

GRUNDFOS MOTORS



ML NEMA 3 phase 1/3 - 10 HP

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GRUNDFOS 

# Grundfos motors in a class of their own

Grundfos is one of the world's leading manufacturers of pumps and pumping equipment. Therefore, high-quality electric motors are a natural priority for us. For decades, we have been manufacturing our own motors that match the very high standard of our pumps for applications in building services, industry and water supply.

The Grundfos manufactured ML NEMA motors are available in three phase and sizes from 1/3 to 10 HP, dual nameplated with both 60 and 50 Hz data.

The motors have smooth shaft ends and are suitable for the Grundfos CR, TP and LP pumps.

## UL Recognized Component

Grundfos ML NEMA motors are extremely reliable, high-efficiency motors, designed and built in accordance with the NEMA MG1 standards. The motors are equipped with NEMA standard C-face flanges and nameplates, and they fully comply with the NEMA standards for service factor and technical data.

The Grundfos ML NEMA motors are recognized under the Component Recognition Program of Underwriters Laboratories Inc. for the United States and Canada.



## UNIQUE FEATURES

The ML NEMA motors are equipped with a reinforced bearing system with locked bearings at the drive end. This ensures an even uptake of the load in order to maximize the lifetime of the bearings, which are guaranteed for a minimum of 18,000 hours service life. All models are inverter ready, and models from 5 HP and larger have a built-in thermistor arrangement.



The motors are "cool running" motors, i.e. class B temperature rise for class F insulation system.

Additional advantages of the ML NEMA motors are low noise level, and stainless steel outer screws and bolts. Heavy models are equipped with eyebolts for easy handling. As a standard, all models are fitted with drain holes (closed on delivery). The exterior surfaces of the motors are electro coated for superior corrosion resistance.

## Product range

Standard motor range - 3 phase					
Grundfos P/N	Voltage	HP	ML type designation	NEMA frame/flange	NEMA efficiency
85900700	208-230/460	1/3	ML71AA	56C	not defined
85900701	208-230/460	1/2	ML71AB	56C	not defined
85900702	208-230/460	3/4	ML71BA	56C	not defined
85900703	208-230/460	1	ML71BB	56C	Premium
85900704	208-230/460	1 1/2	ML80BA	56C	Premium
85900705	208-230/460	2	ML90CC	56C	Premium
85900711	208-230/460	3	ML90CB	56C	Standard
85900712	208-230/460	3	ML90CB	182TC	Standard
85900713	208-230/460	5	ML100BC	182TC	Standard
85900714	208-230/460	7 1/2	ML132AB	213TC	Standard
85900715	208-230/460	10	ML132CA	213TC	Standard

NEMA premium motor range - 3 phase					
Grundfos P/N	Voltage	HP	ML type designation	NEMA frame/flange	NEMA efficiency
85900706	208-230/460	3	ML90FA	182TC	Premium
85900707	208-230/460	5	ML112AA	182TC	Premium
85900708	208-230/460	7 1/2	ML132DA	213TC	Premium
85900709	208-230/460	10	ML132EB	213TC	Premium

## EPAct high-efficiency motors

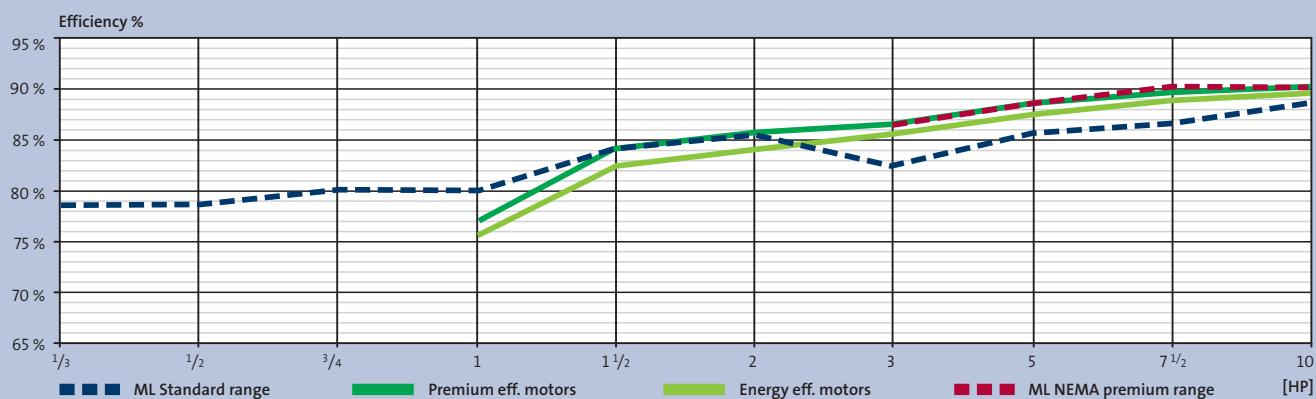
Some motor manufacturers have indiscriminately used the term "high efficiency" for years. In order to counteract this, the US Congress adopted the Energy Policy Act of 1992 (EPAct), effective from October 24th, 1997.

The aim of this act is to reduce energy consumption in the US by requiring the use of energy-efficient products. In order to accomplish this goal, EPAct stipulates that most industrial motors, imported or produced for sale in the US, must meet the minimum efficiency requirements defined in the EPAct list (covering motors from 1-200 HP, 2, 4, and 6 poles). Although footless C-face motors are not covered by this legislation, more and more companies are looking for higher efficiencies in the products they purchase or maintain.

### Environment friendly

High-efficiency motors mean reduced energy consumption and, consequently, reduced harmful influence on the environment. Obviously, reduced energy consumption also means reduced operating costs, which is a vital consideration for modern industry.

Although the EPAct regulations do not require footless C-face motors to meet these efficiency guidelines, the Grundfos ML NEMA 1-10 HP motor range is available in models that not only comply with the EPAct efficiency standards, but meet the even more stringent NEMA Premium efficiency standards.



# Bearings

The ML NEMA motors are equipped with a reinforced bearing system with locked bearings at the drive end, either a deep-groove ball bearing or an angular-contact bearing depending on the motor model. This ensures an even uptake of the load in order to maximize the lifetime of the bearings, which are guaranteed for a minimum of 18,000 hours service life. At the non-drive end, the motors are fitted with bearings with axial clearance in order to meet production tolerances while allowing for thermal expansion during motor operation. This ensures trouble-free operation and long life.

Grundfos uses only high-quality bearings from the world's leading manufacturers. These include:

- **SKF AB** (Sweden)
- **NSK Corporation** (Japan)
- **NTN Bearing Corporation** (Japan)
- **FAG Kugelfischer AG & Co KG** (Germany)
- **INA Schäffler KG** (Germany)

These manufacturers all comply with international standards, which means that replacement bearings are readily available throughout the world and the bearings are fully interchangeable regardless of make.

## Bearing size overview

Grundfos product number	Output $P_2$ [HP]	ML type designation	NEMA frame/ flange	Bearing sizes	
				Drive end	Non-D end
85900700	1/3	ML71AA	56C	6304	6201
85900701	1/2	ML71AB	56C	6304	6201
85900702	3/4	ML71BA	56C	6304	6201
85900703	1	ML71BB	56C	6304	6201
85900704	1 1/2	ML80BA	56C	6304	6201
85900705	2	ML90CC	56C	6306	6205
85900711	3	ML90CB	56C	6306	6205
85900712	3	ML90CB	182TC	6306	6205
85900713	5	ML100BC	182TC	7306	6205
85900714	7 1/2	ML132AB	213TC	7308	6206
85900715	10	ML132CA	213TC	7308	6206

Grundfos product number	Output $P_2$ [HP]	ML type designation	NEMA frame/ flange	Bearing sizes	
				Drive end	Non-D end
85900706	3	ML90FA	182TC	6306	6205
85900707	5	ML112AA	182TC	7306	6206
85900708	7 1/2	ML132DA	213TC	7308	6206
85900709	10	ML132EB	213TC	7308	6206



# Sound pressure

In electric motors, the cooling fan is normally the main source of noise. Because high-efficiency motors have reduced power consumption, less cooling air is needed to maintain the motor temperature. This allows for a smaller cooling fan, which in turn produces less noise.

## Sound pressure levels

Grundfos complies with the following rules relating to sound pressure:

- The sound power is measured according to EN ISO 3743-2.
- The sound power is converted to a mean sound pressure at 3.3 feet (1 m) distance from the test object by means of EN ISO 11203 – method Q2.
- The values for both 50 and 60 Hz have a tolerance of 3 dB[A] according to EN ISO 4871, which is not added to the values in these tables.

## Standard pump-motor range

ML type designation	60 Hz sound pressure level		50 Hz sound pressure level	
	Output P <sub>2</sub>	Sound pressure level dB[A]	Output P <sub>2</sub>	Sound pressure level dB[A]
	[HP]	*Lpa at 3.3 feet distance	[kW]	*Lpa at 3.3 feet distance
ML71AA	1/3	55	0.25	50
ML71AB	1/2	56	0.37	51
ML71BA	3/4	56	0.55	51
ML71BB	1	56	0.75	51
ML71BA	1 1/2	56	1.10	51
ML90CC	2	60	1.50	57
ML90CB	3	60	2.20	55
ML90CB	3	60	2.20	55
ML100BC	5	65	3.70	60
ML132AB	7 1/2	65	5.50	60
ML132CA	10	65	7.50	60

## NEMA premium pump-motor range

ML type designation	60 Hz sound pressure level		50 Hz sound pressure level	
	Output P <sub>2</sub>	Sound pressure level dB[A]	Output P <sub>2</sub>	Sound pressure level dB[A]
	[HP]	*Lpa at 3.3 feet distance	[kW]	*Lpa at 3.3 feet distance
ML90FA	3	60	2.20	55
ML112AA	5	65	3.70	60
ML132DA	7 1/2	65	5.50	60
ML132EB	10	65	7.50	61

\*Reference: 20 micro pascal, airborne



# Electrical data

## 2-pole motors 60 Hz, 208 V

Standard motor range				Voltage: 208 V													
ML type designation	Output $P_2$ [HP]	Service factor	NEMA Efficiency	Full load current	SF current	Power Factor (Cos Phi) by load				Efficiency ( $\eta$ ) by load				Speed	General speed-torque characteristics		
				[A]	[A]	50 %	75 %	100 %	125 %	50 %	75 %	100 %	125 %	RPM	Locked rotor current $I_s/I_N$ [%]	Locked rotor torque $M_s/M_N$ [%]	Breakdown torque $M_B/M_N$ [%]
ML71AA	1/3	1.35	nd*	1.12	1.50	0.62	0.74	0.81	0.86	72.5	77.5	78.5	78.0	3450	630	300	370
ML71AB	1/2	1.25	nd*	1.64	2.00	0.66	0.78	0.84	0.88	74.5	78.0	78.0	76.0	3430	590	250	330
ML71BA	3/4	1.25	nd*	2.40	2.90	0.66	0.78	0.84	0.88	76.5	79.0	79.0	77.0	3430	590	250	330
ML71BB	1	1.25	Premium	3.25	4.00	0.62	0.74	0.81	0.86	78.5	81.0	81.0	80.0	3430	590	300	360
ML80BA	1 1/2	1.15	Premium	4.70	5.20	0.64	0.77	0.84	0.88	82.0	83.5	83.0	81.5	3450	720	300	360
ML90CC	2	1.15	Premium	5.70	6.55	0.75	0.84	0.88	0.90	82.0	84.0	84.5	83.5	3480	810	290	350
ML90CB	3	1.15	Standard	8.90	10.4	0.75	0.83	0.87	0.88	81.5	83.0	82.5	80.0	3470	680	290	350
ML90CB	3	1.15	Standard	8.90	10.4	0.75	0.83	0.87	0.88	81.5	83.0	82.5	80.0	3470	680	290	350
ML100BC	5	1.15	Standard	14.2	16.0	0.75	0.84	0.88	0.90	83.5	85.0	84.5	83.5	3480	770	300	370
ML132AB	7 1/2	1.15	Standard	21.0	24.0	0.71	0.82	0.87	0.90	83.5	85.5	86.0	85.5	3480	770	300	400
ML132CA	10	1.15	Standard	28.0	32.0	0.68	0.79	0.86	0.89	87.5	89.0	89.0	88.5	3500	860	350	420

NEMA premium motor range				Voltage: 208 V													
ML type designation	Output $P_2$ [HP]	Service factor	NEMA Efficiency	Full load current	SF current	Power Factor (Cos Phi) by load				Efficiency ( $\eta$ ) by load				Speed	General speed-torque characteristics		
				[A]	[A]	50 %	75 %	100 %	125 %	50 %	75 %	100 %	125 %	RPM	Locked rotor current $I_s/I_N$ [%]	Locked rotor torque $M_s/M_N$ [%]	Breakdown torque $M_B/M_N$ [%]
ML90FA	3	1.15	Premium	8.40	9.50	0.79	0.86	0.89	0.91	85.0	86.5	86.0	85.0	3510	940	330	410
ML112AA	5	1.15	Premium	13.8	15.6	0.75	0.85	0.89	0.91	86.0	87.5	87.5	87.0	3520	900	330	410
ML132DA	7 1/2	1.15	Premium	20.4	23.0	0.75	0.84	0.89	0.91	87.5	89.0	89.0	88.0	3520	940	340	450
ML132EB	10	1.15	Premium	26.5	30.5	0.76	0.85	0.89	0.91	88.0	89.5	90.0	89.5	3510	900	310	390

\*not defined



## 2-pole motors 60 Hz, 230/460 V

Voltage: 230/460 V															
Full load current	SF current	Power Factor (Cos Phi) by load				Efficiency (eta) by load				NEMA eff.	Speed	General speed-torque characteristics			Torque
[A]	[A]	50 %	75 %	100 %	125 %	50 %	75 %	100 %	125 %	100 %	RPM	Locked rotor current $I_s/I_N$ [%]	Locked rotor torque $M_s/M_N$ [%]	Breakdown torque $M_{B^P}/M_N$ [%]	$M_N$ [lbf-ft.] @ 460 V
1.10/0.55	1.45/0.75	0.55	0.67	0.75	0.81	73.5	78.0	80.0	80.0	78.5	3480	700	370	450	0.516
1.55/0.78	1.90/0.95	0.58	0.70	0.78	0.84	75.0	78.5	79.5	79.0	78.5	3460	650	300	400	0.767
2.30/1.20	2.75/1.40	0.57	0.70	0.78	0.83	75.5	79.5	80.0	79.0	80.0	3460	650	300	400	1.15
3.35/1.68	3.90/1.95	0.47	0.61	0.72	0.78	76.0	80.0	81.0	80.5	80.0	3460	650	360	440	1.50
4.60/2.30	5.10/2.55	0.53	0.66	0.75	0.82	81.0	83.5	84.0	83.5	84.0	3480	800	370	440	2.29
5.40/2.70	6.10/3.05	0.68	0.79	0.84	0.88	82.5	85.0	85.5	85.5	85.5	3510	900	360	430	2.99
8.50/4.25	9.50/4.75	0.65	0.76	0.81	0.85	82.0	84.0	84.0	83.0	82.5	3500	750	360	430	4.54
8.50/4.25	9.50/4.75	0.65	0.76	0.81	0.85	82.0	84.0	84.0	83.0	82.5	3500	750	360	430	4.54
14.0/7.00	15.4/7.80	0.60	0.72	0.80	0.85	83.0	85.5	86.0	85.5	85.5	3510	850	370	450	7.52
21.5/10.8	23.5/11.8	0.54	0.68	0.77	0.83	84.5	87.0	87.5	87.5	86.5	3510	850	370	490	11.2
28.5/14.4	31.5/16.0	0.53	0.67	0.76	0.82	86.5	89.0	89.5	89.5	88.5	3520	950	430	520	15.0

Voltage: 230/460 V															
Full load current	SF current	Power Factor (Cos Phi) by load				Efficiency (eta) by load				NEMA eff.	Speed	General speed-torque characteristics			Torque
[A]	[A]	50 %	75 %	100 %	125 %	50 %	75 %	100 %	125 %	100 %	RPM	Locked rotor current $I_s/I_N$ [%]	Locked rotor torque $M_s/M_N$ [%]	Breakdown torque $M_{B^P}/M_N$ [%]	$M_N$ [lbf-ft.] @ 460 V
7.70/3.90	8.60/4.30	0.72	0.81	0.86	0.89	86.0	87.5	87.5	87.0	86.5	3530	1040	400	500	4.50
13.0/6.50	14.6/7.30	0.65	0.77	0.84	0.86	85.0	87.5	88.5	88.0	88.5	3540	990	400	500	7.38
19.4/9.70	21.5/10.8	0.67	0.78	0.84	0.87	88.0	89.5	90.0	89.5	89.5	3540	1040	420	550	11.2
25.5/12.8	28.5/14.4	0.66	0.78	0.84	0.87	88.5	90.5	90.5	90.5	90.2	3540	990	370	470	15.0

# Electrical data

## 2-pole motors 50 Hz, 400 V

Standard motor range			Voltage: 400 V											
Output $P_2$ [kW]	CEMEP Efficiency	ML type designation	Full load current	Power Factor (Cos Phi) by load			Efficiency (eta) by load			Speed	General speed-torque characteristics			Torque $M_N$ [lbf.-ft.] @ 400 V
			[A]	50 %	75 %	100 %	50 %	75 %	100 %	RPM	Locked rotor current $I_s/I_N$ [%]	Locked rotor torque $M_s/M_N$ [%]	Breakdown torque $M_{Bf}/M_N$ [%]	
0.25	nd*	ML71AA	0.60	0.57	0.70	0.79	75.0	78.5	79.0	2860	620	310	370	1.14
0.37	nd*	ML71AB	0.88	0.61	0.73	0.80	75.0	78.5	78.0	2840	550	260	320	1.68
0.55	nd*	ML71BA	1.30	0.58	0.73	0.80	77.0	79.5	79.0	2840	550	260	320	2.55
0.75	nd*	ML71BB	1.90	0.47	0.62	0.74	75.0	79.5	80.0	2840	550	260	320	3.46
1.10	2	ML80BA	2.60	0.53	0.68	0.78	78.5	81.0	81.0	2860	700	300	360	5.02
1.50	1	ML90CC	3.10	0.70	0.80	0.85	83.0	85.0	85.0	2890	780	300	360	6.78
2.20	2	ML90CB	4.80	0.65	0.76	0.83	83.0	83.5	83.0	2880	760	300	360	10.0
2.20	2	ML90CB	4.80	0.65	0.76	0.83	83.0	83.5	83.0	2880	760	300	360	10.0
3.70	2	ML100BC	8.20	0.58	0.72	0.80	82.5	84.2	84.0	2880	780	340	390	16.8
5.50	2	ML132AB	12.4	0.54	0.68	0.78	84.0	85.7	85.5	2900	800	340	420	24.7
7.50	2	ML132CA	16.8	0.51	0.66	0.76	85.5	87.5	88.0	2910	900	400	520	33.2

NEMA premium motor range			Voltage: 400 V											
Output $P_2$ [kW]	CEMEP Efficiency	ML type designation	Full load current	Power Factor (Cos Phi) by load			Efficiency (eta) by load			Speed	General speed-torque characteristics			Torque $M_N$ [lbf.-ft.] @ 400 V
			[A]	50 %	75 %	100 %	50 %	75 %	100 %	RPM	Locked rotor current $I_s/I_N$ [%]	Locked rotor torque $M_s/M_N$ [%]	Breakdown torque $M_{Bf}/M_N$ [%]	
2.20	1	ML90FA	4.40	0.74	0.83	0.86	84.0	86.5	85.6	2910	920	350	430	9.76
3.70	2	ML112AA	7.40	0.68	0.79	0.85	84.0	86.5	86.5	2910	920	350	430	16.5
5.50	1	ML132DA	10.8	0.68	0.79	0.85	87.5	89.0	89.0	2910	970	370	470	24.7
7.50	1	ML132EB	14.4	0.67	0.79	0.85	89.5	90.0	90.0	2910	950	370	470	33.1

\*not defined

# Other data



Standard motor range													
ML type designation	Output $P_2$ [HP]	NEMA frame/ flange	Weight [lbs]	Temperature		Shaft dimensions		Moment of inertia $10^{-3} [\text{lbsft}^2]$	IP classes	Enclosure class	NEMA design code	KVA code letter	Resistance R-Phase
				T <sub>Amb Max</sub>	T <sub>Min</sub>	diameter	length						[Ohm]
				40	-30	5/8	2 1/16	0.0116	55	TEFC	B	L	13.4
ML71AA	1/3	56C	16	40	-30	5/8	2 1/16	0.0116	55	TEFC	B	K	10.8
ML71AB	1/2	56C	16	40	-30	5/8	2 1/16	0.0131	55	TEFC	B	K	7.10
ML71BA	3/4	56C	17	40	-30	5/8	2 1/16	0.0131	55	TEFC	B	J	4.40
ML71BB	1	56C	17	40	-30	5/8	2 1/16	0.0131	55	TEFC	B	M	2.70
ML80BA	1 1/2	56C	17	40	-30	5/8	2 1/16	0.0183	55	TEFC	B	M	1.76
ML90CC	2	56C	39	40	-30	5/8	2 1/16	0.0475	55	TEFC	A	G	1.20
ML90CB	3	56C	39	40	-30	5/8	2 1/16	0.0570	55	TEFC	A	K	1.20
ML90CB	3	182TC	39	40	-30	1 1/8	2 5/8	0.0570	55	TEFC	A	K	1.20
ML100BC	5	182TC	49	40	-30	1 1/8	2 5/8	0.0736	55	TEFC	A	S	0.645
ML132AB	7 1/2	213TC	97	40	-30	1 3/8	3 1/8	0.1780	55	TEFC	A	M	0.350
ML132CA	10	213TC	99	40	-30	1 3/8	3 1/8	0.2302	55	TEFC	A	L	0.240

NEMA premium motor range													
ML type designation	Output $P_2$ [HP]	NEMA frame/ flange	Weight [lbs]	Temperature		Shaft dimensions		Moment of inertia $10^{-3} [\text{lbsft}^2]$	IP classes	Enclosure class	NEMA design code	KVA code letter	Resistance R-Phase
				T <sub>Amb Max</sub>	T <sub>Min</sub>	diameter	length						[Ohm]
ML90FA	3	182TC	49	40	-30	1 1/8	2 5/8	0.0736	55	TEFC	A	M	1.04
ML112AA	5	182TC	97	40	-30	1 1/8	2 5/8	0.1780	55	TEFC	A	L	0.650
ML132DA	7 1/2	213TC	99	40	-30	1 3/8	3 1/8	0.2088	55	TEFC	A	N	0.390
ML132EB	10	213TC	99	40	-30	1 3/8	3 1/8	0.2302	55	TEFC	A	L	0.275

# Dimensions

Type designation					3-phase ML NEMA									
MLhouse	Standard efficiency		NEMA premium		NEMA Frame/Flange	Stator				Shaft				
	P <sub>2</sub> [HP]	ML type designation	P <sub>2</sub> [HP]	ML type designation		NEMA	P	AB	AF	C	AG	U		
	IEC	AC	AD			L	LB	LL	D		AH			
ML71	1/3	ML71AB	-	-	56C		5 9/16	4 5/8	1 11/16	9 11/16	7 5/8	4 7/16	5/8	2 1/16
	1/2	ML71BA	-	-	56C									
	3/4	ML71BB	-	-	56C									
	-	-	1	ML71BB	56C									
ML80	-	-	1 1/2	ML80BB	56C		5 9/16	4 5/8	1 11/16	10 7/8	8 13/16	4 7/16	5/8	2 1/16
ML90	-	-	2	ML90CC	56C		7 1/16	4 3/8	3 7/32	13 1/2	11 7/16	4 1/16	5/8	2 1/16
	3	ML90CB	-	-	56C		7 1/16	4 3/8	3 7/32	14 5/16	11 11/16	4 1/16	1 1/8	2 5/8
ML100	5	ML100BC	3	ML90FA	182TC		7 1/16	4 3/8	3 7/32	15 7/8	13 1/4	4 1/16	1 1/8	2 5/8
ML112/132	-	-	5	ML112AA	182TC		8 11/16	5 5/16	4	18 1/8	15 1/2	4 1/16	1 1/8	2 5/8
	7 1/2	ML132AB	7 1/2	ML132DA	213TC		8 11/16	5 5/16	4	18 5/8	15 1/2	4 1/16	1 3/8	3 1/8
	10	ML132CA	10	ML132EB	213TC									

All dimensions are in inches



3-phase ML NEMA-						
Flange						Cable entry
	AJ	AK	BD	BF	BB	
LA	M	N	P	S	T	O
c1	e1	b1	a1	s1	f1	
9/16	5 7/8	4 1/2	6 1/2	3/8	3/16	2 x 1/2 (open)
9/16	5 7/8	4 1/2	6 1/2	3/8	3/16	2 x 1/2 (open)
9/16	5 7/8	4 1/2	6 1/2	3/8	3/16	2 x M20 (knockout) 2 x 1/2 (open)
3/4	7 1/4	8 1/2	8 1/2	1/2	0	2 x M20 (knockout) 2 x 1/2 (open)
3/4	7 1/4	8 1/2	8 1/2	1/2	0	2 x M20 (knockout) 2 x 1/2 (open)
5/8	7 1/4	8 1/2	8 1/2	1/2	0	2 x M25 (knockout) 2 x 3/4 (open)
5/8	7 1/4	8 1/2	8 1/2	1/2	0	2 x M25 (knockout) 2 x 3/4 (open)

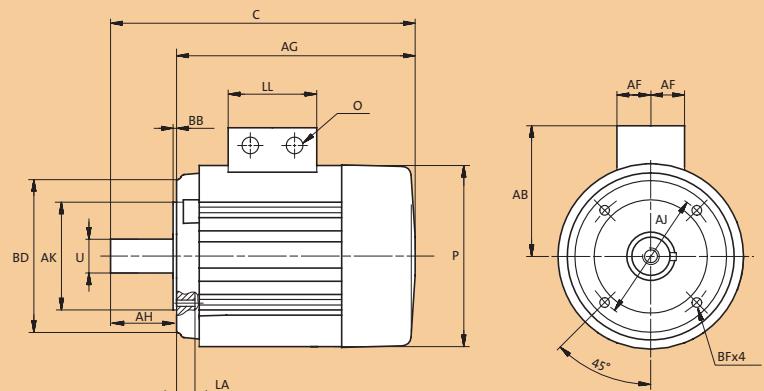
LL and LA correspond to the IEC standard



ML NEMA  
71 and 80



ML NEMA  
90 and 160



**Doing business with Grundfos**

Grundfos has been manufacturing high-quality electrical motors for more than 30 years, and as one of the world's leading pump manufacturers, we know better than anyone what is required of a reliable electrical motor.

Cost of Ownership is an important consideration when choosing a motor for a specific task. At Grundfos we define Cost of Ownership as the total sum of both the costs and benefits of having a business relationship with us. An important element of this is how Grundfos can assist in reducing operation costs through technical advice, customer training, service, and reliable logistics.

L-ML-SL-001 7/05 (US)  
Subject to alterations

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