

SANMOTION

SERVO SYSTEMS

R

3E Model

100 V AC 30 W-200 W, 200 V AC 30 W-30 kW



Ver.2

SANYO DENKI

SANMOTION R

SERVO SYSTEMS *3E Model*

Input voltage 100 V, 200 V AC

Servo amplifier



Amp. capacity 10 A, 20 A, 30 A, 50 A, 100 A, 150 A, 300 A, 600 A

Servo motor



Flange size 40 mm sq., 60 mm sq., 80 mm sq., 86 mm sq.,
130 mm sq., 180 mm sq., 220 mm sq., 275 mm sq.



Rated output 100 V AC: 30 W to 200 W
200 V AC: 30 W to 30 kW



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NEW PRODUCTS High Performance AC Servo Systems

SANMOTION R

AC SERVO SYSTEMS

3E Model

High Performance Servo Amplifier

The Power of **3E**'s

More evolved AC servo amplifiers that provide improved basic performance with high responsiveness, and are more energy-efficient and easier to use. Ideal for chip mounters, semiconductor equipment, machine tools, etc. In addition to the 10 A to 50 A capacity amplifier lineup, a new 100 A to 600 A capacity amplifier lineup has been born.



Evolved

Eco-efficient

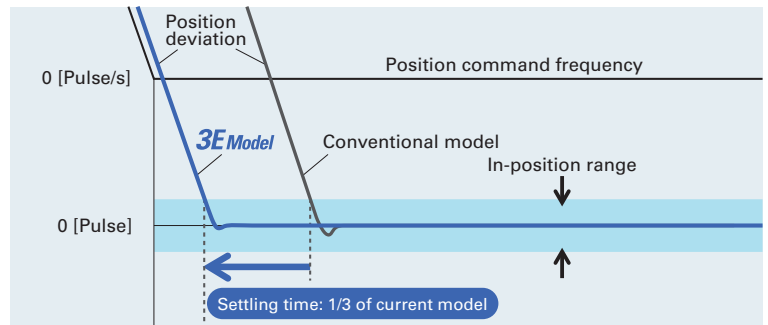
Easy to use

Evolved

Shorter takt time achieved through high-speed positioning control

The 3E Model has a speed frequency response of 2.2 kHz, approximately twice that of our conventional product.* Additionally, the position settling time has been shortened to 1/3 of the original time. Real-time switching between track control and positioning control contributes to a dramatic reduction of machine takt time.

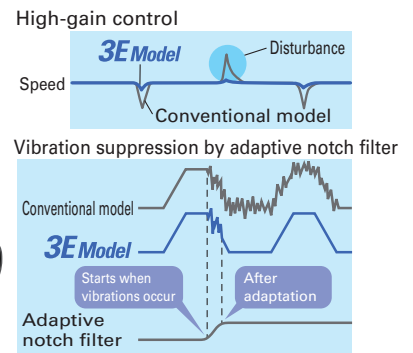
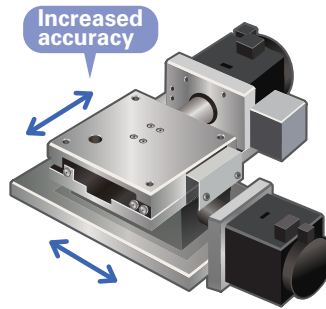
* For amplifiers with capacities from 10 A to 50 A. Compared with our conventional AC servo amplifier, "SANMOTION R ADVANCED MODEL".



Improved control accuracy

The 3E Model is equipped with a gain increase function, a function for suppressing microvibrations at settling time, an adaptive notch filter for suppressing mechanical resonance, and a feed-forward vibration control function. The 4th order notch filter of our conventional products has been upgraded to 5th order.* Highly accurate machine tool feed-axis control significantly improves processing quality.

* Compared with our conventional AC servo amplifier, "SANMOTION R" ADVANCED MODEL.

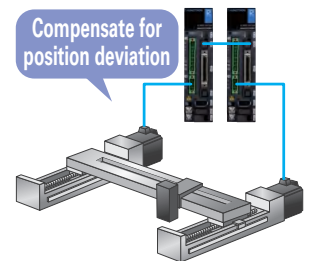


Improved safety performance through the Safe Torque Off function

With the improved Safe Torque Off (STO) function, the 3E Model conforms to international standards, SIL3/IEC61508 and PL=e/ISO13849-1. It is sufficiently reliable for usage in devices requiring high safety, such as medical devices.

High-precision tandem operation

In applications where two shafts are driven simultaneously, such as a gantry mechanism, high-precision tandem operation is possible by mutually compensating for deviation of motor positions between two shafts with the servo amplifier.



Eco-efficient

Reduced power consumption

By incorporating new-generation power devices, the 3E Model decreases electric power losses by up to 10%.* The 3E Model has up to 10% lower standby power consumption as it limits unnecessary energy consumption by controlling the fan speed according to the internal temperature of the servo amplifier.*



* For amplifiers with capacities from 100 A to 300 A.

Power consumption visualization

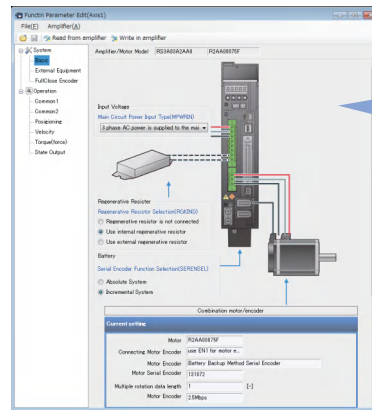
The power consumption monitoring function enables power consumption to be visualized. The servo amplifier calculates power consumption based on the motor current, and displays it on the setup software or digital operator.

Axis	Power consumption	Unit
X	0.41	kWh
Y	0.75	kWh
Z	0.21	kWh
Total	1.37	kWh

Easy to use

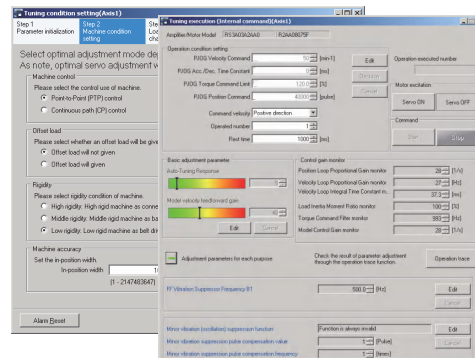
Easy startup

"SANMOTION MOTOR SETUP SOFTWARE" (see p. 10) displays the parameters required for operation in an easy-to-understand manner in order to enable fast and easy equipment startup. The 3E Model has a virtual motor operation function to simulate operation of the motor and amplifier without moving the machine, and a jog function for testing the motor and amplifier connection, without the need to connect to a host device.



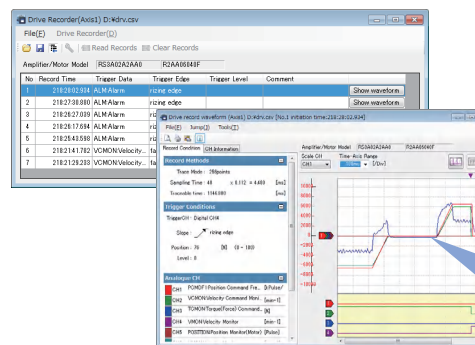
Easy servo tuning

By connecting with the setup software the 3E Model offers a variety of servo tuning support functions such as automatic selection of optimal tuning mode depending on mechanical and load conditions, basic tuning mode for adjustment of up to two parameters, and an application-specific tuning mode. This dramatically shortens time required for servo tuning.



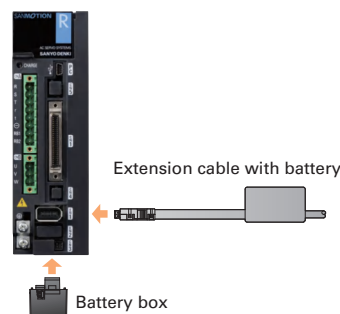
Easy troubleshooting

With a 1 ms time stamp and a drive recorder function to record motor and amplifier operating status, details of abnormal state occurrences such as alarms can be accurately checked even at a later time, facilitating troubleshooting.



Encoder batteries with choice of mounting sites

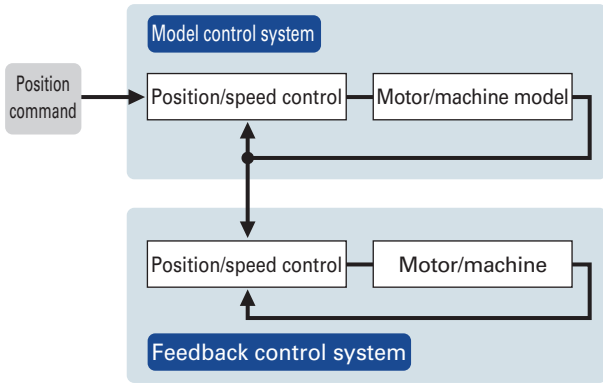
When using a battery-backup method absolute encoder, the required battery can be either a battery box that connects directly to the lower part of the servo amplifier, or an extension cable with battery. (See p. 77)



Common features of R 3E Model and R ADVANCED MODEL

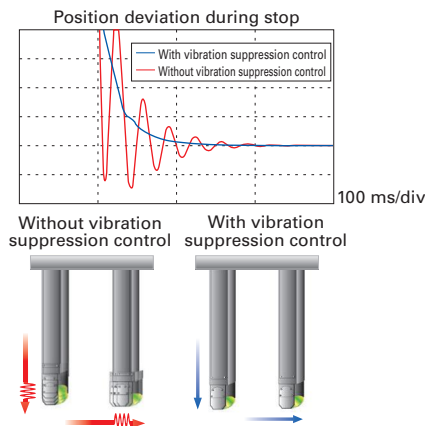
Model-based following control

Model-based following control enables an improved target value response, enhanced disturbance suppression, and greater robustness.



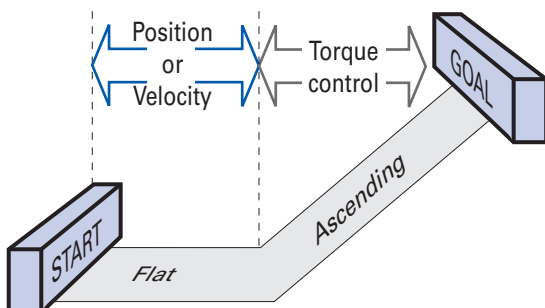
Feed-forward vibration suppression control

With feed-forward vibration suppression control, vibrations at the end effector and base of a machine can be suppressed through simple tuning procedures. Vibration control frequencies are selectable.



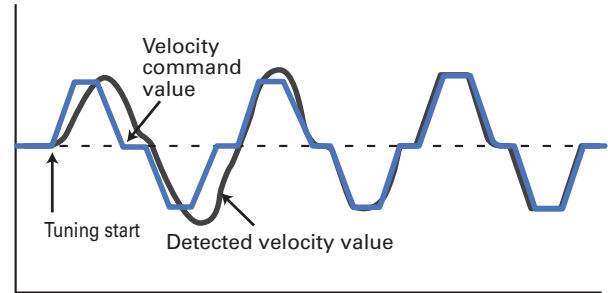
All-in-one control

Configurable parameters allow switching between control modes for torque, position or velocity.



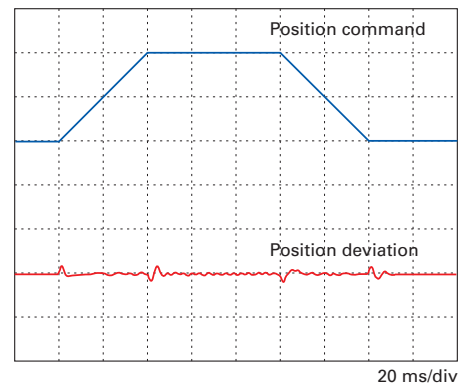
Auto-tuning

The servo amplifier automatically optimizes servo gain and filter frequency in real time.



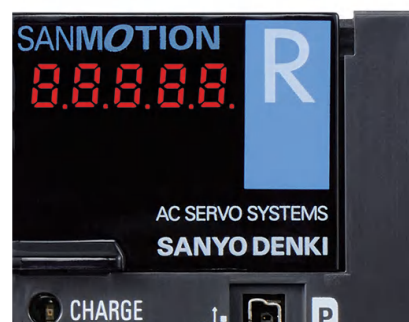
Command following control

Position command following performance doubled in comparison with conventional models through the adoption of new positioning and speed control algorithms. Position deviation ≈ 0 has been achieved.



5-digit LED display, built-in operator

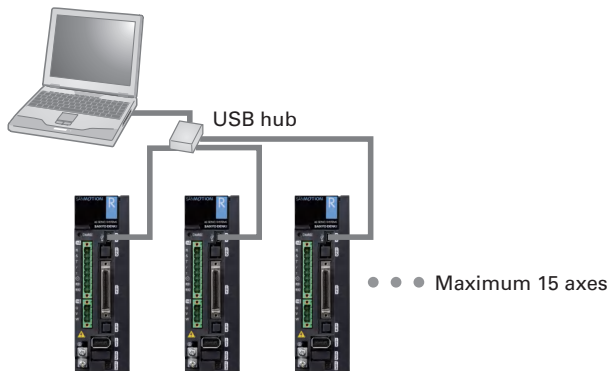
The built-in operator allows you to change parameters and monitor the amplifier status and alarm traces.



Common features of R 3E Model and R ADVANCED MODEL

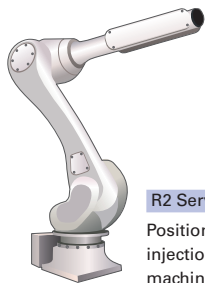
Multiaxial monitor function

The setup software allows up to 15 servo amplifier axes to be monitored.



Medium inertia servo motors selectable for different applications

Two types of medium inertia servo motors are available: R2 servo motors with a wide lineup for positioning applications, and R5 servo motors that are ideal for smooth operations such as for feed shafts of small-sized machine tools.



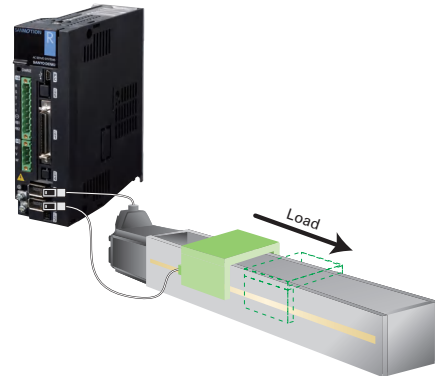
R2 Servo Motor
Positioning in robots, injection molding machines, general industrial machinery, etc.



R5 Servo Motor
Feed axes in machine tools

Dual position feedback fully-closed loop control

Dual position feedback fully-closed loop control is possible by using information from two encoders, such as a linear encoder mounted on the device and a high resolution encoder. Even when there is high motor shaft torsion from the load, servo gain can be improved and high response achieved.



Downsized servo motors

R2 series servo motors have been downsized by as much as 30% in length and 25% in volume from our conventional product, while still achieving high torque and high performance. (When using a battery-backup method absolute encoder)

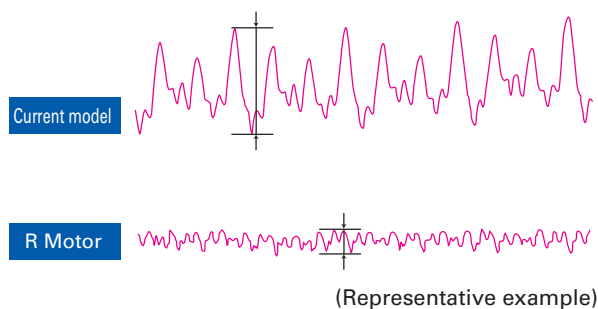
* Our conventional product is "SANMOTION Q" AC servo motor.



Low cogging torque

Cogging torque has been reduced in comparison with our conventional products, and we have achieved smooth movement.

Comparison of cogging torque waveform



Waterproof and dustproof

Our servo motors have high waterproof and dustproof characteristics with IP65 and IP67 ratings, allowing them to work in severe environments. Servo motors with IP65 ratings can be modified to IP67 as an option.



* Excluding shaft feedthrough and cable end.

High-precision battery-less optical absolute encoder

The high-precision battery-less optical absolute encoder HA035 comes standard.

It features a wide -20 to +105°C operating temperature range, and a maximum of 147 m/s² (15G)* of environmental vibration.

The encoder can be used in severe environments.

* When the encoder is mounted on a servo motor, the operating temperature and the environmental vibration vary depending on the servo motor specification.

As an optional specification, high-precision specifications with a maximum resolution of 8388608 (23 bits) during single rotation and an absolute angle accuracy of approximately 0.0167 deg within a rotation (1 min.) can be selected.

In addition, selecting an encoder that is optimal to the device is also available as an option.

Refer to the following table.

Serial encoder

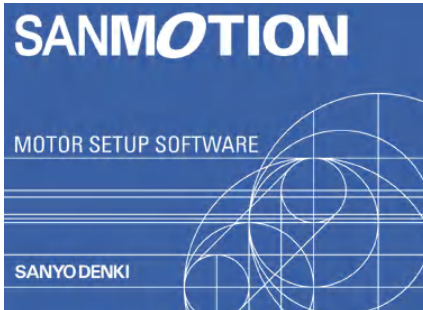
Encoder type	Resolution during single rotation	Total number of rotations during multiple rotations	Encoder model no.	Optional specifications
Battery-less optical absolute encoder This is a high-precision battery-less optical multi-turn encoder. It does not use batteries, which need to be replaced; therefore, the encoder does not require maintenance. This encoder can be broadly used for general industrial equipment including machine tools and robots.	131072 (17 bits)	65536 (16 bits)	HA035	<ul style="list-style-type: none"> Resolution during single rotation: 1048576 (20 bits), 8388608 (23 bits) Absolute angular accuracy within one rotation: Approx. 0.0167 deg (one minute) or lower (standard is approx. 0.1667 deg (ten minutes) or lower.) Baud rate: 4.0 Mbps (standard is 2.5 Mbps)
Optical battery-backup method absolute encoder This is a slim multi-turn battery-backup method optical encoder. It enables the use of a shorter motor; therefore, it is optimal for devices in which motor installation space is limited. Batteries sold separately. (See p. 77.)	131072 (17 bits)	65536 (16 bits)	PA035C	<ul style="list-style-type: none"> Resolution during single rotation: 1048576 (20 bits) Baud rate: 4.0 Mbps (standard is 2.5 Mbps)
Optical absolute encoder for incremental systems This is a slim and single-turn optical encoder. Enables wire-saving and size-reduction for applications that use pulse encoders.	131072 (17 bits)	-	PA035S	<ul style="list-style-type: none"> Resolution during single rotation: 1048576 (20 bits) Baud rate: 4.0 Mbps (standard is 2.5 Mbps)
Resolver method battery-less absolute encoder This is a resolver method battery-less multi-turn encoder. Being a resolver method encoder with outstanding ruggedness, it is ideal for equipment used in harsh environments such as injection molding machines and robots.	131072 (17 bits)	65536 (16 bits)	RA035C	<ul style="list-style-type: none"> Baud rate: 4.0 Mbps (standard is 2.5 Mbps)

Pulse encoder

Encoder type	Pulse/rotation	Multiple rotations	Encoder model no.	Optional specifications
Optical wire-saving incremental encoder This is an incremental encoder that easily connects with host equipment to output phases A, B, and Z. Ideal for general industrial equipment such as chip mounters.	2000 P/R	-	PP031T	<ul style="list-style-type: none"> Number of pulses: Up to 10000 P/R

Setup Software (Option)

This software allows you to set servo system parameters from a PC.
It also allows you to easily start up or test run the servo system.
The software can be downloaded from Product Information on our website.
URL : <http://www.sanyodenki.com>



Start-up screen

■ Setup software title:

SANMOTION MOTOR SETUP SOFTWARE

■ Main Functions

Parameter settings (settings by group, settings by function)

Diagnosis (alarm display, warning display, alarm cancellation)

Test run execution (speed JOG, position JOG, motor starting point search, serial encoder clearance)

Servo tuning (notch filter tuning, FF vibration control frequency tuning)

Various measurement functions (operating waveform display, machinery frequency response measurement)

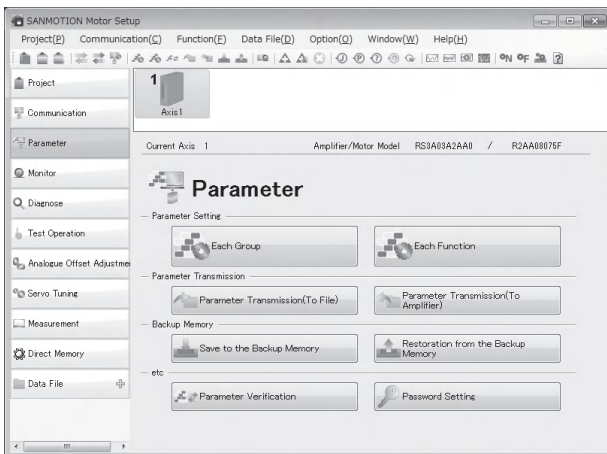
* Use a USB communication cable (mini-B socket) to connect the USB port of PC and servo amplifier.

■ Supported OS

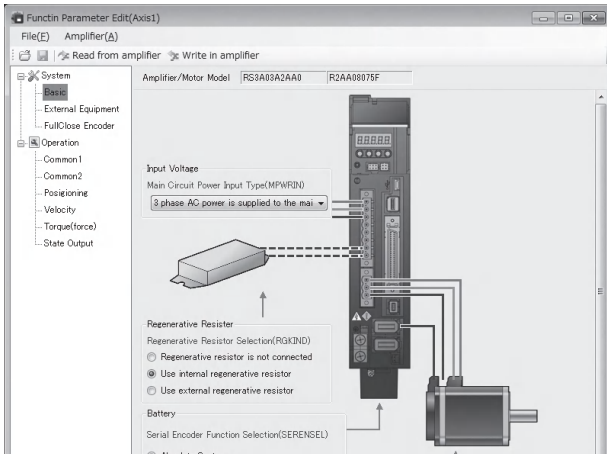
Windows XP (SP3 or higher) / Vista / 7 / 8

* See our website for details on supported versions.

Main screen

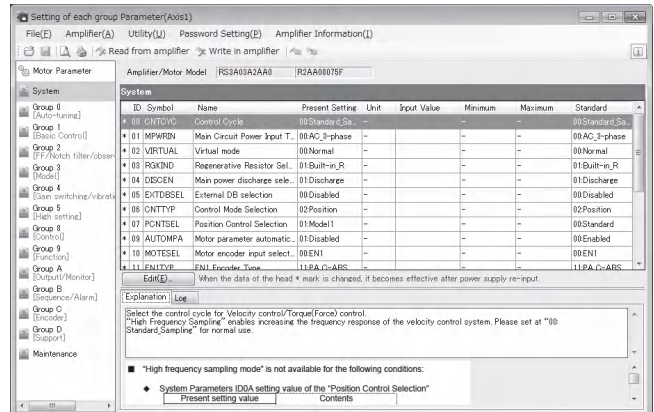


Parameter Setting screen



Function Parameter Edit

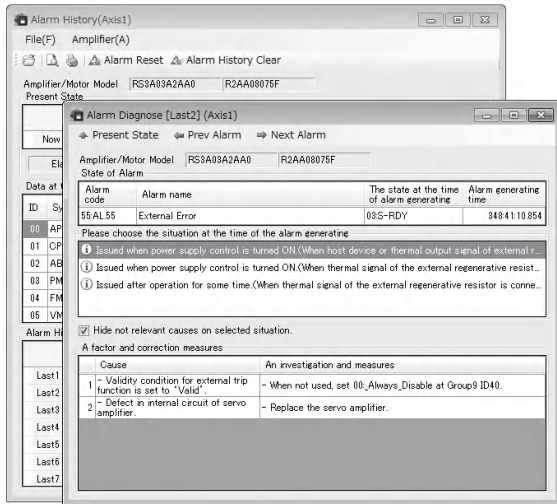
The minimum required parameters for operations can be collectively set.



Setting of each group Parameter

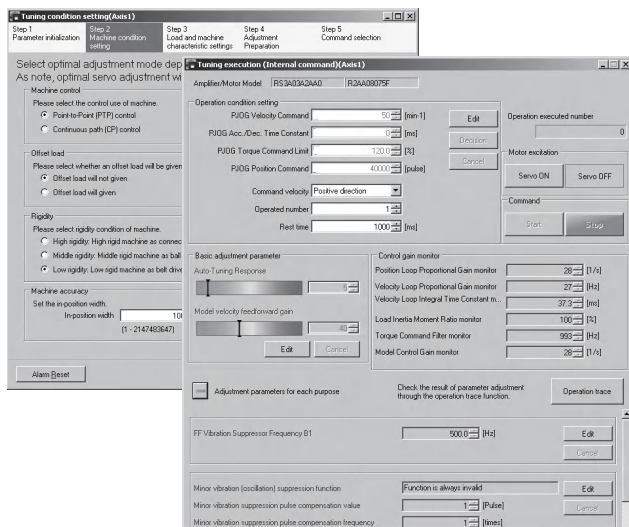
Parameters can be set, saved, and read from a PC.

Diagnosis screen



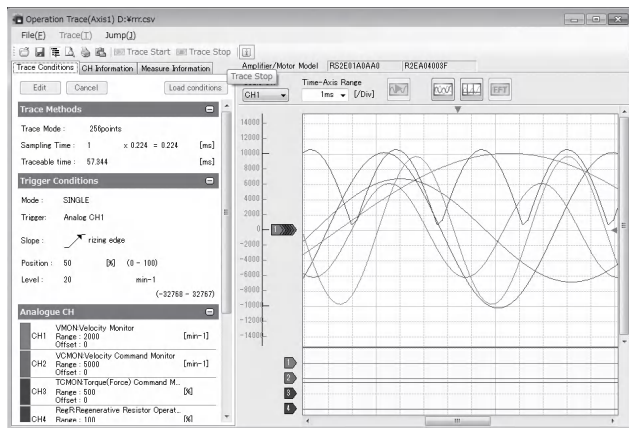
The current and previous 15 alarm occurrences can be checked. Causes and corrective actions can be checked based on alarm status.

Servo adjustment assist



By setting the mechanical conditions, easy servo adjustment is available with the optimal tuning mode.

Measurement



Operation Trace

Graphically displays servo motor's speed, torque and internal status.

Test run



Simple test run of servo motor by issuing velocity commands and position commands from a PC. (Position JOG in operation shown in screen)

Features

Setup Software

System Configuration

List of Combinations of Servo Amplifiers and Servo Motors

Set Model

How to Read Model Numbers

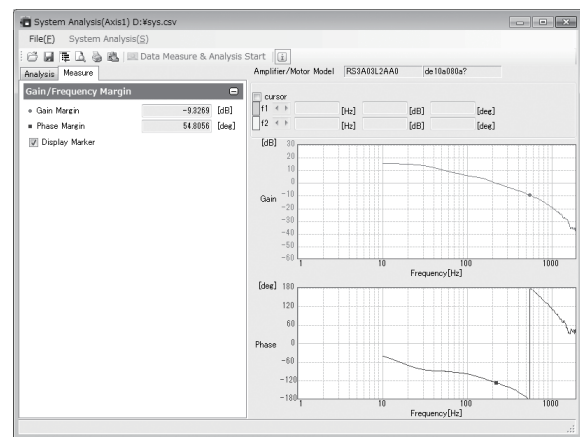
Standard Model Number List

Servo Amplifier Specifications

Servo Motor Specifications

Options

Selection Guide

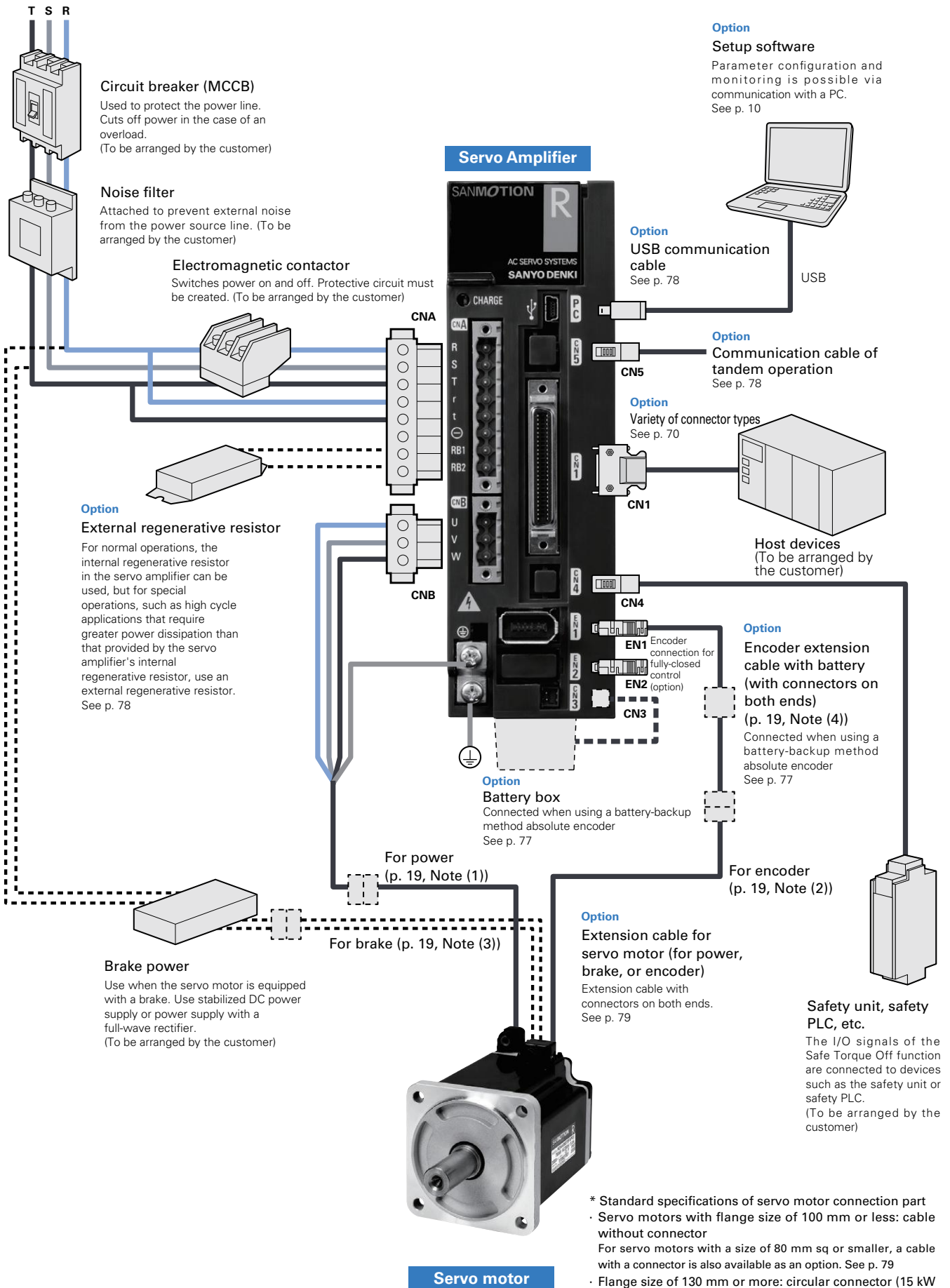


System Analysis

Analyzes servo system frequency characteristics.

Analog/Pulse Input Type Servo Amplifier

10 A to 50 A The photograph shows the 30 A model.

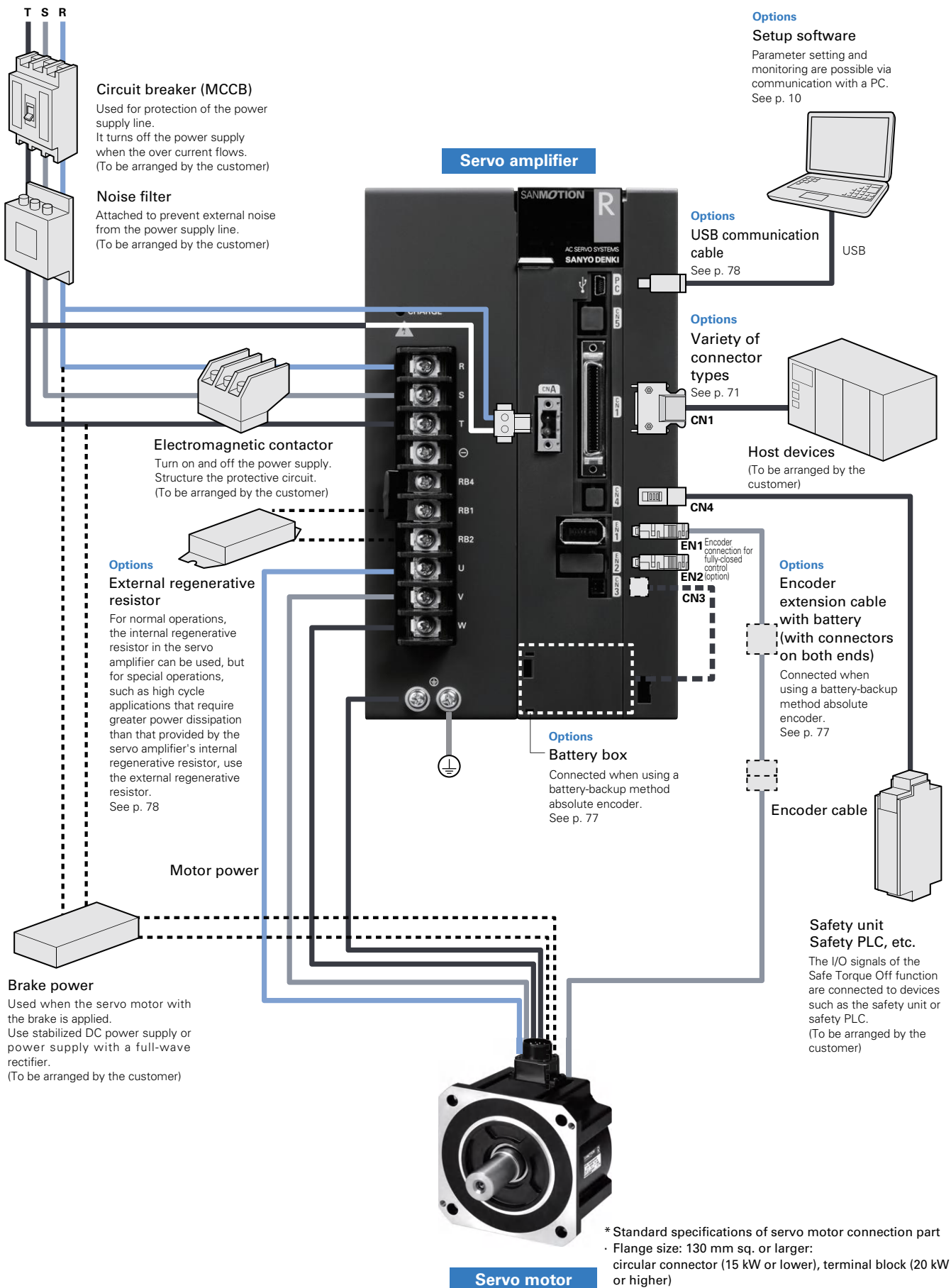


* Standard specifications of servo motor connection part
 · Servo motors with flange size of 100 mm or less: cable without connector
 For servo motors with a size of 80 mm sq or smaller, a cable with a connector is also available as an option. See p. 79
 · Flange size of 130 mm or more: circular connector (15 kW or lower), terminal block (20 kW or higher)

Analog/Pulse Input Type Servo Amplifier

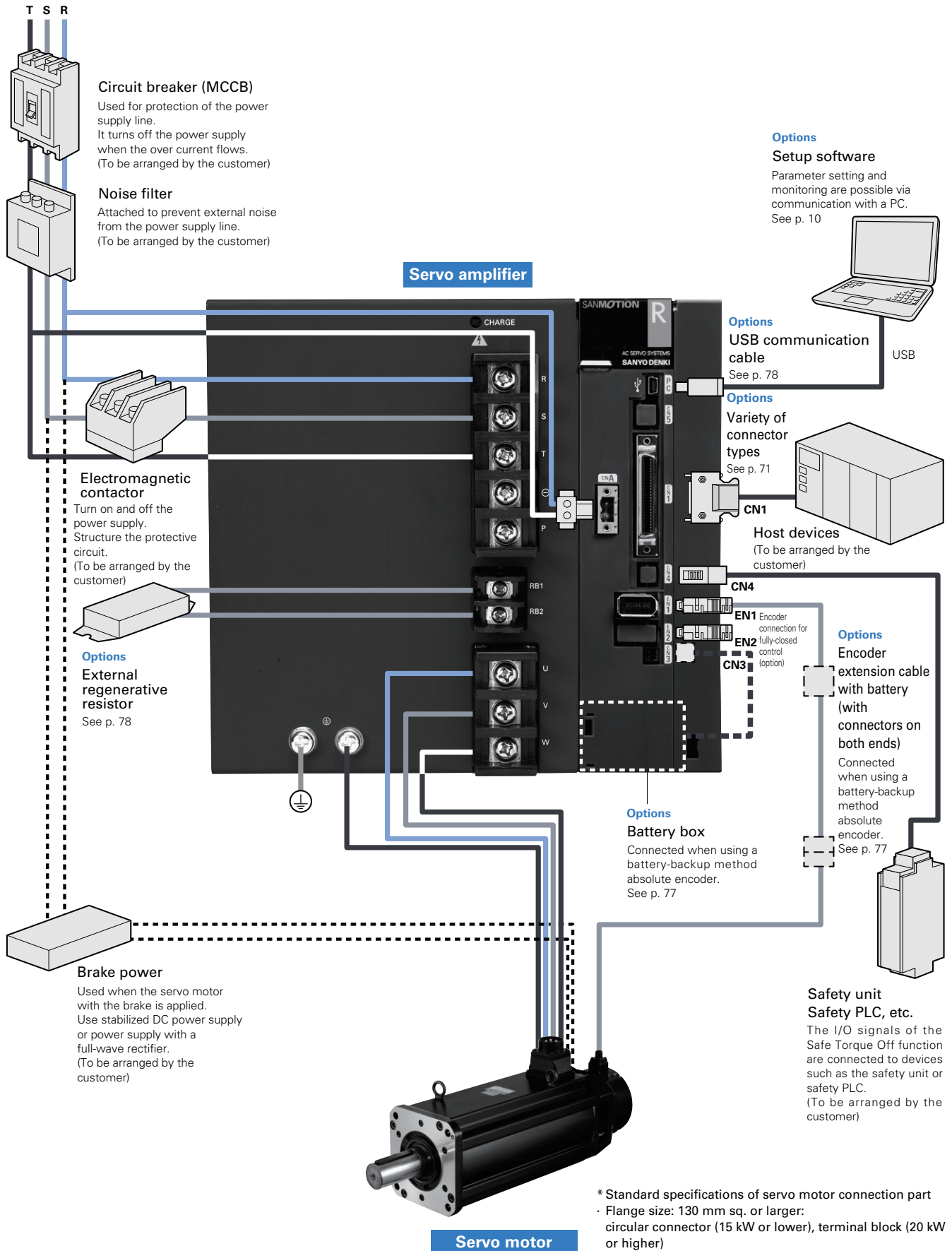
100 A to 150 A

The photograph shows the 150 A model.



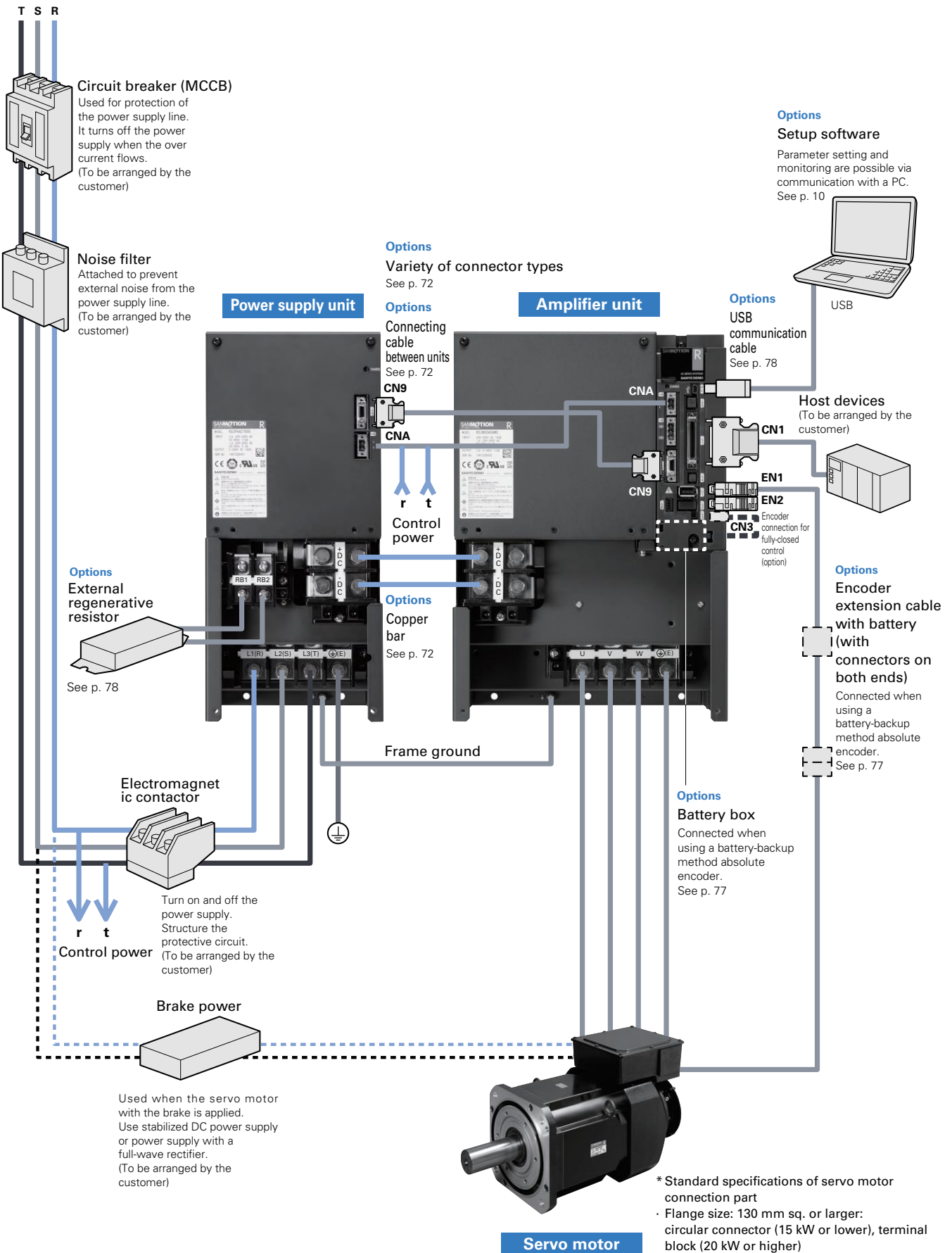
* Standard specifications of servo motor connection part
· Flange size: 130 mm sq. or larger:
circular connector (15 kW or lower), terminal block (20 kW or higher)

Analog/Pulse Input Type Servo Amplifier 300 A



* Standard specifications of servo motor connection part
 - Flange size: 130 mm sq. or larger:
 circular connector (15 kW or lower), terminal block (20 kW or higher)

Analog/Pulse Input Type Servo Amplifier 600 A



List of Combinations of Servo Amplifiers and Servo Motors

Standard specification **C** ...Output shaft: Straight, Oil seal: None, Connecting method: Cable

P ...Output shaft: With key, Oil seal: Yes, Connecting method: circular connector (15 kW or lower), Terminal block (20 kW or higher)

Type	Servo motor				Page		Servo amplifier	Page		Separate option
	Rated output [kW]	Flange size	Model name	Standard specification	Specifications	Exterior drawing	Model number (Amplifier capacity)	Specifications	Exterior drawing	Front mounting brackets
R2 Servo motor 100 V system Medium inertia	0.03	40 mm sq.	R2EA04003F	C	p. 46	p. 62	RS3E01 □□ (10 A)	p. 34	p. 35	AL-00880390-01
	0.05	40 mm sq.	R2EA04005F	C	p. 46	p. 62	RS3E02 □□ (20 A)	p. 34	p. 35	AL-00880390-01
	0.08	40 mm sq.	R2EA04008F	C	p. 46	p. 62	RS3E02 □□ (20 A)	p. 34	p. 35	AL-00880390-01
	0.1	60 mm sq.	R2EA06010F	C	p. 47	p. 62	RS3E02 □□ (20 A)	p. 34	p. 35	AL-00880390-01
	0.2	60 mm sq.	R2EA06020F	C	p. 47	p. 62	RS3E03 □□ (30 A)	p. 34	p. 35	AL-00880390-01
R2 Servo motor 200 V system Medium inertia	0.03	40 mm sq.	R2AA04003F	C	p. 48	p. 62	RS3A01 □□ (10 A)	p. 34	p. 35	AL-00880390-01
	0.05	40 mm sq.	R2AA04005F	C	p. 48	p. 62	RS3A01 □□ (10 A)	p. 34	p. 35	AL-00880390-01
	0.1 (0.09)*	40 mm sq.	R2AA04010F	C	p. 48	p. 62	RS3A01 □□ (10 A)	p. 34	p. 35	AL-00880390-01
	0.1	60 mm sq.	R2AA06010F	C	p. 48	p. 62	RS3A01 □□ (10 A)	p. 34	p. 35	AL-00880390-01
	0.2	60 mm sq.	R2AA06020F	C	p. 49	p. 62	RS3A02 □□ (20 A)	p. 34	p. 35	AL-00880390-01
	0.2	80 mm sq.	R2AA08020F	C	p. 49	p. 62	RS3A02 □□ (20 A)	p. 34	p. 35	AL-00880390-01
	0.4 (0.36)*	60 mm sq.	R2AA06040H	C	p. 49	p. 62	RS3A02 □□ (20 A)	p. 34	p. 35	AL-00880390-01
	0.4 (0.36)*	60 mm sq.	R2AA06040F	C	p. 49	p. 62	RS3A02 □□ (20 A)	p. 34	p. 35	AL-00880390-01
	0.4	80 mm sq.	R2AA08040F	C	p. 50	p. 62	RS3A02 □□ (20 A)	p. 34	p. 35	AL-00880390-01
	0.55	130 mm sq.	R2AA13050H	P	p. 51	p. 63	RS3A03 □□ (30 A)	p. 34	p. 35	AL-00880390-01
	0.55	130 mm sq.	R2AA13050D	P	p. 51	p. 63	RS3A03 □□ (30 A)	p. 34	p. 35	AL-00880390-01
	0.75	80 mm sq.	R2AA08075F	C	p. 50	p. 62	RS3A03 □□ (30 A)	p. 34	p. 35	AL-00880390-01
	0.75	100 mm sq.	R2AA10075F	C	p. 50	p. 62	RS3A03 □□ (30 A)	p. 34	p. 35	AL-00880390-01
	0.75	86 mm sq.	R2AAB8075F	C	p. 52	p. 62	RS3A05 □□ (50 A)	p. 34	p. 36	AL-00880391-01
	1	86 mm sq.	R2AAB8100H	C	p. 50	p. 62	RS3A03 □□ (30 A)	p. 34	p. 35	AL-00880390-01
	1	86 mm sq.	R2AAB8100F	C	p. 52	p. 62	RS3A05 □□ (50 A)	p. 34	p. 36	AL-00880391-01
	1	100 mm sq.	R2AA10100F	C	p. 52	p. 62	RS3A05 □□ (50 A)	p. 34	p. 36	AL-00880391-01
	1.2	130 mm sq.	R2AA13120B	P	p. 51	p. 63	RS3A03 □□ (30 A)	p. 34	p. 35	AL-00880390-01
	1.2	130 mm sq.	R2AA13120L	P	p. 52	p. 63	RS3A05 □□ (50 A)	p. 34	p. 36	AL-00880391-01
	1.2	130 mm sq.	R2AA13120D	P	p. 53	p. 63	RS3A05 □□ (50 A)	p. 34	p. 36	AL-00880391-01
	1.8	130 mm sq.	R2AA13180H	P	p. 53	p. 63	RS3A05 □□ (50 A)	p. 34	p. 36	AL-00880391-01
	1.8	130 mm sq.	R2AA13180D	P	p. 53	p. 63	RS3A10 □□ (100 A)	p. 34	p. 36	AL-00907039-01
	2	130 mm sq.	R2AA13200L	P	p. 53	p. 64	RS3A05 □□ (50 A)	p. 34	p. 36	AL-00880391-01
	2	130 mm sq.	R2AA13200D	P	p. 54	p. 64	RS3A10 □□ (100 A)	p. 34	p. 36	AL-00907039-01
	3.5	180 mm sq.	R2AA18350L	P	p. 54	p. 65	RS3A10 □□ (100 A)	p. 34	p. 36	AL-00907039-01
	3.5	180 mm sq.	R2AA18350D	P	p. 54	p. 65	RS3A15 □□ (150 A)	p. 34	p. 36	AL-00907039-01
	4.5	180 mm sq.	R2AA18450H	P	p. 54	p. 65	RS3A15 □□ (150 A)	p. 34	p. 36	AL-00907039-01
	5	220 mm sq.	R2AA22500L	P	p. 55	p. 66	RS3A15 □□ (150 A)	p. 34	p. 36	AL-00907039-01
	5.5	180 mm sq.	R2AA18550R	P	p. 55	p. 65	RS3A15 □□ (150 A)	p. 34	p. 36	AL-00907039-01
	5.5	180 mm sq.	R2AA18550H	P	p. 55	p. 65	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01
	7	220 mm sq.	R2AA22700S	P	p. 55	p. 66	RS3A15 □□ (150 A)	p. 34	p. 36	AL-00907039-01
	7.5	180 mm sq.	R2AA18750H	P	p. 56	p. 65	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01
	11	180 mm sq.	R2AA1811KR	P	p. 56	p. 65	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01
11	220 mm sq.	R2AA2211KB	P	p. 56	p. 66	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01	
15	220 mm sq.	R2AA2215KB	P	p. 56	p. 66	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01	
20	220 mm sq.	R2AA2220KB	P	p. 57	p. 67	RS3W60 □□ (600 A)	p. 34	p. 37	-	
25	220 mm sq.	R2AA2225KB	P	p. 57	p. 67	RS3W60 □□ (600 A)	p. 34	p. 37	-	
30	275 mm sq.	R2AA2830KV	P	p. 57	p. 67	RS3W60 □□ (600 A)	p. 34	p. 37	-	
R1 Servo motor 200 V system Low Inertia	5.5	180 mm sq.	R1AA18550H	P	p. 58	p. 68	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01
	7.5	180 mm sq.	R1AA18750L	P	p. 58	p. 68	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01
	11	180 mm sq.	R1AA1811KR	P	p. 59	p. 68	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01
	15	180 mm sq.	R1AA1815KB	P	p. 59	p. 68	RS3A30 □□ (300 A)	p. 34	p. 37	AL-00907040-01
	21	220 mm sq.	R1AA2220KV	P	p. 59	p. 68	RS3W60 □□ (600 A)	p. 34	p. 37	-

* If enclosed in (), it comes with a brake. Servo motors that come with oil seals (optional) may require an 80 to 95% reduction in output.

Type	Servo motor				Page		Servo amplifier	Page		Separate option
	Rated output [kW]	Flange size	Model name	Standard specification	Specifications	Exterior drawing	Model number 《Amplifier capacity》	Specifications	Exterior drawing	Front mounting brackets
R5 Servo motor 200 V system Medium inertia	0.2	60 mm sq.	R5AA06020H		p. 60	p. 62	RS3A01 □□ 《10 A》	p. 34	p. 35	AL-00880390-01
	0.2	60 mm sq.	R5AA06020F		p. 61	p. 62	RS3A02 □□ 《20 A》	p. 34	p. 35	AL-00880390-01
	0.4 (0.38)*	60 mm sq.	R5AA06040H		p. 60	p. 62	RS3A02 □□ 《20 A》	p. 34	p. 35	AL-00880390-01
	0.4*	60 mm sq.	R5AA06040F		p. 61	p. 62	RS3A02 □□ 《20 A》	p. 34	p. 35	AL-00880390-01
	0.75 (0.71)*	80 mm sq.	R5AA08075D		p. 60	p. 62	RS3A03 □□ 《30 A》	p. 34	p. 35	AL-00880390-01
	0.75 (0.675)*	80 mm sq.	R5AA08075F		p. 61	p. 62	RS3A03 □□ 《30 A》	p. 34	p. 35	AL-00880390-01

Separate option	Page	Remarks
Connector for servo amplifier · For the input power supply and regenerative resistor connection · To connect host device · To connect encoder · To connect servo motor · To connect safety device (short-circuiting) · To connect safety device (for wiring) · To input control power (100 A or higher)	pp. 70 to 72	
Encoder connector to connect motor	p. 73	Standard specifications of the left and top tables: Necessary for motor (15 kW or lower)
Cooling fan connector to connect motor	p. 73	Necessary for some motors with 11 kW or higher
Power connector to connect motor	p. 74	Standard specifications of the left and top tables: Necessary for motor (15 kW or lower)
Front mounting brackets	p. 75	
Battery and associated items for battery-backup method absolute encoder · Battery box *Cannot be used with the front mounting brackets (10 A to 50 A). · Battery for battery box (Lithium battery) · Encoder extension cable with battery, with connectors on both ends · Encoder extension cable with battery, with connector on one end · Battery for encoder extension cable (Lithium battery)	p. 77	
Analog monitor related · Monitor box · Dedicated cable	p. 77	
USB communication cable	p. 78	Cable for communication with PC for setup software
Communication cable of tandem operation between amplifiers	p. 78	
External regenerative resistor	p. 78	
Servo motor extension cable	p. 79	

The following devices are to be arranged by the customer.

- Circuit breaker (MCCB), noise filter, electromagnetic contactor, brake power, safety unit, safety PLC
- Cable for servo motor with a size of 130 mm sq. or larger (check the recommended motor power line on p. 74 before preparing the cable.)

Input voltage 200 V AC

• We offer 30 to 750 W AC servo motors and servo amplifiers in sets with peripheral cables and connectors.

Set contents



Servo motor
Servo amplifier
Connector



Cable (option)

- **Extension cable for servo motor (1, 2, 3, 5, and 10 m)**
* Select the cable length
- **Encoder extension cable with battery**
* Not necessary when used as an incremental system
- **USB communication cable (1 and 2 m)**
* Select the cable length

Servo motor specifications Protection code: IP67. CE/UL approval: no. Encoder classification: battery-backup method absolute encoder (PA035C). Output shaft: straight. Oil seal: no. Connection: connect with an extension cable. (Connector specification → p.79)

Servo amplifier specifications Main circuit power supply: 3-phase 200 to 240 V AC. Interface: analog/pulse. General output: sink. Internal regenerative resistor. Safe Torque Off function: no.

Rated output	Motor flange size	Holding brake	Ordered model no. set model	Set components											
				Motor model no.	Page		Amplifier model no.	Page		Connector					
					Specifications	Dimensions		Specifications	Dimensions						
30 W	40 mm sq.	No	SR403X01	R2AA04003FXPA0	p. 48	p. 62	RS3A01A0AA0	p. 34	p. 35	Connector for connections with host devices (CN1)					
		Yes (24 V DC)	SR403C01	R2AA04003FCPA0	p. 48	p. 62									
50 W		No	SR405X01	R2AA04005FXPA0	p. 48	p. 62									
		Yes (24 V DC)	SR405C01	R2AA04005FCPA0	p. 48	p. 62									
100 W		No	SR410X01	R2AA04010FXPA0	p. 48	p. 62									
90 W		Yes (24 V DC)	SR410C01	R2AA04010FCPA0	p. 48	p. 62									
100 W		60 mm sq.	No	SR610X01	R2AA06010FXPA0	p. 48					p. 62	RS3A02A0AA0	p. 34	p. 35	Connector for input power, regenerative resistor connections (CNA)
			Yes (24 V DC)	SR610C01	R2AA06010FCPA0	p. 48					p. 62				
200 W	No		SR620X02	R2AA06020FXPA0	p. 49	p. 62									
	Yes (24 V DC)		SR620C02	R2AA06020FCPA0	p. 49	p. 62									
400 W	No		SR640X02	R2AA06040FXPA0	p. 49	p. 62									
360 W	Yes (24 V DC)		SR640C02	R2AA06040FCPA0	p. 49	p. 62									
750 W	80 mm sq.		No	SR875X03	R2AA08075FXPA0	p. 50	p. 62	RS3A03A0AA0	p. 34	p. 35					
			Yes (24 V DC)	SR875C03	R2AA08075FCPA0	p. 50	p. 62								

Available Options

These items will be shipped together when purchased with a Set Model.

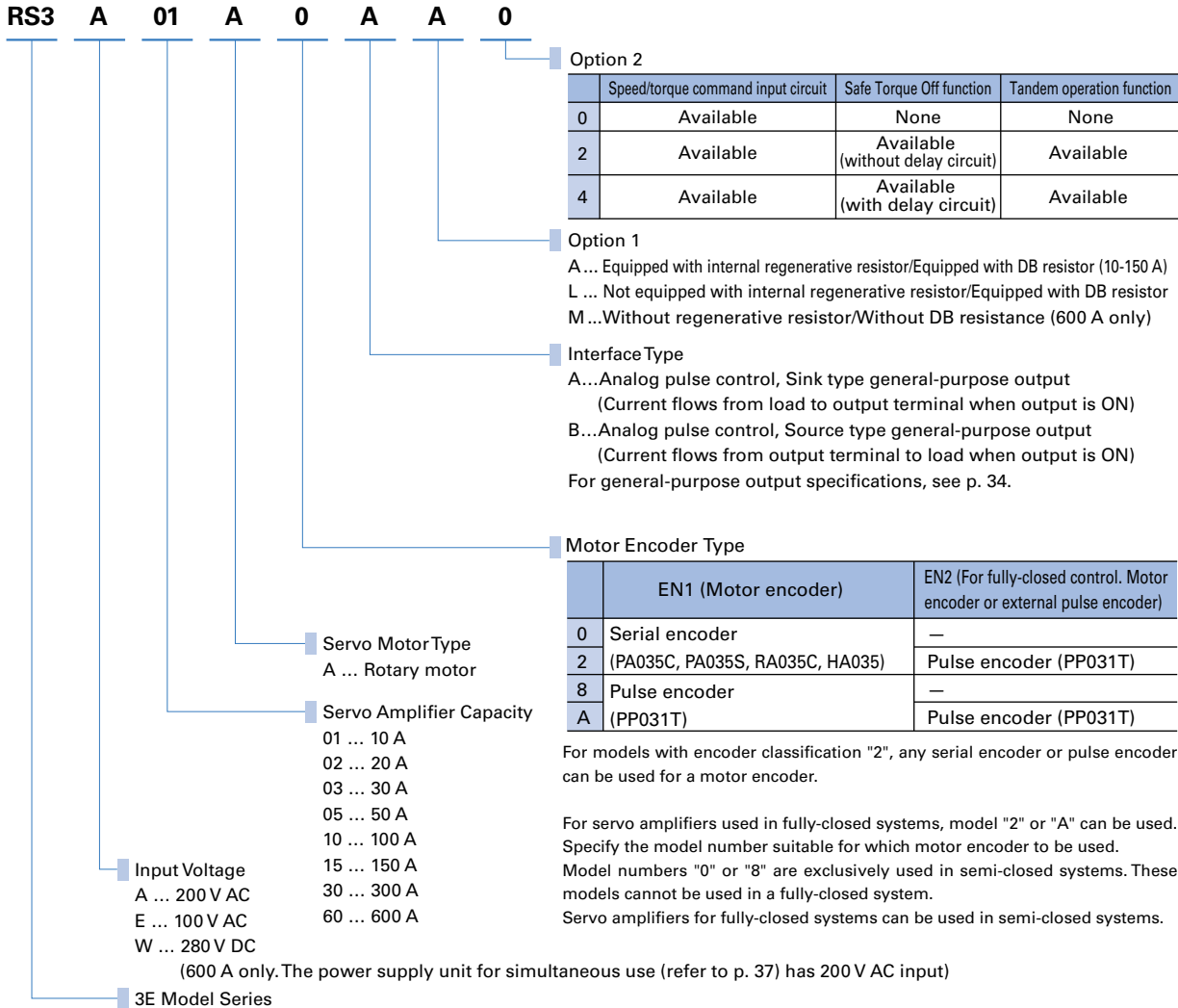
Type	Cable length (m)	Model no.	Page	
Servo motor extension cable (Servo motor ⇔ Servo amplifier)	(1) For power	1	RS-CM4-01-R	p. 79
		2	RS-CM4-02-R	p. 79
		3	RS-CM4-03-R	p. 79
		5	RS-CM4-05-R	p. 79
		10	RS-CM4-10-R	p. 79
	(2) For encoder	1	RS-CA4-01-R	p. 79
		2	RS-CA4-02-R	p. 79
		3	RS-CA4-03-R	p. 79
		5	RS-CA4-05-R	p. 79
		10	RS-CA4-10-R	p. 79
	(3) For brake	1	RS-CB3-01-R	p. 79
		2	RS-CB3-02-R	p. 79
		3	RS-CB3-03-R	p. 79
		5	RS-CB3-05-R	p. 79
		10	RS-CB3-10-R	p. 79
(4) Encoder extension cable with battery (Servo amplifier ⇔ Encoder) For connection when using an absolute encoder.	0.3	AL-00731792-01	p. 77	
(5) USB communication cable (cable for communication with PC for setup software)	1	AL-00896515-01	p. 78	
	2	AL-00896515-02	p. 78	

How to Read Model Numbers

Not all combinations shown below are valid. For available models, refer to "Standard Model Number List" on pp. 22-32.

Servo Amplifier

Example: An RS3 series servo amplifier model, with 200 V AC input voltage, 10 A amplifier capacity, internal regenerative resistor, without Safe Torque Off function.



· Motor parameters need to be set for the amplifier before use. Use the setup software.

Conformance to Safety Standards

Our standard servo amplifier achieves the KC Mark of safety and conforms to the international UL, c-UL, EN standards.

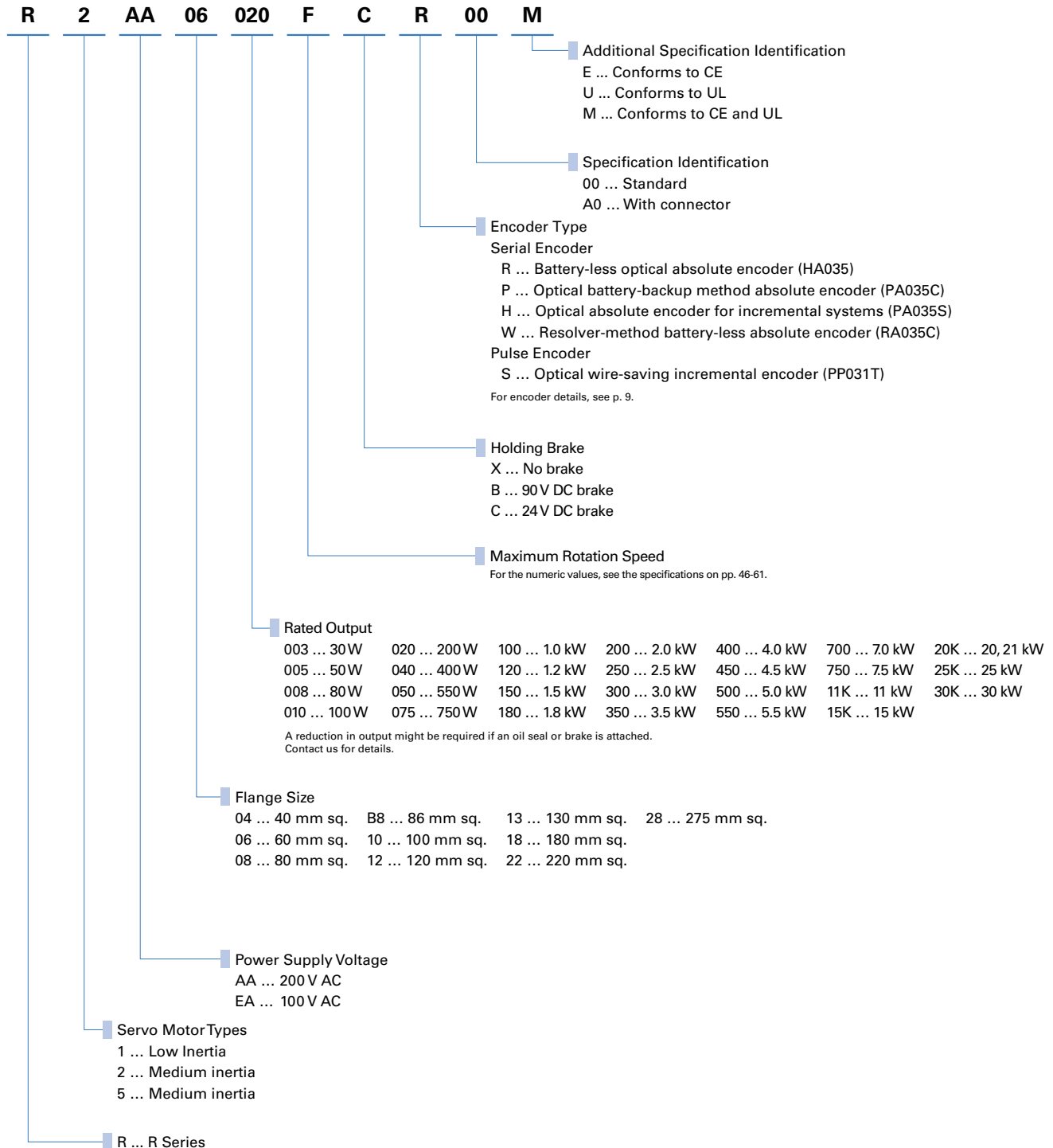
You can also employ servo motors that conform to the UL, c-UL and EN standards.

In addition, all model numbers manufactured after October 2012 in this catalog conform with the acceptable values of specific hazardous substances (cadmium, lead, mercury, hexavalent chrome, PBB, and PBDE) in Appendix II of EU RoHS directive (2011/65/EU).



■ Servo Motor

Example: An R2 series servo motor model with a 60 mm sq. flange size, 200 W rated output, 6000 min⁻¹ maximum rotation speed, 24 V DC brake, and a battery-less optical absolute encoder (131072 partition number/rotation), with UL/CE approval.



• For speed reducer installation, contact us for details.

Input voltage 100 V AC

Servo Amplifier

Type	Main circuit power supply	Control power	Encoder type	General output	Internal regenerative resistor	Safe Torque Off function (without delay), tandem operation function	Amplifier capacity	Model no.	Page	
									Specifications	Dimensions
Analog/Pulse input type	100 V AC system 100 to 120 V AC single-phase	100 V AC system 100 to 120 V AC single-phase	Serial encoder	Sink	No	No	10 A	RS3E01A0AL0	p. 34	p. 35
							20 A	RS3E02A0AL0	p. 34	p. 35
							30 A	RS3E03A0AL0	p. 34	p. 35
						Yes	10 A	RS3E01A0AL2	p. 34	p. 35
							20 A	RS3E02A0AL2	p. 34	p. 35
							30 A	RS3E03A0AL2	p. 34	p. 35
					Yes	No	10 A	RS3E01A0AA0	p. 34	p. 35
							20 A	RS3E02A0AA0	p. 34	p. 35
							30 A	RS3E03A0AA0	p. 34	p. 35
						Yes	10 A	RS3E01A0AA2	p. 34	p. 35
							20 A	RS3E02A0AA2	p. 34	p. 35
							30 A	RS3E03A0AA2	p. 34	p. 35
				Source	No	No	10 A	RS3E01A0BL0	p. 34	p. 35
							20 A	RS3E02A0BL0	p. 34	p. 35
							30 A	RS3E03A0BL0	p. 34	p. 35
						Yes	10 A	RS3E01A0BL2	p. 34	p. 35
							20 A	RS3E02A0BL2	p. 34	p. 35
							30 A	RS3E03A0BL2	p. 34	p. 35
					Yes	No	10 A	RS3E01A0BA0	p. 34	p. 35
							20 A	RS3E02A0BA0	p. 34	p. 35
							30 A	RS3E03A0BA0	p. 34	p. 35
						Yes	10 A	RS3E01A0BA2	p. 34	p. 35
							20 A	RS3E02A0BA2	p. 34	p. 35
							30 A	RS3E03A0BA2	p. 34	p. 35

* Our standard servo amplifier achieves the KC Mark of safety and conforms to the international UL, c-UL, EN standards.

Input voltage 100 V AC

R2 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connection: cable (no connector)

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page			
					Battery-less optical absolute encoder (HA035)	Optical absolute encoder for incremental systems (PA035S)	Specifications	Dimensions		
30 W	40 mm sq.	IP67	No	No	R2EA04003FXR00	R2EA04003FXH00	p. 46	p. 62		
				Yes	R2EA04003FXR00M	R2EA04003FXH00M	p. 46	p. 62		
			Yes (24 V DC)	No	R2EA04003FCR00	R2EA04003FCH00	p. 46	p. 62		
				Yes	R2EA04003FCR00M	R2EA04003FCH00M	p. 46	p. 62		
			IP65	No	No	R2EA04003FXR03	R2EA04003FXH03	p. 46	p. 62	
					Yes	R2EA04003FXR03M	R2EA04003FXH03M	p. 46	p. 62	
		Yes (24 V DC)	No	R2EA04003FCR03	R2EA04003FCH03	p. 46	p. 62			
			Yes	R2EA04003FCR03M	R2EA04003FCH03M	p. 46	p. 62			
		50 W	40 mm sq.	IP67	No	No	R2EA04005FXR00	R2EA04005FXH00	p. 46	p. 62
						Yes	R2EA04005FXR00M	R2EA04005FXH00M	p. 46	p. 62
					Yes (24 V DC)	No	R2EA04005FCR00	R2EA04005FCH00	p. 46	p. 62
						Yes	R2EA04005FCR00M	R2EA04005FCH00M	p. 46	p. 62
IP65	No				No	R2EA04005FXR03	R2EA04005FXH03	p. 46	p. 62	
					Yes	R2EA04005FXR03M	R2EA04005FXH03M	p. 46	p. 62	
Yes (24 V DC)	No			R2EA04005FCR03	R2EA04005FCH03	p. 46	p. 62			
	Yes			R2EA04005FCR03M	R2EA04005FCH03M	p. 46	p. 62			
80 W	40 mm sq.			IP67	No	No	R2EA04008FXR00	R2EA04008FXH00	p. 46	p. 62
						Yes	R2EA04008FXR00M	R2EA04008FXH00M	p. 46	p. 62
					Yes (24 V DC)	No	R2EA04008FCR00	R2EA04008FCH00	p. 46	p. 62
						Yes	R2EA04008FCR00M	R2EA04008FCH00M	p. 46	p. 62
		IP65	No		No	R2EA04008FXR03	R2EA04008FXH03	p. 46	p. 62	
					Yes	R2EA04008FXR03M	R2EA04008FXH03M	p. 46	p. 62	
		Yes (24 V DC)	No	R2EA04008FCR03	R2EA04008FCH03	p. 46	p. 62			
			Yes	R2EA04008FCR03M	R2EA04008FCH03M	p. 46	p. 62			
		100 W	60 mm sq.	IP67	No	No	R2EA06010FXR00	R2EA06010FXH00	p. 47	p. 62
						Yes	R2EA06010FXR00M	R2EA06010FXH00M	p. 47	p. 62
					Yes (24 V DC)	No	R2EA06010FCR00	R2EA06010FCH00	p. 47	p. 62
						Yes	R2EA06010FCR00M	R2EA06010FCH00M	p. 47	p. 62
IP65	No				No	R2EA06010FXR03	R2EA06010FXH03	p. 47	p. 62	
					Yes	R2EA06010FXR03M	R2EA06010FXH03M	p. 47	p. 62	
Yes (24 V DC)	No			R2EA06010FCR03	R2EA06010FCH03	p. 47	p. 62			
	Yes			R2EA06010FCR03M	R2EA06010FCH03M	p. 47	p. 62			
200 W	60 mm sq.			IP67	No	No	R2EA06020FXR00	R2EA06020FXH00	p. 47	p. 62
						Yes	R2EA06020FXR00M	R2EA06020FXH00M	p. 47	p. 62
					Yes (24 V DC)	No	R2EA06020FCR00	R2EA06020FCH00	p. 47	p. 62
						Yes	R2EA06020FCR00M	R2EA06020FCH00M	p. 47	p. 62
		IP65	No		No	R2EA06020FXR03	R2EA06020FXH03	p. 47	p. 62	
					Yes	R2EA06020FXR03M	R2EA06020FXH03M	p. 47	p. 62	
		Yes (24 V DC)	No	R2EA06020FCR03	R2EA06020FCH03	p. 47	p. 62			
			Yes	R2EA06020FCR03M	R2EA06020FCH03M	p. 47	p. 62			

Note: Servo motors that come with oil seals (optional) may require an 80 to 95% reduction in output.

Features

Setup Software

System Configuration

List of Combinations of Servo Amplifiers and Servo Motors

Set Model

How to Read Model Numbers

Standard Model Number List

Servo Amplifier Specifications

Servo Motor Specifications

Options

Selection Guide

Input voltage 200 V AC

Servo Amplifier

Type	Main circuit power supply	Control power	Encoder type	General output	Internal regenerative resistor	Safe Torque Off function (without delay), tandem operation function	Amplifier capacity	Model no.	Page	
									Specifications	Dimensions
Analog/Pulse input type	200 V AC system 200 to 240 V AC 3-phase (can be also used for single-phase with 50 A or lower.)	200 V AC system 200 to 240 V AC single-phase	Serial encoder	Sink	No	No	10 A	RS3A01A0AL0	p. 34	p. 35
							20 A	RS3A02A0AL0	p. 34	p. 35
							30 A	RS3A03A0AL0	p. 34	p. 35
							50 A	RS3A05A0AL0	p. 34	p. 36
							100 A	RS3A10A0AL0	p. 34	p. 36
							150 A	RS3A15A0AL0	p. 34	p. 36
							300 A	RS3A30A0AL0	p. 34	p. 37
							600 A	RS3W60A0AM0	p. 34	p. 37
							10 A	RS3A01A0AL2	p. 34	p. 35
							20 A	RS3A02A0AL2	p. 34	p. 35
							30 A	RS3A03A0AL2	p. 34	p. 35
							50 A	RS3A05A0AL2	p. 34	p. 36
							100 A	RS3A10A0AL2	p. 34	p. 36
							150 A	RS3A15A0AL2	p. 34	p. 36
							300 A	RS3A30A0AL2	p. 34	p. 37
							600 A	RS3W60A0AM2	p. 34	p. 37
							10 A	RS3A01A0AA0	p. 34	p. 35
							20 A	RS3A02A0AA0	p. 34	p. 35
							30 A	RS3A03A0AA0	p. 34	p. 35
							50 A	RS3A05A0AA0	p. 34	p. 36
							100 A	RS3A10A0AA0	p. 34	p. 36
				150 A	RS3A15A0AA0	p. 34	p. 36			
				10 A	RS3A01A0AA2	p. 34	p. 35			
				20 A	RS3A02A0AA2	p. 34	p. 35			
				30 A	RS3A03A0AA2	p. 34	p. 35			
				50 A	RS3A05A0AA2	p. 34	p. 36			
				100 A	RS3A10A0AA2	p. 34	p. 36			
				150 A	RS3A15A0AA2	p. 34	p. 36			
				10 A	RS3A01A0BL0	p. 34	p. 35			
				20 A	RS3A02A0BL0	p. 34	p. 35			
				30 A	RS3A03A0BL0	p. 34	p. 35			
				50 A	RS3A05A0BL0	p. 34	p. 36			
				100 A	RS3A10A0BL0	p. 34	p. 36			
				150 A	RS3A15A0BL0	p. 34	p. 36			
				300 A	RS3A30A0BL0	p. 34	p. 37			
				600 A	RS3W60A0BM0	p. 34	p. 37			
				10 A	RS3A01A0BL2	p. 34	p. 35			
				20 A	RS3A02A0BL2	p. 34	p. 35			
				30 A	RS3A03A0BL2	p. 34	p. 35			
				50 A	RS3A05A0BL2	p. 34	p. 36			
				100 A	RS3A10A0BL2	p. 34	p. 36			
				150 A	RS3A15A0BL2	p. 34	p. 36			
300 A	RS3A30A0BL2	p. 34	p. 37							
600 A	RS3W60A0BM2	p. 34	p. 37							
10 A	RS3A01A0BA0	p. 34	p. 35							
20 A	RS3A02A0BA0	p. 34	p. 35							
30 A	RS3A03A0BA0	p. 34	p. 35							
50 A	RS3A05A0BA0	p. 34	p. 36							
100 A	RS3A10A0BA0	p. 34	p. 36							
150 A	RS3A15A0BA0	p. 34	p. 36							
10 A	RS3A01A0BA2	p. 34	p. 35							
20 A	RS3A02A0BA2	p. 34	p. 35							
30 A	RS3A03A0BA2	p. 34	p. 35							
50 A	RS3A05A0BA2	p. 34	p. 36							
100 A	RS3A10A0BA2	p. 34	p. 36							
150 A	RS3A15A0BA2	p. 34	p. 36							

* Our standard servo amplifier achieves the KC Mark of safety and conforms to the international UL, c-UL, EN standards.

Power supply unit for 600 A servo amplifier

Used together with 600 A amplifier unit.

Model no.	Page (dimensions)
RS3PAA27000	p. 37

Input voltage 200 V AC

R2 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connection: cable (no connector)

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page			
					Battery-less optical absolute encoder (HA035)	Optical absolute encoder for incremental systems (PA035S)	Specifications	Dimensions		
30 W	40 mm sq.	IP67	No	No	R2AA04003FXR00	R2AA04003FXH00	p. 48	p. 62		
				Yes	R2AA04003FXR00M	R2AA04003FXH00M	p. 48	p. 62		
			Yes (24 V DC)	No	R2AA04003FCR00	R2AA04003FCH00	p. 48	p. 62		
				Yes	R2AA04003FCR00M	R2AA04003FCH00M	p. 48	p. 62		
			IP65	No	No	R2AA04003FXR03	R2AA04003FXH03	p. 48	p. 62	
					Yes	R2AA04003FXR03M	R2AA04003FXH03M	p. 48	p. 62	
		Yes (24 V DC)	No	R2AA04003FCR03	R2AA04003FCH03	p. 48	p. 62			
			Yes	R2AA04003FCR03M	R2AA04003FCH03M	p. 48	p. 62			
		50 W	40 mm sq.	IP67	No	No	R2AA04005FXR00	R2AA04005FXH00	p. 48	p. 62
						Yes	R2AA04005FXR00M	R2AA04005FXH00M	p. 48	p. 62
					Yes (24 V DC)	No	R2AA04005FCR00	R2AA04005FCH00	p. 48	p. 62
						Yes	R2AA04005FCR00M	R2AA04005FCH00M	p. 48	p. 62
IP65	No				No	R2AA04005FXR03	R2AA04005FXH03	p. 48	p. 62	
					Yes	R2AA04005FXR03M	R2AA04005FXH03M	p. 48	p. 62	
Yes (24 V DC)	No			R2AA04005FCR03	R2AA04005FCH03	p. 48	p. 62			
	Yes			R2AA04005FCR03M	R2AA04005FCH03M	p. 48	p. 62			
90 W	40 mm sq.			IP67	Yes (24 V DC)	No	R2AA04010FCR00	R2AA04010FCH00	p. 48	p. 62
						Yes	R2AA04010FCR00M6	R2AA04010FCH00M6	p. 48	p. 62
						No	R2AA04010FCR03	R2AA04010FCH03	p. 48	p. 62
				IP65		Yes	R2AA04010FCR03M6	R2AA04010FCH03M6	p. 48	p. 62
		No	No			R2AA04010FXR00	R2AA04010FXH00	p. 48	p. 62	
			Yes			R2AA04010FXR00M	R2AA04010FXH00M	p. 48	p. 62	
100 W	40 mm sq.	IP67	No	No	R2AA04010FXR00	R2AA04010FXH00	p. 48	p. 62		
				Yes	R2AA04010FXR00M	R2AA04010FXH00M	p. 48	p. 62		
				No	R2AA04010FXR03	R2AA04010FXH03	p. 48	p. 62		
		IP65		Yes	R2AA04010FXR03M	R2AA04010FXH03M	p. 48	p. 62		
				No	No	R2AA06010FXR00	R2AA06010FXH00	p. 48	p. 62	
					Yes	R2AA06010FXR00M	R2AA06010FXH00M	p. 48	p. 62	
	60 mm sq.	IP67	Yes (24 V DC)	No	R2AA06010FCR00	R2AA06010FCH00	p. 48	p. 62		
				Yes	R2AA06010FCR00M	R2AA06010FCH00M	p. 48	p. 62		
				No	R2AA06010FCR03	R2AA06010FCH03	p. 48	p. 62		
		IP65		Yes	R2AA06010FCR03M	R2AA06010FCH03M	p. 48	p. 62		
				No	No	R2AA06010FXR03	R2AA06010FXH03	p. 48	p. 62	
					Yes	R2AA06010FXR03M	R2AA06010FXH03M	p. 48	p. 62	
200 W	60 mm sq.	IP67	No	No	R2AA06020FXR00	R2AA06020FXH00	p. 49	p. 62		
				Yes	R2AA06020FXR00M	R2AA06020FXH00M	p. 49	p. 62		
				No	R2AA06020FCR00	R2AA06020FCH00	p. 49	p. 62		
		IP65		Yes	R2AA06020FCR00M	R2AA06020FCH00M	p. 49	p. 62		
				No	No	R2AA06020FXR03	R2AA06020FXH03	p. 49	p. 62	
					Yes	R2AA06020FXR03M	R2AA06020FXH03M	p. 49	p. 62	
	80 mm sq.	IP67	Yes (24 V DC)	No	R2AA06020FCR03	R2AA06020FCH03	p. 49	p. 62		
				Yes	R2AA06020FCR03M	R2AA06020FCH03M	p. 49	p. 62		
				No	R2AA08020FXR00	R2AA08020FXH00	p. 49	p. 62		
		IP65		Yes	R2AA08020FXR00M	R2AA08020FXH00M	p. 49	p. 62		
				No	No	R2AA08020FCR00	R2AA08020FCH00	p. 49	p. 62	
					Yes	R2AA08020FCR00M	R2AA08020FCH00M	p. 49	p. 62	
80 mm sq.	IP67	No	No	R2AA08020FXR03	R2AA08020FXH03	p. 49	p. 62			
			Yes	R2AA08020FXR03M	R2AA08020FXH03M	p. 49	p. 62			
			No	R2AA08020FCR03	R2AA08020FCH03	p. 49	p. 62			
	IP65		Yes	R2AA08020FCR03M	R2AA08020FCH03M	p. 49	p. 62			
			No	No	R2AA08020FXR03	R2AA08020FXH03	p. 49	p. 62		
				Yes	R2AA08020FXR03M	R2AA08020FXH03M	p. 49	p. 62		

Note: The products that come with oil seals (optional) may have 80 to 95% reduction in rating.

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R2 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connection: cable (no connector)

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page		
					Battery-less optical absolute encoder (HA035)	Optical absolute encoder for incremental systems (PA035S)	Specifications	Dimensions	
360 W	60 mm sq.	IP67	Yes (24 V DC)	No	R2AA06040FCR00	R2AA06040FCH00	p. 49	p. 62	
				Yes	R2AA06040FCR00M6	R2AA06040FCH00M6	p. 49	p. 62	
				No	R2AA06040HCR00	R2AA06040HCH00	p. 49	p. 62	
				Yes	R2AA06040HCR00M6	R2AA06040HCH00M6	p. 49	p. 62	
		IP65		No	R2AA06040FCR03	R2AA06040FCH03	p. 49	p. 62	
				Yes	R2AA06040FCR03M6	R2AA06040FCH03M6	p. 49	p. 62	
				No	R2AA06040HCR03	R2AA06040HCH03	p. 49	p. 62	
				Yes	R2AA06040HCR03M6	R2AA06040HCH03M6	p. 49	p. 62	
400 W	60 mm sq.	IP67	No	No	R2AA06040FXR00	R2AA06040FXH00	p. 49	p. 62	
				Yes	R2AA06040FXR00M	R2AA06040FXH00M	p. 49	p. 62	
				No	R2AA06040HXR00	R2AA06040HXH00	p. 49	p. 62	
				Yes	R2AA06040HXR00M	R2AA06040HXH00M	p. 49	p. 62	
		IP65		No	R2AA06040FXR03	R2AA06040FXH03	p. 49	p. 62	
				Yes	R2AA06040FXR03M	R2AA06040FXH03M	p. 49	p. 62	
				No	R2AA06040HXR03	R2AA06040HXH03	p. 49	p. 62	
				Yes	R2AA06040HXR03M	R2AA06040HXH03M	p. 49	p. 62	
	80 mm sq.	IP67	No	No	R2AA08040FXR00	R2AA08040FXH00	p. 50	p. 62	
				Yes	R2AA08040FXR00M	R2AA08040FXH00M	p. 50	p. 62	
				No	R2AA08040FCR00	R2AA08040FCH00	p. 50	p. 62	
				Yes	R2AA08040FCR00M	R2AA08040FCH00M	p. 50	p. 62	
		IP65		Yes (24 V DC)	No	R2AA08040FXR03	R2AA08040FXH03	p. 50	p. 62
					Yes	R2AA08040FXR03M	R2AA08040FXH03M	p. 50	p. 62
					No	R2AA08040FCR03	R2AA08040FCH03	p. 50	p. 62
					Yes	R2AA08040FCR03M	R2AA08040FCH03M	p. 50	p. 62
750 W	80 mm sq.	IP67	No		No	R2AA08075FXR00	R2AA08075FXH00	p. 50	p. 62
					Yes	R2AA08075FXR00M	R2AA08075FXH00M	p. 50	p. 62
					No	R2AA08075FCR00	R2AA08075FCH00	p. 50	p. 62
					Yes	R2AA08075FCR00M	R2AA08075FCH00M	p. 50	p. 62
		IP65		Yes (24 V DC)	No	R2AA08075FXR03	R2AA08075FXH03	p. 50	p. 62
					Yes	R2AA08075FXR03M	R2AA08075FXH03M	p. 50	p. 62
					No	R2AA08075FCR03	R2AA08075FCH03	p. 50	p. 62
					Yes	R2AA08075FCR03M	R2AA08075FCH03M	p. 50	p. 62
	86 mm sq.	IP67	No		No	R2AAB8075FXR00	R2AAB8075FXH00	p. 52	p. 62
					Yes	R2AAB8075FXR00M	R2AAB8075FXH00M	p. 52	p. 62
					No	R2AAB8075FCR00	R2AAB8075FCH00	p. 52	p. 62
					Yes	R2AAB8075FCR00M	R2AAB8075FCH00M	p. 52	p. 62
		IP65		Yes (24 V DC)	No	R2AAB8075FXR03	R2AAB8075FXH03	p. 52	p. 62
					Yes	R2AAB8075FXR03M	R2AAB8075FXH03M	p. 52	p. 62
					No	R2AAB8075FCR03	R2AAB8075FCH03	p. 52	p. 62
					Yes	R2AAB8075FCR03M	R2AAB8075FCH03M	p. 52	p. 62
100 mm sq.	IP67	No	No		R2AA10075FXR00	R2AA10075FXH00	p. 50	p. 62	
			Yes		R2AA10075FXR00M	R2AA10075FXH00M	p. 50	p. 62	
			No		R2AA10075FCR00	R2AA10075FCH00	p. 50	p. 62	
			Yes		R2AA10075FCR00M	R2AA10075FCH00M	p. 50	p. 62	
			No	R2AA10075FXR03	R2AA10075FXH03	p. 50	p. 62		
			Yes	R2AA10075FXR03M	R2AA10075FXH03M	p. 50	p. 62		
	IP65	Yes (24 V DC)	No	R2AA10075FCR03	R2AA10075FCH03	p. 50	p. 62		
			Yes	R2AA10075FCR03M	R2AA10075FCH03M	p. 50	p. 62		

Note: The products that come with oil seals (optional) may have 80 to 95% reduction in rating.

Input voltage 200 V AC

R2 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connection: cable (no connector)

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page	
					Battery-less optical absolute encoder (HA035)	Optical absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
1 kW	86 mm sq.	IP67	No	No	R2AAB8100FXR00	R2AAB8100FXH00	p. 52	p. 62
				Yes	R2AAB8100FXR00M	R2AAB8100FXH00M	p. 52	p. 62
			Yes (24 V DC)	No	R2AAB8100FCR00	R2AAB8100FCH00	p. 52	p. 62
				Yes	R2AAB8100FCR00M	R2AAB8100FCH00M	p. 52	p. 62
			No	No	R2AAB8100HXR00	R2AAB8100HXH00	p. 50	p. 62
				Yes	R2AAB8100HXR00M	R2AAB8100HXH00M	p. 50	p. 62
		Yes (24 V DC)	No	R2AAB8100HCR00	R2AAB8100HCH00	p. 50	p. 62	
			Yes	R2AAB8100HCR00M	R2AAB8100HCH00M	p. 50	p. 62	
		IP65	No	No	R2AAB8100FXR03	R2AAB8100FXH03	p. 52	p. 62
				Yes	R2AAB8100FXR03M	R2AAB8100FXH03M	p. 52	p. 62
			Yes (24 V DC)	No	R2AAB8100FCR03	R2AAB8100FCH03	p. 52	p. 62
				Yes	R2AAB8100FCR03M	R2AAB8100FCH03M	p. 52	p. 62
	No		No	R2AAB8100HXR03	R2AAB8100HXH03	p. 50	p. 62	
			Yes	R2AAB8100HXR03M	R2AAB8100HXH03M	p. 50	p. 62	
	Yes (24 V DC)	No	R2AAB8100HCR03	R2AAB8100HCH03	p. 50	p. 62		
		Yes	R2AAB8100HCR03M	R2AAB8100HCH03M	p. 50	p. 62		
	100 mm sq.	IP67	No	No	R2AA10100FXR00	R2AA10100FXH00	p. 52	p. 62
				Yes	R2AA10100FXR00M	R2AA10100FXH00M	p. 52	p. 62
			Yes (24 V DC)	No	R2AA10100FCR00	R2AA10100FCH00	p. 52	p. 62
				Yes	R2AA10100FCR00M	R2AA10100FCH00M	p. 52	p. 62
			No	No	R2AA10100FXR03	R2AA10100FXH03	p. 52	p. 62
				Yes	R2AA10100FXR03M	R2AA10100FXH03M	p. 52	p. 62
		Yes (24 V DC)	No	R2AA10100FCR03	R2AA10100FCH03	p. 52	p. 62	
			Yes	R2AA10100FCR03M	R2AA10100FCH03M	p. 52	p. 62	

Note: The products that come with oil seals (optional) may have 80 to 95% reduction in rating.

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R2 Servo Motor Medium Capacity, Medium Inertia

Standard specifications Output shaft: with key, oil seal: yes, connection: circular connector (550 W to 15 kW), terminal block (20, 25, and 30 kW)

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page				
					Battery-less optical absolute encoder (HA035)	Optical absolute encoder for incremental systems (PA035S)	Specifications	Dimensions			
550 W	130 mm sq.	IP65	No	No	R2AA13050HXR00	R2AA13050HXH00	p. 51	p. 63			
				Yes	R2AA13050HXR00M	R2AA13050HXH00M	p. 51	p. 63			
			Yes (24 V DC)	No	R2AA13050HCR00	R2AA13050HCH00	p. 51	p. 63			
				Yes	R2AA13050HCR00M	R2AA13050HCH00M	p. 51	p. 63			
			No	No	R2AA13050DXR00	R2AA13050DXH00	p. 51	p. 63			
				Yes	R2AA13050DXR00M	R2AA13050DXH00M	p. 51	p. 63			
			Yes (24 V DC)	No	R2AA13050DCR00	R2AA13050DCH00	p. 51	p. 63			
				Yes	R2AA13050DCR00M	R2AA13050DCH00M	p. 51	p. 63			
			1.2 kW	130 mm sq.	IP65	No	No	R2AA13120BXR00	R2AA13120BXH00	p. 51	p. 63
							Yes	R2AA13120BXR00M	R2AA13120BXH00M	p. 51	p. 63
						Yes (24 V DC)	No	R2AA13120BCR00	R2AA13120BCH00	p. 51	p. 63
							Yes	R2AA13120BCR00M	R2AA13120BCH00M	p. 51	p. 63
No	No	R2AA13120LXR00				R2AA13120LXH00	p. 52	p. 63			
	Yes	R2AA13120LXR00M				R2AA13120LXH00M	p. 52	p. 63			
Yes (24 V DC)	No	R2AA13120LCR00				R2AA13120LCH00	p. 52	p. 63			
	Yes	R2AA13120LCR00M				R2AA13120LCH00M	p. 52	p. 63			
No	No	R2AA13120DXR00				R2AA13120DXH00	p. 53	p. 63			
	Yes	R2AA13120DXR00M				R2AA13120DXH00M	p. 53	p. 63			
Yes (24 V DC)	No	R2AA13120DCR00				R2AA13120DCH00	p. 53	p. 63			
	Yes	R2AA13120DCR00M				R2AA13120DCH00M	p. 53	p. 63			
1.8 kW	130 mm sq.	IP65	No	No	R2AA13180HXR00	R2AA13180HXH00	p. 53	p. 63			
				Yes	R2AA13180HXR00M	R2AA13180HXH00M	p. 53	p. 63			
			Yes (24 V DC)	No	R2AA13180HCR00	R2AA13180HCH00	p. 53	p. 63			
				Yes	R2AA13180HCR00M	R2AA13180HCH00M	p. 53	p. 63			
			No	No	R2AA13180DXR00	R2AA13180DXH00	p. 53	p. 63			
				Yes	R2AA13180DXR00M	R2AA13180DXH00M	p. 53	p. 63			
			Yes (24 V DC)	No	R2AA13180DCR00	R2AA13180DCH00	p. 53	p. 63			
				Yes	R2AA13180DCR00M	R2AA13180DCH00M	p. 53	p. 63			
			2 kW	130 mm sq.	IP65	No	No	R2AA13200LXR00	R2AA13200LXH00	p. 53	p. 64
							Yes	R2AA13200LXR00M	R2AA13200LXH00M	p. 53	p. 64
						Yes (24 V DC)	No	R2AA13200LCR00	R2AA13200LCH00	p. 53	p. 64
							Yes	R2AA13200LCR00M	R2AA13200LCH00M	p. 53	p. 64
No	No	R2AA13200DXR00				R2AA13200DXH00	p. 54	p. 64			
	Yes	R2AA13200DXR00M				R2AA13200DXH00M	p. 54	p. 64			
Yes (24 V DC)	No	R2AA13200DCR00				R2AA13200DCH00	p. 54	p. 64			
	Yes	R2AA13200DCR00M				R2AA13200DCH00M	p. 54	p. 64			
3.5 kW	180 mm sq.	IP65				No	No	R2AA18350LXR00	R2AA18350LXH00	p. 54	p. 65
							Yes	R2AA18350LXR00M	R2AA18350LXH00M	p. 54	p. 65
						Yes (24 V DC)	No	R2AA18350LCR00	R2AA18350LCH00	p. 54	p. 65
							Yes	R2AA18350LCR00M	R2AA18350LCH00M	p. 54	p. 65
			No	No	R2AA18350DXR00	R2AA18350DXH00	p. 54	p. 65			
				Yes	R2AA18350DXR00M	R2AA18350DXH00M	p. 54	p. 65			
			Yes (24 V DC)	No	R2AA18350DCR00	R2AA18350DCH00	p. 54	p. 65			
				Yes	R2AA18350DCR00M	R2AA18350DCH00M	p. 54	p. 65			
			4.5 kW	180 mm sq.	IP65	No	No	R2AA18450HXR00	R2AA18450HXH00	p. 54	p. 65
							Yes	R2AA18450HXR00M	R2AA18450HXH00M	p. 54	p. 65
						Yes (24 V DC)	No	R2AA18450HCR00	R2AA18450HCH00	p. 54	p. 65
							Yes	R2AA18450HCR00M	R2AA18450HCH00M	p. 54	p. 65

* Cables can also be provided for other specifications. (Cables cannot be detached)

Input voltage 200 V AC

R2 Servo Motor 200 V System, Medium Capacity, Medium Inertia

Standard specifications Output shaft: with key, oil seal: yes, connection: circular connector (550 W to 15 kW), terminal block (20, 25, and 30 kW)

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page	
					Battery-less optical absolute encoder (HA035)	Optical absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
5 kW	220 mm sq.	IP65	No	No	R2AA22500LXR00	R2AA22500LXH00	p. 55	p. 66
				Yes	R2AA22500LXR00M	R2AA22500LXH00M	p. 55	p. 66
			Yes (24 V DC)	No	R2AA22500LCR00	R2AA22500LCH00	p. 55	p. 66
				Yes	R2AA22500LCR00M	R2AA22500LCH00M	p. 55	p. 66
5.5 kW	180 mm sq.	IP65	No	No	R2AA18550RXR00	R2AA18550RXH00	p. 55	p. 65
				Yes	R2AA18550RXR00M	R2AA18550RXH00M	p. 55	p. 65
			Yes (24 V DC)	No	R2AA18550RCR00	R2AA18550RCH00	p. 55	p. 65
				Yes	R2AA18550RCR00M	R2AA18550RCH00M	p. 55	p. 65
			No	No	R2AA18550HXR00	R2AA18550HXH00	p. 55	p. 65
				Yes	R2AA18550HXR00M	R2AA18550HXH00M	p. 55	p. 65
			Yes (24 V DC)	No	R2AA18550HCR00	R2AA18550HCH00	p. 55	p. 65
				Yes	R2AA18550HCR00M	R2AA18550HCH00M	p. 55	p. 65
7 kW	220 mm sq.	IP65	No	No	R2AA22700SXR00	R2AA22700SXH00	p. 55	p. 66
				Yes	R2AA22700SXR00M	R2AA22700SXH00M	p. 55	p. 66
			Yes (24 V DC)	No	R2AA22700SCR00	R2AA22700SCH00	p. 55	p. 66
				Yes	R2AA22700SCR00M	R2AA22700SCH00M	p. 55	p. 66
7.5 kW	180 mm sq.	IP65	No	No	R2AA18750HXR00	R2AA18750HXH00	p. 56	p. 65
				Yes	R2AA18750HXR00M	R2AA18750HXH00M	p. 56	p. 65
			Yes (24 V DC)	No	R2AA18750HCR00	R2AA18750HCH00	p. 56	p. 65
				Yes	R2AA18750HCR00M	R2AA18750HCH00M	p. 56	p. 65
11 kW	180 mm sq.	IP65	No	No	R2AA1811KRXR00	R2AA1811KRXH00	p. 56	p. 65
				Yes	R2AA1811KRXR00M	R2AA1811KRXH00M	p. 56	p. 65
			Yes (24 V DC)	No	R2AA1811KRCR00	R2AA1811KRCH00	p. 56	p. 65
				Yes	R2AA1811KRCR00M	R2AA1811KRCH00M	p. 56	p. 65
	220 mm sq.	IP65	No	No	R2AA2211KBXR00	R2AA2211KBXH00	p. 56	p. 66
				Yes	R2AA2211KBXR00M	R2AA2211KBXH00M	p. 56	p. 66
			Yes (24 V DC)	No	R2AA2211KBCR00	R2AA2211KBCH00	p. 56	p. 66
				Yes	R2AA2211KBCR00M	R2AA2211KBCH00M	p. 56	p. 66
15 kW	220 mm sq.	IP65	No	No	R2AA2215KBXR00	R2AA2215KBXH00	p. 56	p. 66
				Yes	R2AA2215KBXR00M	R2AA2215KBXH00M	p. 56	p. 66
			Yes (24 V DC)	No	R2AA2215KBCR00	R2AA2215KBCH00	p. 56	p. 66
				Yes	R2AA2215KBCR00M	R2AA2215KBCH00M	p. 56	p. 66
20 kW	220 mm sq.	IP65	No	Preparing	R2AA2220KBXR00	R2AA2220KBXH00	p. 57	p. 67
					R2AA2220KBCR00	R2AA2220KBCH00	p. 57	p. 67
25 kW	220 mm sq.	IP65	No	Preparing	R2AA2225KBXR00	R2AA2225KBXH00	p. 57	p. 67
					R2AA2225KBCR00	R2AA2225KBCH00	p. 57	p. 67
30 kW	275 mm sq.	IP65	No	Preparing	R2AA2830KVXR00	R2AA2830KVXH00	p. 57	p. 67
					R2AA2830KVCR00	R2AA2830KVCH00	p. 57	p. 67

R1 Servo Motor 200 V System, Medium Capacity, Low Inertia

Standard specifications Output shaft: with key, oil seal: yes, connecting: circular connector (5.5 kW to 15 kW), terminal block (21 kW)

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page	
					Battery-less optical absolute encoder (HA035)	Optical absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
5.5 kW	180 mm sq.	IP65 (excluding the cooling fan)	No	Preparing	R1AA18550HXR00	R1AA18550HXH00	p. 58	p. 68
					Yes (24 V DC)	R1AA18550HCR00	R1AA18550HCH00	p. 58
7.5 kW	180 mm sq.		No		R1AA18750LXR00	R1AA18750LXH00	p. 58	p. 68
					Yes (24 V DC)	R1AA18750LCR00	R1AA18750LCH00	p. 58
11 kW	180 mm sq.		No		R1AA1811KRXR00	R1AA1811KRXH00	p. 59	p. 68
					Yes (24 V DC)	R1AA1811KRCR00	R1AA1811KRCH00	p. 59
15 kW	180 mm sq.		No		R1AA1815KBXR00	R1AA1815KBXH00	p. 59	p. 68
					Yes (24 V DC)	R1AA1815KBCR00	R1AA1815KBCH00	p. 59
21 kW	220 mm sq.		No		R1AA2220KVXR00	R1AA2220KVXH00	p. 59	p. 68

* For specifications on other models, contact us for details.

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Servo Motor Specifications

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Input voltage 200 V AC

R5 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connecting: cable (no connector)

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page	
					Battery-less optical absolute encoder (HA035)	Optical absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
200 W	60 mm sq.	IP65	No	No	R5AA06020HXR03	R5AA06020HXH03	p. 60	p. 62
				Yes	R5AA06020HXR03M	R5AA06020HXH03M	p. 60	p. 62
				No	R5AA06020HCR03	R5AA06020HCH03	p. 60	p. 62
				Yes	R5AA06020HCR03M	R5AA06020HCH03M	p. 60	p. 62
			Yes (24 V DC)	No	R5AA06020FXR03	R5AA06020FXH03	p. 61	p. 62
				Yes	R5AA06020FXR03M	R5AA06020FXH03M	p. 61	p. 62
				No	R5AA06020FCR03	R5AA06020FCH03	p. 61	p. 62
				Yes	R5AA06020FCR03M	R5AA06020FCH03M	p. 61	p. 62
380 W	60 mm sq.	IP65	Yes (24 V DC)	No	R5AA06040HXR03	R5AA06040HXH03	p. 60	p. 62
				Yes	R5AA06040HXR03M	R5AA06040HXH03M	p. 60	p. 62
400 W	60 mm sq.	IP65	No	No	R5AA06040HXR03	R5AA06040HXH03	p. 60	p. 62
				Yes	R5AA06040HXR03M	R5AA06040HXH03M	p. 60	p. 62
				No	R5AA06040FXR03	R5AA06040FXH03	p. 61	p. 62
			Yes (24 V DC)	Yes	R5AA06040FXR03M	R5AA06040FXH03M	p. 61	p. 62
				No	R5AA06040FCR03	R5AA06040FCH03	p. 61	p. 62
				Yes	R5AA06040FCR03M	R5AA06040FCH03M	p. 61	p. 62
675 W	80 mm sq.	IP65	Yes (24 V DC)	No	R5AA08075FCR03	R5AA08075FCH03	p. 61	p. 62
				Yes	R5AA08075FCR03M	R5AA08075FCH03M	p. 61	p. 62
710 W	80 mm sq.	IP65	Yes (24 V DC)	No	R5AA08075DCR03	R5AA08075DCH03	p. 60	p. 62
				Yes	R5AA08075DCR03M	R5AA08075DCH03M	p. 60	p. 62
750 W	80 mm sq.	IP65	No	No	R5AA08075DXR03	R5AA08075DXH03	p. 60	p. 62
				Yes	R5AA08075DXR03M	R5AA08075DXH03M	p. 60	p. 62
			No	No	R5AA08075FXR03	R5AA08075FXH03	p. 61	p. 62
				Yes	R5AA08075FXR03M	R5AA08075FXH03M	p. 61	p. 62

Servo motors that come with oil seals (optional) may require an 80 to 95% reduction in output.

Option

Model no.	Category	Remarks	Page	Model no.	Category	Remarks	Page
AL-00385594	Connector to connect servo amplifier (10 A to 50 A)	Single CN1	p. 70	AL-00892848	Connector to connect servo amplifier (600 A)	Connector set	p. 72
AL-00632607	Connector to connect servo amplifier (10 A to 50 A)	Single EN1 and EN2	p. 70	AL-00892850	Connector to connect servo amplifier (600 A)	Connector set	p. 72
AL-00686902-01	Connector to connect servo amplifier (10 A to 50 A)	Single CNA	p. 70	AL-00723290	Connector to connect servo amplifier (600 A)	Connector set	p. 72
AL-Y0004079-01	Connector to connect servo amplifier (10 A to 50 A)	Single CNB	p. 70	AL-00892854	Connector to connect servo amplifier (600 A)	Connector set	p. 72
AL-00718251-01	Connector to connect servo amplifier (10 A to 50 A)	Single CN4	p. 70	AL-00892856	Connector to connect servo amplifier (600 A)	Connector set	p. 72
AL-00718252-01	Connector to connect servo amplifier (10 A to 50 A)	Single CN4	p. 70	AL-00892858	Connector to connect servo amplifier (600 A)	Connector set	p. 72
AL-00723282	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00723159	Connector to connect servo amplifier (600 A)	Connector set	p. 72
AL-00723284	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00892852	Connector to connect servo amplifier (600 A)	Connector set	p. 72
AL-00723286	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00918125-01	Copper bar to connect servo amplifier units (600 A)		p. 72
AL-00723288	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00917284	Cable to connect servo amplifier units (600 A)		p. 72
AL-00723290	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00880390-01	Front mounting brackets (10 A to 30 A)		p. 75
AL-00696037	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00880391-01	Front mounting brackets (50 A)		p. 75
AL-00723155	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00907039-01	Front mounting brackets (100 A, 150 A)		p. 75
AL-00723156	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00907040-01	Front mounting brackets (300 A)		p. 75
AL-00723157	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00880402-01	Battery box		p. 77
AL-00723158	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00879511-01	Battery for battery box (Lithium battery)		p. 77
AL-00723159	Connector to connect servo amplifier (10 A to 50 A)	Connector set	p. 70	AL-00731792-01	Encoder extension cable with battery	Connectors on both ends	p. 77
AL-00385594	Connector to connect servo amplifier (100 A to 300 A)	Single CN1	p. 71	AL-00697960-□□	Encoder extension cable with battery	Connector on one end	p. 77
AL-00632607	Connector to connect servo amplifier (100 A to 300 A)	Single EN1 and EN2	p. 71	AL-00697958-01	Battery for encoder extension cable (Lithium battery)		p. 77
AL-Y0005159-01	Connector to connect servo amplifier (100 A to 300 A)	Single CNA	p. 71	Q-MON-3	Analog monitor monitor box		p. 77
AL-00718251-01	Connector to connect servo amplifier (100 A to 300 A)	Single CN4	p. 71	AL-00690525-01	Analog monitor dedicated cable		p. 77
AL-00718252-01	Connector to connect servo amplifier (100 A to 300 A)	Single CN4	p. 71	AL-00896515-01	USB communication cable	1.0 m	p. 78
AL-00751448	Connector to connect servo amplifier (100 A to 300 A)	Connector set	p. 71	AL-00896515-02	USB communication cable	2.0 m	p. 78
AL-00751450	Connector to connect servo amplifier (100 A to 300 A)	Connector set	p. 71	AL-00911582-01	Communication cable of tandem operation between amplifiers	0.2 m	p. 78
AL-00723290	Connector to connect servo amplifier (100 A to 300 A)	Connector set	p. 71	AL-00911582-02	Communication cable of tandem operation between amplifiers	3.0 m	p. 78
AL-00751452	Connector to connect servo amplifier (100 A to 300 A)	Connector set	p. 71	REGIST-080W100B	External regenerative resistor		p. 78
AL-00751454	Connector to connect servo amplifier (100 A to 300 A)	Connector set	p. 71	REGIST-080W50B	External regenerative resistor		p. 78
AL-00723159	Connector to connect servo amplifier (100 A to 300 A)	Connector set	p. 71	REGIST-120W100B	External regenerative resistor		p. 78
AL-00608710	Connector to connect servo amplifier (600 A)	Single CN9	p. 72	REGIST-120W50B	External regenerative resistor		p. 78
AL-00385594	Connector to connect servo amplifier (600 A)	Single CN1	p. 72	REGIST-220W20B	External regenerative resistor		p. 78
AL-00632607	Connector to connect servo amplifier (600 A)	Single EN1 and EN2	p. 72	REGIST-220W50B	External regenerative resistor		p. 78
AL-Y0005159-01	Connector to connect servo amplifier (600 A)	Single CNA	p. 72	REGIST-220W100B	External regenerative resistor		p. 78
AL-Y0004079-01	Connector to connect servo amplifier (600 A)	Single CNB	p. 72	REGIST-500CW20B	External regenerative resistor		p. 78
AL-Y0011185-01	Connector to connect servo amplifier (600 A)	Single CN8	p. 72	REGIST-500CW14B	External regenerative resistor		p. 78
AL-00718251-01	Connector to connect servo amplifier (600 A)	Single CN4	p. 72	REGIST-500CW10B	External regenerative resistor		p. 78
AL-00718252-01	Connector to connect servo amplifier (600 A)	Single CN4	p. 72	REGIST-500CW7B	External regenerative resistor		p. 78

* For connectors to connect motors, refer to pp. 73 to 74. For servo motor extension cables and for servo motors with extension cable connectors, refer to p. 79.

Input voltage **200 V AC** Made in The Philippines

The servo motors are made in The Philippines. We can deliver them to customers quickly.

R2 Servo Motor 200 V System, Small Capacity, Medium Inertia

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Encoder	Output shaft	Oil seal	Model no.	Page	
									Specifications	Dimensions
85 W	40 mm sq.	IP67	No	No	Battery backup method absolute encoder	With key	Yes	R2AA04010FXP29	p. 48	p. 62
			Yes (24 V DC)	No	Battery backup method absolute encoder	With key	Yes	R2AA04010FCP29	p. 48	p. 62
90 W	40 mm sq.	IP67	Yes (24 V DC)	No	Battery backup method absolute encoder	Round	No	R2AA04010FCP00	p. 48	p. 62
				No	Battery backup method absolute encoder	With key	No	R2AA04010FCP1C	p. 48	p. 62
				No	Absolute encoder for incremental system	Round	No	R2AA04010FCH00	p. 48	p. 62
				Yes	Battery backup method absolute encoder	Round	No	R2AA04010FCP00M6	p. 48	p. 62
				Yes	Battery backup method absolute encoder	With key	No	R2AA04010FCP1CM6	p. 48	p. 62
				Yes	Absolute encoder for incremental system	Round	No	R2AA04010FCH00M6	p. 48	p. 62
				Yes	Absolute encoder for incremental system	With key	No	R2AA04010FCH1CM6	p. 48	p. 62
100 W	40 mm sq.	IP67	No	No	Battery backup method absolute encoder	Round	No	R2AA04010FXP00	p. 48	p. 62
				No	Battery backup method absolute encoder	With key	No	R2AA04010FXP1C	p. 48	p. 62
				No	Absolute encoder for incremental system	Round	No	R2AA04010FXH00	p. 48	p. 62
				No	Absolute encoder for incremental system	With key	No	R2AA04010FXH1C	p. 48	p. 62
				Yes	Absolute encoder for incremental system	Round	No	R2AA04010FXH00M	p. 48	p. 62
				Yes	Absolute encoder for incremental system	With key	No	R2AA04010FXH1CM	p. 48	p. 62
200 W	60 mm sq.	IP67	No	No	Battery backup method absolute encoder	Round	No	R2AA06020FXP00	p. 49	p. 62
				No	Battery backup method absolute encoder	With key	No	R2AA06020FXP11	p. 49	p. 62
				No	Battery backup method absolute encoder	With key	Yes	R2AA06020FXP29	p. 49	p. 62
				No	Absolute encoder for incremental system	Round	No	R2AA06020FXH00	p. 49	p. 62
				No	Absolute encoder for incremental system	With key	No	R2AA06020FXH11	p. 49	p. 62
				Yes	Battery backup method absolute encoder	Round	No	R2AA06020FXP00M	p. 49	p. 62
				Yes	Battery backup method absolute encoder	With key	No	R2AA06020FXP11M	p. 49	p. 62
				Yes	Absolute encoder for incremental system	Round	No	R2AA06020FXH00M	p. 49	p. 62
				Yes	Absolute encoder for incremental system	With key	No	R2AA06020FXH11M	p. 49	p. 62
			Yes (24 V DC)	No	Battery backup method absolute encoder	Round	No	R2AA06020FCP00	p. 49	p. 62
				No	Battery backup method absolute encoder	With key	No	R2AA06020FCP11	p. 49	p. 62
				No	Battery backup method absolute encoder	With key	Yes	R2AA06020FCP29	p. 49	p. 62
				No	Absolute encoder for incremental system	Round	No	R2AA06020FCH00	p. 49	p. 62
				No	Absolute encoder for incremental system	With key	No	R2AA06020FCH11	p. 49	p. 62
				Yes	Battery backup method absolute encoder	Round	No	R2AA06020FCP00M	p. 49	p. 62
				Yes	Battery backup method absolute encoder	With key	No	R2AA06020FCP11M	p. 49	p. 62
				Yes	Absolute encoder for incremental system	Round	No	R2AA06020FCH00M	p. 49	p. 62
				Yes	Absolute encoder for incremental system	With key	No	R2AA06020FCH11M	p. 49	p. 62
320 W	60 mm sq.	IP67	No	No	Battery backup method absolute encoder	With key	Yes	R2AA06040FXP29	p. 49	p. 62
				No	Absolute encoder for incremental system	Round	Yes	R2AA06040FXH01	p. 49	p. 62
			Yes (24 V DC)	No	Battery backup method absolute encoder	With key	Yes	R2AA06040FCP29	p. 49	p. 62
				No	Absolute encoder for incremental system	Round	Yes	R2AA06040FCH01	p. 49	p. 62
360 W	60 mm sq.	IP67	Yes (24 V DC)	No	Battery backup method absolute encoder	Round	No	R2AA06040FCP00	p. 49	p. 62
				No	Battery backup method absolute encoder	With key	No	R2AA06040FCP11	p. 49	p. 62
				No	Absolute encoder for incremental system	Round	No	R2AA06040FCH00	p. 49	p. 62
				No	Absolute encoder for incremental system	With key	No	R2AA06040FCH11	p. 49	p. 62
				Yes	Battery backup method absolute encoder	Round	No	R2AA06040FCP00M6	p. 49	p. 62
				Yes	Absolute encoder for incremental system	Round	No	R2AA06040FCH00M6	p. 49	p. 62
				Yes	Absolute encoder for incremental system	With key	No	R2AA06040FCH11M6	p. 49	p. 62
400 W	60 mm sq.	IP67	No	No	Battery backup method absolute encoder	Round	No	R2AA06040FXP00	p. 49	p. 62
				No	Battery backup method absolute encoder	With key	No	R2AA06040FXP11	p. 49	p. 62
				No	Absolute encoder for incremental system	Round	No	R2AA06040FXH00	p. 49	p. 62
				No	Absolute encoder for incremental system	With key	No	R2AA06040FXH11	p. 49	p. 62
				Yes	Battery backup method absolute encoder	Round	No	R2AA06040FXP00M	p. 49	p. 62
				Yes	Battery backup method absolute encoder	With key	No	R2AA06040FXP11M	p. 49	p. 62
				Yes	Absolute encoder for incremental system	Round	No	R2AA06040FXH00M	p. 49	p. 62
				Yes	Absolute encoder for incremental system	With key	No	R2AA06040FXH11M	p. 49	p. 62
				675 W	80 mm sq.	IP67	No	No	Battery backup method absolute encoder	With key
Yes	Absolute encoder for incremental system	With key	Yes					R2AA08075FXH29M6	p. 50	p. 62
Yes (24 V DC)	No	Battery backup method absolute encoder	Round				Yes	R2AA08075FCP01	p. 50	p. 62
	No	Battery backup method absolute encoder	With key				Yes	R2AA08075FCP29	p. 50	p. 62
	No	Absolute encoder for incremental system	Round				Yes	R2AA08075FCH01	p. 50	p. 62

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Input voltage 200 V AC Made in The Philippines

The servo motors are made in The Philippines. We can deliver them to customers quickly.

R2 Servo Motor 200 V System, Small Capacity, Medium Inertia

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Encoder	Output shaft	Oil seal	Model no.	Page				
									Specifications	Dimensions			
750 W	80 mm sq.	IP67	No	No	Battery backup method absolute encoder	Round	No	R2AA08075FXP00	p. 50	p. 62			
				No	Battery backup method absolute encoder	With key	No	R2AA08075FXP11	p. 50	p. 62			
				No	Absolute encoder for incremental system	Round	No	R2AA08075FXH00	p. 50	p. 62			
				No	Absolute encoder for incremental system	With key	No	R2AA08075FXH11	p. 50	p. 62			
				Yes	Battery backup method absolute encoder	Round	No	R2AA08075FXP00M	p. 50	p. 62			
				Yes	Absolute encoder for incremental system	Round	No	R2AA08075FXH00M	p. 50	p. 62			
				Yes	Absolute encoder for incremental system	With key	No	R2AA08075FXH11M	p. 50	p. 62			
				Yes (24 V DC)	No	Battery backup method absolute encoder	Round	No	R2AA08075FCP00	p. 50	p. 62		
			No		Battery backup method absolute encoder	With key	No	R2AA08075FCP11	p. 50	p. 62			
			No		Absolute encoder for incremental system	Round	No	R2AA08075FCH00	p. 50	p. 62			
			No		Absolute encoder for incremental system	With key	No	R2AA08075FCH11	p. 50	p. 62			
			Yes		Battery backup method absolute encoder	Round	No	R2AA08075FCP00M	p. 50	p. 62			
			Yes		Absolute encoder for incremental system	Round	No	R2AA08075FCH00M	p. 50	p. 62			
			Yes		Absolute encoder for incremental system	With key	No	R2AA08075FCH11M	p. 50	p. 62			
			1.0 kW		86 mm sq.	IP67	No	No	Battery backup method absolute encoder	Round	No	R2AAB8100FXP04	p. 52
				No				Battery backup method absolute encoder	Round	No	R2AAB8100HXP04	p. 50	p. 63
No	Absolute encoder for incremental system	Round		No				R2AAB8100FXH04	p. 52	p. 63			
No	Absolute encoder for incremental system	With key		Yes				R2AAB8100HXH5A	p. 50	p. 63			
Yes (24 V DC)	No	Battery backup method absolute encoder		Round			No	R2AAB8100HCP04	p. 50	p. 63			
	No	Absolute encoder for incremental system		With key			Yes	R2AAB8100HCH5A	p. 50	p. 63			

R2 Servo Motor 200 V System, Medium Capacity, Medium Inertia

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Encoder	Output shaft	Oil seal	Model no.	Page					
									Specifications	Dimensions				
1.2 kW	130 mm sq.	IP65	No	No	Battery backup method absolute encoder	With key	Yes	R2AA13120BXP00	p. 51	p. 63				
				No	Battery backup method absolute encoder	With key	Yes	R2AA13120LXP00	p. 52	p. 63				
				No	Battery backup method absolute encoder	With key	Yes	R2AA13120DXP00	p. 53	p. 63				
				No	Absolute encoder for incremental system	With key	Yes	R2AA13120BXH00	p. 51	p. 63				
				No	Absolute encoder for incremental system	With key	Yes	R2AA13120LXH00	p. 52	p. 63				
				No	Absolute encoder for incremental system	With key	Yes	R2AA13120DXH00	p. 53	p. 63				
				Yes (24 V DC)	No	Battery backup method absolute encoder	With key	Yes	R2AA13120BCP00	p. 51	p. 63			
					No	Battery backup method absolute encoder	With key	Yes	R2AA13120LCP00	p. 52	p. 63			
			No		Battery backup method absolute encoder	With key	Yes	R2AA13120DCP00	p. 53	p. 63				
			No		Absolute encoder for incremental system	With key	Yes	R2AA13120BCH00	p. 51	p. 63				
			No		Absolute encoder for incremental system	With key	Yes	R2AA13120LCH00	p. 52	p. 63				
			No		Absolute encoder for incremental system	With key	Yes	R2AA13120DCH00	p. 53	p. 63				
			2.0 kW		130 mm sq.	IP65	No	No	Battery backup method absolute encoder	With key	Yes	R2AA13200LXPW0	p. 53	p. 64
								No	Battery backup method absolute encoder	With key	Yes	R2AA13200DXPW0	p. 54	p. 64
				No				Absolute encoder for incremental system	With key	Yes	R2AA13200LXH00	p. 53	p. 64	
				No				Absolute encoder for incremental system	With key	Yes	R2AA13200DXHW0	p. 54	p. 64	
Yes (24 V DC)	No	Battery backup method absolute encoder		With key			Yes	R2AA13200LCPW0	p. 53	p. 64				
	No	Battery backup method absolute encoder		With key			Yes	R2AA13200DCPW0	p. 54	p. 64				
	No	Absolute encoder for incremental system		With key			Yes	R2AA13200LCHW0	p. 53	p. 64				
	No	Absolute encoder for incremental system		With key			Yes	R2AA13200DCHW0	p. 54	p. 64				

Servo Amplifier



Servo Amplifier Specifications

Control function	Position control/Speed control/Torque control (Parameter switching)	
Control system	IGBT: PWM control sinusoidal drive	
Main Circuit Power Supply *1	3-phase: 200 to 240 V AC +10, -15%, 50/60 Hz±3 Hz Single-phase: 200 to 240 V AC +10, -15%, 50/60 Hz±3 Hz *2 Single-phase: 100 to 120 V AC +10, -15%, 50/60 Hz±3 Hz *3	
Control Power *1	Single-phase: 200 to 240 V AC +10, -15%, 50/60 Hz±3 Hz Single-phase: 100 to 120 V AC +10, -15%, 50/60 Hz±3 Hz *3	
Environment	Ambient temperature	0 to +55°C
	Storage temperature	-20 to +65°C
	Operation/Storage humidity	Below 90%RH (no condensation)
	Elevation	Below 1000 m
	Vibration	4.9 m/s ² freq. range 10 to 55 Hz tested for 2 hours in each X, Y and Z-axis directions
	Shock	19.6 m/s ²
Structure	10 to 300 A: Built-in tray-type power supply, 600 A: Separate power supply unit	

*1

Power source voltage should be within the specified range.

200 V AC power input type
Specified power supply range = 170 V AC to 264 V AC

100 V AC power input type
Specified power supply range = 85 V AC to 132 V AC

*2

The 200 V AC single-phase input type corresponds only to RS3□01/RS3□02/RS3□03/RS3□05.

*3

The 100 V AC single-phase input type corresponds only to RS3□01/RS3□02/RS3□03.



Performance

Speed control range	1:5000 (Internal speed command)
Frequency characteristics	2200 Hz (In high frequency sampling mode) *Differs for each model.
Permissible load moment of inertia	10 times motor rotary inertia

Built-in functions

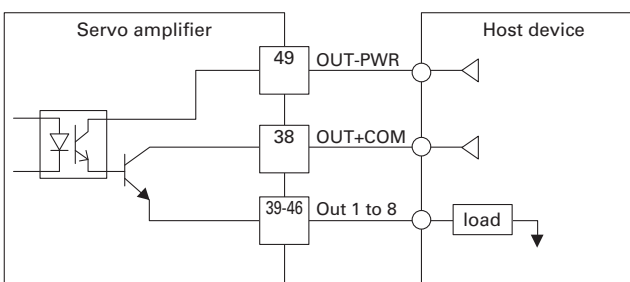
Protection functions	Over current, Current detection error, Overload, Regeneration error, Overheating, External disorder, Over voltage, Main circuit power low voltage, Main circuit power supply open phase, Control power supply low voltage, Encoder error, Over speed, Speed control error, Speed feedback error, Unreasonable position deviation, Position command pulse error, Built-in memory error, Parameter error, Cooling fan error	
Digital operator	Status display, Monitor display, Alarm display, Parameter setting, Test run, Adjustment mode	
Dynamic brake circuit	Built-in	
Regenerative resistor	10 A to 150 A: Built-in/external type, 300 A to 600 A: External type	
Monitor	Speed monitor (VMON)	2.0 V±10% (at 1000 min ⁻¹)
	Torque command monitor (TCMON)	2.0 V±10% (at 100%)

Safety standards

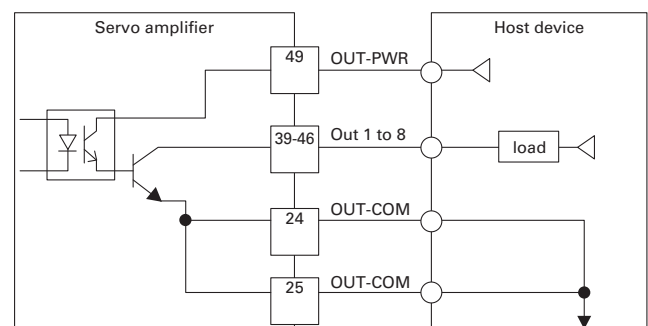
Servo amplifier type	Safety standards		
All models	North American safety standards (UL ratings)	UL508C	
	European directive	Low-voltage directive	• EN61800-5-1
		EMC directive	• EN55011 G1 ClassA • EN61800-3 • EN61326-3-1
KC Mark (Korea Certification Mark)	KN61000-6-2, KN61000-6-4		
Models with safety features	Safety feature standards	• IEC61508, SIL3 • ISO13849-1, Cat.3, PL=e • IEC62061, SILCL3	

General-purpose Output Specifications

Source type (PNP output)



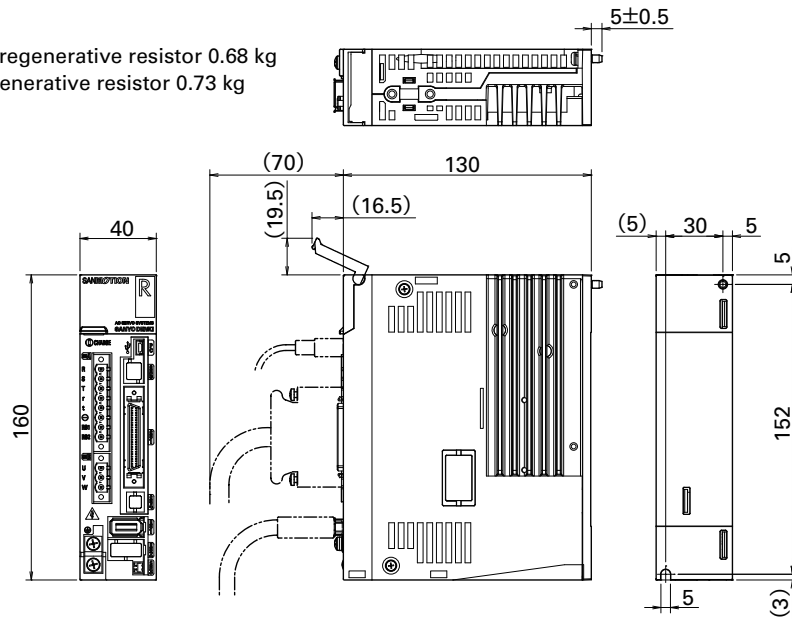
Sink type (NPN output)



Servo Amplifier Dimensions [Unit : mm]

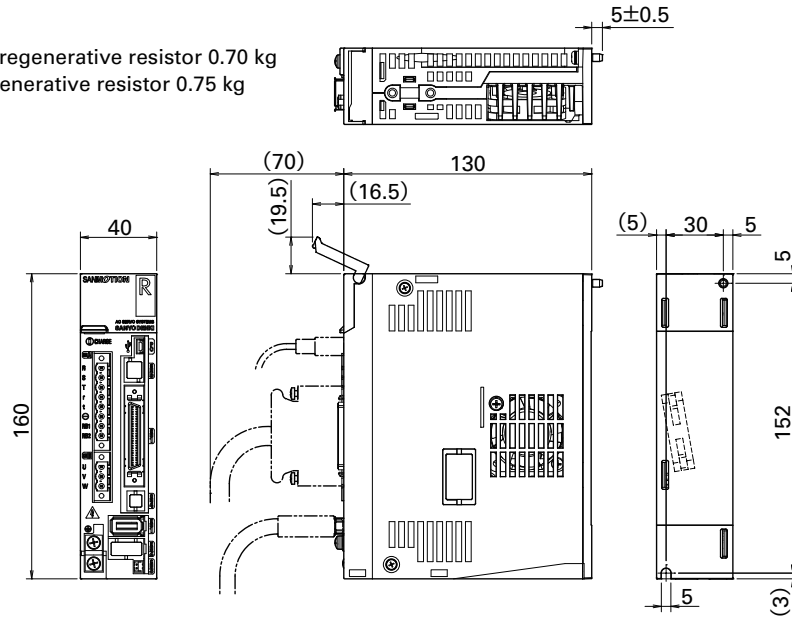
10 A

Mass: Without internal regenerative resistor 0.68 kg
With internal regenerative resistor 0.73 kg



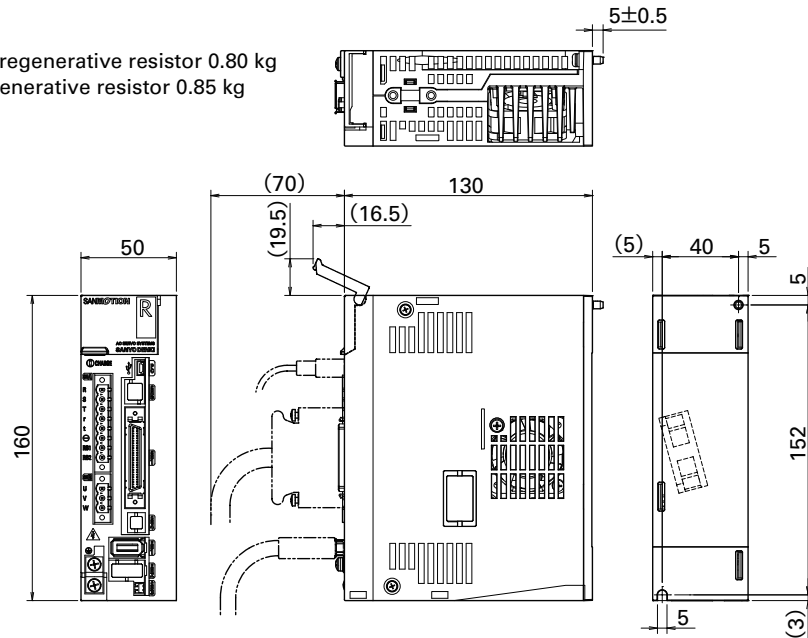
20 A

Mass: Without internal regenerative resistor 0.70 kg
With internal regenerative resistor 0.75 kg



30 A

Mass: Without internal regenerative resistor 0.80 kg
With internal regenerative resistor 0.85 kg



Features

Setup Software

System Configuration

List of Combinations of Servo Amplifiers and Servo Motors

Set Model

How to Read Model Numbers

Standard Model Number List

Servo Amplifier Specifications

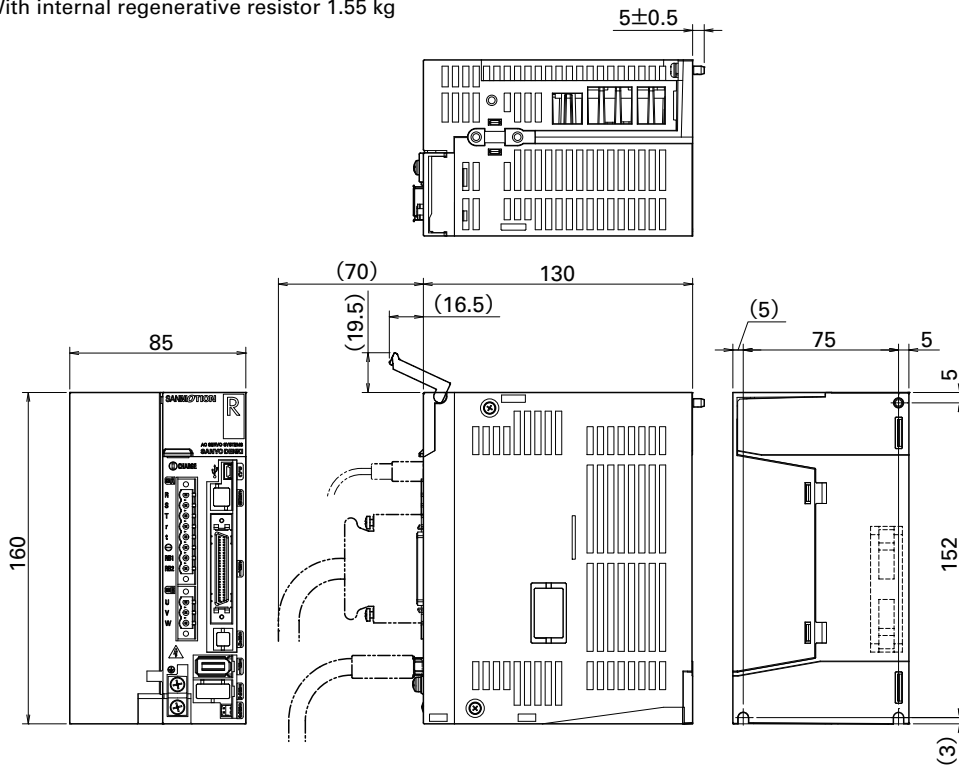
Servo Motor Specifications

Options

Selection Guide

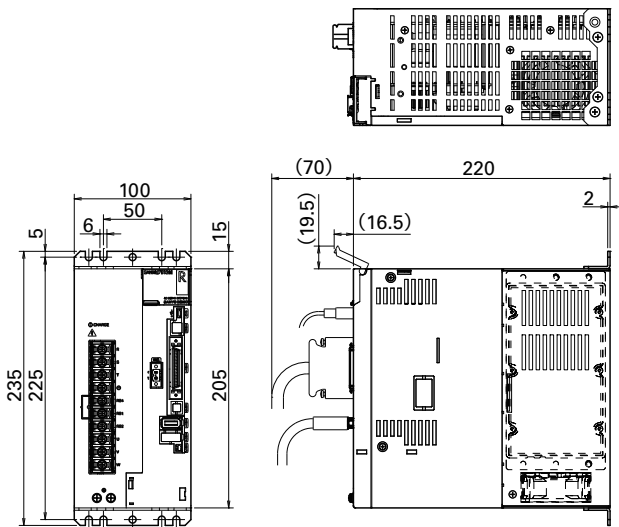
50 A

Mass: Without internal regenerative resistor 1.5 kg
 With internal regenerative resistor 1.55 kg



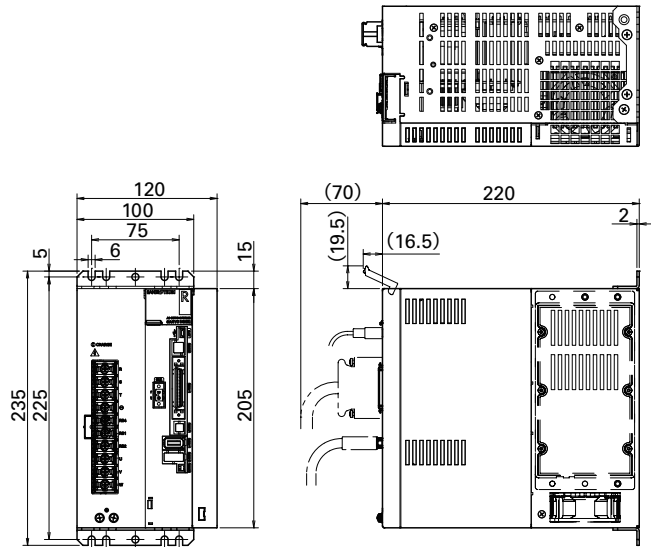
100 A

Mass: 4.2 kg



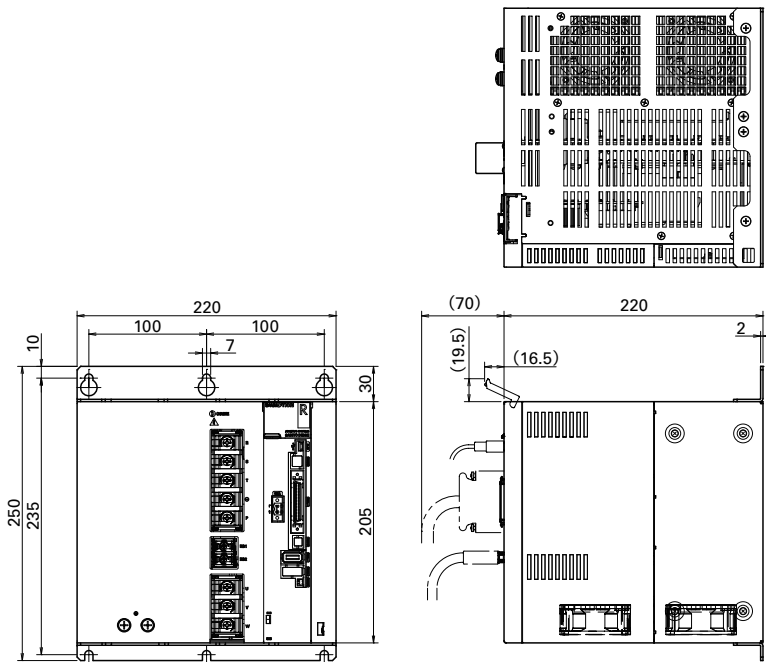
150 A

Mass: 4.9 kg



300 A

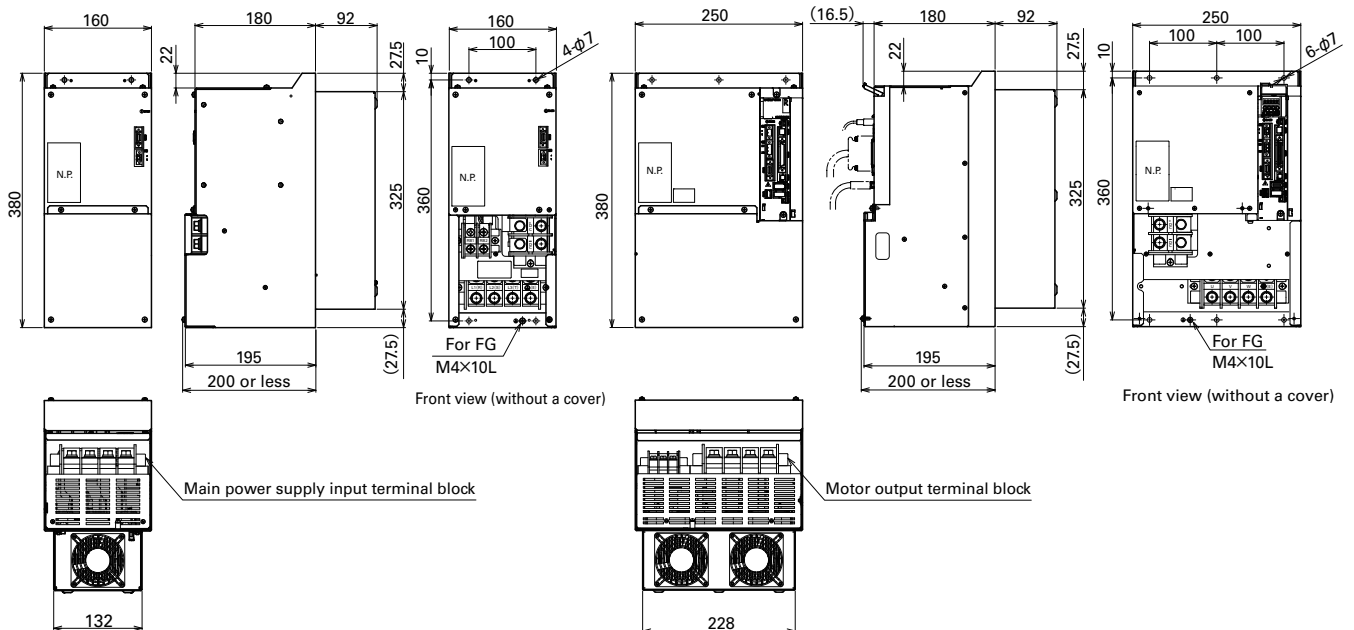
Mass: 9.8 kg



600 A

Power supply unit Mass: 11.8 kg

Amplifier unit Mass: 18 kg



Features

Setup Software

System Configuration

List of Combinations of Servo Amplifiers and Servo Motors

Set Model

How to Read Model Numbers

Standard Model Number List

Servo Amplifier Specifications

Servo Motor Specifications

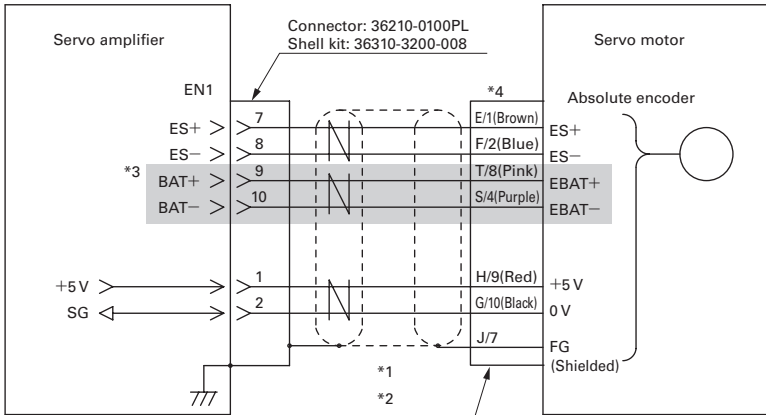
Options

Selection Guide

Encoder Wiring Diagram

Serial Encoder

- Battery-less optical absolute encoder [HA035]
- Optical battery-backup method absolute encoder [PA035C]
- Optical absolute encoder for incremental systems [PA035S]



Circular connector Model No. _____

Flange size: 130 mm sq. or more	JN2DS10SL1-R	JN2FS10ML1-R
	JN2DS10SL2-R	JN2FS10ML2-R
	JN2DS10SL3-R	JN2FS10ML3-R

- *1 Use a twisted pair shielded cable.
- *2 Maximum cable lengths by conductor size of the power supply cable (5 V, SG)

Conductor size		Conductor resistance (Ω/km) *20°C	Length (m)
AWG	SQ (mm ²)		
26	0.15	150 or less	5
24	0.2	100 or less	10
22	0.3	60 or less	15
20	0.5	40 or less	25
18	0.75	25 or less	40

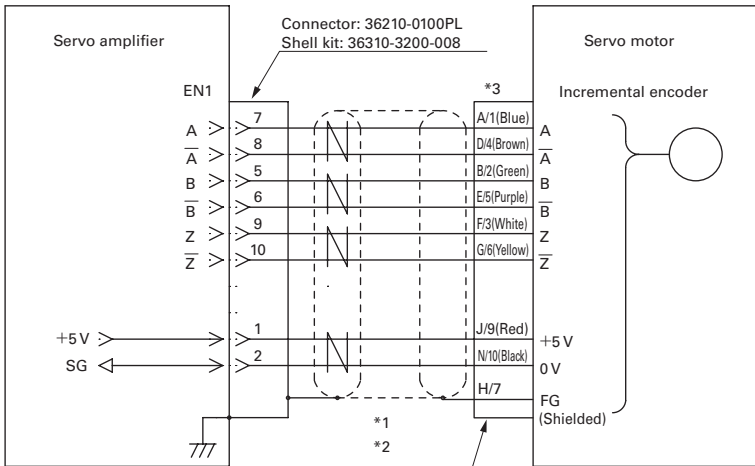
Conductor resistance differs according to conductor specifications.

- *3 Battery lines (EBAT+, EBAT-) are necessary only when a battery-backup method absolute encoder is used.
- *4 Lead wire colors are indicated in parentheses. For lead wire colors and circular connector pin numbers, see the following table.

	ES+	ES-	EBAT+	EBAT-	+5 V	0 V	FG
100 mm sq. or less	Brown	Blue	Pink ^{*3}	Purple ^{*3}	Red	Black	Shielded
130 mm sq. or more	1	2	8 ^{*3}	4 ^{*3}	9	10	7

Pulse Encoder

- Wire-saving incremental encoder



Servo motor encoder connectors p. 73

Circular connector model No. _____

Flange size: 130 mm sq. or more	JN2DS10SL1-R	JN2FS10ML1-R
	JN2DS10SL2-R	JN2FS10ML2-R
	JN2DS10SL3-R	JN2FS10ML3-R

- *1 Use a twisted pair shielded cable.
- *2 Maximum cable lengths by conductor size of the power supply cable (5 V, SG)

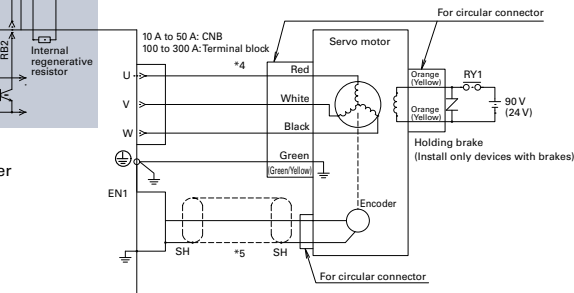
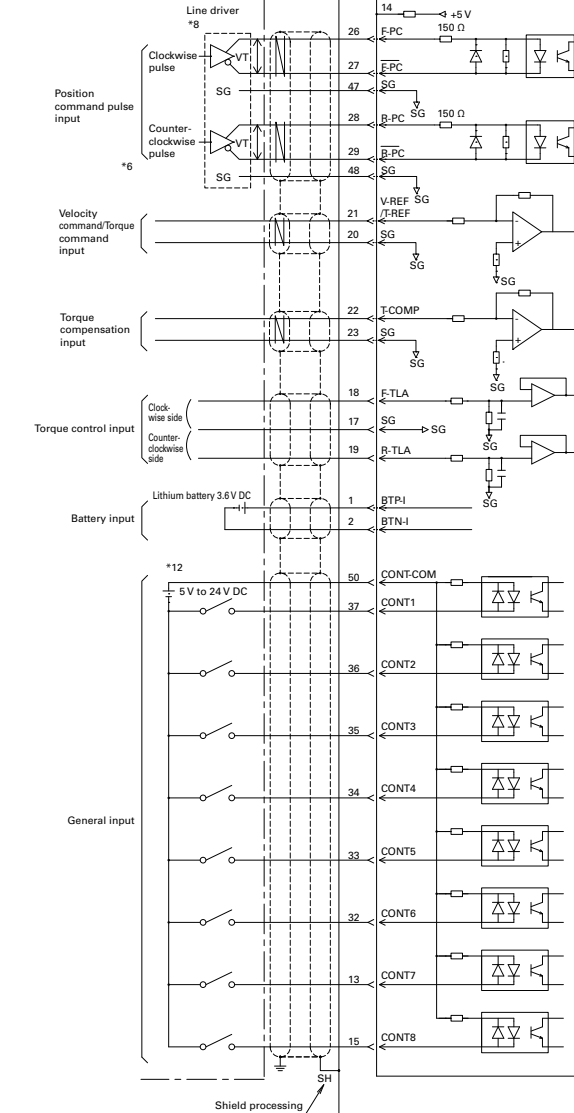
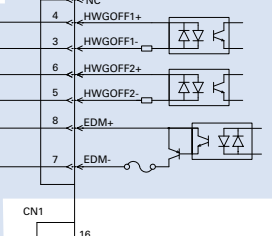
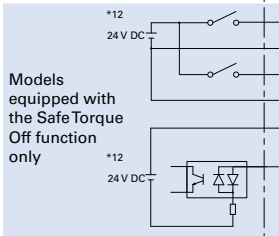
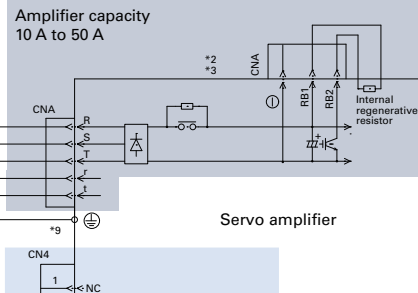
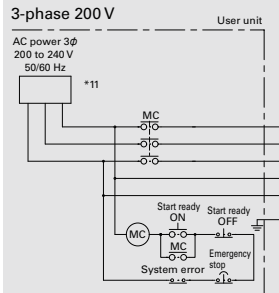
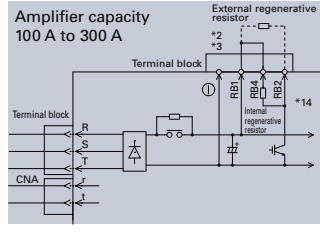
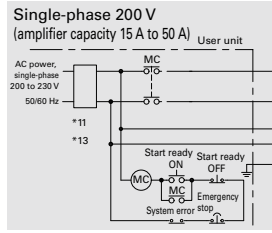
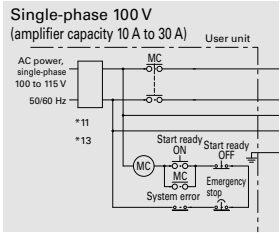
Conductor size		Conductor resistance (Ω/km) *20°C	Length (m)
AWG	SQ (mm ²)		
26	0.15	150 or less	5
24	0.2	100 or less	10
22	0.3	60 or less	15
20	0.5	40 or less	25
18	0.75	25 or less	40

Conductor resistance differs according to conductor specifications.

- *3 Lead wire colors are indicated in parentheses. For lead wire colors and circular connector pin numbers, see the following table:

	A	A-bar	B	B-bar	Z	Z-bar	+5 V
100 mm sq. or less	Blue	Brown	Green	Purple	White	Yellow	Red
130 mm sq. or more	1	4	2	5	3	6	9
	0 V	FG					
100 mm sq. or less	Black	Shielded					
130 mm sq. or more	10	7					

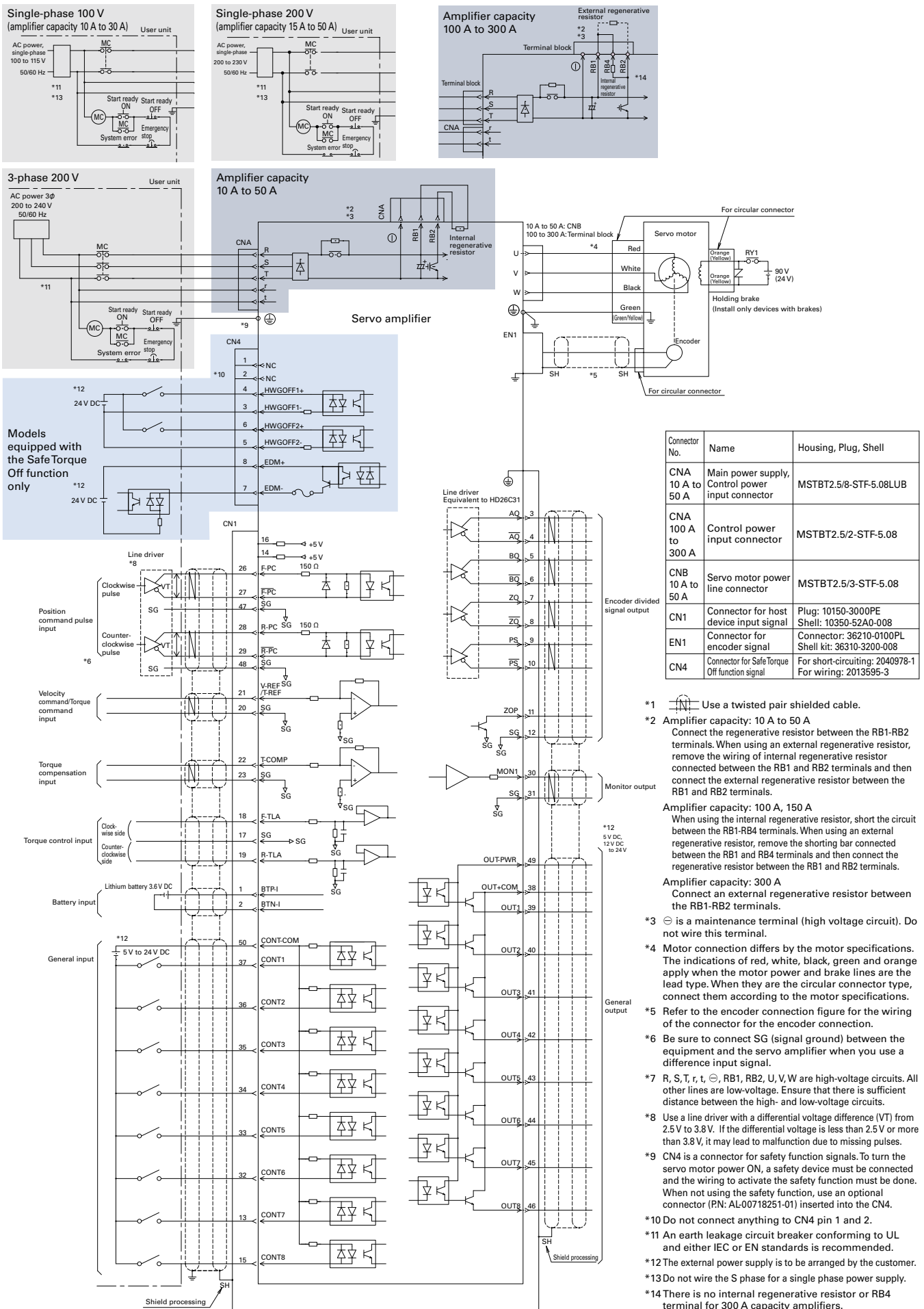
Servo amplifier: 10 A to 300 A, Sink output



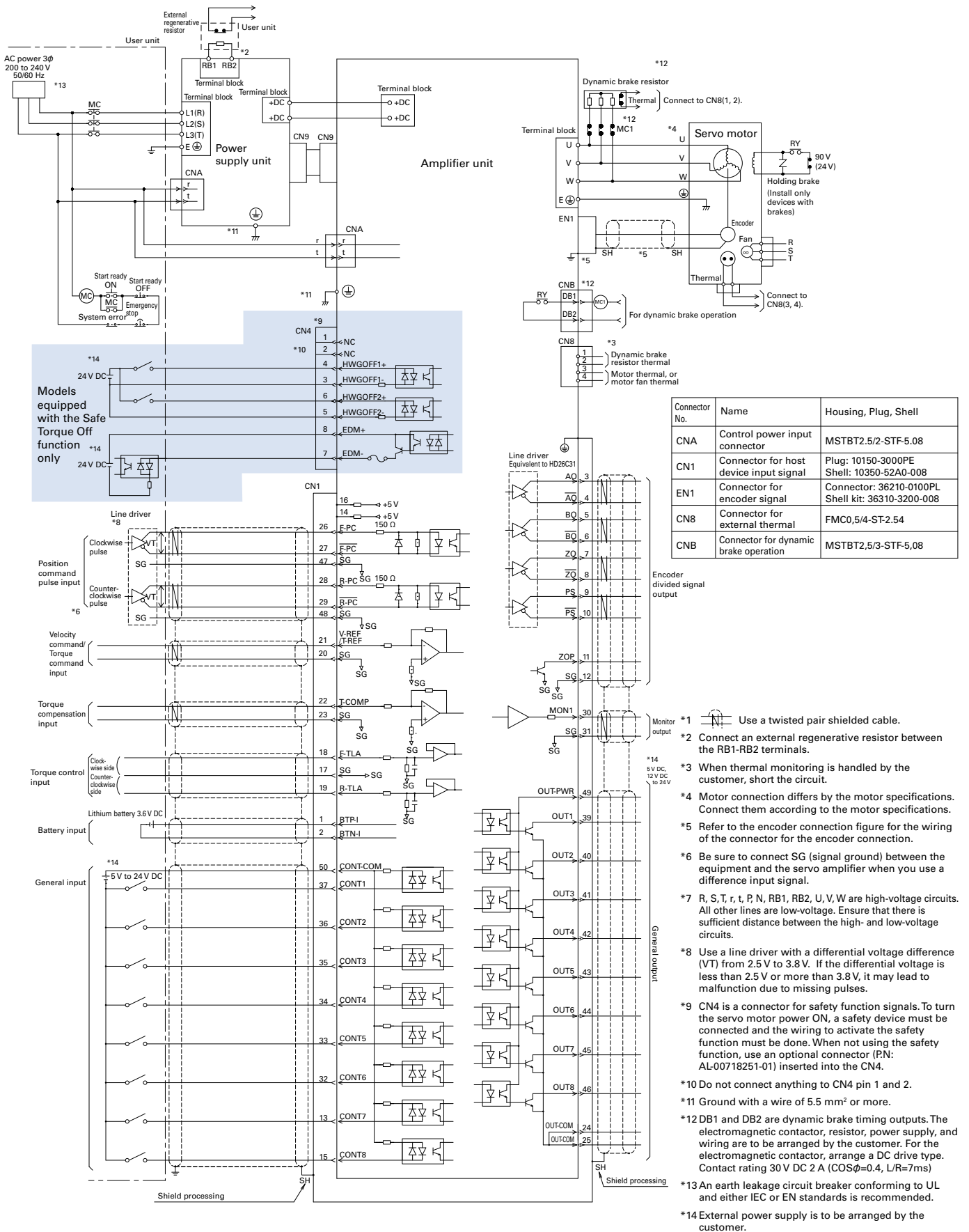
Connector No.	Name	Housing, Plug, Shell
CNA 10 A to 50 A	Main power supply, Control power input connector	MSTBT2.5/8-STF-5.08LUB
CNA 100 A to 300 A	Control power input connector	MSTBT2.5/2-STF-5.08
CNB 10 A to 50 A	Servo motor power line connector	MSTBT2.5/3-STF-5.08
CN1	Connector for host device input signal	Plug: 10150-3000PE Shell: 10350-52A0-008
EN1	Connector for encoder signal	Connector: 36210-0100PL Shell kit: 36310-3200-008
CN4	Connector for Safe Torque Off function signal	For short-circuiting: 2040978-1 For wiring: 2013595-3

- *1 Use a twisted pair shielded cable.
- *2 Amplifier capacity: 10 A to 50 A
Connect a regenerative resistor between the RB1-RB2 terminals. When using an external regenerative resistor, remove the wiring of the internal regenerative resistor connected between the RB1 and RB2 terminals and then connect the external regenerative resistor between the RB1 and RB2 terminals.
- Amplifier capacity: 100 A, 150 A
When using the internal regenerative resistor, short the circuit between the RB1-RB4 terminals. When using an external regenerative resistor, remove the shorting bar connected between the RB1 and RB4 terminals and then connect the regenerative resistor between the RB1 and RB2 terminals.
- Amplifier capacity: 300 A
Connect an external regenerative resistor between the RB1-RB2 terminals.
- *3 ⊕ is a maintenance terminal (high voltage circuit). Do not wire this terminal.
- *4 Motor connection differs by the motor specifications. The indications of red, white, black, green and orange apply when the motor power and brake lines are the lead type. When they are the circular connector type, connect them according to the motor specifications.
- *5 Refer to the encoder connection figure for the wiring of the connector for the encoder connection.
- *6 Be sure to connect SG (signal ground) between the equipment and the servo amplifier when you use a difference input signal.
- *7 R, S, T, r, t, ⊕, RB1, RB2, U, V, W are high-voltage circuits. All other lines are low-voltage. Ensure that there is sufficient distance between the high- and low-voltage circuits.
- *8 Use a line driver with a differential voltage difference (VT) from 2.5 V to 3.8 V. If the differential voltage is less than 2.5 V or more than 3.8 V, it may lead to malfunction due to missing pulses.
- *9 CN4 is a connector for safety function signals. To turn the servo motor power ON, a safety device must be connected and the wiring to activate the safety function must be done. When not using the safety function, use an optional connector (PN: AL00718251-01) inserted into the CN4.
- *10 Do not connect anything to CN4 pin 1 and 2.
- *11 An earth leakage circuit breaker conforming to UL and either IEC or EN standards is recommended.
- *12 The external power supply is to be arranged by the customer.
- *13 Do not wire the S phase for a single phase power supply.
- *14 There is no internal regenerative resistor or RB4 terminal for 300 A capacity amplifiers.

Servo amplifier: 10 A to 300 A, Source output



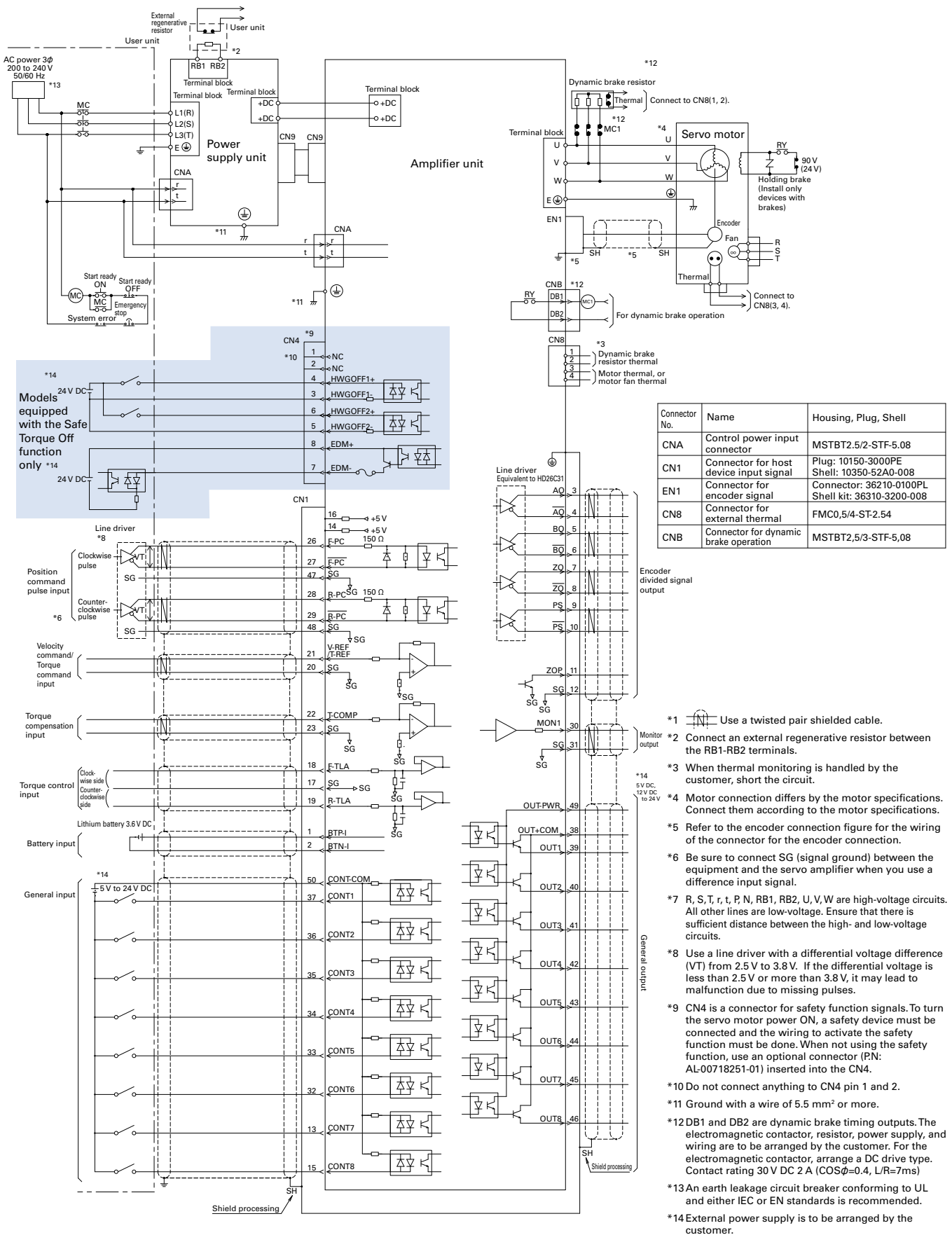
Servo amplifier: 600 A, Sink output



Connector No.	Name	Housing, Plug, Shell
CNA	Control power input connector	MSTBT2.5/2-STF-5.08
CN1	Connector for host device input signal	Plug: 10150-3000PE Shell: 10350-52A0-008
EN1	Connector for encoder signal	Connector: 36210-0100PL Shell kit: 36310-3200-008
CN8	Connector for external thermal	FMC0,5/4-ST-2.54
CNB	Connector for dynamic brake operation	MSTBT2,5/3-STF-5,08

- *1 Use a twisted pair shielded cable.
- *2 Connect an external regenerative resistor between the RB1-RB2 terminals.
- *3 When thermal monitoring is handled by the customer, short the circuit.
- *4 Motor connection differs by the motor specifications. Connect them according to the motor specifications.
- *5 Refer to the encoder connection figure for the wiring of the connector for the encoder connection.
- *6 Be sure to connect SG (signal ground) between the equipment and the servo amplifier when you use a difference input signal.
- *7 R, S, T, r, t, P, N, RB1, RB2, U, V, W are high-voltage circuits. All other lines are low-voltage. Ensure that there is sufficient distance between the high- and low-voltage circuits.
- *8 Use a line driver with a differential voltage difference (VT) from 2.5 V to 3.8 V. If the differential voltage is less than 2.5 V or more than 3.8 V, it may lead to malfunction due to missing pulses.
- *9 CN4 is a connector for safety function signals. To turn the servo motor power ON, a safety device must be connected and the wiring to activate the safety function must be done. When not using the safety function, use an optional connector (PN: AL-00718251-01) inserted into the CN4.
- *10 Do not connect anything to CN4 pin 1 and 2.
- *11 Ground with a wire of 5.5 mm² or more.
- *12 DB1 and DB2 are dynamic brake timing outputs. The electromagnetic contactor, resistor, power supply, and wiring are to be arranged by the customer. For the electromagnetic contactor, arrange a DC drive type. Contact rating 30 V DC 2 A (COSφ=0.4, L/R=7ms)
- *13 An earth leakage circuit breaker conforming to UL and either IEC or EN standards is recommended.
- *14 External power supply is to be arranged by the customer.

Servo amplifier: 600 A, Source output



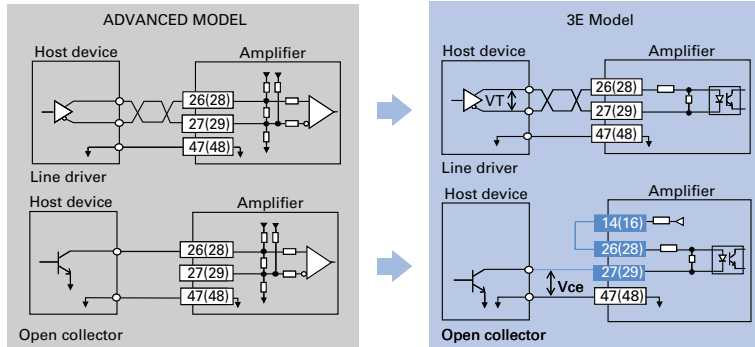
Connector No.	Name	Housing, Plug, Shell
CNA	Control power input connector	MSTBT2.5/2-STF-5.08
CN1	Connector for host device input signal	Plug: 10150-3000PE Shell: 10350-52A0-008
EN1	Connector for encoder signal	Connector: 36210-0100PL Shell kit: 36310-3200-008
CN8	Connector for external thermal	FMC0,5/4-ST-2.54
CNB	Connector for dynamic brake operation	MSTBT2,5/3-STF-5,08

Notes on Replacing Our Conventional Products

Note the following when replacing our conventional products such as servo amplifier SANMOTION R ADVANCED MODEL with SANMOTION R 3E Model.

Position Command Pulse Input

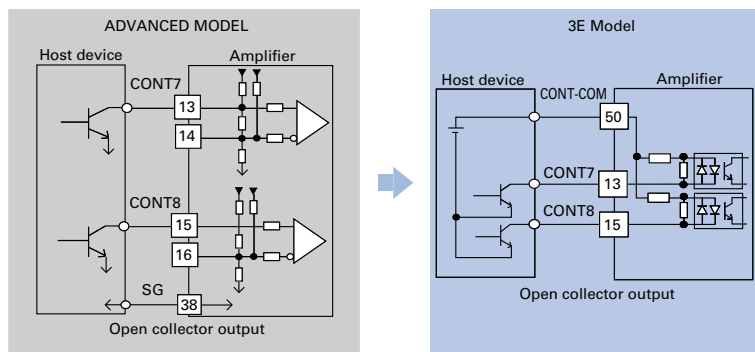
There are constraints on the specifications of the available position pulse signals for the SANMOTION R 3E Model. Also, for the open collector type, a wiring change is necessary.



Pulse output circuit of the host devices	Wiring compatibility	Constraint conditions
Differential output type (Line driver)	Yes	Voltage difference of differential signal (VT) : 2.5 to 3.8 V
Open collector Type	No	Saturation voltage of the transistor (VCE): 1.5V max.

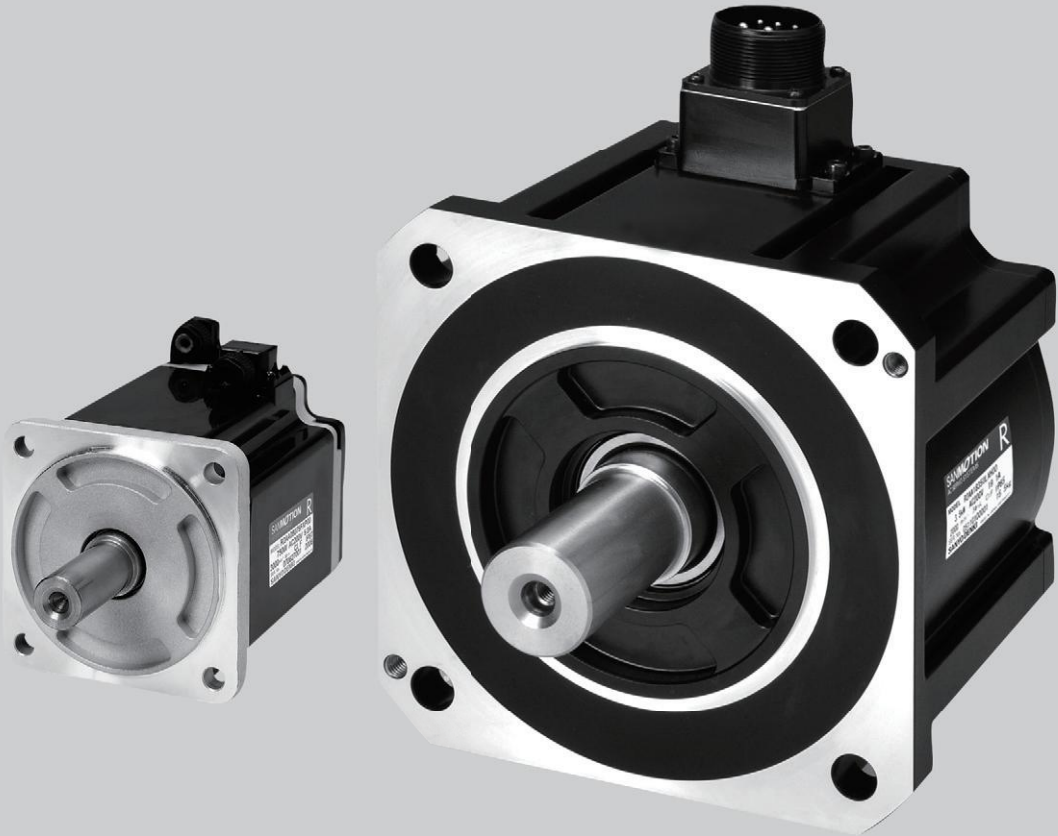
General input

For the SANMOTION R 3E Model, differential (line driver) output type cannot be used as a host device side output circuit. Also, a wiring change is necessary even if open collector output is used.



General output circuit of the host devices	Wiring compatibility	Constraint conditions
Differential output type (Line driver)	-	Change to open collector type.
Open collector Type	No (Refer to the figure)	Wire in a similar way to CONT1 to 6.

Servo Motor



Specifications



Servo Amplifier +



R2 Servo Motor

High Efficiency and Low Ripple (Medium Inertia)

RoHS

Input voltage **100 V AC**

Power supply range 85 V AC to 132 V AC

Servo Amplifier Model No. < > indicates amplifier capacity				RS3E01□□ <10 A>	RS3E02□□ <20 A>	
Servo Motor Model No. < > indicates flange size				R2EA04003F <40 mm sq.>	R2EA04005F <40 mm sq.>	R2EA04008F <40 mm sq.>
	Status	Symbol	Unit			
Rated Output	★	P _R	kW	0.03	0.05 ^{*4}	0.08
Rated Speed	★	N _R	min ⁻¹	3000	3000	3000
Maximum Speed	★	N _{max}	min ⁻¹	6000	6000	6000
Rated Torque	★	T _R	N·m	0.098	0.159	0.255
Continuous Stall Torque	★	T _S	N·m	0.108	0.167	0.255
Peak Stall Torque	★	T _P	N·m	0.37	0.59	0.86
Rated Armature Current	★	I _R	Arms	0.94	1.2	1.3
Armature Stall Current	★	I _S	Arms	1.0	1.3	1.3
Peak Armature Stall Current	★	I _P	Arms	3.7	4.9	4.5
Torque Constant	☆	K _T	N·m/Arms	0.116	0.142	0.22
Voltage Constant for each Phase	☆	K _{E φ}	mV/min ⁻¹	4.04	4.97	7.7
Phase Resistance	☆	R _φ	Ω	4.0	3.0	2.9
Rated Power Rate	★	Q _R	kW/s	3.9	6.7	10
Electrical Time Constant	☆	t _e	ms	0.55	0.67	0.81
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	2.2	1.7	0.98
Rotor Inertia		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0247	0.0376	0.0627
Absolute Encoder Inertia		J _S	×10 ⁻⁴ kg·m ² (GD ² /4)		0.0042 ^{*1}	
Servo Motor Mass *1		W _e	kg	0.37	0.41	0.53
Brake Static Friction Torque		T _b	N·m		0.32 Min.	
Brake Rated Voltage		V _b	V		90 V DC/24 V DC±10%	
Brake Rated Current		I _b	A		0.07/0.27	
Rotor Moment of Inertia (Brake)		J _b	×10 ⁻⁴ kg·m ² (GD ² /4)		0.0078	
Brake Mass		W	kg	0.27	0.27	0.27
Servo amplifier power supply capacity (rating)			kVA	0.2	0.2	0.4
CE and UL approved servo motors *5					p. 23	
Servo motor protection code					IP67, IP65	
Size of aluminum plates for heat radiation during measurement					250 × 250 × 6 mm	
Servo motor dimensions					p. 62	

*1 This is for the battery-less absolute encoder [HA035].
For the following encoders, contact us for details.
· Battery-backup method absolute encoder
· Wire-saving incremental encoder
For the servo amplifier mass, see pp. 35 to 37.

*2 Items with ★ and speed - torque characteristics indicate values after temperature rise saturation when used with a standard servo amplifier. The values are the typical values.

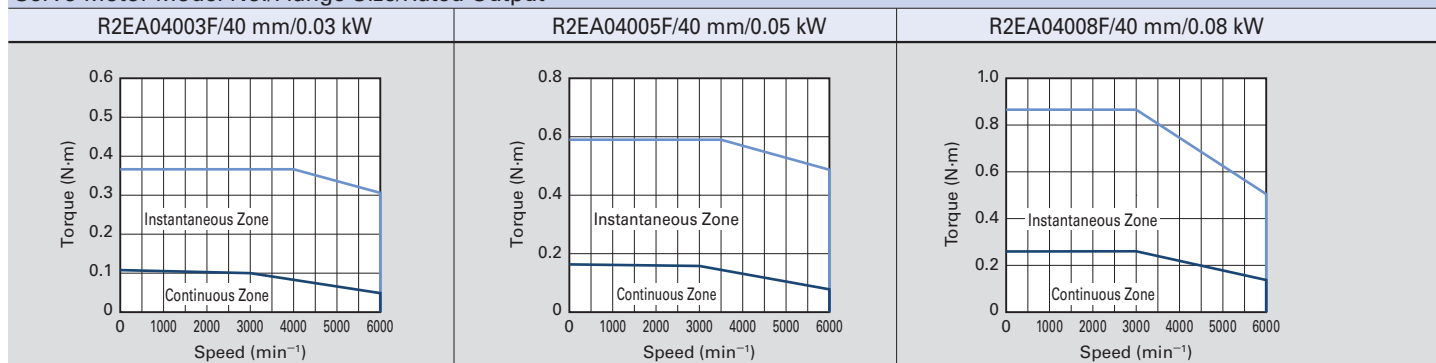
*3 ☆ : Indicates a typical value when the winding temperature is 20°C . The values are the typical values.

*4 Servo motors that come with oil seals (optional) may require an 80 to 95% reduction in output.

*5 Our standard servo amplifiers are CE and UL approved.

Speed-Torque Characteristics

Servo Motor Model No./Flange Size/Rated Output



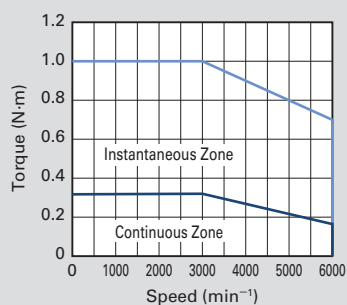
These values are for when the input voltage is a 100 V AC circuit. The area of the instantaneous zone decreases when the power supply voltage is less than 100 V AC.

RS3E02□□《20 A》	RS3E03□□《30 A》	Servo Amplifier Model No. 《 》 indicates amplifier capacity			
R2EA06010F 《60 mm sq.》	R2EA06020F 《60 mm sq.》	Servo Motor Model No. 《 》 indicates flange size			
		Unit	Symbol	Status	
0.1	0.2	kW	P _R	★	Rated Output
3000	3000	min ⁻¹	N _R	★	Rated Speed
6000	6000	min ⁻¹	N _{max}	★	Maximum Speed
0.318	0.637	N·m	T _R	★	Rated Torque
0.318	0.686	N·m	T _S	★	Continuous Stall Torque
1.0	2.2	N·m	T _P	★	Peak Stall Torque
1.7	3.1	Arms	I _R	★	Rated Armature Current
1.7	3.2	Arms	I _S	★	Armature Stall Current
5.6	11.9	Arms	I _P	★	Peak Armature Stall Current
0.206	0.224	N·m/Arms	K _T	☆	Torque Constant
7.2	7.82	mV/min ⁻¹	K _{Eφ}	☆	Voltage Constant for each Phase
1.5	0.6	Ω	R _φ	☆	Phase Resistance
8.6	19	kW/s	Q _R	★	Rated Power Rate
1.9	2.6	ms	t _e	☆	Electrical Time Constant
1.2	0.79	ms	t _m	☆	Mechanical Time Constant (Not including Encoder)
0.117	0.219	×10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia
0.0042 ^{*1}		×10 ⁻⁴ kg·m ² (GD ² /4)	J _S		Absolute Encoder Inertia
0.74	0.99	kg	W _e		Servo Motor Mass ^{*1}
0.36 Min.	1.37 Min.	N·m	T _b		Brake Static Friction Torque
90 V DC/24 V DC±10%		V	V _b		Brake Rated Voltage
0.07/0.27	0.11/0.32	A	I _b		Brake Rated Current
0.06		×10 ⁻⁴ kg·m ² (GD ² /4)	J _b		Rotor Moment of Inertia (Brake)
0.34	0.39	kg	W		Brake Mass
0.5	0.6	kVA			Servo amplifier power supply capacity (rating)
p. 23					CE and UL approved servo motors ^{*5}
IP67, IP65					Servo motor protection code
250 × 250 × 6 mm					Size of aluminum plates for heat radiation during measurement
p. 62					Servo motor dimensions

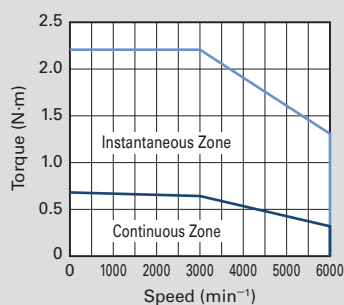
Servo Motor Operating Ambient Conditions

Operating temperature and humidity	Temp.: 0 to 40°C. Humidity: 90% max. (No condensation)
Vibration resistance	24.5 m/s ²
Shock resistance	98 m/s ² , twice
Elevation	1000 m or lower above sea level
Installation location	Indoor (without direct sunlight) Location where no substance that gives adverse effects on the device and motor, such as corrosive gas, flammable gas, or dust exists

R2EA06010F/60 mm/0.1 kW



R2EA06020F/60 mm/0.2 kW



Specifications



Servo Amplifier +



R2 Servo Motor

High Efficiency and Low Ripple (Medium Inertia) RoHS

Input voltage **200 V AC**

Power supply range 170 V AC to 264 V AC

Servo Amplifier Model No. 《 》 indicates amplifier capacity				RS3A01□□ 《10 A》			
Servo Motor Model No. 《 》 indicates flange size				R2AA04003F 《40 mm sq.》	R2AA04005F 《40 mm sq.》	R2AA04010F 《40 mm sq.》	R2AA06010F 《60 mm sq.》
	Status	Symbol	Unit				
Rated Output	★	P _R	kW	0.03	0.05 ^{*4}	0.1(0.085/0.09) ^{*4}	0.1
Rated Speed	★	N _R	min ⁻¹	3000	3000	3000	3000
Maximum Speed	★	N _{max}	min ⁻¹	6000	6000	6000	6000
Rated Torque	★	T _R	N·m	0.098	0.159	0.318	0.318
Continuous Stall Torque	★	T _S	N·m	0.108	0.167	0.318	0.353
Peak Stall Torque	★	T _P	N·m	0.37	0.59	1.18	1.13
Rated Armature Current	★	I _R	Arms	0.51	0.67	0.81	0.86
Armature Stall Current	★	I _S	Arms	0.56	0.69	0.81	0.86
Peak Armature Stall Current	★	I _P	Arms	2.15	2.8	3.3	3.5
Torque Constant	☆	K _T	N·m/Arms	0.201	0.246	0.424	0.375
Voltage Constant for each Phase	☆	K _E φ	mV/min ⁻¹	7.0	8.6	14.8	13.1
Phase Resistance	☆	R φ	Ω	12	9	9.3	4.8
Rated Power Rate	★	Q _R	kW/s	3.9	6.7	16	8.6
Electrical Time Constant	☆	t _e	ms	0.55	0.67	0.82	2
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	2.2	1.7	0.97	1.2
Rotor Inertia		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0247	0.0376	0.0627	0.117
Absolute Encoder Inertia		J _S	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0042 ^{*1}			
Servo Motor Mass ^{*1}		W _e	kg	0.37	0.41	0.53	0.74
Brake Static Friction Torque		T _b	N·m	0.32 Min.			0.36 Min.
Brake Rated Voltage		V _b	V	90 V DC/24 V DC±10%			
Brake Rated Current		I _b	A	0.07/0.27			
Rotor Moment of Inertia (Brake)		J _b	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0078			0.06
Brake Mass		W	kg	0.27	0.27	0.27	0.34
Servo amplifier power supply capacity (rating)			kVA	0.2	0.2	0.3	0.3
CE and UL approved servo motors ^{*5}				p. 25		p. 25, 31	p. 25
Servo motor protection code				IP67, IP65			
Size of aluminum plates for heat radiation during measurement				250 × 250 × 6 mm			
Servo motor dimensions				p. 62			

^{*1} This is for the battery-less absolute encoder [HA035].
For the following encoders, contact us for details.
· Battery-backup method absolute encoder
· Wire-saving incremental encoder
For the servo amplifier mass, see pp. 35 to 37.

^{*2} Items with ★ and speed - torque characteristics indicate values after temperature rise saturation when used with a standard servo amplifier. The values are the typical values.

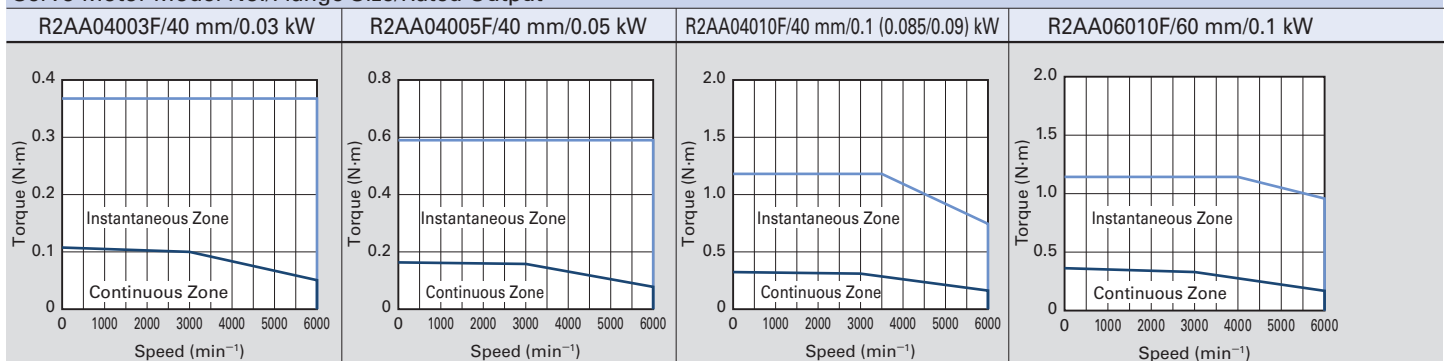
^{*3} ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.

^{*4} If enclosed in (), it comes with brake or oil seal. Servo motors that come with oil seals (optional) may require an 80 to 95% reduction in output.

^{*5} Our standard servo amplifiers are CE and UL approved.

Speed-Torque Characteristics

Servo Motor Model No./Flange Size/Rated Output



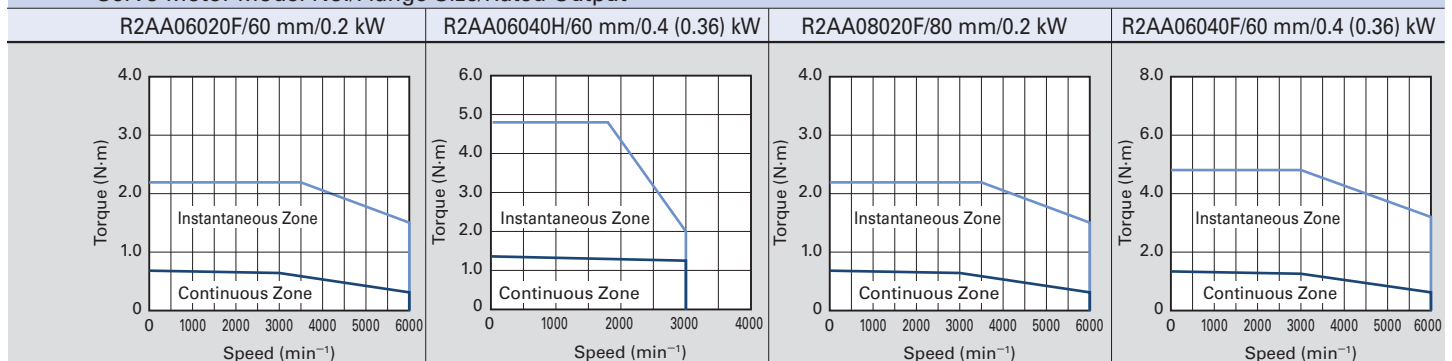
These values are for when the input voltage is a 3-phase 200 V AC circuit. The characteristics of the instantaneous zone may change when the input voltage is less than 200 V AC or a single-phase 200 V AC.

RS3A02□□《20 A》				Servo Amplifier Model No. 《 》 indicates amplifier capacity			
R2AA06020F 《60 mm sq.》	R2AA06040H 《60 mm sq.》	R2AA08020F 《80 mm sq.》	R2AA06040F 《60 mm sq.》	Servo Motor Model No. 《 》 indicates flange size			
				Unit	Symbol	Status	
0.2	0.4(0.36) ^{*4}	0.2	0.4(0.36) ^{*4}	kW	P _R	★	Rated Output
3000	3000	3000	3000	min ⁻¹	N _R	★	Rated Speed
6000	3000	6000	6000	min ⁻¹	N _{max}	★	Maximum Speed
0.637	1.27	0.637	1.27	N·m	T _R	★	Rated Torque
0.686	1.37	0.686	1.37	N·m	T _S	★	Continuous Stall Torque
2.2	4.8	2.2	4.8	N·m	T _P	★	Peak Stall Torque
1.5	1.7	1.5	2.8	Arms	I _R	★	Rated Armature Current
1.6	1.8	1.5	2.8	Arms	I _S	★	Armature Stall Current
5.6	7.1	4.8	10.8	Arms	I _P	★	Peak Armature Stall Current
0.476	0.816	0.516	0.524	N·m/Arms	K _T	☆	Torque Constant
16.6	28.5	18.0	18.3	mV/min ⁻¹	K _{Eφ}	☆	Voltage Constant for each Phase
2.7	3.3	2.3	1.36	Ω	R _φ	☆	Phase Resistance
19	39	8	39	kW/s	Q _R	★	Rated Power Rate
2.6	3.2	2.2	3.2	ms	t _e	☆	Electrical Time Constant
0.78	0.61	1.3	0.61	ms	t _m	☆	Mechanical Time Constant (Not including Encoder)
0.219	0.412	0.52	0.412	x10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia
0.0042 ^{*1}				x10 ⁻⁴ kg·m ² (GD ² /4)	J _S		Absolute Encoder Inertia
0.99	1.5	1.4	1.5	kg	W _e		Servo Motor Mass ^{*1}
1.37 Min.	1.37 Min.	2.55 Min.	1.37 Min.	N·m	T _b		Brake Static Friction Torque
90 V DC/24 V DC±10%				V	V _b		Brake Rated Voltage
0.11/0.32	0.11/0.32	0.12/0.37	0.11/0.32	A	I _b		Brake Rated Current
0.06	0.060	0.25	0.06	x10 ⁻⁴ kg·m ² (GD ² /4)	J _b		Rotor Moment of Inertia (Brake)
0.39	0.39	0.89	0.39	kg	W		Brake Mass
0.6	1.0	0.6	1.0	kVA			Servo amplifier power supply capacity (rating)
p. 25, 31	p. 26	p. 25	p. 26, 31				CE and UL approved servo motors ^{*5}
IP67, IP65							Servo motor protection code
250 × 250 × 6 mm							Size of aluminum plates for heat radiation during measurement
p. 62							Servo motor dimensions

Servo Motor Operating Ambient Conditions

Operating temperature and humidity	Temp.: 0 to 40°C. Humidity: 90% max. (No condensation)
Vibration resistance	24.5 m/s ²
Shock resistance	98 m/s ² , twice
Elevation	1000 m or lower above sea level
Installation location	Indoor (without direct sunlight) Location where no substance that gives adverse effects on the device and motor, such as corrosive gas, flammable gas, or dust exists

Servo Motor Model No./Flange Size/Rated Output



Specifications



Servo Amplifier +



R2

Servo Motor

High Efficiency and Low Ripple (Medium Inertia) **RoHS**

Input voltage **200 V AC**

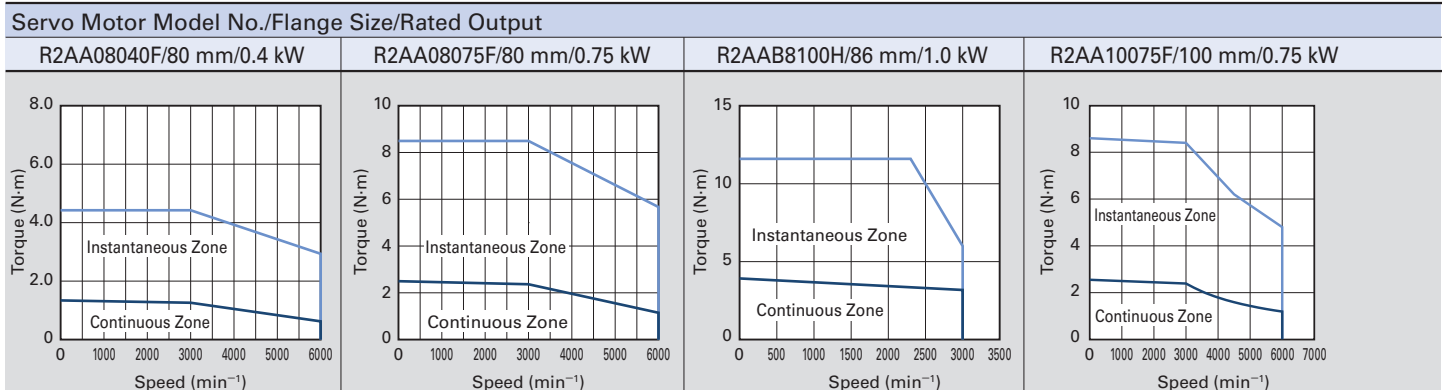
Power range 170 V AC to 264 V AC

Servo Amplifier Model No. < > indicates amplifier capacity				RS3A02□□ (20 A)		RS3A03□□ (30 A)	
Servo Motor Model No. < > indicates flange size				R2AA08040F <80 mm sq.>	R2AA08075F <80 mm sq.>	R2AAB8100H <86 mm sq.>	R2AA10075F <100 mm sq.>
	Status	Symbol	Unit				
Rated Output	★	P _R	kW	0.4	0.75 ^{*4}	1.0	0.75
Rated Speed	★	N _R	min ⁻¹	3000	3000	3000	3000
Maximum Speed	★	N _{max}	min ⁻¹	6000	6000	3000	6000
Rated Torque	★	T _R	N·m	1.27	2.39	3.18	2.39
Continuous Stall Torque	★	T _S	N·m	1.37	2.55	3.92	2.55
Peak Stall Torque	★	T _P	N·m	4.4	8.5	11.6	8.6
Rated Armature Current	★	I _R	Arms	2.6	4.6	4.6	4.4
Armature Stall Current	★	I _S	Arms	2.6	4.6	4.7	4.6
Peak Armature Stall Current	★	I _P	Arms	8.9	15.5	15.5	15.5
Torque Constant	☆	K _T	N·m/Arms	0.559	0.559	0.825	0.582
Voltage Constant for each Phase	☆	K _{Eφ}	mV/min ⁻¹	19.5	19.5	28.8	20.3
Phase Resistance	☆	R _φ	Ω	0.93	0.4	0.85	0.69
Rated Power Rate	★	Q _R	kW/s	16	31	42	29
Electrical Time Constant	☆	t _e	ms	2.5	3	4.6	7.0
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	0.93	0.7	0.89	1.2
Rotor Inertia		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	1.04	1.82	2.38	2.00
Absolute Encoder Inertia		J _S	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0042 ^{*1}			
Servo Motor Mass ^{*1}		W _e	kg	1.8	2.8	3.6	3.3
Brake Static Friction Torque		T _b	N·m	2.55 Min.		3.92 Min.	
Brake Rated Voltage		V _b	V	90 V DC/24 V DC±10%			
Brake Rated Current		I _b	A	0.12/0.37		0.09/0.30	
Rotor Moment of Inertia (Brake)		J _b	×10 ⁻⁴ kg·m ² (GD ² /4)	0.25		0.343	
Brake Mass		W	kg	0.89	0.89	0.84	0.9
Servo amplifier power supply capacity (rating)			kVA	1.0	1.6	2.0	1.7
CE and UL approved servo motors ^{*5}				p. 26	p. 26, 31, 32	p. 27, 32	p. 26
Servo motor protection code				IP67, IP65			
Size of aluminum plates for heat radiation during measurement				250 × 250 × 6 mm		305 × 305 × 12 mm	
Servo motor dimensions				p. 62, 63			

^{*1} This is for the battery-less absolute encoder [HA035].
For the following encoders, contact us for details.
· Battery-backup method absolute encoder
· Wire-saving incremental encoder
For the servo amplifier mass, see pp. 35 to 37.

^{*2} Items with ★ and speed - torque characteristics indicate values after temperature rise saturation when used with a standard servo amplifier. The values are the typical values.
^{*3} ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.
^{*4} Servo motors that come with oil seals (optional) may require an 80 to 95% reduction in output.
^{*5} Our standard servo amplifiers are CE and UL approved.

Speed-Torque Characteristics



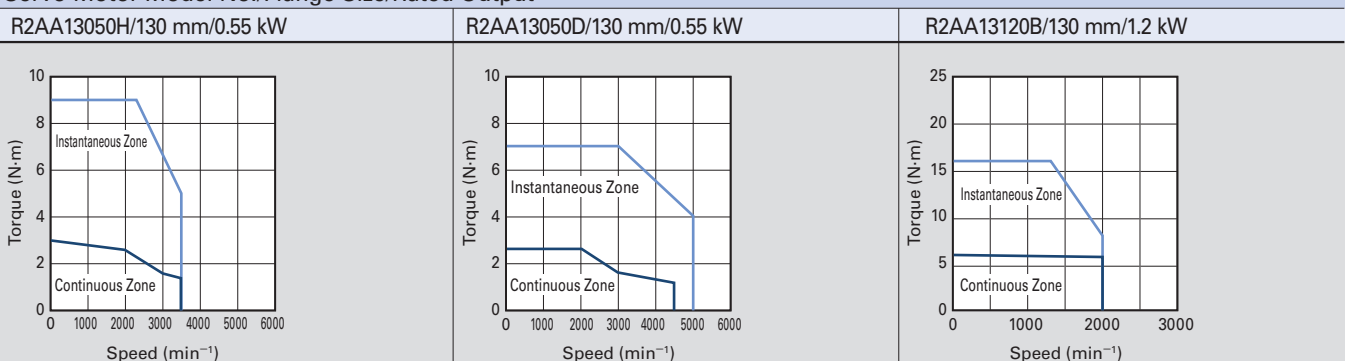
These values are for when the input voltage is a 3-phase 200 V AC circuit. The characteristics of the instantaneous zone may change when the input voltage is less than 200 V AC or a single-phase 200 V AC.

RS3A03□□《30 A》			Servo Amplifier Model No. 《 》 indicates amplifier capacity			
R2AA13050H 《130 mm sq.》	R2AA13050D 《130 mm sq.》	R2AA13120B 《130 mm sq.》	Servo Motor Model No. 《 》 indicates flange size			
			Unit	Symbol	Status	
0.55	0.55	1.2	kW	P _R	★	Rated Output
2000	2000	2000	min ⁻¹	N _R	★	Rated Speed
3500	5000	2000	min ⁻¹	N _{max}	★	Maximum Speed
2.6	2.6	5.7	N·m	T _R	★	Rated Torque
3.0	2.6	6.0	N·m	T _S	★	Continuous Stall Torque
9.0	7.0	16	N·m	T _P	★	Peak Stall Torque
4.2	5.2	5.2	Arms	I _R	★	Rated Armature Current
4.6	5.2	5.2	Arms	I _S	★	Armature Stall Current
15.5	15.5	15.5	Arms	I _P	★	Peak Armature Stall Current
0.67	0.53	1.09	N·m/Arms	K _T	☆	Torque Constant
23.5	18.5	37.8	mV/min ⁻¹	K _{Eφ}	☆	Voltage Constant for each Phase
0.65	0.39	0.64	Ω	R _φ	☆	Phase Resistance
22	22	54	kW/s	Q _R	★	Rated Power Rate
14	14	16	ms	t _e	☆	Electrical Time Constant
1.3	1.3	0.98	ms	t _m	☆	Mechanical Time Constant (Not including Encoder)
3.1	3.1	6.0	×10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia
0.0042 ^{*1}			×10 ⁻⁴ kg·m ² (GD ² /4)	J _S		Absolute Encoder Inertia
4.5	4.5	6.1	kg	W _e		Servo Motor Mass ^{*1}
3.5 Min.	3.5 Min.	9.0 Min.	N·m	T _b		Brake Static Friction Torque
90 V DC/24 V DC±10%			V	V _b		Brake Rated Voltage
0.15/0.41	0.15/0.41	0.17/0.51	A	I _b		Brake Rated Current
0.5	0.5	0.5	×10 ⁻⁴ kg·m ² (GD ² /4)	J _b		Rotor Moment of Inertia (Brake)
1.3	1.3	1.5	kg	W		Brake Mass
1.2	1.2	2.2	kVA			Servo amplifier power supply capacity (rating)
p. 28		p. 28, 32				CE and UL approved servo motors ^{*5}
IP65						Servo motor protection code
305 × 305 × 20 mm		400 × 400 × 20 mm				Size of aluminum plates for heat radiation during measurement
p. 63						Servo motor dimensions

Servo Motor Operating Ambient Conditions

Operating temperature and humidity	Temp.: 0 to 40°C. Humidity: 90% max. (No condensation)
Vibration resistance	24.5 m/s ²
Shock resistance	98 m/s ² , twice
Elevation	1000 m or lower above sea level
Installation location	Indoor (without direct sunlight) Location where no substance that gives adverse effects on the device and motor, such as corrosive gas, flammable gas, or dust exists

Servo Motor Model No./Flange Size/Rated Output



Specifications



Servo Amplifier +



R2

Servo Motor

High Efficiency and Low Ripple (Medium Inertia) RoHS

Input voltage **200 V AC**

Power supply range 170 V AC to 264 V AC

Servo Amplifier Model No. <> indicates amplifier capacity				RS3A05□□ <50 A>			
Servo Motor Model No. <> indicates flange size				R2AAB8075F <86 mm sq.>	R2AAB8100F <86 mm sq.>	R2AA10100F <100 mm sq.>	R2AA13120L <130 mm sq.>
	Status	Symbol	Unit				
Rated Output	★	P _R	kW	0.75	1.0	1.0	1.2
Rated Speed	★	N _R	min ⁻¹	3000	3000	3000	2000
Maximum Speed	★	N _{max}	min ⁻¹	6000	6000	6000	3000
Rated Torque	★	T _R	N·m	2.38	3.18	3.18	5.7
Continuous Stall Torque	★	T _S	N·m	2.94	3.92	3.92	6.0
Peak Stall Torque	★	T _P	N·m	11.0	14.3	14.3	20
Rated Armature Current	★	I _R	Arms	4.7	6.0	5.7	7.6
Armature Stall Current	★	I _S	Arms	5.5	6.8	6.8	8.4
Peak Armature Stall Current	★	I _P	Arms	23.7	25.7	25.7	26.5
Torque Constant	☆	K _T	N·m/Arms	0.547	0.582	0.584	0.77
Voltage Constant for each Phase	☆	K _E φ	mV/min ⁻¹	19.1	20.3	20.4	27.0
Phase Resistance	☆	R φ	Ω	0.62	0.44	0.35	0.35
Rated Power Rate	★	Q _R	kW/s	35	42	29	54
Electrical Time Constant	☆	t _e	ms	4.2	4.3	8.3	15
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	1.00	0.93	1.1	1.1
Rotor Inertia		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	1.64	2.38	3.50	6.0
Absolute Encoder Inertia		J _S	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0042 ^{*1}			
Servo Motor Mass ^{*1}		W _e	kg	2.9	3.6	4.1	6.1
Brake Static Friction Torque		T _b	N·m	3.92 Min.	3.92 Min.	3.92 Min.	9.0 Min.
Brake Rated Voltage		V _b	V	90 V DC/24 V DC±10%			
Brake Rated Current		I _b	A	0.09/0.30	0.09/0.30	0.09/0.30	0.17/0.51
Rotor Moment of Inertia (Brake)		J _b	×10 ⁻⁴ kg·m ² (GD ² /4)	0.34	0.34	0.343	0.5
Brake Mass		W	kg	0.84	0.84	0.9	1.5
Servo amplifier power supply capacity (rating)			kVA	1.6	2.3	2.3	2.8
CE and UL approved servo motors ^{*4}				p. 26	p. 27, 32	p. 27	p. 28, 32
Servo motor protection code				IP67, IP65			IP65
Size of aluminum plates for heat radiation during measurement				305 × 305 × 12 mm			400 × 400 × 20 mm
Servo motor dimensions				p. 62, 63			p. 63

^{*1} This is for the battery-less absolute encoder [HA035].
For the following encoders, contact us for details.
· Battery-backup method absolute encoder
· Wire-saving incremental encoder
For the servo amplifier mass, see pp. 35 to 37.

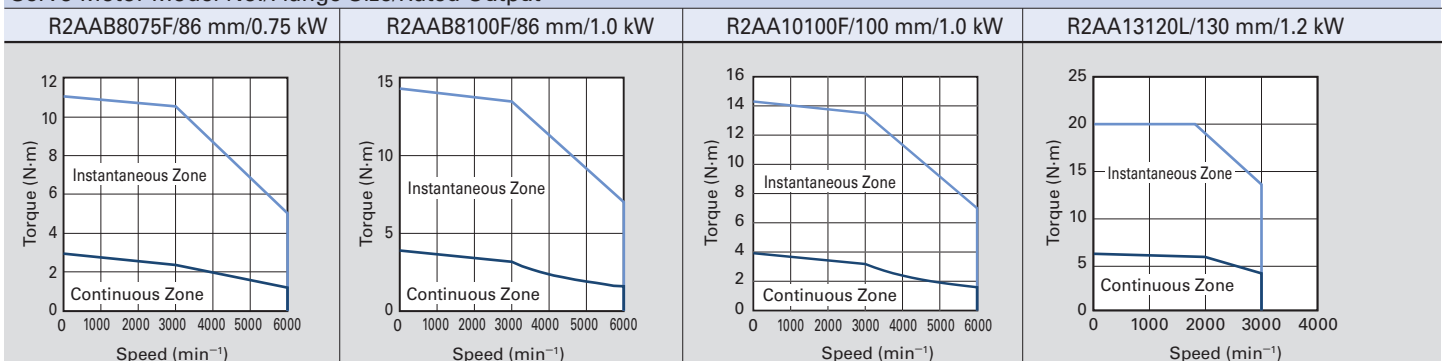
^{*2} Items with ★ and speed - torque characteristics indicate values after temperature rise saturation when used with a standard servo amplifier. The values are the typical values.

^{*3} ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.

^{*4} Our standard servo amplifiers are CE and UL approved.

Speed-Torque Characteristics

Servo Motor Model No./Flange Size/Rated Output



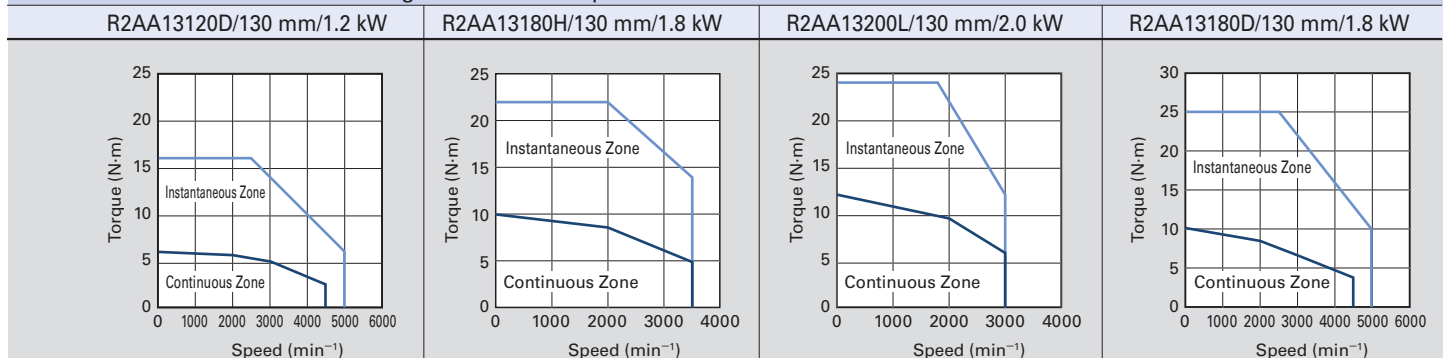
These values are for when the input voltage is a 3-phase 200 V AC circuit. The characteristics of the instantaneous zone may change when the input voltage is less than 200 V AC or a single-phase 200 V AC.

RS3A05□□ (50 A)				RS3A10□□ (100 A)	Servo Amplifier Model No. ◁ ▷ indicates amplifier capacity		
R2AA13120D ◁130 mm sq.▷	R2AA13180H ◁130 mm sq.▷	R2AA13200L ◁130 mm sq.▷	R2AA13180D ◁130 mm sq.▷	Servo Motor Model No. ◁ ▷ indicates flange size			
				Unit	Symbol	Status	
1.2	1.8	2	1.8	kW	P _R	★	Rated Output
2000	2000	2000	2000	min ⁻¹	N _R	★	Rated Speed
5000	3500	3000	5000	min ⁻¹	N _{max}	★	Maximum Speed
5.7	8.6	9.5	8.6	N·m	T _R	★	Rated Torque
6.0	10.0	12	10.0	N·m	T _S	★	Continuous Stall Torque
16	22	24	25	N·m	T _P	★	Peak Stall Torque
9.1	11.0	11.0	15.6	Arms	I _R	★	Rated Armature Current
9.3	11.8	12.0	17.3	Arms	I _S	★	Armature Stall Current
25.4	26.5	26.5	43.0	Arms	I _P	★	Peak Armature Stall Current
0.65	0.89	0.97	0.63	N·m/Arms	K _T	☆	Torque Constant
22.7	31.1	33.7	21.8	mV/min ⁻¹	K _{Eφ}	☆	Voltage Constant for each Phase
0.23	0.23	0.22	0.13	Ω	R _φ	☆	Phase Resistance
54	82	74	82	kW/s	Q _R	★	Rated Power Rate
16	18	17	16	ms	t _e	☆	Electrical Time Constant
0.98	0.78	0.86	0.89	ms	t _m	☆	Mechanical Time Constant (Not including Encoder)
6.0	9.0	12.2	9.0	×10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia
0.0042 ^{*1}				×10 ⁻⁴ kg·m ² (GD ² /4)	J _S		Absolute Encoder Inertia
6.1	7.7	10	7.7	kg	W _e		Servo Motor Mass ^{*1}
9.0 Min.	9.0 Min.	12 Min.	9.0 Min.	N·m	T _b		Brake Static Friction Torque
90 V DC/24 V DC±10%				V	V _b		Brake Rated Voltage
0.17/0.51	0.17/0.51	0.17/0.66	0.17/0.51	A	I _b		Brake Rated Current
0.5	0.5	0.5	0.5	×10 ⁻⁴ kg·m ² (GD ² /4)	J _b		Rotor Moment of Inertia (Brake)
1.5	1.5	1.5	1.5	kg	W		Brake Mass
2.8	3.6	4.0	4.0	kVA			Servo amplifier power supply capacity (rating)
p. 28, 32	p. 28	p. 28, 32	p. 28				CE and UL approved servo motors ^{*4}
IP65							Servo motor protection code
400 x 400 x 20 mm	470 x 470 x 20 mm						Size of aluminum plates for heat radiation during measurement
p. 63		p. 64	p. 63				Servo motor dimensions

Servo Motor Operating Ambient Conditions

Operating temperature and humidity	Temp.: 0 to 40°C. Humidity: 90% max. (No condensation)
Vibration resistance	24.5 m/s ²
Shock resistance	98 m/s ² , twice
Elevation	1000 m or lower above sea level
Installation location	Indoor (without direct sunlight) Location where no substance that gives adverse effects on the device and motor, such as corrosive gas, flammable gas, or dust exists

Servo Motor Model No./Flange Size/Rated Output



Specifications



Servo Amplifier +



R2 Servo Motor

High Efficiency and Low Ripple (Medium Inertia) **RoHS**

Input voltage **200 V AC**

Power supply range 170 V AC to 264 V AC

Servo Amplifier Model No. < > indicates amplifier capacity				RS3A10 □ □ < 100 A >		RS3A15 □ □ < 150 A >	
Servo Motor Model No. < > indicates flange size				R2AA13200D < 130 mm sq. >	R2AA18350L < 180 mm sq. >	R2AA18350D < 180 mm sq. >	R2AA18450H < 180 mm sq. >
	Status	Symbol	Unit				
Rated Output	★	P _R	kW	2	3.5	3.5	4.5
Rated Speed	★	N _R	min ⁻¹	2000	2000	2000	2000
Maximum Speed	★	N _{max}	min ⁻¹	5000	3000	4000	3500
Rated Torque	★	T _R	N·m	9.5	17	17	21.5
Continuous Stall Torque	★	T _S	N·m	12	22.0	22.0	30.0
Peak Stall Torque	★	T _P	N·m	30	49	60	75
Rated Armature Current	★	I _R	Arms	14.3	19.1	21.7	23.7
Armature Stall Current	★	I _S	Arms	17.5	23.7	27.0	31.7
Peak Armature Stall Current	★	I _P	Arms	45.5	55.0	83.0	83.0
Torque Constant	☆	K _T	N·m/Arms	0.70	1.00	0.88	1.02
Voltage Constant for each Phase	☆	K _E φ	mV/min ⁻¹	24.3	34.8	30.6	35.6
Phase Resistance	☆	R φ	Ω	0.11	0.085	0.075	0.065
Rated Power Rate	★	Q _R	kW/s	74	72	72	92
Electrical Time Constant	☆	t _e	ms	18	18	16	18
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	0.83	1.0	1.2	0.94
Rotor Inertia		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	12.2	40	40	50
Absolute Encoder Inertia		J _S	×10 ⁻⁴ kg·m ² (GD ² /4)	0.012 ^{*1}			
Servo Motor Mass ^{*1}		W _e	kg	10	15.5	15.5	19.5
Brake Static Friction Torque		T _b	N·m	12 Min.	22 Min.	22 Min.	32 Min.
Brake Rated Voltage		V _b	V	90 V DC/24 V DC±10%			
Brake Rated Current		I _b	A	0.17/0.66	0.32/1.2	0.32/1.2	0.27/1.0
Rotor Moment of Inertia (Brake)		J _b	×10 ⁻⁴ kg·m ² (GD ² /4)	0.5	5.1	5.1	5.1
Brake Mass		W	kg	1.5	2.4	2.4	2.8
Servo amplifier power supply capacity (rating)			kVA	5.0	6.0	7.0	7.4
CE and UL approved servo motors ^{*4}				p. 28, 32	p. 28		
Servo motor protection code				IP65			
Size of aluminum plates for heat radiation during measurement				470 × 470 × 20 mm			
Servo motor dimensions				p. 64	p. 65		

^{*1} This is for the battery-less absolute encoder [HA035].
For the following encoders, contact us for details.
· Battery-backup method absolute encoder
· Wire-saving incremental encoder
For the servo amplifier mass, refer to pp. 35 to 37.

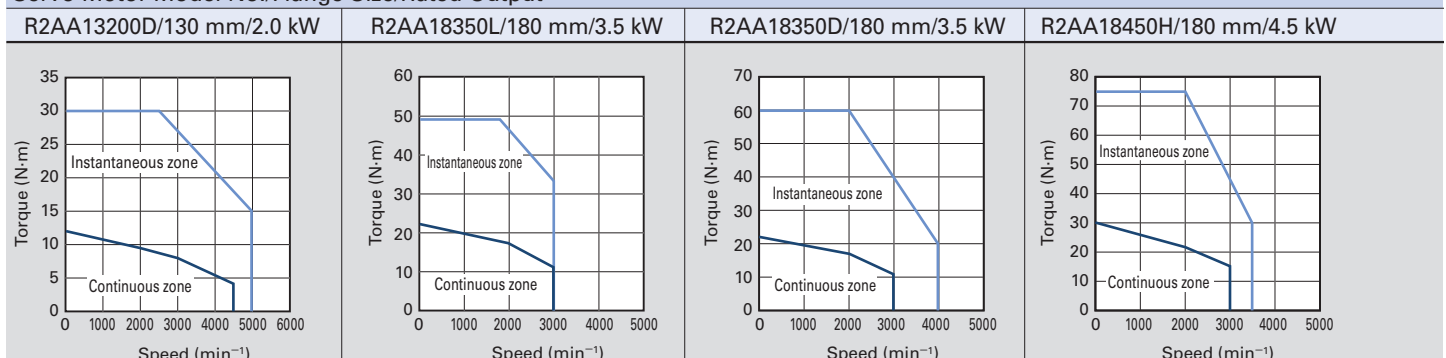
^{*2} Items with ★ and speed - torque characteristics indicate values after temperature rise saturation when used with a standard servo amplifier. The values are the typical values.

^{*3} ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.

^{*4} Our standard servo amplifiers are CE and UL approved.

Speed-Torque Characteristics

Servo Motor Model No./Flange Size/Rated Output



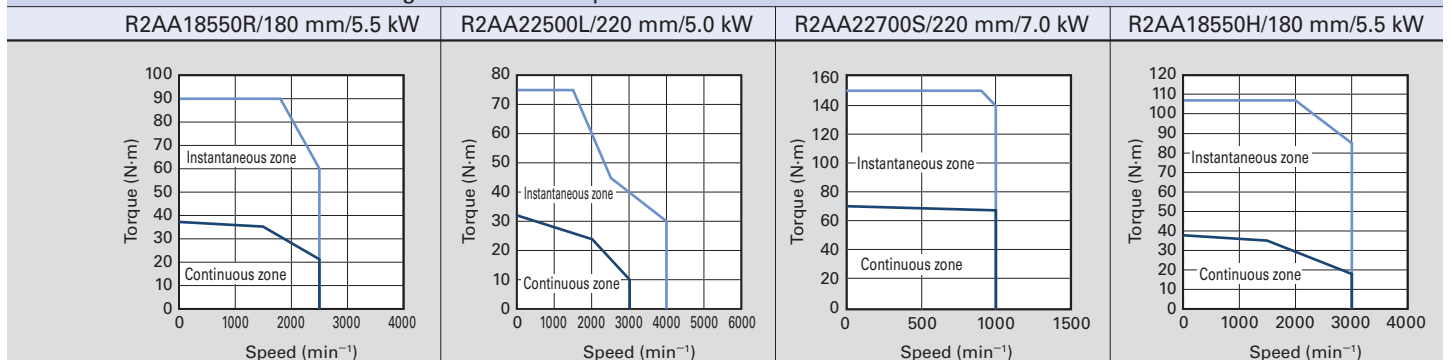
These values are for when the input voltage is a 3-phase 200 V AC circuit. The characteristics of the instantaneous zone may change when the input voltage is less than 200 V AC.

RS3A15□□ (150 A)				RS3A30□□ (300 A)	Servo Amplifier Model No. 《 》 indicates amplifier capacity		
R2AA18550R 《180 mm sq.》	R2AA22500L 《220 mm sq.》	R2AA22700S 《220 mm sq.》	R2AA18550H 《180 mm sq.》	Servo Motor Model No. 《 》 indicates flange size			
				Unit	Symbol	Status	
5.5	5	7	5.5	kW	P _R	★	Rated Output
1500	2000	1000	1500	min ⁻¹	N _R	★	Rated Speed
2500	4000	1000	3000	min ⁻¹	N _{max}	★	Maximum Speed
35	24	67	35	N·m	T _R	★	Rated Torque
37.3	32	70	37.5	N·m	T _S	★	Continuous Stall Torque
90	75	150	107	N·m	T _P	★	Peak Stall Torque
31.6	22.0	34.0	46.2	Arms	I _R	★	Rated Armature Current
32.9	34.0	34.0	48.0	Arms	I _S	★	Armature Stall Current
83.0	83.0	83.0	155.0	Arms	I _P	★	Peak Armature Stall Current
1.23	1.00	2.25	0.84	N·m/Arms	K _T	☆	Torque Constant
42.8	34.9	78.6	29.3	mV/min ⁻¹	K _{Eφ}	☆	Voltage Constant for each Phase
0.059	0.047	0.085	0.030	Ω	R _φ	☆	Phase Resistance
180	105	330	180	kW/s	Q _R	★	Rated Power Rate
22	40	26	20	ms	t _e	☆	Electrical Time Constant
0.80	0.78	0.68	0.87	ms	t _m	☆	Mechanical Time Constant (Not including Encoder)
68	55	136	68	×10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia
0.012 ⁻¹				×10 ⁻⁴ kg·m ² (GD ² /4)	J _S		Absolute Encoder Inertia
27.7	22.5	43	27.7	kg	W _e		Servo Motor Mass *1
42 Min.	42 Min.	90 Min.	42 Min.	N·m	T _b		Brake Static Friction Torque
90 V DC/24 V DC±10%				V	V _b		Brake Rated Voltage
0.27/1.0	0.32/1.2	0.44/1.7	0.27/1.0	A	I _b		Brake Rated Current
5.1	5.1	24	5.1	×10 ⁻⁴ kg·m ² (GD ² /4)	J _b		Rotor Moment of Inertia (Brake)
2.8	5.5	7.8	2.8	kg	W		Brake Mass
8.4	9.6	12.2	9.3	kVA			Servo amplifier power supply capacity (rating)
p. 29							CE and UL approved servo motors *4
IP65			IP65 (excluding the cooling fan)				Servo motor protection code
540 × 540 × 20 mm							Size of aluminum plates for heat radiation during measurement
p. 65	p. 66		p. 65				Servo motor dimensions

Servo Motor Operating Ambient Conditions

Operating temperature and humidity	Temp.: 0 to 40°C. Humidity: 90% max. (No condensation)
Vibration resistance	24.5 m/s ²
Shock resistance	98 m/s ² , twice
Elevation	1000 m or lower above sea level
Installation location	Indoor (without direct sunlight) Location where no substance that gives adverse effects on the device and motor, such as corrosive gas, flammable gas, or dust exists

Servo Motor Model No./Flange Size/Rated Output



Specifications



Servo Amplifier +



R2

Servo Motor

High Efficiency and Low Ripple (Medium Inertia)

RoHS

Input voltage 200 V AC

Power supply range 170 V AC to 264 V AC

Servo Amplifier Model No. < > indicates amplifier capacity				RS3A30□□ (300 A)			
Servo Motor Model No. < > indicates flange size				R2AA18750H <180 mm sq.>	R2AA1811KR <180 mm sq.>	R2AA2211KB <220 mm sq.>	R2AA2215KB <220 mm sq.>
	Status	Symbol	Unit				
Rated Output	★	PR	kW	7.5	11	11	15
Rated Speed	★	NR	min ⁻¹	1500	1500	1500	1500
Maximum Speed	★	N _{max}	min ⁻¹	3000	2500	2000	2000
Rated Torque	★	TR	N·m	48	70	70	95
Continuous Stall Torque	★	TS	N·m	54.9	80.0	80	95
Peak Stall Torque	★	TP	N·m	140	170	176	215
Rated Armature Current	★	IR	Arms	51.2	61.9	60	66
Armature Stall Current	★	IS	Arms	56.8	66.0	66	66
Peak Armature Stall Current	★	IP	Arms	155.0	155.0	155	155
Torque Constant	☆	KT	N·m/Arms	1.04	1.25	1.38	1.50
Voltage Constant for each Phase	☆	KE φ	mV/min ⁻¹	36.6	43.8	48	52.3
Phase Resistance	☆	R φ	Ω	0.030	0.035	0.022	0.017
Rated Power Rate	★	QR	kW/s	235	445	275	380
Electrical Time Constant	☆	te	ms	20	22	27	34
Mechanical Time Constant (Not including Encoder)	☆	tm	ms	0.81	0.74	0.62	0.54
Rotor Inertia		JM	x10 ⁻⁴ kg·m ² (GD ² /4)	98	110	178	237
Absolute Encoder Inertia		JS	x10 ⁻⁴ kg·m ² (GD ² /4)	0.012 ^{*1}			
Servo Motor Mass *1		We	kg	35.7	40	55	62
Brake Static Friction Torque		Tb	N·m	54.9 Min.	100 Min.	90 Min.	
Brake Rated Voltage		Vb	V	90 V DC/24 V DC±10%			
Brake Rated Current		Ib	A	0.37/1.4	0.5/1.9	0.44/1.7	
Rotor Moment of Inertia (Brake)		Jb	x10 ⁻⁴ kg·m ² (GD ² /4)	4.5	9.7	24	
Brake Mass		W	kg	4.5	8.9	7.8	
Servo amplifier power supply capacity (rating)			kVA	11.6	16.0	16.0	21.4
Cooling fan power		PF	W	—	31/29 180 V AC to 253 V AC Single-phase 50 Hz/60 Hz	—	
CE and UL approved servo motors *4				p. 29			
Servo motor protection code				IP65 (excluding the cooling fan)			
Size of aluminum plates for heat radiation during measurement				540 × 540 × 20 mm	610 × 610 × 30 mm		
Servo motor dimensions				p. 65			p. 66

*1 This is for the battery-less absolute encoder [HA035].
For the following encoders, contact us for details.
· Battery-backup method absolute encoder
· Wire-saving incremental encoder
For the servo amplifier mass, refer to pp. 35 to 37.

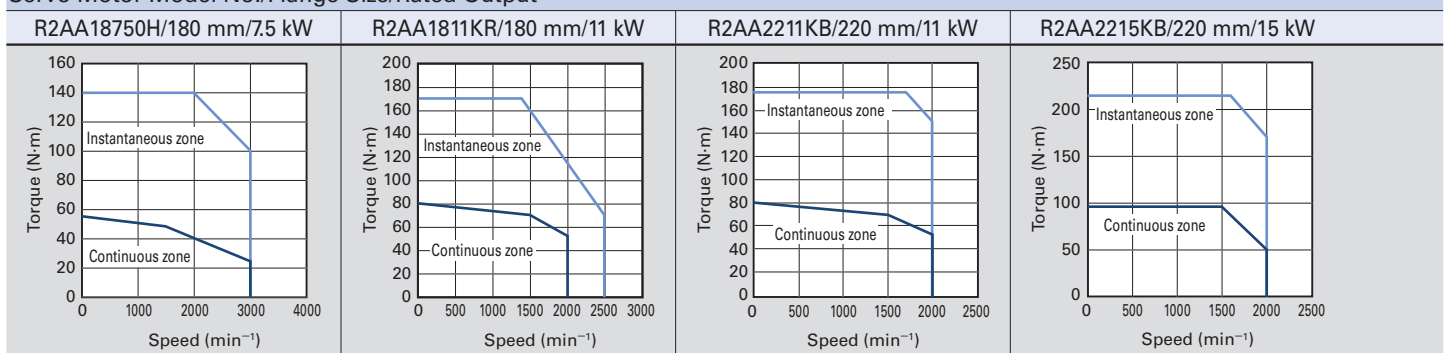
*2 Items with ★ and speed - torque characteristics indicate values after temperature rise saturation when used with a standard servo amplifier. The values are the typical values.

*3 ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.

*4 Our standard servo amplifiers are CE and UL approved.

Speed-Torque Characteristics

Servo Motor Model No./Flange Size/Rated Output



These values are for when the input voltage is a 3-phase 200 V AC circuit. The characteristics of the instantaneous zone may change when the input voltage is less than 200 V AC.

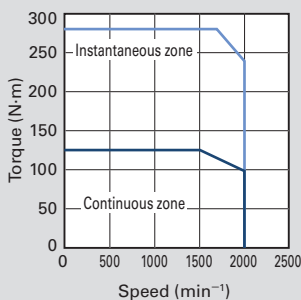
RS3W60 □ □ (600 A)			Servo Amplifier Model No. 《 》 indicates amplifier capacity			
R2AA2220KB 《220 mm sq.》	R2AA2225KB 《220 mm sq.》	R2AA2830KV 《275 mm sq.》	Servo Motor Model No. 《 》 indicates flange size			
			Unit	Symbol	Status	
20	25	30	kW	P _R	★	Rated Output
1500	1500	1500	min ⁻¹	N _R	★	Rated Speed
2000	2000	2000	min ⁻¹	N _{max}	★	Maximum Speed
125	159	191.1	N·m	T _R	★	Rated Torque
125	159	191.1	N·m	T _S	★	Continuous Stall Torque
280	415	480	N·m	T _P	★	Peak Stall Torque
116	111	116	Arms	I _R	★	Rated Armature Current
113	108	114	Arms	I _S	★	Armature Stall Current
290	290	290	Arms	I _P	★	Peak Armature Stall Current
1.21	1.58	1.78	N·m/Arms	K _T	☆	Torque Constant
42.4	55.2	62.1	mV/min ⁻¹	K _{Eφ}	☆	Voltage Constant for each Phase
0.013	0.017	0.013	Ω	R _φ	☆	Phase Resistance
659	878	865	kW/s	Q _R	★	Rated Power Rate
33	36	59	ms	te	☆	Electrical Time Constant
0.63	0.59	0.52	ms	tm	☆	Mechanical Time Constant (Not including Encoder)
237	288	422	x10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia
	0.012 ^{*1}		x10 ⁻⁴ kg·m ² (GD ² /4)	J _S		Absolute Encoder Inertia
70	80	107	kg	W _e		Servo Motor Mass ^{*1}
170 Min.		191.2 Min.	N·m	T _b		Brake Static Friction Torque
24 V DC ± 10%			V	V _b		Brake Rated Voltage
1.5		2.6	A	I _b		Brake Rated Current
12		11.8	x10 ⁻⁴ kg·m ² (GD ² /4)	J _b		Rotor Moment of Inertia (Brake)
17		18.2	kg	W		Brake Mass
30.0	36.0	42.0	kVA			Servo amplifier power supply capacity (rating)
31/29		65/65	W	P _F		Cooling fan power
180 V AC to 253 V AC Single-phase 50 Hz/60 Hz		180 V AC to 253 V AC 3-phase 50 Hz/60 Hz				
Preparing		Preparing				CE and UL approved servo motors ^{*4}
IP65 (excluding the cooling fan)		IP65 (excluding the cooling fan)				Servo motor protection code
610 × 610 × 30 mm		610 × 610 × 30 mm				Size of aluminum plates for heat radiation during measurement
p. 67						Servo motor dimensions

Servo Motor Operating Ambient Conditions

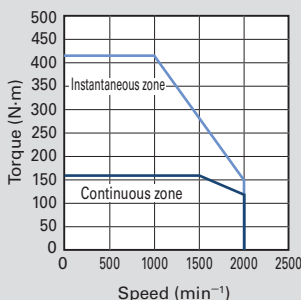
Operating temperature and humidity	Temp.: 0 to 40°C. Humidity: 90% max. (No condensation)
Vibration resistance	24.5 m/s ²
Shock resistance	98 m/s ² , twice
Elevation	1000 m or lower above sea level
Installation location	Indoor (without direct sunlight) Location where no substance that gives adverse effects on the device and motor, such as corrosive gas, flammable gas, or dust exists

Servo Motor Model No./Flange Size/Rated Output

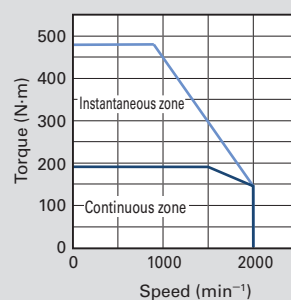
R2AA2220KB/220 mm/20 kW



R2AA2225KB/220 mm/25 kW



R2AA2830KV/275 mm/30 kW



Specifications



Servo Amplifier +



R1 Servo Motor

High Power Rate (Low Inertia) RoHS

Input voltage **200 V AC**

Power supply range 170 V AC to 264 V AC

Servo Amplifier Model No. <> indicates amplifier capacity				RS3A30A □ (300 A)	
Servo Motor Model No. <> indicates flange size				R1AA18550H (180 mm sq.)	R1AA18750L (180 mm sq.)
	Status	Symbol	Unit		
Rated Output	★	P _R	kW	5.5	7.5
Rated Speed	★	N _R	min ⁻¹	1500	1500
Maximum Speed	★	N _{max}	min ⁻¹	3000	3000
Rated Torque	★	T _R	N·m	35	48
Continuous Stall Torque	★	T _S	N·m	37	48
Peak Stall Torque	★	T _P	N·m	110	135
Rated Armature Current	★	I _R	Arms	46	49
Armature Stall Current	★	I _S	Arms	47	47
Peak Armature Stall Current	★	I _P	Arms	155	155
Torque Constant	☆	K _T	N·m/Arms	0.86	1.09
Voltage Constant for each Phase	☆	K _{E φ}	mV/min ⁻¹	30	38.1
Phase Resistance	☆	R _φ	Ω	0.029	0.031
Rated Power Rate	★	Q _R	kW/s	370	550
Electrical Time Constant	☆	t _e	ms	23	21
Mechanical Time Constant (including Encoder)	☆	t _m	ms	0.39	0.33
Rotor Inertia		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	33	42
Servo Motor Mass *1		W _e	kg	33	39
Brake Static Friction Torque		T _b	N·m	53.9 Min.	53.9 Min.
Brake Rated Voltage		V _b	V	90 V DC/24 V DC±10%	
Brake Rated Current		I _b	A	0.37/1.4	0.37/1.4
Rotor Moment of Inertia (Brake)		J _b	×10 ⁻⁴ kg·m ² (GD ² /4)	5.7	5.7
Brake Mass		W	kg	5	5
Servo amplifier power supply capacity (rating)			kVA	9.3	11.6
Cooling fan power		P _F	W	30/26 200 V AC ± 10% Single-phase 50 Hz/60 Hz	
CE and UL approved servo motors *4				Preparing	
Servo motor protection code				IP65 (excluding the cooling fan)	
Size of aluminum plates for heat radiation during measurement				540 × 540 × 20 mm	
Servo motor dimensions				p. 68	

*1 This is for the battery-less absolute encoder [HA035].
For the following encoders, contact us for details.
· Battery-backup method absolute encoder
· Wire-saving incremental encoder
For the servo amplifier mass, refer to pp. 35 to 37.

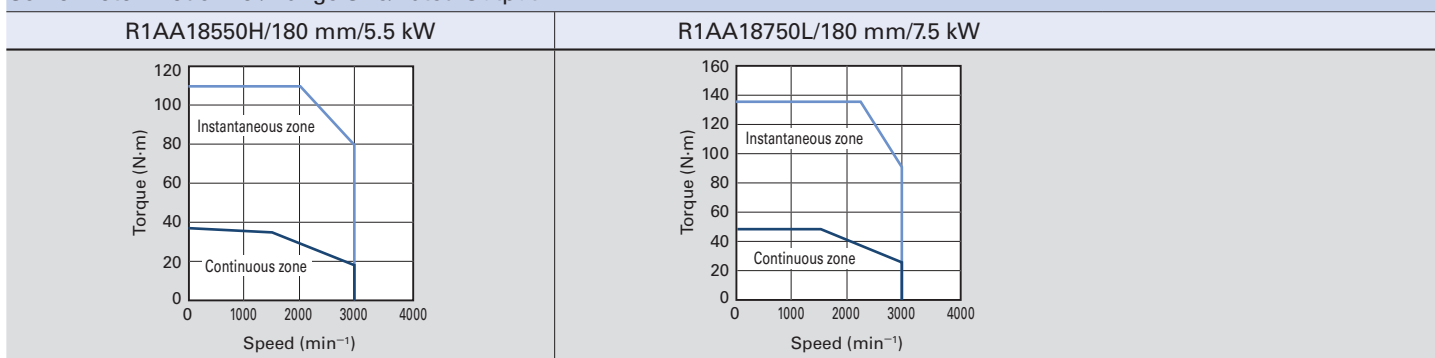
*2 Items with ★ and speed - torque characteristics indicate values after temperature rise saturation when used with a standard servo amplifier. The values are the typical values.

*3 ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.

*4 Our standard servo amplifiers are CE and UL approved.

Speed-Torque Characteristics

Servo Motor Model No./Flange Size/Rated Output



These values are for when the input voltage is a 3-phase 200 V AC circuit. The characteristics of the instantaneous zone may change when the input voltage is less than 200 V AC or a single-phase 200 V AC.

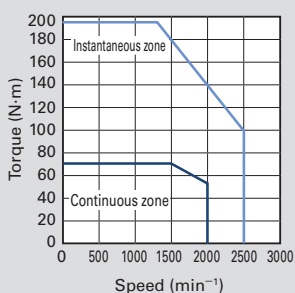
RS3A30A □ 《300 A》			RS3W60 □ □ □ 《600 A》			Servo Amplifier Model No. 《 》 indicates amplifier capacity		
R1AA1811KR 《180 mm sq.》	R1AA1815KB 《180 mm sq.》	R1AA2220KV 《220 mm sq.》	Servo Motor Model No. 《 》 indicates flange size					
			Unit	Symbol	Status			
11	15	21	kW	P _R	★	Rated Output		
1500	1500	1500	min ⁻¹	N _R	★	Rated Speed		
2500	2000	2000	min ⁻¹	N _{max}	★	Maximum Speed		
70	95.5	135	N·m	T _R	★	Rated Torque		
70	95.5	135	N·m	T _S	★	Continuous Stall Torque		
195	230	380	N·m	T _P	★	Peak Stall Torque		
55.0	60.0	100	Arms	I _R	★	Rated Armature Current		
54.0	58.0	96	Arms	I _S	★	Armature Stall Current		
155	155	290	Arms	I _P	★	Peak Armature Stall Current		
1.4	1.77	1.51	N·m/Arms	K _T	☆	Torque Constant		
48.7	61.6	52.8	mV/min ⁻¹	K _{E φ}	☆	Voltage Constant for each Phase		
0.033	0.033	0.014	Ω	R φ	☆	Phase Resistance		
770	1060	1740	kW/s	Q _R	★	Rated Power Rate		
22	25	51	ms	t _e	☆	Electrical Time Constant		
0.32	0.27	0.19	ms	t _m	☆	Mechanical Time Constant (including Encoder)		
64	86	105	×10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia		
52	64	107	kg	W _e		Servo Motor Mass * ¹		
75 Min.	120 Min.	-	N·m	T _b		Brake Static Friction Torque		
24 V DC ± 10%			V	V _b		Brake Rated Voltage		
1.5	1.9	-	A	I _b		Brake Rated Current		
8.0	9.7	-	×10 ⁻⁴ kg·m ² (GD ² /4)	J _b		Rotor Moment of Inertia (Brake)		
7	9	-	kg	W		Brake Mass		
16.0	21.4	30.0	kVA			Servo amplifier power supply capacity (rating)		
30/26 200 V AC ± 10% Single-phase 50 Hz/60 Hz			W	P _F		Cooling fan power		
Preparing		Preparing				CE and UL approved servo motors * ⁴		
IP65 (excluding the cooling fan)						Servo motor protection code		
610 × 610 × 30 mm						Size of aluminum plates for heat radiation during measurement		
p. 68						Servo motor dimensions		

Servo Motor Operating Ambient Conditions

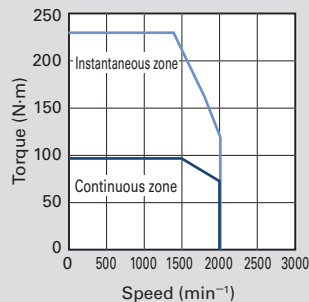
Operating temperature and humidity	Temp.: 0 to 40°C. Humidity: 90% max. (No condensation)
Vibration resistance	24.5 m/s ²
Shock resistance	98 m/s ² , twice
Elevation	1000 m or lower above sea level
Installation location	Indoor (without direct sunlight) Location where no substance that gives adverse effects on the device and motor, such as corrosive gas, flammable gas, or dust exists

Servo Motor Model No./Flange Size/Rated Output

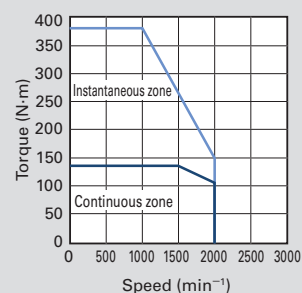
R1AA1811KR/180 mm/11 kW



R1AA1815KB/180 mm/15 kW



R1AA2220KV/220 mm/21 kW



Specifications



Servo Amplifier +



R5 Servo Motor

High Efficiency and Ultra Low Ripple (Medium Inertia)
Low cogging torque **RoHS**

Input voltage **200 V AC**

Power supply range 170 V AC to 264 V AC

Servo Amplifier Model No. () indicates amplifier capacity	RS3A01 () (10 A)			RS3A02 () (20 A)			RS3A03 () (30 A)		
Servo Motor Model No. () indicates flange size	R5AA06020H (60 mm sq.)			R5AA06040H (60 mm sq.)			R5AA08075D (80 mm sq.)		
	Status	Symbol	Unit						
Rated Output	★	P _R	kW	0.2	0.4 (0.38) ^{*4}	0.75 (0.71) ^{*4}			
Rated Speed	★	N _R	min ⁻¹	3000	3000	3000			
Maximum Speed	★	N _{max}	min ⁻¹	3000	3000	5000			
Rated Torque	★	T _R	N·m	0.637	1.27	2.39			
Continuous Stall Torque	★	T _S	N·m	0.686	1.37	2.55			
Peak Stall Torque	★	T _P	N·m	2.2	4.8	8.5			
Rated Armature Current	★	I _R	Arms	1.1	1.8	3.9			
Armature Stall Current	★	I _S	Arms	1.1	1.8	3.9			
Peak Armature Stall Current	★	I _P	Arms	4.2	7.0	14.4			
Torque Constant	☆	K _T	N·m/Arms	0.649	0.836	0.763			
Voltage Constant for each Phase	☆	K _E φ	mV/min ⁻¹	21.7	27.0	23.2			
Phase Resistance	☆	R φ	Ω	4.8	3.3	0.78			
Rated Power Rate	★	Q _R	kW/s	20	39	35			
Electrical Time Constant	☆	t _e	ms	4.3	5.5	13			
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	0.71	0.63	0.76			
Rotor Inertia		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.198	0.414	1.65			
Absolute Encoder Inertia		J _S	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0042 ^{*1}					
Servo Motor Mass ^{*1}		W _e	kg	0.99	1.5	2.8			
Brake Static Friction Torque		T _b	N·m	1.37 Min.		2.55 Min.			
Brake Rated Voltage		V _b	V	90 V DC/24 V DC±10%					
Brake Rated Current		I _b	A	0.11/0.32		0.12/0.37			
Rotor Moment of Inertia (Brake)		J _b	×10 ⁻⁴ kg·m ² (GD ² /4)	0.060	0.060	0.25			
Brake Mass		W	kg	0.39	0.39	0.89			
Servo amplifier power supply capacity (rating)			kVA	0.6	1.0	1.6			
CE and UL approved servo motors ^{*5}				p. 30					
Servo motor protection code				IP65					
Size of aluminum plates for heat radiation during measurement				250 × 250 × 6 mm					
Servo motor dimensions				p. 62					

*1 This is for the battery-less absolute encoder [HA035].
For the following encoders, contact us for details.
· Battery-backup method absolute encoder
· Wire-saving incremental encoder
For the servo amplifier mass, see pp. 35 to 37.

*2 Items with ★ and speed - torque characteristics indicate values after temperature rise saturation when used with a standard servo amplifier. The values are the typical values.

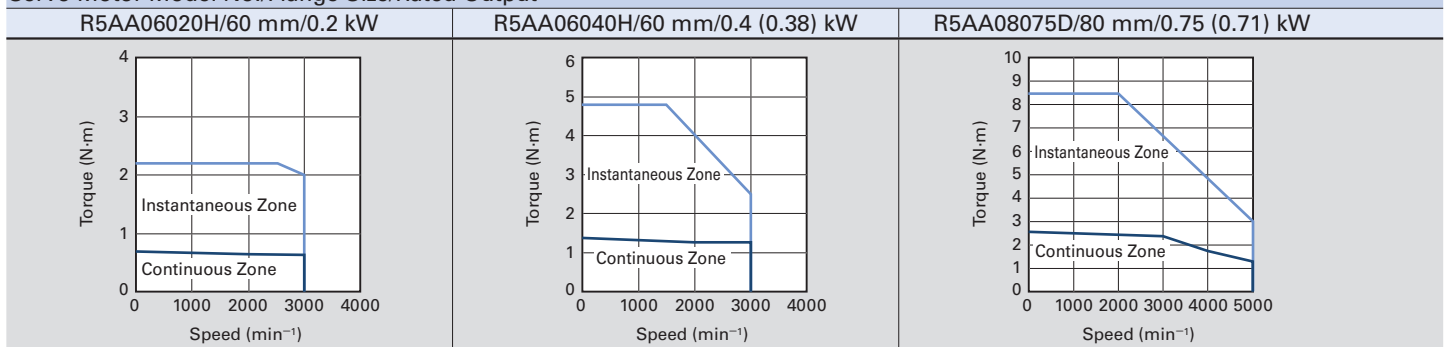
*3 ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.

*4 If enclosed in (), it comes with brake. Servo motors that come with oil seals (optional) and with brakes may have 80 to 95% reduction in rating.

*5 Our standard servo amplifiers are CE and UL approved.

Speed-Torque Characteristics

Servo Motor Model No./Flange Size/Rated Output



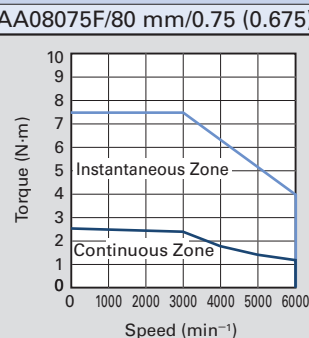
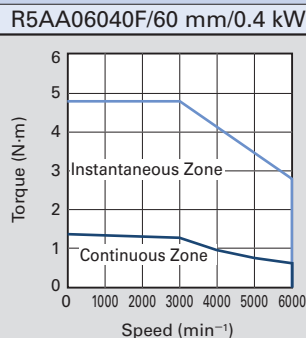
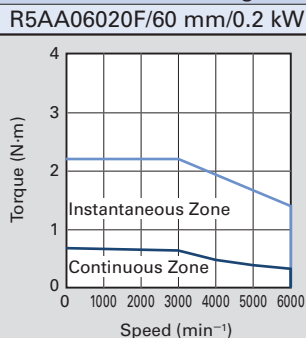
These values are for when the input voltage is a 3-phase 200 V AC circuit. The characteristics of the instantaneous zone may change when the input voltage is less than 200 V AC or a single-phase 200 V AC.

RS3A02 □ □ 《20 A》		RS3A03 □ □ 《30 A》	Servo Amplifier Model No. 《 》 indicates amplifier capacity			
R5AA06020F 《60 mm sq.》	R5AA06040F 《60 mm sq.》	R5AA08075F 《80 mm sq.》	Servo Motor Model No. 《 》 indicates flange size			
			Unit	Symbol	Status	
0.2	0.4	0.75 (0.675) ^{*4}	kW	P _R	★	Rated Output
3000	3000	3000	min ⁻¹	N _R	★	Rated Speed
6000	6000	6000	min ⁻¹	N _{max}	★	Maximum Speed
0.637	1.27	2.39	N·m	T _R	★	Rated Torque
0.686	1.37	2.55	N·m	T _S	★	Continuous Stall Torque
2.2	4.8	7.5	N·m	T _P	★	Peak Stall Torque
1.5	2.8	4.5	Arms	I _R	★	Rated Armature Current
1.6	2.8	4.5	Arms	I _S	★	Armature Stall Current
5.7	10.8	15.5	Arms	I _P	★	Peak Armature Stall Current
0.476	0.525	0.607	N·m/Arms	K _T	☆	Torque Constant
16.1	17.3	18.9	mV/min ⁻¹	K _{E φ}	☆	Voltage Constant for each Phase
2.7	1.36	0.51	Ω	R φ	☆	Phase Resistance
20	39	35	kW/s	Q _R	★	Rated Power Rate
4.2	5.7	13	ms	t _e	☆	Electrical Time Constant
0.73	0.65	0.77	ms	t _m	☆	Mechanical Time Constant (Not including Encoder)
0.198	0.414	1.65	×10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia
	0.0042 ^{*1}		×10 ⁻⁴ kg·m ² (GD ² /4)	J _S		Absolute Encoder Inertia
0.99	1.5	2.8	kg	W _e		Servo Motor Mass ^{*1}
1.37 Min.		2.55 Min.	N·m	T _b		Brake Static Friction Torque
90 V DC/24 V DC±10%			V	V _b		Brake Rated Voltage
0.11/0.32		0.12/0.37	A	I _b		Brake Rated Current
0.060	0.060	0.25	×10 ⁻⁴ kg·m ² (GD ² /4)	J _b		Rotor Moment of Inertia (Brake)
0.39	0.39	0.89	kg	W		Brake Mass
0.6	1.0	1.6	kVA			Servo amplifier power supply capacity (rating)
	p. 30					CE and UL approved servo motors ^{*5}
	IP65					Servo motor protection code
250 × 250 × 6 mm						Size of aluminum plates for heat radiation during measurement
	p. 62					Servo motor dimensions

Servo Motor Operating Ambient Conditions

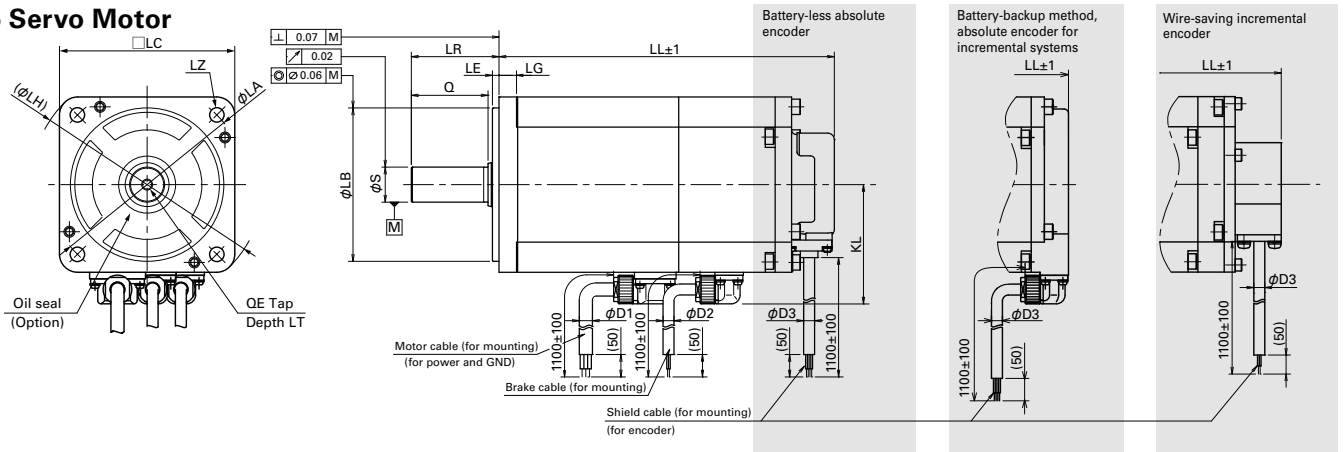
Operating temperature and humidity	Temp.: 0 to 40°C. Humidity: 90% max. (No condensation)
Vibration resistance	24.5 m/s ²
Shock resistance	98 m/s ² , twice
Elevation	1000 m or lower above sea level
Installation location	Indoor (without direct sunlight) Location where no substance that gives adverse effects on the device and motor, such as corrosive gas, flammable gas, or dust exists

Servo Motor Model No./Flange Size/Rated Output



40 mm sq. to 100 mm sq.

R2 Servo Motor R5 Servo Motor



Dimensions of brake and without extension cable connector.

Model No.	Battery-less absolute encoder				Battery-backup method absolute encoder Absolute encoder for incremental systems				Incremental encoder			
	W/out oil seal		With oil seal		W/out oil seal		With oil seal		W/out oil seal		With oil seal	
	W/out brake	With brake	W/out brake	With brake	W/out brake	With brake	W/out brake	With brake	W/out brake	With brake	W/out brake	With brake
R2□A04003	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
R2□A04005	62.5	98.5	67.5	103.5	51.5	87.5	56.5	92.5	63.5	99.5	68.5	104.5
R2EA04008	83.0	119.0	88.0	124.0	72	108	77	113	84	120	89	125
R2AA04010												
R2□A06010	68.5	92.5	75.5	99.5	58.5	82.5	65.5	89.5	78.2	106.2	85.2	113.2
R2□A06020	79.5	107.5	86.5	114.5	69.5	97.5	76.5	104.5	89.2	117.2	96.2	124.2
R2AA06040	105.5	133.5	112.5	140.5	95.5	123.5	102.5	130.5	115.2	143.2	122.2	150.2
R2AA08020	76.3	112.0	83.3	119.0	66.3	102	73.3	109	90	122.7	97	129.7
R2AA08040	88.3	124.0	95.3	131.0	78.3	114	85.3	121	102	134.7	109	141.7
R2AA08075	117.3	153.0	124.3	150.2	107.3	143	114.3	150	131	163.7	138	170.7
R2AAB8075	123.1	149.0	123.1	149.0	114.3	140.2	114.3	140.2	128.8	154.7	128.8	154.7
R2AAB8100 *	145.8	171.8	145.8	171.8	137	163	137	163	151.5	177.4	151.5	177.4
R2AA10075	117.1	134.6	117.1	134.6	111.3	128.8	111.3	128.8	—	—	—	—
R2AA10100	134.1	151.6	134.1	151.6	128.3	145.8	128.3	145.8	—	—	—	—
R5AA06020	79.5	107.5	86.5	114.5	72.5	100.5	79.5	107.5	92.2	120.2	99.2	127.2
R5AA06040	105.5	133.5	112.5	140.5	98.5	126.5	105.5	133.5	118.2	146.2	125.2	153.2
R5AA08075	117.3	153.0	124.3	150.2	110.3	146	117.3	153	134	166.7	141	173.7

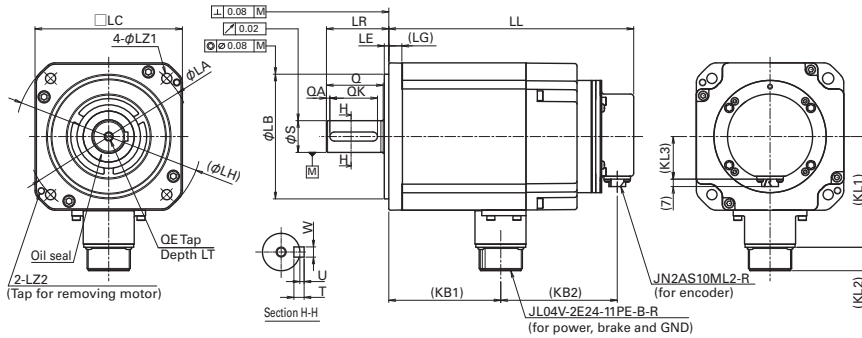
Model No.	LG	KL	LA	LB	LE	LH	LC	LZ	LR	S	Q	QE	LT	D1	D2	D3
R2□A04003	5	35.4	46	$30 - 0.021$	2.5	56	40	2- $\phi 4.5$	25	0 6 - 0.008	20	—	—	6	5	5
R2□A04005										0 8 - 0.009						
R2EA04008										0 8 - 0.009						
R2AA04010										0 8 - 0.009						
R2□A06010	6	44.6	70	$50 - 0.025$	3	82	60	4- $\phi 5.5$	25	0 8 - 0.009	25	M5	12	6	5	5
R2□A06020										0 14 - 0.011						
R2AA06040										0 14 - 0.011						
R2AA08020										0 14 - 0.011						
R2AA08040	8	54.4	90	$70 - 0.030$	3	108	80	4- $\phi 6.6$	30	0 16 - 0.011	35	M5	12	6	5	5
R2AA08075										0 16 - 0.011						
R2AAB8075										0 16 - 0.011						
R2AAB8100 *										0 16 - 0.011						
R2AA10075	10	66.8	115	$95 - 0.035$	3	130	100	4- $\phi 9$	45	0 22 - 0.013	40	M6	20	6	5	5
R2AA10100										0 22 - 0.013						
R5AA06020										0 14 - 0.011						
R5AA06040										0 14 - 0.011						
R5AA08075	8	54.4	90	$70 - 0.030$	3	108	80	4- $\phi 6.6$	40	0 16 - 0.011	35	M5	12	6	5	5

* The outline drawing of the R2AAB8100 varies for Philippine products. See p. 63.

The cable length of the motor with extension cable connector is 200 ± 30 mm.
The connector is attached to the end of the cable. See p. 79

130 mm sq.

R2 Servo Motor 2 kW Made in Japan



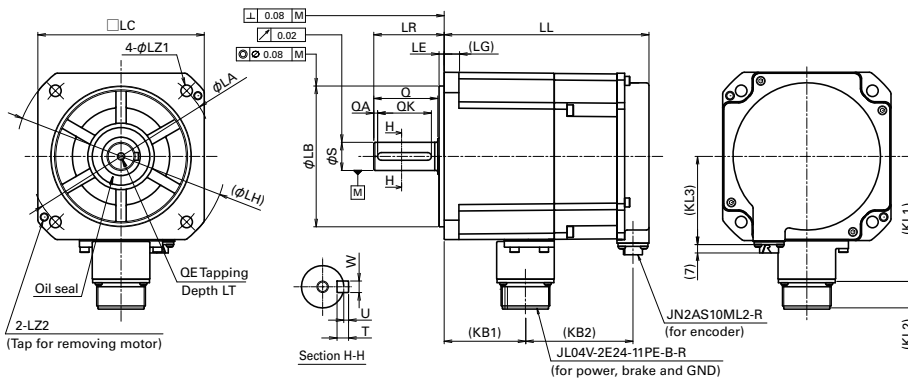
Dimensions of the battery-less absolute encoder with brake

Model No.	Battery-less absolute encoder			Battery-backup method absolute encoder			Absolute encoder for incremental systems			LG	KL1	KL2	LA	LB	LE	LH	LC	LZ1	LZ2	LR
	W/out brake	With brake	With brake	W/out brake	With brake	With brake														
R2AA13200	171	57	38	216	103	38	12	98	21	145	110	4	165	130	9	M6	55			

Model No.	S	Q	QA	QK	W	T	U	KB1	QE	LT
R2AA13200	28	50	3	42	8	7	3	99	M8	25

130 mm sq.

R2 Servo Motor Series 2 kW Made in The Philippines



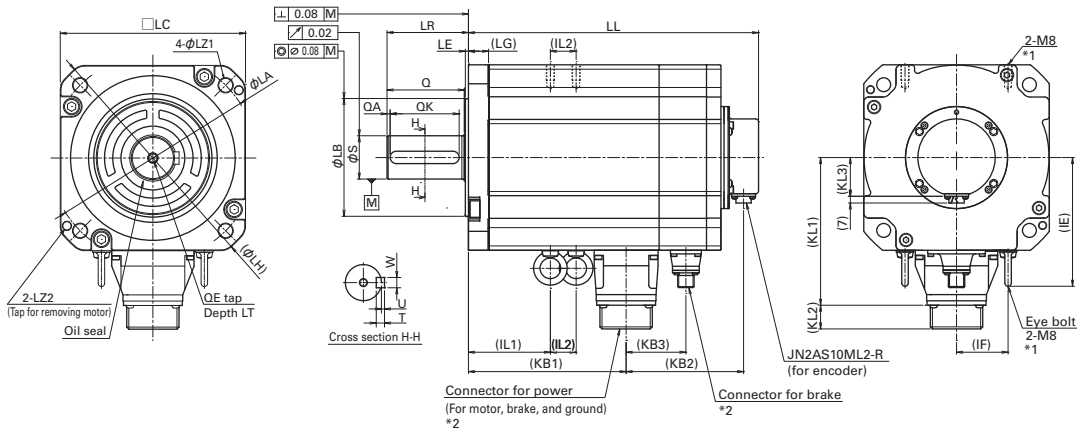
Dimensions of the battery backup method absolute encoder and brake.

Model	Battery backup method absolute encoder,			Absolute encoder for incremental system			LG	KL1	KL2	KL3	LA	LB	LE	LH	LC	LZ1	LZ2	LR
	W/out brake	With brake	With brake	W/out brake	With brake	With brake												
R2AA13200	160	48	90	201	90	38	12	98	21	69	145	110	4	165	130	9	M6	55

Model	S	Q	QA	QK	W	T	U	KB1	QE	LT
R2AA13200	28	50	3	42	8	7	3	99	M8	25

180 mm sq.

R2 Servo Motor 3.5 kW to 7.5 kW



Dimensions of the battery-less absolute encoder with brake

Model No.	Battery-less absolute encoder Battery-backup method absolute encoder Absolute encoder for incremental systems																								
	W/out brake				With brake				LG	KL1	KL2	LA	LB	LE	LH	LC	LZ1	LZ2	LR	S	Q				
	LL	KB2	KB3	KL3	LL	KB2	KB3	KL3																	
R2AA18350	155	48		38	205	98	—	38	16	123	21	200	114.3	0	-0.035	3	230	180	13.5	M8	65	0	35	-0.016	60
R2AA18450	172				222																				
R2AA18550	228	59			274	107	64	38	19	144	22	200	114.3	0	-0.035	3	230	180	13.5	M8	79	0	42	-0.016	75
R2AA18750	273				329																				

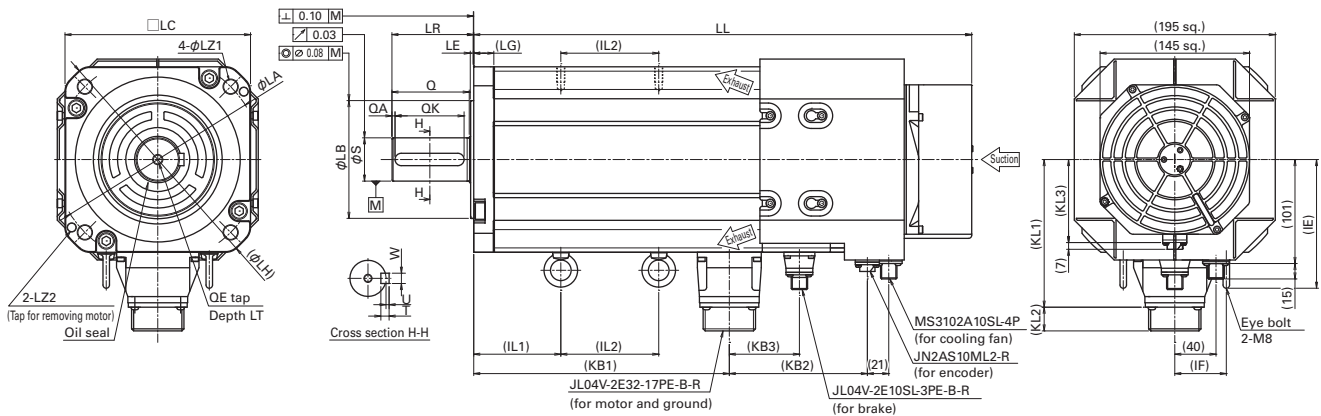
Model No.	QA	QK	W	T	U	KB1	QE	LT	IE	IF	IL1	IL2	Connector Model No. for Power	Connector Model No. for Brake
R2AA18350	3	50	0	8	3	92	M8	25	123	50	47	20	JL04V-2E24-11PE-B-R	—
R2AA18450			10			-0.036			109	57	20			
R2AA18550		0	12	-0.043	153	M10	25	123	50	63	41	86	JL04V-2E32-17PE-B-R	JL04V-2E10SL-3PE-B-R
R2AA18750		67			198									

*1 Eye bolts are not provided to motors without R2AA18350 brake.

*2 The brake wire is commonly used by the connector for power.

180 mm sq.

R2 Servo Motor 11 kW

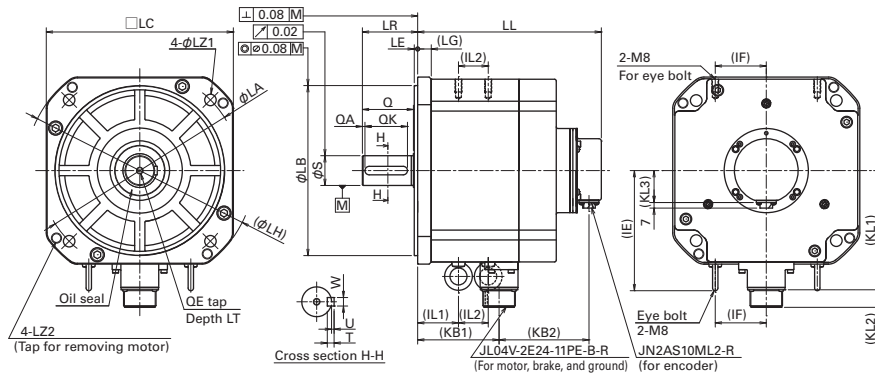


Dimensions of the battery-less absolute encoder with brake

Model No.	Battery-less absolute encoder Battery-backup method absolute encoder Absolute encoder for incremental systems																								
	W/out brake				With brake				LG	KL1	KL2	LA	LB	LE	LH	LC	LZ1	LZ2	LR	S	Q				
	LL	KB2	KB3	KL3	LL	KB2	KB3	KL3																	
R2AA1811K	395	60	—	81	467	133	90	81	19	143	23	200	114.3	0	-0.035	3	230	180	13.5	M8	79	0	42	-0.016	75

Model No.	S	Q	QA	QK	W	T	U	KB1	QE	LT	IE	IF	IL1	IL2		
R2AA1811K	42	0	75	3	67	12	0	8	3	220	M10	25	123	50	63	108

220 mm sq. R2 Servo Motor 5 kW

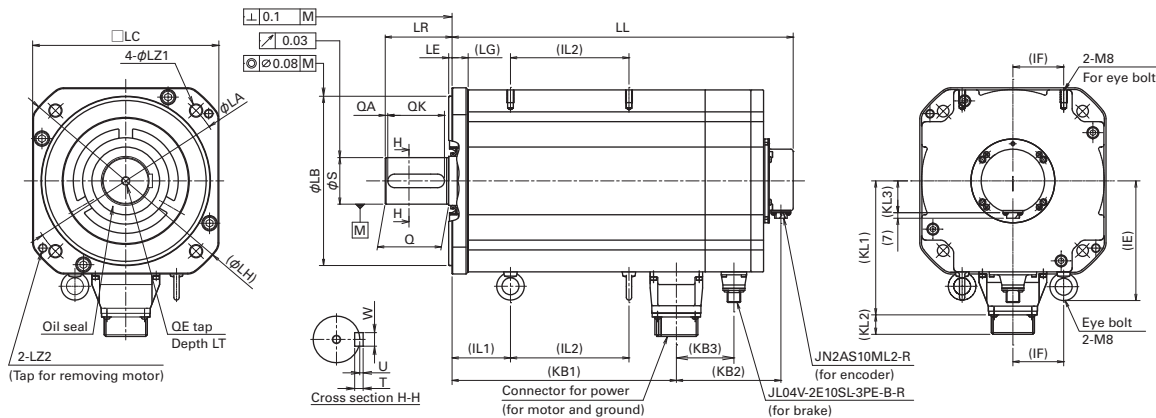


Dimensions of the battery-less absolute encoder with brake

Model no.	Battery-less absolute encoder Battery-backup method absolute encoder Absolute encoder for incremental systems															
	W/out brake				With brake											
	LL	KB2	KL3	LL	KB2	KL3	LG	KL1	KL2	KL3	LA	LB	LE	LH		
R2AA22500	163	52	38	216	106	38	16	142	21	38	235	0 200 -0.046	4	270		

Model no.	LC	LZ1	LZ2	LR	S	Q	QA	QK	W	T	U	KB1	QE	LT	IE	IF	IL1	IL2
R2AA22500	220	13.5	M12	65	0 35 -0.016	60	3	50	0 10 -0.036	8	3	96	M8	25	142	60	48	35

R2 Servo Motor 7 kW to 15 kW



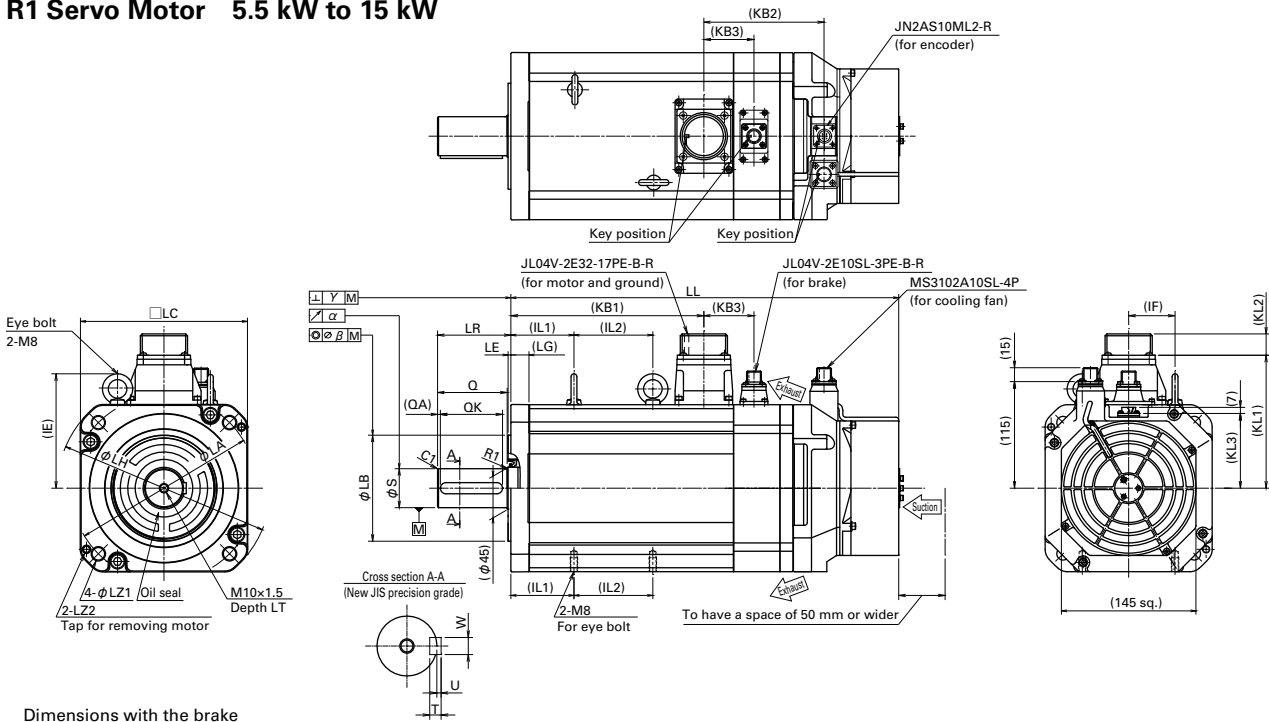
Dimensions of the battery-less absolute encoder with brake

Model no.	Battery-less absolute encoder Battery-backup method absolute encoder Absolute encoder for incremental systems																				
	W/out brake				With brake																
	LL	KB2	KB3	KL3	LL	KB2	KB3	KL3	LG	KL1	KL2	LA	LB	LE	LH	LC	LZ1	LZ2	LR	S	Q
R2AA22700	265	54			325	114	57			141	21										
R2AA2211K	304			38	364			19				235	0 200 -0.046	4	270	220	13.5	M10	79	0 55 -0.019	75
R2AA2215K	343	63			403	123	66			162	22										

Model no.	QA	QK	W	T	U	KB1	QE	LT	IE	IF	IL1	IL2	Connector Model No. for Power
R2AA22700						196						62	JL04V-2E24-11PE-B-R
R2AA2211K	3	67	0 16 -0.043	10	4	226	M10	25	142	60	69	101	JL04V-2E32-17PE-B-R
R2AA2215K						265						140	

180 mm sq.

R1 Servo Motor 5.5 kW to 15 kW



Dimensions with the brake

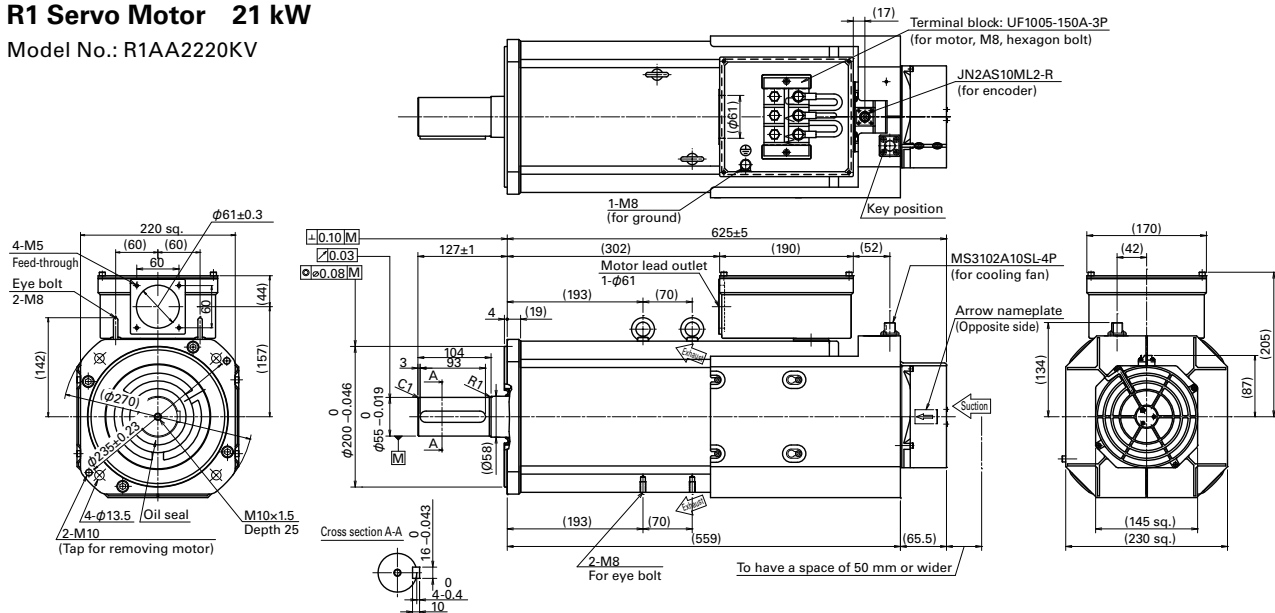
Model no.	Battery-less absolute encoder Battery-backup method absolute encoder Absolute encoder for incremental systems																		
	W/out brake				With brake														
	LL	KB2	KB3	KL3	LL	KB2	KB3	KL3	LG	KL1	KL2	LA	LB	LE	LH	LC	LZ1	LZ2	LR
R1AA18550	333	80	-	81	383	130	54	81	19	143	23	200	φ 114.3 ⁰ -0.035	3	230	180	13.5	M8	79
R1AA18750	368				418	130	54												
R1AA1811K	438				517	158	79												
R1AA1815K	516				628	191	110												

Model no.	S	Q	QA	QK	W	T	U	KB1	α	β	γ	QE	LT	IE	IF	IL1	IL2	
R1AA18550	42 -0.016	75	3	67	0	12 -0.043	8	3	173	0.02	0.08	0.08	M10	25	124	50	54	65
R1AA18750					208				68								85	
R1AA1811K					278				68								163	
R1AA1815K					356				92								210	

220 mm sq.

R1 Servo Motor 21 kW

Model No.: R1AA2220KV



Options

Servo Amplifier Connectors Analog/Pulse input type 10 to 50 A

Single Connectors

Connector No.	Item	Model No.	Manufacturer model No.	Manufacturer
CN1	To connect host device	AL-00385594	10150-3000PE, 10350-52A0-008	3M Japan Limited
EN1, EN2	To connect encoder	AL-00632607	36210-0100PL, 36310-3200-008	
CNA *1	For input power supply, regenerative resistor connection	AL-00686902-01	MSTBT2.5/8-STF-5.08LUB	Phoenix Contact.K.K
CNB	To connect servo motor	AL-Y0004079-01	MSTBT2.5/3-STF-5.08	
CN4 *2	To connect safety device (for short-circuiting)	AL-00718251-01	2040978-1	Tyco Electronics Japan G.K.
CN4	To connect safety device (for wiring)	AL-00718252-01	2013595-3	

*1: When the internal regenerative resistor is attached, one CNA connector is attached to the servo amplifier.

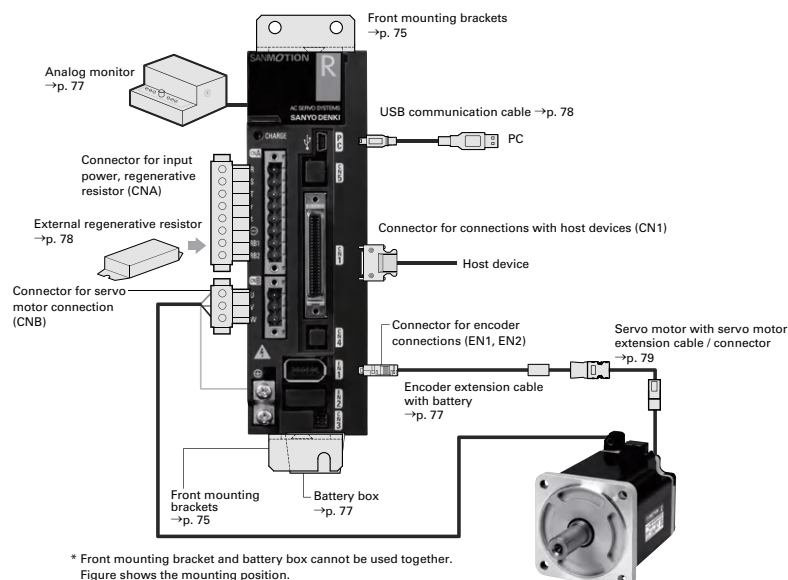
*2: When CN4 is not wired, make sure to insert safety device connector (for short-circuiting) to CN4 on servo amplifier.

Connector sets (No Safe Torque Off function)

Servo Amplifier Model No.	RS3□□□A0□L0 RS3□□□A8□L0	RS3□□□A0□A0 RS3□□□A8□A0	RS3□□□A2□L0 RS3□□□AA□L0	RS3□□□A2□A0 RS3□□□AA□A0	RS3□□□A0□□0 RS3□□□A8□□0	RS3□□□A□□L0
Internal Regenerative Resistor	No	Yes	No	Yes	No / Yes	No
Connector Set Model No.	AL-00723282	AL-00723284	AL-00723286	AL-00723288	AL-00723290	AL-00696037
Connectors included in the set	CN1/To connect host device	Yes	Yes	Yes	Yes	No
	EN1/To connect encoder	Yes	Yes	Yes	Yes	No
	EN2/To connect encoder	No	No	Yes	Yes	No
	CNA/ To connect input power supply, regenerative resistor	Yes	No	Yes	No	Yes
	CNB/For servo motor connection	Yes	Yes	Yes	Yes	No
	CN4/To connect safety device (for short-circuiting)	No	No	No	No	No
CN4/To connect safety device (for wiring)	No	No	No	No	No	
Remarks	For fully-closed control systems					

Connector sets (With Safe Torque Off function)

Servo Amplifier Model No.	RS3□□□A0□L2(4) RS3□□□A8□L2(4)	RS3□□□A0□A2(4) RS3□□□A8□A2(4)	RS3□□□A2□L2(4) RS3□□□AA□L2(4)	RS3□□□A2□A2(4) RS3□□□AA□A2(4)	RS3□□□A0□□2(4) RS3□□□A8□□2(4)
Internal Regenerative Resistor	No	Yes	No	Yes	No / Yes
Connector Set Model No.	AL-00723155	AL-00723156	AL-00723157	AL-00723158	AL-00723159
Connectors included in the set	CN1/To connect host device	Yes	Yes	Yes	Yes
	EN1/To connect encoder	Yes	Yes	Yes	Yes
	EN2/To connect encoder	No	No	Yes	Yes
	CNA/For input power supply, regenerative resistor connection	Yes	No	Yes	No
	CNB/For servo motor connection	Yes	Yes	Yes	Yes
	CN4/To connect safety device (for short-circuiting)	No	No	No	No
CN4/To connect safety device (for wiring)	Yes	Yes	Yes	Yes	
Remarks	For fully-closed control systems				



■ Servo Amplifier Connectors Analog/Pulse input type 100 A, 150 A, 300 A

Single Connectors

Connector No.	Item	Model no.	Manufacturer model No.	Manufacturer
CN1	To connect host device	AL-00385594	10150-3000PE, 10350-52A0-008	3M Japan Limited
EN1, EN2	To connect encoder	AL-00632607	36210-0100PL, 36310-3200-008	
CNA	To input control power	AL-Y0005159-01	MSTBT2.5/2-STF-5.08	Phoenix Contact.K.K
CN4*	To connect safety device (for short-circuiting)	AL-00718251-01	2040978-1	Tyco Electronics Japan G.K.
CN4	To connect safety device (for wiring)	AL-00718252-01	2013595-3	

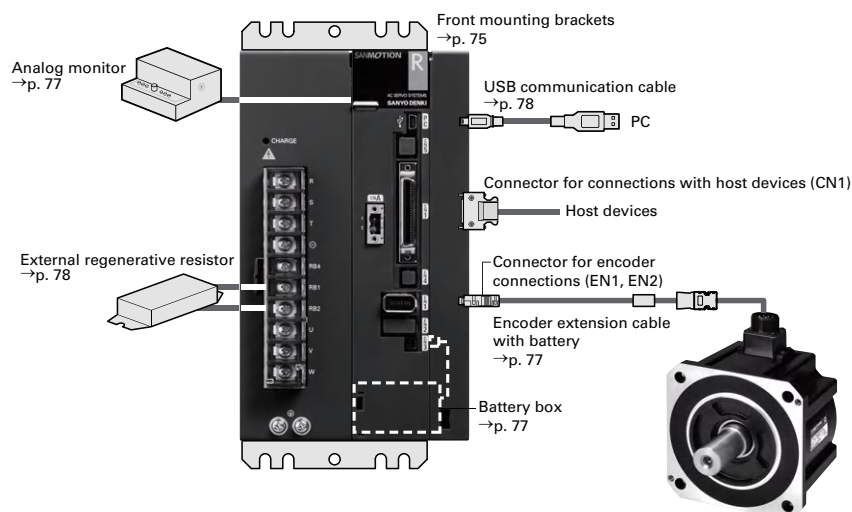
* When CN4 is not wired, make sure to insert safety device connector (for short-circuiting) to CN4 on servo amplifier.

Connector sets (No Safe Torque Off function)

Servo Amplifier Model No.		RS3□□□A0□□0 RS3□□□A8□□0	RS3□□□A2□□0 RS3□□□AA□□0	RS3□□□A0□□0 RS3□□□A8□□0
Internal Regenerative Resistor		-	No	No
Connector Set Model No.		AL-00751448	AL-00751450	AL-00723290
Con-nectors included in the set	CN1/To connect host device	Yes	Yes	Yes
	EN1/To connect encoder	Yes	Yes	Yes
	EN2/To connect encoder	No	Yes	No
	CNA/To input control power	Yes	Yes	No
	CN4/To connect safety device (for short-circuiting)	No	No	No
	CN4/To connect safety device (for wiring)	No	No	No
Remarks			For fully-closed control systems	

Connector sets (With Safe Torque Off function)

Servo Amplifier Model No.		RS3□□□A0□□2(4) RS3□□□A8□□2(4)	RS3□□□A2□□2(4) RS3□□□AA□□2(4)	RS3□□□A0□□2(4) RS3□□□A8□□2(4)
Internal Regenerative Resistor		No	No	No
Connector Set Model No.		AL-00751452	AL-00751454	AL-00723159
Con-nectors included in the set	CN1/To connect host device	Yes	Yes	Yes
	EN1/To connect encoder	Yes	Yes	Yes
	EN2/To connect encoder	No	Yes	No
	CNA/To input control power	Yes	Yes	No
	CN4/To connect safety device (for short-circuiting)	No	No	No
	CN4/To connect safety device (for wiring)	Yes	Yes	Yes
Remarks			For fully-closed control systems	



Servo Amplifier Connectors Analog/Pulse input type 600 A

Single Connectors

Connector No.	Item	Model no.	Manufacturer model No.	Manufacturer
CN9	To connect between units (single item)	AL-00608710	10114-3000PE, 10314-52A0-008	3M Japan Limited
CN1	To connect host device	AL-00385594	10150-3000PE, 10350-52A0-008	
EN1, EN2	To connect encoder	AL-00632607	36210-0100PL, 36310-3200-008	
CNA	Control power input	AL-Y0005159-01	MSTBT2.5/2-STF-5.08	Phoenix Contact.K.K
CNB	For dynamic brake signal	AL-Y0004079-01	MSTBT2.5/3-STF-5.08	
CN8	For external alarm signal	AL-Y0011185-01	FMC0,5/4-ST-2.54	Tyco Electronics Japan G.K.
CN4*	To connect safety device (for short-circuiting)	AL-00718251-01	2040978-1	
CN4	To connect safety device	AL-00718252-01	2013595-3	

* When CN4 is not wired, make sure to insert safety device connector (for short-circuiting) to CN4 on servo amplifier.

Connector sets (No Safe Torque Off function)

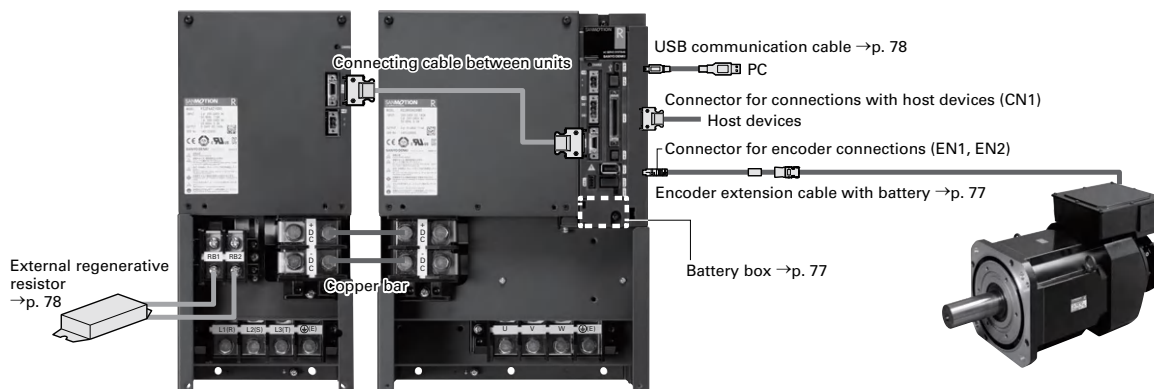
Connector Set Model No.		AL-00892848	AL-00892850	AL-00723290	AL-00892854
Con-nectors included in the set	CN1/To connect host device	Yes	Yes	Yes	No
	EN1/To connect encoder	Yes	Yes	Yes	No
	EN2/To connect encoder	No	Yes	No	No
	CNA/To input control power	Yes	Yes	No	Yes
	CNB/ For dynamic brake signal	No	No	No	Yes
	CN8/ For external alarm signal	Yes	Yes	No	No
Remarks			For fully-closed control systems		

Connector sets (With Safe Torque Off function)

Connector Set Model No.		AL-00892856	AL-00892858	AL-00723159	AL-00892852
Con-nectors included in the set	CN1/To connect host device	Yes	Yes	Yes	No
	EN1/To connect encoder	Yes	Yes	Yes	No
	EN2/To connect encoder	No	Yes	No	No
	CNA/To input control power	Yes	Yes	No	Yes
	CNB/ For dynamic brake signal	No	No	No	Yes
	CN8/ For external alarm signal	Yes	Yes	No	No
	CN4/To connect safety device (for short-circuiting)	No	No	No	No
	CN4/To connect safety device (for wiring)	Yes	Yes	Yes	Yes
Remarks			For fully-closed control systems		

Connecting between servo amplifier units 600 A

Name	Item	Model no.
Copper bar	To connect main power supply between power supply unit and amplifier unit Terminal number: Between +DC/-DC 2-pc. set (5 mm between units)	AL-00918125-01
Connecting cable between units	To connect between power supply unit (CN9) - Amplifier unit (CN9)	AL-00917284



■ Servo Motor Encoder Connectors Manufacturer: Japan Aviation Electronics Industry Limited

R2 Servo Motor

Motor flange size	Combination plug for encoder (with rubber bushing)		Encoder receptacle model number (motor side)	Applicable cable diameter (bushing color phase)	Pin Layout Symbol
	Straight	Angle			
130 mm sq. to 220 mm sq.	JN2DS10SL1-R	JN2FS10SL1-R	JN2AS10ML2-R	φ 5.7 to 7.3 mm (Black)	See the encoder wiring diagram on p. 38.
	JN2DS10SL2-R	JN2FS10SL2-R		φ 6.5 to 8.0 mm (Gray)	
	JN2DS10SL3-R	JN2FS10SL3-R		φ 3.5 to 5.0 mm (Brick)	

Select the correct plug and contacts for the size of cable to be used. The manufacturer's model number and the model number for parts procured from SANYO DENKI are the same number.

Applicable contact for encoder plug*1, 2

Contact size	Category	Applicable contact	
		Socket contact model No.	Applicable wire size
#22	Manual crimp tool type *3,4	JN1-22-20S-R-PKG100	AWG #20
		JN1-22-22S-PKG100	AWG #21 to #25
		JN1-22-26S-PKG100	AWG #26 to #28
	Solder type	JN1-22-22F-PKG100	AWG #20

*1 : Select the correct plug and contacts for the size of cable to be used. The manufacturer's model number and the model number for parts procured from SANYO DENKI are the same number.

*2 : When removing a contact that has already been inserted, use a removal tool. Purchase the removal tool from the connector manufacturer (Japan Aviation Electronics Industry Limited).

*3 : For the manual crimp tool part number, see the instruction manuals from the connector manufacturer (Japan Aviation Electronics Industry Limited).

*4 : Purchase the semi-automatic crimp tool from the manufacturer (Japan Aviation Electronics Industry Limited).

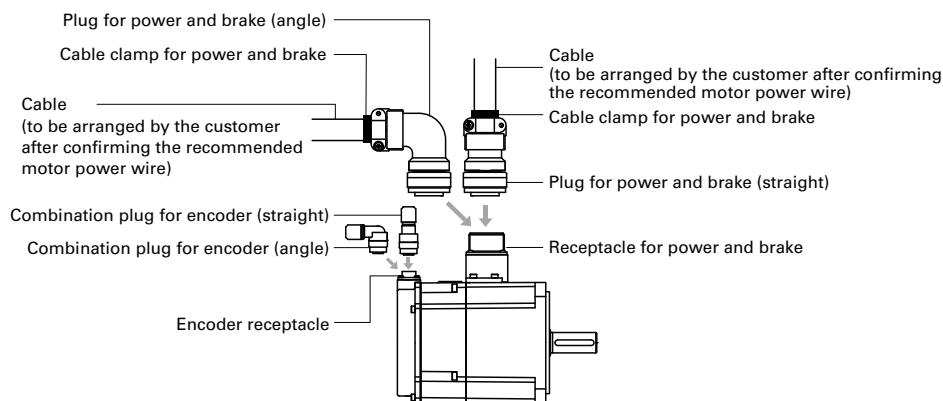
*5 : For the connector and contact instructions, precautions, etc., see the catalogs and instruction manuals from the connector manufacturer (Japan Aviation Electronics Industry Limited).

■ Cooling fan connector to connect motor

R1, R2 Servo Motor

Motor flange size	Receptacle for cooling fan	Standard specification plug for cooling fan (cable clamp)		Water-proof specification plug for cooling fan (cable clamp)		Pin layout symbol
		Straight	Angle	Straight	Angle	
180 mm sq. to 220 mm sq.	N/MS3102A10SL-4P	N/MS3106B10SL-4S (N/MS3057-4A) [MS06B10SL-4S-4]	N/MS3108B10SL-4S (N/MS3057-4A) [MS08B10SL-4S-4]	JA06A-10SL-4S-J1-R (Conduit)		200 V AC ±10% Single-phase 50/60 Hz A B

See the catalogs and instruction manuals of the connector manufacturer (Japan Aviation Electronics Industry Limited) for details, including instructions for the connector and the precautions.
 [] is the arrangement model number for SANYO DENKI. (Plug + cable clamp)



Power connector to connect motor, electric wire size

Manufacturer: Japan Aviation Electronics Industry Limited

Flange size (mm)	Motor model no.	For power standard specification (1) Plug (manufacturer model no.) (2) Cable clamp (manufacturer model no.) (3) Plug + cable clamp (SANYO DENKI part numbers)		For power waterproofing specification TÜV standard plug (1) Plug (manufacturer model no.) (2) Cable clamp (manufacturer model no.) (3) Plug + cable clamp (SANYO DENKI part numbers)		For brake standard specification waterproof specification TÜV standard plug (1) Plug (manufacturer model no.) (2) Cable clamp (manufacturer model no.) (3) Plug + cable clamp (SANYO DENKI part numbers)	
		Straight	Angle	Straight	Angle	Straight	Angle
130 sq.	R2AA13050	(1) N/MS3106B24-11S (2) N/MS3057-16A (3) MS06B24-11S-16	(1) N/MS3108B24-11S (2) N/MS3057-16A (3) MS08B24-11S-16	(1) JL04V-6A24-11SE-EB-R (2) JL04-2428CK-R (3) 332706X10	(1) JL04V-8A24-11SE-EB-R (2) JL04-2428CK-R (3) 332707X10	Same part number as for power	
	R2AA13120						
	R2AA13180						
	R2AA13200						
180 sq.	R2AA18350L	(1) N/MS3106B24-11S (2) N/MS3057-16A (3) MS06B24-11S-16	(1) N/MS3108B24-11S (2) N/MS3057-16A (3) MS08B24-11S-16	(1) JL04V-6A24-11SE-EB-R (2) JL04-2428CK-R (3) 332706X10	(1) JL04V-8A24-11SE-EB-R (2) JL04-2428CK-R (3) 332707X10	Same part number as for power	
	R2AA18350D						
	R2AA18450H						
	R2AA18550R	(1) N/MS3106B32-17S (2) N/MS3057-20A (3) MS06B32-17S-20	(1) N/MS3108B32-17S (2) N/MS3057-20A (3) MS08B32-17S-20	(1) JL04V-6A32-17SE-R (Conduit) (3) JL04V-6A32-17SE	—	(1) JL04V-6A10SL3SE-EB-R (2) JL04-1012CK-R (3) 332706X1	(1) JL04V-8A10SL3SE-EB-R (2) JL04-1012CK-R (3) 332707X1
	R2AA18550H						
	R2AA18750H						
R2AA1811KR							
220 sq.	R2AA22500L	(1) N/MS3106B24-11S (2) N/MS3057-16A (3) MS06B24-11S-16	(1) N/MS3108B24-11S (2) N/MS3057-16A (3) MS08B24-11S-16	(1) JL04V-6A24-11SE-EB-R (2) JL04-2428CK-R (3) 332706X10	(1) JL04V-8A24-11SE-EB-R (2) JL04-2428CK-R (3) 332707X10	Same part number as for power	
	R2AA22700S						
	R2AA2211KB	(1) N/MS3106B32-17S (2) N/MS3057-20A (3) MS06B32-17S-20	(1) N/MS3108B32-17S (2) N/MS3057-20A (3) MS08B32-17S-20	(1) JL04V-6A32-17SE-R (Conduit) (3) JL04V-6A32-17SE	—	(1) JL04V-6A10SL3SE-EB-R (2) JL04-1012CK-R (3) 332706X1	(1) JL04V-8A10SL3SE-EB-R (2) JL04-1012CK-R (3) 332707X1
	R2AA2215KB						
275 sq.	R2AA2830KV	Terminal block; therefore, plug is not necessary					
180 sq.	R1AA18550H	(1) N/MS3106B32-17S (2) N/MS3057-20A (3) MS06B32-17S-20	(1) N/MS3108B32-17S (2) N/MS3057-20A (3) MS08B32-17S-20	(1) JL04V-6A32-17SE-R (Conduit) (3) JL04V-6A32-17SE	—	(1) JL04V-6A10SL3SE-EB-R (2) JL04-1012CK-R (3) 332706X1	(1) JL04V-8A10SL3SE-EB-R (2) JL04-1012CK-R (3) 332707X1
	R1AA18750L						
	R1AA1811KR						
	R1AA1815KB						

Flange size (mm)	Motor model no.	Receptacle for power (motor side)	Standard specification of receptacle for brake (motor side), TÜV specification: 90V DC (*TÜV: 24V DC only)	Pin layout symbol					Amplifier model no.	Recommended motor power wire size (U, V, W, GND)		Wire size of main power supply (R, S, T, GND)													
				U phase	V phase	W phase	Ground	Brake		mm ²	AWG No.	mm ²	AWG No.												
130 sq.	R2AA13050H	JL04V-2E24-11PE-B-R	Same part number as for power	D	E	F	G, H	A, B	RS3A03	0.75	#19	2	#14												
	R2AA13050D																								
	R2AA13120B																								
	R2AA13120L																								
	R2AA13120D																								
	R2AA13180H																								
	R2AA13180D																								
180 sq.	R2AA13200L	JL04V-2E24-11PE-B-R	Same part number as for power	D	E	F	G, H	A, B	RS3A05	2	#14	2	#14												
	R2AA13200D																								
	R2AA18350L													JL04V-2E24-11PE-B-R	Same part number as for power	D	E	F	G, H	A, B	RS3A10	5.5	#10	5.5	#10
	R2AA18350D																								
	R2AA18450H																								
	180 sq.													R2AA18550R	JL04V-2E32-17PE-B-R	JL04V-2E10SL3PE-B-R	A	B	C	D	A, B	RS3A15	8	#8	8
R2AA18550H																									
R2AA18750H																									
R2AA1811KR																									
220 sq.	R2AA22500L	JL04V-2E24-11PE-B-R	Same part number as for power	D	E	F	G, H	A, B	RS3A15	5.5	#10	8	#8												
	R2AA22700S																								
	R2AA2211KB	JL04V-2E32-17PE-B-R	JL04V-2E10SL3PE-B-R	A	B	C	D	A, B	RS3A30	14	#6	14	#6												
	R2AA2215KB																								
275 sq.	R2AA2830KV	Terminal block: UF1005-150A-3P (M8, Hexagon bolt)	Terminal block: F1005-20S-5P (M4, Screws)	—	—	—	—	—	RS3W60	38	#2	38	#2												
180 sq.	R1AA18550H	JL04V-2E32-17PE-B-R	JL04V-2E10SL3PE-B-R	A	B	C	D	A, B	RS3A30	14	#6	14	#6												
	R1AA18750L																								
	R1AA1811KR																								
	R1AA1815KB																								

*The motor with TÜV specification 24V DC brake requires the connector for brake separately from the connector for power.

· See the catalogs and instruction manuals of the connector manufacturer (Japan Aviation Electronics Industry Limited) for details, including the instructions for the connector and the precautions.

· Conduit preparation to be handled by the customer.

■ Front mounting brackets

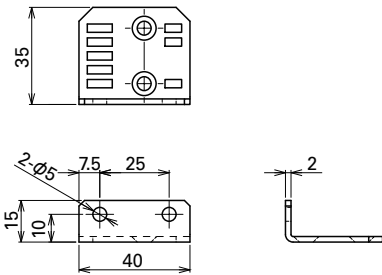
Brackets for mounting the servo amplifier on the front (connector side).

Applicable servo amplifiers	Model no.	Set contents
10 A, 20 A, 30 A (RS3 □ 01,02,03)	AL-00880390-01	Top/bottom mounting brackets: 1 each Clamping screws: 4
50 A (RS3 □ 05)	AL-00880391-01	Top/bottom mounting brackets: 1 each Clamping screws: 4
100 A, 150 A (RS3 □ 10, 15)	AL-00907039-01	Top/bottom mounting brackets: 1 each Clamping screws: 6
300 A (RS3 □ 30)	AL-00907040-01	Top/bottom mounting brackets: 1 each Clamping screws: 8

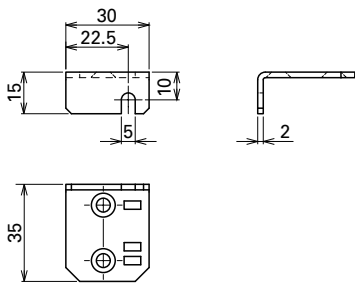
- Trivalent chrome plating is used. (Surface color is silver-blue, and different from body color.)
- Cannot be used with battery box. (10 A to 50 A)

10 A, 20 A, 30 A
AL-00880390-01

Upper side

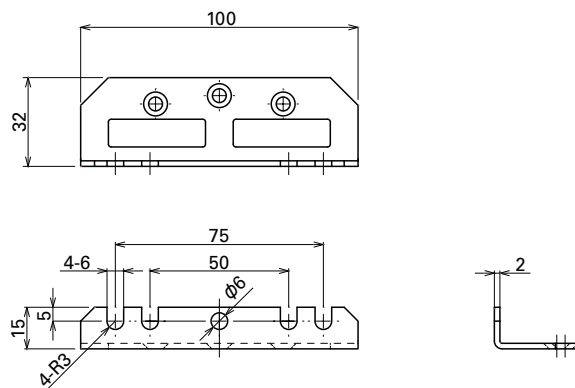


Lower side



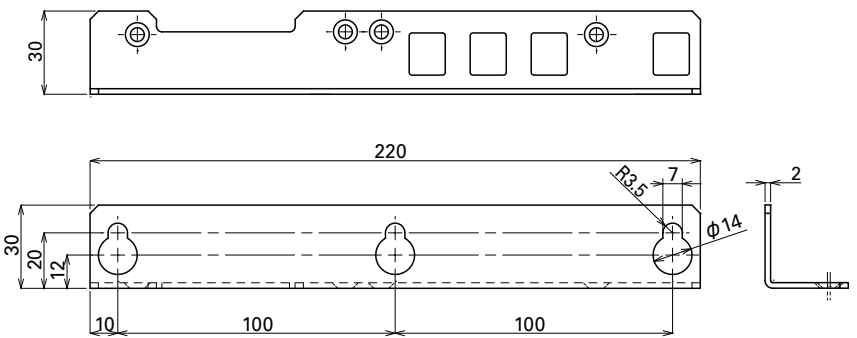
100 A, 150 A
AL-00907039-01

Common to upper side/lower side

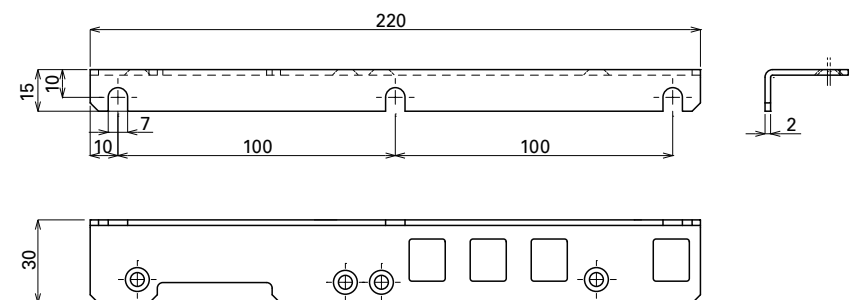


300 A
AL-00907040-01

Upper side

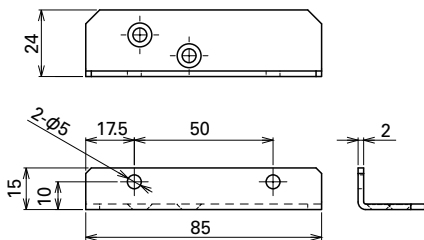


Lower side

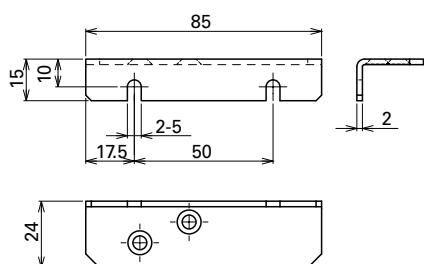


50 A
AL-00880391-01

Upper side

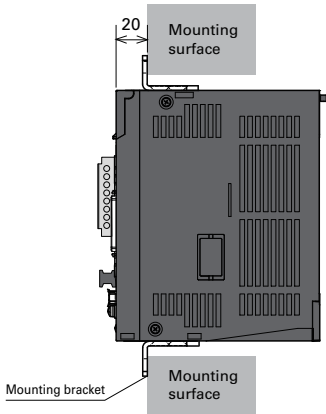


Lower side



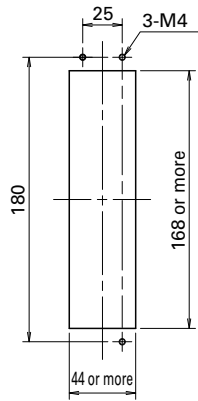
Front mounting brackets

Mounting example

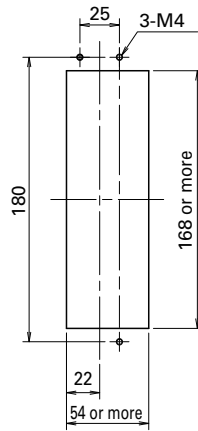


Mounting board processing Reference dimensions drawing

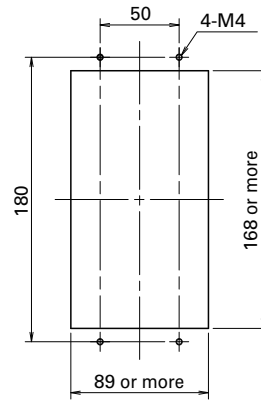
10 A, 20 A



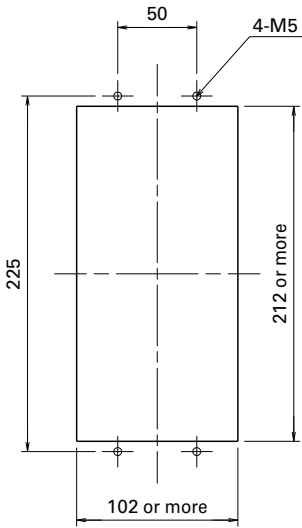
30 A



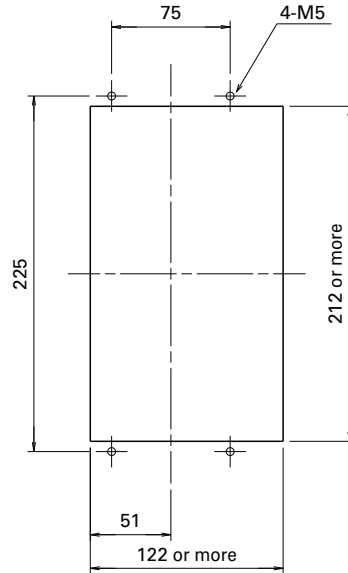
50 A



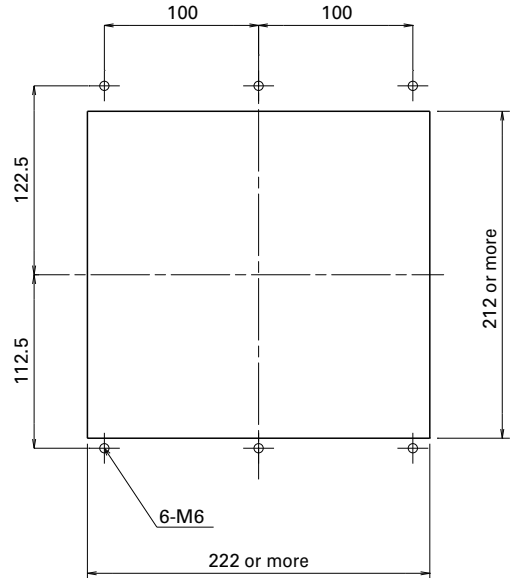
100 A



150 A



300 A

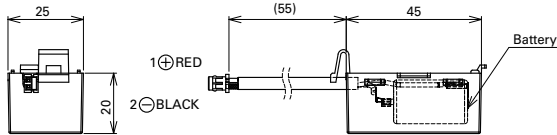


Battery for Battery-backup Method Absolute Encoder and Related Parts

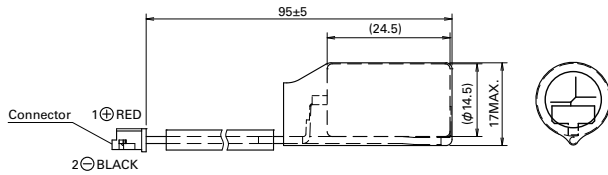
Name	Item	Model no.
1) Battery box *Cannot be used with the metal pieces attached to the front (10 A to 50 A).	Lithium battery: The set of ER3VLY and battery box	AL-00880402-01
2) Battery for battery box (Lithium battery)	Lithium battery: ER3VLY Toshiba Lifestyle Products & Services Corporation	AL-00879511-01
3) Encoder cable attached to battery, with connectors on both ends	No	AL-00731792-01
4) Encoder cable attached to battery, with connectors on one end	No	AL-00697960-□□
5) Replacement battery for encoder cable (Lithium battery)	Lithium battery: ER3VLY Toshiba Lifestyle Products & Services Corporation	AL-00697958-01

Dimensions (Unit : mm)

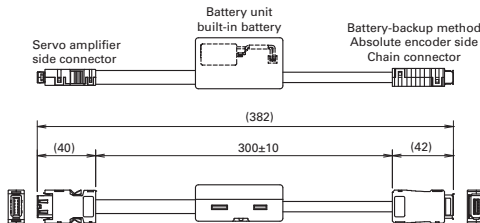
1) Battery box (model no.: AL-00880402-01)



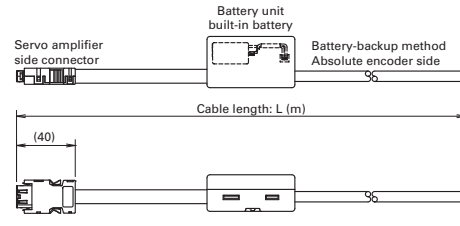
2) Battery for Battery box replacement (model no.: AL-00879511-01)



3) Encoder cable attached to battery, with connectors on both ends (model no.: AL-00731792-01)

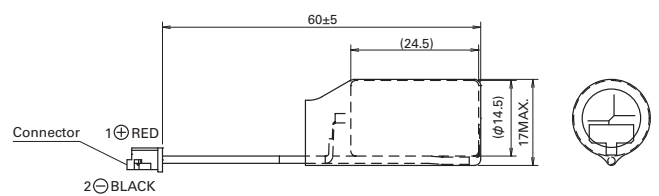


4) Encoder cable attached to battery, with connectors on one end (model no.: AL-00697960-□□)



	Model no.	L [m]
1	AL-00697960-01	3
2	AL-00697960-02	5
3	AL-00697960-03	10
4	AL-00697960-04	15
5	AL-00697960-05	20
6	AL-00697960-06	25

5) Replacement battery for encoder cable (model no.: AL-00697958-01)



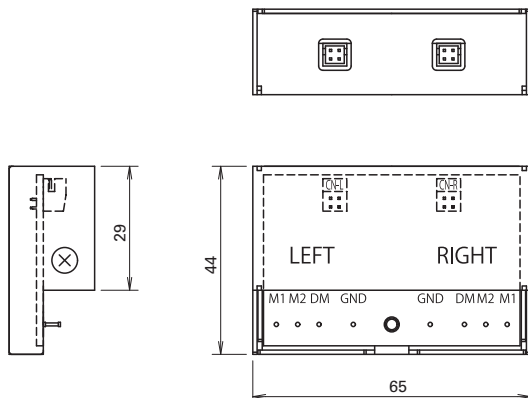
Analog Monitor and Related Parts

This is an analog monitor which can display the velocity waveform with an oscilloscope for system maintenance or when tuning.

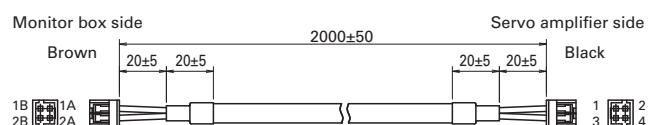
Name	Item	Model no.
1) Monitor box	Monitor box body 2 dedicated cables	Q-MON-3
2) Dedicated cable	1 dedicated cables	AL-00690525-01

Dimensions (Unit : mm)

1) Monitor box (model no. : Q-MON-3)



2) Dedicated cable (model no. : AL-00690525-01)



*1 2 units of the dedicated cables per above 2) (PN# AL-00690525-01) are attached to monitor box (PN#Q-MON-3).

*2 Power is supplied from the servo amplifier.

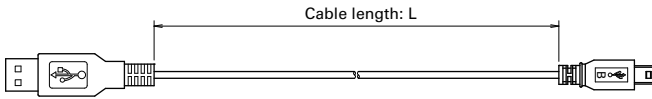
Options

■ USB communication cable

(Cable for communication with PC for setup software)

Cable length: L (m)	Model no.
1.0	AL-00896515-01
2.0	AL-00896515-02

Dimensions



PC side (Series A)

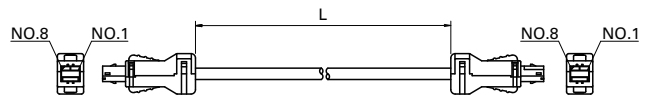
Servo amplifier side (Series mini B)

Specifications and external drawings may be changed without prior notice.

■ Communication cable of tandem operation between amplifiers

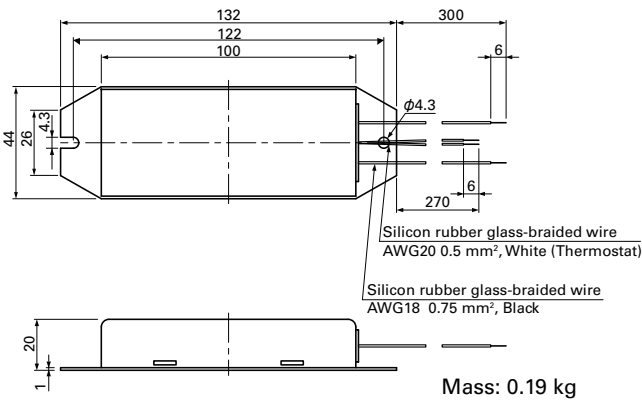
Cable length: L (m)	Model no.
0.2	AL-00911582-01
3.0	AL-00911582-02

Dimensions

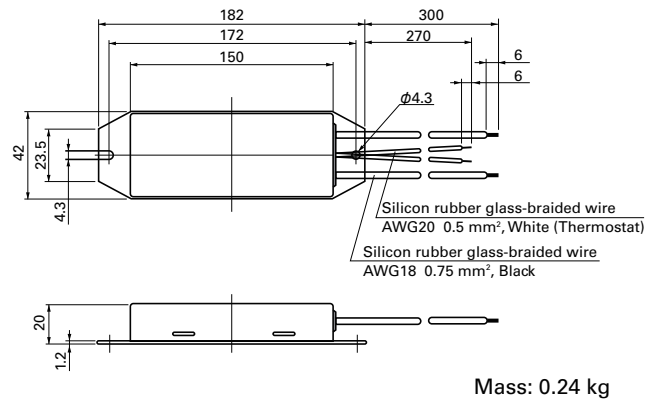


As note, the wiring differs from the communication cable between amplifiers for R ADVANCED MODEL (Model number: AL-00695974-**).

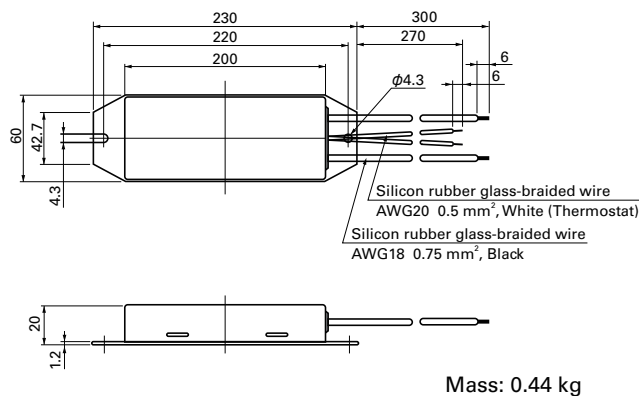
■ External Regenerative Resistor Dimensions (Unit: mm)



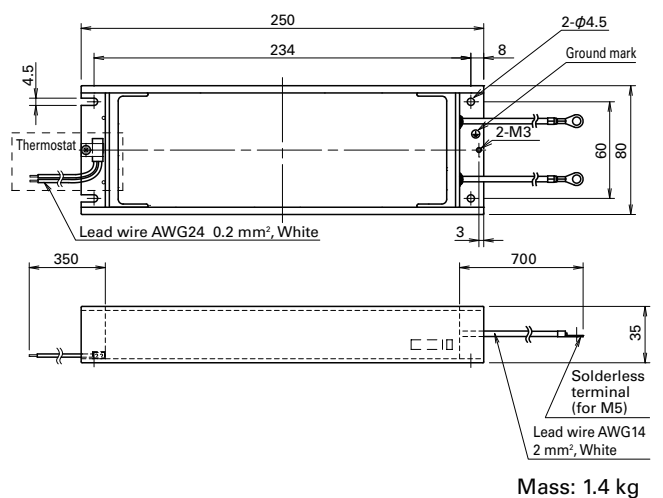
	Model no.	Thermostat
1	REGIST-080W100B	Normally closed
2	REGIST-080W50B	Normally closed



	Model no.	Thermostat
1	REGIST-120W100B	Normally closed
2	REGIST-120W50B	Normally closed



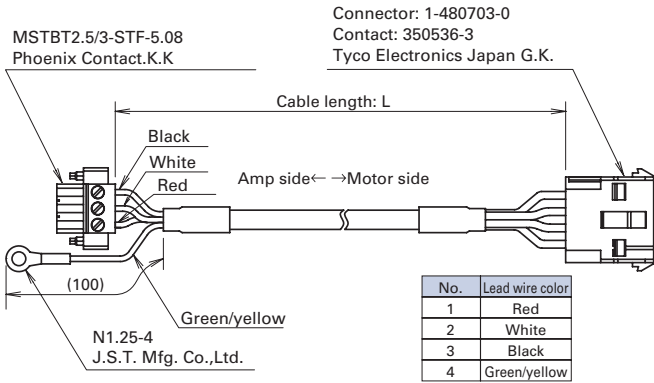
	Model no.	Thermostat
1	REGIST-220W20B	Normally closed
2	REGIST-220W50B	Normally closed
3	REGIST-220W100B	Normally closed



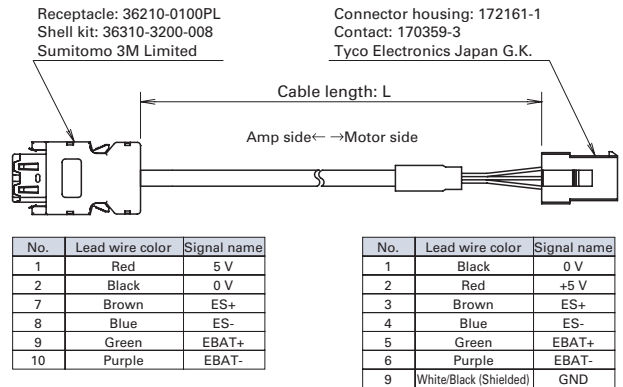
	Model no.	Thermostat
1	REGIST-500CW20B	Normally closed
2	REGIST-500CW14B	Normally closed
3	REGIST-500CW10B	Normally closed
4	REGIST-500CW7B	Normally closed

Extension cable for servo motor dimensions

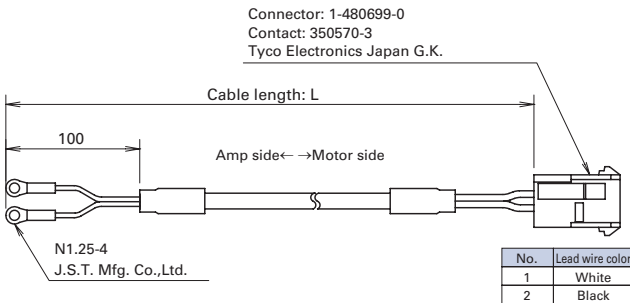
Power cable



Encoder cable



Brake cable



Model no.			Cable length: L (m)
Power cable	Brake cable	Encoder cable	
RS-CM4-01-R	RS-CB3-01-R	RS-CA4-01-R	1
RS-CM4-02-R	RS-CB3-02-R	RS-CA4-02-R	2
RS-CM4-03-R	RS-CB3-03-R	RS-CA4-03-R	3
RS-CM4-05-R	RS-CB3-05-R	RS-CA4-05-R	5
RS-CM4-10-R	RS-CB3-10-R	RS-CA4-10-R	10

Servo motors with connectors for extension cables

200 V system

Rated output	Motor flange size	Holding brake	Model no.
30 W	40 mm sq.	—	R2AA04003FXPA0
30 W	40 mm sq.	Yes (24 V DC)	R2AA04003FCPA0
50 W	40 mm sq.	—	R2AA04005FXPA0
50 W	40 mm sq.	Yes (24 V DC)	R2AA04005FCPA0
90 W	40 mm sq.	Yes (24 V DC)	R2AA04010FCPA0
100 W	40 mm sq.	—	R2AA04010FXPA0
100 W	60 mm sq.	—	R2AA06010FXPA0
100 W	60 mm sq.	Yes (24 V DC)	R2AA06010FCPA0
200 W	60 mm sq.	—	R2AA06020FXPA0
200 W	60 mm sq.	Yes (24 V DC)	R2AA06020FCPA0
360 W	60 mm sq.	Yes (24 V DC)	R2AA06040FCPA0
400 W	60 mm sq.	—	R2AA06040FXPA0
750 W	60 mm sq.	—	R2AA08075FXPA0
750 W	80 mm sq.	Yes (24 V DC)	R2AA08075FCPA0

Protection code: IP67. CE/UL approval: no.

Encoder classification: battery-backup method absolute encoder (PA035C).

Output shaft: straight. Oil seal: no.

Connectors are connected as shown in the figure. The cable length is 200 ± 30 mm.

Connector (for brake)
Housing: 1-480698-0
Pin: 350561-1
Tyco Electronics Japan G.K.

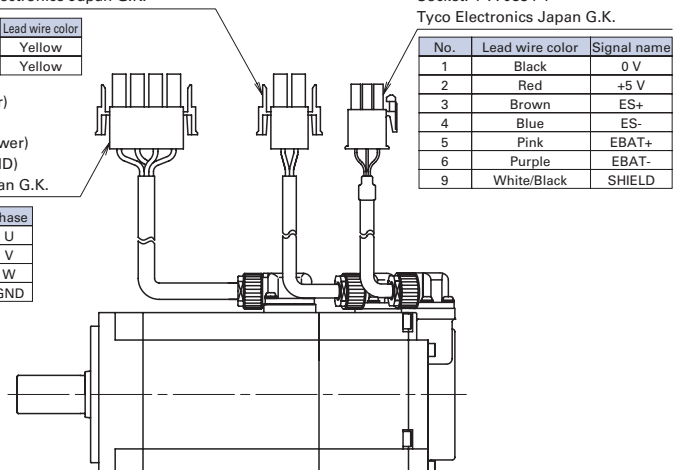
Connector (for encoder)
Housing: 172169-1
Socket: 1-770834-1
Tyco Electronics Japan G.K.

No.	Lead wire color
1	Yellow
2	Yellow

Connector (for power)
Housing: 1-480702-0
Pin: 350218-1 (for power)
Pin: 350654-1 (for GND)
Tyco Electronics Japan G.K.

No.	Lead wire color	Phase
1	Red	U
2	White	V
3	Black	W
4	Green/yellow	GND

No.	Lead wire color	Signal name
1	Black	0 V
2	Red	+5 V
3	Brown	ES+
4	Blue	ES-
5	Pink	EBAT+
6	Purple	EBAT-
9	White/Black	SHIELD



Servo motor capacity selection

This is a method of calculating the required capacity of servo motors from the mechanical specifications. Here we have introduced the basic selection procedure focusing on a ball screw (flat) mechanism.

Selection procedure

1. Creation of operation patterns

Create the operation patterns.

2. Calculation of conversion of motor shaft moment of load inertia J_L

Calculate the moment of load inertia from the machine configuration.

3. Calculation of load torque T_L for motor shaft conversion

Calculate the load torque from the machine configuration.

4. Provisional selection of servo motor capacity

Provisionally select a motor in which the load moment of inertia (J_L) is 10 times or less than the rotor moment of inertia (J_M) of servo motor, while the load torque (T_L) is 80% or less ($T_R \times 0.8$) of rated torque of motor (T_R).

$$J_L \leq J_M \times 10$$

$$T_L \leq T_R \times 0.8$$

5. Calculation of acceleration/deceleration torque

Calculate the required acceleration/deceleration torque from the operation patterns.

6. Calculation of effective torque

Calculate the effective torque from the torque patterns.

7. Judgment

Determine whether the acceleration/deceleration torque (T_a , T_b) is 80% or less ($T_p \times 0.8$) of peak stall torque (T_p) of servo motor, and the effective torque (T_{rms}) is 80% or less ($T_R \times 0.8$) of rating torque (T_R) of servo motor.

$$T_a \leq T_p \times 0.8$$

$$T_b \leq T_p \times 0.8$$

$$T_{rms} \leq T_R \times 0.8$$

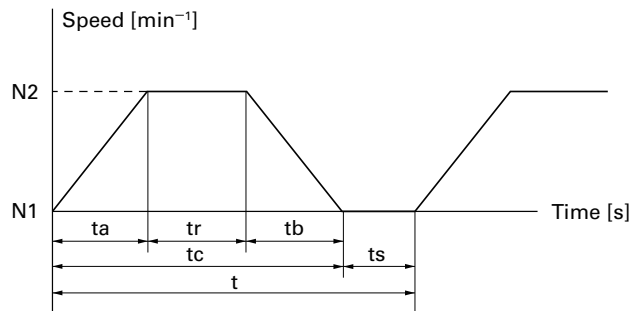
If the judgment results cannot be applied in the aforementioned equation, reconsider the servo motor capacity, for example increasing the capacity.

8. Calculation of regenerative power

Calculate the regenerative power and select an external regenerative resistor if necessary.

1. Creation of operation patterns

First, determine the equipment mechanism, dimensions of all parts, positioning amount, positioning time, gear ratio, etc. An operation pattern is the determined driving force plotted on the speed/time axis.



t_a = Acceleration time [s]

t_b = Deceleration time [s]

t_r = Constant speed-time [s]

t_s = Downtime [s]

t = 1 cycle [s]

2. Calculation of conversion of motor shaft moment of load inertia J_L

Load moment of inertia is the quantity showing inertia of a rotating object.

Given below is the calculation method used in case of ball screw (flat) mechanism.

Ball screw moment of inertia

$$J_{L1} = \left(\frac{1}{G}\right)^2 \times \frac{\pi \times \rho \times D^4 \times L}{32} \quad [\text{kg} \cdot \text{m}^2]$$

G: Gear ratio

ρ : Ball screw specific gravity [kg/m^3] [Iron: 7.8×10^3]

D: Ball screw diameter [m]

L: Ball screw length [m]

Work + table moment of inertia

$$J_{L2} = \left(\frac{1}{G}\right)^2 \times W \times \left(\frac{P}{2\pi}\right)^2 \quad [\text{kg} \cdot \text{m}^2]$$

G: Gear ratio

W: Work + table mass [kg]

P: Ball screw pitch [m]

Conversion of motor shaft moment of load inertia.

$$J_L = J_{L1} + J_{L2}$$

* Moments of inertia of reducer and coupling are assumed to be negligible and have therefore been omitted.

3. Calculation of load torque T_L for motor shaft conversion

Load torque is the power generated from the friction of the driving part or from the gravity that is converted on the motor shaft. When activated, this torque always acts as the load.

Given below is the calculation method used in the case of a ball screw (flat) mechanism.

$$T_L = \frac{(F + \mu W)}{\eta} \times \frac{P}{2\pi} \times \frac{1}{G} \times 9.8 \quad [\text{N}\cdot\text{m}]$$

F: External force [kg]

η : Machine efficiency

μ : Coefficient of friction

W: Work + table mass [kg]

P: Ball screw pitch [m]

G: Gear ratio

4. Provisional selection of servo motor capacity

Provisionally select the motors that apply to the following 2 conditions.

- Load moment of inertia (J_L) calculated in step 2 is 10 times or less than the rotor moment of inertia (J_M) of servo motor

$$J_L \leq J_M \times 10$$

- Load torque (T_L) calculated in step 3 is 80% or less ($T_R \times 0.8$) of rated torque (T_R) of servo motor

$$T_L \leq T_R \times 0.8$$

5. Calculation of acceleration/deceleration torque

Acceleration/deceleration torque is necessary for accelerating and decelerating the motor and load.

- Method of obtaining acceleration torque (T_a)

$$T_a = \frac{2\pi(N_2 - N_1) \times (J_L + J_M)}{60 \times t_a} + T_L \quad [\text{N}\cdot\text{m}]$$

N_2 : Servo motor rotary speed after acceleration [min^{-1}]

N_1 : Servo motor rotary speed before acceleration [min^{-1}]

J_L : Conversion of motor shaft moment of load inertia [$\text{kg}\cdot\text{m}^2$]

J_M : Conversion of servo motor moment of rotor inertia [$\text{kg}\cdot\text{m}^2$]

T_L : Calculation of load torque for motor shaft conversion [$\text{N}\cdot\text{m}$]

t_a : Acceleration time [s]

- Method of obtaining deceleration torque (T_b)

$$T_b = \frac{2\pi(N_2 - N_1) \times (J_L + J_M)}{60 \times t_b} - T_L \quad [\text{N}\cdot\text{m}]$$

N_2 : Servo motor rotary speed before deceleration [min^{-1}]

N_1 : Servo motor rotary speed after deceleration [min^{-1}]

J_L : Conversion of motor shaft moment of load inertia [$\text{kg}\cdot\text{m}^2$]

J_M : Conversion of servo motor moment of rotor inertia [$\text{kg}\cdot\text{m}^2$]

T_L : Calculation of load torque for motor shaft conversion [$\text{N}\cdot\text{m}$]

t_b : Deceleration time [s]

6. Calculation of effective torque

Effective torque is the value per unit time obtained from root mean square of load torque / acceleration torque / deceleration torque .

$$T_{\text{rms}} = \sqrt{\frac{(T_a^2 \times t_a) + (T_L^2 \times t_r) + (T_b^2 \times t_b)}{t}} \quad [\text{N}\cdot\text{m}]$$

7. Judgment

Our company's judgment criteria are as follows.

- Load torque load factor $T_L \leq T_R \times 0.8$
(Load torque is 80% or less of rated torque)
- Acceleration torque load factor $T_a \leq T_p \times 0.8$
(Acceleration torque is 80% or less of peak stall torque)
 T_p : Peak stall torque
- Deceleration torque load factor $T_b \leq T_p \times 0.8$
(Deceleration torque is 80% or less of peak torque at stall)
 T_p : Peak stall torque
- Effective torque load factor $T_{\text{rms}} \leq T_R \times 0.8$
(Effective torque is 80% less than rated torque)
- Moment of inertia ratio $J_L \leq J_M \times 10$
(Load moment of inertia is 10 times or less than the rotor moment of inertia of motor)

Rise in motor temperature can be suppressed by keeping a large margin in torque load factor. The moment of inertia ratio can be controlled at 10 times or more, for example, by slowly rotating the table mechanism. Testing with an actual machine is recommended.

8. Calculation of regenerative power

Calculate the regenerative efficient power (PM) to determine the regenerative resistor to be used. From the calculation results, determine whether an internal regenerative resistor can be used.

- Method of obtaining regenerative efficient power (PM) of horizontal drive shaft
Derive the regenerative energy.

$$EM = E_{\text{hb}} = \frac{1}{2} \times N \times 3 \times K_e \phi \times \frac{T_b}{KT} \times t_b - \left(\frac{T_b}{KT} \right)^2 \times 3 \times R \phi \times t_b$$

EM: Regenerative energy in case of horizontal drive shaft [J]

E_{hb} : Regenerative energy during deceleration [J]

$K_e \phi$: Induced voltage constant [$\text{V}_{\text{rms}}/\text{min}^{-1}$] (motor constant)

KT: Torque constant [$\text{N}\cdot\text{m}/\text{Arms}$] (motor constant)

N: Motor rotary speed [min^{-1}]

$R \phi$: Armature resistance [Ω] (motor constant)

t_b : Deceleration time [s]

T_b : Deceleration torque [$\text{N}\cdot\text{m}$]

Derive the regenerative efficient power from regenerative energy.

$$PM = \frac{EM}{t}$$

PM: Regenerative efficient power [W]

EM: Regenerative energy [J]

t: Cycle time [s]

- Selection of regenerative resistor

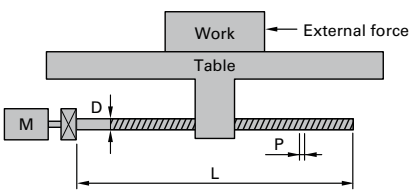
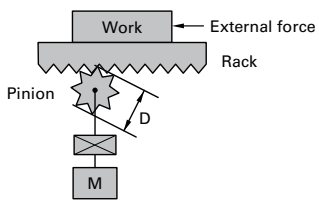
Select a regenerative resistor that meets the following conditions.

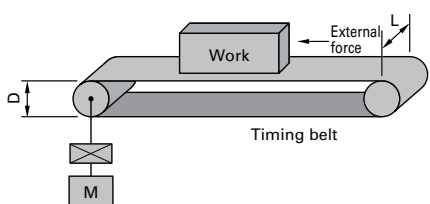
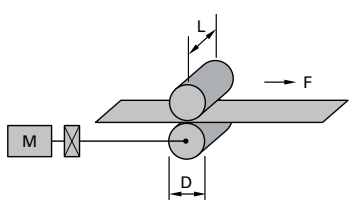
- In case of servo amplifiers with an internal regenerative resistor:
Permissible regenerative power [PR] that is less than efficient regenerative power [PM] and can be used with internal regenerative resistors
- In case of external regenerative resistor:
Permissible regenerative power [PRO] that is less than efficient regenerative power [PM] and can be used with external regenerative resistors

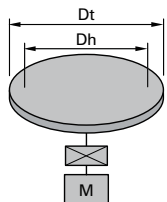
Note that we have servo amplifier models both with and without internal regenerative resistors for absorbing regenerative power. Select the model accordingly.

Selection data for each mechanism

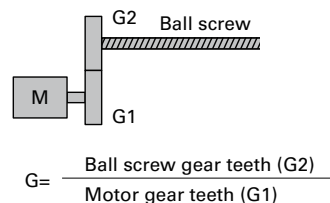
Typical examples of mechanisms and items that require selection are shown below. Provide this information when placing an order.

Ball screw			Rack & pinion		
					
External force	F		N		
W: Work + table mass	W		kg		
Ball screw diameter	D		m		
Ball screw length	L		m		
Ball screw pitch	P		m		
Ball screw material specific gravity	ρ		kg/m ³		
Coefficient of friction	μ				
Gear ratio *	G				
Machine efficiency	η				

Belt drive			Roll feed		
					
External force	F		N		
Work + belt mass	W		kg		
Pulley diameter	D		m		
Pulley width	L		m		
Pulley material specific gravity	ρ		kg/m ³		
Pulley moment of inertia	J		kg · m ²		
Gear ratio *	G				
Machine efficiency	η				
Sheet tension	F		N		
Roll diameter	D		m		
Roll width	L		m		
Roll material specific gravity	ρ		kg/m ³		
Roll moment of inertia	J		kg · m ²		
Gear ratio *	G				
Machine efficiency	η				

Rotary table			
			
Table mass	W		kg
Table diameter	Dt		m
Table support diameter	Dh		m
Table moment of inertia	J		kg · m ²
Support part coefficient of friction	μ		
Gear ratio *	G		
Machine efficiency	η		

* Derivation of gear ratio (G)





■ Motion controller



SANMOTION C
MOTION CONTROLLER

- GA1060 Reduction of wires by networking with the serial I/F.
- SERCOS Motion control, robot control, and sequence control
- CANopen



- EtherCAT EtherCAT interface as standard feature
- GA1060 Motion control, robot control, and sequence control

■ AC servo system



SANMOTION R 3E Model
AC SERVO SYSTEMS

- Safety function mounted Input voltage: 100 V AC, 200 V AC
- Analog/Pulse Motor flange size: 40 mm to 275 mm
Output capacity: 30 W to 30 kW



SANMOTION R ADVANCED MODEL
AC SERVO SYSTEMS

- Safety function mounted Input voltage: 100 V AC, 200 V AC
- EtherCAT Motor flange size: 40 mm to 220 mm
Output capacity: 30 W to 21 kW

Input voltage 48 V DC

- Pulse Motor flange size: 20 mm to 60 mm
- EtherCAT Output capacity: 20 W to 200 W

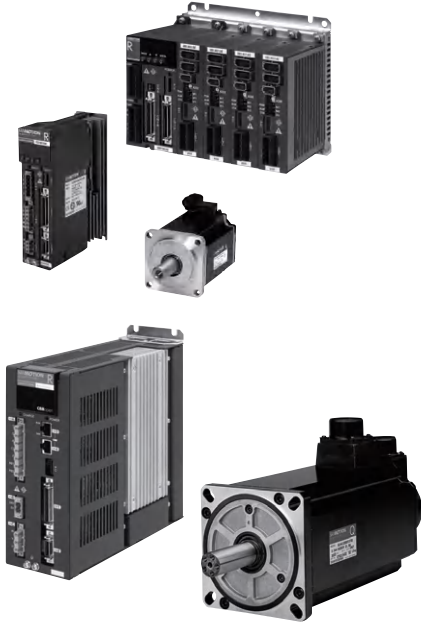


Compact AC servo motor

- Motor flange size: 14 mm
- Output capacity: 2.4 W



■ AC servo system



SANMOTION R
AC SERVO SYSTEMS

Single axis

Positioning function integrated

CANopen

Multi axes

Pulse

Input voltage: 100 V AC, 200 V AC

Motor flange size: 40 mm to 220 mm

Output capacity: 30 W to 25 kW

Analog/Pulse

CANopen

Input voltage: 400 V AC

Motor flange size: 86 mm to 220 mm

Output capacity: 500 W to 20 kW

■ AC spindle motor, AC servo amplifier



SANMOTION S
AC SERVO SYSTEMS

Analog/Pulse

EtherCAT

Input voltage: 200 V AC

Motor flange size: 160 mm

Output capacity: 3.2 kW, 4.5 kW

■ DC servo system



SANMOTION T
DC SERVO SYSTEMS

Analog/Pulse

Input voltage: 50 V DC, 140 V DC

Motor size: ϕ 41 mm to ϕ 87.5 mm

Rated output: 23 W to 500 W



■ Closed-loop stepping system



SANMOTION Model No. PB

Pulse	Driver: AC input/DC input, single axis/multi axes
RS-485	Motor size: 28 to 86 mm
Parallel I/O	With gear and brake
EtherCAT	

■ 5-phase stepping system



SANMOTION F5

Micro step	Driver: AC input/DC input
Pulse	Motor size: 42 to 60 mm, ϕ 60 to 106 mm
	With gear and brake
	Linear drive stepping motor
	Motor size: 42 mm, 60 mm
	With brake, without brake

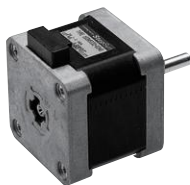
■ 2-phase stepping system



SANMOTION F2

Micro step	Driver: AC input/DC input
Pulse	Motor size: 14 to 86 mm, ϕ 80 to 106 mm
	With gear and brake
	Driver-integrated stepping motor
Pulse	Driver: 24 V DC
RS-485	Motor size: 42 mm, 60 mm
I/O	
	Protection code IP65 stepping motor
	Motor size: 56 mm, 86 mm

■ 3-phase stepping motor



SANMOTION F3

Motor size: 42 mm to 60 mm

■ Linear servo system



SANMOTION

LINEAR SERVO SYSTEMS

Linear servo motor

- Flat type with core, Twin type with core
- Compact cylinder

■ Precautions For Adoption

Failure to follow the precautions on the right may cause moderate injury and property damage, or in some circumstances, could lead to a serious accident. Always follow all listed precautions.

Cautions

- Read the accompanying Instruction Manual carefully prior to using the product.
- If applying to medical devices and other equipment affecting people's lives, please contact us beforehand and take appropriate safety measures.
- If applying to equipment that can have significant effects on society and the general public, please contact us beforehand.
- Do not use this product in an environment where vibration is present, such as in a moving vehicle or shipping vessel.
- Do not perform any retrofitting, re-engineering, or modification to this equipment.
- The products presented in this catalog are meant to be used for general industrial applications. If using for special applications related to aviation and space, nuclear power, electric power, submarine repeaters, etc., please contact us beforehand.

*For any question or inquiry regarding the above, contact our Sales Department.

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