

SANMOTION

SERVO SYSTEMS

R *3E Model*

100 V AC 30 W-200 W, 200 V AC 30 W-2 kW



SANYO DENKI

SANMOTION R

SERVO SYSTEMS *3E Model*

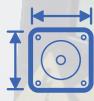
Input voltage 100 V, 200 V AC

Servo amplifier



Amp. capacity 10 A, 20 A, 30 A, 50 A

Servo motor



Flange size 40 mm sq., 60 mm sq., 80 mm sq., 86 mm sq.,
100 mm sq., 130 mm sq.



Rated output 30 W, 50 W, 80 W, 90 W, 100 W, 200 W, 360 W,
400 W, 550 W, 750 W, 1.0 kW, 1.2 kW, 1.8 kW, 2.0 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.



Evolved

Eco-efficient

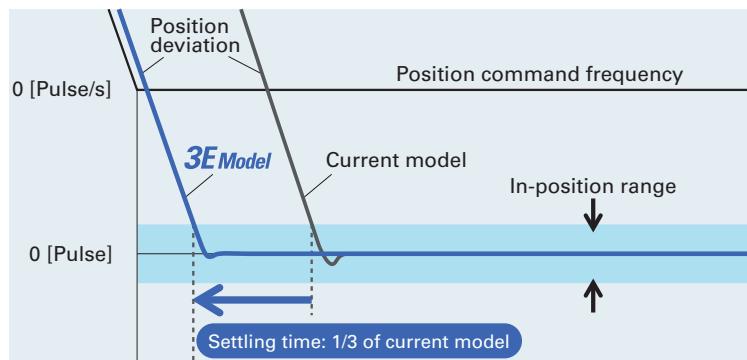
Easy to use

Evolved

Shorter takt time achieved through high-speed positioning control

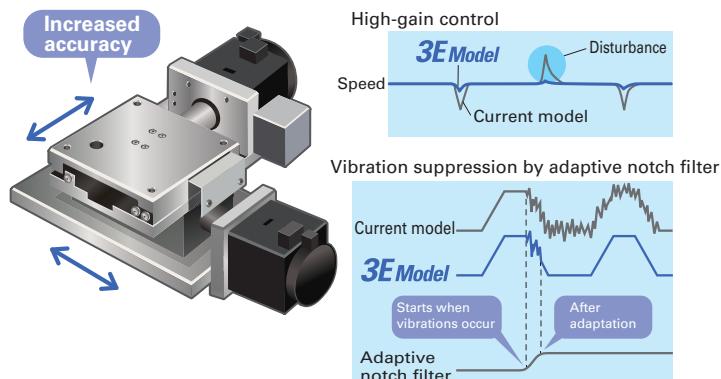
The 3E Model has a speed frequency response of 2.2 kHz, approximately twice that of our conventional product.* Additionally, the position settling time has been shortened to 1/3 of the original time. Real-time switching between track control and positioning control contributes to a dramatic reduction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

* 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.



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.



Eco-efficient

Reduced power consumption

By incorporating new-generation power devices, the 3E Model decreases electric power losses by up to 7%. 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.



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

Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

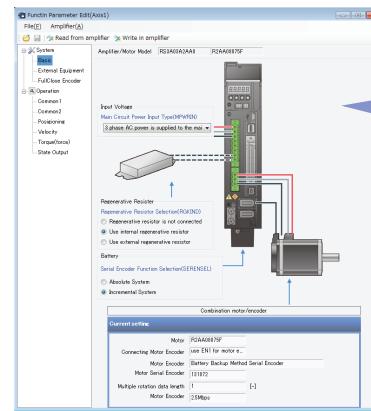
Options

Selection Guide

Easy to use

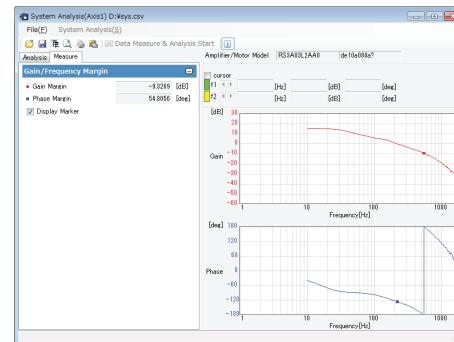
Easy startup

"SANMOTION MOTOR SETUP SOFTWARE" (see p. 40) 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.



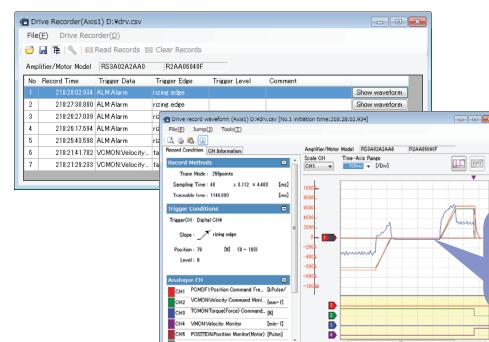
Easy servo tuning

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.



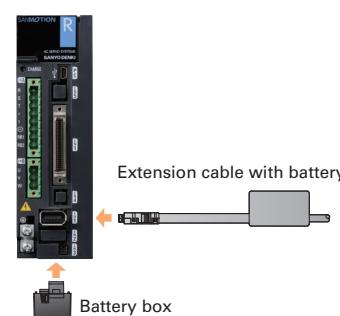
Easy troubleshooting

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

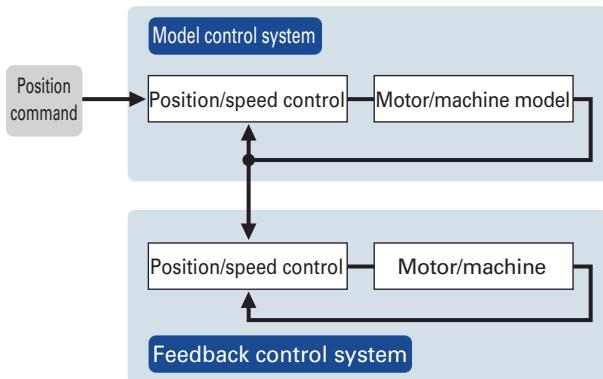
When using a battery-backup method absolute encoder, the required battery can be either a battery box that connects directly to the lower part of the servo amplifier, or an extension cable with battery. (See p. 45)



Common features of R 3E Model and R ADVANCED MODEL

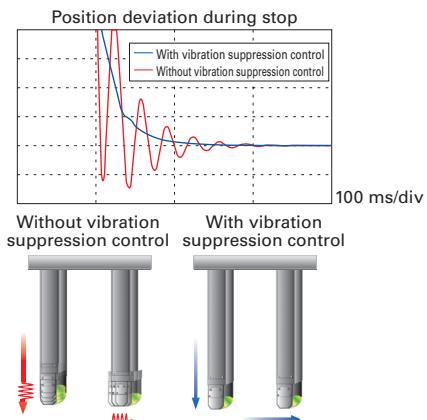
Model-based following control

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



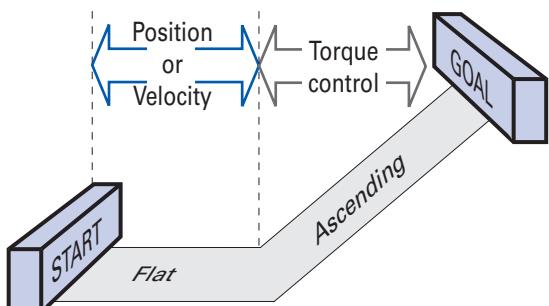
Feed-forward vibration suppression control

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.



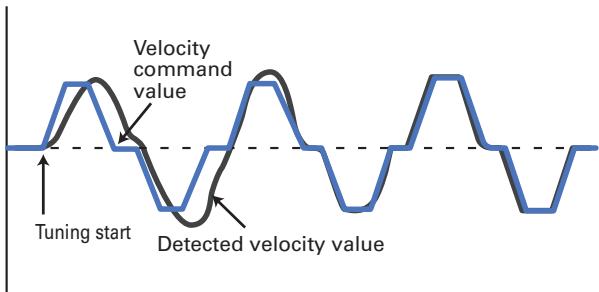
All-in-one control

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



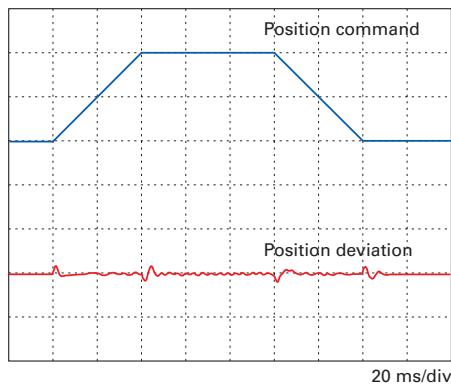
Auto-tuning

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



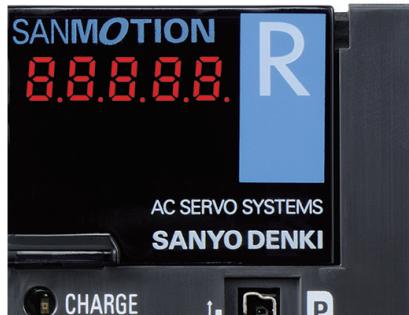
Command following control

Position command following performance doubled in comparison with conventional models through the adoption of new positioning and speed control algorithms. Position deviation $\neq 0$ 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.



Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

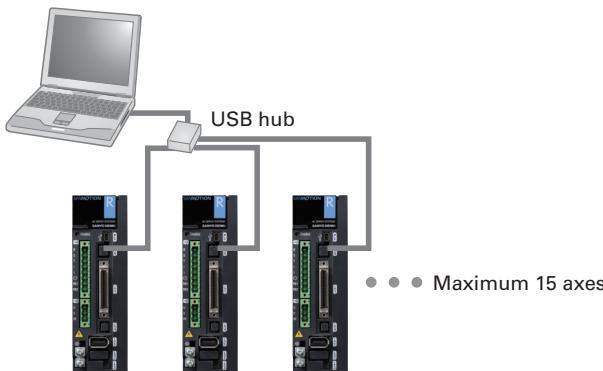
Options

Selection Guide

Common features of R 3E Model and R ADVANCED MODEL

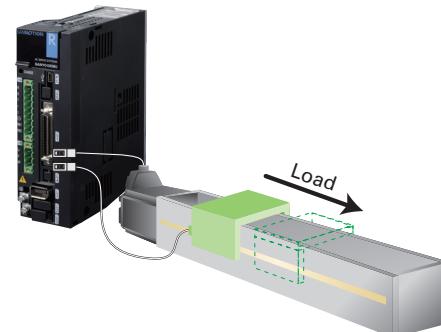
Multiaxial monitor function

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



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.



2 types of servo motors for different applications

Two types of servo motor 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 axes of small sized machine tools.



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.

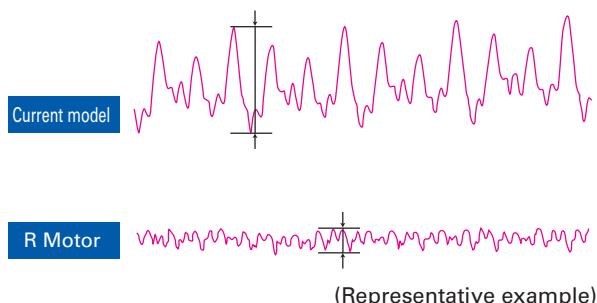
* Our conventional product is "SANMOTION Q" AC servo motor.



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 ratings, allowing them to work in severe environments. Standard R2 series 130 mm sq. servo motors have IP65 protection levels. (IP67 is available as an option.) For other servo motors IP65 or IP67 models can be selected.



* Excluding shaft feedthrough and cable end.

High Resolution Encoders

A 17 bit (131,072 divisions) encoder is included. An optional 20 bit (1,048,576 divisions) encoder is also available. Control for high resolution encoders is also possible.

Serial encoder

Encoder type	No. of partitions per rotation	Resolution during multiple rotations	Encoder model no.	Remarks
Optical battery-backup method absolute encoder A small and slim multi-turn battery-backup method encoder. Ideal for general industrial equipment, including robots. Requires battery. Batteries sold separately. (See p. 45: Options)	17 bit (131072)	16 bit (65536)	PA035C	An optional 20 bit encoder (1,048,576 divisions) is also available.
Optical absolute encoder for incremental systems A small and slim encoder that can output the absolute positions in 1 rotation by converting them to incremental signals of phase A, B, and Z. Enables wire-saving for and size-reduction of applications that use pulse encoder.	17 bit (131072)	-	PA035S	An optional 20 bit encoder (1,048,576 divisions) is also available.
Resolver method battery-less absolute encoder Since it is battery-less, maintenance is not required. Being a resolver method encoder with outstanding ruggedness, it is ideal for equipment with difficult usage environment, like injection molding machines, robots.	17 bit (131072)	16 bit (65536)	RA035C	
High-precision battery-less optical absolute encoder Battery replacement maintenance is not required. This high precision optical encoder is ideal for high precision equipment including robots and other general industrial equipment.	17 bit (131072) 20 bit (1048576)	16 bit (65536)	HA062	Applicable motor size: 100 mm sq. or more

Pulse encoder

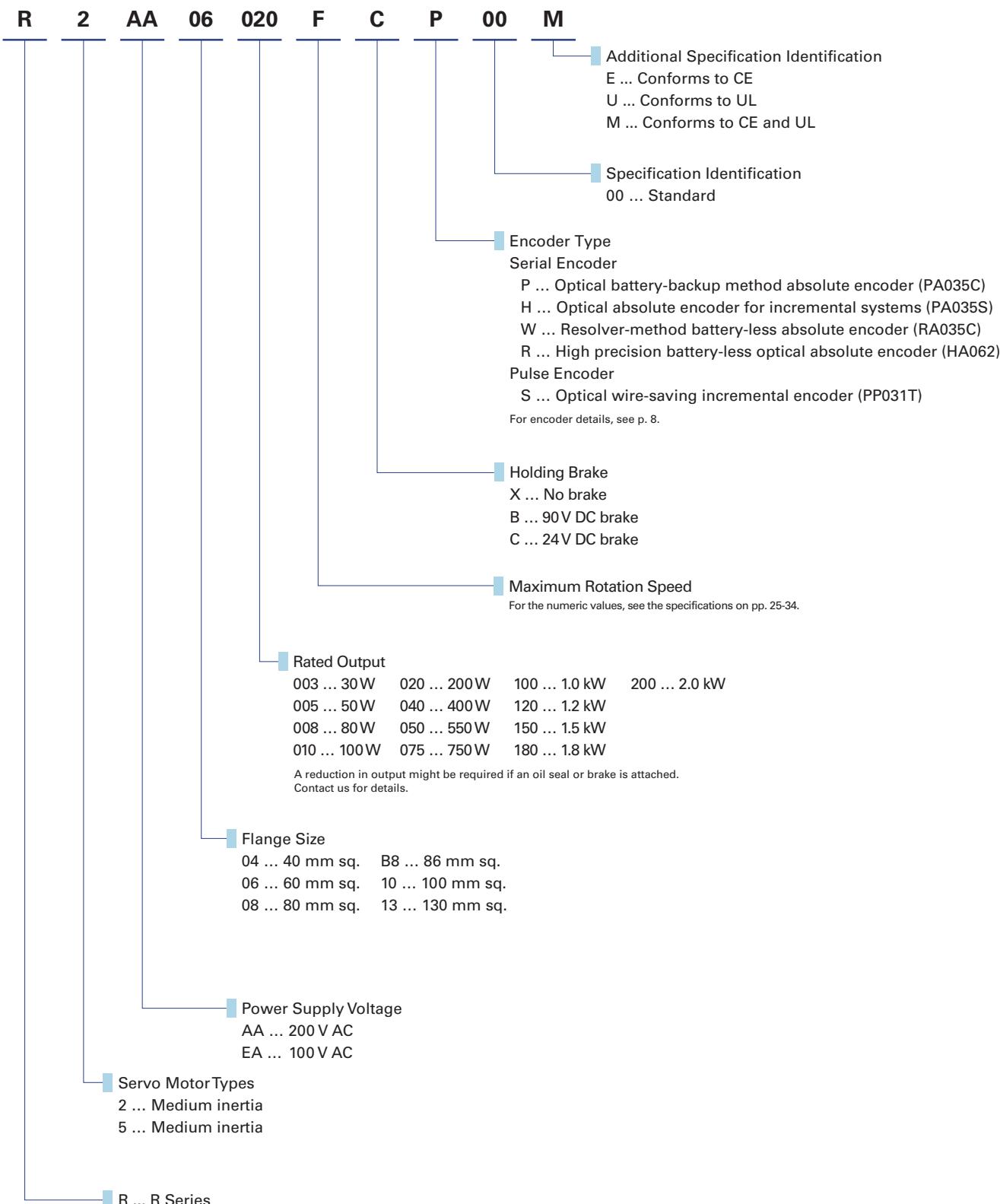
Encoder type	Pulse/rotation	Multiple rotations	Encoder model no.	Remarks
Optical wire-saving incremental encoder An incremental encoder that easily connects with host equipment to output phases A, B, and Z. Ideal for general industrial equipment, like chip mounters.	2000 P/R	No	PP031T	Pulses can be set up to 10000 P/R.

How to Read Model Numbers

Not all combinations shown below are valid. For available models, refer to "Standard Model Number List" on pp. 11-19.

Servo Motor

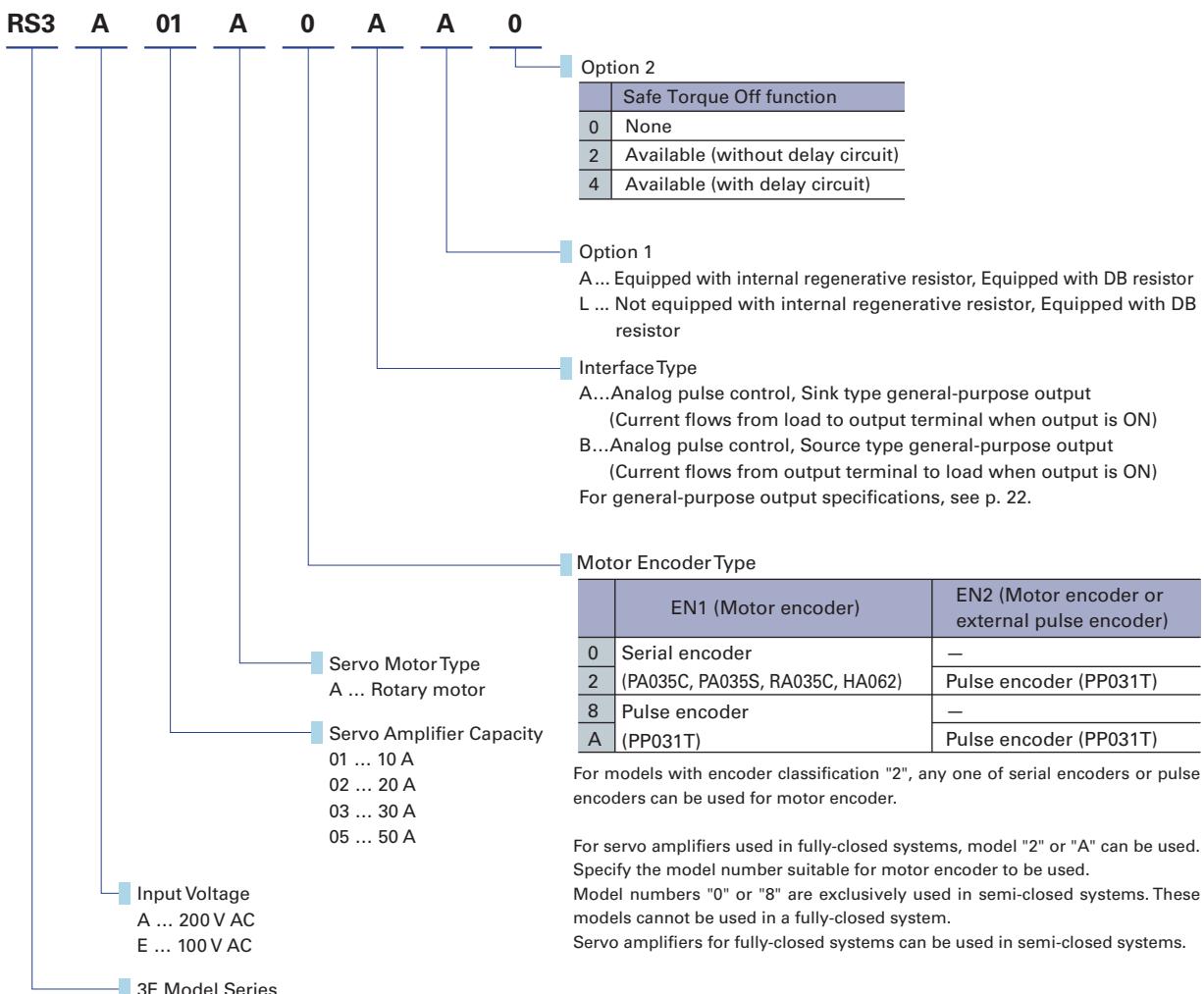
Example: An R2 series servo motor model with a 60 mm sq. flange size, 200 W rated output, 6000 min⁻¹ maximum rotation speed, 24 V DC brake, and a battery-backup method absolute encoder (131072 partition number/rotation), with UL/CE approval.



• For speed reducer installation, contact us for details.

■ 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.



We also provide express delivery service for products required earlier than the usual delivery time.
Ask the seller regarding applicable model number and delivery time.

Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

Options

Selection Guide

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-backup method absolute encoder (PA035C)	Absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
30 W	40 mm sq.	IP67	No	No	R2EA04003FXP00	R2EA04003FXH00	p. 25	p. 38
				Yes	R2EA04003FXP00M	R2EA04003FXH00M	p. 25	p. 38
			Yes (24 V DC)	No	R2EA04003FCP00	R2EA04003FCH00	p. 25	p. 38
				Yes	R2EA04003FCP00M	R2EA04003FCH00M	p. 25	p. 38
		IP65	No	No	R2EA04003FXP03	R2EA04003FXH03	p. 25	p. 38
				Yes	R2EA04003FXP03M	R2EA04003FXH03M	p. 25	p. 38
			Yes (24 V DC)	No	R2EA04003FCP03	R2EA04003FCH03	p. 25	p. 38
				Yes	R2EA04003FCP03M	R2EA04003FCH03M	p. 25	p. 38
50 W	40 mm sq.	IP67	No	No	R2EA04005FXP00	R2EA04005FXH00	p. 25	p. 38
				Yes	R2EA04005FXP00M	R2EA04005FXH00M	p. 25	p. 38
			Yes (24 V DC)	No	R2EA04005FCP00	R2EA04005FCH00	p. 25	p. 38
				Yes	R2EA04005FCP00M	R2EA04005FCH00M	p. 25	p. 38
		IP65	No	No	R2EA04005FXP03	R2EA04005FXH03	p. 25	p. 38
				Yes	R2EA04005FXP03M	R2EA04005FXH03M	p. 25	p. 38
			Yes (24 V DC)	No	R2EA04005FCP03	R2EA04005FCH03	p. 25	p. 38
				Yes	R2EA04005FCP03M	R2EA04005FCH03M	p. 25	p. 38
80 W	40 mm sq.	IP67	No	No	R2EA04008FXP00	R2EA04008FXH00	p. 25	p. 38
				Yes	R2EA04008FXP00M	R2EA04008FXH00M	p. 25	p. 38
			Yes (24 V DC)	No	R2EA04008FCP00	R2EA04008FCH00	p. 25	p. 38
				Yes	R2EA04008FCP00M	R2EA04008FCH00M	p. 25	p. 38
		IP65	No	No	R2EA04008FXP03	R2EA04008FXH03	p. 25	p. 38
				Yes	R2EA04008FXP03M	R2EA04008FXH03M	p. 25	p. 38
			Yes (24 V DC)	No	R2EA04008FCP03	R2EA04008FCH03	p. 25	p. 38
				Yes	R2EA04008FCP03M	R2EA04008FCH03M	p. 25	p. 38
100 W	60 mm sq.	IP67	No	No	R2EA06010FXP00	R2EA06010FXH00	p. 26	p. 38
				Yes	R2EA06010FXP00M	R2EA06010FXH00M	p. 26	p. 38
			Yes (24 V DC)	No	R2EA06010FCP00	R2EA06010FCP00	p. 26	p. 38
				Yes	R2EA06010FCP00M	R2EA06010FCH00M	p. 26	p. 38
		IP65	No	No	R2EA06010FXP03	R2EA06010FXH03	p. 26	p. 38
				Yes	R2EA06010FXP03M	R2EA06010FXH03M	p. 26	p. 38
			Yes (24 V DC)	No	R2EA06010FCP03	R2EA06010FCH03	p. 26	p. 38
				Yes	R2EA06010FCP03M	R2EA06010FCH03M	p. 26	p. 38
200 W	60 mm sq.	IP67	No	No	R2EA06020FXP00	R2EA06020FXH00	p. 26	p. 38
				Yes	R2EA06020FXP00M	R2EA06020FXH00M	p. 26	p. 38
			Yes (24 V DC)	No	R2EA06020FCP00	R2EA06020FCH00	p. 26	p. 38
				Yes	R2EA06020FCP00M	R2EA06020FCH00M	p. 26	p. 38
		IP65	No	No	R2EA06020FXP03	R2EA06020FXH03	p. 26	p. 38
				Yes	R2EA06020FXP03M	R2EA06020FXH03M	p. 26	p. 38
			Yes (24 V DC)	No	R2EA06020FCP03	R2EA06020FCH03	p. 26	p. 38
				Yes	R2EA06020FCP03M	R2EA06020FCH03M	p. 26	p. 38

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

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	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. 21	p. 23
							20 A	RS3E02A0AL0	p. 21	p. 23
							30 A	RS3E03A0AL0	p. 21	p. 24
					Yes	Yes	10 A	RS3E01A0AL2	p. 21	p. 23
							20 A	RS3E02A0AL2	p. 21	p. 23
							30 A	RS3E03A0AL2	p. 21	p. 24
				Source	Yes	No	10 A	RS3E01A0AA0	p. 21	p. 23
							20 A	RS3E02A0AA0	p. 21	p. 23
							30 A	RS3E03A0AA0	p. 21	p. 24
					Yes	Yes	10 A	RS3E01A0AA2	p. 21	p. 23
							20 A	RS3E02A0AA2	p. 21	p. 23
							30 A	RS3E03A0AA2	p. 21	p. 24
				No	No	No	10 A	RS3E01A0BL0	p. 21	p. 23
							20 A	RS3E02A0BL0	p. 21	p. 23
							30 A	RS3E03A0BL0	p. 21	p. 24
					Yes	Yes	10 A	RS3E01A0BL2	p. 21	p. 23
							20 A	RS3E02A0BL2	p. 21	p. 23
							30 A	RS3E03A0BL2	p. 21	p. 24
				Yes	No	No	10 A	RS3E01A0BA0	p. 21	p. 23
							20 A	RS3E02A0BA0	p. 21	p. 23
							30 A	RS3E03A0BA0	p. 21	p. 24
					Yes	Yes	10 A	RS3E01A0BA2	p. 21	p. 23
							20 A	RS3E02A0BA2	p. 21	p. 23
							30 A	RS3E03A0BA2	p. 21	p. 24

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

Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications
Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram
Servo Motor Dimensions

Options

Selection Guide

Input voltage 200 V AC

R2 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connection: cable

Motor flange size	Rated output	Protection code	Holding brake	CE and UL approved	Cable terminal specifications*	Model no.		Page	
						Battery backup method absolute encoder (PA035C)	Absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
40 mm sq.	30 W	IP67	No	No	Without connector	R2AA04003FXP00	R2AA04003FXH00	p. 27	p. 38
				No	With connector	R2AA04003FXPA0	No	p. 27	p. 38
				Yes	Without connector	R2AA04003FXP00M	R2AA04003FXH00M	p. 27	p. 38
			Yes (24 V DC)	No	Without connector	R2AA04003FCP00	R2AA04003FCH00	p. 27	p. 38
				No	With connector	R2AA04003FCPA0	No	p. 27	p. 38
				Yes	Without connector	R2AA04003FCP00M	R2AA04003FCH00M	p. 27	p. 38
	50 W	IP65	No	No	Without connector	R2AA04003FXP03	R2AA04003FXH03	p. 27	p. 38
				Yes	Without connector	R2AA04003FXP03M	R2AA04003FXH03M	p. 27	p. 38
				No	Without connector	R2AA04003FCP03	R2AA04003FCH03	p. 27	p. 38
			Yes (24 V DC)	Yes	Without connector	R2AA04003FCP03M	R2AA04003FCH03M	p. 27	p. 38
				No	Without connector	R2AA04005FXP00	R2AA04005FXH00	p. 27	p. 38
				No	With connector	R2AA04005FXPA0	No	p. 27	p. 38
40 mm sq.	90 W	IP67	No	Yes	Without connector	R2AA04005FXP00M	R2AA04005FXH00M	p. 27	p. 38
				No	Without connector	R2AA04005FCP00	R2AA04005FCH00	p. 27	p. 38
				No	With connector	R2AA04005FCPA0	No	p. 27	p. 38
			Yes (24 V DC)	Yes	Without connector	R2AA04005FCP00M	R2AA04005FCH00M	p. 27	p. 38
				No	Without connector	R2AA04005FXP03	R2AA04005FXH03	p. 27	p. 38
				Yes	Without connector	R2AA04005FXP03M	R2AA04005FXH03M	p. 27	p. 38
	100 W	IP65	No	No	Without connector	R2AA04010FXP00	R2AA04010FXH00	p. 27	p. 38
				No	With connector	R2AA04010FXPA0	No	p. 27	p. 38
				Yes	Without connector	R2AA04010FXP00M	R2AA04010FXH00M	p. 27	p. 38
			Yes (24 V DC)	No	Without connector	R2AA04010FCP00	R2AA04010FCH00	p. 27	p. 38
				No	With connector	R2AA04010FCPA0	No	p. 27	p. 38
				Yes	Without connector	R2AA04010FCP00M6	R2AA04010FCH00M6	p. 27	p. 38
60 mm sq.	90 W	IP67	No	No	Without connector	R2AA04010FXP03	R2AA04010FXH03	p. 27	p. 38
				Yes	Without connector	R2AA04010FXP03M	R2AA04010FXH03M	p. 27	p. 38
				No	Without connector	R2AA04010FCP03	R2AA04010FCH03	p. 27	p. 38
			Yes (24 V DC)	Yes	Without connector	R2AA04010FCP03M6	R2AA04010FCH03M6	p. 27	p. 38
				No	Without connector	R2AA06010FXP00	R2AA06010FXH00	p. 27	p. 38
				No	With connector	R2AA06010FXPA0	No	p. 27	p. 38
	100 W	IP65	No	Yes	Without connector	R2AA06010FXP00M	R2AA06010FXH00M	p. 27	p. 38
				No	Without connector	R2AA06010FCP00	R2AA06010FCH00	p. 27	p. 38
				No	With connector	R2AA06010FCPA0	No	p. 27	p. 38
			Yes (24 V DC)	Yes	Without connector	R2AA06010FCP00M	R2AA06010FCH00M	p. 27	p. 38
				No	Without connector	R2AA06010FXP03	R2AA06010FXH03	p. 27	p. 38
				Yes	Without connector	R2AA06010FXP03M	R2AA06010FXH03M	p. 27	p. 38

* Connectors are to be connected with an extension cable (see p. 45). Cable length for motors with connectors is 200 ± 30 mm.

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

Input voltage 200 V AC

R2 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connection: cable

Motor flange size	Rated output	Protection code	Holding brake	CE and UL approved	Cable terminal specifications*	Model no.		Page	
						Battery backup method absolute encoder (PA035C)	Absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
60 mm sq.	200 W	IP67	No	No	Without connector	R2AA06020FXP00	R2AA06020FXH00	p. 28	p. 38
				No	With connector	R2AA06020FXPA0	No	p. 28	p. 38
				Yes	Without connector	R2AA06020FXP00M	R2AA06020FXH00M	p. 28	p. 38
			Yes (24 V DC)	No	Without connector	R2AA06020FCP00	R2AA06020FCH00	p. 28	p. 38
				No	With connector	R2AA06020FCPA0	No	p. 28	p. 38
				Yes	Without connector	R2AA06020FCP00M	R2AA06020FCH00M	p. 28	p. 38
		IP65	No	No	Without connector	R2AA06020FXP03	R2AA06020FXH03	p. 28	p. 38
				Yes	Without connector	R2AA06020FXP03M	R2AA06020FXH03M	p. 28	p. 38
			Yes (24 V DC)	No	Without connector	R2AA06020FCP03	R2AA06020FCH03	p. 28	p. 38
				Yes	Without connector	R2AA06020FCP03M	R2AA06020FCH03M	p. 28	p. 38
80 mm sq.	200 W	IP67	No	No	Without connector	R2AA08020FXP00	R2AA08020FXH00	p. 28	p. 38
				Yes	Without connector	R2AA08020FXP00M	R2AA08020FXH00M	p. 28	p. 38
			Yes (24 V DC)	No	Without connector	R2AA08020FCP00	R2AA08020FCH00	p. 28	p. 38
				Yes	Without connector	R2AA08020FCP00M	R2AA08020FCH00M	p. 28	p. 38
		IP65	No	No	Without connector	R2AA08020FXP03	R2AA08020FXH03	p. 28	p. 38
				Yes	Without connector	R2AA08020FXP03M	R2AA08020FXH03M	p. 28	p. 38
			Yes (24 V DC)	No	Without connector	R2AA08020FCP03	R2AA08020FCH03	p. 28	p. 38
				Yes	Without connector	R2AA08020FCP03M	R2AA08020FCH03M	p. 28	p. 38
60 mm sq.	400 W	IP67	No	No	Without connector	R2AA06040FXP00	R2AA06040FXH00	p. 28	p. 38
				No	With connector	R2AA06040FXPA0	No	p. 28	p. 38
				Yes	Without connector	R2AA06040FXP00M	R2AA06040FXH00M	p. 28	p. 38
			Yes (24 V DC)	No	Without connector	R2AA06040FCP00	R2AA06040FCH00	p. 28	p. 38
				No	With connector	R2AA06040FCPA0	No	p. 28	p. 38
				Yes	Without connector	R2AA06040FCP00M6	R2AA06040FCH00M6	p. 28	p. 38
		IP65	No	No	Without connector	R2AA06040HXP00	R2AA06040HXH00	p. 28	p. 38
				Yes	Without connector	R2AA06040HXP00M	R2AA06040HXH00M	p. 28	p. 38
			Yes (24 V DC)	No	Without connector	R2AA06040HCP00	R2AA06040HCH00	p. 28	p. 38
				Yes	Without connector	R2AA06040HCP00M6	R2AA06040HCH00M6	p. 28	p. 38
			Yes (24 V DC)	No	Without connector	R2AA06040FXP03	R2AA06040FXH03	p. 28	p. 38
				Yes	Without connector	R2AA06040FXP03M	R2AA06040FXH03M	p. 28	p. 38
80 mm sq.	400 W	IP67	No	No	Without connector	R2AA06040FCP03	R2AA06040FCH03	p. 28	p. 38
				Yes	Without connector	R2AA06040FCP03M6	R2AA06040FCH03M6	p. 28	p. 38
				No	Without connector	R2AA06040HXP03	R2AA06040HXH03	p. 28	p. 38
			Yes (24 V DC)	No	Without connector	R2AA06040HXP03M	R2AA06040HXH03M	p. 28	p. 38
				Yes	Without connector	R2AA06040HCP03	R2AA06040HCH03	p. 28	p. 38
				Yes	Without connector	R2AA06040HCP03M6	R2AA06040HCH03M6	p. 28	p. 38
		IP65	No	No	Without connector	R2AA08040FXP00	R2AA08040FXH00	p. 29	p. 38
				Yes	Without connector	R2AA08040FXP00M	R2AA08040FXH00M	p. 29	p. 38
				No	Without connector	R2AA08040FCP00	R2AA08040FCH00	p. 29	p. 38
			Yes (24 V DC)	No	Without connector	R2AA08040FCP00M	R2AA08040FCH00M	p. 29	p. 38
				No	Without connector	R2AA08040FXP03	R2AA08040FXH03	p. 29	p. 38
				Yes	Without connector	R2AA08040FXP03M	R2AA08040FXH03M	p. 29	p. 38

* Connectors are to be connected with an extension cable (see p. 45). Cable length for motors with connectors is 200 ± 30 mm.

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

Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications
Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram
External Wiring Diagram

Servo Motor Dimensions

Options

Selection Guide

Input voltage 200 V AC

R2 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connection: cable

Motor flange size	Rated output	Protection code	Holding brake	CE and UL approved	Cable terminal specifications*	Model no.		Page	
						Battery backup method absolute encoder (PA035C)	Absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
80 mm sq.	750 W	IP67	No	No	Without connector	R2AA08075FXP00	R2AA08075FXH00	p. 29	p. 38
				No	With connector	R2AA08075FXPA0	No	p. 29	p. 38
				Yes	Without connector	R2AA08075FXP00M	R2AA08075FXH00M	p. 29	p. 38
			Yes (24 V DC)	No	Without connector	R2AA08075FCP00	R2AA08075FCH00	p. 29	p. 38
				No	With connector	R2AA08075FCPA0	No	p. 29	p. 38
				Yes	Without connector	R2AA08075FCP00M	R2AA08075FCH00M	p. 29	p. 38
		IP65	No	No	Without connector	R2AA08075FXP03	R2AA08075FXH03	p. 29	p. 38
				Yes	Without connector	R2AA08075FXP03M	R2AA08075FXH03M	p. 29	p. 38
			Yes (24 V DC)	No	Without connector	R2AA08075FCP03	R2AA08075FCH03	p. 29	p. 38
				Yes	Without connector	R2AA08075FCP03M	R2AA08075FCH03M	p. 29	p. 38
86 mm sq.	100 mm sq.	IP67	No	No	Without connector	R2AAB8075FXP00	R2AAB8075FXH00	p. 31	p. 38
				Yes	Without connector	R2AAB8075FXP00M	R2AAB8075FXH00M	p. 31	p. 38
			Yes (24 V DC)	No	Without connector	R2AAB8075FCP00	R2AAB8075FCH00	p. 31	p. 38
				Yes	Without connector	R2AAB8075FCP00M	R2AAB8075FCH00M	p. 31	p. 38
		IP65	No	No	Without connector	R2AAB8075FXP03	R2AAB8075FXH03	p. 31	p. 38
				Yes	Without connector	R2AAB8075FXP03M	R2AAB8075FXH03M	p. 31	p. 38
			Yes (24 V DC)	No	Without connector	R2AAB8075FCP03	R2AAB8075FCH03	p. 31	p. 38
				Yes	Without connector	R2AAB8075FCP03M	R2AAB8075FCH03M	p. 31	p. 38
100 mm sq.	86 mm sq.	IP67	No	No	Without connector	R2AA10075FXP00	R2AA10075FXH00	p. 29	p. 38
				Yes	Without connector	R2AA10075FXP00M	R2AA10075FXH00M	p. 29	p. 38
			Yes (24 V DC)	No	Without connector	R2AA10075FCP00	R2AA10075FCH00	p. 29	p. 38
				Yes	Without connector	R2AA10075FCP00M	R2AA10075FCH00M	p. 29	p. 38
			No	No	Without connector	R2AA10075FXP03	R2AA10075FXH03	p. 29	p. 38
				Yes	Without connector	R2AA10075FXP03M	R2AA10075FXH03M	p. 29	p. 38
		IP65	Yes (24 V DC)	No	Without connector	R2AA10075FCP03	R2AA10075FCH03	p. 29	p. 38
				Yes	Without connector	R2AA10075FCP03M	R2AA10075FCH03M	p. 29	p. 38
			No	No	Without connector	R2AAB8100FXP00	R2AAB8100FXH00	p. 31	p. 38
				Yes	Without connector	R2AAB8100FXP00M	R2AAB8100FXH00M	p. 31	p. 38
			Yes (24 V DC)	No	Without connector	R2AAB8100FCP00	R2AAB8100FCH00	p. 31	p. 38
				Yes	Without connector	R2AAB8100FCP00M	R2AAB8100FCH00M	p. 31	p. 38
100 mm sq.	1.0 kW	IP67	No	No	Without connector	R2AAB8100FXP03	R2AAB8100FXH03	p. 31	p. 38
				Yes	Without connector	R2AAB8100FXP03M	R2AAB8100FXH03M	p. 31	p. 38
			Yes (24 V DC)	No	Without connector	R2AAB8100FCP03	R2AAB8100FCH03	p. 31	p. 38
				Yes	Without connector	R2AAB8100FCP03M	R2AAB8100FCH03M	p. 31	p. 38
			No	No	Without connector	R2AAB8100HXP00	R2AAB8100HXH00	p. 29	p. 38
				Yes	Without connector	R2AAB8100HXP00M	R2AAB8100HXH00M	p. 29	p. 38
		IP65	Yes (24 V DC)	No	Without connector	R2AAB8100HCP00	R2AAB8100HCH00	p. 29	p. 38
				Yes	Without connector	R2AAB8100HCP00M	R2AAB8100HCH00M	p. 29	p. 38
			No	No	Without connector	R2AAB8100HXP03	R2AAB8100HXH03	p. 29	p. 38
				Yes	Without connector	R2AAB8100HXP03M	R2AAB8100HXH03M	p. 29	p. 38
			Yes (24 V DC)	No	Without connector	R2AAB8100HCP03	R2AAB8100HCH03	p. 29	p. 38
				Yes	Without connector	R2AAB8100HCP03M	R2AAB8100HCH03M	p. 29	p. 38
100 mm sq.	1.0 kW	IP67	No	No	Without connector	R2AA10100FXP00	R2AA10100FXH00	p. 31	p. 38
				Yes	Without connector	R2AA10100FXP00M	R2AA10100FXH00M	p. 31	p. 38
			Yes (24 V DC)	No	Without connector	R2AA10100FCP00	R2AA10100FCH00	p. 31	p. 38
				Yes	Without connector	R2AA10100FCP00M	R2AA10100FCH00M	p. 31	p. 38
		IP65	No	No	Without connector	R2AA10100FXP03	R2AA10100FXH03	p. 31	p. 38
				Yes	Without connector	R2AA10100FXP03M	R2AA10100FXH03M	p. 31	p. 38
			Yes (24 V DC)	No	Without connector	R2AA10100FCP03	R2AA10100FCH03	p. 31	p. 38
				Yes	Without connector	R2AA10100FCP03M	R2AA10100FCH03M	p. 31	p. 38

* Connectors are to be connected with an extension cable (see p. 45). Cable length for motors with connectors is 200 ± 30 mm.

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

Input voltage 200 V AC

R2 Servo Motor Medium Capacity, Medium Inertia

Standard specifications Output shaft: with key, oil seal: yes, connection: circular connector*

Rated output	Motor flange size	Protection code	Holding brake	CE and UL approved	Model no.		Page	
					Battery-backup method absolute encoder (PA035C)	Absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
550 W	130 mm sq.	IP65	No	No	R2AA13050HXP00	R2AA13050HXH00	p. 30	p. 39
				Yes	R2AA13050HXP00M	R2AA13050HXH00M	p. 30	p. 39
			Yes (24 V DC)	No	R2AA13050HCP00	R2AA13050HCH00	p. 30	p. 39
				Yes	R2AA13050HCP00M	R2AA13050HCH00M	p. 30	p. 39
			No	No	R2AA13050DXP00	R2AA13050DXH00	p. 30	p. 39
				Yes	R2AA13050DXP00M	R2AA13050DXH00M	p. 30	p. 39
			Yes (24 V DC)	No	R2AA13050DCP00	R2AA13050DCH00	p. 30	p. 39
				Yes	R2AA13050DCP00M	R2AA13050DCH00M	p. 30	p. 39
1.2 kW	130 mm sq.	IP65	No	No	R2AA13120BXP00	R2AA13120BXH00	p. 30	p. 39
				Yes	R2AA13120BXP00M	R2AA13120BXH00M	p. 30	p. 39
			Yes (24 V DC)	No	R2AA13120BCP00	R2AA13120BCH00	p. 30	p. 39
				Yes	R2AA13120BCP00M	R2AA13120BCH00M	p. 30	p. 39
			No	No	R2AA13120LXP00	R2AA13120LXH00	p. 31	p. 39
				Yes	R2AA13120LXP00M	R2AA13120LXH00M	p. 31	p. 39
			Yes (24 V DC)	No	R2AA13120LCP00	R2AA13120LCH00	p. 31	p. 39
				Yes	R2AA13120LCP00M	R2AA13120LCH00M	p. 31	p. 39
			No	No	R2AA13120DXP00	R2AA13120DXH00	p. 32	p. 39
				Yes	R2AA13120DXP00M	R2AA13120DXH00M	p. 32	p. 39
			Yes (24 V DC)	No	R2AA13120DCP00	R2AA13120DCH00	p. 32	p. 39
				Yes	R2AA13120DCP00M	R2AA13120DCH00M	p. 32	p. 39
1.8 kW	130 mm sq.	IP65	No	No	R2AA13180HXP00	R2AA13180HXH00	p. 32	p. 39
				Yes	R2AA13180HXP00M	R2AA13180HXH00M	p. 32	p. 39
			Yes (24 V DC)	No	R2AA13180HCP00	R2AA13180HCH00	p. 32	p. 39
				Yes	R2AA13180HCP00M	R2AA13180HCH00M	p. 32	p. 39
2.0 kW	130 mm sq.	IP65	No	No	R2AA13200LXP00	R2AA13200LXH00	p. 32	p. 39
				Yes	R2AA13200LXP00M	R2AA13200LXH00M	p. 32	p. 39
			Yes (24 V DC)	No	R2AA13200LCP00	R2AA13200LCH00	p. 32	p. 39
				Yes	R2AA13200LCP00M	R2AA13200LCH00M	p. 32	p. 39

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

Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram
Servo Motor Dimensions

Options

Selection Guide

Input voltage 200 V AC

R5 Servo Motor Small Capacity, Medium Inertia

Standard specifications Output shaft: straight, oil seal: none, connection: cable

Motor flange size	Rated output	Protection code	Holding brake	CE and UL approved	Cable terminal specifications*	Model no.		Page	
						Battery-backup method absolute encoder (PA035C)	Absolute encoder for incremental systems (PA035S)	Specifications	Dimensions
60 mm sq.	200 W	IP67	No	No	Without connector	R5AA06020HXP00	R5AA06020HXH00	p. 33	p. 38
				No	With connector	R5AA06020HXP0A0	No	p. 33	p. 38
				Yes	Without connector	R5AA06020HXP00M	R5AA06020HXH00M	p. 33	p. 38
			Yes (24 V DC)	No	Without connector	R5AA06020HCP00	R5AA06020HCH00	p. 33	p. 38
				No	With connector	R5AA06020HCP0A0	No	p. 33	p. 38
				Yes	Without connector	R5AA06020HCP00M	R5AA06020HCH00M	p. 33	p. 38
			IP65	No	Without connector	R5AA06020HXP03	R5AA06020HXH03	p. 33	p. 38
				Yes	Without connector	R5AA06020HXP03M	R5AA06020HXH03M	p. 33	p. 38
		IP67	Yes (24 V DC)	No	Without connector	R5AA06020HCP03	R5AA06020HCH03	p. 33	p. 38
				Yes	Without connector	R5AA06020HCP03M	R5AA06020HCH03M	p. 33	p. 38
				No	Without connector	R5AA06020FXP00	R5AA06020FXH00	p. 34	p. 38
			Yes (24 V DC)	Yes	Without connector	R5AA06020FXP00M	R5AA06020FXH00M	p. 34	p. 38
				No	Without connector	R5AA06020FCP00	R5AA06020FCH00	p. 34	p. 38
				Yes	Without connector	R5AA06020FCP00M	R5AA06020FCH00M	p. 34	p. 38
		IP65	No	No	Without connector	R5AA06020FXP03	R5AA06020FXH03	p. 34	p. 38
				Yes	Without connector	R5AA06020FXP03M	R5AA06020FXH03M	p. 34	p. 38
				No	Without connector	R5AA06020FCP03	R5AA06020FCH03	p. 34	p. 38
			Yes (24 V DC)	No	Without connector	R5AA06020FCP03M	R5AA06020FCH03M	p. 34	p. 38
				Yes	Without connector	R5AA06040HXP00	R5AA06040HXH00	p. 33	p. 38
				No	With connector	R5AA06040HXP0A0	No	p. 33	p. 38
60 mm sq.	400 W	IP67	No	Yes	Without connector	R5AA06040HXP00M	R5AA06040HXH00M	p. 33	p. 38
				No	Without connector	R5AA06040HCP00*	R5AA06040HCH00*	p. 33	p. 38
				Yes	Without connector	R5AA06040HCP00M*	R5AA06040HCH00M*	p. 33	p. 38
			Yes (24 V DC)	No	Without connector	R5AA06040HXP03	R5AA06040HXH03	p. 33	p. 38
				Yes	Without connector	R5AA06040HXP03M	R5AA06040HXH03M	p. 33	p. 38
				No	Without connector	R5AA06040HCP03*	R5AA06040HCH03*	p. 33	p. 38
				Yes	Without connector	R5AA06040HCP03M*	R5AA06040HCH03M*	p. 33	p. 38
		IP65	No	No	Without connector	R5AA06040FXP00	R5AA06040FXH00	p. 34	p. 38
				Yes	Without connector	R5AA06040FXP00M	R5AA06040FXH00M	p. 34	p. 38
				No	Without connector	R5AA06040FCP00*	R5AA06040FCH00*	p. 34	p. 38
			Yes (24 V DC)	Yes	Without connector	R5AA06040FCP00M*	R5AA06040FCH00M*	p. 34	p. 38
				No	Without connector	R5AA06040FXP03	R5AA06040FXH03	p. 34	p. 38
				Yes	Without connector	R5AA06040FXP03M	R5AA06040FXH03M	p. 34	p. 38
		IP67	Yes (24 V DC)	No	Without connector	R5AA06040FCP03*	R5AA06040FCH03*	p. 34	p. 38
				Yes	Without connector	R5AA06040FCP03M*	R5AA06040FCH03M*	p. 34	p. 38
				No	Without connector	R5AA06040FXP00	R5AA06040FXH00	p. 34	p. 38
			Yes (24 V DC)	Yes	Without connector	R5AA06040FXP00M	R5AA06040FXH00M	p. 34	p. 38
				No	Without connector	R5AA06040FCP00*	R5AA06040FCH00*	p. 34	p. 38
				Yes	Without connector	R5AA06040FCP00M*	R5AA06040FCH00M*	p. 34	p. 38
80 mm sq.	750 W	IP67	No	No	Without connector	R5AA08075DXP00	R5AA08075DXH00	p. 33	p. 38
				No	With connector	R5AA08075DXPA0	No	p. 33	p. 38
				Yes	Without connector	R5AA08075DXP00M	R5AA08075DXH00M	p. 33	p. 38
			Yes (24 V DC)	No	Without connector	R5AA08075DCP00*	R5AA08075DCH00*	p. 33	p. 38
				No	With connector	R5AA08075DCPA0*	No	p. 33	p. 38
				Yes	Without connector	R5AA08075DCP00M*	R5AA08075DCH00M*	p. 33	p. 38
		IP65	No	No	Without connector	R5AA08075DXP03	R5AA08075DXH03	p. 33	p. 38
				Yes	Without connector	R5AA08075DXP03M	R5AA08075DXH03M	p. 33	p. 38
				No	Without connector	R5AA08075DCP03*	R5AA08075DCH03*	p. 33	p. 38
			Yes (24 V DC)	Yes	Without connector	R5AA08075DCP03M*	R5AA08075DCH03M*	p. 33	p. 38
				No	Without connector	R5AA08075FXP00	R5AA08075FXH00	p. 34	p. 38
				Yes	Without connector	R5AA08075FXP00M	R5AA08075FXH00M	p. 34	p. 38
		IP67	Yes (24 V DC)	No	Without connector	R5AA08075FCP00*	R5AA08075FCH00*	p. 34	p. 38
				Yes	Without connector	R5AA08075FCP00M*	R5AA08075FCH00M*	p. 34	p. 38
				No	Without connector	R5AA08075FXP03	R5AA08075FXH03	p. 34	p. 38
			Yes (24 V DC)	Yes	Without connector	R5AA08075FXP03M	R5AA08075FXH03M	p. 34	p. 38
				No	Without connector	R5AA08075FCP03*	R5AA08075FCH03*	p. 34	p. 38
				Yes	Without connector	R5AA08075FCP03M*	R5AA08075FCH03M*	p. 34	p. 38

* Connectors are to be connected with an extension cable (see p. 45). Cable length for motors with connectors is 200 ± 30 mm.

Reduce the output for the model numbers indicated by "#". The reduced output will be between 90 to 95% of the rated output shown in the table.

Servo motors that come with oil seals (optional) may require reduction in output. Contact us for details.

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	Amplifier capacity	Model no.	Page	
									Specifications	Dimensions
Analog/Pulse input type	200 V AC system 200 to 240 V AC 3-phase	200 V AC system 200 to 240 V AC Single-phase	Serial encoder	Sink	No	No	10 A	RS3A01A0AL0	p. 21	p. 23
							20 A	RS3A02A0AL0	p. 21	p. 23
							30 A	RS3A03A0AL0	p. 21	p. 24
							50 A	RS3A05A0AL0	p. 21	p. 24
					Yes	Yes	10 A	RS3A01A0AL2	p. 21	p. 23
							20 A	RS3A02A0AL2	p. 21	p. 23
							30 A	RS3A03A0AL2	p. 21	p. 24
							50 A	RS3A05A0AL2	p. 21	p. 24
				Source	Yes	No	10 A	RS3A01A0AA0	p. 21	p. 23
							20 A	RS3A02A0AA0	p. 21	p. 23
							30 A	RS3A03A0AA0	p. 21	p. 24
							50 A	RS3A05A0AA0	p. 21	p. 24
					Yes	Yes	10 A	RS3A01A0AA2	p. 21	p. 23
							20 A	RS3A02A0AA2	p. 21	p. 23
							30 A	RS3A03A0AA2	p. 21	p. 24
							50 A	RS3A05A0AA2	p. 21	p. 24
				Yes	No	No	10 A	RS3A01A0BL0	p. 21	p. 23
							20 A	RS3A02A0BL0	p. 21	p. 23
							30 A	RS3A03A0BL0	p. 21	p. 24
							50 A	RS3A05A0BL0	p. 21	p. 24
					Yes	Yes	10 A	RS3A01A0BL2	p. 21	p. 23
							20 A	RS3A02A0BL2	p. 21	p. 23
							30 A	RS3A03A0BL2	p. 21	p. 24
							50 A	RS3A05A0BL2	p. 21	p. 24
					Yes	Yes	10 A	RS3A01A0BA0	p. 21	p. 23
							20 A	RS3A02A0BA0	p. 21	p. 23
							30 A	RS3A03A0BA0	p. 21	p. 24
							50 A	RS3A05A0BA0	p. 21	p. 24
					Yes	Yes	10 A	RS3A01A0BA2	p. 21	p. 23
							20 A	RS3A02A0BA2	p. 21	p. 23
							30 A	RS3A03A0BA2	p. 21	p. 24
							50 A	RS3A05A0BA2	p. 21	p. 24

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

Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications
Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram
Servo Motor Dimensions

Options

Selection Guide

Input voltage 200 V AC

Set Model

We offer 30 to 750 W servo motors and servo amplifiers in sets with connectors.

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.

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.

Motor flange size	Rated output	Holding brake	Ordered model no. ser model	Set components						
				Motor model no.	Page		Amplifier model no.	Page		Connector
					Specifications	Dimensions		Specifications	Dimensions	
40 mm sq.	30 W	No	SR403X01	R2AA04003FXPA0	p. 27	p. 38, 47	RS3A01A0AA0	p. 21	p. 23	Connector for connections with host devices (CN1)
		Yes (24 V DC)	SR403C01	R2AA04003FCPA0	p. 27	p. 38, 47				
	50 W	No	SR405X01	R2AA04005FXPA0	p. 27	p. 38, 47				
		Yes (24 V DC)	SR405C01	R2AA04005FCPA0	p. 27	p. 38, 47				
	100 W	No	SR410X01	R2AA04010FXPA0	p. 27	p. 38, 47				
60 mm sq.	90 W	Yes (24 V DC)	SR410C01	R2AA04010FCPA0	p. 27	p. 38, 47				
		No	SR610X01	R2AA06010FXPA0	p. 27	p. 38, 47	RS3A02A0AA0	p. 21	p. 23	Connector for input power, regenerative resistor connections (CNA)
	100 W	Yes (24 V DC)	SR610C01	R2AA06010FCPA0	p. 27	p. 38, 47				
		No	SR620X02	R2AA06020FXPA0	p. 28	p. 38, 47				
	200 W	Yes (24 V DC)	SR620C02	R2AA06020FCPA0	p. 28	p. 38, 47				
80 mm sq.	400 W	No	SR640X02	R2AA06040FXPA0	p. 28	p. 38, 47				
		Yes (24 V DC)	SR640C02	R2AA06040FCPA0	p. 28	p. 38, 47				
	360 W	No	SR875X03	R2AA08075FXPA0	p. 29	p. 38, 47	RS3A03A0AA0	p. 21	p. 24	
		Yes (24 V DC)	SR875C03	R2AA08075FCPA0	p. 29	p. 38, 47				

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

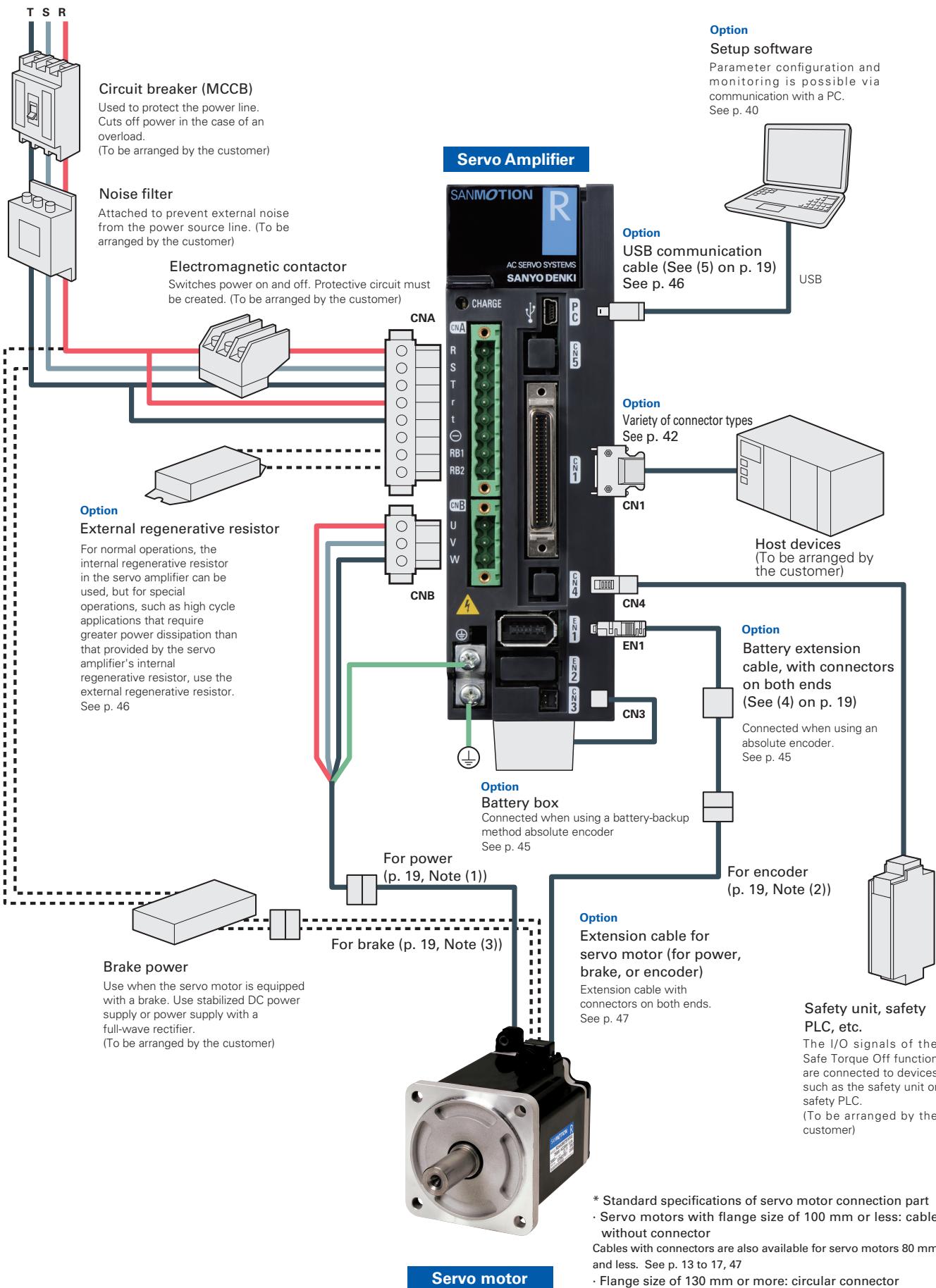
Available Options These items will be shipped together when purchased with a Set Model.

Type	Cable length (m)	Model no.	Page
Servo motor extension cable (Amplifier ⇌ Motor)	(1) For power	1	RS-CM4-01-R
		2	RS-CM4-02-R
		3	RS-CM4-03-R
		5	RS-CM4-05-R
		10	RS-CM4-10-R
	(2) For encoder	1	RS-CA4-01-R
		2	RS-CA4-02-R
		3	RS-CA4-03-R
		5	RS-CA4-05-R
		10	RS-CA4-10-R
	(3) For brake	1	RS-CB3-01-R
		2	RS-CB3-02-R
		3	RS-CB3-03-R
		5	RS-CB3-05-R
		10	RS-CB3-10-R
(4) Encoder extension cable with battery (Encoder ⇌ Servo amplifier) For connection when using an absolute encoder.	0.3	AL-00731792-01	p. 45
(5) USB communication cable (cable for communication with PC for setup software)	1	AL-00896515-01	p. 46
	2	AL-00896515-02	p. 46

System Configuration

Analog/Pulse Input Type Servo Amplifier

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



Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

Options

Selection Guide

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	*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.
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 Storage temperature Operation/Storage humidity Elevation Vibration Shock	0 to +55°C -20 to +65°C Below 90%RH (no condensation) Below 1000 m 4.9 m/s ² freq. range 10 to 55 Hz tested for 2 hours in each X, Y and Z-axis directions 19.6 m/s ²
Structure	Built-in tray type power supply	



Performance

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

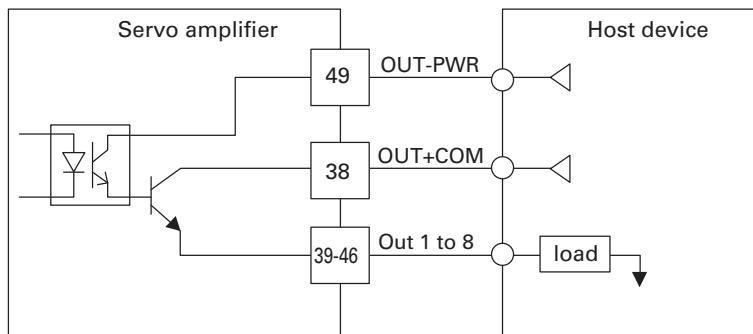
Built-in functions

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 process circuit	Built-in
Monitor	Speed monitor (VMON) 2.0 V±10% (at 1000 min ⁻¹) Torque command monitor (TCMON) 2.0 V±10% (at 100%)

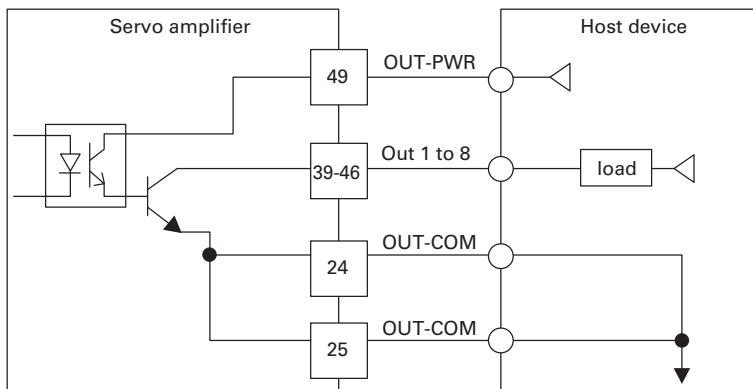
Safety standard

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 • IEC62061, SILCL3	• ISO13849-1, Cat.3, PL=e

Source (PNP output)



Sink (NPN output)



Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier +
Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

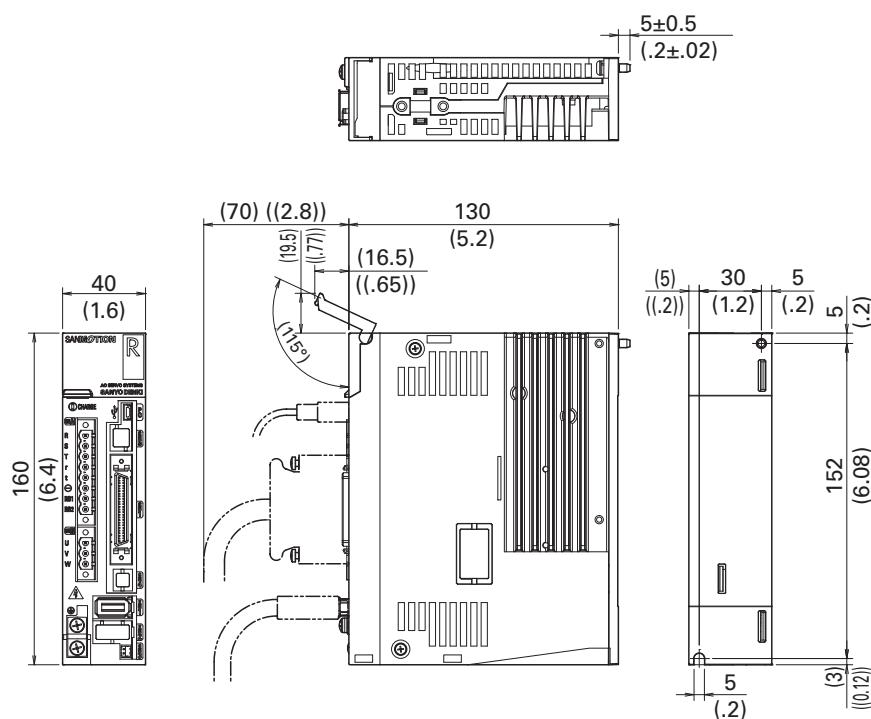
Options

Selection Guide

Servo Amplifier Dimensions [Unit : mm (inch)]

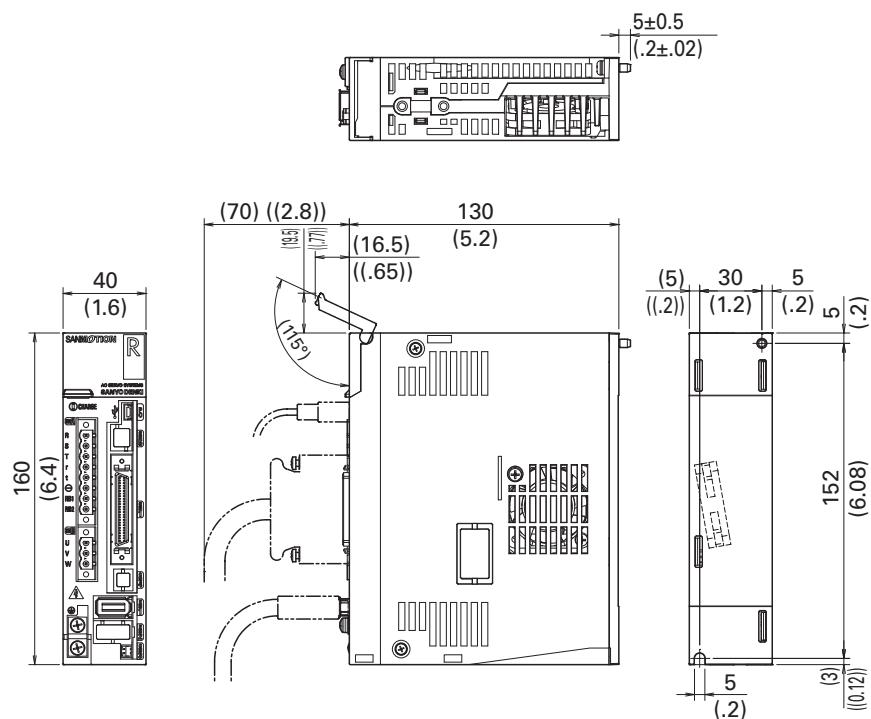
10 A

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



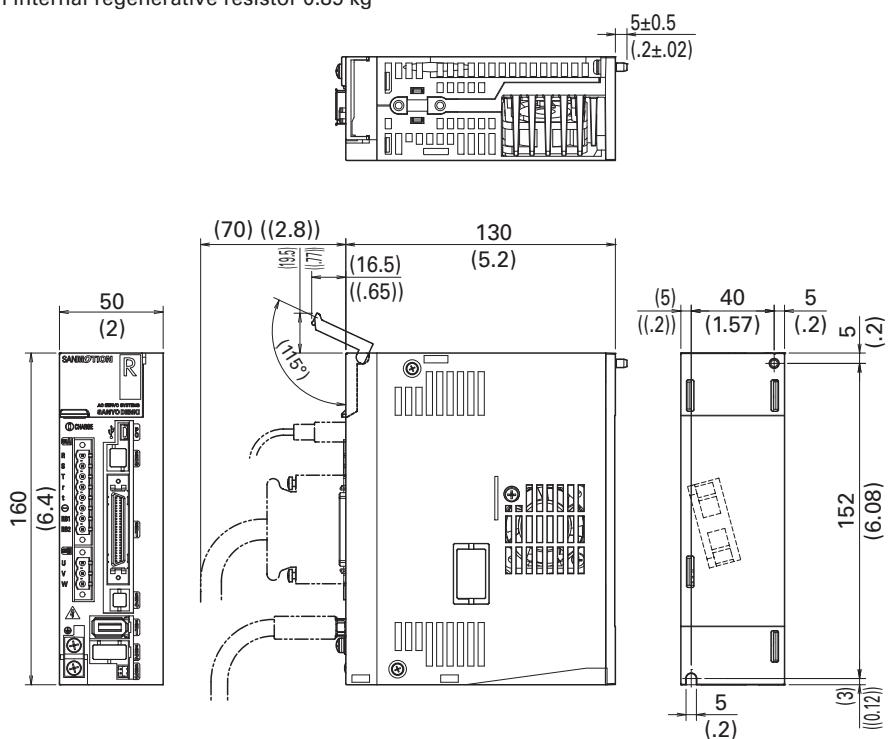
20 A

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



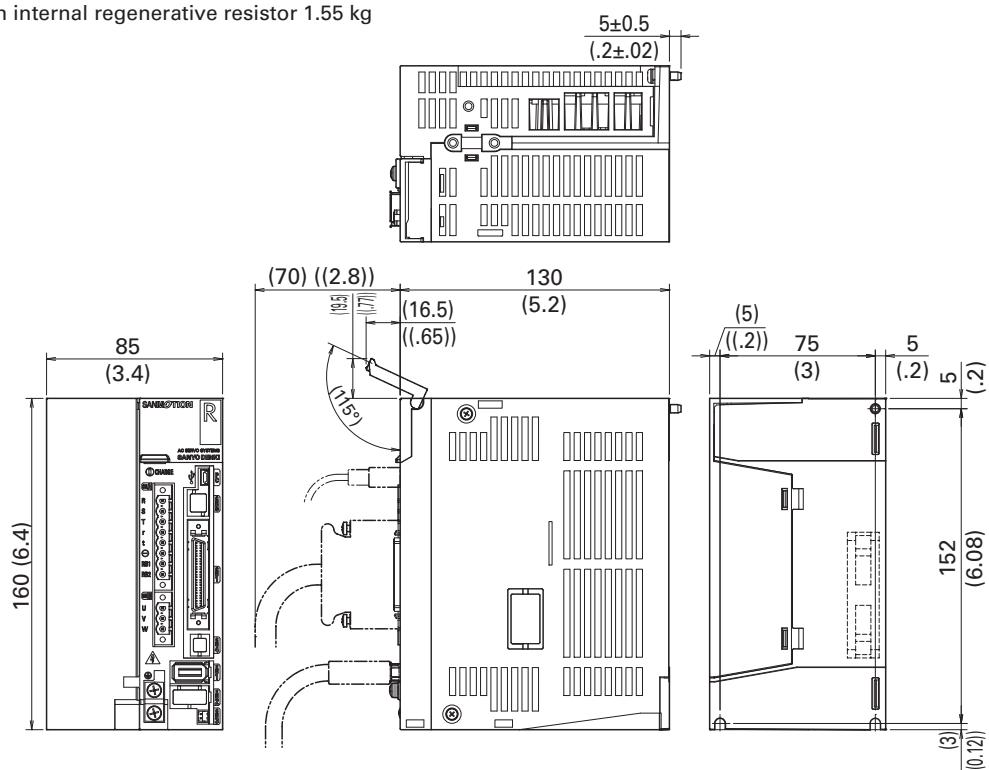
30 A

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



50 A

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



Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier+
Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

Options

Selection Guide

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}
Rated Speed	★	N _R	min ⁻¹	3000	3000
Maximum Speed	★	N _{max}	min ⁻¹	6000	6000
Rated Torque	★	T _R	N·m	0.098	0.159
Continuous Stall Torque	★	T _s	N·m	0.108	0.167
Peak Stall Torque	★	T _p	N·m	0.37	0.59
Rated Armature Current	★	I _R	Arms	0.94	1.2
Armature Stall Current	★	I _s	Arms	1.0	1.3
Peak Armature Stall Current	★	I _p	Arms	3.7	4.9
Torque Constant	☆	K _T	N·m/Arms	0.116	0.142
Voltage Constant for each Phase	☆	K _E φ	mV/min ⁻¹	4.04	4.97
Phase Resistance	☆	R φ	Ω	4.0	3.0
Rated Power Rate	★	Q _R	kW/s	3.9	6.7
Electrical Time Constant	☆	t _e	ms	0.55	0.67
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	2.2	1.7
Rotor Inertia *1		J _M	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0247	0.0376
Absolute Encoder Inertia		J _S	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0033*1	
Servo Motor Mass *1		WE	kg	0.35	0.39
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	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0078	
Brake Mass		W	kg	0.27	0.27
Servo Motor Operating Temp, Rel.Humidity				Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.	
Servo amplifier power supply capacity (rating)			kVA	0.2	0.2
CE and UL approved servo motors *5				Yes	
Servo motor protection code				IP67, IP65	
Size of aluminum plates for heat radiation during measurement				250 × 250 × 6 mm	
External Wiring Diagram				p. 36	

*1 This is for the battery-backup method absolute encoder [PA035C].

For the following encoders, contact us for details.

- Battery-less absolute encoder

- Wire-saving incremental encoder

For the servo amplifier mass, see pp. 23 and 24.

*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.

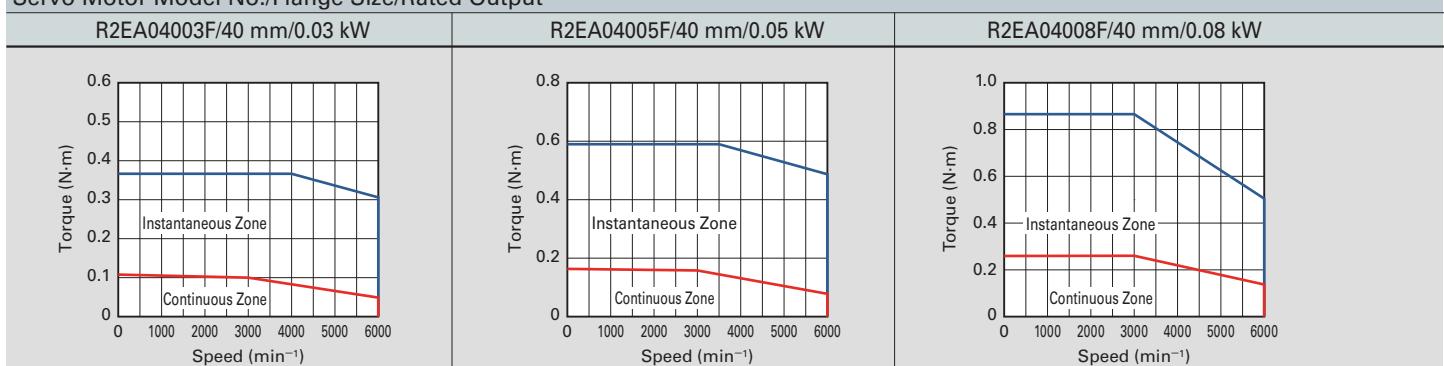
*3 ☆ : Indicates a typical value when the winding temperature is 20°C . The values are the typical values.

*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

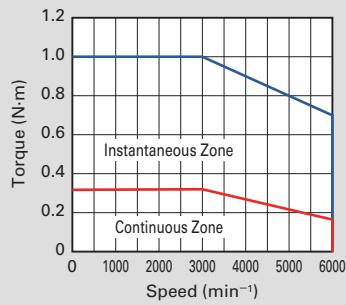
Servo Motor Model No./Flange Size/Rated Output



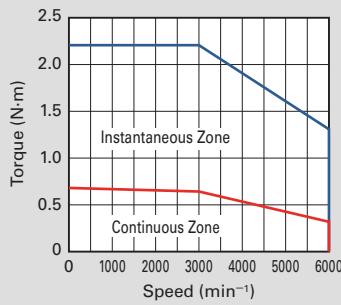
These values are for when the input power supply is 100 V AC. The area of the instantaneous zone decreases when the power supply voltage is less than 100 V AC.

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	x10 ⁻⁴ kg·m ² (GD ² /4)	J _M	Rotor Inertia *1
0.0033*1		x10 ⁻⁴ kg·m ² (GD ² /4)	J _S	Absolute Encoder Inertia
0.71	0.96	kg	WE	Servo Motor Mass *1
0.36 Min.	1.37 Min.	N·m	TB	Brake Static Friction Torque
90 V DC/24 V DC±10%		V	VB	Brake Rated Voltage
0.07/0.27	0.11/0.32	A	IB	Brake Rated Current
0.06		x10 ⁻⁴ kg·m ² (GD ² /4)	JB	Rotor Moment of Inertia (Brake)
0.34	0.39	kg	W	Brake Mass
Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.				Servo Motor Operating Temp, Rel.Humidity
0.5	0.6	kVA		Servo amplifier power supply capacity (rating)
Yes				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. 36				External Wiring Diagram

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(0.09) ^{*4}
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	0.318
Continuous Stall Torque	★	T _s	N·m	0.108	0.167	0.318
Peak Stall Torque	★	T _p	N·m	0.37	0.59	1.18
Rated Armature Current	★	I _R	Arms	0.51	0.67	0.81
Armature Stall Current	★	I _s	Arms	0.56	0.69	0.81
Peak Armature Stall Current	★	I _p	Arms	2.15	2.8	3.3
Torque Constant	☆	K _T	N·m/Arms	0.201	0.246	0.424
Voltage Constant for each Phase	☆	K _E φ	mV/min ⁻¹	7.0	8.6	14.8
Phase Resistance	☆	R φ	Ω	12	9	9.3
Rated Power Rate	★	Q _R	kW/s	3.9	6.7	16
Electrical Time Constant	☆	t _e	ms	0.55	0.67	0.82
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	2.2	1.7	0.97
Rotor Inertia *1		J _M	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0247	0.0376	0.0627
Absolute Encoder Inertia		J _s	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0033 ^{*1}		
Servo Motor Mass *1		WE	kg	0.35	0.39	0.51
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	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0078		0.06
Brake Mass		W	kg	0.27	0.27	0.27
Servo Motor Operating Temp, Rel.Humidity				Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.		
Servo amplifier power supply capacity (rating)			kVA	0.2	0.2	0.3
CE and UL approved servo motors *5				Yes		
Servo motor protection code				IP67, IP65		
Size of aluminum plates for heat radiation during measurement				250 × 250 × 6 mm		
External Wiring Diagram				p. 36		

*1 This is for the battery-backup method absolute encoder [PA035C].

For the following encoders, contact us for details.

- Battery-less absolute encoder • Wire-saving incremental encoder
- For the servo amplifier weight, see pp. 23 and 24.

*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.

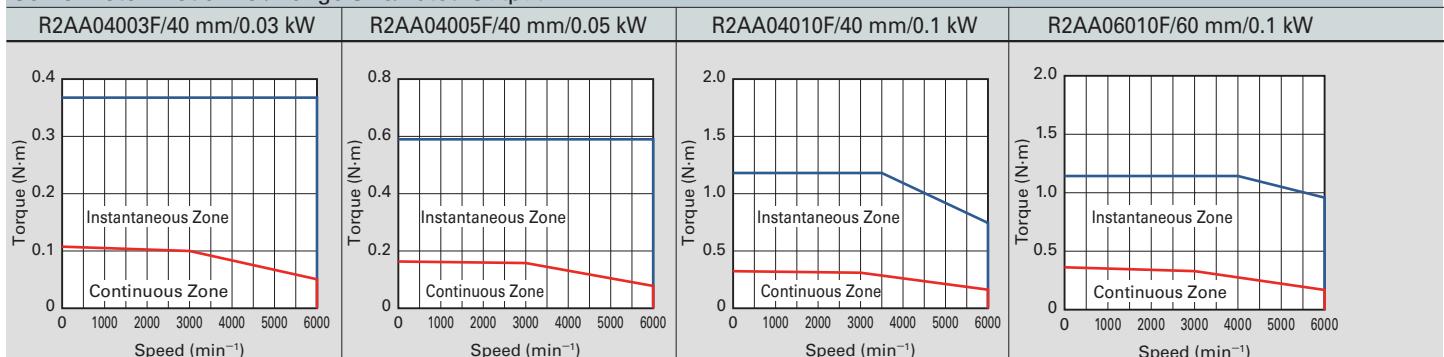
*3 ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.

*4 If enclosed in (), it comes with brake. Servo motors that come with oil seals (optional) 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



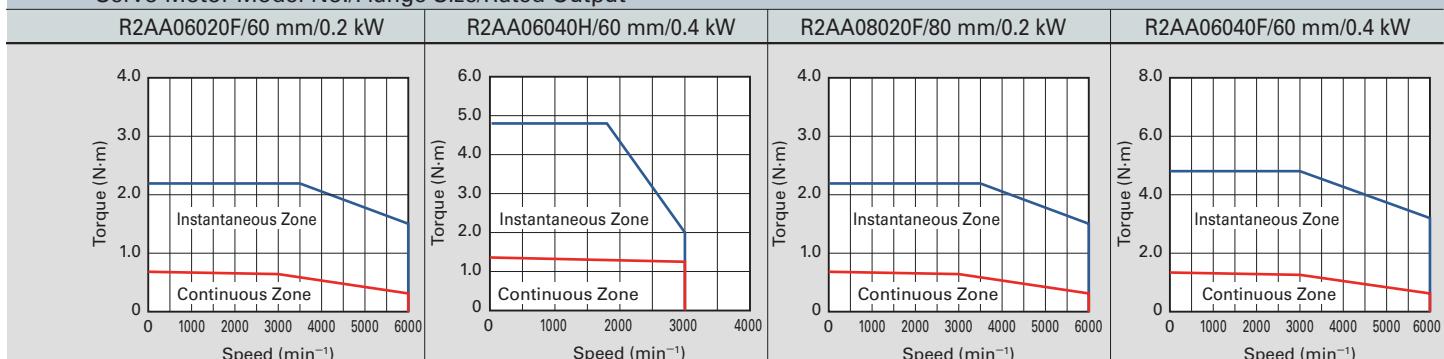
These values are for when the input power supply is a 3-phase 200 V AC circuit. The area of the instantaneous zone decreases when the power supply voltage is less than 200 V. Contact us if the servo amp. power supply is a single-phase 200 V AC circuit.

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 _E φ	★ 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 *1
0.0033 ^{*1}				x10 ⁻⁴ kg·m ² (GD ² /4)	J _s	Absolute Encoder Inertia
0.96	1.4	1.3	1.4	kg	WE	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
Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.						Servo Motor Operating Temp, Rel.Humidity
0.6	1.0	0.6	1.0	kVA		Servo amplifier power supply capacity (rating)
Yes						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. 36						External Wiring Diagram

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 _E φ	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 *1		J _M	x10 ⁻⁴ kg·m ² (GD ² /4)	1.04	1.82	2.38	2.00
Absolute Encoder Inertia		J _s	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0033*1			
Servo Motor Mass*1		WE	kg	1.7	2.7	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	x10 ⁻⁴ kg·m ² (GD ² /4)	0.25		0.343	
Brake Mass		W	kg	0.89	0.89	0.84	0.9
Servo Motor Operating Temp, Rel.Humidity				Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.			
Servo amplifier power supply capacity (rating)			kVA	1.0	1.6	2.0	1.7
CE and UL approved servo motors *5				Yes			
Servo motor protection code				IP67, IP65			
Size of aluminum plates for heat radiation during measurement				250 × 250 × 6 mm		305 × 305 × 12 mm	
External Wiring Diagram				p. 36			

*1 This is for the battery-backup method absolute encoder [PA035C]. For the following encoders, contact us for details.

- Battery-less absolute encoder
- Wire-saving incremental encoder

For the servo amplifier weight, see pp. 23 and 24.

*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.

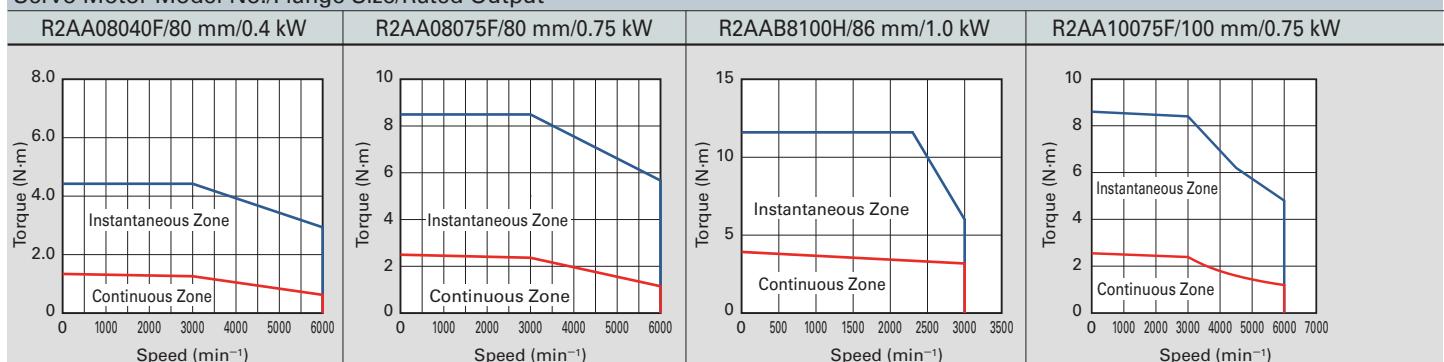
*3 ☆ : Indicates a typical value when the winding temperature is 20°C. The values are the typical values.

*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 power supply is a 3-phase 200 V AC circuit. The area of the instantaneous zone decreases when the power supply voltage is less than 200 V. Contact us if the servo amp. power supply is a single-phase 200 V AC circuit.

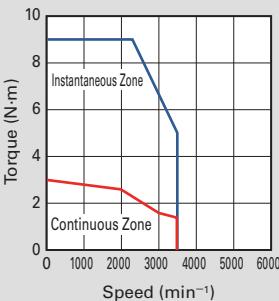
RS3A03□□ □(30 A)

Servo Amplifier Model No. □ indicates amplifier capacity

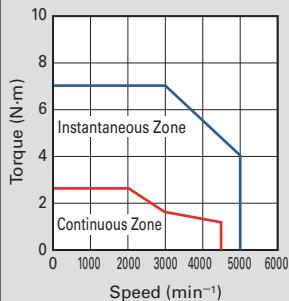
R2AA13050H 《130 mm sq.》	R2AA13050D 《130 mm sq.》	R2AA13120B 《130 mm sq.》	Servo Motor Model No. □ indicates flange size		
			Unit	Symbol	Status
0.55	0.55	1.2	kW	P _R	★ Rated Output
2000	2000	2000	min ⁻¹	N _R	★ Rated Speed
3500	5000	2000	min ⁻¹	N _{max}	★ Maximum Speed
2.6	2.6	5.7	N·m	T _R	★ Rated Torque
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 _{E φ}	☆ 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	x10 ⁻⁴ kg·m ² (GD ² /4)	J _M	Rotor Inertia *1
0.0033*1			x10 ⁻⁴ kg·m ² (GD ² /4)	J _S	Absolute Encoder Inertia
4.5	4.5	6.1	kg	WE	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	x10 ⁻⁴ kg·m ² (GD ² /4)	J _B	Rotor Moment of Inertia (Brake)
1.3	1.3	1.5	kg	W	Brake Mass
Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation					Servo Motor Operating Temp, Rel.Humidity
1.2	1.2	2.2	kVA		Servo amplifier power supply capacity (rating)
Yes					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. 37					External Wiring Diagram

Servo Motor Model No./Flange Size/Rated Output

R2AA13050H/130 mm/0.55 kW



R2AA13050D/130 mm/0.55 kW



R2AA13120B/130 mm/1.2 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			RS3A05□□ 50 A			
Servo Motor Model No. 《 》 indicates flange size			R2AAB807F 《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
Rated Speed	★	N _R	min ⁻¹	3000	3000	3000
Maximum Speed	★	N _{max}	min ⁻¹	6000	6000	6000
Rated Torque	★	T _R	N·m	2.38	3.18	3.18
Continuous Stall Torque	★	T _S	N·m	2.94	3.92	3.92
Peak Stall Torque	★	T _P	N·m	11.0	14.3	14.3
Rated Armature Current	★	I _R	Arms	4.7	6.0	5.7
Armature Stall Current	★	I _S	Arms	5.5	6.8	6.8
Peak Armature Stall Current	★	I _P	Arms	23.7	25.7	25.7
Torque Constant	☆	K _T	N·m/Arms	0.547	0.582	0.584
Voltage Constant for each Phase	☆	K _E φ	mV/min ⁻¹	19.1	20.3	20.4
Phase Resistance	☆	R φ	Ω	0.62	0.44	0.35
Rated Power Rate	★	Q _R	kW/s	35	42	29
Electrical Time Constant	☆	t _E	ms	4.2	4.3	8.3
Mechanical Time Constant (Not including Encoder)	☆	t _M	ms	1.00	0.93	1.1
Rotor Inertia *1		J _M	x10 ⁻⁴ kg·m ² (GD ² /4)	1.64	2.38	3.50
Absolute Encoder Inertia		J _S	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0033*1		
Servo Motor Mass*1		WE	kg	2.9	3.6	4.1
Brake Static Friction Torque		T _B	N·m	3.92 Min.	3.92 Min.	3.92 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
Rotor Moment of Inertia (Brake)		J _B	x10 ⁻⁴ kg·m ² (GD ² /4)	0.34	0.34	0.343
Brake Mass		W	kg	0.84	0.84	0.9
Servo Motor Operating Temp, Rel.Humidity				Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.		
Servo amplifier power supply capacity (rating)			kVA	1.6	2.3	2.3
CE and UL approved servo motors *4				Yes		
Servo motor protection code				IP67, IP65		IP65
Size of aluminum plates for heat radiation during measurement				305 × 305 × 12 mm		400 × 400 × 20 mm
External Wiring Diagram				p. 36		p. 37

*1 This is for the battery-backup method absolute encoder [PA035C].

For the following encoders, contact us for details.

- Battery-less absolute encoder

- Wire-saving incremental encoder

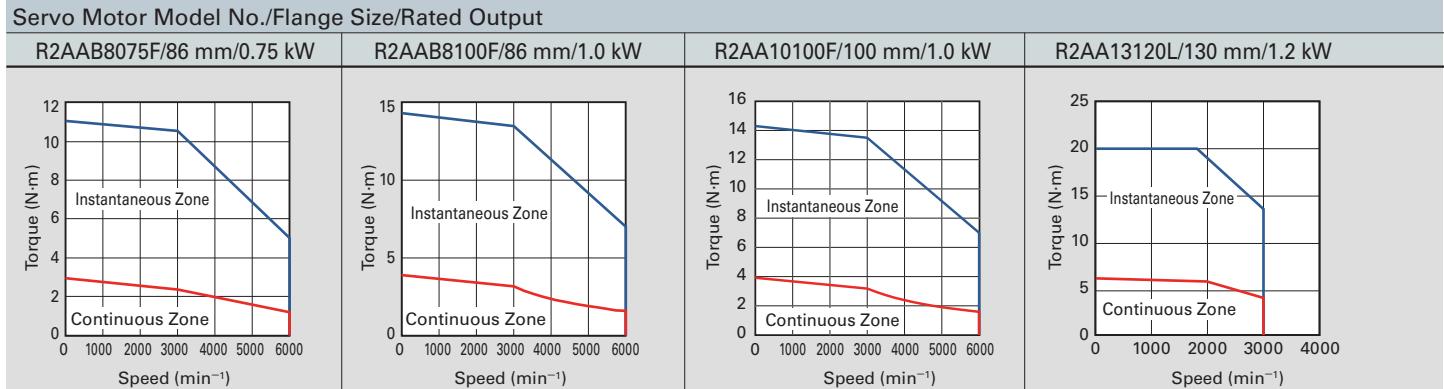
For the servo amplifier weight, see pp. 23 and 24.

*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



These values are for when the input power supply is a 3-phase 200 V AC circuit. The area of the instantaneous zone decreases when the power supply voltage is less than 200 V. Contact us if the servo amp. power supply is a single-phase 200 V AC circuit.

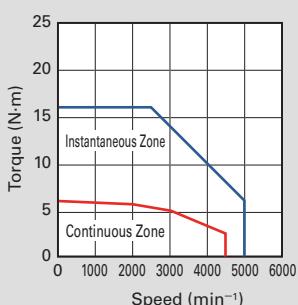
RS3A05□□ (50 A)

Servo Amplifier Model No. () indicates amplifier capacity

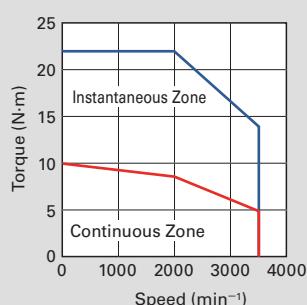
R2AA13120D 《130 mm sq.》	R2AA13180H 《130 mm sq.》	R2AA13200L 《130 mm sq.》	Servo Motor Model No. () indicates flange size		
			Unit	Symbol	Status
1.2	1.8	2	kW	P _R	★ Rated Output
2000	2000	2000	min ⁻¹	N _R	★ Rated Speed
5000	3500	3000	min ⁻¹	N _{max}	★ Maximum Speed
5.7	8.6	9.5	N·m	T _R	★ Rated Torque
6.0	10.0	12	N·m	T _S	Continuous Stall Torque
16	22	24	N·m	T _P	Peak Stall Torque
9.1	11.0	11.0	Arms	I _R	★ Rated Armature Current
9.3	11.8	12.0	Arms	I _S	Armature Stall Current
25.4	26.5	26.5	Arms	I _P	Peak Armature Stall Current
0.65	0.89	0.97	N·m/Arms	K _T	★ Torque Constant
22.7	31.1	33.7	mV/min ⁻¹	K _E φ	★ Voltage Constant for each Phase
0.23	0.23	0.22	Ω	R φ	★ Phase Resistance
54	82	74	kW/s	Q _R	★ Rated Power Rate
16	18	17	ms	t _e	★ Electrical Time Constant
0.98	0.78	0.86	ms	t _m	★ Mechanical Time Constant (Not including Encoder)
6.0	9.0	12.2	x10 ⁻⁴ kg·m ² (GD ² /4)	J _M	Rotor Inertia *1
0.0033*1			x10 ⁻⁴ kg·m ² (GD ² /4)	J _S	Absolute Encoder Inertia
6.1	7.7	10	kg	WE	Servo Motor Mass *1
9.0 Min.	9.0 Min.	12 Min.	N·m	T _B	Brake Static Friction Torque
90 V DC/24 V DC±10%			V	VB	Brake Rated Voltage
0.17/0.51	0.17/0.51	0.17/0.66	A	IB	Brake Rated Current
0.5	0.5	0.5	x10 ⁻⁴ kg·m ² (GD ² /4)	J _B	Rotor Moment of Inertia (Brake)
1.5	1.5	1.5	kg	W	Brake Mass
Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.					Servo Motor Operating Temp, Rel.Humidity
2.8	3.6	4.0	kVA		Servo amplifier power supply capacity (Rating)
Yes					CE and UL approved servo motors *4
IP65					Servo motor protection code
400 × 400 × 20 mm	470 × 470 × 20 mm				Size of aluminum plates for heat radiation during measurement
p. 37					External Wiring Diagram

Servo Motor Model No./Flange Size/Rated Output

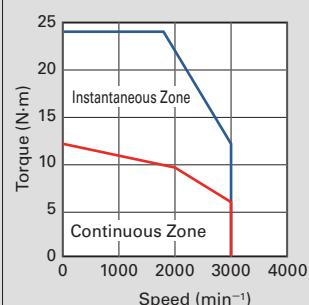
R2AA13120D/130 mm/1.2 kW



R2AA13180H/130 mm/1.8 kW



R2AA13200L/130 mm/2.0 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 ^{*4}
Rated Speed	★	N _R	min ⁻¹	3000	3000
Maximum Speed	★	N _{max}	min ⁻¹	3000	5000
Rated Torque	★	T _R	N·m	0.637	1.27
Continuous Stall Torque	★	T _S	N·m	0.686	1.37
Peak Stall Torque	★	T _P	N·m	2.2	4.8
Rated Armature Current	★	I _R	Arms	1.1	1.8
Armature Stall Current	★	I _S	Arms	1.1	1.8
Peak Armature Stall Current	★	I _P	Arms	4.2	7.0
Torque Constant	☆	K _T	N·m/Arms	0.649	0.836
Voltage Constant for each Phase	☆	K _E φ	mV/min ⁻¹	21.7	27.0
Phase Resistance	☆	R φ	Ω	4.8	3.3
Rated Power Rate	★	Q _R	kW/s	20	39
Electrical Time Constant	☆	t _e	ms	4.3	5.5
Mechanical Time Constant (Not including Encoder)	☆	t _m	ms	0.71	0.63
Rotor Inertia ^{*1}		J _M	x10 ⁻⁴ kg·m ² (GD ² /4)	0.198	0.414
Absolute Encoder Inertia		J _S	x10 ⁻⁴ kg·m ² (GD ² /4)	0.0033 ^{*1}	
Servo Motor Mass ^{*1}		WE	kg	0.96	1.4
Brake Static Friction Torque		T _B	N·m	1.37 Min.	
Brake Rated Voltage		V _B	V	90 V DC/24 V DC±10%	
Brake Rated Current		I _B	A	0.11/0.32	
Rotor Moment of Inertia (Brake)		J _B	x10 ⁻⁴ kg·m ² (GD ² /4)	0.060	0.060
Brake Mass		W	kg	0.39	0.39
Servo Motor Operating Temp, Rel.Humidity				Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.	
Servo amplifier power supply capacity (rating)			kVA	0.6	1.0
CE and UL approved servo motors ^{*5}				Yes	
Servo motor protection code				IP67, IP65	
Size of aluminum plates for heat radiation during measurement				250 × 250 × 6 mm	
External Wiring Diagram				p. 36	

*1 This is for the battery-backup method absolute encoder [PA035C].

For the following encoders, contact us for details.

- Battery-less absolute encoder
- Wire-saving incremental encoder

For the servo amplifier weight, see pp. 23 and 24.

*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.

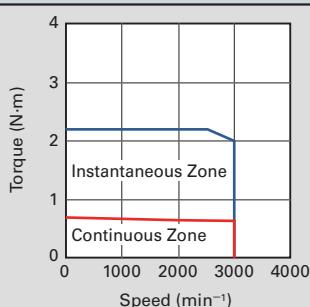
*4 Servo motors that come with oil seals (optional) and with brakes may require an 80 to 95% reduction in output.

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

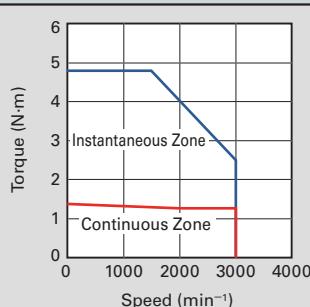
Speed-Torque Characteristics

Servo Motor Model No./Flange Size/Rated Output

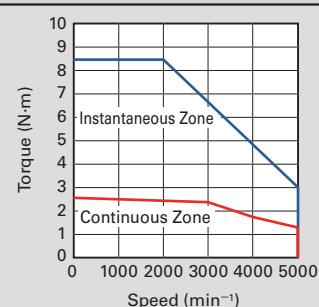
R5AA06020H/60 mm/0.2 kW



R5AA06040H/60 mm/0.4 kW

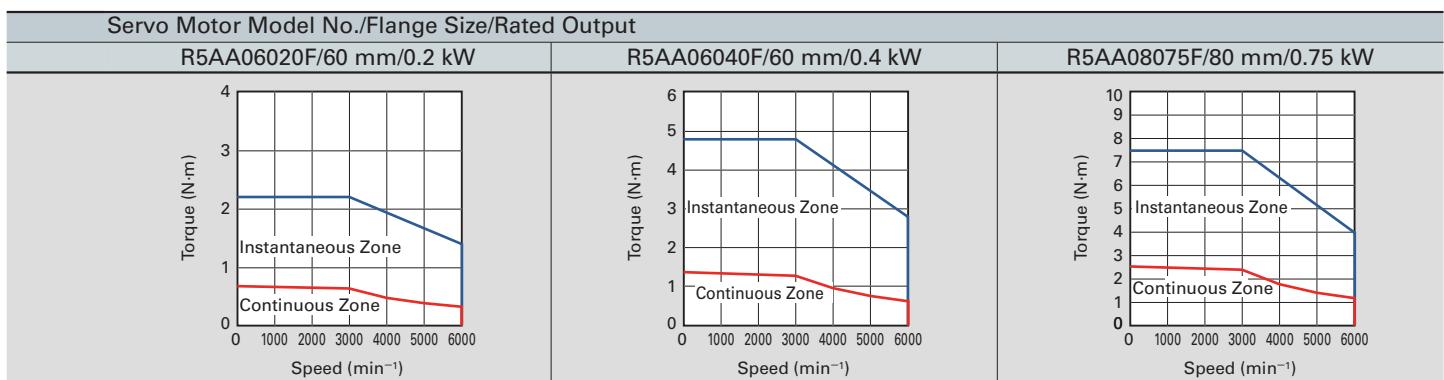


R5AA08075D/80 mm/0.75 kW



These values are for when the input power supply is a 3-phase 200 V AC circuit. The area of the instantaneous zone decreases when the power supply voltage is less than 200 V. Contact us if the servo amp. power supply is a single-phase 200 V AC circuit.

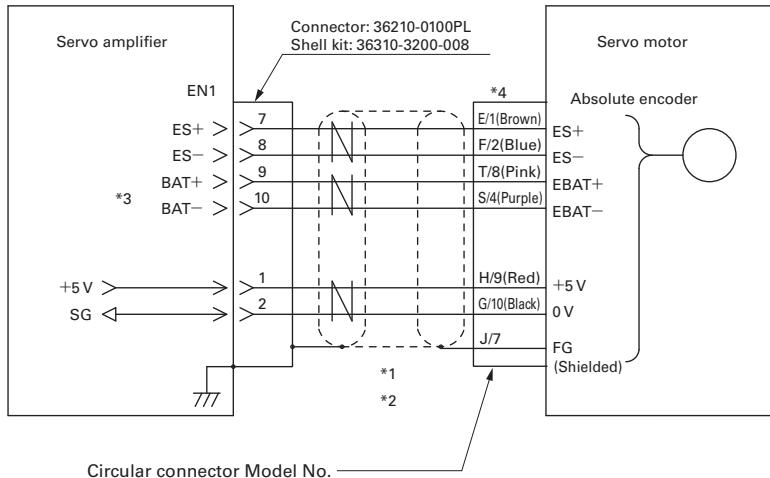
RS3A02□□《20 A》			RS3A03□□《30 A》			Servo Amplifier Model No. 《 》 indicates amplifier capacity			
R5AA06020F 《60 mm sq.》	R5AA06040F 《60 mm sq.》	R5AA08075F 《80 mm sq.》	Servo Motor Model No. 《 》 indicates flange size						
			Unit	Symbol	Status				
0.2	0.4 ^{*4}	0.75 ^{*4}	kW	P _R	★	Rated Output			
3000	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	5.5	12.7	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	x10 ⁻⁴ kg·m ² (GD ² /4)	J _M		Rotor Inertia ^{*1}			
0.0033 ^{*1}			x10 ⁻⁴ kg·m ² (GD ² /4)	J _S		Absolute Encoder Inertia			
0.96	1.4	3.6	kg	WE		Servo Motor Mass ^{*1}			
1.37 Min.		2.55 Min.	N·m	TB		Brake Static Friction Torque			
90 V DC/24 V DC±10%			V	VB		Brake Rated Voltage			
0.11/0.32		0.12/0.37	A	IB		Brake Rated Current			
0.060	0.060	0.25	x10 ⁻⁴ kg·m ² (GD ² /4)	JB		Rotor Moment of Inertia (Brake)			
0.39	0.39	0.89	kg	W		Brake Mass			
Operating Temperature: 0 to 40°C. Relative Humidity: 90% max. No condensation.						Servo Motor Operating Temp, Rel.Humidity			
0.6	1.0	1.6	kVA			Servo amplifier power supply capacity (rating)			
Yes						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. 37						External Wiring Diagram			



Encoder Wiring Diagram

Serial Encoder

- Battery-backup method absolute encoder [PA035C]
- Absolute encoder for incremental systems [PA035S]
- Battery-less absolute encoder [RA035C, HA062]



*1 Use a twisted pair shielded cable.

*2 Maximum cable lengths by conductor size of the power supply cable (5V,SG)

Conductor size	Conductor resistance (Ω/km) *20°C	Length (m)
AWG	SQ (mm²)	
26	0.15	150 or less
24	0.2	100 or less
22	0.3	60 or less
20	0.5	40 or less
18	0.75	25 or less
		40

Conductor resistance differs according to conductor specifications.

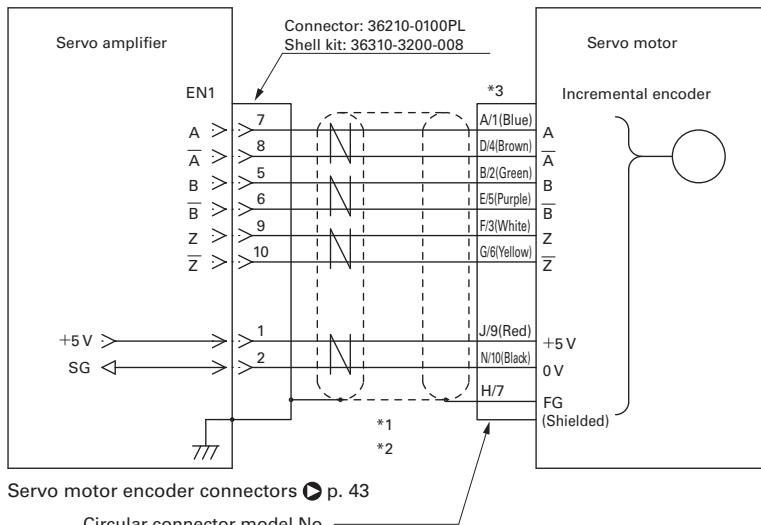
*3 When the absolute encoder for incremental systems or battery-less absolute encoder is used, battery lines (EBAT+, EBAT-) are not required.

*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-	+5V	0V	FG
R2, R5 Servo Motor	100 mm sq. or less	Brown	Blue	Pink *3	Purple *3	Red	Black
	130 mm sq. or more	1	2	8 *3	4 *3	9	10

Pulse Encoder

- Wire-saving incremental encoder



*1 Use a twisted pair shielded cable.

*2 Maximum cable lengths by conductor size of the power supply cable (5V,SG)

Conductor size	Conductor resistance (Ω/km) *20°C	Length (m)
AWG	SQ (mm²)	
26	0.15	150 or less
24	0.2	100 or less
22	0.3	60 or less
20	0.5	40 or less
18	0.75	25 or less
		40

Conductor resistance differs according to conductor specifications.

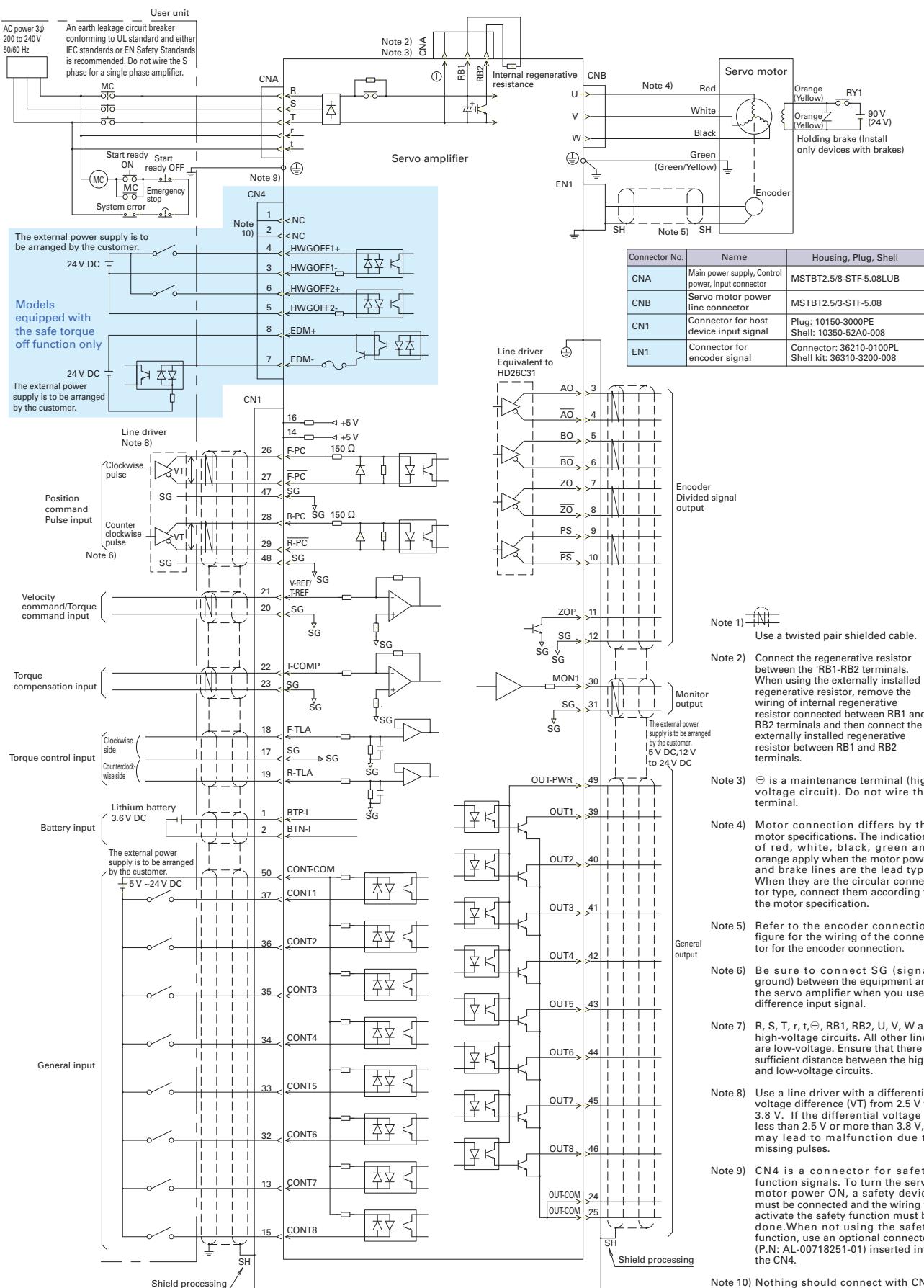
*3 Lead wire colors are indicated in parentheses. For lead wire colors and circular connector pin numbers, see the following table:

	A	Ā	B	Ā	Z	Ā	+5V
R2, R5 Servo Motor	100 mm sq. or less	Blue	Brown	Green	Purple	White	Yellow
	130 mm sq. or more	1	4	2	5	3	6

	0 V	FG	
R2, R5 Servo Motor	100 mm sq. or less	Black	Shielded
	130 mm sq. or more	10	7

External Wiring Diagram

For Servo Amplifier: Sink output, 3-phase 200 V AC power input type



Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

Options

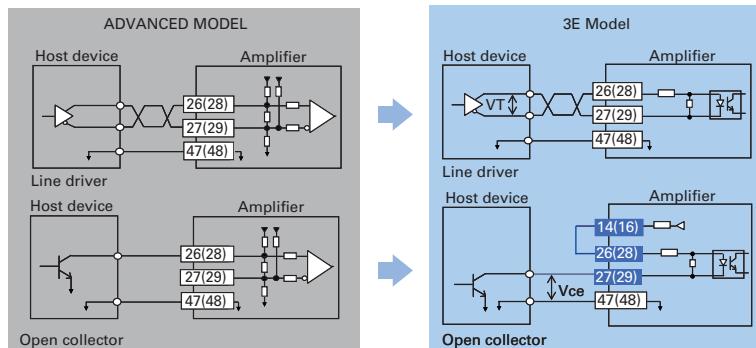
Selection Guide

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

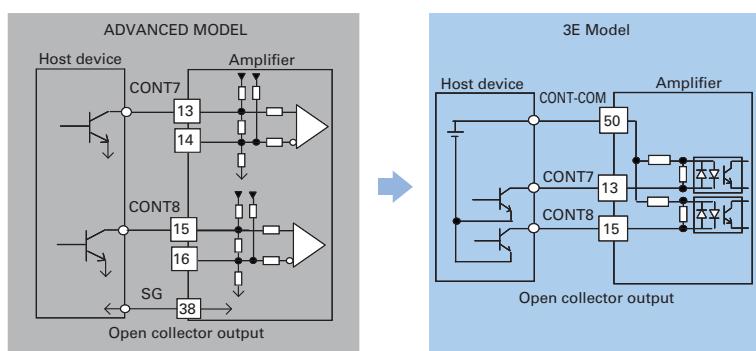
There are constraints on the specifications of the available position pulse signals for the SANMOTION R 3E Model. Also, for the open collector type, a wiring change is necessary.



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 3.8V
Open collector Type	No	Saturation voltage of the transistor (VCE): 1.5 V max.

■ General input 7, 8

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.

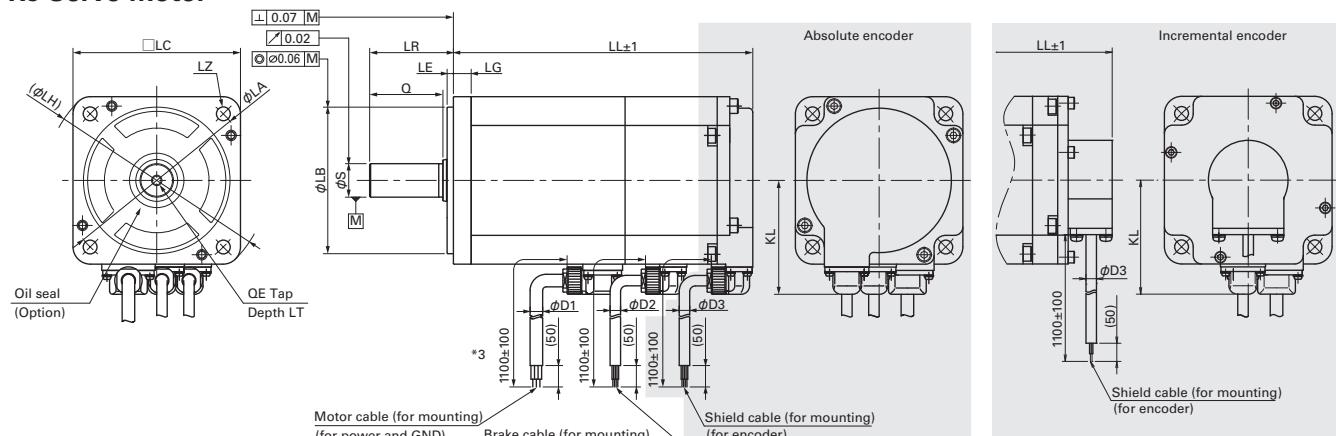


General output circuit of the host devices	Wiring compatibility	Constraint conditions
Differential output type (Line driver)	-	Change to open collector type.
Open collector Type	No (Refer to the figure)	Wire in a similar way to CONT1 to 6.

Servo Motor Dimensions [Unit : mm (inch)]

40 mm sq. to 100 mm sq.

R2 Servo Motor R5 Servo Motor



Dimensions with brake but without extension cable connector

Model No.	Battery-backup method absolute encoder Absolute encoder for incremental systems				Incremental encoder				LG	KL	LA	LB	LE					
	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										
R2□A04003	51.5(2.06)	87.5(3.44)	56.5(2.26)	92.5(3.7)	63.5(2.54)	99.5(3.98)	68.5(2.74)	104.5(4.18)	5 (.2.)	35.4 (1.416)	46 (1.84)	0 (30 - .021)	0 (30 - .00084)	2.5(.1)				
R2□A04005	56.5(2.26)	92.5(3.7)	61.5(2.46)	97.5(3.9)	68.5(2.74)	104.5(4.18)	73.5(2.94)	109.5(4.38)										
R2EA04008	72(2.8)	108(4.25)	77(3.08)	113(4.52)	84(3.36)	120(4.8)	89(3.56)	125(5)										
R2AA04010																		
R2□A06010	58.5(2.34)	82.5(3.3)	65.5(2.62)	89.5(3.58)	78.2(3.128)	106.2(4.248)	85.2(3.408)	113.2(4.528)	6 (.24.)	44.6 (1.784)	70 (2.8)	0 (50 - .025)	0 (2. - .001)	3(.12)				
R2□A06020	69.5(2.78)	97.5(3.9)	76.5(3.06)	104.5(4.18)	89.2(3.568)	117.2(4.688)	96.2(3.848)	124.2(4.968)										
R2AA06040	95.5(3.82)	123.5(4.94)	102.5(4.1)	130.5(5.22)	115.2(4.608)	143.2(5.728)	122.2(4.888)	150.2(6.008)										
R2AA08020	66.3(2.652)	102(4.08)	73.3(2.932)	109(4.36)	90(3.6)	122.7(4.908)	97(3.88)	129.7(5.188)										
R2AA08040	78.3(3.132)	114(4.56)	85.3(3.142)	121(4.84)	102(4.08)	134.7(5.388)	109(4.36)	141.7(5.6799)	8 (.32.)	54.4 (2.176)	90 (3.6)	0 (70 - .030)	0 (2.8 - .012)	3(.12)				
R2AA08075	107.3(4.292)	143(5.72)	114.3(4.572)	150(6)	131(5.24)	163.7(6.548)	138(5.52)	170.7(6.8279)										
R2AAB8075	114.3(4.499)	140.2(5.519)	114.3(4.572)	140.2(5.519)	128.8(5.07)	154.7(6.09)	128.8(5.07)	154.7(6.09)										
R2AAB8100	137(5.48)	163(6.52)	137(5.48)	163(6.52)	151.5(6.06)	177.4(7.096)	151.5(6.06)	177.4(7.096)										
R2AA10075	111.3(4.452)	128.8(5.152)	111.3(4.452)	128.8(5.152)	—	—	—	—	10 (.4.)	66.8 (2.672)	115 (4.6)	0 (95 - .035)	0 (3.8 - .0014)					
R2AA10100	128.3(5.132)	145.8(5.832)	128.3(5.132)	145.8(5.832)	—	—	—	—										
R5□□06020	72.5(2.854)	100.5(3.957)	79.5(3.130)	107.5(4.232)	92.2(3.630)	120.2(4.732)	99.2(3.906)	127.2(5.008)	6 (.24.)	44.6 (1.784)	70 (2.8)	0 (50 - .025)	0 (2. - .001)	3(.12)				
R5□□06040	98.5(3.878)	126.5(4.980)	105.5(4.154)	133.5(5.256)	118.2(4.654)	146.2(5.756)	125.2(4.929)	153.2(6.031)										
R5□□08075	110.3(4.343)	146(5.748)	117.3(4.618)	153(6.024)	134(5.276)	166.7(6.563)	141(5.551)	173.7(6.839)	8 (.32.)	54.4 (2.176)	90 (3.6)	0 (70 - .030)	0 (2.8 - .0012)	3(.12)				

Model No.	LH	LC	LZ	LR	S	Q	QE	LT	D1	D2	D3
R2□A04003	56 (2.24)	40 (1.6)	2-ø4.5 (2-ø1.8)	25(1)	0 (0 - .008)	20(.8)	—	—			
R2□A04005					6 - 0.008 (.24 - .00032)						
R2EA04008	82 (3.28)	60 (2.4)	4-ø5.5 (4-ø.22)	25 (3.14)	0 (0 - .009)	—	—	—			
R2AA04010					8 - 0.009 (.32 - .0003)						
R2□A06010	108 (4.25)	80 (3.14)	4-ø6.6 (4-ø.264)	40 (1.57)	0 (0 - .011)	25(1)	M5	12(.48)			
R2□A06020					.55 - .0003)						
R2AA06040	115.5 (4.6)	86 (3.38)	4-ø6.6 (4-ø.264)	35 (1.37)	0 (0 - .011)	35(1.4)	M5	12(.48)			
R2AA08020					.56 - .0003)						
R2AA08040	130 (5.11)	100 (3.93)	4-ø6.6 (4-ø.36)	45 (1.8)	0 (0 - .013)	30(1.2)	M5	12(.48)			
R2AA08075					.88 - .0005)						
R2AA10075	108 (4.25)	80 (3.14)	4-ø6.6 (4-ø.264)	40 (1.57)	0 (0 - .013)	40 (1.57)	M6	20(.8)			
R2AA10100					.88 - .0005)						
R5□□06020	82 (3.28)	60 (2.4)	4-ø5.5 (4-ø.22)	30 (1.2)	0 (0 - .011)	25(1)	M5	12(.48)			
R5□□06040					.55 - .0003)						
R5□□08075	108 (4.25)	80 (3.14)	4-ø6.6 (4-ø.264)	40 (1.57)	0 (0 - .011)	35 (1.37)	M5	12(.48)			
R5□□08075					.56 - .0003)						

- *1 Brake connectors (cables) are not supplied for models without brakes.
- *2 A reduction in the rating might be needed if an oil seal or brake is attached. Contact us for details.
- *3 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. 47

For the following encoders, contact us for details.

- Resolver method battery-less absolute encoder [RA035C], High precision battery-less optical absolute encoder [HA062]. (100 mm sq. Min.)

Features
Standard Model Numbers
Standard Model Number List

Servo Amplifier
Specifications
Servo Amplifier
Servo Motor

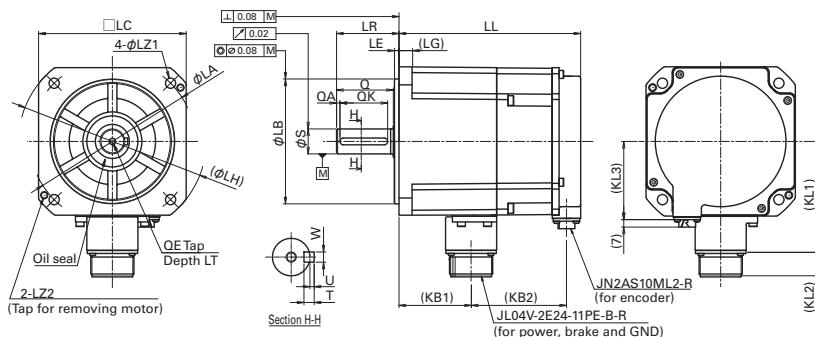
External Wiring
Diagram
Encoder Wiring
Diagram
External Wiring
Diagram
Servo Motor
Dimensions

Options
Selection Guide

Servo Motor Dimensions [Unit : mm (inch)]

130 mm sq.

R2 Servo Motor 0.5 kW to 1.8 kW



Dimensions with the battery-backup method absolute encoder and brake

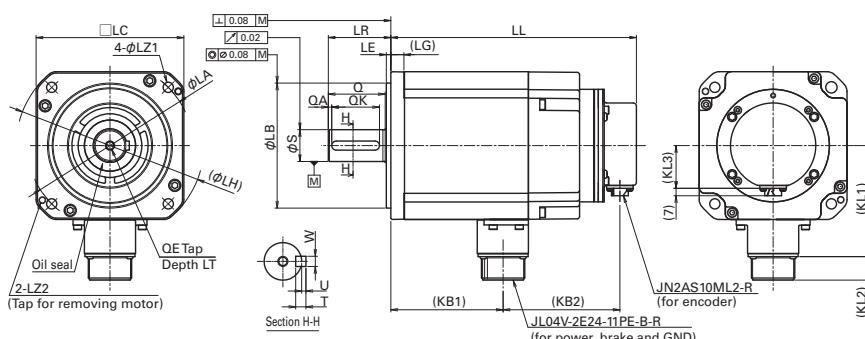
Model No.	Battery-backup method absolute encoder Absolute encoder for incremental systems																
	W/out brake			With brake													
Model No.	LL	KB2	KL3	LL	KB2	KL3	LG	KL1	KL2	LA	LB	LE	LH	LC	LZ1	LZ2	LR
R2AA13050	103 (4.12)	44 (1.76)	69 (2.76)	139.5 (5.58)	81 (3.24)	69 (2.76)	12 (.48)	98 (3.92)	21 (.84)	145 (5.8)	0 0 (4.4 -0.0014)	4 (.16)	165 (6.6)	130 (5.2)	9 (.36)	M6	55 (2.2)
R2AA13120	120.5 (4.82)			160 (6.4)	84 (3.36)						110 -0.035 0 (4.4 -0.0014)						
R2AA13180	138 (5.52)			179 (7.16)	86 (3.44)												
Model No.	S	Q	QA	QK	W	T	U	KB1	QE	LT							
R2AA13050	0	50 (2)	3 (.12)	42 (1.68)	0 6 -0.030 (.24 -0.0012)	6 (.24)	2.5 (.1)	46 (1.84) 64 (2.56) 81 (3.24)	M6	20 (.8)							
R2AA13120	22 -0.013 0 (.88 -0.00052)																
R2AA13180																	

For the following encoders, contact us for details.

• Resolver method battery-less absolute encoder [RA035C], High precision battery-less optical absolute encoder [HA062].

130 mm sq.

R2 Servo Motor 2 kW



Dimensions with the battery-backup method absolute encoder and brake

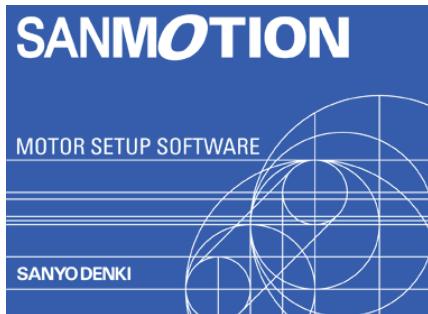
Model No.	Battery-backup method absolute encoder Absolute encoder for incremental systems																
	W/out brake			With brake													
Model No.	LL	KB2	KL3	LL	KB2	KL3	LG	KL1	KL2	LA	LB	LE	LH	LC	LZ1	LZ2	LR
R2AA13200	171 (6.84)	57 (2.28)	38 (1.52)	216 (8.64)	103 (4.12)	38 (1.52)	12 (.48)	98 (3.92)	21 (.84)	145 (5.8)	110 -0.035 0 (4.4 -0.0014)	4 (.16)	165 (6.6)	130 (5.2)	9 (.36)	M6	55 (2.2)
Model No.	S	Q	QA	QK	W	T	U	KB1	QE	LT							
R2AA13200	0 28 -0.013 0 (1.12 -0.00052)	50 (2)	3 (.12)	42 (1.68)	0 8 -0.036 0 (.32 -0.0014)	7 (.28)	3 (.12)	99 (3.96)	M8	25 (1)							

For the following encoders, contact us for details.

• Resolver method battery-less absolute encoder [RA035C], High precision battery-less optical absolute encoder [HA062].

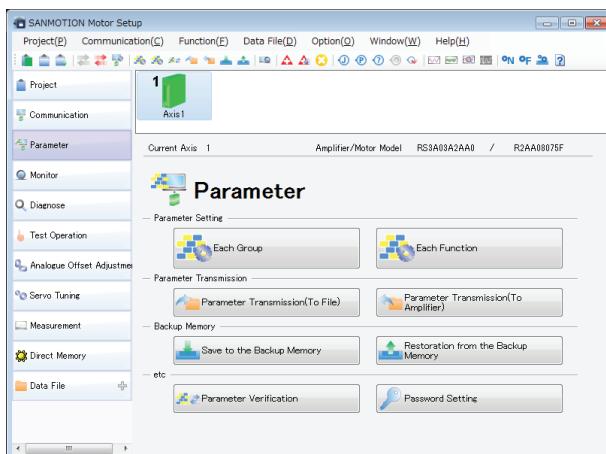
Setup Software

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>

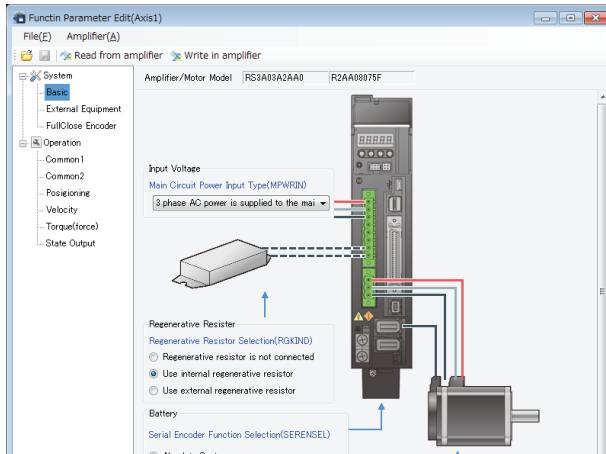


Start-up screen

Main screen



Parameter Setting screen



Function Parameter Edit

The minimum required parameters for operations can be collectively set.

■ 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

* See our website for details on supported versions.

Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications- Servo Amplifier+
Servo Motor

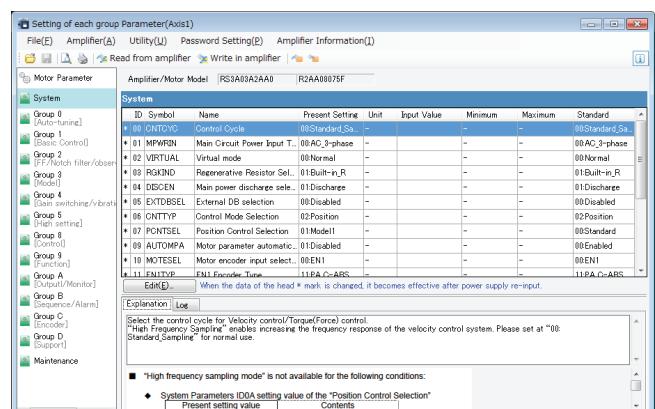
Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

Options

Selection Guide

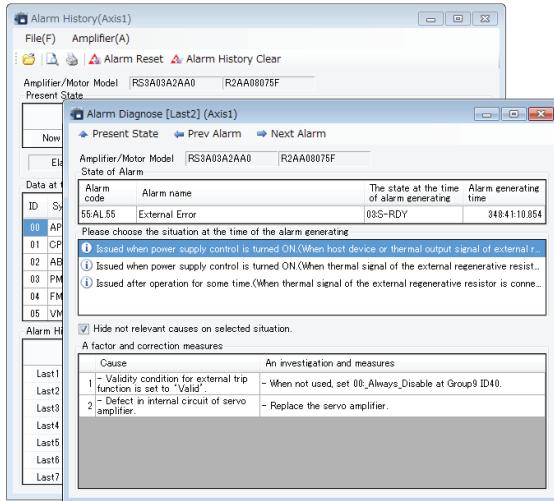


Setting of each group Parameter

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

Setup Software

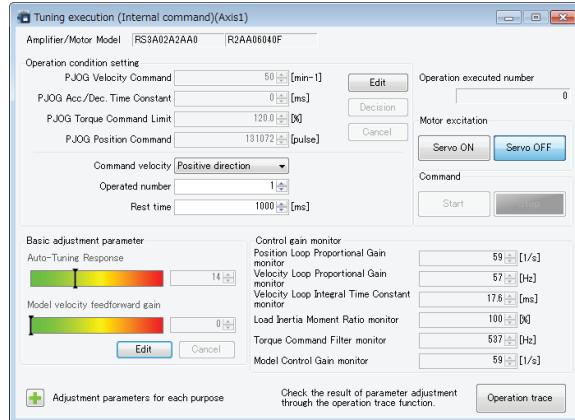
Diagnosis screen



The current and previous 15 alarm occurrences can be checked.

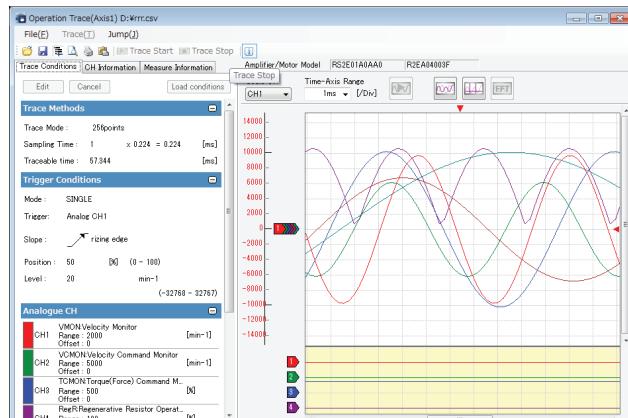
Causes and corrective actions can be checked based on alarm status.

Servo tuning



Automatically sets up the notch filter and saves the tuning results.

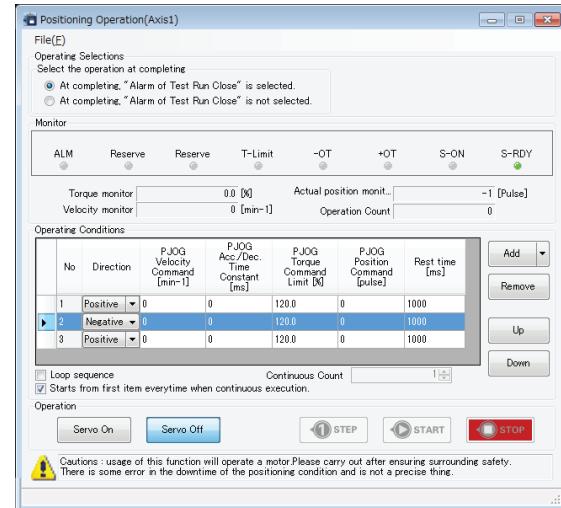
Measurement



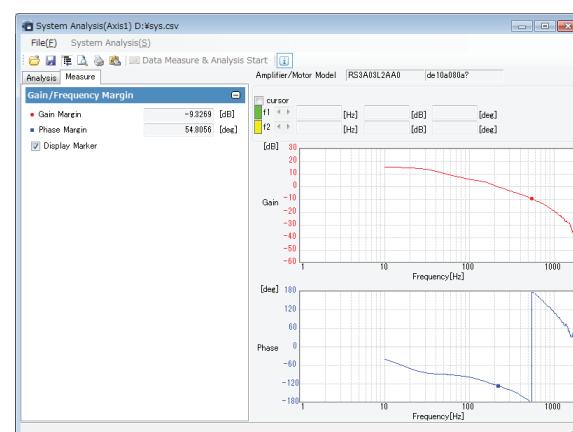
Operation Trace

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)



System Analysis

Analyzes servo system frequency characteristics.

Options

■ Connectors of Servo Amplifier Analog/Pulse input type

Single Connectors

Connector No.	Item	Model No.	Manufacturer model No.	Manufacturer
CN1	To connect host device	AL-00385594	10150-3000PE, 10350-52A0-008	Sumitomo 3M Limited
EN1, EN2	To connect encoder	AL-00632607	36210-0100PL, 36310-3200-008	
CNA	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 *1	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	

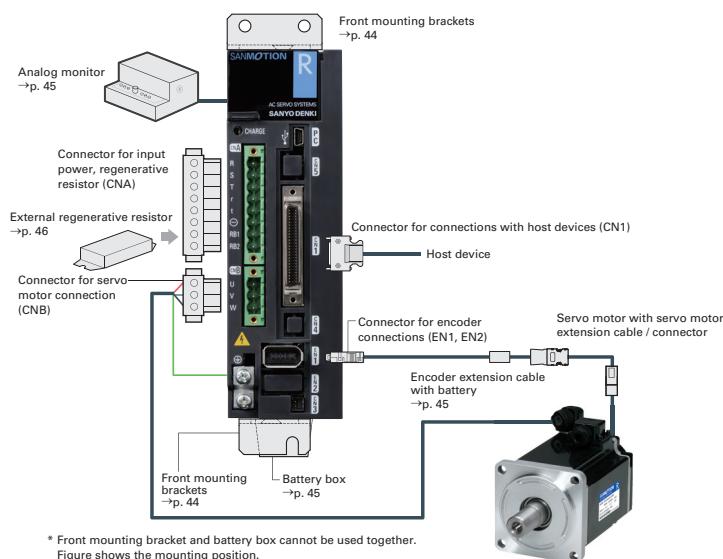
*1 When CN4 is not wired, make sure to insert safety device connector (for short-circuiting) to CN4 on servo amplifier.

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	No	Yes
	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	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	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	For fully-closed control systems	



Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications
Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram
Servo Motor Dimensions

Options

Selection Guide

Options

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

R2 Servo Motor

Motor type	Combination plug for encoder (with rubber bushing)		Encoder receptacle model number (motor side)	Applicable cable diameter (bushing color phase)	Pin Layout Symbol
	Straight	Angle			
All R2 Servo Motor Models	JN2DS10SL1-R	JN2FS10SL1-R	JN2AS10ML2-R	Φ 5.7 to 7.3 mm (Black)	See the encoder wiring diagram on Page 35.
	JN2DS10SL2-R	JN2FS10SL2-R		Φ 6.5 to 8.0 mm (Gray)	
	JN2DS10SL3-R	JN2FS10SL3-R		Φ 3.5 to 5.0 mm (Black)	

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).

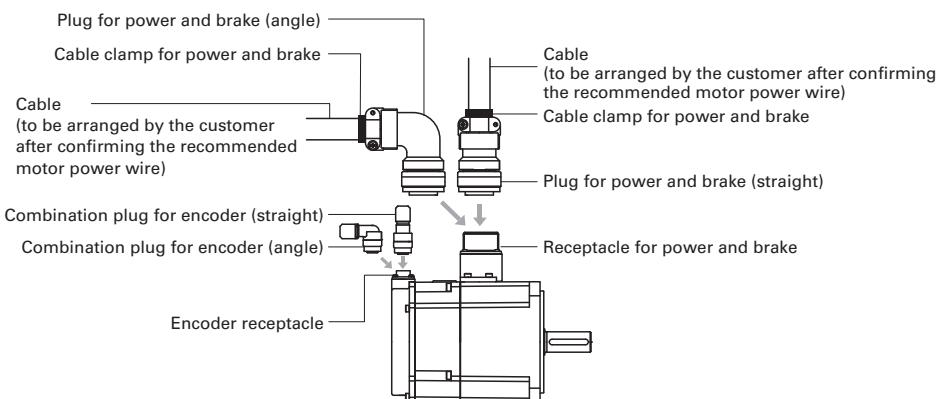
■ Motor connectors Manufacturer: Japan Aviation Electronics Industry Limited

Voltage	Flange size (mm)	Motor model no.	For power and brake standard specifications (1) Plug (manufacturer model no.) (2) Cable clamp (manufacturer model no.) (3) Plug + cable clamp (SANYO DENKI part numbers)			For power and brake waterproofing specifications, TÜV standard plug (1) Plug (manufacturer model no.) (2) Cable clamp (manufacturer model no.) (3) Plug + cable clamp (SANYO DENKI part numbers)			Receptacle for power and brake (motor side)	
			Straight	Angle	Straight	Angle				
200V Type	130 sq.	R2AA13050H	(1) MS3106B24-11S (2) MS3057-16A (3) MS06B24-11S-16	(1) MS3108B24-11S (2) 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	JL04V-2E24-11PE-B-R			
		R2AA13050D								
		R2AA13120B								
		R2AA13120L								
		R2AA13120D								
		R2AA13180H								
		R2AA13200L								

Voltage	Flange size (mm)	Motor model no.	Pin layout symbol					Servo 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.	
200V Type	130 sq.	R2AA13050H	D	E	F	G, H	A, B	RS3A03	0.75	#19	2
		R2AA13050D									
		R2AA13120B									
		R2AA13120L									
		R2AA13120D									
		R2AA13180H									
		R2AA13200L									

* 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

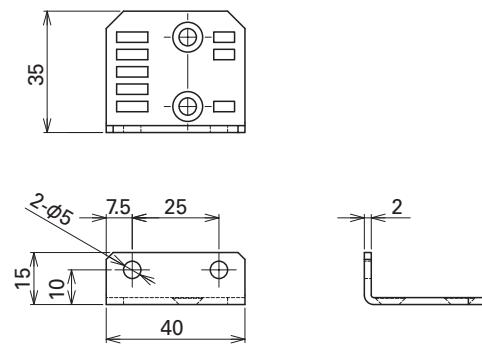
Brackets for mounting the servo amplifier on the front (connector side).

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

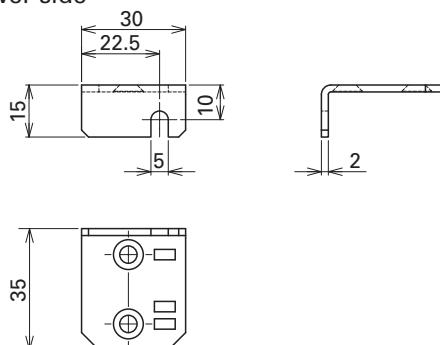
- Trivalent chrome plating is used. (Surface color is silver-blue, and different from body color.)
- Cannot be used with battery box.

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

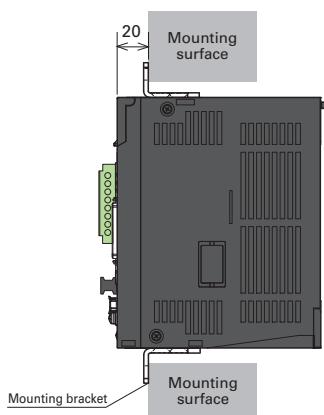
Upper side



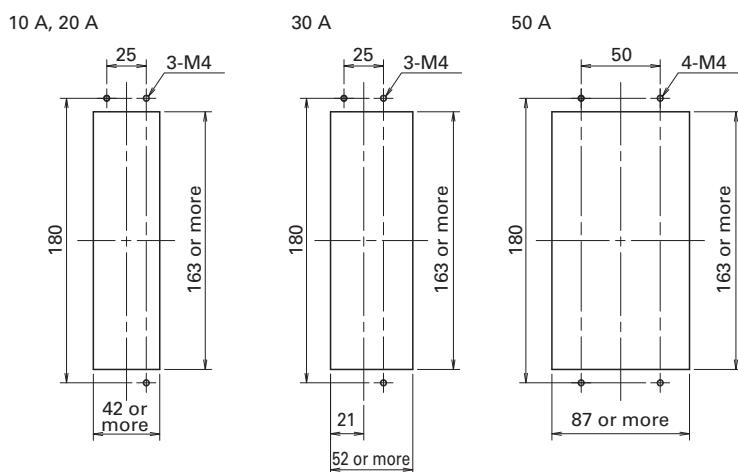
Lower side



Mounting example



Mounting board processing Reference dimensions drawing



Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

Options

Selection Guide

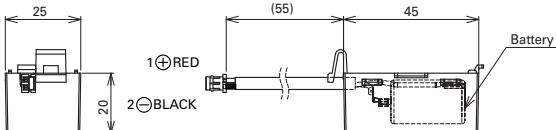
Options

■ Battery for Battery-backup Method Absolute Encoder and Related Parts

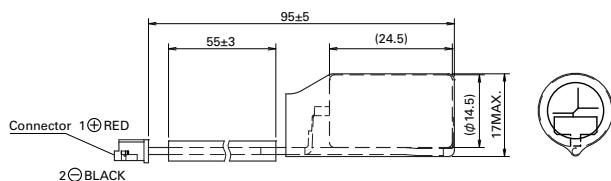
Name	Item	Model no.
1) Battery box *Cannot be used with the metal pieces attached to the front.	No	AL-00880402-01
2) Battery for battery box (Lithium battery)	Lithium battery: ER3VLY Toshiba Home Appliances Co., Ltd	AL-00879511-01
3) Encoder cable attached to battery, with connectors on both ends	No	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 Consumer Marketing Ltd.	AL-00697958-01

Dimensions (Unit : mm)

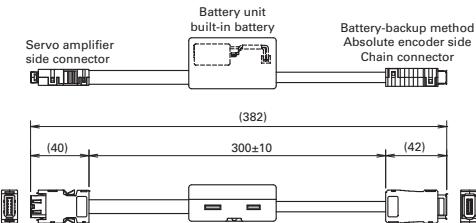
- 1) Battery box (model no.: AL-00880402-01)



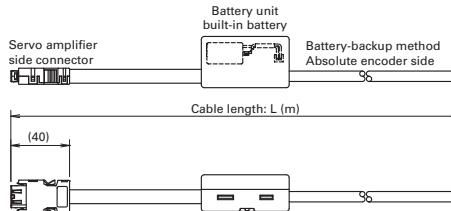
- 2) Battery for Battery box replacement
(model no.: AL-00879511-01)



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

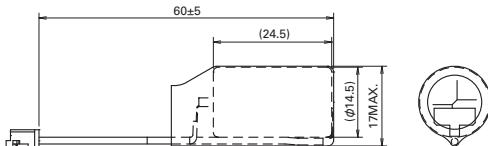


- 4) Encoder cable attached to battery, with connectors on one end (model no.: AL-00697960-□□)



	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)



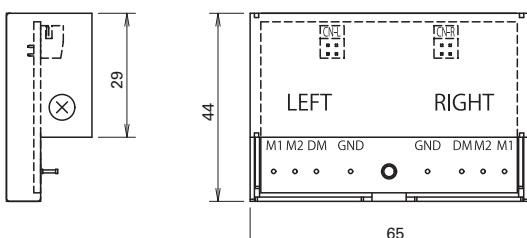
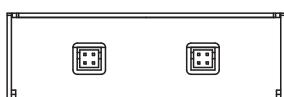
■ Analog Monitor and Related Parts

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

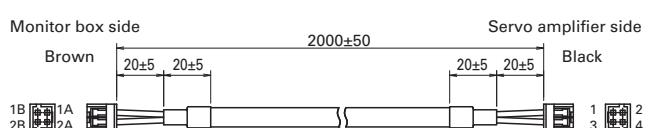
Name	Item	Model no.
1) Monitor box	Monitor box body 2 dedicated cables	Q-MON-3
2) Dedicated cable	2 dedicated cables	AL-00690525-01

Dimensions (Unit : mm)

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



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



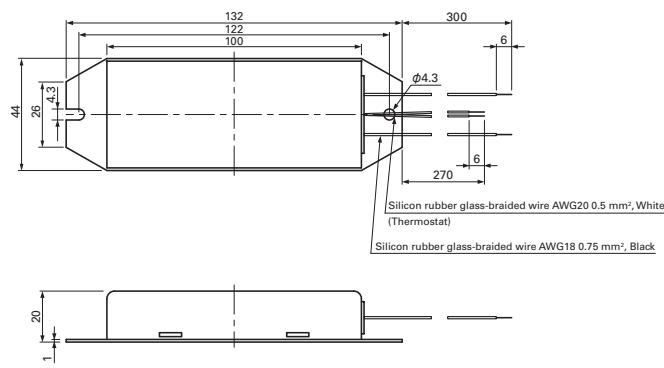
*1 2 units of the dedicated cables per above 2) (PN# AL-00690525-01) are attached to monitor box (PN#Q-MON-3).

*2 Power is supplied from the servo amplifier.

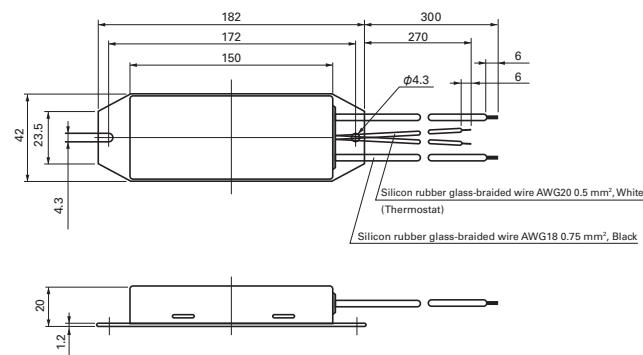
■ USB communication cable

Type	Cable length (m)	Model no.
USB communication cable (cable for communication with PC for setup software)	1	AL-00896515-01
	2	AL-00896515-02

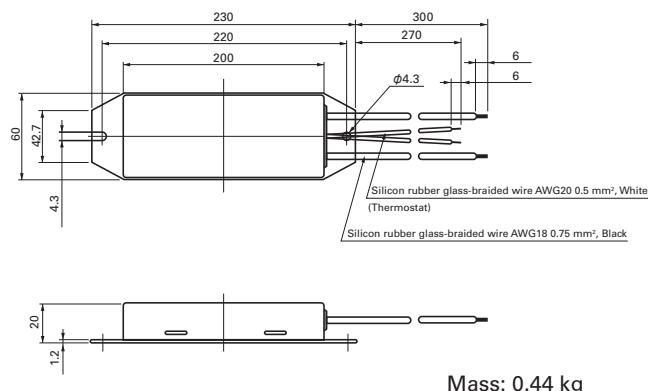
■ External Regenerative Resistor Dimensions (Unit: mm)



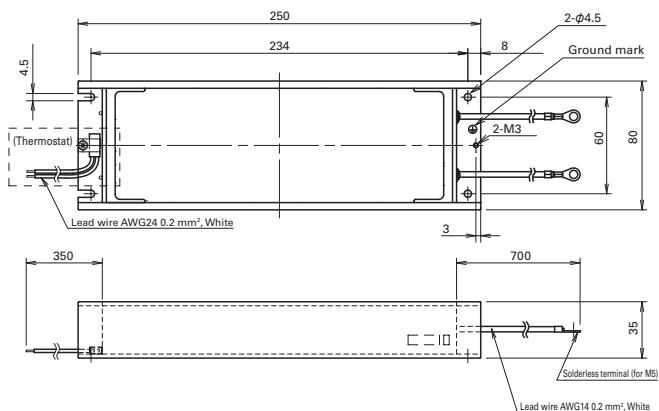
	Model no.	Thermostat
1	REGIST-080W100B	Normally closed
2	REGIST-080W50B	Normally closed



	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

Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier Specifications

Specifications: Servo Amplifier + Servo Motor

Encoder Wiring Diagram

External Wiring Diagram

Servo Motor Dimensions

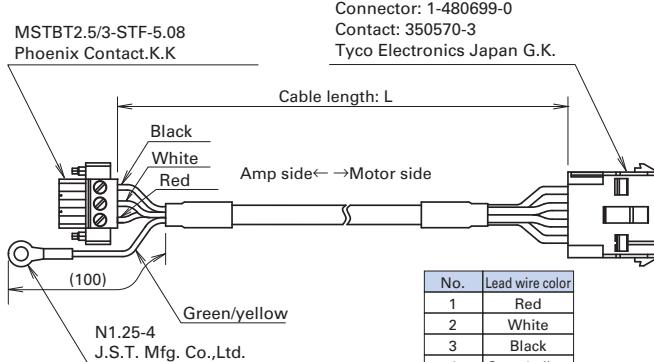
Options

Selection Guide

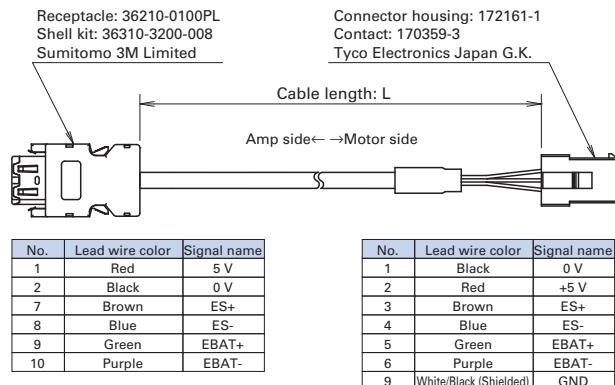
Options

■ Extension cable for servo motor dimensions

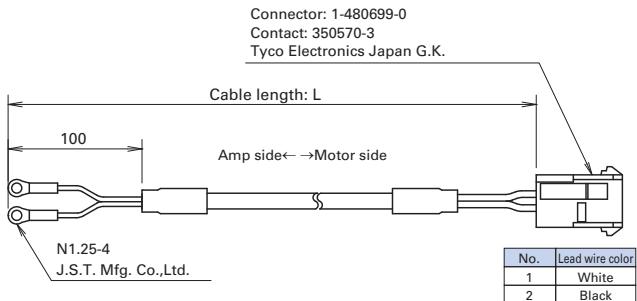
Power cable



Encoder cable



Brake cable

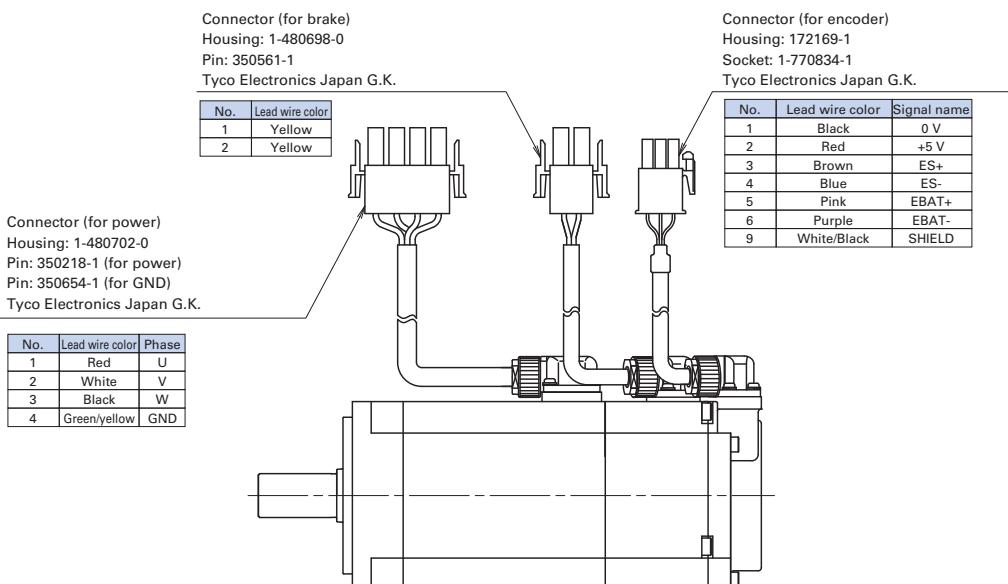


Model no.			Cable length: L (m)
Power cable	Brake cable	Encoder cable	
RS-CM4-01-R	RS-CB3-01-R	RS-CA4-01-R	1
RS-CM4-02-R	RS-CB3-02-R	RS-CA4-02-R	2
RS-CM4-03-R	RS-CB3-03-R	RS-CA4-03-R	3
RS-CM4-05-R	RS-CB3-05-R	RS-CA4-05-R	5
RS-CM4-10-R	RS-CB3-10-R	RS-CA4-10-R	10

Refer to "Standard Model Number List" on pp. 13 to 17 for servo motors with connectors for extension cables.

Models with "cable terminal specification: with connector" are the applicable servo motors.

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



■ 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.

$$T_a \leq T_p \times 0.8$$

$$T_b \leq T_p \times 0.8$$

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

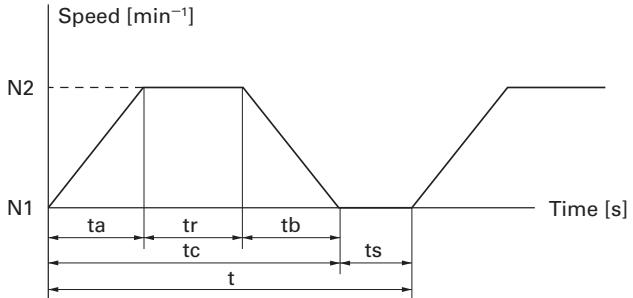
If the judgment results cannot be applied in the aforementioned equation, reconsider the servo motor capacity, for example increasing the capacity.

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.



ta = Acceleration time [s]

tb = Deceleration time [s]

tr = Constant speed-time [s]

ts = 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.

Selection Guide

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 .

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

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 $Trms \leq T_R \times 0.8$
(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.

$$EM = Ehb = \frac{1}{2} \times N \times 3 \times Ke\phi \times \frac{Tb}{KT} \times tb - \left(\frac{Tb}{KT} \right)^2 \times 3 \times R\phi \times tb$$

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

Ehb: Regenerative energy during deceleration [J]

Ke ϕ : Induced voltage constant [$\text{Vrms}/\text{min}^{-1}$] (motor constant)

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

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

R ϕ : Armature resistance [Ω] (motor constant)

tb: Deceleration time [s]

Tb: 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

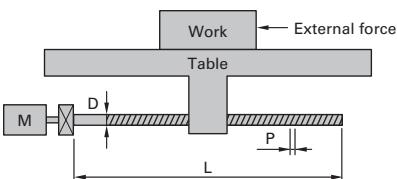
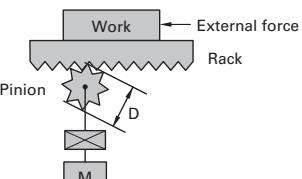
Select a regenerative resistor that meets the following conditions.

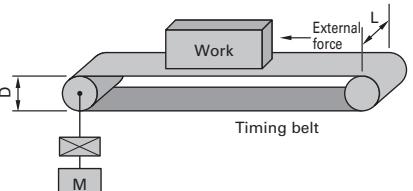
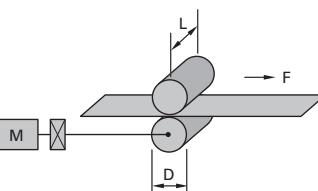
- In case of servo amplifiers with an internal regenerative resistor:
Permissible regenerative power [PR] that is less than efficient regenerative power [PM] and can be used with internal regenerative resistors
- In case of external regenerative resistor:
Permissible regenerative power [PRO] that is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

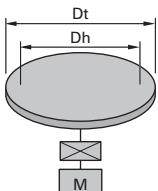
Note that we have servo amplifier models both with and without internal regenerative resistors for absorbing regenerative power.
Select the model accordingly.

■ Selection data for each mechanism

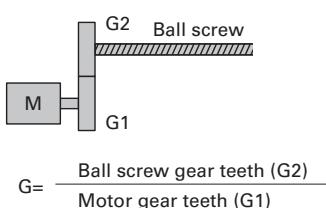
Typical examples of mechanisms and items that require selection are shown below. Provide this information when placing an order.

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		

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)



Features

How to Read Model Numbers
Standard Model Number List

System Configuration

Servo Amplifier
Specifications

Encoder Wiring Diagram

Servo Motor Dimensions

Options

Selection Guide

■ 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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