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SANYO DENKI

AC SERVO SYSTEMS

RTA

Motion Control Systems

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Warning

- The sole purpose of this catalogue is as a general introduction to our products, in order to allow an orientation as well as a choice among them. Detailed information concerning limitations and installation/utilization procedures are described in the manuals and/or technical sheets relating to each product. It is therefore essential to strictly refer to these enclosed technical manuals for a correct use, in accordance with current standards.
- All those products for which a specific obligation is required, as per law regulation in force in the European Community countries, bear the EC marking stating they are in accordance with the related directives (depending on the products, EEC directive 73/23 and/or 89/336 and subsequent modifications and integration).
- All products are classed as “complex components”, exclusively designed and sold for installation in machines or equipments by a technically competent user, who will undertake the responsibility of safety and EMC requirements of the complete system. The necessary installation recommendations are included in the technical manuals.
- R.T.A. reserves the right to modify the products at any time and without prior notice (including, but not limited to, characteristics, availability and prices).

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AC Servo Systems

SANYO DENKI

Q Series AC ServoAmplifiers
P&Q Series ServoMotors

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SANYO DENKI, the world leader in the motion control industry, has recently presented the Q Series Brushless Servoamplifiers, coupled with servomotors P2, P3, P5, P6 and Q1, entrusting **R.T.A.** with their distribution.

The available motorization covers a 50 W to 3 KW power range, with maximum torque up to 28 Nm. The motors, equipped with built-in encoder for all versions and featuring maximum speed up to 4,500 rpm, are among the most compact in the world and, coupled with proposed servoamplifiers, are characterized by an excellent dynamic behavior.

This product selection offered by **R.T.A.**, chosen from among the models on **SANYO DENKI** catalogue and supported by a consistent stock of motors and amplifiers always available at the warehouse, allows to face and solve a wide range of automation problems with maximum efficiency.

R.T.A. 25-years' experience in solving application problems in the motion control industry can provide a reliable support to meet customer requirements in the most effective way.

At present, both **SANYO DENKI** and **R.T.A**. have implemented Quality Assurance Systems certified according to ISO 9001 (JQA - 2837 and TÜV - 50 100 2153, respectively), following the strategic choice of committing the companies more and more to the quality of the products and services provided.

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BRUSHLESS AC SERVOAMPLIFIERS
Q SERIES

FIVE DIGIT DISPLAY. Allows to view parameters, analyze the alarms and monitor in real time the behaviour of the system.

OPERATION KEY. Allows to modify all system parameters and to give access to test, monitor alarm.

RS232 CONNECTOR. The amplifier can be set and monitored by means of Personal Computer interface.

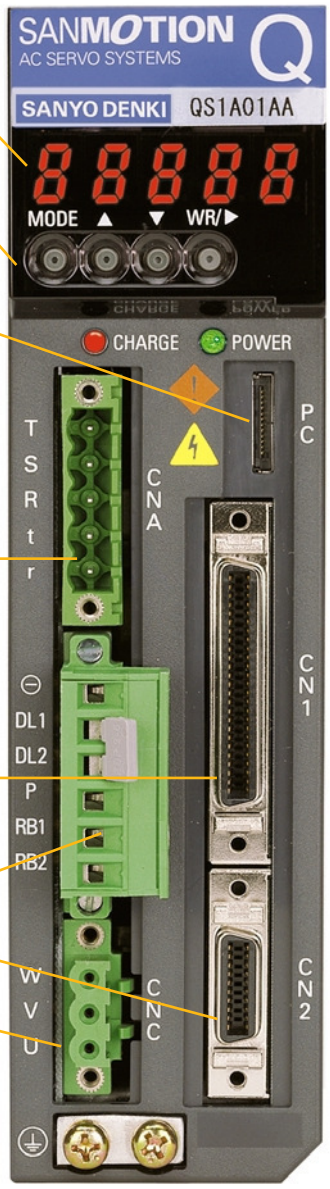
200VAC to 230VAC POWER CONNECTOR [+10%; –15%], single-phase or three-phase (configurable by the user).
Power sections kept separated for logic/signal and power electronics.
Built-in protection circuits against any overload, input overvoltage and any motor connection error (wrong encoder wiring, phase-phase and phase-ground short-circuit).

SIGNAL CONNECTOR. Control: pulse train (clock + direction; forward + backward pulse; 90° phase shift) or analog signal (proportional to speed or torque).
8 inputs (6 optically insulated pnp/npn + 2 high speed inputs line driver) setting by the user.

CONNECTOR for external regenerative resistor provided with sensing for maximum temperature alarm (optional).

ENCODER CONNECTOR

MOTOR POWER CONNECTOR



OTHER CHARACTERISTICS

- Dynamic braking automatic circuit in case of alarm or power off.
- Closed-loop integrated system with Position, Speed and Torque control mode. Possibility of “on fly” changing: position + speed; position + torque; speed + torque.
- Dynamic auto tuning: setting on 11 different values, allows to self-tune the system in real time. The drive reacts to variations/changes of inertial load, modifying continuously Position and Speed loop-parameters.
  When the function is active it is possible to avoid any close-loop setting process.
- Scale factor that can be set by the user on both analog and frequency inputs and on the repetition of the encoder signal.
- Setting time is reduced by five times compared with previous PY2 Series.
- Speed loop frequency response: 600 Hz.
- Two integrated notch filters to remove any system’s resonance frequency.

TECHNICAL DATA	QS1A01	QS1A03	QS1A05	QS1A10
MAX. CURRENT	15 Amp	30 Amp	50 Amp	100 Amp
MOTOR OUTPUT STAGE	IGBT, PWM control, sinusoidal current			
SUPPLY VOLTAGE	Single-phase or three-phase (configurable by the user) 200 VAC o 230 VAC (+10%, -15%). 50/60 Hz (± 3 Hz)			
CONTROL MODE	Position, Speed, Torque (optional Switching Control Mode)			
DIMENSIONS (mm)	45 x 168 x 130	50 x 168 x 130	90 x 168 x 130	100 x 205 x 235
MASS (kg)	1.25	1.3	2.2	5.5

Q - SETUP SOFTWARE

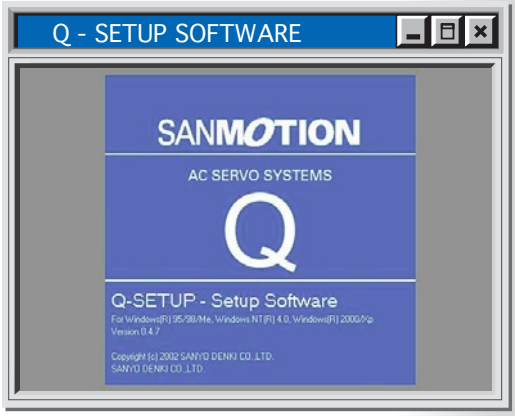
The Q - Setup communication software enables the parameter setting and the complete control of the system on all its function.

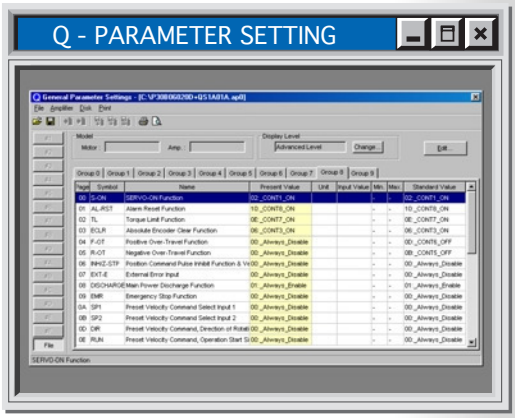
The access to the parameter configuration can be achieved through three levels: basic level, standard level, advanced level.
The software includes a detailed description of all parameters.

Thanks to the Q - Setup software it's possible also to analyze the system operation through:

- Monitor Display: it shows in real time all information about use of the system.
- Trace Operation: it is a complete oscilloscope with 4 analog and 4 digital channels.
- System Analysis: very helpful to study the system frequency response to view and correct mechanics resonance conditions.

Jogging Operation and Operation Pulse Feed Jogging functions are also available.





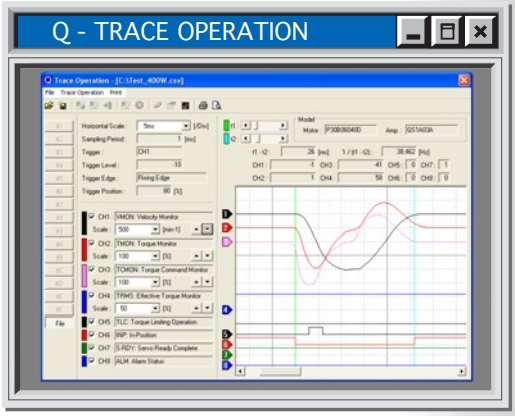
GRAPHIC MONITOR

Thanks to the integrated oscilloscope function, the real-time variation of some important system parameters (such as speed and torque) can be displayed on the PC screen.

Data can be downloaded and saved in Excel-compatible format.

The time base can be selected in the 10 msec. to 2 sec. range.

Every single value acquired and displayed can be easily read using the cursor.



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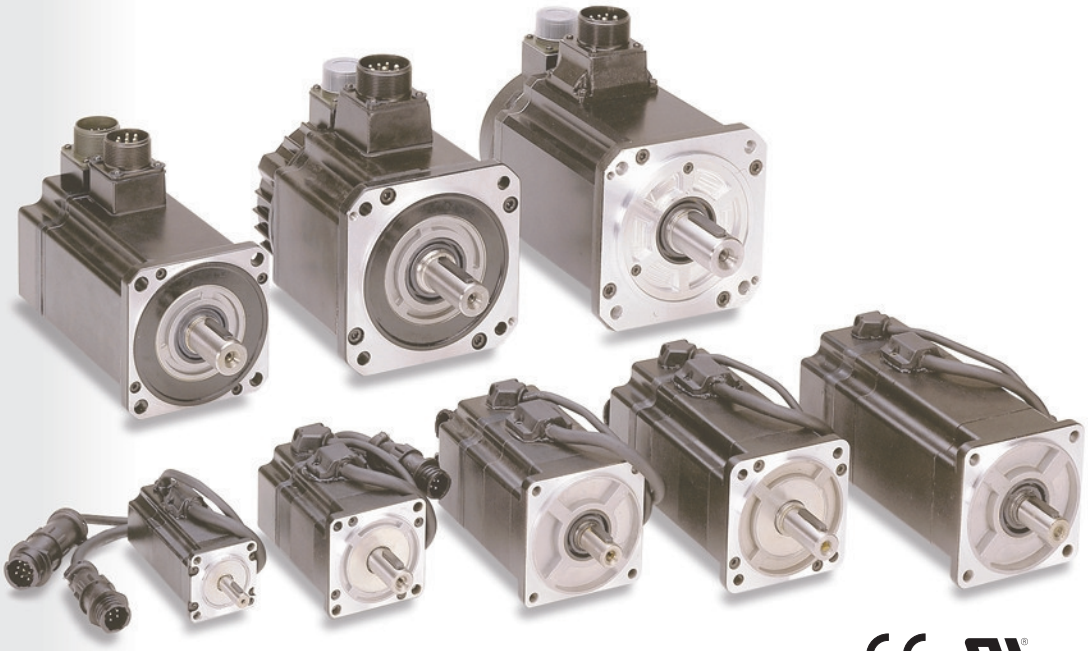
AC BRUSHLESS SERVOMOTORS P2, P3, P5, P6 AND Q1 SERIES



As part of the wide range of AC servomotors proposed by Sanyo Denki, we have identified a series of models, carefully selected from among the most interesting for the Motion Control market, that can be coupled with Q drives.

The main characteristics of the motors are listed below:

- P2, P3 and Q1 Series Motors: very compact, low inertia. Ideal for applications involving quick acceleration and fast positioning.
- P5 and P6 Series Motors: compact, medium inertia. Ideal for applications in which the load inertia exceeds the motor inertia. Very smooth rotation, even at very low speed.
- IP protection degree: IP43 to IP67 (according to the different models).
- Power range: 50W to 3000W.
- Maximum speed: 4500 rpm (3000 rpm for P5 1kW e P6 1.5kW).
- Position sensor: incremental encoder on all models (A, -A, B, -B, C, -C). The real system resolution available is equivalent to 8000 step/rev.
- Perfect behavior in overload conditions. E.g.: a torque equal to 200% of the nominal torque can be maintained for 10 to 20 sec. (according to the different models).
- Proper management of any loads characterized by a level of inertia that far exceeds the motor inertia.
- A complete map of all of the motor's electrical features is stored in the Q drives. Simply set the model being used with the remote operator or dedicated software.
- All motors are equipped with high quality connectors [Encoder; Motor Phases].

TECHNICAL DATA

		Nominal power (W)	Available power * (W)	Nominal speed (rpm)	Maximum speed (rpm)	Nominal torque (Nm)	Stall torque Max. (Nm)	Inertia (kg*m²)	Degree IP	Weight (kg)	Amplifier
P3 SERIES	P30B04005DXS00M	50	65 @ 4500 rpm	3000	4500	0.157	0.49	$0.031x10^{-4}$	IP 43	0.35	QS1A01
	P30B04010DXS1CM	100	125 @ 4500 rpm	3000	4500	0.32	0.98	$0.051x10^{-4}$	IP 43	0.5	QS1A01
	P30B06020DXS11M	200	235 @ 4500 rpm	3000	4500	0.637	1.96	$0.144x10^{-4}$	IP 43	1.15	QS1A01
	P30B06040DXS11M	400	520 @ 4500 rpm	3000	4500	1.274	3.82	$0.255x10^{-4}$	IP 43	1.7	QS1A03
	P30B08075DXS11M	750	940 @ 4500 rpm	3000	4500	2.38	7.15	$0.635x10^{-4}$	IP 43	3.3	QS1A03
P5 SERIES	P50B04010DXS00M	100	125 @ 4500 rpm	3000	4500	0.319	0.98	$0.079x10^{-4}$	IP 55	0.59	QS1A01
	P50B05020DXS00M	200	235 @ 4500 rpm	3000	4500	0.637	1.96	$0.173x10^{-4}$	IP 55	1.07	QS1A01
	P50B07040DXS00M	400	520 @ 4500 rpm	3000	4500	1.274	3.92	$0.74x10^{-4}$	IP 55	2.1	QS1A03
	P50B08100HXS00M	1000	1000 @ 3000 rpm	3000	3000	3.185	8.82	$2.651x10^{-4}$	IP 55	5.05	QS1A03
P2	P20B10150DXS00M	1500	1500 @ 3000 rpm	3000	4500	4.79	14.7	$2.04x10^{-4}$	IP 67	6.5	QS1A05
P6	P60B13150HXS00M	1500	1850 @ 3000 rpm	2000	3000	7.5	20.0	$8.28x10^{-4}$	IP 67	7.8	QS1A05
Q1	Q1AA13300DXS00M	3000	3000 @ 3000 rpm	3000	4500	9.51	28.4	$4.92x10^{-4}$	IP 67	11.4	QS1A10

*Available power - Power that can be supplied for 100% of the time by motor rotating at the indicated speed (Q series drives)

NOTE: all motors can be supplied, on demand, in the version with **24VDC emergency brake**. The codes of motors with brake are characterized by the last letters ("CS") – e.g., the code of the P5 1000W motor with 24VDC brake is P50B08100HCS.
The weight of the motors indicated in the table above refers to the versions without brake.

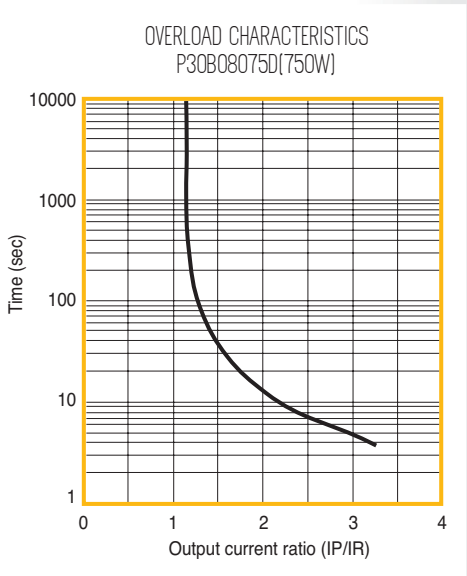
OVERLOAD CURVES

This example shows the P3 750W motor's overload curve.

Note that a torque equal to 200% of the nominal torque can be maintained for approx. 14 seconds.
A torque that is 300% of the nominal torque can be maintained for approx. 4 seconds.

The overload curves of all the other motors have similar characteristics.

The possibility of using the motor in overload conditions for rather long time allows to choose, in different applications, smaller and compact motors, reducing mechanical volumes and to cut costs.



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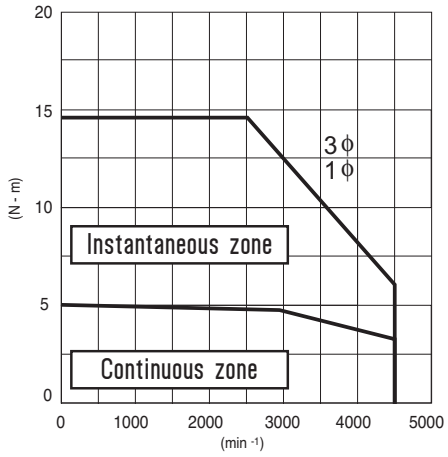
TORQUE CURVES

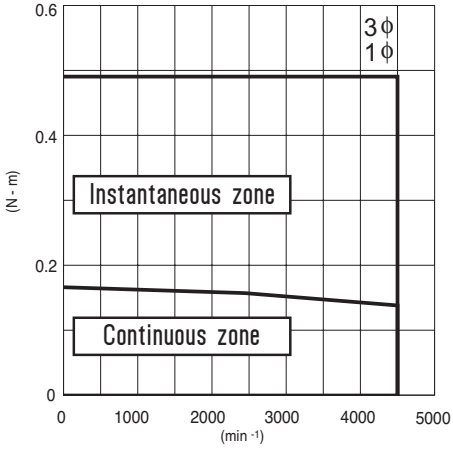
The following diagrams show motor torques delivered according to speed variation (rpm). For each diagram two zones are indicated:

- **Continuous zone**: torque delivered by the motor continuously with a 100% duty cycle
- **Instantaneous zone**: torque delivered by the motor with a duty cycle below 100%. The maximum duty cycle that can be obtained in the Instantaneous zone depends on different factors, such as the system inertia. See the Q Instruction Manual or contact RTA engineers for a correct dimensioning of the system. In a few motors, the Instantaneous Zone is furtherly divided into two parts, according as the power supply is of the single-phase or three-phase type.

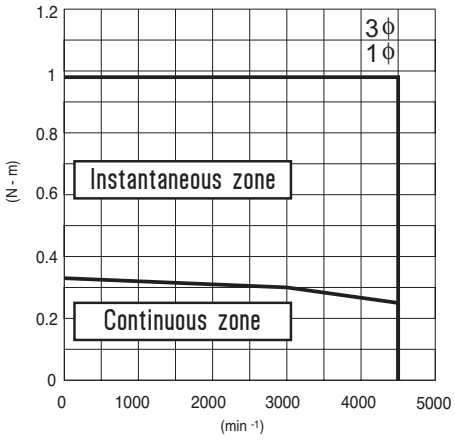
P20B10150D (1.5kW) + QS1A05



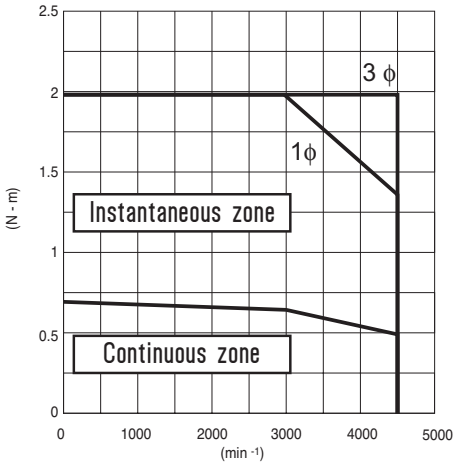
P30B04005D (50W) + QS1A01



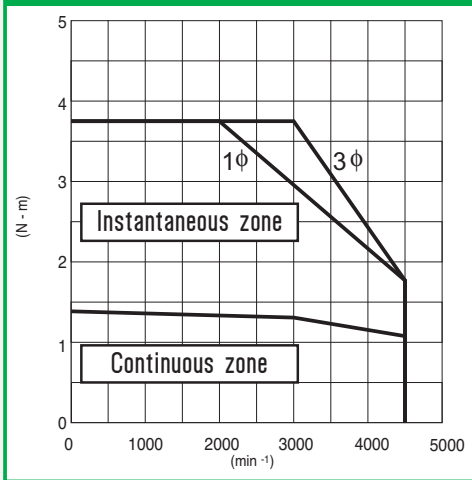
P30B04010D (100W) + QS1A01



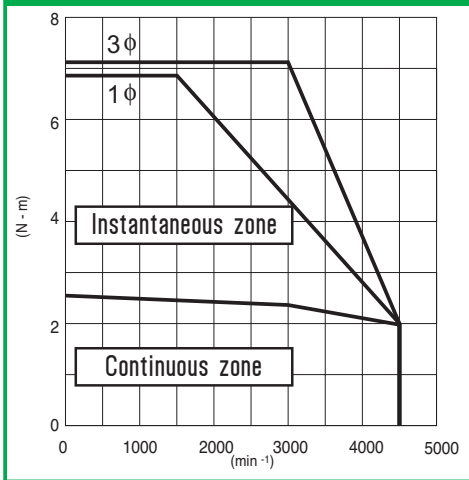
P30B06020D (200W) + QS1A01



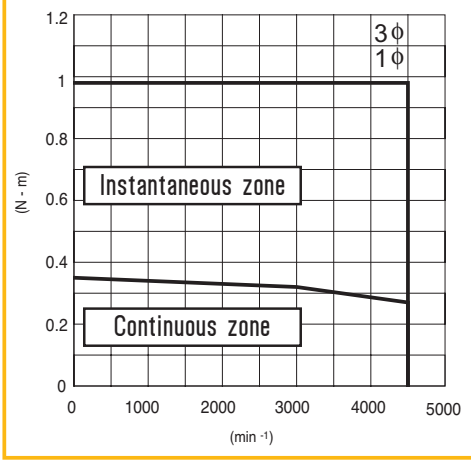
P30B06040D (400W) + QS1A03



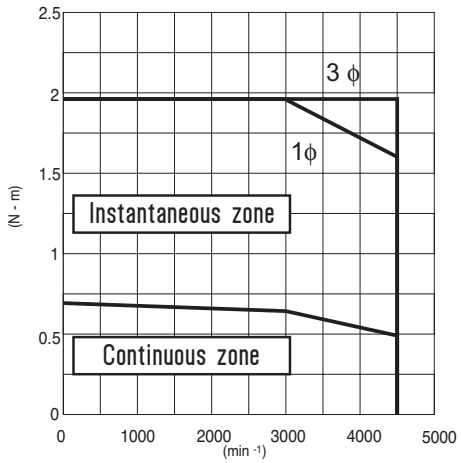
P30B08075D (750W) + QS1A03



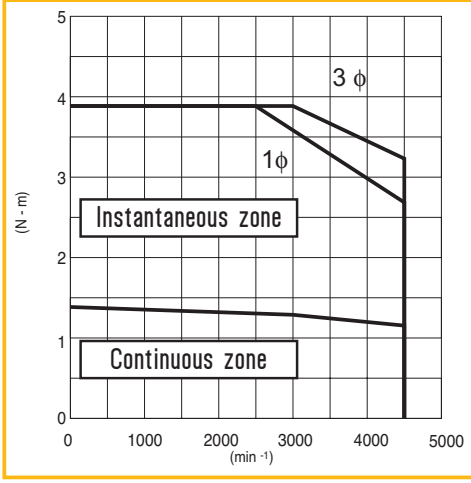
P50B04010D (100W) + QS1A01



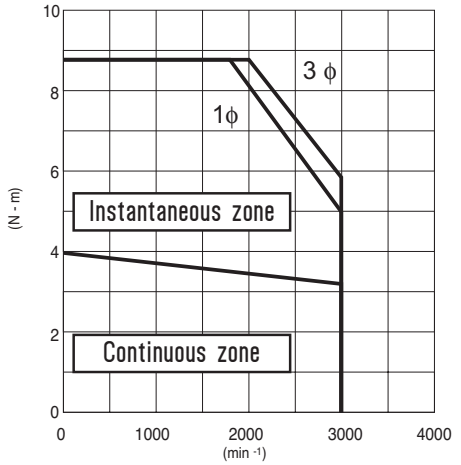
P50B05020D (200W) + QS1A01



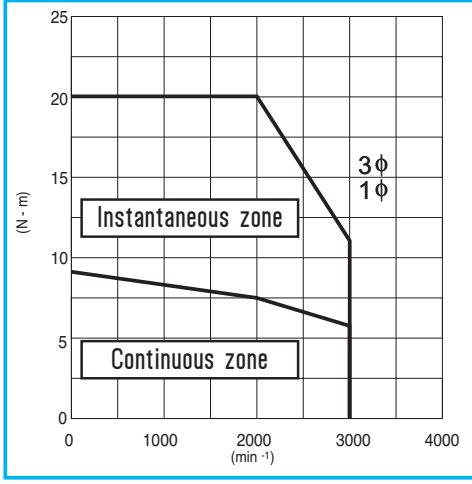
P50B07040D (400W) + QS1A03



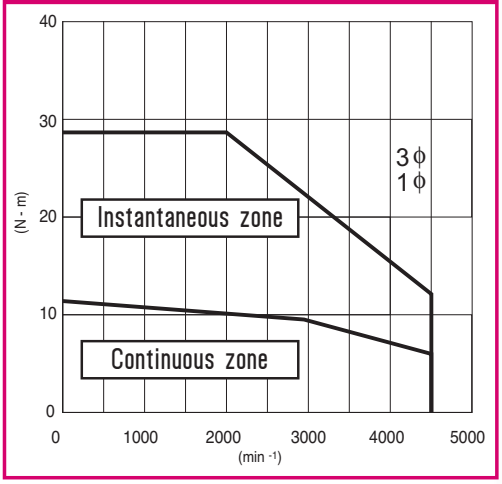
P50B08100H (1000W) + QS1A03



P60B13150H (1.5kW) + QS1A05



Q1AA13300D (3kW) + QS1A10



Indicated performances refer to motors controlled by related Q amplifiers.

1 ϕ = maximum torque with single-phase power supply

3 ϕ = maximum torque with three-phase power supply

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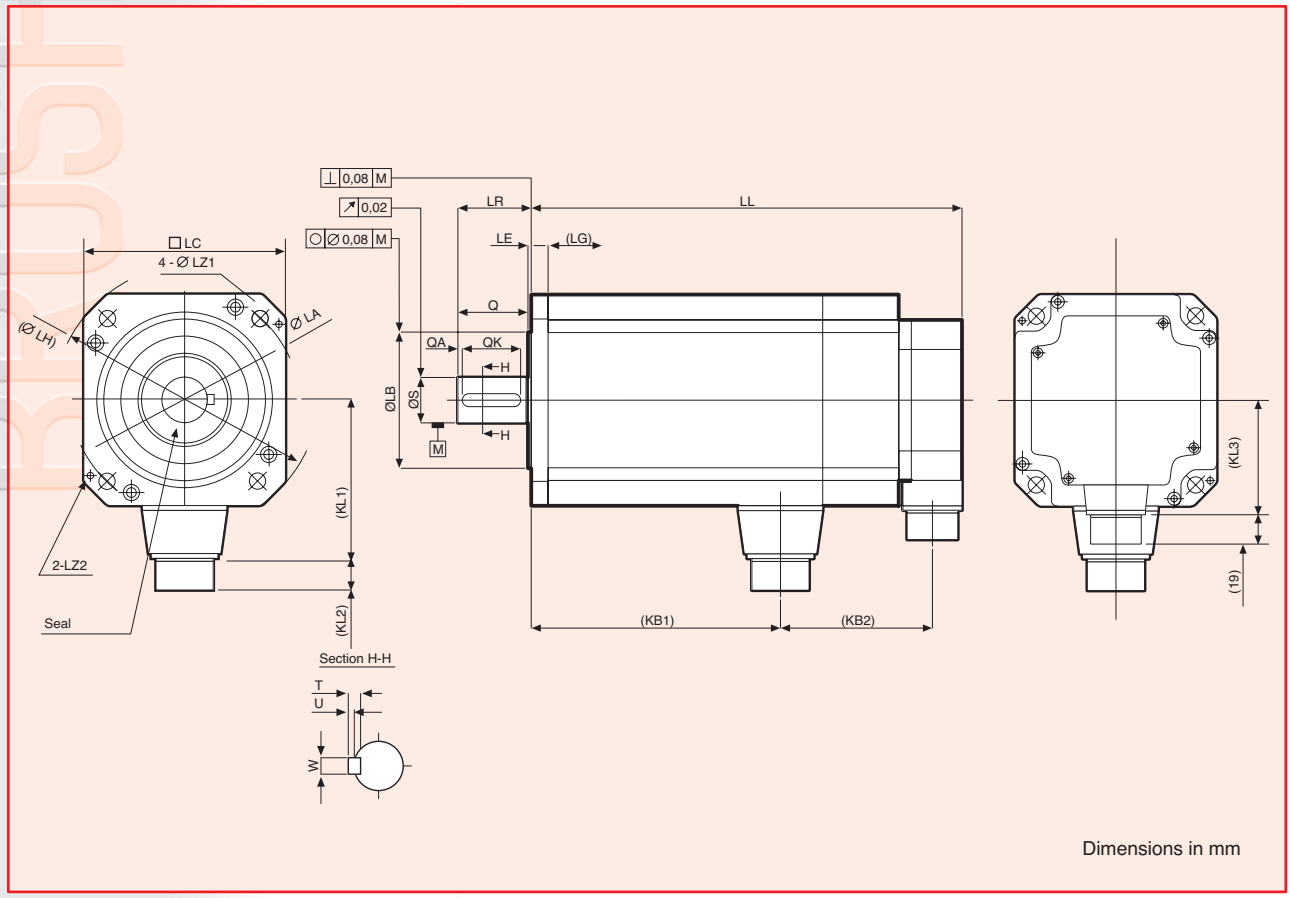
P2 SERIES SERVOMOTORS



Dimensions in mm

P2 SERIES

MODEL

P20B10150DXS00M

without brake		with brake																				
LL	KB2	LL	KB2	KL1	KL2	KL3	LG	LA	LB	LE	LH	LC	LZ1	LZ2	LR	S	Q	QA	QK	W	T	U	KB1
172	48	216	92	76	19	70	10	115	0 95-0.035	3	130	100	9	--	45	0 22-0.013	40	3	32	0 6-0.030	6	2.5	105

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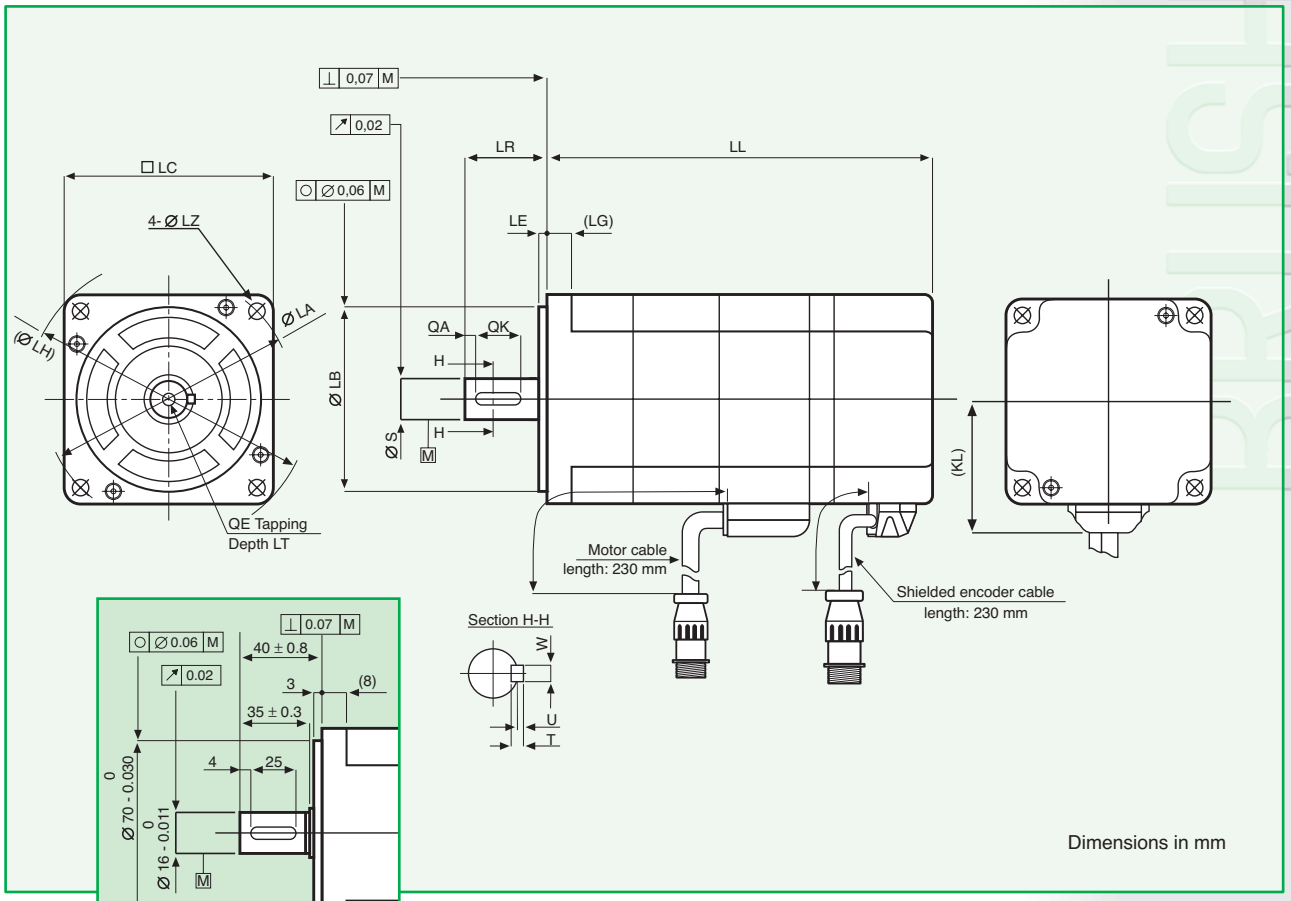
P3 SERIES SERVOMOTORS



MOD. P30B08075DXS11M

The P30B04005DXS00M model and all models with brake are without key groove.

P3 SERIES

MODEL	without brake LL	with brake LL	LG	KL	LA	LB	LE	LH	LC	LZ	LR	S	QE	LT	QA	QK	W	T	U
P30B04005DXS00M	70	108.5	5	30	46	0 30-0.021	2.5	54	40	4.5	25	0 8-0.009	--	--	--	--	--	--	--
P30B04010DXS1CM	88	126.5													2	12	3	3	1.2
P30B06020DXS11M	95.5	133.5	6	41	70	0 50-0.025	3	81	60	5.5	30	0 14-0.011	M5	12	2	20	5	5	2
P30B06040DXS11M	123.5	161.5													2	20	5	5	2
P30B08075DXS11M	140	180.5	8	52	90	0 70-0.030	3	107	80	6.6	40	0 16-0.011			4	25	5	5	2

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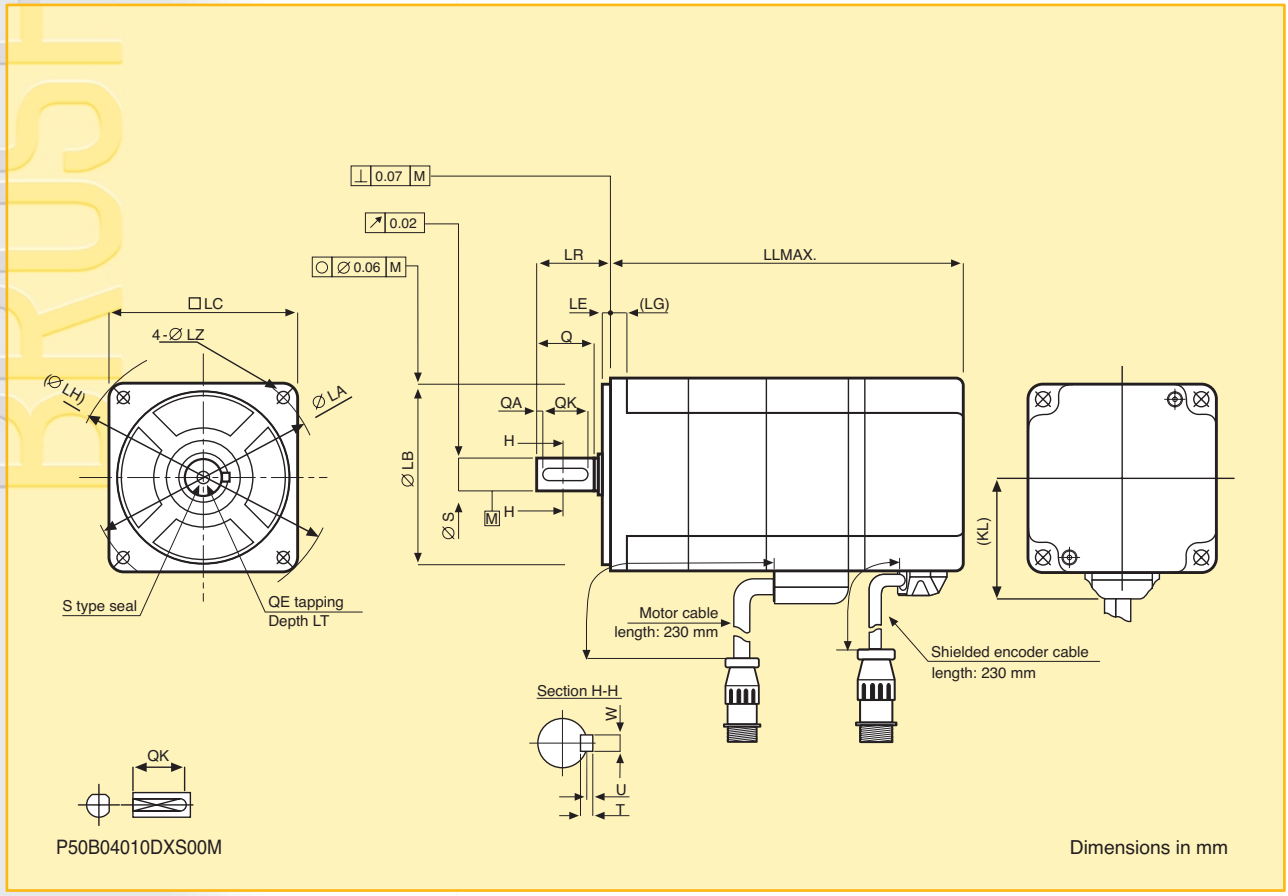
P5 SERIES SERVOMOTORS



P5 SERIES

MODEL	without brake LL	with brake LL	LG	KL	LA	LB	LE	LH	LC	LZ	LR	S	Q	QA	QK	W	T	U	QE	LT
P50B04010DXS00M	95	127	5	31	48	0 34-0.025	2	57	42	3.5	24	0 7-0.009	20	--	15	slotted, 2-faced 6.5±0.2			--	--
P50B05020DXS00M	105	134	5	38	60	0 50-0.025	2.5	71.5	54	4.5	30	0 11-0.011	25	2	20	4	4	1.5	M4	10
P50B07040DXS00M	113	140	8	50	90	0 70-0.030	3	102.5	76	5.5	30	0 14-0.011	25	2	20	5	5	2	M5	12
P50B08100HXS00M	172	212	8	55	100	0 80-0.030	3	115	86	6.6	35	0 16-0.011	30	2	25	5	5	2	M5	12

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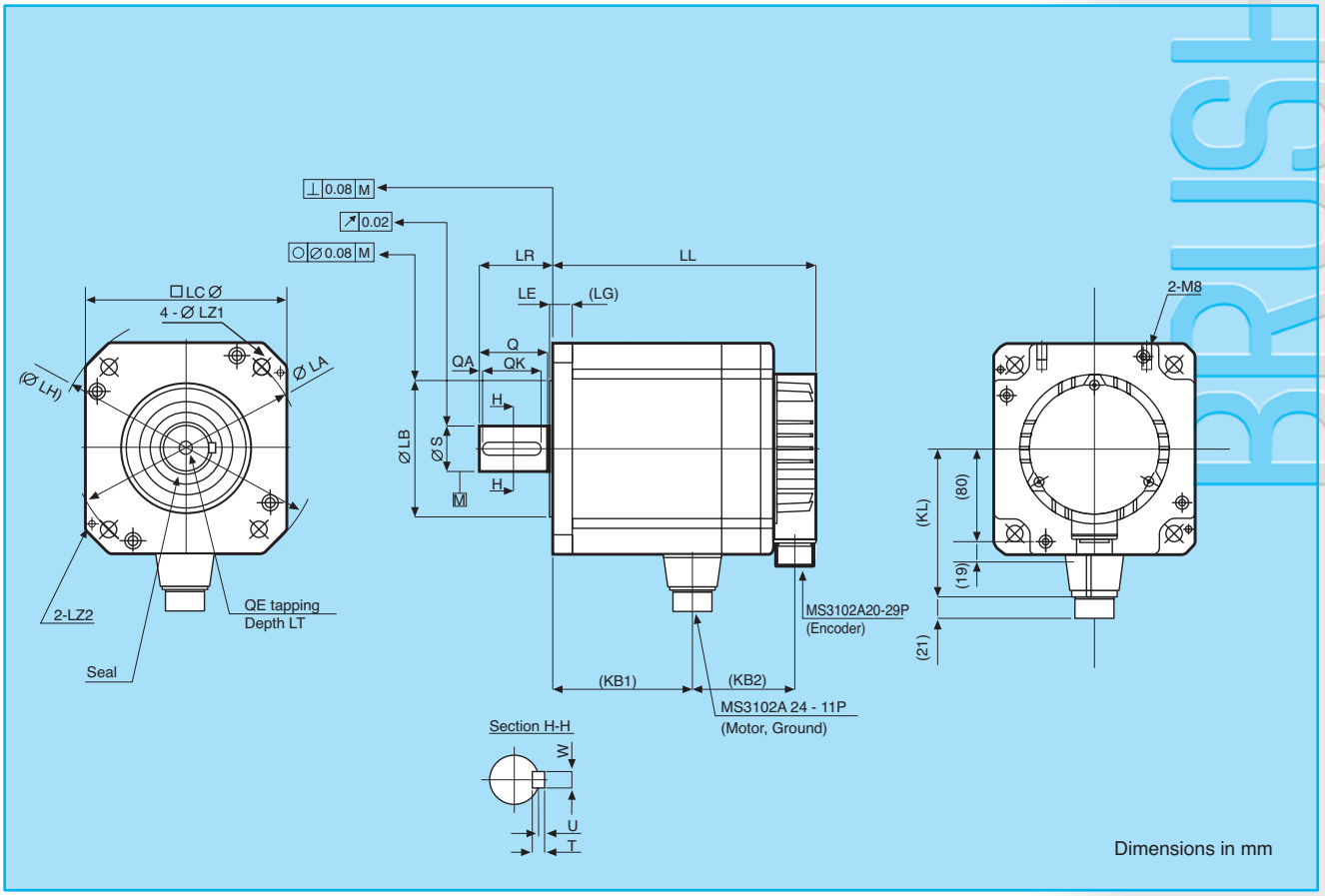
P6 SERIES SERVOMOTORS



P6 SERIES

MODEL
P60B13150HXS00M

without brake		with brake																						
LL	KB2	LL	KB2	KL1	KL2	KL3	LG	LA	LB	LE	LH	LC	LZ1	LZ2	LR	S	Q	QA	QK	W	T	U	KB1	QE	LT
152	57	185	90	98	21	--	12	145	0 110-0.035	4	165	130	9	M6	55	0 22-0.013	50	3	42	0 6-0.030	6	2.5	75	M6	20

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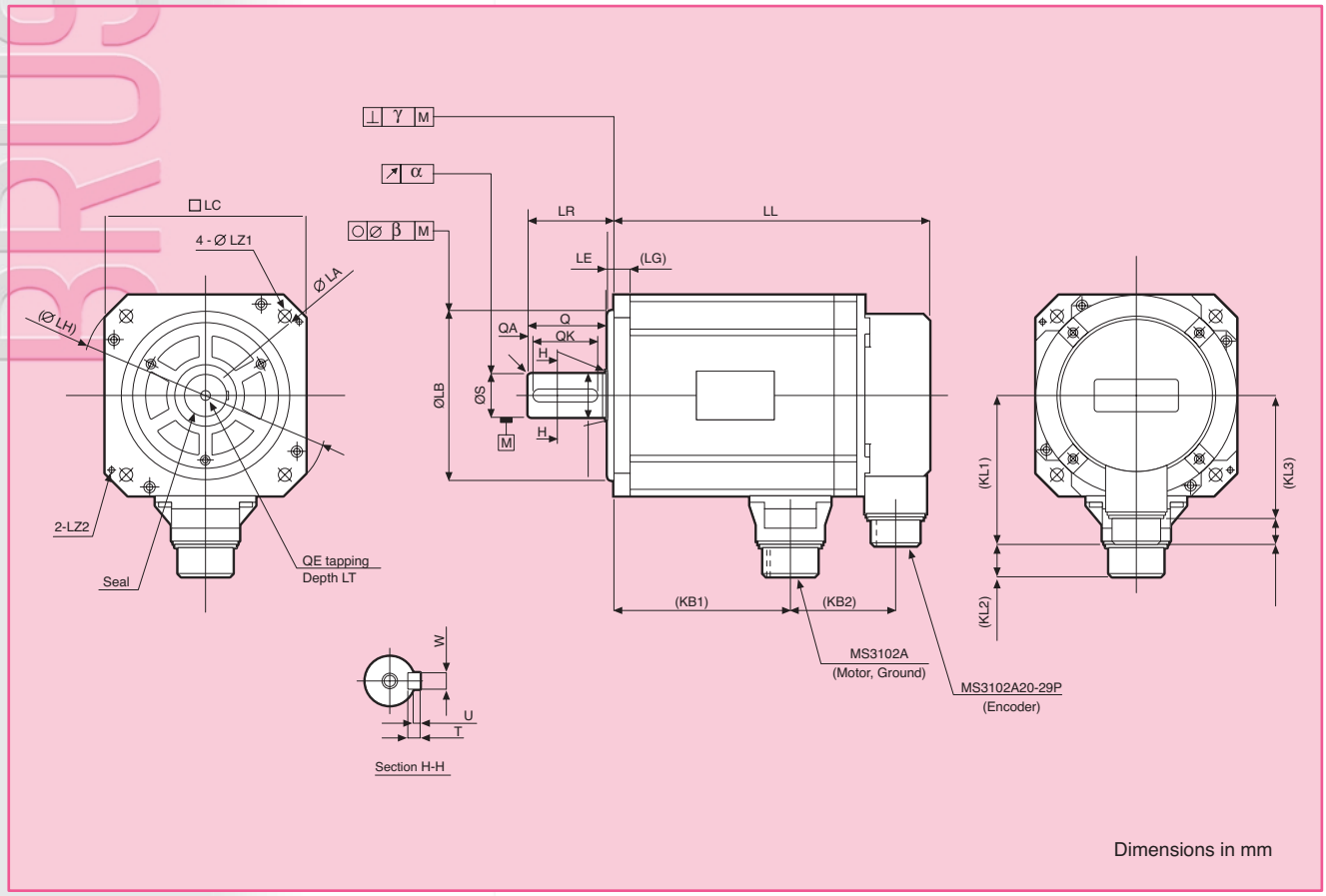
SANYO DENKI

Q1 SERIES SERVOMOTORS



Dimensions in mm

Q1 SERIES

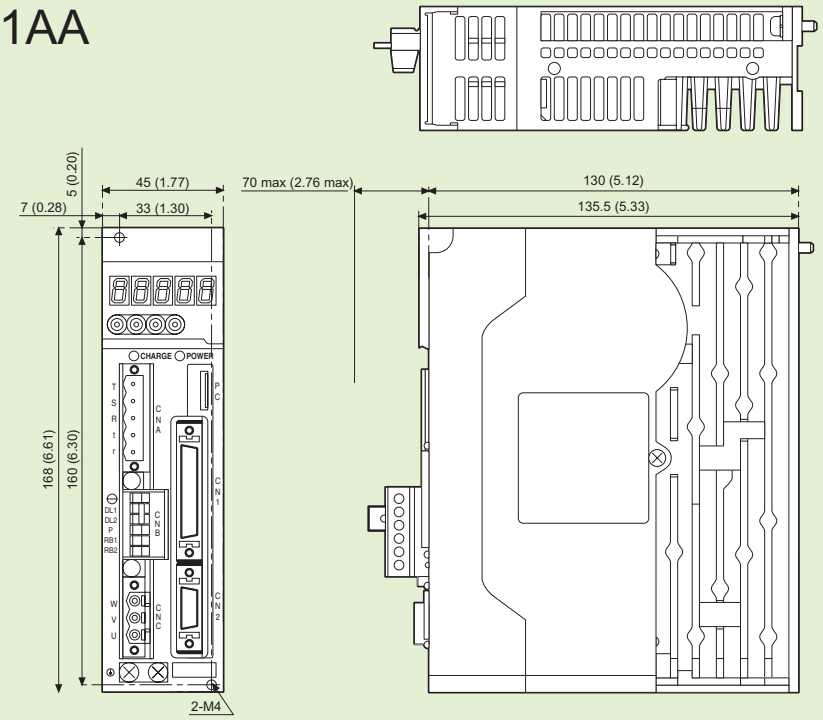
MODEL

Q1AA13300DXS00M

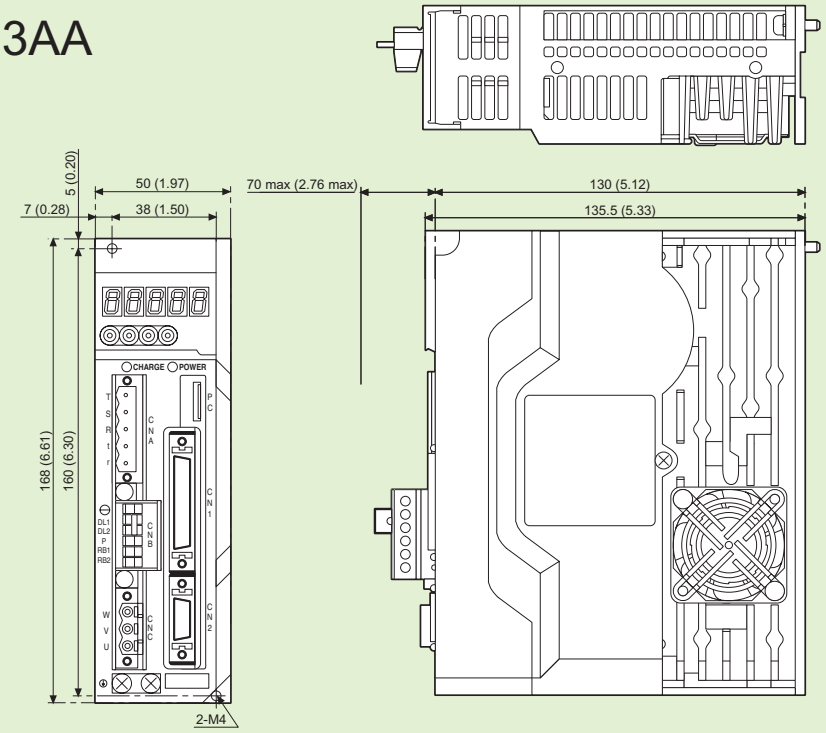
without brake		with brake																						
LL	KB2	LL	KB2	KL1	KL2	KL3	LG	LA	LB	LE	LH	LC	LZ1	LZ2	LR	S	Q	QA	QK	W	T	U	KB1	QE	LT
205	67	241	107	98	21	78	12	145	0 110-0.035	4	165	130	9	M6	55	0 28-0.013	50	3	42	0 8-0.036	7	3	117	M8	25

AMPLIFIERS' MECHANICAL DIMENSIONS

QS1A01AA



QS1A03AA

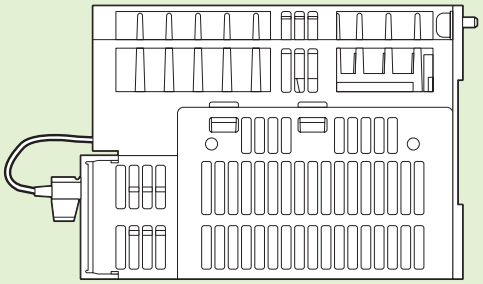


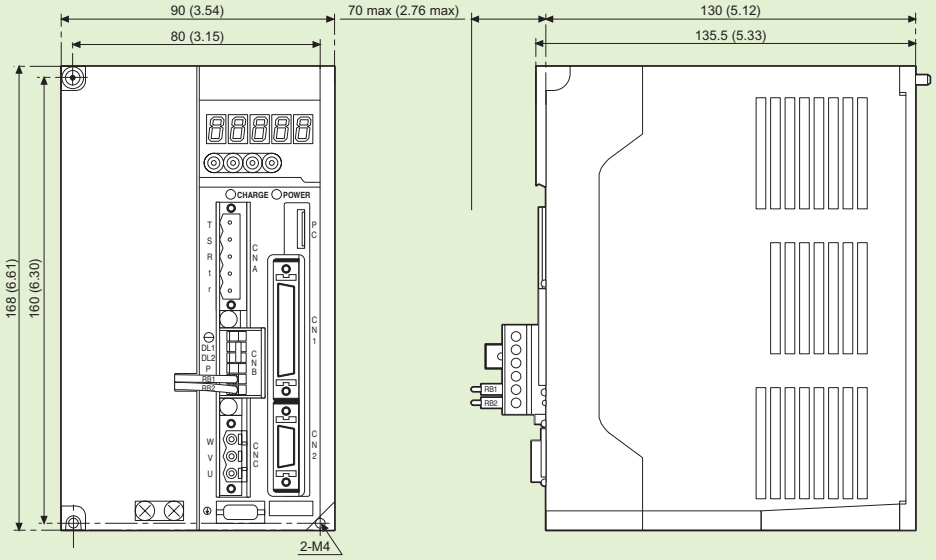
Dimensions mm (inch)

BRUSHLESS

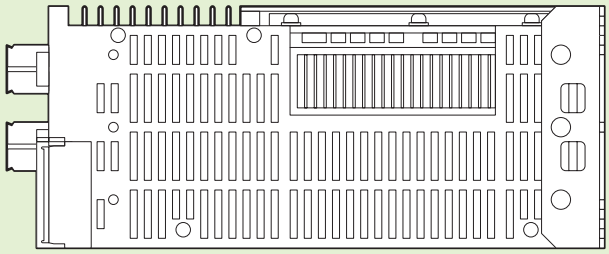
AMPLIFIERS' MECHANICAL DIMENSIONS

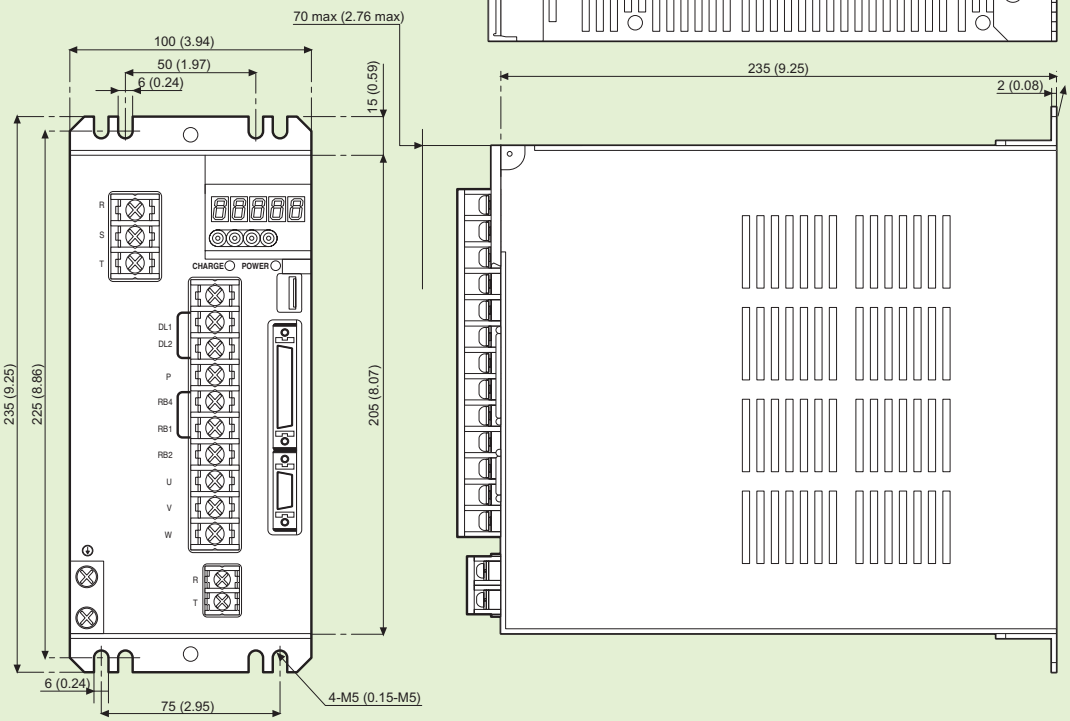
QS1A05AA





QS1A10AA





Dimensions mm (inch)

ACCESSORIES

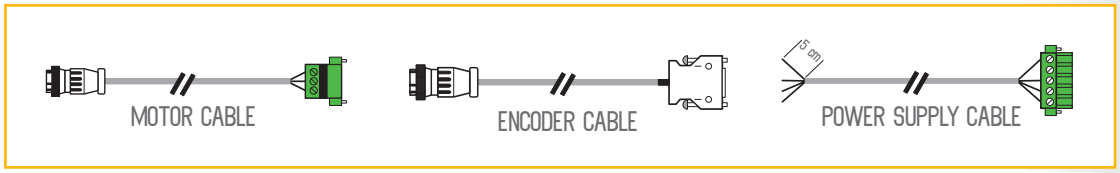
SERIAL CONNECTION KIT: QSK

The kit includes:
- Serial connection cable [length 2.7 m]
- R.T.A. - Q Series CD-Rom: includes Q - Setup Software and Manuals

AMPLIFIER-MOTOR CONNECTION CABLES

All motors supplied are already equipped with high quality connectors.
To ease installation, connection cables of different length are available, for any motor-amplifiers coupling.
The available codes are detailed below:

	CABLES	LENGTHS			
MOTORS	MODEL	1 meter	2 meters	5 meters	10 meters
P2	MOTOR CABLE	CVMBPYP21M	CVMBPYP22M	CVMBPYP25M	CVMBPYP210M
	ENCODER CABLE	CVEBP61M	CVEBP62M	CVEBP65M	CVEBP610M
P3 / P5	POWER SUPPLY CABLE	CVABPY1M	CVABPY2M	CVABPY5M	CVABPY10M
	MOTOR CABLE	CVMBPY1M	CVMBPY2M	CVMBPY5M	CVMBPY10M
	ENCODER CABLE	CVEB1M	CVEB2M	CVEB5M	CVEB10M
P6	MOTOR CABLE	CVMBPYP61M	CVMBPYP62M	CVMBPYP65M	CVMBPYP610M
	ENCODER CABLE	CVEBP61M	CVEBP62M	CVEBP65M	CVEBP610M
Q1	MOTOR CABLE	CVMBQA10Q31M	CVMBQA10Q32M	CVMBQA10Q35M	CVMBQA10Q310M
	ENCODER CABLE	CVEBP61M	CVEBP62M	CVEBP65M	CVEBP610M



EXTERNAL REGENERATIVE RESISTOR

Under special conditions of use, such as, for example, sudden decelerations with high inertial load, it may be necessary to dissipate outside the reverse energy generated by the motor. This need is signaled by the amplifier through a specific alarm.
Any excessive energy is dissipated outside through a regenerative resistor.
The following models are available on demand:

AMPLIFIER	RESISTOR MODEL	VALUE (Ω)	POWER (W)
QS1A01	RB 10006 - 220W/100 OHM	100	220
QS1A03	RB 05005 - 220W/ 50 OHM	50	220
QS1A05	RB 02030 - 500W/ 20 OHM	20	500
QS1A10	RB 01030 - 500W/ 10 OHM	10	500