

SANMOTION



AC SERVO SYSTEMS

R



SANYO DENKI

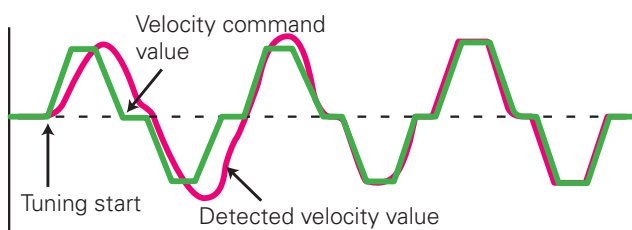
Ver.4

CONCEPT 1

Easy Set-up for Optimal Operation

Auto-Tuning

A new auto-tuning algorithm improves system response by providing functions such as inertia identification, 5 auto-tuning modes, 30 levels of response, and parameter setting auto-save.



Small Compact Servomotors

Motor size and volume is reduced by as much as 30% and 25% respectively compared to current models. The world's smallest high torque high performance servomotor. (as of Sept 2006)



Multi-Axis Servo Amplifier

6-axis model can reduce installation width by up to 42% compared to six single-axis models. Power loss is reduced by up to 20% compared to current single-axis models.



Water Protection

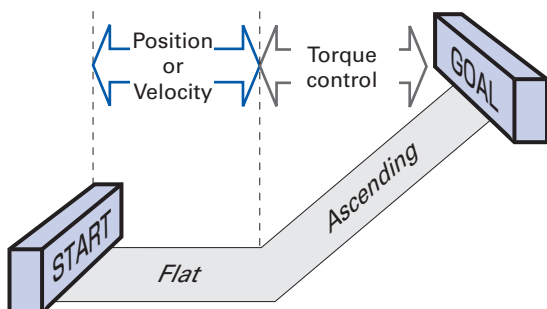
All motor models have IP67 protection.



*Shaft feedthrough and cable end are excluded.

All-in-One Control

Configurable parameters allow you to switch between control modes for torque, position or velocity.



*available for single-axis only

Power Supply Harmonic Suppression

Equipped with DC reactor connection terminals as standard feature for suppressing power supply harmonics.



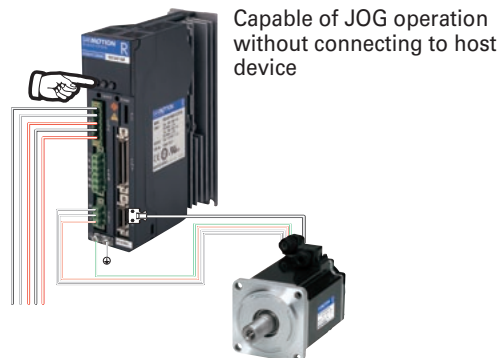
5-digit LED Display, Built-in Operator

Parameter setting, monitoring and alarm tracing can be easily done using the built-in operator.



Test Function (JOG)

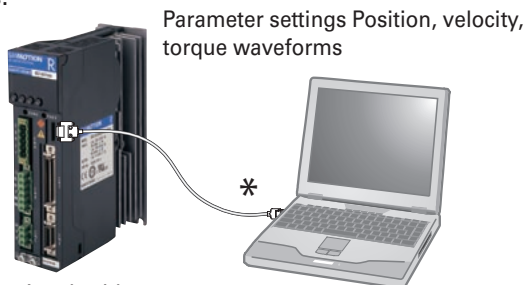
On-board JOG operation function is available for testing motor and amplifier connection without the need to connect to host device.



*Multi-axis is done through a personal computer.

Setup Software

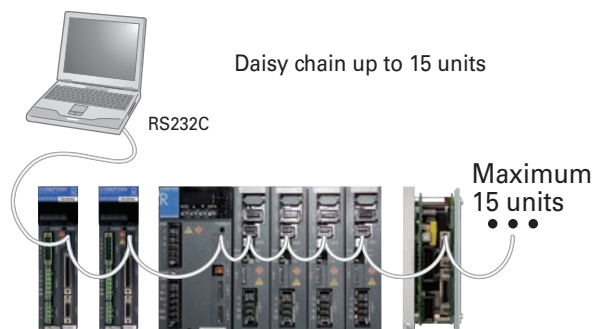
The setup software allows you to set parameters, view graphical displays of monitored position, velocity or torque waveforms, and perform system analysis.



*Use optional cable AL-00490833-01 for PC connection

Simultaneous Monitor Function

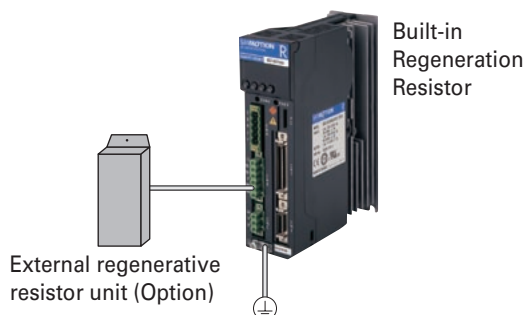
The setup software allows up to 15 amplifiers to be monitored. This function can be used to monitor waveforms in synchronized operations.



*PC connection cable is optional

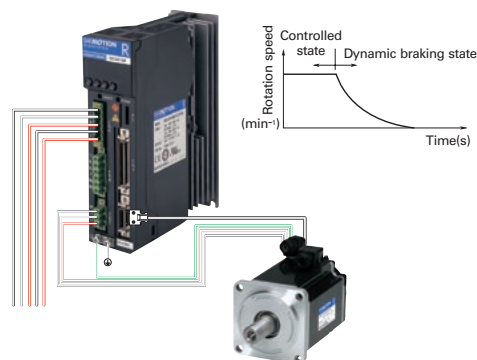
Built-in Regeneration Resistor

A built-in regeneration resistor can be used to absorb regenerative energy generated during motor deceleration. External regeneration resistors can be added if internal regeneration capacity is insufficient.



Built-in Dynamic Brake

A built-in dynamic brake provides emergency stop capability. The six kinds of motion sequences for the dynamic brake can be selected by parameter setting.

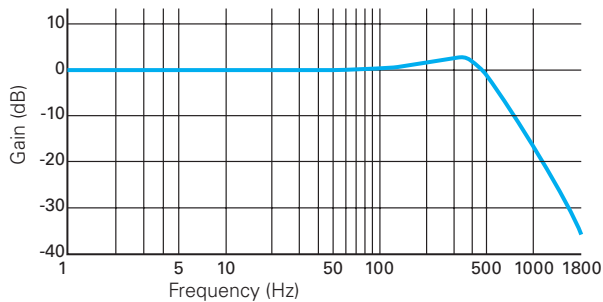


CONCEPT 2

Improved Precision and Reduced Cycle Time

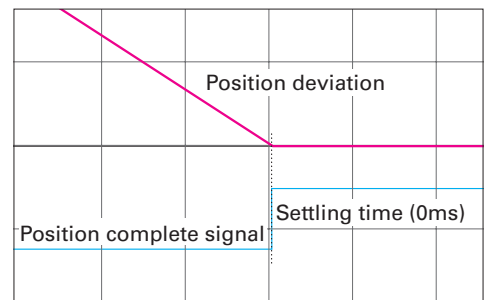
High Response

A 4th-order notch filter reduces phase delay to suppress mechanical resonance and improve velocity response of equipment.



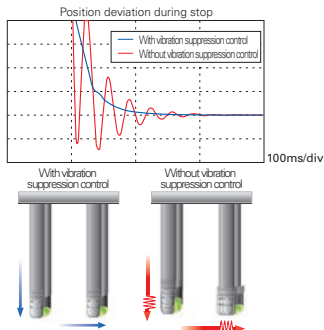
Shorter Position Settling Time

A new algorithm drastically shortens positioning settling time for equipment.



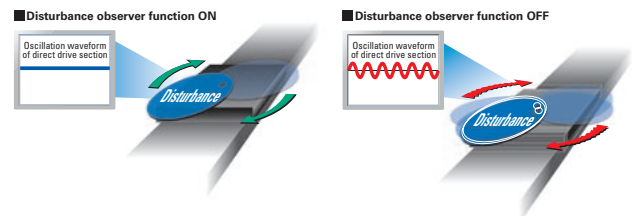
Vibration Suppression Control

With feed-forward vibration suppression control, vibrations at the processing point and base of a machine can be suppressed through simple tuning procedures. Up to 4 types of vibration control frequencies can be selected.



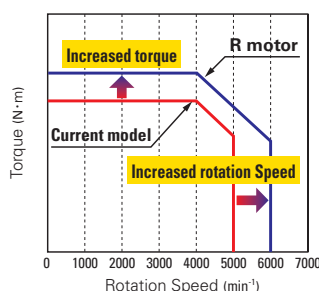
Disturbance Suppression

A new disturbance observer with expanded applicable frequencies suppresses disturbance from other axes in a multi-axis configuration.



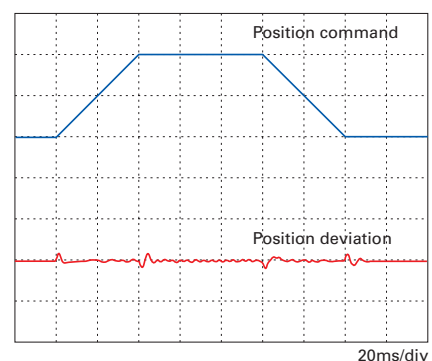
Expanded Power Range

Maximum instantaneous stall torque is improved by 5% to 26%, and maximum rotation speed is increased from 5000min⁻¹ to 6000min⁻¹ compared to current models.



Command Follow-up Control

Performance of the positioning doubled in comparison with current models by adoption of new positioning control algorithm and new speed control algorithm. And position deviation ≈ 0 is achieved.



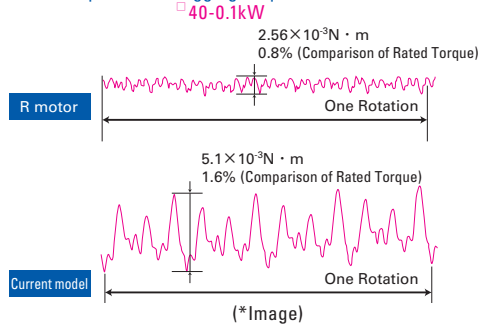
CONCEPT 3

Reduced Running Costs

Low Cogging Torque

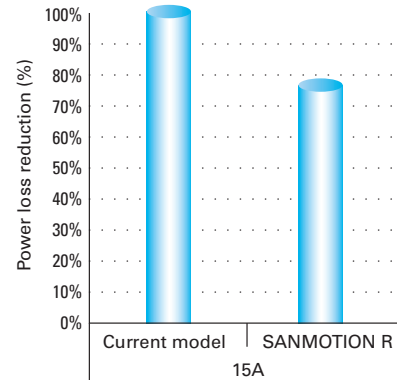
Using our proprietary technology, the motor's low cogging torque delivers smooth rotation that is ideal for high precision processes and vibration-sensitive conveyor applications.

Comparison of cogging torque waveforms



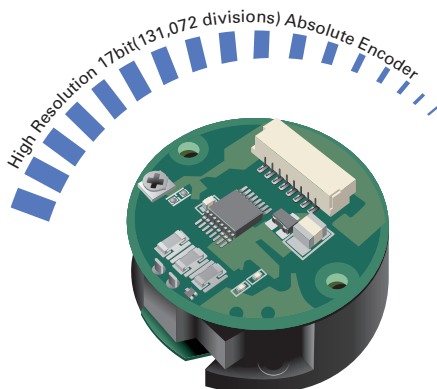
20% Reduction in Power Loss

An energy conserving power module reduces main circuit power loss by up to 20%.



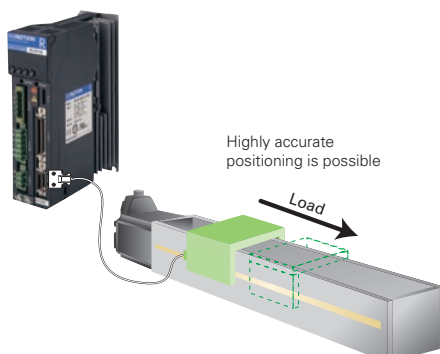
High Resolution

Support for encoders up to 17 bit (131,072 divisions) is available for high resolution control.



Full Closed-Loop Control

Optional support for full closed-loop control using linear scale and other high resolution encoders mounted on device side.



*available for single-axis only

Features and Functions

Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Dimensions

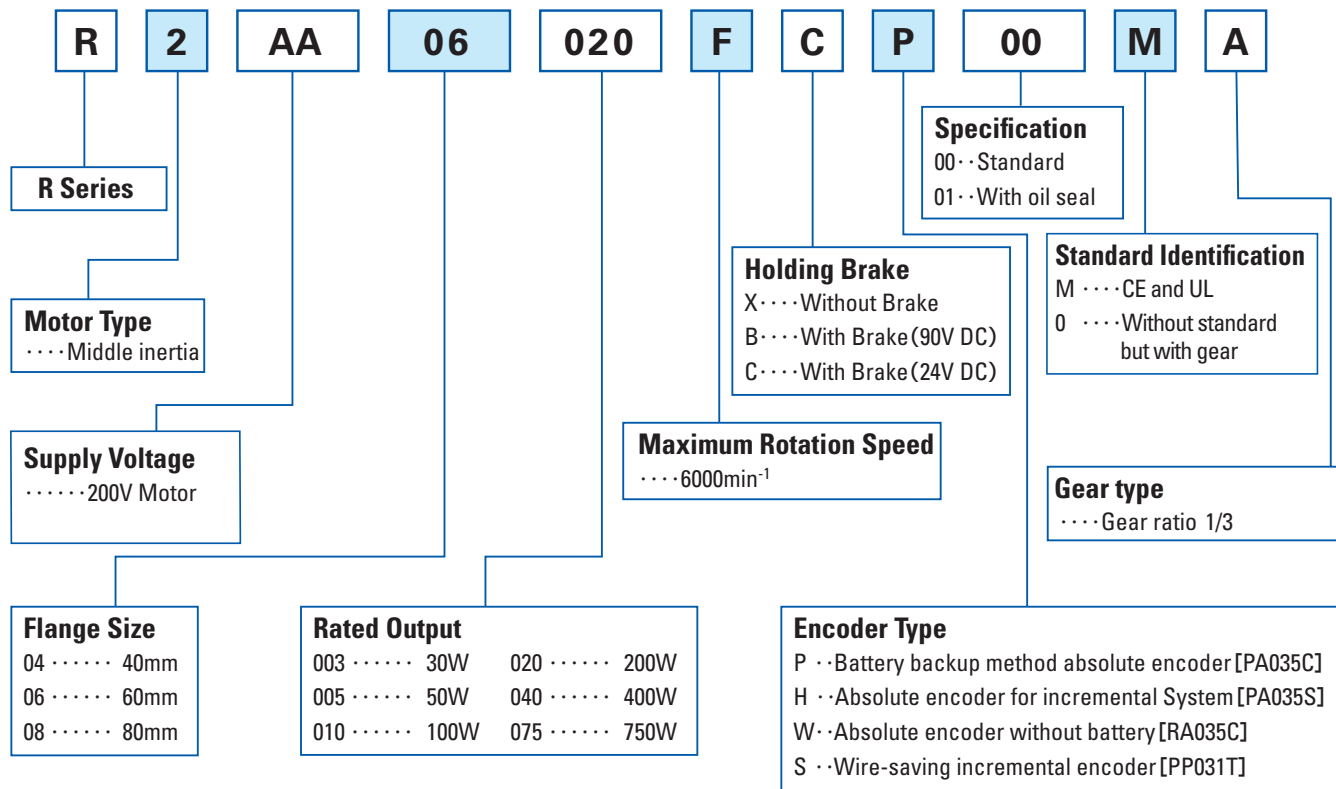
Setup Software

Optional Equipment

Servo Motor Model Number Nomenclature

Servo Motor

Example: The following model number defines a "R2" servomotor with 60mm flange size, 200W rated output, 6000min⁻¹ maximum rotation speed, 24V brake, and an absolute encoder (131,072 divisions/rotation),UL/CE approval and gear ratio 1/3.



Encoder Specification

Model	Per rotation	Multiple Rotations	Remarks
PA035C	131072(17bit)	65536(16bit)	Battery backup method Absolute encoder
PA035S	131072(17bit)	—	Absolute encoder for Incremental system
RA035C	131072(17bit)	65536(16bit)	Absolute encoder without battery
PP031T	40000(10000P/R)	—	Wire-saving incremental encoder

Conformance to Overseas Standards

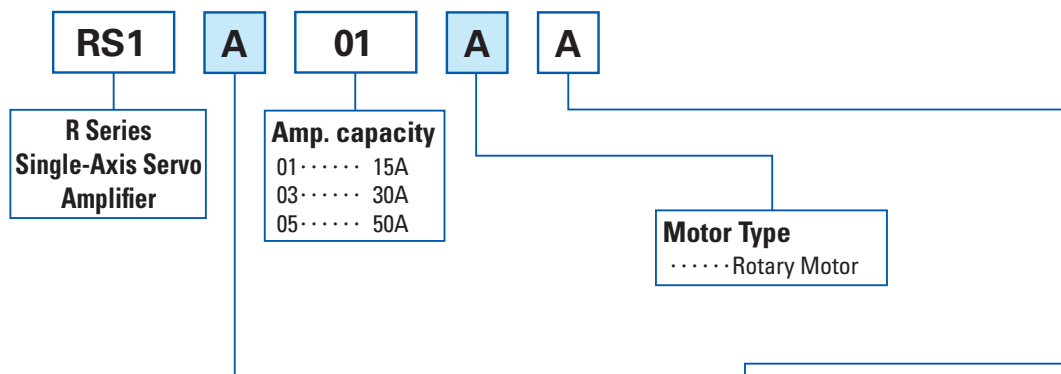
Our standard servo amplifier has attained the UL, c-UL and EN standards.

To comply with the EMC Directive, EMC filters can be used. You can also employ servo motors that have attained the UL and EN standards.



Single-Axis Servo Amplifier (Analog/Pulse input type)

Example: The model number shown below is "R" Series Servo Amplifier with 200V AC input voltage and 15A amplifier capacity.



Power Input, Internal Registration Setting

Model	Input Voltage	Internal Registration Resistor	Amp. capacity
L	AC200V	W	15A,30A (option.setting)
A		W/O	15A,30A
A		W	50A
L		W/O	50A
N	AC100V	W	15A,30A (option.setting)
E		W/O	15A,30A

Control Hardware Type

A... Encoder Specification : Absolute encoder
Wire-saving incremental encoder
Selectable output : NPN Output

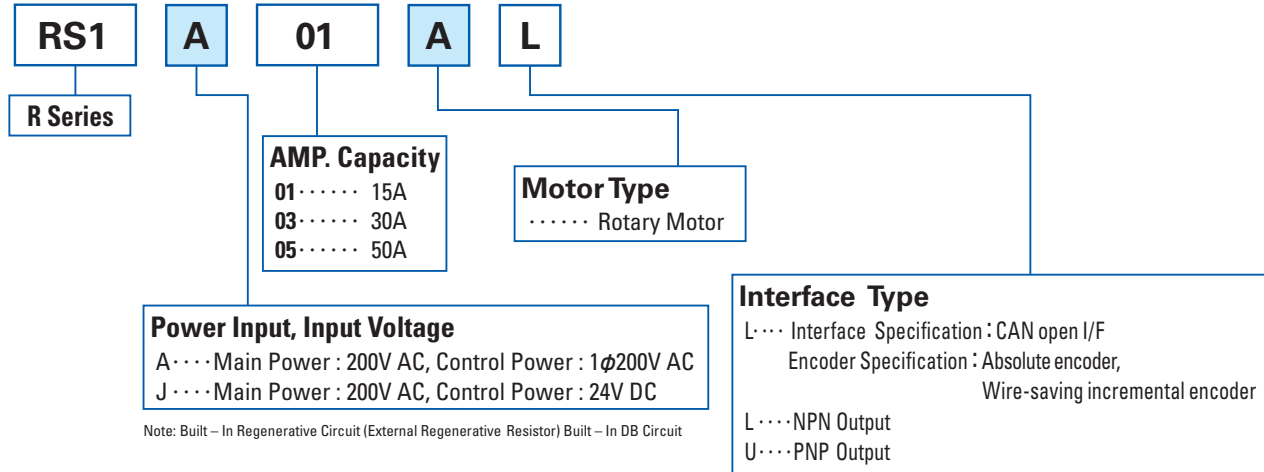
B... Encoder Specification : Absolute encoder
Wire-saving incremental encoder
Selectable output : PNP Output

T... Full Closed-Loop

*Please set the parameters for your selected motor accordingly before using.

Servo Amplifier with CANopen

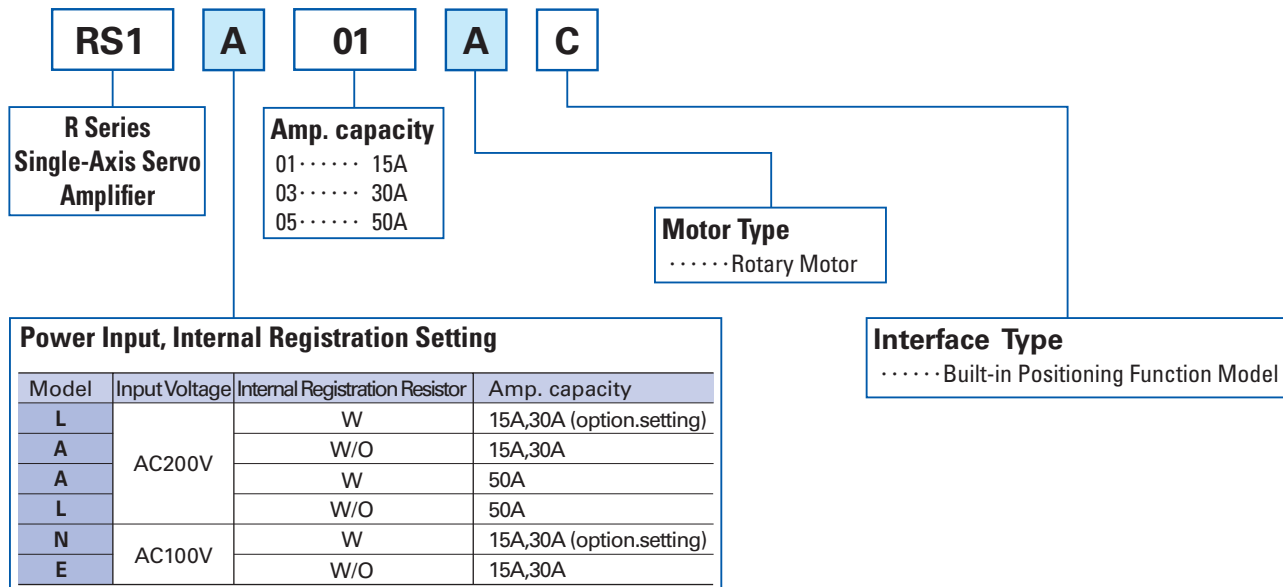
Example: The model number shown below is "R" Series Servo Amplifier with 200V AC input voltage (Main Power and Control Power) and 15A amplifier capacity.



*Please set the parameters for your selected motor accordingly before using.

Single-Axis Servo Amplifier built-in Positioning Function model

Example: The model number shown below is "R" Series Servo Amplifier with 200V AC input voltage (Main Power and Control Power) and 15A amplifier capacity.



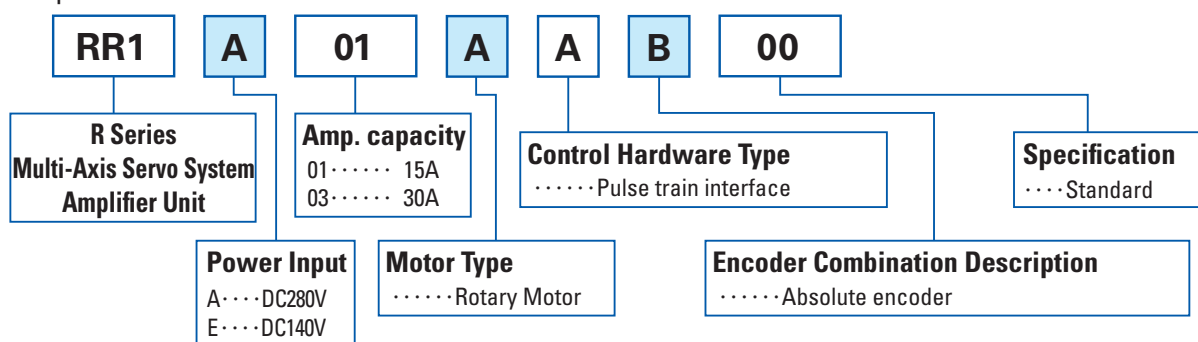
*Please set the parameters for your selected motor accordingly before using.

Multi-Axis Servo Amplifier

Example: The model number shown below is a 4-axis "R" series multiaxis servo amplifier configuration with 200V AC input voltage, 2 units of 15A amplifiers, 2 units of 30A amplifiers, and pulse train interface.

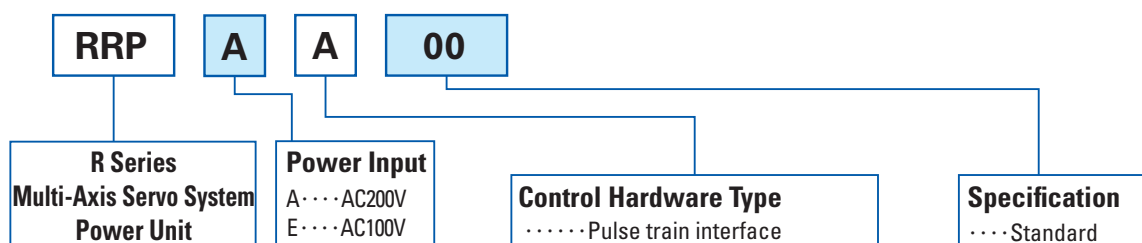
Amplifier Unit RR1A01AAB00 × 2 units
 RR1A03AAB00 × 2 units
 Power Unit RRPAA00 × 1 unit
 Motherboard RRMA600 × 1 unit

Amplifier Unit

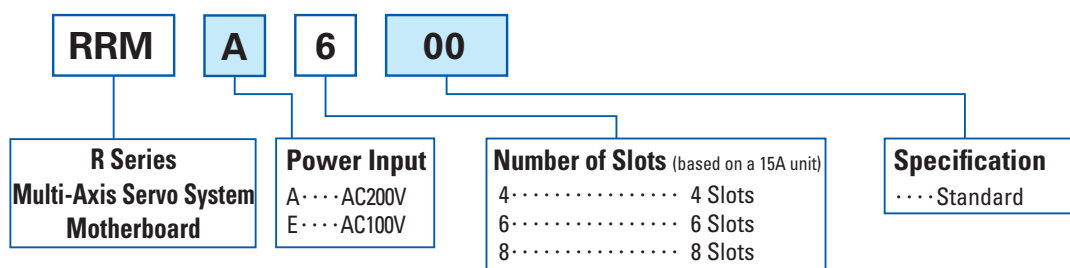


*Please set the parameters for your selected motor accordingly before using.

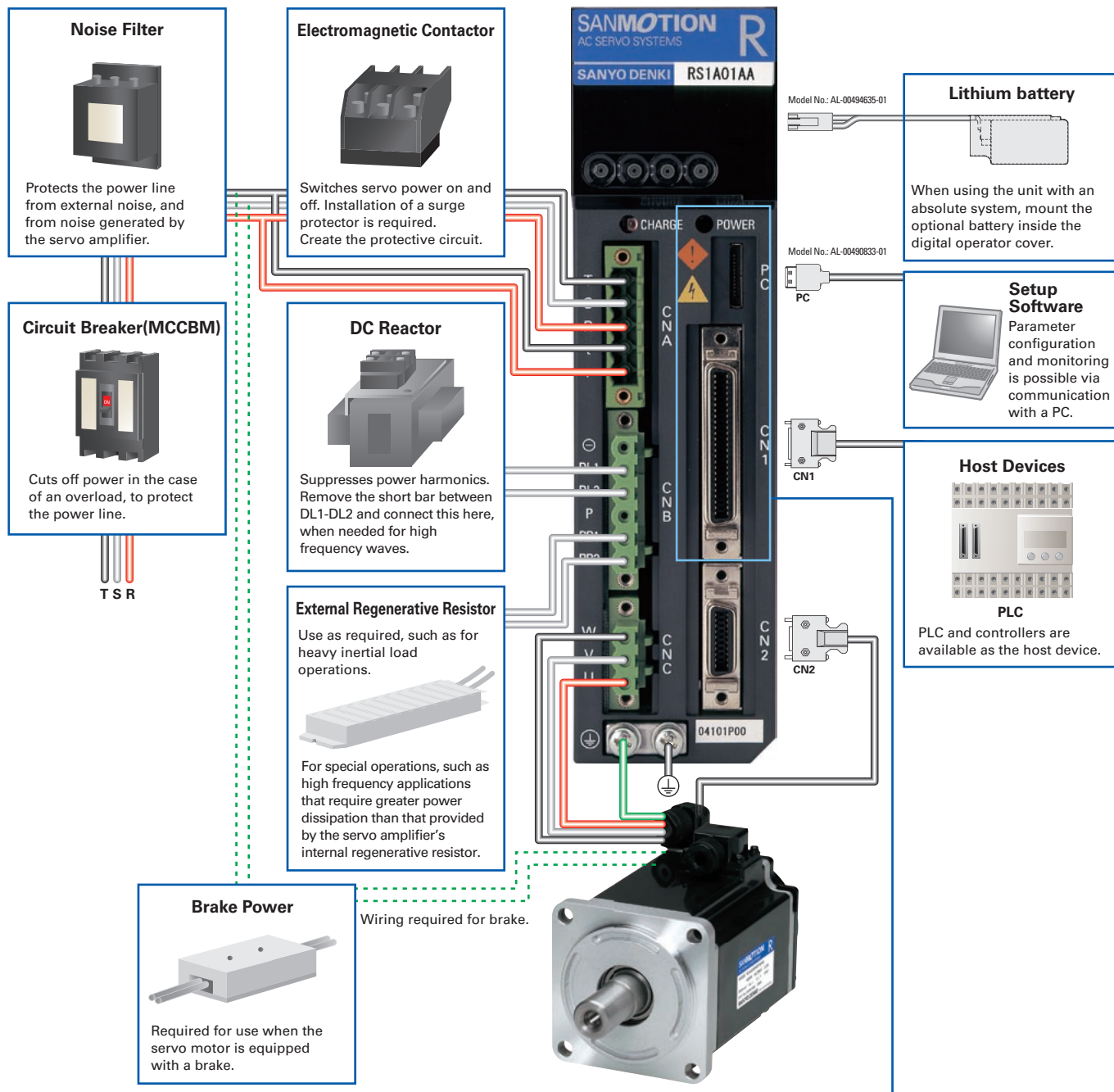
Power Unit



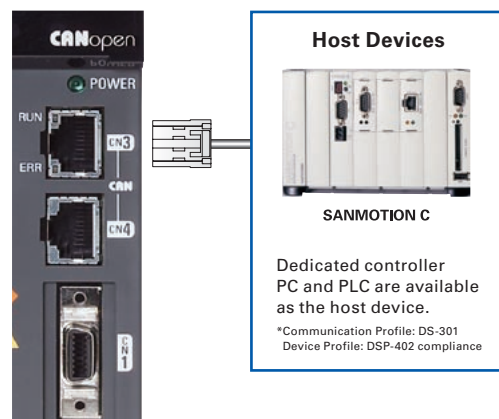
Motherboard



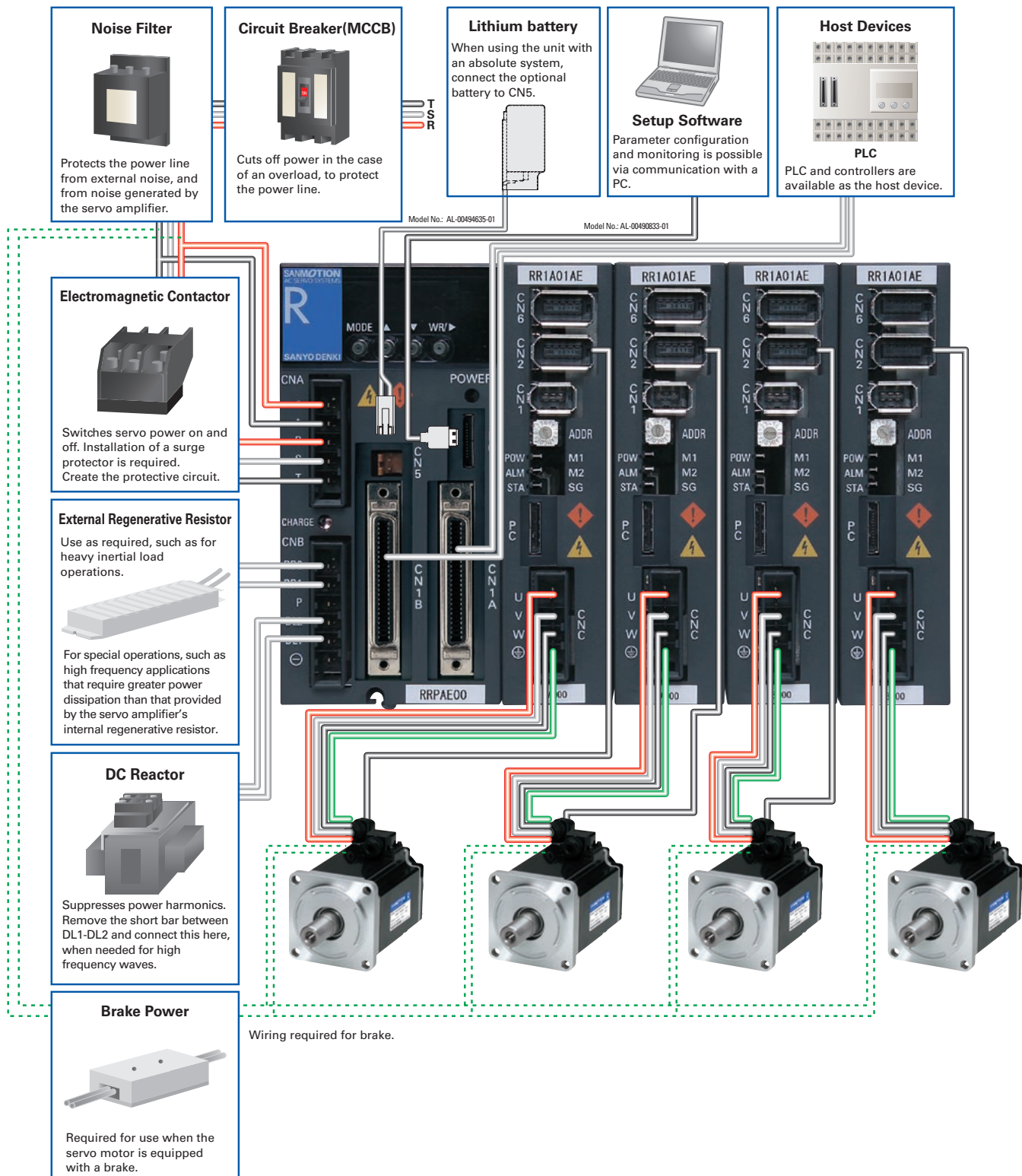
Single-Axis Servo Amplifier



CANopen



Multi-Axis Servo Amplifier



Features and Functions

Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Dimensions

Setup Software

Optional Equipment

Standard Specifications



R2

Servo Motor
200V System

Capacity

□40mm to □80mm
30W to 750W
(9 models)

Features

High Efficiency and Low
Ripple (Medium Inertia)

Motor Dwgs P20

★:Indicates a typical value
after warm-up and thermal
stabilization, together with
a standard amplifier.

☆:Indicates a typical
value when the winding
temperature is 20°C.

Motor Model and Flange Size in mm				R2AA04003F 《40》	R2AA04005F 《40》	R2AA04010F 《40》
	Status	Symbol	Unit			
Rated Output	★	P _R	W	30	50	100
Rated Speed	★	N _R	min ⁻¹	3000		
Maximum Speed	★	N _{max}	min ⁻¹	6000		
Rated Torque	★	T _R	N·m	0.098	0.159	0.318
Continuous Torque at Stall	★	T _S	N·m	0.108	0.167	0.318
Peak Torque at Stall	★	T _P	N·m	0.37	0.59	1.18
Rated Armature Current	★	I _R	Arms	0.51	0.67	0.81
Armature Current at Stall	★	I _S	Arms	0.56	0.69	0.81
Peak Armature Current at Stall	★	I _P	Arms	2.15	2.8	3.3
Torque Constant	☆	K _T	N·m／Arms	0.201	0.246	0.424
Voltage Constant Per Phase	☆	K _{Eφ}	mV／min ⁻¹	7	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 Moment of Inertia (Not including Encoder)		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0247	0.0376	0.0627
Rotor Moment of Inertia (Encoder)		J _S	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0033 (Note 3)		
Mass including Encoder		W _E	kg	0.23	0.27	0.39
Brake Static Friction Torque		T _B	N·m	0.32 MIN.		
Brake Rated Voltage		V _B	V	DC90V／DC24V ± 10%		
Brake Rated Current		I _B	A	0.07／0.27		
Rotor Moment of Inertia (Brake)		J _B	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0078		
Brake Mass		W	kg	0.23		
Motor Operating Temp, Rel. Humidity				Operating Temperature: 0 to 40° C, Relative Humidity: 90% Maximum, no condensation		
Amplifier Model (Single-Axis)				RS1A01AA		
Amplifier Model (CANopen)				RS1A01AL		
Amplifier Model (Multi-Axis)				RR1A01AAB00		
Amplifier Power Supply				AC200V to 230V +10, -15% 50/60Hz ± 3Hz (Note 2)		
Amp. Operating Temp. and RH				Operating Temperature: 0 to 55° C (Note1), Relative Humidity: 90% Maximum, no condensation		
Power Consumption			kVA	0.2		0.4
Amplifier Mass (Weight) [Single / CAN / Multi]			kg	0.9／1.0／0.48		

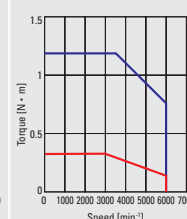
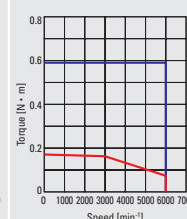
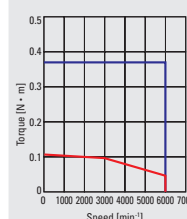
Note 1) The multi-axis type amplifier has an ambient
operating temperature of 0 to 40°C. The operating
temperature with forced air cooling is 0 to 55°C.

Note 2) In case of the amplifier for CANopen, there is also
control power source DC24V type.

Note 3) This is an instance with the battery-backup method
absolute encoder (PA035).

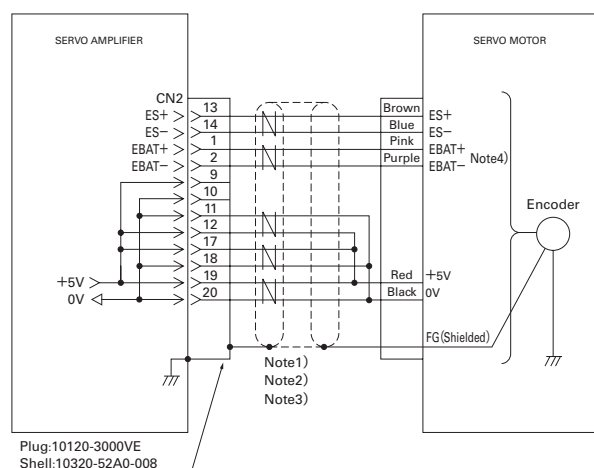
For the following encoders, please make inquiries:
·Absolute encoder without battery [RA035C]
·Red. Wiring Incremental Encoder [PP031T]

* For models with oil seal or brake, reduction in rated value
may become necessary.



Encoder Wiring Diagram

Single-Axis Servo Amplifier



Battery backup type absolute encoder [PA035C]

Absolute encoder for incremental system [PA035S]

Absolute encoder without battery [RA035C]

Note 1) Use a twisted-pair shielded cable.

Note 2) Encoder power connections depend on encoder cable length. See the following

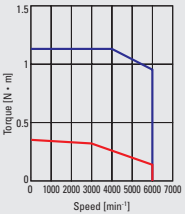
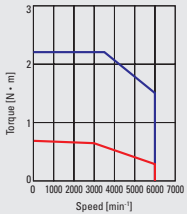
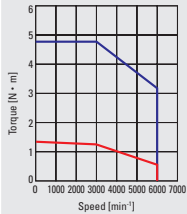
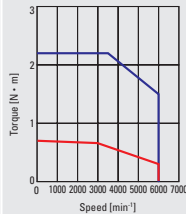
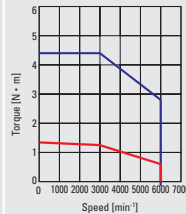
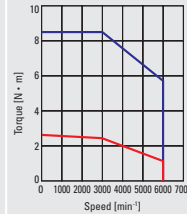
Encoder cable length	10m MAX.	25m MAX.	40m MAX.
+5V DC Wiring	Connect pin 19 (Do not connect pins12,17)	Connect pin 17,19 (Do not connect pins12)	Connect pin 12,17,19
0V DC Wiring	Connect pin 20 (Do not connect pins11,18)	Connect pin 18,20 (Do not connect pins11)	Connect pin 11,18,20

Note 3) Use a Awg24 0.2mm² encoder cable

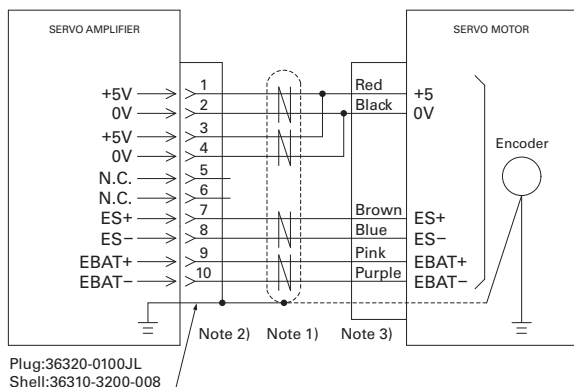
Note 4) When the Absolute encoder for incremental system or absolute encoder
without battery is used, battery lines (EBAT+, EBAT-) are not required.

For the following encoders, please make inquiries:

·Red. Wiring incremental encoder [PP031T] Wiring diagram → page14

R2AA06010F 《60》	R2AA06020F 《60》	R2AA06040F 《60》	R2AA08020F 《80》	R2AA08040F 《80》	R2AA08075F 《80》	Unit
100	200	400	200	400	750	W
3000						min ⁻¹
6000						min ⁻¹
0.318	0.637	1.273	0.637	1.27	2.39	N·m
0.353	0.686	1.372	0.686	1.37	2.55	N·m
1.13	2.2	4.8	2.2	4.4	8.5	N·m
0.86	1.5	2.8	1.5	2.6	4.6	Arms
0.86	1.6	2.8	1.5	2.6	4.6	Arms
3.5	5.6	10.8	4.8	8.9	15.5	Arms
0.375	0.476	0.524	0.516	0.559	0.559	N·m / Arms
13.1	16.6	18.3	18.0	19.5	19.5	mV / min ⁻¹
4.8	2.7	1.36	2.3	0.93	0.4	Ω
8.6	19	39	8	16	31	kW / s
2.0	2.6	3.2	2.2	2.5	3.0	ms
1.2	0.78	0.61	1.3	0.93	0.70	ms
0.117	0.219	0.412	0.52	1.04	1.82	×10 ⁻⁴ kg·m ² (GD ² /4)
0.0033 (Note 3)						×10 ⁻⁴ kg·m ² (GD ² /4)
0.59	0.84	1.3	1.2	1.6	2.6	kg
0.36 MIN.	1.37 MIN.		2.55 MIN.			N·m
DC90V / DC24V ± 10%						V
0.07 / 0.27	0.11 / 0.32		0.12 / 0.37			A
0.060	0.060		0.25			×10 ⁻⁴ kg·m ² (GD ² /4)
0.30	0.35		0.85			kg
Operating Temperature: 0 to 40°C, Relative Humidity: 90% Maximum, no condensation						
RS1A01AA		RS1A03AA	RS1A01AA	RS1A03AA		
RS1A01AL		RS1A03AL	RS1A01AL	RS1A03AL		
RR1A01AAB00		RR1A03AAB00	RR1A01AAB00	RR1A03AAB00		
AC200V to 230V +10, -15% 50/60Hz ± 3Hz (Note 2)						
Operating Temperature: 0 to 55°C (Note), Relative Humidity: 90% Maximum, no condensation						
0.4	0.8	1.0	0.8	1.0	1.7	kVA
0.9 / 1.0 / 0.48		1.0 / 1.11 / 0.77		1.0 / 1.11 / 0.77		kg
						

Multi-Axis Servo Amplifier



Battery backup type absolute encoder [PA035C]

- Note 1)  Use a twisted-pair shielded cable.
- Note 2) The sheathed shield wire should be connected to the metal case (ground) on CN2 side, before connecting to ground on encoder side.
- Note 3) Color symbols shown on the diagram for signal lines on encoder side refer to lead-wire type sensors.
- Note 4) The allowable connection distance between amplifier and encoder varies according to the diameter(impedence) of the electric wire of the cable used. The power voltage specification for encoders is 5V±5%. If the cable is too long, the voltage on encoder side may fall below 5V. Measure the voltage on encoder side to ensure that the cable used is within specification limits.

For the following encoders, please make inquiries:
• Absolute encoder without battery [RA035C]

Standard Specifications



R2

Servo Motor
100V System

Capacity

□40mm to □60mm
30W to 200W
(5 models)

Features

High Efficiency and Low
Ripple (Medium Inertia)

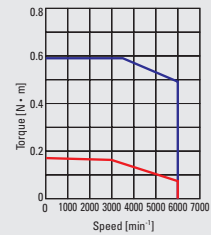
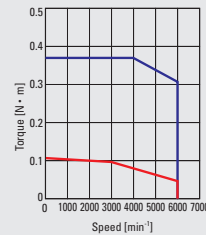
Motor Dwg P20

★:Indicates a typical value after warm-up and thermal stabilization, together with a standard amplifier.

☆:Indicates a typical value when the winding temperature is 20°C.

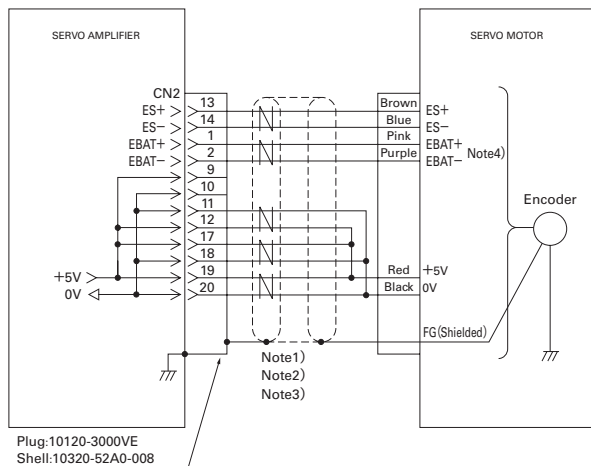
Motor Model and Flange Size in mm				R2EA04003F (40)	R2EA04005F (40)
	Status	Symbol	Unit		
Rated Output	★	P _R	W	30	50
Rated Speed	★	N _R	min ⁻¹	3000	
Maximum Speed	★	N _{max}	min ⁻¹	6000	
Rated Torque	★	T _R	N·m	0.098	0.159
Continuous Torque at Stall	★	T _S	N·m	0.108	0.167
Peak Torque at Stall	★	T _P	N·m	0.37	0.59
Rated Armature Current	★	I _R	Arms	0.94	1.2
Armature Current at Stall	★	I _S	Arms	1.0	1.3
Peak Armature Current at Stall	★	I _P	Arms	3.7	4.9
Torque Constant	☆	K _T	N·m/Arms	0.116 ± 10%	0.142 ± 10%
Voltage Constant Per Phase	☆	K _{Eφ}	mV/min ⁻¹	4.04 ± 10%	4.97 ± 10%
Phase Resistance	☆	R _φ	Ω	4	3
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 Moment of Inertia (Not including Encoder)		J _M	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0247	0.0376
Rotor Moment of Inertia (Encoder)		J _S	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0033	
Mass including Encoder		WE	kg	0.23	0.27
Brake Static Friction Torque		TB	N·m	0.32 MIN.	
Brake Rated Voltage		VB	V	DC90V / DC24V ± 10%	
Brake Rated Current		IB	A	0.07 / 0.27	
Rotor Moment of Inertia (Brake)		JB	×10 ⁻⁴ kg·m ² (GD ² /4)	0.0078	
Brake Mass		W	kg	0.23	
Motor Operating Temp, Rel. Humidity				Operating Temperature: 0 to 40°C, Relative Humidity: 90% Maximum, no condensation	
Amplifier Model (Single-Axis)				RS1E01AA	
Amplifier Power Supply				AC100V to 115V + 10, - 15% 50/60Hz ± 3Hz	
Power Consumption			kVA	0.2	

* For models with oil seal or brake, reduction in rated value may become necessary.



Encoder Wiring Diagram

Single-Axis Servo Amplifier



Battery backup type absolute encoder [PA035C]

Absolute encoder for incremental system [PA035S]

Absolute encoder without battery [RA035C]

Note 1) Use a twisted-pair shielded cable.

Note 2) Encoder power connections depend on encoder cable length. See the following

Encoder cable length	10m MAX.	25m MAX.	40m MAX.
+5V DC Wiring	Connect pin 19 (Do not connect pins 12,17)	Connect pin 17,19 (Do not connect pins 12)	Connect pin 12,17,19
0V DC Wiring	Connect pin 20 (Do not connect pins 11,18)	Connect pin 18,20 (Do not connect pins 11)	Connect pin 11,18,20

Note 3) Use a Awg24 0.2mm² encoder cable

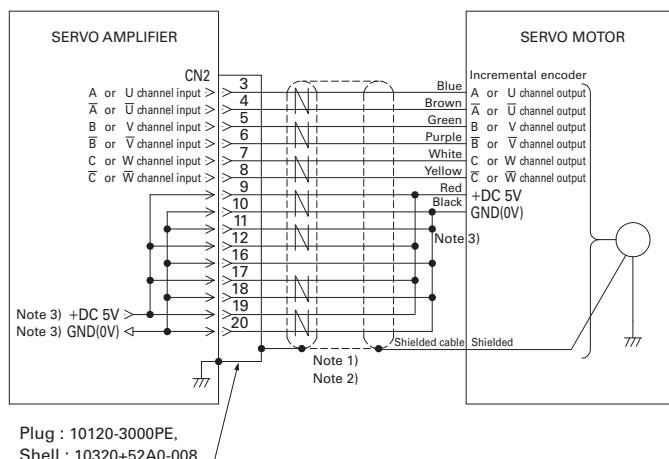
Note 4) When the Absolute encoder for incremental system or absolute encoder without battery is used, battery lines (EBAT+, EBAT-) are not required.

For the following encoders, please make inquiries:

• Red. Wiring incremental encoder [PP031T] Wiring diagram → page14

R2EA04008F 〈40〉	R2EA06010F 〈60〉	R2EA06020F 〈60〉	Unit
80	100	200	W
	3000		min ⁻¹
	6000		min ⁻¹
0.255	0.318	0.637	N·m
0.255	0.318	0.686	N·m
0.86	1.0	2.2	N·m
1.3	1.7	3.1	Arms
1.3	1.7	3.2	Arms
4.5	5.6	11.9	Arms
0.221 ± 10%	0.206 ± 10%	0.224 ± 10%	N·m/Arms
7.7 ± 10%	7.2 ± 10%	7.82 ± 10%	mV/min ⁻¹
2.9	1.5	0.6	Ω
10	8.6	19	kW/s
0.81	1.9	2.6	ms
0.98	1.2	0.79	ms
0.0627	0.117	0.219	×10 ⁻⁴ kg·m ² (60°/4)
	0.0033		×10 ⁻⁴ kg·m ² (60°/4)
0.39	0.59	0.84	kg
0.32 MIN.	0.36 MIN.	1.37 MIN.	N·m
DC90V / DC24V ± 10%			V
0.07 / 0.27	0.07 / 0.27	0.11 / 0.32	A
0.0078	0.06		×10 ⁻⁴ kg·m ² (60°/4)
0.23	0.3	0.35	kg
Operating Temperature: 0 to 40° C, Relative Humidity: 90% Maximum, no condensation			
RS1A01AA		RS1E03AA	
AC100V to 115V +10, -15% 50/60Hz ± 3Hz			
0.4	0.5	0.8	kVA

Single-Axis Servo Amplifier



Red. Wiring incremental encoder [PP031T]

Note 1) Use a twisted-pair shielded cable.

Note 2) Encoder power connections depend on encoder cable length. See the following

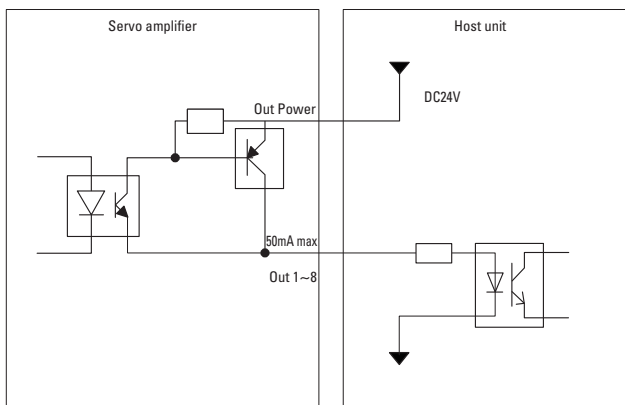
Encoder cable length	5m MAX.	10m MAX.	20m MAX.	30m MAX.
+5V DC Wiring	Connect pin 19 (Do not connect pins 9,12,17)	Connect pin 17,19 (Do not connect pins 9,12)	Connect pin 12,17,19 (Do not connect pins 9)	9,12,17,19 Connect pin
0V DC Wiring	Connect pin 20 (Do not connect pins 10,11,16,18)	Connect pin 18,20 (Do not connect pins 10,11,16)	Connect pin 11,18,20 (Do not connect pins 10,16)	10,11,16,18,20 Connect pin

Note 3) Use a Awg24 0.2mm² encoder cable

CANopen Interface specifications

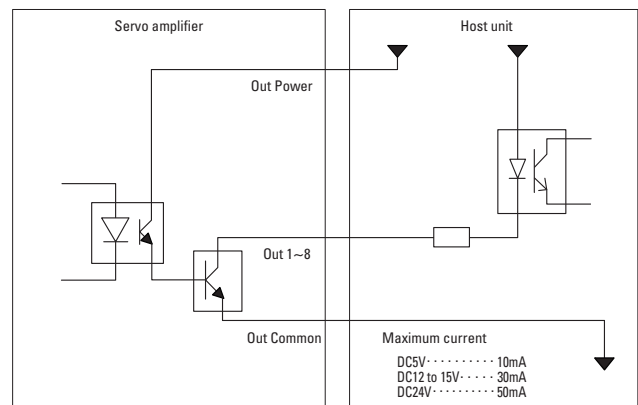
Fieldbus specifications	Bus Connection, Medium	CAN-Standard ISO-11898 (High-speed CAN)	
	Fieldbus	CANopen	
	Communication Profile	CiA DS301 Version 4.02	
	Device Profile	CiA DSP402 (CANopen device profile for drive and motion control) Version 2.0	
	Bit Rate	1Mbps, 800Kbps, 500Kbps(default setting), 250kbps, 125Kbps, 50Kbps, 20Kbps, 10Kbps (Selectable by R-Setup Software)	
	Max. nodes per segment	1 to 127 (Selectable by Double 16-position Rotary Switch or R-Setup Software)	
	Connector	RJ-45 type Modular connector (2 ports) - Pin 1 "CAN_H" high bus line - Pin 2 "CAN_L" low bus line - Pin 3,7 "CAN_GND" Ground - Pin 6 "CAN_SHIELD" Cable Shield - Pin 5 "Terminator" (120 ohm; if necessary, attach a jumper between Pin1 and Pin5)	
	Transceiver	ISO-11898 compliant high-speed transceiver	
	Max. Bus Length	25m (for 1Mbps)	
	Communication Objects	SDO (Service Data Object) EMCY (Emergency) SYNC (Synchronization Object) Heartbeat	PDO (Process Data Object) NMT (Network Management) Node Guarding
	PDO Transfer Modes	Synchronous transmission	Asynchronous transmission
	Mode of Operation	Homing Mode (h.m) Profile Velocity Mode (p.v) Profile Torque Mode (t.q)	Profile Position Mode (p.p) Interpolated Position Mode (i.p)

PNP output



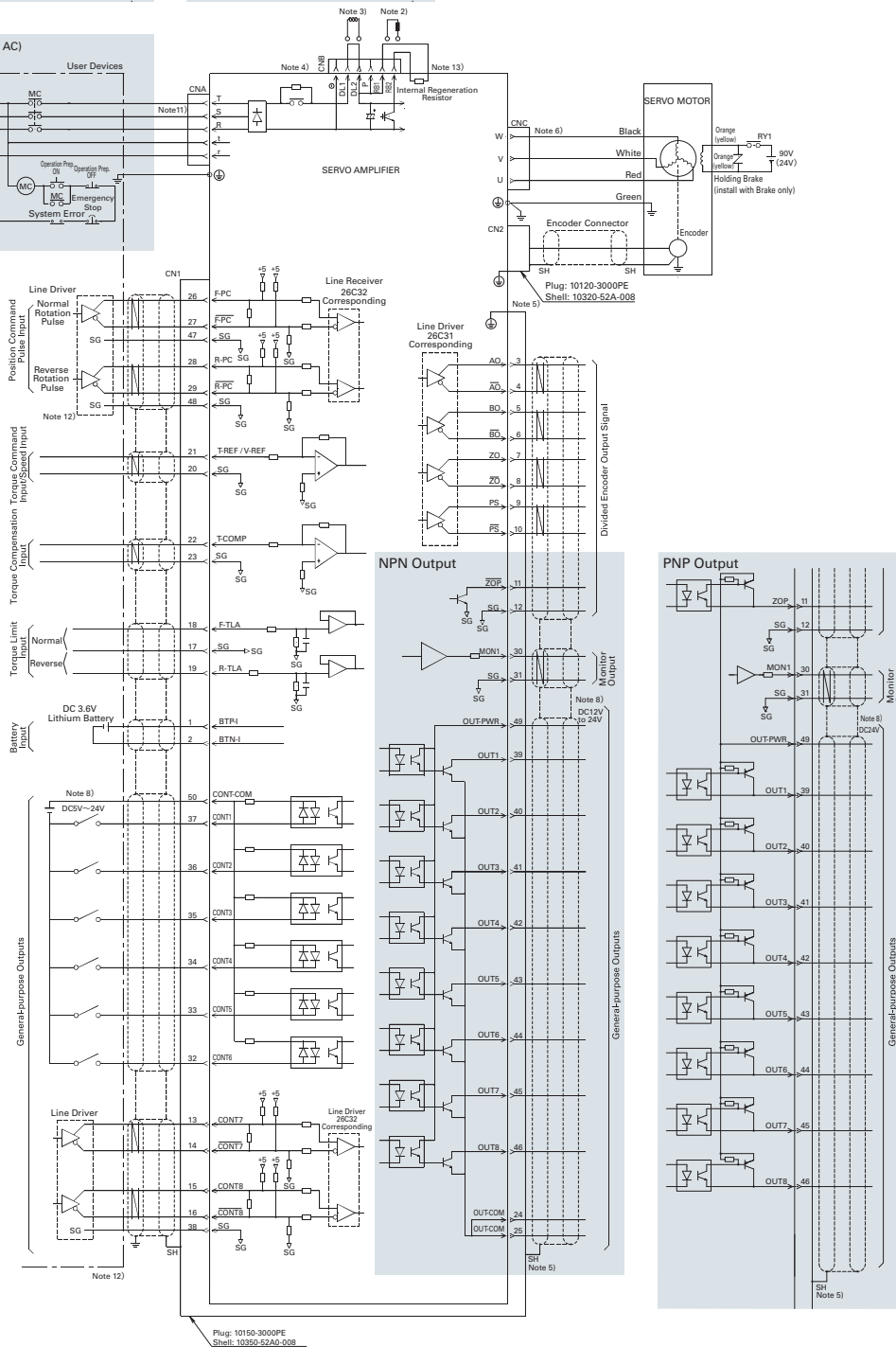
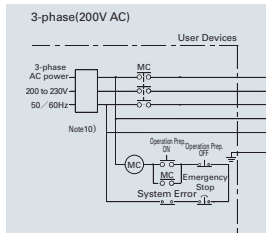
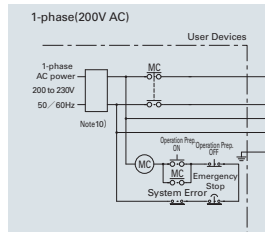
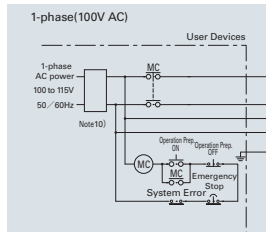
The output port counts are different depending on the specification.

NPN output

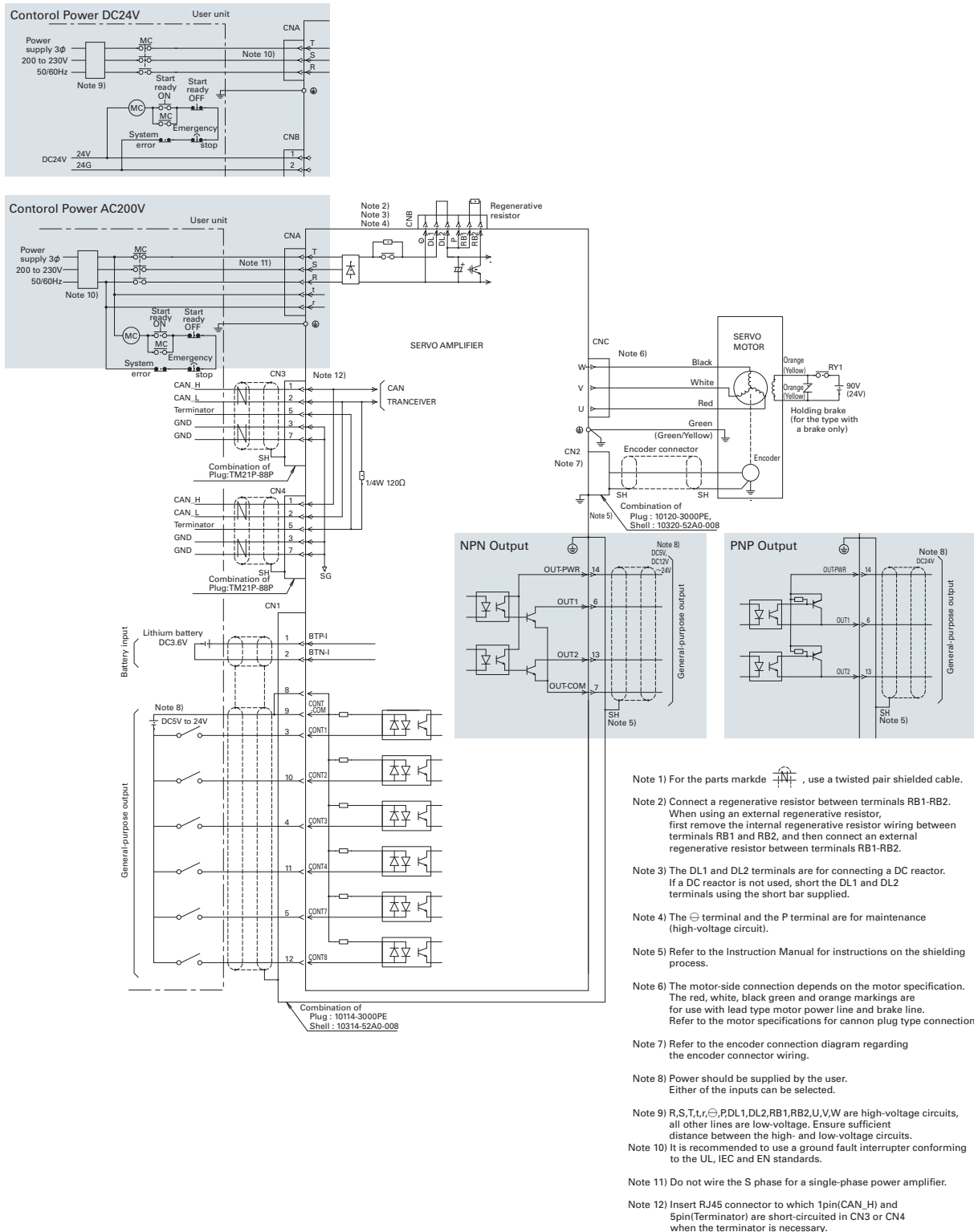


The output port counts are different depending on the specification.

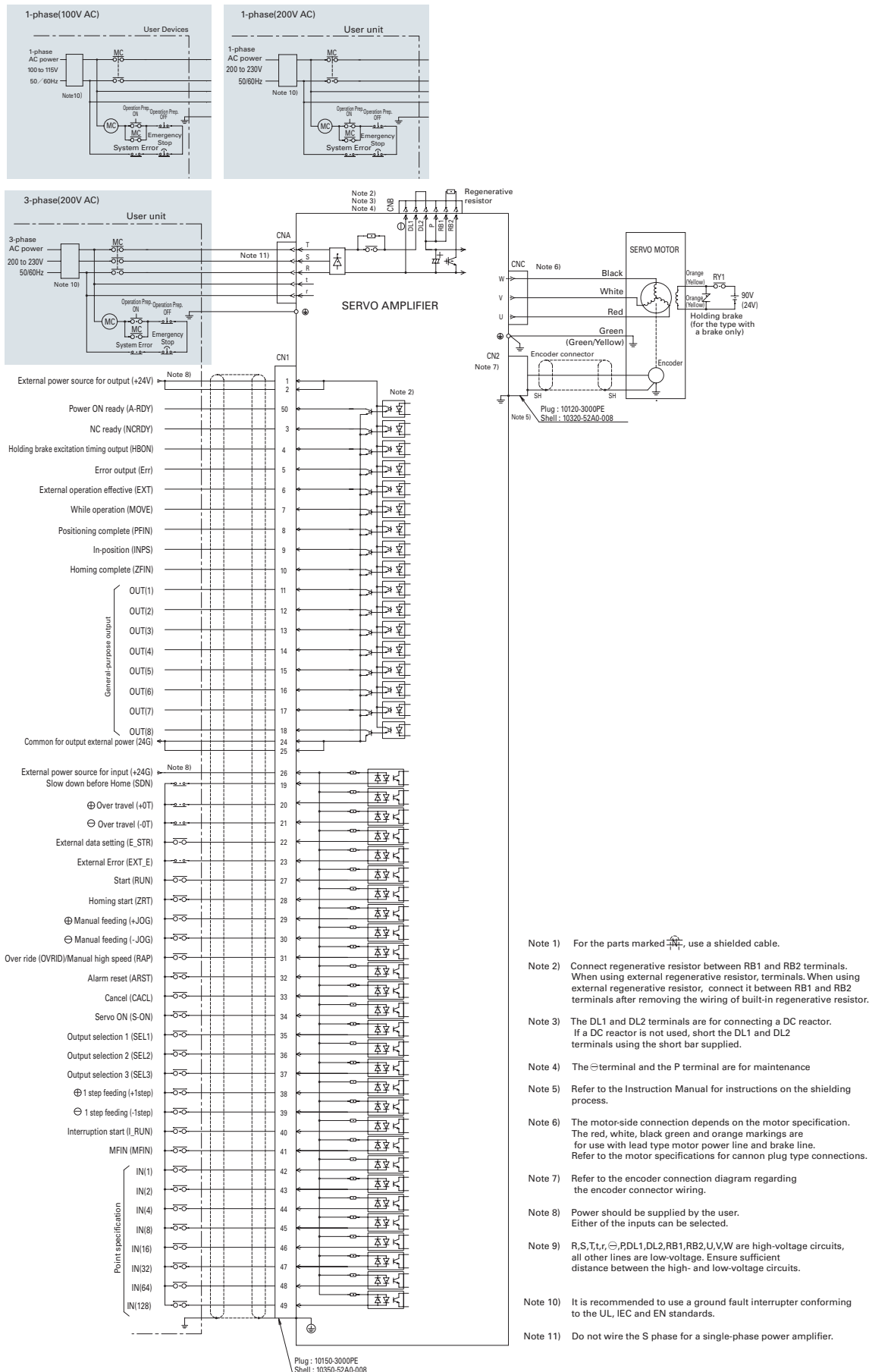
Single-Axis Servo Amplifier



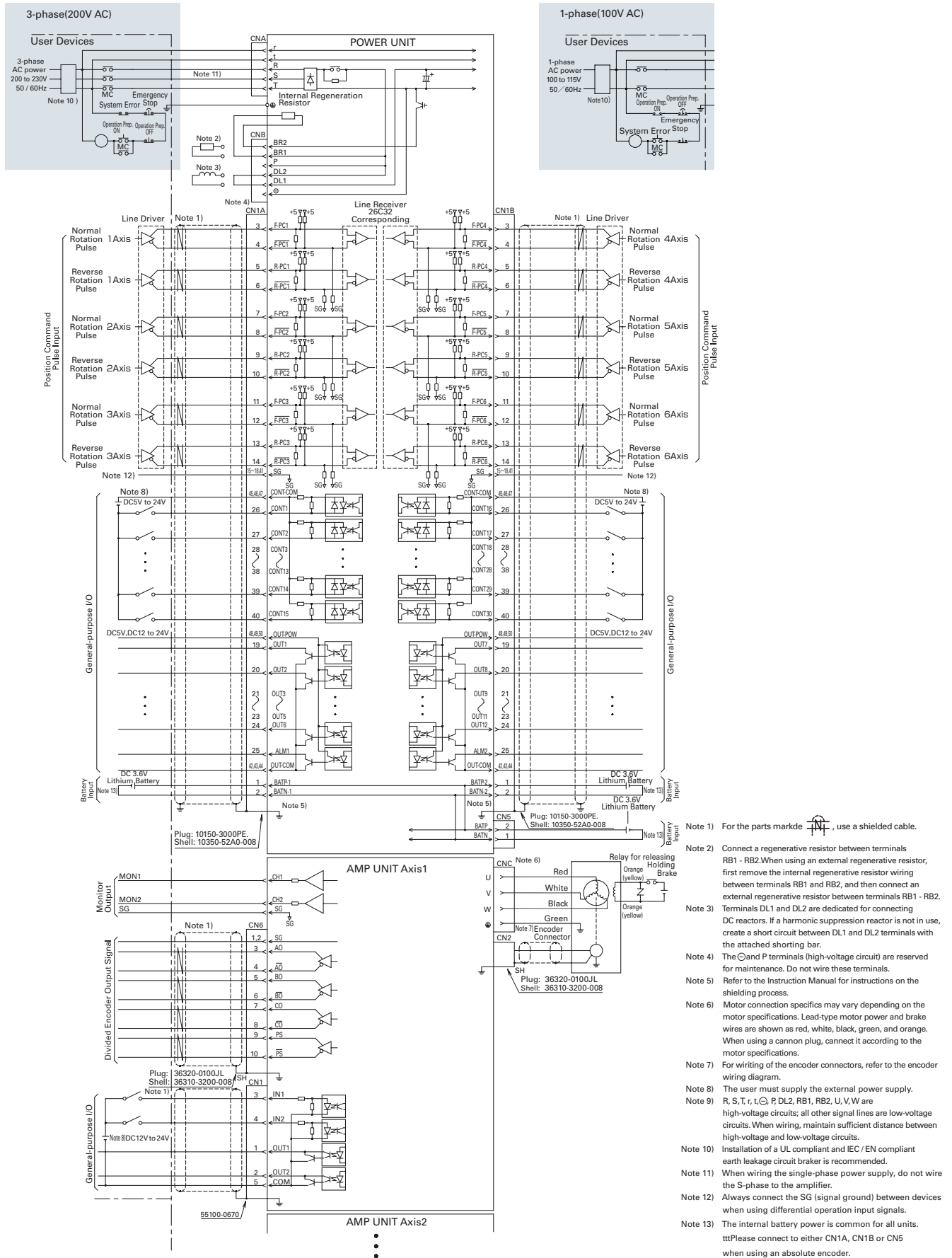
Single-Axis Servo Amplifier with CANopen

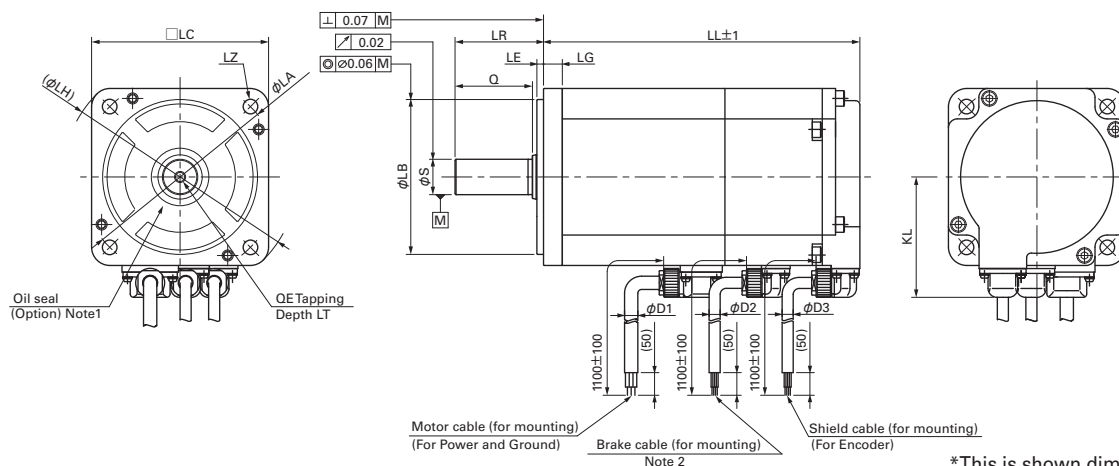


Single-Axis Servo Amplifier built-in positioning function model



Multi-Axis Servo Amplifier





*This is shown dimension for motor with brake

R2 Servo Motor High Efficiency and Low Ripple (Medium Inertia)

MODEL	W/out oil seal		With oil seal Note 1		LG	KL	LA	LB	LE	LH	LC	LZ	LR	
	Battery backup method absolute encoder		Battery backup method absolute encoder											
	W/out brake	With brake	W/out brake	With brake										
R2□A04003△□◇	51.5	87.5	56.5	92.5	5	35.4	46	0 30-0.021	2.5	56	40	4.5	25	
R2□A04005△□◇	56.5	92.5	61.5	97.5										
R2EA04008 △□◇	72	108	77	113										
R2AA04010 △□◇														
R2□A06010△□◇	58.5	82.5	65.5	89.5	6	44.6	70	0 50-0.025	3	82	60	5.5	25	
R2□A06020△□◇	69.5	97.5	76.5	104.5										
R2AA08020 △□◇	66.3	102	73.3	109	8	54.4	90	0 70-0.030		82	80	6.6	30	
R2AA06040 △□◇	95.5	123.5	102.5	130.5	6	44.6	70	0 50-0.025						
R2AA08040 △□◇	78.3	114	85.3	121	8	54.4	90	0 70-0.030	3	108	80	6.6		40
R2AA08075 △□◇	107.3	143	114.3	150										

MODEL	S	Q	QE	LT	D1	D2	D3
R2□A04003△□◇	0 6-0.008	20	—	—	6	5	5
R2□A04005△□◇	0 8-0.009						
R2EA04008 △□◇							
R2AA04010 △□◇							
R2□A06010△□◇	0 8-0.009	25	—	—			
R2□A06020△□◇	0 14-0.011	25	M5	12			
R2AA08020 △□◇							
R2AA06040 △□◇							
R2AA08040 △□◇		35	M5	12			
R2AA08075 △□◇	0 16-0.011						

Note 1: If an oil seal is needed ,the overall motor length is different.

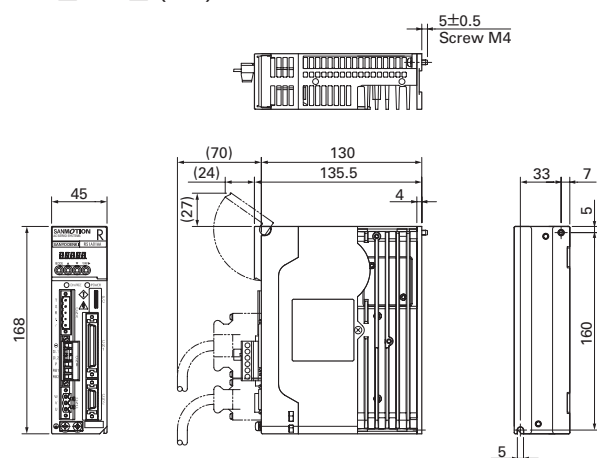
Note 2: Brake connectors (cables) are not supplied for models without brakes.

For the following encoders, please make inquiries:

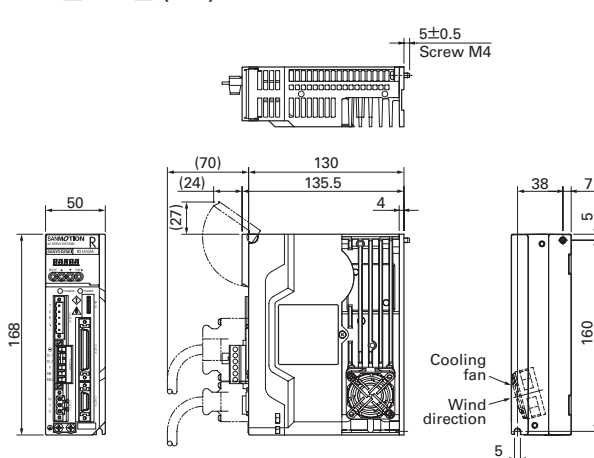
- Absolute encoder without battery [RA035C]
- Red. Wiring Incremental Encoder [PP031T]

Single-Axis Servo Amplifier (Analog/Pulse input type , Built-in positioning function model)

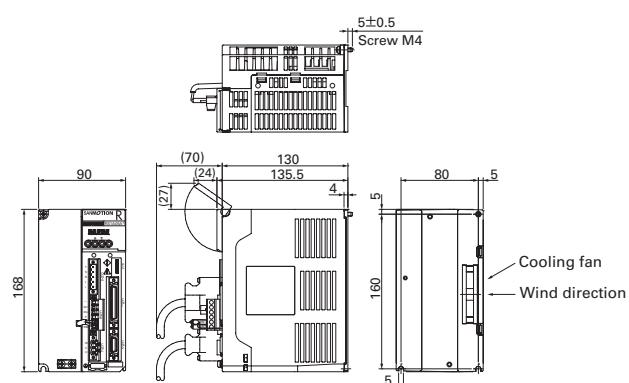
RS1 □ 01A □ (15A)



RS1 □ 03A □ (30A)

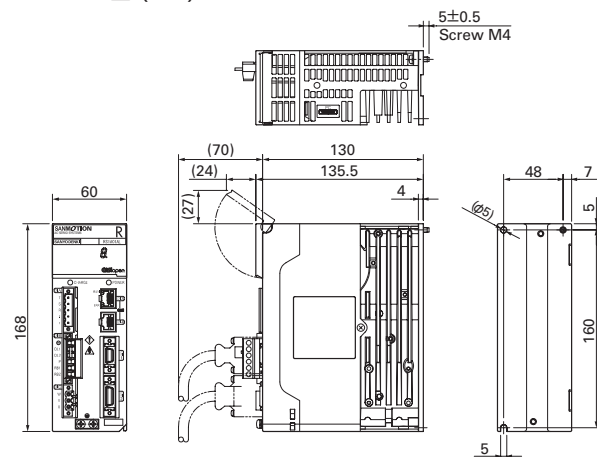


RS1 □ 05A □ (50A)

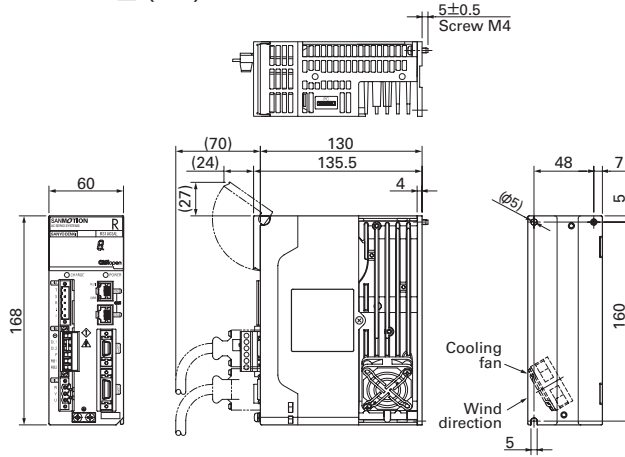


Single-Axis Servo Amplifier with CANopen (Power control AC200V)

RS1A01A □ (15A)

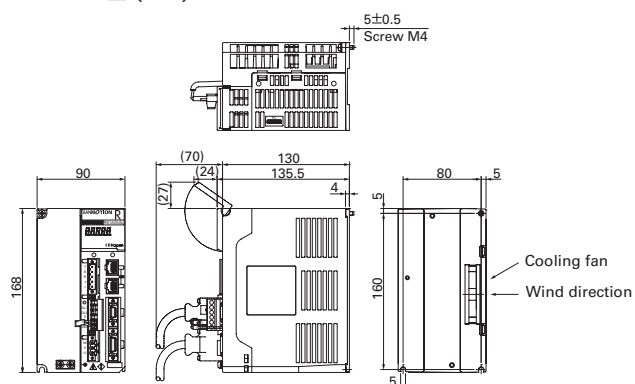


RS1A03A □ (30A)



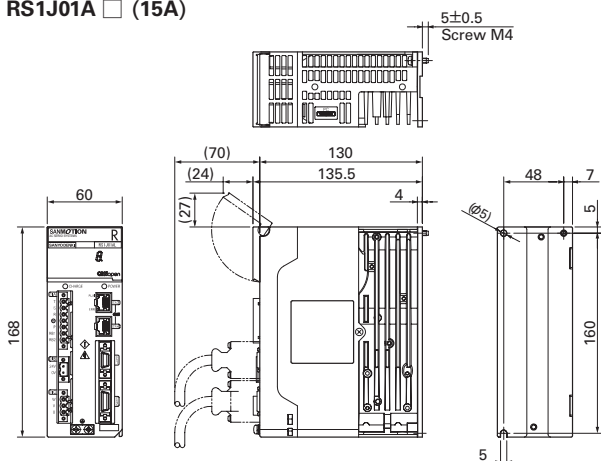
Single-Axis Servo Amplifier with CANopen (Power control AC200V)

RS1A05A □ (50A)

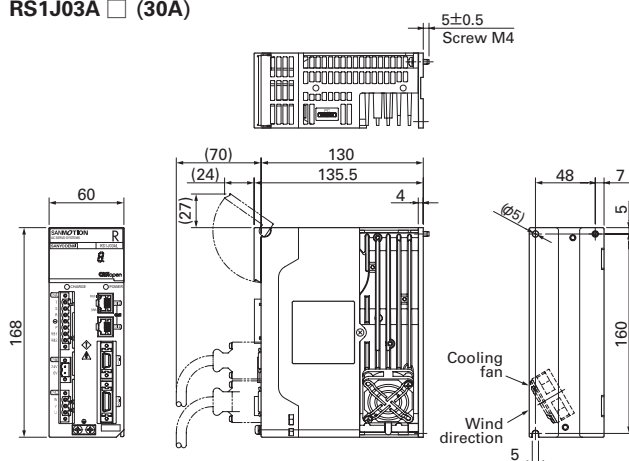


Single-Axis Servo Amplifier with CANopen (Power control DC24V)

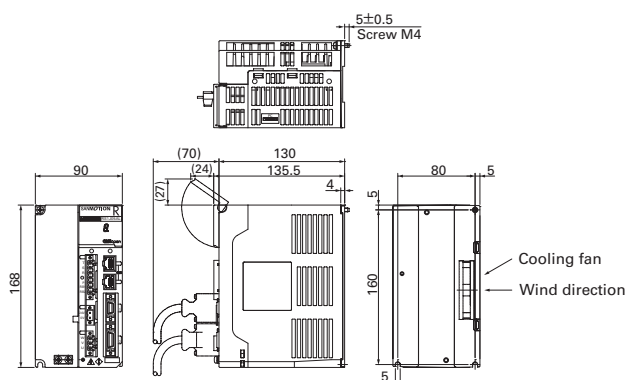
RS1J01A □ (15A)



RS1J03A □ (30A)



RS1J05A □ (50A)



Features and Functions

Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Dimensions

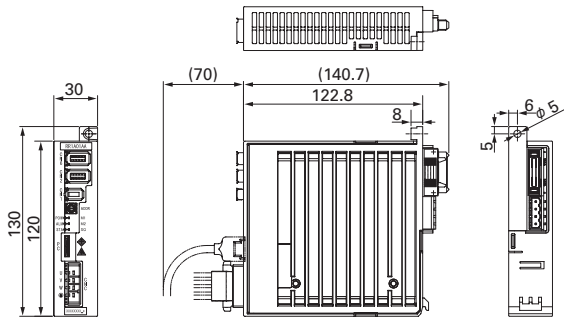
Setup Software

Optional Equipment

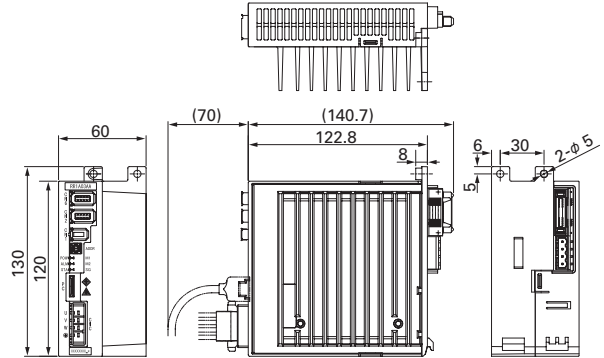
Multi-Axis Sever Amplifier

Amplifier Unit

RR1A01AAB00 (15A)

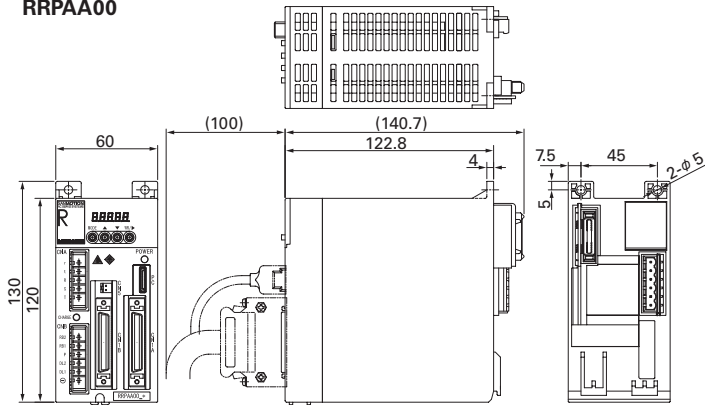


RR1A03AAB00 (30A)

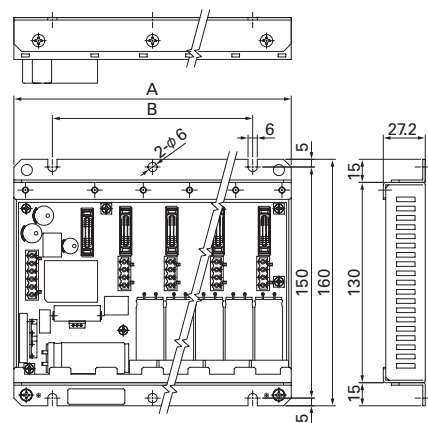


Power Unit

RRPAA00

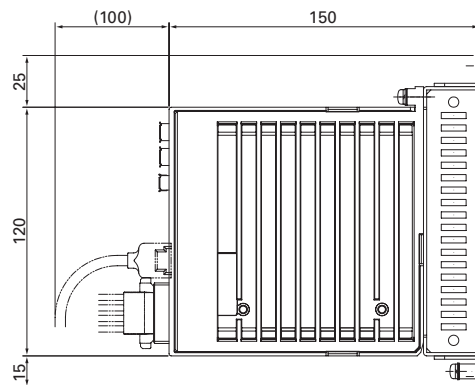
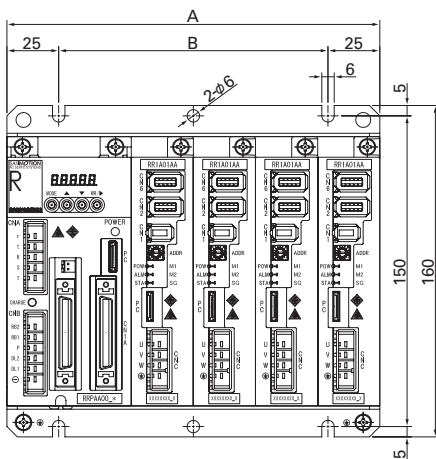


Motherboard



No.	Model No.	Number of Slots	Supported size
3	RRMA800	8	300 250
2	RRMA600	6	240 190
1	RRMA400	4	180 130

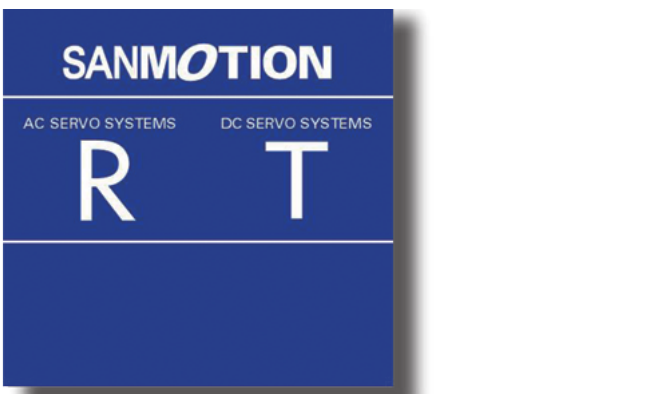
System Dimensions



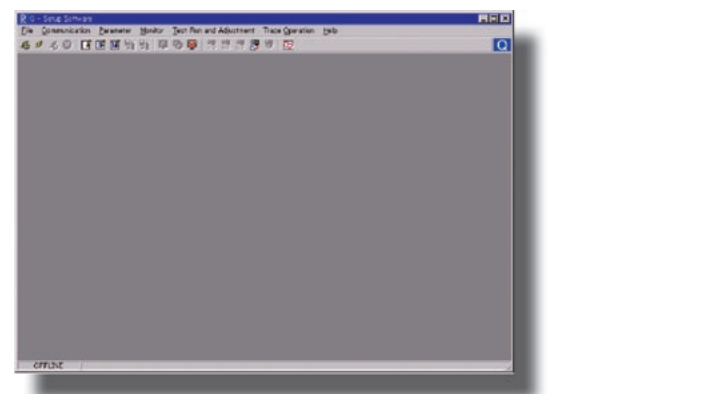
No.	Number of Slots	Supported size
3	8	300 250
2	6	240 190
1	4	180 130

Setup Software

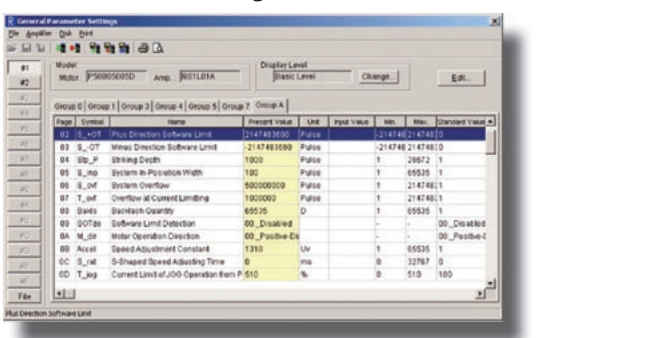
(1) Setup Software Start-up Screen



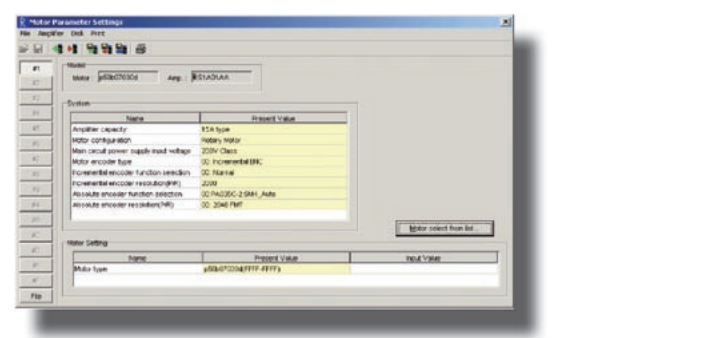
(2) Main Screen



(3) Parameter Configuration Screen

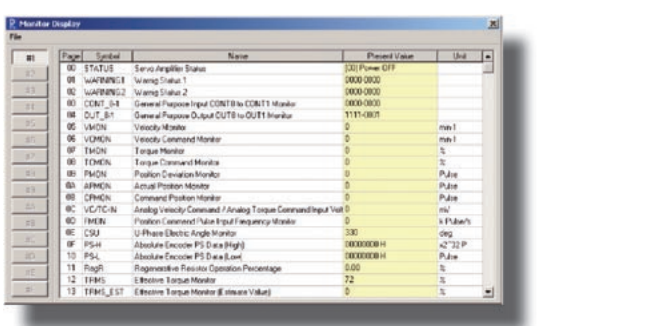


a. Configuration of General Parameters : Enables parameter loading, saving, etc., via PC connection

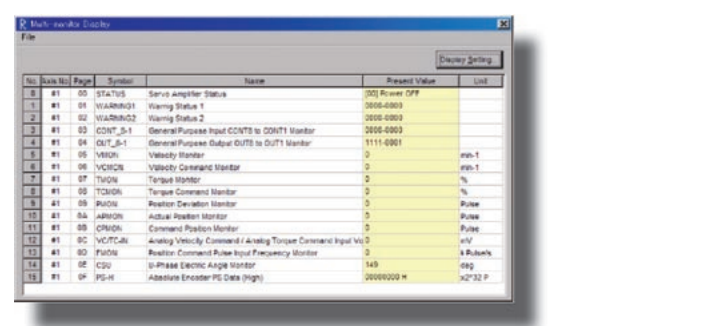


b. Configuration of Motor Parameters : Combined motors can be configured via PC connection

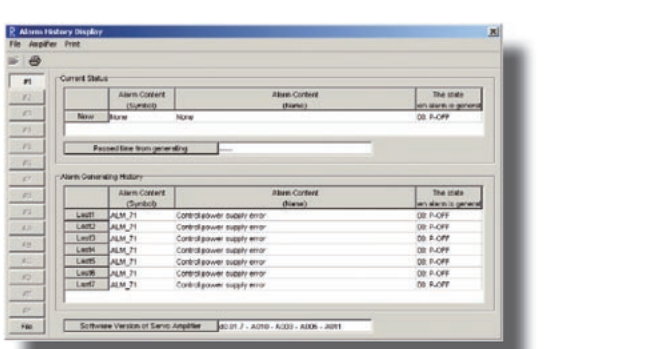
(4) Monitor Functions



a. Monitor Display : Observe Operation and Input/Output signal status



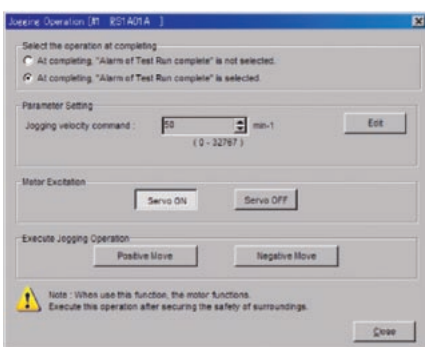
b. Multi-monitor Display : Simultaneous monitoring of operational status of multiple



c. Alarm Record Display : Current and past alarm occurrence can be checked.

Setup Software

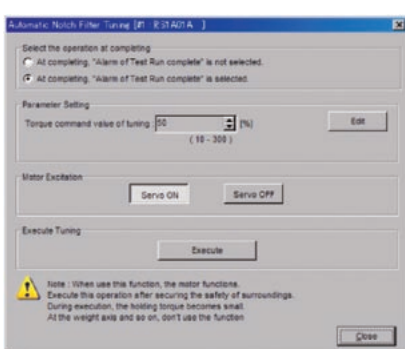
(5) Test Run and Adjustment Function



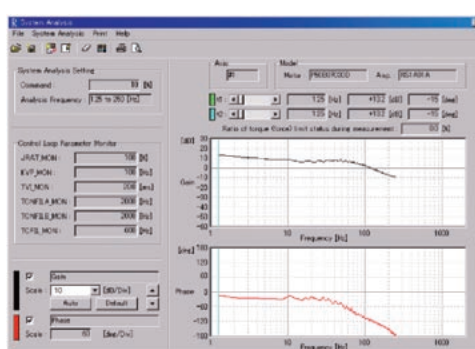
a. Speed Jog : Simplifies motor operation and the issuing of speed commands from a PC



b. Pulse Forward Jog : Simplifies motor operation and the entering of distance and travel speed data from a PC

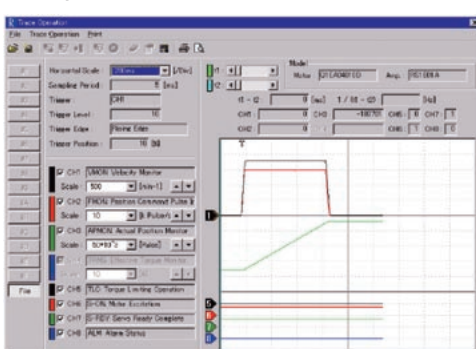


c. Auto Notch Filter Tuning : Configures the appropriate notch filter settings



d. System Analysis : Analyzes servo system frequency characteristics

(6) Operation Trace Function



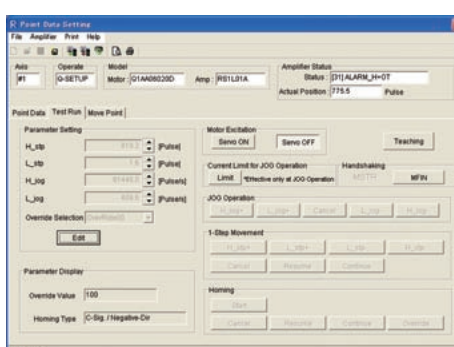
Graphically displays servo motor speed, current, and terminal status

Built-in Positioning Function model Screen

Point Data Setup

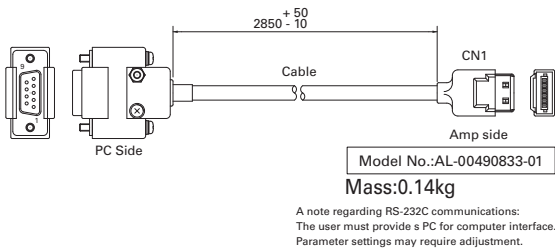
[illegible]

Test Run

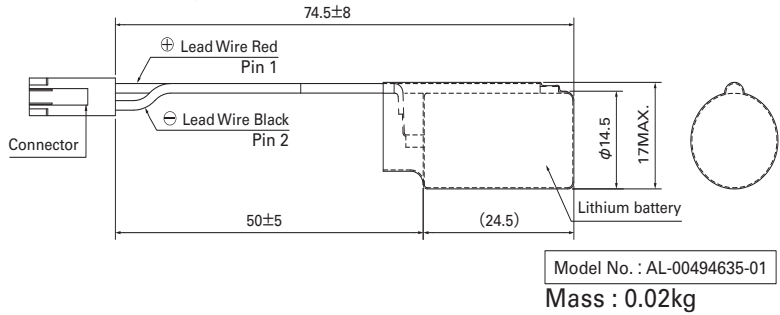


Optional Equipment

PC Interface Cable [Unit: mm]

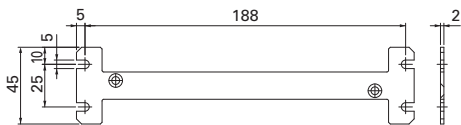


Lithium battery [Unit: mm]



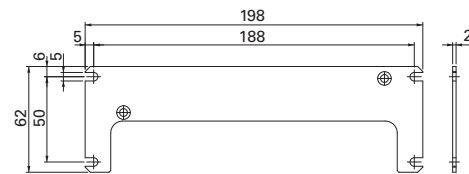
Mounting Hardware [Unit: mm] * Supported For only Single-axis amplifier.

15A / 30A Rear Side



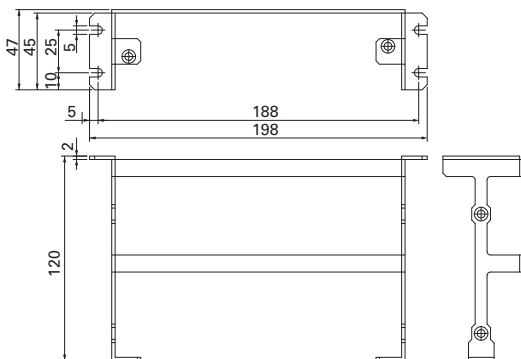
For mounting on the rear side of the amplifier
Model No.:AL-00582791-01
Applicable Amplifiers:RS1*01***
Applicable Amplifiers:RS1*03***
Material:SPCC

50A Rear Side



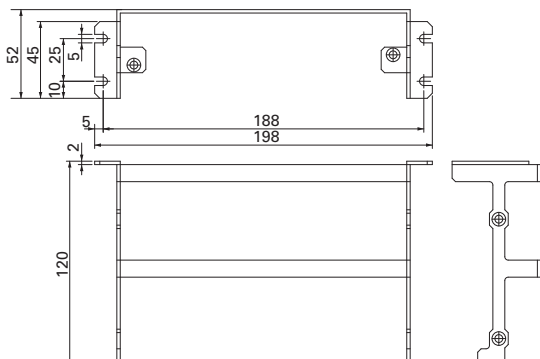
For mounting on the rear side of the amplifier
Model No.:AL-00582792-01
Applicable Amplifiers:RS1*05***
Material:SPCC

15A Front Side



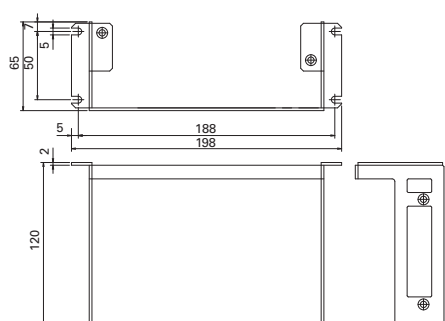
For mounting on the front side of the amplifier
Model No.:AL-00582788-01 Material:SPCC
Applicable Amplifiers:RS1*01***

30A Front Side



For mounting on the front side of the amplifier
Model No.:AL-00582789-01 Material:SPCC
Applicable Amplifiers:RS1*03***

50A Front Side



For mounting on the front side of the amplifier
Model No.:AL-00582790-01 Material:SPCC
Applicable Amplifiers:RS1*05***

Model No.	AL-00582791-01	AL-00582792-01	AL-00582788-01	AL-00582789-01	AL-00582790-01
Contents	Mounting Bracket : 1 Screws : 2	Mounting Bracket : 1 Screws : 2	Mounting Bracket : 1 Screws : 6	Mounting Bracket : 1 Screws : 6	Mounting Bracket : 1 Screws : 6

Features and Functions

Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Dimensions

Setup Software

Optional Equipment

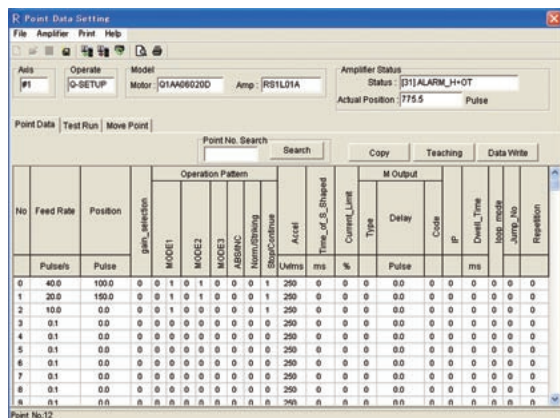
Servo Amplifier built-in positioning function

General Specifications

Positioning Function	Control Shaft Count	Single Shaft
	Register Point Count	Configurable up to 254 points (P000 to P253)
	Maximum No. of Commands	From -2,147,483,648 to +2,147,483,647
	Command Unit	Either mm or pulse is acceptable
	Fast-forward Speed	2,147,483.647mm/sec (0.001mm/when" pulse" is selected)
	Acceleration and Deceleration	Automatic acceleration and deceleration (straight and S switch)
	Point Data Setup	Numerical input via PC, and setup by teaching
	Travel Point Number Setup	Parallel 8 bits (binary code)
	Current Limit	0 to 510% (at 100% rating), but less than instantaneous maximum stall current
	Software Limit	Exists
	Travel Mode	Zero Return, Manual (JOG, 1Step), and Point-specified Travel
Input and Output	Sequence Input Signals	Servo ON, alarm reset, start up, zero return, manual, override/manual high-speed, cancel, deceleration before origin, external error, over-travel, external data setup1 step forward, interrupt activated, output selection, MFIN, point specified input
	Sequence Output Signals	NC ready, holding brake timing, error, external operation enabled, running, positioning completion, in-position output, zero return completion, general output (8 bits)

Sample operations of the Servo Amplifier built-in positioning function model

By starting up Point 1, Points 2 and 3 will be executed consecutively.



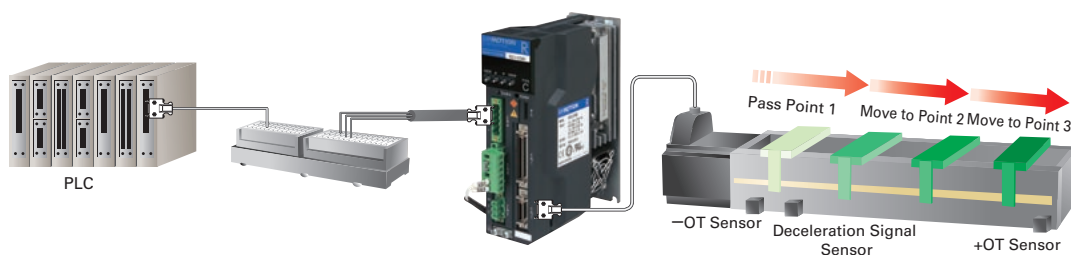
Point Data Setup

Enables configuration and saving of parameters, and the reading of point data from a PC.

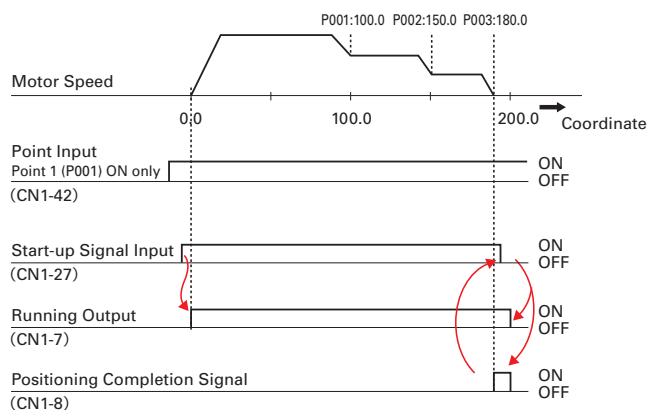
Mode 1: [01]= Positioning Operation enabled;

Mode 2: [00]= Final Travel, [01]= Continue to next Point Number

Gear Change: Stop / Continue: [1]= Consecutive Gear Shift Operation

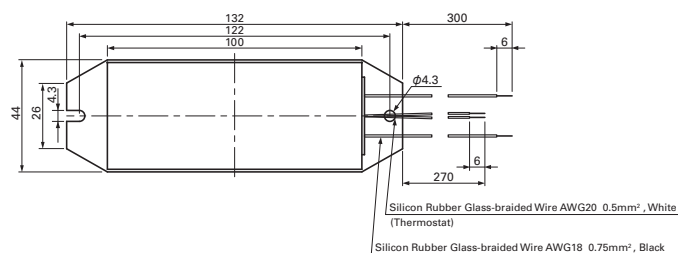


Starting Coordinates: Start-up Point 001 (P001) as 0.0



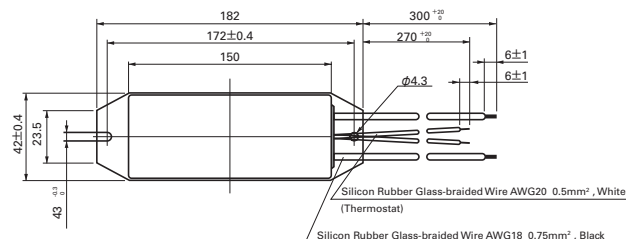
Optional Equipment

External Regenerative Resistor Dimensions [Unit: mm]



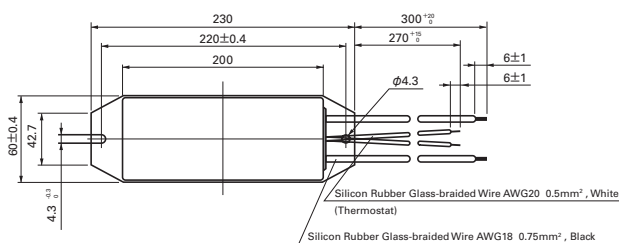
Mass : 0.19kg

	Model No.	Thermostat
1	REGIST-080W100B	Normal close
2	REGIST-080W50B	Normal close



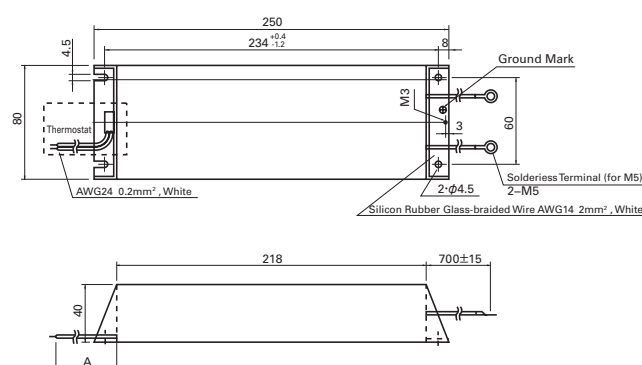
Mass : 0.24kg

	Model No.	Thermostat
1	REGIST-120W100B	Normal close
2	REGIST-120W50B	Normal close



Mass : 0.44kg

	Model No.	Thermostat
1	REGIST-220W20B	Normal close
2	REGIST-220W50B	Normal close
3	REGIST-220W100B	Normal close



Mass : 1.4kg

	Model No.	A	Thermostat
1	REGIST-500W20B	350 ± 15	Normal close
2	REGIST-500W20		No

Connectors for Single-Axis Servo Amplifier Connections (200V AC Input Type)

Usage	Contents	Model No.	Manufacturer	Manufacturer's Part No.
Single Connectors	CN1 (Plug, Housing)	AL - 00385594	Sumitomo 3M	10150-3000PE+10350-52A0-008
	CN2 (Plug, Housing)	AL - 00385596		10120-3000PE+10320-52A0-008
	CNA (Plug)	AL - 00329461-01	Phoenix Contact	MSTB2.5/5-STF-5.08
	CNB (Plug) : Accessory	AL - Y0000988-01		IC2.5/6-STF-5.08
	CNC (Plug)	AL - 00329458-01		IC2.5/3-STF-5.08
Connector Sets	CN1,CN2 (Plug, Housing) CNA,CNC (Plug)	AL - 00393603	Sumitomo 3M Phoenix Contact	10150-3000PE+10350-52A0-008 10120-3000PE+10320-52A0-008 MSTB2.5/5-STF-5.08 IC2.5/3-STF-5.08
	CN1,CN2 (Plug, Housing)	AL - 00292309	Sumitomo 3M	10150-3000PE+10350-52A0-008 10120-3000PE+10320-52A0-008

Optional Equipment

Connectors for Single-Axis Servo Amplifier Connections (100V AC Input Type)

Usage	Contents	Model No.	Manufacturer	Manufacturer's Part No.
Single Connectors	CN1 (Plug, Housing)	AL - 00385594	Sumitomo 3M	10150-3000PE+10350-52A0-008
	CN2 (Plug, Housing)	AL - 00385596		10120-3000PE+10320-52A0-008
	CNA (Plug)	AL - 00329461-02	Phoenix Contact	MSTB2.5/4-STF-5.08
	CNB (Plug) : Accessory	AL - Y0000988-01		IC2.5/6-STF-5.08
	CNC (Plug)	AL - 00329458-01		IC2.5/3-STF-5.08
Connector Sets	CN1,CN2 (Plug, Housing) CNA,CNC (Plug)	AL - 00492384	Sumitomo 3M Phoenix Contact	10150-3000PE+10350-52A0-008 10120-3000PE+10320-52A0-008 MSTB2.5/4-STF-5.08 IC2.5/3-STF-5.08
	CN1,CN2 (Plug, Housing)	AL - 00292309	Sumitomo 3M	10150-3000PE+10350-52A0-008 10120-3000PE+10320-52A0-008

Connectors for Servo Amplifier with CANopen

① Main Power : 200V AC, Control Power : 1 ϕ 200V AC

Usage	Contents	Model No.	Manufacturer	Manufacturer's Part No.
Single Connectors	CN1 (Plug, Housing)	AL - 00608710	Sumitomo 3M	10114-3000PE+10314-52A0-008
	CN2 (Plug, Housing)	AL - 00385596		10120-3000PE+10320-52A0-008
	CNA (Plug)	AL - 00329461-01	Phoenix Contact	MSTB2.5/5-STF-5.08
	CNB (Plug) : Accessory	AL - Y0000988-01		IC2.5/6-STF-5.08
	CNC (Plug)	AL - 00329458-01		IC2.5/3-STF-5.08
Connector Sets	CN1,CN2 (Plug, Housing) CNA,CNC (Plug)	AL - 00661731	Sumitomo 3M Phoenix Contact	10114-3000PE+10314-52A0-008 10120-3000PE+10320-52A0-008 MSTB2.5/6-STF-5.08 IC2.5/3-STF-5.08
	CN1,CN2 (Plug, Housing)	AL - 00661729	Sumitomo 3M	10114-3000PE+10314-52A0-008 10120-3000PE+10320-52A0-008

② Main Power : 200V AC, Control Power : 24V DC

Usage	Contents	Model No.	Manufacturer	Manufacturer's Part No.
Single Connectors	CN1 (Plug, Housing)	AL - 00608710	Sumitomo 3M	10114-3000PE+10314-52A0-008
	CN2 (Plug, Housing)	AL - 00385596		10120-3000PE+10320-52A0-008
	CNA (Plug)	AL - Y0000988-02	Phoenix Contact	IC2.5/7-STF-5.08
	CNB (Plug)	AL - 00329460-01		MSTB2.5/2-STF-5.08
	CNC (Plug)	AL - 00329458-01		IC2.5/3-STF-5.08
Connector Sets	CN1,CN2 (Plug, Housing) CNA,CNB,CNC (Plug)	AL - 00667184	Sumitomo 3M Phoenix Contact	10114-3000PE+10314-52A0-008 10120-3000PE+10320-52A0-008 MSTB2.5/7-STF-5.08 MSTB2.5/2-STF-5.08 IC2.5/3-STF-5.08
	CN1,CN2 (Plug, Housing)	AL - 00661729	Sumitomo 3M	10114 - 3000PE+10314-52A0-008 10120 - 3000PE+10320-52A0-008

Connectors for Multi-Axis Servo Amplifier Connections

	Contents		Model No.	Manufacturer	Manufacturer's Part No.
Single Connectors	Amplifier Unit	CN1 (Plug, Housing)	AL - Y0003305-01	Molex	55100-0670
		CN2 (Plug, Housing)	AL - 00632607	Sumitomo 3M	36310-3200-008
		CN6 (Plug, Housing)			36210-0100PL
		CNC (Plug)	AL - 00632604	J.S.T.Mfg.CO.,LTD	04JFAT-SBXGF-I J-FATOT
	Power Unit	CNA (Plug)	AL - 00632600		05JFAT-SBXGF-I J-FATOT
		CNB (Plug) : Accessory	AL - 00632602		06JFAT-SBXGF-I J-FATOT
		CN1A (Plug, Housing)	AL - 00385594		Sumitomo 3M
		CN1B (Plug, Housing)		10350-52A0-008	
Connector Sets	Amplifier Unit	CN1,CN2 (Plug, Housing) CN6,CNC (Plug)	AL - 00632611	J.S.T.Mfg.CO.,LTD	04JFAT-SBXGF-I
				Molex	55100-0670
				Sumitomo 3M	36310-3200-008 36210-0100PL
	Power Unit	CNA (Plug) CN1A,CN1B (Plug, Housing)	AL - 00632609	Sumitomo 3M	10150-3000PE 10350-52A0-008
				J.S.T.Mfg.CO.,LTD	05JFAT-SBXGF-I

To SANYO DENKI Co.,LTD.

Date :

Company:

Department:

Name:

Tel:

FAX:

E-mail:

Item	Contents																																																																																								
① Name of target equipment	Equipment name, category (transport, processing, test, other)																																																																																								
② Name of servo axis	Axis name, axial mechanism (horizontal/vertical), brake mechanism (yes/no)																																																																																								
③ Current condition of above axis	Manufacturer Name () Series Name () Motor Capacity () Hydraulic, Mechanical, or New System ()																																																																																								
④ Positioning accuracy	± mm ± μm																																																																																								
⑤ Operation pattern	Acceleration α: ____ G ____ [m/s²] Feeding Speed V: ____ [m/s] Moving Distance D: ____ [m] (Stroke) Time [sec] ← t1 (____) → ← t2 (____) → ← t3 (____) → [Reference formula] 1G=9.8[m/s²], 1[m/s²]÷0.1G α[m/s²]=V[m/sec]÷t1[sec] D[m]=V[m/sec]×(t1+t2)[sec]																																																																																								
⑥ Mechanism	Ball-screw/screw-rotation type (horizontal), ball-screw/nut-rotation type (horizontal), rack and pinion (horizontal), belt/chain (horizontal), rotary table, roll feed, instability																																																																																								
⑦ Mechanical structure	<table border="0"> <tr> <td>WT (table mass)</td><td>kg</td> <td>WL (work mass)</td><td>kg</td> <td>WA (mass of other drive parts)</td><td>kg</td> </tr> <tr> <td>WR (rack mass)</td><td>kg</td> <td>WB (belt/chain mass)</td><td>kg</td> <td>WC (counterbalance mass)</td><td>kg</td> </tr> <tr> <td>Fa (external force axial direction)</td><td>N</td> <td>Fb (ball-screw preload)</td><td>N</td> <td>T (roll pushing force)</td><td>N</td> </tr> <tr> <td>Dr1 (drive-side roll diameter)</td><td>mm</td> <td>Dr2 (follower-side roll diameter)</td><td>mm</td> <td></td><td></td> </tr> </table> <table border="0"> <tr> <td>Lr1 (drive-side roll length)</td><td>mm</td> <td>Lr2 (follower-side roll length)</td><td>mm</td> <td>G (reduction ratio)</td><td></td> </tr> <tr> <td>JG (speed-reducer inertia)</td><td>kg·m²</td> <td>JC (coupling inertia)</td><td>kg·m²</td> <td></td><td></td> </tr> <tr> <td>JN (nut inertia)</td><td>kg·m²</td> <td>JO (other motor-axis conversion inertia)</td><td>kg·m²</td> <td></td><td></td> </tr> <tr> <td>Db (ball-screw diameter)</td><td>mm</td> <td>Lb (ball-screw axial length)</td><td>mm</td> <td>Pb (ball-screw lead)</td><td>mm</td> </tr> <tr> <td>Dp (pinion/pulley diameter)</td><td>mm</td> <td>Lp (pinion axial length)</td><td>mm</td> <td>tp (pulley thickness)</td><td>mm</td> </tr> <tr> <td>Dt (table diameter)</td><td>mm</td> <td>Dh (table-support diameter)</td><td>mm</td> <td>LW (load shift from axis)</td><td>mm</td> </tr> <tr> <td>Ds (table shaft diameter)</td><td>mm</td> <td>Ls (table shaft length)</td><td>mm</td> <td></td><td></td> </tr> <tr> <td>ρ (specific gravity of ball-screw/pinion/pulley/table-shaft material)</td><td>kg/cm³</td> <td></td><td></td> <td></td><td></td> </tr> </table> <table border="0"> <tr> <td>μ (friction coefficient between sheet and shilding-surface/support-section/roll)</td><td></td> <td>ρ1 (specific gravity of roll-1 material)</td><td>kg/cm³</td> </tr> <tr> <td>ρ2 (specific gravity of roll-2 material)</td><td>kg/cm³</td> <td>κ (internal friction coefficient of preload nut)</td><td></td> </tr> <tr> <td>η (mechanical efficiency)</td><td></td> <td>JL (load inertia of motor-axis conversion)</td><td>kg·m²</td> </tr> <tr> <td>TF (friction torque of motor axis conversion)</td><td>N·m</td> <td>Tu (imbalance torque of motor axis conversion)</td><td>N·m</td> </tr> </table>	WT (table mass)	kg	WL (work mass)	kg	WA (mass of other drive parts)	kg	WR (rack mass)	kg	WB (belt/chain mass)	kg	WC (counterbalance mass)	kg	Fa (external force axial direction)	N	Fb (ball-screw preload)	N	T (roll pushing force)	N	Dr1 (drive-side roll diameter)	mm	Dr2 (follower-side roll diameter)	mm			Lr1 (drive-side roll length)	mm	Lr2 (follower-side roll length)	mm	G (reduction ratio)		JG (speed-reducer inertia)	kg·m ²	JC (coupling inertia)	kg·m ²			JN (nut inertia)	kg·m ²	JO (other motor-axis conversion inertia)	kg·m ²			Db (ball-screw diameter)	mm	Lb (ball-screw axial length)	mm	Pb (ball-screw lead)	mm	Dp (pinion/pulley diameter)	mm	Lp (pinion axial length)	mm	tp (pulley thickness)	mm	Dt (table diameter)	mm	Dh (table-support diameter)	mm	LW (load shift from axis)	mm	Ds (table shaft diameter)	mm	Ls (table shaft length)	mm			ρ (specific gravity of ball-screw/pinion/pulley/table-shaft material)	kg/cm ³					μ (friction coefficient between sheet and shilding-surface/support-section/roll)		ρ1 (specific gravity of roll-1 material)	kg/cm ³	ρ2 (specific gravity of roll-2 material)	kg/cm ³	κ (internal friction coefficient of preload nut)		η (mechanical efficiency)		JL (load inertia of motor-axis conversion)	kg·m ²	TF (friction torque of motor axis conversion)	N·m	Tu (imbalance torque of motor axis conversion)	N·m
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⑧ Speed reducer	Customer-provided (/)-Sanyo denki standard(planet/spur/no-backlash-planet /) other(/)																																																																																								
⑨ Encoder type	Encoder type specified (yes / no) Yes:(incremental , optical absolute , optical absolute with incremental function, resolver absolute) Resolution()																																																																																								
⑩ Input format	Position , velocity , torque , other ()																																																																																								
⑪ Host equipment (controller)	Sequencer , laptop , customer-developed product , Sanyo dennki-provided , other ()																																																																																								
⑫ Usage environment and other requirements	Cutting , clean-room use , anti-dust measures , other ()																																																																																								
⑬ Estimated production	Single product: () units/month () units/year																																																																																								
⑭ Development schedule	Prototype period: () Year () Month Production period: () Year () Month																																																																																								
⑮ Various measures	Related documentation (already submitted; send later by mail) Visit/PR desired (yes / no) Meeting desired (yes / no)																																																																																								
⑯ Miscellaneous (questions, pending problems, unresolved issues, etc.)																																																																																									

■ ECO PRODUCTS



ECO PRODUCTS are designed with the goal of lessening nevironmental impact, from product development to disposal.

■ 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 SERVO SYSTEMS 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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CATALOG NO. 839-9 '08.11.N