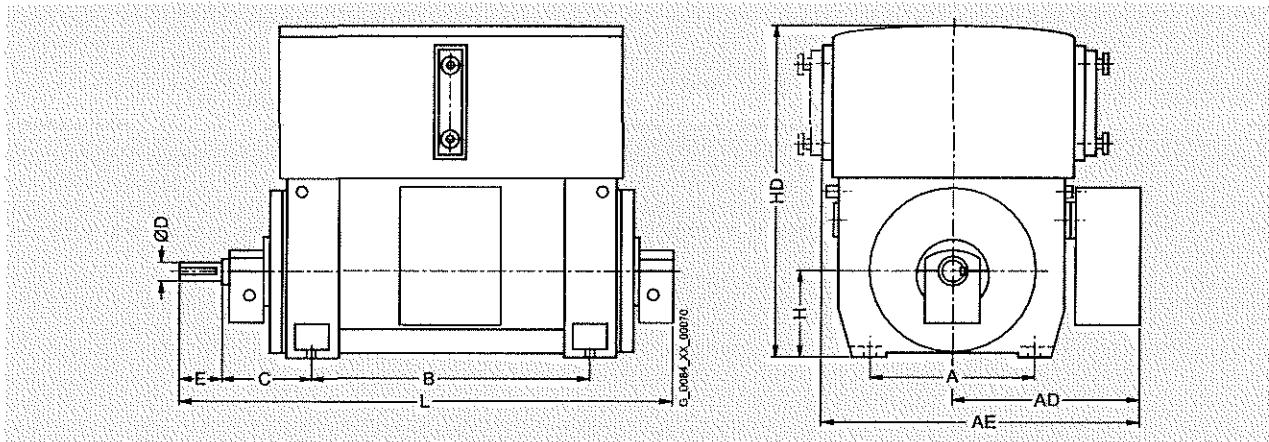
<sup>1)</sup> The dimensions are also valid for the 1SN6 and 1SL6 series.<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "Z K96" not necessary.

# Motors for line operation

## Water-cooled motors

### H-compact PLUS 1RN4 and 1FN6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

Dimensions of H-compact PLUS type of construction above bearings (A = width of bearing housing - 1RN6 series)

#### 6-pole

1RN6 710-6HJ.0-Z K96	17700	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 712-6HJ.0-Z K96	18400	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 714-6HJ.0-Z K96	20200	1500	1500	2560	2240	670	240	330	710	2600	3840
1RN6 716-6HJ.0-Z K96	21300	1500	1500	2560	2240	670	240	330	710	2600	3840

#### 8-pole

1RN6 710-8HJ.0-Z K96	17500	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 712-8HJ.0-Z K96	18300	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 714-8HJ.0-Z K96	20000	1500	1500	2560	2240	670	240	330	710	2600	3840
1RN6 716-8HJ.0-Z K96	21100	1500	1500	2560	2240	670	240	330	710	2600	3840

#### 10-pole

1RN6 710-3HJ.0-Z K96	17300	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 712-3HJ.0-Z K96	18200	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 714-3HJ.0-Z K96	19800	1500	1500	2560	2240	670	240	330	710	2600	3840
1RN6 716-3HJ.0-Z K96	21000	1500	1500	2560	2240	670	240	330	710	2600	3840

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SN6 and 1SL6 series.

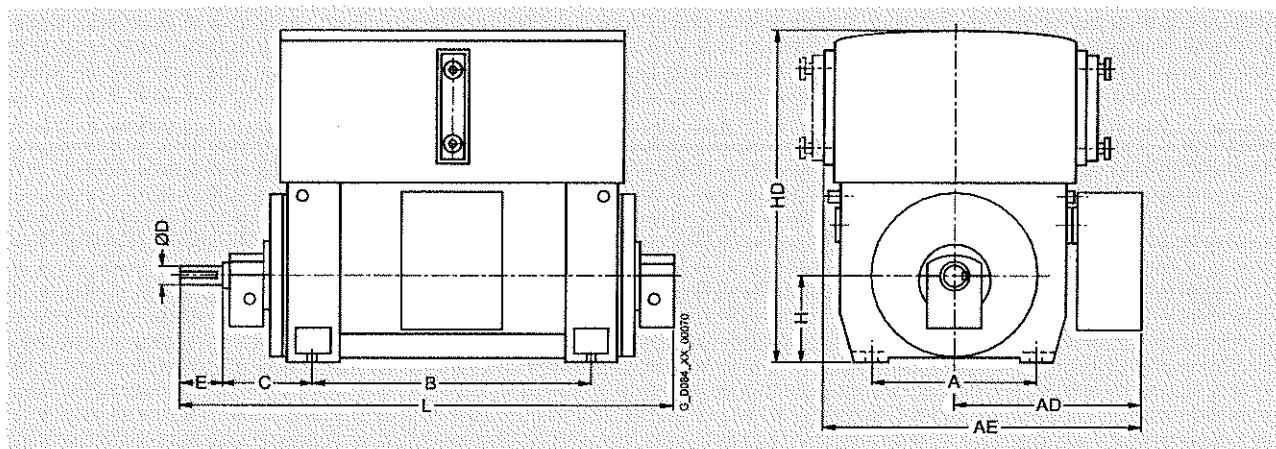


# Motors for line operation

## Water-cooled motors

H-compact PLUS IRN4 and IRN6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>0.75 kW, 110 V, 50 Hz, 4-pole, construction, sleeve bearings, Z10 insulation (IRN6 1000)</b>											
6-pole											
1RN6 710-6HJ.0-Z K96	17500	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 712-6HJ.0-Z K96	18300	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 714-6HJ.0-Z K96	20000	1500	1500	2560	2240	670	240	330	710	2600	3840
1RN6 716-6HJ.0-Z K96	21100	1500	1500	2560	2240	670	240	330	710	2600	3840
8-pole											
1RN6 710-8HJ.0-Z K96	17400	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 712-8HJ.0-Z K96	18200	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 714-8HJ.0-Z K96	19800	1500	1500	2560	2240	670	240	330	710	2600	3840
1RN6 716-8HJ.0-Z K96	20900	1500	1500	2560	2240	670	240	330	710	2600	3840
10-pole											
1RN6 710-3HJ.0-Z K96	17300	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 712-3HJ.0-Z K96	18100	1500	1500	2560	2000	670	240	330	710	2600	3600
1RN6 714-3HJ.0-Z K96	19700	1500	1500	2560	2240	670	240	330	710	2600	3840
1RN6 716-3HJ.0-Z K96	20800	1500	1500	2560	2240	670	240	330	710	2600	3840

### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SN6 and 1SL6 series.

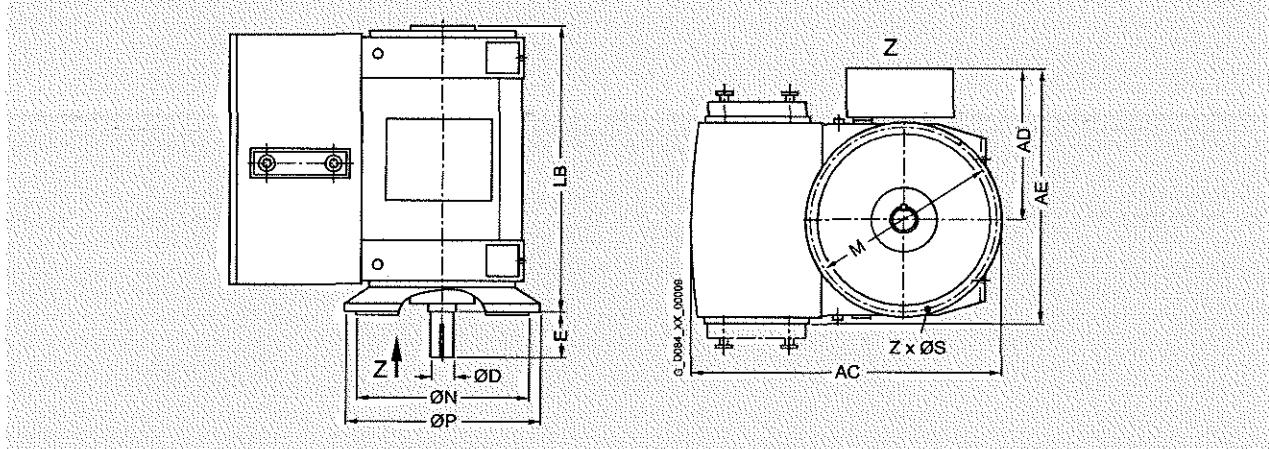


# Motors for line operation

## Water-cooled motors

### Hicompack PLUS 1RN4 and 1RN6

#### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>Hiocompack PLUS 1RN4 and 1RN6 (from catalog 11/08)</b>														
6-pole														
1RN6 710-6HJ.8	17800	2890	1500	2560	240	330	2870	2000	1800	1900	33	24		
1RN6 712-6HJ.8	18700	2890	1500	2560	240	330	2870	2000	1800	1900	33	24		
1RN6 714-6HJ.8	20400	2890	1500	2560	240	330	3110	2000	1800	1900	33	24		
1RN6 716-6HJ.8	21400	2890	1500	2560	240	330	3110	2000	1800	1900	33	24		
8-pole														
1RN6 710-8HJ.8	17700	2890	1500	2560	240	330	2870	2000	1800	1900	33	24		
1RN6 712-8HJ.8	18500	2890	1500	2560	240	330	2870	2000	1800	1900	33	24		
1RN6 714-8HJ.8	20100	2890	1500	2560	240	330	3110	2000	1800	1900	33	24		
1RN6 716-8HJ.8	21200	2890	1500	2560	240	330	3110	2000	1800	1900	33	24		
10-pole														
1RN6 710-3HJ.8	17500	2890	1500	2560	240	330	2870	2000	1800	1900	33	24		
1RN6 712-3HJ.8	18300	2890	1500	2560	240	330	2870	2000	1800	1900	33	24		
1RN6 714-3HJ.8	20000	2890	1500	2560	240	330	3110	2000	1800	1900	33	24		
1RN6 716-3HJ.8	21100	2890	1500	2560	240	330	3110	2000	1800	1900	33	24		

Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SN6 and 1SL6 series.

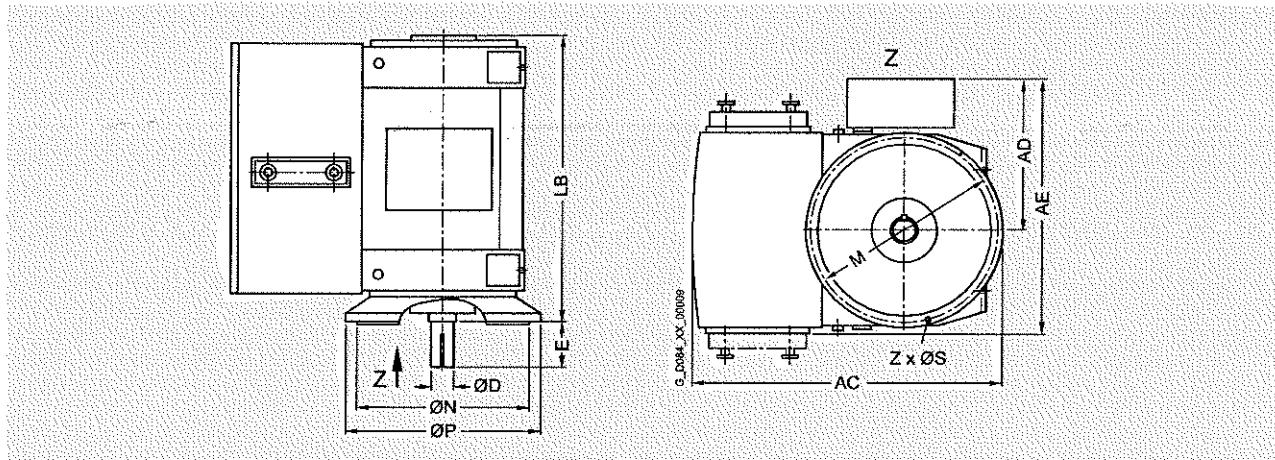


# Motors for line operation

## Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD mm	AE mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z mm		

### Technical data for construction, roller bearings (1RN6 series)

#### 6-pole

1RN6 710-6HJ.8	17800	2890	1500	2560	240	330	2870	2000	1800	1900	33	24
1RN6 712-6HJ.8	18700	2890	1500	2560	240	330	2870	2000	1800	1900	33	24
1RN6 714-6HJ.8	20400	2890	1500	2560	240	330	3110	2000	1800	1900	33	24
1RN6 716-6HJ.8	21400	2890	1500	2560	240	330	3110	2000	1800	1900	33	24

#### 8-pole

1RN6 710-8HJ.8	17700	2890	1500	2560	240	330	2870	2000	1800	1900	33	24
1RN6 712-8HJ.8	18400	2890	1500	2560	240	330	2870	2000	1800	1900	33	24
1RN6 714-8HJ.8	20100	2890	1500	2560	240	330	3110	2000	1800	1900	33	24
1RN6 716-8HJ.8	21200	2890	1500	2560	240	330	3110	2000	1800	1900	33	24

#### 10-pole

1RN6 710-3HJ.8	17500	2890	1500	2560	240	330	2870	2000	1800	1900	33	24
1RN6 712-3HJ.8	18300	2890	1500	2560	240	330	2870	2000	1800	1900	33	24
1RN6 714-3HJ.8	20000	2890	1500	2560	240	330	3110	2000	1800	1900	33	24
1RN6 716-3HJ.8	21100	2890	1500	2560	240	330	3110	2000	1800	1900	33	24

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> The dimensions are also valid for the 1SN6 and 1SL6 series.

# Motors for line operation

## Options and tests

### Description of options

#### Overview

Using the following options, H-compact and H-compact PLUS can be adapted to order-specific requirements. The Order No. is supplemented with a "-Z" and with either one or several order codes.

Other options can be addressed on request with the LOHER Vario (rib-cooled) or LOHER Vario PLUS (modular design) motor series.

Example:

**1LA4354-4AN60-Z H05 + K16 + L20**

As standard, 6x PT 100 slot resistance thermometers without surge arrester for 3-wire or 4-wire circuit from the terminal box are integrated in the stator winding.  
The motors are prepared as standard with SPM nipples to monitor the roller bearings.

Order code	Option description	Remark
<b>Paint finish</b>		
K26	Special paint finish in the standard color RAL 7030	
Y53	Normal paint finish not in the standard color	
Y54	Special paint finish not in the standard color	
<b>Documentation</b>		
B00	No motor manual	
B21	Motor manual on CD instead of paper (PDF format)	
B22	Motor manual as e-mail (PDF format) instead of paper	
B23	Motor manual printed on paper, 3x	
B27	Run out protocol	
B28	Protocol air gap calculation	
B34	Document standard inspection and test plan	
B35	Document balance report	
B36	Document test and inspection description	
B37	Document load characteristics	
B38	Document recommended spare parts	
B41	Document instrumentation list	
B43	Document production schedule: Generated once	
B44	Document production schedule: Updated biweekly	
B45	Document production schedule: Updated monthly	
B48	Document order-specific inspection and test plan	
<b>Document language</b>		
D00	Documentation in German	
D54	Documentation in Czech	
D55	Documentation in Polish	
D56	Documentation in Russian	
D72	Documentation in Italian	
D73	Documentation in Finnish	
D74	Documentation in Dutch	
D75	Documentation in Turkish	
D76	Documentation in English	Standard
D77	Documentation in French	
D78	Documentation in Spanish	
D79	Documentation in Portuguese	
D80	Documentation in Bulgarian	
D81	Documentation in Norwegian	
D82	Documentation in Hungarian	
D83	Documentation in Swedish	
D84	Documentation in Chinese	



# Motors for line operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Speed monitoring</b>		
H70	Rotary pulse encoder LL 861 900 220 (Leine+Linde)	
H73	Rotary pulse encoder HOG 10 D1024 I (16 mm)	
H88	Rotary pulse encoder HOG 11 DN 1024 I (16 mm) with special anti-corrosion protection	For marine applications
H89	Rotary pulse encoder HOG 11 DN 1024 I (16 mm) with integrated shaft grounding and special anti-corrosion protection	For marine applications
<b>Direction of rotation</b>		
K97	Clockwise rotation	
K98	Anticlockwise rotation	
<b>Noise reduction</b>		
L20	Silencer for air inlet	
L21	Noise reduction: Silencer for air outlet	Only for H-compact PLUS
L22	Noise reduction: Lining of interior space	Only for H-compact PLUS
L23	External metal fan; unique directional	Only for H-compact
L25	Rustless grid at inlet silencer	Only for H-compact
<b>Terminal box mounting position</b>		
K09	Terminal box on right-hand side, view from DE	
K10	Terminal box on left-hand side, view from DE	
K83	Terminal box turned through 90°, cable from DE	
K84	Terminal box turned through 90°, cable from NDE	
K85	Terminal box turned through 180°	
N85	Terminal box on NDE	Only for H-compact
<b>Terminal box, main and auxiliary terminal box</b>		
L54	Terminal box 1XB8 751, 6 terminals with 2 cable entries for connection to power supply, rated current > 315 A	
L55	Star-point terminal box 1XA8 711, up to 6 kV, 3 terminals	
L56	Star-point terminal box 1XB8 911, up to 10 kV, 3 terminals	
L57	Star-point terminal box 1XB8 751, up to 6 kV, 6 terminals	
L58	Star-point terminal box 1XB9 011, for installing current transformer (without current transformer)	
L59	Terminal box 1XB8 911 for 1 cable entry for power supply	
M50	Auxiliary terminal box material: Cast iron	
M51	Auxiliary terminal box material: Stainless steel	
M52	Separate auxiliary terminal box for anti-condensation heater	Standard for H-compact PLUS
<b>Terminal box – accessories/equipping</b>		
K59	Cable plug connection, rated voltage 2 to 6.6 kV	
L79	Gland plate for 3 winding ends to connect to the line supply via separately mounted terminal box, 3 m free cable length from the frame	
L80	Gland plate for 6 winding ends to connect to the line supply via separately mounted terminal box, 3 m free cable length from the frame	
L83	Cable plug connection, rated voltage 9 to 11 kV	



# Motors for line operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Cooling air monitoring</b>		
A44	1 resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box for cold air temperature	
A45	1 resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box for hot air temperature	
A46	1 double resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box, for cold air temperature	
A47	1 double resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box, for hot air temperature	
A86	1 dial-type thermometer with 2 NO-Contacts for cold air temperature incl. terminal box	
A87	1 dial-type thermometer with 2 NO-Contacts for hot air temperature incl. terminal box	
<b>Bearing version/instrumentation</b>		
H09 + H11	DIN flange type for forced oil lubrication for oil inlet with flowmeter, manometer and throttle valve (incl. counter flange) + DIN flange type forced oil lubrication for oil outlet with sight glass (incl. counter flange)	
H10 + H12	ANSI flange type for forced oil lubrication for oil inlet with flowmeter, manometer and throttle valve (incl. counter flange) + ANSI flange type for forced oil lubrication for oil outlet with sight glass (incl. counter flange)	
H43	DIN flange type for forced oil lubrication for in- and outlet without instruments (with counter flanges)	
H44	ANSI flange type for forced oil lubrication for in- and outlet without instruments (with counter flanges)	
K20	Bearing design on DE for increased forces (reinforced)	H-compact SH 315 and SH 355 only
K94	Fixed bearing at DE for sleeve bearing	
K96	Sleeve bearing instead of roller bearing	
L18	DE insulation	
L27	NDE insulation	Standard for H-compact PLUS
L60	Forced-circulation oil lubrication (with oil cooling) instead of oil-ring lubrication	
L66	Air cooling, but prepared for future conversion to forced-circulation oil lubrication	
P44	Oil manifold; connections with counter flange; flange flush with the axial shaft face	
<b>Bearing monitoring – sleeve bearings</b>		
A02	Shaft vibration monitoring for sleeve bearings, Bently Nevada system	
A03	Speed monitoring using an inductive proximity switch, Pepperl + Fuchs, incl. terminal box, without evaluation unit	
A39	Prepared for shaft vibration monitoring for sleeve bearings (without monitoring system)	
A41	2 resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for sleeve bearing	
A43	2 double resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for sleeve bearing	
A70	2 dial-type thermometers without contacts	
A71	2 dial-type thermometers with contacts	



# Motors for line operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Bearing monitoring – roller bearings</b>		
A40	2 resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminal box for rolling-contact bearings	
A42	2 double resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for rolling-contact bearing	
G50	Shock pulse measuring nipple (SPM) at DE and NDE	Standard
H05	Shock pulse measurement (SPM); fixed sensors and distributor box	
H07	Shock pulse measurement (SPM), complete alarm box	
<b>Mechanical versions</b>		
K16	Second shaft extension up to 50 % rated torque	
L81	Vibration severity grade B according to IEC/ EN 60034-14	Not available for 2-pole motors with roller bearings.
Y55	Non-standard cylindrical shaft extension (an inquiry must be sent to the factory)	
Y85	Oil shrink fit for cylindrical, single-stage shaft extension instead of a key connection	
<b>Certified for pump drives</b>		
E88	Construction supervision for motors for seawater desalination plants where Siemens AG commissions the acceptance authority	
E89	Construction supervision for motors for seawater desalination plants where a third party commissions the acceptance authority	
E90	Pump drive for seawater desalination plants certified according to Lloyds Register	
<b>Marine applications</b>		
<b>Others/additional options</b>		
H08	Leakage water detection	
K52	Degree of protection IP56 non-heavy-sea	
L15	Supporting ring for coupling guard	
L17	Mounting a coupling provided (finish machined and balanced)	
L31	Motor mounting materials for mounting on a steel foundation: Bolts, shims and taper dowels	
L32	Motor mounting materials for mounting on a concrete foundation or concrete base: Threaded bolts, armature plates, sole plates, shims, leveling plates and taper dowels	
L33	Motor mounting materials to mount on a concrete foundation or concrete base: T-head bolts; foundation bolt sleeves; sole plates; shims; leveling plates and taper dowels	
L91	Higher number of starts; > 1000 ... 10000 starts per year, for Cu rotors	
L92	Higher number of starts, > 5000 ... 10000 starts per year, for Al rotors	
P45	External screws made of stainless steel	



# Motors for line operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Anti-condensation heating</b>		
<b>L08</b>	Anti-condensation heater, rated voltage 400 V	
<b>L09</b>	Anti-condensation heater, rated voltage 500 V	
<b>M12</b>	Anti-condensation heater 110 to 120 V (min. 100 V, max. 132 V)	
<b>M13</b>	Anti-condensation heater 220 to 240 V (min. 200 V, max. 264 V)	Standard for H-compact PLUS
<b>Y83</b>	Anti-condensation heater with other rated voltages, V = additional text required)	
<b>Ambient conditions</b>		
<b>D02</b>	Operation at ambient temperatures up to -50 °C, transport up to -50 °C	
<b>D03</b>	Operation at ambient temperatures up to -40 °C, transport up to -40 °C	
<b>D04</b>	Operation at ambient temperatures up to -30 °C, transport up to -40 °C	
<b>E81</b>	Outdoor use with high salinity or offshore applications (corrosivity grade C5-M/ C5-I)	
<b>E82</b>	Outdoor use with moderate salinity (corrosivity grade C4)	
<b>E83</b>	Outdoor use with low salinity (corrosivity grade C3)	
<b>M06</b>	For use in sulfurous or hydrogenous atmosphere	
<b>Winding and motor protection</b>		
<b>A12</b>	6 PTC thermistors without lightning arresters	
<b>A23</b>	1 temperature sensor KTY 84-130	
<b>A65</b>	6 embedded resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminal box without lightning arresters	Standard
<b>A66</b>	6 embedded resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminal box with lightning arresters	
<b>Tests with acceptance</b>		
<b>F01</b>	All standard tests (routine test), with acceptance	
<b>F15</b>	Recording of no-load characteristic and determination of core and friction losses, with acceptance	
<b>F17</b>	Recording of short-circuit characteristic and determination of short-circuit losses, with acceptance	
<b>F19</b>	Recording of load characteristic, with acceptance	
<b>F23</b>	Dissipation factor test (tan delta) on 2 (test) coils, with acceptance	
<b>F29</b>	No-load noise measurement, without noise analysis, with acceptance	
<b>F31</b>	Cooling air flow and pressure drop measurement, with acceptance	
<b>F35</b>	Recording of current and torque characteristics during acceleration, with acceptance	
<b>F37</b>	Determination of moment of inertia by retardation method, with acceptance	
<b>F39</b>	Overspeed test, with acceptance	
<b>F41</b>	Recording of residual voltage curve, with acceptance	
<b>F53</b>	Locked-rotor torque and current measurement, with acceptance	
<b>F55</b>	Polarization index measurement, with acceptance	
<b>F61</b>	Impulse or AC voltage test on 2 (test) coils, with acceptance	In addition, specify order code F90
<b>F63</b>	Noise analysis, with acceptance	
<b>F83</b>	Type test for horizontal motors with temperature rise test, with acceptance	
<b>F90</b>	2 test coils	
<b>F93</b>	Type test for vertical motors with temperature rise test, with acceptance	



# Motors for line operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Tests without acceptance</b>		
<b>F14</b>	Recording of no-load characteristic and determination of core and friction losses, without acceptance	
<b>F16</b>	Recording of short-circuit characteristic and determination of short-circuit losses, without acceptance	
<b>F18</b>	Recording of load characteristic, without acceptance	
<b>F22</b>	Dissipation factor test ( $\tan \delta$ ) on 2 (test) coils, without acceptance	In addition, specify order code F90
<b>F28</b>	No-load noise measurement, without noise analysis, without acceptance	
<b>F30</b>	Cooling air flow and pressure drop measurement, without acceptance	
<b>F34</b>	Recording of current and torque characteristics during acceleration, without acceptance	
<b>F36</b>	Determination of moment of inertia by retardation method, without acceptance	
<b>F38</b>	Overspeed test, without acceptance	
<b>F42</b>	"Conformance Test (Wet Test)" to NEMA Standard, without acceptance	
<b>F52</b>	Locked-rotor torque and current measurement, without acceptance	
<b>F54</b>	Polarization index measurement, without acceptance	
<b>F60</b>	Impulse or AC voltage test on 2 (test) coils, without acceptance	In addition, specify order code F90
<b>F62</b>	Noise analysis, without acceptance	
<b>F82</b>	Type test for horizontal motors with temperature rise test, without acceptance	
<b>F90</b>	2 test coils	
<b>F92</b>	Type test for vertical motors with temperature rise test, without acceptance	
<b>Extension of liability for defects</b>		<b>Order number for reorder</b>
<b>Q80</b>	Extension of liability for defects, by 12 months to a total of 24 months (2 years) from delivery	<b>9LD1720-0AA24</b>
<b>Q81</b>	Extension of liability for defects, by 18 months to a total of 30 months (2.5 years) from delivery	<b>9LD1720-0AA30</b>
<b>Q82</b>	Extension of liability for defects, by 24 months to a total of 36 months (3 years) from delivery	<b>9LD1720-0AA36</b>
<b>Q83</b>	Extension of liability for defects, by 30 months to a total of 42 months (3.5 years) from delivery	<b>9LD1720-0AA42</b>
<b>Q84</b>	Extension of liability for defects, by 36 months to a total of 48 months (4 years) from delivery	<b>9LD1720-0AA48</b>
<b>Q85</b>	Extension of liability for defects, by 48 months to a total of 60 months (5 years) from delivery	<b>9LD1720-0AA60</b>

#### Conditions for an extension of liability for defects

You will find the currently valid conditions for an extension of liability for defects under:

<http://support.automation.siemens.com/WW/view/en/56715113>



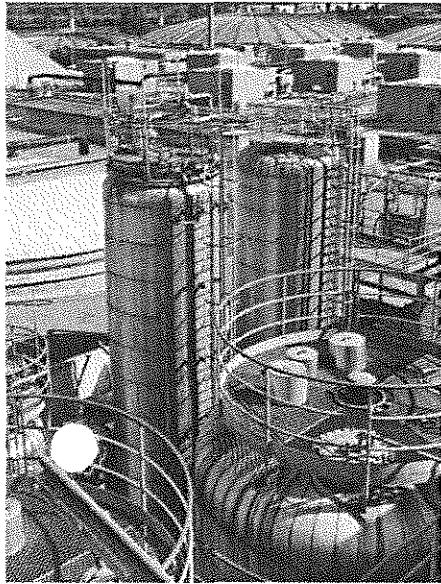
# Motors for line operation

## Options and tests

Notes

2

## Motors for converter operation



<b>3/2</b>	<b>General</b>	<b>3/49</b>	Air-cooled motors
<b>3/2</b>	<u>Sinusoidal and non-sinusoidal converter output</u>		H-compact PLUS 1RA4, 1RA6 and 1RP6
<b>3/3</b>	<b>Converter with non-sinusoidal output</b>		Selection and ordering data
<b>3/3</b>	<u>Air-cooled motors</u>	<b>3/50</b>	690 V, 50 Hz (square-law torque drive)
	<u>H-compact 1LA4</u>	<b>3/52</b>	3.4 to 4.16 kV, 50 Hz (square-law torque drive)
	Selection and ordering data	<b>3/56</b>	690 V, 60 Hz (square-law torque drive)
<b>3/6</b>	690 V, 50 Hz (square-law torque drive)	<b>3/58</b>	3.4 to 4.16 kV, 60 Hz (square-law torque drive)
<b>3/8</b>	690 V, 50 Hz (constant-torque drive)		Dimension drawings
<b>3/10</b>	2.3 kV, 50 Hz (square-law torque drive)	<b>3/62</b>	IM B3 type of construction, roller bearings
<b>3/12</b>	3.4 to 4.16 kV, 50 Hz (square-law torque drive)	<b>3/64</b>	IM B3 type of construction, sleeve bearings
<b>3/14</b>	2.3 kV, 60 Hz (square-law torque drive)	<b>3/68</b>	IM V1 type of construction, roller bearings
<b>3/16</b>	3.4 to 4.16 kV, 60 Hz (square-law torque drive)	<b>3/71</b>	Air-cooled motors
<b>3/18</b>	2.3 kV, 50 Hz (constant-torque drive)		H-compact PLUS 1RQ4 and 1RQ6
<b>3/20</b>	3.4 to 4.16 kV, 50 Hz (constant-torque drive)		Selection and ordering data
<b>3/22</b>	2.3 kV, 60 Hz (constant-torque drive)	<b>3/72</b>	690 V, 50 Hz (square-law torque drive)
<b>3/24</b>	3.4 to 4.16 kV, 60 Hz (constant-torque drive)	<b>3/74</b>	3.4 to 4.16 kV, 50 Hz (square-law torque drive)
	Dimension drawings	<b>3/78</b>	690 V, 60 Hz (square-law torque drive)
<b>3/26</b>	IM B3 type of construction, roller bearings	<b>3/80</b>	3.4 to 4.16 kV, 60 Hz (square-law torque drive)
<b>3/27</b>	IM B3 type of construction, sleeve bearings		Dimension drawings
<b>3/29</b>	IM V1 type of construction, roller bearings	<b>3/84</b>	IM B3 type of construction, roller bearings
<b>3/31</b>	<u>Air-cooled motors</u>	<b>3/86</b>	IM B3 type of construction, sleeve bearings
	<u>H-compact 1PQ4</u>	<b>3/90</b>	IM V1 type of construction, roller bearings
	Selection and ordering data	<b>3/93</b>	<u>Water-cooled motors</u>
<b>3/34</b>	690 V, 50 Hz (constant-torque drive)		<u>H-compact 1LH4</u>
<b>3/36</b>	2.3 kV, 50 Hz (constant-torque drive)		Selection and ordering data
<b>3/38</b>	3.4 to 4.16 kV, 50 Hz (constant-torque drive)	<b>3/94</b>	690 V, 50 Hz
<b>3/40</b>	6 to 6.6 kV, 50 Hz (constant-torque drive)	<b>3/94</b>	2.3 to 4.16 kV, 50 Hz
<b>3/42</b>	2.3 kV, 60 Hz (constant-torque drive)		Dimension drawings
<b>3/44</b>	3.4 to 4.16 kV, 60 Hz (constant-torque drive)	<b>3/95</b>	IM B3 type of construction, roller bearings
	Dimension drawings	<b>3/96</b>	IM V1 type of construction, roller bearings
<b>3/46</b>	IM B3 type of construction, roller bearings	<b>3/97</b>	<u>Water-cooled motors</u>
<b>3/47</b>	IM B3 type of construction, sleeve bearings		<u>H-compact PLUS 1RN4 and 1RN6</u>
<b>3/48</b>	IM V1 type of construction, roller bearings		Selection and ordering data
		<b>3/98</b>	690 V, 50 Hz (square-law torque drive)
		<b>3/100</b>	3.4 to 4.16 kV, 50 Hz (square-law torque drive)
		<b>3/104</b>	690 V, 60 Hz (square-law torque drive)
		<b>3/106</b>	3.4 to 4.16 kV, 60 Hz (square-law torque drive)
			Dimension drawings
		<b>3/110</b>	IM B3 type of construction, roller bearings
		<b>3/112</b>	IM B3 type of construction, sleeve bearings
		<b>3/116</b>	IM V1 type of construction, roller bearings
		<b>3/118</b>	<b>Options and tests</b>
			Description of options

# Motors for converter operation

## General

### Sinusoidal and non-sinusoidal converter output

#### Overview

By using variable speed drives, cost savings can be achieved in many applications compared to fixed-speed operation.

H-compact and H-compact PLUS motors have proven themselves many times in variable-speed applications.

They are designed for an optimized drive system with the appropriate SINAMICS converters, couplings and gear units to achieve a reliable drive train with high availability and long lifetime, which results in low lifecycle costs. The integrated drive system also features engineering tools that allow the configuration of the entire drive train and the automation environment with optimized parameters. A tailor-made service concept secures the effective operation of the whole drive train application over a long time.

#### Sinusoidal output

For operation with medium-voltage converters ROBICON Perfect Harmony or SINAMICS GM150 and SINAMICS SM150 with sine-wave filter, as a result of the sinusoidal output, line motors for applications with square-law load characteristic are suitable. For converter operation, these motors must be equipped with electrically-isolated bearings at the NDE. The technical data can be taken from the tables in Chapter 2.

The insulation system of these motors corresponds to thermal class 155 (F) – and they are generally utilized to thermal class 130 (B).

#### Non-sinusoidal output

For the H-compact and H-compact PLUS motor series, special versions have been designed for operation with medium-voltage SINAMICS GM150 and SINAMICS SM150 drive converters or low-voltage SINAMICS G and SINAMICS S drive converters.

These motors have, as standard, a reinforced stator winding insulation so that they can be fed from the specified drive converters without requiring a sine-wave filter. Further, for the medium-voltage version of the motors, both bearings are electrically insulated and the shaft is equipped with a grounding system.

The technical data can be taken from the tables in Chapter 3. The insulation system of these motors corresponds to thermal class 155 (F) – and they are generally utilized to thermal class 155 (F).

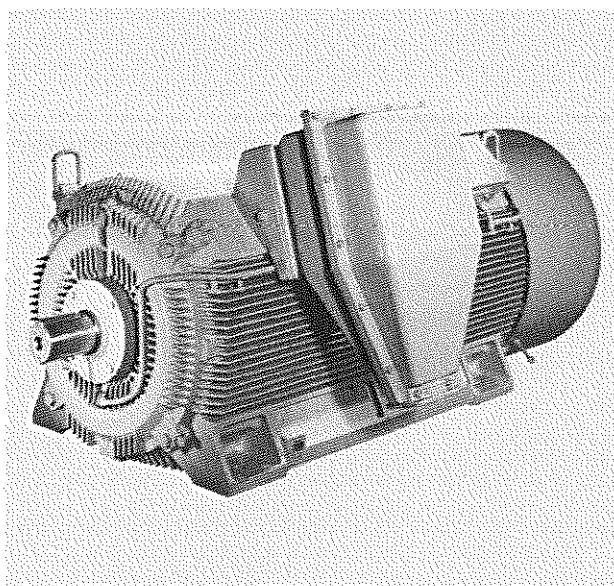


# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Overview



### Technical data

#### Overview of technical data

##### H-compact 1LA4

<b>Rated voltage</b>	690 V ... 6.6 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Cooling method</b>	IC411
<b>Stator winding insulation</b>	Insulation system, thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	450 ... 630 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Die-cast aluminum or copper (dependent on the shaft height and number of poles)
<b>Standards</b>	IEC, EN
<b>Frame design</b>	Cast iron with cooling ribs

3



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Technical data (continued)

#### **Power ranges for IEC motors with reinforced insulation for SINAMICS converters without sine-wave filter**

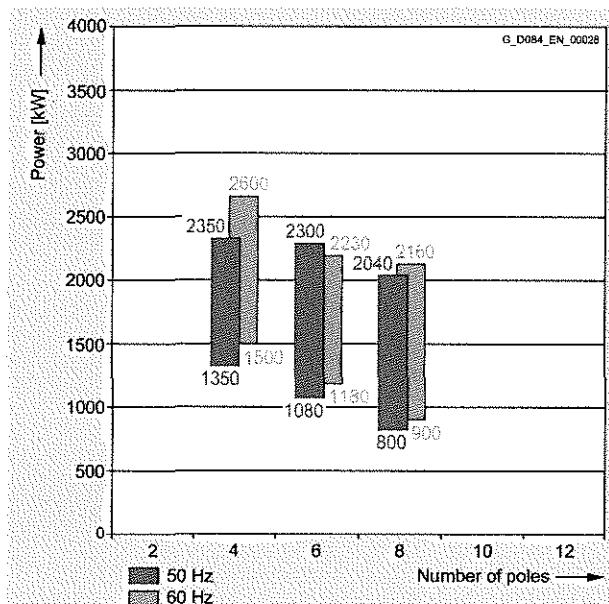
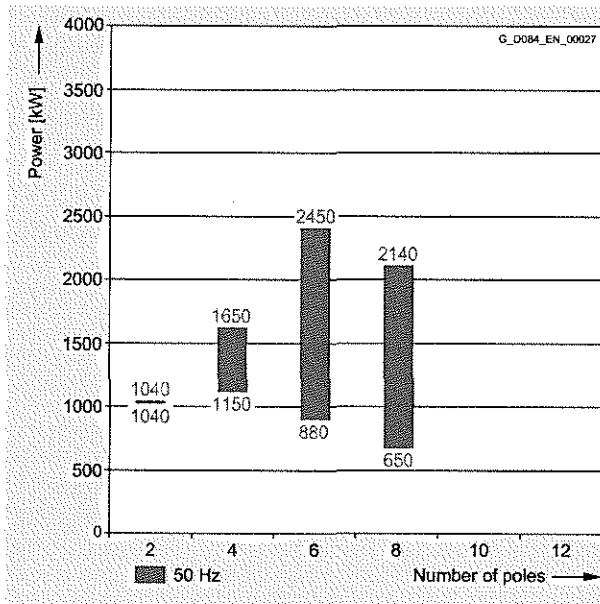
##### 1LA4, 1MS4 (Ex nA), 1MG4 (Ex px) series

Insulation system, thermal class 155 (F), utilized to 155 (F)

The power data listed here apply for an ambient temperature of 40 °C and an installation altitude ≤ 1000 m.

690 V; 50 Hz

2.3 kV; 50 and 60 Hz



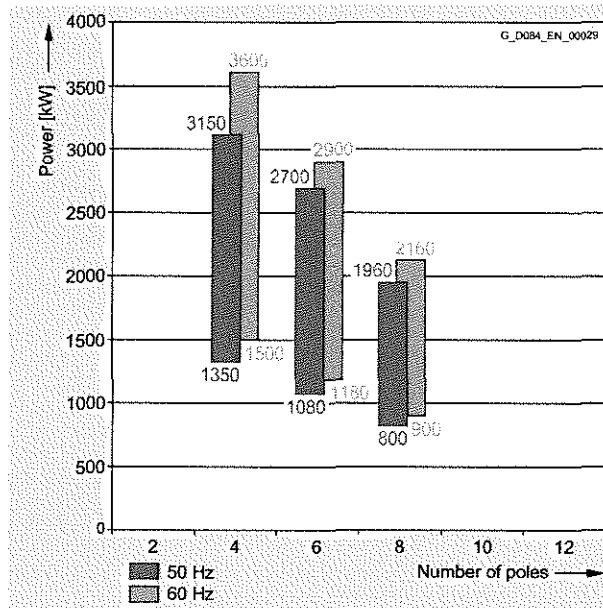
# Motors for converter operation

## Converter with non-sinusoidal output

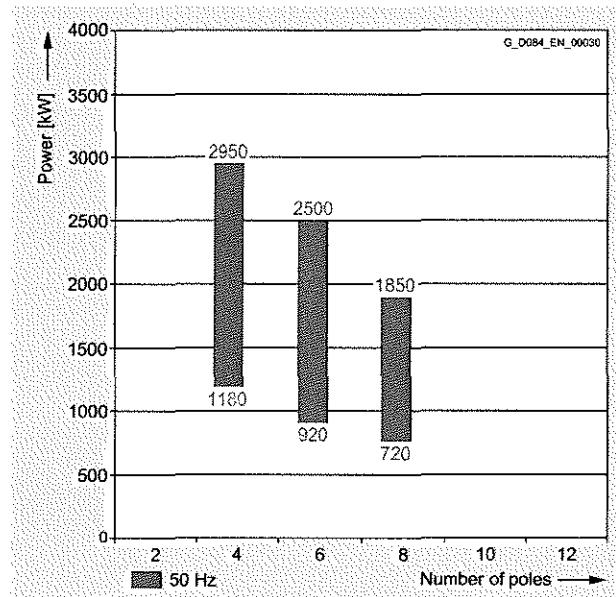
Air-cooled motors  
B-compact 11 A4

### Technical data (continued)

3.4 to 4.16 kV; 50 and 60 Hz



6 to 6.6 kV; 50 Hz



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Selection and ordering data

Rated power kW	Low-voltage motor H-compact	Rated speed rpm	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current at 690 V A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm		
<b>690 V, 50 Hz</b>											
2-pole											
1040	<b>1LA4 454-2CM00</b>	2981	97.2	0.92	970	3331	2.70	22.2	3000		
4-pole											
1150	<b>1LA4 454-4AM00</b>	1491	97.2	0.89	1120	7365	2.50	33.9	2400		
1300	<b>1LA4 500-4CM00</b>	1491	96.9	0.88	1280	8326	2.10	44.3	2200		
1500	<b>1LA4 502-4CM00</b>	1492	97.2	0.87	1480	9600	2.30	49.0	2200		
1650	<b>1LA4 504-4CM00</b>	1491	97.2	0.89	1600	10567	2.10	56.2	2200		
6-pole											
880	<b>1LA4 454-6AM00</b>	993	97.1	0.86	880	8462	2.50	53.5	2200		
1250	<b>1LA4 500-6CM00</b>	995	97.1	0.85	1260	11996	2.35	82.1	2100		
1350	<b>1LA4 502-6CM00</b>	995	97.1	0.86	1360	12956	2.35	92.4	2100		
1500	<b>1LA4 504-6CM00</b>	995	97.2	0.86	1500	14395	2.35	102.6	2100		
1750	<b>1LA4 560-6CM00</b>	995	97.4	0.86	1740	16795	2.60	141.5	2000		
1950	<b>1LA4 562-6CM00</b>	995	97.5	0.86	1940	18714	2.60	162.1	2000		
2150	<b>1LA4 564-6CM00</b>	995	97.6	0.86	2150	20634	2.60	188.5	2000		
2300	<b>1LA4 634-6CM00</b>	997	97.3	0.88	2250	22030	2.70	297.0	O. R. <sup>2)</sup>		
2450	<b>1LA4 636-6CM00</b>	997	97.3	0.89	2350	23495	2.70	323.0	O. R. <sup>2)</sup>		
8-pole											
650	<b>1LA4 454-8AM00</b>	745	96.6	0.80	700	8331	2.40	52.8	2200		
900	<b>1LA4 500-8CM00</b>	746	96.6	0.80	970	11520	2.20	81.7	2100		
970	<b>1LA4 502-8CM00</b>	746	96.7	0.80	1040	12416	2.30	91.9	2100		
1080	<b>1LA4 504-8CM00</b>	746	96.8	0.80	1160	13824	2.30	102.2	2100		
1250	<b>1LA4 560-8CM00</b>	746	96.9	0.80	1340	16000	2.60	141.6	2000		
1400	<b>1LA4 562-8CM00</b>	746	97.0	0.80	1500	17920	2.60	162.3	2000		
1630	<b>1LA4 564-8CM00</b>	746	97.1	0.81	1740	20864	2.60	188.8	2000		
1900	<b>1LA4 634-8CM00</b>	746	96.8	0.86	1900	24321	2.65	294.0	O. R. <sup>2)</sup>		
2140	<b>1LA4 636-8CM00</b>	746	97.0	0.85	2150	27357	2.60	320.0	O. R. <sup>2)</sup>		

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> On request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
+ compact | LA4

Motor type (repeated)	Partial load values for square-law torque drive											
	$P/P_{rated} = 75\%$				$P/P_{rated} = 50\%$				$P/P_{rated} = 25\%$			
	$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]	$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]	$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
<b>Square-law torque drive</b>												
2-pole												
1LA4 454-2...	780	2709	97.2	0.92	520	2366	97.1	0.90	260	1878	96.6	0.83
4-pole												
1LA4 454-4...	863	1355	97.2	0.89	575	1183	97.2	0.86	288	939	96.7	0.76
1LA4 500-4...	975	1355	97.0	0.88	650	1183	96.9	0.86	325	939	96.3	0.77
1LA4 502-4...	1125	1356	97.2	0.86	750	1184	97.0	0.84	375	940	96.4	0.73
1LA4 504-4...	1238	1355	97.3	0.89	825	1183	97.2	0.87	413	939	96.7	0.79
6-pole												
1LA4 454-6...	660	902	96.9	0.85	440	788	96.8	0.81	220	626	96.0	0.69
1LA4 500-6...	938	904	97.1	0.85	625	790	96.9	0.81	313	627	96.0	0.69
1LA4 502-6...	1013	904	97.1	0.86	675	790	97.0	0.82	338	627	96.1	0.70
1LA4 504-6...	1125	904	97.2	0.86	750	790	97.0	0.83	375	627	96.2	0.72
1LA4 560-6...	1313	904	97.4	0.86	875	790	97.1	0.81	438	627	96.3	0.70
1LA4 562-6...	1463	904	97.5	0.86	975	790	97.1	0.81	488	627	96.2	0.69
1LA4 564-6...	1613	904	97.6	0.86	1075	790	97.2	0.82	538	627	96.3	0.70
1LA4 634-6...	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>
1LA4 636-6...	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>
8-pole												
1LA4 454-8...	488	677	96.5	0.77	325	591	96.2	0.72	163	469	95.1	0.58
1LA4 500-8...	675	678	96.6	0.78	450	592	96.2	0.73	225	470	95.0	0.60
1LA4 502-8...	728	678	96.7	0.79	485	592	96.3	0.74	243	470	95.1	0.61
1LA4 504-8...	810	678	96.8	0.79	540	592	96.3	0.74	270	470	95.2	0.60
1LA4 560-8...	938	678	96.8	0.78	625	592	96.4	0.73	313	470	95.1	0.58
1LA4 562-8...	1050	678	96.9	0.78	700	592	96.4	0.73	350	470	95.1	0.58
1LA4 564-8...	1223	678	97.0	0.79	815	592	96.4	0.73	408	470	95.2	0.59
1LA4 634-8...	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>
1LA4 636-8...	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>	O. R. <sup>2)</sup>

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Selection and ordering data

Rated power kW	Low-voltage motor H-compact	Rated speed rpm	Operating values at rated output									
			Efficiency %	Power factor [-]	Rated current at 690 V A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm			
<b>690 V, 50 Hz</b>												
2-pole												
1040	<b>1LA4 454-2CM00</b>	2981	97.2	0.92	970	3331	2.70	22.2	3000			
4-pole												
1150	<b>1LA4 454-4AM00</b>	1491	97.2	0.89	1120	7365	2.50	33.9	2400			
1300	<b>1LA4 500-4CM00</b>	1491	96.9	0.88	1280	8326	2.10	44.3	2200			
1500	<b>1LA4 502-4CM00</b>	1492	97.2	0.87	1480	9600	2.30	49.0	2200			
1650	<b>1LA4 504-4CM00</b>	1491	97.2	0.89	1600	10567	2.10	56.2	2200			
6-pole												
880	<b>1LA4 454-6AM00</b>	993	96.9	0.86	880	8462	2.50	53.5	2200			
1250	<b>1LA4 500-6CM00</b>	995	97.1	0.85	1260	11996	2.35	82.1	2100			
1350	<b>1LA4 502-6CM00</b>	995	97.1	0.86	1360	12956	2.35	92.4	2100			
1500	<b>1LA4 504-6CM00</b>	995	97.2	0.86	1500	14395	2.35	102.6	2100			
1750	<b>1LA4 560-6CM00</b>	995	97.4	0.86	1740	16795	2.60	141.5	2000			
1950	<b>1LA4 562-6CM00</b>	995	97.5	0.86	1940	18714	2.60	162.1	2000			
2150	<b>1LA4 564-6CM00</b>	995	97.6	0.86	2150	20634	2.60	188.5	2000			
2300	<b>1LA4 634-6CM00</b>	997	97.3	0.88	2250	22030	2.70	297.0	1200			
2450	<b>1LA4 636-6CM00</b>	997	97.3	0.89	2350	23495	2.70	323.0	1200			
8-pole												
650	<b>1LA4 454-8AM00</b>	745	96.6	0.80	700	8331	2.40	52.8	2200			
900	<b>1LA4 500-8CM00</b>	746	96.6	0.80	970	11520	2.20	81.7	2100			
970	<b>1LA4 502-8CM00</b>	746	96.7	0.80	1040	12416	2.30	91.9	2100			
1080	<b>1LA4 504-8CM00</b>	760	96.8	0.80	1160	13570	2.30	102.2	2100			
1250	<b>1LA4 560-8CM00</b>	746	96.9	0.80	1340	16000	2.60	141.6	2000			
1400	<b>1LA4 562-8CM00</b>	746	97.0	0.80	1500	17920	2.60	162.3	2000			
1630	<b>1LA4 564-8CM00</b>	746	97.1	0.81	1740	20864	2.60	188.8	2000			
1900	<b>1LA4 634-8CM00</b>	746	96.8	0.86	1900	24321	2.65	294.0	1200			
2140	<b>1LA4 636-8CM00</b>	746	97.0	0.85	2150	27357	2.60	320.0	1200			

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
B-compact (1 LA)

Motor type (repeated)	Constant-torque drive, speed range											
	1:2				1:5				1:10			
	$P_{max}$ kW	$T_{max}$ rpm	$\eta$ %	$\cos \varphi$ [-]	$P_{max}$ kW	$T_{max}$ rpm	$\eta$ %	$\cos \varphi$ [-]	$P_{max}$ kW	$T_{max}$ rpm	$\eta$ %	$\cos \varphi$ [-]
<b>Constant-torque drive</b>												
2-pole												
1LA4 454-2...	970	3107	96.9	0.91	800	2563	97.1	0.91	750	2402	97.1	0.91
4-pole												
1LA4 454-4...	1060	6789	97.1	0.88	940	6020	97.3	0.88	900	5764	97.3	0.88
1LA4 500-4...	1200	7685	96.7	0.87	1000	6404	96.9	0.87	940	6020	96.9	0.87
1LA4 502-4...	1400	8960	96.9	0.85	1170	7488	97.1	0.85	1100	7040	97.1	0.85
1LA4 504-4...	1500	9607	97.0	0.88	1250	8006	97.2	0.88	1200	7685	97.2	0.88
6-pole												
1LA4 454-6...	820	7885	97.0	0.85	700	6731	97.2	0.84	660	6347	97.2	0.84
1LA4 500-6...	1180	11324	96.8	0.84	1020	9789	97.0	0.83	960	9213	97.1	0.83
1LA4 502-6...	1280	12284	97.0	0.84	1120	10749	97.1	0.84	1040	9981	97.2	0.84
1LA4 504-6...	1430	13724	97.1	0.84	1260	12092	97.2	0.84	1180	11324	97.3	0.84
1LA4 560-6...	1650	15835	97.1	0.82	1450	13916	97.3	0.83	1350	12956	97.4	0.83
1LA4 562-6...	1850	17754	97.2	0.83	1650	15835	97.3	0.83	1550	14875	97.4	0.83
1LA4 564-6...	2100	20154	97.1	0.83	1850	17754	97.4	0.84	1800	17275	97.4	0.84
1LA4 634-6...	2180	20880	97.2	0.88	1960	18773	97.2	0.87	1875	17959	97.1	0.87
1LA4 636-6...	2325	22269	97.3	0.89	2080	19922	97.2	0.89	1985	19012	97.2	0.89
8-pole												
1LA4 454-8...	580	7434	96.4	0.79	490	6281	96.6	0.76	450	5768	96.6	0.74
1LA4 500-8...	900	11520	96.5	0.81	770	9856	96.5	0.79	710	9088	96.5	0.78
1LA4 502-8...	970	12416	96.6	0.81	850	10880	96.6	0.79	780	9984	96.6	0.78
1LA4 504-8...	1080	13570	96.7	0.81	940	11811	96.7	0.79	880	11057	96.7	0.78
1LA4 560-8...	1150	14720	96.8	0.79	980	12544	96.8	0.77	930	11904	96.8	0.76
1LA4 562-8...	1290	16512	96.9	0.79	1100	14080	96.9	0.78	1050	13440	96.9	0.77
1LA4 564-8...	1500	19200	96.9	0.80	1280	16384	97.0	0.79	1250	16000	97.0	0.78
1LA4 634-8...	1725	22081	96.8	0.85	1560	19969	96.7	0.84	1460	18689	96.7	0.83
1LA4 636-8...	1950	24961	97.0	0.85	1760	22529	96.9	0.84	1670	21377	96.9	0.83



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Selection and ordering data

Rated power kW	High voltage motor H-compact	Rated speed IEC	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm		
<b>2.3 kV, 50 Hz</b>											
4-pole											
1350	<b>1LA4 500-4CV0■</b>	1493	97.0	0.87	400	8634	2.50	42	2200		
1500	<b>1LA4 502-4CV0■</b>	1493	97.2	0.87	445	9594	2.60	47	2200		
1650	<b>1LA4 504-4CV0■</b>	1493	97.3	0.88	485	10553	2.60	54	2200		
1850	<b>1LA4 560-4CV0■</b>	1494	97.5	0.87	550	11824	2.40	79	2000		
2100	<b>1LA4 562-4CV0■</b>	1494	97.5	0.87	620	13422	2.40	92	2000		
2350	<b>1LA4 564-4CV0■</b>	1494	97.5	0.87	700	15020	2.40	104	2000		
6-pole											
1080	<b>1LA4 500-6CV0■</b>	995	97.0	0.86	325	10365	2.40	82	2100		
1180	<b>1LA4 502-6CV0■</b>	995	97.0	0.87	350	11324	2.40	92	2100		
1280	<b>1LA4 504-6CV0■</b>	995	97.1	0.87	380	12284	2.40	103	2100		
1500	<b>1LA4 560-6CV0■</b>	995	97.3	0.86	450	14395	2.60	142	2000		
1750	<b>1LA4 562-6CV0■</b>	995	97.4	0.86	520	16795	2.70	162	2000		
1950	<b>1LA4 564-6CV0■</b>	995	97.5	0.87	580	18714	2.50	189	2000		
2300	<b>1LA4 632-6CV0■</b>	995	97.1	0.89	670	22075	2.40	269	1500		
8-pole											
800	<b>1LA4 500-8CV0■</b>	745	96.5	0.81	255	10254	2.10	82	2100		
850	<b>1LA4 502-8CV0■</b>	745	96.5	0.81	275	10895	2.10	92	2100		
950	<b>1LA4 504-8CV0■</b>	745	96.5	0.81	305	12177	2.10	102	2100		
1120	<b>1LA4 560-8CV0■</b>	745	96.8	0.83	350	14356	2.20	142	2000		
1250	<b>1LA4 562-8CV0■</b>	745	96.9	0.83	390	16022	2.20	162	2000		
1450	<b>1LA4 564-8CV0■</b>	745	97.0	0.83	450	18585	2.20	189	2000		
1650	<b>1LA4 632-8CV0■</b>	745	96.7	0.84	510	21151	2.20	265	1500		
1850	<b>1LA4 634-8CV0■</b>	746	96.8	0.84	570	23683	2.40	294	1500		
2040	<b>1LA4 636-8CV0■</b>	745	96.9	0.85	620	26150	2.10	320	1500		

#### Type of construction:

IM B3	0
IM V1 (with canopy)	4
IM V1 (without canopy)	8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
+ compact 11 A4

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{\text{rated}} = 75 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{\text{rated}} = 50 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{\text{rated}} = 25 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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Square-law torque drive

4-pole

1LA4 500-4...	1013	1357	97.0	0.87	675	1185	96.9	0.84	338	941	96.5	0.73
1LA4 502-4...	1125	1357	97.1	0.87	750	1185	97.0	0.84	375	941	96.5	0.73
1LA4 504-4...	1238	1357	97.2	0.88	825	1185	97.1	0.86	413	941	96.8	0.77
1LA4 560-4...	1388	1357	97.4	0.85	925	1186	97.2	0.81	463	941	96.8	0.68
1LA4 562-4...	1575	1357	97.5	0.86	1050	1186	97.4	0.83	525	941	97.0	0.71
1LA4 564-4...	1763	1357	97.5	0.86	1175	1186	97.4	0.83	588	941	97.0	0.72

6-pole

1LA4 500-6...	810	904	96.9	0.86	540	790	96.7	0.83	270	627	96.2	0.72
1LA4 502-6...	885	904	97.0	0.86	590	790	97.0	0.84	295	627	96.4	0.73
1LA4 504-6...	960	904	97.1	0.87	640	790	97.0	0.84	320	627	96.5	0.74
1LA4 560-6...	1125	904	97.3	0.85	750	790	97.2	0.81	375	627	96.7	0.70
1LA4 562-6...	1313	904	97.4	0.85	875	790	97.2	0.82	438	627	96.7	0.70
1LA4 564-6...	1463	904	97.5	0.86	975	790	97.3	0.84	488	627	96.9	0.73
1LA4 632-6...	1725	904	97.2	0.89	1150	789	97.0	0.86	575	626	96.7	0.77

8-pole

1LA4 500-8...	600	677	96.3	0.80	400	591	96.1	0.75	200	469	95.2	0.62
1LA4 502-8...	638	677	96.4	0.80	425	591	96.1	0.75	213	469	95.2	0.62
1LA4 504-8...	713	677	96.4	0.80	475	591	96.2	0.75	238	469	95.2	0.62
1LA4 560-8...	840	677	96.8	0.82	560	591	96.6	0.78	280	469	96.1	0.66
1LA4 562-8...	938	677	96.9	0.82	625	591	96.7	0.78	313	469	96.1	0.66
1LA4 564-8...	1088	677	97.0	0.82	725	591	96.8	0.78	363	469	96.1	0.66
1LA4 632-8...	1240	677	96.6	0.83	825	592	96.4	0.79	415	470	95.8	0.68
1LA4 634-8...	1390	678	96.7	0.82	925	592	96.4	0.78	465	470	95.7	0.66
1LA4 636-8...	1530	677	96.8	0.84	1020	592	96.7	0.80	510	470	96.1	0.70



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Selection and ordering data

Rated power kW	High voltage motor H-compact	Rated speed n <sub>rated</sub> rpm	Operating values at rated output								
			Efficiency η %	Power factor cos φ [-]	Rated current at 3.4 kV I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm		
<b>3.4 ... 4.16 kV, 50 Hz</b>											
4-pole											
1350	<b>1LA4 500-4CV■■■</b>	1493	97.0	0.87	280	8634	2.50	42	2200		
1500	<b>1LA4 502-4CV■■■</b>	1493	97.2	0.87	310	9594	2.60	47	2200		
1650	<b>1LA4 504-4CV■■■</b>	1493	97.3	0.88	335	10553	2.60	54	2200		
1850	<b>1LA4 560-4CV■■■</b>	1494	97.5	0.87	380	11824	2.40	79	2000		
2100	<b>1LA4 562-4CV■■■</b>	1494	97.5	0.87	435	13422	2.40	92	2000		
2350	<b>1LA4 564-4CV■■■</b>	1494	97.5	0.87	485	15020	2.40	104	2000		
2600	<b>1LA4 632-4CV■■■</b>	1494	97.5	0.88	530	16620	2.20	157	1500		
2900	<b>1LA4 634-4CV■■■</b>	1494	97.6	0.88	590	18537	2.20	171	1500		
3150	<b>1LA4 636-4CV■■■</b>	1494	97.7	0.88	640	20136	2.20	186	1500		
6-pole											
1080	<b>1LA4 500-6CV■■■</b>	995	97.0	0.86	225	10365	2.40	82	2100		
1180	<b>1LA4 502-6CV■■■</b>	995	97.0	0.87	245	11324	2.40	92	2100		
1280	<b>1LA4 504-6CV■■■</b>	995	97.1	0.87	265	12284	2.40	103	2100		
1500	<b>1LA4 560-6CV■■■</b>	995	97.3	0.86	315	14395	2.60	142	2000		
1750	<b>1LA4 562-6CV■■■</b>	995	97.4	0.86	365	16795	2.70	162	2000		
1950	<b>1LA4 564-6CV■■■</b>	995	97.5	0.87	400	18714	2.50	189	2000		
2220	<b>1LA4 632-6CV■■■</b>	995	97.1	0.89	450	21308	2.30	269	1500		
2480	<b>1LA4 634-6CV■■■</b>	995	97.2	0.89	500	23803	2.20	297	1500		
2700	<b>1LA4 636-6CV■■■</b>	995	97.3	0.89	550	25915	2.20	323	1500		
8-pole											
800	<b>1LA4 500-8CV■■■</b>	745	96.5	0.81	180	10254	2.10	82	2100		
850	<b>1LA4 502-8CV■■■</b>	745	96.5	0.81	190	10895	2.10	92	2100		
950	<b>1LA4 504-8CV■■■</b>	745	96.5	0.81	215	12177	2.10	102	2100		
1120	<b>1LA4 560-8CV■■■</b>	745	96.8	0.83	245	14356	2.20	142	2000		
1250	<b>1LA4 562-8CV■■■</b>	745	96.9	0.83	270	16022	2.20	162	2000		
1450	<b>1LA4 564-8CV■■■</b>	745	97.0	0.83	315	18585	2.20	189	2000		
1570	<b>1LA4 632-8CV■■0</b>	745	96.6	0.84	340	20126	2.30	265	1500		
1780	<b>1LA4 634-8CV■■0</b>	745	96.7	0.84	385	22817	2.30	294	1500		
1960	<b>1LA4 636-8CV■■0</b>	745	96.8	0.85	415	25125	2.20	320	1500		

#### Voltage code:

4.16 kV, 50 Hz  
Other voltage

4  
9

#### Type of construction:

IM B3  
IM V1 (with canopy)  
IM V1 (without canopy)

0  
4  
8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 11 A4

Motor type (repeated)	Partial load values for square-law torque drive											
	$P/P_{\text{rated}} = 75 \%$				$P/P_{\text{rated}} = 50 \%$				$P/P_{\text{rated}} = 25 \%$			
	$P$	$n$	$\eta$	$\cos \phi$	$P$	$n$	$\eta$	$\cos \phi$	$P$	$n$	$\eta$	$\cos \phi$
kW rpm % [-]												
<b>Square-law torque drive</b>												
4-pole												
1LA4 500-4...	1013	1357	97.0	0.87	675	1185	96.9	0.84	338	941	96.5	0.73
1LA4 502-4...	1125	1357	97.1	0.87	750	1185	97.0	0.84	375	941	96.5	0.73
1LA4 504-4...	1238	1357	97.2	0.88	825	1185	97.1	0.86	413	941	96.8	0.77
1LA4 560-4...	1388	1357	97.4	0.85	925	1186	97.2	0.81	463	941	96.8	0.68
1LA4 562-4...	1575	1357	97.5	0.86	1050	1186	97.4	0.83	525	941	97.0	0.71
1LA4 564-4...	1763	1357	97.5	0.86	1175	1186	97.4	0.83	588	941	97.0	0.72
1LA4 632-4...	1950	1357	97.5	0.87	1300	1185	97.5	0.85	650	940	97.2	0.76
1LA4 634-4...	2175	1357	97.6	0.87	1450	1185	97.6	0.85	725	940	97.3	0.76
1LA4 636-4...	2363	1357	97.6	0.87	1575	1185	97.6	0.85	788	940	97.4	0.77
6-pole												
1LA4 500-6...	810	904	96.9	0.86	540	790	96.7	0.83	270	627	96.2	0.72
1LA4 502-6...	885	904	97.0	0.86	590	790	97.0	0.84	295	627	96.4	0.73
1LA4 504-6...	960	904	97.1	0.87	640	790	97.0	0.84	320	627	96.5	0.74
1LA4 560-6...	1125	904	97.3	0.85	750	790	97.2	0.81	375	627	96.7	0.70
1LA4 562-6...	1313	904	97.4	0.85	875	790	97.2	0.82	438	627	96.7	0.70
1LA4 564-6...	1463	904	97.5	0.86	975	790	97.3	0.84	488	627	96.9	0.73
1LA4 632-6...	1665	904	97.1	0.89	1110	789	97.1	0.87	555	626	96.7	0.79
1LA4 634-6...	1860	904	97.2	0.89	1240	789	97.2	0.87	620	626	96.9	0.80
1LA4 636-6...	2025	905	97.3	0.89	1350	789	97.3	0.87	675	627	96.9	0.80
8-pole												
1LA4 500-8...	600	677	96.3	0.80	400	591	96.1	0.75	200	469	95.2	0.62
1LA4 502-8...	638	677	96.4	0.80	425	591	96.1	0.75	213	469	95.2	0.62
1LA4 504-8...	713	677	96.4	0.80	475	591	96.2	0.75	238	469	95.2	0.62
1LA4 560-8...	840	677	96.8	0.82	560	591	96.6	0.78	280	469	96.1	0.66
1LA4 562-8...	938	677	96.9	0.82	625	591	96.7	0.78	313	469	96.1	0.66
1LA4 564-8...	1088	677	97.0	0.82	725	591	96.8	0.78	363	469	96.1	0.66
1LA4 632-8...	1180	678	96.6	0.82	785	592	96.5	0.78	395	470	95.9	0.66
1LA4 634-8...	1335	678	96.7	0.83	890	592	96.5	0.79	445	470	95.9	0.68
1LA4 636-8...	1470	677	96.8	0.84	980	592	96.7	0.80	490	470	96.1	0.70



# Motors for converter operation

## Converter with non-sinusoidal output

All-electric motors  
H-compact 1LA4

### Selection and ordering data

Rated power kW	High voltage motor H-compact	Rated speed rpm	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current A	Rated torque Nm	Break-down torque [ $T_B/T_{rated}$ ]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm		
<b>2.3 kV 60 Hz</b>											
4-pole											
1500	1LA4 500-4CV1 ■	1793	96.8	0.87	445	7989	2.50	42	2200		
1650	1LA4 502-4CV1 ■	1793	96.8	0.87	490	8787	2.50	47	2200		
1800	1LA4 504-4CV1 ■	1793	96.8	0.87	540	9586	2.50	54	2200		
2000	1LA4 560-4CV1 ■	1794	97.3	0.87	590	10645	2.40	79	2000		
2300	1LA4 562-4CV1 ■	1794	97.3	0.87	680	12242	2.40	92	2000		
2600	1LA4 564-4CV1 ■	1794	97.3	0.87	770	13839	2.40	104	2000		
6-pole											
1180	1LA4 500-6CV1 ■	1195	96.8	0.87	350	9429	2.40	82	2100		
1320	1LA4 502-6CV1 ■	1195	97.0	0.87	395	10548	2.40	92	2100		
1450	1LA4 504-6CV1 ■	1195	97.1	0.87	430	11587	2.50	103	2100		
1650	1LA4 560-6CV1 ■	1195	97.2	0.86	495	13185	2.60	142	2000		
1900	1LA4 562-6CV1 ■	1195	97.4	0.86	570	15183	2.60	162	2000		
2150	1LA4 564-6CV1 ■	1195	97.5	0.87	640	17180	2.60	189	2000		
2230	1LA4 632-6CV1 ■	1195	96.7	0.89	650	17825	2.40	234	1500		
8-pole											
900	1LA4 500-8CV1 ■	896	96.4	0.79	295	9592	2.30	82	2100		
950	1LA4 502-8CV1 ■	896	96.4	0.79	315	10124	2.30	92	2100		
1050	1LA4 504-8CV1 ■	896	96.4	0.79	345	11190	2.30	102	2100		
1200	1LA4 560-8CV1 ■	895	96.8	0.83	375	12803	2.20	142	2000		
1380	1LA4 562-8CV1 ■	895	96.8	0.83	430	14724	2.30	162	2000		
1580	1LA4 564-8CV1 ■	895	96.9	0.83	495	16857	2.40	189	2000		
1800	1LA4 632-8CV1 ■	895	96.6	0.85	550	19205	2.10	265	1500		
2000	1LA4 634-8CV1 ■	895	96.7	0.86	600	21339	2.00	294	1500		
2160	1LA4 636-8CV1 ■	895	96.8	0.86	650	23046	2.10	320	1500		

#### Type of construction:

IM B3	0
IM V1 (with canopy)	4
IM V1 (without canopy)	8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

All-cooled motors  
H-compact II A4

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \varphi$   
[-]

$P/P_{rated} = 50\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \varphi$   
[-]

$P/P_{rated} = 25\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \varphi$   
[-]

Square-law torque drive

4-pole

1LA4 500-4...	1125	1629	96.5	0.86	750	1423	96.2	0.82	375	1130	95.5	0.71
1LA4 502-4...	1238	1629	96.7	0.86	825	1423	96.4	0.83	413	1130	95.7	0.73
1LA4 504-4...	1350	1629	96.8	0.87	900	1423	96.5	0.84	450	1130	95.9	0.75
1LA4 560-4...	1500	1630	97.1	0.86	1000	1424	96.9	0.82	500	1130	96.4	0.72
1LA4 562-4...	1725	1630	97.2	0.86	1150	1424	97.2	0.83	575	1130	96.8	0.74
1LA4 564-4...	1950	1630	97.3	0.87	1300	1424	97.3	0.84	650	1130	96.9	0.74

6-pole

1LA4 500-6...	885	1086	96.8	0.86	590	949	96.6	0.83	295	753	96.0	0.74
1LA4 502-6...	990	1086	96.9	0.86	660	949	96.7	0.83	330	753	96.0	0.74
1LA4 504-6...	1088	1086	97.0	0.86	725	949	96.7	0.83	363	753	96.0	0.73
1LA4 560-6...	1238	1086	97.2	0.85	825	949	97.0	0.82	413	753	96.3	0.72
1LA4 562-6...	1425	1086	97.3	0.85	950	949	97.0	0.82	475	753	96.4	0.72
1LA4 564-6...	1613	1086	97.4	0.86	1075	949	97.1	0.83	538	753	96.5	0.73
1LA4 632-6...	1675	1086	96.6	0.88	1115	945	96.4	0.85	560	755	95.8	0.77

8-pole

1LA4 500-8...	675	814	96.3	0.79	450	711	95.8	0.74	225	564	94.8	0.62
1LA4 502-8...	713	814	96.3	0.78	475	711	95.8	0.73	238	564	94.8	0.60
1LA4 504-8...	788	814	96.3	0.78	525	711	95.9	0.73	263	564	94.9	0.61
1LA4 560-8...	900	813	96.7	0.82	600	710	96.4	0.78	300	564	95.7	0.66
1LA4 562-8...	1035	813	96.8	0.82	690	710	96.4	0.77	345	564	95.7	0.66
1LA4 564-8...	1185	813	96.8	0.81	790	710	96.4	0.76	395	564	95.7	0.65
1LA4 632-8...	1350	814	96.4	0.84	900	708	96.1	0.81	450	566	95.5	0.71
1LA4 634-8...	1500	814	96.6	0.85	1000	708	96.4	0.82	500	565	95.8	0.73
1LA4 636-8...	1620	814	96.7	0.84	1080	708	96.5	0.82	540	565	95.9	0.72



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed rpm	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque $T_B/T_{rated}$ [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm		
<b>3.4 ... 4.16 kV, 60 Hz</b>											
<b>4-pole</b>											
1500	<b>1LA4 500-4CV5 ■</b>	1793	96.8	0.87	245	7989	2.50	42	2200		
1650	<b>1LA4 502-4CV5 ■</b>	1793	96.8	0.87	270	8787	2.50	47	2200		
1800	<b>1LA4 504-4CV5 ■</b>	1793	96.8	0.87	295	9586	2.50	54	2200		
2000	<b>1LA4 560-4CV5 ■</b>	1794	97.3	0.87	330	10645	2.40	79	2000		
2300	<b>1LA4 562-4CV5 ■</b>	1794	97.3	0.87	375	12242	2.40	92	2000		
2600	<b>1LA4 564-4CV5 ■</b>	1794	97.3	0.87	425	13839	2.40	104	2000		
2950	<b>1LA4 632-4CV50</b>	1794	97.2	0.87	485	15702	2.40	157	1500		
3320	<b>1LA4 634-4CV50</b>	1794	97.3	0.87	540	17672	2.20	171	1500		
3600	<b>1LA4 636-4CV50</b>	1795	97.5	0.87	590	19161	2.40	186	1500		
<b>6-pole</b>											
1180	<b>1LA4 500-6CV5 ■</b>	1195	96.8	0.87	194	9429	2.40	82	2100		
1320	<b>1LA4 502-6CV5 ■</b>	1195	97.0	0.87	215	10548	2.40	92	2100		
1450	<b>1LA4 504-6CV5 ■</b>	1195	97.1	0.87	240	11587	2.50	103	2100		
1650	<b>1LA4 560-6CV5 ■</b>	1195	97.2	0.86	275	13185	2.60	142	2000		
1900	<b>1LA4 562-6CV5 ■</b>	1195	97.4	0.86	315	15183	2.60	162	2000		
2150	<b>1LA4 564-6CV5 ■</b>	1195	97.5	0.87	350	17180	2.60	189	2000		
2400	<b>1LA4 632-6CV5 ■</b>	1195	96.8	0.89	385	19183	2.40	269	1500		
2700	<b>1LA4 634-6CV5 ■</b>	1195	96.9	0.89	435	21587	2.20	297	1500		
2900	<b>1LA4 636-6CV5 ■</b>	1195	97.0	0.89	465	23181	2.20	323	1500		
<b>8-pole</b>											
900	<b>1LA4 500-8CV5 ■</b>	896	96.4	0.79	164	9592	2.30	82	2100		
950	<b>1LA4 502-8CV5 ■</b>	896	96.4	0.79	174	10124	2.30	92	2100		
1050	<b>1LA4 504-8CV5 ■</b>	896	96.4	0.79	192	11190	2.30	102	2100		
1200	<b>1LA4 560-8CV5 ■</b>	895	96.8	0.83	205	12803	2.20	142	2000		
1380	<b>1LA4 562-8CV5 ■</b>	895	96.8	0.83	240	14724	2.30	162	2000		
1580	<b>1LA4 564-8CV5 ■</b>	895	96.9	0.83	275	16857	2.40	189	2000		
1800	<b>1LA4 632-8CV5 ■</b>	895	96.6	0.85	305	19205	2.20	265	1500		
1960	<b>1LA4 634-8CV5 ■</b>	895	96.7	0.86	325	20912	2.00	294	1500		
2160	<b>1LA4 636-8CV5 ■</b>	895	96.8	0.86	360	23046	2.10	320	1500		

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation. Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact II A4

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [ $\cdot$ ]
-----------	------------	-------------	-------------------------------

$P/P_{rated} = 50\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [ $\cdot$ ]
-----------	------------	-------------	-------------------------------

$P/P_{rated} = 25\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [ $\cdot$ ]
-----------	------------	-------------	-------------------------------

Square-law torque drive

4-pole

1LA4 500-4...	1125	1629	96.5	0.86	750	1423	96.2	0.82	375	1130	95.5	0.71
1LA4 502-4...	1238	1629	96.7	0.86	825	1423	96.4	0.83	413	1130	95.7	0.73
1LA4 504-4...	1350	1629	96.8	0.87	900	1423	96.5	0.84	450	1130	95.9	0.75
1LA4 560-4...	1500	1630	97.1	0.86	1000	1424	96.9	0.82	500	1130	96.4	0.72
1LA4 562-4...	1725	1630	97.2	0.86	1150	1424	97.2	0.83	575	1130	96.8	0.74
1LA4 564-4...	1950	1630	97.3	0.87	1300	1424	97.3	0.84	650	1130	96.9	0.74
1LA4 632-4...	2215	1630	97.2	0.86	1475	1419	97.0	0.83	740	1132	96.6	0.73
1LA4 634-4...	2490	1631	97.3	0.86	1660	1419	97.2	0.83	830	1132	96.8	0.74
1LA4 636-4...	2700	1631	97.4	0.87	1800	1419	97.2	0.83	900	1132	96.8	0.74

6-pole

1LA4 500-6...	885	1086	96.8	0.86	590	949	96.6	0.83	295	753	96.0	0.74
1LA4 502-6...	990	1086	96.9	0.86	660	949	96.7	0.83	330	753	96.0	0.74
1LA4 504-6...	1088	1086	97.0	0.86	725	949	96.7	0.83	363	753	96.0	0.73
1LA4 560-6...	1238	1086	97.2	0.85	825	949	97.0	0.82	413	753	96.3	0.72
1LA4 562-6...	1425	1086	97.3	0.85	950	949	97.0	0.82	475	753	96.4	0.72
1LA4 564-6...	1613	1086	97.4	0.86	1075	949	97.1	0.83	538	753	96.5	0.73
1LA4 632-6...	1800	1086	96.7	0.88	1200	945	96.5	0.86	600	755	95.9	0.78
1LA4 634-6...	2025	1086	97.0	0.89	1350	945	96.8	0.87	675	755	96.4	0.80
1LA4 636-6...	2175	1086	97.0	0.89	1450	945	96.9	0.87	725	755	96.4	0.80

8-pole

1LA4 500-8...	675	814	96.3	0.79	450	711	95.8	0.74	225	564	94.8	0.62
1LA4 502-8...	713	814	96.3	0.78	475	711	95.8	0.73	238	564	94.8	0.60
1LA4 504-8...	788	814	96.3	0.78	525	711	95.9	0.73	263	564	94.9	0.61
1LA4 560-8...	900	813	96.7	0.82	600	710	96.4	0.78	300	564	95.7	0.66
1LA4 562-8...	1035	813	96.8	0.82	690	710	96.4	0.77	345	564	95.7	0.66
1LA4 564-8...	1185	813	96.8	0.81	790	710	96.4	0.76	395	564	95.7	0.65
1LA4 632-8...	1350	814	96.3	0.83	900	709	95.9	0.79	450	566	95.1	0.67
1LA4 634-8...	1470	814	96.5	0.84	980	708	96.3	0.82	490	566	95.8	0.72
1LA4 636-8...	1620	814	96.6	0.84	1080	708	96.4	0.81	540	566	95.8	0.72



# Motors for converter operation

## Converter with non-sinusoidal output

**Ale-coupled motor  
H-compact 1LA4**

### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed rpm	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm		
<b>2.3 kW, 50 Hz</b>											
4-pole											
1350	<b>1LA4 500-4CV0■</b>	1493	97.0	0.87	400	8634	2.50	42	2200		
1500	<b>1LA4 502-4CV0■</b>	1493	97.2	0.87	445	9594	2.60	47	2200		
1650	<b>1LA4 504-4CV0■</b>	1493	97.3	0.88	485	10553	2.60	54	2200		
1850	<b>1LA4 560-4CV0■</b>	1494	97.5	0.87	550	11824	2.40	79	2000		
2100	<b>1LA4 562-4CV0■</b>	1494	97.5	0.87	620	13422	2.40	92	2000		
2350	<b>1LA4 564-4CV0■</b>	1494	97.5	0.87	700	15020	2.40	104	2000		
6-pole											
1080	<b>1LA4 500-6CV0■</b>	995	97.0	0.86	325	10365	2.40	82	2100		
1180	<b>1LA4 502-6CV0■</b>	995	97.0	0.87	350	11324	2.40	92	2100		
1280	<b>1LA4 504-6CV0■</b>	995	97.1	0.87	380	12284	2.40	103	2100		
1500	<b>1LA4 560-6CV0■</b>	995	97.3	0.86	450	14395	2.60	142	2000		
1750	<b>1LA4 562-6CV0■</b>	995	97.4	0.86	520	16795	2.70	162	2000		
1950	<b>1LA4 564-6CV0■</b>	995	97.5	0.87	580	18714	2.50	189	2000		
2300	<b>1LA4 632-6CV0■</b>	995	97.1	0.89	670	22075	2.40	269	1500		
8-pole											
800	<b>1LA4 500-8CV0■</b>	745	96.5	0.81	255	10254	2.10	82	2100		
850	<b>1LA4 502-8CV0■</b>	745	96.5	0.81	275	10895	2.10	92	2100		
950	<b>1LA4 504-8CV0■</b>	745	96.5	0.81	305	12177	2.10	102	2100		
1120	<b>1LA4 560-8CV0■</b>	745	96.8	0.83	350	14356	2.20	142	2000		
1250	<b>1LA4 562-8CV0■</b>	745	96.9	0.83	390	16022	2.20	162	2000		
1450	<b>1LA4 564-8CV0■</b>	745	97.0	0.83	450	18585	2.20	189	2000		
1650	<b>1LA4 632-8CV0■</b>	745	96.7	0.84	510	21151	2.20	265	1500		
1850	<b>1LA4 634-8CV0■</b>	746	96.8	0.84	570	23683	2.40	294	1500		
2040	<b>1LA4 636-8CV0■</b>	745	96.9	0.85	620	26150	2.10	320	1500		

#### Type of construction:

IM B3	0
IM V1 (with canopy)	4
IM V1 (without canopy)	8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact II A4

Motor type (repeated)	Constant-torque drive, speed range											
	1:2				1:5				1:10			
	$P_{max}$ kW	$T_{max}$ Nm	$\eta$ %	$\cos \varphi$ [-]	$P_{max}$ kW	$T_{max}$ Nm	$\eta$ %	$\cos \varphi$ [-]	$P_{max}$ kW	$T_{max}$ Nm	$\eta$ %	$\cos \varphi$ [-]
<b>Constant-torque drive</b>												
4-pole												
1LA4 500-4...	1300	8315	96.8	0.85	1050	6716	96.9	0.85	940	6012	96.9	0.84
1LA4 502-4...	1450	9274	97.0	0.85	1180	7547	97.1	0.85	1060	6780	97.1	0.85
1LA4 504-4...	1600	10233	97.1	0.86	1320	8443	97.2	0.86	1180	7547	97.2	0.86
1LA4 560-4...	1760	11249	97.3	0.85	1450	9268	97.4	0.84	1320	8437	97.4	0.83
1LA4 562-4...	2040	13039	97.3	0.85	1680	10738	97.4	0.85	1550	9907	97.4	0.84
1LA4 564-4...	2300	14701	97.3	0.85	1900	12144	97.4	0.85	1750	11185	97.4	0.84
6-pole												
1LA4 500-6...	1060	10173	96.6	0.85	880	8445	96.8	0.84	800	7678	96.9	0.84
1LA4 502-6...	1160	11133	96.8	0.86	970	9309	97.0	0.86	880	8445	97.0	0.85
1LA4 504-6...	1260	12092	96.8	0.86	1060	10173	97.0	0.86	960	9213	97.1	0.86
1LA4 560-6...	1480	14204	97.0	0.84	1250	11996	97.2	0.84	1120	10749	97.2	0.83
1LA4 562-6...	1720	16507	97.1	0.84	1450	13916	97.3	0.83	1250	11996	97.3	0.83
1LA4 564-6...	1930	18522	97.3	0.85	1650	15835	97.4	0.85	1400	13436	97.5	0.85
1LA4 632-6...	2210	21190	97.1	0.89	1795	17720	97.0	0.88	1680	16115	97.0	0.87
8-pole												
1LA4 500-8...	790	10126	96.1	0.79	650	8331	96.3	0.78	580	7434	96.3	0.76
1LA4 502-8...	850	10895	96.1	0.80	730	9357	96.2	0.79	650	8331	96.3	0.77
1LA4 504-8...	950	12177	96.1	0.80	800	10254	96.2	0.78	710	9100	96.3	0.77
1LA4 560-8...	1090	13971	96.6	0.82	890	11408	96.8	0.81	800	10254	96.8	0.79
1LA4 562-8...	1240	15894	96.7	0.82	1020	13074	96.9	0.81	920	11792	96.9	0.80
1LA4 564-8...	1440	18457	96.8	0.82	1200	15381	97.0	0.81	1100	14099	97.0	0.80
1LA4 632-8...	1585	20305	96.6	0.84	1285	16495	96.5	0.82	1205	15440	96.4	0.81
1LA4 634-8...	1775	22735	96.7	0.83	1445	18470	96.6	0.81	1350	17285	96.5	0.80
1LA4 636-8...	1960	25100	96.8	0.85	1590	20395	96.8	0.83	1490	19090	96.7	0.82

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact (1LA4)

### Selection and ordering data

Rated power kW	High voltage motor H-compact	Rated speed rpm	Operating values at rated output																	
			IEC	Efficiency %	Power factor [-]	Rated current at 3.4 kV A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm										
<b>3.4 ... 4.16 kV, 50 Hz</b>																				
<b>4-pole</b>																				
1350	<b>1LA4 500-4CV■■</b>	1493	97.0	0.87	280	8634	2.50	42	2200											
1500	<b>1LA4 502-4CV■■</b>	1493	97.2	0.87	310	9594	2.60	47	2200											
1650	<b>1LA4 504-4CV■■</b>	1493	97.3	0.88	335	10553	2.60	54	2200											
1850	<b>1LA4 560-4CV■■</b>	1494	97.5	0.87	380	11824	2.40	79	2000											
2100	<b>1LA4 562-4CV■■</b>	1494	97.5	0.87	435	13422	2.40	92	2000											
2350	<b>1LA4 564-4CV■■</b>	1494	97.5	0.87	485	15020	2.40	104	2000											
2600	<b>1LA4 632-4CV■ 0</b>	1494	97.5	0.88	530	16620	2.20	157	1500											
2900	<b>1LA4 634-4CV■ 0</b>	1494	97.6	0.88	590	18537	2.20	171	1500											
3150	<b>1LA4 636-4CV■ 0</b>	1494	97.7	0.88	640	20136	2.20	186	1500											
<b>6-pole</b>																				
1080	<b>1LA4 500-6CV■■</b>	995	97.0	0.86	225	10365	2.40	82	2100											
1180	<b>1LA4 502-6CV■■</b>	995	97.0	0.87	245	11324	2.40	92	2100											
1280	<b>1LA4 504-6CV■■</b>	995	97.1	0.87	265	12284	2.40	103	2100											
1500	<b>1LA4 560-6CV■■</b>	995	97.3	0.86	315	14395	2.60	142	2000											
1750	<b>1LA4 562-6CV■■</b>	995	97.4	0.86	365	16795	2.70	162	2000											
1950	<b>1LA4 564-6CV■■</b>	995	97.5	0.87	400	18714	2.50	189	2000											
2220	<b>1LA4 632-6CV■■</b>	995	97.1	0.89	450	21308	2.30	269	1500											
2480	<b>1LA4 634-6CV■■</b>	995	97.2	0.89	500	23803	2.20	297	1500											
2700	<b>1LA4 636-6CV■■</b>	995	97.3	0.89	550	25915	2.20	323	1500											
<b>8-pole</b>																				
800	<b>1LA4 500-8CV■■</b>	745	96.5	0.81	180	10254	2.10	82	2100											
850	<b>1LA4 502-8CV■■</b>	745	96.5	0.81	190	10895	2.10	92	2100											
950	<b>1LA4 504-8CV■■</b>	745	96.5	0.81	215	12177	2.10	102	2100											
1120	<b>1LA4 560-8CV■■</b>	745	96.8	0.83	245	14356	2.20	142	2000											
1250	<b>1LA4 562-8CV■■</b>	745	96.9	0.83	270	16022	2.20	162	2000											
1450	<b>1LA4 564-8CV■■</b>	745	97.0	0.83	315	18585	2.20	189	2000											
1570	<b>1LA4 632-8CV■■</b>	745	96.6	0.84	340	20126	2.30	265	1500											
1780	<b>1LA4 634-8CV■■</b>	745	96.7	0.84	385	22817	2.30	294	1500											
1960	<b>1LA4 636-8CV■■</b>	745	96.8	0.85	415	25125	2.20	320	1500											

#### Voltage code:

4.16 kV, 50 Hz  
Other voltage

4  
9

#### Type of construction:

IM B3  
IM V1 (with canopy)  
IM V1 (without canopy)

0  
4  
8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 11 A4

Motor type (repeated)	Constant-torque drive, speed range											
	1:2				1:5				1:10			
	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$
<b>Constant-torque drive</b>												
<b>4-pole</b>												
1LA4 500-4...	1300	8315	96.8	0.85	1050	6716	96.9	0.85	940	6012	96.9	0.84
1LA4 502-4...	1450	9274	97.0	0.85	1180	7547	97.1	0.85	1060	6780	97.1	0.85
1LA4 504-4...	1600	10233	97.1	0.86	1320	8443	97.2	0.86	1180	7547	97.2	0.86
1LA4 560-4...	1760	11249	97.3	0.85	1450	9268	97.4	0.84	1320	8437	97.4	0.83
1LA4 562-4...	2040	13039	97.3	0.85	1680	10738	97.4	0.85	1550	9907	97.4	0.84
1LA4 564-4...	2300	14701	97.3	0.85	1900	12144	97.4	0.85	1750	11185	97.4	0.84
1LA4 632-4...	2495	15950	97.4	0.88	2030	12960	97.4	0.87	1900	12130	97.4	0.87
1LA4 634-4...	2780	17790	97.5	0.88	2260	14460	97.5	0.87	2110	13530	97.4	0.87
1LA4 636-4...	3020	19330	97.6	0.88	2460	15700	97.6	0.87	2300	14700	97.5	0.87
<b>6-pole</b>												
1LA4 500-6...	1060	10173	96.6	0.85	880	8445	96.8	0.84	800	7678	96.9	0.84
1LA4 502-6...	1160	11133	96.8	0.86	970	9309	97.0	0.86	880	8445	97.0	0.85
1LA4 504-6...	1260	12092	96.8	0.86	1060	10173	97.0	0.86	960	9213	97.1	0.86
1LA4 560-6...	1480	14204	97.0	0.84	1250	11996	97.2	0.84	1120	10749	97.2	0.83
1LA4 562-6...	1720	16507	97.1	0.84	1450	13916	97.3	0.83	1250	11996	97.3	0.83
1LA4 564-6...	1930	18522	97.3	0.85	1650	15835	97.4	0.85	1400	13436	97.5	0.85
1LA4 632-6...	2130	20456	97.0	0.89	1730	16620	97.0	0.88	1620	15555	97.0	0.88
1LA4 634-6...	2380	22839	97.1	0.89	1935	18545	97.2	0.89	1810	17342	97.1	0.88
1LA4 636-6...	2590	24880	97.3	0.89	2100	20215	97.3	0.89	1970	18920	97.2	0.88
<b>8-pole</b>												
1LA4 500-8...	790	10126	96.1	0.79	650	8331	96.3	0.78	580	7434	96.3	0.76
1LA4 502-8...	850	10895	96.1	0.80	730	9357	96.2	0.79	650	8331	96.3	0.77
1LA4 504-8...	950	12177	96.1	0.80	800	10254	96.2	0.78	710	9100	96.3	0.77
1LA4 560-8...	1090	13971	96.6	0.82	890	11408	96.8	0.81	800	10254	96.8	0.79
1LA4 562-8...	1240	15894	96.7	0.82	1020	13074	96.9	0.81	920	11792	96.9	0.80
1LA4 564-8...	1440	18457	96.8	0.82	1200	15381	97.0	0.81	1100	14099	97.0	0.80
1LA4 632-8...	1510	19310	96.5	0.84	1225	15697	96.4	0.82	1145	14690	96.3	0.81
1LA4 634-8...	1710	21903	96.7	0.84	1390	17796	96.6	0.82	1300	16666	96.5	0.81
1LA4 636-8...	1880	24118	96.8	0.85	1530	19596	96.7	0.83	1430	18340	96.7	0.82



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Selection and ordering data

Rated power <b>P<sub>rated</sub></b> kW	<b>High voltage motor H-compact</b> Order No.	Rated speed <b>n<sub>rated</sub></b> rpm	Operating values at rated output									
			Efficiency <b>η</b> %	Power factor <b>cos φ</b> [-]	Rated current <b>I<sub>rated</sub></b> A	Rated torque <b>T<sub>rated</sub></b> Nm	Break-down torque <b>T<sub>B</sub>/T<sub>rated</sub></b> [-]	Moment of inertia <b>J</b> kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> <b>n<sub>max</sub></b> rpm			
<b>2.3 kV, 60 Hz</b>												
4-pole												
1500	<b>1LA4 500-4CV1</b>	1793	96.8	0.87	445	7989	2.50	42	2200			
1650	<b>1LA4 502-4CV1</b>	1793	96.8	0.87	490	8787	2.50	47	2200			
1800	<b>1LA4 504-4CV1</b>	1793	96.8	0.87	540	9586	2.50	54	2200			
2000	<b>1LA4 560-4CV1</b>	1794	97.3	0.87	590	10645	2.40	79	2000			
2300	<b>1LA4 562-4CV1</b>	1794	97.3	0.87	680	12242	2.40	92	2000			
2600	<b>1LA4 564-4CV1</b>	1794	97.3	0.87	770	13839	2.40	104	2000			
6-pole												
1180	<b>1LA4 500-6CV1</b>	1195	96.8	0.87	350	9429	2.40	82	2100			
1320	<b>1LA4 502-6CV1</b>	1195	97.0	0.87	395	10548	2.40	92	2100			
1450	<b>1LA4 504-6CV1</b>	1195	97.1	0.87	430	11587	2.50	103	2100			
1650	<b>1LA4 560-6CV1</b>	1195	97.2	0.86	495	13185	2.60	142	2000			
1900	<b>1LA4 562-6CV1</b>	1195	97.4	0.86	570	15183	2.60	162	2000			
2150	<b>1LA4 564-6CV1</b>	1195	97.5	0.87	640	17180	2.60	189	2000			
2230	<b>1LA4 632-6CV1</b>	1195	96.7	0.89	650	17825	2.40	234	1500			
8-pole												
900	<b>1LA4 500-8CV1</b>	896	96.4	0.79	295	9592	2.30	82	2100			
950	<b>1LA4 502-8CV1</b>	896	96.4	0.79	315	10124	2.30	92	2100			
1050	<b>1LA4 504-8CV1</b>	896	96.4	0.79	345	11190	2.30	102	2100			
1200	<b>1LA4 560-8CV1</b>	895	96.8	0.83	375	12803	2.20	142	2000			
1380	<b>1LA4 562-8CV1</b>	895	96.8	0.83	430	14724	2.30	162	2000			
1580	<b>1LA4 564-8CV1</b>	895	96.9	0.83	495	16857	2.40	189	2000			
1800	<b>1LA4 632-8CV1</b>	895	96.6	0.85	550	19205	2.10	265	1500			
2000	<b>1LA4 634-8CV1</b>	895	96.7	0.86	600	21339	2.00	294	1500			
2160	<b>1LA4 636-8CV1</b>	895	96.8	0.86	650	23046	2.10	320	1500			

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact II A4

Motor type  
(repeated)

Constant-torque drive, speed range

1:2

$P_{\max}$   
kW

$T_{\max}$   
Nm

$\eta$   
%

$\cos \phi$

[ $\circ$ ]

1:5

$P_{\max}$   
kW

$T_{\max}$   
Nm

$\eta$   
%

$\cos \phi$

[ $\circ$ ]

1:10

$P_{\max}$   
kW

$T_{\max}$   
Nm

$\eta$   
%

$\cos \phi$

[ $\circ$ ]

Constant-torque drive

4-pole

1LA4 500-4...	1470	7829	96.5	0.86	1270	6764	96.5	0.86	1150	6125	96.5	0.85
1LA4 502-4...	1600	8521	96.5	0.86	1320	7030	96.5	0.85	1200	6391	96.5	0.85
1LA4 504-4...	1750	9320	96.5	0.86	1500	7989	96.5	0.86	1350	7190	96.5	0.85
1LA4 560-4...	1920	10220	97.1	0.87	1610	8570	97.2	0.86	1500	7984	97.2	0.85
1LA4 562-4...	2250	11976	97.1	0.87	1880	10007	97.2	0.86	1750	9315	97.2	0.85
1LA4 564-4...	2580	13733	97.1	0.87	2250	11976	97.2	0.86	2100	11178	97.2	0.86

6-pole

1LA4 500-6...	1160	9269	96.6	0.86	980	7831	96.7	0.86	880	7032	96.7	0.85
1LA4 502-6...	1300	10388	96.7	0.85	1120	8950	96.8	0.85	1020	8151	96.8	0.85
1LA4 504-6...	1430	11427	96.9	0.86	1250	9988	97.0	0.86	1150	9189	97.0	0.85
1LA4 560-6...	1630	13025	97.0	0.84	1450	11587	97.1	0.84	1350	10788	97.1	0.84
1LA4 562-6...	1880	15023	97.1	0.85	1650	13185	97.1	0.85	1520	12146	97.2	0.84
1LA4 564-6...	2130	17020	97.3	0.86	1930	15422	97.3	0.86	1800	14383	97.4	0.86
1LA4 632-6...	2165	17297	96.6	0.89	1760	14048	96.4	0.88	1650	13166	96.3	0.87

8-pole

1LA4 500-8...	880	9378	96.0	0.79	780	8313	96.0	0.77	710	7567	96.0	0.76
1LA4 502-8...	950	10124	96.0	0.79	870	9272	96.0	0.78	780	8313	96.0	0.77
1LA4 504-8...	1050	11190	96.0	0.79	970	10338	96.0	0.78	880	9378	96.0	0.77
1LA4 560-8...	1200	12803	96.6	0.83	1010	10776	96.7	0.82	930	9922	96.7	0.81
1LA4 562-8...	1380	14724	96.6	0.82	1190	12696	96.7	0.81	1100	11736	96.8	0.81
1LA4 564-8...	1580	16857	96.8	0.82	1420	15150	96.9	0.81	1320	14083	96.9	0.81
1LA4 632-8...	1746	18629	96.4	0.85	1422	15172	96.2	0.84	1332	14212	96.3	0.83
1LA4 634-8...	1940	20699	96.6	0.85	1580	16858	96.4	0.84	1480	15791	96.4	0.84
1LA4 636-8...	2095	22355	96.6	0.85	1705	18206	96.5	0.84	1598	17054	96.4	0.84

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1-LA4

### Selection and ordering data

Rated power kW	High voltage motor H-compact	Rated speed n <sub>rated</sub> rpm	Operating values at rated output							Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm			
			IEC	Efficiency η %	Power factor cos φ [-]	Rated current at 4.16 kV I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> / T <sub>rated</sub> [-]						
<b>3.4 ... 4.16 kV, 60 Hz</b>														
4-pole														
1500	<b>1LA4 500-4CV5</b>	1793	96.8	0.87	245	7989	2.50	42	2200					
1650	<b>1LA4 502-4CV5</b>	1793	96.8	0.87	270	8787	2.50	47	2200					
1800	<b>1LA4 504-4CV5</b>	1793	96.8	0.87	295	9586	2.50	54	2200					
2000	<b>1LA4 560-4CV5</b>	1794	97.3	0.87	330	10645	2.40	79	2000					
2300	<b>1LA4 562-4CV5</b>	1794	97.3	0.87	375	12242	2.40	92	2000					
2600	<b>1LA4 564-4CV5</b>	1794	97.3	0.87	425	13839	2.40	104	2000					
2950	<b>1LA4 632-4CV50</b>	1794	97.2	0.87	485	15702	2.40	157	1500					
3320	<b>1LA4 634-4CV50</b>	1794	97.3	0.87	540	17672	2.20	171	1500					
3600	<b>1LA4 636-4CV50</b>	1795	97.5	0.87	590	19161	2.40	186	1500					
6-pole														
1180	<b>1LA4 500-6CV5</b>	1195	96.8	0.87	194	9429	2.40	82	2100					
1320	<b>1LA4 502-6CV5</b>	1195	97.0	0.87	215	10548	2.40	92	2100					
1450	<b>1LA4 504-6CV5</b>	1195	97.1	0.87	240	11587	2.50	103	2100					
1650	<b>1LA4 560-6CV5</b>	1195	97.2	0.86	275	13185	2.60	142	2000					
1900	<b>1LA4 562-6CV5</b>	1195	97.4	0.86	315	15183	2.60	162	2000					
2150	<b>1LA4 564-6CV5</b>	1195	97.5	0.87	350	17180	2.60	189	2000					
2400	<b>1LA4 632-6CV5</b>	1195	96.8	0.89	385	19183	2.40	269	1500					
2700	<b>1LA4 634-6CV5</b>	1195	96.9	0.89	435	21587	2.20	297	1500					
2900	<b>1LA4 636-6CV5</b>	1195	97.0	0.89	465	23181	2.20	323	1500					
8-pole														
900	<b>1LA4 500-8CV5</b>	896	96.4	0.79	164	9592	2.30	82	2100					
950	<b>1LA4 502-8CV5</b>	896	96.4	0.79	174	10124	2.30	92	2100					
1050	<b>1LA4 504-8CV5</b>	896	96.4	0.79	192	11190	2.30	102	2100					
1200	<b>1LA4 560-8CV5</b>	895	96.8	0.83	205	12803	2.20	142	2000					
1380	<b>1LA4 562-8CV5</b>	895	96.8	0.83	240	14724	2.30	162	2000					
1580	<b>1LA4 564-8CV5</b>	895	96.9	0.83	275	16857	2.40	189	2000					
1800	<b>1LA4 632-8CV5</b>	895	96.6	0.85	305	19205	2.20	265	1500					
1960	<b>1LA4 634-8CV5</b>	895	96.7	0.86	325	20912	2.00	294	1500					
2160	<b>1LA4 636-8CV5</b>	895	96.8	0.86	360	23046	2.10	320	1500					

#### Type of construction:

IM B3  
IM V1 (with canopy)  
IM V1 (without canopy)

0

4

8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact II A4

Motor type  
(repeated)

Constant-torque drive, speed range

1:2

$P_{max}$   
kW

$T_{max}$   
Nm

$\eta$   
%

$\cos \varphi$   
[-]

1:5

$P_{max}$   
kW

$T_{max}$   
Nm

$\eta$   
%

$\cos \varphi$   
[-]

1:10

$P_{max}$   
kW

$T_{max}$   
Nm

$\eta$   
%

$\cos \varphi$   
[-]

Constant-torque drive

4-pole

1LA4 500-4...	1470	7829	96.5	0.86	1270	6764	96.5	0.86	1150	6125	96.5	0.85
1LA4 502-4...	1600	8521	96.5	0.86	1320	7030	96.5	0.85	1200	6391	96.5	0.85
1LA4 504-4...	1750	9320	96.5	0.86	1500	7989	96.5	0.86	1350	7190	96.5	0.85
1LA4 560-4...	1920	10220	97.1	0.87	1610	8570	97.2	0.86	1500	7984	97.2	0.85
1LA4 562-4...	2250	11976	97.1	0.87	1880	10007	97.2	0.86	1750	9315	97.2	0.85
1LA4 564-4...	2580	13733	97.1	0.87	2250	11976	97.2	0.86	2100	11178	97.2	0.86
1LA4 632-4...	2860	15219	97.2	0.87	2330	12389	97.0	0.86	2185	11616	96.9	0.85
1LA4 634-4...	3220	17135	97.3	0.87	2625	13957	97.1	0.86	2455	13052	97.1	0.85
1LA4 636-4...	3490	18567	97.4	0.87	2845	15125	97.2	0.86	2665	14166	97.2	0.85

6-pole

1LA4 500-6...	1160	9269	96.6	0.86	980	7831	96.7	0.86	880	7032	96.7	0.85
1LA4 502-6...	1300	10388	96.7	0.85	1120	8950	96.8	0.85	1020	8151	96.8	0.85
1LA4 504-6...	1430	11427	96.9	0.86	1250	9988	97.0	0.86	1150	9189	97.0	0.85
1LA4 560-6...	1630	13025	97.0	0.84	1450	11587	97.1	0.84	1350	10788	97.1	0.84
1LA4 562-6...	1880	15023	97.1	0.85	1650	13185	97.1	0.85	1520	12146	97.2	0.84
1LA4 564-6...	2130	17020	97.3	0.86	1930	15422	97.3	0.86	1800	14383	97.4	0.86
1LA4 632-6...	2330	18613	96.7	0.89	1895	15124	96.5	0.88	1775	14163	96.4	0.88
1LA4 634-6...	2620	20937	96.9	0.89	2135	17042	96.8	0.89	2000	15960	96.7	0.88
1LA4 636-6...	2815	22489	97.0	0.89	2290	18276	96.9	0.89	2145	17115	96.8	0.88

8-pole

1LA4 500-8...	880	9378	96.0	0.79	780	8313	96.0	0.77	710	7567	96.0	0.76
1LA4 502-8...	950	10124	96.0	0.79	870	9272	96.0	0.78	780	8313	96.0	0.77
1LA4 504-8...	1050	11190	96.0	0.79	970	10338	96.0	0.78	880	9378	96.0	0.77
1LA4 560-8...	1200	12803	96.6	0.83	1010	10776	96.7	0.82	930	9922	96.7	0.81
1LA4 562-8...	1380	14724	96.6	0.82	1190	12696	96.7	0.81	1100	11736	96.8	0.81
1LA4 564-8...	1580	16857	96.8	0.82	1420	15150	96.9	0.81	1320	14083	96.9	0.81
1LA4 632-8...	1746	18629	96.3	0.84	1422	15172	96.1	0.82	1332	14212	95.9	0.81
1LA4 634-8...	1901	20285	96.5	0.85	1548	16520	96.4	0.84	1450	15475	96.3	0.83
1LA4 636-8...	2095	22355	96.6	0.85	1706	18206	96.5	0.84	1598	17054	96.4	0.83

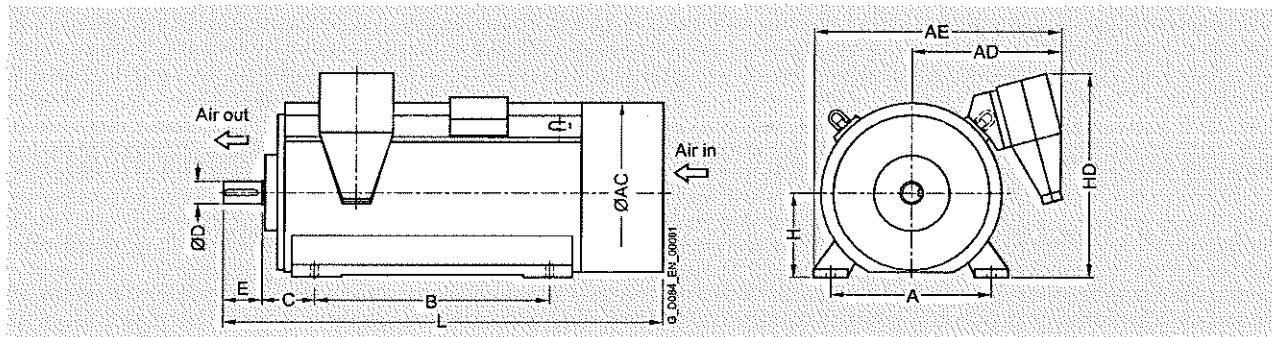


# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Dimension drawings



Motor type	Weight kg	Dimensions											
		A mm	AC mm	AD <sup>1)</sup> mm	AE <sup>1,2,3) mm</sup>	B mm	C mm	D mm	E mm	H mm	HD <sup>4)</sup> mm	L mm	
<sup>1) For G5.5 kV roller bearings, 11) for type of construction</sup>													
2-pole													
1LA4454-2CM00	5200	850	960	825	1340	1250	280	95	130	450	1100	2320	
4-pole													
1LA4454-4A..0	5300	850	960	825	1340	1250	280	130	200	450	1100	2390	
1LA4500-4C..0	6200	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4502-4C..0	6500	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4504-4C..0	7000	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4560-4C..0	8200	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4562-4C..0	8900	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4564-4C..0	9700	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4632-4C..0	12200	1120	1350	945	1560	1600	335	170	240	630	1410	3015	
1LA4634-4C..0	12800	1120	1350	945	1560	1600	335	170	240	630	1410	3015	
1LA4636-4C..0	13600	1120	1350	945	1560	1600	335	170	240	630	1410	3015	
6-pole													
1LA4454-6AM00	5200	850	960	825	1340	1250	280	130	200	450	1100	2390	
1LA4500-6C..0	6400	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4502-6C..0	6800	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4504-6C..0	7300	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4560-6C..0	8500	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4562-6C..0	9300	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4564-6C..0	10100	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4632-6C..0	12700	1120	1350	945	1560	1600	335	180	240	630	1410	3015	
1LA4634-6C..0	13400	1120	1350	945	1560	1600	335	180	240	630	1410	3015	
1LA4636-6C..0	14100	1120	1350	945	1560	1600	335	180	240	630	1410	3015	
8-pole													
1LA4454-8AM00	5200	850	960	825	1340	1250	280	130	200	450	1100	2390	
1LA4500-8C..0	6400	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4502-8C..0	6700	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4504-8C..0	7200	950	1070	875	1440	1320	315	140	200	500	1200	2525	
1LA4560-8C..0	8500	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4562-8C..0	9200	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4564-8C..0	10000	1060	1210	925	1560	1400	335	160	240	560	1310	2775	
1LA4632-8C..0	12500	1120	1350	945	1560	1600	335	180	240	630	1410	3015	
1LA4634-8C..0	13300	1120	1350	945	1560	1600	335	180	240	630	1410	3015	
1LA4636-8C..0	14000	1120	1350	945	1560	1600	335	180	240	630	1410	3015	

Note: Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} = 690$  V, the dimension changes by + 100 mm.

<sup>2)</sup> For  $V_{rated} = 690$  V and  $I_{rated} > 1230$  A, the dimension changes by + 475 mm (a second main terminal box is required).

<sup>3)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

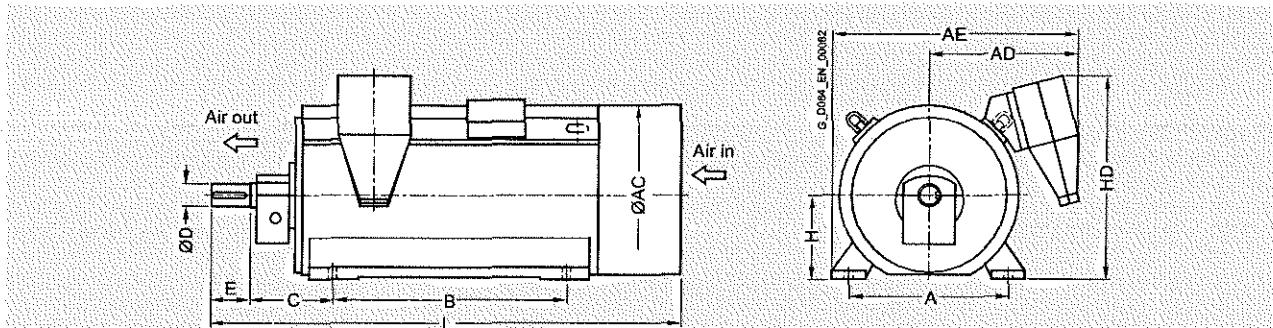
<sup>4)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
Compact 1 LA4

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)(3)</sup> mm	AE <sup>1)(2)(3)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>4)</sup> mm

### Table 1: Motor dimensions for standard construction

#### 2-pole

1LA4454-2CM00-Z K96	5200	850	960	825	1340	1250	475	95	130	450	1100	2515
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#### 4-pole

1LA4454-4A..0-Z K96	5400	850	960	825	1340	1250	475	130	200	450	1100	2745
1LA4500-4C..0-Z K96	6300	950	1070	875	1440	1320	500	140	200	500	1200	2870
1LA4502-4C..0-Z K96	6700	950	1070	875	1440	1320	500	140	200	500	1200	2870
1LA4504-4C..0-Z K96	7200	950	1070	875	1440	1320	500	140	200	500	1200	2870
1LA4560-4C..0-Z K96	8500	1060	1210	925	1560	1400	560	160	240	560	1310	3170
1LA4562-4C..0-Z K96	9200	1060	1210	925	1560	1400	560	160	240	560	1310	3170
1LA4564-4C..0-Z K96	10000	1060	1210	925	1560	1400	560	160	240	560	1310	3170
1LA4632-4C..0-Z K96	12500	1120	1350	945	1560	1600	560	170	240	630	1410	3450
1LA4634-4C..0-Z K96	13100	1120	1350	945	1560	1600	560	170	240	630	1410	3450
1LA4636-4C..0-Z K96	13900	1120	1350	945	1560	1600	560	170	240	630	1410	3450

#### 6-pole

1LA4454-6AM00-Z K96	5300	850	960	825	1340	1250	475	130	200	450	1100	2745
1LA4500-6C..0-Z K96	6600	950	1070	875	1440	1320	530	140	200	500	1200	2900
1LA4502-6C..0-Z K96	7000	950	1070	875	1440	1320	530	140	200	500	1200	2900
1LA4504-6C..0-Z K96	7500	950	1070	875	1440	1320	530	140	200	500	1200	2900
1LA4560-6C..0-Z K96	8800	1060	1210	925	1560	1400	560	160	240	560	1310	3170
1LA4562-6C..0-Z K96	9500	1060	1210	925	1560	1400	560	160	240	560	1310	3170
1LA4564-6C..0-Z K96	10400	1060	1210	925	1560	1400	560	160	240	560	1310	3170
1LA4632-6C..0-Z K96	13000	1120	1350	945	1560	1600	560	180	240	630	1410	3450
1LA4634-6C..0-Z K96	13700	1120	1350	945	1560	1600	560	180	240	630	1410	3450
1LA4636-6C..0-Z K96	14500	1120	1350	945	1560	1600	560	180	240	630	1410	3450

<sup>1)</sup> For  $V_{rated} = 690$  V, the dimension changes by + 100 mm.

<sup>2)</sup> For  $V_{rated} = 690$  V and  $I_{rated} > 1230$  A, the dimension changes by + 475 mm (a second main terminal box is required).

<sup>3)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>4)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

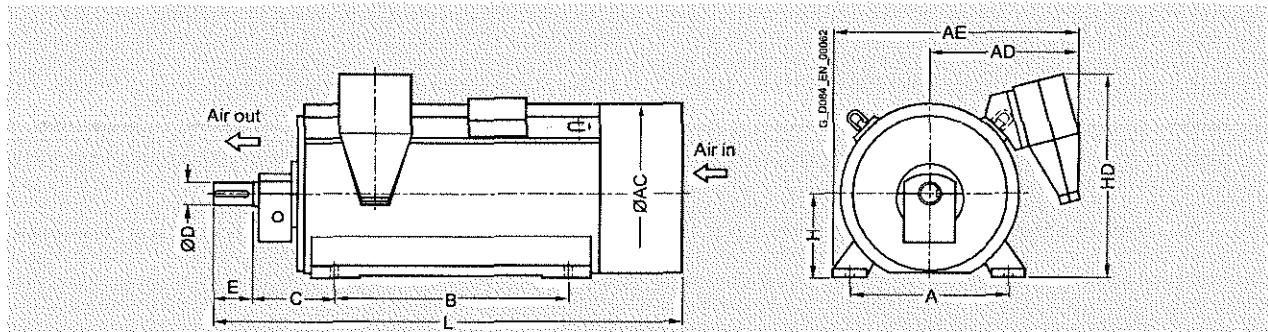


# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
1LA44

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)(3)</sup> mm	AE <sup>1)(2)(3)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>4)</sup> mm
<b>1LA44 series - 8-pole - standard dimensions</b>											
1LA4454-8AM00-Z K96	5300	850	960	825	1340	1250	475	130	200	450	1100
1LA4500-8C..0-Z K96	6600	950	1070	875	1440	1320	530	140	200	500	1200
1LA4502-8C..0-Z K96	6900	950	1070	875	1440	1320	530	140	200	500	1200
1LA4504-8C..0-Z K96	7400	950	1070	875	1440	1320	530	140	200	500	1200
1LA4560-8C..0-Z K96	8800	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4562-8C..0-Z K96	9500	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4564-8C..0-Z K96	10300	1060	1210	925	1560	1400	560	160	240	560	1310
1LA4632-8C..0-Z K96	12800	1120	1350	945	1560	1600	560	180	240	630	1410
1LA4634-8C..0-Z K96	13600	1120	1350	945	1560	1600	560	180	240	630	1410
1LA4636-8C..0-Z K96	14400	1120	1350	945	1560	1600	560	180	240	630	1410

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} = 690$  V, the dimension changes by + 100 mm.  
<sup>2)</sup> For  $V_{rated} = 690$  V and  $I_{rated} > 1230$  A, the dimension changes by + 475 mm (a second main terminal box is required).

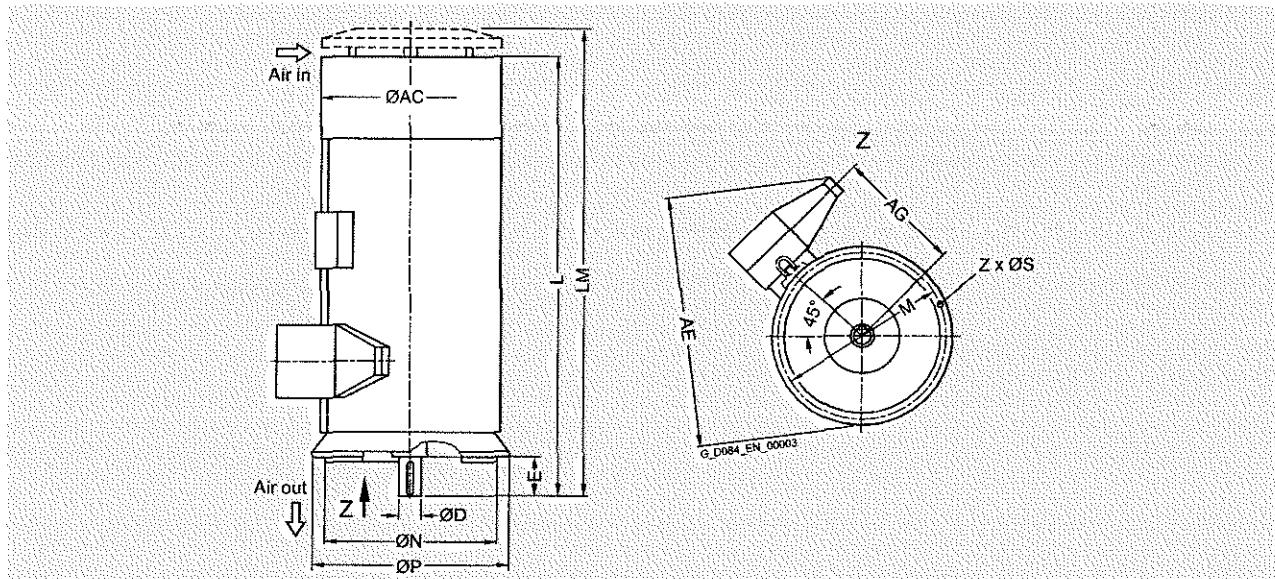
<sup>3)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.  
<sup>4)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact - 1 LA4

### Dimension drawings



Motor type	Weight kg	Dimensions													Quantity
		AC mm	AG <sup>1)</sup> <sup>2)</sup> mm	AE <sup>3)</sup> mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z		
<b>Up to 5.5 kV, roller bearings, IM V1 type of construction</b>															
<b>4-pole</b>															
1LA4454-4AM0...	5200	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4500-4C...	6100	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4502-4C...	6500	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4504-4C...	7000	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4560-4C...	8300	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4562-4C...	9000	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4564-4C...	9700	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
<b>6-pole</b>															
1LA4454-6AM0...	5200	960	770	1550	130	200	2390	2550	1150	1000	1080	26	8		
1LA4500-6C...	6400	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4502-6C...	6800	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4504-6C...	7300	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4560-6C...	8500	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4562-6C...	9300	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4564-6C...	10100	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4632-6C...	12700	1350	980	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4634-6C...	13400	1350	980	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4636-6C...	14100	1350	980	1820	180	240	3115	3305	1400	1250	1320	26	16		

<sup>1)</sup> For  $V_{rated} = 690$  V, the dimension changes by -50 mm.

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by +45 mm.

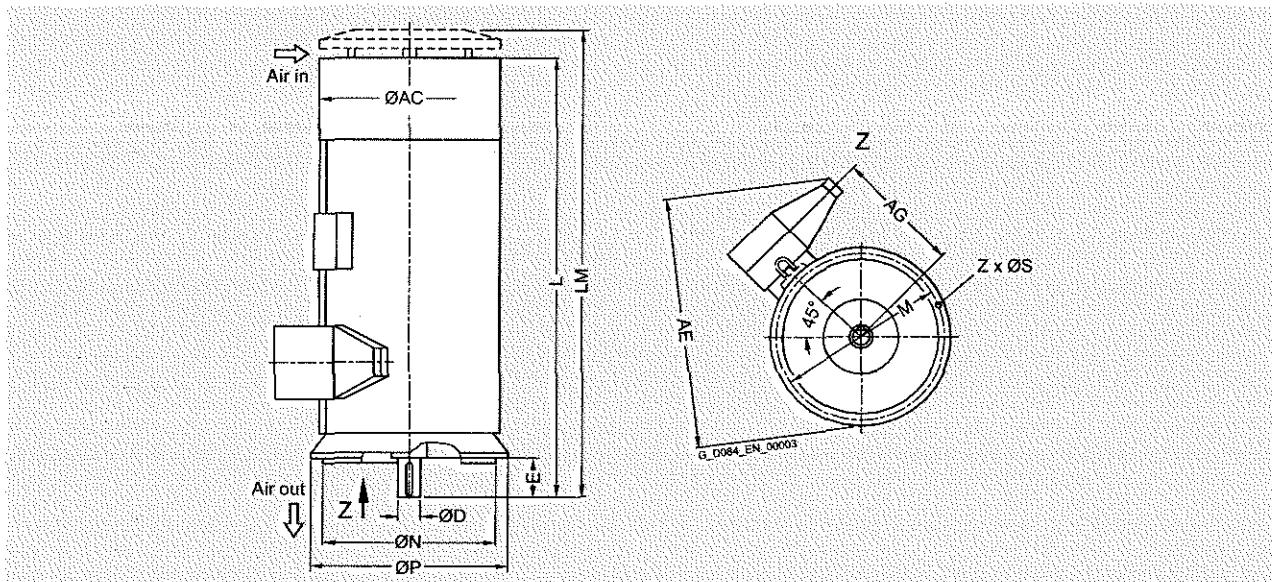
<sup>3)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by +180 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1LA4

### Dimension drawings (continued)



Motor type	Weight	Dimensions													Quantity
		AC mm	AG <sup>1)</sup> mm	AE <sup>2)</sup> mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z		
<b>Up to 5.5 kV, roller bearings, IM V1 type of construction</b>															
8-pole															
1LA4454-8AM0...	5200	960	770	1550	130	200	2390	2550	1000	1150	1080	26	8		
1LA4500-8C...	6400	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4502-8C...	6800	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4504-8C...	7200	1070	840	1660	140	200	2525	2695	1250	1120	1180	26	16		
1LA4560-8C...	8500	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4562-8C...	9200	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4564-8C...	10000	1210	910	1800	160	240	2775	2955	1400	1250	1320	26	16		
1LA4632-8C...	12500	1350	980	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4634-8C...	13300	1350	980	1820	180	240	3115	3305	1400	1250	1320	26	16		
1LA4636-8C...	14000	1350	980	1820	180	240	3115	3305	1400	1250	1320	26	16		

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} = 690$  V, the dimension changes by - 50 mm.

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 45 mm.

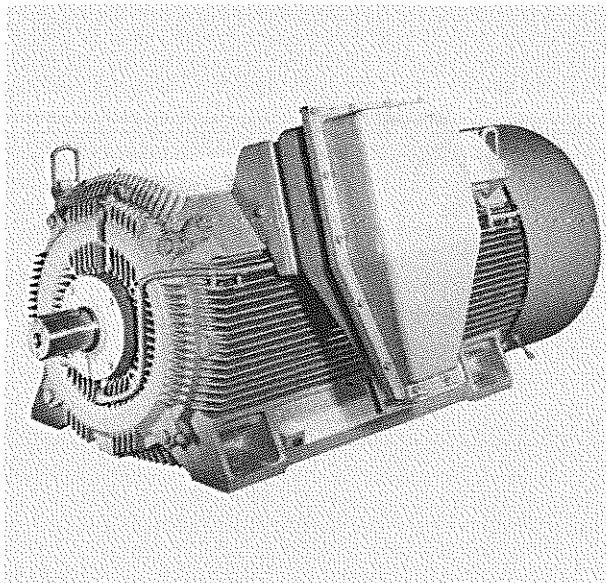
<sup>3)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 180 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1PQ4

### Overview



### Technical data

#### *Overview of technical data*

##### H-compact 1PQ4

Rated voltage	690 V ... 6.6 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3, IM V1
Degree of protection	IP55
Cooling method	IC416
Stator winding insulation	Insulation system, thermal class 155 (F), utilized to 155 (F)
Shaft height	450 ... 630 mm
Bearings	Roller bearings, sleeve bearings
Cage material	Die-cast aluminum or copper (dependent on the shaft height and number of poles)
Standards	IEC, EN
Frame design	Cast iron with cooling ribs

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1PQ4

### Technical data (continued)

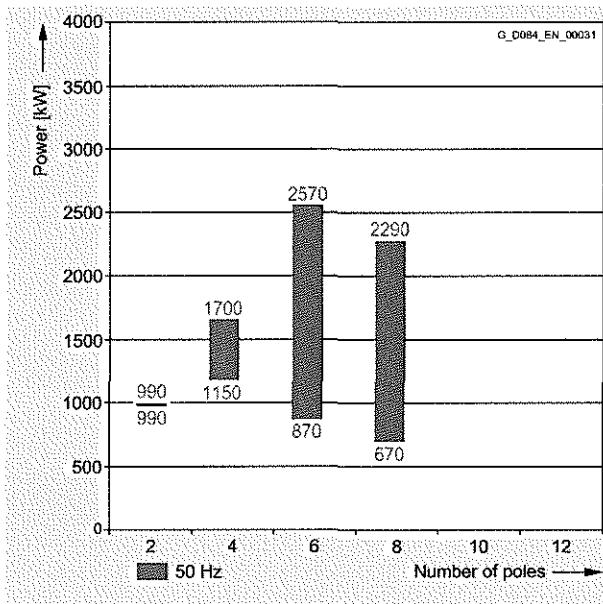
#### **Power ranges for IEC motors with reinforced insulation for SINAMICS drive converters without sine-wave filter**

##### 1PQ4 series

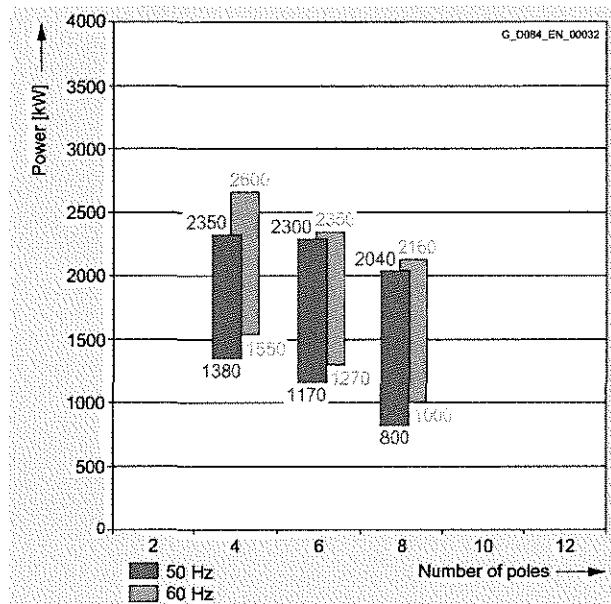
Insulation system, thermal class 155 (F), utilized to 155 (F)

The power data listed here apply for an ambient temperature of 40 °C and an installation altitude ≤ 1000 m.

690 V; 50 Hz



2.3 kV; 50 and 60 Hz



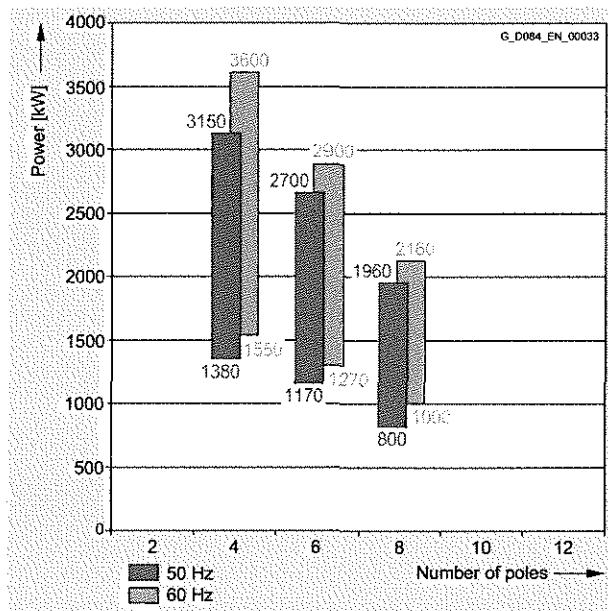
# Motors for converter operation

## Converter with non-sinusoidal output

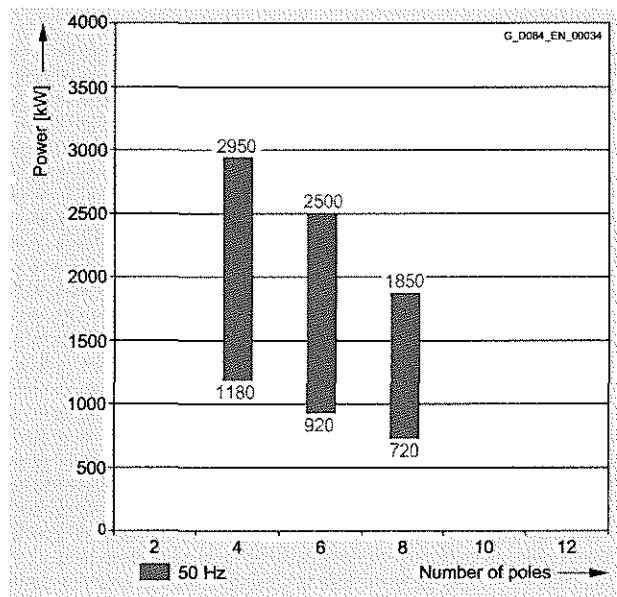
All-cooled motors  
H-compact (IP04)

### Technical data (continued)

3.4 to 4.16 kV; 50 and 60 Hz



6 to 6.6 kV; 50 Hz



# Motors for converter operation

## Converter with non-sinusoidal output

**Al-poled motors**  
**H-compact 1PQ4**

### Selection and ordering data

Rated power kW	<b>Low-voltage motor H-compact</b>	Rated speed n <sub>rated</sub> rpm	Operating values at rated output								
			Efficiency η %	Power factor cos φ [-]	Rated current at 690 V I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> / T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm		
<b>690 V, 50 Hz</b>											
2-pole											
990	<b>1PQ4 454-2CM00</b>	2983	97.3	0.92	930	3169	2.80	22.2	3000		
4-pole											
1150	<b>1PQ4 454-4AM00</b>	1491	97.5	0.89	1100	7365	2.50	33.9	2400		
1340	<b>1PQ4 500-4CM00</b>	1490	97.3	0.88	1300	8588	2.00	44.3	2400		
1550	<b>1PQ4 502-4CM00</b>	1492	97.5	0.87	1520	9920	2.20	49.0	2400		
1700	<b>1PQ4 504-4CM00</b>	1490	97.4	0.89	1640	10895	2.00	56.2	2400		
6-pole											
870	<b>1PQ4 454-6AM00</b>	993	97.3	0.86	870	8366	2.50	53.5	2200		
1350	<b>1PQ4 500-6CM00</b>	995	97.2	0.86	1360	12956	2.20	82.1	2200		
1480	<b>1PQ4 502-6CM00</b>	995	97.2	0.86	1480	14204	2.15	92.4	2200		
1630	<b>1PQ4 504-6CM00</b>	995	97.3	0.87	1620	15643	2.15	102.6	2200		
1900	<b>1PQ4 560-6CM00</b>	995	97.5	0.86	1900	18234	2.30	141.5	2000		
2100	<b>1PQ4 562-6CM00</b>	995	97.5	0.86	2100	20154	2.40	162.1	2000		
2300	<b>1PQ4 564-6CM00</b>	995	97.6	0.87	2250	22073	2.40	188.5	2000		
2455	<b>1PQ4 634-6CM00</b>	996	97.4	0.88	2400	23538	3.00	331.5	1200		
2570	<b>1PQ4 636-6CM00</b>	996	97.4	0.89	2500	24640	3.00	361.5	1200		
8-pole											
670	<b>1PQ4 454-8AM00</b>	745	96.7	0.80	720	8588	2.40	52.8	2200		
950	<b>1PQ4 500-8CM00</b>	746	96.7	0.80	1020	12160	2.10	81.7	2200		
1050	<b>1PQ4 502-8CM00</b>	746	96.8	0.81	1120	13440	2.10	91.9	2200		
1150	<b>1PQ4 504-8CM00</b>	746	96.9	0.81	1220	14720	2.10	102.2	2200		
1400	<b>1PQ4 560-8CM00</b>	745	97.0	0.81	1500	17944	2.30	141.6	2000		
1600	<b>1PQ4 562-8CM00</b>	746	97.1	0.82	1680	20480	2.30	162.3	2000		
1850	<b>1PQ4 564-8CM00</b>	746	97.1	0.82	1940	23680	2.30	188.8	2000		
2030	<b>1PQ4 634-8CM00</b>	746	97.0	0.86	2050	25985	2.40	330.0	1200		
2290	<b>1PQ4 636-8CM00</b>	746	97.1	0.86	2300	29314	2.40	360.0	1200		

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.



# Motors for converter operation

## Converter with non-sinusoidal output

All-cooled motors  
H-compact 1PQ4

Motor type (repeated)	Constant-torque drive; speed range											
	1:2				1:5				1:10			
	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$
<b>Constant-torque drive</b>												
2-pole												
1PQ4 454-2...	990	3169	97.3	0.92	880	2817	97.3	0.92	850	2721	97.3	0.92
4-pole												
1PQ4 454-4...	1130	7237	97.5	0.89	1060	6789	97.6	0.89	1020	6533	97.6	0.88
1PQ4 500-4...	1320	8460	97.2	0.88	1230	7883	97.3	0.88	1200	7690	97.3	0.88
1PQ4 502-4...	1530	9792	97.5	0.87	1420	9088	97.6	0.87	1390	8896	97.6	0.87
1PQ4 504-4...	1680	10767	97.4	0.89	1540	9869	97.5	0.89	1510	9677	97.5	0.89
6-pole												
1PQ4 454-6...	870	8366	97.3	0.86	770	7405	97.4	0.85	740	7116	97.4	0.85
1PQ4 500-6...	1350	12956	97.2	0.85	1320	12668	97.2	0.85	1300	12476	97.2	0.85
1PQ4 502-6...	1480	14204	97.2	0.86	1430	13724	97.2	0.86	1420	13628	97.2	0.86
1PQ4 504-6...	1630	15643	97.3	0.87	1580	15163	97.3	0.87	1570	15067	97.3	0.87
1PQ4 560-6...	1900	18234	97.5	0.86	1750	16795	97.5	0.86	1700	16315	97.5	0.85
1PQ4 562-6...	2100	20154	97.5	0.86	2000	19194	97.5	0.86	1950	18714	97.6	0.86
1PQ4 564-6...	2300	22073	97.6	0.87	2250	21593	97.6	0.87	2200	21113	97.6	0.87
1PQ4 634-6...	2455	23538	97.4	0.88	2455	23538	97.4	0.88	2455	23538	97.4	0.88
1PQ4 636-6...	2570	24640	97.4	0.89	2570	24640	97.4	0.89	2570	24640	97.4	0.89
8-pole												
1PQ4 454-8...	670	8588	96.7	0.80	640	8203	96.7	0.80	610	7819	96.8	0.79
1PQ4 500-8...	950	12160	96.7	0.80	950	12160	96.7	0.80	950	12160	96.7	0.80
1PQ4 502-8...	1050	13440	96.8	0.81	1050	13440	96.8	0.81	1050	13440	96.8	0.81
1PQ4 504-8...	1150	14720	96.9	0.81	1150	14720	96.9	0.81	1150	14720	96.9	0.81
1PQ4 560-8...	1400	17944	97.0	0.81	1300	16663	97.0	0.80	1300	16663	97.0	0.80
1PQ4 562-8...	1600	20480	97.1	0.82	1500	19200	97.1	0.82	1500	19200	97.1	0.82
1PQ4 564-8...	1850	23680	97.1	0.82	1700	21760	97.1	0.81	1700	21760	97.1	0.81
1PQ4 634-8...	2030	25985	97.0	0.86	2030	25985	97.0	0.86	2030	25985	97.0	0.86
1PQ4 636-8...	2290	29314	97.1	0.86	2290	29314	97.1	0.86	2290	29314	97.1	0.86

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact IP04

### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed n <sub>rated</sub> rpm	Operating values at rated output							Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm				
			Efficiency %	Power factor cos φ [-]	Rated current I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> / T <sub>rated</sub> [-]								
<b>2.3 kV, 50 Hz</b>															
4-pole															
1380	<b>1PQ4 500-4CV0■</b>	1492	97.4	0.87	410	8833	2.35	42.3	2400						
1530	<b>1PQ4 502-4CV0■</b>	1492	97.5	0.87	455	9793	2.35	47.0	2400						
1680	<b>1PQ4 504-4CV0■</b>	1492	97.6	0.88	490	10753	2.35	54.2	2400						
1850	<b>1PQ4 560-4CV0■</b>	1494	97.8	0.87	550	11826	2.45	79.0	2200						
2100	<b>1PQ4 562-4CV0■</b>	1494	97.8	0.87	620	13424	2.45	92.0	2200						
2350	<b>1PQ4 564-4CV0■</b>	1494	97.8	0.87	690	15022	2.45	104.0	2200						
6-pole															
1170	<b>1PQ4 500-6CV0■</b>	994	97.2	0.87	345	11241	2.20	82.1	2200						
1280	<b>1PQ4 502-6CV0■</b>	994	97.2	0.87	380	12298	2.20	92.4	2200						
1380	<b>1PQ4 504-6CV0■</b>	994	97.2	0.87	410	13259	2.20	102.6	2200						
1700	<b>1PQ4 560-6CV0■</b>	995	97.4	0.86	510	16317	2.25	141.5	2000						
1900	<b>1PQ4 562-6CV0■</b>	995	97.5	0.87	560	18236	2.40	162.1	2000						
2150	<b>1PQ4 564-6CV0■</b>	995	97.6	0.87	640	20636	2.25	188.5	2000						
2300	<b>1PQ4 632-6CV0■</b>	995	97.1	0.89	670	22075	2.40	269.0	O. R. <sup>2)</sup>						
8-pole															
800	<b>1PQ4 500-8CV0■</b>	746	96.6	0.81	255	10241	2.20	81.7	2200						
850	<b>1PQ4 502-8CV0■</b>	746	96.6	0.81	275	10881	2.20	91.9	2200						
950	<b>1PQ4 504-8CV0■</b>	746	96.6	0.81	305	12162	2.20	102.2	2200						
1300	<b>1PQ4 560-8CV0■</b>	744	96.8	0.84	400	16687	1.90	141.6	2000						
1450	<b>1PQ4 562-8CV0■</b>	744	96.9	0.84	445	18612	1.90	162.3	2000						
1700	<b>1PQ4 564-8CV0■</b>	744	97.0	0.84	520	21821	1.90	188.8	2000						
1850	<b>1PQ4 634-8CV0■</b>	746	96.8	0.84	570	23683	2.40	294.0	O. R. <sup>2)</sup>						
2040	<b>1PQ4 636-8CV0■</b>	745	96.9	0.85	620	26150	2.10	320.0	O. R. <sup>2)</sup>						

### Type of construction:

IM B3	0
IM V1 (with canopy)	4
IM V1 (without canopy)	8

### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation. Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> On request.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compliant IP04

Motor type  
(repeated)

Constant-torque drive, speed range

	1:2				1:5				1:10			
	$P_{max}$ kW	$T_{max}$ Nm	$\eta$ %	$\cos \varphi$ [-]	$P_{max}$ kW	$T_{max}$ Nm	$\eta$ %	$\cos \varphi$ [-]	$P_{max}$ kW	$T_{max}$ Nm	$\eta$ %	$\cos \varphi$ [-]

Constant-torque drive

4-pole

1PQ4 500-4...	1350	8641	97.4	0.87	1280	8193	97.4	0.87	1230	7873	97.4	0.86
1PQ4 502-4...	1500	9601	97.5	0.87	1430	9153	97.5	0.87	1380	8833	97.5	0.87
1PQ4 504-4...	1650	10561	97.6	0.88	1560	9985	97.6	0.88	1500	9601	97.6	0.88
1PQ4 560-4...	1850	11826	97.8	0.87	1780	11378	97.8	0.87	1730	11059	97.8	0.87
1PQ4 562-4...	2100	13424	97.8	0.87	2030	12976	97.8	0.87	1980	12657	97.8	0.87
1PQ4 564-4...	2350	15022	97.8	0.87	2300	14702	97.8	0.87	2250	14383	97.8	0.87

6-pole

1PQ4 500-6...	1170	11241	97.2	0.87	1170	11241	97.2	0.87	1120	10761	97.2	0.87
1PQ4 502-6...	1280	12298	97.2	0.87	1280	12298	97.2	0.87	1220	11721	97.2	0.87
1PQ4 504-6...	1380	13259	97.2	0.87	1380	13259	97.2	0.87	1320	12682	97.3	0.87
1PQ4 560-6...	1700	16317	97.4	0.86	1700	16317	97.4	0.86	1600	15357	97.4	0.86
1PQ4 562-6...	1900	18236	97.5	0.87	1900	18236	97.5	0.87	1800	17276	97.5	0.87
1PQ4 564-6...	2150	20636	97.6	0.87	2150	20636	97.6	0.87	2050	19676	97.6	0.87
1PQ4 632-6...	2210	21212	97.1	0.89	1795	17228	97.0	0.88	1680	16125	97.0	0.87

8-pole

1PQ4 500-8...	800	10241	96.6	0.81	800	10241	96.6	0.81	760	9729	96.6	0.81
1PQ4 502-8...	850	10881	96.6	0.81	850	10881	96.6	0.81	810	10369	96.6	0.81
1PQ4 504-8...	980	12546	96.6	0.81	980	12546	96.6	0.81	930	11905	96.6	0.81
1PQ4 560-8...	1300	16687	96.8	0.84	1260	16173	96.8	0.84	1230	15788	96.8	0.84
1PQ4 562-8...	1450	18612	96.9	0.84	1440	18484	96.9	0.84	1400	17970	96.9	0.84
1PQ4 564-8...	1700	21821	97.0	0.84	1690	21693	97.0	0.84	1650	21179	97.0	0.84
1PQ4 634-8...	1775	22723	96.7	0.83	1445	18498	96.6	0.81	1350	17282	96.5	0.80
1PQ4 636-8...	1960	25125	96.8	0.85	1590	20382	96.8	0.83	1490	19100	96.7	0.82

# Motors for converter operation

## Converter with non-sinusoidal output

Air-coupled motors  
H-compact | P04

### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed rpm	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current at 3.4 kV A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm		
<b>3.4 ... 4.16 kV, 50 Hz</b>											
4-pole											
1380	<b>1PQ4 500-4CV■■</b>	1492	97.4	0.87	285	8833	2.35	42.3	2400		
1530	<b>1PQ4 502-4CV■■</b>	1492	97.5	0.87	315	9793	2.35	47.0	2400		
1680	<b>1PQ4 504-4CV■■</b>	1492	97.6	0.88	340	10753	2.35	54.2	2400		
1850	<b>1PQ4 560-4CV■■</b>	1494	97.8	0.87	380	11826	2.45	79.0	2200		
2100	<b>1PQ4 562-4CV■■</b>	1494	97.8	0.87	430	13424	2.45	92.0	2200		
2350	<b>1PQ4 564-4CV■■</b>	1494	97.8	0.87	485	15022	2.45	104.0	2200		
2600	<b>1PQ4 632-4CV■ 0</b>	1494	97.5	0.88	530	16620	2.20	157.0	O. R. <sup>2)</sup>		
2900	<b>1PQ4 634-4CV■ 0</b>	1494	97.6	0.88	590	18537	2.20	171.0	O. R. <sup>2)</sup>		
3150	<b>1PQ4 636-4CV■ 0</b>	1494	97.7	0.88	640	20136	2.20	186.0	O. R. <sup>2)</sup>		
6-pole											
1170	<b>1PQ4 500-6CV■■</b>	994	97.2	0.87	240	11241	2.20	82.1	2200		
1280	<b>1PQ4 502-6CV■■</b>	994	97.2	0.87	265	12298	2.20	92.4	2200		
1380	<b>1PQ4 504-6CV■■</b>	994	97.2	0.87	285	13259	2.20	102.6	2200		
1700	<b>1PQ4 560-6CV■■</b>	995	97.4	0.86	355	16317	2.25	141.5	2000		
1900	<b>1PQ4 562-6CV■■</b>	995	97.5	0.87	390	18236	2.40	162.1	2000		
2150	<b>1PQ4 564-6CV■■</b>	995	97.6	0.87	445	20636	2.25	188.5	2000		
2220	<b>1PQ4 632-6CV■■</b>	995	97.1	0.89	450	21308	2.30	269.0	O. R. <sup>2)</sup>		
2480	<b>1PQ4 634-6CV■■</b>	995	97.2	0.89	500	23803	2.20	297.0	O. R. <sup>2)</sup>		
2700	<b>1PQ4 636-6CV■■</b>	995	97.3	0.89	550	25915	2.20	323.0	O. R. <sup>2)</sup>		
8-pole											
800	<b>1PQ4 500-8CV■■</b>	746	96.6	0.81	178	10241	2.20	81.7	2200		
850	<b>1PQ4 502-8CV■■</b>	746	96.6	0.81	190	10881	2.20	91.9	2200		
950	<b>1PQ4 504-8CV■■</b>	746	96.6	0.81	210	12162	2.20	102.2	2200		
1300	<b>1PQ4 560-8CV■■</b>	744	96.8	0.84	280	16687	1.90	141.6	2000		
1450	<b>1PQ4 562-8CV■■</b>	744	96.9	0.84	310	18612	1.90	162.3	2000		
1700	<b>1PQ4 564-8CV■■</b>	744	97.0	0.84	365	21821	1.90	188.8	2000		
1780	<b>1PQ4 634-8CV■■</b>	745	96.7	0.84	385	22817	2.30	294.0	O. R. <sup>2)</sup>		
1960	<b>1PQ4 636-8CV■■</b>	745	96.8	0.85	415	25125	2.20	320.0	O. R. <sup>2)</sup>		

#### Voltage code:

4.16 kV, 50 Hz  
Other voltage

4  
9

#### Type of construction:

IM B3  
IM V1 (with canopy)  
IM V1 (without canopy)

0  
4  
8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> On request.

# Motors for converter operation

## Converter with non-sinusoidal output

All-cooled motors  
H-compack IPQ4

Motor type  
(repeated)

Constant-torque drive, speed range

1:2

$P_{\max}$   
kW

$T_{\max}$   
Nm

$\eta$   
%

$\cos \phi$   
[-]

1:5

$P_{\max}$   
kW

$T_{\max}$   
Nm

$\eta$   
%

$\cos \phi$   
[-]

1:10

$P_{\max}$   
kW

$T_{\max}$   
Nm

$\eta$   
%

$\cos \phi$   
[-]

Constant-torque drive

4-pole

1PQ4 500-4...	1350	8641	97.4	0.87	1280	8193	97.4	0.87	1230	7873	97.4	0.86
1PQ4 502-4...	1500	9601	97.5	0.87	1430	9153	97.5	0.87	1380	8833	97.5	0.87
1PQ4 504-4...	1650	10561	97.6	0.88	1560	9985	97.6	0.88	1500	9601	97.6	0.88
1PQ4 560-4...	1850	11826	97.8	0.87	1780	11378	97.8	0.87	1730	11059	97.8	0.87
1PQ4 562-4...	2100	13424	97.8	0.87	2030	12976	97.8	0.87	1980	12657	97.8	0.87
1PQ4 564-4...	2350	15022	97.3	0.85	1900	12145	97.8	0.87	2250	14383	97.8	0.87
1PQ4 632-4...	2495	15949	97.4	0.88	2030	12976	97.4	0.87	1900	12145	97.4	0.87
1PQ4 634-4...	2780	17770	97.5	0.88	2260	14446	97.5	0.87	2110	13488	97.4	0.87
1PQ4 636-4...	3020	19305	97.6	0.88	2460	15725	97.6	0.87	2300	14702	97.5	0.87

6-pole

1PQ4 500-6...	1170	11241	97.2	0.87	1170	11241	97.1	0.87	1120	11529	97.2	0.87
1PQ4 502-6...	1280	12298	97.2	0.87	1280	12298	96.9	0.87	1220	12970	97.2	0.87
1PQ4 504-6...	1380	13259	97.2	0.87	1380	13259	97.4	0.87	1320	14700	97.3	0.87
1PQ4 560-6...	1700	16317	97.4	0.86	1700	16317	97.5	0.87	1600	16796	97.4	0.86
1PQ4 562-6...	1900	18236	97.5	0.87	1900	18236	97.5	0.87	1800	18716	97.5	0.87
1PQ4 564-6...	2150	20636	97.6	0.87	2150	20636	97.6	0.87	2050	21595	97.6	0.87
1PQ4 632-6...	2130	20444	97.0	0.89	1730	16605	97.0	0.88	1620	15549	97.0	0.88
1PQ4 634-6...	2380	22843	97.1	0.89	1935	18572	97.2	0.89	1810	17372	97.1	0.88
1PQ4 636-6...	2590	24859	97.3	0.89	2100	20156	97.3	0.89	1970	18908	97.2	0.88

8-pole

1PQ4 500-8...	800	10241	96.6	0.81	800	10241	96.6	0.81	760	9729	96.6	0.81
1PQ4 502-8...	850	10881	96.6	0.81	850	10881	96.6	0.81	810	10369	96.6	0.81
1PQ4 504-8...	980	12546	96.6	0.81	980	12546	96.6	0.81	930	11905	96.6	0.81
1PQ4 560-8...	1300	16687	96.8	0.84	1260	16173	96.8	0.84	1230	15788	96.8	0.84
1PQ4 562-8...	1450	18612	96.9	0.84	1440	18484	96.9	0.84	1400	17970	96.9	0.84
1PQ4 564-8...	1700	21821	97.0	0.84	1690	21693	97.0	0.84	1650	21179	97.0	0.84
1PQ4 634-8...	1710	21920	96.7	0.84	1390	17818	96.6	0.82	1300	16664	96.5	0.81
1PQ4 636-8...	1880	24099	96.8	0.85	1530	19613	96.7	0.83	1430	18331	96.7	0.82

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1P04

### Selection and ordering data

Rated power <b>P<sub>rated</sub></b> kW	<b>High voltage motor H-compact</b>	Rated speed <b>n<sub>rated</sub></b> rpm	Operating values at rated output								
			Efficiency <b>η</b> %	Power factor <b>cos φ</b> [-]	Rated current at 6.6 kV <b>I<sub>rated</sub></b> A	Rated torque <b>T<sub>rated</sub></b> Nm	Break-down torque <b>T<sub>b</sub>/T<sub>rated</sub></b> [ - ]	Moment of inertia <b>J</b> kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> <b>n<sub>max</sub></b> rpm		
<b>6 ... 6.6 kV, 50 Hz</b>											
4-pole											
1180	<b>1PQ4 500-4CV■■</b>	1493	96.8	0.87	122	7548	2.60	42.0	2400		
1300	<b>1PQ4 502-4CV■■</b>	1493	96.9	0.87	134	8315	2.60	47.0	2400		
1450	<b>1PQ4 504-4CV■■</b>	1493	97.1	0.88	148	9275	2.50	54.0	2400		
1600	<b>1PQ4 560-4CV■■</b>	1494	97.2	0.86	168	10228	2.60	79.0	2200		
1850	<b>1PQ4 562-4CV■■</b>	1494	97.4	0.87	190	11826	2.60	92.0	2200		
2100	<b>1PQ4 564-4CV■■</b>	1494	97.5	0.87	215	13424	2.60	104.0	2200		
2400	<b>1PQ4 632-4CV■ 0</b>	1494	97.3	0.88	245	15341	2.40	157.0	O. R. <sup>2)</sup>		
2700	<b>1PQ4 634-4CV■ 0</b>	1494	97.4	0.87	280	17259	2.40	171.0	O. R. <sup>2)</sup>		
2950	<b>1PQ4 636-4CV■ 0</b>	1494	97.5	0.87	305	18857	2.40	186.0	O. R. <sup>2)</sup>		
6-pole											
920	<b>1PQ4 500-6CV■■</b>	995	96.6	0.86	97	8830	2.50	82.0	2200		
1030	<b>1PQ4 502-6CV■■</b>	995	96.7	0.87	108	9886	2.40	92.0	2200		
1120	<b>1PQ4 504-6CV■■</b>	995	96.8	0.87	116	10750	2.40	103.0	2200		
1400	<b>1PQ4 560-6CV■■</b>	996	97.1	0.86	146	13424	2.70	142.0	2000		
1550	<b>1PQ4 562-6CV■■</b>	996	97.2	0.86	162	14862	2.70	162.0	2000		
1700	<b>1PQ4 564-6CV■■</b>	996	97.3	0.87	176	16300	2.50	189.0	2000		
2050	<b>1PQ4 632-6CV■■</b>	995	97.0	0.88	210	19676	2.40	269.0	O. R. <sup>2)</sup>		
2300	<b>1PQ4 634-6CV■■</b>	995	97.1	0.89	235	22075	2.40	297.0	O. R. <sup>2)</sup>		
2500	<b>1PQ4 636-6CV■■</b>	995	97.1	0.88	255	23995	2.40	323.0	O. R. <sup>2)</sup>		
8-pole											
720	<b>1PQ4 500-8CV■■</b>	746	96.0	0.80	82	9217	2.30	82.0	2200		
760	<b>1PQ4 502-8CV■■</b>	746	96.2	0.81	85	9729	2.30	92.0	2200		
820	<b>1PQ4 504-8CV■■</b>	746	96.3	0.81	92	10497	2.30	102.0	2200		
1050	<b>1PQ4 560-8CV■■</b>	745	96.6	0.82	116	13460	2.40	142.0	2000		
1180	<b>1PQ4 562-8CV■■</b>	745	96.7	0.82	130	15126	2.40	162.0	2000		
1350	<b>1PQ4 564-8CV■■</b>	745	96.8	0.83	146	17305	2.40	189.0	2000		
1500	<b>1PQ4 632-8CV■■</b>	746	96.5	0.83	164	19202	2.50	265.0	O. R. <sup>2)</sup>		
1700	<b>1PQ4 634-8CV■■</b>	746	96.6	0.83	186	21763	2.50	294.0	O. R. <sup>2)</sup>		
1850	<b>1PQ4 636-8CV■■</b>	746	96.7	0.83	200	23683	2.50	320.0	O. R. <sup>2)</sup>		

#### Voltage code:

6 kV, 50 Hz	<b>6</b>
6.6 kV, 50 Hz	<b>7</b>
Other voltage	<b>9</b>

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation. Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> On request.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact (PQ4)

Motor type (repeated)	Constant-torque drive, speed range											
	1:2				1:5				1:10			
	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$	$P_{max}$	$T_{max}$	$\eta$	$\cos \phi$
<b>Constant-torque drive</b>												
<b>4-pole</b>												
1PQ4 500-4...	1180	7548	96.8	0.87	1180	7548	96.8	0.87	1070	6844	96.7	0.86
1PQ4 502-4...	1300	8315	96.9	0.87	1300	8315	96.9	0.87	1200	7676	96.8	0.87
1PQ4 504-4...	1450	9275	97.1	0.88	1450	9275	97.1	0.88	1370	8763	97.0	0.88
1PQ4 560-4...	1600	10228	97.2	0.86	1600	10228	97.2	0.86	1450	9269	97.1	0.84
1PQ4 562-4...	1850	11826	97.4	0.87	1850	11826	97.4	0.87	1700	10867	97.3	0.86
1PQ4 564-4...	2100	13424	97.5	0.87	2100	13424	97.5	0.87	1950	12465	97.4	0.87
1PQ4 632-4...	2400	15341	97.3	0.88	2400	15341	97.3	0.88	2100	13424	97.3	0.87
1PQ4 634-4...	2700	17259	97.4	0.87	2700	17259	97.4	0.87	2450	15661	97.4	0.86
1PQ4 636-4...	2950	18857	97.5	0.87	2950	18857	97.5	0.87	2750	17579	97.5	0.86
<b>6-pole</b>												
1PQ4 500-6...	920	8830	96.6	0.86	920	8830	96.6	0.86	920	8830	96.6	0.86
1PQ4 502-6...	1030	9886	96.7	0.87	1030	9886	96.7	0.87	1030	9886	96.7	0.87
1PQ4 504-6...	1120	10750	96.8	0.87	1120	10750	96.8	0.87	1120	10750	96.8	0.87
1PQ4 560-6...	1400	13424	97.1	0.86	1400	13424	97.1	0.86	1400	13424	97.2	0.86
1PQ4 562-6...	1550	14862	97.2	0.86	1550	14862	97.2	0.86	1550	14862	97.3	0.86
1PQ4 564-6...	1700	16300	97.3	0.87	1700	16300	97.3	0.87	1700	16300	97.4	0.87
1PQ4 632-6...	2050	19676	97.0	0.88	2050	19676	97.0	0.88	2050	19676	97.0	0.88
1PQ4 634-6...	2300	22075	97.1	0.89	2300	22075	97.1	0.89	2300	22075	97.0	0.89
1PQ4 636-6...	2500	23995	97.1	0.88	2500	23995	97.1	0.88	2500	23995	97.1	0.88
<b>8-pole</b>												
1PQ4 500-8...	720	9217	96.0	0.80	720	9217	96.0	0.80	720	9217	96.1	0.81
1PQ4 502-8...	760	9729	96.2	0.81	760	9729	96.2	0.81	760	9729	96.2	0.81
1PQ4 504-8...	820	10497	96.3	0.81	820	10497	96.3	0.81	820	10497	96.3	0.81
1PQ4 560-8...	1050	13460	96.6	0.82	1050	13460	96.6	0.82	1050	13460	96.6	0.82
1PQ4 562-8...	1180	15126	96.7	0.82	1180	15126	96.7	0.82	1180	15126	96.8	0.82
1PQ4 564-8...	1350	17305	96.8	0.83	1350	17305	96.8	0.83	1350	17305	96.8	0.82
1PQ4 632-8...	1500	19202	96.5	0.83	1500	19202	96.5	0.83	1500	19202	96.5	0.83
1PQ4 634-8...	1700	21763	96.6	0.83	1700	21763	96.6	0.83	1700	21763	96.6	0.83
1PQ4 636-8...	1850	23683	96.7	0.83	1850	23683	96.7	0.83	1850	23683	96.7	0.83

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1PQ4

### Selection and ordering data

Rated power kW	High voltage motor H-compact	Rated speed rpm	Operating values at rated output						Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm					
			Efficiency %	Power factor [-]	Rated current A	Rated torque Nm	T <sub>B</sub> /T <sub>rated</sub> [-]									
<b>230 kV, 60 Hz</b>																
4-pole																
1550	<b>1PQ4 500-4CV1■</b>	1793	97.5	0.88	455	8256	2.50	42.3	2400							
1700	<b>1PQ4 502-4CV1■</b>	1793	97.5	0.88	495	9055	2.50	47.0	2400							
1850	<b>1PQ4 504-4CV1■</b>	1793	97.5	0.88	540	9854	2.50	54.2	2400							
2000	<b>1PQ4 560-4CV1■</b>	1794	97.7	0.87	590	10647	2.40	79.0	2200							
2300	<b>1PQ4 562-4CV1■</b>	1794	97.7	0.87	680	12244	2.40	92.0	2200							
2600	<b>1PQ4 564-4CV1■</b>	1794	97.7	0.87	770	13841	2.40	104.0	2200							
6-pole																
1270	<b>1PQ4 500-6CV1■</b>	1195	97.1	0.87	375	10149	2.25	82.1	2200							
1420	<b>1PQ4 502-6CV1■</b>	1196	97.3	0.87	420	11339	2.25	92.4	2200							
1600	<b>1PQ4 504-6CV1■</b>	1195	97.4	0.87	475	12787	2.25	102.6	2200							
1850	<b>1PQ4 560-6CV1■</b>	1195	97.5	0.87	550	14785	2.40	141.5	2000							
2050	<b>1PQ4 562-6CV1■</b>	1195	97.5	0.87	610	16383	2.40	162.1	2000							
2350	<b>1PQ4 564-6CV1■</b>	1195	97.6	0.87	690	18780	2.40	188.5	2000							
8-pole																
1000	<b>1PQ4 500-8CV1■</b>	895	96.7	0.81	320	10670	2.10	81.7	2200							
1100	<b>1PQ4 502-8CV1■</b>	895	96.7	0.81	355	11737	2.10	91.9	2200							
1200	<b>1PQ4 504-8CV1■</b>	895	96.7	0.81	385	12804	2.10	102.2	2200							
1400	<b>1PQ4 560-8CV1■</b>	894	96.9	0.84	430	14955	1.90	141.6	2000							
1630	<b>1PQ4 562-8CV1■</b>	894	97.0	0.84	500	17412	1.90	162.3	2000							
1860	<b>1PQ4 564-8CV1■</b>	894	97.1	0.84	570	19869	2.10	188.8	2000							
2000	<b>1PQ4 634-8CV1■</b>	895	96.7	0.86	600	21341	2.00	294.0	O. R. <sup>2)</sup>							
2160	<b>1PQ4 636-8CV1■</b>	895	96.8	0.86	650	23048	2.10	320.0	O. R. <sup>2)</sup>							

### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> On request.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact (PQ4)

Motor type  
(repeated)

Constant-torque drive, speed range

	1:2			1:5			1:10					
	$P_{\max}$ kW	$T_{\max}$ Nm	$\eta$ %	$\cos \varphi$ [-]	$P_{\max}$ kW	$T_{\max}$ Nm	$\eta$ %	$\cos \varphi$ [-]	$P_{\max}$ kW	$T_{\max}$ Nm	$\eta$ %	$\cos \varphi$ [-]

Constant-torque drive

4-pole

1PQ4 500-4...	1550	8256	97.5	0.88	1550	8256	97.5	0.88	1480	7883	97.5	0.88
1PQ4 502-4...	1700	9055	97.5	0.88	1700	9055	97.5	0.88	1620	8629	97.5	0.88
1PQ4 504-4...	1850	9854	97.5	0.88	1850	9854	97.5	0.88	1780	9481	97.5	0.88
1PQ4 560-4...	2000	10647	97.7	0.87	1940	10327	97.7	0.87	1900	10114	97.7	0.87
1PQ4 562-4...	2300	12244	97.7	0.87	2300	12244	97.7	0.87	2250	11977	97.7	0.87
1PQ4 564-4...	2600	13841	97.7	0.87	2600	13841	97.7	0.87	2550	13574	97.7	0.87

6-pole

1PQ4 500-6...	1270	10149	97.1	0.87	1270	10149	97.1	0.87	1200	9590	97.1	0.87
1PQ4 502-6...	1420	11339	96.9	0.87	1420	11339	96.9	0.87	1350	10780	96.9	0.87
1PQ4 504-6...	1600	12787	97.4	0.87	1600	12787	97.4	0.87	1530	12227	97.4	0.87
1PQ4 560-6...	1850	14785	97.5	0.87	1850	14785	97.5	0.87	1750	13985	97.5	0.87
1PQ4 562-6...	2050	16383	97.5	0.87	2050	16383	97.5	0.87	1950	15584	97.5	0.87
1PQ4 564-6...	2350	18780	97.6	0.87	2350	18780	97.6	0.87	2250	17981	97.6	0.87

8-pole

1PQ4 500-8...	1000	10670	96.7	0.81	1000	10670	96.7	0.81	950	10137	96.7	0.81
1PQ4 502-8...	1100	11737	96.7	0.81	1100	11737	96.7	0.81	1050	11204	96.7	0.81
1PQ4 504-8...	1200	12804	96.7	0.81	1200	12804	96.7	0.81	1150	12271	96.7	0.81
1PQ4 560-8...	1400	14955	96.9	0.84	1400	14955	96.9	0.84	1350	14421	96.9	0.84
1PQ4 562-8...	1630	17412	97.0	0.84	1630	17412	97.0	0.84	1580	16878	97.0	0.84
1PQ4 564-8...	1860	19869	97.1	0.84	1860	19869	97.1	0.84	1800	19228	97.1	0.84
1PQ4 634-8...	1940	20701	96.6	0.85	1580	16859	96.4	0.84	1480	15792	96.4	0.84
1PQ4 636-8...	2095	22354	96.6	0.85	1705	18193	96.5	0.84	1598	17051	96.4	0.84

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact IP04

### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed rpm	Operating values at rated output							Break- down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm
			IEC	Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	T <sub>B</sub> /T <sub>rated</sub> [-]				
<b>34 ... 416 kV, 60 Hz</b>												
4-pole												
1550	<b>1PQ4 500-4CV5■</b>	1793	97.5	0.88	250	8256	2.50	42.3	2400			
1700	<b>1PQ4 502-4CV5■</b>	1793	97.5	0.88	275	9055	2.50	47.0	2400			
1850	<b>1PQ4 504-4CV5■</b>	1793	97.5	0.88	300	9854	2.50	54.2	2400			
2000	<b>1PQ4 560-4CV5■</b>	1794	97.7	0.87	325	10647	2.40	79.0	2200			
2300	<b>1PQ4 562-4CV5■</b>	1794	97.7	0.87	375	12244	2.40	92.0	2200			
2600	<b>1PQ4 564-4CV5■</b>	1794	97.7	0.87	425	13841	2.40	104.0	2200			
2950	<b>1PQ4 632-4CV5 0</b>	1794	97.2	0.87	485	15704	2.40	157.0	O. R. <sup>2)</sup>			
3320	<b>1PQ4 634-4CV5 0</b>	1794	97.3	0.87	540	17673	2.20	171.0	O. R. <sup>2)</sup>			
3600	<b>1PQ4 636-4CV5 0</b>	1795	97.5	0.87	590	19153	2.40	186.0	O. R. <sup>2)</sup>			
6-pole												
1270	<b>1PQ4 500-6CV5■</b>	1195	97.1	0.87	210	10149	2.25	82.1	2200			
1420	<b>1PQ4 502-6CV5■</b>	1196	97.3	0.87	235	11339	2.25	92.4	2200			
1600	<b>1PQ4 504-6CV5■</b>	1195	97.4	0.87	260	12787	2.25	102.6	2200			
1850	<b>1PQ4 560-6CV5■</b>	1195	97.5	0.87	305	14785	2.40	141.5	2000			
2050	<b>1PQ4 562-6CV5■</b>	1195	97.5	0.87	335	16383	2.40	162.1	2000			
2350	<b>1PQ4 564-6CV5■</b>	1195	97.6	0.87	385	18780	2.40	188.5	2000			
2400	<b>1PQ4 632-6CV5■</b>	1195	96.8	0.89	385	19180	2.40	269.0	O. R. <sup>2)</sup>			
2700	<b>1PQ4 634-6CV5■</b>	1195	96.9	0.89	435	21577	2.20	297.0	O. R. <sup>2)</sup>			
2900	<b>1PQ4 636-6CV5■</b>	1195	97.0	0.89	465	23176	2.20	323.0	O. R. <sup>2)</sup>			
8-pole												
1000	<b>1PQ4 500-8CV5■</b>	895	96.7	0.81	178	10670	2.10	81.7	2200			
1100	<b>1PQ4 502-8CV5■</b>	895	96.7	0.81	194	11737	2.10	91.9	2200			
1200	<b>1PQ4 504-8CV5■</b>	895	96.7	0.81	215	12804	2.10	102.2	2200			
1400	<b>1PQ4 560-8CV5■</b>	894	96.9	0.84	240	14955	1.90	141.6	2000			
1630	<b>1PQ4 562-8CV5■</b>	894	97.0	0.84	280	17412	1.90	162.3	2000			
1860	<b>1PQ4 564-8CV5■</b>	894	97.1	0.84	315	19869	2.10	188.8	2000			
1960	<b>1PQ4 634-8CV5■</b>	895	96.7	0.86	325	20914	2.00	294.0	O. R. <sup>2)</sup>			
2160	<b>1PQ4 636-8CV5■</b>	895	96.8	0.86	360	23048	2.10	320.0	O. R. <sup>2)</sup>			

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>
IM V1 (without canopy)	<b>8</b>

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> On request.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1PQ4

Motor type  
(repeated)

Constant-torque drive, speed range

1:2

$P_{max}$   
kW

$T_{max}$   
Nm

$\eta$   
%

$\cos \phi$   
[-]

1:5

$P_{max}$   
kW

$T_{max}$   
Nm

$\eta$   
%

$\cos \phi$   
[-]

1:10

$P_{max}$   
kW

$T_{max}$   
Nm

$\eta$   
%

$\cos \phi$   
[-]

Constant-torque drive

4-pole

1PQ4 500-4...	1550	8256	97.5	0.88	1550	8256	97.5	0.88	1480	7883	97.5	0.88
1PQ4 502-4...	1700	9055	97.5	0.88	1700	9055	97.5	0.88	1620	8629	97.5	0.88
1PQ4 504-4...	1850	9854	97.5	0.88	1850	9854	97.5	0.88	1780	9481	97.5	0.88
1PQ4 560-4...	2000	10647	97.7	0.87	1940	10327	97.7	0.87	1900	10114	97.7	0.87
1PQ4 562-4...	2300	12244	97.7	0.87	2300	12244	97.7	0.87	2250	11977	97.7	0.87
1PQ4 564-4...	2600	13841	97.7	0.87	2600	13841	97.7	0.87	2550	13574	97.7	0.87
1PQ4 632-4...	2860	15225	97.2	0.87	2330	12403	97.0	0.86	2185	11631	96.9	0.85
1PQ4 634-4...	3220	17141	97.3	0.87	2625	13974	97.1	0.86	2455	13069	97.1	0.85
1PQ4 636-4...	3490	18568	97.4	0.87	2845	15136	97.2	0.86	2665	14179	97.2	0.85

6-pole

1PQ4 500-6...	1270	10149	97.1	0.87	1270	10149	97.1	0.87	1200	9590	97.1	0.87
1PQ4 502-6...	1420	11339	96.9	0.87	1420	11339	96.9	0.87	1350	10780	96.9	0.87
1PQ4 504-6...	1600	12787	97.4	0.87	1600	12787	97.4	0.87	1530	12227	97.4	0.87
1PQ4 560-6...	1850	14785	97.5	0.87	1850	14785	97.5	0.87	1750	13985	97.5	0.87
1PQ4 562-6...	2050	16383	97.5	0.87	2050	16383	97.5	0.87	1950	15584	97.5	0.87
1PQ4 564-6...	2350	18780	97.6	0.87	2350	18780	97.6	0.87	2250	17981	97.6	0.87
1PQ4 632-6...	2330	18621	96.7	0.89	1895	15144	96.5	0.88	1775	14185	96.4	0.88
1PQ4 634-6...	2620	20938	96.9	0.89	2135	17062	96.8	0.89	2000	15983	96.7	0.88
1PQ4 636-6...	2815	22496	97.0	0.89	2290	18301	96.9	0.89	2145	17142	96.8	0.88

8-pole

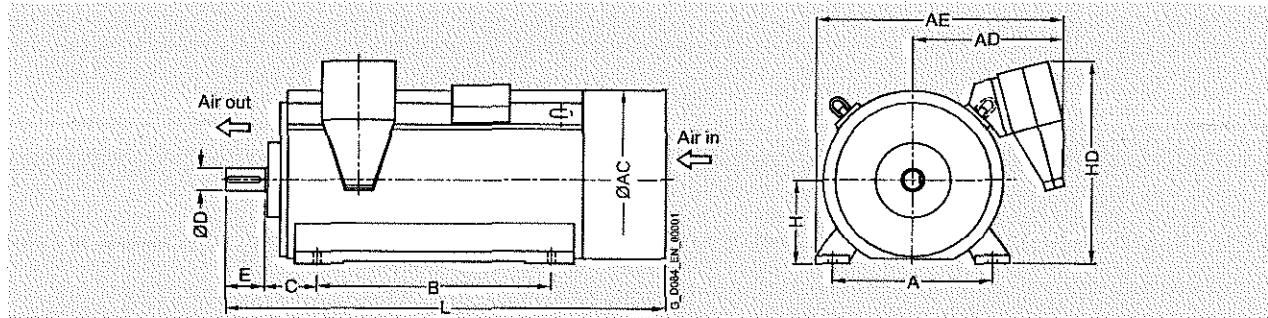
1PQ4 500-8...	1000	10670	96.7	0.81	1000	10670	96.7	0.81	950	10137	96.7	0.81
1PQ4 502-8...	1100	11737	96.7	0.81	1100	11737	96.7	0.81	1050	11204	96.7	0.81
1PQ4 504-8...	1200	12804	96.7	0.81	1200	12804	96.7	0.81	1150	12271	96.7	0.81
1PQ4 560-8...	1400	14955	96.9	0.84	1400	14955	96.9	0.84	1350	14421	96.9	0.84
1PQ4 562-8...	1630	17412	97.0	0.84	1630	17412	97.0	0.84	1580	16878	97.0	0.84
1PQ4 564-8...	1860	19869	97.1	0.84	1860	19869	97.1	0.84	1800	19228	97.1	0.84
1PQ4 634-8...	1901	20284	96.5	0.85	1548	16518	96.4	0.84	1450	15472	96.3	0.83
1PQ4 636-8...	2095	22354	96.6	0.85	1706	18204	96.5	0.84	1598	17051	96.4	0.83

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1PQ4

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)3)</sup> mm	AE <sup>1)2)3)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>4)</sup> mm
<b>Up to 3.15 kV: tandem bearings, IMB3 type of construction</b>											
2-pole											
1PQ4454-2CM00	5350	850	960	920	1440	1250	280	95	130	450	1100
4-pole											
1PQ4454-4AM00	5300	850	960	920	1440	1250	280	130	200	450	1100
1PQ4500-4C..0	6400	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4502-4C..0	6800	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4504-4C..0	7300	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4560-4C..0	8600	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4562-4C..0	9300	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4564-4C..0	10100	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4632-4C..0	12700	1120	1350	945	1560	1600	335	170	240	630	1410
1PQ4634-4C..0	13300	1120	1350	945	1560	1600	335	170	240	630	1410
1PQ4636-4C..0	14200	1120	1350	945	1560	1600	335	170	240	630	1410
6-pole											
1PQ4454-6AM00	5400	850	960	920	1440	1250	280	130	200	450	1100
1PQ4500-6C..0	6700	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4502-6C..0	7100	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4504-6C..0	7600	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4560-6C..0	8900	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4562-6C..0	9600	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4564-6C..0	10500	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4632-6C..0	12800	1120	1350	960	1630	1600	335	180	240	630	1410
1PQ4634-6C..0	13800	1120	1350	960	1630	1600	335	180	240	630	1410
1PQ4636-6C..0	14600	1120	1350	960	1630	1600	335	180	240	630	1410
8-pole											
1PQ4454-8AM00	5400	850	960	920	1630	1250	280	130	200	450	1100
1PQ4500-8C..0	6700	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4502-8C..0	7000	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4504-8C..0	7500	950	1070	875	1440	1320	315	140	200	500	1200
1PQ4560-8C..0	8900	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4562-8C..0	9600	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4564-8C..0	10400	1060	1210	925	1560	1400	335	160	240	560	1310
1PQ4632-8C..0	12800	1120	1350	960	1630	1600	335	180	240	630	1410
1PQ4634-8C..0	13400	1120	1350	960	1630	1600	335	180	240	630	1410
1PQ4636-8C..0	14300	1120	1350	960	1630	1600	335	180	240	630	1410

Note: Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} = 690$  V, the dimension changes by + 100 mm.

<sup>2)</sup> For  $V_{rated} = 690$  V and  $I_{rated} > 1230$  A, the dimension changes by + 475 mm (a second main terminal box is required).

<sup>3)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>4)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

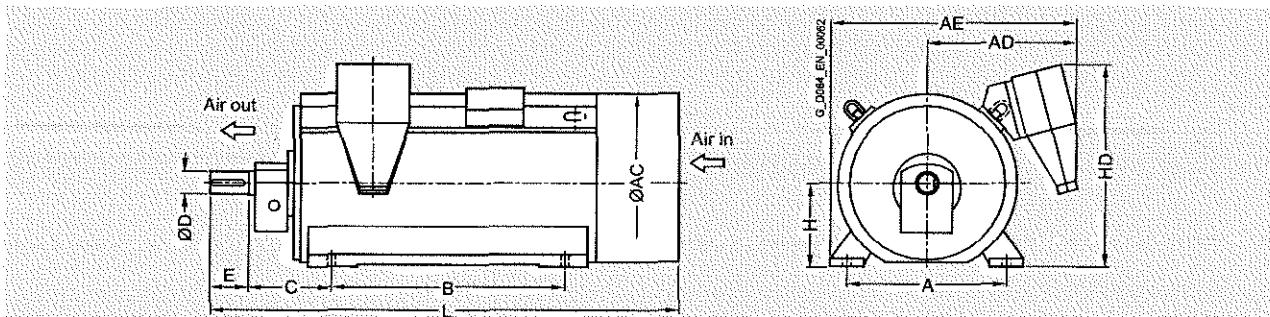


# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact (IP04)

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AC mm	AD <sup>1)3)</sup> mm	AE <sup>1)2)3)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>4)</sup> mm
<b>Up to 3.6 kV, single bearings, 1 m/s body type of construction</b>											
2-pole											
1PQ4454-2AM00-Z K96	5400	850	960	920	1440	1250	475	95	130	450	1100
4-pole											
1PQ4454-4AM00-Z K96	5300	850	960	920	1440	1250	475	130	200	450	1100
1PQ4500-4C..0-Z K96	6400	950	1070	875	1440	1320	500	140	200	500	1200
1PQ4502-4C..0-Z K96	6800	950	1070	875	1440	1320	500	140	200	500	1200
1PQ4504-4C..0-Z K96	7300	950	1070	875	1440	1320	500	140	200	500	1200
1PQ4560-4C..0-Z K96	8600	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4562-4C..0-Z K96	9300	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4564-4C..0-Z K96	10100	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4632-4C..0-Z K96	12700	1120	1350	945	1560	1600	560	170	240	630	1410
1PQ4634-4C..0-Z K96	13300	1120	1350	945	1560	1600	560	170	240	630	1410
1PQ4636-4C..0-Z K96	14200	1120	1350	945	1560	1600	560	170	240	630	1410
6-pole											
1PQ4454-6AM00-Z K96	5400	850	960	920	1440	1250	475	130	200	450	1100
1PQ4500-6C..0-Z K96	6700	950	1070	875	1440	1320	530	140	200	500	1200
1PQ4502-6C..0-Z K96	7100	950	1070	875	1440	1320	530	140	200	500	1200
1PQ4504-6C..0-Z K96	7600	950	1070	875	1440	1320	530	140	200	500	1200
1PQ4560-6C..0-Z K96	8900	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4562-6C..0-Z K96	9600	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4564-6C..0-Z K96	10500	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4632-6C..0-Z K96	12800	1120	1350	960	1630	1600	560	180	240	630	1410
1PQ4634-6C..0-Z K96	13800	1120	1350	960	1630	1600	560	180	240	630	1410
1PQ4636-6C..0-Z K96	14600	1120	1350	960	1630	1600	560	180	240	630	1410
8-pole											
1PQ4454-8AM00-Z K96	5400	850	960	920	1630	1250	475	130	200	450	1100
1PQ4500-8C..0-Z K96	6700	950	1070	875	1440	1320	530	140	200	500	1200
1PQ4502-8C..0-Z K96	7000	950	1070	875	1440	1320	530	140	200	500	1200
1PQ4504-8C..0-Z K96	7500	950	1070	875	1440	1320	530	140	200	500	1200
1PQ4560-8C..0-Z K96	8900	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4562-8C..0-Z K96	9600	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4564-8C..0-Z K96	10400	1060	1210	925	1560	1400	560	160	240	560	1310
1PQ4632-8C..0-Z K96	12800	1120	1350	960	1630	1600	560	180	240	630	1410
1PQ4634-8C..0-Z K96	13400	1120	1350	960	1630	1600	560	180	240	630	1410
1PQ4636-8C..0-Z K96	14300	1120	1350	960	1630	1600	560	180	240	630	1410

Note: Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} = 690$  V, the dimension changes by + 100 mm.

<sup>2)</sup> For  $V_{rated} = 690$  V and  $I_{rated} > 1230$  A, the dimension changes by + 475 mm (a second main terminal box is required).

<sup>3)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

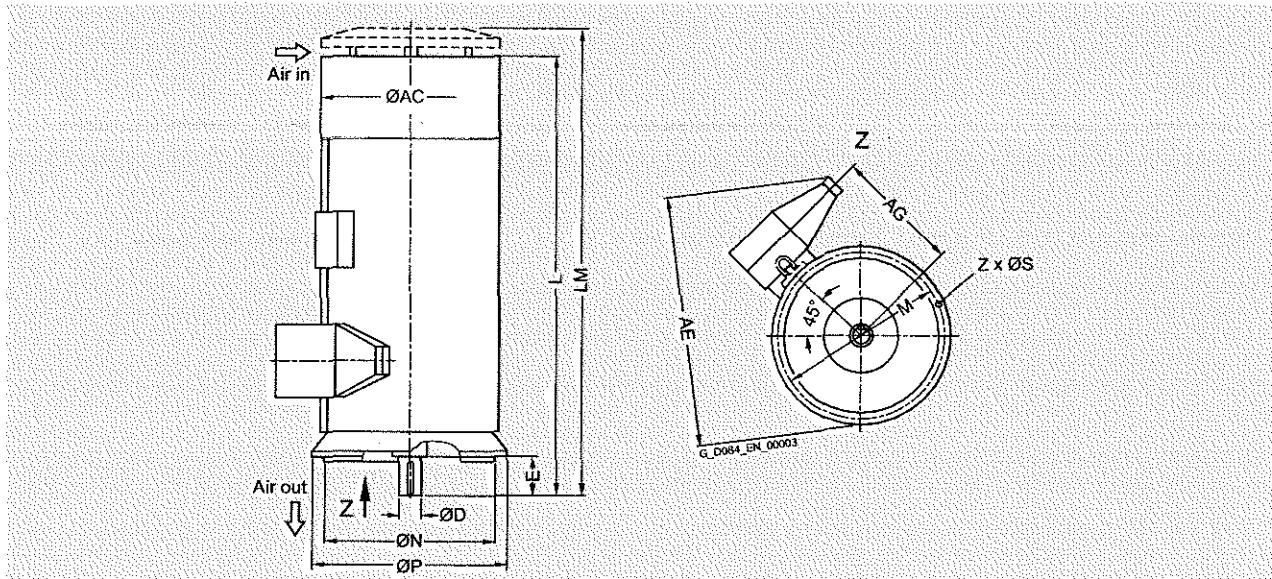
<sup>4)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 70 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact 1PQ4

### Dimension drawings



Motor type	Weight kg	Dimensions AC mm	Dimensions AG <sup>1)</sup> <sup>2)</sup> mm	Dimensions AE <sup>3)</sup> mm	D mm	E mm	L mm	LM mm	P mm	N mm	M mm	S mm	Z	Quantity
<b>1.6-3.6 kV roller bearings, M1 type of construction</b>														
<b>4-pole</b>														
1PQ4454-4AM04	5200	960	770	1550	130	200	3062	3212	1150	1000	1080	26	8	
1PQ4500-4C..4	6200	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4502-4C..4	6600	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4504-4C..4	7100	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4560-4C..4	8400	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
1PQ4562-4C..4	9100	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
1PQ4564-4C..4	9800	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
<b>6-pole</b>														
1PQ4454-6AM04	5500	960	770	1550	130	200	3062	3212	1150	1000	1080	26	8	
1PQ4500-6C..4	6500	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4502-6C..4	6900	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4504-6C..4	7400	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4560-6C..4	8600	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
1PQ4562-6C..4	9400	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
1PQ4564-6C..4	10200	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
1PQ4632-6C..4	13100	1350	980	1820	180	240	3564	3614	1400	1250	1320	26	16	
1PQ4634-6C..4	13800	1350	980	1820	180	240	3564	3614	1400	1250	1320	26	16	
1PQ4636-6C..4	14600	1350	980	1820	180	240	3564	3614	1400	1250	1320	26	16	
<b>8-pole</b>														
1PQ4454-8AM04	5500	960	770	1550	130	200	3062	3212	1000	1150	1080	26	8	
1PQ4500-8C..4	6500	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4502-8C..4	6900	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4504-8C..4	7300	1070	840	1660	140	200	3205	3255	1250	1120	1180	26	16	
1PQ4560-8C..4	8600	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
1PQ4562-8C..4	9300	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
1PQ4564-8C..4	10100	1210	910	1800	160	240	3496	3546	1400	1250	1320	26	16	
1PQ4632-8C..4	13100	1350	980	1820	180	240	3564	3614	1400	1250	1320	26	16	
1PQ4634-8C..4	13800	1350	980	1820	180	240	3564	3614	1400	1250	1320	26	16	
1PQ4636-8C..4	14600	1350	980	1820	180	240	3564	3614	1400	1250	1320	26	16	

Note: Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} = 690$  V, the dimension changes by - 50 mm.

<sup>2)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 45 mm.

<sup>3)</sup> For currents  $I_{rated} > 315$  A, the dimension changes by + 180 mm.

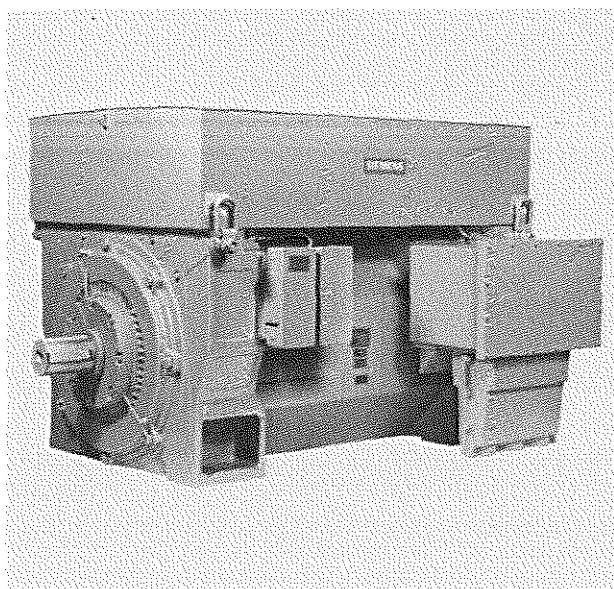
# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Overview



### Technical data

#### Overview of technical data

##### H-compact PLUS 1RA4, 1RA6 and 1RP6

Rated voltage	690 V ... 4.16 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3; IM V1
Degree of protection	IP23
Cooling method	IC01
Stator winding insulation	Insulation system, thermal class 155 (F), utilized to 155 (F)
Shaft height	450 ... 630 mm
Bearings	Roller bearings, sleeve bearings
Cage material	Copper
Standards	IEC, EN
Frame design for shaft heights 450 ... 560 mm	Frame: Cast iron Cooling enclosure: Steel
Frame design for shaft heights 630 mm	Frame: Steel Cooling enclosure: Steel

The following versions can be offered on request:

- 2-pole up to 75 Hz
- 4-pole up to 100 Hz
- 6-pole up to 90 Hz

For individual motor types, it must be ensured that the motor does not run-through any critical speed in the required speed control range and that the maximum speed does not exceed the mechanical speed limit of the motor! Please contact your Siemens sales person regarding this check. The motor types are marked with footnotes in the following data tables.

### Technical data (continued)

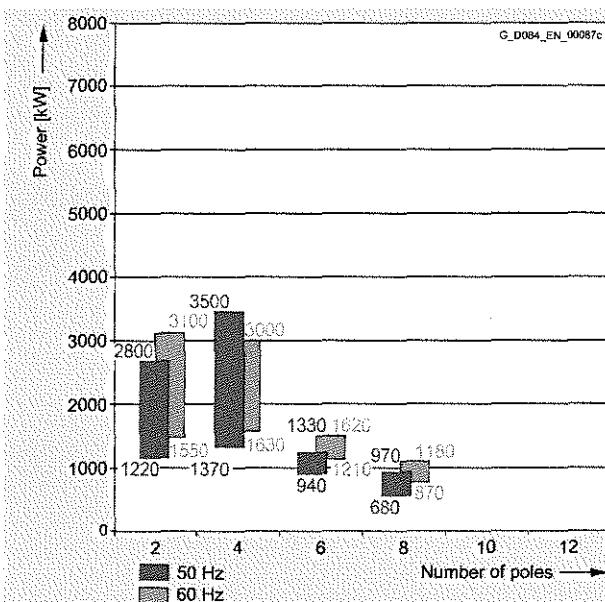
#### Power ranges for IEC motors with reinforced insulation for SINAMICS drive converters without sine-wave filter

##### 1RA4/1RA6 and 1RP6 series

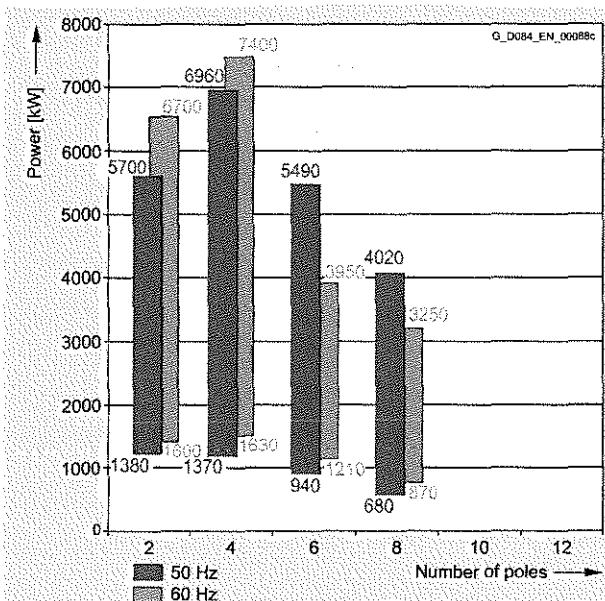
Insulation system, thermal class 155 (F), utilized to 155 (F)

The power data listed here apply for an ambient temperature of 40 °C and an installation altitude ≤ 1000 m.

690 V; 50 Hz and 60 Hz



3.4 kV to 4.16 kV; 50 Hz and 60 Hz<sup>1)</sup>



<sup>1)</sup> Maximum and minimum power ratings can be different for specific voltage levels.

# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

#### H-compact PLUS 1RA4, 1RA6 and 1RP6

##### Selection and ordering data

Rated power kW	High voltage motor H-compact PLUS	Rated speed n <sub>rated</sub> rpm	Operating values at rated output								
			Efficiency η %	Power factor cos φ [-]	Rated current I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> / T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm		
<b>690 V, 50 Hz</b>											
2-pole											
1220	<b>1RA6 450-2HP00</b>	2980	95.5	0.90	1180	3913	2.20	13	3000		
1520	<b>1RA6 452-2HP00</b>	2980	96.0	0.90	2x740	4875	2.10	14	3000		
1600	<b>1RA6 454-2HP00</b>	2983	96.2	0.92	2x760	5129	2.30	16	3000		
1700	<b>1RA6 456-2HP00</b>	2983	96.2	0.92	2x800	5445	2.30	18	3000		
2250	<b>1RA6 500-2HP00</b>	2975	96.4	0.90	2x1080	7222	2.30	19	3000		
2550	<b>1RA6 502-2HP00</b>	2974	96.6	0.90	2x1220	8188	2.10	20	3000		
2800	<b>1RA6 504-2HP00</b>	2977	96.7	0.92	4x660	8982	2.50	24	3000 <sup>3)</sup>		
4-pole											
1370	<b>1RA6 450-4HP00</b>	1484	95.6	0.89	2x670	8833	2.40	20	1800		
1500	<b>1RA6 452-4HP00</b>	1484	95.6	0.90	2x730	9671	2.40	22	1800		
1640	<b>1RA6 454-4HP00</b>	1484	96.0	0.90	2x790	10568	2.40	25	1800		
1860	<b>1RA6 456-4HP00</b>	1485	96.2	0.90	2x900	11977	2.30	29	1800		
2300 <sup>2)</sup>	<b>1RA6 500-4HP00</b>	1486	96.6	0.90	2x1100	14780	2.40	42	1800		
2350 <sup>2)</sup>	<b>1RA6 502-4HP00</b>	1486	96.6	0.92	2x1100	15102	2.50	46	1800		
2800 <sup>2)</sup>	<b>1RA6 504-4HP00</b>	1488	96.9	0.90	4x670	17969	2.60	52	1800		
3200 <sup>2)</sup>	<b>1RA6 560-4HP00</b>	1486	96.8	0.90	4x770	20564	2.15	82	1800		
3500 <sup>2)</sup>	<b>1RA6 562-4HP00</b>	1487	96.9	0.88	4x860	22476	2.15	93	1800		
6-pole											
940	<b>1RA6 450-6HP00</b>	990	95.8	0.86	950	9079	2.30	26	1200		
1040	<b>1RA6 452-6HP00</b>	991	95.9	0.86	1060	10039	2.30	29	1200		
1180	<b>1RA6 454-6HP00</b>	991	96.0	0.86	1200	11394	2.30	32	1200		
1330	<b>1RA6 456-6HP00</b>	992	96.2	0.86	2x670	12823	2.30	37	1200		
8-pole											
680	<b>1RA6 450-8HP00</b>	743	94.9	0.83	720	8750	2.30	32	1200		
750	<b>1RA6 452-8HP00</b>	743	95.2	0.84	780	9651	2.40	36	1200		
880	<b>1RA6 454-8HP00</b>	743	95.2	0.84	920	11324	2.40	40	1200		
970	<b>1RA6 456-8HP00</b>	744	95.4	0.84	1020	12476	2.40	46	1200		

##### Type of construction:

IM B3 0  
IM V1 (without canopy) 8

##### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> Data of vertical motors (IM V1) on request.

<sup>3)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

Motor type  
(repeated)

Partial load values for square-law torque drive

 $P/P_{rated} = 75\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \varphi$   
[-] $P/P_{rated} = 50\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \varphi$   
[-] $P/P_{rated} = 25\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \varphi$   
[-]

Square-law torque drive

2-pole

1RA6 450-2HP0.	916	2709	95.8	0.91	610	2371	96.0	0.90	305	1883	96.0	0.85
1RA6 452-2HP0.	1141	2708	96.4	0.91	760	2371	96.6	0.91	380	1883	96.5	0.87
1RA6 454-2HP0.	1201	2710	96.5	0.92	800	2372	96.6	0.91	400	1884	96.6	0.87
1RA6 456-2HP0.	1276	2711	96.5	0.92	850	2373	96.7	0.92	425	1884	96.6	0.88
1RA6 500-2HP0.	1688	2708	96.8	0.89	1125	2369	97.1	0.87	563	1883	97.2	0.79
1RA6 502-2HP0.	1913	2707	96.9	0.89	1275	2368	97.2	0.87	638	1882	97.4	0.80
1RA6 504-2HP0.	2101	2710	97.0	0.91	1400	2370	97.3	0.90	701	1883	97.5	0.84

4-pole

1RA6 450-4HP0.	1028	1350	95.9	0.88	685	1182	96.1	0.86	343	940	95.9	0.79
1RA6 452-4HP0.	1125	1350	96.0	0.90	750	1182	96.2	0.88	375	940	96.2	0.83
1RA6 454-4HP0.	1230	1350	96.3	0.90	820	1183	96.5	0.89	410	940	96.4	0.84
1RA6 456-4HP0.	1395	1351	96.5	0.89	930	1183	96.6	0.88	465	941	96.5	0.82
1RA6 500-4HP0.	1726	1353	96.9	0.89	1150	1183	97.2	0.86	575	941	97.4	0.77
1RA6 502-4HP0.	1763	1353	97.0	0.91	1175	1184	97.3	0.88	588	941	97.4	0.80
1RA6 504-4HP0.	2100	1354	97.2	0.89	1400	1184	97.4	0.85	700	941	97.5	0.74
1RA6 560-4HP0.	2401	1353	97.2	0.90	1600	1184	97.5	0.90	801	941	97.7	0.87
1RA6 562-4HP0.	2626	1354	97.2	0.89	1750	1184	97.5	0.89	876	941	97.7	0.85

6-pole

1RA6 450-6HP0.	705	900	96.1	0.85	470	789	96.3	0.82	235	627	96.2	0.73
1RA6 452-6HP0.	780	901	96.3	0.85	520	789	96.4	0.82	260	627	96.3	0.73
1RA6 454-6HP0.	885	901	96.3	0.85	590	789	96.4	0.83	295	627	96.4	0.74
1RA6 456-6HP0.	998	902	96.5	0.84	665	789	96.6	0.81	333	627	96.3	0.71

8-pole

1RA6 450-8HP0.	510	676	95.1	0.80	340	592	95.0	0.75	170	470	94.4	0.63
1RA6 452-8HP0.	563	676	95.4	0.81	375	592	95.4	0.77	188	470	94.9	0.65
1RA6 454-8HP0.	660	676	95.4	0.82	440	592	95.4	0.77	220	470	94.8	0.65
1RA6 456-8HP0.	728	676	95.6	0.82	485	592	95.6	0.77	243	470	95.1	0.65



# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

H-compact PI US 1RA4, 1RA6 and 1RP6

#### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Rated speed rpm	Operating values at rated output:								
			Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>2)</sup> rpm		
<b>3.4 ... 4.16 kV, 50 Hz</b>											
2-pole											
1380	<b>1RA6 450-2HS40</b>	2973	95.9	0.90	220	4433	2.00	13	3000		
1570	<b>1RA6 452-2HS40</b>	2977	96.2	0.90	250	5040	2.20	14	3000		
1750	<b>1RA6 454-2HS40</b>	2978	96.4	0.91	275	5616	2.30	16	3000		
1950	<b>1RA6 456-2HS40</b>	2981	96.6	0.92	305	6252	2.30	18	3000		
2550	<b>1RA6 500-2HS40</b>	2967	96.2	0.89	415	8207	1.90	19	3000		
2700	<b>1RA6 502-2HS40</b>	2969	96.3	0.90	430	8684	2.00	20	3000		
3200	<b>1RA6 504-2HS40</b>	2974	96.6	0.91	510	10275	2.40	24	3000 <sup>5)</sup>		
3550	<b>1RA6 506-2HS40</b>	2975	96.9	0.92	550	11395	2.40	26	3000 <sup>5)</sup>		
3700	<b>1RA6 560-2HS40</b>	2977	96.7	0.90	590	11868	1.90	39	3000 <sup>5)</sup>		
4300	<b>1RA6 562-2HS40</b>	2979	97.0	0.90	680	13784	2.05	43	3000 <sup>5)</sup>		
5000	<b>1RA6 564-2HS40</b>	2981	97.1	0.90	790	16017	2.25	49	3000 <sup>5)</sup>		
5700	<b>1RA6 566-2HS40</b>	2982	97.3	0.90	2x450	18253	2.45	54	3000 <sup>5)</sup>		
4-pole											
1370	<b>1RA6 450-4HS40</b>	1484	95.6	0.88	225	8824	2.60	20	1800		
1500	<b>1RA6 452-4HS40</b>	1485	95.8	0.88	245	9649	2.50	22	1800		
1640	<b>1RA6 454-4HS40</b>	1485	96.0	0.89	265	10549	2.50	25	1800		
1860	<b>1RA6 456-4HS40</b>	1485	96.1	0.90	300	11966	2.50	29	1800		
2500 <sup>4)</sup>	<b>1RA6 500-4HS40</b>	1485	96.4	0.90	400	16076	2.30	42	1800		
2800 <sup>4)</sup>	<b>1RA6 502-4HS40</b>	1485	96.5	0.90	445	18005	2.20	46	1800		
3150 <sup>4)</sup>	<b>1RA6 504-4HS40</b>	1485	96.7	0.91	495	20256	2.30	52	1800		
3450 <sup>1)(4)</sup>	<b>1RA6 506-4HS40</b>	1486	96.8	0.91	540	22170	2.30	56	1800		
3900 <sup>4)</sup>	<b>1RA6 560-4HS40</b>	1489	97.0	0.89	630	25012	1.95	84	1800		
4500 <sup>4)</sup>	<b>1RA6 562-4HS40</b>	1489	97.1	0.89	720	28860	2.00	94	1800		
5000 <sup>4)</sup>	<b>1RA6 564-4HS40</b>	1490	97.2	0.89	800	32045	2.10	105	1800		
5500 <sup>4)</sup>	<b>1RA6 566-4HS40</b>	1490	97.4	0.87	2x450	35249	2.20	115	1800		
5880 <sup>1)</sup>	<b>1RA4 632-4HV■■</b>	1490	97.2	0.89	1180	37687	2.20	150	1800		
6470 <sup>1)</sup>	<b>1RA4 634-4HV■■</b>	1490	97.3	0.90	1300	41469	2.20	168	1800		
6960 <sup>1)</sup>	<b>1RA4 636-4HV■■</b>	1491	97.4	0.90	1390	44579	2.40	197	1800		

#### Voltage code:

4.16 kV, 50 Hz  
Other voltage

4

9

#### Type of construction:

IM B3

0

IM V1 (without canopy)

8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.

Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

<sup>1)</sup> Rated voltage less than 4.16 kV on request.

<sup>2)</sup> For IM B3, roller bearings.

<sup>3)</sup> On request.

<sup>4)</sup> Data of vertical motors (IM V1) on request.

<sup>5)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS IRA4, IRA6 and IRP6

Motor type  
(repeated)

Partial load values for square-law torque drive

 $P/P_{rated} = 75\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \varphi$   
[-] $P/P_{rated} = 50\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \varphi$   
[-] $P/P_{rated} = 25\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \varphi$   
[-]

Square-law torque drive

2-pole

1RA6 450-2...	1035	2704	96.1	0.91	690	2368	96.3	0.91	345	1882	96.4	0.87
1RA6 452-2...	1178	2707	96.4	0.91	785	2370	96.5	0.90	393	1883	96.4	0.87
1RA6 454-2...	1313	2707	96.6	0.92	875	2370	96.7	0.91	438	1883	96.6	0.88
1RA6 456-2...	1464	2709	96.8	0.92	975	2371	96.9	0.91	488	1884	96.8	0.88
1RA6 500-2...	1914	2704	96.7	0.88	1276	2366	97.0	0.87	638	1881	97.2	0.81
1RA6 502-2...	2026	2705	96.7	0.90	1350	2367	97.1	0.88	675	1882	97.2	0.83
1RA6 504-2...	2401	2708	97.0	0.90	1600	2369	97.2	0.88	801	1883	97.3	0.81
1RA6 506-2...	2663	2708	97.2	0.91	1775	2369	97.4	0.89	888	1883	97.5	0.83
1RA6 560-2...	2777	2709	97.0	0.90	1851	2370	97.3	0.91	925	1883	97.4	0.88
1RA6 562-2...	3226	2711	97.2	0.90	2151	2371	97.5	0.90	1076	1884	97.5	0.87
1RA6 564-2...	3751	2712	97.4	0.91	2500	2371	97.6	0.90	1251	1884	97.6	0.86
1RA6 566-2...	4276	2713	97.5	0.90	2850	2372	97.7	0.89	1426	1885	97.7	0.85

4-pole

1RA6 450-4...	1028	1350	95.8	0.87	685	1183	96.0	0.85	343	940	95.8	0.78
1RA6 452-4...	1125	1351	96.0	0.87	750	1183	96.1	0.85	375	941	95.9	0.77
1RA6 454-4...	1230	1351	96.2	0.89	820	1183	96.3	0.87	410	941	96.2	0.80
1RA6 456-4...	1395	1351	96.3	0.90	930	1183	96.5	0.88	465	941	96.4	0.83
1RA6 500-4...	1876	1352	96.7	0.89	1250	1183	97.0	0.86	625	941	97.1	0.76
1RA6 502-4...	2101	1352	96.9	0.89	1400	1183	97.1	0.86	700	941	97.2	0.77
1RA6 504-4...	2363	1353	97.0	0.90	1575	1183	97.3	0.88	788	941	97.3	0.79
1RA6 506-4...	2588	1353	97.1	0.90	1725	1184	97.3	0.88	863	941	97.4	0.79
1RA6 560-4...	2927	1355	97.3	0.90	1950	1185	97.5	0.90	976	942	97.6	0.86
1RA6 562-4...	3377	1355	97.4	0.90	2250	1185	97.6	0.89	1126	942	97.7	0.85
1RA6 564-4...	3752	1356	97.5	0.89	2500	1185	97.7	0.89	1251	942	97.7	0.84
1RA6 566-4...	4126	1356	97.6	0.88	2750	1186	97.8	0.87	1376	942	97.8	0.81
1RA4 632-4...	O. R. <sup>3)</sup>											
1RA4 634-4...	O. R. <sup>3)</sup>											
1RA4 636-4...	O. R. <sup>3)</sup>											

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

## Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Rated speed rpm	Operating values at rated output							
			Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>(2)</sup> rpm	
<b>3.4 ... 4.16 kV, 50 Hz</b>										
6-pole										
940	<b>1RA6 450-6HS4■■</b>	990	95.7	0.85	160	9071	2.40	26	1200	
1040	<b>1RA6 452-6HS4■■</b>	991	95.9	0.85	178	10026	2.50	29	1200	
1180	<b>1RA6 454-6HS4■■</b>	991	96.1	0.86	198	11381	2.50	32	1200	
1330	<b>1RA6 456-6HS4■■</b>	992	96.2	0.85	225	12811	2.50	37	1200	
1860	<b>1RA4 500-6HV■■■</b>	988	95.7	0.86	395	17977	1.90	57	1200	
2100	<b>1RA4 502-6HV■■■</b>	989	96.1	0.87	440	20277	2.00	65	1200	
2340	<b>1RA4 504-6HV■■■</b>	990	96.2	0.87	490	22571	2.00	72	1200	
2560	<b>1RA4 506-6HV■■■</b>	990	96.4	0.87	530	24693	2.00	81	1200	
3000	<b>1RA4 560-6HV■■■</b>	990	96.5	0.86	630	28939	1.90	105	1200	
3380 <sup>(1)</sup>	<b>1RA4 562-6HV■■■</b>	991	96.7	0.86	710	32572	1.90	120	1200	
3750 <sup>(1)</sup>	<b>1RA4 564-6HV■■■</b>	991	96.7	0.87	780	36138	2.00	135	1200	
4300 <sup>(1)</sup>	<b>1RA4 566-6HV■■■</b>	991	97.0	0.87	890	41438	2.00	147	O. R. <sup>(3)</sup>	
4610 <sup>(1)</sup>	<b>1RA4 632-6HV■■■</b>	993	97.0	0.86	970	44336	2.10	202	1200	
5000 <sup>(1)</sup>	<b>1RA4 634-6HV■■■</b>	993	97.1	0.86	1040	48087	2.30	223	1200	
5490 <sup>(1)</sup>	<b>1RA4 636-6HV■■■</b>	994	97.2	0.86	1140	52746	2.30	246	1200	
8-pole										
680	<b>1RA6 450-8HS4■■</b>	743	94.7	0.82	122	8743	2.50	32	1200	
750	<b>1RA6 452-8HS4■■</b>	744	95.0	0.82	134	9638	2.50	36	1200	
880	<b>1RA6 454-8HS4■■</b>	743	95.1	0.83	154	11318	2.50	40	1200	
970	<b>1RA6 456-8HS4■■</b>	743	95.3	0.85	166	12477	2.40	46	1200	
1360	<b>1RA4 500-8HV■■■</b>	741	95.3	0.84	295	17526	1.80	70	1200	
1520	<b>1RA4 502-8HV■■■</b>	742	95.5	0.85	330	19562	1.90	80	1200	
1700	<b>1RA4 504-8HV■■■</b>	742	95.6	0.84	370	21878	2.00	88	1200	
1860	<b>1RA4 506-8HV■■■</b>	742	95.8	0.85	400	23938	1.90	99	1200	
2120	<b>1RA4 560-8HV■■■</b>	742	95.9	0.83	465	27286	1.80	123	1200	
2400	<b>1RA4 562-8HV■■■</b>	742	96.1	0.83	530	30889	1.80	141	1200	
2600	<b>1RA4 564-8HV■■■</b>	743	96.2	0.83	570	33419	1.90	158	1200	
2830	<b>1RA4 566-8HV■■■</b>	742	96.3	0.85	600	36424	1.80	173	1200	
3140 <sup>(1)</sup>	<b>1RA4 630-8HV■■■</b>	743	96.5	0.85	670	40359	1.90	239	1200	
3430 <sup>(1)</sup>	<b>1RA4 632-8HV■■■</b>	743	96.7	0.85	730	44087	2.10	265	1200	
3680 <sup>(1)</sup>	<b>1RA4 634-8HV■■■</b>	743	96.7	0.85	780	47300	2.00	293	1200	
4020 <sup>(1)</sup>	<b>1RA4 636-8HV■■■</b>	744	96.9	0.84	860	51601	2.30	324	1200	

**Voltage code:**4.16 kV, 50 Hz  
Other voltage4  
9**Type of construction:**

IM B3

0

IM V1 (without canopy)

8

**Note:**

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation. Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> Rated voltage less than 4.16 kV on request.<sup>3)</sup> On request.<sup>2)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS (1RA4, 1RA6 and 1RP6)

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \phi$   
[-]

$P/P_{rated} = 50\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \phi$   
[-]

$P/P_{rated} = 25\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \phi$   
[-]

Square law torque drive

6-pole

1RA6 450-6...	705	901	96.0	0.84	470	789	96.1	0.81	235	627	96.0	0.71
1RA6 452-6...	780	901	96.1	0.84	520	789	96.2	0.80	260	627	96.0	0.70
1RA6 454-6...	885	901	96.3	0.85	590	789	96.4	0.82	295	627	96.3	0.73
1RA6 456-6...	998	902	96.4	0.83	665	790	96.5	0.80	333	627	96.2	0.69
1RA4 500-6...	1395	900	96.2	0.86	930	786	96.3	0.84	465	625	96.1	0.75
1RA4 502-6...	1575	900	96.3	0.86	1050	786	96.5	0.84	525	625	96.3	0.76
1RA4 504-6...	1755	900	96.5	0.86	1170	786	96.6	0.84	585	625	96.3	0.75
1RA4 506-6...	1920	900	96.6	0.86	1280	787	96.6	0.84	640	625	96.4	0.76
1RA4 560-6...	2250	901	96.6	0.85	1500	787	96.7	0.83	750	625	96.4	0.74
1RA4 562-6...	2535	900	96.9	0.86	1690	787	97.0	0.84	845	624	96.8	0.75
1RA4 564-6...	2813	900	96.8	0.86	1875	787	96.9	0.84	938	624	96.7	0.76
1RA4 566-6...	3225	900	97.0	0.86	2150	787	97.0	0.83	1075	624	96.8	0.75
1RA4 632-6...	O. R. <sup>(3)</sup>											
1RA4 634-6...	O. R. <sup>(3)</sup>											
1RA4 636-6...	O. R. <sup>(3)</sup>											

8-pole

1RA6 450-8...	510	676	94.8	0.80	340	592	94.7	0.75	170	470	94.0	0.63
1RA6 452-8...	563	676	95.1	0.80	375	592	95.1	0.75	188	470	94.4	0.62
1RA6 454-8...	660	676	95.3	0.82	440	592	95.3	0.78	220	470	94.8	0.66
1RA6 456-8...	728	676	95.5	0.83	485	592	95.5	0.80	243	470	95.1	0.69
1RA4 500-8...	1020	675	95.7	0.83	680	590	95.8	0.81	340	468	95.5	0.71
1RA4 502-8...	1140	675	95.8	0.83	760	590	95.9	0.80	380	468	95.5	0.69
1RA4 504-8...	1275	675	95.9	0.82	850	590	95.9	0.78	425	468	95.4	0.67
1RA4 506-8...	1395	675	96.1	0.84	930	590	96.1	0.81	465	468	95.8	0.72
1RA4 560-8...	1590	675	96.2	0.82	1060	590	96.2	0.79	530	469	95.9	0.69
1RA4 562-8...	1800	676	96.3	0.83	1200	590	96.4	0.80	600	469	96.0	0.70
1RA4 564-8...	1950	676	96.5	0.82	1300	590	96.5	0.79	650	469	96.2	0.69
1RA4 566-8...	2125	676	96.6	0.84	1415	590	96.7	0.82	710	469	96.4	0.74
1RA4 630-8...	O. R. <sup>(3)</sup>											
1RA4 632-8...	O. R. <sup>(3)</sup>											
1RA4 634-8...	O. R. <sup>(3)</sup>											
1RA4 636-8...	O. R. <sup>(3)</sup>											

3



# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

#### H-compact PLUS 1RA4, 1RA6 and 1RP6

##### Selection and ordering data

Rated power kW	High voltage motor H-compact PLUS	Rated speed rpm	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current A	Rated torque Nm	Break-down torque [-]	Moment of inertia kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm		
<b>690 V, 60 Hz</b>											
2-pole											
1550	<b>1RA6 450-2HP10</b>	3578	95.9	0.90	2x750	4140	1.90	13	3600		
1650	<b>1RA6 452-2HP10</b>	3581	96.0	0.91	2x790	4403	2.20	14	3600		
1720	<b>1RA6 454-2HP10</b>	3584	96.1	0.91	2x820	4586	2.40	16	3600 <sup>2)</sup>		
2180	<b>1RA6 456-2HP10</b>	3584	96.7	0.92	2x1020	5814	2.40	18	3600 <sup>2)</sup>		
2500	<b>1RA6 500-2HP10</b>	3579	96.6	0.90	2x1200	6670	2.50	20	3600 <sup>2)</sup>		
2750	<b>1RA6 502-2HP10</b>	3577	96.6	0.91	4x650	7342	2.40	22	3600 <sup>2)</sup>		
3100	<b>1RA6 504-2HP10</b>	3581	96.9	0.92	4x730	8267	2.60	25	3600 <sup>2)</sup>		
4-pole											
1630	<b>1RA6 450-4HP10</b>	1784	95.9	0.88	2x810	8740	2.30	20	1800		
1750	<b>1RA6 452-4HP10</b>	1783	96.0	0.90	2x850	9385	2.30	22	1800		
2070	<b>1RA6 454-4HP10</b>	1783	96.2	0.90	2x1000	11104	2.30	25	1800		
2310	<b>1RA6 456-4HP10</b>	1786	96.4	0.89	2x1120	12364	2.50	29	1800		
2700 <sup>4)</sup>	<b>1RA6 500-4HP10</b>	1788	96.9	0.90	4x650	14420	2.80	42	1800 <sup>3)</sup>		
2850 <sup>4)</sup>	<b>1RA6 502-4HP10</b>	1786	96.9	0.91	4x680	15238	2.50	46	1800 <sup>3)</sup>		
3000 <sup>4)</sup>	<b>1RA6 504-4HP10</b>	1786	97.0	0.92	4x700	16040	2.40	52	1800 <sup>3)</sup>		
6-pole											
1210	<b>1RA6 450-6HP10</b>	1191	96.1	0.85	2x620	9718	2.40	26	1200		
1350	<b>1RA6 452-6HP10</b>	1191	96.3	0.84	2x700	10837	2.40	29	1200		
1480	<b>1RA6 454-6HP10</b>	1191	96.3	0.86	2x750	11883	2.30	32	1200		
1620	<b>1RA6 456-6HP10</b>	1192	96.6	0.86	2x820	12995	2.40	37	1200		
8-pole											
870	<b>1RA6 450-8HP10</b>	893	95.3	0.84	910	9323	2.30	32	1200		
960	<b>1RA6 452-8HP10</b>	892	95.4	0.84	1000	10290	2.20	36	1200		
1050	<b>1RA6 454-8HP10</b>	893	95.5	0.84	1100	11239	2.40	40	1200		
1180	<b>1RA6 456-8HP10</b>	893	95.7	0.85	1220	12636	2.30	46	1200		

##### Type of construction:

IM B3

0

IM V1 (without canopy)

8

##### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.

<sup>3)</sup> Higher speed limit on request.

<sup>4)</sup> Data of vertical motors (IM V1) on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

Motor type  
(repeated)

Partial load values for square-law torque drive

 $P/P_{rated} = 75\%$  $P$   
kW $n$  $\eta$  $\cos \varphi$ 

[-]

 $P/P_{rated} = 50\%$  $P$   
kW $n$  $\eta$  $\cos \varphi$ 

[-]

 $P/P_{rated} = 25\%$  $P$   
kW $n$  $\eta$  $\cos \varphi$ 

[-]

Square-law torque drive

2-pole

1RA6 450-2HP1.	1164	3253	96.2	0.90	775	2844	96.3	0.90	388	2261	96.2	0.86
1RA6 452-2HP1.	1239	3255	96.3	0.92	825	2845	96.4	0.91	413	2262	96.3	0.87
1RA6 454-2HP1.	1291	3257	96.3	0.92	860	2847	96.4	0.91	430	2262	96.2	0.86
1RA6 456-2HP1.	1636	3258	96.9	0.92	1090	2847	96.9	0.91	545	2263	96.7	0.87
1RA6 500-2HP1.	1876	3256	96.9	0.89	1250	2846	97.1	0.87	626	2261	97.1	0.77
1RA6 502-2HP1.	2064	3254	96.9	0.90	1375	2846	97.1	0.89	688	2261	97.2	0.82
1RA6 504-2HP1.	2325	3257	97.2	0.91	1550	2847	97.4	0.89	776	2262	97.4	0.82

4-pole

1RA6 450-4HP1.	1223	1623	96.1	0.88	815	1420	96.2	0.86	408	1129	95.9	0.78
1RA6 452-4HP1.	1313	1623	96.3	0.90	875	1419	96.4	0.89	438	1129	96.3	0.84
1RA6 454-4HP1.	1553	1623	96.5	0.90	1035	1419	96.6	0.89	518	1129	96.5	0.85
1RA6 456-4HP1.	1733	1625	96.6	0.89	1155	1421	96.6	0.87	578	1130	96.3	0.79
1RA6 500-4HP1.	2025	1627	97.2	0.88	1351	1422	97.4	0.83	675	1130	97.3	0.69
1RA6 502-4HP1.	2138	1626	97.2	0.90	1425	1422	97.4	0.87	713	1130	97.5	0.78
1RA6 504-4HP1.	2251	1625	97.3	0.91	1500	1421	97.5	0.90	750	1130	97.6	0.83

6-pole

1RA6 450-6HP1.	908	1083	96.3	0.82	605	947	96.4	0.79	303	753	96.0	0.67
1RA6 452-6HP1.	1013	1083	96.5	0.82	675	947	96.5	0.78	338	753	96.2	0.67
1RA6 454-6HP1.	1110	1083	96.5	0.84	740	947	96.6	0.81	370	753	96.3	0.71
1RA6 456-6HP1.	1215	1084	96.8	0.84	810	947	96.8	0.81	405	753	96.5	0.71

8-pole

1RA6 450-8HP1.	653	812	95.5	0.81	435	710	95.4	0.77	218	565	94.9	0.66
1RA6 452-8HP1.	720	812	95.7	0.83	480	710	95.6	0.79	240	565	95.2	0.68
1RA6 454-8HP1.	788	812	95.6	0.81	525	710	95.6	0.77	263	565	95.0	0.65
1RA6 456-8HP1.	885	812	95.9	0.83	590	710	95.8	0.79	295	565	95.3	0.69

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

## Selection and ordering data

Rated power kW	High voltage motor H-compact PLUS Order No.	Rated speed rpm	Operating values at rated output																
			Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	<b>Mechanical speed limit<sup>1)</sup> rpm</b>										
<b>3.4...4.16 kV, 50 Hz</b>																			
2-pole																			
1600	<b>1RA6 450-2HS30</b>	3576	96.0	0.89	260	4274	2.10	13	3600										
1850	<b>1RA6 452-2HS30</b>	3578	96.3	0.91	295	4941	2.30	14	3600										
2060	<b>1RA6 454-2HS30</b>	3579	96.6	0.91	325	5500	2.30	16	3600 <sup>3)</sup>										
2300	<b>1RA6 456-2HS30</b>	3581	96.8	0.92	360	6137	2.40	18	3600 <sup>3)</sup>										
3000	<b>1RA6 500-2HS30</b>	3572	96.5	0.89	485	8020	2.10	20	3600 <sup>3)</sup>										
3250	<b>1RA6 502-2HS30</b>	3570	96.5	0.89	530	8693	1.90	22	3600 <sup>3)</sup>										
3700	<b>1RA6 504-2HS30</b>	3576	96.8	0.91	580	9880	2.30	25	3600 <sup>3)</sup>										
4200	<b>1RA6 506-2HS30</b>	3577	97.1	0.92	650	11212	2.40	27	3600 <sup>3)</sup>										
4600	<b>1RA6 560-2HS30</b>	3577	96.8	0.90	730	12280	1.90	39	3600 <sup>3)</sup>										
5100	<b>1RA6 562-2HS30</b>	3579	96.9	0.89	2x410	13608	2.05	43	3600 <sup>3)</sup>										
5900	<b>1RA6 564-2HS30</b>	3580	97.1	0.89	2x475	15738	2.15	49	3600 <sup>3)</sup>										
6700	<b>1RA6 566-2HS30</b>	3582	97.3	0.89	2x540	17862	2.45	54	3600 <sup>3)</sup>										
4-pole																			
1630	<b>1RA6 450-4HS3■</b>	1782	95.7	0.89	265	8742	2.30	20	1800										
1750	<b>1RA6 452-4HS3■</b>	1783	95.9	0.89	285	9375	2.40	22	1800										
2070	<b>1RA6 454-4HS3■</b>	1784	96.1	0.90	330	11088	2.50	25	1800										
2310	<b>1RA6 456-4HS3■</b>	1786	96.3	0.89	375	12358	2.50	29	1800										
3100 <sup>4)</sup>	<b>1RA6 500-4HS30</b>	1785	96.7	0.90	495	16584	2.30	42	1800										
3450 <sup>4)</sup>	<b>1RA6 502-4HS30</b>	1785	96.8	0.90	550	18457	2.20	46	1800										
3800 <sup>4)</sup>	<b>1RA6 504-4HS30</b>	1786	97.0	0.91	600	20318	2.40	52	1800										
4100 <sup>4)</sup>	<b>1RA6 506-4HS30</b>	1787	97.0	0.91	640	21909	2.40	56	1800										
4700 <sup>4)</sup>	<b>1RA6 560-4HS30</b>	1789	97.2	0.87	770	25088	1.95	84	1800										
5400 <sup>4)</sup>	<b>1RA6 562-4HS30</b>	1789	97.3	0.87	2x445	28824	1.95	94	1800										
6000 <sup>4)</sup>	<b>1RA6 564-4HS30</b>	1789	97.4	0.91	2x470	32027	2.05	105	1800										
6600 <sup>4)</sup>	<b>1RA6 566-4HS30</b>	1790	97.5	0.90	2x520	35210	2.10	115	1800										
7400 <sup>2)</sup>	<b>1RA4 632-4HV5■</b>	1790	97.3	0.89	1180	39480	1.90	150	1800										

## Type of construction:

IM B3	<b>0</b>
IM V1 (without canopy)	<b>8</b>

## Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

<sup>1)</sup> For IM B3, roller bearings.<sup>2)</sup> Rated voltage less than 4.16 kV on request.<sup>3)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.<sup>4)</sup> Data of vertical motors (IM V1) on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

Motor type  
(repeated)

Partial load values for square-law torque drive

 $P/P_{rated} = 75\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \phi$   
[-] $P/P_{rated} = 50\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \phi$   
[-] $P/P_{rated} = 25\%$  $P$   
kW $n$   
rpm $\eta$   
% $\cos \phi$   
[-]

Square-law torque drive

2-pole

1RA6 450-2...	1201	3251	96.1	0.90	800	2843	96.2	0.90	400	2260	96.1	0.85
1RA6 452-2...	1389	3253	96.4	0.91	925	2844	96.5	0.91	463	2261	96.3	0.87
1RA6 454-2...	1545	3254	96.7	0.91	1030	2845	96.7	0.90	515	2261	96.5	0.86
1RA6 456-2...	1725	3256	96.9	0.92	1150	2846	96.9	0.91	575	2262	96.7	0.87
1RA6 500-2...	2251	3251	96.8	0.88	1500	2844	97.0	0.87	750	2260	97.1	0.79
1RA6 502-2...	2439	3250	96.8	0.89	1626	2843	97.1	0.88	813	2259	97.2	0.83
1RA6 504-2...	2776	3254	97.1	0.91	1850	2845	97.3	0.89	926	2261	97.3	0.83
1RA6 506-2...	3151	3254	97.3	0.91	2100	2846	97.5	0.89	1051	2261	97.5	0.83
1RA6 560-2...	3452	3255	97.1	0.90	2301	2846	97.3	0.91	1150	2262	97.3	0.88
1RA6 562-2...	3827	3256	97.2	0.90	2551	2847	97.3	0.90	1275	2262	97.3	0.87
1RA6 564-2...	4427	3257	97.4	0.90	2951	2848	97.5	0.90	1476	2262	97.5	0.86
1RA6 566-2...	5026	3258	97.5	0.90	3350	2849	97.6	0.89	1676	2263	97.6	0.83

4-pole

1RA6 450-4...	1224	1622	96.0	0.89	815	1419	96.1	0.88	408	1129	96.0	0.83
1RA6 452-4...	1313	1623	96.1	0.89	875	1420	96.2	0.88	438	1129	96.1	0.82
1RA6 454-4...	1553	1623	96.3	0.90	1035	1420	96.4	0.89	518	1129	96.3	0.83
1RA6 456-4...	1733	1624	96.5	0.89	1155	1421	96.5	0.87	578	1130	96.2	0.80
1RA6 500-4...	2326	1625	97.0	0.88	1550	1421	97.2	0.86	775	1130	97.1	0.75
1RA6 502-4...	2589	1625	97.1	0.89	1725	1421	97.3	0.86	863	1130	97.3	0.77
1RA6 504-4...	2851	1626	97.2	0.90	1900	1422	97.4	0.87	950	1130	97.3	0.77
1RA6 506-4...	3076	1626	97.2	0.90	2050	1422	97.4	0.87	1025	1130	97.3	0.77
1RA6 560-4...	3527	1628	97.4	0.88	2350	1423	97.6	0.87	1176	1131	97.6	0.82
1RA6 562-4...	4052	1628	97.5	0.88	2701	1423	97.7	0.88	1351	1131	97.7	0.83
1RA6 564-4...	4502	1628	97.6	0.91	3000	1423	97.8	0.91	1501	1131	97.7	0.87
1RA6 566-4...	4952	1628	97.7	0.91	3300	1423	97.9	0.91	1651	1131	97.8	0.87
1RA4 632-4...	5550	1626	97.5	0.90	3700	1421	97.1	0.87	1850	1128	96.5	0.75

# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

#### H-compact PLUS 1RA4, 1RA6 and 1RP6

##### Selection and ordering data

Rated power kW	High voltage motor H-compact PLUS	Rated speed rpm	Operating values at rated output									
			Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm			
<b>3.1 ... 4.16 kV, 60 Hz</b>												
<b>6-pole</b>												
1210	<b>1RA6 450-6HS3■</b>	1190	96.0	0.84	210	9715	2.40	26	1200			
1350	<b>1RA6 452-6HS3■</b>	1191	96.2	0.85	230	10833	2.40	29	1200			
1480	<b>1RA6 454-6HS3■</b>	1191	96.3	0.85	250	11875	2.50	32	1200			
1620	<b>1RA6 456-6HS3■</b>	1191	96.4	0.87	270	12995	2.50	37	1200			
2120	<b>1RA4 500-6HV5■</b>	1189	96.2	0.86	355	17028	1.90	57	1200			
2400	<b>1RA4 502-6HV5■</b>	1188	96.3	0.87	400	19293	1.90	65	1200			
2680	<b>1RA4 504-6HV5■</b>	1189	96.4	0.87	445	21526	1.90	72	1200			
2940	<b>1RA4 506-6HV5■</b>	1189	96.6	0.87	485	23614	1.90	81	1200			
3400	<b>1RA4 560-6HV5■</b>	1190	96.6	0.87	560	27286	1.90	105	1200			
3950	<b>1RA4 562-6HV5■</b>	1191	96.9	0.86	660	31673	1.90	120	1200			
<b>8-pole</b>												
870	<b>1RA6 450-8HS3■</b>	893	95.2	0.81	156	9308	2.50	32	1200			
960	<b>1RA6 452-8HS3■</b>	893	95.3	0.82	170	10269	2.50	36	1200			
1050	<b>1RA6 454-8HS3■</b>	893	95.4	0.84	182	11239	2.40	40	1200			
1180	<b>1RA6 456-8HS3■</b>	894	95.6	0.82	210	12613	2.50	46	1200			
1560	<b>1RA4 500-8HV5■</b>	891	95.6	0.84	270	16721	1.80	70	1200			
1760	<b>1RA4 502-8HV5■</b>	892	95.7	0.84	305	18843	1.90	80	1200			
1940	<b>1RA4 504-8HV5■</b>	892	96.0	0.84	335	20770	2.00	88	1200			
2120	<b>1RA4 506-8HV5■</b>	892	96.2	0.84	365	22697	2.00	99	1200			
2440	<b>1RA4 560-8HV5■</b>	893	96.3	0.84	420	26094	1.90	123	1200			
2750	<b>1RA4 562-8HV5■</b>	893	96.5	0.84	470	29409	1.90	141	1200			
3000	<b>1RA4 564-8HV5■</b>	893	96.6	0.84	510	32083	1.90	158	1200			
3250	<b>1RA4 566-8HV5■</b>	893	96.7	0.85	550	34756	1.90	173	1200			

##### Type of construction:

IM B3

0

IM V1 (without canopy)

8

##### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PI US 1RA4, 1RA6 and 1RP6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 50\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 25\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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Square-law torque drive

6-pole

1RA6 450-6...	908	1083	96.2	0.83	605	947	96.2	0.80	303	753	96.0	0.69
1RA6 452-6...	1013	1083	96.3	0.84	675	947	96.4	0.80	338	753	96.1	0.70
1RA6 454-6...	1110	1083	96.5	0.84	740	947	96.5	0.81	370	753	96.3	0.71
1RA6 456-6...	1215	1083	96.6	0.86	810	947	96.7	0.83	405	753	96.5	0.74
1RA4 500-6...	1590	1080	96.4	0.86	1060	944	96.4	0.84	530	749	96.1	0.75
1RA4 502-6...	1800	1079	96.5	0.87	1200	943	96.5	0.85	600	748	96.3	0.78
1RA4 504-6...	2010	1080	96.5	0.87	1340	944	96.5	0.85	670	749	96.3	0.77
1RA4 506-6...	2205	1080	96.6	0.87	1470	944	96.6	0.86	735	749	96.4	0.78
1RA4 560-6...	2550	1081	96.7	0.86	1700	945	96.7	0.84	850	750	96.4	0.76
1RA4 562-6...	2963	1082	96.9	0.85	1975	945	96.8	0.82	988	750	96.5	0.73

8-pole

1RA6 450-8...	653	812	95.2	0.79	435	710	95.1	0.74	218	565	94.3	0.61
1RA6 452-8...	720	812	95.4	0.80	480	710	95.3	0.75	240	565	94.5	0.62
1RA6 454-8...	788	812	95.5	0.83	525	710	95.5	0.79	263	565	95.0	0.69
1RA6 456-8...	885	813	95.6	0.79	590	711	95.5	0.75	295	565	94.8	0.62
1RA4 500-8...	1170	810	95.8	0.83	780	707	95.9	0.81	390	561	95.5	0.71
1RA4 502-8...	1320	810	95.9	0.83	880	708	95.9	0.80	440	562	95.5	0.70
1RA4 504-8...	1455	810	96.1	0.83	970	708	96.0	0.80	485	562	95.5	0.69
1RA4 506-8...	1590	810	96.3	0.83	1060	708	96.2	0.80	530	562	95.8	0.70
1RA4 560-8...	1830	811	96.4	0.82	1220	709	96.3	0.79	610	563	95.9	0.69
1RA4 562-8...	2063	811	96.5	0.83	1375	709	96.4	0.80	688	563	96.0	0.70
1RA4 564-8...	2250	811	96.6	0.83	1500	709	96.5	0.80	750	563	96.0	0.70
1RA4 566-8...	2438	811	96.6	0.84	1625	709	96.6	0.82	813	563	96.2	0.73

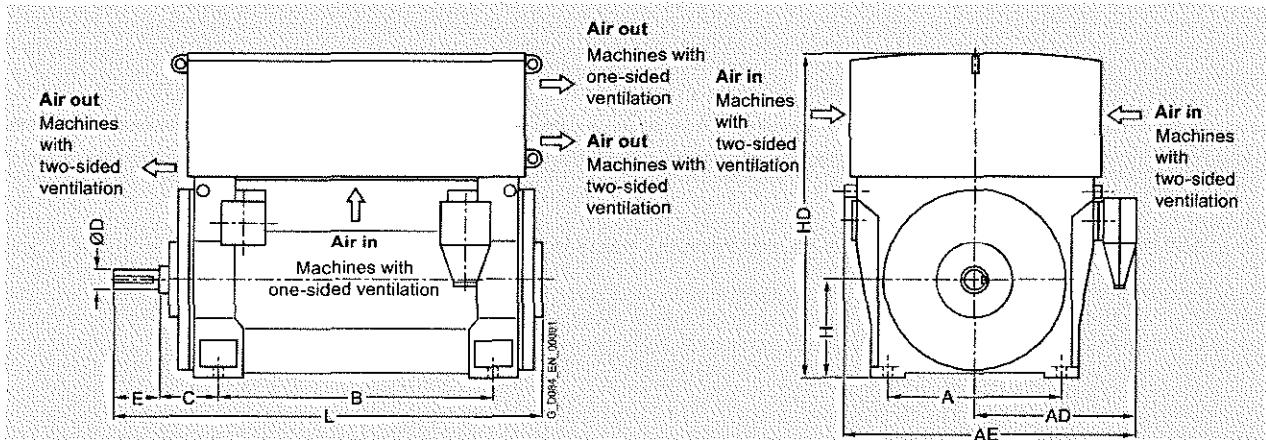
# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm
<b>Dimensions for bearing housing (H) depending on construction</b>											
2-pole											
1RA6450-2H..0 <sup>2)</sup>	3700	850	930	1620	1180	280	95	130	450	1628	1843
1RA6452-2H..0 <sup>2)</sup>	3900	850	930	1620	1180	280	95	130	450	1628	1843
1RA6454-2H..0 <sup>2)</sup>	4300	850	930	1620	1400	280	95	130	450	1628	2053
1RA6456-2H..0 <sup>2)</sup>	4550	850	930	1620	1400	280	95	130	450	1628	2053
1RA6500-2H..0 <sup>2)</sup>	5700	950	1135	1835	1320	315	110	165	500	1845	2103
1RA6502-2H..0 <sup>2)</sup>	5850	950	1135	1835	1320	315	110	165	500	1845	2103
4-pole											
1RA6450-4H..0	4050	850	930	1620	1180	250	130	200	450	1408	1896
1RA6452-4H..0	4250	850	930	1620	1180	250	130	200	450	1408	1896
1RA6454-4H..0	4650	850	930	1620	1400	250	130	200	450	1408	2106
1RA6456-4H..0	4950	850	930	1620	1400	250	130	200	450	1408	2106
1RA6500-4H..0	6250	950	1135	1835	1320	280	150	200	500	1845	2109
1RA6502-4H..0	6450	950	1135	1835	1320	280	150	200	500	1845	2109
1RA6504-4H..0	7150	950	1135	1835	1500	280	150	200	500	1845	2289
1RA6506-4H..0	7450	950	1135	1835	1500	280	150	200	500	1845	2289
1RA6560-4H..0	7950	1060	1205	1975	1400	315	170	240	560	2098	2300
1RA6562-4H..0	8350	1060	1205	1975	1400	315	170	240	560	2098	2300
1RA6564-4H..0	9300	1060	1205	1975	1600	315	170	240	560	2098	2530
1RA6566-4H..0	9900	1060	1205	1975	1600	315	170	240	560	2098	2530
1RA4630-4H..0 <sup>2)</sup>	9950	1320	1330	2210	1600	335	200	280	630	2400	2500
1RA4632-4H..0 <sup>2)</sup>	10650	1320	1330	2210	1600	335	200	280	630	2400	2500
1RA4634-4H..0 <sup>2)</sup>	11700	1320	1330	2210	1800	335	220	280	630	2400	2740
1RA4636-4H..0 <sup>2)</sup>	12250	1320	1330	2210	1800	335	220	280	630	2400	2740
6-pole											
1RA6450-6H..0	4150	850	930	1620	1180	250	140	200	450	1408	1896
1RA6452-6H..0	4400	850	930	1620	1180	250	140	200	450	1408	1896
1RA6454-6H..0	4750	850	930	1620	1400	280	140	200	450	1408	2136
1RA6456-6H..0	5100	850	930	1620	1400	280	140	200	450	1408	2136

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>2)</sup> Roller bearings only for 50 Hz version.

<sup>3)</sup> Dimension HD for 1RP6 on request.

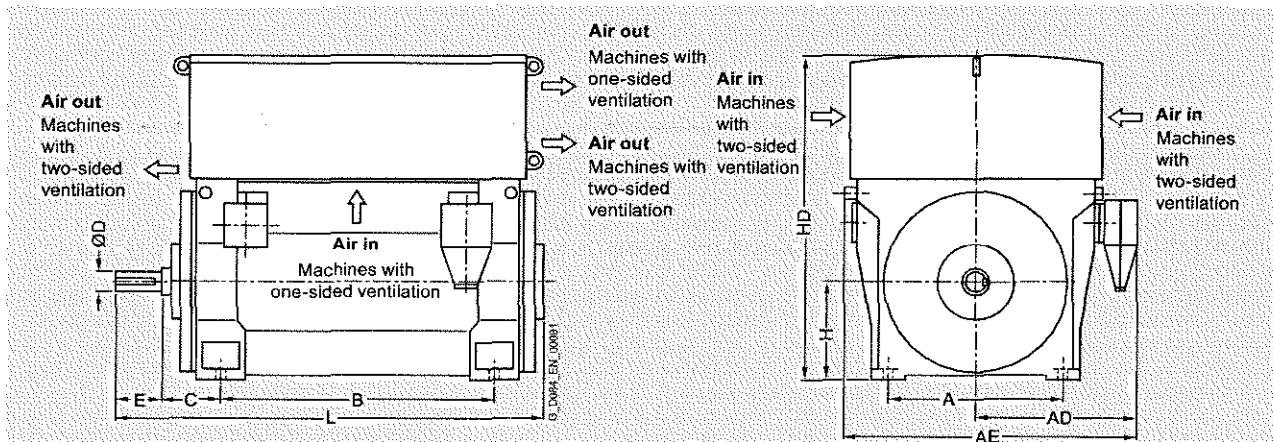
# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm

## Dimensions of ball bearings (H-compact construction)

## 6-pole

1RA4500-6H..0	5250	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4502-6H..0	5650	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4504-6H..0	6200	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4506-6H..0	6550	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4560-6H..0	7200	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4562-6H..0	7850	1060	1210	2040	1400	315	180	240	560	1750	2300
1RA4564-6H..0	8650	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4566-6H..0	9100	1060	1210	2040	1600	315	190	280	560	1750	2570
1RA4630-6H..0	10250	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4632-6H..0	10800	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4634-6H..0	11800	1320	1330	2210	1800	335	220	280	630	2400	2740
1RA4636-6H..0	12550	1320	1330	2210	1800	335	220	280	630	2400	2740

## 8-pole

1RA6450-8H..0	4150	850	930	1620	1180	250	140	200	450	1408	1896
1RA6452-8H..0	4450	850	930	1620	1180	250	140	200	450	1408	1896
1RA6454-8H..0	4800	850	930	1620	1400	280	140	200	450	1408	2136
1RA6456-8H..0	5150	850	930	1620	1400	280	140	200	450	1408	2136
1RA4500-8H..0	5300	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4502-8H..0	5700	950	1000	1760	1320	280	160	240	500	1520	2270
1RA4504-8H..0	6200	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4506-8H..0	6550	950	1000	1760	1500	280	170	240	500	1520	2480
1RA4560-8H..0	7200	1060	1070	1900	1400	315	180	240	560	1750	2300
1RA4562-8H..0	7700	1060	1070	1900	1400	315	180	240	560	1750	2300
1RA4564-8H..0	8550	1060	1070	1900	1600	315	190	280	560	1750	2570
1RA4566-8H..0	9000	1060	1070	1900	1600	315	190	280	560	1750	2570
1RA4630-8H..0 <sup>2)</sup>	10150	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4632-8H..0 <sup>2)</sup>	10800	1320	1330	2210	1600	335	220	280	630	2400	2500
1RA4634-8H..0 <sup>2)</sup>	11700	1320	1330	2210	1800	335	220	280	630	2400	2740
1RA4636-8H..0 <sup>2)</sup>	12450	1320	1330	2210	1800	335	220	280	630	2400	2740

## Note:

Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by +140 mm.<sup>2)</sup> Roller bearings only for 50 Hz version.<sup>3)</sup> Dimension HD for 1RP6 on request.

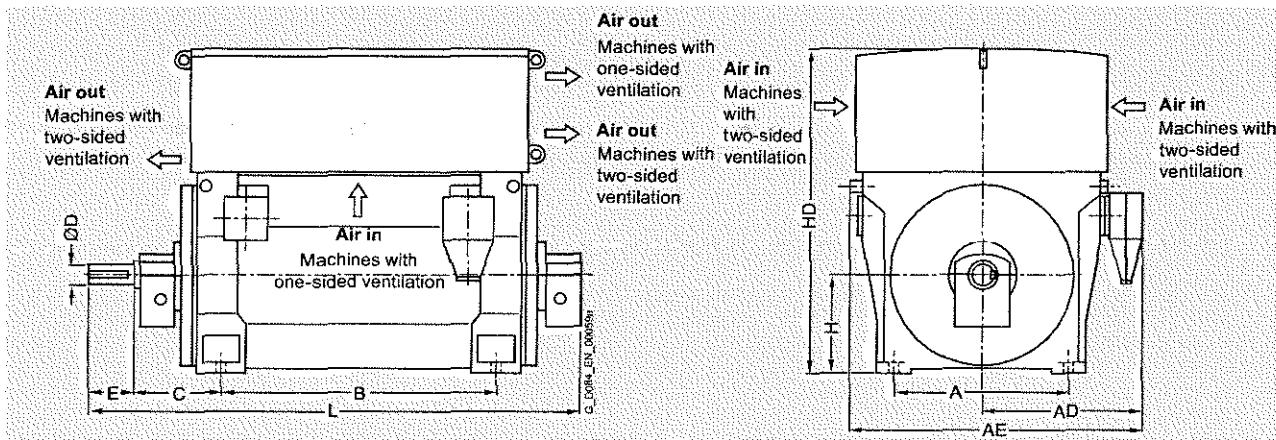
# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

#### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm

#### Front and side views of the motor housing construction

##### 2-pole

1RA6450-2H.0-Z K96	3750	850	930	1620	1180	425	95	130	450	1628	2218
1RA6452-2H.0-Z K96	3950	850	930	1620	1180	425	95	130	450	1628	2218
1RA6454-2H.0-Z K96	4300	850	930	1620	1400	425	95	130	450	1628	2428
1RA6456-2H.0-Z K96	4550	850	930	1620	1400	425	95	130	450	1628	2428
1RA6500-2H.0-Z K96 <sup>2)</sup>	5800	950	1135	1835	1320	450	110	165	500	1845	2455
1RA6502-2H.0-Z K96 <sup>2)</sup>	5950	950	1135	1835	1320	450	110	165	500	1845	2455
1RA6504-2H.0	6750	950	1135	1835	1500	450	110	165	500	1845	2635
1RA6506-2H.0	7050	950	1135	1835	1500	450	110	165	500	1845	2635
1RA6560-2H.0	7950	1060	1205	1975	1400	600	130	200	560	2098	2830
1RA6562-2H.0	8350	1060	1205	1975	1400	600	130	200	560	2098	2830
1RA6564-2H.0	9350	1060	1205	1975	1600	600	130	200	560	2098	3060
1RA6566-2H.0	9800	1060	1205	1975	1600	600	130	200	560	2098	3060

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by +140 mm.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "Z K96" not necessary.

<sup>3)</sup> Dimension HD for 1RP6 on request.

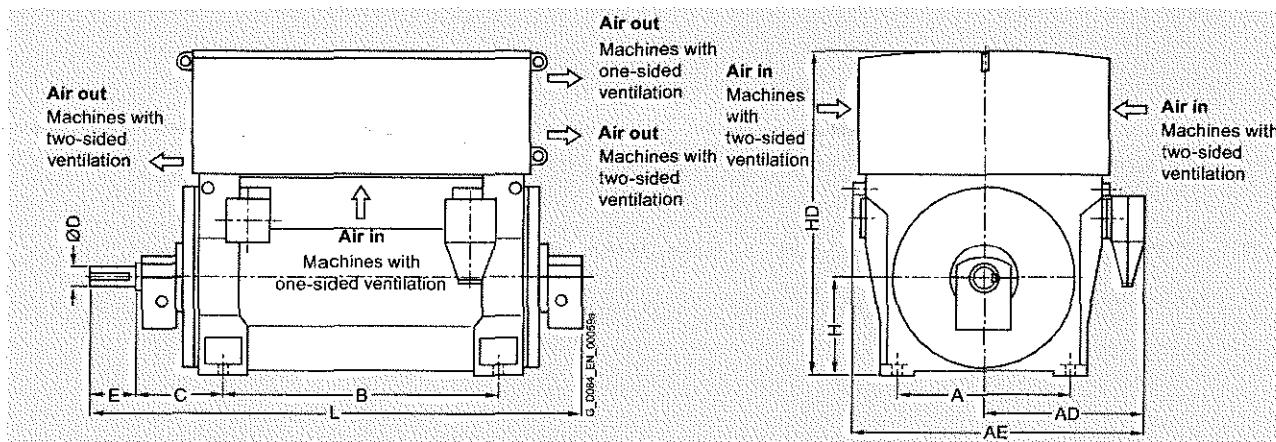


# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>3)</sup> mm	L mm
<b>1) 60 Hz sleeve bearing, 110 B3 motor construction</b>											
4-pole											
1RA6450-4H..0-Z K96	4100	850	930	1620	1180	500	130	200	450	1408	2438
1RA6452-4H..0-Z K96	4350	850	930	1620	1180	500	130	200	450	1408	2438
1RA6454-4H..0-Z K96	4750	850	930	1620	1400	500	130	200	450	1408	2648
1RA6456-4H..0-Z K96	5000	850	930	1620	1400	500	130	200	450	1408	2648
1RA6500-4H..0-Z K96	6550	950	1135	1835	1320	560	150	200	500	1845	2700
1RA6502-4H..0-Z K96	6800	950	1135	1835	1320	560	150	200	500	1845	2700
1RA6504-4H..0-Z K96	7500	950	1135	1835	1500	560	150	200	500	1845	2880
1RA6506-4H..0-Z K96	7800	950	1135	1835	1500	560	150	200	500	1845	2880
1RA6560-4H..0-Z K96	8150	1060	1205	1975	1400	600	170	240	560	2098	2870
1RA6562-4H..0-Z K96	8550	1060	1205	1975	1400	600	170	240	560	2098	2870
1RA6564-4H..0-Z K96	9500	1060	1205	1975	1600	600	170	240	560	2098	3100
1RA6566-4H..0-Z K96	10050	1060	1205	1975	1600	600	170	240	560	2098	3100
1RA4630-4H..0-Z K96 <sup>2)</sup>	10250	1320	1330	2210	1600	600	200	280	630	2400	2970
1RA4632-4H..0-Z K96 <sup>2)</sup>	10950	1320	1330	2210	1600	600	200	280	630	2400	2970
1RA4634-4H..0-Z K96 <sup>2)</sup>	11950	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4636-4H..0-Z K96 <sup>2)</sup>	12500	1320	1330	2210	1800	600	220	280	630	2400	3210

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, '·Z K96' not necessary.

<sup>3)</sup> Dimension HD for 1RP6 on request.

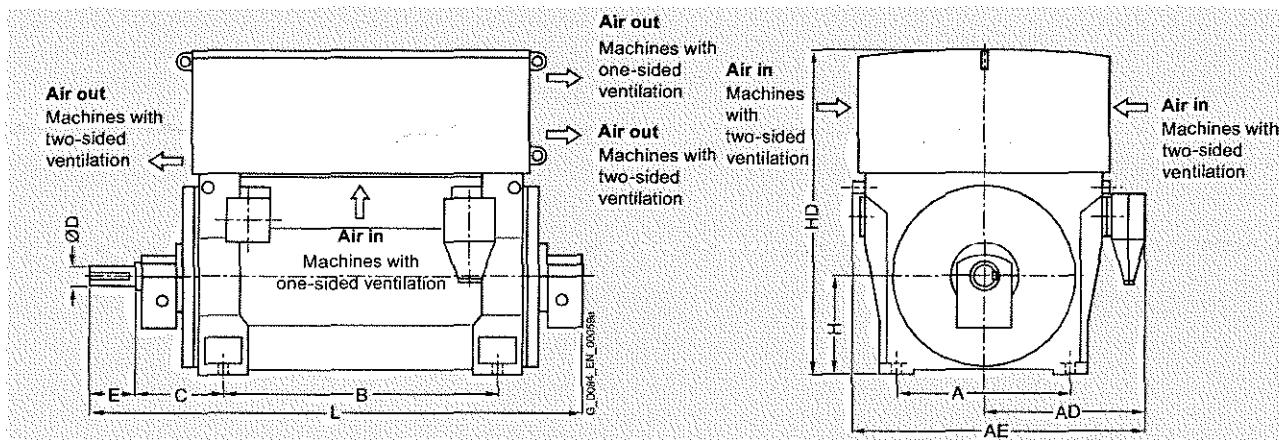
# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

#### H-compact PI, US, 1RA4, 1RA6 and 1RP6

##### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2)</sup> mm	L mm

##### Data table for 6-pole, 1HP, 1000 rpm, construction

###### 6-pole

1RA6450-6H..0-Z K96	4200	850	930	1620	1180	500	140	200	450	1408	2438
1RA6452-6H..0-Z K96	4500	850	930	1620	1180	500	140	200	450	1408	2438
1RA6454-6H..0-Z K96	4850	850	930	1620	1400	500	140	200	450	1408	2648
1RA6456-6H..0-Z K96	5200	850	930	1620	1400	500	140	200	450	1408	2648
1RA4500-6H..0-Z K96	5450	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4502-6H..0-Z K96	5800	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4504-6H..0-Z K96	6350	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4506-6H..0-Z K96	6750	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4560-6H..0-Z K96	7450	1060	1210	2040	1400	530	180	240	560	1750	2670
1RA4562-6H..0-Z K96	8050	1060	1210	2040	1400	530	180	240	560	1750	2670
1RA4564-6H..0-Z K96	8850	1060	1210	2040	1600	530	190	280	560	1750	2940
1RA4566-6H..0-Z K96	9300	1060	1210	2040	1600	530	190	280	560	1750	2940
1RA4630-6H..0-Z K96	10500	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4632-6H..0-Z K96	11050	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4634-6H..0-Z K96	12100	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4636-6H..0-Z K96	12850	1320	1330	2210	1800	600	220	280	630	2400	3210

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

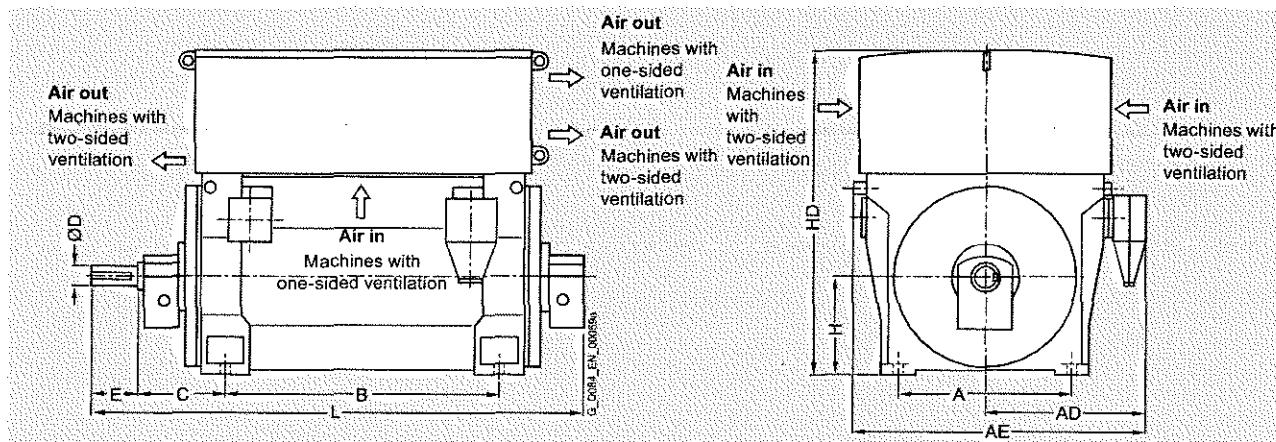
<sup>2)</sup> Dimension HD for 1RP6 on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RA4, 1RA6 and 1RP6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1</sup> mm	AE <sup>1</sup> mm	B mm	C mm	D mm	E mm	H mm	HD <sup>2</sup> mm	L mm

### Standard drive bearings, IEC-type 211 construction

#### 8-pole

1RA6450-8H..0-Z K96	4250	850	930	1620	1180	500	140	200	450	1408	2438
1RA6452-8H..0-Z K96	4550	850	930	1620	1180	500	140	200	450	1408	2438
1RA6454-8H..0-Z K96	4900	850	930	1620	1400	500	140	200	450	1408	2648
1RA6456-8H..0-Z K96	5250	850	930	1620	1400	500	140	200	450	1408	2648
1RA4500-8H..0-Z K96	5500	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4502-8H..0-Z K96	5850	950	1000	1760	1320	500	160	240	500	1520	2620
1RA4504-8H..0-Z K96	6350	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4506-8H..0-Z K96	6700	950	1000	1760	1500	500	170	240	500	1520	2830
1RA4560-8H..0-Z K96	7400	1060	1070	1900	1400	530	180	240	560	1750	2670
1RA4562-8H..0-Z K96	7950	1060	1070	1900	1400	530	180	240	560	1750	2670
1RA4564-8H..0-Z K96	8750	1060	1070	1900	1600	530	190	280	560	1750	2940
1RA4566-8H..0-Z K96	9250	1060	1070	1900	1600	530	190	280	560	1750	2940
1RA4630-8H..0-Z K96	10400	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4632-8H..0-Z K96	11050	1320	1330	2210	1600	600	220	280	630	2400	2970
1RA4634-8H..0-Z K96	12000	1320	1330	2210	1800	600	220	280	630	2400	3210
1RA4636-8H..0-Z K96	12700	1320	1330	2210	1800	600	220	280	630	2400	3210

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

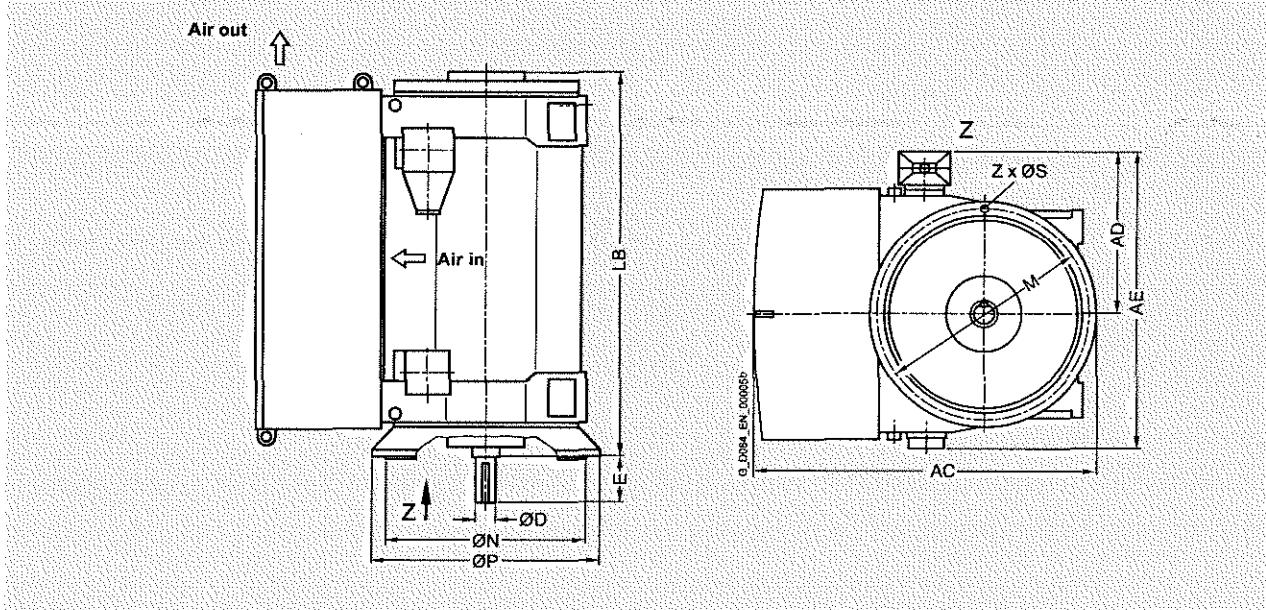
<sup>2)</sup> Dimension HD for 1RP6 on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RA4, 1EA6 and 1RP6

### Dimension drawings



Motor type	Weight kg	Dimensions												Z Quantity
		AC <sup>3)</sup> mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		

#### Data for 6 kV roller bearings (M1 VI) type of construction

##### 4-pole

1RA6450-4H..8	4250	1533	930	1620	130	200	1720	1150	1000	1080	26	8
1RA6452-4H..8	4450	1533	930	1620	130	200	1720	1150	1000	1080	26	8
1RA6454-4H..8	4850	1533	930	1620	130	200	1930	1150	1000	1080	26	8
1RA6456-4H..8	5150	1533	930	1620	130	200	1930	1150	1000	1080	26	8
1RA4500-4H..8	5250	1640	1000	1810	150	200	1910	1250	1120	1180	26	8
1RA4502-4H..8	5450	1640	1000	1810	150	200	1910	1250	1120	1180	26	8
1RA4504-4H..8	6150	1640	1000	1810	160	240	2120	1250	1120	1180	26	8
1RA4506-4H..8	6550	1640	1000	1810	160	240	2120	1250	1120	1180	26	8
1RA4560-4H..8	7250	1890	1210	2100	180	240	2090	1400	1250	1320	26	16
1RA4562-4H..8 <sup>2)</sup>	7700	1890	1210	2100	180	240	2090	1400	1250	1320	26	16
1RA4564-4H..8 <sup>2)</sup>	8600	1890	1210	2100	190	280	2320	1400	1250	1320	26	16
1RA4566-4H..8 <sup>2)</sup>	9050	1890	1210	2100	190	280	2320	1400	1250	1320	26	16
1RA4630-4H..8 <sup>2)</sup>	11600	2430	1330	2300	200	280	2470	2000	1800	1900	33	16
1RA4632-4H..8 <sup>2)</sup>	12300	2430	1330	2300	200	280	2470	2000	1800	1900	33	16
1RA4634-4H..8 <sup>2)</sup>	13350	2430	1330	2300	220	280	2710	2000	1800	1900	33	16
1RA4636-4H..8 <sup>2)</sup>	13900	2430	1330	2300	220	280	2710	2000	1800	1900	33	16

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>2)</sup> Only in the 50 Hz version.

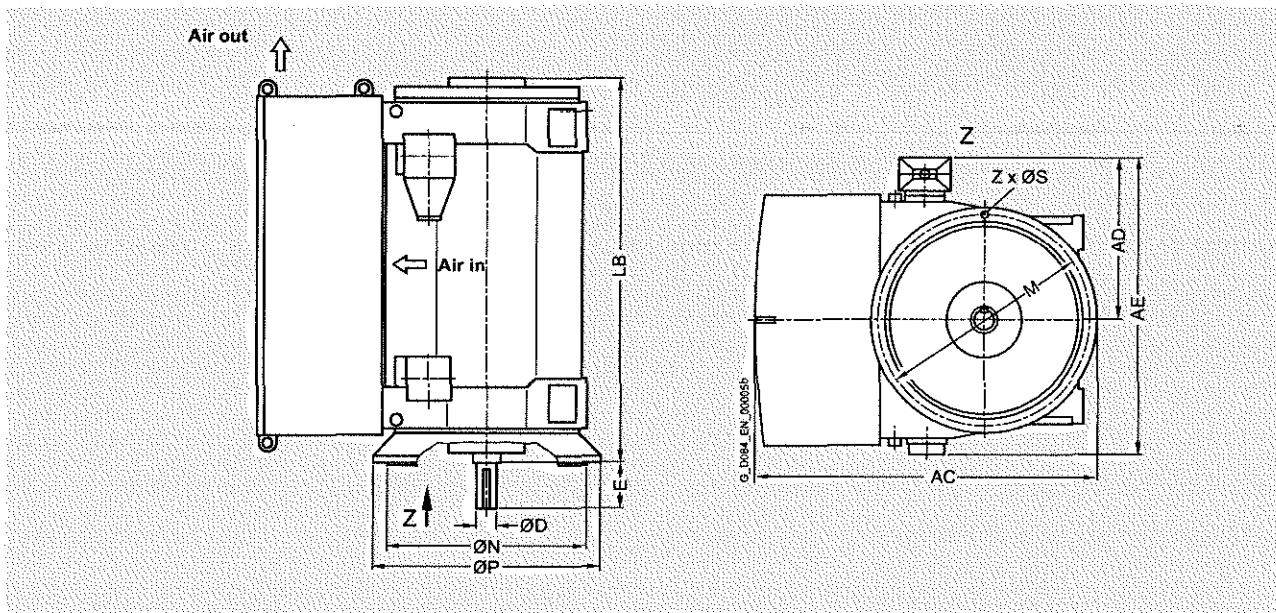
<sup>3)</sup> Dimension AC for 1RP6 on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RA1, 1RA6 and 1RP6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Z Quantity
		AC <sup>2)</sup> mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm			
<b>Up to 1.6 kV, roller bearings, IPM VI type of construction</b>														
6-pole														
1RA6450-6H..8	4350	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6452-6H..8	4600	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6454-6H..8	4950	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA6456-6H..8	5300	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA4500-6H..8	5400	1640	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RA4502-6H..8	5750	1640	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RA4504-6H..8	6300	1640	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RA4506-6H..8	6700	1640	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RA4560-6H..8	7400	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4562-6H..8	8000	1890	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RA4564-6H..8	8800	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4566-6H..8	9300	1890	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RA4630-6H..8	11900	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4632-6H..8	12450	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4634-6H..8	13450	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
1RA4636-6H..8	14200	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>2)</sup> Dimension AC for 1RP6 on request.

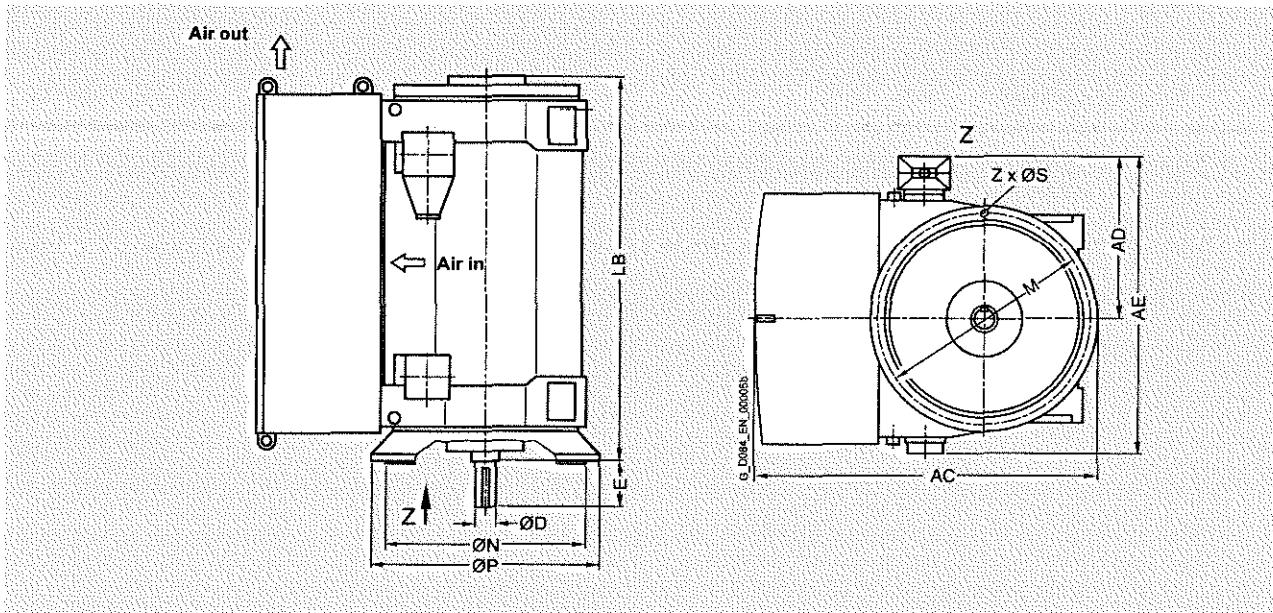
# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RA4, 1RA6 and 1RP6

## Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Z Quantity
		AC <sup>2)</sup> mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>Up to 6.5 kV, roller bearings, M1/M1 type of construction</b>														
8-pole														
1RA6450-8H..8	4350	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6452-8H..8	4650	1533	930	1620	140	200	1720	1150	1000	1080	26	8		
1RA6454-8H..8	5000	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA6456-8H..8	5350	1533	930	1620	140	200	1930	1150	1000	1080	26	8		
1RA4500-8H..8	5450	1640	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RA4502-8H..8	5800	1640	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RA4504-8H..8	6300	1640	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RA4506-8H..8	6700	1640	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RA4560-8H..8	7350	1890	1070	1960	180	240	2090	1400	1250	1320	26	16		
1RA4562-8H..8	7900	1890	1070	1960	180	240	2090	1400	1250	1320	26	16		
1RA4564-8H..8	8700	1890	1070	1960	190	280	2320	1400	1250	1320	26	16		
1RA4566-8H..8	9200	1890	1070	1960	190	280	2320	1400	1250	1320	26	16		
1RA4630-8H..8	11800	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4632-8H..8	12450	2430	1330	2300	220	280	2470	2000	1800	1900	33	16		
1RA4634-8H..8	13350	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		
1RA4636-8H..8	14100	2430	1330	2300	220	280	2710	2000	1800	1900	33	16		

## Note:

Higher pole numbers are available on request.

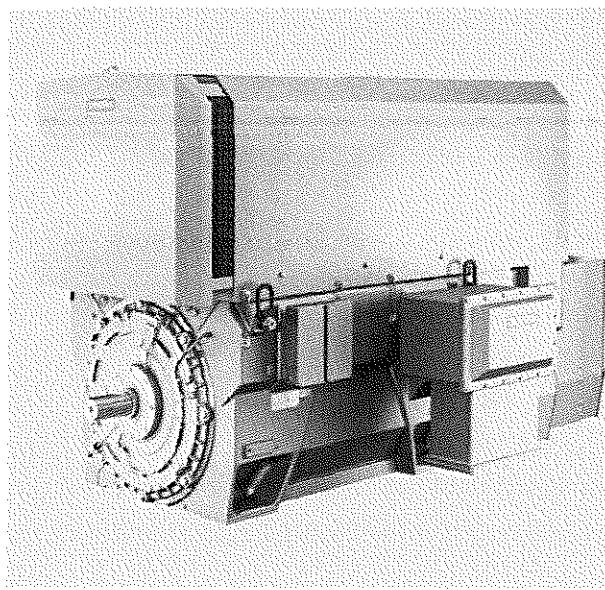
<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.<sup>2)</sup> Dimension AC for 1RP6 on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Overview



### Technical data (continued)

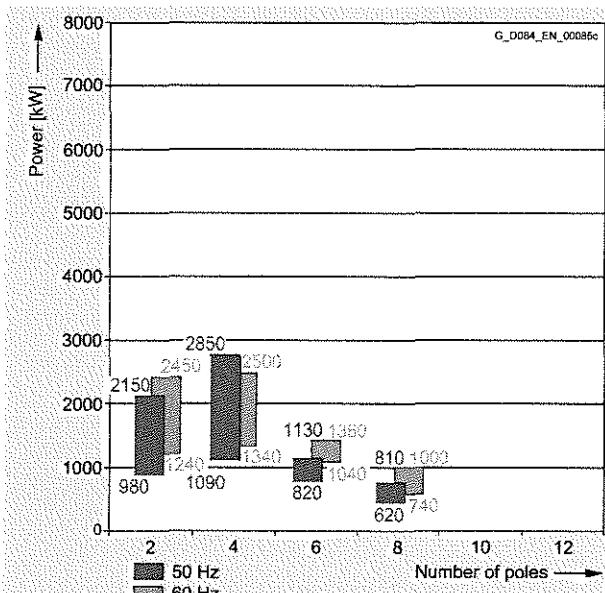
#### Power ranges for IEC motors with reinforced insulation for SINAMICS drive converters without sine-wave filter

1RQ4/1RQ6, 1SG4/1SG6 (Ex nA) and 1SB4/1SB6 (Ex px) series

Insulation system, thermal class 155 (F), utilized to 155 (F)

The power data listed here apply for an ambient temperature of 40 °C and an installation altitude ≤ 1000 m.

690 V, 50 and 60 Hz



### Technical data

#### Overview of technical data

##### H-compact PLUS 1RQ4 and 1RQ6

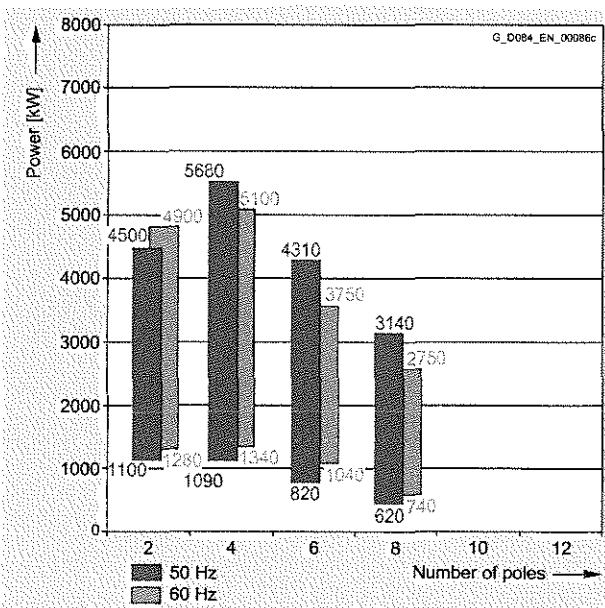
Rated voltage	690 V ... 4.16 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3, IM V1
Degree of protection	IP55
Cooling method	IC611/IC616
Stator winding insulation	Insulation system, thermal class 155 (F), utilized to 155 (F)
Shaft height	450 ... 630 mm
Bearings	Roller bearings, sleeve bearings
Cage material	Copper
Standards	IEC, EN
Frame design for shaft heights 450 ... 560 mm	Frame: Cast iron Cooling enclosure: Steel
Frame design for shaft heights 630 mm	Frame: Steel Cooling enclosure: Steel

The following versions can be offered on request:

- 2-pole up to 75 Hz
- 4-pole up to 100 Hz
- 6-pole up to 90 Hz

For individual motor types, it must be ensured that the motor does not run-through any critical speed in the required speed control range and that the maximum speed does not exceed the mechanical speed limit of the motor! Please contact your Siemens sales person regarding this check. The motor types are marked with footnotes in the following data tables.

#### 3.4 kV to 4.16 kV; 50 and 60 Hz<sup>1)</sup>



<sup>1)</sup> Maximum and minimum power ratings can be different for specific voltage levels.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Rated speed rpm	Operating values at rated output									
			Efficiency %	Power factor [-]	Rated current A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm			
<b>690 V, 50 Hz</b>												
2-pole												
980	<b>1RQ6 450-2JP00</b>	2983	95.1	0.91	950	3141	2.40	13	3000			
1040	<b>1RQ6 452-2JP00</b>	2984	95.2	0.91	1000	3331	2.40	14	3000			
1320	<b>1RQ6 454-2JP00</b>	2983	95.9	0.92	2x630	4232	2.30	16	3000			
1370	<b>1RQ6 456-2JP00</b>	2982	95.9	0.93	2x640	4394	2.40	18	3000			
1740	<b>1RQ6 500-2JP00</b>	2980	96.2	0.91	2x830	5576	2.70	19	3000			
1880	<b>1RQ6 502-2JP00</b>	2978	96.3	0.91	2x900	6028	2.60	20	3000			
2150	<b>1RQ6 504-2JP00</b>	2980	96.6	0.92	2x1020	6890	2.60	24	3000 <sup>3)</sup>			
4-pole												
1090	<b>1RQ6 450-4JP00</b>	1487	95.4	0.87	1100	7008	2.60	20	1800			
1200	<b>1RQ6 452-4JP00</b>	1486	95.5	0.90	1160	7724	2.50	22	1800			
1290	<b>1RQ6 454-4JP00</b>	1488	95.9	0.89	2x630	8289	2.60	25	1800			
1420	<b>1RQ6 456-4JP00</b>	1490	96.1	0.89	2x690	9113	2.90	29	1800			
1950 <sup>2)</sup>	<b>1RQ6 500-4JP00</b>	1487	96.1	0.91	2x930	12523	2.60	42	1800			
2000 <sup>2)</sup>	<b>1RQ6 502-4JP00</b>	1487	96.2	0.91	2x960	12844	2.50	46	1800			
2100 <sup>2)</sup>	<b>1RQ6 504-4JP00</b>	1486	96.2	0.92	2x990	13495	2.50	52	1800			
2400 <sup>2)</sup>	<b>1RQ6 506-4JP00</b>	1489	96.6	0.91	2x1140	15392	2.70	56	1800			
2700 <sup>2)</sup>	<b>1RQ6 560-4JP00</b>	1486	96.5	0.91	4x640	17351	2.10	82	1800			
2850 <sup>2)</sup>	<b>1RQ6 562-4JP00</b>	1490	96.7	0.91	4x680	18265	2.65	93	1800			
6-pole												
820	<b>1RQ6 450-6JP00</b>	991	95.6	0.85	840	7915	2.30	26	1200			
910	<b>1RQ6 452-6JP00</b>	992	95.9	0.85	930	8775	2.40	29	1200			
1020	<b>1RQ6 454-6JP00</b>	992	95.9	0.85	1040	9835	2.40	32	1200			
1130	<b>1RQ6 456-6JP00</b>	991	95.8	0.87	1140	10906	2.30	37	1200			
8-pole												
620	<b>1RQ6 450-8JP00</b>	744	94.9	0.82	670	7967	2.70	32	1200			
675	<b>1RQ6 452-8JP00</b>	744	95.1	0.82	720	8679	2.40	36	1200			
750	<b>1RQ6 454-8JP00</b>	744	95.1	0.82	800	9635	2.50	40	1200			
810	<b>1RQ6 456-8JP00</b>	745	95.4	0.82	870	10398	2.70	46	1200			

### Type of construction:

IM B3

0

IM V1 (with canopy)

4

### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> Data of vertical motors (IM V1) on request.

<sup>3)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 50\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 25\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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Square-law torque drive

2-pole

1RQ6 450-2JP0.	735	2711	95.4	0.91	490	2372	95.5	0.90	245	1884	95.3	0.84
1RQ6 452-2JP0	780	2712	95.5	0.91	520	2373	95.6	0.90	260	1885	95.4	0.85
1RQ6 454-2JP0.	991	2711	96.1	0.92	660	2372	96.2	0.91	330	1884	96.1	0.87
1RQ6 456-2JP0.	1028	2710	96.2	0.94	685	2372	96.3	0.93	343	1884	96.4	0.90
1RQ6 500-2JP0.	1305	2711	96.5	0.89	870	2371	96.7	0.86	435	1884	96.8	0.76
1RQ6 502-2JP0.	1411	2710	96.6	0.90	940	2370	96.9	0.88	470	1884	97.0	0.81
1RQ6 504-2JP0.	1613	2712	96.9	0.91	1075	2371	97.2	0.90	538	1884	97.3	0.83

4-pole

1RQ6 450-4JP0.	818	1352	95.6	0.85	545	1184	95.6	0.82	273	941	95.1	0.72
1RQ6 452-4JP0.	900	1351	95.8	0.89	600	1184	95.9	0.87	300	941	95.7	0.81
1RQ6 454-4JP0.	968	1353	96.1	0.88	645	1185	96.1	0.86	323	941	95.8	0.78
1RQ6 456-4JP0.	1065	1354	96.2	0.88	711	1185	96.2	0.85	355	941	95.8	0.76
1RQ6 500-4JP0.	1463	1353	96.4	0.90	975	1184	96.7	0.87	488	941	96.8	0.77
1RQ6 502-4JP0.	1500	1354	96.5	0.90	1000	1184	96.8	0.88	500	941	96.8	0.79
1RQ6 504-4JP0.	1575	1353	96.5	0.92	1050	1184	96.8	0.90	526	941	97.0	0.84
1RQ6 506-4JP0.	1800	1355	96.8	0.90	1200	1185	97.0	0.87	600	942	97.0	0.76
1RQ6 560-4JP0.	2026	1353	96.8	0.92	1350	1184	97.1	0.92	675	941	97.3	0.89
1RQ6 562-4JP0.	2138	1355	97.0	0.91	1425	1185	97.2	0.90	713	942	97.3	0.85

6-pole

1RQ6 450-6JP0.	615	901	96.0	0.84	410	789	96.0	0.81	205	627	95.8	0.71
1RQ6 452-6JP0.	683	902	96.1	0.83	455	789	96.1	0.80	228	627	95.8	0.69
1RQ6 454-6JP0.	765	902	96.2	0.84	510	789	96.2	0.80	255	627	95.9	0.70
1RQ6 456-6JP0.	848	901	96.2	0.87	565	789	96.3	0.84	283	627	96.2	0.76

8-pole

1RQ6 450-8JP0.	465	676	95.0	0.77	310	592	94.8	0.71	155	471	93.8	0.57
1RQ6 452-8JP0.	506	676	95.2	0.79	338	592	95.1	0.74	169	470	94.4	0.61
1RQ6 454-8JP0.	563	677	95.2	0.79	375	592	95.0	0.73	188	471	94.2	0.60
1RQ6 456-8JP0.	608	677	95.5	0.79	405	592	95.3	0.73	203	471	94.5	0.59

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

## Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed rpm	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>2)</sup> rpm		
<b>3.4 ... 4.16 kV, 50 Hz</b>											
2-pole											
1100	<b>1RQ6 450-2JS40</b>	2979	95.4	0.90	178	3529	2.30	13	3000		
1220	<b>1RQ6 452-2JS40</b>	2981	95.8	0.91	194	3910	2.60	14	3000		
1350	<b>1RQ6 454-2JS40</b>	2982	96.0	0.91	215	4325	2.60	16	3000		
1490	<b>1RQ6 456-2JS40</b>	2984	96.3	0.92	235	4771	2.70	18	3000		
2000	<b>1RQ6 500-2JS40</b>	2973	96.2	0.91	315	6424	2.30	19	3000		
2100	<b>1RQ6 502-2JS40</b>	2972	96.2	0.91	335	6747	2.20	20	3000		
2450	<b>1RQ6 504-2JS40</b>	2976	96.6	0.92	385	7861	2.40	24	3000 <sup>5)</sup>		
2550	<b>1RQ6 506-2JS40</b>	2977	96.6	0.92	400	8180	2.60	26	3000 <sup>5)</sup>		
3100	<b>1RQ6 560-2JS40</b>	2978	96.4	0.88	510	9941	1.95	39	3000 <sup>5)</sup>		
3500	<b>1RQ6 562-2JS40</b>	2982	96.7	0.88	570	11208	2.30	43	3000 <sup>5)</sup>		
4000	<b>1RQ6 564-2JS40</b>	2983	97.0	0.92	620	12805	2.40	49	3000 <sup>5)</sup>		
4500	<b>1RQ6 566-2JS40</b>	2984	97.1	0.92	700	14401	2.65	54	3000 <sup>5)</sup>		
4-pole											
1090	<b>1RQ6 450-4JS4■</b>	1486	95.3	0.88	180	7007	2.70	20	1800		
1200	<b>1RQ6 452-4JS4■</b>	1486	95.5	0.89	196	7716	2.60	22	1800		
1290	<b>1RQ6 454-4JS4■</b>	1488	95.8	0.89	210	8281	2.80	25	1800		
1420	<b>1RQ6 456-4JS4■</b>	1489	96.0	0.89	230	9114	2.90	29	1800		
2100 <sup>4)</sup>	<b>1RQ6 500-4JS40</b>	1486	96.0	0.91	335	13495	2.50	42	1800		
2300 <sup>4)</sup>	<b>1RQ6 502-4JS40</b>	1487	96.2	0.90	370	14770	2.60	46	1800		
2600 <sup>4)</sup>	<b>1RQ6 504-4JS40</b>	1487	96.3	0.91	410	16697	2.40	52	1800		
2800 <sup>4)</sup>	<b>1RQ6 506-4JS40</b>	1487	96.5	0.91	445	17981	2.60	56	1800		
3200 <sup>4)</sup>	<b>1RQ6 560-4JS40</b>	1491	96.8	0.88	520	20495	2.40	84	1800		
3500 <sup>4)</sup>	<b>1RQ6 562-4JS40</b>	1492	96.9	0.87	580	22401	2.55	94	1800		
4000 <sup>4)</sup>	<b>1RQ6 564-4JS40</b>	1491	97.1	0.91	630	25619	2.45	105	1800		
4400 <sup>4)</sup>	<b>1RQ6 566-4JS40</b>	1492	97.2	0.90	700	28161	2.75	115	1800		
4800 <sup>1)</sup>	<b>1RQ4 632-4JV■■</b>	1491	97.0	0.89	970	30744	2.50	154	1800		
5190 <sup>1)</sup>	<b>1RQ4 634-4JV■■</b>	1492	97.2	0.89	1040	33220	2.40	174	1800		
5680 <sup>1)</sup>	<b>1RQ4 636-4JV■■</b>	1492	97.2	0.88	1160	36357	2.40	186	1800		

**Voltage code:**4.16 kV, 50 Hz  
Other voltage4  
9**Type of construction:**IM B3  
IM V1 (with canopy)0  
4**Note:**

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

<sup>1)</sup> Rated voltage less than 4.16 kV on request.<sup>2)</sup> For IM B3, roller bearings.<sup>3)</sup> On request.<sup>4)</sup> Data of vertical motors (IM V1) on request.<sup>5)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{\text{rated}} = 75 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

$P/P_{\text{rated}} = 50 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

$P/P_{\text{rated}} = 25 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

Square-law torque drive

2-pole

1RQ6 450-2...	825	2708	95.6	0.90	550	2371	95.6	0.89	275	1883	95.4	0.84
1RQ6 452-2...	915	2709	95.9	0.92	610	2372	96.0	0.91	305	1884	95.7	0.86
1RQ6 454-2...	1013	2710	96.1	0.91	675	2372	96.2	0.90	338	1884	95.9	0.85
1RQ6 456-2...	1118	2711	96.4	0.92	745	2373	96.4	0.91	373	1885	96.2	0.87
1RQ6 500-2...	1500	2707	96.6	0.90	1000	2368	96.8	0.88	500	1883	96.9	0.81
1RQ6 502-2...	1576	2707	96.6	0.90	1050	2368	96.9	0.89	525	1882	97.0	0.84
1RQ6 504-2...	1838	2709	96.9	0.91	1225	2369	97.2	0.90	613	1883	97.2	0.85
1RQ6 506-2...	1913	2710	96.9	0.92	1275	2370	97.2	0.90	638	1883	97.2	0.85
1RQ6 560-2...	2326	2710	96.7	0.89	1550	2370	97.0	0.89	775	1884	97.0	0.86
1RQ6 562-2...	2626	2713	96.9	0.88	1750	2372	97.1	0.88	875	1885	97.1	0.82
1RQ6 564-2...	3001	2713	97.2	0.92	2000	2372	97.3	0.92	1001	1885	97.3	0.89
1RQ6 566-2...	3375	2714	97.3	0.92	2250	2373	97.4	0.91	1126	1885	97.4	0.87

4-pole

1RQ6 450-4...	818	1352	95.5	0.87	545	1184	95.6	0.85	273	941	95.3	0.76
1RQ6 452-4...	900	1352	95.7	0.89	600	1184	95.8	0.87	300	941	95.6	0.80
1RQ6 454-4...	968	1353	95.9	0.88	645	1185	96.0	0.85	323	941	95.6	0.77
1RQ6 456-4...	1065	1353	96.1	0.89	711	1185	96.2	0.87	355	941	95.8	0.79
1RQ6 500-4...	1575	1353	96.3	0.89	1050	1184	96.5	0.86	525	941	96.5	0.76
1RQ6 502-4...	1725	1354	96.5	0.88	1150	1184	96.7	0.85	575	941	96.6	0.73
1RQ6 504-4...	1951	1353	96.6	0.90	1300	1184	96.9	0.88	650	941	96.9	0.79
1RQ6 506-4...	2100	1354	96.8	0.90	1400	1184	97.0	0.87	700	941	96.9	0.78
1RQ6 560-4...	2401	1357	97.0	0.88	1600	1186	97.1	0.86	801	942	97.1	0.78
1RQ6 562-4...	2626	1357	97.1	0.87	1750	1186	97.3	0.85	875	943	97.2	0.76
1RQ6 564-4...	3001	1357	97.3	0.91	2000	1186	97.4	0.90	1001	942	97.4	0.85
1RQ6 566-4...	3300	1357	97.4	0.90	2202	1187	97.5	0.88	1100	943	97.4	0.80
1RQ4 632-4...	O. R. <sup>3)</sup>											
1RQ4 634-4...	O. R. <sup>3)</sup>											
1RQ4 636-4...	O. R. <sup>3)</sup>											

# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

#### H-compact PI US 1RQ4 and 1RQ6

##### Selection and ordering data (continued)

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed rpm	Operating values at rated output									
			Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>2)</sup> rpm			
<b>3.4...4.16 kV, 50 Hz</b>												
6-pole												
820	1RQ6 450-6JS4■■	991	95.5	0.85	140	7905	2.50	26	1200			
910	1RQ6 452-6JS4■■	990	95.6	0.87	152	8783	2.40	29	1200			
1020	1RQ6 454-6JS4■■	990	95.7	0.87	170	9845	2.40	32	1200			
1130	1RQ6 456-6JS4■■	992	96.0	0.86	190	10890	2.50	37	1200			
1540	1RQ4 500-6JV■■■	989	95.8	0.87	325	14869	2.10	62	1200			
1760	1RQ4 502-6JV■■■	990	96.1	0.87	370	16977	2.10	70	1200			
1960	1RQ4 504-6JV■■■	990	96.3	0.87	410	18906	2.20	77	1200			
2140	1RQ4 506-6JV■■■	991	96.4	0.87	445	20621	2.20	85	1200			
2430	1RQ4 560-6JV■■■	992	96.5	0.86	510	23394	2.00	108	1200			
2750	1RQ4 562-6JV■■■	992	96.6	0.86	580	26474	2.00	123	1200			
3000	1RQ4 564-6JV■■■	992	96.7	0.86	630	28881	2.10	137	1200			
3240 <sup>1)</sup>	1RQ4 566-6JV■■■	993	96.9	0.85	690	31160	2.10	149	1200			
3480 <sup>1)</sup>	1RQ4 630-6JV■■■	993	96.8	0.86	730	33468	2.20	188	1200			
3770 <sup>1)</sup>	1RQ4 632-6JV■■■	993	96.9	0.87	780	36257	2.20	207	1200			
4020 <sup>1)</sup>	1RQ4 634-6JV■■■	994	96.9	0.86	840	38623	2.30	228	1200			
4310 <sup>1)</sup>	1RQ4 636-6JV■■■	994	97.1	0.86	900	41409	2.40	251	1200			
8-pole												
620	1RQ6 450-8JS4■■	743	94.6	0.83	110	7976	2.40	32	1200			
675	1RQ6 452-8JS4■■	744	94.8	0.82	120	8674	2.50	36	1200			
750	1RQ6 454-8JS4■■	743	95.0	0.83	132	9640	2.50	40	1200			
810	1RQ6 456-8JS4■■	744	95.2	0.83	142	10399	2.70	46	1200			
1140	1RQ4 500-8JV■■■	743	95.5	0.83	250	14652	2.10	74	1200			
1280	1RQ4 502-8JV■■■	743	95.8	0.83	280	16451	2.10	84	1200			
1400	1RQ4 504-8JV■■■	742	95.8	0.84	305	18018	2.00	92	1200			
1540	1RQ4 506-8JV■■■	742	95.9	0.85	330	19819	2.00	103	1200			
1800	1RQ4 560-8JV■■■	743	95.9	0.84	390	23136	1.90	128	1200			
2000	1RQ4 562-8JV■■■	743	96.1	0.84	435	25707	1.90	146	1200			
2180	1RQ4 564-8JV■■■	744	96.3	0.84	470	27983	2.00	163	1200			
2400	1RQ4 566-8JV■■■	744	96.4	0.84	520	30806	2.00	178	1200			
2600 <sup>1)</sup>	1RQ4 630-8JV■■■	744	96.5	0.84	560	33374	2.40	246	1200			
2790 <sup>1)</sup>	1RQ4 632-8JV■■■	745	96.6	0.83	610	35764	2.50	272	1200			
2940 <sup>1)</sup>	1RQ4 634-8JV■■■	745	96.6	0.84	630	37687	2.50	300	1200			
3140 <sup>1)</sup>	1RQ4 636-8JV■■■	745	96.7	0.85	670	40251	2.50	331	1200			

##### Voltage code:

4.16 kV, 50 Hz  
Other voltage

4

9

##### Type of construction:

IM B3  
IM V1 (with canopy)

0

4

##### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> Rated voltage less than 4.16 kV on request.

<sup>2)</sup> For IM B3, roller bearings.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \phi$ [-]
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$P/P_{rated} = 50\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \phi$ [-]
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$P/P_{rated} = 25\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \phi$ [-]
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Square-law torque drive

6-pole

1RQ6 450-6...	615	901	95.7	0.84	410	789	95.8	0.80	205	627	95.5	0.70
1RQ6 452-6...	683	900	95.8	0.86	455	789	96.0	0.84	228	627	95.9	0.76
1RQ6 454-6...	765	901	95.9	0.87	510	789	96.1	0.84	255	627	96.1	0.76
1RQ6 456-6...	848	902	96.2	0.85	565	789	96.3	0.83	283	627	96.1	0.73
1RQ4 500-6...	1155	900	96.1	0.86	770	787	96.1	0.83	385	625	95.8	0.74
1RQ4 502-6...	1320	900	96.2	0.86	880	787	96.3	0.83	440	625	95.9	0.74
1RQ4 504-6...	1470	901	96.4	0.86	980	787	96.4	0.83	490	625	96.0	0.74
1RQ4 506-6...	1605	901	96.5	0.86	1070	787	96.5	0.83	535	625	96.1	0.74
1RQ4 560-6...	1825	902	96.6	0.85	1215	788	96.6	0.82	610	625	96.2	0.72
1RQ4 562-6...	2065	902	96.7	0.85	1375	788	96.7	0.82	690	626	96.3	0.72
1RQ4 564-6...	2250	902	96.8	0.86	1500	788	96.8	0.83	750	626	96.5	0.74
1RQ4 566-6...	2430	902	96.9	0.84	1620	788	96.8	0.81	810	626	96.4	0.71
1RQ4 630-6...	O. R. <sup>3)</sup>											
1RQ4 632-6...	O. R. <sup>3)</sup>											
1RQ4 634-6...	O. R. <sup>3)</sup>											
1RQ4 636-6...	O. R. <sup>3)</sup>											

8-pole

1RQ6 450-8...	465	676	94.8	0.81	310	592	94.7	0.77	155	470	94.1	0.65
1RQ6 452-8...	506	676	94.9	0.80	338	592	94.8	0.76	169	470	94.1	0.63
1RQ6 454-8...	563	676	95.1	0.82	375	592	95.1	0.77	188	470	94.5	0.66
1RQ6 456-8...	608	677	95.3	0.81	405	592	95.2	0.76	203	471	94.5	0.63
1RQ4 500-8...	855	675	95.6	0.81	570	590	95.6	0.77	285	469	95.0	0.66
1RQ4 502-8...	960	676	95.9	0.80	640	590	95.8	0.76	320	469	95.2	0.63
1RQ4 504-8...	1050	675	95.9	0.82	700	590	95.9	0.78	350	469	95.4	0.68
1RQ4 506-8...	1155	675	96.1	0.83	770	590	96.1	0.80	385	469	95.7	0.70
1RQ4 560-8...	1350	676	96.1	0.83	900	590	96.2	0.79	450	469	95.8	0.69
1RQ4 562-8...	1500	676	96.2	0.84	1000	590	96.3	0.81	500	469	95.9	0.71
1RQ4 564-8...	1635	676	96.4	0.82	1090	591	96.4	0.79	545	469	95.9	0.67
1RQ4 566-8...	1800	676	96.5	0.83	1200	591	96.5	0.80	600	469	96.1	0.69
1RQ4 630-8...	O. R. <sup>3)</sup>											
1RQ4 632-8...	O. R. <sup>3)</sup>											
1RQ4 634-8...	O. R. <sup>3)</sup>											
1RQ4 636-8...	O. R. <sup>3)</sup>											

<sup>3)</sup> On request.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors

H-compact PLUS 1RQ4 and 1RQ6

## Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Rated speed rpm	Operating values at rated output:								
			Efficiency %	Power factor [-]	Rated current A	Rated torque Nm	Break-down torque [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm		
<b>690 V, 60 Hz</b>											
2-pole											
1240	<b>1RQ6 450-2JP10</b>	3583	95.2	0.90	1220	3309	2.40	13	3600		
1300	<b>1RQ6 452-2JP10</b>	3582	95.4	0.92	2x620	3470	2.40	14	3600		
1400	<b>1RQ6 454-2JP10</b>	3582	95.4	0.92	2x670	3734	2.40	16	3600 <sup>2)</sup>		
1700	<b>1RQ6 456-2JP10</b>	3587	96.1	0.92	2x800	4530	2.60	18	3600 <sup>2)</sup>		
1940	<b>1RQ6 500-2JP10</b>	3581	96.2	0.91	2x930	5173	2.70	20	3600 <sup>2)</sup>		
2050	<b>1RQ6 502-2JP10</b>	3581	96.2	0.92	2x970	5467	2.70	22	3600 <sup>2)</sup>		
2450	<b>1RQ6 504-2JP10</b>	3583	96.6	0.92	2x1160	6530	2.80	25	3600 <sup>2)</sup>		
4-pole											
1340	<b>1RQ6 450-4JP1■</b>	1786	95.5	0.88	2x670	7174	2.40	20	1800		
1410	<b>1RQ6 452-4JP1■</b>	1785	95.6	0.89	2x690	7553	2.30	22	1800		
1590	<b>1RQ6 454-4JP1■</b>	1787	95.9	0.89	2x780	8509	2.40	25	1800		
1740	<b>1RQ6 456-4JP1■</b>	1784	95.9	0.90	2x840	9329	2.10	29	1800		
2000 <sup>3)</sup>	<b>1RQ6 500-4JP10</b>	1787	95.9	0.92	2x950	10688	2.60	42	1800		
2100 <sup>3)</sup>	<b>1RQ6 502-4JP10</b>	1785	95.9	0.92	2x1000	11234	2.30	46	1800		
2500 <sup>3)</sup>	<b>1RQ6 504-4JP10</b>	1787	96.3	0.92	2x1180	13359	2.50	52	1800		
6-pole											
1040	<b>1RQ6 450-6JP1■</b>	1190	95.7	0.86	1060	8350	2.30	26	1200		
1130	<b>1RQ6 452-6JP1■</b>	1191	95.9	0.85	1160	9070	2.20	29	1200		
1270	<b>1RQ6 454-6JP1■</b>	1191	96.1	0.86	2x640	10192	2.30	32	1200		
1360	<b>1RQ6 456-6JP1■</b>	1193	96.3	0.84	2x700	10905	2.30	37	1200		
8-pole											
740	<b>1RQ6 450-8JP1■</b>	893	95.1	0.83	780	7922	2.30	32	1200		
820	<b>1RQ6 452-8JP1■</b>	893	95.2	0.84	860	8783	2.30	36	1200		
910	<b>1RQ6 454-8JP1■</b>	893	95.5	0.84	950	9739	2.40	40	1200		
1000	<b>1RQ6 456-8JP1■</b>	893	95.6	0.85	1020	10704	2.30	46	1200		

## Type of construction:

IM B3

0

IM V1 (with canopy)

4

## Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.<sup>2)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.<sup>3)</sup> Data of vertical motors (IM V1) on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

Motor type (repeated)	Partial load values for square-law torque drive											
	$P/P_{rated} = 75\%$				$P/P_{rated} = 50\%$				$P/P_{rated} = 25\%$			
	$P$	$n$	$\eta$	$\cos \varphi$	$P$	$n$	$\eta$	$\cos \varphi$	$P$	$n$	$\eta$	$\cos \varphi$
kW rpm % [-]												
<b>Square-law torque drive</b>												
<b>2-pole</b>												
1RQ6 450-2JP1.	930	3257	95.4	0.90	620	2846	95.3	0.89	310	2262	95.0	0.83
1RQ6 452-2JP1.	975	3256	95.6	0.92	650	2846	95.6	0.92	325	2262	95.4	0.88
1RQ6 454-2JP1.	1050	3257	95.7	0.92	700	2846	95.7	0.92	350	2262	95.5	0.88
1RQ6 456-2JP1.	1275	3260	96.2	0.91	850	2848	96.1	0.90	425	2263	95.8	0.83
1RQ6 500-2JP1.	1455	3257	96.4	0.89	970	2847	96.6	0.87	485	2262	96.5	0.77
1RQ6 502-2JP1.	1538	3257	96.5	0.91	1025	2847	96.7	0.89	513	2262	96.6	0.81
1RQ6 504-2JP1.	1838	3258	96.8	0.91	1225	2848	96.9	0.88	613	2262	96.9	0.80
<b>4-pole</b>												
1RQ6 450-4JP1.	1005	1624	95.6	0.86	670	1421	95.6	0.84	335	1130	95.2	0.75
1RQ6 452-4JP1.	1058	1624	95.9	0.89	705	1420	95.9	0.88	353	1129	95.6	0.82
1RQ6 454-4JP1.	1193	1625	96.1	0.89	795	1421	96.0	0.87	398	1130	95.7	0.81
1RQ6 456-4JP1.	1306	1624	96.2	0.90	870	1420	96.3	0.90	435	1129	96.2	0.86
1RQ6 500-4JP1.	1500	1626	96.2	0.91	1000	1422	96.4	0.89	500	1130	96.4	0.81
1RQ6 502-4JP1.	1576	1625	96.2	0.91	1050	1421	96.5	0.90	525	1129	96.5	0.84
1RQ6 504-4JP1.	1876	1626	96.6	0.91	1250	1422	96.8	0.89	625	1130	96.8	0.82
<b>6-pole</b>												
1RQ6 450-6JP1.	780	1083	96.0	0.85	520	947	96.1	0.82	260	753	95.8	0.72
1RQ6 452-6JP1.	848	1083	96.1	0.84	565	947	96.1	0.80	283	753	95.8	0.70
1RQ6 454-6JP1.	953	1083	96.3	0.85	635	947	96.4	0.83	318	753	96.1	0.73
1RQ6 456-6JP1.	1020	1084	96.5	0.82	680	948	96.4	0.79	340	754	96.1	0.68
<b>8-pole</b>												
1RQ6 450-8JP1.	555	812	95.2	0.80	370	710	95.1	0.76	185	565	94.4	0.63
1RQ6 452-8JP1.	615	812	95.4	0.82	410	710	95.4	0.79	205	565	94.8	0.67
1RQ6 454-8JP1.	683	813	95.5	0.81	455	710	95.5	0.77	228	565	94.8	0.65
1RQ6 456-8JP1.	750	813	95.8	0.83	500	710	95.7	0.79	250	565	95.1	0.68

# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

#### H-compact PLUS 1RQ4 and 1RQ6

##### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Rated speed rpm	Operating values at rated output									
			Efficiency %	Power factor [-]	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque [-]	Moment of inertia kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm			
<b>3.4 ... 4.16 kV, 60 Hz</b>												
2-pole												
1280	<b>1RQ6 450-2JS30</b>	3579	95.1	0.90	210	3418	2.50	13	3600			
1420	<b>1RQ6 452-2JS30</b>	3581	95.6	0.91	225	3788	2.60	14	3600			
1580	<b>1RQ6 454-2JS30</b>	3580	95.8	0.93	245	4217	2.60	16	3600 <sup>2)</sup>			
1740	<b>1RQ6 456-2JS30</b>	3586	96.0	0.92	275	4634	3.50	18	3600 <sup>2)</sup>			
2250	<b>1RQ6 500-2JS30</b>	3578	96.2	0.90	360	6005	2.50	20	3600 <sup>2)</sup>			
2400	<b>1RQ6 502-2JS30</b>	3578	96.3	0.91	380	6405	2.50	22	3600 <sup>2)</sup>			
2800	<b>1RQ6 504-2JS30</b>	3577	96.6	0.92	435	7475	2.40	25	3600 <sup>2)</sup>			
2950	<b>1RQ6 506-2JS30</b>	3578	96.6	0.92	460	7873	2.50	27	3600 <sup>2)</sup>			
3500	<b>1RQ6 560-2JS30</b>	3579	96.3	0.87	580	9339	1.95	39	3600 <sup>2)</sup>			
3900	<b>1RQ6 562-2JS30</b>	3581	96.5	0.88	640	10400	2.15	43	3600 <sup>2)</sup>			
4400	<b>1RQ6 564-2JS30</b>	3583	96.7	0.92	690	11727	2.35	49	3600 <sup>2)</sup>			
4900	<b>1RQ6 566-2JS30</b>	3585	96.9	0.92	760	13052	2.75	54	3600 <sup>2)</sup>			
4-pole												
1340	<b>1RQ6 450-4JS3■</b>	1784	95.4	0.88	220	7177	2.40	20	1800			
1410	<b>1RQ6 452-4JS3■</b>	1785	95.6	0.89	230	7546	2.40	22	1800			
1590	<b>1RQ6 454-4JS3■</b>	1785	95.8	0.90	255	8509	2.50	25	1800			
1740	<b>1RQ6 456-4JS3■</b>	1785	95.9	0.91	275	9313	2.70	29	1800			
2600 <sup>3)</sup>	<b>1RQ6 500-4JS30</b>	1786	96.1	0.90	415	13902	2.40	42	1800			
2700 <sup>3)</sup>	<b>1RQ6 502-4JS30</b>	1786	96.2	0.91	430	14436	2.50	46	1800			
3000 <sup>3)</sup>	<b>1RQ6 504-4JS30</b>	1788	96.4	0.91	475	16022	2.60	52	1800			
3200 <sup>3)</sup>	<b>1RQ6 506-4JS30</b>	1787	96.4	0.92	500	17100	2.40	56	1800			
3700 <sup>3)</sup>	<b>1RQ6 560-4JS30</b>	1791	96.7	0.88	600	19728	2.50	84	1800			
4100 <sup>3)</sup>	<b>1RQ6 562-4JS30</b>	1792	96.9	0.88	670	21848	2.50	94	1800			
4600 <sup>3)</sup>	<b>1RQ6 564-4JS30</b>	1791	97.0	0.91	720	24526	2.35	105	1800			
5100 <sup>3)</sup>	<b>1RQ6 566-4JS30</b>	1791	97.2	0.91	800	27192	2.40	115	1800			

##### Type of construction:

IM B3

0

IM V1 (with canopy)

4

##### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.

Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.

<sup>3)</sup> Data of vertical motors (IM V1) on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 50\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 25\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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Square-law torque drive

2-pole

1RQ6 450-2...	960	3254	95.2	0.90	640	2845	95.1	0.89	320	2261	94.8	0.83
1RQ6 452-2...	1065	3256	95.6	0.91	710	2846	95.6	0.90	355	2262	95.2	0.85
1RQ6 454-2...	1185	3255	95.9	0.93	790	2845	95.9	0.92	395	2261	95.7	0.89
1RQ6 456-2...	1305	3259	96.0	0.91	871	2848	95.8	0.89	435	2263	95.3	0.81
1RQ6 500-2...	1688	3255	96.4	0.89	1125	2846	96.5	0.87	563	2261	96.4	0.78
1RQ6 502-2...	1801	3255	96.5	0.90	1200	2846	96.7	0.88	600	2261	96.6	0.81
1RQ6 504-2...	2101	3254	96.8	0.92	1400	2846	97.0	0.90	700	2261	97.0	0.85
1RQ6 506-2...	2213	3255	96.8	0.92	1475	2846	97.0	0.91	738	2261	96.9	0.85
1RQ6 560-2...	2627	3256	96.5	0.89	1751	2847	96.6	0.89	875	2262	96.6	0.86
1RQ6 562-2...	2926	3258	96.7	0.89	1951	2848	96.8	0.89	975	2263	96.8	0.85
1RQ6 564-2...	3301	3259	96.9	0.93	2200	2849	97.0	0.92	1100	2263	96.9	0.89
1RQ6 566-2...	3676	3260	97.1	0.92	2450	2850	97.1	0.92	1226	2263	97.0	0.87

4-pole

1RQ6 450-4...	1005	1623	95.6	0.88	670	1420	95.6	0.87	335	1129	95.4	0.80
1RQ6 452-4...	1058	1624	95.7	0.88	705	1420	95.8	0.87	353	1130	95.5	0.81
1RQ6 454-4...	1193	1624	96.0	0.90	795	1420	96.0	0.89	398	1130	95.8	0.83
1RQ6 456-4...	1305	1624	96.1	0.91	870	1420	96.2	0.91	435	1130	96.1	0.86
1RQ6 500-4...	1951	1626	96.3	0.89	1300	1422	96.5	0.86	650	1130	96.3	0.75
1RQ6 502-4...	2025	1626	96.4	0.90	1350	1422	96.6	0.87	676	1130	96.5	0.78
1RQ6 504-4...	2250	1627	96.6	0.90	1500	1423	96.7	0.86	751	1130	96.5	0.76
1RQ6 506-4...	2401	1626	96.7	0.91	1600	1422	96.8	0.89	801	1130	96.8	0.82
1RQ6 560-4...	2776	1629	96.8	0.88	1850	1424	96.9	0.86	926	1131	96.8	0.79
1RQ6 562-4...	3076	1629	97.0	0.88	2050	1424	97.1	0.86	1026	1131	97.0	0.78
1RQ6 564-4...	3451	1629	97.2	0.92	2300	1424	97.3	0.91	1151	1131	97.2	0.86
1RQ6 566-4...	3826	1629	97.3	0.91	2550	1424	97.4	0.90	1276	1131	97.3	0.85

# Motors for converter operation

## Converter with non-sinusoidal output

### Air-cooled motors

#### H-compact PLUS 1RQ4 and 1RQ6

##### Selection and ordering data (continued)

Rated power kW	High voltage motor H-compact PLUS	Rated speed n <sub>rated</sub> rpm	Operating values at rated output							Break-down torque T <sub>B</sub> /T <sub>rated</sub>	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm											
			Efficiency η %	Power factor cos φ [-]	Rated current at 4.16 kV I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm																	
<b>3.4 ... 4.16 kV, 60 Hz</b>																							
<b>6-pole</b>																							
1040	<b>1RQ6 450-6JS3■</b>	1190	95.7	0.86	176	8354	2.40	26	1200														
1130	<b>1RQ6 452-6JS3■</b>	1191	95.9	0.86	190	9071	2.40	29	1200														
1270	<b>1RQ6 454-6JS3■</b>	1191	96.1	0.86	215	10187	2.50	32	1200														
1360	<b>1RQ6 456-6JS3■</b>	1192	96.2	0.85	230	10902	2.50	37	1200														
1760	<b>1RQ4 500-6JV5■</b>	1190	96.0	0.87	290	14123	2.20	62	1200														
2000	<b>1RQ4 502-6JV5■</b>	1190	96.2	0.87	330	16049	2.20	70	1200														
2240	<b>1RQ4 504-6JV5■</b>	1191	96.4	0.87	370	17960	2.30	77	1200														
2440	<b>1RQ4 506-6JV5■</b>	1191	96.5	0.87	405	19564	2.30	85	1200														
2800	<b>1RQ4 560-6JV5■</b>	1191	96.5	0.86	470	22448	2.00	108	1200														
3190	<b>1RQ4 562-6JV5■</b>	1192	96.7	0.85	540	25553	2.10	123	1200														
3500	<b>1RQ4 564-6JV5■</b>	1193	96.8	0.85	590	28024	2.20	137	1200														
3750	<b>1RQ4 566-6JV5■</b>	1193	96.9	0.85	630	30019	2.20	149	1200														
<b>8-pole</b>																							
740	<b>1RQ6 450-8JS3■</b>	892	94.9	0.84	128	7927	2.30	32	1200														
820	<b>1RQ6 452-8JS3■</b>	893	95.2	0.84	142	8778	2.40	36	1200														
910	<b>1RQ6 454-8JS3■</b>	893	95.3	0.84	158	9739	2.40	40	1200														
1000	<b>1RQ6 456-8JS3■</b>	893	95.5	0.84	174	10702	2.30	46	1200														
1300	<b>1RQ4 500-8JV5■</b>	892	95.7	0.83	225	13917	2.10	74	1200														
1460	<b>1RQ4 502-8JV5■</b>	893	96.1	0.83	255	15613	2.20	84	1200														
1600	<b>1RQ4 504-8JV5■</b>	893	95.9	0.84	275	17110	2.10	92	1200														
1760	<b>1RQ4 506-8JV5■</b>	893	96.2	0.85	300	18821	2.10	103	1200														
2060	<b>1RQ4 560-8JV5■</b>	893	96.3	0.84	355	22029	2.00	128	1200														
2310	<b>1RQ4 562-8JV5■</b>	893	96.4	0.85	390	24702	2.00	146	1200														
2500	<b>1RQ4 564-8JV5■</b>	894	96.5	0.85	425	26704	2.10	163	1200														
2750	<b>1RQ4 566-8JV5■</b>	894	96.6	0.85	465	29374	2.10	178	1200														

##### Type of construction:

IM B3

0

IM V1 (with canopy)

4

##### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.



# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

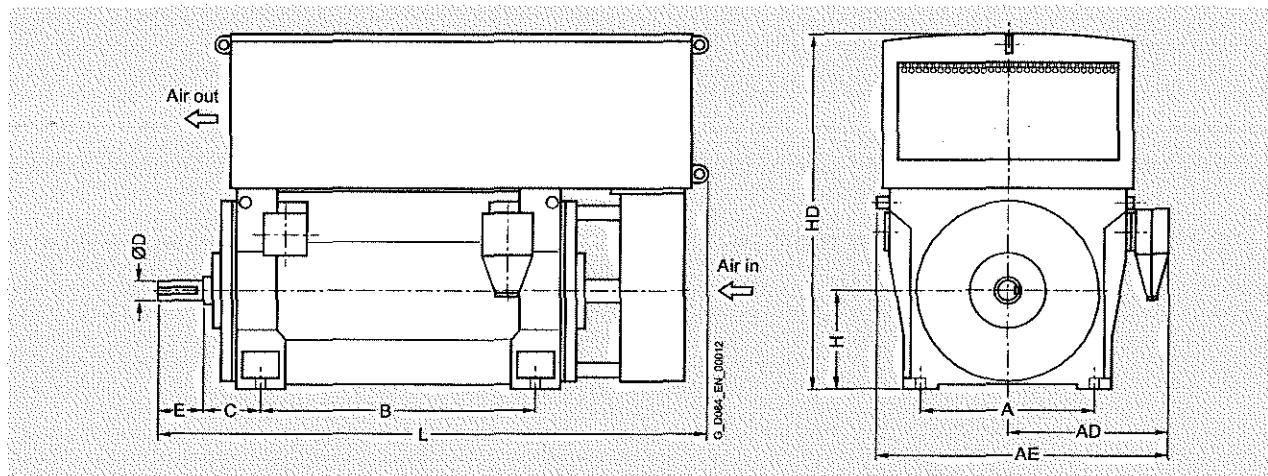
Motor type (repeated)	Partial load values for square-law torque drive											
	$P/P_{\text{rated}} = 75 \%$				$P/P_{\text{rated}} = 50 \%$				$P/P_{\text{rated}} = 25 \%$			
	$P$	$n$	$\eta$	$\cos \varphi$	$P$	$n$	$\eta$	$\cos \varphi$	$P$	$n$	$\eta$	$\cos \varphi$
	kW	rpm	%	[ $\cdot$ ]	kW	rpm	%	[ $\cdot$ ]	kW	rpm	%	[ $\cdot$ ]
<b>Square-law torque drive</b>												
<b>6-pole</b>												
1RQ6 450-6...	780	1082	95.9	0.85	520	947	96.0	0.83	260	753	95.8	0.74
1RQ6 452-6...	848	1083	96.1	0.85	565	947	96.2	0.82	283	753	96.0	0.73
1RQ6 454-6...	953	1083	96.2	0.85	635	947	96.3	0.82	318	753	96.0	0.72
1RQ6 456-6...	1020	1084	96.4	0.84	680	948	96.4	0.81	340	753	96.1	0.71
1RQ4 500-6...	1320	1081	96.0	0.86	880	943	95.9	0.82	440	751	95.5	0.73
1RQ4 502-6...	1500	1081	96.2	0.86	1000	943	96.1	0.83	500	751	95.7	0.74
1RQ4 504-6...	1680	1081	96.3	0.85	1120	943	96.2	0.82	560	751	95.6	0.72
1RQ4 506-6...	1830	1081	96.4	0.86	1220	943	96.3	0.83	610	751	95.8	0.74
1RQ4 560-6...	2100	1084	96.5	0.85	1400	944	96.4	0.83	700	753	96.0	0.74
1RQ4 562-6...	2395	1084	96.7	0.84	1595	944	96.6	0.81	800	754	96.1	0.71
1RQ4 564-6...	2625	1085	96.8	0.84	1750	944	96.6	0.80	875	754	96.1	0.70
1RQ4 566-6...	2815	1085	96.8	0.84	1875	944	96.6	0.80	940	754	96.1	0.70
<b>8-pole</b>												
1RQ6 450-8...	555	812	95.0	0.83	370	710	95.1	0.80	185	565	94.6	0.69
1RQ6 452-8...	615	812	95.3	0.82	410	710	95.3	0.79	205	565	94.7	0.68
1RQ6 454-8...	683	812	95.4	0.83	455	710	95.4	0.79	228	565	94.9	0.68
1RQ6 456-8...	750	812	95.6	0.83	500	710	95.6	0.80	250	565	95.2	0.70
1RQ4 500-8...	975	810	95.7	0.82	650	707	95.5	0.77	325	563	94.8	0.66
1RQ4 502-8...	1095	811	95.9	0.81	730	707	95.7	0.77	365	563	95.0	0.65
1RQ4 504-8...	1200	811	95.9	0.81	800	707	95.8	0.77	400	563	95.2	0.65
1RQ4 506-8...	1320	811	96.2	0.83	880	707	96.1	0.79	440	563	95.5	0.68
1RQ4 560-8...	1545	812	96.3	0.83	1030	707	96.3	0.79	515	565	95.9	0.69
1RQ4 562-8...	1733	812	96.3	0.83	1155	707	96.2	0.80	578	565	95.7	0.69
1RQ4 564-8...	1875	813	96.4	0.83	1250	707	96.3	0.80	625	565	95.7	0.70
1RQ4 566-8...	2063	813	96.5	0.83	1375	707	96.3	0.79	688	565	95.7	0.68

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1RQ6450-6J.0<sup>2)</sup> Vervelde bearings (NEMA type of construction)</b>											
2-pole											
1RQ6450-2J.0 <sup>2)</sup>	4250	850	930	1620	1180	280	95	130	450	1842	2425 <sup>3)</sup>
1RQ6452-2J.0 <sup>2)</sup>	4450	850	930	1620	1180	280	95	130	450	1842	2425 <sup>3)</sup>
1RQ6454-2J.0 <sup>2)</sup>	4800	850	930	1620	1400	280	95	130	450	1842	2635 <sup>3)</sup>
1RQ6456-2J.0 <sup>2)</sup>	5050	850	930	1620	1400	280	95	130	450	1842	2635 <sup>3)</sup>
1RQ6500-2J.0 <sup>2)</sup>	6400	950	1135	1835	1320	315	110	165	500	2040	3403 <sup>3)</sup>
1RQ6502-2J.0 <sup>2)</sup>	6550	950	1135	1835	1320	315	110	165	500	2040	3403 <sup>3)</sup>
4-pole											
1RQ6450-4J.0	4550	850	930	1620	1180	250	130	200	450	1842	2455
1RQ6452-4J.0	4750	850	930	1620	1180	250	130	200	450	1842	2455
1RQ6454-4J.0	5200	850	930	1620	1400	250	130	200	450	1842	2665
1RQ6456-4J.0	5450	850	930	1620	1400	250	130	200	450	1842	2665
1RQ6500-4J.0	6900	950	1135	1835	1320	280	150	200	500	2040	2856
1RQ6502-4J.0	7150	950	1135	1835	1320	280	150	200	500	2040	2856
1RQ6504-4J.0	7900	950	1135	1835	1500	280	150	200	500	2040	3036
1RQ6506-4J.0	8200	950	1135	1835	1500	280	150	200	500	2040	3036
1RQ6560-4J.0	8800	1060	1205	1975	1400	315	170	240	560	2288	2985
1RQ6562-4J.0	9200	1060	1205	1975	1400	315	170	240	560	2288	2985
1RQ6564-4J.0	10200	1060	1205	1975	1600	315	170	240	560	2288	3215
1RQ6566-4J.0	10750	1060	1205	1975	1600	315	170	240	560	2288	3215
1RQ4630-4J.0 <sup>2)</sup>	11100	1320	1330	2210	1600	335	190	280	630	2340	3140
1RQ4632-4J.0 <sup>2)</sup>	11800	1320	1330	2210	1600	335	190	280	630	2340	3140
1RQ4634-4J.0 <sup>2)</sup>	12900	1320	1330	2210	1800	335	200	280	630	2340	3380
1RQ4636-4J.0 <sup>2)</sup>	13450	1320	1330	2210	1800	335	200	280	630	2340	3380
6-pole											
1RQ6450-6J.0	4650	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6452-6J.0	4900	850	930	1620	1180	250	140	200	450	1842	2455
1RQ6454-6J.0	5300	850	930	1620	1400	280	140	200	450	1842	2665
1RQ6456-6J.0	5650	850	930	1620	1400	280	140	200	450	1842	2665

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>2)</sup> Roller bearings only for 50 Hz version.

<sup>3)</sup> Including air inlet silencer.

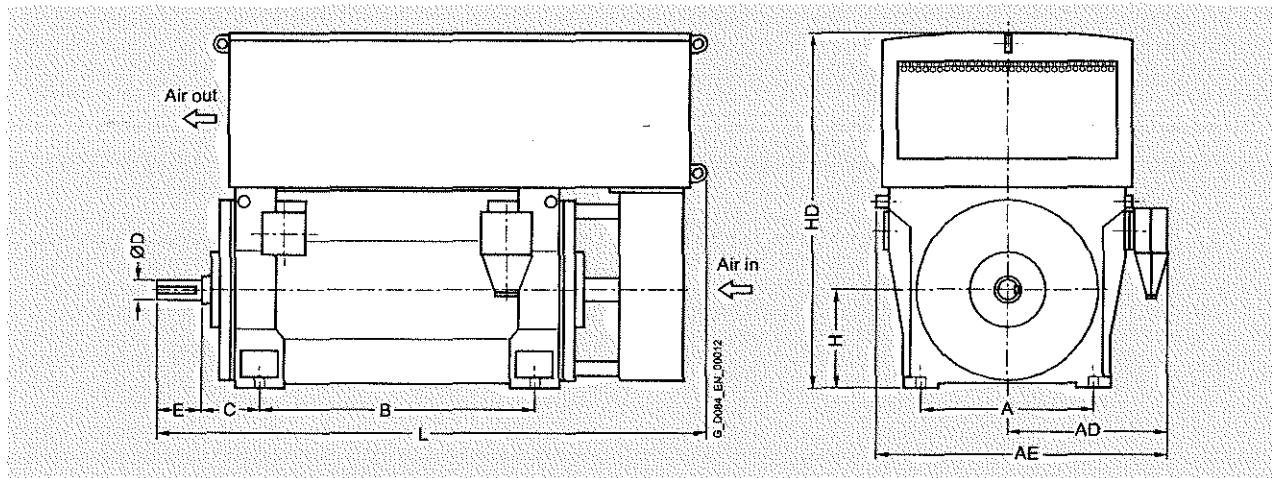


# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions										
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm	
<b>Index 6 10<sup>3</sup> pole bearings, 1M35 top cover construction</b>												
<b>6-pole</b>												
1RQ4500-6J..0	6000	950	1000	1760	1320	280	150	200	500	2000	2660	
1RQ4502-6J..0	6400	950	1000	1760	1320	280	150	200	500	2000	2660	
1RQ4504-6J..0	6950	950	1000	1760	1500	280	160	240	500	2000	2910	
1RQ4506-6J..0	7350	950	1000	1760	1500	280	160	240	500	2000	2910	
1RQ4560-6J..0	8100	1060	1070	1900	1400	315	170	240	560	2260	2950	
1RQ4562-6J..0	8650	1060	1070	1900	1400	315	170	240	560	2260	2950	
1RQ4564-6J..0	9600	1060	1210	2040	1600	315	180	240	560	2260	3180	
1RQ4566-6J..0	10050	1060	1210	2040	1600	315	180	240	560	2260	3180	
1RQ4630-6J..0	11400	1320	1330	2210	1600	335	200	280	630	2340	3140	
1RQ4632-6J..0	12000	1320	1330	2210	1600	335	200	280	630	2340	3140	
1RQ4634-6J..0	12900	1320	1330	2210	1800	335	200	280	630	2340	3380	
1RQ4636-6J..0	13750	1320	1330	2210	1800	335	200	280	630	2340	3380	
<b>8-pole</b>												
1RQ6450-8J..0	4650	850	930	1620	1180	250	140	200	450	1842	2455	
1RQ6452-8J..0	4950	850	930	1620	1180	250	140	200	450	1842	2455	
1RQ6454-8J..0	5350	850	930	1620	1400	280	140	200	450	1842	2665	
1RQ6456-8J..0	5700	850	930	1620	1400	280	140	200	450	1842	2665	
1RQ4500-8J..0	6050	950	1000	1760	1320	280	150	200	500	2000	2660	
1RQ4502-8J..0	6400	950	1000	1760	1320	280	150	200	500	2000	2660	
1RQ4504-8J..0	6950	950	1000	1760	1500	280	160	240	500	2000	2910	
1RQ4506-8J..0	7350	950	1000	1760	1500	280	160	240	500	2000	2910	
1RQ4560-8J..0	8100	1060	1070	1900	1400	315	170	240	560	2260	2950	
1RQ4562-8J..0	8650	1060	1070	1900	1400	315	170	240	560	2260	2950	
1RQ4564-8J..0	9500	1060	1070	1900	1600	315	180	240	560	2260	3180	
1RQ4566-8J..0	9950	1060	1070	1900	1600	315	180	240	560	2260	3180	
1RQ4630-8J..0	11200	1320	1180	2060	1600	335	200	280	630	2340	3140	
1RQ4632-8J..0	11950	1320	1330	2210	1600	335	200	280	630	2340	3140	
1RQ4634-8J..0	12900	1320	1330	2210	1800	335	200	280	630	2340	3380	
1RQ4636-8J..0	13650	1320	1330	2210	1800	335	200	280	630	2340	3380	

### Note:

Higher pole numbers are available on request.

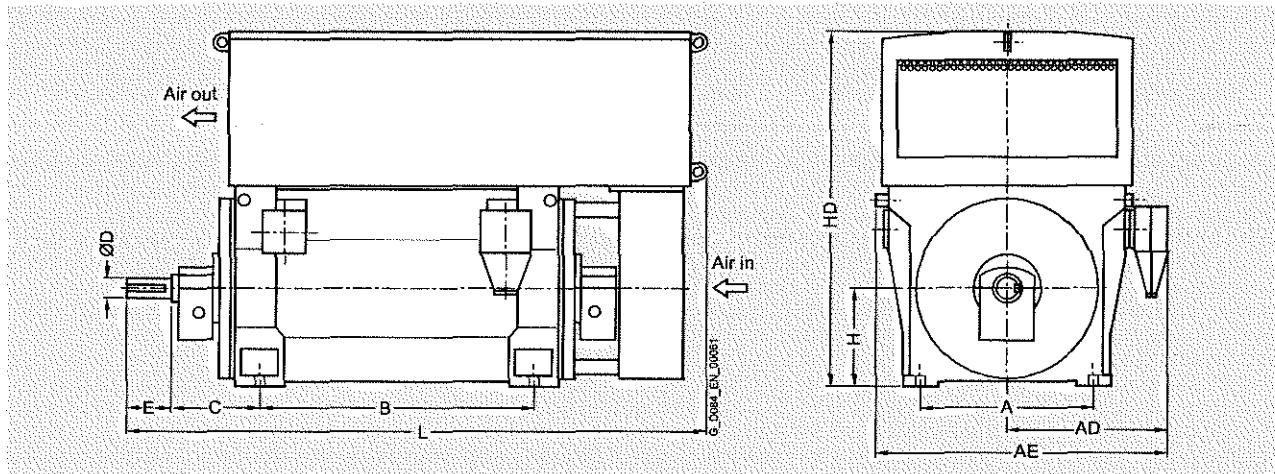
<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by +140 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

### Up to 60 Hz sleeve bearing, flange mounting construction

#### 2-pole

1RQ6450-2J..0-Z K96	4250	850	930	1620	1180	425	95	130	450	1842	2575 <sup>3)</sup>
1RQ6452-2J..0-Z K96	4500	850	930	1620	1180	425	95	130	450	1842	2575 <sup>3)</sup>
1RQ6454-2J..0-Z K96	4850	850	930	1620	1400	425	95	130	450	1842	2790 <sup>3)</sup>
1RQ6456-2J..0-Z K96	5100	850	930	1620	1400	425	95	130	450	1842	2790 <sup>3)</sup>
1RQ6500-2J..0-Z K96 <sup>2)</sup>	6400	950	1135	1835	1320	450	110	165	500	2040	3538 <sup>3)</sup>
1RQ6502-2J..0-Z K96 <sup>2)</sup>	6550	950	1135	1835	1320	450	110	165	500	2040	3538 <sup>3)</sup>
1RQ6504-2J..0	7450	950	1135	1835	1500	450	110	165	500	2040	3718 <sup>3)</sup>
1RQ6506-2J..0	7700	950	1135	1835	1500	450	110	165	500	2040	3718 <sup>3)</sup>
1RQ6560-2J..0	8800	1060	1205	1975	1400	600	130	200	560	2288	3900 <sup>3)</sup>
1RQ6562-2J..0	9200	1060	1205	1975	1400	600	130	200	560	2288	3900 <sup>3)</sup>
1RQ6564-2J..0	10200	1060	1205	1975	1600	600	130	200	560	2288	4130 <sup>3)</sup>
1RQ6566-2J..0	10700	1060	1205	1975	1600	600	130	200	560	2288	4130 <sup>3)</sup>

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

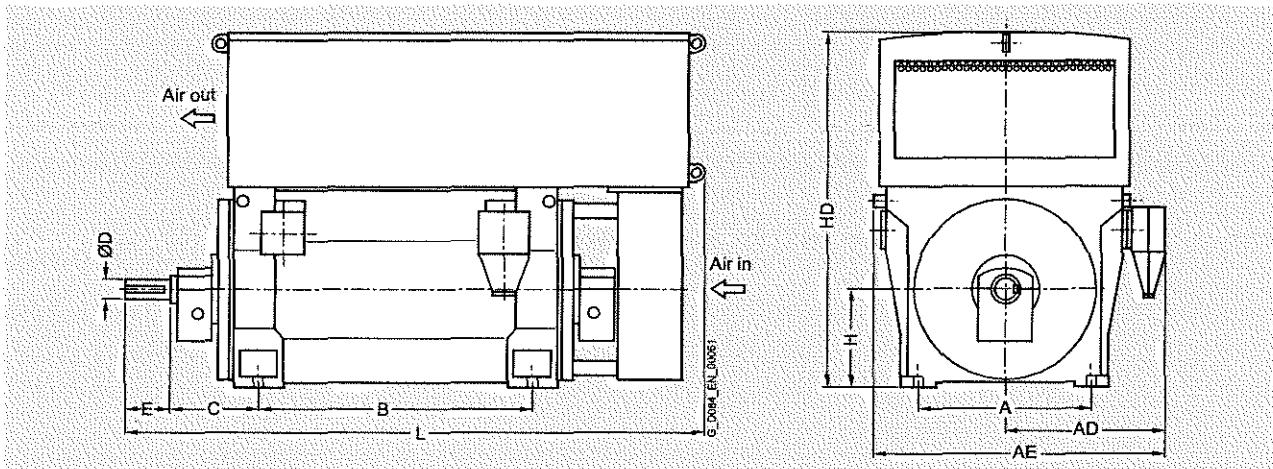
<sup>3)</sup> Including air inlet silencer.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

### Dimensions (Values given are for the 60 Hz version. The 400 Hz version has the same construction.)

4-pole

1RQ6450-4J..0-Z K96	4650	850	930	1620	1180	500	130	200	450	1842	2705
1RQ6452-4J..0-Z K96	4850	850	930	1620	1180	500	130	200	450	1842	2705
1RQ6454-4J..0-Z K96	5300	850	930	1620	1400	500	130	200	450	1842	2915
1RQ6456-4J..0-Z K96	5550	850	930	1620	1400	500	130	200	450	1842	2915
1RQ6500-4J..0-Z K96	7200	950	1135	1835	1320	560	150	200	500	2040	3136
1RQ6502-4J..0-Z K96	7450	950	1135	1835	1320	560	150	200	500	2040	3136
1RQ6504-4J..0-Z K96	8150	950	1135	1835	1500	560	150	200	500	2040	3316
1RQ6506-4J..0-Z K96	8500	950	1135	1835	1500	560	150	200	500	2040	3316
1RQ6560-4J..0-Z K96	8950	1060	1205	1975	1400	600	170	240	560	2288	3270
1RQ6562-4J..0-Z K96	9350	1060	1205	1975	1400	600	170	240	560	2288	3270
1RQ6564-4J..0-Z K96	10350	1060	1205	1975	1600	600	170	240	560	2288	3500
1RQ6566-4J..0-Z K96	10900	1060	1205	1975	1600	600	170	240	560	2288	3500
1RQ4630-4J..0-Z K96 <sup>2)</sup>	11350	1320	1330	2210	1600	600	190	280	630	2340	3400
1RQ4632-4J..0-Z K96 <sup>2)</sup>	12050	1320	1330	2210	1600	600	190	280	630	2340	3400
1RQ4634-4J..0-Z K96 <sup>2)</sup>	13150	1320	1330	2210	1800	600	200	280	630	2340	3640
1RQ4636-4J..0-Z K96 <sup>2)</sup>	13700	1320	1330	2210	1800	600	200	280	630	2340	3640

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

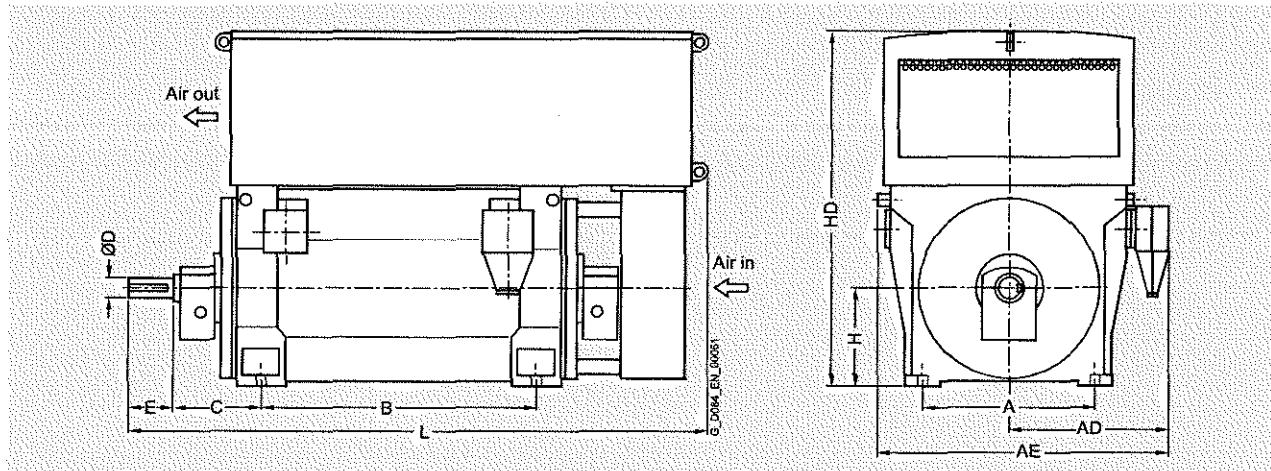
<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, '1-Z K96' not necessary.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm.	AD <sup>1)</sup> mm.	AE <sup>1)</sup> mm.	B mm.	C mm.	D mm.	E mm.	H mm.	HD mm.	L mm.

### Dimensions of standard motors with different construction

6-pole

1RQ6450-6J..0-Z K96	4800	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6452-6J..0-Z K96	5050	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6454-6J..0-Z K96	5450	850	930	1620	1400	500	140	200	450	1842	2915
1RQ6456-6J..0-Z K96	5800	850	930	1620	1400	500	140	200	450	1842	2915
1RQ4500-6J..0-Z K96	6200	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4502-6J..0-Z K96	6500	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4504-6J..0-Z K96	7150	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4506-6J..0-Z K96	7550	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4560-6J..0-Z K96	8250	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4562-6J..0-Z K96	8800	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4564-6J..0-Z K96	9750	1060	1210	2040	1600	530	180	240	560	2260	3400
1RQ4566-6J..0-Z K96	10200	1060	1210	2040	1600	530	180	240	560	2260	3400
1RQ4630-6J..0-Z K96	11650	1320	1330	2210	1600	600	200	280	630	2340	3400
1RQ4632-6J..0-Z K96	12250	1320	1330	2210	1600	600	200	280	630	2340	3400
1RQ4634-6J..0-Z K96	13150	1320	1330	2210	1800	600	200	280	630	2340	3640
1RQ4636-6J..0-Z K96	14000	1320	1330	2210	1800	600	200	280	630	2340	3640

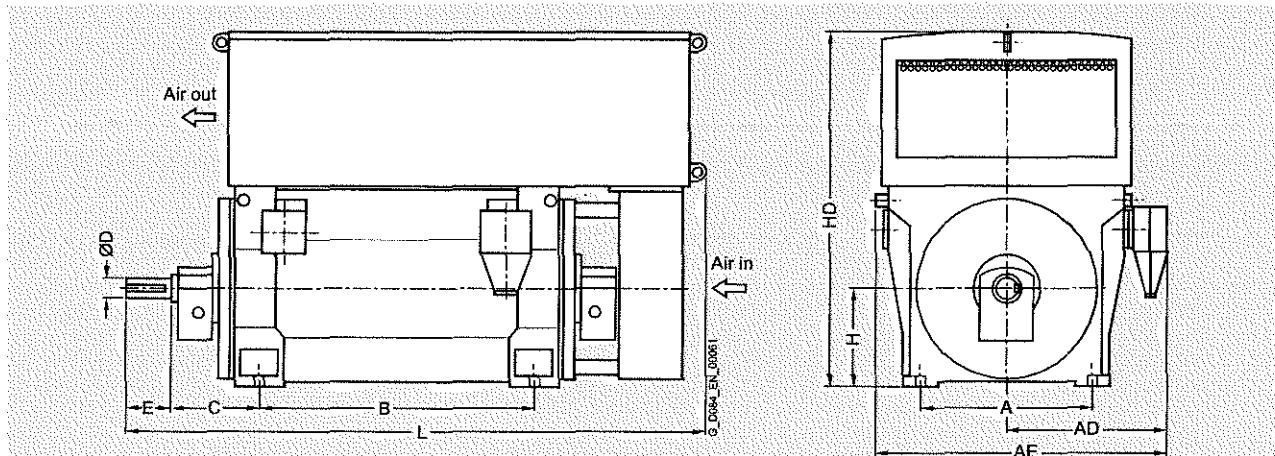
<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Up to 6.3 kW cooling air via side connection</b>											
8-pole											
1RQ6450-8J..0-Z K96	4800	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6452-8J..0-Z K96	5100	850	930	1620	1180	500	140	200	450	1842	2705
1RQ6454-8J..0-Z K96	5500	850	930	1620	1400	500	140	200	450	1842	2915
1RQ6456-8J..0-Z K96	5850	850	930	1620	1400	500	140	200	450	1842	2915
1RQ4500-8J..0-Z K96	6200	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4502-8J..0-Z K96	6550	950	1000	1760	1320	500	150	200	500	2000	2880
1RQ4504-8J..0-Z K96	7050	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4506-8J..0-Z K96	7450	950	1000	1760	1500	500	160	240	500	2000	3130
1RQ4560-8J..0-Z K96	8250	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4562-8J..0-Z K96	8800	1060	1070	1900	1400	530	170	240	560	2260	3170
1RQ4564-8J..0-Z K96	9650	1060	1070	1900	1600	530	180	240	560	2260	3400
1RQ4566-8J..0-Z K96	10100	1060	1070	1900	1600	530	180	240	560	2260	3400
1RQ4630-8J..0-Z K96	11450	1320	1180	2060	1600	600	200	280	630	2340	3400
1RQ4632-8J..0-Z K96	12200	1320	1330	2210	1600	600	200	280	630	2340	3400
1RQ4634-8J..0-Z K96	13150	1320	1330	2210	1800	600	200	280	630	2340	3640
1RQ4636-8J..0-Z K96	13900	1320	1330	2210	1800	600	200	280	630	2340	3640

#### Note:

Higher pole numbers are available on request.

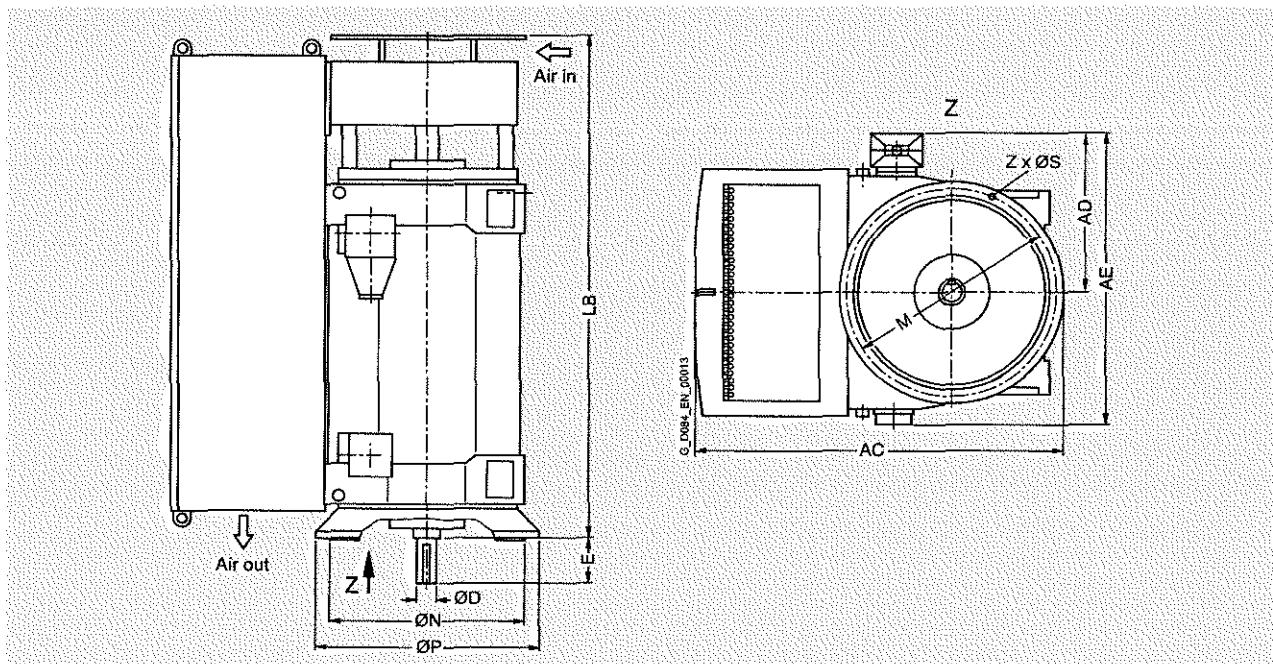
<sup>1)</sup> For  $V_{rated} \geq 2.0 \text{ kV}$  and current  $I_{rated} > 315 \text{ A}$ , the dimension changes by + 140 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings



Motor type	Weight kg	Dimensions												Z Quantity
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm			
<b>Up to 0.6 kV, roller bearings (M/H) type of construction</b>														
4-pole														
1RQ6450-4J..4	4750	1967	930	1620	130	200	2730	1150	1000	1080	26	8		
1RQ6452-4J..4	5000	1967	930	1620	130	200	2730	1150	1000	1080	26	8		
1RQ6454-4J..4	5400	1967	930	1620	130	200	2940	1150	1000	1080	26	8		
1RQ6456-4J..4	5700	1967	930	1620	130	200	2940	1150	1000	1080	26	8		
1RQ4500-4J..4	6050	2130	1000	1810	140	200	2560	1250	1120	1180	26	8		
1RQ4502-4J..4	6250	2130	1000	1810	140	200	2560	1250	1120	1180	26	8		
1RQ4504-4J..4	6950	2130	1000	1810	150	200	2770	1250	1120	1180	26	8		
1RQ4506-4J..4	7300	2130	1000	1810	150	200	2770	1250	1120	1180	26	8		
1RQ4560-4J..4	8200	2400	1210	2100	170	240	2800	1400	1250	1320	26	16		
1RQ4562-4J..4	8600	2400	1210	2100	170	240	2800	1400	1250	1320	26	16		
1RQ4564-4J..4	9500	2400	1210	2100	180	240	3030	1400	1250	1320	26	16		
1RQ4566-4J..4 <sup>2)</sup>	9950	2400	1210	2100	180	240	3030	1400	1250	1320	26	16		
1RQ4630-4J..4 <sup>2)</sup>	12750	2840	1330	2300	200	280	3170	2000	1800	1900	33	16		
1RQ4632-4J..4 <sup>2)</sup>	13450	2840	1330	2300	200	280	3170	2000	1800	1900	33	16		
1RQ4634-4J..4 <sup>2)</sup>	14550	2840	1330	2300	200	280	3410	2000	1800	1900	33	16		
1RQ4636-4J..4 <sup>2)</sup>	15100	2840	1330	2300	200	280	3410	2000	1800	1900	33	16		

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

<sup>2)</sup> Only in the 50 Hz version.

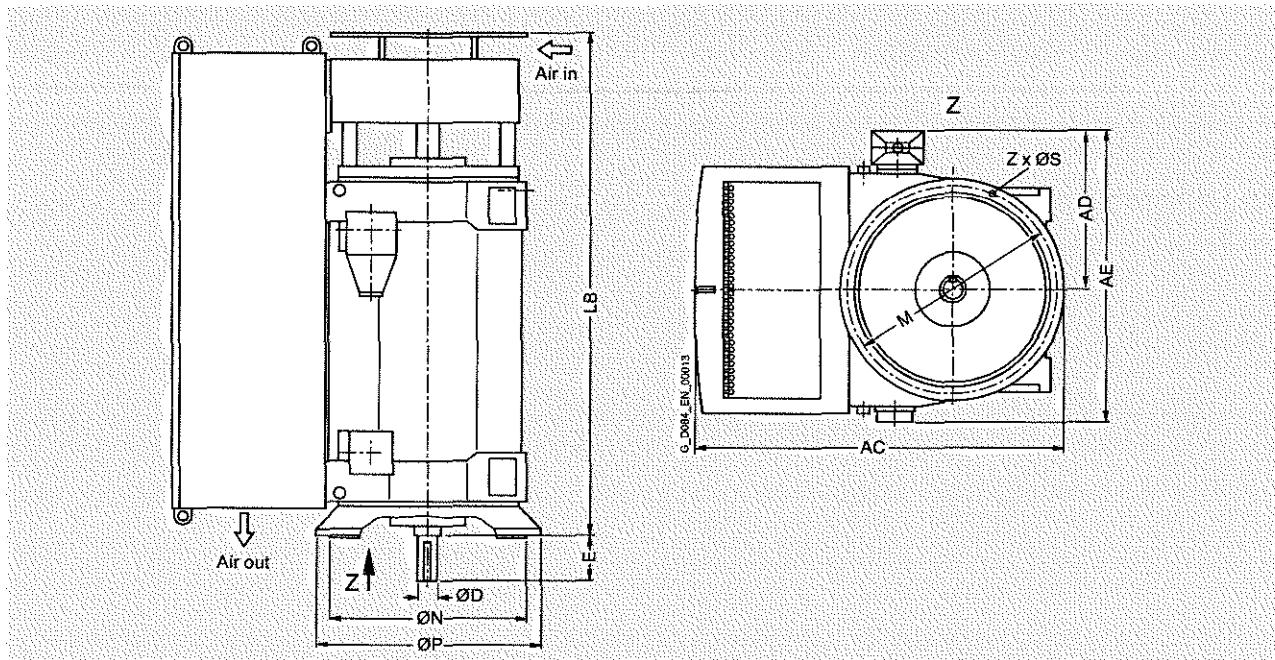
# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)

**1RQ4, up to 6.6 kV 50/60 Hz, roller bearings, IM V1 type of construction**



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		

### Up to 6.6 kV, roller bearings, IM V1 type of construction

#### 6-pole

1RQ6450-6J..4	4850	1967	930	1620	140	200	2730	1150	1000	1080	26	8
1RQ6452-6J..4	5150	1967	930	1620	140	200	2730	1150	1000	1080	26	8
1RQ6454-6J..4	5500	1967	930	1620	140	200	2940	1150	1000	1080	26	8
1RQ6456-6J..4	5850	1967	930	1620	140	200	2940	1150	1000	1080	26	8
1RQ4500-6J..4	6200	2130	1000	1810	150	200	2560	1250	1120	1180	26	8
1RQ4502-6J..4	6550	2130	1000	1810	150	200	2560	1250	1120	1180	26	8
1RQ4504-6J..4	7100	2130	1000	1810	160	240	2770	1250	1120	1180	26	8
1RQ4506-6J..4	7500	2130	1000	1810	160	240	2770	1250	1120	1180	26	8
1RQ4560-6J..4	8300	2400	1070	1960	170	240	2800	1400	1250	1320	26	16
1RQ4562-6J..4	8800	2400	1070	1960	170	240	2800	1400	1250	1320	26	16
1RQ4564-6J..4	9750	2400	1210	2100	180	240	3030	1400	1250	1320	26	16
1RQ4566-6J..4	10200	2400	1210	2100	180	240	3030	1400	1250	1320	26	16
1RQ4630-6J..4	13050	2840	1330	2300	200	280	3170	2000	1800	1900	33	16
1RQ4632-6J..4	13650	2840	1330	2300	200	280	3170	2000	1800	1900	33	16
1RQ4634-6J..4	14550	2840	1330	2300	200	280	3410	2000	1800	1900	33	16
1RQ4636-6J..4	15400	2840	1330	2300	200	280	3410	2000	1800	1900	33	16

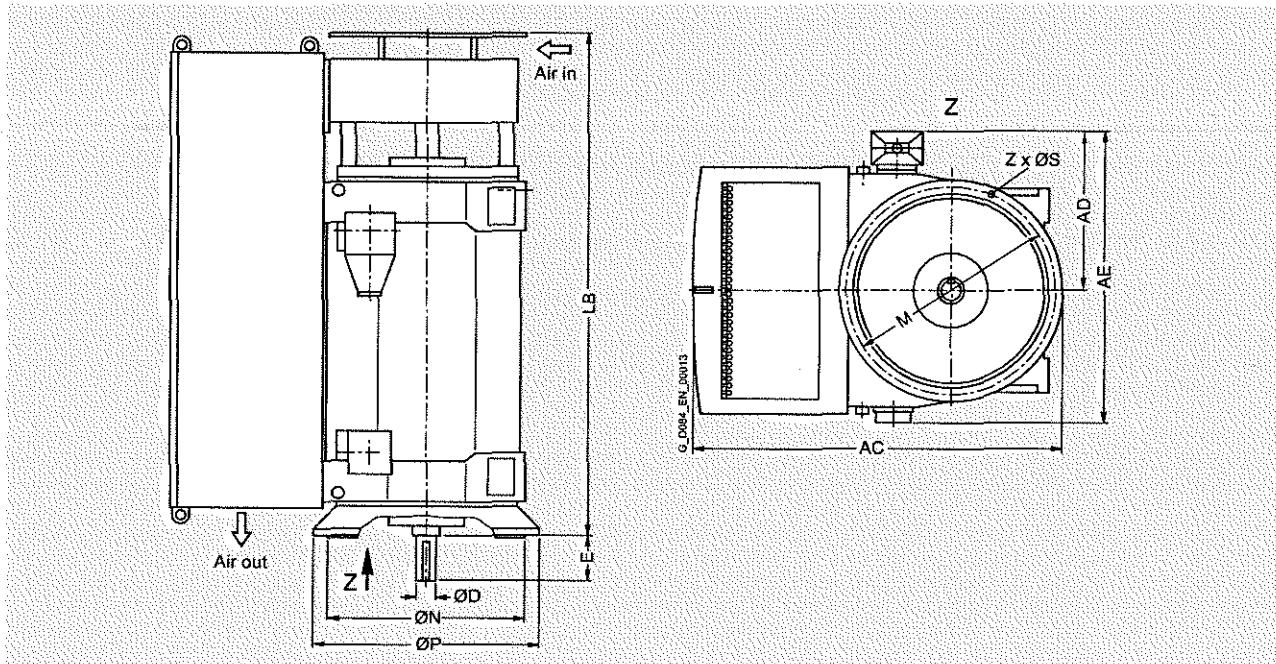
<sup>1)</sup> For  $V_{rated} \geq 2.0 \text{ kV}$  and current  $I_{rated} > 315 \text{ A}$ , the dimension changes by + 140 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Air-cooled motors  
H-compact PLUS 1RQ4 and 1RQ6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions											
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z Quantity	
<b>Up to 5.5 kV, roller bearings, IM V1 type of construction</b>													
8-pole													
1RQ6450-8J..4	4850	1967	930	1620	140	200	2730	1150	1000	1080	26	8	
1RQ6452-8J..4	5150	1967	930	1620	140	200	2730	1150	1000	1080	26	8	
1RQ6454-8J..4	5550	1967	930	1620	140	200	2940	1150	1000	1080	26	8	
1RQ6456-8J..4	5900	1967	930	1620	140	200	2940	1150	1000	1080	26	8	
1RQ4500-8J..4	6200	2130	1000	1810	150	200	2560	1250	1120	1180	26	8	
1RQ4502-8J..4	6600	2130	1000	1810	150	200	2560	1250	1120	1180	26	8	
1RQ4504-8J..4	7100	2130	1000	1810	160	240	2770	1250	1120	1180	26	8	
1RQ4506-8J..4	7500	2130	1000	1810	160	240	2770	1250	1120	1180	26	8	
1RQ4560-8J..4	8250	2400	1070	1960	170	240	2800	1400	1250	1320	26	16	
1RQ4562-8J..4	8800	2400	1070	1960	170	240	2800	1400	1250	1320	26	16	
1RQ4564-8J..4	9650	2400	1070	1960	180	240	3030	1400	1250	1320	26	16	
1RQ4566-8J..4	10100	2400	1070	1960	180	240	3030	1400	1250	1320	26	16	
1RQ4630-8J..4 <sup>2)</sup>	12850	2840	1180	2150	200	280	3170	2000	1800	1900	33	16	
1RQ4632-8J..4 <sup>2)</sup>	13600	2840	1330	2300	200	280	3170	2000	1800	1900	33	16	
1RQ4634-8J..4 <sup>2)</sup>	14550	2840	1330	2300	200	280	3410	2000	1800	1900	33	16	
1RQ4636-8J..4 <sup>2)</sup>	15300	2840	1330	2300	200	280	3410	2000	1800	1900	33	16	

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

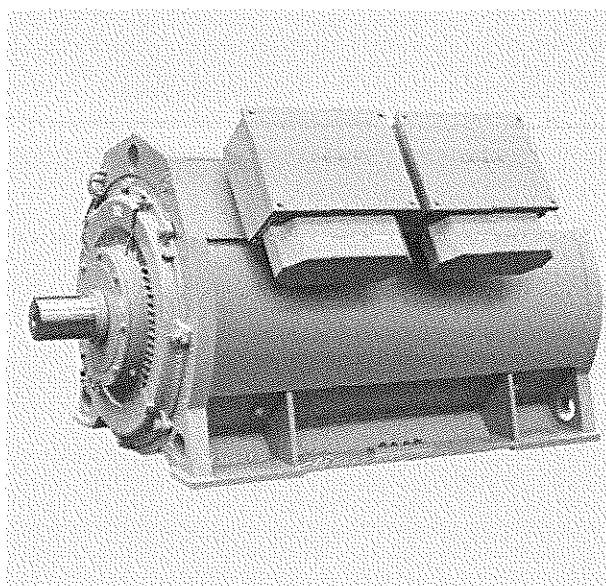
<sup>2)</sup> Only in the 50 Hz version.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact 1LH4

### Overview



### Technical data (continued)

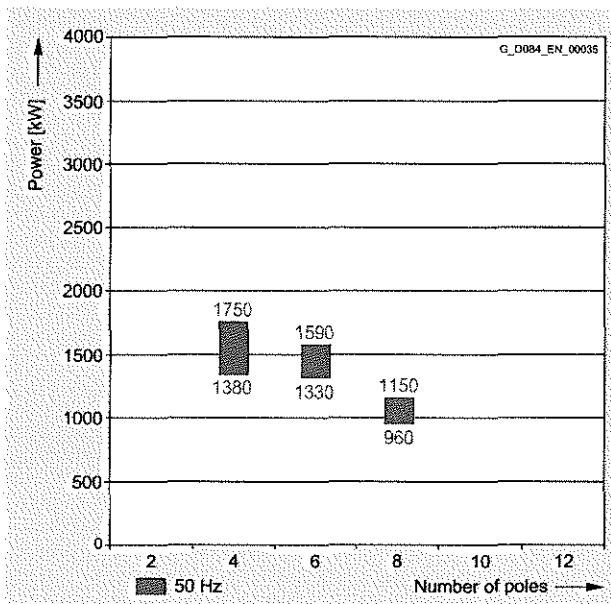
**Power ranges for IEC motors with reinforced insulation for SINAMICS drive converters without sine-wave filter**

#### 1LH4 series (water-jacket-cooled)

Insulation system, thermal class 155 (F), utilized to 155 (F)

The power data listed here apply for a water inlet temperature of 38 °C and an installation altitude ≤ 1000 m.

690 V; 50 Hz



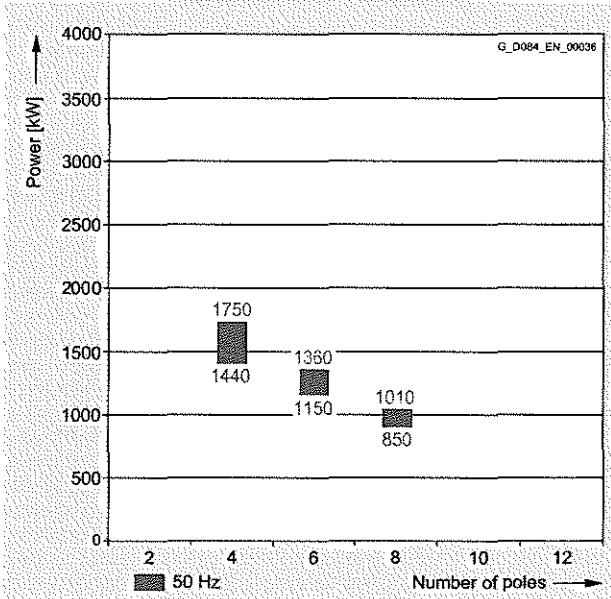
### Technical data

#### Overview of technical data

##### H-compact 1LH4

Rated voltage	690 V ... 4.16 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3, IM B35 and IM V1
Degree of protection	IP55
Cooling method	IC71W
Stator winding insulation	Insulation system, thermal class 155 (F), utilized to 155 (F)
Shaft height	500 mm
Bearings	Roller bearings
Cage material	Copper
Standards	IEC, EN
Frame design	Steel frame with water jacket

2.3 to 4.16 kV; 50 Hz



# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact 1LH4

### Selection and ordering data

Rated power <i>P<sub>rated</sub></i> kW	Low-voltage motor H-compact	Rated speed <i>n<sub>rated</sub></i> rpm	Operating values at rated output								
			Efficiency η %	Power factor cos φ [-]	Rated current at 690 V <i>I<sub>rated</sub></i> A	Rated torque <i>T<sub>rated</sub></i> Nm	Break-down torque <i>T<sub>B</sub>/T<sub>rated</sub></i> [-]	Moment of inertia <i>J</i> kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> <i>n<sub>max</sub></i> rpm		
<b>690 V, 50 Hz</b>											
4-pole											
1380	<b>1LH4 500-4CM0■■</b>	1490	96.8	0.88	1360	8844	2.0	44	1800		
1590	<b>1LH4 502-4CM0■■</b>	1491	97.1	0.87	1580	10183	2.2	49	1800		
1750	<b>1LH4 504-4CM0■■</b>	1490	97.1	0.88	1720	11216	2.0	56	1800		
6-pole											
1330	<b>1LH4 500-6CM0■■</b>	994	97.0	0.85	1350	12777	2.2	82	1800		
1440	<b>1LH4 502-6CM0■■</b>	994	97.0	0.86	1450	13834	2.2	92	1800		
1590	<b>1LH4 504-6CM0■■</b>	994	97.1	0.86	1600	15275	2.2	102	1800		
8-pole											
960	<b>1LH4 500-8CM0■■</b>	745	96.5	0.80	1040	12305	2.0	82	1800		
1030	<b>1LH4 502-8CM0■■</b>	745	96.6	0.80	1120	13202	2.1	92	1800		
1150	<b>1LH4 504-8CM0■■</b>	745	96.7	0.80	1250	14741	2.1	102	1800		

#### Type of construction:

IM B3  
IM V1 (without canopy)

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation. Additional details see Page 3/2.  
Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007. The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

Rated power <i>P<sub>rated</sub></i> kW	High voltage motor H-compact	Rated speed <i>n<sub>rated</sub></i> rpm	Operating values at rated output								
			Efficiency η %	Power factor cos φ [-]	Rated current at 4.16 kV <i>I<sub>rated</sub></i> A	Rated torque <i>T<sub>rated</sub></i> Nm	Break-down torque <i>T<sub>B</sub>/T<sub>rated</sub></i> [-]	Moment of inertia <i>J</i> kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> <i>n<sub>max</sub></i> rpm		
<b>23 → 4.16 kV, 50 Hz</b>											
4-pole											
1440	<b>1LH4 500-4CV■■■</b>	1492	97.0	0.87	235	9216	2.3	42	1800		
1590	<b>1LH4 502-4CV■■■</b>	1492	97.1	0.87	260	10177	2.4	47	1800		
1750	<b>1LH4 504-4CV■■■</b>	1492	97.2	0.88	285	11201	2.4	54	1800		
6-pole											
1150	<b>1LH4 500-6CV■■■</b>	994	96.9	0.86	192	11048	2.2	82	1800		
1250	<b>1LH4 502-6CV■■■</b>	994	97.0	0.87	205	12009	2.2	92	1800		
1360	<b>1LH4 504-6CV■■■</b>	994	97.0	0.87	225	13065	2.2	102	1800		
8-pole											
850	<b>1LH4 500-8CV■■■</b>	745	96.3	0.80	154	10895	2.0	82	1800		
910	<b>1LH4 502-8CV■■■</b>	745	96.4	0.80	164	11664	2.1	92	1800		
1010	<b>1LH4 504-8CV■■■</b>	745	96.5	0.81	180	12946	2.1	102	1800		

#### Voltage code:

3.3 kV, 50 Hz  
4.16 kV, 50 Hz  
Other voltage

#### Note:

Partial load values for H-compact 1LH4 are available on request.

Higher pole numbers are available on request.

#### Type of construction:

IM B3  
IM V1 (without canopy)

#### Note:

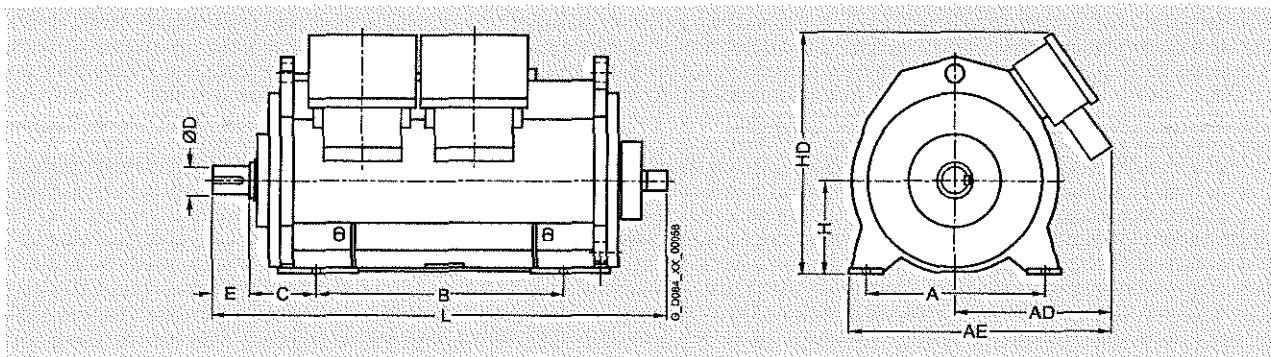
<sup>1)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact 1-H4

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD mm	AE mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>With 6.6 kV roller bearings - All types of construction</b>											
4-pole											
1LH4500-4C..0	5910	950	820	1390	1320	355	150	200	500	1280	2250
1LH4502-4C..0	6310	950	820	1390	1320	355	150	200	500	1280	2250
1LH4504-4C..0	6810	950	820	1390	1320	355	150	200	500	1280	2250
6-pole											
1LH4500-6C..0	6210	950	820	1390	1320	355	150	200	500	1280	2250
1LH4502-6C..0	6610	950	820	1390	1320	355	150	200	500	1280	2250
1LH4504-6C..0	7110	950	820	1390	1320	355	150	200	500	1280	2250
8-pole											
1LH4500-8C..0	6210	950	820	1390	1320	355	150	200	500	1280	2250
1LH4502-8C..0	6510	950	820	1390	1320	355	150	200	500	1280	2250
1LH4504-8C..0	7010	950	820	1390	1320	355	150	200	500	1280	2250

### Note:

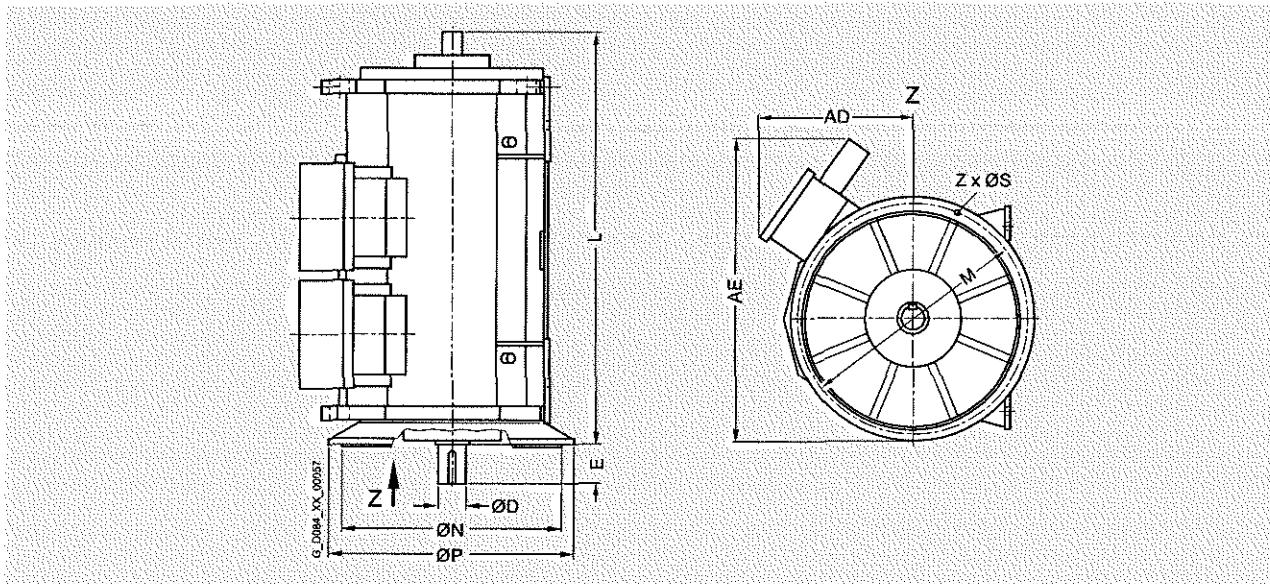
Higher pole numbers are available on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact 1LHA

### Dimension drawings



Motor type	Weight kg	Dimensions									
		AD mm	AE mm	D mm	E mm	L mm	P mm	N mm	M mm	S mm	Z mm
<b>Unit 6.6 kV roller bearings, IM Y1 type of construction</b>											
4-pole											
1LH4500-4C..8	5910	780	1450	150	200	2100	1250	1120	1180	26	16
1LH4502-4C..8	6310	780	1450	150	200	2100	1250	1120	1180	26	16
1LH4504-4C..8	6810	780	1450	150	200	2100	1250	1120	1180	26	16
6-pole											
1LH4500-6C..8	6210	780	1450	150	200	2100	1250	1120	1180	26	16
1LH4502-6C..8	6610	780	1450	150	200	2100	1250	1120	1180	26	16
1LH4504-6C..8	7110	780	1450	150	200	2100	1250	1120	1180	26	16
8-pole											
1LH4500-8C..8	6210	780	1450	150	200	2100	1250	1120	1180	26	16
1LH4502-8C..8	6510	780	1450	150	200	2100	1250	1120	1180	26	16
1LH4504-8C..8	7010	780	1450	150	200	2100	1250	1120	1180	26	16

### Note:

Higher pole numbers are available on request.

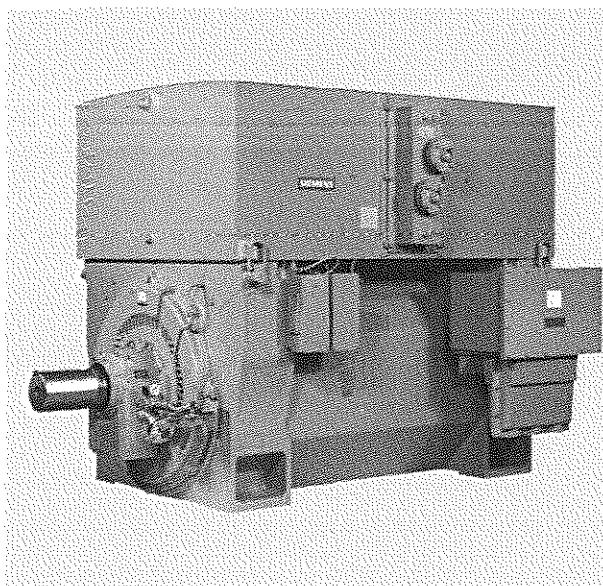
# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

### Overview



### Technical data

#### Overview of technical data

##### H-compact PLUS 1RN4 and 1RN6

<b>Rated voltage</b>	690 V ... 4.16 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor.
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Cooling method</b>	IC81W
<b>Stator winding insulation</b>	Insulation system, thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	450 ... 630 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC, EN
<b>Frame design for shaft heights 450 ... 560 mm</b>	Frame: Cast iron Cooling enclosure: Steel
<b>Frame design for shaft heights 630 mm</b>	Frame: Steel Cooling enclosure: Steel

The following versions can be offered on request:

- 2-pole up to 75 Hz
- 4-pole up to 100 Hz
- 6-pole up to 90 Hz

For individual motor types, it must be ensured that the motor does not run-through any critical speed in the required speed control range and that the maximum speed does not exceed the mechanical speed limit of the motor! Please contact your Siemens sales person regarding this check. The motor types are marked with footnotes in the following data tables.

### Technical data (continued)

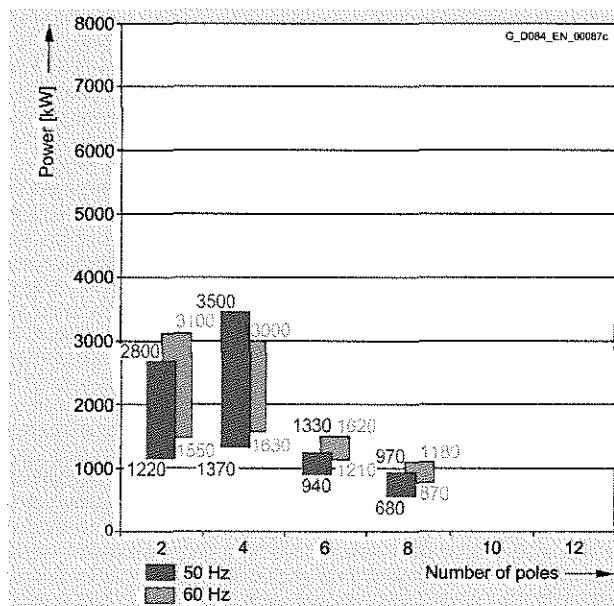
#### Power ranges for IEC motors with reinforced insulation for SINAMICS converters without sine-wave filter

##### 1RN4/1RN6, 1SL4/1SL6 (Ex nA) and 1SQ4/1SQ6 (Ex px) series

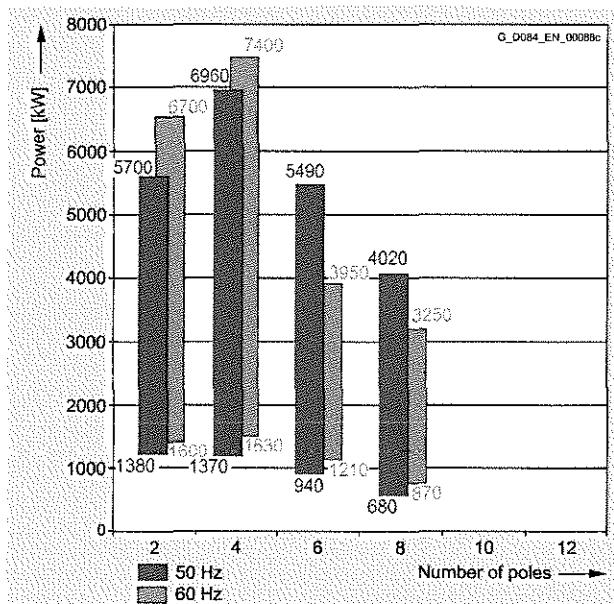
Insulation system, thermal class 155 (F), utilized to 155 (F)

The power data listed here apply for a water inlet temperature of 25 °C and an installation altitude ≤ 1000 m.

690 V; 50 Hz and 60 Hz



3.4 kV to 4.16 kV; 50 Hz and 60 Hz<sup>1)</sup>



<sup>1)</sup> Maximum and minimum power ratings can be different for specific voltage levels.

# Motors for converter operation

## Converter with non-sinusoidal output

**Water-cooled motors**  
**H-compact PLUS 1RN4 and 1RN6**

### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Rated speed rpm	Operating values at rated output								
			Efficiency %	Power factor [-]	Rated current A	Rated torque Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> rpm		
<b>690 V, 50 Hz</b>											
<b>2-pole</b>											
1220	<b>1RN6 450-2HP00</b>	2980	95.5	0.90	1180	3913	2.20	13	3000		
1520	<b>1RN6 452-2HP00</b>	2980	96.0	0.90	2x740	4875	2.10	14	3000		
1600	<b>1RN6 454-2HP00</b>	2983	96.2	0.92	2x760	5129	2.30	16	3000		
1700	<b>1RN6 456-2HP00</b>	2983	96.2	0.92	2x800	5445	2.30	18	3000		
2250	<b>1RN6 500-2HP00</b>	2975	96.4	0.90	2x1080	7222	2.30	19	3000		
2550	<b>1RN6 502-2HP00</b>	2974	96.6	0.90	2x1220	8188	2.10	20	3000		
2800	<b>1RN6 504-2HP00</b>	2977	96.7	0.92	4x660	8982	2.50	24	3000 <sup>3)</sup>		
<b>4-pole</b>											
1370	<b>1RN6 450-4HP00</b>	1484	95.6	0.89	2x670	8833	2.40	20	1800		
1500	<b>1RN6 452-4HP00</b>	1484	95.6	0.90	2x730	9671	2.40	22	1800		
1640	<b>1RN6 454-4HP00</b>	1484	96.0	0.90	2x790	10568	2.40	25	1800		
1860	<b>1RN6 456-4HP00</b>	1485	96.2	0.90	2x900	11977	2.30	29	1800		
2300 <sup>2)</sup>	<b>1RN6 500-4HP00</b>	1486	96.6	0.90	2x1100	14780	2.40	42	1800		
2350 <sup>2)</sup>	<b>1RN6 502-4HP00</b>	1486	96.6	0.92	2x1100	15102	2.50	46	1800		
2800 <sup>2)</sup>	<b>1RN6 504-4HP00</b>	1488	96.9	0.90	4x670	17969	2.60	52	1800		
3200 <sup>2)</sup>	<b>1RN6 560-4HP00</b>	1486	96.8	0.90	4x770	20564	2.15	82	1800		
3500 <sup>2)</sup>	<b>1RN6 562-4HP00</b>	1487	96.9	0.88	4x860	22476	2.15	93	1800		
<b>6-pole</b>											
940	<b>1RN6 450-6HP00</b>	990	95.8	0.86	950	9079	2.30	26	1200		
1040	<b>1RN6 452-6HP00</b>	991	95.9	0.86	1060	10039	2.30	29	1200		
1180	<b>1RN6 454-6HP00</b>	991	96.0	0.86	1200	11394	2.30	32	1200		
1330	<b>1RN6 456-6HP00</b>	992	96.2	0.86	2x670	12823	2.30	37	1200		
<b>8-pole</b>											
680	<b>1RN6 450-8HP00</b>	743	94.9	0.83	720	8750	2.30	32	1200		
750	<b>1RN6 452-8HP00</b>	743	95.2	0.84	780	9651	2.40	36	1200		
880	<b>1RN6 454-8HP00</b>	743	95.2	0.84	920	11324	2.40	40	1200		
970	<b>1RN6 456-8HP00</b>	744	95.4	0.84	1020	12476	2.40	46	1200		

#### Type of construction:

IM B3

0

IM V1 (without canopy)

8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> Data of vertical motors (IM V1) on request.

<sup>3)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS IRN4 and IRN6

Motor type:  
(repeated)

Partial load values for square-law torque drive

$P/P_{\text{rated}} = 75 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{\text{rated}} = 50 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

$P/P_{\text{rated}} = 25 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

Square-law torque drive

2-pole

1RN6 450-2...	916	2709	95.8	0.91	610	2371	96.0	0.90	305	1883	96.0	0.85
1RN6 452-2...	1141	2708	96.4	0.91	760	2371	96.6	0.91	380	1883	96.5	0.87
1RN6 454-2...	1201	2710	96.5	0.92	800	2372	96.6	0.91	400	1884	96.6	0.87
1RN6 456-2...	1276	2711	96.5	0.92	850	2373	96.7	0.92	425	1884	96.6	0.88
1RN6 500-2...	1688	2708	96.8	0.89	1125	2369	97.1	0.87	563	1883	97.2	0.79
1RN6 502-2...	1913	2707	96.9	0.89	1275	2368	97.2	0.87	638	1882	97.4	0.80
1RN6 504-2...	2101	2710	97.0	0.91	1400	2370	97.3	0.90	701	1883	97.5	0.84

4-pole

1RN6 450-4...	1028	1350	95.9	0.88	685	1182	96.1	0.86	343	940	95.9	0.79
1RN6 452-4...	1125	1350	96.0	0.90	750	1182	96.2	0.88	375	940	96.2	0.83
1RN6 454-4...	1230	1350	96.3	0.90	820	1183	96.5	0.89	410	940	96.4	0.84
1RN6 456-4...	1395	1351	96.5	0.89	930	1183	96.6	0.88	465	941	96.5	0.82
1RN6 500-4..	1726	1353	96.9	0.89	1150	1183	97.2	0.86	575	941	97.4	0.77
1RN6 502-4..	1763	1353	97.0	0.91	1175	1184	97.3	0.88	588	941	97.4	0.80
1RN6 504-4..	2100	1354	97.2	0.89	1400	1184	97.4	0.85	700	941	97.5	0.74
1RN6 560-4..	2401	1353	97.2	0.90	1600	1184	97.5	0.90	801	941	97.7	0.87
1RN6 562-4..	2626	1354	97.2	0.89	1750	1184	97.5	0.89	876	941	97.7	0.85

6-pole

1RN6 450-6...	705	900	96.1	0.85	470	789	96.3	0.82	235	627	96.2	0.73
1RN6 452-6...	780	901	96.3	0.85	520	789	96.4	0.82	260	627	96.3	0.73
1RN6 454-6...	885	901	96.3	0.85	590	789	96.4	0.83	295	627	96.4	0.74
1RN6 456-6...	998	902	96.5	0.84	665	789	96.6	0.81	333	627	96.3	0.71

8-pole

1RN6 450-8...	510	676	95.1	0.80	340	592	95.0	0.75	170	470	94.4	0.63
1RN6 452-8...	563	676	95.4	0.81	375	592	95.4	0.77	188	470	94.9	0.65
1RN6 454-8...	660	676	95.4	0.82	440	592	95.4	0.77	220	470	94.8	0.65
1RN6 456-8...	728	676	95.6	0.82	485	592	95.6	0.77	243	470	95.1	0.65

# Motors for converter operation

## Converter with non-sinusoidal output

**Water-cooled motors**  
**H-compact PLUS 1RN4 and 1RN6**

### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b> <b>1EC</b>	Rated speed n <sub>rated</sub> rpm	Operating values at rated output								
			Efficiency η %	Power factor cos φ [-]	Rated current at 4.16 kV I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>2)</sup> n <sub>max</sub> rpm		
<b>3.4 ... 4.16 kV, 50 Hz</b>											
<b>2-pole</b>											
1380	<b>1RN6 450-2HS40</b>	2973	95.9	0.90	220	4433	2.00	13	3000		
1570	<b>1RN6 452-2HS40</b>	2977	96.2	0.90	250	5040	2.20	14	3000		
1750	<b>1RN6 454-2HS40</b>	2978	96.4	0.91	275	5616	2.30	16	3000		
1950	<b>1RN6 456-2HS40</b>	2981	96.6	0.92	305	6252	2.30	18	3000		
2550	<b>1RN6 500-2HS40</b>	2967	96.2	0.89	415	8207	1.90	19	3000		
2700	<b>1RN6 502-2HS40</b>	2969	96.3	0.90	430	8684	2.00	20	3000		
3200	<b>1RN6 504-2HS40</b>	2974	96.6	0.91	510	10275	2.40	24	3000 <sup>5)</sup>		
3550	<b>1RN6 506-2HS40</b>	2975	96.9	0.92	550	11395	2.40	26	3000 <sup>5)</sup>		
3700	<b>1RN6 560-2HS40</b>	2977	96.7	0.90	590	11868	1.90	39	3000 <sup>5)</sup>		
4300	<b>1RN6 562-2HS40</b>	2979	97.0	0.90	680	13784	2.05	43	3000 <sup>5)</sup>		
5000	<b>1RN6 564-2HS40</b>	2981	97.1	0.90	790	16017	2.25	49	3000 <sup>5)</sup>		
5700	<b>1RN6 566-2HS40</b>	2982	97.3	0.90	2x450	18253	2.45	54	3000 <sup>5)</sup>		
<b>4-pole</b>											
1370	<b>1RN6 450-4HS40</b>	1484	95.6	0.88	225	8824	2.60	20	1800		
1500	<b>1RN6 452-4HS40</b>	1485	95.8	0.88	245	9649	2.50	22	1800		
1640	<b>1RN6 454-4HS40</b>	1485	96.0	0.89	265	10549	2.50	25	1800		
1860	<b>1RN6 456-4HS40</b>	1485	96.1	0.90	300	11966	2.50	29	1800		
2500 <sup>4)</sup>	<b>1RN6 500-4HS40</b>	1485	96.4	0.90	400	16076	2.30	42	1800		
2800 <sup>4)</sup>	<b>1RN6 502-4HS40</b>	1485	96.5	0.90	445	18005	2.20	46	1800		
3150 <sup>4)</sup>	<b>1RN6 504-4HS40</b>	1485	96.7	0.91	495	20256	2.30	52	1800		
3450 <sup>1)(4)</sup>	<b>1RN6 506-4HS40</b>	1486	96.8	0.91	540	22170	2.30	56	1800		
3900 <sup>4)</sup>	<b>1RN6 560-4HS40</b>	1489	97.0	0.89	630	25012	1.95	84	1800		
4500 <sup>4)</sup>	<b>1RN6 562-4HS40</b>	1489	97.1	0.89	720	28860	2.00	94	1800		
5000 <sup>4)</sup>	<b>1RN6 564-4HS40</b>	1490	97.2	0.89	800	32045	2.10	105	1800		
5500 <sup>4)</sup>	<b>1RN6 566-4HS40</b>	1490	97.4	0.87	2x450	35249	2.20	115	1800		
5880 <sup>1)</sup>	<b>1RN4 632-4HV</b>	1490	97.2	0.89	1180	37687	2.20	150	1800		
6470 <sup>1)</sup>	<b>1RN4 634-4HV</b>	1490	97.3	0.90	1300	41469	2.20	168	1800		
6960 <sup>1)</sup>	<b>1RN4 636-4HV</b>	1491	97.4	0.90	1390	44579	2.40	197	1800		

### Voltage code:

4.16 kV, 50 Hz  
 Other voltage

4  
9

### Type of construction:

IM B3  
 IM V1 (without canopy)

0  
8

### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
 Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

<sup>1)</sup> Rated voltage < 4.16 kV on request.

<sup>2)</sup> For IM B3, roller bearings.

<sup>3)</sup> On request.

<sup>4)</sup> Data of vertical motors (IM V1) on request.

<sup>5)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.



# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS IRN4 and IRN6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{\text{rated}} = 75 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \phi$ [-]
-----------	------------	-------------	--------------------

$P/P_{\text{rated}} = 50 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \phi$ [-]
-----------	------------	-------------	--------------------

$P/P_{\text{rated}} = 25 \%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \phi$ [-]
-----------	------------	-------------	--------------------

Square-law torque drive

2-pole

1RN6 450-2...	1035	2704	96.1	0.91	690	2368	96.3	0.91	345	1882	96.4	0.87
1RN6 452-2...	1178	2707	96.4	0.91	785	2370	96.5	0.90	393	1883	96.4	0.87
1RN6 454-2...	1313	2707	96.6	0.92	875	2370	96.7	0.91	438	1883	96.6	0.88
1RN6 456-2...	1464	2709	96.8	0.92	975	2371	96.9	0.91	488	1884	96.8	0.88
1RN6 500-2...	1914	2704	96.7	0.88	1276	2366	97.0	0.87	638	1881	97.2	0.81
1RN6 502-2...	2026	2705	96.7	0.90	1350	2367	97.1	0.88	675	1882	97.2	0.83
1RN6 504-2...	2401	2708	97.0	0.90	1600	2369	97.2	0.88	801	1883	97.3	0.81
1RN6 506-2...	2663	2708	97.2	0.91	1775	2369	97.4	0.89	888	1883	97.5	0.83
1RN6 560-2...	2777	2709	97.0	0.90	1851	2370	97.3	0.91	925	1883	97.4	0.88
1RN6 562-2...	3226	2711	97.2	0.90	2151	2371	97.5	0.90	1076	1884	97.5	0.87
1RN6 564-2...	3751	2712	97.4	0.91	2500	2371	97.6	0.90	1251	1884	97.6	0.86
1RN6 566-2...	4276	2713	97.5	0.90	2850	2372	97.7	0.89	1426	1885	97.7	0.85

4-pole

1RN6 450-4...	1028	1350	95.8	0.87	685	1183	96.0	0.85	343	940	95.8	0.78
1RN6 452-4...	1125	1351	96.0	0.87	750	1183	96.1	0.85	375	941	95.9	0.77
1RN6 454-4...	1230	1351	96.2	0.89	820	1183	96.3	0.87	410	941	96.2	0.80
1RN6 456-4...	1395	1351	96.3	0.90	930	1183	96.5	0.88	465	941	96.4	0.83
1RN6 500-4...	1876	1352	96.7	0.89	1250	1183	97.0	0.86	625	941	97.1	0.76
1RN6 502-4...	2101	1352	96.9	0.89	1400	1183	97.1	0.86	700	941	97.2	0.77
1RN6 504-4...	2363	1353	97.0	0.90	1575	1183	97.3	0.88	788	941	97.3	0.79
1RN6 506-4...	2588	1353	97.1	0.90	1725	1184	97.3	0.88	863	941	97.4	0.79
1RN6 560-4...	2927	1355	97.3	0.90	1950	1185	97.5	0.90	976	942	97.6	0.86
1RN6 562-4...	3377	1355	97.4	0.90	2250	1185	97.6	0.89	1126	942	97.7	0.85
1RN6 564-4...	3752	1356	97.5	0.89	2500	1185	97.7	0.89	1251	942	97.7	0.84
1RN6 566-4...	4126	1356	97.6	0.88	2750	1186	97.8	0.87	1376	942	97.8	0.81
1RN4 632-4...	O. R. <sup>3)</sup>											
1RN4 634-4...	O. R. <sup>3)</sup>											
1RN4 636-4...	O. R. <sup>3)</sup>											

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors

H-compact PI US 1RN4 and 1RN6

## Selection and ordering data (continued)

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed n <sub>rated</sub> rpm	Operating values at rated output									
			Efficiency %	Power factor cos φ	Rated current at 4.16 kV A	Rated torque Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>2)</sup> n <sub>max</sub> rpm			
<b>34 ... 416 kV, 50 Hz</b>												
<b>6-pole</b>												
940	<b>1RN6 450-6HS4■■</b>	990	95.7	0.85	160	9071	2.40	26	1200			
1040	<b>1RN6 452-6HS4■■</b>	991	95.9	0.85	178	10026	2.50	29	1200			
1180	<b>1RN6 454-6HS4■■</b>	991	96.1	0.86	198	11381	2.50	32	1200			
1330	<b>1RN6 456-6HS4■■</b>	992	96.2	0.85	225	12811	2.50	37	1200			
1860	<b>1RN4 500-6HV■■■</b>	988	95.7	0.86	395	17977	1.90	57	1200			
2100	<b>1RN4 502-6HV■■■</b>	989	96.1	0.87	440	20277	2.00	65	1200			
2340	<b>1RN4 504-6HV■■■</b>	990	96.2	0.87	490	22571	2.00	72	1200			
2560	<b>1RN4 506-6HV■■■</b>	990	96.4	0.87	530	24693	2.00	81	1200			
3000	<b>1RN4 560-6HV■■■</b>	990	96.5	0.86	630	28939	1.90	105	1200			
3380 <sup>1)</sup>	<b>1RN4 562-6HV■■■</b>	991	96.7	0.86	710	32572	1.90	120	1200			
3750 <sup>1)</sup>	<b>1RN4 564-6HV■■■</b>	991	96.7	0.87	780	36138	2.00	135	1200			
4300 <sup>1)</sup>	<b>1RN4 566-6HV■■■</b>	991	97.0	0.87	890	41438	2.00	147	O. R. <sup>3)</sup>			
4610 <sup>1)</sup>	<b>1RN4 632-6HV■■■</b>	993	97.0	0.86	970	44336	2.10	202	1200			
5000 <sup>1)</sup>	<b>1RN4 634-6HV■■■</b>	993	97.1	0.86	1040	48087	2.30	223	1200			
5490 <sup>1)</sup>	<b>1RN4 636-6HV■■■</b>	994	97.2	0.86	1140	52746	2.30	246	1200			
<b>8-pole</b>												
680	<b>1RN6 450-8HS4■■</b>	743	94.7	0.82	122	8743	2.50	32	1200			
750	<b>1RN6 452-8HS4■■</b>	744	95.0	0.82	134	9638	2.50	36	1200			
880	<b>1RN6 454-8HS4■■</b>	743	95.1	0.83	154	11318	2.50	40	1200			
970	<b>1RN6 456-8HS4■■</b>	743	95.3	0.85	166	12477	2.40	46	1200			
1360	<b>1RN4 500-8HV■■■</b>	741	95.3	0.84	295	17526	1.80	70	1200			
1520	<b>1RN4 502-8HV■■■</b>	742	95.5	0.85	330	19562	1.90	80	1200			
1700	<b>1RN4 504-8HV■■■</b>	742	95.6	0.84	370	21878	2.00	88	1200			
1860	<b>1RN4 506-8HV■■■</b>	742	95.8	0.85	400	23938	1.90	99	1200			
2120	<b>1RN4 560-8HV■■■</b>	742	95.9	0.83	465	27286	1.80	123	1200			
2400	<b>1RN4 562-8HV■■■</b>	742	96.1	0.83	530	30889	1.80	141	1200			
2600	<b>1RN4 564-8HV■■■</b>	743	96.2	0.83	570	33419	1.90	158	1200			
2830	<b>1RN4 566-8HV■■■</b>	742	96.3	0.85	600	36424	1.80	173	1200			
3140 <sup>1)</sup>	<b>1RN4 630-8HV■■■</b>	743	96.5	0.85	670	40359	1.90	239	1200			
3430 <sup>1)</sup>	<b>1RN4 632-8HV■■■</b>	743	96.7	0.85	730	44087	2.10	265	1200			
3680 <sup>1)</sup>	<b>1RN4 634-8HV■■■</b>	743	96.7	0.85	780	47300	2.00	293	1200			
4020 <sup>1)</sup>	<b>1RN4 636-8HV■■■</b>	744	96.9	0.84	860	51601	2.30	324	1200			

**Voltage code:**

4.16 kV, 50 Hz

4

Other voltage

9

**Type of construction:**

IM B3

0

IM V1 (without canopy)

8

**Note:**

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation. Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> Rated voltage < 4.16 kV on request.<sup>3)</sup> On request.<sup>2)</sup> For IM B3, roller bearings.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS 1RN4 and 1RN6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

$P/P_{rated} = 50\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

$P/P_{rated} = 25\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

Square-law torque drive

6-pole

1RN6 450-6...	705	901	96.0	0.84	470	789	96.1	0.81	235	627	96.0	0.71
1RN6 452-6...	780	901	96.1	0.84	520	789	96.2	0.80	260	627	96.0	0.70
1RN6 454-6...	885	901	96.3	0.85	590	789	96.4	0.82	295	627	96.3	0.73
1RN6 456-6...	998	902	96.4	0.83	665	790	96.5	0.80	333	627	96.2	0.69
1RN4 500-6...	1395	900	96.2	0.86	930	786	96.3	0.84	465	625	96.1	0.75
1RN4 502-6...	1575	900	96.3	0.86	1050	786	96.5	0.84	525	625	96.3	0.76
1RN4 504-6...	1755	900	96.5	0.86	1170	786	96.6	0.84	585	625	96.3	0.75
1RN4 506-6...	1920	900	96.6	0.86	1280	787	96.6	0.84	640	625	96.4	0.76
1RN4 560-6...	2250	901	96.6	0.85	1500	787	96.7	0.83	750	625	96.4	0.74
1RN4 562-6...	2535	900	96.9	0.86	1690	787	97.0	0.84	845	624	96.8	0.75
1RN4 564-6...	2813	900	96.8	0.86	1875	787	96.9	0.84	938	624	96.7	0.76
1RN4 566-6...	3225	900	97.0	0.86	2150	787	97.0	0.83	1075	624	96.8	0.75
1RN4 632-6...	O. R. <sup>(3)</sup>											
1RN4 634-6...	O. R. <sup>(3)</sup>											
1RN4 636-6...	O. R. <sup>(3)</sup>											

8-pole

1RN6 450-8...	510	676	94.8	0.80	340	592	94.7	0.75	170	470	94.0	0.63
1RN6 452-8...	563	676	95.1	0.80	375	592	95.1	0.75	188	470	94.4	0.62
1RN6 454-8...	660	676	95.3	0.82	440	592	95.3	0.78	220	470	94.8	0.66
1RN6 456-8...	728	676	95.5	0.83	485	592	95.5	0.80	243	470	95.1	0.69
1RN4 500-8...	1020	675	95.7	0.83	680	590	95.8	0.81	340	468	95.5	0.71
1RN4 502-8...	1140	675	95.8	0.83	760	590	95.9	0.80	380	468	95.5	0.69
1RN4 504-8...	1275	675	95.9	0.82	850	590	95.9	0.78	425	468	95.4	0.67
1RN4 506-8...	1395	675	96.1	0.84	930	590	96.1	0.81	465	468	95.8	0.72
1RN4 560-8...	1590	675	96.2	0.82	1060	590	96.2	0.79	530	469	95.9	0.69
1RN4 562-8...	1800	676	96.3	0.83	1200	590	96.4	0.80	600	469	96.0	0.70
1RN4 564-8...	1950	676	96.5	0.82	1300	590	96.5	0.79	650	469	96.2	0.69
1RN4 566-8...	2125	676	96.6	0.84	1415	590	96.7	0.82	710	469	96.4	0.74
1RN4 630-8...	O. R. <sup>(3)</sup>											
1RN4 632-8...	O. R. <sup>(3)</sup>											
1RN4 634-8...	O. R. <sup>(3)</sup>											
1RN4 636-8...	O. R. <sup>(3)</sup>											

# Motors for converter operation

## Converter with non-sinusoidal output

### Water-cooled motors

H-compact PI US 1RN4 and 1RN6

#### Selection and ordering data

Rated power kW	<b>High voltage motor H-compact PLUS</b>	Rated speed n <sub>rated</sub> rpm	Operating values at rated output								
			Efficiency %	Power factor cos φ	Rated current I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>1)</sup> n <sub>max</sub> rpm		
<b>690 V, 60 Hz</b>											
2-pole											
1550	<b>1RN6 450-2HP10</b>	3578	95.9	0.90	2x750	4140	1.90	13	3600		
1650	<b>1RN6 452-2HP10</b>	3581	96.0	0.91	2x790	4403	2.20	14	3600		
1720	<b>1RN6 454-2HP10</b>	3584	96.1	0.91	2x820	4586	2.40	16	3600 <sup>2)</sup>		
2180	<b>1RN6 456-2HP10</b>	3584	96.7	0.92	2x1020	5814	2.40	18	3600 <sup>2)</sup>		
2500	<b>1RN6 500-2HP10</b>	3579	96.6	0.90	2x1200	6670	2.50	20	3600 <sup>2)</sup>		
2750	<b>1RN6 502-2HP10</b>	3577	96.6	0.91	4x650	7342	2.40	22	3600 <sup>2)</sup>		
3100	<b>1RN6 504-2HP10</b>	3581	96.9	0.92	4x730	8267	2.60	25	3600 <sup>2)</sup>		
4-pole											
1630	<b>1RN6 450-4HP1■</b>	1784	95.9	0.88	2x810	8740	2.30	20	1800		
1750	<b>1RN6 452-4HP1■</b>	1783	96.0	0.90	2x850	9385	2.30	22	1800		
2070	<b>1RN6 454-4HP1■</b>	1783	96.2	0.90	2x1000	11104	2.30	25	1800		
2310	<b>1RN6 456-4HP1■</b>	1786	96.4	0.89	2x1120	12364	2.50	29	1800		
2700 <sup>4)</sup>	<b>1RN6 500-4HP10</b>	1788	96.9	0.90	4x650	14420	2.80	42	1800 <sup>3)</sup>		
2850 <sup>4)</sup>	<b>1RN6 502-4HP10</b>	1786	96.9	0.91	4x680	15238	2.50	46	1800 <sup>3)</sup>		
3000 <sup>4)</sup>	<b>1RN6 504-4HP10</b>	1786	97.0	0.92	4x700	16040	2.40	52	1800 <sup>3)</sup>		
6-pole											
1210	<b>1RN6 450-6HP1■</b>	1191	96.1	0.85	2x620	9718	2.40	26	1200		
1350	<b>1RN6 452-6HP1■</b>	1191	96.3	0.84	2x700	10837	2.40	29	1200		
1480	<b>1RN6 454-6HP1■</b>	1191	96.3	0.86	2x750	11883	2.30	32	1200		
1620	<b>1RN6 456-6HP1■</b>	1192	96.6	0.86	2x820	12995	2.40	37	1200		
8-pole											
870	<b>1RN6 450-8HP1■</b>	893	95.3	0.84	910	9323	2.30	32	1200		
960	<b>1RN6 452-8HP1■</b>	892	95.4	0.84	1000	10290	2.20	36	1200		
1050	<b>1RN6 454-8HP1■</b>	893	95.5	0.84	1100	11239	2.40	40	1200		
1180	<b>1RN6 456-8HP1■</b>	893	95.7	0.85	1220	12636	2.30	46	1200		

#### Type of construction:

IM B3

0

IM V1 (without canopy)

8

#### Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation. Additional details, see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> For IM B3, roller bearings.

<sup>2)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.

<sup>3)</sup> Higher speed limit on request.

<sup>4)</sup> Data of vertical motors (IM V1) on request.



# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS IRN4 and IRN6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \varphi$   
[-]

$P/P_{rated} = 50\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \varphi$   
[-]

$P/P_{rated} = 25\%$

$P$   
kW

$n$   
rpm

$\eta$   
%

$\cos \varphi$   
[-]

Square-law torque drive

2-pole

1RN6 450-2...	1164	3253	96.2	0.90	775	2844	96.3	0.90	388	2261	96.2	0.86
1RN6 452-2...	1239	3255	96.3	0.92	825	2845	96.4	0.91	413	2262	96.3	0.87
1RN6 454-2...	1291	3257	96.3	0.92	860	2847	96.4	0.91	430	2262	96.2	0.86
1RN6 456-2...	1636	3258	96.9	0.92	1090	2847	96.9	0.91	545	2263	96.7	0.87
1RN6 500-2...	1876	3256	96.9	0.89	1250	2846	97.1	0.87	626	2261	97.1	0.77
1RN6 502-2...	2064	3254	96.9	0.90	1375	2846	97.1	0.89	688	2261	97.2	0.82
1RN6 504-2...	2325	3257	97.2	0.91	1550	2847	97.4	0.89	776	2262	97.4	0.82

4-pole

1RN6 450-4...	1223	1623	96.1	0.88	815	1420	96.2	0.86	408	1129	95.9	0.78
1RN6 452-4...	1313	1623	96.3	0.90	875	1419	96.4	0.89	438	1129	96.3	0.84
1RN6 454-4...	1553	1623	96.5	0.90	1035	1419	96.6	0.89	518	1129	96.5	0.85
1RN6 456-4...	1733	1625	96.6	0.89	1155	1421	96.6	0.87	578	1130	96.3	0.79
1RN6 500-4...	2025	1627	97.2	0.88	1351	1422	97.4	0.83	675	1130	97.3	0.69
1RN6 502-4...	2138	1626	97.2	0.90	1425	1422	97.4	0.87	713	1130	97.5	0.78
1RN6 504-4...	2251	1625	97.3	0.91	1500	1421	97.5	0.90	750	1130	97.6	0.83

6-pole

1RN6 450-6...	908	1083	96.3	0.82	605	947	96.4	0.79	303	753	96.0	0.67
1RN6 452-6...	1013	1083	96.5	0.82	675	947	96.5	0.78	338	753	96.2	0.67
1RN6 454-6...	1110	1083	96.5	0.84	740	947	96.6	0.81	370	753	96.3	0.71
1RN6 456-6...	1215	1084	96.8	0.84	810	947	96.8	0.81	405	753	96.5	0.71

8-pole

1RN6 450-8...	653	812	95.5	0.81	435	710	95.4	0.77	218	565	94.9	0.66
1RN6 452-8...	720	812	95.7	0.83	480	710	95.6	0.79	240	565	95.2	0.68
1RN6 454-8...	788	812	95.6	0.81	525	710	95.6	0.77	263	565	95.0	0.65
1RN6 456-8...	885	812	95.9	0.83	590	710	95.8	0.79	295	565	95.3	0.69

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors

H-compact PI US 1RN4 and 1RN6

## Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b> <b>Order No.</b>	Rated speed n <sub>rated</sub> rpm	Operating values at rated output									
			Efficiency %	Power factor cos φ	Rated current at 4.16 kV I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>2)</sup> n <sub>max</sub> rpm			
<b>3.4 ... 4.16 kV, 60 Hz</b>												
<b>2-pole</b>												
1600	<b>1RN6 450-2HS30</b>	3576	96.0	0.89	260	4274	2.10	13	3600			
1850	<b>1RN6 452-2HS30</b>	3578	96.3	0.91	295	4941	2.30	14	3600			
2060	<b>1RN6 454-2HS30</b>	3579	96.6	0.91	325	5500	2.30	16	3600 <sup>3)</sup>			
2300	<b>1RN6 456-2HS30</b>	3581	96.8	0.92	360	6137	2.40	18	3600 <sup>3)</sup>			
3000	<b>1RN6 500-2HS30</b>	3572	96.5	0.89	485	8020	2.10	20	3600 <sup>3)</sup>			
3250	<b>1RN6 502-2HS30</b>	3570	96.5	0.89	530	8693	1.90	22	3600 <sup>3)</sup>			
3700	<b>1RN6 504-2HS30</b>	3576	96.8	0.91	580	9880	2.30	25	3600 <sup>3)</sup>			
4200	<b>1RN6 506-2HS30</b>	3577	97.1	0.92	650	11212	2.40	27	3600 <sup>3)</sup>			
4600	<b>1RN6 560-2HS30</b>	3577	96.8	0.90	730	12280	1.90	39	3600 <sup>3)</sup>			
5100	<b>1RN6 562-2HS30</b>	3579	96.9	0.89	2x410	13608	2.05	43	3600 <sup>3)</sup>			
5900	<b>1RN6 564-2HS30</b>	3580	97.1	0.89	2x475	15738	2.15	49	3600 <sup>3)</sup>			
6700	<b>1RN6 566-2HS30</b>	3582	97.3	0.89	2x540	17862	2.45	54	3600 <sup>3)</sup>			
<b>4-pole</b>												
1630	<b>1RN6 450-4HS3■</b>	1782	95.7	0.89	265	8742	2.30	20	1800			
1750	<b>1RN6 452-4HS3■</b>	1783	95.9	0.89	285	9375	2.40	22	1800			
2070	<b>1RN6 454-4HS3■</b>	1784	96.1	0.90	330	11088	2.50	25	1800			
2310	<b>1RN6 456-4HS3■</b>	1786	96.3	0.89	375	12358	2.50	29	1800			
3100 <sup>4)</sup>	<b>1RN6 500-4HS30</b>	1785	96.7	0.90	495	16584	2.30	42	1800			
3450 <sup>4)</sup>	<b>1RN6 502-4HS30</b>	1785	96.8	0.90	550	18457	2.20	46	1800			
3800 <sup>4)</sup>	<b>1RN6 504-4HS30</b>	1786	97.0	0.91	600	20318	2.40	52	1800			
4100 <sup>4)</sup>	<b>1RN6 506-4HS30</b>	1787	97.0	0.91	640	21909	2.40	56	1800			
4700 <sup>4)</sup>	<b>1RN6 560-4HS30</b>	1789	97.2	0.87	770	25088	1.95	84	1800			
5400 <sup>4)</sup>	<b>1RN6 562-4HS30</b>	1789	97.3	0.87	2x445	28824	1.95	94	1800			
6000 <sup>4)</sup>	<b>1RN6 564-4HS30</b>	1789	97.4	0.91	2x470	32027	2.05	105	1800			
6600 <sup>4)</sup>	<b>1RN6 566-4HS30</b>	1790	97.5	0.90	2x520	35210	2.10	115	1800			
7400 <sup>1)</sup>	<b>1RN4 632-4HV5■</b>	1790	97.3	0.89	1180	39480	1.90	150	1800			

## Type of construction:

IM B3

0

IM V1 (without canopy)

8

## Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

<sup>1)</sup> Rated voltage < 4.16 kV on request<sup>2)</sup> For IM B3, roller bearings.<sup>3)</sup> There are speed exclusion ranges for this type. It must be ensured that the motors are not continuously operated in these speed ranges. The exclusion ranges must be clarified in advance in the factory.<sup>4)</sup> Data of vertical motors (IM V1) on request.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS 1RN4 and 1RN6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 50\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 25\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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Square-law torque drive

2-pole

1RN6 450-2...	1201	3251	96.1	0.90	800	2843	96.2	0.90	400	2260	96.1	0.85
1RN6 452-2...	1389	3253	96.4	0.91	925	2844	96.5	0.91	463	2261	96.3	0.87
1RN6 454-2...	1545	3254	96.7	0.91	1030	2845	96.7	0.90	515	2261	96.5	0.86
1RN6 456-2...	1725	3256	96.9	0.92	1150	2846	96.9	0.91	575	2262	96.7	0.87
1RN6 500-2...	2251	3251	96.8	0.88	1500	2844	97.0	0.87	750	2260	97.1	0.79
1RN6 502-2...	2439	3250	96.8	0.89	1626	2843	97.1	0.88	813	2259	97.2	0.83
1RN6 504-2...	2776	3254	97.1	0.91	1850	2845	97.3	0.89	926	2261	97.3	0.83
1RN6 506-2...	3151	3254	97.3	0.91	2100	2846	97.5	0.89	1051	2261	97.5	0.83
1RN6 560-2...	3452	3255	97.1	0.90	2301	2846	97.3	0.91	1150	2262	97.3	0.88
1RN6 562-2...	3827	3256	97.2	0.90	2551	2847	97.3	0.90	1275	2262	97.3	0.87
1RN6 564-2...	4427	3257	97.4	0.90	2951	2848	97.5	0.90	1476	2262	97.5	0.86
1RN6 566-2...	5026	3258	97.5	0.90	3350	2849	97.6	0.89	1676	2263	97.6	0.83

4-pole

1RN6 450-4...	1224	1622	96.0	0.89	815	1419	96.1	0.88	408	1129	96.0	0.83
1RN6 452-4...	1313	1623	96.1	0.89	875	1420	96.2	0.88	438	1129	96.1	0.82
1RN6 454-4...	1553	1623	96.3	0.90	1035	1420	96.4	0.89	518	1129	96.3	0.83
1RN6 456-4...	1733	1624	96.5	0.89	1155	1421	96.5	0.87	578	1130	96.2	0.80
1RN6 500-4...	2326	1625	97.0	0.88	1550	1421	97.2	0.86	775	1130	97.1	0.75
1RN6 502-4...	2589	1625	97.1	0.89	1725	1421	97.3	0.86	863	1130	97.3	0.77
1RN6 504-4...	2851	1626	97.2	0.90	1900	1422	97.4	0.87	950	1130	97.3	0.77
1RN6 506-4...	3076	1626	97.2	0.90	2050	1422	97.4	0.87	1025	1130	97.3	0.77
1RN6 560-4...	3527	1628	97.4	0.88	2350	1423	97.6	0.87	1176	1131	97.6	0.82
1RN6 562-4...	4052	1628	97.5	0.88	2701	1423	97.7	0.88	1351	1131	97.7	0.83
1RN6 564-4...	4502	1628	97.6	0.91	3000	1423	97.8	0.91	1501	1131	97.7	0.87
1RN6 566-4...	4952	1628	97.7	0.91	3300	1423	97.9	0.91	1651	1131	97.8	0.87
1RN4 632-4...	5550	1626	97.5	0.90	3700	1421	97.1	0.87	1850	1128	96.5	0.75

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors

H-compact PLUS 1RN4 and 1RN6

## Selection and ordering data

Rated power kW	<b>High voltage motor H-compact</b>	Rated speed n <sub>rated</sub> rpm	Operating values at rated output									
			Efficiency %	Power factor cos φ	Rated current at 4.16 kV I <sub>rated</sub> A	Rated torque T <sub>rated</sub> Nm	Break-down torque T <sub>B</sub> /T <sub>rated</sub> [-]	Moment of inertia J kgm <sup>2</sup>	Mechanical speed limit <sup>2)</sup> n <sub>max</sub> rpm			
<b>3.4 ... 4.16 kV, 60 Hz</b>												
6 pole												
1210	<b>1RN6 450-6HS3■</b>	1190	96.0	0.84	210	9715	2.40	26	1200			
1350	<b>1RN6 452-6HS3■</b>	1191	96.2	0.85	230	10833	2.40	29	1200			
1480	<b>1RN6 454-6HS3■</b>	1191	96.3	0.85	250	11875	2.50	32	1200			
1620	<b>1RN6 456-6HS3■</b>	1191	96.4	0.87	270	12995	2.50	37	1200			
2120	<b>1RN4 500-6HV5■</b>	1189	96.2	0.86	355	17028	1.90	57	1200			
2400	<b>1RN4 502-6HV5■</b>	1188	96.3	0.87	400	19293	1.90	65	1200			
2680	<b>1RN4 504-6HV5■</b>	1189	96.4	0.87	445	21526	1.90	72	1200			
2940	<b>1RN4 506-6HV5■</b>	1189	96.6	0.87	485	23614	1.90	81	1200			
3400	<b>1RN4 560-6HV5■</b>	1190	96.6	0.87	560	27286	1.90	105	1200			
3950	<b>1RN4 562-6HV5■</b>	1191	96.9	0.86	660	31673	1.90	120	1200			
8-pole												
870	<b>1RN6 450-8HS3■</b>	893	95.2	0.81	156	9308	2.50	32	1200			
960	<b>1RN6 452-8HS3■</b>	893	95.3	0.82	170	10269	2.50	36	1200			
1050	<b>1RN6 454-8HS3■</b>	893	95.4	0.84	182	11239	2.40	40	1200			
1180	<b>1RN6 456-8HS3■</b>	894	95.6	0.82	210	12613	2.50	46	1200			
1560	<b>1RN4 500-8HV5■</b>	891	95.6	0.84	270	16721	1.80	70	1200			
1760	<b>1RN4 502-8HV5■</b>	892	95.7	0.84	305	18843	1.90	80	1200			
1940	<b>1RN4 504-8HV5■</b>	892	96.0	0.84	335	20770	2.00	88	1200			
2120	<b>1RN4 506-8HV5■</b>	892	96.2	0.84	365	22697	2.00	99	1200			
2440	<b>1RN4 560-8HV5■</b>	893	96.3	0.84	420	26094	1.90	123	1200			
2750	<b>1RN4 562-8HV5■</b>	893	96.5	0.84	470	29409	1.90	141	1200			
3000	<b>1RN4 564-8HV5■</b>	893	96.6	0.84	510	32083	1.90	158	1200			
3250	<b>1RN4 566-8HV5■</b>	893	96.7	0.85	550	34756	1.90	173	1200			

## Type of construction:

IM B3

0

IM V1 (without canopy)

8

## Note:

The motors for converter operation with non-sinusoidal output have, among other things, a reinforced winding insulation.  
Additional details see Page 3/2.

Ratings are defined for sinusoidal supply, based on IEC 60034-2-1:2007.

The ratings for converter operation depend on the converter and its settings and cannot be predetermined.

Higher pole numbers are available on request.

<sup>1)</sup> Rated voltage < 4.16 kV on request.<sup>2)</sup> For IM B3, roller bearings.<sup>3)</sup> On request.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS IRN4 and IRN6

Motor type  
(repeated)

Partial load values for square-law torque drive

$P/P_{rated} = 75\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
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$P/P_{rated} = 50\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

$P/P_{rated} = 25\%$

$P$ kW	$n$ rpm	$\eta$ %	$\cos \varphi$ [-]
-----------	------------	-------------	-----------------------

Square-law torque drive

6-pole

1RN6 450-6...	908	1083	96.2	0.83	605	947	96.2	0.80	303	753	96.0	0.69
1RN6 452-6...	1013	1083	96.3	0.84	675	947	96.4	0.80	338	753	96.1	0.70
1RN6 454-6...	1110	1083	96.5	0.84	740	947	96.5	0.81	370	753	96.3	0.71
1RN6 456-6...	1215	1083	96.6	0.86	810	947	96.7	0.83	405	753	96.5	0.74
1RN4 500-6...	1590	1080	96.4	0.86	1060	944	96.4	0.84	530	749	96.1	0.75
1RN4 502-6...	1800	1079	96.5	0.87	1200	943	96.5	0.85	600	748	96.3	0.78
1RN4 504-6...	2010	1080	96.5	0.87	1340	944	96.5	0.85	670	749	96.3	0.77
1RN4 506-6...	2205	1080	96.6	0.87	1470	944	96.6	0.86	735	749	96.4	0.78
1RN4 560-6...	2550	1081	96.7	0.86	1700	945	96.7	0.84	850	750	96.4	0.76
1RN4 562-6...	2963	1082	96.9	0.85	1975	945	96.8	0.82	988	750	96.5	0.73

8-pole

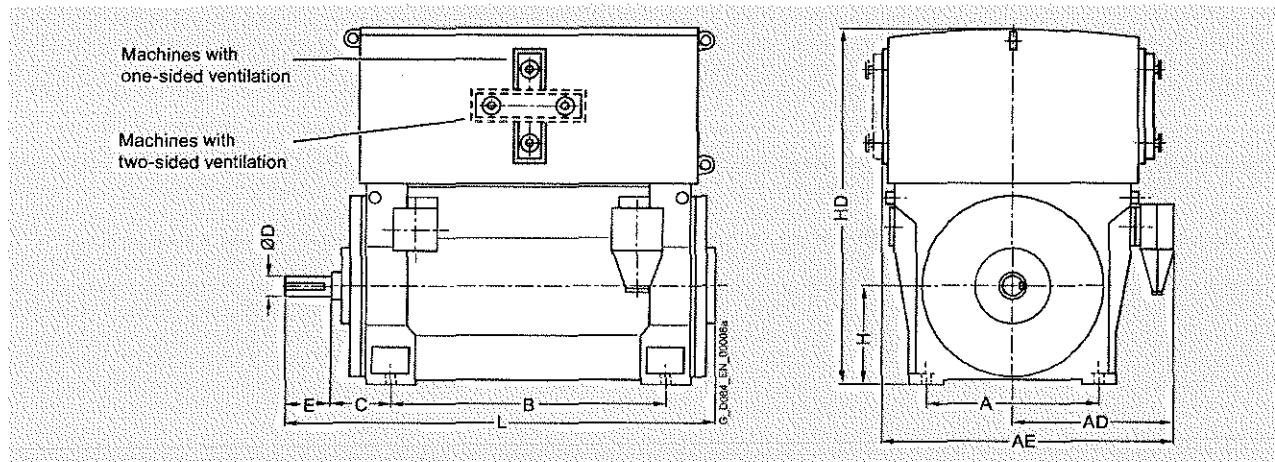
1RN6 450-8...	653	812	95.2	0.79	435	710	95.1	0.74	218	565	94.3	0.61
1RN6 452-8...	720	812	95.4	0.80	480	710	95.3	0.75	240	565	94.5	0.62
1RN6 454-8...	788	812	95.5	0.83	525	710	95.5	0.79	263	565	95.0	0.69
1RN6 456-8...	885	813	95.6	0.79	590	711	95.5	0.75	295	565	94.8	0.62
1RN4 500-8...	1170	810	95.8	0.83	780	707	95.9	0.81	390	561	95.5	0.71
1RN4 502-8...	1320	810	95.9	0.83	880	708	95.9	0.80	440	562	95.5	0.70
1RN4 504-8...	1455	810	96.1	0.83	970	708	96.0	0.80	485	562	95.5	0.69
1RN4 506-8...	1590	810	96.3	0.83	1060	708	96.2	0.80	530	562	95.8	0.70
1RN4 560-8...	1830	811	96.4	0.82	1220	709	96.3	0.79	610	563	95.9	0.69
1RN4 562-8...	2063	811	96.5	0.83	1375	709	96.4	0.80	688	563	96.0	0.70
1RN4 564-8...	2250	811	96.6	0.83	1500	709	96.5	0.80	750	563	96.0	0.70
1RN4 566-8...	2438	811	96.6	0.84	1625	709	96.6	0.82	813	563	96.2	0.73

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PI US 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>Up to 1000 V and up to 1100 A (50 Hz construction)</b>											
<b>2-pole</b>											
1RN6450-2H..0 <sup>2)</sup>	4050	850	930	1620	1180	280	95	130	450	1653	1843
1RN6452-2H..0 <sup>2)</sup>	4250	850	930	1620	1180	280	95	130	450	1653	1843
1RN6454-2H..0 <sup>2)</sup>	4550	850	930	1620	1400	280	95	130	450	1653	2053
1RN6456-2H..0 <sup>2)</sup>	4850	850	930	1620	1400	280	95	130	450	1653	2053
1RN6500-2H..0 <sup>2)</sup>	6150	950	1135	1835	1320	315	110	165	500	1971	2103
1RN6502-2H..0 <sup>2)</sup>	6300	950	1135	1835	1320	315	110	165	500	1971	2103
<b>4-pole</b>											
1RN6450-4H..0	4350	850	930	1620	1180	250	130	200	450	1684	1896
1RN6452-4H..0	4250	850	930	1620	1180	250	130	200	450	1684	1896
1RN6454-4H..0	4950	850	930	1620	1400	250	130	200	450	1684	2106
1RN6456-4H..0	5250	850	930	1620	1400	250	130	200	450	1684	2106
1RN6500-4H..0	6650	950	1135	1835	1320	280	150	200	500	1971	2109
1RN6502-4H..0	6850	950	1135	1835	1320	280	150	200	500	1971	2109
1RN6504-4H..0	7550	950	1135	1835	1500	280	150	200	500	1971	2289
1RN6506-4H..0	7900	950	1135	1835	1500	280	150	200	500	1971	2289
1RN6560-4H..0	8150	1060	1205	1975	1400	315	170	240	560	2124	2300
1RN6562-4H..0	8550	1060	1205	1975	1400	315	170	240	560	2124	2300
1RN6564-4H..0	9500	1060	1205	1975	1600	315	170	240	560	2124	2530
1RN6566-4H..0	10050	1060	1205	1975	1600	315	170	240	560	2124	2530
1RN4630-4H..0 <sup>2)</sup>	10400	1320	1330	2290	1600	335	200	280	630	2400	2500
1RN4632-4H..0 <sup>2)</sup>	11100	1320	1330	2290	1600	335	200	280	630	2400	2500
1RN4634-4H..0 <sup>2)</sup>	12150	1320	1330	2290	1800	335	220	280	630	2400	2740
1RN4636-4H..0 <sup>2)</sup>	12700	1320	1330	2290	1800	335	220	280	630	2400	2740
<b>6-pole</b>											
1RN6450-6H..0	4450	850	930	1620	1180	250	140	200	450	1684	1896
1RN6452-6H..0	4750	850	930	1620	1180	250	140	200	450	1684	1896
1RN6454-6H..0	5100	850	930	1620	1400	280	140	200	450	1684	2136
1RN6456-6H..0	5450	850	930	1620	1400	280	140	200	450	1684	2136

<sup>1)</sup> For  $V_{rated} \geq 2.0 \text{ kV}$  and current  $I_{rated} > 315 \text{ A}$ , the dimension changes by + 140 mm.

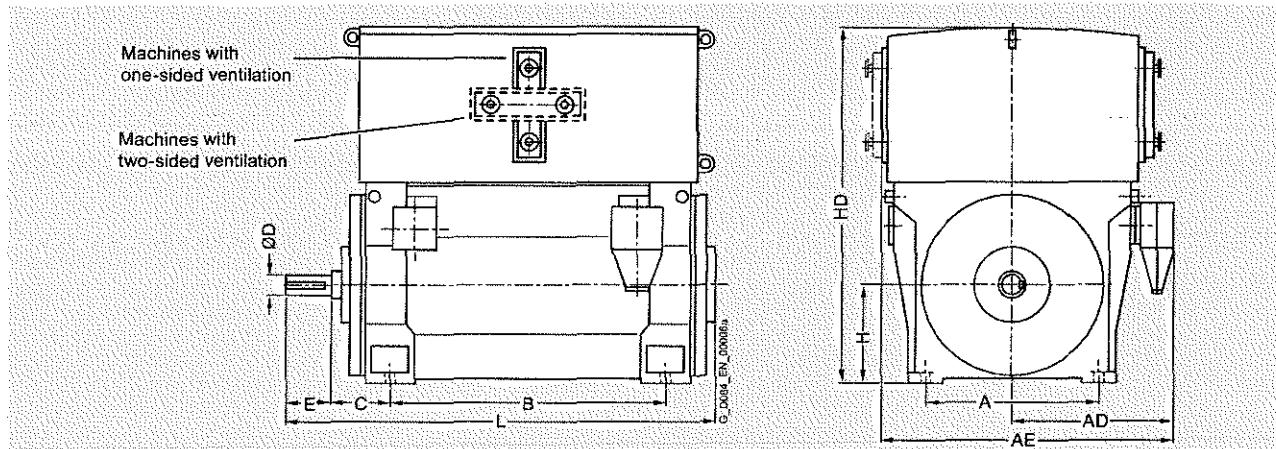
<sup>2)</sup> Roller bearings only for 50 Hz version.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS 1RN4 and 1RN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

### Technical data/Order conditions (IEC 60034-7-9 construction)

#### 6-pole

1RN4500-6H.0	5550	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4502-6H.0	5900	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4504-6H.0	6450	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4506-6H.0	6850	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4560-6H.0	7500	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4562-6H.0	8150	1060	1210	2060	1400	315	180	240	560	2040	2300
1RN4564-6H.0	8950	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4566-6H.0	9400	1060	1210	2060	1600	315	190	280	560	2040	2570
1RN4630-6H.0	10650	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4632-6H.0	11200	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4634-6H.0	12300	1320	1330	2290	1800	335	220	280	630	2400	2740
1RN4636-6H.0	13000	1320	1330	2290	1800	335	220	280	630	2400	2740

#### 8-pole

1RN6450-8H.0	4450	850	930	1620	1180	250	140	200	450	1684	1896
1RN6452-8H.0	4750	850	930	1620	1180	250	140	200	450	1684	1896
1RN6454-8H.0	5150	850	930	1620	1400	280	140	200	450	1684	2136
1RN6456-8H.0	5450	850	930	1620	1400	280	140	200	450	1684	2136
1RN4500-8H.0	5550	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4502-8H.0	5950	950	1000	1790	1320	280	160	240	500	1830	2270
1RN4504-8H.0	6450	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4506-8H.0	6800	950	1000	1790	1500	280	170	240	500	1830	2480
1RN4560-8H.0	7500	1060	1070	1920	1400	315	180	240	560	2040	2300
1RN4562-8H.0	8000	1060	1070	1920	1400	315	180	240	560	2040	2300
1RN4564-8H.0	8850	1060	1070	1920	1600	315	190	280	560	2040	2570
1RN4566-8H.0	9350	1060	1070	1920	1600	315	190	280	560	2040	2570
1RN4630-8H.0	10600	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4632-8H.0	11200	1320	1330	2290	1600	335	220	280	630	2400	2500
1RN4634-8H.0	12150	1320	1330	2290	1800	335	220	280	630	2400	2740
1RN4636-8H.0	12900	1320	1330	2290	1800	335	220	280	630	2400	2740

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

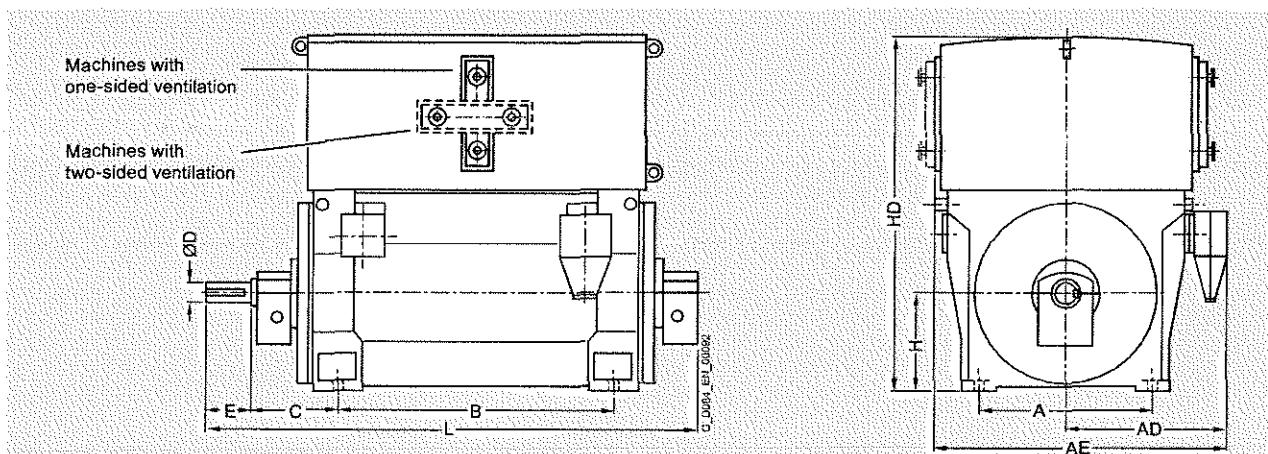


# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

Dimensions in mm, unless otherwise specified. All dimensions in mm.

#### 2-pole

1RN6450-2H..0-Z K96	4050	850	930	1620	1180	425	95	130	450	1653	2218
1RN6452-2H..0-Z K96	4300	850	930	1620	1180	425	95	130	450	1653	2218
1RN6454-2H..0-Z K96	4600	850	930	1620	1400	425	95	130	450	1653	2428
1RN6456-2H..0-Z K96	4900	850	930	1620	1400	425	95	130	450	1653	2428
1RN6500-2H..0-Z K96 <sup>2)</sup>	6200	950	1135	1835	1320	450	110	165	500	1971	2455
1RN6502-2H..0-Z K96 <sup>2)</sup>	6350	950	1135	1835	1320	450	110	165	500	1971	2455
1RN6504-2H..0	7150	950	1135	1835	1500	450	110	165	500	1971	2635
1RN6506-2H..0	7450	950	1135	1835	1500	450	110	165	500	1971	2635
1RN6560-2H..0	8100	1060	1205	1975	1400	600	130	200	560	2124	2830
1RN6562-2H..0	8550	1060	1205	1975	1400	600	130	200	560	2124	2830
1RN6564-2H..0	9500	1060	1205	1975	1600	600	130	200	560	2124	3060
1RN6566-2H..0	10000	1060	1205	1975	1600	600	130	200	560	2124	3060

<sup>1)</sup> For  $V_{rated} \geq 2.0 \text{ kV}$  and current  $I_{rated} > 315 \text{ A}$ , the dimension changes by + 140 mm.

<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, '-Z K96' not necessary.

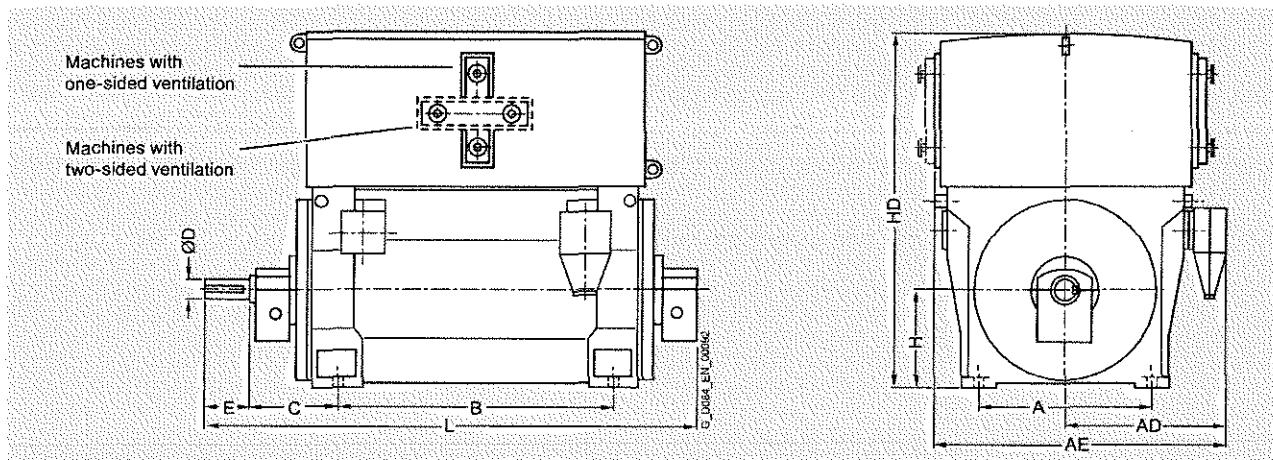


# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS 1RN4 and 1RN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

### Dimensions (V<sub>rated</sub> = 1 kV, current I<sub>rated</sub> = 10 times construction)

#### 4-pole

1RN6450-4H..0-Z K96	4400	850	930	1620	1180	500	130	200	450	1684	2438
1RN6452-4H..0-Z K96	4650	850	930	1620	1180	500	130	200	450	1684	2438
1RN6454-4H..0-Z K96	5050	850	930	1620	1400	500	130	200	450	1684	2648
1RN6456-4H..0-Z K96	5350	850	930	1620	1400	500	130	200	450	1684	2648
1RN6500-4H..0-Z K96	6950	950	1135	1835	1320	560	150	200	500	1971	2700
1RN6502-4H..0-Z K96	7200	950	1135	1835	1320	560	150	200	500	1971	2700
1RN6504-4H..0-Z K96	7900	950	1135	1835	1500	560	150	200	500	1971	2880
1RN6506-4H..0-Z K96	8200	950	1135	1835	1500	560	150	200	500	1971	2880
1RN6560-4H..0-Z K96	8300	1060	1205	1975	1400	600	170	240	560	2124	2870
1RN6562-4H..0-Z K96	8750	1060	1205	1975	1400	600	170	240	560	2124	2870
1RN6564-4H..0-Z K96	9700	1060	1205	1975	1600	600	170	240	560	2124	3100
1RN6566-4H..0-Z K96	10250	1060	1205	1975	1600	600	170	240	560	2124	3100
1RN4630-4H..0-Z K96 <sup>2)</sup>	10650	1320	1330	2290	1600	600	200	280	630	2400	2970
1RN4632-4H..0-Z K96 <sup>2)</sup>	11350	1320	1330	2290	1600	600	200	280	630	2400	2970
1RN4634-4H..0-Z K96 <sup>2)</sup>	12400	1320	1330	2290	1800	600	220	280	630	2400	3210
1RN4636-4H..0-Z K96 <sup>2)</sup>	13000	1320	1330	2290	1800	600	220	280	630	2400	3210

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

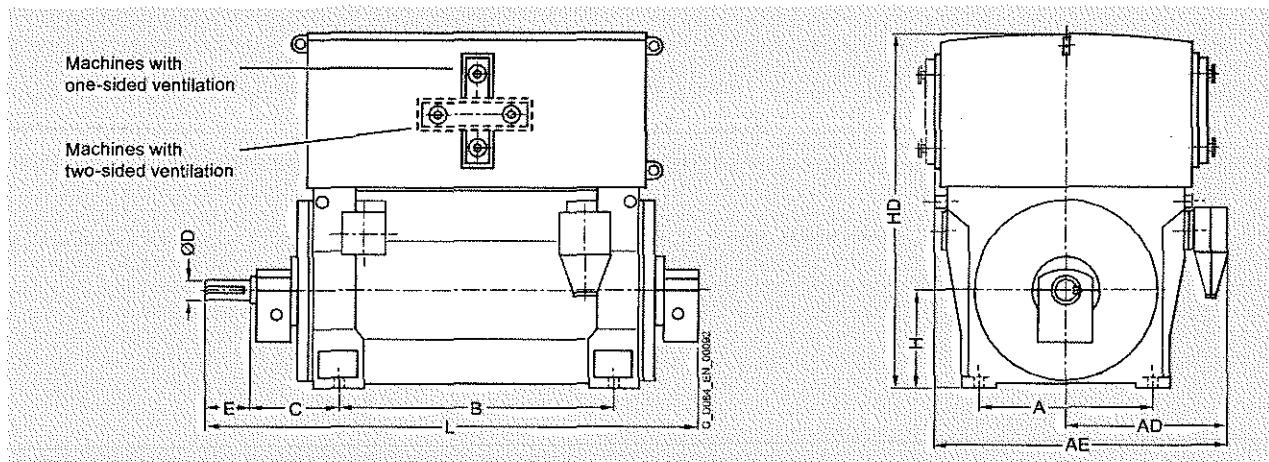
<sup>2)</sup> For the 60 Hz version, sleeve bearings are standard, "-Z K96" not necessary.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PI US 1RN4 and 1RN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm
<b>1RN450-6H.0-Z K96</b>											
1RN6450-6H.0-Z K96	4550	850	930	1620	1180	500	140	200	450	1684	2438
1RN6452-6H.0-Z K96	4800	850	930	1620	1180	500	140	200	450	1684	2438
1RN6454-6H.0-Z K96	5150	850	930	1620	1400	500	140	200	450	1684	2648
1RN6456-6H.0-Z K96	5500	850	930	1620	1400	500	140	200	450	1684	2648
1RN4500-6H.0-Z K96	5700	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4502-6H.0-Z K96	6100	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4504-6H.0-Z K96	6600	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4506-6H.0-Z K96	7000	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4560-6H.0-Z K96	7750	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4562-6H.0-Z K96	8350	1060	1210	2060	1400	530	180	240	560	2040	2670
1RN4564-6H.0-Z K96	9150	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4566-6H.0-Z K96	9650	1060	1210	2060	1600	530	190	280	560	2040	2940
1RN4630-6H.0-Z K96	10950	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4632-6H.0-Z K96	11500	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4634-6H.0-Z K96	12550	1320	1330	2290	1800	600	220	280	630	2400	3210
1RN4636-6H.0-Z K96	13300	1320	1330	2290	1800	600	220	280	630	2400	3210

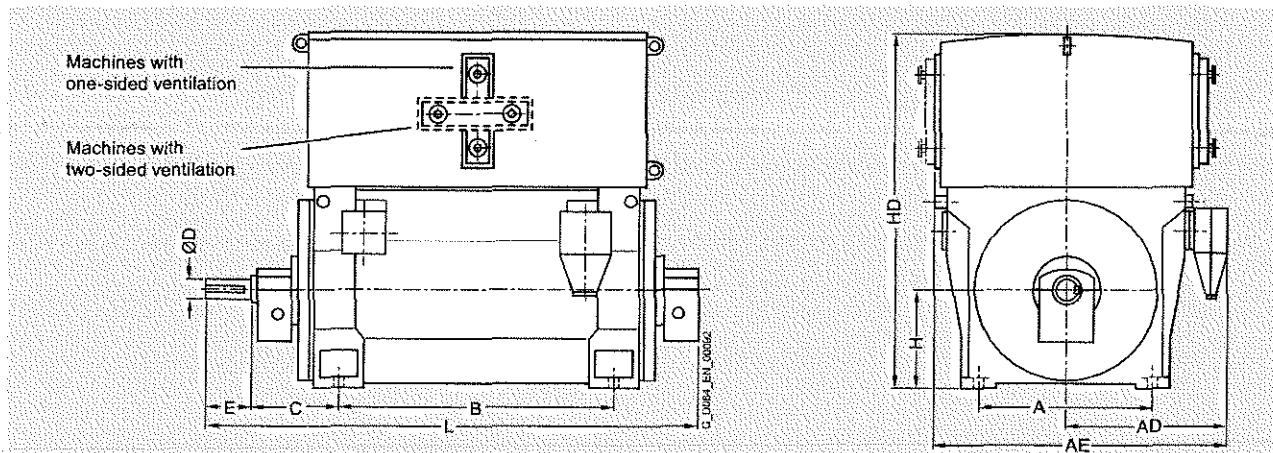
<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS IRN4 and IRN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions									
		A mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	B mm	C mm	D mm	E mm	H mm	HD mm	L mm

#### Unit 30 kV, sleeve bearing, IP 54, flat construction

##### 8-pole

1RN6450-8H..0-Z K96	4550	850	930	1620	1180	500	140	200	450	1684	2438
1RN6452-8H..0-Z K96	4850	850	930	1620	1180	500	140	200	450	1684	2438
1RN6454-8H..0-Z K96	5200	850	930	1620	1400	500	140	200	450	1684	2648
1RN6456-8H..0-Z K96	5550	850	930	1620	1400	500	140	200	450	1684	2648
1RN4500-8H..0-Z K96	5750	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4502-8H..0-Z K96	6100	950	1000	1790	1320	500	160	240	500	1830	2620
1RN4504-8H..0-Z K96	6600	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4506-8H..0-Z K96	7000	950	1000	1790	1500	500	170	240	500	1830	2830
1RN4560-8H..0-Z K96	7700	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4562-8H..0-Z K96	8250	1060	1070	1920	1400	530	180	240	560	2040	2670
1RN4564-8H..0-Z K96	9050	1060	1070	1920	1600	530	190	280	560	2040	2940
1RN4566-8H..0-Z K96	9550	1060	1070	1920	1600	530	190	280	560	2040	2940
1RN4630-8H..0-Z K96	10850	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4632-8H..0-Z K96	11500	1320	1330	2290	1600	600	220	280	630	2400	2970
1RN4634-8H..0-Z K96	12450	1320	1330	2290	1800	600	220	280	630	2400	3210
1RN4636-8H..0-Z K96	13150	1320	1330	2290	1800	600	220	280	630	2400	3210

##### Note:

Higher pole numbers are available on request.

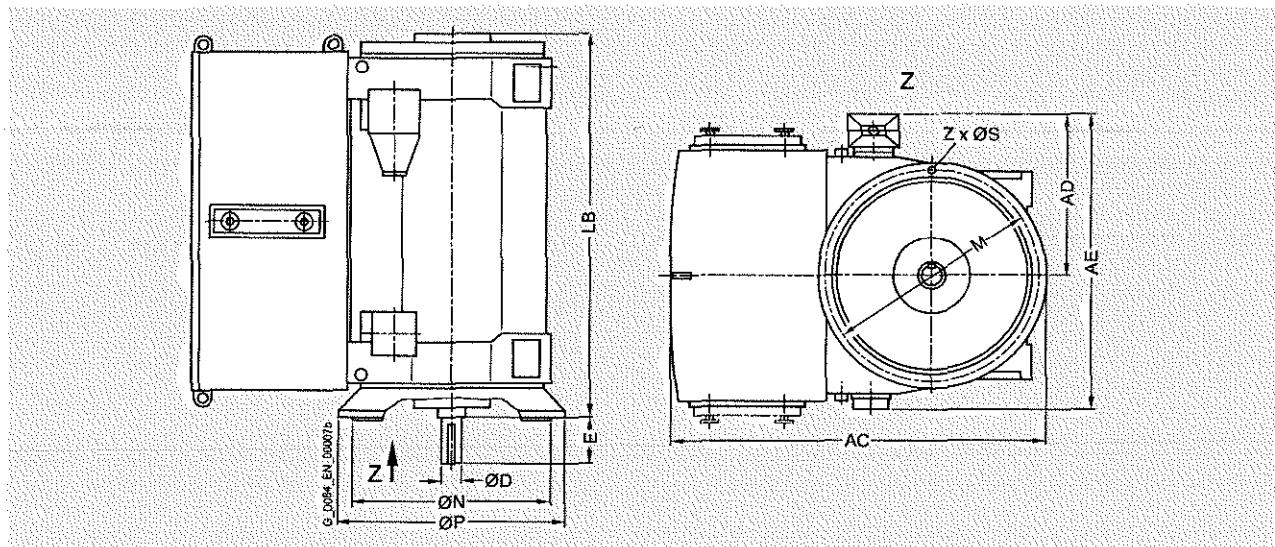
<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PI US 1RN4 and 1RN6

### Dimension drawings



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>Up to 6.0 kV roller bearings, IM VI type of construction</b>														
<b>4-pole</b>														
1RN6450-4H..8	4550	1809	930	1620	130	200	1720	1150	1000	1080	26	8		
1RN6452-4H..8	4750	1809	930	1620	130	200	1720	1150	1000	1080	26	8		
1RN6454-4H..8	5150	1809	930	1620	130	200	1930	1150	1000	1080	26	8		
1RN6456-4H..8	5450	1809	930	1620	130	200	1930	1150	1000	1080	26	8		
1RN4500-4H..8	5500	1960	1000	1810	150	200	1910	1250	1120	1180	26	8		
1RN4502-4H..8	5700	1960	1000	1810	150	200	1910	1250	1120	1180	26	8		
1RN4504-4H..8	6400	1960	1000	1810	160	240	2120	1250	1120	1180	26	8		
1RN4506-4H..8	6800	1960	1000	1810	160	240	2120	1250	1120	1180	26	8		
1RN4560-4H..8	7550	2180	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RN4562-4H..8 <sup>2)</sup>	8000	2180	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RN4564-4H..8 <sup>2)</sup>	8900	2180	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RN4566-4H..8 <sup>2)</sup>	9350	2180	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RN4630-4H..8 <sup>2)</sup>	12050	2875	1330	2300	200	280	2400	2000	1800	1900	33	16		
1RN4632-4H..8 <sup>2)</sup>	12750	2875	1330	2300	200	280	2400	2000	1800	1900	33	16		
1RN4634-4H..8 <sup>2)</sup>	13800	2875	1330	2300	220	280	2640	2000	1800	1900	33	16		
1RN4636-4H..8 <sup>2)</sup>	14350	2875	1330	2300	220	280	2640	2000	1800	1900	33	16		
<b>6-pole</b>														
1RN6450-6H..8	4650	1809	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6452-6H..8	4950	1809	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6454-6H..8	5300	1809	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN6456-6H..8	5650	1809	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN4500-6H..8	5650	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4502-6H..8	6050	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4504-6H..8	6550	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4506-6H..8	6950	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

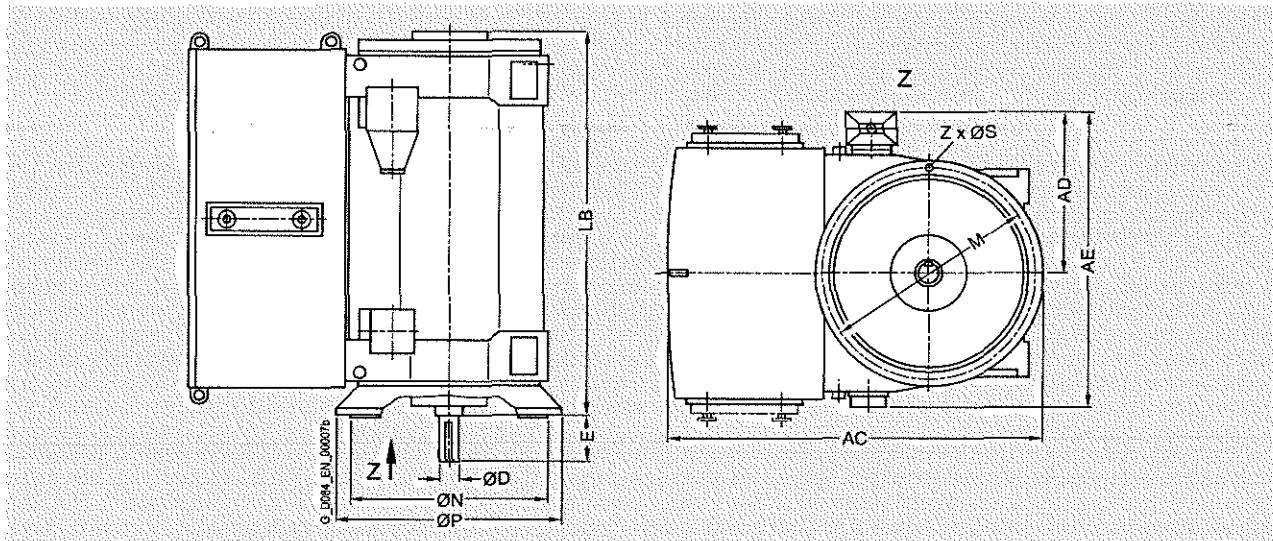
<sup>2)</sup> Only in the 50 Hz version.

# Motors for converter operation

## Converter with non-sinusoidal output

Water-cooled motors  
H-compact PLUS 1RN4 and 1RN6

### Dimension drawings (continued)



Motor type	Weight kg	Dimensions												Quantity
		AC mm	AD <sup>1)</sup> mm	AE <sup>1)</sup> mm	D mm	E mm	LB mm	P mm	N mm	M mm	S mm	Z		
<b>Up to 6 kV roller bearings, IM VI type of construction</b>														
6-pole														
1RN4560-6H..8	7650	2180	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RN4562-6H..8	8250	2180	1210	2100	180	240	2090	1400	1250	1320	26	16		
1RN4564-6H..8	9100	2180	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RN4566-6H..8	9550	2180	1210	2100	190	280	2320	1400	1250	1320	26	16		
1RN4630-6H..8	12300	2875	1330	2300	220	280	2400	2000	1800	1900	33	16		
1RN4632-6H..8	12850	2875	1330	2300	220	280	2400	2000	1800	1900	33	16		
1RN4634-6H..8	13950	2875	1330	2300	220	280	2640	2000	1800	1900	33	16		
1RN4636-6H..8	14650	2875	1330	2300	220	280	2640	2000	1800	1900	33	16		
8-pole														
1RN6450-8H..8	4650	1809	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6452-8H..8	4950	1809	930	1620	140	200	1720	1150	1000	1080	26	8		
1RN6454-8H..8	5350	1809	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN6456-8H..8	5650	1809	930	1620	140	200	1930	1150	1000	1080	26	8		
1RN4500-8H..8	5700	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4502-8H..8	6050	1960	1000	1810	160	240	1910	1250	1120	1180	26	8		
1RN4504-8H..8	6550	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4506-8H..8	6950	1960	1000	1810	170	240	2120	1250	1120	1180	26	8		
1RN4560-8H..8	7650	2180	1070	1960	180	240	2090	1400	1250	1320	26	16		
1RN4562-8H..8	8150	2180	1070	1960	180	240	2090	1400	1250	1320	26	16		
1RN4564-8H..8	9000	2180	1070	1960	190	280	2320	1400	1250	1320	26	16		
1RN4566-8H..8	9450	2180	1070	1960	190	280	2320	1400	1250	1320	26	16		
1RN4630-8H..8	12250	2875	1330	2300	220	280	2400	2000	1800	1900	33	16		
1RN4632-8H..8	12850	2875	1330	2300	220	280	2400	2000	1800	1900	33	16		
1RN4634-8H..8	13800	2875	1330	2300	220	280	2640	2000	1800	1900	33	16		
1RN4636-8H..8	14550	2875	1330	2300	220	280	2640	2000	1800	1900	33	16		

#### Note:

Higher pole numbers are available on request.

<sup>1)</sup> For  $V_{rated} \geq 2.0$  kV and current  $I_{rated} > 315$  A, the dimension changes by + 140 mm.

# Motors for converter operation

## Options and tests

### Description of options

#### Overview

Using the following options, H-compact and H-compact PLUS can be adapted to order-specific requirements. The Order No. is supplemented with a "-Z" and with either one or several order codes.

Other options can be addressed on request with the LOHER Vario (rib-cooled) or LOHER Vario PLUS (modular design) motor series.

Order code	Option description	Remark
<b>Paint finish</b>		
<b>K26</b>	Special paint finish in the standard color RAL 7030	
<b>Y53</b>	Normal paint finish not in the standard color	
<b>Y54</b>	Special paint finish not in the standard color	
<b>Documentation</b>		
<b>B00</b>	No motor manual	
<b>B21</b>	Motor manual on CD instead of paper (PDF format)	
<b>B22</b>	Motor manual as e-mail (PDF format) instead of paper	
<b>B23</b>	Motor manual printed on paper, 3x	
<b>B27</b>	Run out protocol	
<b>B28</b>	Protocol air gap calculation	
<b>B34</b>	Document standard inspection and test plan	
<b>B35</b>	Document balance report	
<b>B36</b>	Document test and inspection description	
<b>B37</b>	Document load characteristics	
<b>B38</b>	Document recommended spare parts	
<b>B41</b>	Document instrumentation list	
<b>B43</b>	Document production schedule: Generated once	
<b>B44</b>	Document production schedule: Updated biweekly	
<b>B45</b>	Document production schedule: Updated monthly	
<b>B48</b>	Document order-specific inspection and test plan	
<b>Document language</b>		
<b>D00</b>	Documentation in German	
<b>D54</b>	Documentation in Czech	
<b>D55</b>	Documentation in Polish	
<b>D56</b>	Documentation in Russian	
<b>D72</b>	Documentation in Italian	
<b>D73</b>	Documentation in Finnish	
<b>D74</b>	Documentation in Dutch	
<b>D75</b>	Documentation in Turkish	
<b>D76</b>	Documentation in English	Standard
<b>D77</b>	Documentation in French	
<b>D78</b>	Documentation in Spanish	
<b>D79</b>	Documentation in Portuguese	
<b>D80</b>	Documentation in Bulgarian	
<b>D81</b>	Documentation in Norwegian	
<b>D82</b>	Documentation in Hungarian	
<b>D83</b>	Documentation in Swedish	
<b>D84</b>	Documentation in Chinese	
<b>Speed monitoring</b>		
<b>H70</b>	Rotary pulse encoder LL 861 900 220 (Leine+Linde)	
<b>H73</b>	Rotary pulse encoder HOG 10 D1024 I (16 mm)	
<b>H76</b>	Rotary pulse encoder HOG 10 D1024 I with integrated shaft grounding	
<b>H88</b>	Rotary pulse encoder HOG 11 DN 1024 I (16 mm) with special anti-corrosion protection	For marine applications
<b>H89</b>	Rotary pulse encoder HOG 11 DN 1024 I (16 mm) with integrated shaft grounding and special anti-corrosion protection	For marine applications

# Motors for converter operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Direction of rotation</b>		
K97	Clockwise rotation	Standard
K98	Anticlockwise rotation	
<b>Noise reduction</b>		
L20	Silencer for air inlet	
L21	Noise reduction: Silencer for air outlet	Only for H-compact PLUS
L22	Noise reduction: Lining of interior space	Only for H-compact PLUS
L23	External metal fan, unique directional	Only for H-compact
L25	Rustless grid at inlet silencer	Only for H-compact
<b>Terminal box mounting position</b>		
K09	Terminal box on right-hand side, view from DE	Standard
K10	Terminal box on left-hand side, view from DE	
K83	Terminal box turned through 90°, cable from DE	
K84	Terminal box turned through 90°, cable from NDE	
K85	Terminal box turned through 180°	
N85	Terminal box on NDE	Only for H-compact
<b>Terminal box, main and auxiliary terminal box</b>		
L54	Terminal box 1XB8 751, 6 terminals with 2 cable entries for connection to power supply, rated current > 315 A	
L59	Terminal box 1XB8 911 for 1 cable entry for power supply	
L55	Star-point terminal box 1XA8 711, up to 6 kV, 3 terminals	
L56	Star-point terminal box 1XB8 911, up to 10 kV, 3 terminals	
L57	Star-point terminal box 1XB8 751, up to 6 kV, 6 terminals	
L58	Star-point terminal box 1XB9 011, for installing current transformer (without current transformer)	
M50	Auxiliary terminal box material: Cast iron	
M51	Auxiliary terminal box material: Stainless steel	
M52	Separate auxiliary terminal box for anti-condensation heater	Standard for H-compact PLUS
<b>Terminal box – accessories/equipping</b>		
K59	Cable plug connection, rated voltage 2 to 6.6 kV	
L79	Gland plate for 3 winding ends to connect to the line supply via separately mounted terminal box, 3 m free cable length from the frame	
L80	Gland plate for 6 winding ends to connect to the line supply via separately mounted terminal box, 3 m free cable length from the frame	
L83	Cable plug connection, rated voltage 9 to 11 kV	
<b>Cooling air monitoring</b>		
A44	1 resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box for cold air temperature	
A45	1 resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box for hot air temperature	
A46	1 double resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box, for cold air temperature	
A47	1 double resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box, for hot air temperature	
A86	1 dial-type thermometer with 2 NO-Contacts for cold air temperature incl. terminal box	
A87	1 dial-type thermometer with 2 NO-Contacts for hot air temperature incl. terminal box	

# Motors for converter operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Bearing version/instrumentation</b>		
<b>H09 + H11</b>	DIN flange type for forced oil lubrication for oil inlet with flowmeter, manometer and throttle valve (incl. counter flange) + DIN flange type forced oil lubrication for oil outlet with sight glass (incl. counter flange)	
<b>H10 + H12</b>	ANSI flange type for forced oil lubrication for oil inlet with flowmeter, manometer and throttle valve (incl. counter flange) + ANSI flange type for forced oil lubrication for oil outlet with sight glass (incl. counter flange)	
<b>H43</b>	DIN flange type for forced oil lubrication for in- and outlet without instruments (with counter flanges)	
<b>H44</b>	ANSI flange type for forced oil lubrication for in- and outlet without instruments (with counter flanges)	
<b>K20</b>	Bearing design on DE for increased forces (reinforced)	H-compact SH 315 and SH 355 only
<b>K94</b>	Fixed bearing at DE for sleeve bearing	
<b>K96</b>	Sleeve bearing instead of roller bearing	
<b>L18</b>	DE insulation	
<b>L27</b>	NDE insulation	
<b>L60</b>	Forced-circulation oil lubrication (with oil cooling) instead of oil-ring lubrication	
<b>L66</b>	Air cooling, but prepared for future conversion to forced-circulation oil lubrication	
<b>P44</b>	Oil manifold; connections with counter flange; flange flush with the axial shaft face	
<b>Bearing monitoring – sleeve bearings</b>		
<b>A02</b>	Shaft vibration monitoring for sleeve bearings, Bently Nevada system	
<b>A03</b>	Speed monitoring using an inductive proximity switch, Pepperl + Fuchs, incl. terminal box, without evaluation unit	
<b>A39</b>	Prepared for shaft vibration monitoring for sleeve bearings (without monitoring system)	
<b>A41</b>	2 resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for sleeve bearing	
<b>A43</b>	2 double resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for sleeve bearing	
<b>A70</b>	2 dial-type thermometers without contacts	
<b>A71</b>	2 dial-type thermometers with contacts	
<b>Bearing monitoring – roller bearings</b>		
<b>A40</b>	2 resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminal box for rolling-contact bearings	
<b>A42</b>	2 double resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for rolling-contact bearing	
<b>G50</b>	Shock pulse measuring nipple (SPM) at DE and NDE	Standard
<b>H05</b>	Shock pulse measurement (SPM), fixed sensors and distributor box	
<b>H07</b>	Shock pulse measurement (SPM), complete alarm box	
<b>Mechanical versions</b>		
<b>K16</b>	Second shaft extension up to 50 % rated torque	
<b>L81</b>	Vibration severity grade B according to IEC/ EN 60034-14	Not available for 2-pole motors with roller bearings.
<b>Y55</b>	Non-standard cylindrical shaft extension (an inquiry must be sent to the factory)	
<b>Y85</b>	Oil shrink fit for cylindrical, single-stage shaft extension instead of a key connection	

# Motors for converter operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Certified for pump drives</b>		
<b>E88</b> Construction supervision for motors for seawater desalination plants where Siemens AG commissions the acceptance authority.		
<b>E89</b>	Construction supervision for motors for seawater desalination plants where a third party commissions the acceptance authority	
<b>E90</b>	Pump drive for seawater desalination plants certified according to Lloyds Register	
<b>Marine applications</b>		
<b>Others/additional options</b>		
<b>H08</b>	Leakage water detection	
<b>K52</b>	Degree of protection IP56 non-heavy-sea	
<b>L15</b>	Supporting ring for coupling guard	
<b>L17</b>	Mounting a coupling provided (finish machined and balanced)	
<b>L31</b>	Motor mounting materials for mounting on a steel foundation: Bolts, shims and taper dowels	
<b>L32</b>	Motor mounting materials for mounting on a concrete foundation or concrete base: Threaded bolts, armature plates, sole plates, shims, leveling plates and taper dowels	
<b>L33</b>	Motor mounting materials to mount on a concrete foundation or concrete base: T-head bolts, foundation bolt sleeves, sole plates, shims, leveling plates and taper dowels	
<b>L91</b>	Higher number of starts, > 1000 ... 10000 starts per year, for Cu rotors	
<b>L92</b>	Higher number of starts, > 5000 ... 10000 starts per year, for Al rotors	
<b>P45</b>	External screws made of stainless steel	
<b>Anti-condensation heating</b>		
<b>L08</b>	Anti-condensation heater, rated voltage 400 V	
<b>L09</b>	Anti-condensation heater, rated voltage 500 V	
<b>M12</b>	Anti-condensation heater 110 to 120 V (min. 100 V, max. 132 V)	
<b>M13</b>	Anti-condensation heater 220 to 240 V (min. 200 V, max. 264 V)	Standard for H-compact PLUS
<b>Y83</b>	Anti-condensation heater with other rated voltages, V = additional text required	
<b>Ambient conditions</b>		
<b>D02</b>	Operation at ambient temperatures up to -50 °C, transport up to -50 °C	
<b>D03</b>	Operation at ambient temperatures up to -40 °C, transport up to -40 °C	
<b>D04</b>	Operation at ambient temperatures up to -30 °C, transport up to -40 °C	
<b>E81</b>	Outdoor use with high salinity or offshore applications (corrosivity grade C5-M/ C5-I)	
<b>E82</b>	Outdoor use with moderate salinity (corrosivity grade C4)	
<b>E83</b>	Outdoor use with low salinity (corrosivity grade C3)	
<b>M06</b>	For use in sulfurous or hydrogenous atmosphere	
<b>Winding and motor protection</b>		
<b>A12</b>	6 PTC thermistors without lightning arresters	
<b>A23</b>	2 temperature sensors KTY 84-130	
<b>A65</b>	6 embedded resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminal box without lightning arresters	Standard
<b>A66</b>	6 embedded resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminal box with lightning arresters	

# Motors for converter operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Tests with acceptance</b>		
<b>F01</b>	All standard tests (routine test), with acceptance	
<b>F15</b>	Recording of no-load characteristic and determination of core and friction losses, with acceptance	
<b>F17</b>	Recording of short-circuit characteristic and determination of short-circuit losses, with acceptance	
<b>F19</b>	Recording of load characteristic, with acceptance	
<b>F23</b>	Dissipation factor test ( $\tan \delta$ ) on 2 (test) coils, with acceptance	In addition, specify order code F90
<b>F29</b>	No-load noise measurement, without noise analysis, with acceptance	
<b>F31</b>	Cooling air flow and pressure drop measurement, with acceptance	
<b>F35</b>	Recording of current and torque characteristics during acceleration, with acceptance	
<b>F37</b>	Determination of moment of inertia by retardation method, with acceptance	
<b>F39</b>	Overspeed test, with acceptance	
<b>F41</b>	Recording of residual voltage curve, with acceptance	
<b>F53</b>	Locked-rotor torque and current measurement, with acceptance	
<b>F55</b>	Polarization index measurement, with acceptance	
<b>F61</b>	Impulse or AC voltage test on 2 (test) coils, with acceptance	In addition, specify order code F90
<b>F63</b>	Noise analysis, with acceptance	
<b>F83</b>	Type test for horizontal motors with temperature rise test, with acceptance	
<b>F90</b>	2 test coils	
<b>F93</b>	Type test for vertical motors with temperature rise test, with acceptance	
<b>Tests without acceptance</b>		
<b>F14</b>	Recording of no-load characteristic and determination of core and friction losses, without acceptance	
<b>F16</b>	Recording of short-circuit characteristic and determination of short-circuit losses, without acceptance	
<b>F18</b>	Recording of load characteristic, without acceptance	
<b>F22</b>	Dissipation factor test ( $\tan \delta$ ) on 2 (test) coils, without acceptance	In addition, specify order code F90
<b>F28</b>	No-load noise measurement, without noise analysis, without acceptance	
<b>F30</b>	Cooling air flow and pressure drop measurement, without acceptance	
<b>F34</b>	Recording of current and torque characteristics during acceleration, without acceptance	
<b>F36</b>	Determination of moment of inertia by retardation method, without acceptance	
<b>F38</b>	Overspeed test, without acceptance	
<b>F42</b>	"Conformance Test (Wet Test)" to NEMA Standard, without acceptance	
<b>F52</b>	Locked-rotor torque and current measurement, without acceptance	
<b>F54</b>	Polarization index measurement, without acceptance	
<b>F60</b>	Impulse or AC voltage test on 2 (test) coils, without acceptance	In addition, specify order code F90
<b>F62</b>	Noise analysis, without acceptance	
<b>F82</b>	Type test for horizontal motors with temperature rise test, without acceptance	
<b>F90</b>	2 test coils	
<b>F92</b>	Type test for vertical motors with temperature rise test, without acceptance	

# Motors for converter operation

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
<b>Extension of liability for defects</b>		<b>Order number for reorder</b>
<b>Q80</b>	Extension of liability for defects, by 12 months to a total of 24 months (2 years) from delivery	<b>9LD1720-0AA24</b>
<b>Q81</b>	Extension of liability for defects, by 18 months to a total of 30 months (2.5 years) from delivery	<b>9LD1720-0AA30</b>
<b>Q82</b>	Extension of liability for defects, by 24 months to a total of 36 months (3 years) from delivery	<b>9LD1720-0AA36</b>
<b>Q83</b>	Extension of liability for defects, by 30 months to a total of 42 months (3.5 years) from delivery	<b>9LD1720-0AA42</b>
<b>Q84</b>	Extension of liability for defects, by 36 months to a total of 48 months (4 years) from delivery	<b>9LD1720-0AA48</b>
<b>Q85</b>	Extension of liability for defects, by 48 months to a total of 60 months (5 years) from delivery	<b>9LD1720-0AA60</b>

#### Conditions for an extension of liability for defects

You will find the currently valid conditions for an extension of liability for defects under:

<http://support.automation.siemens.com/WW/view/en/56715113>

# Motors for converter operation

## Options and tests

Notes



## Explosion-protected motors



<b>4/2</b>	<b>Overview</b>
4/2	Classification of zones
4/3	Types of protection
4/4	Certification
<b>4/5</b>	<b>Type of protection Ex nA/Ex tc</b>
4/5	Air-cooled motors
	H-compact 1MS4
4/6	Air-cooled motors
	H-compact PLUS 1SG4 and 1SG6
4/7	Water-cooled motors
	H-compact PLUS 1SL4 and 1SL6
<b>4/8</b>	<b>Type of protection Ex px</b>
4/8	Overview
4/9	Air-cooled motors
	H-compact 1MG4
4/10	Air-cooled motors
	H-compact PLUS 1SB4 and 1SB6
4/11	Water-cooled motors
	H-compact PLUS 1SQ4 and 1SQ6
<b>4/12</b>	<b>Type of protection Ex e</b>
4/12	Air-cooled motors
	H-compact 1MA4
4/14	Air-cooled motors
	H-compact PLUS 1SJ4 and 1SJ6
4/14	Water-cooled motors
	H-compact PLUS 1SN4 and 1SN6
<b>4/15</b>	<b>Options and tests</b>
4/15	Description of options

# Explosion-protected motors

## Overview

### Classification of zones

#### Overview

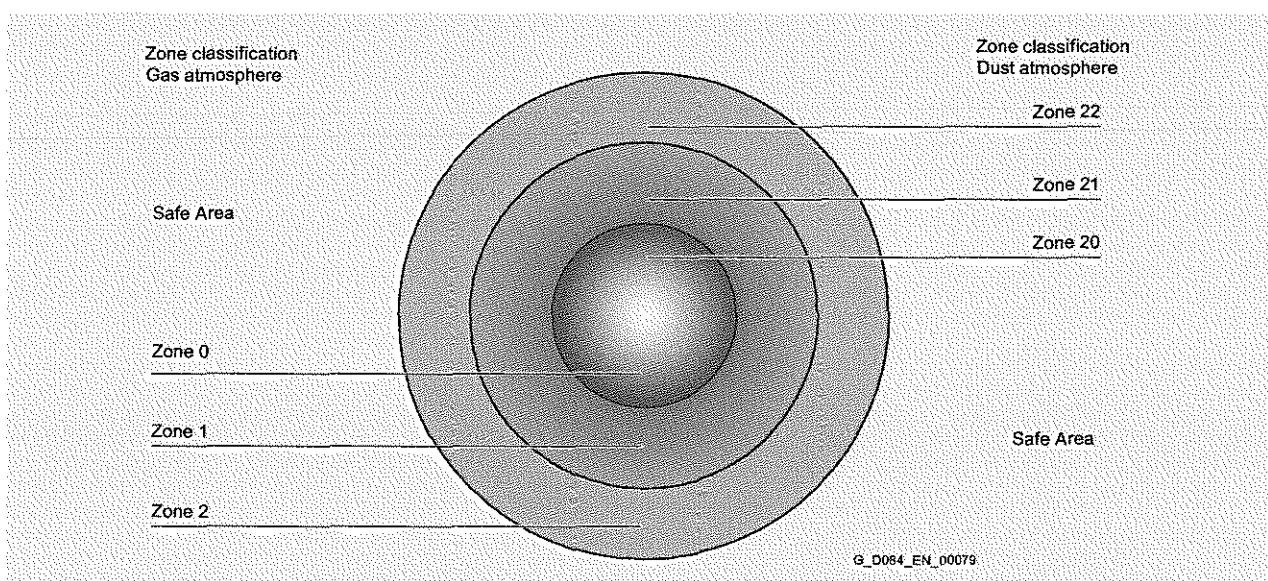
In many industries, the manufacture, processing, transport or storage of combustible materials results in the creation or release of gases, vapors or mist into the environment. Combustible dusts are created in other processes.

Explosive atmospheres are formed when gases, vapors, mist or dust come into contact with oxygen in the air. If ignited, this can result in an explosion. In the chemical and petrochemical industries in particular, when crude oil and natural gas are transported, or in mining, milling (e.g. grain and granular solids), this can result in serious injury to personnel and damage to equipment.

To ensure maximum safety in these areas, legislators in most countries have implemented appropriate stipulations in the form

of laws and regulations based on national and international standards.

Hazardous areas are classified in zones. Classification in zones depends on the probability of the presence of an explosive atmosphere, the duration and the location. Information and specifications regarding classification in zones are provided in IEC/EN 60079-10-1 for gas atmospheres and in IEC/EN 60079-10-2 for potentially explosive atmospheres as a result of dust. Further, a distinction is made between various explosion groups as well as temperature classes and these are included in the hazard assessment.



Depending on the particular zone and therefore the associated hazard, operating equipment must comply with defined minimum requirements regarding the type of protection. The different

types of protection require corresponding measures to prevent ignition that should be implemented at the motor in order to prevent that a surrounding explosive atmosphere is ignited.

Zone Dust <sup>2)</sup>	Gas <sup>1,2)</sup>	Zone definition acc. to IEC/EN 60079-10-1 for Gas atmospheres IEC/EN 60079-10-2 for dust atmospheres	Assigned types of protection	Category according to 94/9/EC
22	-	An area in which in normal operation it is not expected that an explosive atmosphere in the form of a cloud of combustible dust in the air occurs, and if it does occur then only briefly.	Ex tc	3D
-	2	An area in which in normal operation it is not expected that an explosive gas atmosphere occurs and if so, only infrequently and only briefly.	Ex nA	3G
-	1	An area in which it is expected that an explosive gas atmosphere occurs during normal operation.	Ex e Ex px Ex d	2G
-	0	An area in which it is expected that a gas atmosphere is constantly present or for long periods of time	Motors are not permitted	

<sup>1)</sup> Motors for Zone 1 may also be used in Zone 2.

<sup>2)</sup> Motors, which are marked for gas or dust protection, must not be used in hybrid mixtures! Hybrid mixtures: When explosive gas and dust atmospheres occur simultaneously.



# Explosion-protected motors

## Overview

### Types of protection

#### Overview (continued)

##### **Type of protection, pressurized enclosure Ex px acc. to IEC/EN 60079-2**

In the motor, protective gas is kept under pressure in relation to the surrounding atmosphere to prevent the penetration of explosive atmospheres. The inside of the motor must be flushed with an protective gas before it is switched on.

H-compact motors fulfill this type of protection (type series 1MG4) and H-compact PLUS (air-cooled, type series 1SB4/1SB6 and water-cooled, type series 1SQ4/1SQ6).

##### **Type of protection, increased safety Ex e acc. to IEC/EN 60079-7**

Additional measures are taken to prevent the possibility of high temperatures and to prevent sparks or arcs from occurring inside the motor and at external motor components.

Increased safety can be guaranteed by H-compact motors (type series 1MA4) and H-compact PLUS (air-cooled, type series 1SJ4/1SJ6 and water-cooled (type series 1SN4/1SN6) (an inquiry must be sent to the factory).

##### **Type of protection, flameproof enclosure Ex d acc. to IEC/EN 60079-1**

The components that can ignite an explosive atmosphere are located in an enclosure that is not damaged by an internal explosion and flameproof joints prevent flames from escaping to the explosive atmosphere on the outside.

The LOHER Vario series is available in **Ex d**.

##### **Type of protection, Ex nA acc. to IEC/EN 60079-15**

The type of protection **Ex nA** ensures that a motor in normal operation as well as when operated under deviating conditions as specified in the standard is not in a position to ignite a surrounding explosive gas atmosphere.

The series of H-compact motors (type series 1MS4) and H-compact PLUS (air-cooled, type series 1SG4/1SG6) and water-cooled (type series 1SL4/1SL6) are available in **Ex nA**.

##### **Type of protection Ex t acc. to IEC/EN 60079-31**

This type of protection applies for electrical equipment protected using an enclosure and with limited surface temperature for use in areas in which combustible dust can occur in concentration levels that could cause a fire or an explosion.

The series of H-compact motors (type series 1MS4) and H-compact PLUS (air-cooled, 1SG4/1SG6 and water-cooled, 1SL4/1SL6) are available in **Ex tc**.

# Explosion-protected motors

## Overview

### Certification

#### Overview (continued)

##### Certification

Motors for use in hazardous areas are certified according to the EC Directive 94/9/EC (ATEX) or other regional certification schemes and are marked according to the following schematic.

Example, pressurized enclosure:	Acc. to Directive 94/9/EC (ATEX)					Acc. to Standards (IEC/EN)				
	CE	XXXX	Ex	II	2	G	Ex	px	II	T3
CE marking										
Number of the certifying "notified body"										
Ex symbol for explosion protected equipment										
Groups:										
• I = mining										
• II = other than mining										
Category:										
• 2 (Zone 1/21)										
• 3 (Zone 2/22)										
Explosive atmosphere										
• G = gas										
• D = dust										
Explosion protected equipment										
Type of protection nA, d, e, px or tc										
Note: Additional types of protection for accessories are alphabetically listed										
Explosion group, where relevant, restricted (Gas: IIA, IIB, IIC; Dust: IIIA, IIIB, IIIC)										
Temperature class with max. surface temperature										
• T1 ≤ 450 °C										
• T2 ≤ 300 °C										
• T3 ≤ 200 °C (standard for motors from Siemens I DT LD P)										
• T4 ≤ 135 °C										
Alternatively the maximum surface temperature may be marked: e.g. T125 °C (possible for gas, necessary for dust explosion protected machines)										
Special conditions according to the operating instructions or type examination certificate										

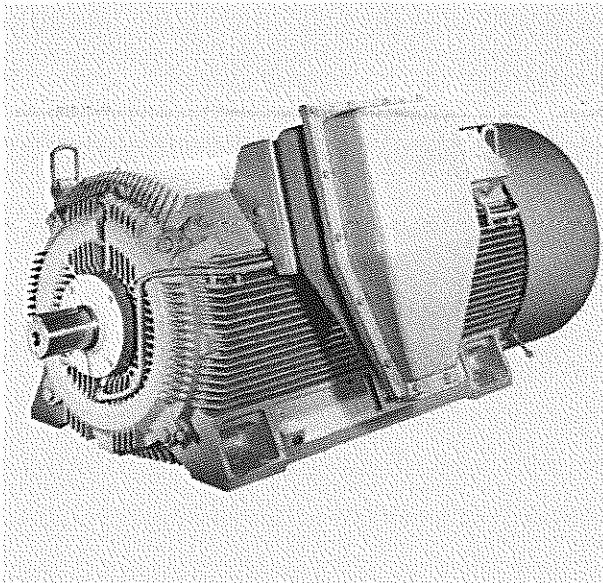
Additional information on the subject of explosion protection, types of protection and zones is provided in the Siemens brochure *Explosion Protection*.

# Explosion-protected motors

## Type of protection Ex nA/Ex tc

Air-cooled motors  
H-compact 1MS4

### Overview



### Technical data

#### Overview of technical data

H-compact 1MS4	
Rated voltage	2.0 ... 11 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3, IM V1
Degree of protection	IP55
Type of protection	Ex nA/Ex tc
Operation in hazardous areas	Zone 2/Zone 22
Cooling method	IC411/IC416
Stator winding insulation	Thermal class 155 (F), utilized to 130 (B)
Shaft height	315 ... 630 mm
Bearings	Roller bearings, sleeve bearings
Cage material	Die-cast aluminum or copper (dependent on the shaft height and number of poles)
Standards	IEC, EN
Frame design	Cast iron with cooling ribs

The series of H-compact motors (IC411/IC416 cooling type), developed for Zone 2 in type of protection **Ex nA** or for Zone 22 in type of protection **Ex tc** are available as 1MS4 motors. The Order No. schematic is shown in Chapter 1.

These **Ex nA** or **Ex tc** measures do not affect the performance data or main dimensions with respect to H-compact motors (1LA4 type series). This is the reason that the values of the 1LA4 type series from Chapter 2 and Chapter 3 can also be used for 1MS4 motors.

An extensive range of options and tests are available for H-compact motors, type of protection **Ex nA** or **Ex tc** (→ Options and tests).

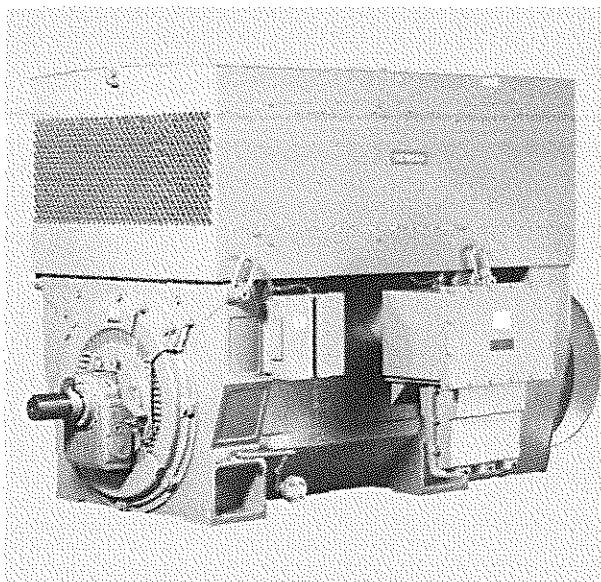
# Explosion-protected motors

## Type of protection Ex nA/Ex tc

Air-cooled motors

H-compact PLUS 1SG4 and 1SG6

### Overview



### Technical data

#### Overview of technical data

##### H-compact PLUS 1SG4/1SG6

<b>Rated voltage</b>	3.3 ... 11 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3; IM V1
<b>Degree of protection</b>	IP55
<b>Type of protection</b>	Ex nA/Ex tc
<b>Operation in hazardous areas</b>	Zone 2/Zone 22
<b>Cooling method</b>	IC611/IC616/IC666
<b>Stator winding insulation</b>	Thermal class 155 (F), utilized to 130 (B)
<b>Shaft height</b>	450 ... 710 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC, EN
<b>Frame design for shaft heights 450 ... 560 mm</b>	Frame: Cast iron Cooling enclosure: Steel
<b>Frame design for shaft heights 630 ... 710 mm</b>	Frame: Steel Cooling enclosure: Steel

H-compact PLUS motors (type series 1SG4 and 1SG6) developed for Zone 2 in type of protection **Ex nA** or for Zone 22 in type of protection **Ex tc** are available as modular motors with air/air heat exchanger. The Order No. schematic is shown in Chapter 1.

These **Ex nA** or **Ex tc** measures do not affect the performance data or main dimensions with respect to H-compact PLUS motors. This is the reason that the values of the 1RQ4 or 1RQ6 type series from Chapter 2 can be used for 1SG4 and 1SG6 motors.

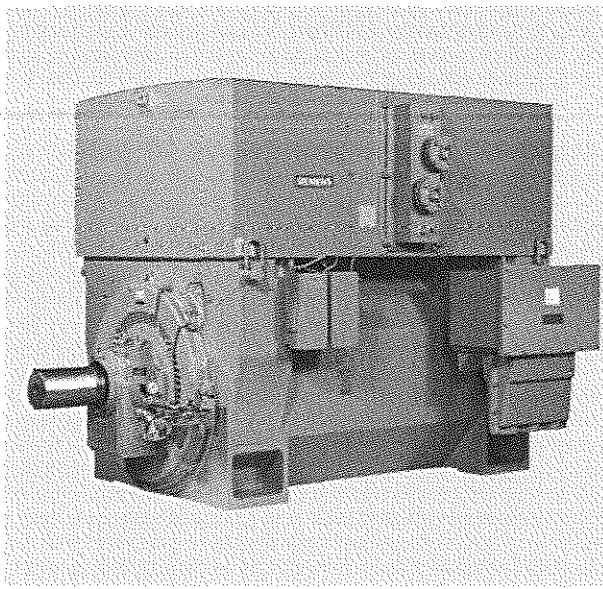
An extensive range of options and tests are available for H-compact PLUS motors, type of protection **Ex nA** or **Ex tc** (→ Options and tests).

# Explosion-protected motors

## Type of protection Ex nA/Ex tc

Water-cooled motors  
H-compact PLUS 1SL4 and 1SL6

### Overview



### Technical data

#### Overview of technical data

##### H-compact PLUS 1SL4/1SL6

Rated voltage	3.3 ... 11 kV
Rated frequency	50/60 Hz
Motor type	Induction motor with squirrel-cage rotor
Type of construction	IM B3, IM V1
Degree of protection	IP55
Type of protection	Ex nA/Ex tc
Operation in hazardous areas	Zone 2/Zone 22
Cooling method	IC81W/IC86W
Stator winding insulation	Thermal class 155 (F), utilized to 130 (B)
Shaft height	450 ... 710 mm
Bearings	Roller bearings, sleeve bearings
Cage material	Copper
Standards	IEC, EN
Frame design for shaft heights 450 ... 560 mm	Frame: Cast iron Cooling enclosure: Steel
Frame design for shaft heights 630 ... 710 mm	Frame: Steel Cooling enclosure: Steel

H-compact PLUS motors (type series 1SL4 and 1SL6) developed for Zone 2 in type of protection **Ex nA** or for Zone 22 in type of protection **Ex tc** are available as modular motors with air/water heat exchanger (cooling type IC81W/IC86W). The Order No. schematic is shown in Chapter 1.

These **Ex nA** or **Ex tc** measures do not affect the performance data or main dimensions with respect to H-compact PLUS motors. This is the reason that the values of the 1RN4 or 1RN6 type series from Chapter 2 can be used for 1SL4 and 1SL6 motors.

An extensive range of options and tests are available for H-compact PLUS motors, type of protection **Ex nA** or **Ex tc** (→ Options and tests).

## Explosion-protected motors

### Type of protection Ex px

#### Overview

##### Overview

For motors with pressurized enclosure (type of protection **Ex px**) the terminal box is included in the pressurized enclosure or has increased safety (type of protection **Ex e**).

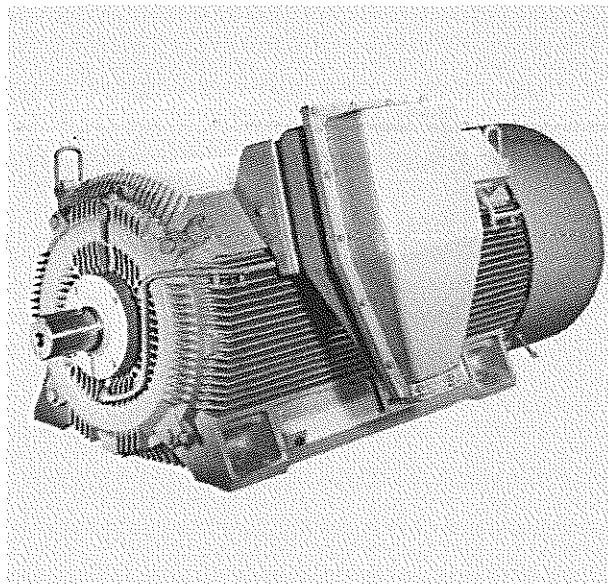
For motors > 11 kV, the terminal box is always included in the pressurized enclosure.

# Explosion-protected motors

## Type of protection Ex px

Air-cooled motors  
H-compact 1MG4

### Overview



### Technical data

#### Overview of technical data

##### H-compact 1MG4

<b>Rated voltage</b>	2.0 ... 11 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Type of protection</b>	Ex px
<b>Operation in hazardous areas</b>	Zone 1 (may also be used in Zone 2)
<b>Cooling method</b>	IC411/IC416
<b>Stator winding insulation</b>	Thermal class 155 (F), utilized to 155 (F)
<b>Shaft height</b>	315 ... 560 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Die-cast aluminum or copper (dependent on the shaft height and number of poles)
<b>Standards</b>	IEC, EN
<b>Frame design</b>	Cast iron with cooling ribs

The H-compact motors (IC411/IC416 cooling type), developed for Zone 1 in type of protection **Ex px** are available as 1MG4 motors. The Order No. schematic is shown in Chapter 1.

The motors are shipped with a control unit to maintain the internal pressure and to carry out the purging process required each time before the motor is started.

These **Ex px** measures have no effect on the performance data with respect to H-compact motors of the 1LA4 type series. This is the reason that the values of the 1LA4 motors from Chapter 1 can be used for 1MG4 motors. Main dimensions on request.

A wide range of options and tests is available for H-compact motors, type of protection **Ex px**.

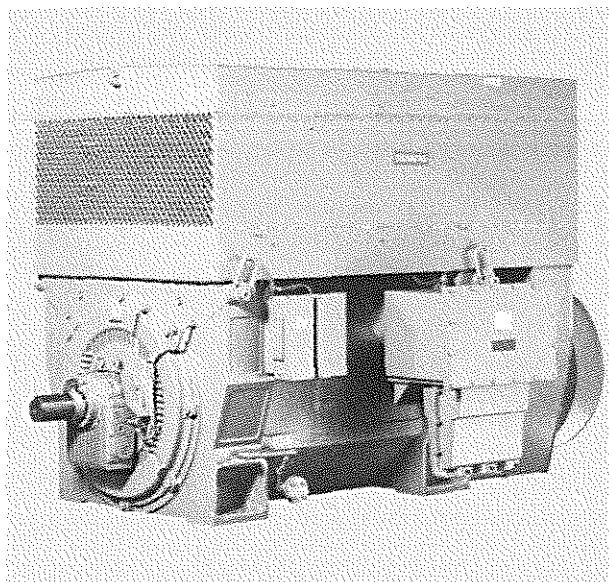
# Explosion-protected motors

## Type of protection Ex px

Air-cooled motors

H-compact PLUS 1SB4 and 1SB6

### Overview



### Technical data

#### Overview of technical data

##### H-compact PLUS 1SB4/1SB6

<b>Rated voltage</b>	3.3 ... 13.8 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Type of protection</b>	Ex px
<b>Operation in hazardous areas</b>	Zone 1 (may also be used in Zone 2)
<b>Cooling method</b>	IC611/IC616/IC666
<b>Stator winding insulation</b>	Thermal class 155 (F), utilized to 130 (B)
<b>Shaft height</b>	450 ... 710 mm
<b>Bearings</b>	Roller bearings; sleeve bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC; EN
<b>Frame design for shaft heights 450 ... 560 mm</b>	Frame: Cast iron Cooling enclosure: Steel
<b>Frame design for shaft heights 630 ... 710 mm</b>	Frame: Steel Cooling enclosure: Steel

This series of H-compact PLUS motors, developed for Zone 1 (type series 1SB4 and 1SB6) in type of protection **Ex px** are available as modular motors with air/air heat exchanger (IC611/IC616/IC666 cooling type). The Order No. schematic is shown in Chapter 1.

The motors are shipped with a control unit to maintain the internal pressure and to carry out the purging process required each time before the motor is started.

These **Ex px** measures have no effect on the performance data when compared to H-compact PLUS motors. This is the reason that the values of 1RQ4 or 1RQ6 motors from Chapter 2 can be used for 1SB4 and 1SB6 motors. Main dimensions on request.

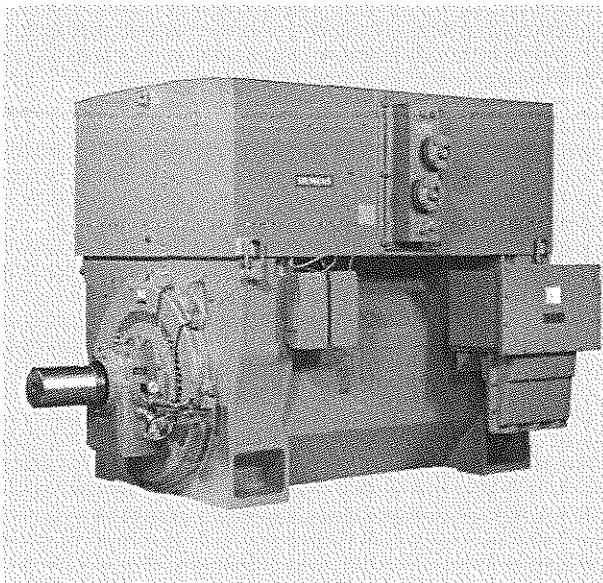
A wide range of options and tests is available for H-compact PLUS motors, type of protection **Ex px**.

# Explosion-protected motors

## Type of protection Ex px

Water-cooled motors  
H-compact PLUS 1SQ4 and 1SQ6

### Overview



### Technical data

#### Overview of technical data

##### H-compact PLUS 1SQ4/1SQ6

<b>Rated voltage</b>	3.3 ... 13.8 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3, IM V1
<b>Degree of protection</b>	IP55
<b>Type of protection</b>	Ex px
<b>Operation in hazardous areas</b>	Zone 1 (may also be used in Zone 2)
<b>Cooling method</b>	IC81W/IC86W
<b>Stator winding insulation</b>	Thermal class 155 (F), utilized to 130 (B)
<b>Shaft height</b>	450 ... 710 mm
<b>Bearings</b>	Roller bearings; sleeve bearings
<b>Cage material</b>	Copper
<b>Standards</b>	IEC, EN
<b>Frame design for shaft heights 450 ... 560 mm</b>	Frame: Cast iron Cooling enclosure: Steel
<b>Frame design for shaft heights 630 ... 710 mm</b>	Frame: Steel Cooling enclosure: Steel

This series of H-compact PLUS motors, developed for Zone 1 (type series 1SQ4 and 1SQ6) in type of protection **Ex px** is available as modular motors with air/water heat exchanger (IC81W/IC86W cooling type). The Order No. schematic is shown in Chapter 1.

The motors are shipped with a control unit to maintain the internal pressure and to carry out the purging process required each time before the motor is started.

These **Ex px** measures have no effect on the performance data when compared to H-compact PLUS motors. This is the reason that the values of 1RN4 or 1RN6 type series from Chapter 2 can be used for 1SQ4 and 1SQ6 motors. Main dimensions on request.

A wide range of options and tests is available for H-compact PLUS motors, type of protection **Ex px**.

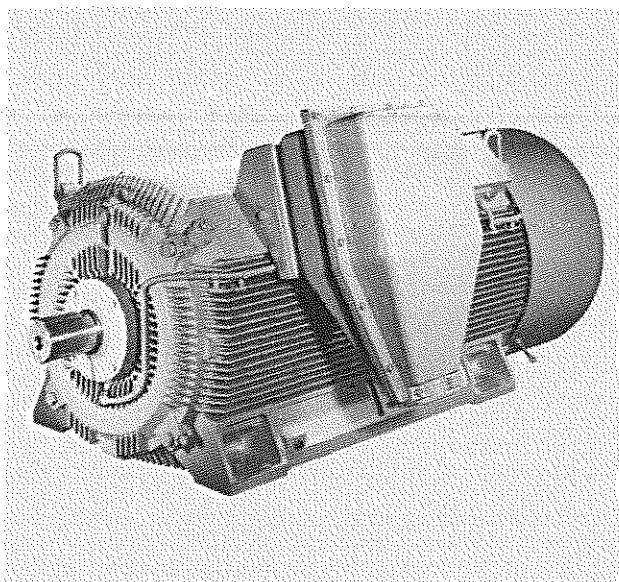


# Explosion-protected motors

## Type of protection Ex e

Air-cooled motors  
H-compact 1MA4

### Overview



### Technical data

#### Overview of technical data

##### H-compact 1MA4

<b>Rated voltage</b>	3.0 ... 11 kV
<b>Rated frequency</b>	50/60 Hz
<b>Motor type</b>	Induction motor with squirrel-cage rotor
<b>Type of construction</b>	IM B3; IM V1
<b>Degree of protection</b>	IP55
<b>Type of protection</b>	Ex e
<b>Operation in hazardous areas</b>	Zone 1 (may also be used in Zone 2)
<b>Cooling method</b>	IC411/IC416
<b>Stator winding insulation</b>	Thermal class 155 (F), utilized to 130 (B)
<b>Shaft height</b>	315 ... 560 mm
<b>Bearings</b>	Roller bearings, sleeve bearings
<b>Cage material</b>	Die-cast aluminum or copper (dependent on the shaft height and number of poles)
<b>Standards</b>	IEC, EN
<b>Frame design</b>	Cast iron with cooling ribs

The series of H-compact motors developed for Zone 1 in type of protection **Ex e** is available as 1MA4 motors (cooling type IC411/IC416). The Order No. code is shown in Chapter 1.

**Versions of motors that deviate from those listed in this chapter are available request.**

# Explosion-protected motors

## Type of protection Ex e

All-cooled motors  
H-compact 1MA4

### Selection and ordering data

For H-compact in **Ex e**, the following power ratings are available as standard:

Rated power kW	<b>High voltage motor H-compact</b>	Speed rpm	Rated current $I_{rated}$ at 6 kV	Efficiency		Power factor		Torque Nm	Break-down torque $T_B/T_{rated}$	Locked- rotor torque $T_{LR}/T_{rated}$	Locked- rotor current $I_{LR}/I_{rated}$	Moment of inertia $\text{kgm}^2$								
				4/4 load	3/4 load	4/4 load	3/4 load													
<b>2.0 ... 6.6 kV, 50 Hz</b>																				
<b>2-pole</b>																				
185	<b>1MA4 312-2AN■■</b>	2974	22	95.2	95.1	0.86	0.85	594	2.3	0.85	5.1	2.2								
230	<b>1MA4 314-2AN■■</b>	2977	26	95.6	95.6	0.88	0.86	738	2.3	0.9	5.5	2.7								
280	<b>1MA4 316-2AN■■</b>	2977	32	96	96	0.89	0.88	898	2.2	0.85	5.3	3.1								
315	<b>1MA4 350-2CN■■</b>	2982	35	96.2	96.2	0.9	0.88	1009	2.4	0.7	5.5	5.5								
355	<b>1MA4 352-2CN■■</b>	2981	39	96.3	96.3	0.91	0.9	1137	2.3	0.7	5.5	6								
400	<b>1MA4 354-2CN■■</b>	2981	44	96.6	96.7	0.91	0.9	1281	2.4	0.7	5.5	6.5								
<b>4-pole</b>																				
170	<b>1MA4 310-4AN■■</b>	1486	21	94.4	94.3	0.82	0.78	1093	2.3	0.8	5.5	2.8								
220	<b>1MA4 312-4AN■■</b>	1485	26	95	95.1	0.85	0.82	1415	2.2	0.8	5.4	3.5								
260	<b>1MA4 314-4AN■■</b>	1486	31	95.3	95.5	0.85	0.82	1671	2.2	0.8	5.5	4								
310	<b>1MA4 316-4AN■■</b>	1486	36	95.6	95.8	0.86	0.84	1992	2.2	0.8	5.5	4.8								
335	<b>1MA4 350-4AN■■</b>	1487	40	95.7	95.7	0.84	0.81	2151	2.2	0.75	5.4	6								
375	<b>1MA4 352-4AN■■</b>	1487	44	95.9	95.9	0.86	0.84	2408	2.2	0.75	5.4	6.9								
440	<b>1MA4 354-4AN■■</b>	1487	51	96.1	96.2	0.87	0.85	2826	2.2	0.8	5.5	8.1								
500	<b>1MA4 400-4AN■■</b>	1490	60	96.2	96.1	0.84	0.82	3205	2.2	0.7	5.4	11.6								
560	<b>1MA4 402-4AN■■</b>	1490	66	96.3	96.2	0.85	0.82	3589	2.15	0.7	5.3	12.9								
630	<b>1MA4 404-4AN■■</b>	1490	73	96.6	96.5	0.86	0.84	4038	2.1	0.7	5.2	14.5								

#### Voltage code:

3.3 kV, 50 Hz	<b>0</b>
3 kV, 50 Hz	<b>3</b>
5 kV, 50 Hz	<b>5</b>
6 kV, 50 Hz	<b>6</b>
6.6 kV, 50 Hz	<b>7</b>
Other voltage	<b>9</b>

#### Note:

Higher pole numbers are available on request.

#### Type of construction:

IM B3	<b>0</b>
IM V1 (with canopy)	<b>4</b>

The power/performance data of H-compact 1LA4 motors **CANNOT be used here**. On the other hand, the main dimensions correspond to those of the 1LA4 motors and can be taken from Chapter 2.

A wide range of options and tests is available for H-compact motors, type of protection **Ex e**.

# Explosion-protected motors

## Type of protection Ex e

### Air-cooled motors

H-compact PLUS 1SJ4 and 1SJ6

### Water-cooled motors

H-compact PLUS 1SN4 and 1SN6

#### Overview

Based on the series of H-compact PLUS motors, air/air-cooled motors, type **1SJ4** and **1SJ6** are available for Zone 1 in **Ex e**.

**An inquiry must always be sent to the factory for these motors.**

#### Overview

Based on the series of H-compact PLUS motors, air/water-cooled motors, type **1SN4** and **1SN6** are available for Zone 1 in **Ex e**.

**An inquiry must always be sent to the factory for these motors.**

# Explosion-protected motors

## Options and tests

### Description of options

#### Options

Using the following options, H-compact and H-compact PLUS can be adapted to order-specific requirements. The Order No. is supplemented with a "Z" and with either one or several order codes.

Other options can be addressed on request with the Vario (rib-cooled) or Vario PLUS (modular design) motor series.

Order code	Option description	Remark
<b>Paint finish</b>		
K26	Special paint finish in the standard color RAL 7030	
Y53	Normal paint finish not in the standard color	
Y54	Special paint finish not in the standard color	
<b>Documentation</b>		
B00	No motor manual	
B21	Motor manual on CD instead of paper (PDF format)	
B22	Motor manual as e-mail (PDF format) instead of paper	
B23	Motor manual printed on paper, 3x	
B27	Run out protocol	
B28	Protocol air gap calculation	
B34	Document standard inspection and test plan	
B35	Document balance report	
B36	Document test and inspection description	
B37	Document load characteristics	
B38	Document recommended spare parts	
B41	Document instrumentation list	
B43	Document production schedule: Generated once	
B44	Document production schedule: Updated biweekly	
B45	Document production schedule: Updated monthly	
B48	Document order-specific inspection and test plan	
<b>Document language</b>		
D00	Documentation in German	
D54	Documentation in Czech	
D55	Documentation in Polish	
D56	Documentation in Russian	
D72	Documentation in Italian	
D73	Documentation in Finnish	
D74	Documentation in Dutch	
D75	Documentation in Turkish	
D76	Documentation in English	Standard
D77	Documentation in French	
D78	Documentation in Spanish	
D79	Documentation in Portuguese	
D80	Documentation in Bulgarian	
D81	Documentation in Norwegian	
D82	Documentation in Hungarian	
D83	Documentation in Swedish	
D84	Documentation in Chinese	
<b>Direction of rotation</b>		
K97	Clockwise rotation	
K98	Anticlockwise rotation	

# Explosion-protected motors

## Options and tests

Description of options		
<b>Options (continued)</b>		
Order code	Option description	Remark
<b>Noise reduction</b>		
L20	Silencer for air inlet	
L21	Noise reduction: Silencer for air outlet	Only for H-compact PLUS
L22	Noise reduction: Lining of interior space	Only for H-compact PLUS
L23	External metal fan, unique directional	Only for H-compact
L25	Rustless grid at inlet silencer	Only for H-compact
<b>Terminal box mounting position</b>		
K09	Terminal box on right-hand side; view from DE	Standard
K10	Terminal box on left-hand side; view from DE	
K83	Terminal box turned through 90°; cable from DE	
K84	Terminal box turned through 90°; cable from NDE	
K85	Terminal box turned through 180°	
N85	Terminal box on NDE	Only for H-compact
<b>Terminal box, main and auxiliary terminal box</b>		
L54	Terminal box 1XB8 751, 6 terminals with 2 cable entries for connection to power supply, rated current > 315 A	
L59	Terminal box 1XB8 911 for 1 cable entry for power supply	
L55	Star-point terminal box 1XA8 711, up to 6 kV, 3 terminals	
L56	Star-point terminal box 1XB8 911, up to 10 kV, 3 terminals	
L57	Star-point terminal box 1XB8 751, up to 6 kV, 6 terminals	
M50	Auxiliary terminal box material: Cast iron	
M51	Auxiliary terminal box material: Stainless steel	
M52	Separate auxiliary terminal box for anti-condensation heater	
<b>Cooling air monitoring</b>		
A44	1 resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box for cold air temperature	
A45	1 resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box for hot air temperature	
A46	1 double resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box, for cold air temperature	
A47	1 double resistance thermometer Pt 100 for 2-, 3- or 4-wire connection from terminal box, for hot air temperature	
A86	1 dial-type thermometer with 2 NO-Contacts for cold air temperature incl. terminal box	
A87	1 dial-type thermometer with 2 NO-Contacts for hot air temperature incl. terminal box	

# Explosion-protected motors

## Options and tests

	Description of options
--	------------------------

### **Options (continued)**

Order code	Option description	Remark
<b>Bearing version/instrumentation</b>		
<b>H09 + H11</b>	DIN flange type for forced oil lubrication for oil inlet with flowmeter, manometer and throttle valve (incl. counter flange) + DIN flange type forced oil lubrication for oil outlet with sight glass (incl. counter flange)	
<b>H10 + H12</b>	ANSI flange type for forced oil lubrication for oil inlet with flowmeter, manometer and throttle valve (incl. counter flange) + ANSI flange type for forced oil lubrication for oil outlet with sight glass (incl. counter flange)	
<b>H43</b>	DIN flange type for forced oil lubrication for in- and outlet without instruments (with counter flanges)	
<b>H44</b>	ANSI flange type for forced oil lubrication for in- and outlet without instruments (with counter flanges)	
<b>K20</b>	Bearing design on DE for increased forces (reinforced)	H-compact SH 315 and SH 355 only
<b>K94</b>	Fixed bearing at DE for sleeve bearing	
<b>K96</b>	Sleeve bearing instead of roller bearing	
<b>L18</b>	DE insulation	
<b>L27</b>	NDE insulation	Standard for H-compact PLUS
<b>L60</b>	Forced-circulation oil lubrication (with oil cooling) instead of oil-ring lubrication	
<b>L66</b>	Air cooling, but prepared for future conversion to forced-circulation oil lubrication	
<b>P44</b>	Oil manifold; connections with counter flange; flange flush with the axial shaft face	
<b>Bearing monitoring – sleeve bearings</b>		
<b>A02</b>	Shaft vibration monitoring for sleeve bearings, Bently Nevada system	
<b>A03</b>	Speed monitoring using an inductive proximity switch, Pepperl + Fuchs, incl. terminal box; without evaluation unit	
<b>A39</b>	Prepared for shaft vibration monitoring for sleeve bearings (without monitoring system)	
<b>A41</b>	2 resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for sleeve bearing	
<b>A43</b>	2 double resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for sleeve bearing	
<b>A70</b>	2 dial-type thermometers without contacts	
<b>A71</b>	2 dial-type thermometers with contacts	
<b>Bearing monitoring – roller bearings</b>		
<b>A40</b>	2 resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminal box for rolling-contact bearings	
<b>A42</b>	2 double resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminals for rolling-contact bearing	
<b>G50</b>	Shock pulse measuring nipple (SPM) at DE and NDE	Standard
<b>Mechanical versions</b>		
<b>K16</b>	Second shaft extension up to 50 % rated torque	
<b>L81</b>	Vibration severity grade B according to IEC/ EN 60034-14	Not available for 2-pole motors with roller bearings
<b>Y55</b>	Non-standard cylindrical shaft extension (an inquiry must be sent to the factory)	
<b>Y85</b>	Oil shrink fit for cylindrical, single-stage shaft extension instead of a key connection	

# Explosion-protected motors

## Options and tests

### Description of options

#### Options (continued)

Order code	Option description	Remark
<b>Others/additional options</b>		
H08	Leakage water detection	
K52	Degree of protection IP56 non-heavy-sea	
K35	Metal external fan, bidirectional	
L15	Supporting ring for coupling guard	
L17	Mounting a coupling provided (finish machined and balanced)	
L31	Motor mounting materials for mounting on a steel foundation: Bolts, shims and taper dowels	
L32	Motor mounting materials for mounting on a concrete foundation or concrete base: Threaded bolts, armature plates, sole plates, shims, leveling plates and taper dowels	
L33	Motor mounting materials to mount on a concrete foundation or concrete base: T-head bolts, foundation bolt sleeves, sole plates, shims, leveling plates and taper dowels	
L91	Higher number of starts, > 1000 ... 10000 starts per year, for Cu rotors	
L92	Higher number of starts, > 5000 ... 10000 starts per year, for Al rotors	
P45	External screws made of stainless steel	
<b>Anti-condensation heating</b>		
M14	Anti-condensation heater Ex e II T3, rated voltage range 110 to 120 V	
M15	Anti-condensation heater Ex e II T3, rated voltage range 220 to 240 V	Standard for H-compact in type of protection Ex e (1MA4) and H-compact PLUS
<b>Ambient conditions</b>		
D02	Operation at ambient temperatures up to -50 °C, transport up to -50 °C	
D03	Operation at ambient temperatures up to -40 °C, transport up to -40 °C	
D04	Operation at ambient temperatures up to -30 °C, transport up to -40 °C	
E81	Outdoor use with high salinity or offshore applications (corrosivity grade C5-M/ C5-I)	
E82	Outdoor use with moderate salinity (corrosivity grade C4)	
E83	Outdoor use with low salinity (corrosivity grade C3)	
<b>Winding and motor protection</b>		
A12	6 PTC thermistors without lightning arresters	
A23	1 temperature sensor KTY 84-130	
A65	6 embedded resistance thermometers Pt 100 for 2-, 3- or 4-wire connection from terminal box without lightning arresters	Standard
A67	6 embedded screened resistance thermometers Pt 100 for 3- or 4-wire connection from terminal box without lightning arresters	
<b>Marine applications</b>		
Options and tests for marine and offshore applications: see Chapter 5		

# Explosion-protected motors

## Options and tests

### Description of options

#### Options (continued)

Order code	Option description	Remark
<b>Tests with acceptance</b>		
F01	All standard tests (routine test), with acceptance	
F15	Recording of no-load characteristic and determination of core and friction losses, with acceptance	
F17	Recording of short-circuit characteristic and determination of short-circuit losses, with acceptance	
F19	Recording of load characteristic, with acceptance	
F23	Dissipation factor test ( $\tan \delta$ ) on 2 (test) coils, with acceptance	In addition, specify order code F90
F29	No-load noise measurement, without noise analysis, with acceptance	
F31	Cooling air flow and pressure drop measurement, with acceptance	
F35	Recording of current and torque characteristics during acceleration, with acceptance	
F37	Determination of moment of inertia by retardation method, with acceptance	
F39	Overspeed test, with acceptance	
F41	Recording of residual voltage curve, with acceptance	
F53	Locked-rotor torque and current measurement, with acceptance	
F55	Polarization index measurement, with acceptance	
F61	Impulse or AC voltage test on 2 (test) coils, with acceptance	In addition, specify order code F90
F63	Noise analysis, with acceptance	
F83	Type test for horizontal motors with temperature rise test, with acceptance	
F90	2 test coils	
F93	Type test for vertical motors with temperature rise test, with acceptance	
<b>Tests without acceptance</b>		
F14	Recording of no-load characteristic and determination of core and friction losses, without acceptance	
F16	Recording of short-circuit characteristic and determination of short-circuit losses, without acceptance	
F18	Recording of load characteristic, without acceptance	
F22	Dissipation factor test ( $\tan \delta$ ) on 2 (test) coils, without acceptance	In addition, specify order code F90
F28	No-load noise measurement, without noise analysis, without acceptance	
F30	Cooling air flow and pressure drop measurement, without acceptance	
F34	Recording of current and torque characteristics during acceleration, without acceptance	
F36	Determination of moment of inertia by retardation method, without acceptance	
F38	Overspeed test, without acceptance	
F42	*Conformance Test (Wet Test)* to NEMA Standard, without acceptance	
F52	Locked-rotor torque and current measurement, without acceptance	
F54	Polarization index measurement, without acceptance	
F60	Impulse or AC voltage test on 2 (test) coils, without acceptance	In addition, specify order code F90
F62	Noise analysis, without acceptance	
F82	Type test for horizontal motors with temperature rise test, without acceptance	
F90	2 test coils	
F92	Type test for vertical motors with temperature rise test, without acceptance	
<b>Certificates for explosion protection</b>		
D32	Ex certification for China (CQST)	
D35	Ex certification for Russia (RosTechNadzor)	
D36	Conformity declaration acc. to 94/9/EG (ATEX) of an independent test body for Zone 2 motors (Ex nA)	
D37	IECEx certification	

# Explosion-protected motors

## Options and tests

### Description of options

#### Overview (continued)

Order code	Option description	Remark
		Order number for reorder
<b>Extension of liability for defects</b>		
<b>Q80</b>	Extension of liability for defects, by 12 months to a total of 24 months (2 years) from delivery	<b>9LD1720-0AA24</b>
<b>Q81</b>	Extension of liability for defects, by 18 months to a total of 30 months (2.5 years) from delivery	<b>9LD1720-0AA30</b>
<b>Q82</b>	Extension of liability for defects, by 24 months to a total of 36 months (3 years) from delivery	<b>9LD1720-0AA36</b>
<b>Q83</b>	Extension of liability for defects, by 30 months to a total of 42 months (3.5 years) from delivery	<b>9LD1720-0AA42</b>
<b>Q84</b>	Extension of liability for defects, by 36 months to a total of 48 months (4 years) from delivery	<b>9LD1720-0AA48</b>
<b>Q85</b>	Extension of liability for defects, by 48 months to a total of 60 months (5 years) from delivery	<b>9LD1720-0AA60</b>

#### Conditions for an extension of liability for defects

You will find the currently valid conditions for an extension of liability for defects under:

<http://support.automation.siemens.com/WW/view/en/56715113>



## Offshore applications



**5/2 Orientation**

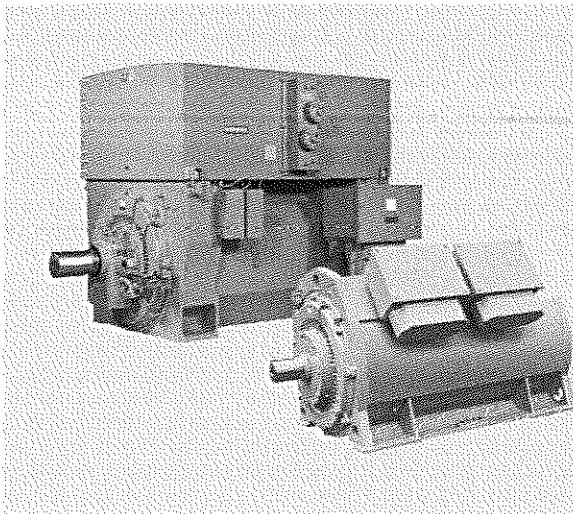
**5/7 Ordering examples**

**5/9 Options**

# Options for marine and offshore applications

## Orientation

### Overview



SIMOTICS HV/TN Series H-compact and H-compact PLUS in a marine design have been designed for below-deck operation on ships. If the motors are intended for on deck operation or for offshore applications, then these must be explicitly ordered using an additional order code. The reason for this is that in these cases special measures are required. The thermal utilization of the motors is adapted to the generally higher ambient temperatures onboard ships. If the application demands compliance with additional regulations, such as explosion protection, the appropriate motor series must be chosen.

The motors onboard ships are subdivided into three importance categories by the marine classification societies in collaboration with customers, depending on the field of application:

- **Essential Service for Propulsion** or also Primary Essential Service
- **Essential Service** or also Secondary Essential Service or Important Service
- **Non-Essential Service** or also Non-Important Service

As the assignment of a drive to one of the importance categories has a direct impact on the scope of the marine options, this must be known when ordering the motor.

The following services of the motor manufacturer are associated with the categories:

	Importance category		
Typical applications	<b>Essential Service for Propulsion</b>	<b>Essential Service</b>	<b>Non-Essential Service</b>
	Propeller drive, thruster (if used as main drive/declared as propulsion)	Thrusters, lateral thrust units, anchor winches, bilge and ballast pumps, fire-fighting pumps	Pumps for service water
Version	In accordance with the regulations of the classification society		In accordance with ambient conditions of the classification society
Acceptance test certificate	Acceptance test certificate 3.2 according to EN10204		Acceptance test certificate 3.1 according to EN 10204 <sup>1)</sup>
Individual acceptance by classification society	Will be performed. Motor is assigned an individual certificate of the classification society.		Not necessary
Ordering several identical motors	Differentiation between the first motor and additional ones must be realized when ordering using an order code.		No distinction
Rating plate data	Information about ambient conditions of the classification society		
Stamp of the classification society	Stamp on the shaft <sup>2)</sup> and enclosure		No stamp

### Classification authorities

Society	Abbreviation	Location
American Bureau Of Shipping	ABS	USA
Bureau Veritas	BV	France
China Classification Society	CCS	China
Det Norske Veritas	DNV	Norway
Germanischer Lloyd	GL	Germany
Korean Register	KR	Korea
Lloyds Register	LR	UK

<sup>1)</sup> Certificate is not stipulated by the classification society but it is issued according to the internal quality standards within the scope of a routine test.

<sup>2)</sup> Provided that it is specified that the classification society supervises construction.

# Options for marine and offshore applications

## Orientation

### Benefits

- The marine motors offer the user a number of advantages and benefits:
- Cast iron and steel versions can be supplied for corrosive atmospheres especially for high humidity levels and salt laden air
  - Increased corrosion protection using specially designed paint finishes is available

- Certified marine motors can be supplied for use in areas to be protected against explosion
- In depth know-how regarding customer requirements
- Worldwide service network with 24-hour service hotline for motors and converters

### Application

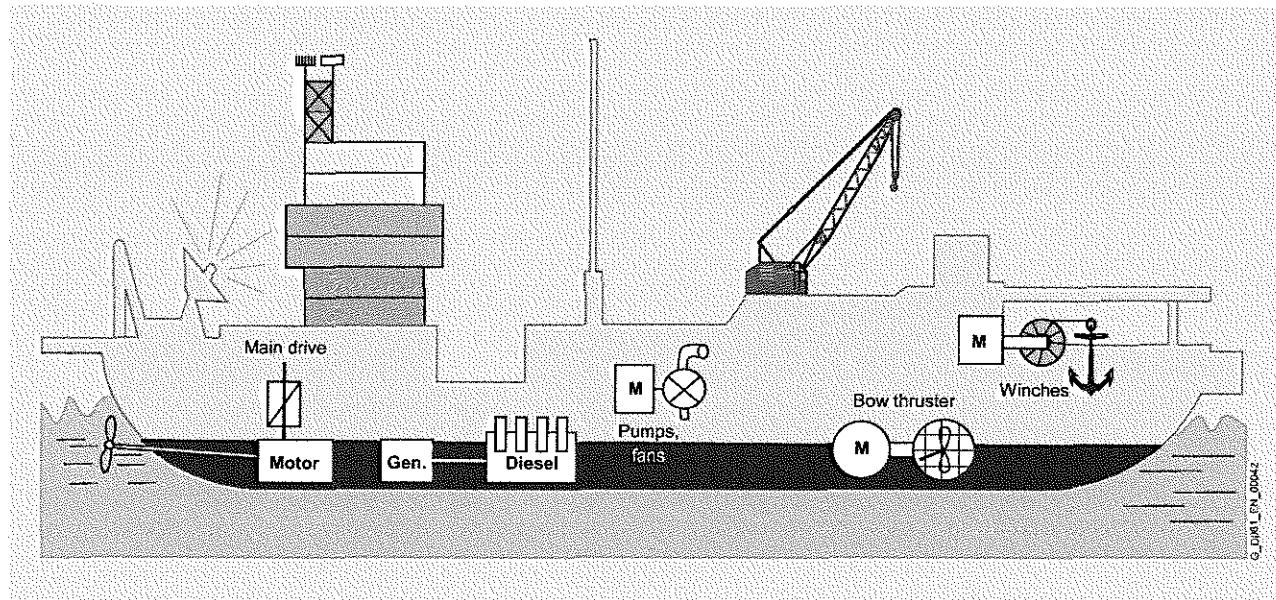
Our marine motors are designed for use onboard ships (installed below deck or on deck under a protective canopy):

- Applications onboard ships as main and auxiliary drives below deck, e.g.:
  - Fans (air conditioning, refrigeration plants)
  - Pumps (for fire-extinguishing water, fuels, oils)
  - Winches (anchor winches, warping winches, lifting gear)
  - Compressors
  - Bow thruster drives
  - Main propulsion drives
  - Ex motors for hazardous zones

If marine motors are to be used on deck in especially corrosive atmospheres or in offshore applications, then they must be additionally upgraded to meet these more stringent conditions. For this purpose, one of the options E81, E82 or E83 should be selected.

- Typical applications are:
  - Coastal areas, e.g. oil rigs, drilling ships
  - Dynamic positioning drives for platforms
  - Pumps

Offshore versions must be specifically ordered, as they require special measures.



Typical areas of application

# Options for marine and offshore applications

## Orientation

### Technical data

#### Enclosure version

Depending on the motor series, motors are available in a corrosion-resistant steel enclosure or in a rugged low-vibration cast-iron version.

Regulations of the individual classifications societies for motors:

Classification society	Coolant temperature CT		Admissible temperature rise limit according to the classification society			Rated power limit for individual acceptance test	Construction supervision mandatory		
	Water cooling °C	Air cooling °C	Temperature class						
			130 (B)	155 (F), $P_{rated} < 5000 \text{ kW}$	155 (F), $P_{rated} \geq 5000 \text{ kW}$				
GL	32	45	75	100	100	≥ 50	All propulsions		
LR	32	45	70	95	90	≥ 100	≥ 100 kW		
BV	32	45	75	100	95	≥ 100	≥ 500 kW		
DNV	32	45	75	100	100	≥ 300	—		
ABS	32	50	70	95	90	≥ 100	—		
KR	32	45	75	100	95	≥ 7.5	—		
CCS	32	45	75	100	95	All power ratings	All power ratings		

#### Motor connection

Cable glands are not included in the scope of delivery.

All marine motors generally have an external grounding terminal.



# Options for marine and offshore applications

Orientation

## Technical data (continued)

Regulations of the individual classification societies with order codes when ordering H-compact and H-compact PLUS motors (low and high voltage versions) in a marine design

### H-compact and H-compact PLUS in a marine design

	Motor type H-compact	Motor type H-compact PLUS
Water-cooled motors for line and converter operation	1LH4	1RN4, 1RN6
Air-cooled motors for line and converter operation (self-ventilated)	1LA4	1RQ4, 1RQ6
Air-cooled motors with externally mounted fan for converter operation	1PQ4	1RQ4, 1RQ6
Self-ventilated motors with open-circuit air cooling for line and converter operation		1RA4, 1RP6
Motors with the cooling types listed above with type of protection "nA" or "ID" (Zone 2 or Zone 22)	1MS4	1SL4, 1SL6 1SG4, 1SG6
Motors with the cooling types listed above with type of protection "e" (Zone 1)	1MA4	1SN4, 1SN6 1SJ4, 1SJ6
Motors with the cooling types listed above with type of protection "px" (Zone 1)	1MG4	1SQ4, 1SQ6 1SB4, 1SB6

H-compact and H-compact PLUS motors for marine applications must be ordered with the classification-specific options. This ensures that both the mechanical design of the motor, and the tests are performed exactly in accordance with the instructions provided by the respective classification society.

There are four categories of classification-specific options:

- 1) *Design options* define the marine-compatible technical design in accordance with the definitions of the classification society
- 2) *Certification options* define the scope of the test certificates
- 3) *Test options* define the scope of the individual tests
- 4) *Additional options* for deviations and special conditions: specify the customer's request for participation in the tests at the factory, or define coolant temperatures that differ from the requirements of the classification society (additional plain text required)

The options of the importance categories listed above are combined with each other depending on the class of importance, classification society and other conditions.

If motors are to be designed according to the specifications of several classification societies, a special inquiry is necessary.

### Motors for Non-Essential Services

The technical design is in accordance with the ambient operating conditions specified by the classification society. One of the marine design options X00, X01, X12<sup>1)</sup>, X03, X04, X05 or X06 must be specified depending on the classification society. Acceptance inspections are not required. There is no distinction between ordering an individual motor or several ones.

Non-Essential Service	Options according to the classification society						
Technical version	ABS	BV	CCS	DNV	GL	KR	LR
	X00	X01	<sup>1)</sup>	X03	X04	X05	X06

<sup>1)</sup> Non-Essential Service must be handled by CCS just like an Essential Service.

### Motors for Essential Services

The technical design is in accordance with regulations of the classification society: Options X10 to X16. An acceptance test certificate 3.2 according to EN 10204 and a product certificate of the classification society is provided with each motor. Depending on the classification society, the test steps are defined by options X30 to X42 for the first motor (even numbers) and X31 to X43 for the additional motors (uneven numbers). Options J70 to J82 or J71 to J83 define the expenditure for certifying the motor.

Essential Service	Options according to the classification society						
	ABS	BV	CCS	DNV	GL	KR	LR
Technical version	X10	X11	X12	X13	X14	X15	X16
Certification							
• First motor	J70	J72	J74	J76	J78	J80	J82
• Additional motors	J71	J73	J75	J77	J79	J81	J83
Scope of the tests and presence of representatives of the classification society							
• First motor	X30	X32	X34	X36	X38	X40	X42
• Additional motors	X31	X33	X35	X37	X39	X41	X43
Tests in presence of representatives of the customer (in addition to the inspector of the classification society)	X99						
Conditions deviating from classification requirements must be fulfilled	E80						

### Motors for Essential Services for Propulsion

The technical design is in accordance with regulations of the classification society: Options X20 to X26. An acceptance test certificate 3.2 according to EN 10204 and a product certificate of the classification society is provided with each motor. Depending on the classification society, the test steps are defined by options X60 to X72 for the first motor (even numbers) and X61 to X73 for the additional motors (uneven numbers). Options N40 to N52, or N41 to N53 define the expenditure for certifying the motor.

Essential Service for Propulsion	Options according to the classification society						
	ABS	BV	CCS	DNV	GL	KR	LR
Technical version	X20	X21	X22	X23	X24	X25	X26
Certification							
• First motor	N40	N42	N44	N46	N48	N50	N52
• Additional motors	N41	N43	N45	N47	N49	N51	N53
Scope of the tests and presence of representatives of the classification society							
• First motor	X60	X62	X64	X66	X68	X70	X72
• Additional motors	X61	X63	X65	X67	X69	X71	X73
Tests in presence of representatives of the customer (in addition to the inspector of the classification society)	X99						
Conditions deviating from classification requirements must be fulfilled	E80						

Option E80 is used if a different coolant temperature CT is required. The CT must also be specified in plain text, e.g. CT55.

# Options for marine and offshore applications

## Orientation

### Technical data (continued)

#### Scope of design options X00 to X26

All classification-specific technical measures are contained in the design options.

#### Temperature class and coolant temperature

Standard motors and explosion-protected motors up to shaft height 710 mm

In general, marine motors are designed for a coolant temperature CT 45 °C in temperature class 155 (F), used according to 155 (F). Motors according to the ABS classification that specify CT 50 °C are an exception. When motors are used according to temperature class 130 (B) derating is required.

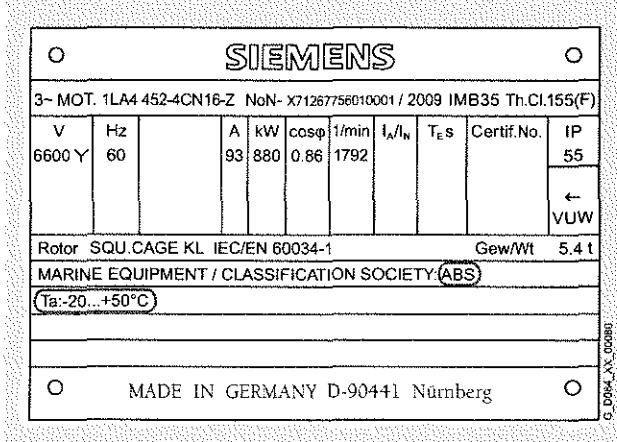
Coolant temperatures that exceed CT 45 °C require derating in accordance with the following table:

Temperature class 155 (F) according to IEC (F)	Coolant temperature CT			
	45 °C	50 °C	55 °C	60 °C
Derating factor for line operation	1.00	0.95	0.90	0.85

More detailed information is available on request.

#### Rating plate and acceptance test certificate

The metal rating plate includes the data of the relevant classification society (exception: Non-Essential Services) and the associated coolant temperature.



#### Degree of protection

The degrees of protection as specified in Catalog D 84.1 apply. For IP56 (non-heavy sea, order code K52) the formation of ice must be avoided.

#### Winding and motor protection

To monitor the winding – and if specified by the classification society – to monitor the bearings, the motors are equipped with PTC thermistors, temperature sensors and resistance thermometers. Marine motors are equipped with anti-condensation heating in order to prevent possible condensation forming on the windings.

#### Paint finish

The paint finish has an increased coating thickness (order code K26). This is suitable for indoor installations and outdoors under a roof or canopy.

A paint finish according to DIN EN ISO 12944-5 C5-M is used for unprotected installation on deck, especially aggressive atmospheres or offshore applications. This is part of order code E81, which upgrades a standard marine motor for these special ambient conditions.

Special paint colors and increased layer thicknesses are available on request.

#### Recommended special versions:

- Installation of 2 screw-in PT100 resistance thermometers in basic circuit for roller bearings – Order code A40
- IP56 degree of protection (non-heavy-sea) for protection against harmful dust deposits, protection against water jets from any direction – Order code K52
- Degree of protection IP65 on request.
- External screws and bolts manufactured out of stainless steel – Order code P45
- Upgrading a marine motor for unprotected installation on deck, use in especially aggressive atmospheres or offshore applications – Order code E81

## Additional information

### Order information

The fees of the classification societies for individual acceptance inspections are included in the order code.

# Options for marine and offshore applications

## Ordering examples

### Selection and ordering data

Ordering examples:

Selection criteria	Requirement	Structure of the Order No.
<b>1st motor (1)</b> Motor type: Rib-cooled H-compact motor, high voltage version, self-ventilated, cooling type IC411, degree of protection IP55 Shaft height: 560 mm No. of poles/synchronous speed: 6-pole/1000 rpm Type rating: 1750 kW Rotor cage material: Copper Voltage and frequency: 690 V, 50 Hz Operating mode: Converter operation Type of construction: IM B3 Special versions: Technical design in accordance with GL (Germanischer Lloyd), Germany Order No. for all 5 motors		
Motor type	Rib-cooled H-compact high voltage motor, low voltage version, self-ventilated, cooling type IC411, degree of protection IP55	1LA4560-6CM00
Shaft height	560 mm	1LA4560-6CM00
No. of poles/synchronous speed	6-pole/1000 rpm	1LA4560-6CM00
Type rating	1750 kW	1LA4560-6CM00
Rotor cage material	Copper	1LA4560-6CM00
Voltage and frequency	690 V, 50 Hz	1LA4560-6CM00
Operating mode	Converter operation	1LA4560-6CM00
Type of construction	IM B3	1LA4560-6CM00
Special versions	Technical design in accordance with GL (Germanischer Lloyd), Germany	1LA4560-6CM00-Z X04
	Order No. for all 5 motors	1LA4560-6CM00-Z X04
<b>1st motor (1)</b> Motor type: Water-cooled high voltage H-compact PLUS motor, cooling type IC81W, degree of protection IP55, type of protection Ex px Shaft height: 630 mm No. of poles/synchronous speed: 4-pole/1500 rpm Type rating: 6000 kW Ventilation: Shaft-mounted fan (basic version) Rotor version and operating mode: Copper (standard), line operation Voltage and frequency: 6 kV, 50 Hz Type of construction: IM V10 with canopy Special versions: <b>1st motor</b> Technical design in accordance with BV (Bureau Veritas), France Necessary certification for first motor ordered in accordance with BV (Bureau Veritas), France Necessary tests for first motor ordered in accordance with BV (Bureau Veritas), France Order No. for 1st motor <b>Additional 6 motors</b> (additional motors) Technical design in accordance with BV (Bureau Veritas), France Necessary certification for additional motors ordered in accordance with BV (Bureau Veritas), France Necessary tests for additional motors ordered in accordance with BV (Bureau Veritas), France Order No. for the additional 6 motors		
Motor type	Water-cooled high voltage H-compact PLUS motor, cooling type IC81W, degree of protection IP55, type of protection Ex px	1SQ4632-4HE64
Shaft height	630 mm	1SQ4632-4HE64
No. of poles/synchronous speed	4-pole/1500 rpm	1SQ4632-4HE64
Type rating	6000 kW	1SQ4632-4HE64
Ventilation	Shaft-mounted fan (basic version)	1SQ4632-4HE64
Rotor version and operating mode	Copper (standard), line operation	1SQ4632-4HE64
Voltage and frequency	6 kV, 50 Hz	1SQ4632-4HE64
Type of construction	IM V10 with canopy	1SQ4632-4HE64
Special versions: <b>1st motor</b>	Technical design in accordance with BV (Bureau Veritas), France Necessary certification for first motor ordered in accordance with BV (Bureau Veritas), France Necessary tests for first motor ordered in accordance with BV (Bureau Veritas), France Order No. for 1st motor	1SQ4632-4HE64-Z X11 1SQ4632-4HE64-Z X11+J72 1SQ4632-4HE64-Z X11+J72+X32 1SQ4632-4HE64-Z X11+J72+X32
<b>Additional 6 motors</b> (additional motors)	Technical design in accordance with BV (Bureau Veritas), France Necessary certification for additional motors ordered in accordance with BV (Bureau Veritas), France Necessary tests for additional motors ordered in accordance with BV (Bureau Veritas), France Order No. for the additional 6 motors	1SQ4632-4HE64-Z X11 1SQ4632-4HE64-Z X11+J73 1SQ4632-2HE64-Z X11+J73+X33 1SQ4632-2HE64-Z X11+J73+X33

# Options for marine and offshore applications

## Ordering examples

Selection criteria	Requirement	Structure of the Order No.
<b>Ordering example 2: 1st motor (for essential service according to DNV/Norske Veritas)</b>		
Motor type	The same as for the 1st ordering example	<b>1LA4560-6CM00</b>
<b>Special versions</b>		
<b>1st motor</b>	Technical design in accordance with DNV (Det Norske Veritas), Norway Necessary certification for first motor ordered according to DNV (Det Norske Veritas), Norway Necessary tests for first motor ordered according to DNV (Det Norske Veritas), Norway Tests in presence of representatives of the customer (in addition to the inspector of the classification society) Order No. for 1st motor	<b>1LA4560-6CM00-Z X13</b> <b>1LA4560-6CM00-Z X13+J76</b> <b>1LA4560-6CM00-Z X13+X36</b> <b>1LA4560-6CM00-Z X13+J76+X36+X99</b> <b>1LA4560-6CM00-Z X13+J76+X36+X99</b>
<b>Additional motor</b> (additional motors)	Technical design in accordance with BV (Bureau Veritas), France Necessary certification for additional motors ordered according to DNV (Det Norske Veritas), Norway Necessary tests for additional motors ordered according to DNV (Det Norske Veritas), Norway Order No. for additional motor	<b>1LA4560-6CM00-Z X13</b> <b>1LA4560-6CM00-Z X13+J77</b> <b>1LA4560-6CM00-Z X13+J77+X37</b> <b>1LA4560-6CM00-Z X13+J77+X37</b>
<b>Ordering example 3: 2 motors (for essential service according to ABS/American Bureau of Shipping, USA)</b>		
Motor type	The same as for the 2nd ordering example	<b>1SQ4632-4HE64</b>
<b>Special versions</b>		
<b>1st motor</b>	Technical design in accordance with ABS (American Bureau of Shipping), USA Necessary certification for first motor ordered according to ABS (American Bureau of Shipping), USA Necessary tests for first motor ordered according to ABS (American Bureau of Shipping), USA Order No. for 1st motor	<b>1SQ4632-4HE64-Z X20</b> <b>1SQ4632-4HE64-Z X20+N40</b> <b>1SQ4632-4HE64-Z X20+N40+X60</b> <b>1SQ4632-4HE64-Z X20+N40+X60</b>
<b>Additional 2 motors</b> (additional motors)	Technical design in accordance with ABS (American Bureau of Shipping), USA Necessary certification for additional motors ordered according to ABS (American Bureau of Shipping), USA Necessary tests for additional motors ordered according to ABS (American Bureau of Shipping), USA Order No. for the additional 2 motors	<b>1SQ4632-4HE64-Z X20</b> <b>1SQ4632-4HE64-Z X20+N41</b> <b>1SQ4632-4HE64-Z X20+N41+X61</b> <b>1SQ4632-4HE64-Z X20+N41+X61</b>
<b>Ordering example 4: 1 motor (for essential service according to ABS/American Bureau of Shipping, USA)</b>		
Motor type	The same as for the 1st ordering example	<b>1LA4560-6CM00</b>
<b>Special versions</b>		
	Technical design in accordance with ABS (American Bureau of Shipping), USA Necessary certification for first motor ordered according to ABS (American Bureau of Shipping), USA Necessary tests for first motor ordered according to ABS (American Bureau of Shipping), USA Motor for marine application, higher ambient temperature and/or utilization to temperature class 155 (F) according to 130 (B) – Coolant temperature 60 °C Order No. for the motor	<b>1LA4560-6CM00-Z X10</b> <b>1LA4560-6CM00-Z X10+J70</b> <b>1LA4560-6CM00-Z X10+J70+X30</b> <b>1LA4560-6CM00-Z X10+J70+X30+E80</b> <b>Plain text: COOLANT TEMP CT60</b> <b>1LA4560-6CM00-Z X10+J70+X30+E80</b> <b>Plain text: COOLANT TEMP CT60</b>

# Options for marine and offshore applications

Options

## Options

### Options for marine motors

Order code: Option description

Non-Essential Service

#### *Technical version*

X00	Version according to ABS for Non-Essential Service
X01	Version according to BV for Non-Essential Service
X12 <sup>1)</sup>	Version according to CCS for Essential Service
X03	Version according to DNV for Non-Essential Service
X04	Version according to GL for Non-Essential Service
X05	Version according to KR for Non-Essential Service
X06	Version according to LR for Non-Essential Service

Essential Service

#### *Technical version*

X10	Version according to ABS for Essential Service
X11	Version according to BV for Essential Service
X12	Version according to CCS for Essential Service
X13	Version according to DNV for Essential Service
X14	Version according to GL for Essential Service
X15	Version according to KR for Essential Service
X16	Version according to LR for Essential Service

#### *Certification*

##### **for the first motor ordered**

J70	Certification for the first motor ordered according to ABS for Essential Service
J72	Certification for the first motor ordered according to BV for Essential Service
J74	Certification for the first motor ordered according to CCS for Essential Service
J76	Certification for the first motor ordered according to DNV for Essential Service
J78	Certification for the first motor ordered according to GL for Essential Service
J80	Certification for the first motor ordered according to KR for Essential Service
J82	Certification for the first motor ordered according to LR for Essential Service

##### **for the second and additional motors ordered**

J71	Certification for the second and additional motors ordered according to ABS for Essential Service
J73	Certification for the second and additional motors ordered according to BV for Essential Service
J75	Certification for the second and additional motors ordered according to CCS for Essential Service
J77	Certification for the second and additional motors ordered according to DNV for Essential Service
J79	Certification for the second and additional motors ordered according to GL for Essential Service
J81	Certification for the second and additional motors ordered according to KR for Essential Service
J83	Certification for the second and additional motors ordered according to LR for Essential Service

#### *Tests*

##### **for the first motor ordered**

X30	Tests for the first motor ordered according to ABS for Essential Service
X32	Tests for the first motor ordered according to BV for Essential Service
X34	Tests for the first motor ordered according to CCS for Essential Service
X36	Tests for the first motor ordered according to DNV for Essential Service
X38	Tests for the first motor ordered according to GL for Essential Service
X40	Tests for the first motor ordered according to KR for Essential Service
X42	Tests for the first motor ordered according to LR for Essential Service

##### **for the second and additional motors ordered**

X31	Tests for the second and additional motors ordered according to ABS for Essential Service
X33	Tests for the second and additional motors ordered according to BV for Essential Service
X35	Tests for the second and additional motors ordered according to CCS for Essential Service
X37	Tests for the second and additional motors ordered according to DNV for Essential Service
X39	Tests for the second and additional motors ordered according to GL for Essential Service
X41	Tests for the second and additional motors ordered according to KR for Essential Service
X43	Tests for the second and additional motors ordered according to LR for Essential Service

<sup>1)</sup> CCS handles Non-Essential Service just the same as Essential Service

# Options for marine and offshore applications

## Options

### Options (continued)

Order code	Option description
<b>Essential Service Propulsion</b>	
<i>Technical version</i>	
X20	Version according to ABS for Essential Service Propulsion
X21	Version according to BV for Essential Service Propulsion
X22	Version according to CCS for Essential Service Propulsion
X23	Version according to DNV for Essential Service Propulsion
X24	Version according to GL for Essential Service Propulsion
X25	Version according to KR for Essential Service Propulsion
X26	Version according to LR for Essential Service Propulsion
<i>Certification</i>	
<b>for the first motor ordered for essential service propulsion</b>	
N40	Certification for the first motor ordered according to ABS for Essential Service Propulsion
N42	Certification for the first motor ordered according to BV for Essential Service Propulsion
N44	Certification for the first motor ordered according to CCS for Essential Service Propulsion
N46	Certification for the first motor ordered according to DNV for Essential Service Propulsion
N48	Certification for the first motor ordered according to GL for Essential Service Propulsion
N50	Certification for the first motor ordered according to KR for Essential Service Propulsion
N52	Certification for the first motor ordered according to LR for Essential Service Propulsion
<i>Certification</i>	
<b>for the second and additional motors ordered</b>	
N41	Certification for the second and additional motors ordered according to ABS for Essential Service Propulsion
N43	Certification for the second and additional motors ordered according to BV for Essential Service Propulsion
N45	Certification for the second and additional motors ordered according to CCS for Essential Service Propulsion
N47	Certification for the second and additional motors ordered according to DNV for Essential Service Propulsion
N49	Certification for the second and additional motors ordered according to GL for Essential Service Propulsion
N51	Certification for the second and additional motors ordered according to KR for Essential Service Propulsion
N53	Certification for the second and additional motors ordered according to LR for Essential Service Propulsion
<i>Tests</i>	
<b>for the first motor ordered</b>	
X60	Tests for the first motor ordered according to ABS for Essential Service Propulsion
X62	Tests for the first motor ordered according to BV for Essential Service Propulsion
X64	Tests for the first motor ordered according to CCS for Essential Service Propulsion
X66	Tests for the first motor ordered according to DNV for Essential Service Propulsion
X68	Tests for the first motor ordered according to GL for Essential Service Propulsion
X70	Tests for the first motor ordered according to KR for Essential Service Propulsion
X72	Tests for the first motor ordered according to LR for Essential Service Propulsion
<b>for the second and additional motors ordered</b>	
X61	Tests for the second and additional motors ordered according to ABS for Essential Service Propulsion
X63	Tests for the second and additional motors ordered according to BV for Essential Service Propulsion
X65	Tests for the second and additional motors ordered according to CCS for Essential Service Propulsion
X67	Tests for the second and additional motors ordered according to DNV for Essential Service Propulsion
X69	Tests for the second and additional motors ordered according to GL for Essential Service Propulsion
X71	Tests for the second and additional motors ordered according to KR for Essential Service Propulsion
X73	Tests for the second and additional motors ordered according to LR for Essential Service Propulsion

### Supplementary options

Order code	Option description
X99 <sup>1)</sup>	Tests in the presence of representatives of the customer (together with the inspector of the classification society)
E80 <sup>2)</sup>	Conditions deviating from the classification requirements
E81	Upgrading a marine motor for unprotected installation on deck, use in especially aggressive atmospheres or offshore applications

<sup>1)</sup> Only for Essential Service and Essential Service Propulsion.

<sup>2)</sup> Additional plain text data explaining the deviation required.



## Service & Support



6/2

**Industry Services**

# Service & Support Industry Services

Your machines and plant can do more  
with Industry Services

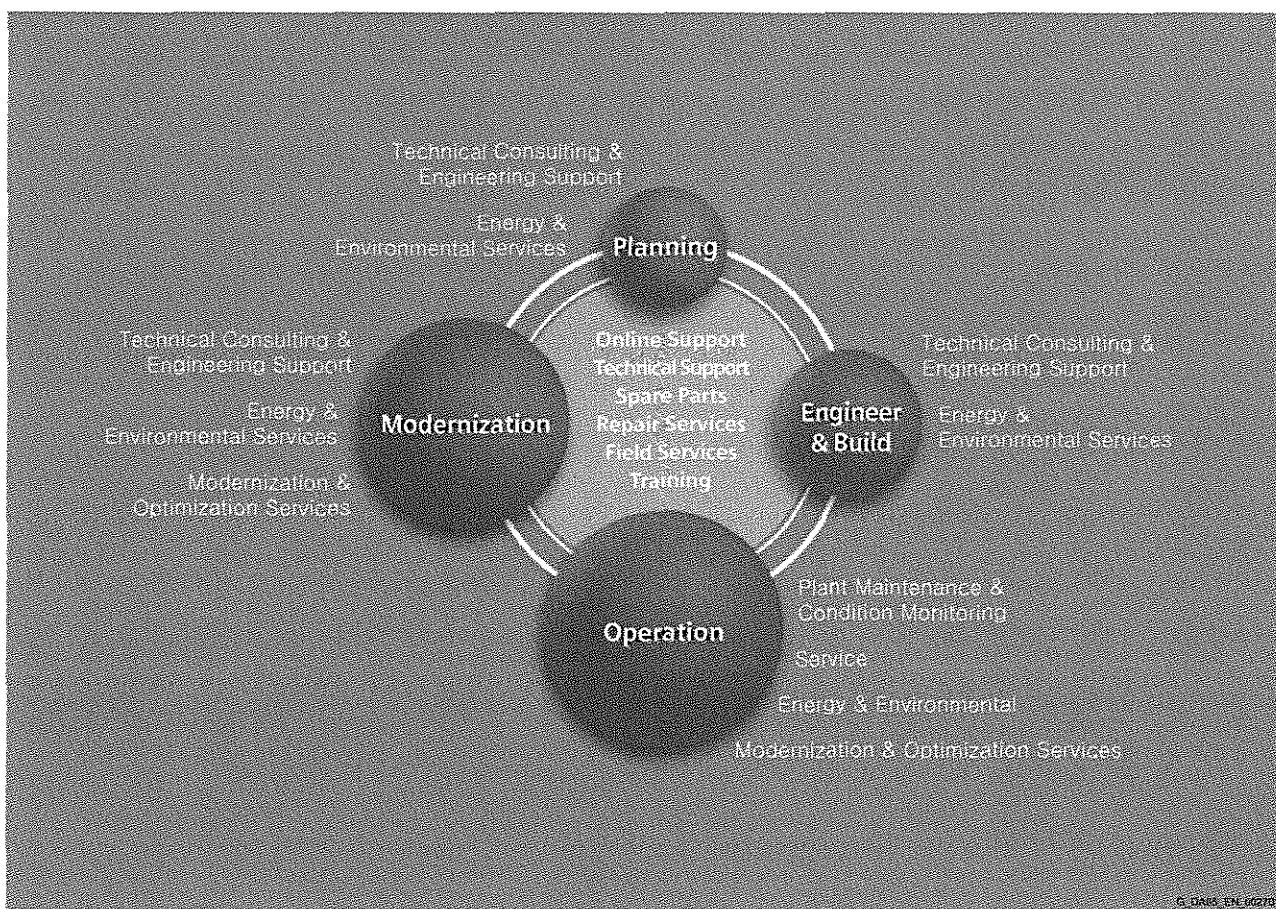


Whether it is production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries.

All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant. Right from the earliest stages of planning, engineering, and building, all the way to operation and modernization. These services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise.

Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

Discover all advantages of our service portfolio:  
[www.siemens.com/industry-services](http://www.siemens.com/industry-services)



Siemens supports its clients with technology based Services across a plants entire life cycle.

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# Service & Support

## Industry Services

Industry Services  
for the entire life cycle

### Online Support

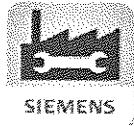
Online support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimediacased – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.



[www.siemens.com/industry/onlinesupport](http://www.siemens.com/industry/onlinesupport)

### Online Support App

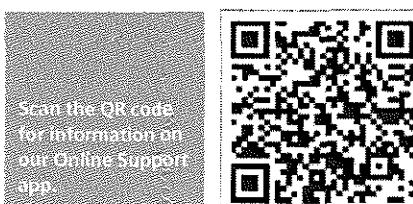


Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products - anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristics curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.

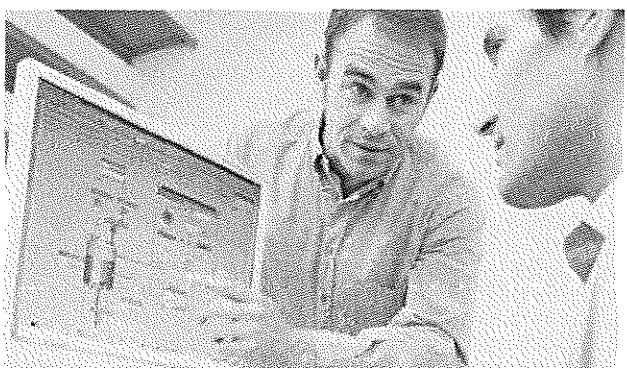


The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

[www.siemens.com/industry/onlinesupportapp](http://www.siemens.com/industry/onlinesupportapp)

### Technical Support

The ability to quickly analyze system and error messages and take appropriate action are key factors in ensuring that plants run safely and efficiently. Questions can arise at any time and in any industry, whether it's an individual product or a complete automation solution. Siemens technical support offers individual technical assistance in matters related to functionality, how to operate, applications, and fault clearance in industrial products and systems – at any time and globally, over the phone, by e-mail, or via remote access. Experienced experts from Siemens answer incoming questions promptly. Depending on the requirements, they first consult specialists in the areas of development, on-site services, and sales. Technical support is also available for discontinued products that are no longer available. Using the support request number, any inquiry can be clearly identified and systematically tracked.



<http://support.automation.siemens.com/WW/view/en/16605032>



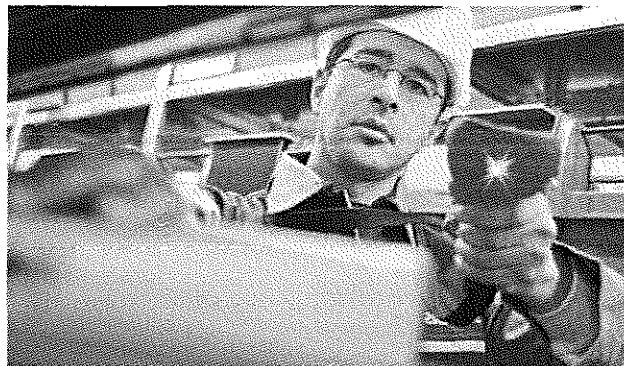
# Service & Support

## Industry Services

**Industry Services**  
for the entire life cycle

### Spare Parts

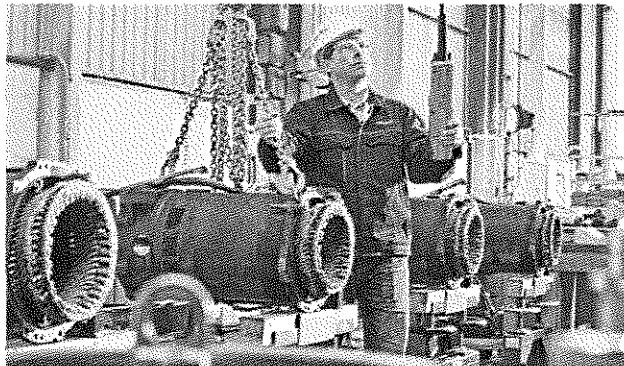
Drive and automation systems must be available at all times. Even a single missing spare part can bring the entire plant to a standstill – and result in substantial financial losses for the operator. The spare parts services from Siemens protects against such losses – with the aid of quickly available, original spare parts that ensure smooth interaction with all other system components. Spare parts are kept on hand for up to ten years; defective parts can be returned. For many products and solutions, individual spare parts packages ensure a preventive stock of spare parts on-site. The spare parts services is available around the world and around the clock. Optimum supply chain logistics ensure that replacement components reach their destination as quickly as possible. Siemens' logistics experts take care of planning and management as well as procurement, transportation, customs handling, warehousing, and complete order management for spare parts.



<http://support.automation.siemens.com/WW/view/en/43502238>

### Repair Services

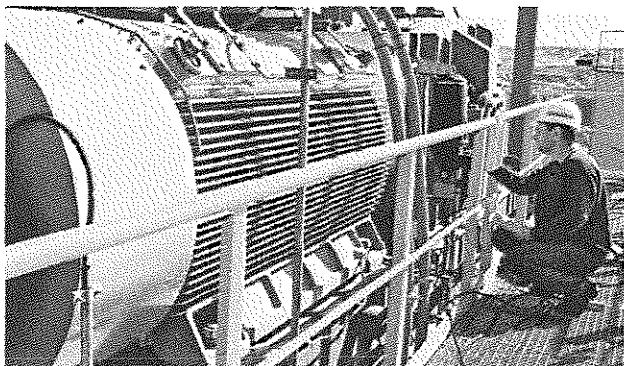
Reliable electrical and electronic equipment is crucial for operating continuous processes. That is why it is essential that motors and converters always undergo highly specialized repair and maintenance. Siemens offers complete customer and repair services – on site and in repair centers – as well as technical emergency services worldwide. The repair services include all measures necessary to quickly restore the functionality of defective units. In addition, services such as spare parts logistics, spare parts storage and rapid manufacturing are available to plant operators in all verticals. With a global network of certified repair shops operated by Siemens as well as third parties, Siemens handles the maintenance and overhaul of motors, converters, and other devices as an authorized service partner.



<http://support.automation.siemens.com/WW/view/en/43512848>

### Field Services

It's a top priority in all industries: the availability of plants and equipment. Siemens offers specialized maintenance services such as inspection and upkeep as well as rapid fault clearance in industrial plants – worldwide, continuously, and even with emergency services as needed. The services include startup as well as maintenance and fault clearance during operation. The startup service includes checking the installation, function tests, parameterization, integration tests for machines and plants, trial operation, final acceptance, and employee training. All services, including remote maintenance of drives, are also available as elements of customized service contracts.



<http://support.automation.siemens.com/WW/view/en/66012486>

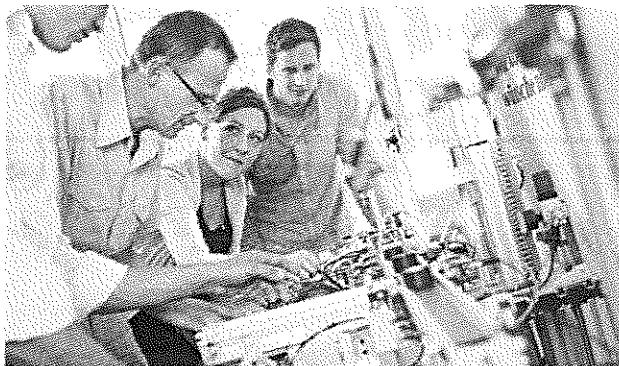
# Service & Support

## Industry Services

Industry Services  
for the entire life cycle

### **Training**

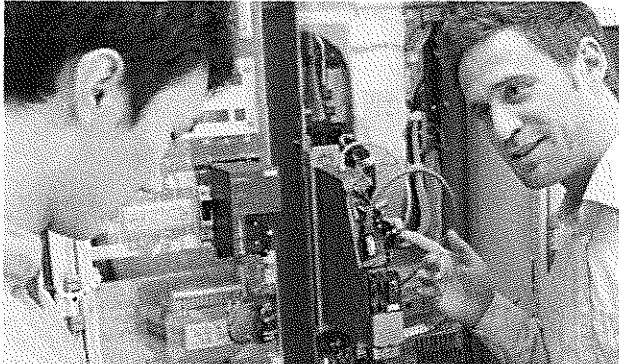
Increasingly, up-to-date knowledge is becoming a determining factor in success. One of the key resources of any company is well-trained staff that can make the right decision at the right moment and take full advantage of the potential. With SITRAIN – Training for Industry, Siemens offers comprehensive advanced training programs. The technical training courses convey expertise and practical knowledge directly from the manufacturer. SITRAIN covers Siemens' entire product and system portfolio in the field of automation and drives. Together with the customer, Siemens determines the company's individual training needs and then develops an advanced training program tailored to the desired requirements. Additional services guarantee that the knowledge of all Siemens partners and their employees is always up-to-date.



<http://support.automation.siemens.com/WW/view/en/43514324>

### **Technical Consulting & Engineering Support**

The efficiency of plants and processes leads to sustainable economic success. Individual services from Siemens help save substantial time and money while also guaranteeing maximum safety. Technical consulting covers the selection of products and systems for efficient industrial plants. The services include planning, consulting, and conceptual design as well as product training, application support, and configuration verification – in all phases of a plant's lifecycle and in all questions related to product safety. Engineering support offers competent assistance throughout the entire project, from developing a precise structure for startup to product-specific preparation for implementation as well as support services in areas such as prototype development, testing and acceptance.



### **Energy & Environmental Services**

Efficient energy use and resource conservation – these top sustainability concerns pay off – both for the environment and for companies. Siemens offers integrated solutions that unlock all technical and organizational potential for successful environmental management. Customized consulting services are aimed at sustainably lowering the cost of energy and environmental protection and thus increasing plant efficiency and availability. The experts provide support in the conceptual design and implementation of systematic solutions in energy and environmental management, enabling maximum energy efficiency and optimized water consumption throughout the entire company. Improved data transparency makes it possible to identify savings potential, reduce emissions, optimize production processes, and thereby noticeably cut costs.



<http://support.automation.siemens.com/WW/view/en/42350774>

# Service & Support

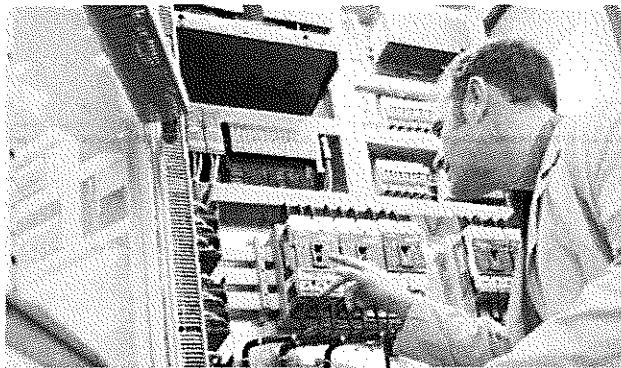
## Industry Services

**Industry Services**  
for the entire life cycle

### **Modernization & Optimization Services**

High machine availability, expanded functionality and selective energy savings – in all industries, these are decisive factors for increasing productivity and lowering costs. Whether a company wants to modernize individual machines, optimize drive systems, or upgrade entire plants, Siemens' experts support the projects from planning to commissioning.

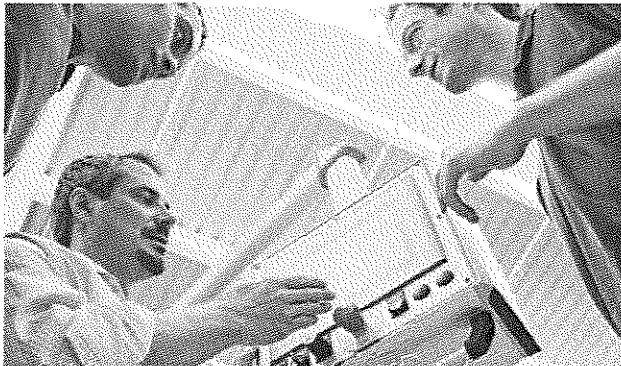
Expert consulting and project management with solution responsibility lead to security and make it possible to specifically identify savings potential in production. This secures investments over the long term and increases economic efficiency in operation.



<http://support.automation.siemens.com/WW/view/en/66005532>

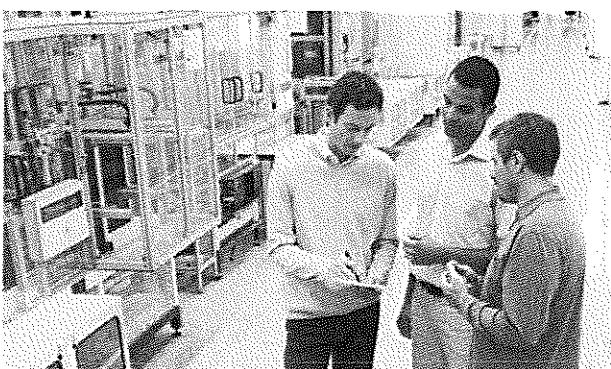
### **Plant Maintenance & Condition Monitoring**

Modern industrial plants are complex and highly automated. They must operate efficiently in order to ensure the company's competitive strength. In addition, the steadily increasing networking of machines and plants require consistent security concepts. Maintenance and status monitoring as well as the implementation of integrated security concepts by Siemens' experts support optimum plant use and avoid downtime. The services include maintenance management as well as consulting on maintenance concepts, including the complete handling and execution of the necessary measures. Complete solutions also cover remote services, including analysis, remote diagnosis, and remote monitoring. These are based on the Siemens Remote Services platform with certified IT security.



### **Service Contracts**

Making maintenance costs calculable, reducing interfaces, speeding up response times, and unburdening the company's resources – the reduced downtimes that these measures achieve increase the productivity of a plant. Service contracts from Siemens make maintenance and repairs more cost-effective and efficient. The service packages include local and remote maintenance for a system or product group in automation and drive technology. Whether you need extended service periods, defined response times, or special maintenance intervals, the services are compiled individually and according to need. They can be adjusted flexibly at any time and used independently of each other. The expertise of Siemens' specialists and the capabilities of remote maintenance thus ensure reliable and fast maintenance processes throughout a plant's entire lifecycle.



<http://support.automation.siemens.com/WW/view/en/65961857>

## Appendix



<b>7/2</b>	<b>Partners at Industry Automation and Drive Technologies</b>
<b>7/3</b>	<b>Online Services</b>
7/3	Information and Ordering in the Internet and on DVD
7/4	Information and Download Center Social Media, Mobile Media
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7/6	Order number index
7/12	Index of order codes
<b>7/14</b>	<b>Conditions of sale and delivery</b>

# Appendix

## Partners at Industry Automation and Drive Technologies



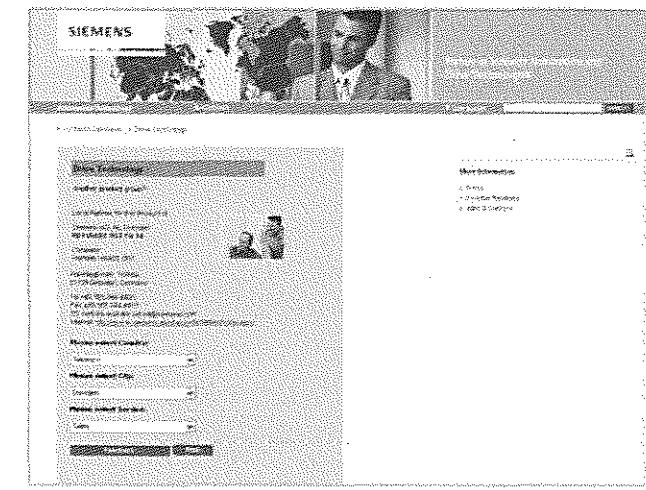
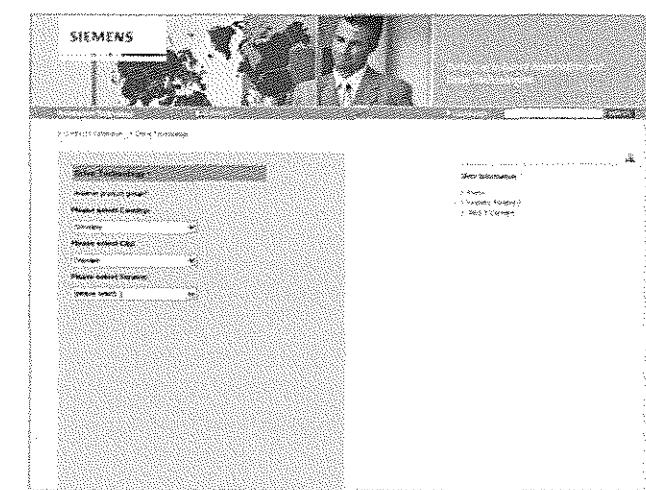
At Siemens Industry Automation and Drive Technologies, more than 85 000 people are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at: [www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

You start by selecting a

- Product group,
- Country,
- City,
- Service.



## Appendix Online Services

**Information and Ordering  
in the Internet and on DVD**

### Siemens Industry Automation and Drive Technologies in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

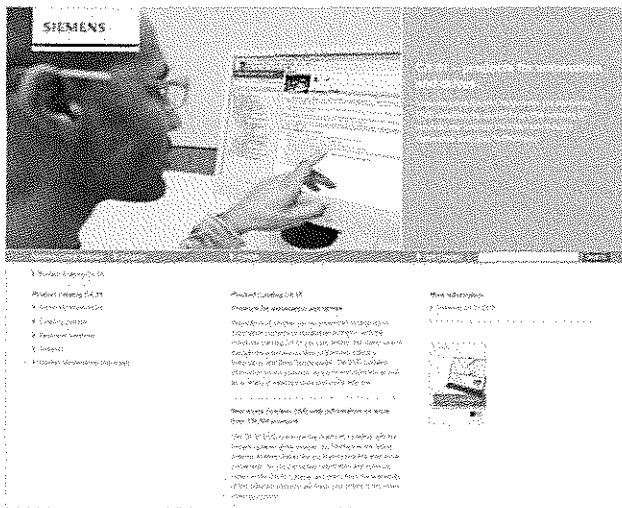
Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

[www.siemens.com/industry](http://www.siemens.com/industry)

you will find everything you need to know about products, systems and services.

### Product Selection Using the Interactive Catalog CA 01 of Industry



Detailed information together with convenient interactive functions:

The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

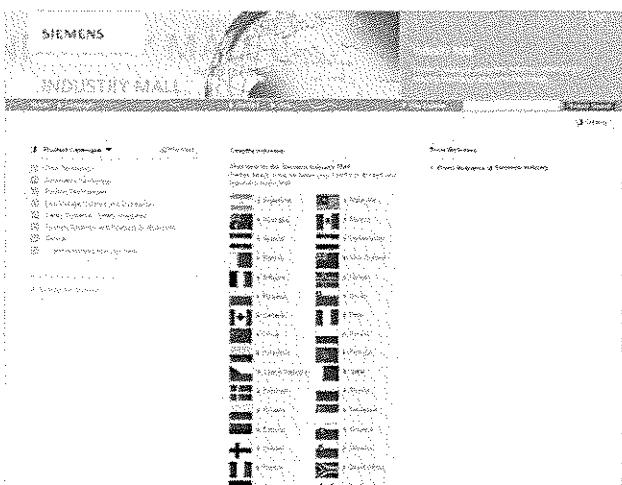
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

[www.siemens.com/automation/ca01](http://www.siemens.com/automation/ca01)

or on DVD.

### Easy Shopping with the Industry Mall



The Industry Mall is the virtual department store of Siemens AG on the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Industry Mall on the Internet under:

[www.siemens.com/industrymall](http://www.siemens.com/industrymall)

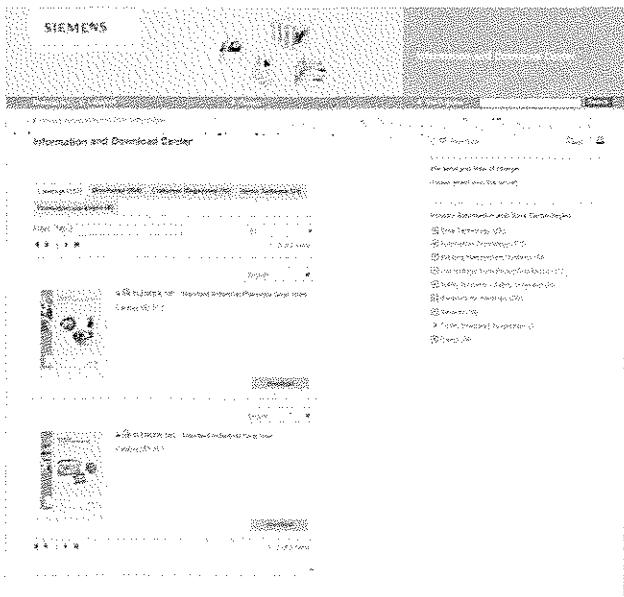


# Appendix

## Online Services

### Information and Download Center Social Media, Mobile Media

#### Downloading Catalogs



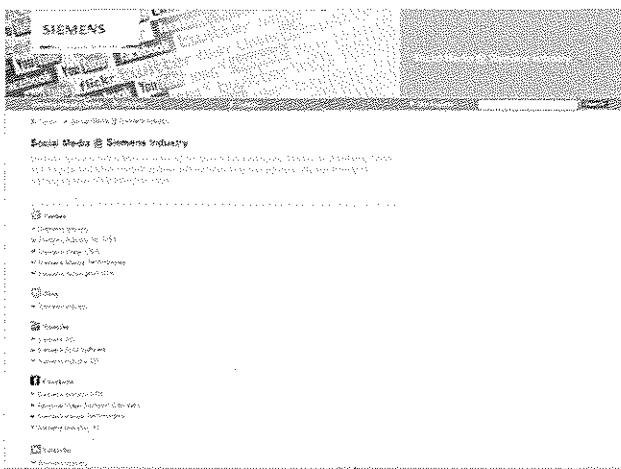
In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. Without having to register, you can download these catalogs in PDF format or increasingly as digital page-turning e-books.

The filter dialog box above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.3 catalogs. If you enter "ST 70" both the ST 70 catalog and the associated news or add-ons are displayed.

Visit us on the web at:

[www.siemens.com/automation/infocenter](http://www.siemens.com/automation/infocenter)

#### Social Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

[www.siemens.com/industry/socialmedia](http://www.siemens.com/industry/socialmedia)

Or via our product pages at:

[www.siemens.com/automation](http://www.siemens.com/automation)

or

[www.siemens.com/drives](http://www.siemens.com/drives)

To find out more about Siemens' current social media activities visit us at:

[www.siemens.com/socialmedia](http://www.siemens.com/socialmedia)

#### Mobile Media



Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the app store (iOS) or at Google Play (Android).

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

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# Appendix

## Conditions of sale and delivery

### 1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

#### 1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"<sup>1)</sup> and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"<sup>1)</sup> and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"<sup>1)</sup>.

#### 1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"<sup>1)</sup> and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"<sup>1)</sup> and,
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"<sup>1)</sup>.

### 2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at: [www.siemens.com/automation/salesmaterial-as/catalog/en/terms\\_of\\_trade\\_en.pdf](http://www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf)

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

### 3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

### 4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i. a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

1) The text of the Terms and Conditions of Siemens AG can be downloaded at [www.siemens.com/automation/salesmaterial-as/catalog/en/terms\\_of\\_trade\\_en.pdf](http://www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf)



# Catalogs

## Industry Automation, Drive Technologies and Low-Voltage Power Distribution

Further information can be obtained from our branch offices  
listed at [www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

<b>System Solutions</b> <b>Interactive Catalog on DVD</b> Products for Automation and Drives	<b>Catalog</b> <b>CA 01</b>	<b>Catalog</b> <b>GAMMA Building Control</b>
<b>Drive Systems</b>		<b>Motion Control</b>
<b>Variable-Speed Drives</b>		SINUMERIK & SIMODRIVE Automation Systems for Machine Tools
SINAMICS G130 Drive Converter Chassis Units	D 11	NC 60
SINAMICS G150 Drive Converter Cabinet Units		NC 61
SINAMICS GM150, SINAMICS SM150	D 12	NC 62
Medium-Voltage Converters		Equipment for Machine Tools
ROBICON Perfect Harmony	D 15.1	SINUMERIK 840D sl Type 1B
Medium-Voltage Air-Cooled Drives		Equipment for Machine Tools
Germany Edition		SINUMERIK 808D, SINAMICS V60 and G120, SIMOTICS 1FL5 and 1LE1
SINAMICS S120 Chassis Format Units and	D 21.3	NC 81.1
Cabinet Modules		SINUMERIK 828D BASIC T/BASIC M, SINAMICS S120 Combi, 1FK7 and 1PH8 motors
SINAMICS S150 Converter Cabinet Units	D 23.1	NC 82
SINAMICS DCM Converter Units	D 31	SIMOTION, SINAMICS S120 and Motors for Production Machines
SINAMICS and Motors for Single-Axis Drives	D 84.1	PM 21
Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN		Drive and Control Components for Cranes
• Series H-compact		CR 1
• Series H-compact PLUS		
Asynchronous Motors Standardline	D 86.1	
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2	
DC Motors	DA 12	
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1	
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2	
<i>Digital: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units</i>	DA 22	
SIMOVERT PM Modular Converter Systems	DA 45	
SIEMOSYN Motors	DA 48	
MICROMASTER 420/430/440 Inverters	DA 51.2	
MICROMASTER 411/COMBIMASTER 411	DA 51.3	
SIMOVERT MASTERDRIVES Vector Control	DA 65.10	
SIMOVERT MASTERDRIVES Motion Control	DA 65.11	
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3	
SIMODRIVE 611 universal and POSMO	DA 65.4	
<i>Note: Additional catalogs on SIMODRIVE or SINAMICS drive systems and SIMOTICS motors with SINUMERIK and SIMOTION can be found under Motion Control</i>		
<b>Low-Voltage Three-Phase-Motors</b>		
SIMOTICS Low-Voltage Motors	D 81.1	
MOTOX Geared Motors	D 87.1	
SIMOGEAR Geared Motors	MD 50.1	
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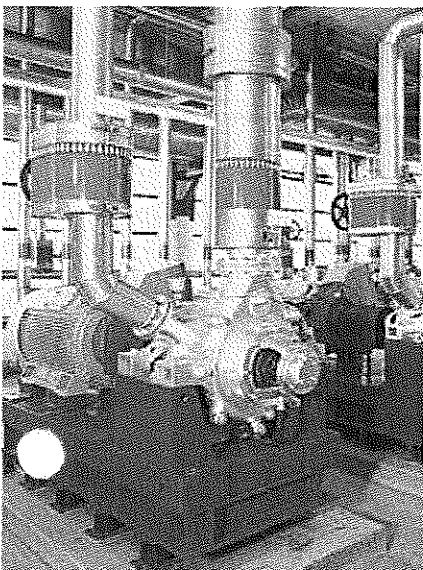
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**Chapter 4.2**

**Technical Literature -**

**LV Motors**

# SINOTICS Neo compact Non-Standard Motors



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## Dimensions

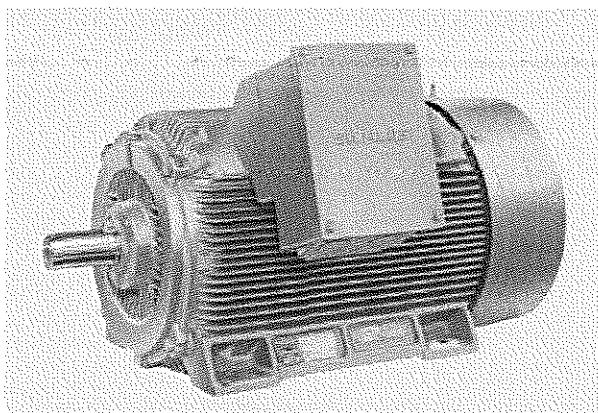
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# SIMOTICS N-compact Non-Standard Motors

## Orientation

### Overview

#### SIMOTICS N-compact: Series 1LA8, 1PQ8, 1LL8



The three-phase motor series SIMOTICS N-compact covers outputs up to 1250 kW (at 50 Hz) in the non-standard range. A number of technical features provide this motor series with its ruggedness and long service life and ensure the highest level of availability, for example, motor protection with PTC thermistors with 6 embedded temperature sensors for alarm and tripping is standard.

SIMOTICS N-compact motors are also characterized by their high output for small frame size. The consequence of this is an extremely compact design that can be used to save space in a number of industrial applications.

SIMOTICS N-compact motors are not only optimized in terms of their construction, but also in terms of their efficiency, so they also contribute towards lower energy consumption.

Apart from mains-fed operation, the SIMOTICS N-compact motors are also specially designed for converter-fed operation, for example, insulated bearings are used at the non-drive-end NDE for converter-fed operation as standard to prevent damage being caused as a result of bearing currents. In combination with frequency converters from the SINAMICS and SIMOVERT MASTERDRIVES product series, they build up perfectly interacting drive systems for variable-speed drive applications.

#### Versions in the SIMOTICS N-compact series

##### **Series 1LA8**

The motors are asynchronous squirrel-cage motors with compact dimensions in fin-cooled design. They are designed for direct connection to the three-phase supply and for converter-fed operation.

##### **1LA8 for mains-fed operation**

- Designed for operation on the three-phase supply
- Degree of protection: IP55
- Cooling method: IC411, self-ventilated
- Housing: Cast iron

##### **1LA8 for converter-fed operation**

- Converter-fed operation, optimized for the SINAMICS and SIMOVERT MASTERDRIVES drive systems
- Degree of protection: IP55
- Cooling method: IC411, self-ventilated
- Housing: Cast iron
- With standard insulation for voltages ≤ 500 V or with special insulation for 690 V

##### **Series 1PQ8**

The motors are asynchronous squirrel-cage motors with compact dimensions in fin-cooled design with forced ventilation. As these motors are forced-ventilated, no derating or only relatively minor derating (depending on their speed range) is required for operation at constant load torque and with wide speed ranges. The motors are designed for converter-fed operation with the SINAMICS and SIMOVERT MASTERDRIVES drive system.

##### **1PQ8 for converter-fed operation**

- Converter-fed operation
- Degree of protection: IP55
- Cooling method: IC416, forced ventilation
- Housing: Cast iron
- With standard insulation for voltages ≤ 500 V or with special insulation for 690 V

##### **Series 1LL8**

The motors of series 1LL8 are asynchronous squirrel-cage motors with compact dimensions in an open fin-cooled design with self-cooling. They are similar in construction to 1LA8 motors. IP23 degree of protection is achieved by opening the internal cooling circuit which enables it to be supplied with external cooling air. This can increase the performance by up to 25 % as compared to the 1LA8. They are designed for direct connection to the three-phase supply and for converter-fed operation.

Motors of the 1LL8 type series are intended for installation indoors. They must not be subjected to humid, salty or corrosive atmospheres.

##### **1LL8 for mains-fed operation**

- Designed for operation on the three-phase supply
- Degree of protection: IP23
- Cooling method: IC01, self-ventilated
- Housing: Cast iron

##### **1LL8 for converter-fed operation**

- Converter-fed operation
- Degree of protection: IP23
- Cooling method: IC01, self-ventilated
- Housing: Cast iron

Versions with special insulation for > 500 V and operation without an output filter on the frequency converter are only available on request.

#### **Standardline**

4-pole 1LA8 motors up to 500 kW are available with a reduced range of options as the *Standardline*.

#### Benefits to the customer:

- Much shorter delivery time
- Can be configured with a variety of options, retaining a high degree of flexibility.

#### **Applications**

*Standardline* low-voltage motors are optimized for applications in pump, fan and compressor drives. The low-voltage motors are specially constructed for use in complete, coordinated drive systems comprising the motor and a SINAMICS G150 frequency converter.

*Standardline* motors can be ordered using order code B20.

#### **Scope of the Standardline**

- 4-pole version
- Power range 250 to 500 kW
- Types 1LA8315, 1LA8317, 1LA8353, 1LA8355 and 1LA8357
- Type of construction code 0 (IM B3)
- For mains-fed operation: Voltage code 6 (400 VΔ/690 VY) or 5 (500 VΔ)
- For converter-fed operation: Voltage code 4 (400 VΔ), 8 (400 VΔ/690 VY) or 5 (500 VΔ)
- Can be ordered for converter-fed operation, but not in the 690 V version
- Possible order codes: A23, A61, A72, G50, H70, H73, K09, K10, K45, K46, K57, K83, K84, K85, L00, L97, M58 (frame size 315 only), M88 and Y53



# SIMOTICS N-compact Non-Standard Motors

## Orientation

### Benefits

Non-standard motors from Siemens offer the user numerous advantages:

- The optimized efficiency results in lower operating costs.
- The high output/size ratio ensures low space requirements combined with low weight.
- The cast-iron housing and bearing plates are extremely rigid and rugged and can therefore be subjected to considerable stress and have excellent vibration damping properties and are resistant to corrosion.

- The bearings are designed for maximum reliability, which results in good vibration characteristics, a long service life and low maintenance costs.
- The DURIGNIT IR 2000 insulation system with VPI or current-UV impregnation results in high reliability, a long service life and high resistance to stress, for example, during starting or under overload conditions.
- Due to the low noise emission level, the stringent requirements of worker protection are fulfilled without the need for additional measures.

### Application

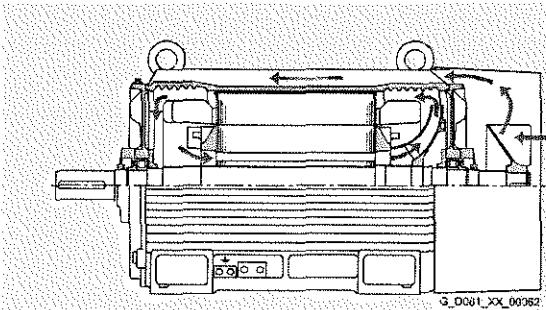
Thanks to the many options, the motor series SIMOTICS N-compact covers applications in a wide range of different sectors: Chemicals, paper, water/waste water, steel and shipbuilding are just a few examples. The available types of construction are IM B3, IM B35 and IM V1 according to DIN EN 60034-7. The degree of protection is IP55 as standard, but IP23 for motor series 1LL8.

The 1PQ8 motors are specially designed for variable-speed applications with constant torque. The mounted separately driven fan provides a constantly high cooling air flow at any speed. These motors can therefore be continuously operated at low speed and high torque simultaneously.

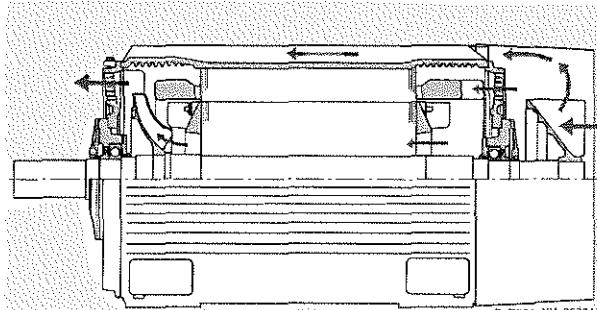
The low-voltage motor series SIMOTICS N-compact is also available in a through-ventilated version to IP23 degree of protection. This 1LL8 motor series boasts an output 25 % higher than that of the closed 1LA8 motor series for the same frame size. The 1LL8 motor is therefore useful for applications in which a closed 1LA8 motor is not essential and when the ambient conditions permit the use of a through-ventilated machine (IC 01 cooling method, IP23 degree of protection). Motors of the 1LL8 type series are only intended for installation indoors. They must not be subjected to humid, salty or corrosive atmospheres.

### Design

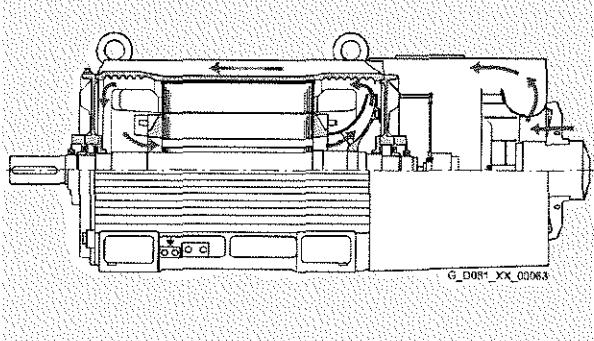
The basic structure of the non-standard motors is shown in the following sectional diagrams.



Sectional diagram of 1LA8



Sectional diagram of 1LL8



Sectional diagram of 1PQ8

In conventional fin-cooled motors, the one-sided external ventilation naturally results in an uneven temperature distribution – this is however not the case with SIMOTICS N-compact motors with their additional internal air-flow channels. This cools, in particular, the stator winding heads, the rotor winding and the drive-end bearings. The resulting reduction in thermal loading increases the operating reliability and lengthens the service life. The internal air-flow channels increase the efficiency of the ventilation which means that the external air-flow can be reduced. The lower volumetric flow and air-flow optimization of all guide channels results in a low level of fan noise.



# SIMOTICS N-compact Non-Standard Motors

## Orientation

### Technical specifications

#### Rating plate

According to DIN EN 60034-1, the approximate overall weight is specified on the rating plate for all motors of frame size 90 and above (from approx. 30 kg). For all motors, an additional rating plate can be supplied loose, order code K31. An extra rating plate for identification codes is also possible, order code Y82. In the standard version, the rating plate is available in English and German.

SIEMENS										
3-MOT. 1LA8 317-4AB60-Z NoN-A91302567020001 / 2010 IMB3 Th.Cl155(F)										
V	Hz	IE2	A	kW	cosφ	1/min	I <sub>A</sub> /I <sub>N</sub>	T <sub>ES</sub>	Certif.No.	IP
400 Δ	50	95.7%	550	315	0.87	1488				55
690 Y			315							
Rotor SQU.CAGE KL 13 IEC/EN 60034-1										
380..420VΔ, 570..520A 660..725V Y, 330..300A 50Hz										
NMAX=3000 1/MIN										
Ta:-20...+40°C										
○ MADE IN GERMANY D-90441 Nürnberg CE ○										

Example of rating plate for 1LA8 mains-fed operation (IE2)

SIEMENS										
3-MOT. 1LA8 317-4AZ94-Z NoN-A01299606010001 / 2010 IMV1 Th.Cl155(F)										
V	Hz	IE3	A	kW	cosφ	1/min	I <sub>A</sub> /I <sub>N</sub>	T <sub>ES</sub>	Certif.No.	IP
400 Δ	50	96.1%	430	250	0.87	1488				55
690 Y			315							
Rotor SQU.CAGE KL 13 IEC/EN 60034-1										
NMAX=3000 1/MIN										
Ta:-20...+40°C										
○ MADE IN GERMANY D-90441 Nürnberg CE ○										

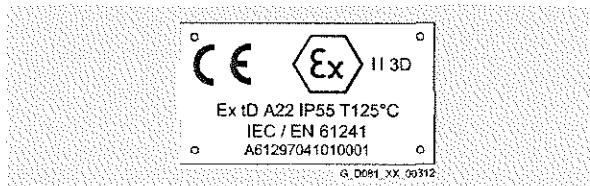
Example of rating plate for 1LA8 mains-fed operation (IE3)

SIEMENS										
3-MOT. 1LA8 317-4PB80-Z NoN-A61297041010001 / 2010 IMB3 Th.Cl155(F)										
V	Hz		A	kW	cosφ	1/min	I <sub>A</sub> /I <sub>N</sub>	T <sub>ES</sub>	Certif.No.	IP
400 Δ	50		550	315	0.87	1488				55
690 Y			315							
Rotor SQU.CAGE KL 13 IEC/EN 60034-1										
FÜR/FOR SIMOVERT MASTERDRIVES/SINAMICS										
NMAX=3000 1/MIN										
Ta:-20...+40°C										
○ MADE IN GERMANY D-90441 Nürnberg CE ○										

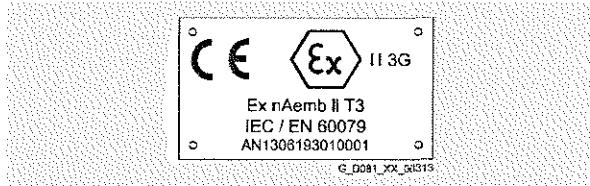
Example of rating plate for 1LA8 converter-fed operation

All motors which comply with the international standard IEC 60034-30:2008 (Rotating electrical machines – Part 30: Efficiency classes of single-speed, three-phase, cage-induction motors (IE code)) display the efficiency class and the efficiency on the rating plate. This efficiency is based, according to the above standard, on the losses determined in accordance with standard part IEC 60034-2-1:2007.

Explosion-proof motors, order codes M35 and M39 for Zone 22 as well as M72 and M73 for Zone 2, display the corresponding identification on an extra rating plate.



Example for extra rating plate for Zone 22 (mains-fed and converter-fed operation)



Example for extra rating plate for Zone 2 (mains-fed and converter-fed operation)

#### Converter-fed operation

The motors are equipped with standard rotors and are suitable for mains-fed or converter-fed operation.

All motors can therefore be operated with a converter, in principle. Special measures are necessary in the case of some motors, especially when non-Siemens converters are used.

All data is applicable to a 50 Hz sinusoidal supply.

#### Rated voltage

The tolerance for the rated voltage is in accordance with DIN EN 60034-1 in all cases, a rated voltage range is not specified.

#### Motor protection

A motor protection function can be implemented using the  $P_t$  sensing circuit implemented in the converter software.

If required, more precise motor protection can be afforded by direct temperature measurement using KTY84 sensors, PT100 resistance thermometers or PTC thermistors in the motor winding. Some converters from Siemens determine the motor temperature using the resistance of the temperature sensor. They can be set to a required temperature for alarm and tripping. If PT100 resistance thermometers are ordered for cooling temperature monitoring (order code A61) or KTY84 temperature sensors (order code A23), the standard thermistors are omitted. Combination of A12 and A61 or A12 and A23 is possible, additional charge on request.

Evaluation of the KTY or PT100 sensor is performed as described above, for example, in the converter. For motors for mains-fed operation, the 3RS10 temperature monitoring device that forms part of the protective equipment must be ordered separately, for further details, see Catalog IC 10.

### Technical specifications (continued)

#### Insulation

The standard insulation of the motors is designed such that converter-fed operation is possible without limitation at voltages  $\leq 500$  V. This also applies for operation with a pulse-controlled AC converter with voltage rise times  $t_s > 0.1 \mu\text{s}$  at the motor terminals.

All motors with voltage codes 4, 5 and 8 must be operated under these preconditions on a converter.

This does not apply to motors with voltages  $> 500$  up to 690 V, that must have special insulation for operation on a pulse-controlled AC converter (SIMAMICS, SIMOVERT MASTERDRIVES) without a converter circuit ( $du/dt$  filter or sine-wave filter), i.e. when 10th position of the Order No. = "M").

**For converter-fed operation with the outputs specified in the Catalog, the motors are used according to temperature class 155 (F), i.e. in this case neither a service factor > 1 nor an increased coolant temperature is possible (order codes C11, C12 and C13 cannot be ordered).**

#### Connecting motors

When connecting the motors, it is important to consider the restrictions for mains-fed machines as well as the maximum conductor cross-sections permitted for the converter.

#### Ventilation/noise generation

The fan noise can increase at speeds that are higher than the rated speed of self-ventilated motors (this is not the case for forced-ventilated motors 1PQ8). To increase motor utilization at low speeds it is recommended that forced-ventilated 1PQ8 motors are used.

#### Technical data of the separately driven fans for 1PQ8 motors

Frame size	$P_{\text{rated}, 50 \text{ Hz}} \text{ kW}$	$P_{\text{rated}, 60 \text{ Hz}} \text{ kW}$	$I_{\text{rated}, 400 \text{ V}}$ 50 Hz A	$I_{\text{rated}, 460 \text{ V}}$ 50 Hz A
FS	0.75	1.23	3.4	3.3
315, 400	1.3	2.2	6.4	6.2
450	3.0	4.2	8.2	7.7

In general, for converter-fed operation, the noise level is higher than that specified in the Catalog (exception: 1PQ8). The increase depends on the converter type and can lie between 5 and 10 dB(A) depending on the frame size and number of poles of the motor.

#### Mechanical stress and grease lifetime

When motors are operated at speeds above the rated speed, the running smoothness and the bearings are subjected to greater mechanical stress. This reduces the service life of the grease and bearings. More detailed information on request.

#### Bearings

To prevent damage being caused as a result of bearing currents, insulated bearings are used at the non-drive-end (NDE) of 1LA8, 1LL8 and 1PQ8 motors for converter-fed operation in the standard version (this can be recognized when 9th position of Order No. = "P").

When operating multiphase induction machines on a converter, an electrical bearing stress results from a capacitive induced voltage via the bearing lubricating film, depending on the principle being used. The physical cause of this is the common-mode voltage at the converter output that is inherent in the control method for a converter: The sum of the three phase voltages is – in contrast to straightforward mains-fed operation – not equal to zero at every point in time. The high-frequency, pulse-shaped common-mode voltage brings about a residual current, which closes back to the converter's DC link via the machine's internal capacitances, the machine housing and the grounding circuit. The machine's internal capacitances include the main insulation winding capacitance, the geometric capacitance between the

rotor and stator, the lubricating film capacitance and the capacitance of any bearing insulation that may be present. The level of the currents due to the internal capacitances is proportional to the gradients, i.e. the voltage variation of the DC voltage ( $i_{(t)} = C \cdot du/dt$ ).

In order to apply currents to the motor which are sinusoidal as far as possible (smooth running, oscillation torques, stray losses), a high clock frequency is required for the converter's output voltage. The related (very steep) switching edges of the converter output voltage (and also, therefore, of the common-mode voltage) cause correspondingly high capacitive currents and voltages on the machine's internal capacitances.

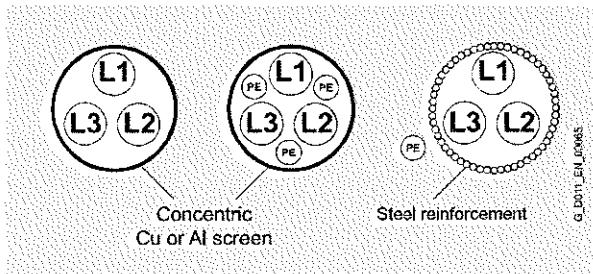
The voltage that is injected capacitively across the bearing can result, in the worst case, in stochastic arcing through the lubrication film of the bearing and prematurely age or damage the bearing. (The current pulses caused by arcing in the lubrication film are known as EDM currents (Electrostatic Discharge Machining) in the technical literature.)

This physical effect, which occurs in isolated cases, has mostly been observed in connection with larger motors.

*EMC-compliant installation of the drive system is a basic prerequisite for preventing premature bearing damage as a result of bearing currents.*

The most important measures for reducing bearing currents:

- Insulated motor bearings at the non-drive-end NDE (standard for 1LA8, 1LL8 and 1PQ8 for converter-fed operation)
- Use of cables with a symmetrical cable cross-section:



- Preference given to a supply with insulated neutral point (IT system)
- Use of grounding cables with low impedance in a large frequency range (DC up to approximately 70 MHz); for example, plaited copper ribbon cables, HF litz wires
- Separate HF equipotential-bonding cable between motor housing and driven machine
- Separate HF equipotential-bonding cable between motor housing and converter PE busbar
- 360° HF contacting of the cable shield on the motor housing and the converter PE busbar. This can be achieved using EMC screwed glands on the motor end and EMC shield clips on the converter end, for example
- Using motor reactors at the converter
- Common-mode filters at the converter output



# SIMOTICS N-compact Non-Standard Motors

## Orientation

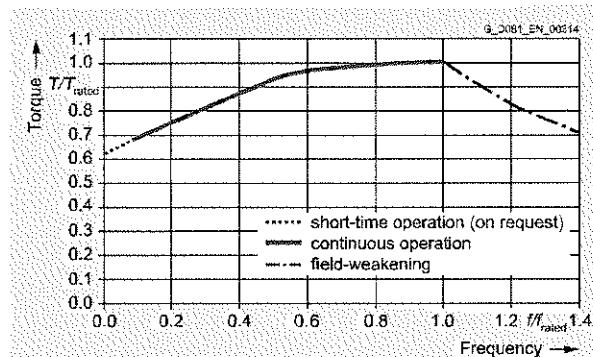
### Technical specifications (continued)

#### Thermal torque limits

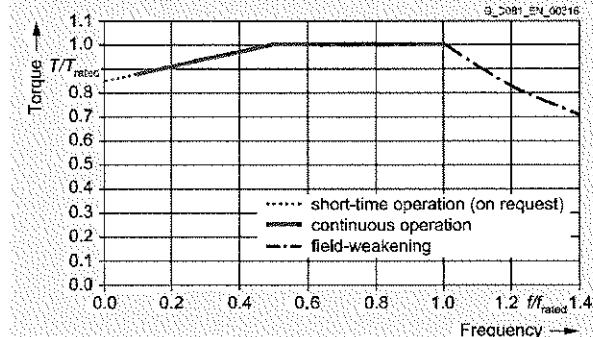
In the case of self-ventilated motors, such as series 1LA8 and 1LL8, the thermally admissible load torques are reduced for continuous operation for speeds below the rated speed. This must be taken into account in those applications in particular that are not subjected to a load torque that is dependent on the square of the speed. Also in the case of forced-air cooled motors of series 1PQ8, the maximum load torques are reduced slightly for high speed ranges.

When motors are operated at speeds above their rated speed (operation in the field-weakening range), the maximum load torque is also reduced.

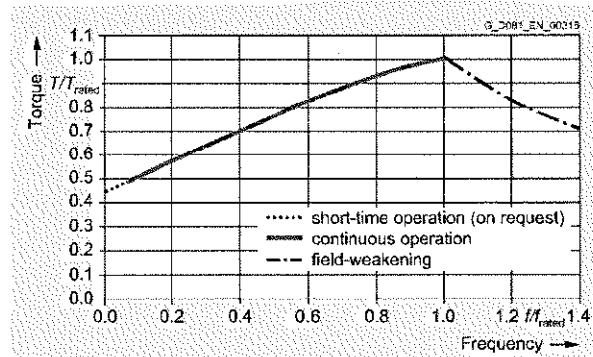
Operating points with speeds lower than one tenth of the rated speed are only possible following consultation. In an inquiry, the load torque, the duration of the load and, if necessary, the frequency (number per time interval) of the occurring load must be specified.



Thermal torque limit characteristic 1LA8



Thermal torque limit characteristic 1PQ8

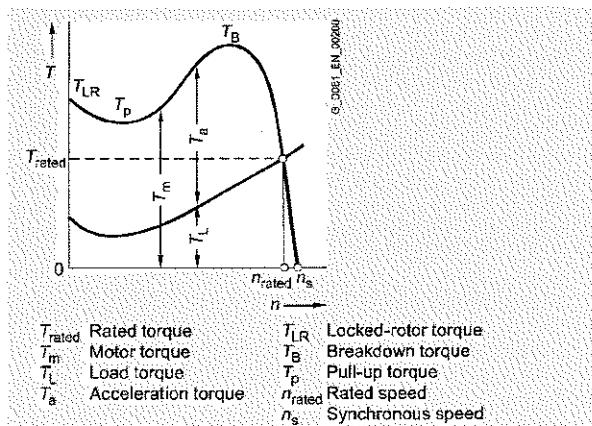


Thermal torque limit characteristic 1LL8

#### Technical explanations regarding torque and determination of the start-up time for mains-fed operation

##### Torque characteristic

The torque generated by a three-phase motor at its shaft varies considerably within the speed range  $n = 0$  to  $n = n_s$ . The characteristic curve of the torque as a function of the speed of a three-phase motor with squirrel-cage rotor (CL) is shown in the following diagram.



The values for locked-rotor torque and breakdown torque as well as for locked-rotor current for a certain motor can be found in the selection and ordering data.

The limit for the mechanical overload capability is the breakdown torque. According to IEC/EN 60034-1 asynchronous motors must have an overload capability at rated voltage and rated frequency of up to 1.6 times the rated torque for a duration of 15 s.

At rated voltage, the pull-up torque of asynchronous motors must – unless otherwise agreed – at least have the rated torque values specified in the following.

For three-phase motors without pole changing with a rated output equal to or greater than 100 kW the following applies:

- 0.3 times their rated torque and at least 0.5 times the locked-rotor torque

According to IEC/EN 60034-1, the following tolerances are admissible:

- For locked-rotor torque, from -15 to 25 % of the stated locked-rotor torque
- For locked-rotor current, up to 20 % of the stated locked-rotor current without lower limit
- For breakdown torque, up to -10 % of the stated breakdown torque
- For pull-up torque, -15 % of the guaranteed value.

Taking these tolerances into account, the locked-rotor torque must be sufficiently higher than the breakaway torque of the driven machine; and the motor torque must constantly exceed the load torque during ramp-up until the operating speed is achieved.

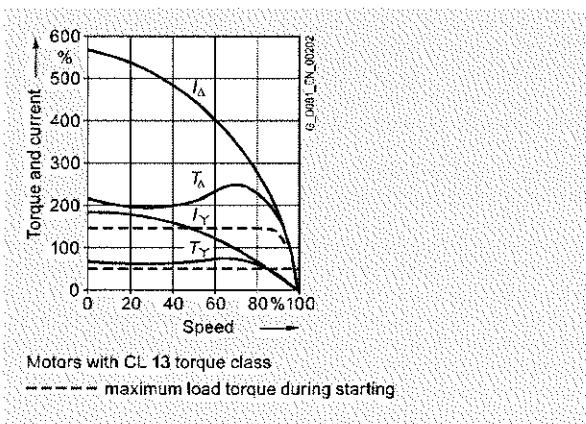
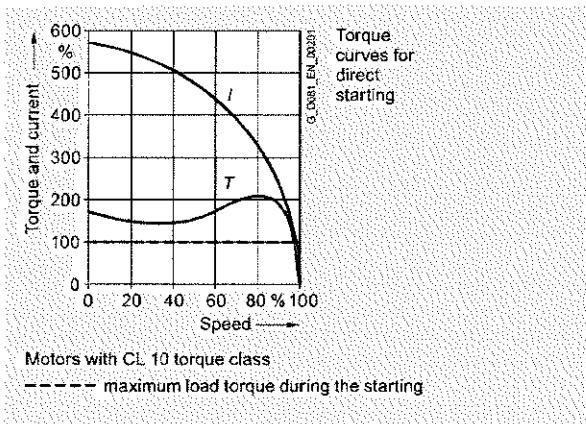
In the case of squirrel-cage motors, the locked-rotor torque and breakdown torque are listed in the selection and ordering data as multiples of the rated torque.

### Technical specifications (continued)

The normal practice is to start squirrel-cage motors directly on line. The torque class indicates that with direct-on-line starting, even if there is 5 % undervoltage, it is possible to start up the motor against a load torque of

- 130 % (for CL 13),
- 100 % (for CL 10),
- 70 % (for CL 7),
- 50 % (for CL 5)

of the rated torque.



The rated torque can be calculated as follows:

$$T_{\text{rated}} = 9.55 \cdot P_{\text{rated}} \cdot \frac{1000}{n_{\text{rated}}}$$

$T_{\text{rated}}$  Rated torque in Nm  
 $n_{\text{rated}}$  Rated speed in rpm  
 $P_{\text{rated}}$  Rated output in kW

The rated speed of the motor differs from the synchronous speed by the slip  $S_{\text{rated}}$ .

It is:

$$S_{\text{rated}} = \frac{n_s - n_{\text{rated}}}{n_s} \cdot 100$$

$S_{\text{rated}}$  Slip in %  
 $n_s$  Synchronous speed in rpm  
 $n_{\text{rated}}$  Rated speed in rpm

### Calculation of the start-up time for direct on-line starting

The start-up time from  $n = 0$  to  $n = n_{\text{op}}$  can be approximately determined from the average acceleration torque.

$$t_{\text{st}} = \frac{\sum J \cdot n_{\text{op}}}{9.55 \cdot T_{\text{aav}}}$$

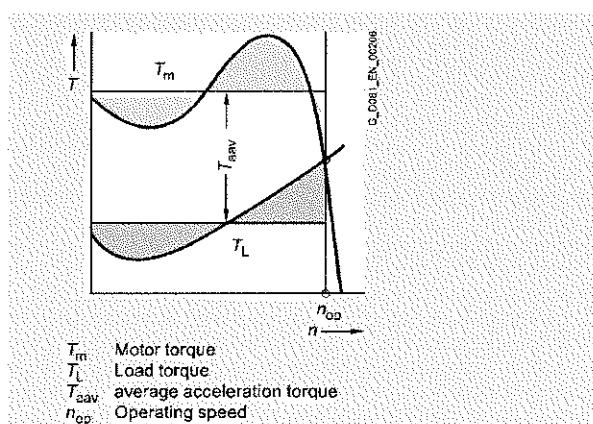
$t_{\text{st}}$  Start-up time in s  
 $J$  Total moment of inertia in  $\text{kgm}^2$   
 $n_{\text{op}}$  Operating speed in rpm  
 $T_{\text{aav}}$  Average acceleration torque in Nm

The total moment of inertia is made up of the motor moment of inertia plus the moment of inertia of the driven machine and the coupling or belt pulleys and is converted to the speed of the motor shaft.

Limit values for the start-up curve of three-phase squirrel-cage motors for voltages up to and including 690 V are included in IEC/EN 60034.

If no sound start-up is possible due to a high moment of inertia and/or a high load torque, a larger motor or a three-phase motor with a SINAMICS frequency converter can be selected for SIMOTICS N-compact motors.

A mechanical solution for coping with heavy starting is to use a starting coupling, whose application is limited by its capability to absorb heat.



Determination of the average acceleration torque

3.0



# SIMOTICS N-compact Non-Standard Motors

## Orientation

### Technical specifications (continued)

#### *Start-up procedure for three-phase motors with squirrel-cage rotor*

Three-phase motors with squirrel-cage rotors should, as far as possible, be started directly on-line.

- It must be observed that the torque and current curve for a specific motor is predetermined, regardless of the heaviness of start-up. Star/delta start-up of motors with squirrel-cage rotor must be used if small locked-rotor currents (e.g. in the supply conditions of the electric power company) or a particularly low start-up torque (soft starting) are required. Locked-rotor torque, breakdown torque and all other torque values as well as the locked-rotor current are 25 to 30 % of the values at direct on-line starting.
- The motor torque must be sufficiently higher than the load torque during start-up in the star stage. The change from star to delta must not occur before approximately the operating speed.

The first diagram shows a case in which star-delta start-up is not appropriate, because the excessive load torque causes the premature change which in turn causes a high torque and current surge that renders the star-delta starting ineffective.

The torque curve can be approximately reduced by the square of the voltage and the current curve linearly with the voltage by reducing the voltage at the motor terminals with the help of a starting transformer or starting resistors.

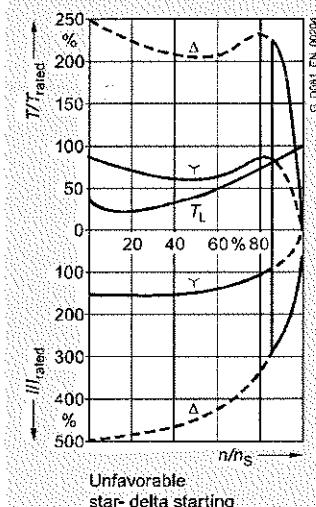
A starting with rated current is possible on the converter – second diagram.

Soft starting for motors with squirrel-cage rotor can also be achieved with short-circuit soft starting (a resistor can be connected in one phase during start-up). The locked-rotor torque can be arbitrarily reduced with the help of this circuit. The locked-rotor current without a resistor or reactor is slightly higher in both phases than with direct on-line starting.

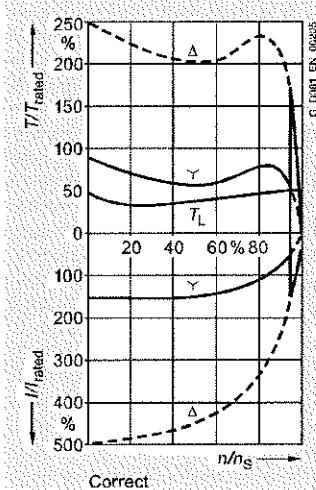
This start-up procedure can be achieved more satisfactorily using the electronic motor starter "SIKOSTART" which limits the torque and the current during starting.

Any inquiries regarding start-up procedures must include the following information:

- Required output and rated speed of the driven machine
- Planned motor speed
- Load torque of the driven machine, depending on the speed of the driven machine or the motor speed
- Total external moment of inertia and rated speed of the driven machine or referred to the motor speed
- Number of starts in a specific time period and duty cycle or
- Characteristics and number of operating cycles in a certain time (method of braking)



Unfavorable star-delta starting



Correct star-delta starting

**Technical specifications (continued)**

*Start-up times and moments of inertia for 1LA8 motors for mains-fed operation (default values)*

The values in the following table are only valid for 1LA8 motors for mains-fed operation (Pages 3/15 and 3/17) and are applicable for continuous heating of 90 % of the rated output at 50 Hz ( $0.9 \times P_{\text{rated}}$ ). At 60 Hz, the admissible moments of inertia must be reduced again by about 20 %. The moment of inertia  $J_{\text{adm}}$  in the tables is the moment of inertia which the driven machine is allowed to have as a maximum in order to start the motor. For this reason, the moment of inertia of the motor is already taken into account in the selection and ordering data on Pages 3/15 and 3/17.

Frame size FS	Type	Locking of brake		Admissible moment of inertia and start-up times when starting up the motor			
		cold	warm	1x cold	Start-up time	1x warm	Start-up time
		Blocking time $t_{\text{Br}}$ s	Blocking time $t_{\text{Br}}$ s	Moment of inertia $J_{\text{adm}}$ kgm <sup>2</sup>	$t_{\text{st}}$ s	Moment of inertia $J_{\text{adm}}$ kgm <sup>2</sup>	$t_{\text{st}}$ s
<b>1LA8 ventilated motors for mains-fed operation (standard series 1LA8 &gt; 2000 rpm at 50 Hz)</b>							
315	1LA8315-2AC..	18	10	125	33.9	48	13.0
315	1LA8317-2AC..	17.5	10	140	33.2	58	13.4
355	1LA8353-2AC..	18	9	175	41.4	33	7.8
355	1LA8355-2AC..	20	10	190	45.8	40	9.7
355	1LA8357-2AC..	15	7.5	180	30.0	40	6.7
400	1LA8403-2AC..	22	13	245	40.2	95	15.7
400	1LA8405-2AC..	19	11	255	37.2	90	13.1
400	1LA8407-2AC..	17	9.5	300	34.9	85	9.9
450	1LA8453-2AE..	21.5	15	178	31.3	83	14.6
450	1LA8455-2AE..	20.5	14	190	30.2	90	14.3
450	1LA8457-2AE..	19	13	200	28.2	95	13.4
<b>1LA8 semi-enclosed motors for mains-fed operation (standard series 1LA8 &gt; 2000 rpm at 50 Hz)</b>							
315	1LA8315-4AB..	22	13	590	36.9	350	21.9
315	1LA8317-4AB..	19	11	730	32.3	425	18.8
355	1LA8353-4AB..	20	11	1000	45.7	270	12.4
355	1LA8355-4AB..	18	10	1020	39.6	280	10.9
355	1LA8357-4AB..	19	10.5	1370	41.9	370	11.3
400	1LA8403-4AB..	20.5	11.5	1420	46.2	430	14.0
400	1LA8405-4AB..	20	11	1600	44.5	480	13.3
400	1LA8407-4AB..	19	10.5	1750	43.6	525	13.1
450	1LA8453-4CE..	17.5	10	950	23.7	300	7.5
450	1LA8455-4AC..	18.5	10.5	1200	26.8	370	8.3
450	1LA8457-4AC..	17	9	1160	22.3	380	7.3
<b>1LA8 non-ventilated motors for mains-fed operation (standard series 1LA8 &gt; 2000 rpm at 50 Hz)</b>							
315	1LA8315-6AB..	33	18	1900	57.4	830	25.1
315	1LA8317-6AB..	31	15.5	2300	55.6	1000	24.2
355	1LA8355-6AB..	40	22	2950	62.2	1350	28.5
355	1LA8356-6AB..	37	18	3150	60	1450	27.9
355	1LA8357-6AB..	40	22	3950	62.5	1800	28.5
400	1LA8403-6AB..	34	18.4	3450	51.1	850	12.6
400	1LA8405-6AB..	32	17.5	3500	43.3	900	11.1
400	1LA8407-6AB..	24	12	2200	25.6	740	8.6
450	1LA8453-6AB..	16	7	1400	15.5	580	6.2
450	1LA8455-6AB..	19	8.5	1700	18.1	670	7.1
450	1LA8457-6AB..	16	7	1800	15.9	720	6.4
<b>1LA8 non-ventilated motors for mains-fed operation (standard series 1LA8 &gt; 3000 rpm at 50 Hz)</b>							
315	1LA8315-8AB..	40	22	4800	109.5	1950	44.5
315	1LA8317-8AB..	42	23	6800	125.9	2500	46.3
355	1LA8355-8AB..	41	22.5	6200	89.6	3100	44.8
355	1LA8357-8AB..	40	22	7600	88.7	3800	44.3
400	1LA8403-8AB..	55	30	9700	107.5	4400	48.8
400	1LA8405-8AB..	54	29.5	11000	102.9	5400	50.5
400	1LA8407-8AB..	52	28.5	11200	95.4	5400	46.0
450	1LA8453-8AB..	44	25	9800	78.8	2900	23.3
450	1LA8455-8AB..	42	23	10500	71.4	3000	20.4
450	1LA8457-8AB..	44	25	12400	78.1	3700	23.3

# SIMOTICS N-compact Non-Standard Motors

## Orientation

### Technical specifications (continued)

Frame size FG	Type	Locking of brake		Admissible moment of inertia and start-up times when starting up the motor			
		cold	warm	1x cold	1x warm		
		Blocking time $t_{Br}$ s	Blocking time $t_{Br}$ s	Moment of inertia $J_{adm}$ kgm <sup>2</sup>	Start-up time $t_{st}$ s	Moment of inertia $J_{adm}$ kgm <sup>2</sup>	Start-up time $t_{st}$ s
<b>Cooling ventilation</b> (IP 54) (IP 55) (IP 56) (IP 57) (IP 58) (IP 59) (IP 60) (IP 61) (IP 62) (IP 63) (IP 64) (IP 65) (IP 66) (IP 67)							
315	1LA8315-2EC..	18	10	125	33.9	48	13.0
315	1LA8317-2EC..	17.5	10	140	33.2	58	13.4
355	1LA8353-2FC..	18	9	175	41.4	33	7.8
<b>Cooling ventilation</b> (IP 54) (IP 55) (IP 56) (IP 57) (IP 58) (IP 59) (IP 60) (IP 61) (IP 62) (IP 63) (IP 64) (IP 65) (IP 66) (IP 67)							
315	1LA8316-4EB..	28	13	590	36.7	350	21.9
315	1LA8318-4EB..	31	9	730	38.4	330	17.5
355	1LA8353-4EB..	23	9	1000	49.6	270	13.6
<b>Cooling ventilation</b> (IP 54) (IP 55) (IP 56) (IP 57) (IP 58) (IP 59) (IP 60) (IP 61) (IP 62) (IP 63) (IP 64) (IP 65) (IP 66) (IP 67)							
315	1LA8317-6EB..	49	17	1900	72.1	830	31.6
315	1LA8318-6EB..	42	16	2300	71	1000	31
355	1LA8355-6EB..	40	22	2950	62.2	1350	28.5
355	1LA8356-6EB..	37	18	3150	60	1450	27.9

# SIMOTICS N-compact Non-Standard Motors

## Orientation

**Standard delivery times:**

10 working days	20 working days	On request
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Overview of selection and ordering data  
with base prices and standard delivery times

### Overview

Category	SIMOTICS N-compact Non-Standard Motors					
Series version	Standard series IE3					
Cooling	Self-ventilated (IC 411)					
Degree of protection	IP55, optionally IP56 (non-heavy-sea) or IP65		IP55, optionally IP56 (non-heavy-sea) or IP65		IP23	
Insulation	Thermal class 155 (F), optionally 180 (H)		Thermal class 155 (F), optionally 180 (H)		Thermal class 155 (F), optionally 180 (H)	
Utilization	Thermal class 130 (B)		Thermal class 130 (B)		Thermal class 130 (B)	
Number of poles	2, 4, 6		2, 4, 6, 8		2, 4, 6, 8	
Frame size (FS)	315 ... 355		315 ... 450		315 ... 450	
Rated output at 50 Hz	250 ... 400 kW		160 ... 1000 kW		200 ... 1250 kW	
Synchronous speed	1000 ... 3600 rpm		750 ... 3600 rpm		750 ... 3600 rpm	
Rated torque at 50 Hz	801 ... 3418 Nm		801 ... 8090 Nm		1010 ... 10300 Nm	
Efficiency	Premium Efficiency IE3		High Efficiency IE2		High Efficiency IE2	
Metal factor for metal surcharges (MS)	N - W ---		N - W ---		N - W ---	
Price group	6ZZ		6ZZ		6ZZ	
Range of motors with Order No., delivery time and base price plus MS for type of construction IE3						
Frame size	$P_{rated}$ 50 Hz class KW	IE Order No. ▲ New	$P_{rated}$ 50 Hz class KW	IE Order No. ▲ New ▼ Standardline	$P_{rated}$ 50 Hz class KW	IE Order No.
315	250	IE3 ▲ 1LA8315-2EC..	250	IE2 1LA8315-2AC..	315	IE2 1LL8315-2AC..
315	315	IE3 ▲ 1LA8317-2EC..	315	IE2 1LA8317-2AC..	400	- 1LL8317-2AC..
355	355	IE3 ▲ 1LA8353-2EC..	355	IE2 1LA8353-2AC..	450	- 1LL8353-2AD..
355			400	- 1LA8355-2AC..	500	- 1LL8355-2AD..
355			500	- 1LA8357-2AC..	630	- 1LL8357-2AD..
400			560	- 1LA8403-2AC..	710	- 1LL8403-2AD..
400			630	- 1LA8405-2AC..	800	- 1LL8405-2AD..
400			710	- 1LA8407-2AC..	900	- 1LL8407-2AD..
450			800	- 1LA8453-2AE..	1000	- 1LL8453-2AE..
450			900	- 1LA8455-2AE..	1120	- 1LL8455-2AE..
450			1000	- 1LA8457-2AE..	1250	- 1LL8457-2AE..
Range of motors with Order No., delivery time and base price plus MS for type of construction IE4						
315	250	IE3 ▲ 1LA8316-4EB..	250	IE2 ▼ 1LA8315-4AB..	315	IE2 1LL8315-4AC..
315	315	IE3 ▲ 1LA8318-4EB..	315	IE2 ▼ 1LA8317-4AB..	400	- 1LL8317-4AC..
355	355	IE3 ▲ 1LA8353-4EB..	355	IE2 ▼ 1LA8353-4AB..	450	- 1LL8353-4AC..
355			400	- ▼ 1LA8355-4AB..	500	- 1LL8355-4AC..
355			500	- ▼ 1LA8357-4AB..	630	- 1LL8357-4AC..
400			560	- 1LA8403-4AB..	710	- 1LL8403-4AC..
400			630	- 1LA8405-4AB..	800	- 1LL8405-4AC..
400			710	- 1LA8407-4AB..	900	- 1LL8407-4AC..
450			800	- 1LA8453-4AC..	1000	- 1LL8453-4AD..
450			900	- 1LA8455-4AC..	1120	- 1LL8455-4AD..
450			1000	- 1LA8457-4AC..	1250	- 1LL8457-4AD..
Range of motors with Order No., delivery time and base price plus MS for type of construction IE6						
315	200	IE3 ▲ 1LA8317-6EB..	200	IE2 1LA8315-6AB..	250	IE2 1LL8315-6AC..
315	250	IE3 ▲ 1LA8318-6EB..	250	IE2 1LA8317-6AB..	315	IE2 1LL8317-6AC..
355	315	IE3 ▲ 1LA8355-6EB..	315	IE2 1LA8355-6AB..	400	- 1LL8355-6AC..
355	355	IE3 ▲ 1LA8356-6EB..	355	IE2 ▲ 1LA8356-6AB..		
355			400	- 1LA8357-6AB..	500	- 1LL8357-6AC..
400			450	- 1LA8403-6AB..	560	- 1LL8403-6AC..
400			500	- 1LA8405-6AB..	630	- 1LL8405-6AC..
400			560	- 1LA8407-6AB..	710	- 1LL8407-6AC..
450			630	- 1LA8453-6AB..	800	- 1LL8453-6AD..
450			710	- 1LA8455-6AB..	900	- 1LL8455-6AD..
450			800	- 1LA8457-6AB..	1000	- 1LL8457-6AD..
315			160	- 1LA8315-8AB..	200	- 1LL8315-8AC..
315			200	- 1LA8317-8AB..	250	- 1LL8317-8AC..
355			250	- 1LA8355-8AB..	315	- 1LL8355-8AC..
355			315	- 1LA8357-8AB..	400	- 1LL8357-8AC..
400			355	- 1LA8403-8AB..	450	- 1LL8403-8AD..
400			400	- 1LA8405-8AB..	500	- 1LL8405-8AD..
400			450	- 1LA8407-8AB..	560	- 1LL8407-8AD..
450			500	- 1LA8453-8AB..	630	- 1LL8453-8AD..
450			560	- 1LA8455-8AB..	710	- 1LL8455-8AD..
450			630	- 1LA8457-8AB..	800	- 1LL8457-8AD..

3.0

# SIMOTICS N-compact Non-Standard Motors

## Orientation

**Overview of selection and ordering data  
with base prices and standard delivery times**

<b>Standard delivery times:</b>		
10 working days	20 working days	On request

### Overview (continued)

Category	N2 – Motors specially designed for converter fed operation – optimally matched to SINAMICS and SIMOVERT MASTERDRIVES drive systems	
Series version	Standard version 12-N	Standard version 1LA
Cooling	Self-ventilated (IC 411)	Self-ventilated (IC 411)
Degree of protection	IP55, optionally IP56 (non-heavy-sea) or IP65	IP55, optionally IP56 (non-heavy-sea) or IP65
Insulation	Thermal class 155 (F), optionally 180 (H)	Thermal class 155 (F), optionally 180 (H)
Utilization	Thermal class 155 (F)	Thermal class 155 (F)
Number of poles	2, 4, 6, 8	2, 4, 6, 8
Frame size (FS)	315 ... 450	315 ... 450
Rated output at 50 Hz	180 ... 1000 kW	145 ... 980 kW
Synchronous speed	750 ... 3600 rpm	750 ... 3600 rpm
Rated torque at 50 Hz	801 ... 8090 Nm	770 ... 7691 Nm
Efficiency	High Efficiency	High Efficiency
Metal factor for metal surcharges (MS)	N - W ---	N - W ---
Price group	6ZZ	6ZZ

Order No. and Order line, delivery time and base price plus MS for type of construction in 50 Hz				
Frame size	P <sub>rated</sub> 50 Hz	Order No.	P <sub>rated</sub> 50 Hz	Order No.
FS	KW	▲ New ▼ Standardline	KW	▲ New
315	250	1LA8315-2PC..	240	1LA8315-2PM..
315	315	1LA8317-2PC..	300	1LA8317-2PM..
355	355	1LA8353-2PC..	345	1LA8353-2PM..
355	400	1LA8355-2PC..	390	1LA8355-2PM..
355	500	1LA8357-2PC..	485	1LA8357-2PM..
400	560	1LA8403-2PC..	545	1LA8403-2PM..
400	630	1LA8405-2PC..	610	1LA8405-2PM..
400	710	1LA8407-2PC..	680	1LA8407-2PM..
450	800	1LA8453-2PE..	775	1LA8453-2PM..
450	900	1LA8455-2PE..	875	1LA8455-2PM..
450	1000	1LA8457-2PE..	970	1LA8457-2PM..
315	250	1LA8315-4PB..	235	1LA8315-4PM..
315	315	1LA8317-4PB..	290	1LA8317-4PM..
355	355	1LA8353-4PB..	340	1LA8353-4PM..
355	400	1LA8355-4PB..	385	1LA8355-4PM..
355	500	1LA8357-4PB..	480	1LA8357-4PM..
400	560	1LA8403-4PB..	545	1LA8403-4PM..
400	630	1LA8405-4PB..	615	1LA8405-4PM..
400	710	1LA8407-4PB..	690	1LA8407-4PM..
450	800	1LA8453-4PC..	785	1LA8453-4PM..
450	900	1LA8455-4PC..	880	1LA8455-4PM..
450	1000	1LA8457-4PC..	980	1LA8457-4PM..
315	200	1LA8315-6PB..	190	1LA8315-6PM..
315	250	1LA8317-6PB..	235	1LA8317-6PM..
355	315	1LA8355-6PB..	300	1LA8355-6PM..
355	355	1LA8356-6PB..	340	1LA8356-6PM..
355	400	1LA8357-6PB..	380	1LA8357-6PM..
400	450	1LA8403-6PB..	435	1LA8403-6PM..
400	500	1LA8405-6PB..	485	1LA8405-6PM..
400	560	1LA8407-6PB..	545	1LA8407-6PM..
450	630	1LA8453-6PB..	615	1LA8453-6PM..
450	710	1LA8455-6PB..	690	1LA8455-6PM..
450	800	1LA8457-6PB..	780	1LA8457-6PM..
315	160	1LA8315-8PB..	145	1LA8315-8PM..
315	200	1LA8317-8PB..	180	1LA8317-8PM..
355	250	1LA8355-8PB..	230	1LA8355-8PM..
355	315	1LA8357-8PB..	290	1LA8357-8PM..
400	355	1LA8403-8PB..	335	1LA8403-8PM..
400	400	1LA8405-8PB..	375	1LA8405-8PM..
400	450	1LA8407-8PB..	425	1LA8407-8PM..
450	500	1LA8453-8PB..	485	1LA8453-8PM..
450	560	1LA8455-8PB..	545	1LA8455-8PM..
450	630	1LA8457-8PB..	600	1LA8457-8PM..

# SIMOTICS N-compact Non-Standard Motors

## Orientation

**Standard delivery times:**

10 working days	20 working days	On request
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Overview of selection and ordering data  
with base prices and standard delivery times

### Overview (continued)

Category	6.2 – Motors specially designed for converter-fed operation – optimally matched to SINAMICS and SIMOVETMASTERDRIVES drive systems			
Series version	SIMOTICS N-compact			
Cooling	Self-ventilated with through-ventilation (IC 01)	Self-ventilated with through-ventilation (IC 01)		
Degree of protection	IP23	IP23		
Insulation	Thermal class 155 (F), optionally 180 (H)	Thermal class 155 (F), optionally 180 (H)		
Utilization	Thermal class 155 (F)	Thermal class 155 (F)		
Number of poles	2, 4, 6, 8	2, 4, 6, 8		
Frame size (FS)	315 ... 450	315 ... 450		
Rated output at 50 Hz	200 ... 1250 kW	180 ... 1225 kW		
Synchronous speed	750 ... 3600 rpm	750 ... 3600 rpm		
Rated torque at 50 Hz	1010 ... 10300 Nm	962 ... 9782 Nm		
Efficiency	High Efficiency	High Efficiency		
Metal factor for metal surcharges (MS)	N - W - -	N - W - -		
Price group	6ZZ	6ZZ		
Order No. according to the tables below				
Frame size	P <sub>rated</sub> , 50 Hz KW	Order No.	P <sub>rated</sub> , 50 Hz KW	Order No.
FS				
315	315	1LL8315-2PC..	300	1LL8315-2PM..
315	400	1LL8317-2PC..	380	1LL8317-2PM..
355	450	1LL8353-2PD..	435	1LL8353-2PM..
355	500	1LL8355-2PD..	485	1LL8355-2PM..
355	630	1LL8357-2PD..	610	1LL8357-2PM..
400	710	1LL8403-2PD..	690	1LL8403-2PM..
400	800	1LL8405-2PD..	770	1LL8405-2PM..
400	900	1LL8407-2PD..	860	1LL8407-2PM..
450	1000	1LL8453-2PE..	965	1LL8453-2PM..
450	1120	1LL8455-2PE..	1085	1LL8455-2PM..
450	1250	1LL8457-2PE..	1210	1LL8457-2PM..
315	315	1LL8315-4PC..	295	1LL8315-4PM..
315	400	1LL8317-4PC..	365	1LL8317-4PM..
355	450	1LL8353-4PC..	430	1LL8353-4PM..
355	500	1LL8355-4PC..	480	1LL8355-4PM..
355	630	1LL8357-4PC..	600	1LL8357-4PM..
400	710	1LL8403-4PC..	690	1LL8403-4PM..
400	800	1LL8405-4PC..	780	1LL8405-4PM..
400	900	1LL8407-4PC..	870	1LL8407-4PM..
450	1000	1LL8453-4PD..	980	1LL8453-4PM..
450	1120	1LL8455-4PD..	1095	1LL8455-4PM..
450	1250	1LL8457-4PD..	1225	1LL8457-4PM..
315	250	1LL8315-6PC..	235	1LL8315-6PM..
315	315	1LL8317-6PC..	295	1LL8317-6PM..
355	400	1LL8355-6PC..	380	1LL8355-6PM..
355	500	1LL8357-6PC..	475	1LL8357-6PM..
400	560	1LL8403-6PC..	540	1LL8403-6PM..
400	630	1LL8405-6PC..	610	1LL8405-6PM..
400	710	1LL8407-6PC..	690	1LL8407-6PM..
450	800	1LL8453-6PD..	780	1LL8453-6PM..
450	900	1LL8455-6PD..	870	1LL8455-6PM..
450	1000	1LL8457-6PD..	975	1LL8457-6PM..
315	200	1LL8315-8PC..	180	1LL8315-8PM..
315	250	1LL8317-8PC..	225	1LL8317-8PM..
355	315	1LL8355-8PC..	285	1LL8355-8PM..
355	400	1LL8357-8PC..	365	1LL8357-8PM..
400	450	1LL8403-8PD..	420	1LL8403-8PM..
400	500	1LL8405-8PD..	465	1LL8405-8PM..
400	560	1LL8407-8PD..	525	1LL8407-8PM..
450	630	1LL8453-8PD..	610	1LL8453-8PM..
450	710	1LL8455-8PD..	690	1LL8455-8PM..
450	800	1LL8457-8PD..	760	1LL8457-8PM..

3.0



# SIMOTICS N-compact Non-Standard Motors

## Orientation

**Overview of selection and ordering data  
with base prices and standard delivery times**

10 working days	20 working days	On request
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### Overview (continued)

Category	<b>3.2 Motors specially designed for converter-fed operation – optimally matched to SINAMICS and SIMOVERT / MASTERDRIVES drive systems</b>					
	Order No.: 1PQ8315-2PC..		Order No.: 1PQ8317-2PC..		Order No.: 1PQ8353-2PM..	
Series version						
Cooling	Forced-air cooled with mounted separately driven fan (IC 416)		Forced-air cooled with mounted separately driven fan (IC 416)			
Degree of protection	IP55, optionally IP56 (non-heavy-sea) or IP65		IP55, optionally IP56 (non-heavy-sea) or IP65			
Insulation	Thermal class 155 (F), optionally 180 (H)		Thermal class 155 (F), optionally 180 (H)			
Utilization	Thermal class 155 (F)		Thermal class 155 (F)			
Number of poles	2, 4, 6, 8		2, 4, 6, 8			
Frame size (FS)	315 ... 450		315 ... 450			
Rated output at 50 Hz	160 ... 1000 kW		145 ... 980 kW			
Synchronous speed	750 ... 3600 rpm		750 ... 3600 rpm			
Rated torque at 50 Hz	801 ... 8090 Nm		770 ... 7691 Nm			
Efficiency	High Efficiency		High Efficiency			
Metal factor for metal surcharges (MS)	N - W ---		N - W ---			
Price group	6ZZ		6ZZ			
List of motors with Order No., rated output, base price, type of construction and Order No. for each frame size.						
Frame size	P <sub>rated</sub> 50 Hz	Order No. ▲ New	P <sub>rated</sub> 50 Hz	Order No. ▲ New		
FS	kW		kW			
315	250	1PQ8315-2PC..	240	1PQ8315-2PM..		
315	315	1PQ8317-2PC..	300	1PQ8317-2PM..		
355	355	1PQ8353-2PC..	345	1PQ8353-2PM..		
355	400	1PQ8355-2PC..	390	1PQ8355-2PM..		
355	500	1PQ8357-2PC..	485	1PQ8357-2PM..		
400	560	1PQ8403-2PC..	545	1PQ8403-2PM..		
400	630	1PQ8405-2PC..	610	1PQ8405-2PM..		
400	710	1PQ8407-2PC..	680	1PQ8407-2PM..		
450	800	1PQ8453-2PE..	775	1PQ8453-2PM..		
450	900	1PQ8455-2PE..	875	1PQ8455-2PM..		
450	1000	1PQ8457-2PE..	970	1PQ8457-2PM..		
315	250	1PQ8315-4PB..	235	1PQ8315-4PM..		
315	315	1PQ8317-4PB..	290	1PQ8317-4PM..		
355	355	1PQ8353-4PB..	340	1PQ8353-4PM..		
355	400	1PQ8355-4PB..	385	1PQ8355-4PM..		
355	500	1PQ8357-4PB..	480	1PQ8357-4PM..		
400	560	1PQ8403-4PB..	545	1PQ8403-4PM..		
400	630	1PQ8405-4PB..	615	1PQ8405-4PM..		
400	710	1PQ8407-4PB..	690	1PQ8407-4PM..		
450	800	1PQ8453-4PC..	785	1PQ8453-4PM..		
450	900	1PQ8455-4PC..	880	1PQ8455-4PM..		
450	1000	1PQ8457-4PC..	980	1PQ8457-4PM..		
315	200	1PQ8315-6PB..	190	1PQ8315-6PM..		
315	250	1PQ8317-6PB..	235	1PQ8317-6PM..		
355	315	1PQ8355-6PB..	300	1PQ8355-6PM..		
355	355	▲ 1PQ8356-6PB..	340	▲ 1PQ8356-6PM..		
355	400	1PQ8357-6PB..	380	1PQ8357-6PM..		
400	450	1PQ8403-6PB..	435	1PQ8403-6PM..		
400	500	1PQ8405-6PB..	485	1PQ8405-6PM..		
400	560	1PQ8407-6PB..	545	1PQ8407-6PM..		
450	630	1PQ8453-6PB..	615	1PQ8453-6PM..		
450	710	1PQ8455-6PB..	690	1PQ8455-6PM..		
450	800	1PQ8457-6PB..	780	1PQ8457-6PM..		
315	160	1PQ8315-8PB..	145	1PQ8315-8PM..		
315	200	1PQ8317-8PB..	180	1PQ8317-8PM..		
355	250	1PQ8355-8PB..	230	1PQ8355-8PM..		
355	315	1PQ8357-8PB..	290	1PQ8357-8PM..		
400	355	1PQ8403-8PB..	335	1PQ8403-8PM..		
400	400	1PQ8405-8PB..	375	1PQ8405-8PM..		
400	450	1PQ8407-8PB..	425	1PQ8407-8PM..		
450	500	1PQ8453-8PB..	485	1PQ8453-8PM..		
450	560	1PQ8455-8PB..	545	1PQ8455-8PM..		
450	630	1PQ8457-8PB..	600	1PQ8457-8PM..		

# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for mains-fed operation

IE3

Self-ventilated motors  
Cast-Iron Series 1LA8

### Selection and ordering data

Operating values at rated output														Cast-Iron series																					
P <sub>rated</sub> , 50 Hz	P <sub>rated</sub> , 60 Hz	Frame size	n <sub>rated</sub> , 50 Hz	T <sub>rated</sub> , 50 Hz	IE class	η <sub>ra</sub> led.	η <sub>ra</sub> ted.	η <sub>ra</sub> led.	cos φ <sub>rated</sub>	I <sub>rated</sub> , 50 Hz	I <sub>rated</sub> , 50 Hz	T <sub>IR</sub> / T <sub>ra</sub>	I <sub>pA</sub> / I <sub>ra</sub>	L <sub>WA</sub> , 50 Hz	m <sub>M</sub> B3	J	Torque class																		
250	280	315	2979	801	IE3	95.8	95.8	95.1	0.90	420	245	1.8	7.0	2.8	82 (75) <sup>2)</sup> 97 (90) <sup>2)</sup>	▲ 1LA8315-2EC	1300	2.7	10																
315	353	315	2979	1010	IE3	96.0	96.1	95.5	0.91	520	300	1.8	7.0	2.8	82 (75) <sup>2)</sup> 97 (90) <sup>2)</sup>	▲ 1LA8317-2EC	1500	3.3	10																
355	398	355	2980	1140	IE3	96.0	96.1	95.5	0.90	590	345	1.7	6.5	2.5	77 <sup>3)</sup> 92 <sup>3)</sup>	▲ 1LA8353-2EC	1900	4.8	10																
250	288	315	1490	1602	IE3	96.0	96.0	95.5	0.85	440	255	1.7	7.0	3.2	75	90	▲ 1LA8316-4EB	1500	4.1	13															
315	362	315	1486	2021	IE3	96.0	96.0	95.8	0.86	550	320	1.6	6.5	3.0	75	90	▲ 1LA8318-4EB	1600	4.8	13															
355	408	355	1489	2277	IE3	96.1	96.0	95.6	0.85	630	365	1.6	6.5	2.9	75	90	▲ 1LA8353-4EB	2000	6.1	13															
200	230	315	993	1923	IE3	95.8	95.7	95.1	0.84	360	210	1.8	6.5	2.7	68	82	▲ 1LA8317-6EB	1300	7.3	13															
250	288	315	992	2407	IE3	95.8	95.7	95.2	0.84	450	260	1.7	6.2	2.7	68	82	▲ 1LA8318-6EB	1500	7.7	13															
315	362	355	992	3033	IE3	95.9	95.9	95.6	0.85	560	325	1.9	6.5	2.8	71	86	▲ 1LA8355-6EB	2000	13	13															
355	408	355	992	3418	IE3	96.0	96.1	95.9	0.86	620	360	1.9	6.8	2.8	71	86	▲ 1LA8356-6EB	2200	15	13															
<b>Voltages</b>		No. of poles	<b>Motor type</b>		<b>Version</b>												<b>Order code(s)</b>																		
50 Hz	400 VΔ/690 VY	2, 4, 6	1LA8315 ... 356		<b>Standard</b>											6		—																	
	500 VA	2, 4, 6	1LA8315 ... 356		Without additional charge											5		—																	
60 Hz <sup>1)</sup>	460 VA	2, 4, 6	1LA8315 ... 356		Without additional charge											9		L2F																	
<b>Further voltages<sup>1)</sup></b>		For additional charges, code numbers, order codes and descriptions, see from Page 3/32.														9		...																	
<b>For types of construction</b>		see Page 3/33. <b>Motor type</b>														<b>Order code(s)</b>																			
Without flange	IM B3	1LA8315 ... 356		<b>Standard</b>																0	—														
	IM V5, IM V6	1LA8315 ... 356		With additional charge																0	—														
With flange	IM V1 without protective cover	1LA8315 ... 356		With additional charge																8	—														
	IM V1 with protective cover	1LA8315 ... 356		With additional charge																The "Second shaft extension" option (K16) is not possible.	4	—													
	IM B3S	1LA8315 ... 356		With additional charge																6	—														
<b>Special versions</b>																<b>Order code(s)</b>																			
Options	For additional charges, order codes and descriptions, see from Page 3/34.														1LA8...-...-Z...-+...-+...																				
<b>Motor type 1LA8</b>		315-2	317-2	353-2	316-4	318-4	353-4	317-6	318-6	355-6	356-6																								
400 V	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes																								
500 V	—	—	—	Yes	—	—	Yes	—	—	—	—																								
690 V	—	—	—	—	—	—	—	—	—	—	—																								
Standard use	3600	3600	3600	3000	3000	2500	2950	2950	2500	2500	2500																								
IM V1 type	—	—	3100	—	—	—	—	—	—	—	—																								
Ex protection	—	—	—	2650	2650	2350	2350	2350	2350	2100	2100																								



<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

<sup>2)</sup> Low-noise version in brackets. To reduce noise, 2-pole motors can be equipped with an axial fan for one direction of rotation. Clockwise rotation order code K37, counter-clockwise rotation K38.

<sup>3)</sup> Standard version with axial fan for clockwise rotation. Without order code K37. For counter-clockwise rotation, order code K38 is necessary.

# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for mains-fed operation

Self-ventilated motors  
Cast-Iron series T, AB

IE2

### Selection and ordering data (continued)

P <sub>rated</sub> , P <sub>rated</sub> 50 Hz 60 Hz	Frame size 1)	I <sub>rated</sub> , 50 Hz 50 Hz	IE class	η <sub>ra- ted, 50 Hz</sub>	η <sub>ra- ted, 50 Hz</sub>	cos φ <sub>rated</sub> , 50 Hz, 50 Hz	I <sub>rated</sub> , 400 V	I <sub>rated</sub> , 690 V	I <sub>LR</sub> / I <sub>rated</sub>	I <sub>P</sub> / I <sub>rated</sub>	T <sub>P</sub> / I <sub>rated</sub>	I <sub>pA</sub> , 50 Hz	Cast-Iron series			
													mIM B3	J	Torque class	
kW	kW	FS	rpm	Nm	%	%	%	A	A	dB(A)	dB(A)	▼ Standardline	kg	kgm <sup>2</sup>	CL	
<b>Calculation: Thermal class IEC (temp. rise class) or IEC 50188 class of protection utilization in accordance with thermal class IEC (temperature class IEC)</b>																
<b>Condition: 3000 rpm at 50 Hz, 3000 rpm at 60 Hz<sup>1)</sup></b>																
250	280	315	2979	801	IE2	95.7	95.7	95.1	0.90	420	245	1.8	7.0	2.8	82 (75) <sup>2)</sup>	97 (90) <sup>2)</sup>
315	353	315	2979	1010	IE2	95.7	95.7	95.5	0.91	520	300	1.8	7.0	2.8	82 (75) <sup>2)</sup>	97 (90) <sup>2)</sup>
355	398	355	2980	1140	IE2	95.7	95.7	95.5	0.90	590	345	1.7	6.5	2.5	77 <sup>3)</sup>	92 <sup>3)</sup>
400	448	355	2980	1280	-	96.2	96.3	96.0	0.91	660	380	1.7	6.5	2.5	77 <sup>3)</sup>	92 <sup>3)</sup>
500	560	355	2982	1600	-	96.6	96.7	96.2	0.91	820	475	1.8	6.5	2.6	77 <sup>3)</sup>	92 <sup>3)</sup>
560	616	400	2985	1790	-	96.6	96.7	96.4	0.91	920	530	1.6	7.0	2.8	79 <sup>3)</sup>	94 <sup>3)</sup>
630	693	400	2985	2020	-	96.6	96.7	96.6	0.91	1040	600	1.6	7.0	2.8	79 <sup>3)</sup>	94 <sup>3)</sup>
710	781	400	2985	2270	-	96.8	96.9	96.8	0.91	-	670 <sup>4)</sup>	1.7	7.0	2.8	79 <sup>3)</sup>	94 <sup>3)</sup>
800	-	450	2986	2560	-	96.7	96.8	96.5	0.91	-	760	0.9	7.0	3.0	81 <sup>3)</sup>	96 <sup>3)</sup>
900	-	450	2986	2880	-	96.8	96.9	96.5	0.92	-	850	0.9	7.0	2.8	81 <sup>3)</sup>	96 <sup>3)</sup>
1000	-	450	2986	3200	-	96.9	97.0	96.7	0.93	-	930	0.9	7.0	2.7	81 <sup>3)</sup>	96 <sup>3)</sup>
250	288	315	1488	1600	IE2	95.5	95.6	95.2	0.87	435	250	1.8	6.5	2.8	75	87
315	362	315	1488	2020	IE2	95.7	95.8	95.5	0.87	550	315	2.0	6.8	2.8	75	87
355	408	355	1488	2280	IE2	95.8	95.9	95.5	0.87	610	355	1.8	6.0	2.5	75	90
400	460	355	1488	2570	-	95.9	96.0	95.7	0.87	690	400	2.0	6.2	2.5	75	90
500	575	355	1488	3210	-	96.2	96.3	96.1	0.88	850	495	2.0	6.5	2.5	75	90
560	644	400	1492	3580	-	96.2	96.3	95.8	0.88	950	550	1.9	6.5	2.7	78	93
630	725	400	1492	4030	-	96.4	96.5	95.9	0.88	1060	620	1.9	6.8	2.7	78	93
710	817	400	1492	4540	-	96.5	96.6	96.2	0.89	-	690 <sup>4)</sup>	1.9	6.8	2.7	78	93
800	920	450	1492	5120	-	96.5	96.6	96.1	0.88	-	790 <sup>4)</sup>	1.6	7.0	2.6	81	96
900	1040	450	1492	5760	-	96.6	96.7	96.2	0.87	-	900 <sup>5)</sup>	1.6	7.0	2.6	81	96
1000	1150	450	1492	6400	-	96.6	96.7	96.3	0.89	-	970 <sup>5)</sup>	1.7	7.0	2.6	81	96
<b>Voltages</b>																
No. of poles																
50 Hz	400 VΔ/690 VY	2, 4														Order code(s)
	690 VΔ	2, 4														6 -
	500 VΔ	2, 4														0 -
60 Hz <sup>1)</sup>	460 VA	2, 4														5 -
Further voltages <sup>1)</sup>																L2F
For types of construction	see Page 3/33															Order code(s)
Without flange	IM B3															0 -
	IM V5, IM V6															0 -
With flange	IM V1 without protective cover															8 -
	IM V1 with protective cover															4 -
	IM B35															6 -
<b>Special versions</b>																
▼ Standardline	No. of poles															Order code(s)
With price and delivery time advantages	4															1LA83...-4AB 6 0 - Z B20+...+... 5 0 - Z B20+...+... -
Options																1LA8...-...-... - Z ...+...+...+...
<b>Motor type 1LA8</b>																
315-2 317-2 353-2 355-2 357-2 403-2 405-2 407-2 453-2 455-2 457-2 315-4 317-4 353-4 355-4 357-4 403-4 405-4 407-4 453-4 455-4 457-4																
<b>Order code required</b>																
400 V	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	Yes	Yes	Yes	Yes	- - - - -
500 V	-	-	Yes	Yes	-	-	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes Yes Yes Yes
690 V	-	-	-	-	-	-	-	-	Yes	Yes	Yes	-	-	-	-	Yes Yes
Standard	3600	3600	3600	3600	3600	3600	3600	3000	3000	3000	3000	2500	2500	2200	2200	2100 2100 2100 2100
IM V1	-	-	3100	3100	3100	3100	3100	3100	-	-	-	-	-	-	-	2100 2100 2100 1800 1800 1800
Ex prot.	-	-	-	-	-	-	-	-	-	-	-	2650	2650	2350	2350	2100 2100 2100 1900 1900 1900

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

<sup>2)</sup> Low-noise version in brackets. To reduce noise, 2-pole motors can be equipped with an axial fan for one direction of rotation. Clockwise rotation order code K37, counter-clockwise rotation K38.

<sup>3)</sup> Standard version with axial fan for clockwise rotation. Without order code K37. For counter-clockwise rotation, order code K38 is necessary.

<sup>4)</sup> Can be ordered for 400 VA 50 Hz as special version with voltage code 9 and order code L1Y (specify output, voltage and frequency).

<sup>5)</sup> Also available on request for 400 V 50 Hz.

<sup>6)</sup> Not for 1LA8353 to 457 2-pole, 60 Hz.

<sup>7)</sup> Not for 1LA8453 to 457 2-pole, 60 Hz.

# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for mains-fed operation

IE2

Self-ventilated motors  
Cast-iron series 1LA8

### Selection and ordering data (continued)

P <sub>rated</sub> , 50 Hz kW	P <sub>rated</sub> , 60 Hz kW	Frame size 1)	n <sub>rated</sub> , 50 Hz	T <sub>rated</sub> , 50 Hz	IE class	η <sub>rated</sub> , 50 Hz	η <sub>rated</sub> , 50 Hz	COS φ <sub>rated</sub>	I <sub>rated</sub> , 50 Hz	I <sub>rated</sub> , 60 Hz	I <sub>fr</sub> / I <sub>ra</sub>	I <sub>fr</sub> / I <sub>re</sub>	I <sub>fr</sub> / I <sub>rd</sub>	L <sub>PLA</sub> , 50 Hz	L <sub>WA</sub> , 50 Hz	Operating values at rated output			Cast-Iron series																	
																m <sub>M B3</sub> Order No.	J	Torque class																		
kW	kW	FS	rpm	Nm	%	%	%	A	A	dB(A)	dB(A)	▲ New	kg	kgm <sup>2</sup>	CL																					
<b>1) Protection: Discharge class I (50 °C ambient temperature), IP21 (standard protection). Utilization in accordance with IEC norm class 1 (0 °C to 40 °C ambient, 1000 rpm at 50 Hz, 1200 rpm at 60 Hz).</b>																																				
200	230	315	990	1930	IE2	95.2	95.4	94.8	0.86	355	205	2.0	6.3	2.5	68	82	1LA8315-6AB	1300	6.0	13																
250	288	315	989	2410	IE2	95.4	95.6	95.2	0.86	440	255	2.0	6.3	2.5	68	82	1LA8317-6AB	1500	7.3	13																
315	362	355	992	3040	IE2	95.7	95.7	95.5	0.86	550	320	2.1	6.5	2.8	71	86	1LA8355-6AB	2000	13	13																
355	408	355	992	3418	IE2	95.7	95.7	95.6	0.86	620	360	2.0	6.8	2.9	71	86	▲ 1LA8356-6AB	2200	15	13																
400	460	355	993	3850	-	96.0	96.1	95.7	0.86	700	405	2.2	6.5	2.8	71	86	1LA8357-6AB	2200	16	13																
450	518	400	992	4330	-	96.0	96.1	95.8	0.86	790	455	2.1	6.5	2.7	73	88	1LA8403-6AB	2800	21	13																
500	575	400	992	4810	-	96.0	96.1	95.8	0.86	870	510	2.2	6.5	2.7	73	88	1LA8405-6AB	3000	24	13																
560	644	400	992	5390	-	96.2	96.3	96.0	0.86	980	570	2.2	6.5	2.7	73	88	1LA8407-6AB	3200	27	13																
630	725	450	993	6060	-	96.3	96.4	96.2	0.85	1120	640	2.0	6.5	2.6	75	90	1LA8453-6AB	4000	35	13																
710	817	450	993	6830	-	96.3	96.4	96.4	0.85	-	730 <sup>2)</sup>	2.0	6.5	2.5	75	90	1LA8455-6AB	4200	39	13																
800	920	450	993	7690	-	96.5	96.7	96.5	0.85	-	820 <sup>3)</sup>	2.0	6.5	2.5	75	90	1LA8457-6AB	4500	44	13																
160	184	315	739	2070	-	94.4	94.5	94.4	0.81	300	176	2.1	6.0	2.4	65	79	1LA8315-8AB	1300	6.0	13																
200	230	315	739	2580	-	94.7	94.8	94.8	0.82	370	215	2.1	6.0	2.4	65	79	1LA8317-8AB	1500	7.3	13																
250	288	355	741	3220	-	95.2	95.3	95.1	0.82	460	270	2.1	6.1	2.4	67	82	1LA8355-8AB	2000	13	13																
315	362	355	741	4060	-	95.5	95.6	95.4	0.82	580	335	2.1	6.1	2.4	67	82	1LA8357-8AB	2200	16	13																
355	408	400	742	4570	-	95.6	95.7	95.6	0.82	650	380	2.0	6.2	2.6	69	84	1LA8403-8AB	2800	21	13																
400	460	400	742	5150	-	95.7	95.8	95.5	0.82	740	425	2.1	6.5	2.6	69	84	1LA8405-8AB	3000	24	13																
450	518	400	742	5790	-	95.8	95.9	95.8	0.82	830	480	2.1	6.5	2.6	69	84	1LA8407-8AB	3200	27	13																
500	575	450	744	6420	-	95.9	96.0	95.7	0.80	940	550	2.0	6.6	2.4	71	86	1LA8453-8AB	4000	35	13																
560	644	450	744	7190	-	96.0	96.1	95.8	0.81	1040	600	2.0	6.6	2.4	71	86	1LA8455-8AB	4200	39	13																
630	725	450	744	8090	-	96.1	96.2	95.9	0.81	1160	680	2.0	6.6	2.4	71	86	1LA8457-8AB	4500	44	13																
<b>Voltages</b>																					Order code(s)															
50 Hz	400 VΔ/690 VY	6																			6	-														
		8																			6	-														
	690 VΔ	6																			0	-														
	500 VΔ	6, 8																			5	-														
60 Hz <sup>1)</sup>	460 VΔ	6																			9	L2F														
		8																			9	L2F														
<b>Further voltages<sup>1)</sup></b> For additional charges, code numbers, order codes and descriptions, see from Page 3/32.																					9	...	Order code(s)													
<b>For types of construction</b> see Page 3/33																					Order code(s)															
Without flange	IM B3																				0	-														
	IM V5, IM V6																				0	-														
With flange	IM V1 without protective cover																				8	-														
	IM V1 with protective cover																				4	-														
	IM B35																				6	-														
<b>Special versions</b>																					Order code(s)															
Options																					1LA8 ... - ... Z ... + ...															
<b>Motor type 1LA8</b>																																				
315-6	317-6	355-6	356-6	357-6	403-6	405-6	407-6	453-6	455-6	457-6	315-8	317-8	355-8	357-8	403-8	405-8	407-8	453-8	455-8	457-8																
400 V	-	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	-	-	-	-	Yes	-	-	Yes	Yes	Yes	Yes															
500 V	-	-	-	Yes	Yes	-	-	-	Yes	Yes	Yes	-	-	-	-	-	-	-	-	Yes	Yes															
690 V	-	-	-	Yes	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-															
Standard	2950	2950	2500	2500	2500	2200	2200	2200	2100	2100	2100	2950	2950	2500	2500	2200	2200	2200	2100	2100	2100	2100														
IM V1	-	-	-	-	-	2100	2100	2100	1800	1800	1800	-	-	-	-	2100	2100	2100	1800	1800	1800	1800														
Ex prot.	2350	2350	2100	2100	2100	1900	1900	1900	1700	1700	1700	1700	1700	2350	2350	2100	2100	1900	1900	1900	1700	1700														

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

<sup>2)</sup> Can be ordered for 400 VΔ 50 Hz as special version with voltage code 9 and order code L1Y (specify output, voltage and frequency).

<sup>3)</sup> Also available on request for 400 VΔ 50 Hz.



# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for mains-fed operation

Self-ventilated motors with through-ventilation  
Cast-Iron series ILL8

**IE2**

### Selection and ordering data (continued)

Operating values at rated output												Cast-Iron series								
$P_{rated}$ , 50 Hz 1)	$P_{rated}$ , 60 Hz 1)	Frame size	$I_{rated}$ , 50 Hz 1)	IE class	$\eta_{rated}$ , 50 Hz 1)	$\eta_{rated}$ , 50 Hz 1)	$\cos\phi_{rated}$ , 50 Hz 1)	$I_{rated}$ , 50 Hz 1)	$I_{rated}$ , 50 Hz 1)	$T_{rated}$ , 50 Hz 1)	$T_{rated}$ , 50 Hz 1)	$T_{rated}$ , 50 Hz 1)	$L_{WA}$ , 50 Hz 1)	$m_{MB3}$	$J$	Torque class				
kW	kW	FS	rpm	Nm	%	%	%	A	A	dB(A)	dB(A)	Order No.	kg	$\text{kgm}^2$	CL					
<small>1) Current limitation: A safety factor (SF) of 1.05 is applied on all ILL8 motors connected to 100% mains voltage. The temperature limit of the motor is determined in accordance with thermal class. End temperature depends on the ambient temperature and load.</small>																				
<small>2) Current limitation: A safety factor (SF) of 1.05 is applied on all ILL8 motors connected to 100% mains voltage. The temperature limit of the motor is determined in accordance with thermal class. End temperature depends on the ambient temperature and load.</small>																				
<small>3) Current limitation: A safety factor (SF) of 1.05 is applied on all ILL8 motors connected to 100% mains voltage. The temperature limit of the motor is determined in accordance with thermal class. End temperature depends on the ambient temperature and load.</small>																				
315	345	315	2977	1010	IE2	95.5	95.7	95.6	0.92	520	300	1.6	7.0	2.8	84 <sup>2)</sup>	99	ILL8315-2AC	1300	2.7	10
400	440	315	2977	1280	-	95.9	96.2	96.1	0.92	650	380	1.7	7.0	2.8	84 <sup>2)</sup>	99	ILL8317-2AC	1500	3.3	10
450	495	355	2981	1440	-	95.9	96.0	95.7	0.91	740	430	1.4	7.0	2.6	86 <sup>2)</sup>	101	ILL8353-2AD	1900	4.8	7
500	550	355	2982	1600	-	96.1	96.3	96.0	0.92	820	475	1.4	7.0	2.6	86 <sup>2)</sup>	101	ILL8355-2AD	2000	5.3	7
630	690	355	2982	2020	-	96.4	96.6	96.5	0.93	1020	590	1.6	7.0	2.6	86 <sup>2)</sup>	101	ILL8357-2AD	2200	6.4	7
710	780	400	2986	2270	-	96.5	96.6	96.3	0.91	1160	680	1.4	6.8	2.6	88 <sup>2)</sup>	103	ILL8403-2AD	2800	8.6	7
800	880	400	2986	2560	-	96.6	96.7	96.5	0.92	1300	750	1.5	7.0	2.6	88 <sup>2)</sup>	103	ILL8405-2AD	3000	9.6	7
900	990	400	2987	2880	-	96.8	96.9	96.7	0.92	-	850	1.5	7.0	2.7	88 <sup>2)</sup>	103	ILL8407-2AD	3200	11	7
1000	1100	450	2987	3200	-	96.8	96.7	96.3	0.93	-	930	0.9	7.0	2.9	90 <sup>2)</sup>	105	ILL8453-2AE	4000	19	5
1120	1230	450	2986	3580	-	96.8	96.9	96.6	0.94	-	1020	0.9	7.0	2.7	90 <sup>2)</sup>	105	ILL8455-2AE	4200	21	5
1250	1370	450	2984	4000	-	97.0	97.1	96.8	0.94	-	1140	0.9	7.0	2.6	90 <sup>2)</sup>	105	ILL8457-2AE	4400	23	5
315	360	315	1485	2030	IE2	95.5	95.6	95.4	0.87	550	315	1.6	7.0	2.7	77	90	ILL8315-4AC	1300	3.6	10
400	460	315	1485	2570	-	95.7	95.9	95.8	0.88	690	395	1.7	7.0	2.7	77	90	ILL8317-4AC	1500	4.4	10
450	515	355	1487	2890	-	96.0	96.0	95.8	0.87	780	450	1.5	7.0	2.6	77	92	ILL8353-4AC	1900	6.1	10
500	575	355	1488	3210	-	96.1	96.2	96.0	0.88	850	495	1.6	7.0	2.6	77	92	ILL8355-4AC	2000	6.8	10
630	725	355	1490	4040	-	96.4	96.5	96.2	0.88	1080	620	1.6	7.0	2.7	77	92	ILL8357-4AC	2200	8.5	10
710	815	400	1490	4550	-	96.4	96.5	96.3	0.88	1200	700	1.6	7.0	2.4	81	96	ILL8403-4AC	2800	13	10
800	920	400	1490	5130	-	96.5	96.6	96.4	0.88	1360	790	1.7	7.0	2.5	81	96	ILL8405-4AC	3000	14	10
900	1035	400	1492	5760	-	96.7	96.7	96.4	0.87	-	900	1.7	7.0	2.6	81	96	ILL8407-4AC	3200	16	10
1000	1150	450	1492	6400	-	96.7	96.7	96.3	0.86	-	1000	1.5	7.0	2.8	84	99	ILL8453-4AD	4000	23	7
1120	1280	450	1491	7170	-	96.7	96.7	96.5	0.89	-	1080	1.5	7.0	2.6	84	99	ILL8455-4AD	4200	26	7
1250	1430	450	1490	8010	-	96.8	96.8	96.7	0.89	-	1220	1.5	7.0	2.5	84	99	ILL8457-4AD	4400	28	7
<b>Voltages</b>															<b>Order code(s)</b>					
50 Hz	400 VA/690 VY	2, 4													6	-				
	690 VA	2, 4													0	-				
	500 VA	2, 4													5	-				
60 Hz <sup>1)</sup>	460 VA	2, 4													9	L2F				
<b>Further voltages<sup>1)</sup></b> For additional charges, code numbers, order codes and descriptions, see from Page 3/32.															9	...				
<b>For types of construction</b> see Page 3/33. Motor type															<b>Order code(s)</b>					
Without flange	IM B3														0	-				
With flange	IM V1														8	-				
	without protective cover														4	-				
	IM V1														6	-				
	with protective cover														The "Second shaft extension" option (K16) is not possible.					
	IM B35																			
<b>Special versions</b>															<b>Order code(s)</b>					
Options	For additional charges, order codes and descriptions, see from Page 3/34.														1LL8...-...-Z ...+...+					
<b>Partial feeding required</b>																				
400 V	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	Yes	Yes	Yes	Yes	-	-	-	-	
500 V	-	-	Yes	Yes	-	-	Yes	Yes	Yes	Yes	-	-	Yes	Yes	-	-	Yes	Yes	Yes	
690 V	-	-	-	-	-	-	-	Yes	Yes	-	-	-	-	-	-	-	-	Yes	Yes	
<b>Performance limits</b>																				
Standard	3600	3600	3600	3600	3600	3600	3600	3000	3000	3000	3000	2500	2500	2200	2200	2200	2100	2100	2100	
IM V1	-	-	3100	3100	3100	3100	3100	-	-	-	2600	2600	2200	2200	1900	1900	1900	1800	1800	1800

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.  
<sup>2)</sup> The noise values for 2-pole ILL8 motors are for guidance only.

<sup>3)</sup> Not for 1LL8453 to 457 2-pole, 60 Hz.

<sup>4)</sup> Not for 1LL8 2-pole, 60 Hz.



# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for mains-fed operation

IE2

Self-ventilated motors with through-ventilation  
Cast-iron series ILLR

### Selection and ordering data (continued)

Operating values at rated output													Cast-Iron series											
$P_{rated}$ , 50 Hz 60 Hz	$P_{rated}$ , 50 Hz	Frame size	$n_{rated}$ , 50 Hz	$T_{rated}$ , 50 Hz	IE class	$\eta_{rated}$ , 50 Hz	$\eta_{rated}$ , 50 Hz	COS $\phi_{rated}$	$I_{rated}$ , 50 Hz	$I_{rated}$ , 50 Hz	$T_{A1}/T_{A2}$	$I_{A1}/I_{A2}$	$T_B$	$L_{WA}$	$L_{WA}$	$m_{IM\ B3}$	$J$	Torque class						
kW	kW	FS	rpm	Nm		%	%	%	A	A		dB(A)	dB(A)	Order No.	kg	$\text{Kg m}^2$	CL							
<small>1) Mains-fed operation: A service factor of 1.15 is standard onto all ILLR motors connected to the mains. Values from the thermal curves apply to the maximum permissible degree of utilization in accordance with the national standard DIN 43 710 (temperature class 1).</small>																								
<small>2) Order code: 1000 = 1000 V AC 50 Hz, 1000 = 1000 V AC 60 Hz, 1000 = 1000 V DC 50 Hz, 1000 = 1000 V DC 60 Hz.</small>																								
250	285	315	988	2420	IE2	95.0	95.0	94.8	0.88	430	250	1.6	7.0	2.6	70	84	ILL8315-6AC	1300	6.0 10					
315	360	315	988	3040	IE2	95.2	95.2	95.1	0.89	540	310	1.7	7.0	2.6	70	84	ILL8317-6AC	1500	7.3 10					
400	460	355	991	3850	–	95.6	95.8	95.9	0.88	690	400	1.7	7.0	2.5	73	88	ILL8355-6AC	2000	13 10					
500	575	355	992	4820	–	95.9	96.2	96.1	0.88	860	495	1.8	7.0	2.6	73	88	ILL8357-6AC	2200	16 10					
560	645	400	993	5390	–	96.1	96.1	95.8	0.86	980	570	1.8	7.0	2.6	76	91	ILL8403-6AC	2800	21 10					
630	725	400	993	6060	–	96.2	96.4	96.3	0.87	1080	630	1.8	7.0	2.6	76	91	ILL8405-6AC	3000	24 10					
710	815	400	993	6830	–	96.2	96.4	96.3	0.88	1220	700	1.8	7.0	2.5	76	91	ILL8407-6AC	3200	27 10					
800	920	450	993	7700	–	96.3	96.5	96.4	0.86	1380	810	1.5	7.0	2.5	78	93	ILL8453-6AD	4000	35 7					
900	1035	450	992	8660	–	96.3	96.6	96.6	0.87	–	900	1.5	7.0	2.4	78	93	ILL8455-6AD	4200	39 7					
1000	1150	450	993	9620	–	96.4	96.7	96.7	0.88	–	990	1.5	7.0	2.5	78	93	ILL8457-6AD	4500	44 7					
<small>3) Order code: 1000 = 1000 V AC 50 Hz, 1000 = 1000 V AC 60 Hz, 1000 = 1000 V DC 50 Hz, 1000 = 1000 V DC 60 Hz.</small>																								
200	230	315	738	2590	–	94.2	94.7	94.9	0.82	375	215	1.6	5.8	2.4	67	81	ILL8315-8AC	1300	6.0 10					
250	285	315	738	3240	–	94.5	95.1	95.2	0.82	465	270	1.6	5.8	2.4	67	81	ILL8317-8AC	1500	7.3 10					
315	360	355	740	4070	–	95.0	95.2	95.2	0.83	580	335	1.6	6.0	2.4	69	84	ILL8355-8AC	2000	13 10					
400	460	355	740	5160	–	95.1	95.4	95.5	0.84	720	420	1.6	6.0	2.3	69	84	ILL8357-8AC	2200	16 10					
450	515	400	741	5800	–	95.4	95.6	95.7	0.84	810	470	1.3	5.8	2.3	72	87	ILL8403-8AD	2800	21 7					
500	575	400	741	6440	–	95.6	95.8	95.8	0.84	900	520	1.4	5.8	2.4	72	87	ILL8405-8AD	3000	24 7					
560	645	400	742	7210	–	95.7	95.9	95.8	0.83	1020	590	1.4	6.0	2.4	72	87	ILL8407-8AD	3200	27 7					
630	745	450	742	8100	–	95.8	96.0	96.0	0.82	1160	670	1.3	5.8	2.3	74	89	ILL8453-8AD	4000	35 7					
710	815	450	743	9130	–	95.9	96.2	96.1	0.83	1280	750	1.3	5.8	2.3	74	89	ILL8455-8AD	4200	39 7					
800	920	450	742	10300	–	96.0	96.0	95.9	0.83	–	840	1.3	5.8	2.3	74	89	ILL8457-8AD	4500	44 7					
<b>Voltages</b>													Order code(s)											
50 Hz	400 VΔ/690 VY	6				1LL8315 ... 453	Standard						6	–										
		8				1LL8315 ... 455	Standard						6	–										
	690 VΔ	6				1LL8455 ... 457	Standard						0	–										
		8				1LL8457	Standard						0	–										
	500 VΔ	6, 8				1LL8315 ... 457	Without additional charge						5	–										
60 Hz <sup>1)</sup>	460 VΔ	6				1LL8315 ... 453	With additional charge						9	L2F										
		8				1LL8315 ... 455	With additional charge						9	L2F										
<small>Further voltages<sup>1)</sup>: For additional charges, order codes and descriptions, see from Page 3/32.</small>													9	...										
<b>For types of construction</b> see Page 3/33. Motor type													Order code(s)											
Without flange	IM B3					1LL8315 ... 457	Standard						0	–										
With flange	IM V1 without protective cover					1LL8315 ... 457	With additional charge						8	–										
	IM V1 with protective cover					1LL8315 ... 457	With additional charge						The "Second shaft extension" option (K16) is not possible.	4	–									
	IM B35					1LL8315 ... 457	With additional charge						6	–										
<b>Special versions</b>													Order code(s)											
Options	For additional charges, order codes and descriptions, see from Page 3/34.												1LL8 ... -Z	...+...+										
<b>Motor type ILL8</b>																								
315-6	317-6	355-6	357-6	403-6	405-6	407-6	453-6	455-6	457-6	315-8	317-8	355-8	357-8	403-8	407-8	453-8	455-8	457-8						
400 V	–	Yes	Yes	Yes	–	Yes	Yes	Yes	Yes	–	–	–	Yes	–	Yes	Yes	Yes	Yes						
500 V	–	–	–	Yes	–	–	–	Yes	Yes	–	–	–	–	–	–	–	–	Yes						
690 V	–	–	–	Yes	–	–	–	–	–	–	–	–	–	–	–	–	–	–						
<b>Mechanical limit switch, no limit switch</b>																								
Standard	2950	2950	2500	2500	2200	2200	2200	2100	2100	2950	2950	2500	2500	2200	2200	2100	2100	2100						
IM V1	2600	2600	2200	2200	1900	1900	1900	1800	1800	2600	2600	2200	2200	1900	1900	1800	1800	1800						

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.





# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Self-ventilated motors

Cast-iron series 1LA8 with standard insulation for 5500 V

## Selection and ordering data (continued)

P <sub>rated</sub> , 50 Hz 60 Hz 1)	P <sub>rated</sub> , 50 Hz 60 Hz 1)	Frame size	Operating values at rated output with sinusoidal infeed										Cast-Iron series												
			I <sub>rated</sub> , 50 Hz	T <sub>rated</sub> , 50 Hz	n <sub>rated</sub> , 50 Hz	n <sub>rated</sub> , 50 Hz	COS <sub>φ</sub> rated	I <sub>rated</sub> , 50 Hz	I <sub>rated</sub> , 50 Hz	T <sub>p</sub> / I <sub>rated</sub>	I <sub>p(A), 50Hz</sub> , tolerance	I <sub>WA 50Hz</sub> , tolerance	m <sub>IM B3</sub>	J	Torque class										
KW	kW	FS	rpm	Nm	%	%	A	A	dB(A)	dB(A)	▲ New	kg	kgm <sup>2</sup>	CL											
<b>1LA8 Series</b> (see also page 3/31)																									
For converter-fed operation: Specified for operation on SIMOTICS or SIMOVER®-MASTERDRIVES with standard insulation for voltages of 5500 V.																									
Order code: The order code consists of the frame size, followed by the voltage code and the order code for protection class IP54 in accordance with thermal class 155 (temperature class 155).																									
Periods: 1000 rpm at 50 Hz / 1200 rpm at 60 Hz																									
200	230	315	990	1930	95.2	95.4	0.86	355	205	2.5	68	82	1LA8315-6PB	1300	6.0	13									
250	288	315	989	2410	95.4	95.6	0.86	440	255	2.5	68	82	1LA8317-6PB	1500	7.3	13									
315	362	355	992	3040	95.7	95.7	0.86	550	320	2.8	71	86	1LA8355-6PB	2000	13	13									
355	408	355	992	3418	95.7	95.7	0.86	620	360	2.9	71	86	▲ 1LA8356-6PB	2200	15	13									
400	460	355	993	3850	96.0	96.1	0.86	700	405	2.8	71	86	1LA8357-6PB	2200	16	13									
450	518	400	992	4330	96.0	96.1	0.86	790	455	2.7	73	88	1LA8403-6PB	2800	21	13									
500	575	400	992	4810	96.0	96.1	0.86	870	510	2.7	73	88	1LA8405-6PB	3000	24	13									
560	644	400	992	5390	96.2	96.3	0.86	980	570	2.7	73	88	1LA8407-6PB	3200	27	13									
630	725	450	993	6060	96.3	96.4	0.85	1120	640	2.6	75	90	1LA8453-6PB	4000	35	13									
710	817	450	993	6830	96.3	96.4	0.85	—	730 <sup>2)</sup>	2.5	75	90	1LA8455-6PB	4200	39	13									
800	920	450	993	7690	96.5	96.7	0.85	—	820 <sup>3)</sup>	2.5	75	90	1LA8457-6PB	4500	44	13									
<b>Voltages</b>																									
No. of poles																									
50 Hz	400 VΔ/690 VY <sup>4)</sup>	6	Motor type										Order code(s)												
		8	1LA8315 ... 453 Standard										6	—											
	690 VΔ <sup>4)</sup>	6	1LA8315 ... 457 Standard										8	—											
	400 VΔ	6	1LA8315 ... 457 Without additional charge										7	—											
		8	1LA8315 ... 457 Without additional charge										4	—											
	500 VΔ	6, 8	1LA8315 ... 457 Without additional charge										5	—											
Further voltages <sup>1)</sup> : For additional charges, code numbers, order codes and descriptions, see from Page 3/32.																									
<b>For types of construction</b> See Page 3/33.																									
Without flange	IM B3	Motor type										Order code(s)													
	IM V5, IM V6	1LA8315 ... 457 Standard										0	—												
With flange	IM V1 without protective cover	1LA8315 ... 457 With additional charge										8	—												
	IM V1 with protective cover	1LA8315 ... 457 With additional charge										4	—	The "Second shaft extension" option (K16) is not possible.											
	IM B35	1LA8315 ... 457 With additional charge										6	—												
<b>Special versions</b>																									
Options	For additional charges, order codes and descriptions, see from Page 3/34.										1LA8... .... Z ...+...+...+...+...														
Motor type 1LA8																									
315-6	317-6	355-6	356-6	357-6	403-6	405-6	407-6	453-6	455-6	457-6	315-8	317-8	355-8	357-8	403-8	405-8	407-8	453-8	455-8	457-8					
400 V	—	Yes	Yes	Yes	Yes	—	Yes	Yes	—	—	—	Yes	—	—	Yes	Yes	Yes	Yes	Yes	Yes					
500 V	—	—	—	Yes	Yes	—	—	Yes	Yes	Yes	—	—	—	—	—	—	—	—	Yes	Yes					
690 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—					
Standard																									
2950	2950	2500	2500	2500	2200	2200	2200	2100	2100	2100	2950	2950	2500	2500	2200	2200	2200	2100	2100	2100					
IM V1	—	—	—	—	—	2100	2100	2100	1800	1800	1800	—	—	—	—	2100	2100	2100	1800	1800	1800				
Ex prot.	2350	2350	2100	2100	2100	1900	1900	1900	1700	1700	1700	2350	2350	2100	2100	1900	1900	1900	1700	1700	1700				
Standard																									
147	147	125	125	125	110	110	110	105	105	105	196	196	166	166	146	146	146	140	140	140					
IM V1	—	—	—	—	—	105	105	105	90	90	90	—	—	—	—	140	140	140	120	120	120				
Ex prot.	117	117	105	105	95	95	95	85	85	85	156	156	140	140	126	126	126	113	113	113					

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

<sup>3)</sup> Also available on request for 400 VΔ 50 Hz.

<sup>2)</sup> Can be ordered for 400 VΔ 50 Hz as special version with voltage code 9 and order code L1Y (specify output, voltage and frequency).

<sup>4)</sup> Operation is possible only with converter circuit (d/dt filter or sine-wave filter).



# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Self-ventilated motors

Cast-iron series 1LA8 with special insulation for &gt; 500 to 690 V

## Selection and ordering data

Operating values at rated output with sinusoidal infeed												Cast-Iron series			
$P_{rated}$ , 50 Hz 1)	$P_{rated}$ , 60 Hz	Frame size	$n_{rated}$ , 50 Hz	$T_{rated}$ , 50 Hz	$\eta_{rated}$ , 50 Hz	$\cos\phi_{rated}$ , 50 Hz	$I_{rated}$ , 50 Hz, 690 V	$T_p/T_{rated}$	$L_{pA, 50Hz}$ , tolerance +3 dB(A)	$L_{WA, 50Hz}$ , tolerance +3 dB(A)	1LA8 – with special insulation	IM B3	J	Torque class	
kW	kW	FS	rpm	Nm	%	%	A	dB(A)	dB(A)	Order No.	kg	kgm <sup>2</sup>	CL		
<b>1LA8 – with special insulation</b>															
For additional information see Page 3/32															
Conventional operation. Especially for operation on SINAMICS or SIMOVOLT MASTERSDRIVES with special insulation for voltages of > 500 to 690 V.															
Type 1LA8-2PM: 2-pole, 1500 rpm at 50 Hz, 1500 rpm at 60 Hz															
240	270	315	2978	770	95.5	95.6	0.90	235	3.0	82 (75) <sup>2)</sup>	97 (90) <sup>2)</sup>	1LA8315-2PM	1300	2.7	10
300	335	315	2978	962	95.7	95.7	0.91	290	3.0	82 (75) <sup>2)</sup>	97 (90) <sup>2)</sup>	1LA8317-2PM	1500	3.3	10
345	385	355	2981	1105	95.7	95.7	0.90	335	2.6	77 <sup>3)</sup>	92 <sup>3)</sup>	1LA8353-2PM	1900	4.8	10
390	435	355	2981	1249	96.1	96.2	0.91	375	2.6	77 <sup>3)</sup>	92 <sup>3)</sup>	1LA8355-2PM	2000	5.3	10
485	545	355	2982	1553	96.5	96.6	0.91	460	2.6	77 <sup>3)</sup>	92 <sup>3)</sup>	1LA8357-2PM	2200	6.4	10
545	600	400	2986	1743	96.6	96.7	0.91	520	3.0	79 <sup>3)</sup>	94 <sup>3)</sup>	1LA8403-2PM	2800	8.6	10
610	670	400	2986	1951	96.6	96.7	0.91	580	3.1	79 <sup>3)</sup>	94 <sup>3)</sup>	1LA8405-2PM	3000	9.6	10
680	750	400	2986	2175	96.7	96.8	0.92	640	3.0	79 <sup>3)</sup>	94 <sup>3)</sup>	1LA8407-2PM	3200	11	10
775	—	450	2987	2478	96.7	96.8	0.92	730	2.8	81 <sup>3)</sup>	96 <sup>3)</sup>	1LA8453-2PM	4000	19	5
875	—	450	2987	2798	96.8	96.9	0.92	820	2.8	81 <sup>3)</sup>	96 <sup>3)</sup>	1LA8455-2PM	4200	21	5
970	—	450	2987	3101	96.9	97.0	0.93	900	2.8	81 <sup>3)</sup>	96 <sup>3)</sup>	1LA8457-2PM	4400	23	5
<b>1LA8 – with standard insulation</b>															
235	270	315	1485	1511	95.3	95.4	0.87	235	2.8	75	87	1LA8315-4PM	1300	3.6	13
290	335	315	1485	1865	95.4	95.5	0.87	290	2.8	75	87	1LA8317-4PM	1500	4.4	13
340	390	355	1488	2182	95.5	95.6	0.87	340	2.6	75	90	1LA8353-4PM	1900	6.1	13
385	445	355	1488	2471	95.7	95.8	0.87	385	2.6	75	90	1LA8355-4PM	2000	6.8	13
480	550	355	1488	3081	95.9	96.0	0.87	480	2.5	75	90	1LA8357-4PM	2200	8.5	13
545	625	400	1491	3491	96.0	96.1	0.88	540	2.6	78	93	1LA8403-4PM	2800	13	13
615	710	400	1491	3939	96.2	96.3	0.88	610	2.7	78	93	1LA8405-4PM	3000	14	13
690	795	400	1491	4420	96.4	96.5	0.89	670	2.6	78	93	1LA8407-4PM	3200	16	13
785	905	450	1492	5025	96.3	96.4	0.88	780	2.5	81	96	1LA8453-4PM	4000	23	10
880	1010	450	1492	5633	96.5	96.6	0.87	880	2.6	81	96	1LA8455-4PM	4200	26	10
980	1125	450	1492	6273	96.6	96.7	0.89	950	2.6	81	96	1LA8457-4PM	4400	28	10
<b>Voltages</b>															
50 Hz: 400 VΔ/690 VY	2													Order code(s)	
	4														
690 VΔ	2														
	4														
Further voltages <sup>1)</sup>														9	...
<b>For types of construction</b> see Page 3/33															
Without flange	IM B3													Order code(s)	
	IM V5, IM V6														
With flange	IM V1 without protective cover														
	IM V1 with protective cover														
	IM B35														
<b>Special versions</b>															
Options	For additional charges, order codes and descriptions, see from Page 3/34.												1LA8 ... - - - Z ... + + + + + +	Order code(s)	
Motor type 1LA8															
400 V	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—	—	—	—	—	—	
500 V	—	—	Yes	Yes	—	—	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes	
690 V	—	—	—	—	—	—	—	—	Yes	Yes	—	—	—	—	
Standard															
3600	3600	3600	3600	3600	3600	3600	3600	3000	3000	3000	3000	2500	2500	2200	
IM V1	—	—	3100	3100	3100	3100	3100	—	—	—	—	—	—	2100	
Ex prot.	—	—	—	—	—	—	—	—	—	2650	2650	2350	2350	2100	
Standard	60	60	60	60	60	60	60	50	50	50	100	83	83	73	
IM V1	—	—	52	52	52	52	52	—	—	—	—	70	70	70	
Ex prot.	—	—	—	—	—	—	—	—	—	88	88	78	78	70	
1) Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.															
2) Low-noise version, 2-pole, in brackets. To reduce noise, 2-pole motors can be equipped with an axial fan. Clockwise rotation order code K37, counter-clockwise rotation K38.															
3) Standard version with axial fan for clockwise rotation. Without order code K37. For counter-clockwise rotation, order code K38 is necessary.															
4) Not for 1LA8353 to 457 2-pole, 60 Hz.															
5) Not for 1LA8453 to 457 2-pole, 60 Hz.															



# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Self-ventilated motors

Cast-iron series 1LA8 with special insulation for &gt; 500 to 690 V

**Selection and ordering data (continued)**

$P_{rated}$ 50 Hz 60 Hz 1)	$P_{rated}$ 50 Hz 60 Hz	Frame size	Operating values at rated output with sinusoidal infeed								<b>Cast-iron series</b> <b>1LA8 - with special insulation</b>	$m_{IM\ B3}$	$J$	Torque class												
			$n_{rated}$ 50 Hz	$T_{rated}$ 50 Hz	$\eta_{rated}$ 50 Hz	$\eta_{rated}$ 50 Hz	$\cos\phi_{rated}$ 50 Hz	$I_{rated}$ 50 Hz	$T_B/T_{rated}$	$L_p/\Delta\ 50\text{-Hz}$ tolerance																
kW	kW	FS	rpm	Nm	%	%	A	dB(A)	dB(A)	▲ New	kg	kgm <sup>2</sup>	CL													
<b>1) Voltage code 6 (60 Hz)</b>																										
190	220	315	990	1833	95.0	95.2	0.85	196	2.7	68	82	1LA8315-6PM	1300	6.0	13											
235	270	315	990	2267	95.2	95.4	0.86	240	2.7	68	82	1LA8317-6PM	1500	7.3	13											
300	345	355	992	2888	95.7	95.7	0.86	305	2.8	71	86	1LA8355-6PM	2000	13	13											
340	390	355	992	3273	95.6	95.7	0.86	345	3.1	71	86	▲ 1LA8356-6PM	2200	15	13											
380	435	355	992	3658	95.9	96.0	0.86	385	2.9	71	86	1LA8357-6PM	2200	16	13											
435	500	400	993	4184	95.9	96.0	0.85	445	2.8	73	88	1LA8403-6PM	2800	21	13											
485	560	400	993	4664	96.0	96.1	0.86	490	2.8	73	88	1LA8405-6PM	3000	24	13											
545	625	400	993	5241	96.1	96.2	0.86	550	2.7	73	88	1LA8407-6PM	3200	27	13											
615	705	450	993	5915	96.3	96.4	0.84	640	2.7	75	90	1LA8453-6PM	4000	35	13											
690	795	450	993	6636	96.3	96.4	0.85	710	2.5	75	90	1LA8455-6PM	4200	39	13											
780	895	450	993	7502	96.4	96.6	0.85	800	2.6	75	90	1LA8457-6PM	4500	44	13											
145	165	315	740	1871	94.1	94.2	0.79	164	2.5	65	79	1LA8315-8PM	1300	6.0	13											
180	205	315	740	2323	94.4	94.5	0.80	200	2.5	65	79	1LA8317-8PM	1500	7.3	13											
230	265	355	743	2956	95.0	95.1	0.80	255	2.4	67	82	1LA8355-8PM	2000	13	13											
290	335	355	743	3727	95.2	95.3	0.81	315	2.4	67	82	1LA8357-8PM	2200	16	13											
335	385	400	743	4306	95.5	95.6	0.80	365	2.6	69	84	1LA8403-8PM	2800	21	13											
375	430	400	743	4820	95.6	95.7	0.80	410	2.7	69	84	1LA8405-8PM	3000	24	13											
425	490	400	743	5463	95.7	95.8	0.79	470	2.7	69	84	1LA8407-8PM	3200	27	13											
485	560	450	745	6217	96.0	96.1	0.78	540	2.5	71	86	1LA8453-8PM	4000	35	13											
545	625	450	745	6986	96.1	96.2	0.78	610	2.5	71	86	1LA8455-8PM	4200	39	13											
600	690	450	745	7691	96.2	96.3	0.79	660	2.5	71	86	1LA8457-8PM	4500	44	13											
<b>Voltages</b>			No. of poles	Motor type		Version								Order code(s)												
50 Hz	400 VΔ/690 VY	6		1LA8315 ... 453		Standard								8	-											
		8		1LA8315 ... 457		Standard								8	-											
	690 VΔ	6		1LA8455 ... 457		Standard								7	-											
Further voltages <sup>1)</sup>			For additional charges, code numbers, order codes and descriptions, see from Page 3/32.												9	...										
<b>For types of construction</b> see Page 3/33. Motor type			Version														Order code(s)									
Without flange	IM B3		1LA8315 ... 457		Standard														0	-						
	IM V5, IM V6		1LA8315 ... 457		With additional charge														0	-						
With flange	IM V1 without protective cover		1LA8315 ... 457		With additional charge		Not for explosion-proof motors.												8	-						
	IM V1 with protective cover		1LA8315 ... 457		With additional charge		The "Second shaft extension" option (K16) is not possible.												4	-						
	IM B35		1LA8315 ... 457		With additional charge														6	-						
<b>Special versions</b>															Order code(s)											
Options	For additional charges, order codes and descriptions, see from Page 3/34.												1LA8...Z		...+...+...+...+...		3-2									
Motor type 1LA8																										
315-6	317-6	355-6	356-6	357-6	403-6	405-6	407-6	453-6	455-6	457-6	315-8	317-8	355-8	357-8	403-8	405-8	407-8	453-8	455-8	457-8						
400 V	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	-	-	-	-	-	Yes	-	-	Yes	Yes	Yes						
500 V	-	-	-	Yes	Yes	-	-	-	Yes	Yes	Yes	-	-	-	-	-	-	-	Yes	Yes						
690 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Standard	2950	2950	2500	2500	2500	2200	2200	2200	2100	2100	2100	2950	2950	2500	2500	2200	2200	2200	2100	2100						
IM V1	-	-	-	-	-	-	2100	2100	2100	1800	1800	1800	-	-	-	-	-	2100	2100	2100						
Ex protection	2350	2350	2100	2100	2100	1900	1900	1900	1700	1700	1700	2350	2350	2100	2100	1900	1900	1900	1700	1700						
Standard	147	147	125	125	125	110	110	105	105	105	105	196	196	166	166	146	146	146	140	140						
IM V1	-	-	-	-	-	105	105	105	90	90	90	-	-	-	-	140	140	140	120	120						
Ex protection	117	117	105	105	105	95	95	95	85	85	85	156	156	140	140	126	126	126	113	113						

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.



**SIMOTICS N-compact Non-Standard Motors**  
Motors specially designed for converter-fed operation

#### **Self-ventilated motors with through-ventilation**

**Cast-Iron series 1118 with standard insulation for > 500V**

## Selection and ordering data

**• Cooling:** Self-ventilated with forced ventilation (IC 001)  
**• Current range:** Specially for operation on SIMANICS or SIMOVERTMASTERDRIVES with standard insulation for voltages of  $\leq 600$  V  
**• Insulation:** Thermal class 155 (temperature class F), IP23 degree of protection, utilization in accordance with thermal class 155 (temperature class F)

<b>315</b>	<b>345</b>	<b>315</b>	2977	1010	95.5	95.7	0.92	520	300	2.8	84 <sup>2)</sup>	99	<b>1LL8315-2PC</b>	1300	2.7	10
<b>400</b>	<b>440</b>	<b>315</b>	2977	1280	95.9	96.2	0.92	650	380	2.8	84 <sup>2)</sup>	99	<b>1LL8317-2PC</b>	1500	3.3	10
<b>450</b>	<b>495</b>	<b>355</b>	2981	1440	95.9	96.0	0.91	740	430	2.6	86 <sup>2)</sup>	101	<b>1LL8353-2PD</b>	1900	4.8	7
<b>500</b>	<b>550</b>	<b>355</b>	2982	1600	96.1	96.3	0.92	820	475	2.6	86 <sup>2)</sup>	101	<b>1LL8355-2PD</b>	2000	5.3	7
<b>630</b>	<b>690</b>	<b>355</b>	2982	2020	96.4	96.6	0.93	1020	590	2.6	86 <sup>2)</sup>	101	<b>1LL8357-2PD</b>	2200	6.4	7
<b>710</b>	<b>780</b>	<b>400</b>	2986	2270	96.5	96.6	0.91	1160	680	2.6	88 <sup>2)</sup>	103	<b>1LL8403-2PD</b>	2800	8.6	7
<b>800</b>	<b>880</b>	<b>400</b>	2986	2560	96.6	96.7	0.92	1300	750	2.6	88 <sup>2)</sup>	103	<b>1LL8405-2PD</b>	3000	9.6	7
<b>900</b>	<b>990</b>	<b>400</b>	2987	2880	96.8	96.9	0.92	-	850	2.7	88 <sup>2)</sup>	103	<b>1LL8407-2PD</b>	3200	11	7
<b>1000</b>	<b>1100</b>	<b>450</b>	2987	3200	96.8	96.7	0.93	-	930	2.9	90 <sup>2)</sup>	105	<b>1LL8453-2PE</b>	4000	19	5
<b>1120</b>	<b>1220</b>	<b>450</b>	2986	2550	96.8	96.9	0.94	-	1020	2.7	90 <sup>2)</sup>	105	<b>1LL8455-2PE</b>	4200	21	5

**1220**    **1230**    **450**    2980    3500    90.6    90.5    0.94    -    1020    2.7    90<sup>1)</sup>    105    **1LL4455-2PE** ■■■■■ 4200    21    5  
**1250**    **1370**    **450**    2984    4000    97.0    97.1    0.94    -    1140    2.6    90<sup>2)</sup>    105    **1LL8457-2PE** ■■■■■ 4400    23    5

315	360	315	1485	2030	95.5	95.6	0.87	550	315	2.7	77	90	1LL8315-4PC	1300	3.6	10
400	460	315	1485	2570	95.7	95.9	0.88	690	395	2.7	77	90	1LL8317-4PC	1500	4.4	10
450	515	355	1487	2890	96.0	96.0	0.87	780	450	2.6	77	92	1LL8353-4PC	1900	6.1	10
500	575	355	1488	3210	96.1	96.2	0.88	850	495	2.6	77	92	1LL8355-4PC	2000	6.8	10
630	725	355	1490	4040	96.4	96.5	0.88	1080	620	2.7	77	92	1LL8357-4PC	2200	8.5	10
710	815	400	1490	4550	96.4	96.5	0.88	1200	700	2.4	81	96	1LL8403-4PC	2800	13	10
800	920	400	1490	5130	96.5	96.6	0.88	-	790	2.5	81	96	1LL8405-4PC	3000	14	10
900	1035	400	1492	5760	96.7	96.7	0.87	-	900	2.6	81	96	1LL8407-4PC	3200	16	10
1000	1150	450	1492	6400	96.7	96.7	0.86	-	1000	2.8	84	99	1LL8453-4PC	4000	23	7
1120	1280	450	1491	7170	96.7	96.7	0.89	-	1080	2.6	84	99	1LL8455-4PD	4200	26	7
1250	1430	450	1490	8010	96.8	96.8	0.89	-	1220	2.5	84	99	1LL8457-4PD	4400	28	7

Voltages	No. of poles	Motor type	Version	Order codes(s)
50 Hz 400 VΔ/690 VY <sup>3)</sup>	2, 4	1LL8315 ... 405	<b>Standard</b>	8
690 VΔ <sup>3)</sup>	2, 4	1LL8407 ... 457	<b>Standard</b>	7
400 VΔ	2, 4	1LL8315 ... 405	Without additional charge	4
500 VΔ	2, 4	1LL8315 ... 457	Without additional charge	05

**Further voltages<sup>1)</sup>** For additional charges, code numbers, order codes and descriptions, see from Page 3/32.

<b>For types of construction see Page 3/3:</b>	<b>Motor type</b>	<b>Version</b>	<b>Order code(s)</b>
Without flange	IM B3	1LL8315 ... 457 <sup>4)</sup>	0 -
With flange	IM V1 without protective cover	1LL8315 ... 457 <sup>5)</sup>	8 -
	IM V1 with protective cover	1LL8315 ... 457 <sup>5)</sup>	With additional charge The "Second shaft extension" option (K16) is not possible. 4 -
	IM B35	1LL8315 ... 457 <sup>5)</sup>	With additional charge 6 -

#### **Special versions**

**Options** For additional charges, order codes and descriptions, see from Page 3/34.

Motor type 1LL8

315-2 317-2 353-2 355-2 357-2 403-2 405-2 407-2 453-2 455-2 457-2 315-4 317-4 353-4 355-4 357-4 403-4 405-4 407-4 453-4 455-4 457-4

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400 V Yes Yes Yes Yes Yes Yes Yes Yes - - - - - Yes - - - - -

500 V — — Yes Yes — — Yes Yes Yes Yes Yes Yes — — — Yes Yes — — Yes Yes Yes Yes Yes Yes

690 V - - - - - - - - Yes Yes - - - - - - - - - - - - - - - - Yes Yes

Standard: 3600 3600 3600 3600 3600 3600 3600 3600 3000 3000 3000 3000 3000 3000 2500 2500 2500 2200 2200 2200 2100 2100

Macroturbulence limit frequency = 5000 m/s

Standard 60 60 60 60 60 60 60 60 50 50 50 100 100 83 83 83 73 73 73 70 70 70

1) Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

<sup>2)</sup> The noise values for 2-pole 1118 motors are for guidance only.

3) Operation is possible only with converter circuit ( $du/dt$  filter or sine-wave shaper).

4) Not for 111.8353 to 457.3-pole, 60 Hz.

5) Not for 111 8453 to 457 2-pole, 60 Hz.

# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Self-ventilated motors with through-ventilation  
Cast-iron series ILL8 with standard insulation for ≤ 500 V

### Selection and ordering data (continued)

$P_{\text{rated}}$ 50 Hz 1)	$P_{\text{rated}}$ 60 Hz	Frame size	Operating values at rated output with sinusoidal infeed										Cast-Iron series														
			$I_{\text{rated}}$ , 50 Hz	$T_{\text{rated}}$ , 50 Hz	$\eta_{\text{rated}}$ , 50 Hz, 4/4	$\eta_{\text{rated}}$ , 50 Hz, 3/4	$\cos \varphi_{\text{rated}}$	$I_{\text{rated}}$ , 50 Hz, 400 V	$I_{\text{rated}}$ , 50 Hz, 690 V	$T_B/T_{\text{rated}}$	$L_{\text{pIA}}$ , 50 Hz tolerance +3 dB(A)	$L_{\text{WA}}$ , 50 Hz tolerance +3 dB(A)	mM B3	J	Torque class												
kW	kW	FS	rpm	Nm	%	%	A	A	dB(A)	dB(A)	Order No.	kg	kgm <sup>2</sup> CL														
1) Cooling: Self-ventilated with through-ventilation (D03)																											
2) Insulation: Thermal class F (50 °C temperature rise). Protection utilization in accordance with the first class of the temperature code (50 °C rise at 1000 rpm at 50 Hz / 1000 rpm at 60 Hz).																											
250	285	315	988	2420	95.0	95.0	0.88	430	250	2.6	70	84	ILL8315-6PC	1300	6.0 10												
315	360	315	988	3040	95.2	95.2	0.89	540	310	2.6	70	84	ILL8317-6PC	1500	7.3 10												
400	460	355	991	3850	95.6	95.8	0.88	690	400	2.5	73	88	ILL8355-6PC	2000	13 10												
500	575	355	992	4820	95.9	96.2	0.88	860	495	2.6	73	88	ILL8357-6PC	2200	16 10												
560	645	400	993	5390	96.1	96.1	0.86	980	570	2.6	76	91	ILL8403-6PC	2800	21 10												
630	725	400	993	6060	96.2	96.4	0.87	1080	630	2.6	76	91	ILL8405-6PC	3000	24 10												
710	815	400	993	6830	96.2	96.4	0.88	1220	700	2.5	76	91	ILL8407-6PC	3200	27 10												
800	920	450	993	7700	96.3	96.5	0.86	—	810	2.5	78	93	ILL8453-6PD	4000	35 7												
900	1035	450	992	8660	96.3	96.6	0.87	—	900	2.4	78	93	ILL8455-6PD	4200	39 7												
1000	1150	450	993	9620	96.4	96.7	0.88	—	990	2.5	78	93	ILL8457-6PD	4500	44 7												
200	230	315	738	2590	94.2	94.7	0.82	375	215	2.4	67	81	ILL8315-8PC	1300	6.0 10												
250	285	315	738	3240	94.5	95.1	0.82	465	270	2.4	67	81	ILL8317-8PC	1500	7.3 10												
315	360	355	740	4070	95.0	95.2	0.83	580	335	2.4	69	84	ILL8355-8PC	2000	13 10												
400	460	355	740	5160	95.1	95.4	0.84	720	420	2.3	69	84	ILL8357-8PC	2200	16 10												
450	515	400	741	5800	95.4	95.6	0.84	810	470	2.3	72	87	ILL8403-8PD	2800	21 7												
500	575	400	741	6440	95.6	95.8	0.84	900	520	2.4	72	87	ILL8405-8PD	3000	24 7												
560	645	400	742	7210	95.7	95.9	0.83	1020	590	2.4	72	87	ILL8407-8PD	3200	27 7												
630	745	450	742	8100	95.8	96.0	0.82	1160	670	2.3	74	89	ILL8453-8PD	4000	35 7												
710	815	450	743	9130	95.9	96.2	0.83	1280	750	2.3	74	89	ILL8455-8PD	4200	39 7												
800	920	450	742	10300	96.0	96.0	0.83	—	840	2.3	74	89	ILL8457-8PD	4500	44 7												
<b>Voltages</b>			No. of poles		Motor type		Version						Order code(s)														
50 Hz: 400 VΔ/690 VY <sup>2)</sup>			6		ILL8315 ... 453		<b>Standard</b>						8														
			8		ILL8315 ... 455		<b>Standard</b>						8														
690 VΔ <sup>2)</sup>			6		ILL8455 ... 457		<b>Standard</b>						7														
			8		ILL8457		<b>Standard</b>						7														
400 VΔ			6		ILL8315 ... 453		Without additional charge						4														
			8		ILL8315 ... 455		Without additional charge						4														
500 VΔ			6, 8		ILL8315 ... 457		Without additional charge						5														
Further voltages <sup>1)</sup>			For additional charges, code numbers, order codes and descriptions, see from Page 3/32.													9											
<b>For types of construction</b> See Page 3/33			Motor type		Version								Order code(s)														
Without flange			IM B3		ILL8315 ... 457		<b>Standard</b>						0														
With flange			IM V1 without protective cover		ILL8315 ... 457		With additional charge						8														
			IM V1 with protective cover		ILL8315 ... 457		With additional charge		The "Second shaft extension" option (K16) is not possible.				4														
			IM B35		ILL8315 ... 457		With additional charge						6														
<b>Special versions</b>																Order code(s)											
Options			For additional charges, order codes and descriptions, see from Page 3/34.													ILL8...-...-Z ...+...+...+...+...											
Motor type ILL8																32											
315-6 317-6 355-6 357-6 403-6 405-6 407-6 453-6 455-6 457-6 315-8 317-8 355-8 357-8 403-8 405-8 407-8 453-8 455-8 457-8																											
400 V			Yes		Yes		Yes		—		—		Yes		—												
500 V			—		Yes		—		Yes		—		—		—												
690 V			—		—		—		—		—		—		—												
Standard			2950		2500		2200		2200		2100		2100		2950												
IM V1			2600		2200		1900		1900		1800		1800		2600												
Standard			147		125		110		110		105		105		196												
IM V1			130		110		110		95		95		90		173												
			147		125		110		110		105		105		196												
			130		110		110		95		95		90		173												
			146		125		110		110		105		105		196												
			130		110		110		95		95		90		173												
			146		125		110		110		105		105		196												
			130		110		110		95		95		90		173												
			146		125		110		110		105																

# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Self-ventilated motors with through-ventilation

Cast-Iron series ILL8 with special insulation for &gt; 500 to 690 V

## Selection and ordering data

<b>P<sub>rated</sub>, 50 Hz 1)</b>	<b>P<sub>rated</sub>, 60 Hz 1)</b>	<b>Frame size</b>	Operating values at rated output with sinusoidal infeed							<b>Cast-Iron series</b>																								
			<i>n<sub>rated</sub>, 50 Hz</i>	<i>T<sub>rated</sub>, 50 Hz</i>	<i>η<sub>rated</sub>, 50 Hz</i>	<i>cos φ<sub>rated</sub>, 50 Hz</i>	<i>I<sub>rated</sub>, 50 Hz, 690 V</i>	<i>T<sub>B</sub>/ T<sub>rated</sub></i>	<i>L<sub>pFA, 50Hz</sub>, tolerance +3 dB(A)</i>	<i>L<sub>V/A, 50Hz</sub>, tolerance +3 dB(A)</i>	<b>1LL8 – with special insulation</b>	<b>mIM B3</b>	<b>J</b>																					
<b>KW</b>	<b>KW</b>	<b>FS</b>	<b>rpm</b>	<b>Nm</b>	<b>%</b>	<b>A</b>	<b>dB(A)</b>	<b>dB(A)</b>	<b>Order No.</b>	<b>kg</b>	<b>kgm<sup>2</sup></b>	<b>CL</b>																						
<b>Conversion factors from motor data to drive data</b>																																		
<b>Conversion factors for operation on SIMOTICS or SIMOVERT MASTERSERIES with special insulation for voltages of &gt; 500 to 690 V</b>																																		
<b>Conversion factors for operation on SIMOTICS or SIMOVERT MASTERSERIES with special insulation in accordance with the standard IEC 60034-16-2</b>																																		
<b>Speed: 3000 rpm at 50 Hz, 3600 rpm at 60 Hz</b>																																		
300	330	315	2977	962	95.3	0.91	290	2.9	84 <sup>2)</sup>	99	1LL8315-2PM	1300	2.7	10																				
380	415	315	2977	1219	95.8	0.91	365	2.9	84 <sup>2)</sup>	99	1LL8317-2PM	1500	3.3	10																				
435	475	355	2982	1393	95.7	0.90	420	2.7	86 <sup>2)</sup>	101	1LL8353-2PM	1900	4.8	7																				
485	530	355	2982	1553	96.0	0.90	470	2.7	86 <sup>2)</sup>	101	1LL8355-2PM	2000	5.3	7																				
610	670	355	2983	1953	96.3	0.91	580	2.7	86 <sup>2)</sup>	101	1LL8357-2PM	2200	6.4	7																				
690	755	400	2986	2207	96.4	0.91	660	2.7	88 <sup>2)</sup>	103	1LL8403-2PM	2800	8.6	7																				
770	845	400	2986	2463	96.4	0.91	730	2.7	88 <sup>2)</sup>	103	1LL8405-2PM	3000	9.6	7																				
860	945	400	2988	2749	96.7	0.92	810	2.8	88 <sup>2)</sup>	103	1LL8407-2PM	3200	11	7																				
965	1060	450	2988	3084	96.7	0.92	910	3.0	90 <sup>2)</sup>	105	1LL8453-2PM	4000	19	5																				
1085	1190	450	2987	3469	96.7	0.92	1020	2.8	90 <sup>2)</sup>	105	1LL8455-2PM	4200	21	5																				
1210	1330	450	2985	3871	96.9	0.93	1120	2.7	90 <sup>2)</sup>	105	1LL8457-2PM	4400	23	5																				
295	340	315	1485	1897	95.2	0.86	300	2.9	77	90	1LL8315-4PM	1300	3.6	10																				
365	420	315	1487	2344	95.6	0.87	365	3.0	77	90	1LL8317-4PM	1500	4.4	10																				
430	495	355	1489	2758	95.8	0.86	435	2.7	77	92	1LL8353-4PM	1900	6.1	10																				
480	550	355	1489	3079	96.0	0.87	480	2.7	77	92	1LL8355-4PM	2000	6.8	10																				
600	690	355	1490	3846	96.3	0.86	600	2.8	77	92	1LL8357-4PM	2200	8.5	10																				
690	790	400	1491	4420	96.2	0.87	690	2.5	81	96	1LL8403-4PM	2800	13	10																				
780	895	400	1491	4996	96.4	0.88	770	2.6	81	96	1LL8405-4PM	3000	14	10																				
870	1000	400	1493	5565	96.6	0.85	880	2.7	81	96	1LL8407-4PM	3200	16	10																				
980	1125	450	1493	6269	96.6	0.85	1000	2.9	84	99	1LL8453-4PM	4000	23	7																				
1095	1255	450	1492	7009	96.6	0.88	1060	2.7	84	99	1LL8455-4PM	4200	26	7																				
1225	1405	450	1491	7846	96.7	0.88	1200	2.6	84	99	1LL8457-4PM	4400	28	7																				
<b>Voltages</b>			<b>No. of poles</b>		<b>Motor type</b>		<b>Version</b>		<b>Order code(s)</b>																									
50 Hz	400 VΔ/690 VY	6	1LL8315 ... 453		<b>Standard</b>		8		—																									
	690 VΔ	6	1LL8455 ... 457		<b>Standard</b>		7		—																									
Further voltages <sup>1)</sup>			For additional charges, code numbers, order codes and descriptions, see from Page 3/32.										9	...																				
<b>For types of construction</b> see Page 3/33			<b>Motor type</b>		<b>Version</b>		<b>Order code(s)</b>		—																									
Without flange	IM B3	1LL8315 ... 457 <sup>3)</sup>		<b>Standard</b>		0		—																										
With flange	IM V1	1LL8315 ... 457 <sup>4)</sup>		With additional charge		8		—																										
	without protective cover			IM V1 with protective cover		With additional charge		The "Second shaft extension" option (K16) is not possible.		4																								
	IM B35	1LL8315 ... 457 <sup>4)</sup>		With additional charge		6		—																										
<b>Special versions</b>			For additional charges, order codes and descriptions, see from Page 3/34.										<b>Order code(s)</b>																					
Options			1LL8 ... -Z ... + ... + ... + ...										—																					
<b>Motor type 1LL8</b>													—																					
315-2 317-2 355-2 357-2 403-2 405-2 407-2 453-2 455-2 457-2 315-4 317-4 353-4 355-4 357-4 403-4 405-4 407-4 453-4 455-4 457-4													—																					
<b>Particularities required</b>													—																					
400 V	—	—	—	—	—	—	—	—	—	—	—	—	—																					
500 V	—	—	—	—	—	—	—	—	—	—	—	—	—																					
690 V	—	—	—	—	—	—	Yes	Yes	Yes	—	—	—	Yes Yes Yes																					
<b>Maximum permissible speed (max. 1/min.)</b>													—																					
Standard	3600	3600	3600	3600	3600	3600	3600	3000	3000	3000	3000	2500	2500	2500	2200	2200	2200	2200	2100	2100	2100													
IM V1	—	—	3100	3100	3100	3100	3100	—	—	2600	2600	2200	2200	1900	1900	1900	1800	1800	1800	1800	1800													
<b>Maximum torque (max. 1/Nm)</b>													—																					
Standard	60	60	60	60	60	60	60	50	50	50	50	100	100	83	83	73	73	73	73	70	70													
IM V1	—	—	52	52	52	52	52	52	—	—	—	87	87	73	73	63	63	63	60	60	60													

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

<sup>2)</sup> The noise values for 2-pole 1LL8 motors are for guidance only.

<sup>3)</sup> Not for 1LL8453 to 1LL8457 2-pole, 60 Hz.

<sup>4)</sup> Not for 1LL8353 to 457 2-pole, 60 Hz.



# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Self-ventilated motors with through-ventilation  
Cast-Iron series 1LL8 with special insulation for > 500 to 690 V

### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz 1)	$P_{\text{rated}}$ , 60 Hz	Frame size	Operating values at rated output with sinusoidal infeed							Cast-Iron series										
			$n_{\text{rated}}$ , 50 Hz	$T_{\text{rated}}$ , 50 Hz	$\eta_{\text{rated}}$ , 50 Hz	$\cos \varphi_{\text{rated}}$	$I_{\text{rated}}$ , 50 Hz, 690 V	$T_B/T_{\text{rated}}$	$L_{\text{pA}, 50Hz}$ , tolerance	$L_{\text{WA}, 50Hz}$ , tolerance	1LL8 – with special insulation	IM B3	J							
kW	kW	FS	rpm	Nm	%	A	dB(A)	dB(A)	Order No.	kg	kgm <sup>2</sup>	CL								
1) Converter-fed operation. Specified for operation on SIMAMOTS or SIMOVERT MASTERSERIES with special insulation for voltages of > 500 to 690 V. Protection class: IP54.																				
2) Speeds: 1000 rpm at 50 Hz = 1200 rpm at 60 Hz.																				
235	270	315	990	2267	94.5	0.87	240	2.8	70	84	1LL8315-6PM	1300	6.0	10						
295	335	315	990	2846	94.8	0.87	300	2.8	70	84	1LL8317-6PM	1500	7.3	10						
380	435	355	992	3658	95.1	0.87	380	2.6	73	88	1LL8355-6PM	2000	13	10						
475	545	355	993	4568	95.8	0.87	480	2.7	73	88	1LL8357-6PM	2200	16	10						
540	620	400	993	5193	95.9	0.86	550	2.7	76	91	1LL8403-6PM	2800	21	10						
610	700	400	994	5961	96.0	0.87	610	2.7	76	91	1LL8405-6PM	3000	24	10						
690	790	400	993	6636	96.1	0.87	690	2.6	76	91	1LL8407-6PM	3200	27	10						
780	895	450	993	7502	96.2	0.87	780	2.6	78	93	1LL8453-6PM	4000	35	7						
870	1000	450	993	8367	96.3	0.87	870	2.5	78	93	1LL8455-6PM	4200	39	7						
975	1120	450	993	9377	96.3	0.88	960	2.6	78	93	1LL8457-6PM	4500	44	7						
3) Protection class: IP54.																				
180	205	315	738	2329	93.6	0.81	198	2.7	67	81	1LL8315-8PM	1300	6.0	10						
225	255	315	740	2904	94.3	0.80	250	2.7	67	81	1LL8317-8PM	1500	7.3	10						
285	325	355	741	3673	94.6	0.81	310	2.7	69	84	1LL8355-8PM	2000	13	10						
365	415	355	741	4704	94.9	0.83	385	2.5	69	84	1LL8357-8PM	2200	16	10						
420	480	400	741	5413	95.0	0.83	445	2.5	72	87	1LL8403-8PM	2800	21	7						
465	530	400	742	5965	95.5	0.83	490	2.6	72	87	1LL8405-8PM	3000	24	7						
525	600	400	742	6757	95.5	0.82	560	2.6	72	87	1LL8407-8PM	3200	27	7						
610	700	450	742	7851	95.4	0.82	660	2.4	74	89	1LL8453-8PM	4000	35	7						
690	790	450	742	8881	95.5	0.82	730	2.4	74	89	1LL8455-8PM	4200	39	7						
760	870	450	742	9782	95.5	0.83	800	2.4	74	89	1LL8457-8PM	4500	44	7						
4) Protection class: IP54.																				
<b>Voltages</b>			No. of poles	<b>Motor type</b>			<b>Version</b>			<b>Order code(s)</b>										
50 Hz	400 VΔ/690 VY	6		1LL8315 ... 453			Standard			8										
		8		1LL8315 ... 457			Standard			8										
	690 VΔ	6		1LL8455 ... 457			Standard			7										
Further voltages <sup>1)</sup>			For additional charges, code numbers, order codes and descriptions, see from Page 3/32.																	
<b>For types of construction</b> see Page 3/33			<b>Motor type</b>			<b>Version</b>			<b>Order code(s)</b>											
Without flange	IM B3		1LL8315 ... 457			Standard			0											
With flange	IM V1		1LL8315 ... 457			With additional charge			8											
	without protective cover																			
	IM V1		1LL8315 ... 457			With additional charge	The "Second shaft extension" option (K16) is not possible.		4											
	with protective cover								6											
	IM B35		1LL8315 ... 457			With additional charge														
5) Protection class: IP54.																				
<b>Special versions</b>			For additional charges, order codes and descriptions, see from Page 3/34.																	
Options			1LL8... ... -Z ... +...+...+...+																	
Motor type 1LL8																				
315-6	317-6	355-6	357-6	403-6	405-6	407-6	453-6	455-6	457-6	315-8	317-8	355-8	357-8	403-8	405-8	407-8	453-8	455-8	457-8	
400 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
500 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
690 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6) Protection class: IP54.																				
Standard			2950	2950	2500	2500	2200	2200	2100	2100	2100	2950	2950	2500	2500	2200	2200	2200	2100	2100
IM V1			2600	2600	2200	2200	1900	1900	1800	1800	1800	2600	2600	2200	2200	1900	1900	1900	1800	1800
7) Protection class: IP54.																				
Standard			147	147	125	125	110	110	105	105	105	196	196	166	166	146	146	146	140	140
IM V1			130	130	110	110	95	95	90	90	90	173	173	146	146	126	126	126	120	120

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.



# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Forced-air cooled motors with mounted separately driven fan  
Cast-iron series 1PQ8 with standard insulation for < 500 V

### Selection and ordering data

Operating values at rated output with sinusoidal infeed												Cast-iron series															
P <sub>rated</sub> , 50 Hz 1)	P <sub>rated</sub> , 60 Hz	Frame size	I <sub>rated</sub> , 50 Hz	I <sub>rated</sub> , 50 Hz	η <sub>rated</sub> , 50 Hz	cos φ <sub>rated</sub>	I <sub>rated</sub> , 50 Hz	I <sub>rated</sub> , 50 Hz	T <sub>B</sub> / I <sub>rated</sub>	L <sub>pIA</sub> , 50 Hz, tolerance +3 dB(A)	L <sub>WA</sub> , 50 Hz, tolerance +3 dB(A)	m <sub>IM B3</sub>	J	Torque class													
kW	kW	FS	rpm	Nm	%	%	A	A	dB(A)	dB(A)	Order No.	kg	kgm <sup>2</sup>	CL													
<small>1) Values for 60 Hz can be ordered with voltage code 9 and the appropriate order code. 2) Can be ordered for 400 VΔ 50 Hz as special version with voltage code 9 and order code L1Y (specify output, voltage and frequency). 3) Also available on request for 400 VΔ 50 Hz.</small>																											
<small>4) Operation is possible only with converter circuit (d/u/d filter or sine-wave filter).</small>																											
<small>5) Not for 1PQ8353 to 457 2-pole, 60 Hz.</small>																											
<small>6) Not for 1PQ8453 to 457 2-pole, 60 Hz.</small>																											
250	280	315	2979	801	95.7	95.7	0.90	420	245	2.8	79	94	1PQ8315-2PC	1400	2.7 10												
315	353	315	2979	1010	95.7	95.7	0.91	520	300	2.8	79	94	1PQ8317-2PC	1600	3.3 10												
355	398	355	2980	1140	95.7	95.7	0.90	590	345	2.5	81	96	1PQ8353-2PC	2000	4.8 10												
400	448	355	2980	1280	96.2	96.3	0.91	660	380	2.5	81	96	1PQ8355-2PC	2100	5.3 10												
500	560	355	2982	1600	96.6	96.7	0.91	820	475	2.6	81	96	1PQ8357-2PC	2300	6.4 10												
560	616	400	2985	1790	96.6	96.7	0.91	920	530	2.8	83	98	1PQ8403-2PC	2900	8.6 10												
630	693	400	2985	2020	96.6	96.7	0.91	1040	600	2.8	83	98	1PQ8405-2PC	3100	9.6 10												
710	781	400	2985	2270	96.8	96.9	0.91	~	670 <sup>2)</sup>	2.8	83	98	1PQ8407-2PC	3300	11 10												
800	—	450	2986	2560	96.7	96.8	0.91	~	760	3.0	86	101	1PQ8453-2PE	4100	19 5												
900	—	450	2986	2880	96.8	96.9	0.92	~	850	2.8	86	101	1PQ8455-2PE	4300	21 5												
1000	—	450	2986	3200	96.9	97.0	0.93	~	930	2.7	86	101	1PQ8457-2PE	4500	23 5												
250	288	315	1488	1600	95.5	95.6	0.87	435	250	2.8	79	93	1PQ8315-4PB	1400	3.6 13												
315	362	315	1488	2020	95.7	95.8	0.87	550	315	2.8	79	93	1PQ8317-4PB	1600	4.4 13												
355	408	355	1488	2280	95.8	95.9	0.87	610	355	2.5	81	96	1PQ8353-4PB	2000	6.1 13												
400	460	355	1488	2570	95.9	96.0	0.87	690	400	2.5	81	96	1PQ8355-4PB	2100	6.8 13												
500	575	355	1488	3210	96.2	96.3	0.88	850	495	2.5	81	96	1PQ8357-4PB	2300	8.5 13												
560	644	400	1492	3580	96.2	96.3	0.88	950	550	2.7	83	98	1PQ8403-4PB	2900	13 13												
630	725	400	1492	4030	96.4	96.5	0.88	1080	620	2.7	83	98	1PQ8405-4PB	3100	14 13												
710	817	400	1492	4540	96.5	96.6	0.89	~	690 <sup>2)</sup>	2.7	83	98	1PQ8407-4PB	3300	16 13												
800	920	450	1492	5120	96.5	96.6	0.88	~	790 <sup>2)</sup>	2.6	86	101	1PQ8453-4PC	4100	23 10												
900	1040	450	1492	5760	96.6	96.7	0.87	~	900 <sup>3)</sup>	2.6	86	101	1PQ8455-4PC	4300	26 10												
1000	1150	450	1492	6400	96.6	96.7	0.89	~	970 <sup>3)</sup>	2.6	86	101	1PQ8457-4PC	4500	28 10												
<b>Voltages</b>															Order code(s)												
50 Hz	400 VΔ/690 VY <sup>4)</sup>	2, 4													8												
	690 VΔ <sup>4)</sup>	2, 4													7												
	400 VΔ	2, 4													4												
	500 VΔ	2, 4													6												
<b>Further voltages<sup>1)</sup></b>															9 ...												
<b>For types of construction</b> see Page 3/33															Order code(s)												
Without flange	IM B3														0												
	IM V5, IM V6														0												
With flange	IM V1 without protective cover														3												
	IM V1 with protective cover														4												
	IM B35														5												
<b>Special versions</b>															Order code(s)												
Options	For additional charges, order codes and descriptions, see from Page 3/34												1PQ8...-...-Z	...+...+...+...													
<b>Motor type 1PQ8</b>																											
315-2 317-2 353-2 355-2 357-2 403-2 405-2 407-2 453-2 455-2 457-2 315-4 317-4 353-4 355-4 357-4 403-4 405-4 407-4 453-4 455-4 457-4																											
400 V	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—	—	Yes	Yes	Yes	Yes	—												
500 V	—	—	Yes	Yes	—	—	Yes	Yes	Yes	—	Yes	Yes	—	Yes	Yes												
690 V	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Yes Yes												
Standard	3600	3600	3600	3600	3600	3600	3600	3000	3000	3000	2500	2500	2200	2200	2200												
IM V1	—	—	3100	3100	3100	3100	3100	—	—	—	—	—	2100	2100	2100												
Ex prot.	—	—	—	—	—	—	—	—	—	—	2650	2650	2350	2350	2100												
Standard	60	60	60	60	60	60	60	50	50	50	100	100	83	83	73												
IM V1	—	—	52	52	52	52	52	—	—	—	—	—	70	70	70												
Ex prot.	—	—	—	—	—	—	—	—	—	—	88	88	78	78	70												
1)	Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.														4)												
2)	Can be ordered for 400 VΔ 50 Hz as special version with voltage code 9 and order code L1Y (specify output, voltage and frequency).														5)												
3)	Also available on request for 400 VΔ 50 Hz.														6)												



# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Forced-air cooled motors with mounted separately driven fan  
Cast-iron series 1PQ8 with standard insulation for < 500 V

### Selection and ordering data (continued)

P <sub>rated</sub> , 50 Hz 1)	P <sub>rated</sub> , 60 Hz	Frame size	Operating values at rated output with sinusoidal infeed										Cast-iron series 1PQ8 – with standard insulation Order No.	mM B3 J	Torque class			
			n <sub>rated</sub> , 50 Hz		T <sub>rated</sub> , 50 Hz		η <sub>rated</sub> , 50 Hz		cos φ <sub>rated</sub>		I <sub>rated</sub> , 50 Hz, 400 V		I <sub>rated</sub> , 50 Hz, 690 V					
			n <sub>rated</sub> , 50 Hz	T <sub>rated</sub> , 50 Hz	4/4	3/4	50 Hz	400 V	50 Hz	690 V	I <sub>B</sub> / <sub>rated</sub>	L <sub>pA</sub> , 50 Hz, tolerance +3 dB(A)	L <sub>WA</sub> , 50 Hz, tolerance +3 dB(A)					
kW	kW	FS	rpm	Nm	%	%			A	A	dB(A)	dB(A)	▲ New	kg	kgm <sup>2</sup>	CL		
<b>Converter fed operation: Speciality for operation on SINAMICS or SIMOVERT FASTERNESS with standard insulation for voltages of ≤ 500 V.</b>																		
<b>Notes: 1000 rpm at 50 Hz, 1200 rpm at 60 Hz.)</b>																		
<b>200</b>	<b>230</b>	<b>315</b>	990	1930	95.2	95.4	0.86	355	205	2.5	80	94	<b>1PQ8315-6PB</b>	1400	6.0	13		
<b>250</b>	<b>288</b>	<b>315</b>	989	2410	95.4	95.6	0.86	440	255	2.5	80	94	<b>1PQ8317-6PB</b>	1600	7.3	13		
<b>315</b>	<b>362</b>	<b>355</b>	992	3040	95.7	95.7	0.86	550	320	2.8	82	97	<b>1PQ8355-6PB</b>	2100	13	13		
<b>355</b>	<b>408</b>	<b>355</b>	992	3418	95.7	95.7	0.86	620	360	2.9	82	97	<b>1PQ8356-6PB</b>	2200	15	13		
<b>400</b>	<b>460</b>	<b>355</b>	993	3850	96.0	96.1	0.86	700	405	2.8	82	97	<b>1PQ8357-6PB</b>	2300	16	13		
<b>450</b>	<b>518</b>	<b>400</b>	992	4330	96.0	96.1	0.86	790	455	2.7	84	99	<b>1PQ8403-6PB</b>	2900	21	13		
<b>500</b>	<b>575</b>	<b>400</b>	992	4810	96.0	96.1	0.86	870	510	2.7	84	99	<b>1PQ8405-6PB</b>	3100	24	13		
<b>560</b>	<b>644</b>	<b>400</b>	992	5390	96.2	96.3	0.86	980	570	2.7	84	99	<b>1PQ8407-6PB</b>	3300	27	13		
<b>630</b>	<b>725</b>	<b>450</b>	993	6060	96.3	96.4	0.85	1120	640	2.6	87	102	<b>1PQ8453-6PB</b>	4100	35	13		
<b>710</b>	<b>817</b>	<b>450</b>	993	6830	96.3	96.4	0.85	–	730 <sup>2)</sup>	2.5	87	102	<b>1PQ8455-6PB</b>	4300	39	13		
<b>800</b>	<b>920</b>	<b>450</b>	993	7690	96.5	96.7	0.85	–	820 <sup>3)</sup>	2.5	87	102	<b>1PQ8457-6PB</b>	4600	44	13		
<b>Voltages</b>																		
50 Hz	400 VΔ/690 VY <sup>1)</sup>	6															Order code(s)	
		8																
	690 VΔ <sup>4)</sup>	6																
	400 VΔ	6																
	500 VΔ	6, 8																
Further voltages <sup>1)</sup> For additional charges, code numbers, order codes and descriptions, see from Page 3/32.																		
<b>For types of construction</b> See Page 3/33. <b>Motor type</b>																		
Without flange	IM B3																Order code(s)	
	IM V5, IM V6																	
With flange	IM V1 without protective cover																	
	IM V1 with protective cover																	
	IM B35																	
<b>Special versions</b>																		
Options	For additional charges, order codes and descriptions, see from Page 3/34.																	
	<b>Motor type 1PQ8</b>																	
	315-6 317-6 355-6 356-6 357-6 403-6 405-6 407-6 453-6 455-6 457-6 315-8 317-8 355-8 357-8 403-8 405-8 407-8 453-8 455-8 457-8																	
<b>Parallel test results</b>																		
400 V	–	Yes	Yes	Yes	Yes	–	Yes	Yes	–	–	–	–	Yes	–	–	Yes	Yes	
500 V	–	–	–	Yes	Yes	–	–	Yes	Yes	–	–	–	–	–	–	–	Yes	
690 V	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
<b>Mechanical limit speed</b>																		
Standard	2950	2950	2500	2500	2500	2200	2200	2100	2100	2100	2950	2950	2500	2500	2200	2200	2100	
IM V1	–	–	–	–	–	2100	2100	2100	1800	1800	1800	–	–	–	–	2100	2100	
Ex protection	2350	2350	2100	2100	2100	1900	1900	1900	1700	1700	2350	2350	2100	2100	1900	1900	1700	
<b>Mechanical limit frequency</b>																		
Standard	147	147	125	125	125	110	110	110	105	105	196	196	166	166	146	146	140	
IM V1	–	–	–	–	–	105	105	105	90	90	–	–	–	–	140	140	120	
Ex prot.	117	117	105	105	105	95	95	95	85	85	156	156	140	140	126	126	113	

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

<sup>2)</sup> Can be ordered for 400 VΔ 50 Hz as special version with voltage code 9 and order code L1Y (specify output, voltage and frequency).

<sup>3)</sup> Also available on request for 400 VΔ 50 Hz.

<sup>4)</sup> Operation is possible only with converter circuit (du/dt filter or sine-wave filter).

# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Forced-air cooled motors with mounted separately driven fan  
Cast-iron series 1PQ8 with special insulation (for > 500 to 690 V)

### Selection and ordering data

P <sub>rated</sub> , 50 Hz 60 Hz 1)	P <sub>rated</sub> , 50 Hz 60 Hz 1)	Frame size	Operating values at rated output with sinusoidal infeed								Cast-iron series												
			n <sub>rated</sub> , 50 Hz, 4/4	n <sub>rated</sub> , 50 Hz, 3/4	COS φ <sub>rated</sub>	I <sub>rated</sub> , 50 Hz, 690 V	T <sub>b</sub> / <sub>f<sub>rated</sub></sub>	L <sub>pA, 50Hz</sub> , tolerance +3 dB(A)	L <sub>WA, 50Hz</sub> , tolerance +3 dB(A)	1PQ8 – with special insulation	mM B3	J	Torque class										
kW	kW	FS	rpm	Nm	%	%	A	dB(A)	dB(A)	Order No.	kg	kgm <sup>2</sup>	CL										
<b>1) For converter-fed operation, specify for operation on SIMOTICS or SIMOVERT® MASTERSDRIVES with special insulation for voltages of &gt; 500 to 690 V. The insulation class F (130 °C) is standard. The insulation class H (160 °C) is available as an option. For further information, see the technical data (130 °C temperature class).</b>																							
240	270	315	2978	770	95.5	95.6	0.90	230	3.0	79	94	1PQ8315-2PM	1400	2.7 10									
300	335	315	2978	962	95.7	95.7	0.91	285	3.0	79	94	1PQ8317-2PM	1600	3.3 10									
345	385	355	2981	1105	95.7	95.7	0.90	335	2.6	81	96	1PQ8353-2PM	2000	4.8 10									
390	435	355	2981	1249	96.1	96.2	0.91	370	2.6	81	96	1PQ8355-2PM	2100	5.3 10									
485	545	355	2982	1553	96.5	96.6	0.91	460	2.6	81	96	1PQ8357-2PM	2300	6.4 10									
545	600	400	2986	1743	96.6	96.7	0.91	520	3.0	83	98	1PQ8403-2PM	2900	8.6 10									
610	670	400	2986	1951	96.6	96.7	0.91	580	3.1	83	98	1PQ8405-2PM	3100	9.6 10									
680	750	400	2986	2175	96.7	96.8	0.92	640	3.0	83	98	1PQ8407-2PM	3300	11 10									
775	—	450	2987	2478	96.7	96.8	0.92	730	2.8	86	101	1PQ8453-2PM	4100	19 5									
875	—	450	2987	2798	96.8	96.9	0.92	820	2.8	86	101	1PQ8455-2PM	4300	21 5									
970	—	450	2987	3101	96.9	97.0	0.93	900	2.8	86	101	1PQ8457-2PM	4500	23 5									
235	270	315	1485	1511	95.3	95.4	0.87	235	2.8	79	93	1PQ8315-4PM	1400	3.6 13									
290	335	315	1485	1865	95.4	95.5	0.87	285	2.8	79	93	1PQ8317-4PM	1600	4.4 13									
340	390	355	1488	2182	95.5	95.6	0.87	340	2.6	81	96	1PQ8353-4PM	2000	6.1 13									
385	445	355	1488	2471	95.7	95.8	0.87	385	2.6	81	96	1PQ8355-4PM	2100	6.8 13									
480	550	355	1488	3081	95.9	96.0	0.87	480	2.5	81	96	1PQ8357-4PM	2300	8.5 13									
545	625	400	1491	3491	96.0	96.1	0.88	540	2.6	83	98	1PQ8403-4PM	2900	13 13									
615	710	400	1491	3939	96.2	96.3	0.88	600	2.7	83	98	1PQ8405-4PM	3100	14 13									
690	795	400	1491	4420	96.4	96.5	0.89	670	2.8	83	98	1PQ8407-4PM	3300	16 13									
785	905	450	1492	5025	96.3	96.4	0.88	770	2.5	86	101	1PQ8453-4PM	4100	23 10									
880	1010	450	1492	5633	96.5	96.6	0.87	870	2.6	86	101	1PQ8455-4PM	4300	26 10									
980	1125	450	1492	6273	96.6	96.7	0.89	950	2.6	86	101	1PQ8457-4PM	4500	28 10									
<b>Voltages</b>			No. of poles		Motor type		Version						Order code(s)										
50 Hz	400 VΔ/690 VY	2	1PQ8315 ... 357		Standard		1PQ8315 ... 405						8	—									
		4	1PQ8315 ... 405		Standard		1PQ8403 ... 457						8	—									
	690 VΔ	2	1PQ8403 ... 457		Standard		1PQ8407 ... 457						7	—									
		4	1PQ8407 ... 457		Standard		1PQ8453-4PM						7	—									
Further voltages <sup>1)</sup>			For additional charges, code numbers, order codes and descriptions, see from Page 3/32.												9	...							
<b>For types of construction</b> see Page 3/32			Motor type		Version								Order code(s)										
Without flange	IM B3	IM V5, IM V6	1PQ8315 ... 457	1PQ8315 ... 457	Standard		1PQ8317-4PM						0	—									
					With additional charge		1PQ8317-4PM						0	—									
With flange	IM V1 without protective cover	IM V1 with protective cover	1PQ8315 ... 457 <sup>2)</sup>	1PQ8315 ... 457 <sup>2)</sup>	With additional charge		Not for explosion-proof motors.						6	—									
	IM B35	IM B35	1PQ8315 ... 457 <sup>3)</sup>	1PQ8315 ... 457 <sup>3)</sup>	With additional charge		The "Second shaft extension" option (K16) is not possible.						4	—									
<b>Special versions</b>			For additional charges, order codes and descriptions, see from Page 3/34.												Order code(s)								
Options	For additional charges, order codes and descriptions, see from Page 3/34.												1PQ8...-...-Z...+...+...+...										
<b>Motor type 1PQ8</b>																							
315-2 317-2 353-2 357-2 403-2 405-2 407-2 453-2 455-2 457-2 315-4 317-4 353-4 355-4 357-4 403-4 405-4 407-4 453-4 455-4 457-4																							
400 V	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	—	—	—	—	—	—	—								
500 V	Yes	Yes	Yes	Yes	—	—	Yes	Yes	Yes	Yes	—	—	Yes	Yes	Yes								
690 V	—	—	—	—	—	—	—	Yes	Yes	—	—	—	—	—	Yes								
Standard	3600	3600	3600	3600	3600	3600	3600	3000	3000	3000	2500	2500	2200	2200	2100	2100							
IM V1	—	—	3100	3100	3100	3100	3100	—	—	—	—	—	2100	2100	2100	1800							
Ex protection	—	—	—	—	—	—	—	—	—	2650	2650	2350	2350	2100	2100	1900							
Standard	60	60	60	60	60	60	60	50	50	100	83	83	73	73	70	70							
IM V1	—	—	52	52	52	52	52	—	—	—	88	88	78	78	70	70							
Ex protection	—	—	—	—	—	—	—	—	—	—	70	70	70	63	63	63							

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

<sup>2)</sup> Not for 1PQ8353 to 457 2-pole, 60 Hz.

<sup>3)</sup> Not for 1PQ8453 to 457 2-pole, 60 Hz.



# SIMOTICS N-compact Non-Standard Motors

## Motors specially designed for converter-fed operation

Forced-air cooled motors with mounted separately driven fan  
Cast-iron series 1PQ8 with special insulation for > 500 to 690 V

### Selection and ordering data (continued)

P <sub>rated</sub> , 50 Hz 60 Hz 1) kW	P <sub>rated</sub> , 50 Hz 60 Hz 1) kW	Frame size FS	Operating values at rated output with sinusoidal infeed								T <sub>B</sub> / T <sub>rated</sub>	L <sub>WA</sub> , 50 Hz, tolerance +3 dB(A) dB(A)	L <sub>WA</sub> , 50 Hz, tolerance +3 dB(A) dB(A)	Cast-iron series														
			n <sub>rated</sub> , 50 Hz	T <sub>rated</sub> , 50 Hz	n <sub>rated</sub> , 50 Hz	cos φ <sub>rated</sub>	I <sub>rated</sub> , 50 Hz, 690 V	A	m <sub>M</sub> B3	J				▲ New	kg	kgm <sup>2</sup> CL												
1) 100% (1000 rpm) to 150% (1200 rpm) (see page 3/2)																												
190	220	315	990	1833	95.0	95.2	0.85	196	2.7	80	94	1PQ8315-6PM	1400	6.0	13													
235	270	315	990	2267	95.2	95.4	0.86	240	2.7	80	94	1PQ8317-6PM	1600	7.3	13													
300	345	355	992	2688	95.7	95.7	0.86	305	2.8	82	97	1PQ8355-6PM	2100	13	13													
340	390	355	992	3273	95.6	95.7	0.86	345	3.1	82	97	▲ 1PQ8356-6PM	2200	15	13													
380	435	355	992	3658	95.9	96.0	0.86	385	2.9	82	97	1PQ8357-6PM	2300	16	13													
435	500	400	993	4184	95.9	96.0	0.85	445	2.8	84	99	1PQ8403-6PM	2900	21	13													
485	560	400	993	4664	96.0	96.1	0.86	490	2.8	84	99	1PQ8405-6PM	3100	24	13													
545	625	400	993	5241	96.1	96.2	0.86	550	2.7	84	99	1PQ8407-6PM	3300	27	13													
615	705	450	993	5915	96.3	96.4	0.84	630	2.7	87	102	1PQ8453-6PM	4100	35	13													
690	795	450	993	6636	96.3	96.4	0.85	700	2.5	87	102	1PQ8455-6PM	4300	39	13													
780	895	450	993	7502	96.4	96.6	0.85	790	2.6	87	102	1PQ8457-6PM	4600	44	13													
145	165	315	740	1871	94.1	94.2	0.79	162	2.5	79	93	1PQ8315-8PM	1400	6.0	13													
180	205	315	740	2323	94.4	94.5	0.80	198	2.5	79	93	1PQ8317-8PM	1600	7.3	13													
230	265	355	743	2956	95.0	95.1	0.80	250	2.4	81	96	1PQ8355-8PM	2100	13	13													
290	335	355	743	3727	95.2	95.3	0.81	315	2.4	81	96	1PQ8357-8PM	2300	16	13													
335	385	400	743	4306	95.5	95.6	0.80	365	2.6	83	98	1PQ8403-8PM	2900	21	13													
375	430	400	743	4820	95.6	95.7	0.80	410	2.7	83	98	1PQ8405-8PM	3100	24	13													
425	490	400	743	5463	95.7	95.8	0.79	470	2.7	83	98	1PQ8407-8PM	3300	27	13													
485	560	450	745	6217	96.0	96.1	0.78	540	2.5	86	101	1PQ8453-8PM	4100	35	13													
545	625	450	745	6986	96.1	96.2	0.78	610	2.5	86	101	1PQ8455-8PM	4300	39	13													
600	690	450	745	7691	96.2	96.3	0.79	660	2.5	86	101	1PQ8457-8PM	4600	44	13													
<b>Voltages</b>			No. of poles		Motor type		Version						Order code(s)															
50 Hz	400 V Δ/690 V Y	6	1PQ8315 ... 453		Standard				8																			
		8	1PQ8315 ... 457		Standard				8																			
		6	1PQ8455 ... 457		Standard				7																			
Further voltages <sup>1)</sup>			For additional charges, code numbers, order codes and descriptions, see from Page 3/32.												9													
<b>For types of construction</b> see Page 3/33			Motor type		Version								Order code(s)															
Without flange	IM B3		1PQ8315 ... 457		Standard				0																			
	IM V5, IM V6		1PQ8315 ... 457		With additional charge				0																			
With flange	IM V1 without protective cover		1PQ8315 ... 457		With additional charge		Not for explosion-proof motors.		8																			
	IM V1 with protective cover		1PQ8315 ... 457		With additional charge		The "Second shaft extension" option (K16) is not possible.		4																			
	IM B35		1PQ8315 ... 457		With additional charge				6																			
<b>Special versions</b>																												
Options	For additional charges, order codes and descriptions, see from Page 3/34.															1PQ8...+...-Z												
Motor type 1PQ8																												
315-6	317-6	355-6	356-6	357-6	403-6	405-6	407-6	453-6	455-6	457-6	315-8	317-8	355-8	357-8	403-8	405-8	407-8	453-8	455-8	457-8								
400 V	-	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	-	-	-	Yes	-	-	Yes	Yes	Yes	Yes									
500 V	-	-	-	Yes	Yes	-	-	-	Yes	Yes	Yes	-	-	-	-	-	-	-	Yes	Yes								
690 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Standard	2950	2950	2500	2500	2500	2200	2200	2200	2100	2100	2100	2950	2950	2500	2500	2200	2200	2200	2100	2100	2100							
IM V1	-	-	-	-	-	2100	2100	2100	1800	1800	1800	-	-	-	-	2100	2100	2100	1800	1800	1800							
Ex protec-	2350	2350	2100	2100	2100	1900	1900	1900	1700	1700	1700	2350	2350	2100	2100	1900	1900	1900	1700	1700	1700							
tion																												
Standard	147	147	125	125	125	110	110	110	105	105	105	196	196	166	166	146	146	146	140	140	140							
IM V1	-	-	-	-	-	105	105	105	90	90	90	-	-	-	-	140	140	140	120	120	120							
Ex protec-	117	117	105	105	105	95	95	95	85	85	85	156	156	140	140	126	126	126	113	113	113							
tion																												

<sup>1)</sup> Voltages for 60 Hz can be ordered with voltage code 9 and the appropriate order code.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

**Voltages**

Cast-Iron series 1LA8, 1LL8, 1PQ8

**Standard delivery times:****10 working days****20 working days****On request****Selection and ordering data**

Voltages	Voltage code 11th position of the Order No.	Additional identification code with order code and plain text if required	Motor category	Standard delivery time (colored area)															
				Motor version	Motor type	Number of poles	Motor type – Frame size												
				315	355	400	450												
				Mains-fed operation	1LA8	2, 4, 6, 8	10		20										
					1LL8	2, 4, 6, 8	10		20										
				Converter-fed operation	1LA8	2, 4, 6, 8	10		20										
					1LL8	2, 4, 6, 8	10		20										
				1PQ8	2, 4, 6, 8		10		20										
				Motor version	Motor type	Number of poles	Motor type 1LA8 ... /1LL8 ... /1PQ8 ...												
					315	353	403	407	453	455	457								
					317	355	405												
						356													
						357													
<b>1PQ8... - - - - -</b>																			
<b>1L... - - - - -</b>																			
<b>400 VA/690 VY<sup>1)</sup></b>				<b>6</b>	-	Mains-fed operation	1LA8, 1LL8	2, 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	-	-	-				
						6		8	<input type="checkbox"/>										
				<b>8</b>	-	Converter-fed operation with standard insulation	1LA8, 1LL8, 1PQ8	2, 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	-	-	-				
						6		8	<input type="checkbox"/>										
<b>400 VΔ</b>				<b>4</b>	-	Mains-fed operation	1LA8, 1LL8	2, 4, 6, 8	-	-	-	-	-	-	-				
						2, 4			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	-	-	-				
				Converter-fed operation with standard insulation	1LA8, 1LL8, 1PQ8	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	-	-	-				
						8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>500 VΔ</b>				<b>5</b>	-	Mains-fed operation	1LA8, 1LL8	2, 4, 6, 8	<input type="checkbox"/>										
						2, 4, 6, 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>690 VΔ<sup>1)</sup></b>				<b>0</b>	-	Mains-fed operation	1LA8, 1LL8	2, 4	<input type="checkbox"/>										
						6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
				Converter-fed operation with standard insulation	1LA8, 1LL8, 1PQ8	2, 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
						6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
						8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>380 VΔ/660 VY, 50 Hz output<sup>6)</sup></b>				<b>9</b>	<b>L2C</b>	All	All	All	<input checked="" type="checkbox"/>										
				380 VΔ/660 VY, 60 Hz output <sup>6)</sup>	<b>L2D</b>	All	All	All	<input checked="" type="checkbox"/>										
<b>440 VΔ; 50 Hz output<sup>6)</sup></b>				<b>9</b>	<b>L2R</b>	All	All	All	<input checked="" type="checkbox"/>										
				440 VΔ; 60 Hz output <sup>6)</sup>	<b>L2X</b>	All	All	All	<input checked="" type="checkbox"/>										
<b>460 VΔ; 50 Hz output<sup>6)</sup></b>				<b>9</b>	<b>L2T</b>	All	All	All	<input checked="" type="checkbox"/>										
				460 VΔ; 60 Hz output <sup>6)</sup>	<b>L2F</b>	All	All	All	<input checked="" type="checkbox"/>										
<b>575 VΔ; 50 Hz output</b>				<b>9</b>	<b>L2V</b>	All	All	All	<input checked="" type="checkbox"/>										
				575 VΔ; 60 Hz output	<b>L2M</b>	All	All	All	<input checked="" type="checkbox"/>										
<b>Standard winding<sup>8)</sup></b>				<b>9</b>	<b>L8Y • and identification code</b>	All	All	All	<input checked="" type="checkbox"/>										
<b>Non-standard winding<sup>9)</sup></b>				<b>9</b>	<b>L1Y • and identification code</b>	All	All	All	<input checked="" type="checkbox"/>										

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- With additional charge
- Not possible

**Note:**

The order codes listed above are only valid for motor series 1PQ8 with forced-air cooled motor.

For the mounted separately driven fan, the required voltage/frequency must be ordered according to order code Y81 "Separately driven fan with non-standard voltage and/or frequency" in plain text with indication of the voltage, frequency and circuit.

<sup>8)</sup> Plain text must be specified in the order: Voltage, frequency, circuit, required rated output in kW.

Winding according to voltage code:

- 0, 4, 5, 6, 7 or 8 for 1LA8 motors  
- 4, 5, 7 or 8 for 1PQ8 motors

- 0, 5 or 6 for 1LL8 motors.

The rating plate will be stamped in accordance with identification code. The order code Y80 is not necessary, as it is included in the price of L8Y.

<sup>9)</sup> Plain text must be specified in the order: Voltage between 380 V and 690 V (voltages outside this range are available on request), frequency, circuit, required rated output in kW.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

Types of construction

Cast-iron series 1LA8, 1LL8, 1PQ8

10 working days	20 working days	On request
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**Selection and ordering data**

Types of construction	Type of construction code 12th position of the Order No.	Additional identification code with order code and plain text if required	Motor category	Standard delivery time (colored area)			
				Motor version	Motor type	Motor type - Frame size	Frame size
				315	355	400	450
			Mains-fed operation	1LA8	1LA8		
				1LL8	1LL8		
			Converter-fed operation	1LA8	1LA8		
				1LL8	1LL8		
				1PQ8	1PQ8		
1PQ8.....	0		Motor version	Motor type	Frame size	315	355
1L.....	0					400	450
<b>Without flange</b>							
IM B3	0	-	All	All	<input checked="" type="checkbox"/>	<input type="checkbox"/> 1)	<input type="checkbox"/> 1)
IM V6	0	- New!	Mains-fed operation	1LA8	O. R.	O. R.	O. R.
				1LL8	-	-	-
			Converter-fed operation	1LA8	O. R.	O. R.	O. R.
				1LL8	-	-	-
				1PQ8	O. R.	O. R.	O. R.
			Mains-fed operation	1LA8	O. R.	O. R.	O. R.
				1LL8	-	-	-
			Converter-fed operation	1LA8	O. R.	O. R.	O. R.
				1LL8	-	-	-
				1PQ8	O. R.	O. R.	O. R.
IM V5	0	- New!					
<b>With flange</b>							
Accessories DIN EN 12847 Accessories DIN 12849							
A 800 A 900 A 1000 A 1150							
IM V1 without protective cover 2)	8	-	Mains-fed operation	1LA8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 3)	<input checked="" type="checkbox"/> 3)
				1LL8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 1)	<input checked="" type="checkbox"/> 1)
			Converter-fed operation	1LA8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 3)	<input checked="" type="checkbox"/> 3)
				1LL8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				1PQ8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 3)	<input checked="" type="checkbox"/> 3)
IM V1 with protective cover 4)	4	-	Mains-fed operation	1LA8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 3)	<input checked="" type="checkbox"/> 3)
				1LL8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 1)	<input checked="" type="checkbox"/> 1)
			Converter-fed operation	1LA8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				1LL8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				1PQ8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 3)	<input checked="" type="checkbox"/> 3)
IM B35	6	-	Mains-fed operation	1LA8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				1LL8	<input type="checkbox"/> O. R.	<input type="checkbox"/> O. R.	<input type="checkbox"/> O. R.
			Converter-fed operation	1LA8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				1LL8	<input type="checkbox"/> O. R.	<input type="checkbox"/> O. R.	<input type="checkbox"/> O. R.
				1PQ8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Standard version  
 O. R. Possible on request  
 With additional charge

Note:  
 With the same order number supplement in the 12th position, the respective basic type of construction will always be specified on the rating plate.

**Ordering example:**

Selection criteria	Requirement	Structure of the Order No.
Motor type	Non-standard motor specially designed for mains-fed operation, self-ventilated, cast-iron version, IP55 degree of protection	1LA8
Motor frame size/No. of poles/speed	315/6-pole/1000 rpm	315-6AB
Rated output	200 kW	
Voltage and frequency	400 VΔ/690 VY, 50 Hz	1LA8315-6AB6
Type	IM V1 with protective cover	1LA8315-6AB64

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- 1) Not possible for 2-pole 1LL8 motors in 60 Hz version for mains-fed operation.  
 2) For explosion-proof 1LA8 and 1PQ8 motors, the type of construction IM V1 without protective cover is not possible.
- 3) For 2-pole 1LA8 and 1PQ8 motors for mains-fed and converter-fed operation up to 500 V, the 60 Hz version is not possible.  
 4) The "Second shaft extension" option, order code K16 is not possible.



# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

Options

Cast-Iron series 1LA8, 1LL8, 1PQ8

Standard delivery times:

10 working days

20 working days

On request

### Selection and ordering data

Special versions		Additional identification code -Z with order code and plain text if required	Motor category		Standard delivery time (colored area)				
Motor version	Motor type		Motor type – Frame size		315	355	400	450	
Mains-fed operation	1LA8								
	1LL8								
Converter-fed operation	1LA8								
	1LL8								
	1PQ8								
<b>1PQ8</b>	<b>-Z</b>		<b>Motor version</b>	<b>Motor type</b>	<b>Frame size</b>	<b>315</b>	<b>355</b>	<b>400</b>	<b>450</b>
<b>1L</b>	<b>-Z</b>								
<b>Standardline</b>		<b>B20</b>	Mains-fed operation	1LA8	O	O	—	—	
Standardline version <sup>1)</sup>			1LL8	—	—	—	—	—	
The price reduction refers to the basic machine			Converter-fed operation	1LA8	O	O	—	—	
Possible range of options: A23, A61, A72, G50, H70, H73, K09, K10, K45, K46, K57, K83, K84, K85, L00, L97, M58 (frame size 315 only), M88, Y53			1LL8	—	—	—	—	—	
			1PQ8	—	—	—	—	—	
<b>Motor protection</b>									
Motor protection with PTC thermistors with 6 embedded temperature sensors for alarm and tripping <sup>2)</sup>		<b>A12</b>	All	All	□	□	□	□	
Motor temperature detection with embedded temperature sensor KTY 84-130 <sup>3)</sup>		<b>A23</b>	All	All	O	O	O	O	
Installation of 6 PT100 resistance thermometers in stator winding <sup>3)</sup>		<b>A61</b>	All	All	✓	✓	✓	✓	
Installation of 6 PT100 resistance thermometers in stator winding, 3-wire circuit from auxiliary terminal box (Option M50 or M88)		<b>A64</b>	All	All	✓	✓	✓	✓	
Installation of 2 PT100 screw-in resistance thermometers in basic circuit for rolling-contact bearings		<b>A72</b>	All	All	✓	✓	✓	✓	
Installation of 2 PT100 screw-in resistance ther- mometers for rolling-contact bearings, in 3-wire circuit from auxiliary terminal box (Option M50 or M88)		<b>A78</b>	All	All	✓	✓	✓	✓	
Installation of 2 PT100 double screw-in resis- tance thermometers in 3-wire circuit for rolling- contact bearings		<b>A80</b>	New!	All	✓	✓	✓	✓	
6 x PT100 Smart transmitter -40 to +140 °C Rosemount <sup>4)</sup>		<b>M62</b>	All	All	✓	✓	✓	✓	
<b>Connection boxes</b>									
Two-part plate on connection box		<b>K06</b>	Mains-fed operation	1LA8	✓ <sup>5)</sup>	✓	✓	✓	
			1LL8	✓	✓	✓	✓	✓	
			Converter-fed operation	1LA8	O.R.	O.R.	O.R.	O.R.	
			1LL8	O.R.	O.R.	O.R.	O.R.	O.R.	
			1PQ8	O.R.	O.R.	O.R.	O.R.	O.R.	
Undrilled entry plate		<b>L01</b>	All	All	O <sup>6)</sup>	O	O	O	
Connection box on RHS		<b>K09</b>	All	All	□	□	□	□	
Connection box on LHS		<b>K10</b>	New!	All	O	O	O	O	
Cable entry in direction of NDE with rotation of the terminal box console through 180°		<b>N81</b>	All	All	O	O	O	O	
Cable entry in direction of DE with rotation of the terminal box console through 180°		<b>N82</b>	New!	All	O	O	O	O	
Cable entry from the top		<b>N83</b>	New!	All	O	O	O	O	
Rotation of the terminal box console through 180°		<b>N84</b>	New!	All	O	O	O	O	
Connection box on NDE		<b>N85</b>	New!	All	O.R.	O.R.	O.R.	O.R.	
Connection box on top (1XB1634 connection box) <sup>7)</sup>		<b>K11</b>	All	All	✓	✓	✓	✓	
DIN 89280 cable gland, maximum configuration		<b>K57</b>	All	All	✓	✓	✓	✓	
Rotation of the connection box through 90°, entry from DE		<b>K83</b>	All	All	O	O	O	O	
Rotation of the connection box through 90°, entry from NDE		<b>K84</b>	All	All	O	O	O	O	
Rotation of the connection box through 180°		<b>K85</b>	All	All	O	O	O	O	
Larger connection box (1XB1621 connection box)		<b>M58</b>	All	All	✓ <sup>8)</sup>	—	—	—	
PE connection without cable lug		<b>Q00</b>	New!	All	✓	✓	✓	✓	
Larger connection box (1XB1631 connection box)		<b>L00</b>	Mains-fed operation	1LA8	✓	✓ <sup>8)</sup>	□	□	
			1LL8	✓	□	□	□	□	
			Converter-fed operation	1LA8	✓	✓ <sup>8)</sup>	□	□	
			1LL8	✓	□	□	□	□	
			1PQ8	✓	✓ <sup>8)</sup>	□	□	□	

For legends, see Page 3/42; for footnotes, see Page 3/43.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

**Standard delivery times:**

10 working days	20 working days	On request
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**Options**  
Cast-Iron Series 1LA8, 1LL8, 1PQ8

Special versions	Additional identification code -Z with order code and plain text if required	Motor category	Standard delivery time (colored area)				
			Motor version	Motor type	Frame size	315	355
		Mains-fed operation	1LA8	All	–	✓	✓
			1LL8	All	–	✓	✓
		Converter-fed operation	1LA8	All	–	✓	✓
			1LL8	All	–	✓	✓
			1PQ8	All	–	✓	✓
<b>1PQ8. .... -Z</b>		<b>Motor version</b>	<b>Motor type</b>	<b>Frame size</b>	<b>315</b>	<b>355</b>	<b>400</b>
<b>1L.... -Z</b>							<b>450</b>
Larger connection box (1XB9600 connection box) <sup>9)</sup>	<b>M63</b>	All	All	–	✓	✓	✓
Subsequently rotatable main connection box 6 cables protruding, 1.5 m long	<b>J12</b>	All	All	–	✓	✓	✓
6 cables protruding, 3 m long	<b>L48</b>	All	All	O. R.	O. R.	O. R.	O. R.
Auxiliary connection box 1XB9016 (cast-iron)	<b>M50</b>	All	All	O. R.	O. R.	O. R.	O. R.
Auxiliary connection box 1XB9015 (stainless steel)	<b>M51</b>	All	All	✓	✓	✓	✓
Flange version A660 instead of standard version 10)	<b>M61</b>	Mains-fed operation	1LA8	✓	✓	–	–
			1LL8	–	–	–	–
		Converter-fed operation	1LA8	✓	✓	–	–
			1LL8	–	–	–	–
			1PQ8	✓	✓	–	–
Auxiliary connection box 1XB3020 <sup>11)</sup>	<b>L97</b>	All	All	✓	✓	✓	✓
Auxiliary connection box 1XB9014 (aluminum)	<b>M88</b>	All	All	✓	✓	✓	✓
Connection box on NDE	<b>M64</b>	All	All	✓	✓	✓	✓
Temperature class 155 (F), utilized to 155 (F), with service factor (1LA8 motors: SF 1.1 from frame size 400 SF 1.05; 1LL8 motors: SF 1.05) <sup>12)</sup>	<b>C11</b>	Mains-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓
		Converter-fed operation	1LA8	–	–	–	–
			1LL8	–	–	–	–
			1PQ8	–	–	–	–
Temperature class 155 (F), utilized to 155 (F), with increased output (1LA8 motors: 10 %, from frame size 400 5 %; 1LL8 motors: 5 %) <sup>12)</sup>	<b>C12</b>	Mains-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓
		Converter-fed operation	1LA8	–	–	–	–
			1LL8	–	–	–	–
			1PQ8	–	–	–	–
Temperature class 155 (F), utilized to 155 (F), with increased coolant temperature (1LA8 motors: 55 °C, from frame size 400 50 °C; 1LL8 motors: 50 °C) <sup>12)</sup>	<b>C13</b>	Mains-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓
		Converter-fed operation	1LA8	–	–	–	–
			1LL8	–	–	–	–
			1PQ8	–	–	–	–
Temperature class 180 (H), utilized to 155 (F), with service factor (SF 1.1) <sup>12)</sup>	<b>C14</b>	Mains-fed operation	1LA8	✓	✓	✓	✓
			1LL8	O. R.	O. R.	O. R.	O. R.
		Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	O. R.	O. R.	O. R.	O. R.
			1PQ8	✓	✓	✓	✓
<b>Colors and paint finish</b>							
Standard finish in RAL 7030 stone gray		All	All	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standard paint finish in other colors	<b>Y53</b> * and standard finish RAL ...	All	All	✓	✓	✓	✓
Special finish in RAL 7030 stone gray	<b>K26</b>	All	All	✓	✓	✓	✓
Special finish in other colors	<b>Y54</b> * and special finish RAL ...	All	All	✓	✓	✓	✓
Unpainted (only cast-iron parts primed)	<b>K23</b>	All	All	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mounting of brake (incl. the brake from Stromag)	<b>H47</b>	Mains-fed operation	1LA8	O. R.	O. R.	O. R.	O. R.
			1LL8	–	–	–	–
		Converter-fed operation	1LA8	O. R.	O. R.	O. R.	O. R.
			1LL8	–	–	–	–
			1PQ8	O. R.	O. R.	O. R.	O. R.
Mounting of the holding brake SFB 160, 1600 Nm, 230 V, Pintsch-Bubenzer <sup>13)</sup>	<b>J48</b>	All	Mains-fed operation	1LA8	✓	–	–
			1LL8	–	–	–	–
		Converter-fed operation	1LA8	✓	–	–	–
			1LL8	–	–	–	–
			1PQ8	✓	–	–	–

For legends, see Page 3/42; for footnotes, see Page 3/43.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

Options

Cast-Iron Series 1LA8, 1LL8, 1PQ8

Standard delivery times:

10 working days

20 working days

On request

Special versions	Additional identification code -Z with order code and plain text if required	Motor category	Standard delivery time (colored area)					
			Motor version	Motor type	Motor type – Frame size			
					315	355	400	450
1PQ8.....-Z	1L.....-Z	Mains-fed operation	1LA8	1LA8	✓	–	–	–
		1LL8	1LL8	1LL8	–	–	–	–
Mounting of the holding brake SFB 160 SH, 2100 Nm, 230 V, Pintsch-Bubenzer <sup>13)</sup>	J49	New!	Converter-fed operation	1LA8	✓	–	–	–
			1LL8	1LL8	–	–	–	–
Mounting of the holding brake SFB 160 H, 2500 Nm, 230 V, Pintsch-Bubenzer <sup>13)</sup>	J56	New!	1PQ8	1PQ8	✓	–	–	–
			1LA8	1LA8	✓	✓	–	–
Mounting of the holding brake SFB 250 SH, 3300 Nm, 230 V, Pintsch-Bubenzer <sup>13)</sup>	J57	New!	1LL8	1LL8	–	–	–	–
			1LA8	1LA8	✓	–	–	–
Mounting of the holding brake SFB 250 H, 4000 Nm, 230 V, Pintsch-Bubenzer <sup>13)</sup>	J58	New!	1LL8	1LL8	–	–	–	–
			1PQ8	1PQ8	✓	–	–	–
Mounting of the holding brake SFB 250 H, 4000 Nm, 400 V, Pintsch-Bubenzer <sup>13)</sup>	J59	New!	1LA8	1LA8	–	–	✓	–
			1LL8	1LL8	–	–	–	–
Mounting of the holding brake SFB 400 SH, 5200 Nm, 400 V, Pintsch-Bubenzer <sup>13)</sup>	J66	New!	1LA8	1LA8	–	–	✓	–
			1LL8	1LL8	–	–	✓	–
Mounting of the holding brake SFB 400 H, 6300 Nm, 400 V, Pintsch-Bubenzer <sup>13)</sup>	J67	New!	1PQ8	1PQ8	–	–	✓	–
			1LA8	1LA8	–	–	✓	✓
Mounting of the holding brake SFB 630 SH, 8000 Nm, 400 V, Pintsch-Bubenzer <sup>13)</sup>	J68	New!	1LL8	1LL8	–	–	–	✓
			1LA8	1LA8	–	–	–	✓
Mounting of the holding brake SFB 630 H, 10000 Nm, 400 V, Pintsch-Bubenzer <sup>13)</sup>	J69	New!	1PQ8	1PQ8	–	–	–	✓
			1LA8	1LA8	–	–	–	✓
Prepared for mounting of the holding brake SFB for shaft height 315 <sup>13)</sup>	J06	New!	1LL8	1LL8	–	–	–	✓
			1PQ8	1PQ8	✓	–	–	–
Prepared for mounting of the holding brake SFB for shaft height 355 <sup>13)</sup>	J07	New!	1LA8	1LA8	–	✓	–	–
			1LL8	1LL8	–	–	–	–
			1PQ8	1PQ8	✓	–	–	–

For legends, see Page 3/42; for footnotes, see Page 3/43.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

Options

Cast-iron series 1LA8, 1LL8, 1PQ8

Standard delivery times:		
10 working days	20 working days	On request

Special versions	Additional identification code -Z with order code and plain text if required	Motor category		Standard delivery time (colored area)				
		Motor version	Motor type	Motor type → Frame size	315	355	400	
		Mains-fed operation	1LA8	315	—	✓	—	
			1LL8	355	—	—	—	
		Converter-fed operation	1LA8	315	—	—	—	
			1LL8	355	—	—	—	
			1PQ8	315	—	✓	—	
				355	—	—	—	
				400	—	—	—	
				450	—	—	—	
1PQ8. .... -Z		Motor version	Motor type	Frame size	315	355	400	450
1L. .... -Z								
<b>Special technology</b>								
Prepared for mounting of the holding brake SFB	J08	New!	Mains-fed operation	1LA8	—	—	✓	—
for shaft height 400 [3]			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	—	✓	—	—
			1LL8	—	—	—	—	—
			1PQ8	—	—	✓	—	—
Prepared for mounting of the holding brake SFB	J09	New!	Mains-fed operation	1LA8	—	—	—	✓
for shaft height 450 [3]			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	—	—	—	✓
			1LL8	—	—	—	—	—
			1PQ8	—	—	✓	—	—
Mounting of LL 861 900 220 rotary pulse encoder	H70		Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓
Mounting of HOG 10 D 1024 I rotary pulse encoder	H73		Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓
Prepared for mounting of LL 861 900 220	H78		Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓
Prepared for mounting of HOG 10 D 1024 I	H80		Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓
Mounting of HOG10 DN 2048 incremental encoder	H83	New!	Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓
Mounting of HOG11 DN 2048 incremental encoder	H84	New!	Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓
Mounting of LL861 incremental encoder (2048 pulses)	H85	New!	Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓
Mounting of LL861900 222 rotary pulse encoder with Advanced Diagnostic System	H16	New!	Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓
HOG 11 DN 1024 I rotary pulse encoder (16 mm) with special anti-corrosion protection	H89	New!	Mains-fed operation	1LA8	—	—	—	—
			1LL8	—	—	—	—	—
			Converter-fed operation	1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓	✓

For legends, see Page 3/42; for footnotes, see Page 3/43.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

**Options**

Cast-iron series: 1LA8, 1LL8, 1PQ8

**Standard delivery times:**

<b>10 working days</b>	<b>20 working days</b>	<b>On request</b>
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Special versions	Additional identification code -Z with order code and plain text if required	Motor category	Standard delivery time (colored area)				
			Motor version	Motor type	Motor type - Frame size	315	355
		Mains-fed operation	1LA8				
			1LL8				
		Converter-fed operation	1LA8				
			1LA8				
			1LL8				
			1PQ8				
<b>1PQ8.....-Z</b>	<b>1L.....-Z</b>	<b>Motor version</b>	<b>Motor type</b>	<b>Frame size</b>	<b>315</b>	<b>355</b>	<b>400</b>
<b>1PQ8.....-Z</b>	<b>1L.....-Z</b>	<b>Motor version</b>	<b>Motor type</b>	<b>Frame size</b>	<b>315</b>	<b>355</b>	<b>400</b>
Mounting of HOG 10 DN 1024 I rotary pulse encoder + centrifugal switch, (speed .... rpm), terminal box protection against humidity	<b>Y74</b> • and required speed .... rpm	New!	Mains-fed operation	1LA8	-	-	-
			1LL8	-	-	-	-
			Converter-fed operation	1LA8	✓	✓	✓
			1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓
Mounting of HOG 10 DN 1024 I rotary pulse encoder + centrifugal switch, (speed .... rpm), terminal box protection against dust	<b>Y76</b> • and required speed .... rpm	New!	Mains-fed operation	1LA8	-	-	-
			1LL8	-	-	-	-
			Converter-fed operation	1LA8	✓	✓	✓
			1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓
Mounting of HOG 10 D 1024 I with terminal box/protection against dust	<b>N05</b>	New!	Mains-fed operation	1LA8	-	-	-
			1LL8	-	-	-	-
			Converter-fed operation	1LA8	✓	✓	✓
			1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓
Mounting of HOG 10 DN 1024 I with terminal box/protection against dust (zero signal)	<b>N06</b>	New!	Mains-fed operation	1LA8	-	-	-
			1LL8	-	-	-	-
			Converter-fed operation	1LA8	✓	✓	✓
			1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓
Mounting of HOG 10 DN 1024 I with terminal box/protection against humidity (zero signal)	<b>N08</b>	New!	Mains-fed operation	1LA8	-	-	-
			1LL8	-	-	-	-
			Converter-fed operation	1LA8	✓	✓	✓
			1LA8	✓	✓	✓	✓
			1LL8	✓	✓	✓	✓
			1PQ8	✓	✓	✓	✓
Mounting a special type of rotary pulse encoder	<b>Y70</b> • and encoder designation		Mains-fed operation	1LA8	-	-	-
			1LL8	-	-	-	-
			Converter-fed operation	1LA8	O.R.	O.R.	O.R.
			1LA8	O.R.	O.R.	O.R.	O.R.
			1LL8	O.R.	O.R.	O.R.	O.R.
			1PQ8	O.R.	O.R.	O.R.	O.R.
Low-noise version for 2-pole motors with clockwise direction of rotation	<b>K37</b>		Mains-fed operation	1LA8	✓	□	□
			1LL8	✓	○	○	○
			Converter-fed operation	1LA8	✓	□	□
			1LA8	✓	○	○	○
			1LL8	✓	○	○	○
			1PQ8	-	-	-	-
Low-noise version for 2-pole motors with counter-clockwise direction of rotation	<b>K38</b>		Mains-fed operation	1LA8	✓	□	□
			1LL8	✓	○	○	○
			Converter-fed operation	1LA8	✓	□	□
			1LA8	✓	○	○	○
			1LL8	✓	○	○	○
			1PQ8	-	-	-	-
IP65 degree of protection	<b>K50</b>		Mains-fed operation	1LA8	✓	✓	✓
			1LL8	-	-	-	-
			Converter-fed operation	1LA8	✓	✓	✓
			1LA8	-	-	-	-
			1LL8	-	-	-	-
			1PQ8	✓	✓	✓	✓
IP56 degree of protection (non-heavy-sea)	<b>K52</b>		Mains-fed operation	1LA8	✓	✓	✓
			1LL8	-	-	-	-
			Converter-fed operation	1LA8	✓	✓	✓
			1LA8	-	-	-	-
			1LL8	-	-	-	-
			1PQ8	O.R.	O.R.	O.R.	O.R.
Rust-resistant screws (externally) <sup>(14)</sup>	<b>M27</b>	All	All	✓	✓	✓	✓

For legends, see Page 3/42; for footnotes, see Page 3/43.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

**Standard delivery times:**

10 working days	20 working days	On request
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**Options****Cast-Iron series 1LA8, 1LL8, 1PQ8**

Special versions		Additional identification code -Z with order code and plain text if required		Motor category		Standard delivery time (colored area)				
				Motor version	Motor type	315	355	400	450	
		Mains-fed operation	-Z	1LA8	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
		Converter-fed operation	-Z	1LA8	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				1PQ8	1PQ8	✓	✓	✓	✓	
	1PQ8.....-Z			Motor version	Motor type	Frame size	315	355	400	450
	1L.....-Z									
Coolant temperature -50 to +40 °C		D02	New!	Mains-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				1PQ8	1PQ8	✓	✓	✓	✓	
Coolant temperature -40 to +40 °C		D03		Mains-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				1PQ8	1PQ8	✓	✓	✓	✓	
Coolant temperature -30 to +40 °C		D04		Mains-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				1PQ8	1PQ8	✓	✓	✓	✓	
Coolant temperature 45 °C, derating 4 % <sup>15)</sup>		D11	All	All	O	O	O	O	O	
Coolant temperature 50 °C, derating 8 % <sup>15)</sup>		D12	All	All	O	O	O	O	O	
Coolant temperature 55 °C, derating 13 % <sup>15)</sup>		D13	All	All	O	O	O	O	O	
Coolant temperature 60 °C, derating 18 % <sup>15)</sup>		D14	All	All	O	O	O	O	O	
Conformity statement in accordance with standards and specifications										
Electrical according to NEMA MG1-12 <sup>14)</sup>		D30	All	All	✓	✓	✓	✓	✓	
Design according to UL with "Recognition Mark"		D31	All	All	✓	✓	✓	✓	✓	
China Energy Efficiency Label <sup>16)</sup>		D34	New!	Mains-fed operation	1LA8	O	O	—	—	
				1LL8	1LL8	O	O	—	—	
				Converter-fed operation	1LA8	—	—	—	—	
				1LL8	1LL8	—	—	—	—	
				1PQ8	1PQ8	—	—	—	—	
Ex certification for Russia – only in combination with order codes M35, M39, M72 and M73		D35	New!	Mains-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				1PQ8	1PQ8	✓	✓	✓	✓	
Conformity statement in accordance with 94/9/EC (ATEX) of an independent body for Zone 2 motors (Ex nA)		D36	New!	Mains-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				1PQ8	1PQ8	✓	✓	✓	✓	
IEC Ex certificate – only in combination with order codes M72 and M73		D37	New!	Mains-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	1LL8	—	—	—	—	
				1PQ8	1PQ8	O.R.	O.R.	O.R.	O.R.	
Canadian regulations (CSA)		D40	All	All	✓	✓	✓	✓	✓	
Commissioning of the classification society by Siemens <sup>17)</sup>										
Commissioning of the classification society by third party <sup>17)</sup>		E88	New!	All	All	✓	✓	✓	✓	
Pump drive for sea water desalination plants certified according to Lloyd's Register <sup>17)</sup>		E89	New!	All	All	✓	✓	✓	✓	
		E90	New!	All	All	✓	✓	✓	✓	

3.3

For legends, see Page 3/42; for footnotes, see Page 3/43.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

## Options

Cast-iron series 1LA8, 1LL8, 1PQ8

Standard delivery times:

10 working days	20 working days	On request
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Special versions		Additional identification code -Z with order code and plain text if required	Motor category	Standard delivery time (colored area)					
Motor version	Motor type			Motor type – Frame size	315	355	400		
Mains-fed operation	1LA8								
	1LL8								
Converter-fed operation	1LA8								
	1LL8								
	1PQ8								
1PQ8...-Z			Motor version	Motor type	Frame size	315	355	400	450
1L...-Z									
<b>Design for Zone 2 for mains-fed operation Ex nA II T3 according to IEC/EN 60079-15 (19) 20)</b>		M72	Mains-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	–	–	–	–	
				1LL8	–	–	–	–	
				1PQ8	–	–	–	–	
<b>Design for Zone 2 for converter-fed operation, with derating Ex nA II T3 according to IEC/EN 60079-15 (19) 20) (21)</b>		M73	Mains-fed operation	1LA8	–	–	–	–	
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	O.R.	O.R.	O.R.	O.R.	
				1LL8	–	–	–	–	
				1PQ8	O.R.	O.R.	O.R.	O.R.	
<b>Design for Zone 22 for non-conductive dust (IP55) for mains-fed operation (20)</b>		M35	Mains-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	–	–	–	–	
				1LL8	–	–	–	–	
				1PQ8	–	–	–	–	
<b>Design for Zone 22 for non-conductive dust (IP55) for converter-fed operation, with derating (19) 20)</b>		M39	Mains-fed operation	1LA8	–	–	–	–	
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	–	–	–	–	
				1PQ8	–	–	–	–	
<b>VIK version (comprises Zone 2 for mains-fed operation, without Ex nA II marking on rating plate) (20) (22)</b>		K30	Mains-fed operation	1LA8	✓	✓	–	–	
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	O.R.	O.R.	–	–	
				1LL8	–	–	–	–	
				1PQ8	–	–	–	–	
<b>Ex nA II on VIK rating plate</b>		C27	Mains-fed operation	1LA8	✓	✓	–	–	
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	O.R.	O.R.	–	–	
				1LL8	–	–	–	–	
				1PQ8	–	–	–	–	
<b>Bearings and lubrication</b>									
Measuring nipple for SPM shock pulse measurement for bearing inspection		G50	All	All	✓	✓	✓	✓	
Shock pulse measurement, fixed sensor and distributor box		H05	New!	All	✓	✓	✓	✓	
Shock pulse measurement, complete alarm box (23)		H07	New!	All	✓	✓	✓	✓	
Automatic re-lubricating device EasyMatic (24)		N30	New!	Mains-fed operation	1LA8	✓	✓	✓	✓
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	–	–	–	–	
				1PQ8	✓	✓	✓	✓	
Automatic re-lubricating device STAR CONTROL TIME M120 (25)		N31	New!	Mains-fed operation	1LA8	✓	✓	✓	✓
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	–	–	–	–	
				1PQ8	✓	✓	✓	✓	
Automatic re-lubricating device STAR CONTROL IMPULSE L250 (26)		N32	New!	Mains-fed operation	1LA8	✓	✓	✓	✓
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	✓	✓	✓	✓	
				1LL8	–	–	–	–	
				1PQ8	✓	✓	✓	✓	
Bearing design for increased cantilever forces (27)		K20	Mains-fed operation	1LA8	✓	✓	–	–	
				1LL8	–	–	–	–	
			Converter-fed operation	1LA8	✓	✓	–	–	
				1LL8	–	–	–	–	
				1PQ8	✓	✓	–	–	

For legends, see Page 3/42; for footnotes, see Page 3/43.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

Standard delivery times:	10 working days	20 working days	On request

Options

Cast-iron series 1LAB, 1LLB, 1PQ8

Special versions		Additional identification code -Z with order code and plain text if required	Motor category	Standard delivery time (colored area)			
Motor version	Motor type			Motor type - Frame size	315	355	400
Mains-fed operation	1LAB	1PQ8.....-Z	1LA8	315	✓	✓	✓
	1LL8	1L.....-Z	1LL8	355	✓	✓	✓
Converter-fed operation	1LA8		1LA8	400	✓	✓	✓
	1LL8		1LL8	450	✓	✓	✓
	1PQ8		1PQ8		-	-	-
Shaft and vibration severity		Motor version	Motor type	Frame size			
Vibration severity level B	K02		All	315	✓	✓	✓
Full-key balancing	L68	All	All	355	✓	✓	✓
Shaft and rotor		K16	Mains-fed operation	315	✓	✓	✓
Second standard shaft extension <sup>28)</sup>				355	✓	✓	✓
	K16	1LA8	400	✓	✓	✓	✓
			450	✓	✓	✓	✓
Shaft extension with standard dimensions, without feather keyway	K42	All	All	315	✓	✓	✓
Non-standard cylindrical shaft extension	Y55 • and identification code	All	All	355	✓	✓	✓
Fan and ventilation		K35	Mains-fed operation	400	✓	✓	✓
Metal external fan				450	✓	✓	✓
	K35	1LA8	315	✓	✓	✓	✓
			355	✓	✓	✓	✓
		1LL8	400	✓	✓	✓	✓
			450	✓	✓	✓	✓
Anti-condensation heating for 230 V	K45	All	All	315	✓	✓	✓
Anti-condensation heating for 115 V	K46	All	All	355	✓	✓	✓
Anti-condensation heating for 400 V	L08	New!	All	400	✓	✓	✓
Anti-condensation heating for 500 V	L09	New!	All	450	✓	✓	✓
Sheet metal fan cover		L36	Mains-fed operation	315	-	-	-
Sheet metal fan cover				355	-	-	-
	L36	1LA8	400	-	-	-	-
			450	-	-	-	-
		1LL8	315	-	-	-	-
			355	-	-	-	-
	L36	1LA8	400	-	-	-	-
			450	-	-	-	-
		1PQ8	315	-	-	-	-
			355	-	-	-	-
Separately driven fan with non-standard voltage and/or frequency <sup>29)</sup>		Y81 • and identification code	Mains-fed operation	400	-	-	-
Separately driven fan with non-standard voltage and/or frequency <sup>29)</sup>				450	-	-	-
	Y81	1LA8	315	-	-	-	-
			355	-	-	-	-
		1LL8	400	-	-	-	-
			450	-	-	-	-
	Y81	1LA8	315	-	-	-	-
			355	-	-	-	-
		1LL8	400	-	-	-	-
			450	-	-	-	-
Extra rating plate and extra rating plates		Y82 • and identification code	Mains-fed operation	315	-	-	-
Second rating plate, loose	K31	All	All	355	✓	✓	✓
Extra rating plate or rating plate with deviating rating plate data	Y80 • and identification code	All	All	400	✓	✓	✓
Extra rating plate with identification codes	Y82 • and identification code	All	All	450	✓	✓	✓
Extension of liability for defects		Q80	All	315	✓	✓	✓
Extension of liability for defects by 12 to 24 months		New!	All	355	✓	✓	✓
Extension of liability for defects by 18 to 30 months <sup>31)</sup>	Q81	New!	All	400	✓	✓	✓
Extension of liability for defects by 24 to 36 months <sup>31)</sup>	Q82	New!	All	450	✓	✓	✓
Extension of liability for defects by 30 to 42 months <sup>31)</sup>	Q83	New!	All	315	✓	✓	✓
Extension of liability for defects by 36 to 48 months <sup>32)</sup>	Q84	New!	All	355	✓	✓	✓
Extension of liability for defects by 48 to 60 months <sup>32)</sup>	Q85	New!	All	400	✓	✓	✓
		All	All	450	✓	✓	✓

For legends, see Page 3/42; for footnotes, see Page 3/43.

**SIMOTICS N-compact Non-Standard Motors**  
Supplements to order numbers and special versions

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CB350 Iron Series 11 LEAD THERAPY

**Standard delivery times:**

10 working days	20 working days	On request
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Special versions	Additional identification code -Z with order code and plain text if required	Motor category	Standard delivery time (colored area)					
			Motor version	Motor type	Motor type - Frame size			
					315	355	400	
1PQ8.....-Z	1L.....-Z	Mains-fed operation	1LAB	1L8	✓	✓	✓	
		1LL8	1LL8	1LL8	✓	✓	✓	
		Converter-fed operation	1LAB	1L8	✓	✓	✓	
		1LL8	1LL8	1LL8	✓	✓	✓	
		1PQ8	1PQ8	1PQ8	✓	✓	✓	
1L.....-Z		Motor version	Motor type	Frame size	315	355	400	
Document – Electrical data sheet		B31	All	All	✓	✓	✓	
Document – Order dimension drawing		B32	All	All	○	○	○	
Document – Standard test schedule		B34	New!	All	✓	✓	✓	
Document – Load characteristics		B37	All	All	O.R.	O.R.	O.R.	
Document – Production schedule: Generated once		B43	New!	All	✓	✓	✓	
Document – Production schedule: Updated every two weeks		B44	New!	All	✓	✓	✓	
Document – Production schedule: Updated monthly		B45	New!	All	✓	✓	✓	
Standard test (routine test) with acceptance		F01	All	All	✓	✓	✓	
Visual acceptance and report handover with acceptance		F03	All	All	✓	✓	✓	
Temperature-rise test, without acceptance		F04	All	All	✓	✓	✓	
Temperature-rise test with acceptance		F05	All	All	✓	✓	✓	
Noise measurement in no-load operation, no noise analysis, without acceptance		F28	All	All	✓	✓	✓	
Noise measurement in no-load operation, no noise analysis, with acceptance		F29	All	All	✓	✓	✓	
Noise measurement in no-load operation, with noise analysis, without acceptance		F62	All	All	✓	✓	✓	
Noise measurement in no-load operation, with noise analysis, with acceptance		F63	All	All	✓	✓	✓	
Recording of current and torque curves with torque metering shaft during starting, without acceptance		F34	Mains-fed operation	1LAB	✓	✓	✓	
			1LL8	✓	✓	✓	✓	
			Converter-fed operation	1LAB	—	—	—	
			1LL8	—	—	—	—	
			1PQ8	—	—	—	—	
Recording of current and torque curves with torque metering shaft during starting, with acceptance		F35	Mains-fed operation	1LAB	✓	✓	✓	
			1LL8	✓	✓	✓	✓	
			Converter-fed operation	1LAB	—	—	—	
			1LL8	—	—	—	—	
			1PQ8	—	—	—	—	
Measurement of locked-rotor torque and current, without acceptance		F52	Mains-fed operation	1LAB	✓	✓	✓	
			1LL8	✓	✓	✓	✓	
			Converter-fed operation	1LAB	—	—	—	
			1LL8	—	—	—	—	
			1PQ8	—	—	—	—	
Measurement of locked-rotor torque and current, with acceptance		F53	Mains-fed operation	1LAB	✓	✓	✓	
			1LL8	✓	✓	✓	✓	
			Converter-fed operation	1LAB	—	—	—	
			1LL8	—	—	—	—	
			1PQ8	—	—	—	—	
Type test with heat run for horizontal motors, without acceptance	F82	All	All	✓	✓	✓	✓	
Type test with heat run for horizontal motors, with acceptance	F83	All	All	✓	✓	✓	✓	
Type test with heat run for vertical motors, without acceptance	F92	All	All	✓	✓	✓	✓	
Type test with heat run for vertical motors, with acceptance	F93	All	All	✓	✓	✓	✓	

- Standard version
  - Without additional charge
  - This order code only determines the price of the version –  
Additional plain text is required.
  - O. R. Possible on request
  - With additional charge
  - Not possible

For footnotes, see Page 3/43.

# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

Options  
Cast-Iron series 1LA8, 1LL8, 1PQ8

### Ordering example:

Selection criteria	Requirement	Structure of the Order No.
Motor type	Non-standard motor specially designed for mains-fed operation, self-ventilated, cast-iron version, IP55 degree of protection	1LA8■■■■■
Motor frame size/No. of poles/speed	315/6-pole/1000 rpm	1LA8315-6AB■■
Rated output	200 kW	1LA8315-6AB6■
Voltage and frequency	400 VΔ/690 VY, 50 Hz	1LA8315-6AB64
Type	IM V1 with protective cover	1LA8315-6AB64
Special versions	Metal external fan Extension of liability for defects by 12 to 24 months	1LA8315-6AB64-Z K35 1LA8315-6AB64-Z K35+Q10

- 1) Only for 1LA8 motors in 4-pole version, IM B3 type of construction, voltage 400 VΔ/690 VY or 500 VA (without special insulation). Only the following order codes can be ordered in combination with the Standardline: A23, A61, A72, G50, H70, H73, K09, K10, K45, K46, K57, K83, K84, K85, L00, L97, M58 (frame size 315 only), M88, Y53.
- 2) Evaluation with appropriate tripping unit (see Catalog IC 10) is recommended.
- 3) The standard thermistors are omitted. If PTC thermistors are required as well as KTYs or PT100s, this must be specified in the order in plain text. A combination of A12 and A23 or A12 and A61 is available on request for an additional charge.
- 4) Only possible in combination with the stainless steel auxiliary terminal box (order code M51).
- 5) Only possible in combination with the larger connection boxes 1XB1621 or 1XB1631 (order codes M58 or L00).
- 6) For 1LA8 and 1PQ8 motors, only possible in combination with the larger connection boxes 1XB1621 or 1XB1631 (order codes M58 or L00).
- 7) Combination with the order codes M88 and M50 is not possible. The 1XB1634 connection box is rotatable by 4 × 90°. Cable entry is from NDE or the delivery position. Dimension drawings available on request.
- 8) For motors 1LA8357-2, 1LA8357-4, 1PQ8357-2 and 1PQ8357-4, connection box 1XB1631 is supplied in the standard version.
- 9) For 1LA8357-2, 1PQ8357-2, 1LA8357-4, 1PQ8357-4, 1LA8 and 1PQ8 motors frame size 400 and 450, terminal box 1XB9600 can be ordered as the next largest connection box. For 1LA8353 to 1LA8355 and 1PQ8353 to 1PQ8355 as well as for 1LA8356-6, 1LA8357-6 and 1LA8357-8 and with 1PQ8356-6, 1PQ8357-6 and 1PQ8357-8, only terminal box 1XB1631 can be ordered as the next largest connection box.
- 10) Only possible for 4-pole and 6-pole 1LA8 and 1PQ8 motors with frame size 315 or 355 in versions IM V1 or IM B35.
- 11) VIK version is not possible for 1LA8 motors.
- 12) Utilization according to temperature class 180 (H) is not possible. All 400 V versions are available upon request only. Due to the rated current, for frame size 400 (2-pole and 4-pole) and 450 (all numbers of poles), a larger connection box with the type designation 1XB9600 is provided in some cases which is part of the order code C14.
- 13) Only possible for horizontal version IM B3 – other versions (such as type, rated voltage, mounting position) on request.
- 14) For 1PQ8 motors, only possible for the main motor – not for the separately driven fan motor.
- 15) Site altitude 1000 m above sea level.
- 16) For 1LA8 motors in mains-fed operation up to 315 kW.
- 17) Sector solution for pump drives certified according to Lloyds Register LR-T-3600 (Rev. 9 of August 2008), (Electric Motors higher than 100 hp) and LR-T-3601 (Rev. 8 of August 2008), (Vertical Electric Motors higher than 100 hp). Only combination of order codes E88 + E90 or E89 + E90 can be ordered.
- 18) Explosion-proof encoders are available on request.
- 19) These motors do not have a rated voltage range stamped on the rating plate.
- 20) For 1LA8 motors, with options K30, M35, M39, M72 and M73, the metal external fan order code K35 must also be ordered.
- 21) In the order, the "Speed range and torque characteristic" must be specified in plain text.  
A system test is necessary for  $M = \text{constant}$ .
- 22) For 2-pole 1LA8 motors of frame size 315, the low-noise version is also required. Order code K37 or K38 and, in addition, the metal external fan order code K35. Note the specified output and dimensions. For 1LA8353 to 1LA8357 motors, the connection box cannot be rotated by 4 × 90°.
- 23) Does not apply to explosion-proof motors.
- 24) Only approved for 1LA8 and 1PQ8 motors of the IM V1 type of construction, maintenance interval 2 years.
- 25) Only approved for 1LA8 and 1PQ8 motors of the IM B3 type of construction, maintenance interval 1 year.
- 26) Only approved for 1LA8 and 1PQ8 motors of the IM B3 type of construction, maintenance interval 2 years.
- 27) Not possible for 2-pole motors and motors of vertical type of construction.
- 28) Please inquire in the case of 2-pole motors and motors in vertical type of construction.
- 29) When ordering, specify in plain text: Voltage, frequency and circuit.
- 30) Extension is only valid in the case of proper use. For long-term storage > 6 months, a special agreement is necessary.
- 31) Registration and declaration of the installation site.
- 32) Additional condition: Simultaneous completion of a maintenance contract subject to charge, with regular inspection.
- 33) Type testing is also performed for converter-fed operation.



# SIMOTICS N-compact Non-Standard Motors

## Supplements to order numbers and special versions

### Accessories

#### Overview

##### *Slide rails with fixing bolts and tensioning screws according to DIN 42923*

Slide rails are used to tension the belt of a machine easily and conveniently when a belt tightener is not available. They are fixed to the base using stone bolts or foundation blocks.

The assignment of slide rails to motor size can be found in DIN 42923. For motors of frame sizes 355 to 450, there are no standardized slide rails (please inquire).

##### Source of supply:

Lütgert & Co. GmbH  
Postfach 42 51  
33276 Gütersloh, Germany  
Tel. +49 (0)5241-74 07-0  
Fax +49 (0)5241-74 07-90  
[www.luetgert-antriebe.de](http://www.luetgert-antriebe.de)  
E-mail: [info@luetgert-antriebe.de](mailto:info@luetgert-antriebe.de)

##### *Foundation block according to DIN 799*

The foundation blocks are inserted into the stone foundation and embedded in concrete. They are used for fixing machines of medium size, slide rails, pedestal bearings, baseframes, etc. After the fixing bolts have been unscrewed, the machine can be dragged without it having to be lifted.

When the machine is initially installed, the foundation block that is bolted to the machine (without washers) and fitted with tapered pins is not embedded with concrete until the machine has been fully aligned. The machine is set 2 to 3 mm deeper in this case. The difference in shaft height is compensated by inserting shims on final installation. The tapered pins safeguard the exact position of the machine when it is repeatedly removed and replaced without the need for realignment.

##### Source of supply:

Lütgert & Co. GmbH  
Postfach 42 51  
33276 Gütersloh, Germany  
Tel. +49 (0)5241-74 07-0  
Fax +49 (0)5241-74 07-90  
[www.luetgert-antriebe.de](http://www.luetgert-antriebe.de)  
E-mail: [info@luetgert-antriebe.de](mailto:info@luetgert-antriebe.de)

##### *Taper pins to DIN 258 with threaded ends and constant taper lengths*

Taper pins are used for components that are repeatedly removed. The drilled hole is ground conical using a conical reamer until the pin can be pushed in by hand until the cone shoulder lies 3 to 4 mm above the rim of the hole.

It can then be driven in using a hammer until it is correctly seated. The pin is removed from the drilled hole by screwing on the nut and tightening it.

Standardized taper pins are available from general engineering suppliers.

##### Source of supply, for example:

Otto Roth GmbH & Co. KG  
Rutesheimer Straße 22  
70499 Stuttgart, Germany  
Tel. +49 (0)711-13 88-0  
Fax. +49 (0)711-13 88-233

[www.ottoroth.de](http://www.ottoroth.de)  
E-mail: [info@ottoroth.de](mailto:info@ottoroth.de)

#### Couplings

The motor from Siemens is connected to the machine or gear unit through a coupling. Siemens is an important coupling manufacturer with a wide range of products.

For standard applications, Siemens recommends that elastic couplings of types N-EUPEX and RUPEX or torsionally rigid couplings of types ARPEX and ZAPEX are used. For special applications, FLUDEX and ELPEX-S couplings are recommended.

##### Source of supply:

Siemens contact partner – ordering from Catalog  
Siemens MD 10.1 "FLENDER Standard Couplings"  
or

SIEMENS AG  
Kupplungswerk Müssum  
Industriepark Bocholt  
Schlavenhorst 100  
46395 Bocholt, Germany  
Tel. +49 (0)2871-92 21 85  
Fax +49 (0)2871-92 25 79

[www.siemens.com](http://www.siemens.com)  
E-mail: [flendercouplings@siemens.com](mailto:flendercouplings@siemens.com)

#### More information

##### *Spare motors and repair parts*

- Supply commitment for spare motors and repair parts following delivery of the motor:
  - For up to 5 years, in the event of total motor failure, Siemens will supply a comparable motor with regard to the mounting dimensions and functions.
  - Spare parts will generally be available for up to 5 years.
  - After 5 years and up to 10 years, Siemens will provide information about spare parts and will, if necessary, supply documentation for acquiring spare parts.
- When repair parts are ordered, the following details must be provided:
  - Designation and part number
  - Order No. and factory number of the motor.

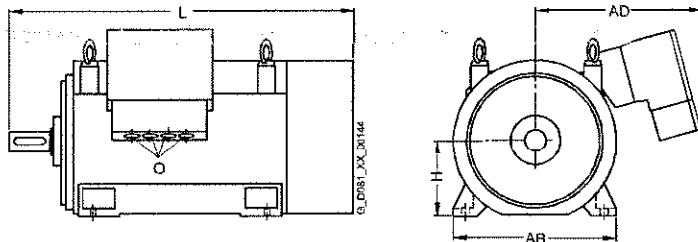
##### Example for ordering a fan cover 1LA8, frame size 315, 4-pole:

**Fan cover No. 12.01,  
1LA8315-4AB60, factory No. J1172515010001**

- For bearing assignment, see Catalog D 81.1 · 2008, Part "Introduction".
- For standard components, a supply commitment does not apply.
- Support – Hotline  
In Germany  
Tel. +49 (0)1 80/5 05 04 48

You will find telephone numbers for other countries on our Internet site:  
[www.siemens.com/automation/service&support](http://www.siemens.com/automation/service&support)



**SIMOTICS N-compact Non-Standard Motors****Dimensions****Overall dimensions****Notes on the dimensions****Overview***Overall dimensions*

Frame size	Type	Number of poles	Dimension L	AD	H	AB
315	1LA8	2	1380	570	315	680
	1LA8	4, 6, 8	1410	570	315	680
	1LA8	4, 6, 8 <sup>1)</sup>	1430	570	315	680
	1PQ8	2	1742	570	315	680
	1PQ8	4, 6, 8	1772	570	315	680
	1PQ8	4 <sup>1)</sup>	1792	570	315	680
	1LL8	2	1380	662	315	680
	1LL8	4, 6, 8	1410	662	315	680
355	1LA8	2	1605	710	355	780
	1LA8	4, 6, 8	1635	710	355	780
	1LA8	4, 6, 8 <sup>1)</sup>	1699	710	355	780
	1PQ8	2	1971	690	355	780
	1PQ8	4, 6, 8	2001	690	355	780
	1PQ8	4, 6, 8 <sup>1)</sup>	2065	690	355	780
	1LL8	2	1635	840	355	780
	1LL8	4, 6, 8	1675	840	355	780

Frame size	Type	Number of poles	Dimension L	AD	H	AB
400	1LA8	2	1793	865	400	860
	1LA8	4, 6, 8	1833	865	400	860
	1PQ8	2	2148	865	400	860
	1PQ8	4, 6, 8	2188	865	400	860
	1LL8	2	1793	865	400	860
	1LL8	4, 6, 8	1833	865	400	860
450	1LA8	2	1953	900	450	960
	1LA8	4, 6, 8	1993	900	450	960
	1PQ8	2	2308	900	450	960
	1PQ8	4, 6, 8	2348	900	450	960
	1LL8	2	1953	900	450	960
	1LL8	4, 6, 8	2033	900	450	960

For dimension "O", see "Introduction" under "Connection boxes".

*Notes on the dimensions*

Dimension designations according to DIN EN 50347 and IEC 60072.

**Fits**

The shaft extensions specified in the dimension tables (DIN 748) and centering spigot diameters (DIN EN 50347) are machined with the following fits:

Dimension designation ISO fit DIN ISO 286-2

D, DA	over 50	m6
N	over 250	h6
F, FA		h9
K		H17
S	flange (FF)	H17

The drilled holes of couplings and belt pulleys should have an ISO fit of at least H7.

**Dimension tolerances**

For the following dimension designations, the admissible deviations are given below:

Dimension designation	Dimension	Admissible deviation
H	over 250	- 1.0
E, EA		- 0.5

Keyways and feather keyways (dimensions GA, GC, F and FA) are made in compliance with DIN 6885 Part 1.

All dimensions are specified in mm.

<sup>1)</sup> With bearings for increased cantilever forces.



# SIMOTICS N-compact Non-Standard Motors

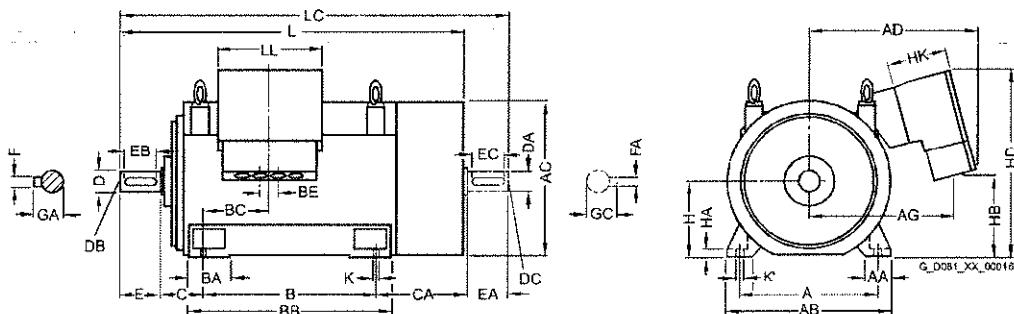
## Dimensions

Cast-iron series: 1LA8

Frame sizes 315 to 450

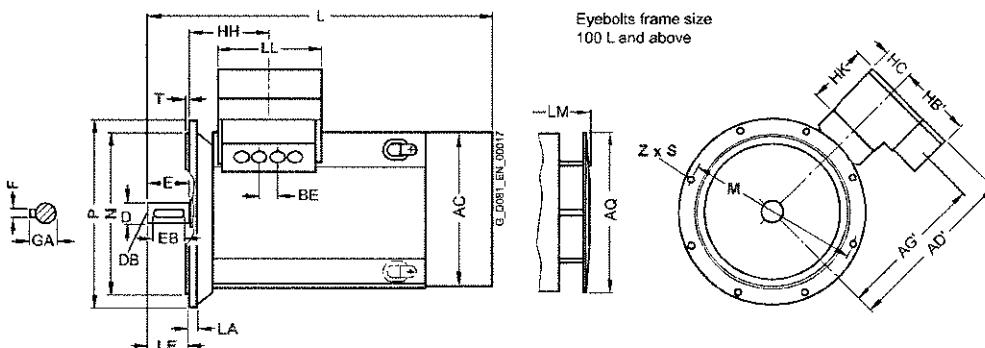
### Dimensional drawings

Type of construction IM B3

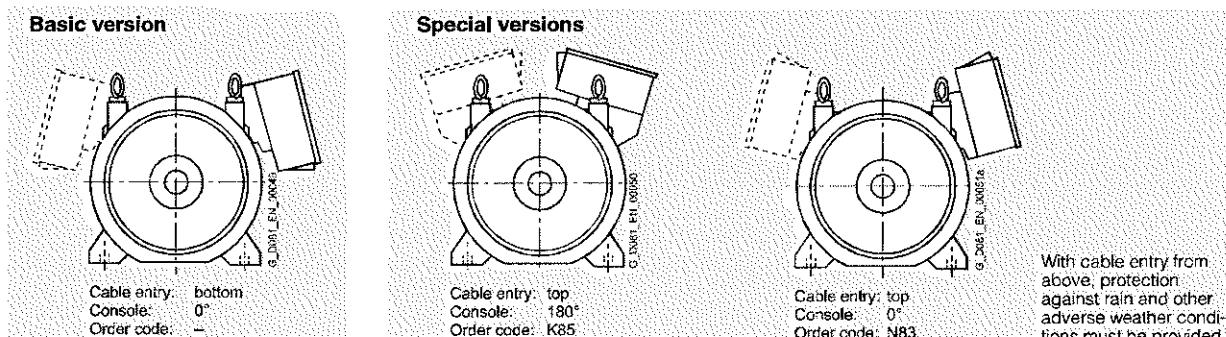


Type of construction IM V1

For flange dimensions, see Page 3/52 (Z = the number of retaining holes)



Connection box position



Frame size	Type	Number of poles	Dimension designation acc. to IEC																				
			A	AA	AB	AC <sup>1)</sup>	AD	AD'	AG	AG'	AQ	B	BA	BB	BC	BE	C	CA	H	HA	HB	HB'	HC
315	1LA831	2, 4, 6, 8 <sup>2)</sup> , 4, 6, 8 <sup>3)</sup>	560	120	680	710	570	582	474	481	670	630	180	780	195	140	180 180 200	435	315	28	404	217	162
355	1LA835	2, 4, 6, 8	630	150	780	790	690	697	597	593	750	800	220	980	185	135	200 200	470	355	35	431	290	165
	1LA8356	6					829	875	739	745							100	200			359	395	175
	1LA8357	2, 4																					
	1LA835	4, 6, 8 <sup>2)</sup>					690	697	597	593							135	224			431	290	165
400	1LA840	2, 4, 6, 8	710	150	860	880	865	925	775	795	850	900	220	1080	186	100	224	506	400	35	439	395	175
450	1LA845	2 <sup>3)</sup> , 4, 6, 8	800	180	980	970	900	975	810	845	950	1000	260	1220	170	100	250	540	450	42	525	395	175

1) Measured across the bolt heads (not in the flattened area of the fan cover).

2) With bearings for increased cantilever forces. Second shaft extension is not possible.

3) Only at 50 Hz.

# SIMOTICS N-compact Non-Standard Motors

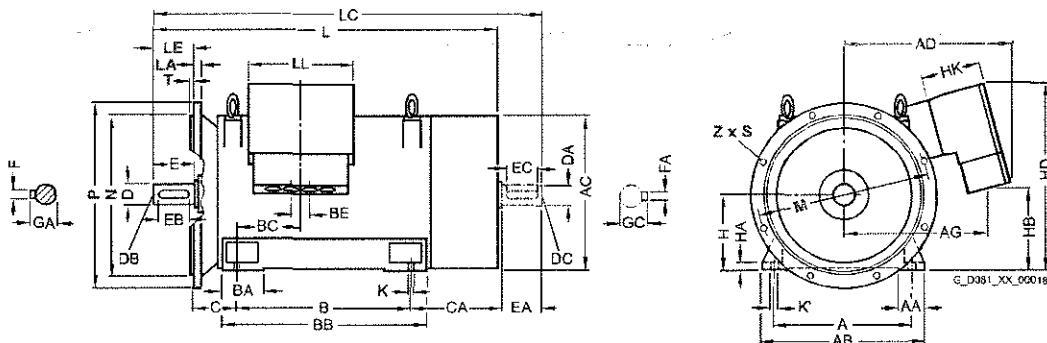
## Dimensions

Cast-Iron series 1LA8  
Frame sizes 315 to 450

### Dimensional drawings (continued)

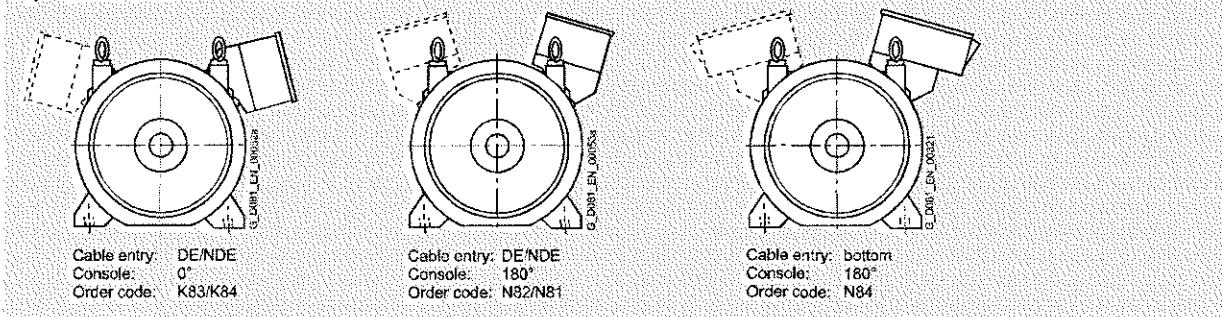
Type of construction IM B35

For flange dimensions, see Page 3/52 (Z = the number of retaining holes)



Connection box position

#### Special versions



For motor	Frame size	Type	Number of poles	Dimension designation acc. to IEC							DE shaft extension						NDE shaft extension						
				HD	HK	K	K'	L	LC	LL	LM	D	DB	E	EB	F	GA	DA	DC	EA	EC	FA	GC
315	1LA831 .	2	783 170 26 33	1380 1495 308	1510 65 M20	140 125 18	69	50 M16	110 100 14	53.5													
		4, 6, 8		1410 1555	1540 85 M20	170 140 22	90	70 M20	140 125 20	74.5													
		4, 6, 8 <sup>1)</sup>		1430 1575	95 M24	170 140 25	100	-	-	-													
355	1LA835 .	2	896 229 33 40	1605 1750 330	1745 75 M20	140 125 20	79.5	60 M20	140 125 18	64													
		4, 6, 8		1635 1810	1775 95 M24	170 140 25	100	80	170 140 22	85													
	1LA8356	6	945 320		554																		
	1LA8357	2, 4																					
	1LA835 .	4, 6, 8 <sup>1)</sup>		1699 -		100 M24	210 180 28	106	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
400	1LA840 .	2	1025 320 33 40	1793 1940 554	1943 80 M20	170 140 22	85	70 M20	140 125 20	74.5													
		4, 6, 8		1833 2010	1983 110 M24	210 180 28	116	90 M24	170 140 25	95													
450	1LA845 .	2 <sup>4)</sup>	1111 320 39 47	1953 2100 554	2103 90 M24	170 140 25	95	75 M20	140 125 20	79.5													
		4, 6, 8		1993 2210	2143 120	210 180 32	127	100 M24	210 180 28	106													

<sup>1)</sup> With bearings for increased cantilever forces. Second shaft extension is not possible.

<sup>2)</sup> Only at 50 Hz.



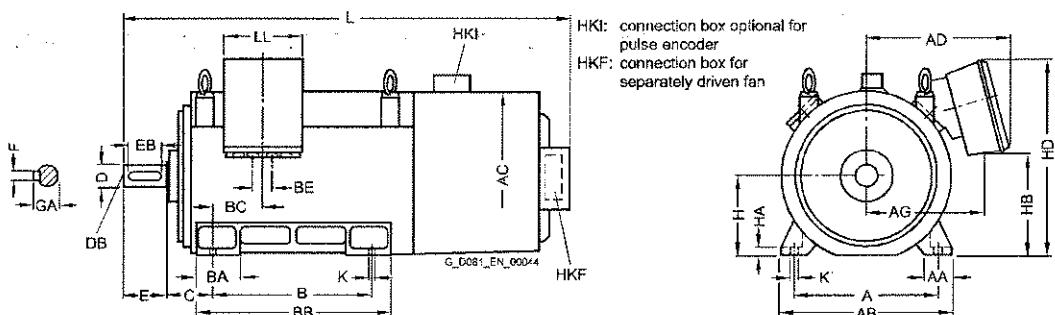
# SIMOTICS N-compact Non-Standard Motors

## Dimensions

Cast-Iron series 1P08  
Frame sizes 011 to 450

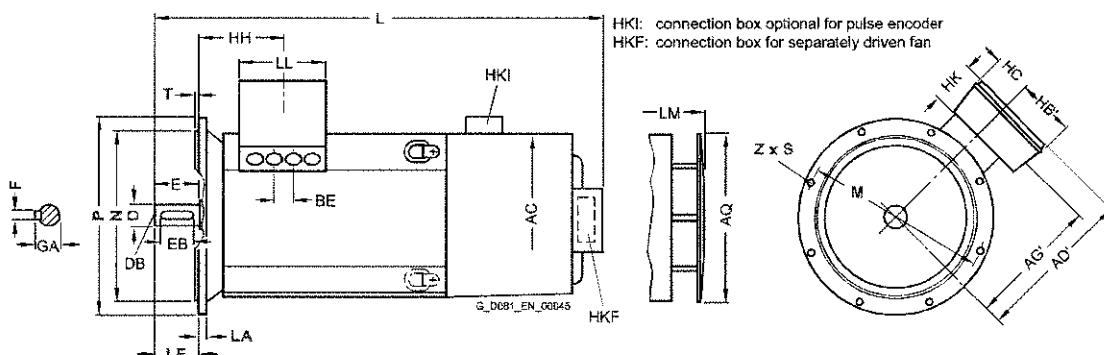
### Dimensional drawings

Type of construction IM B3

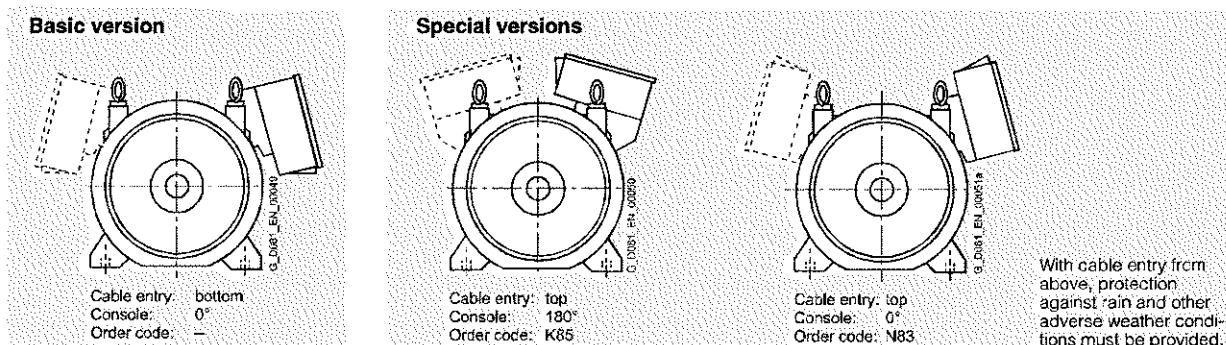


Type of construction IM V3

For flange dimensions, see Page 3/52 (Z = the number of retaining holes)



Connection box position:



Frame size	Type	Number of poles	Dimension designation acc. to IEC														
			A	AA	AB	AC <sup>1)</sup>	AD	AD'	AG	AG'	AQ	B	BA	BB	BC	BE	C
315	1PQ831	2, 4, 6, 8, 4, 6, 8 <sup>2)</sup>	560	120	680	710	570	582	474	481	750	630	180	780	195	140	180
																180	
																200	
355	1PQ835, 35	2, 4, 6, 8	630	150	780	790	690	697	597	593	850	800	220	980	185	135	200
	1PQ8356	6															200
	1PQ8357	2, 4															100
	1PQ835	4, 6, 8 <sup>2)</sup>															224
400	1PQ840	2, 4, 6, 8	710	150	860	880	865	925	775	795	950	900	220	1080	186	100	224
450	1PQ845	2 <sup>3)</sup> , 4, 6, 8	800	180	980	970	900	980	810	845	950	1000	260	1220	170	100	250

<sup>1)</sup> Measured across the bolt heads (not in the flattened area of the fan cover).

<sup>2)</sup> With bearings for increased cantilever forces.

<sup>3)</sup> Only at 50 Hz.



# SIMOTICS N-compact Non-Standard Motors

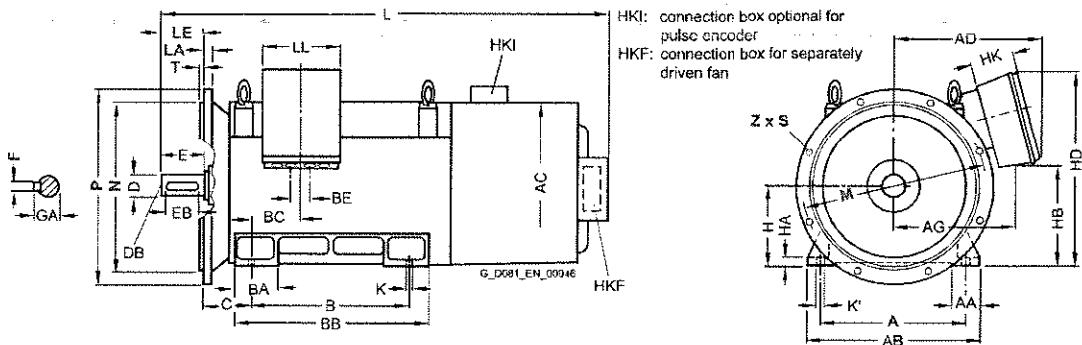
## Dimensions

Cast-Iron series IP08  
Frame sizes 315 to 450

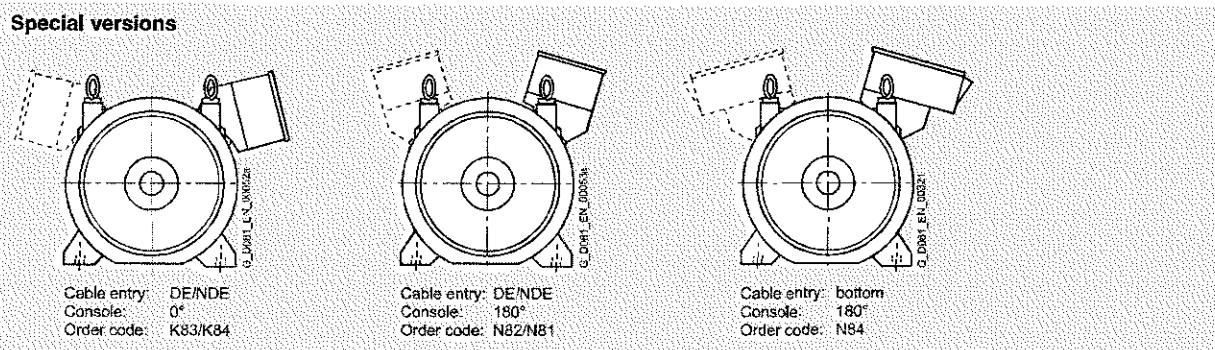
### Dimensional drawings (continued)

Type of construction IM B35

For flange dimensions, see Page 3/52 (Z = the number of retaining holes)



### Connection box position



For motor	Frame size	Type	Number of poles	Dimension designation acc. to IEC								DE shaft extension									
				H	HA	HB	HB'	HC	HD	HK	K	K'	L	LL	LM	D	DB	E	EB	F	GA
315	1PQ831.	2	315	28	404	217	162	783		170	26	33	1742	308	1765	65	M20	140	125	18	69
			4, 6, 8							1772			1795	85	M20	170	140	22	22	90	
			4, 6, 8 <sup>1)</sup>							1792			95	M24	170	140	25	100			
355	1PQ835.	2	355	35	431	290	165	896	229	33	40	1971	330	2005	75	M20	140	125	20	79,5	
			4, 6, 8							2001			2035	95	M24	170	140	25	100		
		6			359	395	175	945	320				554								
		2, 4																			
400	1PQ840.	2	400	35	440	400	175	1025	320	33	40	2148	554	2182	80	M20	170	140	22	85	
			4, 6, 8							2188			2222	110	M24	210	180	28	116		
		4, 6, 8 <sup>1)</sup>										2065		2099	100	M24	210	180	28	106	
450	1PQ845.	2 <sup>2)</sup>	450	42	525	400	175	1111	320	39	47	2308	554	2340	90	M24	170	140	25	95	
			4, 6, 8							2348			2380	120		210	180	32	127		

<sup>1)</sup> With bearings for increased cantilever forces.

<sup>2)</sup> Only at 50 Hz.



# SIMOTICS N-compact Non-Standard Motors

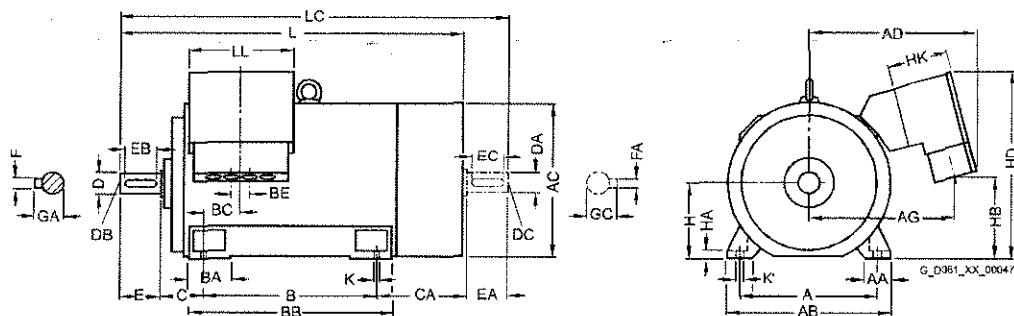
## Dimensions

Cast-Iron series 1LL8

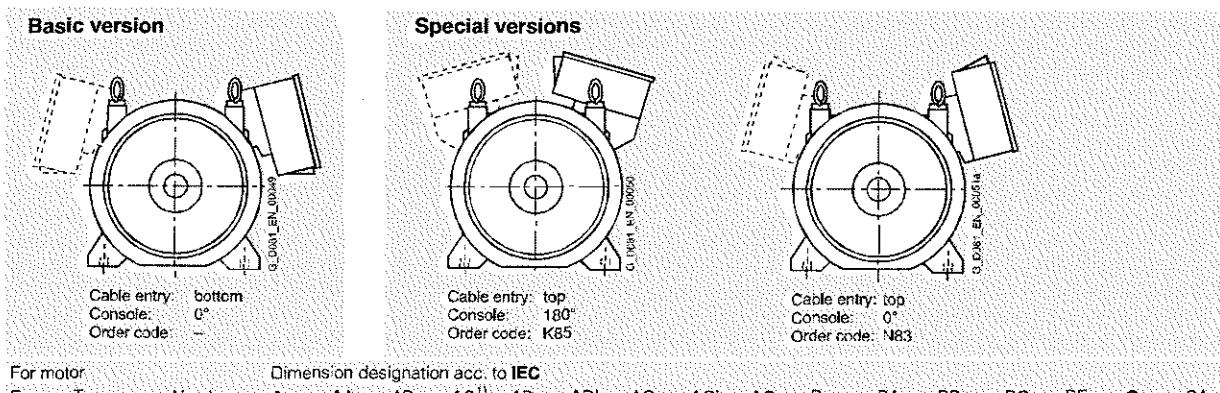
Frame sizes 315 to 450

### Dimensional drawings

Type of construction IM 83



### Connection box position



For motor Frame size	Type size	Number of poles	Dimension designation acc. to IEC															
			A	AA	AB	AC <sup>1)</sup>	AD	AD'	AG	AG'	AQ	B	BA	BB	BC	BE	C	CA
315	1LL831	2, 4, 6, 8	560	120	680	710	662	-	569	-	670	630	180	780	195	110	180	435
355	1LL835	2, 4, 6, 8	630	150	780	790	829	-	739	-	750	800	220	980	185	135	200	470
400	1LL840	2, 4, 6, 8	710	150	860	880	865	-	775	-	850	900	220	1080	186	100	224	506
450	1LL845	2 <sup>2)</sup> , 4, 6, 8	800	180	980	970	900	-	810	-	950	1000	260	1220	170	100	250	540

<sup>1)</sup> Measured across the bolt heads.<sup>2)</sup> Only at 50 Hz.

# SIMOTICS N-compact Non-Standard Motors

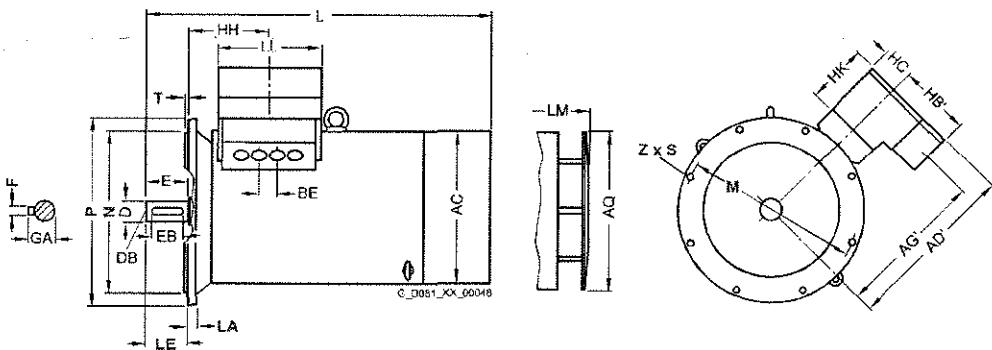
## Dimensions

Cast-iron series 1LL8  
Frame sizes 015 to 450

### Dimensional drawings (continued)

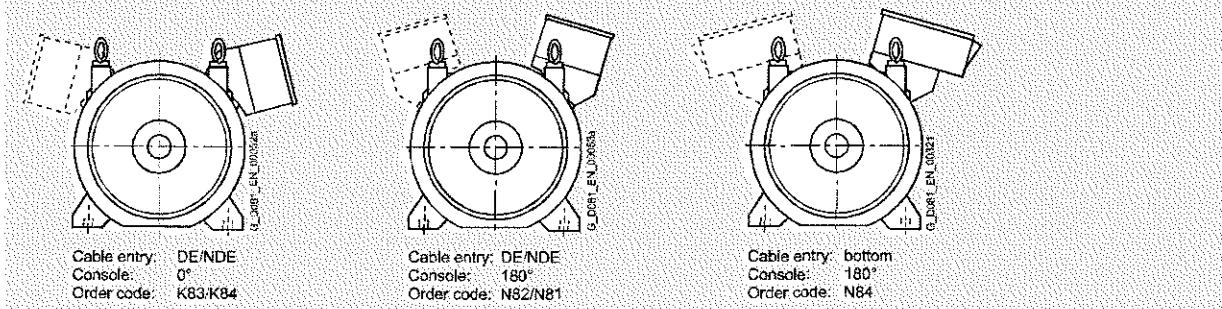
Type of construction IM V1

For flange dimensions, see Page 3/52 (Z = the number of retaining holes)



Connection box position

### Special versions



Frame size	Type	Number of poles	Dimension designation acc. to IEC												DE shaft extension					
			H	HA	HB	HB'	HD	HK	K	K'	L	LC	LL	LM	D	DB	E	EB	F	GA
315	1LL831.	2	315	28	363	—	828	229	26	33	1380	1495	330	1510	70	M20	140	125	20	74.5
		4, 6, 8				290					1410	1555		1540	90	M24	170	140	25	95
355	1LL835.	2	355	35	359	—	945	320	33	40	1605	1750	554	1775	80	M20	170	140	22	85
		4, 6, 8				400					1635	1820		1815	110	M24	210	180	28	116
400	1LL840.	2	400	35	439	—	1025	320	33	40	1793	1940	554	1943	85	M20	170	140	22	90
		4, 6, 8				400					1833	2010		1983	120	M24	210	180	32	127
450	1LL845.	2 <sup>1)</sup>	450	42	525	—	1111	320	39	47	1953	2100	554	2143	90	M24	170	140	25	95
		4, 6, 8				400					1993	2250		2193	130	M24	250	220	32	137

1) Only at 50 Hz.

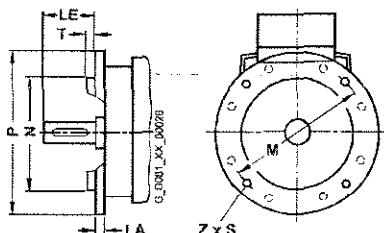


# SIMOTICS N-compact Non-Standard Motors

## Dimensions

### Flange dimensions

### Dimensional drawings



Frame size	Type of construction	Flange type	Flange with through holes (FF/A)		Dimension designation acc. to IEC							
			acc. to DIN EN 50347	acc. to DIN 42948	LA	LE	M	N	P	S	T	Z
<b>315</b> 2-pole 4-pole to 8-pole	IM B35, IM V1	Flange	—	A 800	25	140 170	740	680	800	22	6	8
<b>355</b> 2-pole 4-pole to 8-pole	IM B35, IM V1	Flange	—	A 900	25	140 170	840	780	900	22	6	8
<b>400</b> 2-pole 4-pole to 8-pole	IM B35, IM V1	Flange	—	A 1000	28	170 210	940	880	1000	22	6	8
<b>450</b> 2-pole 4-pole to 8-pole	IM B35, IM V1	Flange	—	A 1150	30	170 210	1080	1000	1150	26	6	8

34

# SIMOTICS XP

## 1MA/1M671-1AV1-LG

### Explosion-Proof Motors

4



<b>Orientation</b>	<b>Motors for Zone 2 or 21/22 in type of protection Ex n or Ex tD</b>
<u>Overview</u>	Self-ventilated motors with Standard Efficiency IE1
Classification of zones	Aluminum series 1LA7, 1LA5 with order code for explosion protection
Types of protection	Self-ventilated motors with Standard Efficiency IE1
Certification	Cast-Iron series 1LA6, 1LG4 with order code for explosion protection
<u>Overview of explosion-proof motors</u>	Self-ventilated motors with High Efficiency IE2
Benefits	Aluminum series 1LA9 with order code for explosion protection
Application	Self-ventilated motors
Technical specifications	NEMA Energy Efficient MG1 Table 12-11
General information	Aluminum series 1LA9 with order code D42 and explosion protection
Zone 1 with type of protection Ex e II increased safety "e"	Self-ventilated motors with High Efficiency IE2
Zone 1 with type of protection Ex de IIC explosion-proof enclosure "d"	Cast-iron series 1LG6 with order code for explosion protection
Zone 1/21 with type of protection Ex de IIC/Ex tD	Self-ventilated motors
Zone 2 with type of protection Ex nA (non-sparking)	NEMA Energy Efficient MG1 Table 12-11
Zone 2/22 with type of protection Ex tD	Cast-iron series 1LG6 with order code D42 and explosion protection
Converter-fed operation	Self-ventilated motors with High Efficiency IE2
• Converter-fed operation specially for motors in type of prot. "Ex nA" (Zone 2)	Cast-iron series 1LG6 with order code for explosion protection
• Converter-fed operation specially for motors in type of protection "Ex tD" (Zone 21/22)	Self-ventilated motors
• Converter-fed operation specially for motors in type of protection "Ex n/Ex tD" (Zone 2/22)	NEMA Energy Efficient MG1 Table 12-11
• 1LA8, 1PQ8 motors for converter-fed operation	Cast-iron series 1LG6 with order code D42 and explosion protection
<u>Mechanical limit speeds <math>n_{max}</math> at maximum supply frequency <math>f_{max}</math></u>	<b>Supplements to order numbers and special versions</b>
VIK version	<u>Voltages</u>
Ex certification for China	<u>Types of construction</u>
Ex certification for Russia	<u>Options</u>
Coolant temperature and site altitude	<u>Accessories</u>
Special technology	<b>Dimensions</b>
• Explosion-proof rotary pulse encoder	Overall dimensions
• Explosion-proof separately driven fan	Notes on the dimensions, Dimension sheet generator (within DT Configurator)
<u>Overview of selection and ordering data with base prices and standard delivery times</u>	Aluminum series 1MA7
<u>Overview</u>	Frame sizes 63 M to 160 L
<b>Loher motors</b>	Cast-iron series 1MA6
Loher CHEMSTAR motors – Loher three-phase industrial motors for applications in the chemical and petrochemical sector in types of protection Ex n, Ex e, Ex de and for safe areas	Frame sizes 100 L to 160 L
<b>Motors for Zone 1 in type of protection Ex e</b>	Cast-iron series 1MA6
Self-ventilated motors with Standard Efficiency IE1 – Aluminum series 1MA7	Frame sizes 180 M to 315 L
Self-ventilated motors with Standard Efficiency IE1 – Cast-iron series 1MA6	Cast-iron series 1MJ6
<b>Motors for Zone 1 in type of protection Ex de</b>	Frame sizes 71 M to 160 L
Self-ventilated motors with Standard Efficiency IE1	Cast-iron series 1MJ6, 1MJ7
Cast-iron series 1M671, 1MJ7	Frame sizes 180 M to 315 M
<b>Motors for Zone 1 in type of protection Ex de IIC</b>	Aluminum series 1LA7, 1LA5
Self-ventilated motors with Standard Efficiency IE1	Frame sizes 63 M to 225 M
Cast-iron series 1LG4	Aluminum series 1LA9
<b>Motors for Zone 1 in type of protection Ex tD</b>	Frame sizes 63 M to 200 L
Self-ventilated motors with Standard Efficiency IE1	Cast-iron series 1LA6
Cast-iron series 1LG6	Frame sizes 100 L to 160 L
<b>Motors for Zone 2 in type of protection Ex n</b>	Cast-iron series 1LG4
Self-ventilated motors with Standard Efficiency IE1	Frame sizes 180 M to 315 L
Cast-iron series 1LG6	Cast-iron series 1LG6
<b>Motors for Zone 2 in type of protection Ex tD</b>	Frame sizes 180 M to 250 M
Self-ventilated motors with Standard Efficiency IE1	Cast-iron series 1LG6
Cast-iron series 1LG6	Frame sizes 280 S to 315 L
<b>Flange dimensions</b>	Flange dimensions

**QUOTE No: OP-140528-2605397**

**PROJECT**

**CONSTRUCTION OF MEGA RESERVOIR PRPS 01-05**

**TECHNICAL PROPOSAL FOR  
PLANTWIDE SCADA AUTOMATION**

**END USER**

Kahramma

**PREPARED BY**  
**Schneider**  


**P.O. Box 17192, DUBAI  
U A E**

Rev	Date	Description	Total Pages	Prepared by	Checked by	Authorised by
00	14 Jul, 2014	Technical Proposal	64	TRB	TRB	SA



**Technical Proposal**  
Construction of Mega Reservoir PRPS 01-05  
Plantwide SCADA Automation  
OP-140528-2605397

**REVISION HISTORY**

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<b>Revision No</b>	<b>REMARKS</b>
00	Original Offer.

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## 1.0 EXECUTIVE SUMMARY

Thank you for inviting Schneider Electric to provide a proposal for the Plantwide SCADA Automation for Construction of Mega Reservoir PRPS 01-05. This document will provide the technical details of the solution proposed by Schneider Electric for this project. It will define the scope of supply of material and services required to complete the project. This proposal is based upon the Technical Specification and other tendering documents provided by client.

### 1.1 BASIS FOR PROPOSAL

Our proposal is based on the following,

- ☛ Appendix A Section 8: Automation Specification
- ☛ Appendix A Section 6: Instrumentation Specification
- ☛ Control Level Schematics for Rings 1-4 for PRPS 01-05
- ☛ Electrical SCADA Schematics for Rings 1-4 for PRPS 01-05
- ☛ Field Level Schematics for Rings 1-4 for PRPS 01-05
- ☛ HVAC SCADA Schematics for Rings 1-4 for PRPS 01-05
- ☛ SCADA Rack Details Rings 1-4 for PRPS 01-05

## 2.0 SCOPE OF WORK

Our scope of work for the Construction of Mega Reservoir PRPS 01-05 includes the following:-

- ☛ Supply, supervision of installation, commissioning of Pipeworks (Process) & Master PLC panels
- ☛ Supply, supervision of installation, commissioning of Servers & Workstations

To achieve the above, following activities have been considered:-

- ☛ Design, Detailed Engineering of the system.
- ☛ System Configuration & Software Development.
- ☛ Drawings & Documentation.
- ☛ Internal Testing and Factory Acceptance Test.
- ☛ Commissioning & Site Acceptance Test
- ☛ As-Built Documentation.

**3.0 ABBREVIATIONS**

PLC	Programmable Logic Controller
SE	Schneider Electric
HMI	Human Machine Interface
SCADA	Supervisory Control & Data acquisition
PES	Process Expert System
I/O	Input/Output
SOV	Solenoid Operated Valve
AC	Alternating Current

**4.0 TECHNICAL DESCRIPTION OF THE PROPOSED SOLUTION**

Our Proposal is broadly explained in the following sections.

- **Section-A # System Description**
- **Section-B # Engineering & Services**
- **Section-C # Annexure**

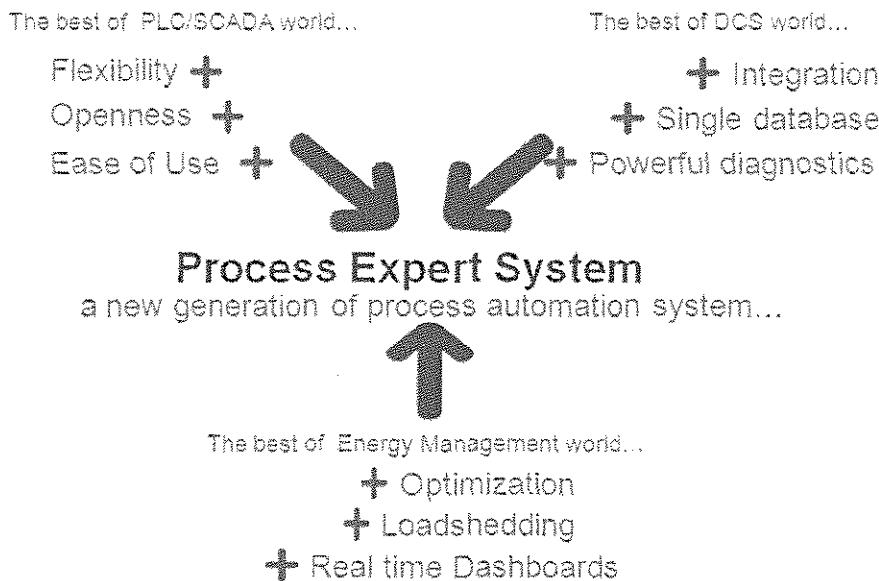
## **SECTION-A: SYSTEM DESCRIPTION**

**A.1 SCHNEIDER ELECTRIC PLANTSTRUXURE PLATFORM**

In order to answer to Kahramma Mega Reservoir project needs, Schneider Electric delivers a new Process Automation System: PlantStruxure Process Expert System.

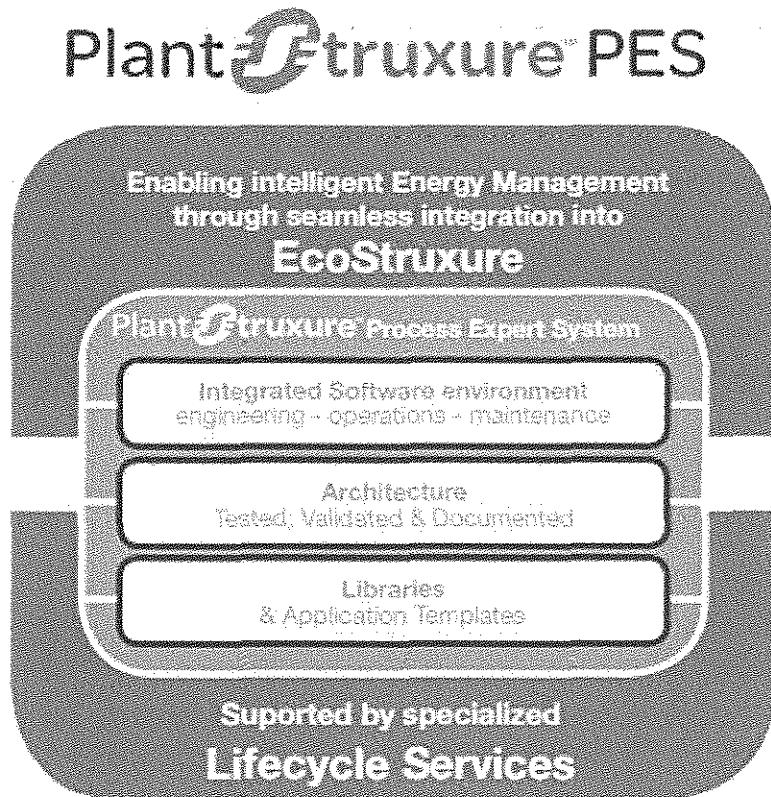
PlantStruxure™ PES (Process Expert System) is the innovative process automation system from Schneider Electric. It brings together the best of the PLC/SCADA and DCS worlds to meet the demands of today's production facilities while delivering on growing energy management requirements.

- ✓ PlantStruxure PES offers integrated energy management features to deliver superior value throughout the lifecycle of the facility.
- ✓ The tight integration of the system ensures efficiency from design engineering through to operation - engineers can develop the configuration faster and more accurately, operators will have all data at their fingertips for better insights and process optimization, and maintenance teams can diagnose and solve problems faster to reduce downtime.
- ✓ PlantStruxure PES helps our customers make the right decision at the right time, leading to increased uptime for the whole plant, and a more productive enterprise.



PlantStruxure is Schneider Electric's collaborative and integrated automation architecture for industrial and infrastructure applications. It brings together our Telemetry, PLC/SCADA and DCS offerings with complete lifecycle services to help make your operations more efficient. From initial design to modernization, PlantStruxure transparently connects control, operation and enterprise levels of your business. Also contributing to your energy efficiency goals, PlantStruxure helps you measure, analyze and improve the energy consumption of your process so you can produce efficiently with minimum waste, effort and cost.

PlantStruxure is built on an Ethernet network – it's open and flexible architecture and network topologies offer transparent access to the information you need, from the plant floor up to the enterprise level. In addition, it is a key building block of Schneider Electric's comprehensive energy management portfolio, EcoStruxure, and complementary to our StruxureWare software suites.



PES covers the needs of an automation system from the field devices all the way up to the control room. In addition, PES is open so other components can be added to it – either as devices, other controllers or IT level applications like batch, MES, historian or asset management.

PlantStruxure PES is based on three key elements, all of which are delivered within a single environment that integrates all its key engineering and operation functionalities:

- ✓ **A system-wide, Ethernet based energy-aware architecture** - transparent and standardized Ethernet technology ensures connectivity, flexibility, scalability and performance.
- ✓ **A powerful and scalable controller platform** - PlantStruxure PES supports a range of controllers to meet different process needs: the controller platforms are modular, scalable and redundant, with the ability to add or remove hardware online. In addition, they support a full range of input and output modules, along with dedicated communication and fieldbus modules, regulatory control, sequencing, motor control, power devices and instrumentation.
- ✓ **Integrated functionalities in a single environment** - PlantStruxure PES integrates functionalities to efficiently manage a process and its energy use in a single environment for engineering, operation and maintenance. This includes a single, object-oriented database to engineer and maintain systems more quickly and easily, a powerful operations and navigation environment for real-time monitoring and

control of the plant, including alarms, events and trend data, and standard interfaces with historian, MES and other business systems for fast and easy information exchange.

StruxureWare PE (Process Expert) is the software component of PlantStruxure PES. It's user interface and compatibility is common to the Schneider Electric StruxureWare software suites.

## A.2 SYSTEM SOLUTION

Our project scope is composed of the following parts:-

- ✓ Trusted Zone
  - At the lowest level, we will supply the **Pipeworks (Process) PLCs**, which interface with field devices such as valves, process switches (Temperature, pressure, level etc.), and transmitters, using either hardwired signals (contacts, 4-20mA, 0-10VDC) or Profibus DP/PA connections. We have considered supply of Pipeworks PLCs (Qty as per RFQ), complete with PLC racks, redundant Ethernet/IP communication modules, telefast pre-assembled cabling with field termination adaptors, panel & related accessories. We have not considered the Ethernet switches in this scope.
  - For each location of Process PLC, we have considered a panel-mounted **15" colour touch screen HMI** for local visualization of data. The HMIs will function independent of the SCADA system. The HMIs will communicate with the Pipeworks PLC using the Modbus TCP/IP protocol.
  - We will supply 5 nos. of **Hot Standby Master PLCs** per PRPS, which will control the Pipeworks PLCs & the vendor supplied PLCs. The vendor PLCs are in the scope of the contractor. The communication between the Master PLCs & the Pipeworks & Vendor PLCs will be over redundant ethernet connections using the Ethernet/IP protocol.
  - We will supply **redundant IOservers** (PES Operation Servers), which will interface with the Master PLCs & provide runtime data to the DMZ OPC servers.
- ✓ DMZ
  - We will supply **redundant OPC servers** (PES operation servers) to consolidate data from the redundant IOservers supplied by us & data from other IOservers installed in the trusted zone e.g. IOservers for electrical system, building management system.
- ✓ Untrusted Zone
  - We will supply **redundant Operator Servers** (PES operation servers) which will be the source of alarms & trends for the operator workstations. The source of runtime data for the Operator server itself will be the DMZ OPC servers.
  - We will supply a **Historian server** which will store the runtime data (process real time values, alarms) into an SQL server database. This server will provide the required plant reporting services.
  - We will supply an **Engineering Workstation** (PES System Server) which holds the project database for the PES System.
  - We will supply 3 nos. of Operator Workstations. Two of these will be designated as Process workstations & the third will be used for MEP data visualization.

The system described above is typical for one PRPS. The same shall be provided for each PRPS (PRPS 01-05).

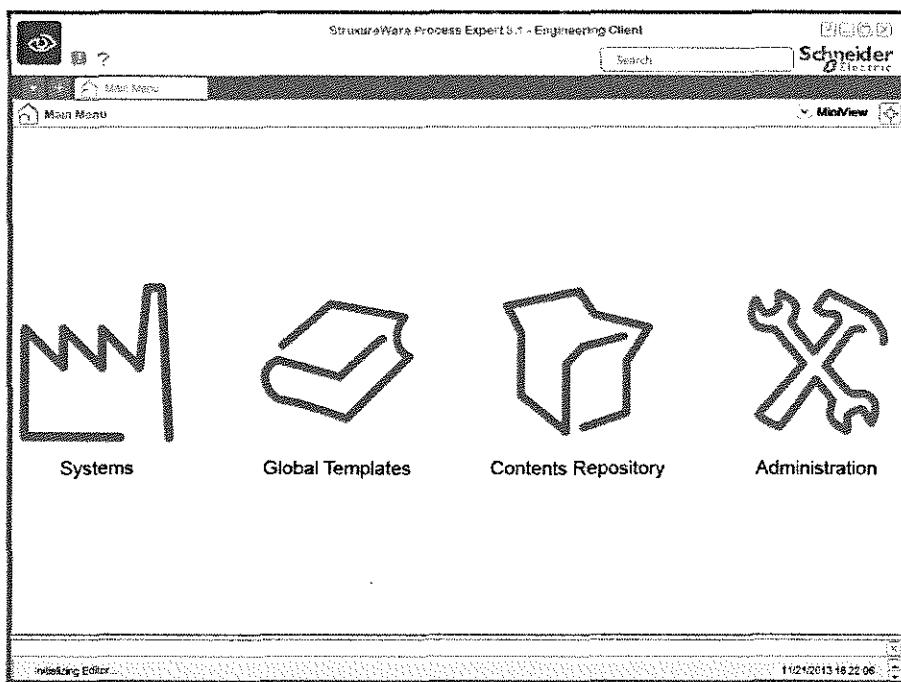
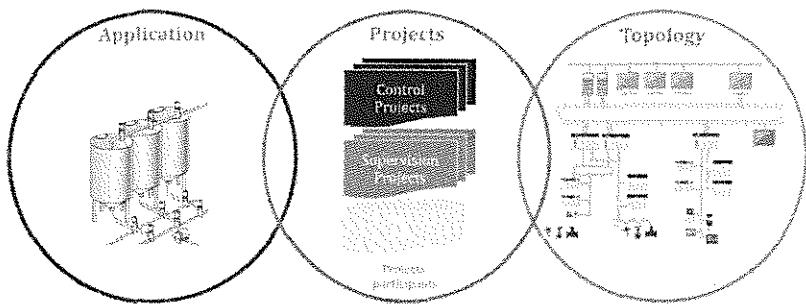
### A.3 STRUXUREWARE PE SALIENT TRAITS

#### A.3.1 Engineering

PlantStruxure PES improves efficiency throughout the engineering phase of a plant, accelerating start-up and minimizing project risk with five key features:

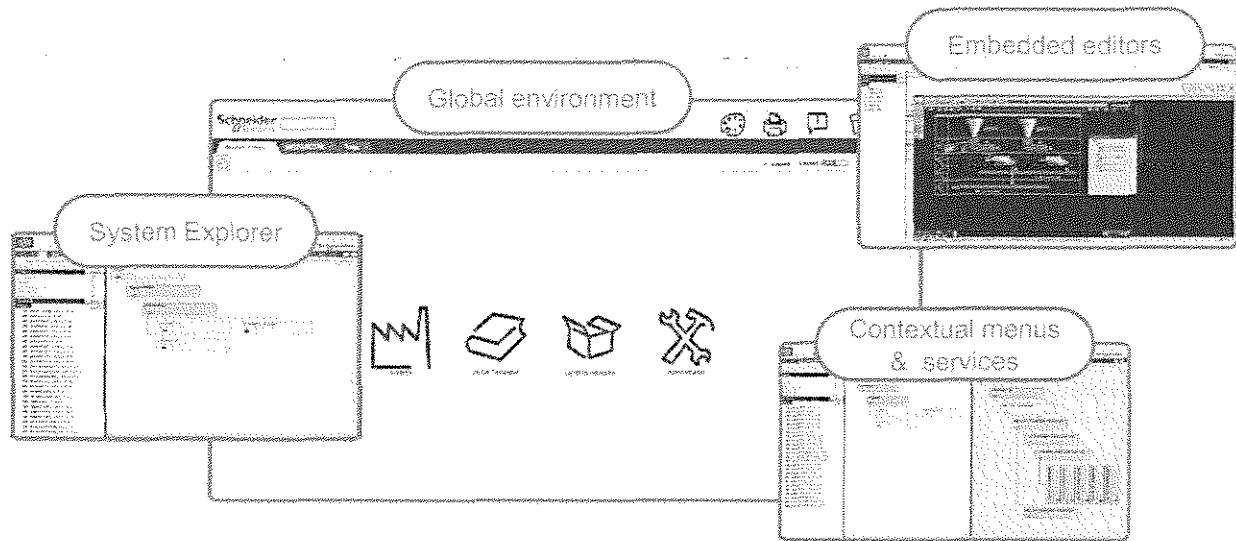
- 1 **Intuitive and modern user interface** - PlantStruxure PES embeds all the software tools needed to design a process application:

- ✓ The Library Manager contains extensive object templates organized into libraries
- ✓ The Application Manager describes the equivalent plant hierarchy
- ✓ The Topology Manager describes the overall topology of the system
- ✓ The Project Manager defines the project that runs in the topology

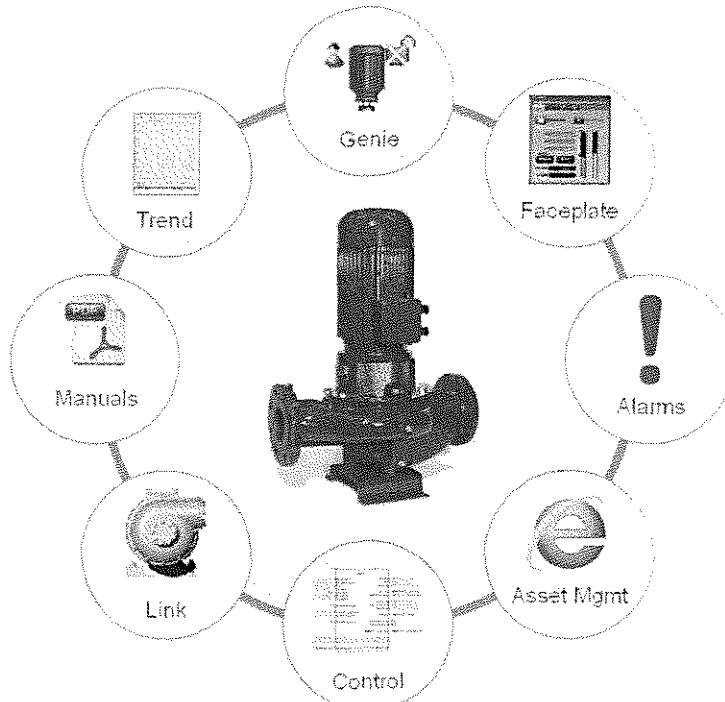


- 2 **All-in-one configuration** - PlantStruxure PES offers an all-in-one configuration functionality, allowing faster system design from a single point of data entry. Via the Application Manager, a replication of the application can be seen as it is in real life, using any model, the ISA88 or ISA95 standards, or any other model of choice.

In addition, the design can be based on a hierarchical organization according to the P&ID definition, allowing easier evolution of the installation.



- 3 **Object model approach** - an object is composed of different facets that contain internal information about the software participant. These facets offer different points of view of the same object. Interfaces allow connections between object instances, enabling collaboration between participants, even while they remain de-coupled.



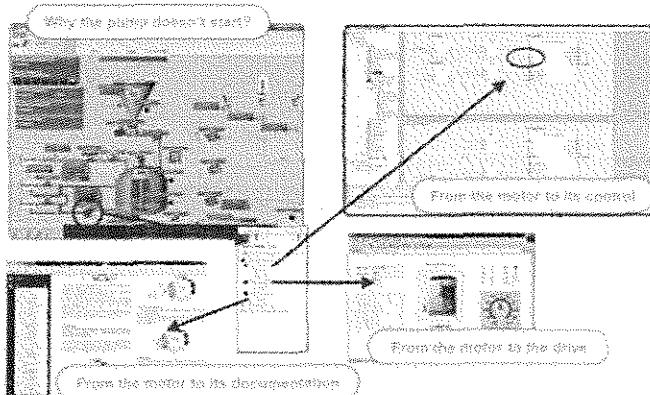
The image above shows (with the example of a pump) the concept of object modelling. Several points of view are represented through the facets: control and the command of the pump at the bottom, monitoring of the pump through a graphic display and faceplate on top, and other information such as alarms, data history, user guides and so on. When an instance of an object is created, all facets are created as well, along with all the links between those facets.

- 4 **Sustainable engineering** - PlantStruxure PES remains adaptable to different business needs at every stage of the application lifecycle. The original design of the process application can be adjusted at any time, and the system will execute the modifications by propagating the required changes across the plant. Modifications of an object facet can be applied to all objects or to the selected instances only. System libraries support versioning, and the system always verifies any discrepancy between the object model and its instances.
- 5 **Standard and reusable application data** - PlantStruxure PES includes a set of object libraries that help kick-start the design process. The ready-to-use libraries can be modified to address specific preferences. Optional libraries focus specifically on applications for different segments, with embedded expertise like energy management functionalities to help with the reduction of energy waste at the source of over-consumption

#### A.3.2 Operation & Maintenance

PlantStruxure PES provides a consistent control and operational interface with a real-time view of the process. The system delivers operators all the data they need to make timely and accurate decisions and all the standard DCS functionalities are available in the PlantStruxure PES operator interface, including:

- 1 **Trending** - trends are a seamless combination of real-time and historical data. When users view a trend page they can monitor the current activity as it happens and simply scroll back through time to view the trend history. The distributed trending system handles a large number of variables without compromising system performance or data integrity. Operators can choose from a selection of pre-configured trend pages that provide clear data representation with customizable views for quick and simple trend analysis.
- 2 **Advanced alarms and events** - the PlantStruxure PES alarm system is fast and reliable, providing detailed information about the status of the plant. Alarms are displayed on dedicated alarm pages, with the most recent alarms visible at all times in the alarm banner on every page. Working in conjunction with the controller, alarms are time stamped with precision.
- 3 **From any operator station, monitor the process and identify the root cause of any disturbance** - from any animated symbol on the display the object faceplates can be directly opened. Each faceplate provides the basic object information (also indicated by the status icon on the object) along with a wealth of other data, such as monitoring parameters, interlocks, alarms and others.

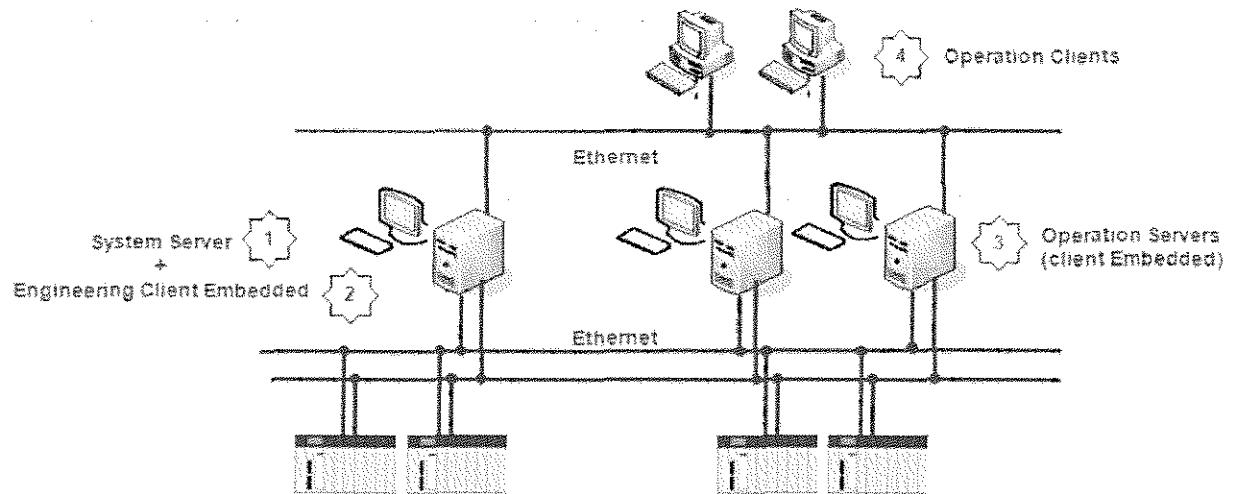


### A.3.3 System Presentation

The PlantStruxure PES architecture is fully flexible and its infrastructure can be deployed on one single machine that hosts all the needed functions, or on a set of multiple machines. For this project, all the components of PES are distributed to achieve the expected performance & reliability. The functions needed to execute a PlantStruxure PES project are:

- ✓ **PlantStruxure PES System Server** – this server hosts the global database and centralizes and synchronizes all the information throughout the system infrastructure. The engineering software to configure, monitor, diagnose and maintain the deployed application is also embedded on the System Server. The engineering software suites are embedded on a virtual machine, which is installed with the PES System Server.
- ✓ **PlantStruxure PES Engineering Client** – this workstation houses all the editors that are needed to configure and build the project. Multiple engineering clients can be connected to an Engineering Server for concurrent development.
- ✓ **PlantStruxure PES Operation Servers** – these servers offer a set of services such as I/O servers, alarms servers, trend servers and report servers. A minimum of one Operation Server is required when deploying a PES configuration. In order to improve the scalability and the performance of PlantStruxure PES the Operation Servers can be split into several machines that can be stand alone or redundant. Each operation server embeds a local PlantStruxure PES Operation Client. In addition, it is possible to set up a redundant configuration of the PlantStruxure PES Operation Servers to ensure the monitoring of the automation system at any time.
- ✓ **PlantStruxure PES Operation Clients** – the number of Operation Clients needed depends on from where the Control System Application is monitored, and how many client stations are required. There are two types of operation clients – the Control Client enables modifications to be made like set points; the View Only client doesn't allow any kind of modification to be made to the running system. Both the Control and View Only Clients can be used remotely as Web Clients. In addition, each Operator Server embeds a local Operation Client, which can run exclusively on the server.

All these machines are interconnected through the Ethernet Network architecture (refer to the figure below).



## A.4 STRUXUREWARE PE FEATURES

### A.4.1 System Features

#### A.4.1.1 Object Model

Natively, the Process Expert System (PES) uses the Object Oriented paradigm as a model for the representation of the components present in the libraries of Functional Modules. This model provides benefits during the entire lifecycle, from a simplified design using instantiation and setting up parameters to an improved operation using the run-time services available in each object.

The object model is based on three basic types of entities:

- **Software Facets:** Intended to Encapsulate basic functionality for controllers and supervisory subsystem and to provide access to its defined methods and properties by application interfaces that are able to link to other Hardware, Software or Platform Facets
- **Hardware Facets:** A logic projection of a physical hardware device, exposing, as Software Facets do, a physical interface or communication interface to other Hardware Facets or an Application Interface for linking with other Software or Platform Facets
- **Platform Facets:** Associated to Software or Hardware Facets, provide services for both design time and runtime, such as diagnostics, offline access to documents and web pages or capabilities to run third-party applications supporting contextual parameters. Additionally facilitate their linking to Software or Hardware facets through application interfaces

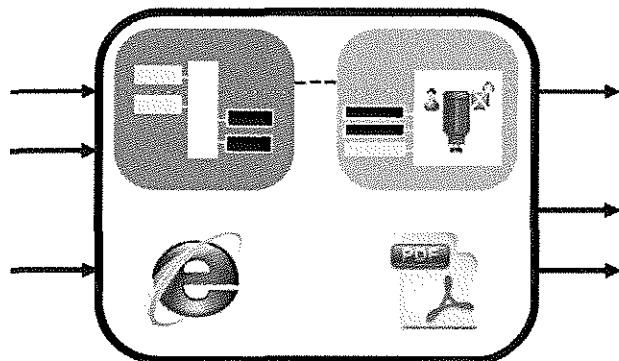
Based on these entities, the Process Expert System (PES) provides the designer with two types of composite Functional Modules:

- **Software Composites:** Objects that represent a particular functionality achieved by the composition of Software Facets or other Software Composites linked through their Application Interfaces. The Software Composites can be instantiated in the application and its parameters adjusted depending on the project requirements
- **Hardware Composites:** A projection of the characteristics of different hardware components such as communication networks, Supervisory stations, servers, controllers, field devices, and so on, which can be interconnected through communication or Physical Interfaces provided by Hardware Facets to Software Composites. Intended to model the hardware infrastructure through a logical representation of the physical system that is in the plant.

Additionally, there are two types of Template Sections able to accommodate the previously described objects:

- **Application Sections:** A logical and ordered representation of different sections in the plant which allow the instantiation of different Software Facets and Composites. This templates simplifies the representation of common process units in Process Expert System (PES)s, allowing maximum reusability of work

- **Topological Sections:** A combination of Hardware Facets and Composites representing common hardware configurations including, controllers, networks, operator stations and servers that can also be reused in any future project



*Upper: Control logic, communication interface and graphic representation*

*Lower: an embedded link to diagnostic web site in a controller and linked documentation*

#### A.4.1.2 Scalability

The Object Model allows the Process Expert System (PES) its future extensibility and facilitates the creation of Facets and Composites applicable to the current development or future projects to be developed. In this context, the ability of the designer to choose in an easy way the Facets used in each instance of a Composite ensure that the project is going to be respectful on required hardware resources at runtime, specially, the power required by processors and the amount of memory needed by the application.

In addition, by enabling or disabling certain services associated with objects, such as alarm management, the platform will generate only the necessary code for controllers and the corresponding Supervision views will be automatically adjusted, resulting in optimized size, runtime requirements and bandwidth demand in the network.

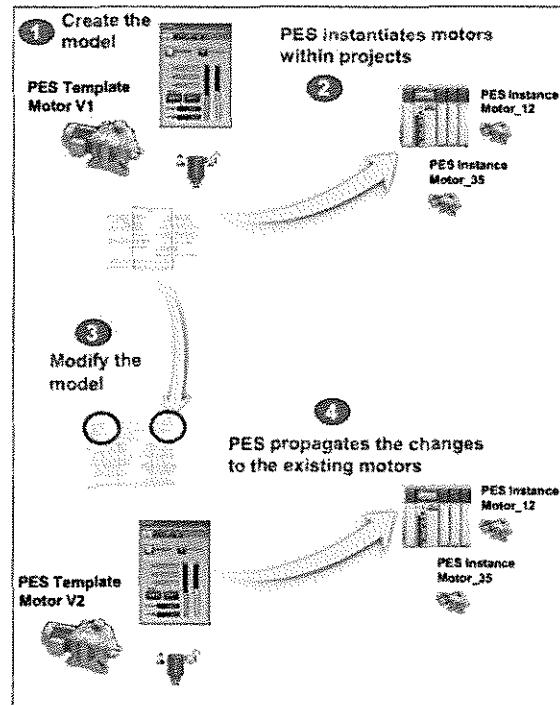
The Process Expert System (PES) accepts its execution in a variety of hardware configurations, ranging from a single controller from entry level environment to multi-node deployments in client-server architectures without imposing restrictions on the level of functionality obtained. The architecture of the System as a whole is fully extensible in the future, ensuring that the addition of new controllers, field devices, servers or operating stations can be done without changing the architecture proposed in the project definition phase.

#### A.4.1.3 Object edition, changes and Propagation

The Object Model's flexibility simplifies the identification of dependencies and impact of potential changes to be incurred in the Facets and Composites by means of cross-references or visualization of object's reverse genealogy.

Any persistent change made in any object, once validated, can be selectively propagated to the concerned instances, leaving its resolution to the platform. Additionally, the designer may choose to retain in the same project the initial version and the modified version of the same object and decide which version must be instantiated. Any instance can be modified without involving the modification of the base class from which it inherits.

The designer has the capability to manually edit the automatically generated source code by the platform if necessary, remaining under their responsibility to carry out the tasks of reconciliation that might result from their actions. In any case, further additions or elimination of instances or topology changes in the underlying supporting hardware will respect code modifications made by the designer.

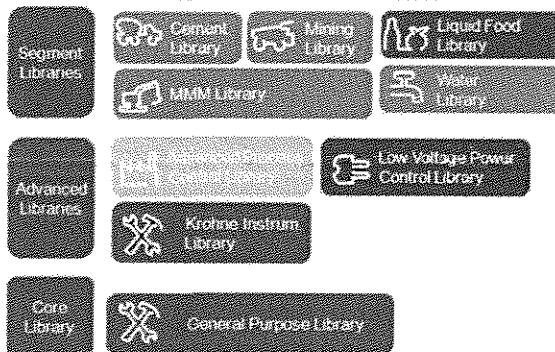


#### A.4.1.4 Functional Module Libraries

PlantStruxure Process Expert System provides resources:

- ✓ That have been pre-configured and tested by Schneider Electric.
- ✓ That were specifically designed for automating a large variety of processes.

The control resources for the Control and monitoring resources for Operator Interface provide the commonly required functions to facilitate the development of the DCS application. StruxureWare PE includes global templates organized through the Foundation and General Purpose libraries. Optional libraries to address specific needs in markets and applications can be installed as options on top of StruxureWare PE. The picture below shows an overview of the General Purpose and optional libraries available with PlantStruxure.



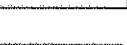
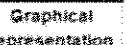
Global templates include two libraries:

- ✓ Foundation library, which includes elementary object templates. Generally, these templates are not used as single templates, but combined with others as composites with more value-added features. This library is required to design home-made templates.
- ✓ General Purpose library (GPL), which embeds composite templates corresponding to a process feature, as a control module. Automation systems are designed with object templates from the GPL, and objects may also be used from the optional libraries and home-made templates.

The General Purpose Library is organized in categories according to their purpose:-

- ✓ Process templates
  - Signal conditioning and processing
  - On/off device control
  - Analog device control
  - Process control
  - Sequential control
  - Auxiliary functions
- ✓ Devices
  - Circuit breakers
  - Digital protective relays
  - Motor control and starters
  - Power monitoring devices
  - Progressive starters
  - Variable speed drives
- ✓ Communication
  - Ethernet Modbus TCP
  - Modbus Serial
- ✓ Diagnostics
  - Modicon Quantum PLC
  - Modicon M340 PLC
  - Modicon M340 PLC

The picture below gives an overview of these object templates. Most of them embed graphical representations as there could be many representations of the same object that can be used in the Operator Interface. Some examples are given below.

	Function family	Sub- Function	Template	Graphical representation
	<b>Signal processing</b>	Digital input acquisition	SDigitalInput	
		Digital output signal	SDigitalOutput	
		Digital calculation	SDigitalCalc	
		Analog input calculation	SAnalogInput	
		Analog input calculation with conversion	SAnalogInput1	
		Multiple Analog Input Acquisition	SMultipleAnalogInput	
		Analog output signal	SAnalogOutput	
	<b>Analog calculation</b>	Derivative rate of change, totalizing, average, minimum, maximum	SAnalogCalc	
		Analog Signal Linearization	SAnalogLinear	

Function family	Sub- Function	Template	Graphical representation
<b>Controllers</b>	Internal Model Controller (IMC)	SIIMC	
	PID Controller	SPID	
	(to condition the signals associated with the control of a PID with optional feed forward)		
	PID closed loop circuit	SPIDCL	
	(to condition the signals associated with the control of a PID with optional feed forward. It also includes analog input and output management)		
	Radio Controller	SRadioCtrl	
	(to condition the signals associated with the control of a Radio Controller)		
<b>Sequential control</b>	Split Range Controller	SSplitRange	
	(to condition a PID signal into split range signals)		
	Pulse width Modulation Controller	SPWMController	
	(to condition an analog signal into modulated pulses)		
<b>Step3 Controller</b>	Step3 Controller	SStep3Ctrl	
	(to condition the signals associated with the control of a Step3 Controller)		
<b>Lead/Lag calculation</b>	Lead/Lag calculation	SLagCalc	
	(to calculate the signals associated with the control of a Lead/Lag controller)		
<b>Advanced Sequence control</b>	Advanced Sequence control	SSequenceCtrl	
	(develop and manage a control sequence)		

	Function family	Sub- Function	Template	Graphical representation
	On/Off device control; Valve	Hand Valve management	\$HandValve	
		Mvalve: Motorized valve	\$MValve	
		On/Off Valve	\$Valve	
		On/Off Valve with 2 outputs	\$Valve2	
	On/Off device control; Motor	On/Off motor 1 speed, 1 rotation direction	\$Motor	
		On/Off motor 2 speed, 2 rotation direction	\$Motor2	
	Analog devices Control; Valve	Control valve with optional position feedback (analog position and/or limit switches)	\$ControlValve	
		Motorized valve, or a gate with analog position feedback and 2 rotational directions	\$MValveWithPos	
	Analog devices Control; Motor	Motor management with Variable Speed Drive	\$MotorVS	
	Diagnostic	M340 PLC Diagnostic	\$M340Diag	
		Quantum PLC Diagnostic	\$QuantumDiag	

	Family of devices	Device name	Ethernet	Modbus Serial	Advanced features (GA/Reporting)
	Progressive starters	AT522, AT548		<input checked="" type="checkbox"/>	
		ATV12, ATV312,		<input checked="" type="checkbox"/>	
		ATV31		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Variable speed drives	ATV61, ATV71	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Tetyst1 (5 functions) Tetyst1 (2 functions)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Motor controllers and starters	Sepam20C, Sepam40C, Sepam80C		<input checked="" type="checkbox"/>	
		CompactNSX, MasterPact, MasterPactC		<input checked="" type="checkbox"/>	
	Power monitoring devices	PM9, PM710, PM800, PM1200		<input checked="" type="checkbox"/>	
	Harmonic filter and power compensation	Accusine	<input checked="" type="checkbox"/>		
	Uninterruptible power supply	SmartUPS		<input checked="" type="checkbox"/>	
	Safety module	XPSMC		<input checked="" type="checkbox"/>	
	Generic device		<input checked="" type="checkbox"/>		

Even if it is recommended to minimize the development time to use pre-defined template, any configuration of PES for engineering enables the design of templates. This design can be done from scratch, or following a copy of an existing template of the GPL library and its customization to fulfill the project requirements.

#### Advanced Process Control Library

Advanced Process Control Library consists of 18 functions blocks for monitoring and controlling complex processes in the plant. An additional software called OptiReg v3.1 provides features for modeling the process, tuning PIDs as well as the model based controllers.

The APC Library for the PES offer includes:

- ✓ Standard Library
- ✓ PCR Library
- ✓ IMC Library

The Standard Library includes the following functions:

**PID Block** - Standard PID function with the ability manage the complete loop from a single place. Data from transmitter and positioner (value, status and mode) are seamless in the loop and used for calculations. Upstream object information transfers to the downstream objects.

**Enhanced PID Block** - This is an enhanced and completed PID block with feed forward gain for disturbance compensation and override function by copying the actuator current status (RCPY). Auto tuning functionality is embedded in this block.

**Analog Acquisition Block** - Analog input with signal filtering, square root extraction and process analyst.

**Analog Positioner Block** - Analog output with ability to loop back the output data (value, status and mode) with upstream object to downstream objects information transfer feature.

**De-multiplexer Block** - Auxiliary block; transfers single control output to 4 positioners. Upstream object to downstream objects information transfer feature.

**Choice Block** - Auxiliary block; select 1 of 4 input signals by PLC logic and manual. Selection is bump-less. Priority management is also possible.

**Set Point Block** - Auxiliary block, used to create a filtered set point with upstream object to downstream objects information transfer feature.

**Ratio Block** - Auxiliary block; ratio control function with filtering, tracking mode and alarm detection. Generally used in cascade mode, it supports a loop back from the connected actuators. Error mode or manual mode operation of actuators is used in ratio control & PID calculations to prevent saturation. **Split Block** - Auxiliary block; split range function with transforms an analog input value into 2 analog outputs using the coordinate values, and checks for threshold overruns. The values and status of the downstream actuators are used to initialize the loop and to prevent integral saturation.

**Split Block** - Auxiliary block; split range function with transforms an analog input value into 2 analog outputs using the coordinate values, and checks for threshold overruns. The values and status of the downstream actuators are used to initialize the loop and to prevent integral saturation.

**Selection Block** - Auxiliary block; this block is used to select one of 3 transmitter signals based on logical decisions, where status of the analog output is looped back and manages different modes. It checks for threshold overruns.

**Vote Block** - Auxiliary block; this object is used to calculate a mean value of 3 process variables. A deviation alarm occurs if the deviation between 1 input and the 2 others is greater than the set limit.

**Wrapper Block** – Auxiliary block; this block is used for using/linking the analog actuators of other libraries (e.g. General Purpose Library, Water Library etc.) with APC library blocks without losing the APC library's key feature of upstream object status transfer to the downstream object (i.e. back-in / back-out feature).

The model based predictive control library includes the following functions:

**AP\_PSF1 Block** - Predictive controller for 1st order simple process. (Model: Km,Tm & Dm) : simple, and convenient for long time delays.

**AP\_PIF1 Block** - Predictive controller for 1st order integrative process.

**AP\_PZTR Block** - Zone control with non-linear time response. This block is used for automatically changing the closed-loop time-response when the process variable (PV) is inside or outside a zone.

The internal model based control library includes the following functions:

**AP\_MSF1 Block** - Internal model based controller for 1st order simple processes. It identifies a first order system with pure delay (the transfer function of the process and the transfer function of closed loop (controller + process)). The controller AP\_MSF1 allows a static gain unit and acceleration of the time constant by a factor 'n', where n is the gain speed.

**AP\_MIF1 Block** - Internal model based controller for 1st order integrative process.

**AP\_MRAMP Block** - An intelligent ramp management block. It is used with IMC controllers and allows both the AP\_MSF1 block and APMIF1 block to follow a parallel path to ramp the setpoint and to join and follow it precisely. Tracking a reference trajectory, and in particular a setpoint ramp is necessary in many applications.

The LVPC Library contains following functions:

**LOADMNG** - Load manager manages the system's available power in order to ensure the availability of the installation's top-priority loads.

**GENERATOR** – It manages a generator's most characteristic signals and alarms. It is combined with the SOURCE block.

**SOURCE** – It represents an element that supplies power to the system.

**TRAFO** - It manages a transformer's most characteristic signals and alarms. It is combined with the SOURCE block.

**COMPACT / MASTERPACT** - Model and control COMPACT NSX or MASTERPACT devices. In the LVPC Library, it is used together with the INFEED or LOAD.

**INFEED** - Circuit breaker. It can be combined with COMPACT and MASTERPACT, as well as with any ON-OFF device. It allows the simulation, interlocks, owner management, failure summary, and confirmation of alarms.

**LOAD** - It is combined with COMPACT & MASTERPACT. It allows the simulation, interlocks, failure summary, owner management, and confirmation of alarms.

**BUSBAR** – It closes the circuit breakers with voltage in order to supply power to the system

The LVPC library includes the following services:

- ✓ Design of a power circuit
  - Components to build a one-line diagram of the electrical system
  - Seamless connections between components of the electrical system
  - Each item of equipment can be uniquely identified with nominal ratings
- ✓ Management of load and priorities
  - Maximum (nominal) power that a source is capable of providing
  - Generation that can be picked up within reasonable time after the loss of connected generation
  - The maximum (nominal) power that every load can draw
  - Criticality of every load connected
  - Priority of loads for re-connection within a criticality group
- ✓ Load shedding
  - Continuous power balance calculations that enable decisions
  - Perform automatic load shedding
  - Re-connecting the disconnected loads when power source is restored
  - Interlocking between loads to control load shedding
- ✓ Simulation
  - Supports simulation for efficient design of power management systems
  - Evaluate impact of power loss or overload scenarios during operation by simulation

#### A.4.1.5 Redundancy

The ability to configure systems based on redundant hardware is natively supported by the platform, including Supervisory stations, servers, communication networks and controllers. The platform enables designers to easily choose which equipments must be primary and which ones standby.

All the tasks running in servers can be considered critical so they use true redundancy and avoid task duplication methods. The Process Expert System (PES) ensures a continuous operation without any interruption in case of hardware or software failure, so in order to achieve this functionality all the operator actions and all the field information acquired by the primary server is automatically replicated into the standby server.

The redundancy scheme for controllers performs a primary/standby switching without any loss over the process control and without any appreciable discontinuity in the system responsiveness.

#### **A.4.1.6 Sequence of events management**

In order to provide operators with the ability to manage and analyze sequences of events, the system is able to store and show events with two timestamp levels according to the project needs.

The controllers are able to acquire with timestamp and store locally any physical input that meets a defined condition with an accuracy of 10 milliseconds without requiring specific hardware. However, in applications where high resolution is required, there is the possibility to include additional hardware to achieve up to 1 millisecond. Both time resolutions are managed by servers and are fully supported by the operator stations.

#### **A.4.1.7 Information Security**

The Process Expert System (PES) provides mechanisms to ensure the confidentiality, integrity and availability of information being processed or persistently stored. Access control in operator stations and robustness in front of abnormal conditions, both physical and in networks, are supported by controllers. Additionally, in order to ensure compliance with the above premises, a collection of recommendation documents designed to help the correct implementation of the constituents of the supporting infrastructure are available from the manufacturer. These documents are validated by experts in Process Expert System (PES) security.

#### **A.4.1.8 Other features**

All the tools involved in the design and operation are equipped with graphical user interfaces and facilitate access to its functions even when they are inherently complex.

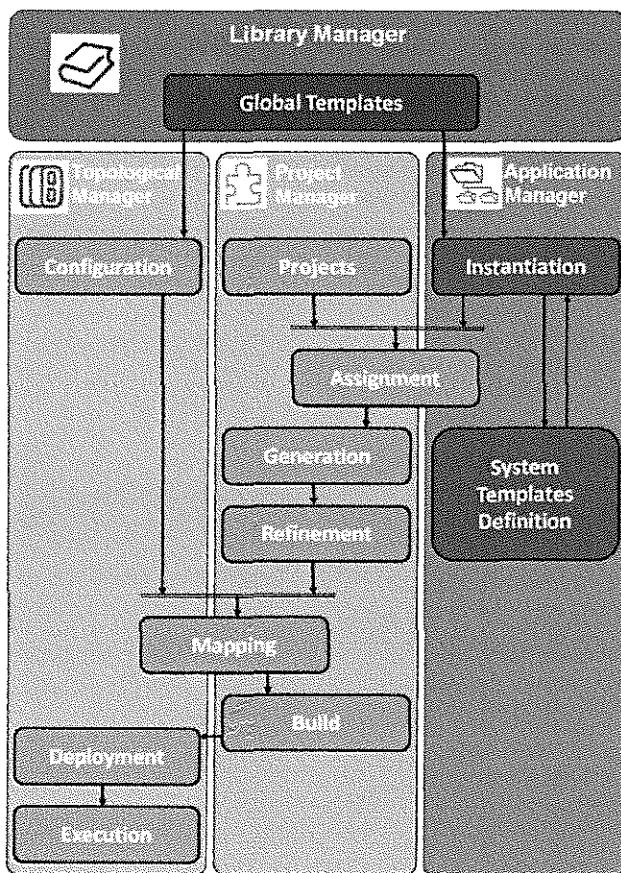
Both hardware and software elements in controllers and Supervisory stations subsystems have been selected under the concept of modularity, enabling easy replacement in case of hardware elements and easy combination in the case of software components. The use of standard protocols in all elements provides easy replacement and exchange.

All the hardware and software components have a large installed base and have been tested extensively in all kinds of applications: redundant, high volume, high level of integration with third party equipment, and so on.

### **A.4.2 System Design & Set-up**

#### **A.4.2.1 Design Lifecycle**

The design of the Process Expert System (PES) can be done in different phases and by doing so, will provide designers with enough flexibility to advance their work in each phase independently or in all phases in parallel without having any noticeable difference on the system depending on the chosen operating mode. Each phase has a specialized editor, where all of them are interrelated, contained in the same environment and share a single configuration database.



The system's ability to manage multi-user environments ensures the integrity and consistency of the entered information in locations where multiple developers cooperate on the same project simultaneously from their respective workstations. There is not necessary to make further consolidation tasks manually.

During the design phase, developers are able to define and establish multiple restore points with timestamp, where the whole context of the system is stored and will enable future restoration into a consistent and known scenario if needed.

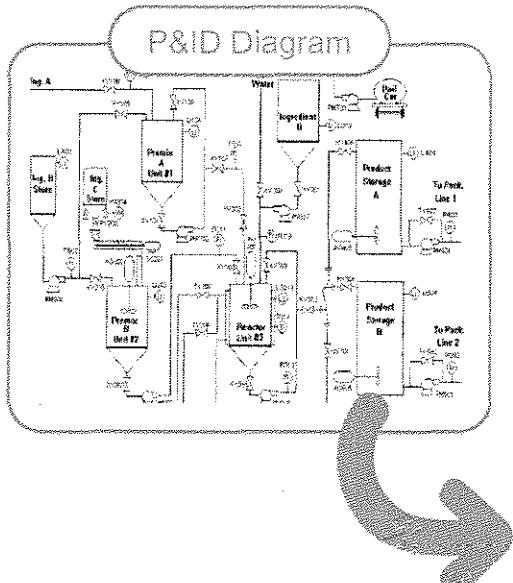
#### A.4.2.2 Process Modelling

The Process Expert System (PES) supports the graphical creation of the hierarchy of control equipment and instrumentation which constitutes the process using a tree with nodes and sub-nodes, all of them consistent with the organization defined in the project, for example the P & ID description, and without imposing mandatory design criteria, limitations on the number of nodes and sub-nodes or restrictions on the capability of nesting. The hierarchical tree shows the nomenclature, procedures and organization of the physical assets that the designer wants to represent.

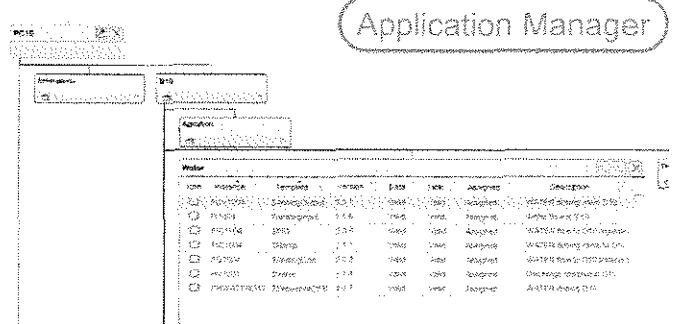
The platform supports the creation of custom views to enable sorting of nodes and instances in folders, and subsequent navigation will be adapted to the project. Each folder and content items have attributes that can be defined by the user and will be automatically inherited by each sub-node of the folder, either new folders or object instances.

Thanks to the usage of custom views, the following example classifications can be created:

- Application views:
  - **S88**: Area, Process Cell, Process Unit
  - **Subsystem**: Transport, Processing, Storage
- Topological views:
  - **Space**: Technical Room, Control Room, Production Area
  - **Subsystem**: Electrical Distribution, Networks, Controllers



- > A free & flexible model to describe the user application
- > Standards based (ISA88, ISA95) or user choice
- > From the P&ID diagrams
- > Hierarchical organization
- > Fully independent from the hardware architecture



In this design phase, a browser is available and show its content in a list or folders, where Functional Control Modules libraries are located in an organized manner. The information displayed for each Functional Module include its type (control or supervision object, composite object), version in the library, approved or pending state, used or not used in the application, and a textual description about its functionality.

The location of a particular module can be performed manually by browsing through the list or folders or by specific search tools that can be used as filters such as Module version, approved or not, used or not, and so on.

The Functional Control Modules corresponding to each node and sub-node in the hierarchy of equipment and instrumentation can be instantiated by a simple drag and drop operation, automatically inheriting the naming criteria described in the hierarchical tree and giving a way to a dialog where the designer can assign its parameters.

At design time it is possible to determine, using simple checkboxes, auxiliary modules which will support the operation of the Functional Control Modules, for example, associating interlocks or alarms to management modules that may require them. By doing so, the system will only generate the strictly necessary code for graphics and controllers. Additionally, in the same operation the platform enable designers to specify in which security area the Module is located, thus only operators with access to the particular area will be able to perform operations over the object in run time.

The system allows, if necessary, to graphically link the various levels of modules together to describe the information flows between them. Based on these links, data exchanges will be automatically resolved if both providers and consumers of such data are located on the same controller or they are in different controllers communicating over a network. There is a link validation mechanism to check the requirements of each instance, proposing the designer through dialog boxes which links are possible and which are not allowed.

When needed, any node or sub-node created and their instances can be promoted as Application Template, thus encapsulating reusable parts that can be re-instantiated in the future. A template editor allows designers to set the parameters of any nesting level that can be changed at instantiation time or remain hidden when creating new instances.

The management of Hierarchical tree and module instances benefits from copy/paste/move tools that automatically resolve any naming convention issues. Export and Import of hierarchies is also supported and they use non-proprietary format files, therefore, they will be externally editable if desired. The resolution of conflicts arising from duplication of names or identifiers is the responsibility of the system which provides the designer with a simple way and indications on how to proceed.

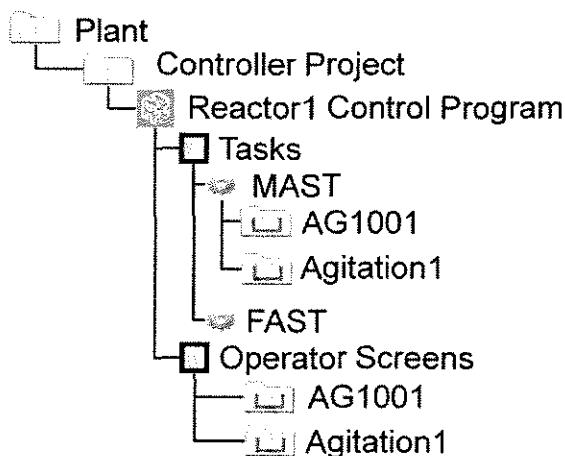
The described functionalities are not conditioned in any way by the characteristics of the underlying hardware

#### A.4.2.3 Project Definition

The Process Expert System (PES) is supported for normal operation by hardware resources such as controllers, field devices, networks and operating stations. During the Project definition phase the designer is able to describe from a high level perspective how the Functional Control Modules instances, created among various nodes and sub-nodes specified in the hierarchical tree of the application, are assigned to hardware resources.

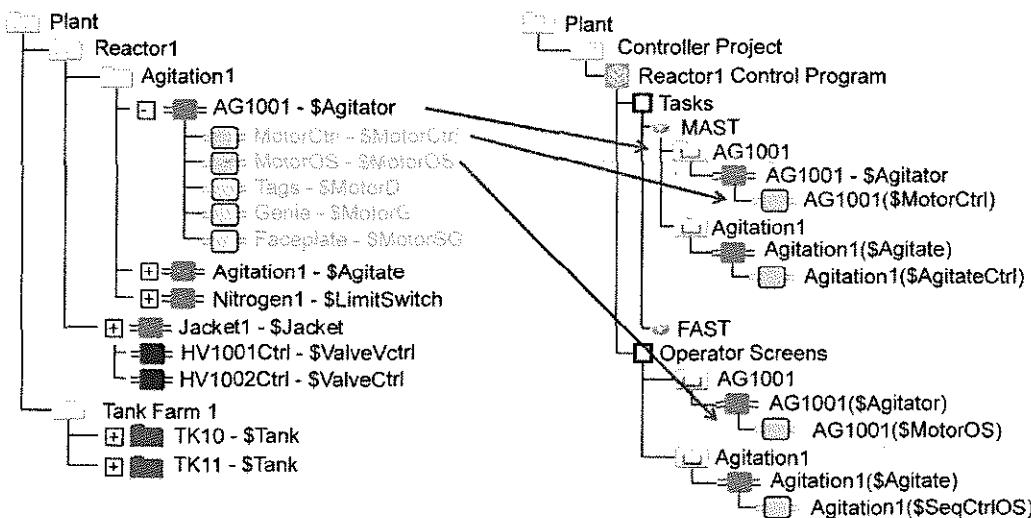
As noted above, the Functional Modules encapsulate the logic control components and their interrelationships with supervision by Interfaces, therefore the platform will manage two different kinds of Projects, Supervisor and Controller, which allow designers to accommodate the hierarchical tree of instanced Functional Modules in different containers.

The container concept defines the ability of the platform to organize constituents according to the service they offer, for instance, a controller container hosts the tasks to be executed or operator screens to help to start up the system, a supervisory container accommodates graphic pages and communication data. Once the container is created, the designer can assign to them the instances of Functional Modules as appropriate.

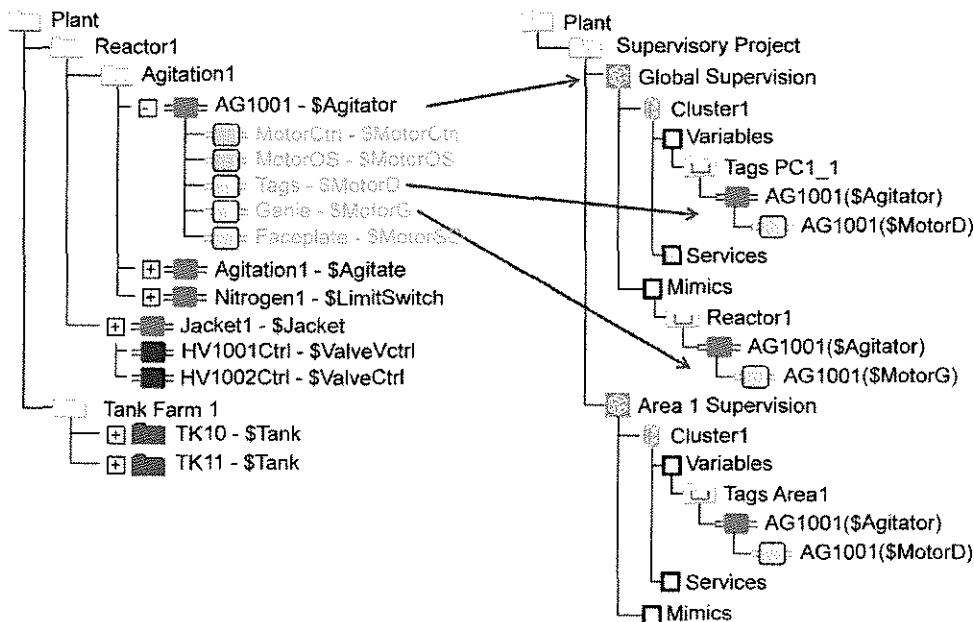


The two types of projects that the platform supports and are transparently linked with each other without any development effort are:

- **Controller Project.** Each controller has the containers in which it locates control logic components, operator pages and lists of data provided by Functional Modules. The designer has complete freedom in terms of organization and number of containers and their contents.



- **Supervisory Project.** The project for Supervisory stations has various types of containers to allocate the associated components, such as graphic objects or data communication, additionally, additionally provides services such as alarms and trends.



Additionally, the system allows the designer to optionally, add information manually to both the Controller and the Supervisory Project. As mentioned above, the controllers accept the addition of new logic functionality or new sequences unrelated to the created instances of Functional Modules. The Supervisory Project accepts editing synoptic, adding HMI panels, adding schematic drawings and so on.

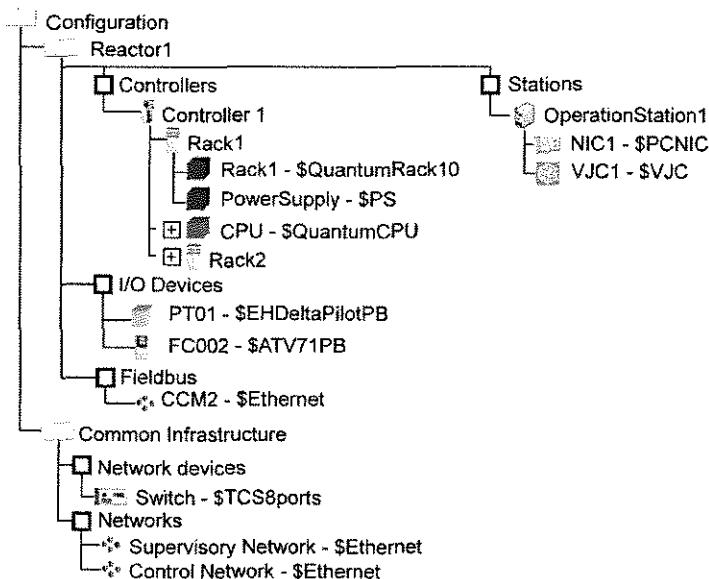
The phases described up to this point allow its configuration without having any dependency with the hardware which constitutes the system.

#### A.4.2.4 Architecture Design

Using the same concept exposed in previous chapters about the hierarchical organization of the application, the topological configuration of the system also benefits from a tree view where the different nodes show the associated hardware constituents and sub-nodes show what devices and equipment comprises the node. For example, an operator station will show what network cards are used or in a controller, what processor and I/O modules are included.

The platform provides Functional Hardware Modules intended to design the topological configuration of the system, including but not limited to controllers, field devices, control networks, supervisory networks, field buses, operator stations, engineering stations and servers.

Using the Functional Hardware Modules the designer can instantiate the components which apply to the system and has dialogs to adjust settings such as IP address, device name, I/O parameters and so on, leaving the platform in charge of system consistency checking based on the information entered.



Each hardware element in the topology is represented by an instance of a Functional Hardware Module which in turn exposes the data that is able to manage through a specific interface. For example, an analog input in a controller will have a logical definition that describes the data it can provide through its interface when connected to an instance of a Functional Control Module.

Through this combination of interfaces, as a hardware abstraction layer, the control strategy modeled on the P & ID description in the hierarchical tree can be associated with the topological configuration without depending on the characteristics of the underlying equipment. In addition, when necessary, transparent communication mechanisms are established to enable designers to deploy the application across different

controllers and share information between Functional Modules that run on distributed hardware, for example, different controllers or servers connected in a network.

Multiple topological configurations are supported simultaneously without requiring application modification in Control or Supervisory Projects. It is possible to deploy the system to both testing laboratory environments or to the actual topology of the project without the need to alter the application hierarchy, their instances or their distribution in containers of each project.

The platform always guarantees the system consistency when changes occur or the topology is updated.

#### **A.4.2.5 Hardware Mapping**

The inherent ability to have simultaneously multiple topological configurations facilitates the designer a development with complete abstraction about dependencies between different hardware controllers and between hardware controller and Supervisory software.

This ability includes mechanisms to establish links between instances of Functional Control Modules and Hardware constituents and its associated execution engines.

#### **A.4.2.6 Generation, deployment and execution**

The generation process creates, under designer request, the binary executables for the corresponding nodes in the topological configuration. To do so, the platform will combine the information in the hierarchical tree of the application, the Controller and Supervisory Projects and the hierarchical topology tree, consolidating instances of Functional Modules and manually added code and resolving communication links between controllers and between controllers and servers.

The generation can be performed in whole or, at the designer's request, partially, simply by selecting which projects and / or containers must be generated.

From this point, at the designer's request, executable binaries can be transferred to target nodes. The transfer manager is able to include all the additional data needed to establish the proper execution context, for example, PID loop parameters, alarm presets, formulas, translation files into different languages, and so on. In addition, the platform allows retrieval and duplication of those parameters and files present in systems which are already operating if necessary.

The system boot can take place in an orderly manner and can take into account the dependencies that exist, for example, launching first publisher data nodes and then monitoring subsystem acting as consumers of the published data.

#### A.4.2.7 Online changes

In the test, commissioning and operation phases it is possible to make changes that are not affecting the normal operation of the System or necessarily force to stop controllers or Supervisory stations involved. Online changes can support modifications done in the plant, directly in the system or come from a remote workstation where work has been carried out offline. These changes are then incorporated into the system ensuring consistency after a reconciliation process assisted by the designer.

The deployment of changes benefit from online graphical support by the platform, which shows what changes are ready to deploy and which changes should be transferred in block because of interdependencies.

When performing any online transfer to the controllers the platform warns the designer about the need to move hardware to shutdown condition if required by the nature of the changes.

### A.4.3 Operation Environment

#### A.4.3.1 Functionalities

The Process Expert System (PES) includes a graphical monitoring subsystem whose main mission is enable operators, supervisors and maintenance personnel to perform the tasks of their position, monitoring and operating the system in real time and accessing historical data stored. The Information can be accessed and sent from / to the controllers, the alarms managed, historical information can be stored, communications and hardware equipment diagnosed, users managed and authentication and activities performed logged.

The Supervisory subsystem has enough scalability to enable projects based on a small system to grow and expand to any size by simply updating the license, additionally new Supervisory stations can be added by increasing the number of licenses and configuring the servers. In order to support new stations no changes are needed in existing stations or in the Project

In order to protect the investment, the monitoring subsystem has a consolidated capacity upgrade from one version to another without requiring reconfiguration or specific development efforts to migrate the system's functionality to new versions.

#### A.4.3.2 Architecture

The Supervisory subsystem consists on several processes able to run independently so in case of any incident in one of them no impact over the operation of any other will impact, and so that the process can

be restarted and recovered without the need to close the application or the server. The different processes are responsible for providing specific services to Supervisory subsystem such as:

- ✓ Controllers communication service
- ✓ Monitoring, alerts, distribution and acknowledge of alarms
- ✓ Collection, storage and distribution of variables for historical trends
- ✓ Report processing, storage and distribution
- ✓ Support for conventional client operator stations or web browser based.

Each of these processes can run individually and are able to take advantage of computers with multiple CPUs or multiple cores per CPU, thus securing the load distribution at the designer's criteria and improving overall performance.

Changes made to the configuration of any of the subsystems of the server do not require a reboot of unrelated subsystems. Remote viewing Supervisory stations do not need a reboot after performing configuration changes to the project and are automatically updated as changes are made.

#### **A.4.3.3 Controllers communication service**

The data required by the monitoring subsystem at any time is scanned and displayed in any client station within a second maximum average in LAN. In order to meet this system performance, it is not needed to fix scan rates for each data or adjust each data set individually. The communication service reads trending information according to the period set for trends, alarms are scanned in a single predetermined time interval and the remaining information is read only as needed, for instance, when the page displayed contains them, to minimize a negative impact on the processing speed.

The communication service uses a cached storage for read and writes data with a configurable time period for each controller. This prevents the reading of unnecessary data and the consequent impact in the communication bandwidth, for instance, a single variable is read only once within the storage cached period even it is required by multiple client stations and / or processes.

#### **A.4.3.4 Alarms monitoring service**

The alarms and events manager component is integrated so that an alarm displayed in a particular Supervisory station can be acknowledged globally and appear as such in all stations of all the operators. The system can be configured as a common database, without requiring any other setting, to allow global alarms acknowledgement from any node within the Supervisory network.

As for the nature of the managed alarms, the system is capable of processing analog and digital variables and computed conditions and determines if the variable is or is not in an alarm condition. All alarm

properties permit adjustments without shutting the system down, including viewing and filtering, for which the platform provides several levels of priority or alarm categories.

Natively, although configurable depending on the specific needs of the Project, the platform provides the following user interfaces for alarm management:

- ✓ Alarm summary: Summarize the activation, recognition and alarm solution in one line for each alarm variable. This functionality facilitate the analysis of the global state in which the Process Expert System (PES) is
- ✓ Alarms history: Act as an alarm log so each new event in the alarm subsystem, appearance / disappearance of alarm or acknowledgment is recorded in a new entry
- ✓ Hardware alarms: Allow the management of alarms related to the Process Expert System (PES) itself and its hardware and communications constituents, clearly segregating this alarms from the ones from the process control
- ✓ Disabled alarms: Facilitate the management of alarms that have been temporarily disabled by the user
- ✓ Sequences of events: Display with originator timestamp all those events configured with this objective

The Alarm Viewer displays the information described in accordance with the organizational criterion used in the modeling phase of the process, so that the hierarchy used to house the instances of Functional Modules with nodes and sub-nodes is used to structure the viewer. This facilitates the operator the management of alarms and events, who will benefit from a logical projection of the physical installation.

Each alarm has a field to enable the operator to enter a free comment where they may state, for instance, the corrective actions applied to the solution of the alarm.

All activity on the alarm subsystem can be stored on disk and / or printed according to the settings applied.

#### A.4.3.5 Trending, collection and distribution

The number of collected trends is not limited by software. Trend data can be stored in a circular file system where the number of files, size of each file, sampling period, location of the file, the privilege and the area for each trend can be configured. The system is able to record historical trend information with configurable sampling periods ranging from 1 millisecond to 24 hours.

Each defined variable, regardless of its nature, can have the plotting capability. Trends can be kept online by an operator without the need of file backup or restore, additionally, each trend graph is able to display multiple trend pens with adjustable time base of 1 second to see all archived trend history.

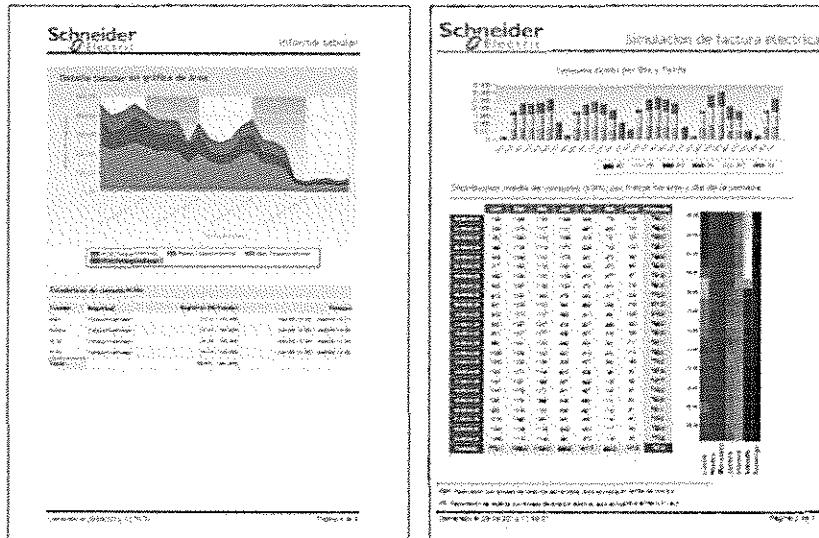
The trending display is handled by a component able to move back and forward within a selected time interval and can show the exact value of any variable by selecting a point in the graph or table. For comparative purposes it is also possible to show several pens per trend or several traces of the same pen in various time periods, for example, the results of the previous day compared to today. The visualization of

the trends is dynamic and able to "play" or move from historical time to the present. It can also be including the ability to stop auto scrolling of the trend scroll to see a detailed analysis of a history point.

This same component provides zoom and pan functionalities for both variable scale and for the time axis interval in the trend. The zoom allows the operator to compress or expand the range of the axis, while the pan enables them to change the origin of the axis. The software allows users to define any zoom area by dragging the mouse over the trend.

#### A.4.3.6 Report processing, storage and distribution

Within the scope of the platform, there is the possibility to generate multiple and varied reports. Clear examples in this regard are the production of reports focused on specific stages of the process in order to assess all of its features at work or for maintenance and diagnostics, to obtain a list of incidents and other derived parameters (cause, duration, timestamp). The recording of energy consumption and energy management is another possibility offered by the report management service.



*Left, consumption comparison over time. Right, detailed energy consumption per period*

#### A.4.3.7 Hierarchies

The Supervisory subsystem provides methods for logical grouping of objects, such as tags or alarms, following the criteria used in the definition of the hierarchical application tree described above herein. Each

item can be assigned to a given location in the hierarchy, which in turn, is based on the nomenclature used in the tree.

The usage of a custom or standard naming convention, such as S88 style which takes advantage of a consistent model and terminology, remains at designer's criteria.

This feature is intended to provide the operator with an optimal mechanism to explore, identify and quantify incidents or other events at the facility.

#### A.4.3.8 Graphical Interface

The number of possible graphic pages is not limited by the software. The viewer pages have capacity for up to 2000 tags per page, with updates of a second on average.

The graphic pages benefit from automatic resizing to fit the physical resolution of the screen in a specific computer, regardless of the resolution where they have been developed and irrespective also of whether the page is employing vector graphics or bitmap. This feature works without having multiple copies of the pages for different resolutions, do not require a new compilation of the application and do not need to close and restart the supervision subsystem to work properly. In addition, the user has the ability to resize the window that hosts the graphics page and all the components will be automatically resized to fit the new window size.

Client Supervisory stations communicate with various server subsystems to acquire or write data associated with the relevant subsystem. Client stations perform as clients for such tasks instead of processing these elements independently. The computers which control the various server subsystems are also able to act as clients of the server.

The system support ordinary web browsing clients such as Internet Explorer, so that operators which has been authorized can have remotely access to the monitoring subsystem. The web browser clients admit visualization only and visualization and control functionality, both protected by user authentication depending on different licensing models. The web client provides operation functionality identical to those offered by the standard client software, including but not limited to displaying graphic pages, trend pages, alarm pages and system security. All the pages, including graphics, alarms and trends, are available to operator client station through web browsing clients and do not require any specific development effort. Web browser clients ensure page changes within a mean delay of less than 2 seconds in a LAN.

#### A.4.3.9 Information Persistency

All the process information that the designer considers can be configured as persistent without requiring any development effort, in addition, it is possible to incorporate additional information not covered at the beginning of the implementation with equal simplicity.

The storage of adequate process data persistently and on a standard repository allow users to perform studies and analysis, such as correlating data over time, without being conditioned by the nature of the queries performed from any Supervisory stations or the particular structure of the stored information.

#### A.4.3.10 Access Control

Access control is fully integrated into the Process Expert System (PES) and allows access to any individual part of the system only to those users who have the appropriate levels.

The system accepts users who have been defined in a Windows domain, where they can be added, removed and allowed to access to the existing roles through Windows domain server without requiring modifications to the monitoring subsystem configuration. The Windows authenticated user's credentials are stored securely in a cache of the Supervisory station so that the user can be identified and access the supervisor in cases where the domain controller is not available. It is possible to use both the users own monitoring subsystem and Windows users.

Each graphic object accepts its assignation to an area of the process and its privilege level can be customized to establish whether the input fields are enabled or disabled for an operator or to determine whether the object will be visible or not depending on the current level of operator's privilege.

The Monitoring subsystem prevents access to the operating system by unauthorized personnel, for example, disabling the Windows key combinations shortcut as Ctrl-Esc and Ctrl-Alt-Del.

#### A.4.3.11 Traceability

The Process Expert System (PES) automatically monitors the actions of the user currently logged on each station and will store his operations, including the time of login and logout. The logout will not shutdown the station but return it to a safe state to allow viewing only.

These activities log can accept its viewing, if allowed by the operator's privilege, using a log viewer and the monitoring subsystem can store the information in a file with non-proprietary format for further analysis.

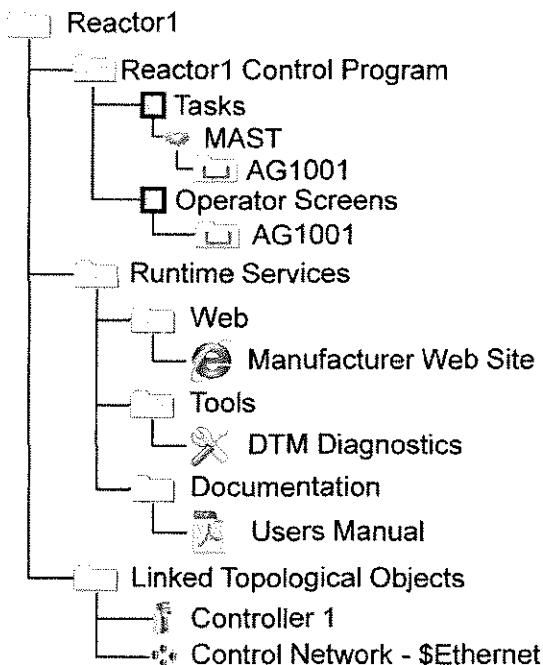
#### A.4.3.12 Runtime Services

The object model, as noted in previous chapters of the document, provides mechanisms to embed additional information into the Functional Modules. This feature provides integrated and user-friendly navigability both to the designers and to the operators, providing access to linked documents such as drawings, diagrams or websites, and also allowing parametrically invocation of external tools at runtime, providing visualization about the Functional Control Modules through a simple mouse action over the associated Supervision object.

Supported services include, depending on the settings made by the designer:

- ✓ Control: Services offered by the control software components, for example, online visualization of Functional Control Modules showing animated real-time data from the operating environment in the particular program section and controller where the selected module is located
- ✓ Web: Links, for instance, to the website of the manufacturer or, if the device allows it, to its diagnostic website
- ✓ Tools: Parametric call of external executables such as FDT containers for DTM software
- ✓ Documents: File viewers relying on their default applications, such as CAD viewers for electrical schematics or document readers for instruction guides
- ✓ Linked control Objects: From the application point of view, access to instances of other Functional Modules linked to the selected object, which may, at the request of the operator, be converted by a mouse action in the new selected object showing its specific runtime services
- ✓ Linked topological Objects: From the topology point of view, hardware instances whose component are linked to the selected object, for example, the controller in charge of its execution or network controllers that drive its information. At the request of the operator, these instances can become the new selected object thus displaying their services available

Client Supervisory station can have available the runtime environment for the purpose of popping up windows where, contextually, the available services from selected Functional Modules is shown similarly to the following conceptual scheme:



The described contents and their descriptions can be easily translated to different languages by the designer, being in charge of the platform the usage of language files in accordance with the Operating System locale on the target machine.

The use of an object oriented database as a global configuration repository keep and maintain all content stored in a single location.

#### A.5 VIJEO HISTORIAN

Vijeo Historian provides an integrated long-term data archiving mechanism designed to store information from multiple disparate SCADA systems. The data store is an embedded Microsoft SQL Server 2012 and can persist thousands of changes per second to the database (depending on hardware and configuration).

The historian collects all changes in the process tag values, as well as alarm activity, from each control system. Each change is saved with a timestamp and quality stamp.

The historian supports redundant control system links. In the event that one link fails, the historian will request the data from the other link to the control system. In the event that the network link to the historian fails, the historian will backfill from the control system's trend and alarm systems to acquire data that it could not acquire in real time.

The historian compresses data by saving only changes in values. For each tag, a deadband is available that will enable small ripples or insignificant changes to be filtered from the data that is stored. To calculate the exact disk requirements, Vijeo Historian provides performance counters that show the number of changes that occur per second and the number of samples logged per second to the database.

The historian leverages the security of SQL Server to enable the user to secure each table, view and function within SQL Server.

The advantages of storing data directly in a SQL Server are evident when accessing the data from external applications. The large number of applications that have SQL connectors assists in making sure your data will be available in most of the applications that you require.

#### Reporting Features

With Vijeo Historian, you can produce a range of reports using a convenient built-in historian in the familiar, open Microsoft user interface which only an embedded Microsoft SQL server makes possible. The combination of the powerful reporting tool and Process Analyst makes it easier for you to make sense of the vast volumes of generated data. The reports can be built using stored procedures and (table value functions) that are defined within the historian database, or can be directly driven by the data in the historized tables.

The stored procedure interfaces enable the data, which is stored only when the data changes, to be returned as a set of time-series data (e.g. 30 second averages). The data can be based on raw values or by interpolating between recorded values.

The (table value functions) also process the raw data with a focus on enabling the data to be grouped. Reporting often requires the maximum of a variable during the production of a product or the total for a set of production runs, or even just the runtime for a device (or all devices) within the system.

These views allow the user to query statistical data, including maximum, minimum, average, total, count or on-time of any variables or conditions. These values can be grouped by time, the value of a tag (such as a batch ID), an event (such as a pump running) or by an alarm (allowing reports for the data preceding each occurrence of an alarm). Views can also provide an alarm summary and alarm event lists.

Reports are generated using Microsoft Reporting Services. By using an industry standard report generation tool, Vijeo Historian reduces the cost of report development training. Reporting Services provides templates for report design, a drag-and-drop environment to extend the base reports and a full-featured reporting system compatible with every other major business.

Once generated, reports are deployed to the Vijeo Historian server and scheduled to run based on an advanced scheduler. Scheduled reports can be sent to managers by email or recorded in a file share. In either case, the user is able to select to receive the report as HTML, PDF or an Excel spreadsheet. In this way, reporting data can act as a secure record or as a starting point for more detailed plant analysis.

Reports are also accessible via web browser. This enables them to be integrated into the Vijeo Historian Web Client, Vijeo Citect or any corporate reporting system.

#### **Data Access via Web and Excel Clients**

Using Vijeo Historian Web Client, you can visualize plant information from your control systems and historian over an intranet simply by using Internet Explorer. Built-in views include time-series line and XY graphs for analyzing analog values over time, Gantt charts for analyzing state changes over time, Pareto charts for analyzing frequency and duration of states, as well as data lists which allow raw plant data to be pasted directly from the web browser into other applications. The Web Client analytical tools can also be used on real-time tags to take snapshots of current values and display them as a real-time trend.

The Vijeo Historian Web Client can also act as a portal to the reports generated by the reporting system. Web pages can also be integrated and viewed within the Vijeo Historian hierarchy.

## A.6 PROCESS EXPERT SYSTEM – HARDWARE SOLUTION

### A.6.1 Master PLC

#### A.6.1.1 PES Controller CPU Module

The CPUs for the Modicon Quantum automation platform are based on high-performance processors with numerous functions included as standard:

- ✓ Superior scan times and fast I/O acquisition
- ✓ Ability to handle interrupts (timed and I/O based)
- ✓ Handling of Fast task, as well as a Master task
- ✓ Memory expansion using PCMCIA cards
- ✓ Multiple communication ports integrated in the CPU
- ✓ Ease of diagnostics and maintenance via the LCD display block on the front panel of high-end CPUs

#### Protected backed up memory

As standard, the CPUs store the application program in a battery-backed internal RAM. This battery is located on the front of the CPU and can be replaced while the CPU is running. A switch enables the application to be made secure against malicious tampering via a remote connection.

It also features a slot for a data storage memory expansion card.

#### A.6.1.2 Hot Standby System

- ☞ The 140CPU67160CPU comprises following on the front panel.
  1. An LCD display cover, providing access to:
  2. A key switch:
    - Unlocked: All system menu operations are able to be invoked and all changeable module parameters are able to be modified by the operator via the LCD and keypad, memory protection is off.
    - Locked: No system menu operations are able to be invoked and all changeable module parameters are read only, memory protection is on.
  3. A backup battery slot.
  4. A reset button (Restart).
  5. An LCD display (2 lines of 16 characters) with brightness and contrast controls.
  6. A 5-button keypad with 2 LEDs (ESC, ENTER, MOD, ↑ , ⇐ )
  7. An RJ45 connector for connecting to the Modbus bus.
  8. A type B female USB connector for connecting the programming PC terminal.
  9. A 9-way female SUB-D connector for connecting to the Modbus Plus network.
  10. Two slots for PCMCIA memory extension cards.
  11. Two LEDs:
    - COM LED (green): Activity on the Hot Standby primary or secondary drop
    - ERR LED (red): Communication error between the Hot Standby primary and secondary drops.

**12. A connector:**

- One MT-RJ fibre optic connector for interconnecting the primary and standby PLCs in *the Hot Standby architecture*

**A.6.1.3 Controller Environmental Conditions**

Characteristics	Value
<i>Operating Temperature</i>	0..60°C
<i>Storage Temperature</i>	-40..85°C
<i>Supply voltage</i>	24VDC / 110-220VAC
<i>Protection Class</i>	IP20
<i>Humidity level</i>	0.. 95% without condensation at 60°C
<i>Atmospheric Pressure</i>	Up to 2000 meters without modifying operation temperature
<i>Approvals</i>	UL508  c UL, CSA 22.2-142, CSA Clase 1 Div 2  Factory Mutual, Clase 1, Div 2

**A.6.1.4 PES Controller Power Supply**

Quantum power supply modules serve two purposes - they provide power to the system rack and protect the system from noise and voltage swings. All power supply modules feature over current and overvoltage protection. They operate in most electrically noisy environments without the need for external isolation transformers.

In the event of an unforeseen loss of power, the power supply modules ensure that the system has adequate time for a safe and orderly shutdown. A power supply module converts the input voltage to regulated + 5 VDC for the requirements of the CPU, the I/O modules and those of all the communication modules installed in the rack.

Three types of power supply module are available, with various input voltage (115/230VAC, 24 VDC, 48/60 VDC and 125VDC) options, for use in local or remote (RIO) architectures:

- ✓ Low power standalone power supply modules
- ✓ High power summable power supply modules
- ✓ High power redundant power supply modules

For this project, we propose to use redundant power supply module 140CPS22400 (24VDC input, 8A output).

This redundant power supply module provides 8A current to the Quantum rack. For high-availability applications, two redundant power supply modules will provide a redundant current of 8 A. If one of the two power supply modules is out of service, the one that remains operational maintains the supply of the required power. Each redundant power supply module has a status bit that can be monitored by the application program or by a supervision system, in order to react quickly if the power supply has a problem. If an additional power supply module is necessary in a configuration with redundant power supply modules, a third redundant power supply module can be added to the rack, increasing the available capacity to 16A. If one of the three power supply modules has technical issues, those which remain operational supply a redundant current of 8A to the rack. If a second power supply module has a problem, power is lost to the rack.

A redundant power supply module can be used as a standalone power supply module.

#### **A.6.1.5 PES Controller Network Adaptor**

The four (4) Ethernet ports of the new cards NOC780 00 Schneider Electric facilitate connection of different networks in ports of the cards, avoiding the use of external switches, making the dimensions smaller control box and prevents use of external elements.

The 140 NOC 780 00 module monitors the functionality of network links depending on which links are connected to the network. The module has 4 external ports, with up to three IP addresses. The SERVICE/EXTEND port (Port1) allows the diagnosis of Ethernet ports and provides access to external tools and devices (Unity Pro, ConneXium Network Manager, HMI, etc.). The INTERLINK port (port 2) provides connectivity to other Quantum EIO head modules on the local rack. The CTRL network ports (Ports 3, 4) provide connectivity for device network connections & support star, loop & mesh topologies.



4 Port RJ45 but only 1 IP addresses

- Port 1 service port. Access port, port mirroring, disabled.
- Port 2 interlink
- Port 3 Device network.
- Port 4 Device network.

**A.6.1.6 PES Controller ERIo Head Module**

The main objective of 140 CRP 312 00 module is to provide I/O scanning services for remote I/O devices or networks with remote I/O or distributed I/O. The module is connected directly to the main ring network I/O remote and controls network I/O remote via a loop topology daisy chain. This Ethernet module provides various services, such as settings for the I/O remote diagnostics.

You can use the following function blocks with the 140 CRP 312 00:

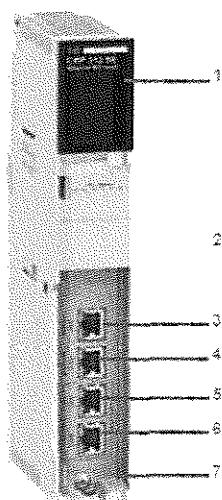
- ✓ IU\_ERIO
- ✓ STATION
- ✓ XDROP

You can only set a 140 CRP 312 00 in the local drop. This module interfaces to communicate with devices I/O Remote Ethernet network.

The 140 CRP 312 00 allows the CONTROLLER to connect to an Ethernet network and have and deterministic exchange with the modules stations I/O remote Ethernet.

Other services module 140 CRP 312 00 are:

- ✓ The module uses RSTP to enable all the I/O remote in the main ring to repair communication breakdowns in less than 50 ms.
- ✓ The module can set IP parameters and configurations of I/O in stations up to 31 devices I/O remote.
- ✓ The module provides a communication path (through an interface) that enables I/O distributed networking and traffic control network participate in the E / S remote.
- ✓ The module supports Hot Standby functionality. The 140 CRP 312 00 primary and 140 CRP 312 00 module standby not exchange their IP addresses when a switchover occurs.



1. Display information on the CRP module status
2. Service port to connect with external devices such as a PC with Unity
3. Interconnect interlink cable to connect to other Ethernet cards
4. Network equipment used for interconnection with the Erio
5. Network equipment used for interconnection with the Erio
6. Removable door

This is a mandatory module for the Quantum Hot Standby system to function. For this project, the Master PLCs which are supplied in a Hot standby configuration, do not have I/O modules attached. Hence the CRA 312 00 module is not connected to any device.

#### A.6.2 Pipeworks PLC

##### A.6.2.1 PES M340

The Modicon M340 (Programmable Automation Controllers) feature openness, flexibility, robustness and sustainability. The M340 are designed with an Ethernet backbone to optimize connectivity and communications. They support X80 common I/O modules which can be easily integrated into its architecture. The powerful processors offer high levels of computation for complex networked communication, display and control applications.

##### A.6.2.2 PES M 340 Controller

The controller proposed for the pipeworks PLCs is BMXP342000, which is a CPU from the M340 family. The controller is placed in the first slot of an X80 rack. This controller supports local I/O, remote I/O, & distributed I/O. The following are the main characteristics of this CPU:-

Range of product	Modicon M340 automation platform
Ambient air temperature for operation	0...60 °C
Relative humidity	10...95 % without condensation
Product or component type	Processor module
Number of racks	1
Number of slots	11
Discrete I/O processor capacity	1024 I/O single-rack configuration
Analogue I/O processor capacity	66 I/O single-rack configuration 256 I/O multi-rack configuration
Number of application specific channel	36
Monitoring	Event Counters Modbus Diagnostic counters Modbus
Integrated connection type	USB port 12 Mbit/s Non isolated serial link RJ45 Modbus master/slave RTU/ASCII asynchronous in baseband RS485 half duplex 0.3...19.2 kbit/s 1 twisted shielded pair Non isolated serial link RJ45 Modbus master/slave RTU/ASCII asynchronous in baseband RS232C half duplex 0.3...19.2 kbit/s 1 twisted shielded pair Non isolated serial link RJ45 character mode asynchronous in baseband RS485 half duplex 0.3...19.2 kbit/s 1 twisted shielded pair Non isolated serial link RJ45 character mode asynchronous in baseband RS232C full duplex 0.3...19.2 kbit/s 2 twisted shielded pairs
Communication module processor	4 AS-Interface module 2 Ethernet communication module
Number of devices per segment	0...32 Modbus 0...32 character mode
IP degree of protection	IP 20

#### A.6.2.3 PES M 340 Power Supply

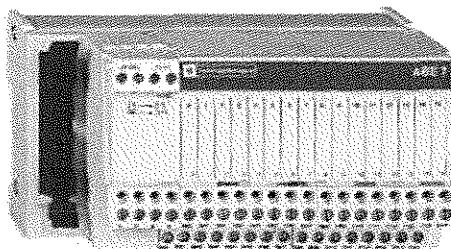
We have considered High power Isolated 24-48 VDC Rack Power Supply( BMXCPS 3020) from M-340 family.

#### A.6.2.4 PES M340 Digital Mixed Module

For this project, we propose to use the digital mixed module BMXDDM3202K. The functional characteristics of this module are:

Input Signal Type	24VDC, Positive Logic (Sink type)
Modularity	16 isolated inputs and 1 common
Current per channel	2.5mA
Sensor Power Supply	19...30VDC
IEC/EN 61131-2 conformity	Type 3
Sensor compatibility IEC/EN 60947-5-2	2-wire DC, 3-wire DC PNP any type
Other features	Reverse polarity protection
Output Signal Type	Transistor output, 24VDC, Positive Logic (Source type)
Modularity	16 protected outputs and 1 common
Current per channel	0.1A
Pre-actuator Power Supply	19...30VDC
IEC/EN 61131-2 conformity	Yes
Other features	Configurable output fallback, continuous monitoring of output control and resetting of outputs in case of internal fault

The telefast sub-base ABE7H16S21 is proposed to be used alongwith the digital mixed module for field termination of the input signals.

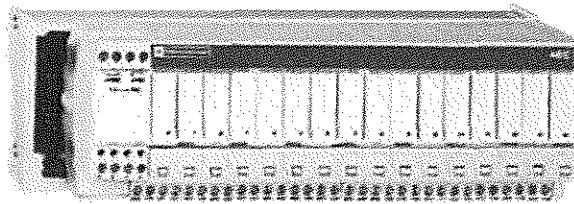


The main functional characteristics of this base are:

Product type	Passive discrete I/O sub-base
Rated supply voltage	19...30VDC conforming to IEC61131-2
Number of Channels	16, with switch disconnector per channel

Terminals per Channel	2
Status LED	1 LED per channel, green for channel status 1 LED, green for power ON

The telefast sub-base ABE7P16T334 is proposed to be used alongwith the digital mixed module for field termination of the output signals.

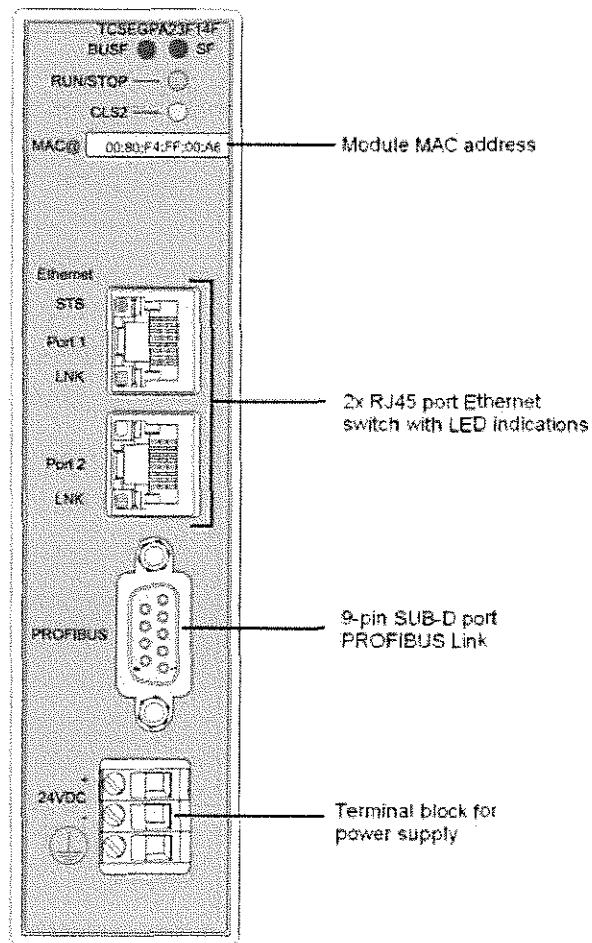


The main functional characteristics of this base are:

Product type	Passive discrete I/O sub-base
Rated supply voltage	19...30VDC conforming to IEC61131-2
Number of Channels	16, with fuse per channel
Terminals per Channel	3
Removable Relay Type	Electromechanical, ABR7S33
Contact Type	1C/O
Contact rating	10 A (Ith)
Status LED	1 LED per channel, green for channel status 1 LED, green for power ON

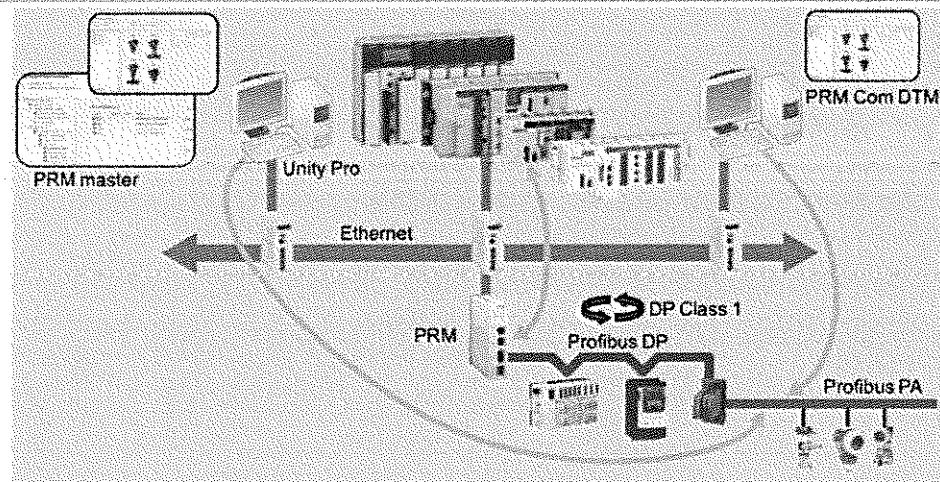
#### A.6.2.5 PES M340 Profibus DP Gateway

For this project, we propose to use the Standard version Profibus Remote Master module TCSEGPA23F14F.



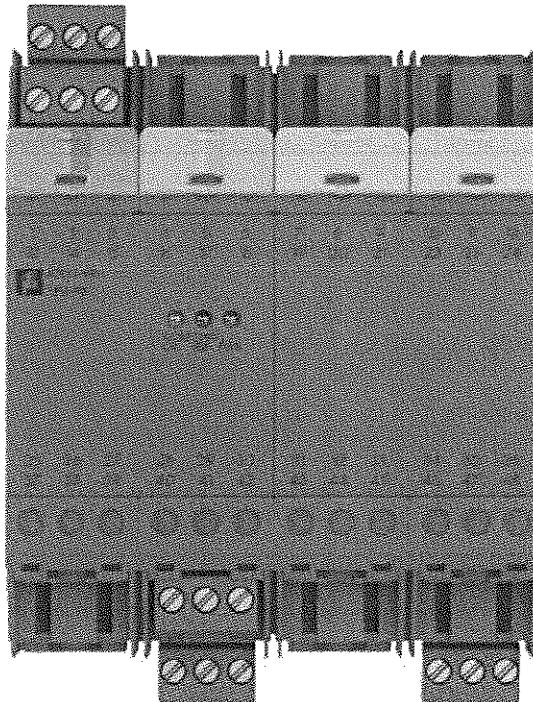
The Profibus Remote Master (PRM) module is connected to the Ethernet Modbus TCP/IP network via its integrated 2-port switch, as close as possible to the process and the instrumentation. The communication between the M340 controller and the Profibus Remote Master, is performed with the NOC Modbus TCP/IP I/O Scanning service. The purpose of this service is the exchange of information, and monitor that this communication is active and properly executed.

The PRM module is open to Asset Management tools. A dedicated communication DTM is supplied with the product, thus allowing any compatible FDT standard tool to remotely adjust devices on Profibus using Ethernet.



#### A.6.2.6 Profibus DP/PA Coupler

For this project, we propose to use the Profibus DP/PA Segment Coupler from Pepperl+Fuchs.



This "Segment Coupler 1" or SK1 is an all-in-one gateway and fieldbus power supply for connecting PROFIBUS PA to PROFIBUS DP transparently. It powers a single PROFIBUS PA segment adapting current and voltage. Power output is designed for long cable lengths and device counts suiting the needs of most fieldbus applications. Fieldbus couplers provide explosion protection for live work at the spur where needed. Transparent coupling

means that each PA slave is directly addressed and configured from the PROFIBUS DP master. The gateway itself is configuration free. A DTM enables setup of communication and offers several status and diagnostic functionalities. SK1 supports any DP master at a fixed transmission speed of 93.75 kbps.

#### A.6.2.7 Panel-Mounted HMI

For this project, we propose to use the Magelis GTW series HMI. We propose to use the 15" display HMI GTW7354. The main characteristics of the proposed HMI are:-

Screen Definition	1024 x 768 pixels, 16M colors
Screen Type	15" color Active matrix colour TFT, LED backlit,
Terminal type	Touch screen Display
Touch panel	Analogue resistive
Operating System	Windows Embedded Standard WES2009 - English
Pre-installed software	Adobe PDF reader Internet Explorer Vijeo Citect web client .NET Framework 3.5 Viewer Word/Excel/Power Point Vijeo Designer run time unlimited
Memory	SRAM, 512 kB RAM DDR2, 1 GB
Storage	SD card and x2 CFast
Ports	Ethernet: x2 RJ45 10BASE-T/100BASE-TX/1000BASE-T Serial Line: RJ45 RS485 (COM1) + SubD9 RS232/RS485/RS422 (COM2) Fieldbus: Modbus Plus via USB Gateway USB: 6
Discrete I/O	Terminal block with 1 speaker + 1 alarm + 1 buzzer output
Multimedia I/O	1 Microphone input + 1 DVI output
Rated Power Supply	24VDC
Supply Voltage Limits	18-30 V
Power Consumption	36W

#### A.6.3 Major Cabinet Characteristics

The enclosures offered are from Schneider Electric Spacial SF having a unique design ensuring greater robustness, practicality, reliability, comfort, aesthetics, simplicity, convenience, accessibility and rapidity.

The Spacial SF enclosures are characterized by:

- ✓ Enclosures compliant with international standard IEC 62208 for empty enclosures for low-voltage switchgear and controlgear assemblies.

- ✓ IP55 enclosure, IK10 for plain door.
- ✓ The structure is made from profiled and laser-welded galvanised steel, with vertical and horizontal cut-outs with a pitch of 25 mm.
- ✓ Doors made from folded and welded steel, 120° opening, hinges with captive pin made from zamak and handle lock with 5-mm double-bar insert.

For this project Schneider Electric has offered assembled enclosures with plain door, with front & rear access, painted with epoxy-polyester resin, textured RAL 7035 grey, with galvanised steel mounting plates. The size of the panels offered is 2000mm (H) x 1000mm(W) x 800mm (D).

The Panel shall be powered by 230V AC, 50Hz Supply which is recommended to be from a UPS. Our offer does not include UPS System as part of our scope.

Our cabinets are supplied with all basic services,

- ✓ Fan & Filter for panel ventilation.
- ✓ Internal Panel Light.
- ✓ Door Limit Switch.
- ✓ Utility Sockets.
- ✓ Drawing Pockets.
- ✓ Door Handle & Lock Insert.

The front mounting plate is used to mechanically secure the following components:-

- ✓ PLC racks
- ✓ Communication Devices (Ethernet, Profibus DP/PA)
- ✓ Protective devices for alternating current and direct current.
- ✓ Power supplies (redundant)
- ✓ Telecom equipment (Ethernet switches)

The rear mounting plate, termed the marshalling cabinet, contains all the field termination adaptors, which is achieved through the use of Telefast sub-bases in our project.

All cables inside the cabinet are routed through flame retardant PVC ducts.

## **SECTION-B:ENGINEERING SERVICES & RESPONSIBILITIES**

Schneider Electric has broken out the Scope of Work into three sections of responsibility.

- ☛ Schneider Electric Responsibilities
- ☛ Assumptions
- ☛ Client/End User Responsibilities

These sections define the scope and content of what Schneider Electric will provide for the project. Following Section outlines the specific services to be provided by Schneider Electric under this proposal.

## **B.1 SCHNEIDER ELECTRIC RESPONSIBILITIES**

### **B.1.1 Engineering Services**

Engineering Services proposed for this project by Schneider Electric are presented in a modular format to give a better understanding of which services are to be performed. These services cover only those which are specifically mentioned in this proposal.

The engineering and services work includes for the following functional areas:

- ☛ Functional Design Specification.
- ☛ Design and supply of the Cabinet.
- ☛ Design and supply of control system software
- ☛ Simulation and Factory Acceptance Testing.
- ☛ Documentation, As-Built Drawings and Manuals.
- ☛ Commissioning and Site Acceptance Testing.

Indirect Costs:

- ☛ Project Management and Quality Assurance
- ☛ Project Review Meetings
- ☛ Factory Acceptance Testing Supervision

### **B.1.2 Services Offered**

#### **B.1.2.1 Project Management**

Our offer allows for Project Management responsible for the management, co-ordination, supervision and execution of all the activities relating to the Contract Works relevant to Schneider scope of works.

Schneider will appoint a Project Manager as a single point of liaison between your nominated representative/s and Schneider. The Project Manager will coordinate all works within project team, attend applicable project meetings and provide reports as required by Client.

#### **B.1.2.2 Engineering Services**

##### **Design Services**

Design and engineering for the Control System as per the scope of work will include all conceptual, systems engineering, system integration and detailed manufacturing design for all systems provided under Schneider scope of works.

Design services will include:

- ☛ Project Progress & Design review meetings
- ☛ Functional Design Specification for Control system from your process description
- ☛ Drawings such as: general arrangements & System Architecture
- ☛ Engineering Test sheets, ITPs.
- ☛ PLC Software Engineering.

#### Functional Specification

The hardware and software Functional Specification is a document detailing all the system interfaces and clearly describing in text the required operation of the system. We would develop this document after receiving your design inputs as identified in this offer. We have allowed for attendance at Design and Review Meetings for design discussions with Client.

The Functional Specification will detail the Control System software objects to control each device type, and these standard objects will be used for all applications on the project. The Functional Specification will include details of the III<sup>rd</sup> party Interface etc.,

During the first phase of the project, Schneider Electric will produce specifications which will describe how they intend to implement the control system. The applicable Functional Specification sections would be submitted to client for approval, prior to commencement of construction / programming. This would serve as the reference for the application software. Supporting documentation such as drawings etc would be included where appropriate.

The validation of Functional Specifications by the client will be considered as a critical phase of the project as Schneider Electric will not proceed to the next phase of the project until the Software Design Specifications / Hardware Design Specifications have been signed off by the client. In compliance with Schneider Electric quality procedures, it is expected that the Functional Specifications document will be used as the basis of the test documents for FAT, SAT and commissioning activities.

This offer includes the preparation of a functional specification to client supplied design inputs.

#### Hardware Engineering

- ☛ Equipment Panel layout
- ☛ Cabinets BOM

All drawings shall be prepared in AutoCAD Software and unless otherwise specified all the drawings & documents will be in English Language only.

#### Software Engineering

This offer includes the development of software required to operate the control system to meet the functional requirements of this project. This will include configuration of the control system to control hardwired I/O and communicate to III<sup>rd</sup> party devices and instruments.

Further interfaced I/O and changes to the control system functionality would need to be reviewed for the impact on the control system scope and project timeline for delivery impact.

#### **B.1.2.3 Pre-FAT & Factory Acceptance Testing (FAT)**

Prior to commencing the FAT, 100% internal testing (Pre-FAT) will be done in our facility, which includes, verifying the completeness of the panel, IO loop testing, application program testing, communication interfaces etc.,

After successful completion of the Pre-FAT, the test reports will be submitted to client for review and detailed FAT procedure will be submitted to the contractor before commencement of the FAT as per the agreed schedule by both parties.

The Factory Acceptance Test will be witnessed by the contractor / client personnel and the testing includes the following,

- ☛ Hardware physical inspections for completeness, safety, finish, correct labeling, conformity with arrangement and layout drawings.
- ☛ Power rating for all the components.
- ☛ Demonstration of correct operation of all inputs and outputs by using simulator panels & 4-20mA sources.
- ☛ Demonstrations of correct control algorithms and communications as per the approved FDS and control philosophy.

A FAT report detailing all the tests along with any punch list will be issued at the end of the test, to be signed by each party.

FAT will be carried out at our Schneider Electric, Technopark Facility in UAE. All expenses for Client towards Boarding, Lodging, Visa, Local Transportation is not included as part our scope.

#### **B.1.2.4 Integrated FAT (IFAT)**

Integrated FAT for any other third party system at our works (or) at III<sup>rd</sup> party supplier works is not included in our offer.

### **B.2 ASSUMPTIONS / EXCLUSIONS**

#### **B.2.1 Assumptions**

1. The specification makes extensive use of the following two terms:  
    Contractor: Indicates the party to which this specification is addressed  
    Vendor: Schneider Electric and its approved subcontractors
2. Kindly note reference to these terms in particular in the Assumptions, Exclusions and Compliance sections.
3. The quoted price by Schneider Electric is for the scope of work & Bill of materials specified in the offer. Any excess in quantity/scope will be priced on unit rate.
4. System designs to be approved by clients appointed authority before they are wired. Client Approval cycles to be agreed to a recommended 2 weeks for project plan adherence purposes.
5. Clients appointed authority would provide personnel to work with Schneider Electric to understand plant design.
6. A number of initial documents including, P&ID and templates to be adopted for this work shall be submitted during kick off meeting.
7. Project timing is subject to "Approved for construction" drawings, P&ID and other documents necessary for the commencement of work and ordering of material.

8. All modifications and changes to the I/O count, signal types, and system configuration resulting from alterations from the Client and affecting the deliverables of this proposal are not included and shall be considered as variations.
9. All modifications and changes to the instruments schedule resulting from alterations from the Client and affecting the deliverables of this proposal are not included and shall be considered as variations.
10. It is assumed that Client will arrange for all local authorizations/permissions required.
11. All the permits required at all sites to carry out the works to be arranged by Client.
12. This offer is purely based on the reference under section 1.1, offer is subject to change based on the actual layout design.

#### **B.2.2 Exclusions**

1. Any kind of Installation works are not in our scope.
2. Unloading & Storage of the panels at site is not in our scope.
3. Supply & Installation of Field Instruments, excluding supply of decoders & surge protection devices.
4. All Civil and Mechanical works including excavation, sand padding, back filling of cable trenches.
5. Supply, laying and Installation of Field Control Cables (Outside the panels), Power Cables, Fiber Optic Cables, Cable trays, Conduits and other related accessories.
6. Supply & Laying of Splicing Works, Patch Panels etc.
7. Any type of Structured Cabling / LAN Works.
8. Earthing of the system (However provision shall be provided in our Control panel).
9. 3rd Party Design Consultancy or Testing & Inspection.
10. Any 3<sup>rd</sup> party Certification Agency.
11. Any Local authority approval.
12. Supply of UPS is not in our scope
13. Supply of Telecom equipment is not in our scope

### **B.3 CLIENT-END-USER RESPONSIBILITIES**

#### **B.3.1 Single Point of Contact**

Client/End-user will designate a representative authorized to act in the plant on behalf of client/end-user with respect to this project. This representative should have a basic knowledge of the RTU, HMI, Instrumentation and Electrical system.

#### **B.3.2 Maintenance Staff and Technician**

Client/End-user will provide maintenance personnel knowledgeable in the process operation and control system installation during start-up activities.

#### **B.3.3 Access to the System**

Contractor will make the process available to Schneider Electric engineers during the mutually agreed schedule for the purpose of implementing the services and equipment described in this proposal.

#### **B.3.4 Proposal Specific Customer Responsibilities**

Every reasonable effort must be made on the part of Client/End user to provide Schneider Electric with all pertinent system information in an expedient manner after the order is released.

#### B.4 ACCEPTANCE

The following criteria, whether functional or operational, shall define the acceptance of this work or system by Contractor and Schneider Electric.

##### B.4.1 Acceptance Criteria

Schneider Electric in conjunction with Contractor will produce a Functional Design Specification (FDS) which will be agreed in writing by both parties. Compliance with this FDS will be the basis for all design and programming

##### B.4.2 Acceptance Test Procedure

1. System Architecture Approval
2. Panel Drawings Approval
3. BOQ Approval
4. Factory Acceptance Test
5. Site Acceptance Test

The Plantwide SCADA Automation for Construction of Mega Reservoir PRPS 01-05 will be considered as completed by Contractor and Schneider Electric when the items listed in the Acceptance Test Procedures have been accomplished.

#### B.5 SCOPE MATRIX

SCOPE MATRIX				
S. No	Description	Included	Excluded	Remarks
1.	Design, Engineering Panel Manufacturing	✓		
2.	SCADA & HMI Graphics Development	✓		
3.	PLC Programming	✓		
4.	FAT at our works	✓		
5.	Delivery		✓	EXW Jebel Ali
6.	Customs Duty		✓	
7.	Training	✓		
8.	Supply of Field Instruments		✓	
9.	Installation / Installation Accessories for the Field instruments		✓	
10.	Site Services (Supervision, Commissioning)	✓		On manday rate basis
11.	SAT (Part of Commissioning)	✓		Included in site services
12.	Installation of the System. However installation supervision for the supplied system is included		✓	
13.	Supply & Installation of Field Signal cables,		✓	

<b>SCOPE MATRIX</b>				
<b>S. No</b>	<b>Description</b>	<b>Included</b>	<b>Excluded</b>	<b>Remarks</b>
	Power Cables (Outside the Cabinets)			
14.	Field Junction Boxes		✓	
15.	Third Party Inspection		✓	
16.	UPS		✓	

**Note 1:** Such obtained permits shall be provided to Schneider Electric in due time. If delays were due by the late obtaining of permits, the deadline of prospect would be delayed accordingly. Site readiness and access to sites are the responsibility of the purchaser and outside the scope of Schneider Electric.

**Note 2:** Schneider Electric's responsibility is restricted to the scope of work & services offered as detailed in the current document, and the associated Bill of Quantities and responsibility matrix. Schneider Electric reserves the right to modify its offer if actual requirement are different from the assumptions.s