SANM**O**TION

SERVO SYSTEMS

R

ADVANCED MODEL

AC 100 V   30 W – 200 W,   AC 200 V   30 W – 1kW

SANYO DENKI

SANMOTION R
SERVO SYSTEMS

R *ADVANCED MODEL*

Input voltage **AC100 V, 200 V**

Servo amplifier

Amp.capacity 15A · 30A · 50A

R2 Servo motor

Flange size 40mm · 60mm · 80mm · 86mm

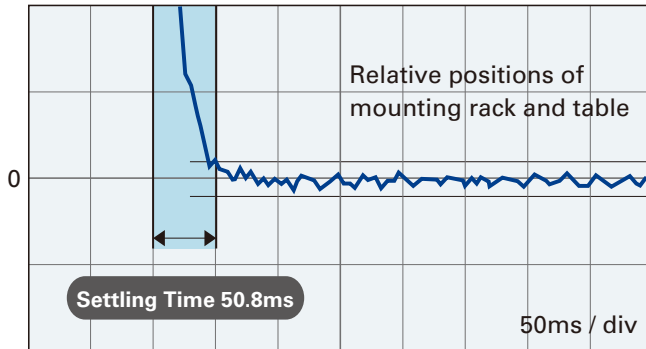**Rated output** 30W · 50W · 80W · 100W · 200W · 400W · 750W · 1.0kW
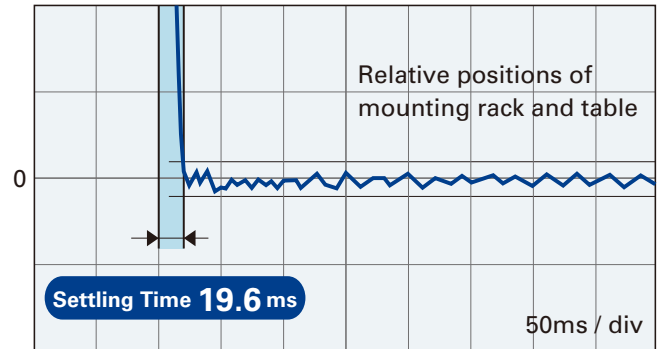
ECO PRODUCTS

Index

50% Shorter Position Settling Time [※]

The vibrations of the low rigidity machine stand resonance is minimized, and shortens positioning settling time.
The amplifier is suitable for chip mounters and equipment needs high speed positioning.
※ Compared with our conventional product "SANMOTION R".

Relative positions of mounting rack and table

0

Settling Time 50.8ms

50ms / div

Our conventional product

Relative positions of mounting rack and table
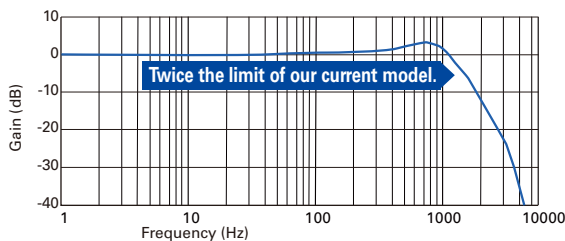
0

Settling Time 19.6 ms

50ms / div

SANMOTION R ADVANCED MODEL
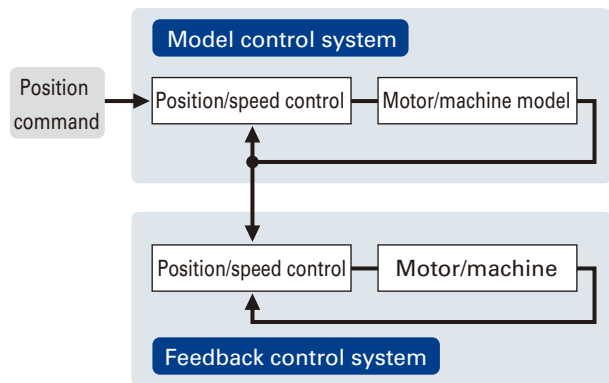
Doubled Frequency Response Limit

The frequency response limit has been increased to 1200 Hz, twice the limit of our current model. [※]
※ Compared with our conventional product "SANMOTION R".

Gain (dB)

Twice the limit of our current model.

10
0
-10
-20
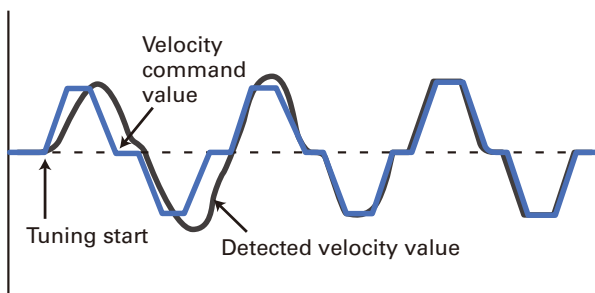-30
-40

1   10   100   1000   10000

Frequency (Hz)

Features Model-based Following Control

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

Model control system

Position command → Position/speed control → Motor/machine model

Position/speed control → Motor/machine

Feedback control system

Auto-Tuning

Servo amplifier automatically optimizes servo gain and filter frequency in realtime.

Velocity command value

Tuning start

Detected velocity value

Small Compact Servomotors

Motor size and volume is reduced by as much as 30% and 25% respectively compared to our current models. This provides high torque and high performance in a small package.
※ Compared with our conventional product "SANMOTION Q".

30% reduction

Feed-forward 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. Vibration control frequencies are selectable.

Position deviation during stop

— With vibration suppression control
— Without vibration suppression control

100ms/div

Without vibration suppression control

With vibration suppression control
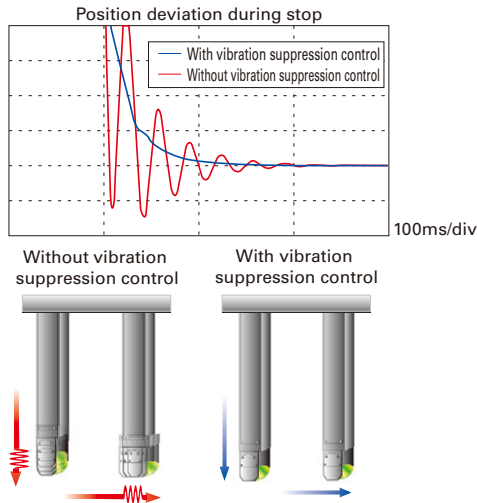
Command Follow-up Control

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.

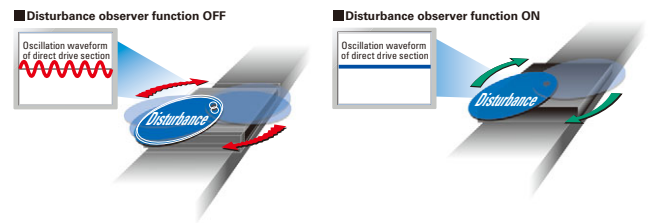Position command

Position deviation

20ms/div
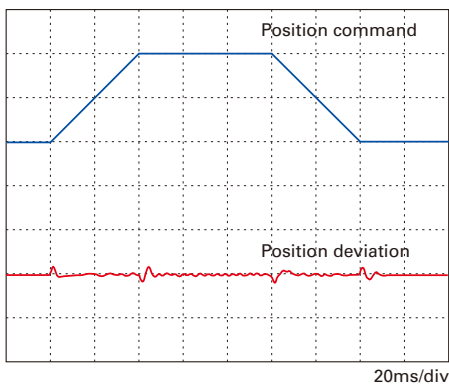
Resonance Suppression

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

Disturbance Suppression

It is possible to control impacts from other axes in case of multiaxial constitution, by using the new disturbance observer with extended applicable frequency.

■**Disturbance observer function OFF**

Oscillation waveform of direct drive section

Disturbance

■**Disturbance observer function ON**

Oscillation waveform of direct drive section

Disturbance

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 waveform

Current model

R motor

(Image)
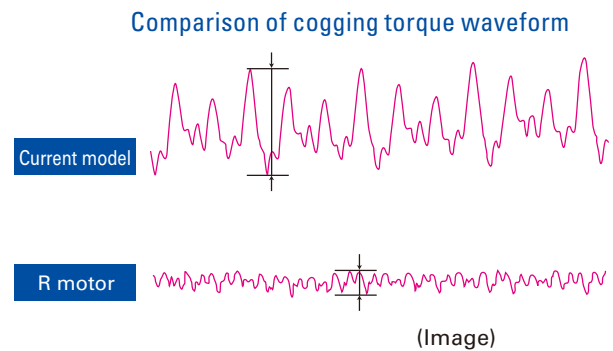
High Resolution

Support for encoders up to 17 bit (131,072 divisions) is available for high resolution control. An optional 20 bit encoder (1,048,576 divisions) is also available.

Features and Functions

Model No. List · Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

Now Available with EtherCAT Interface

EtherCAT is a 100Mbps high-speed fieldbus system, which helps shorten Takt time. It is compatible with Ethernet, and its high versatility enables the creation of a system compatible with a variety of devices. Servo amplifier firmware can be updated via EtherCAT. It is also certified through EtherCAT conformance testing conducted by a third party organization.

EtherCAT
Conformance tested

Safety Model newly added to lineup

Since this new model safely shutdown motor torque, safety system is more easily installed on the equipments. This safety function is defined in the "IEC61800-5-2:Safe Torque Off" and "IEC60204-1:Stop Category 0". In addition, this model has aquired "IEC61508, SIL2/IEC62061,SILCL2" and "ISO13849-1:Cat.3,PL=d".

Protection IP67

Protection code is IP67 for all models

IP67

Water   Dust

*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.

Position or Velocity   Torque control   GOAL

START   Flat   Ascending
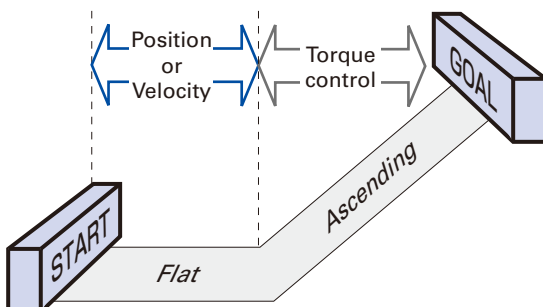
5-digit LED Display, Built-in Operator

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

SANMOTION R
AC SERVO SYSTEMS
8.8.8.8.8.
SANYO DENKI

Test Function (JOG)

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

Capable of JOG operation without connecting to host device
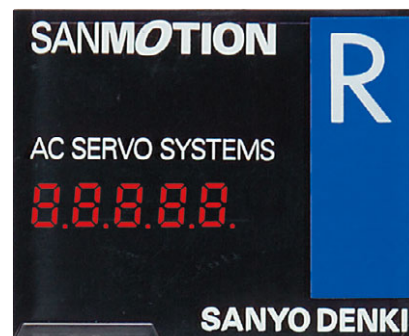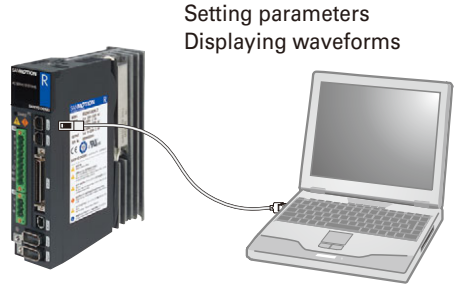
Setup Software

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

Setting parameters
Displaying waveforms

Multiaxial Monitor Function

The setup software allows up to 15 axes to be monitored. To enable monitoring of multiple axes, an optional communication converter and amplifier communication cable are available.

*Analog/Pulse input type only

Daisy chain up to 15 axes

Communication converter
(Option)
RS-422A

Maximum
15 axes
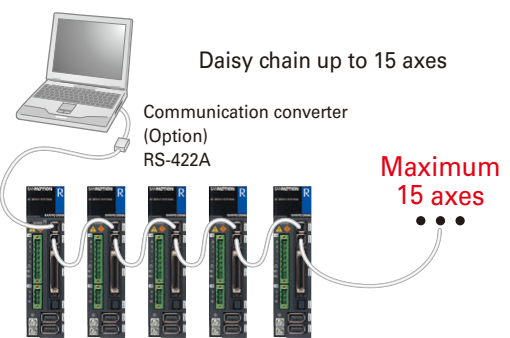
Built-in Regeneration Resistor

It is possible to choose whether to equip regenerative resistance or not. If the regenerative resistance capability is insufficient, it is possible to use an external regenerative resistance unit.

Built-in Regeneration Resistor

External regenerative resistor unit (Option)
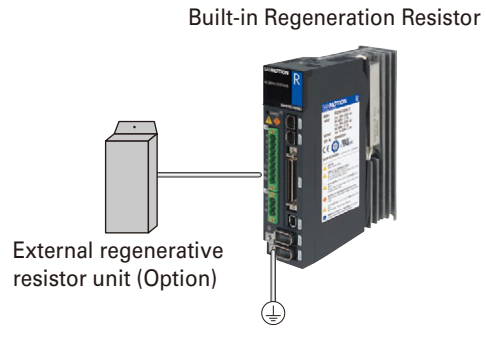
Built-in Dynamic Brake

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.

Rotation speed (min⁻¹)

Controlled state | Dynamic braking state

Time (s)
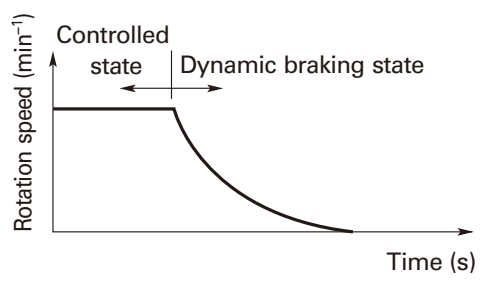
Fully-closed loop control

Fully-closed control is possible using a linear scale mounted on the device together with high resolution encoder information.

Highly accurate positioning is possible

Load

Model No. List • Model
Number Nomenclature

System
Configuration

Standard
Specifications

External Wiring
Diagram

Encoder Wiring
Diagram

Dimensions

Setup Software

Optional
Equipment

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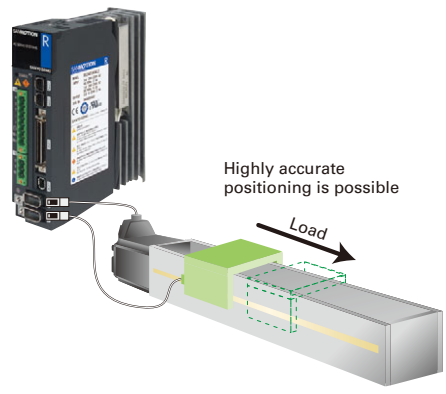
200V System

Power Voltage	Encoder models	Rated Output	Motor Flange Size	Holding Brake	CE·UL	Model No.
200V	Battery backup method absolute encoder (PA035C)	30W	40mm sq.	—	—	R2AA04003FXP00
				—	Standard	R2AA04003FXP00M
				yes (DC24V)	—	R2AA04003FCP00
				yes (DC24V)	Standard	R2AA04003FCP00M
		50W	40mm sq.	—	—	R2AA04005FXP00
				—	Standard	R2AA04005FXP00M
				yes (DC24V)	—	R2AA04005FCP00
				yes (DC24V)	Standard	R2AA04005FCP00M
		100W	40mm sq.	—	—	R2AA04010FXP00
				—	Standard	R2AA04010FXP00M
			60mm sq.	—	—	R2AA06010FXP00
				—	Standard	R2AA06010FXP00M
				yes (DC24V)	—	R2AA06010FCP00
				yes (DC24V)	Standard	R2AA06010FCP00M
		200W	60mm sq.	—	—	R2AA06020FXP00
				—	Standard	R2AA06020FXP00M
				yes (DC24V)	—	R2AA06020FCP00
				yes (DC24V)	Standard	R2AA06020FCP00M
			80mm sq.	—	—	R2AA08020FXP00
				—	Standard	R2AA08020FXP00M
				yes (DC24V)	—	R2AA08020FCP00
				yes (DC24V)	Standard	R2AA08020FCP00M
		400W	60mm sq.	—	—	R2AA06040FXP00
				—	Standard	R2AA06040FXP00M
			80mm sq.	—	—	R2AA08040FXP00
				—	Standard	R2AA08040FXP00M
				yes (DC24V)	—	R2AA08040FCP00
				yes (DC24V)	Standard	R2AA08040FCP00M
		750W	80mm sq.	—	—	R2AA08075FXP00
				—	Standard	R2AA08075FXP00M
				yes (DC24V)	—	R2AA08075FCP00
				yes (DC24V)	Standard	R2AA08075FCP00M
		1000W	86mm sq.	—	—	R2AAB8100FXP00
				—	Standard	R2AAB8100FXP00M
				yes (DC24V)	—	R2AAB8100FCP00
				yes (DC24V)	Standard	R2AAB8100FCP00M
	Absolute encoder for incremental System (PA035S)	30W	40mm sq.	—	—	R2AA04003FXH00
				—	Standard	R2AA04003FXH00M
				yes (DC24V)	—	R2AA04003FCH00
				yes (DC24V)	Standard	R2AA04003FCH00M
		50W	40mm sq.	—	—	R2AA04005FXH00
				—	Standard	R2AA04005FXH00M
				yes (DC24V)	—	R2AA04005FCH00
				yes (DC24V)	Standard	R2AA04005FCH00M
		100W	40mm sq.	—	—	R2AA04010FXH00
				—	Standard	R2AA04010FXH00M
			60mm sq.	—	—	R2AA06010FXH00
				—	Standard	R2AA06010FXH00M
				yes (DC24V)	—	R2AA06010FCH00
				yes (DC24V)	Standard	R2AA06010FCH00M
		200W	60mm sq.	—	—	R2AA06020FXH00
				—	Standard	R2AA06020FXH00M
				yes (DC24V)	—	R2AA06020FCH00
				yes (DC24V)	Standard	R2AA06020FCH00M
			80mm sq.	—	—	R2AA08020FXH00
				—	Standard	R2AA08020FXH00M
				yes (DC24V)	—	R2AA08020FCH00
				yes (DC24V)	Standard	R2AA08020FCH00M
		400W	60mm sq.	—	—	R2AA06040FXH00
				—	Standard	R2AA06040FXH00M
			80mm sq.	—	—	R2AA08040FXH00
				—	Standard	R2AA08040FXH00M
				yes (DC24V)	—	R2AA08040FCH00
				yes (DC24V)	Standard	R2AA08040FCH00M
		750W	80mm sq.	—	—	R2AA08075FXH00
				—	Standard	R2AA08075FXH00M
				yes (DC24V)	—	R2AA08075FCH00
				yes (DC24V)	Standard	R2AA08075FCH00M
		1000W	86mm sq.	—	—	R2AAB8100FXH00
				—	Standard	R2AAB8100FXH00M
				yes (DC24V)	—	R2AAB8100FCH00
				yes (DC24V)	Standard	R2AAB8100FCH00M

For specifications on other model, please contact us.

Servo Amplifier Standard Model Number List

200V System

Type	Main Power	Control Power	Encoder Type	Selectable Output	Internal Registration Resistor	Safe Torque Off function	Amplifier Capacity	Model No.
Analog/Pulse input type	AC200V system AC200 to 230V Three-phase	AC200V system AC200 to 230V Single-phase	Serial encoder	NPN	—	—	15A	RS2A01A0AL0
							30A	RS2A03A0AL0
							50A	RS2A05A0AL0
						With	15A	RS2A01A0AL2
							30A	RS2A03A0AL2
							50A	RS2A05A0AL2
					With	—	15A	RS2A01A0AA0
							30A	RS2A03A0AA0
							50A	RS2A05A0AA0
						With	15A	RS2A01A0AA2
							30A	RS2A03A0AA2
							50A	RS2A05A0AA2
				PNP	—	—	15A	RS2A01A0BL0
							30A	RS2A03A0BL0
							50A	RS2A05A0BL0
						With	15A	RS2A01A0BL2
							30A	RS2A03A0BL2
							50A	RS2A05A0BL2
					With	—	15A	RS2A01A0BA0
							30A	RS2A03A0BA0
							50A	RS2A05A0BA0
						With	15A	RS2A01A0BA2
							30A	RS2A03A0BA2
							50A	RS2A05A0BA2
EtherCAT interface type	AC200V system AC200 to 230V Three-phase	AC200V system AC200 to 230V Single-phase	Serial encoder	Photo relay output	—	—	15A	RS2A01A0KL0
							30A	RS2A03A0KL0
							50A	RS2A05A0KL0
					With		15A	RS2A01A0KA0
							30A	RS2A03A0KA0
							50A	RS2A05A0KA0
					—	With (with delay circuit)	15A	RS2A01A0KL4
							30A	RS2A03A0KL4
							50A	RS2A05A0KL4
					With		15A	RS2A01A0KA4
							30A	RS2A03A0KA4
							50A	RS2A05A0KA4

Servo Motor Standard Model Number List

100V System

Power Voltage	Encoder models	Rated Output	Motor Flange Size	Holding Brake	CE·UL	Model No.
100V	Battery backup method absolute encoder (PA035C)	30W	40mm sq.	yes (DC24V)	—	R2EA04003FCP00
				yes (DC24V)	Standard	R2EA04003FCP00M
				—	—	R2EA04003FXP00
				—	Standard	R2EA04003FXP00M
		50W	40mm sq.	yes (DC24V)	—	R2EA04005FCP00
				yes (DC24V)	Standard	R2EA04005FCP00M
				—	—	R2EA04005FXP00
				—	Standard	R2EA04005FXP00M
		80W	40mm sq.	yes (DC24V)	—	R2EA04008FCP00
				yes (DC24V)	Standard	R2EA04008FCP00M
				—	—	R2EA04008FXP00
				—	Standard	R2EA04008FXP00M
		100W	60mm sq.	yes (DC24V)	—	R2EA06010FCP00
				yes (DC24V)	Standard	R2EA06010FCP00M
				—	—	R2EA06010FXP00
				—	Standard	R2EA06010FXP00M
		200W	60mm sq.	yes (DC24V)	—	R2EA06020FCP00
				yes (DC24V)	Standard	R2EA06020FCP00M
				—	—	R2EA06020FXP00
				—	Standard	R2EA06020FXP00M
	Absolute encoder for incremental System (PA035S)	30W	40mm sq.	yes (DC24V)	—	R2EA04003FCH00
				yes (DC24V)	Standard	R2EA04003FCH00M
				—	—	R2EA04003FXH00
				—	Standard	R2EA04003FXH00M
		50W	40mm sq.	yes (DC24V)	—	R2EA04005FCH00
				yes (DC24V)	Standard	R2EA04005FCH00M
				—	—	R2EA04005FXH00
				—	Standard	R2EA04005FXH00M
		80W	40mm sq.	yes (DC24V)	—	R2EA04008FCH00
				yes (DC24V)	Standard	R2EA04008FCH00M
				—	—	R2EA04008FXH00
				—	Standard	R2EA04008FXH00M
		100W	60mm sq.	yes (DC24V)	—	R2EA06010FCH00
				yes (DC24V)	Standard	R2EA06010FCH00M
				—	—	R2EA06010FXH00
				—	Standard	R2EA06010FXH00M
		200W	60mm sq.	yes (DC24V)	—	R2EA06020FCH00
				yes (DC24V)	Standard	R2EA06020FCH00M
				—	—	R2EA06020FXH00
				—	Standard	R2EA06020FXH00M

For specifications on other model, please contact us.

Servo Amplifier Standard Model Number List

100V System

Type	Main Power	Control Power	Encoder Type	Selectable Output	Internal Registration Resistor	Safe Torque Off function	Amplifier Capacity	Model No.
Analog/Pulse input type	AC100V System AC100 to 115V Single-phase	AC100V System AC100 to 115V Single-phase	Serial encoder	NPN	—	—	15A	RS2E01A0AL0
							30A	RS2E03A0AL0
						With	15A	RS2E01A0AL2
							30A	RS2E03A0AL2
					With	—	15A	RS2E01A0AA0
							30A	RS2E03A0AA0
						With	15A	RS2E01A0AA2
							30A	RS2E03A0AA2
				PNP	—	—	15A	RS2E01A0BL0
							30A	RS2E03A0BL0
						With	15A	RS2E01A0BL2
							30A	RS2E03A0BL2
					With	—	15A	RS2E01A0BA0
							30A	RS2E03A0BA0
						With	15A	RS2E01A0BA2
							30A	RS2E03A0BA2
EtherCAT interface type	AC100V System AC100 to 115V Single-phase	AC100V System AC100 to 115V Single-phase	Serial encoder	Photo relay output	—	—	15A	RS2E01A0KL0
							30A	RS2E03A0KL0
					With		15A	RS2E01A0KA0
							30A	RS2E03A0KA0
					—	With (with delay circuit)	15A	RS2E01A0KL4
							30A	RS2E03A0KL4
					With		15A	RS2E01A0KA4
							30A	RS2E03A0KA4

Features and Functions

Model No. List · Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram
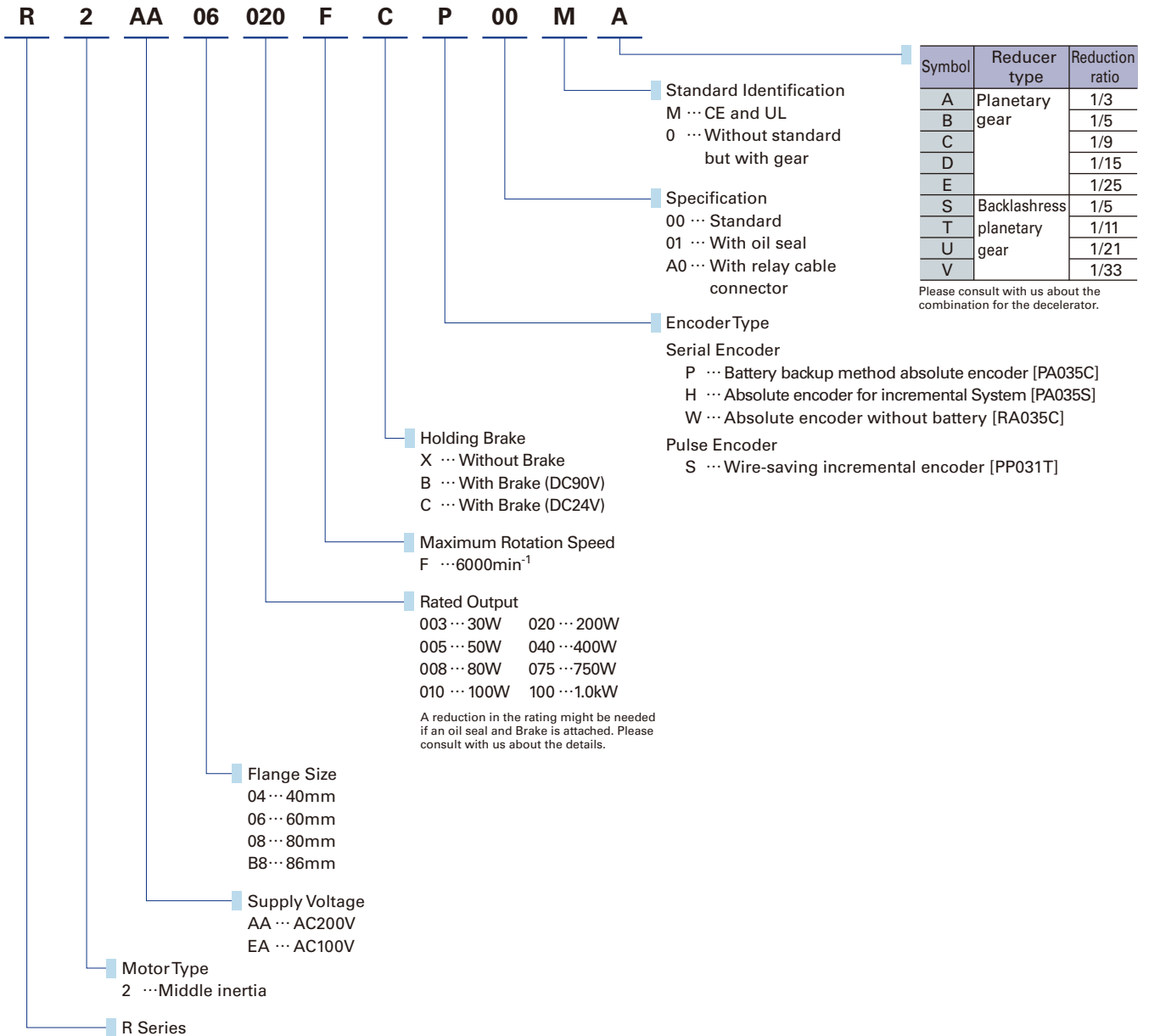
Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

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 reduction ratio 1/3.(Planetary gear)

R 2 AA 06 020 F C P 00 M A

Symbol	Reducer type	Reduction ratio
A	Planetary gear	1/3
B		1/5
C		1/9
D		1/15
E		1/25
S	Backlashress planetary gear	1/5
T		1/11
U		1/21
V		1/33

Please consult with us about the combination for the decelerator.

Standard Identification
M … CE and UL
0 … Without standard but with gear

Specification
00 … Standard
01 … With oil seal
A0 … With relay cable connector

Encoder Type
Serial Encoder
P … Battery backup method absolute encoder [PA035C]
H … Absolute encoder for incremental System [PA035S]
W … Absolute encoder without battery [RA035C]
Pulse Encoder
S … Wire-saving incremental encoder [PP031T]

Holding Brake
X … Without Brake
B … With Brake (DC90V)
C … With Brake (DC24V)

Maximum Rotation Speed
F … 6000min⁻¹

Rated Output
003 … 30W   020 … 200W
005 … 50W   040 … 400W
008 … 80W   075 … 750W
010 … 100W   100 … 1.0kW

A reduction in the rating might be needed if an oil seal and Brake is attached. Please consult with us about the details.

Flange Size
04 … 40mm
06 … 60mm
08 … 80mm
B8 … 86mm

Supply Voltage
AA … AC200V
EA … AC100V

Motor Type
2 … Middle inertia

R Series

Encoder Specification

Serial encoder

Model	Partition number/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

Pulse encoder

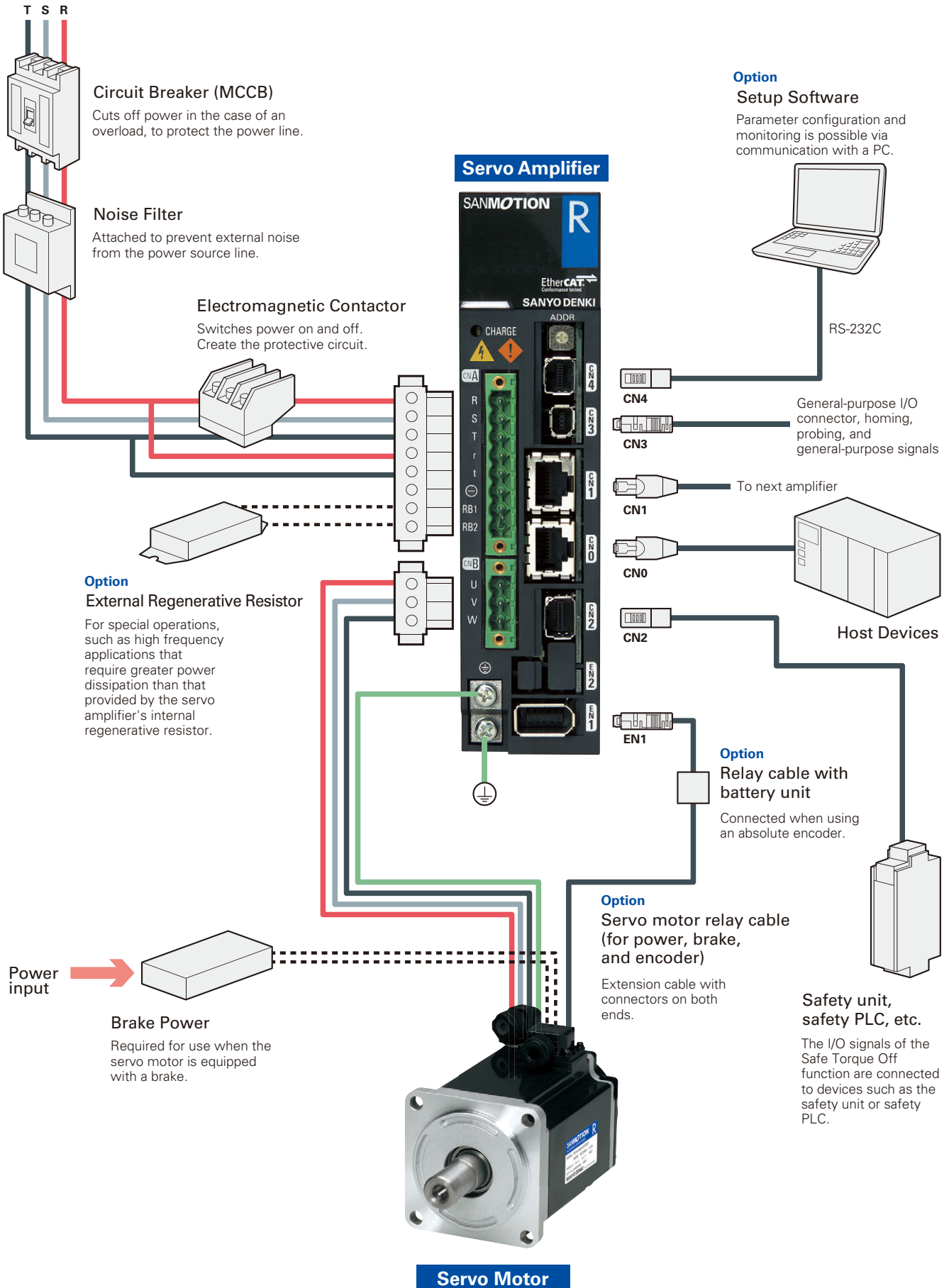| Model	Partition number/rotation	Multiple Rotations	Remarks
PP031T	8000（2000P/R）	–	Wire-saving incremental encoder Maximum 40000 (Partition number/ rotation)

Features and Functions

Model No. List · Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

Servo Amplifier

Example: RS2 Series Servo Amplifier models, Input voltage AC200V, Amplifier capacity15A, With built-in regenerative resistance/with DB resistance, With safety furction.

RS2 A 01 A 0 A A 2

Option 2

	Speed / Torque command input	Safe Torque Off function
0	Available	None
2	Available	Available (without delay circuit)
4	Available	Available (with delay circuit)

Option 1

A ··· With built-in regenerative resistance/ with DB resistance
L ··· Without built-in regenerative resistance/ with DB resistance

Interface type

A···Analog pulse control, NPN (Sink) output
B···Analog pulse control, PNP (Source) output
K···EtherCAT interface

PNP Generic output : PNP (Source) output :
It takes external 24VDC as common power supply and outputs 24VDC when generic output is ON.

Motor Encoder Type

	EN1 (Motor encoder)	EN2 (External pulse encoder)
0	Serial encoder	—
2	Serial encoder	Pulse encoder
8	Pulse encoder	—
A	Pulse encoder	Pulse encoder

2 or A is selectable for a servo amplifier for a fully-closed system. Please specify 2 or A according to the motor encoder to be used.
0 or 8 is only for a semi-closed system and is not selectable for a fully-closed system. Please note that a servo amplifier for a fully-closed system can be used for a semi-closed system.

Motor type
A ··· Rotary motor

Amplifier capacity
01 ··· 15A
03 ··· 30A
05 ··· 50A

Input voltage
A ··· AC200V
E ··· AC100V

RS2 Series

* The motor parameters need to be set for the amplifier for use.
Use the setup software.

Conformance to Overseas Standards

Our standard servo amplifier has attained the international standards (UL, c-UL and EN Standards).
You can also employ servo motors that have attained the international standards (UL, c-UL and EN Standards).

Analog/Pulse Input Type Servo Amplifier

Circuit Breaker (MCCB)
Cuts off power in the case of an overload, to protect the power line.

Noise Filter
Attached to prevent external noise from the power source line.

Electromagnetic Contactor
Switches power on and off. Create the protective circuit.

Option
External Regenerative Resistor
For special operations, such as high frequency applications that require greater power dissipation than that provided by the servo amplifier's internal regenerative resistor.

Servo Amplifier

Option
Setup Software
Parameter configuration and monitoring is possible via communication with a PC.

RS-232C

CN2

CN3
To next amplifier (RS-422A)

Host Devices

CN1

CN4

EN1

Option
Relay cable with battery unit
Connected when using an absolute encoder.

Power input

Brake Power
Required for use when the servo motor is equipped with a brake.

Option
Servo motor relay cable (for power, brake, and encoder)
Extension cable with connectors on both ends.

Safety unit, safety PLC, etc.
The I/O signals of the Safe Torque Off function are connected to devices such as the safety unit or safety PLC.

Servo Motor

Features and Functions

Model No. List • Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

EtherCAT interface type servo amplifier

T S R

Circuit Breaker (MCCB)
Cuts off power in the case of an overload, to protect the power line.

Noise Filter
Attached to prevent external noise from the power source line.

Electromagnetic Contactor
Switches power on and off. Create the protective circuit.

Option
External Regenerative Resistor
For special operations, such as high frequency applications that require greater power dissipation than that provided by the servo amplifier's internal regenerative resistor.

Servo Amplifier

SANMOTION R

EtherCAT
Conformance tested
SANYO DENKI

CHARGE

ADDR

CN4
CN3
CN1
CN0
CN2

EN2
EN1

Option
Setup Software
Parameter configuration and monitoring is possible via communication with a PC.

RS-232C

CN4

General-purpose I/O connector, homing, probing, and general-purpose signals

CN3

To next amplifier

CN1

CN0

CN2

Host Devices

EN1

Option
Relay cable with battery unit
Connected when using an absolute encoder.

Option
Servo motor relay cable (for power, brake, and encoder)
Extension cable with connectors on both ends.

Safety unit, safety PLC, etc.
The I/O signals of the Safe Torque Off function are connected to devices such as the safety unit or safety PLC.

Power input

Brake Power
Required for use when the servo motor is equipped with a brake.

Servo Motor

Servo Amplifier Specifications

Control function	Position control/Speed control/Torque control (Parameter changeover)		
Control system	IGBT：PWM control Sinusoidal drive		
Main Circuit Power Note1)	Three-phase：AC200 to 230V+10, -15%, 50/60Hz±3Hz		
	Single-phase：AC200 to 230V+10, -15%, 50/60Hz±3Hz		
	Single-phase：AC100 to 115V+10, -15%, 50/60Hz±3Hz Note2)		
Controlling circuit Note1)	Single-phase：AC200 to 230V+10, -15%, 50/60Hz±3Hz		
	Single-phase：AC100 to 115V+10, -15%, 50/60Hz±3Hz Note2)		
Environment	Ambient temperature	0 to 55℃	
	Storage temperature	−20 to +65℃	
	Operation/Storage humidity	Below 90%RH (no condensation)	
	Elevation	Below 2000m sea level	
	Vibration	4.9m/s^2 Frequency range 10 to 55Hz tested for 2H in each direction X.Y.Z	
	Shock	19.6m/s^2	
Structure	Built-in tray type power supply		

Note1)
Power source voltage should be within the specified range AC200V
Power input type:
Specified power supply range = AC170V to AC253V
AC100V Power input type:
Specified power supply range = AC85V to AC127V

Note2)
AC100Vsingle-phase input type corresponds only to, RS2-01/RS2-03

Performance

Speed control range	1:5000 (Internal speed command)
Frequency characteristics	1200Hz (In case of high frequency sampling mode)

Built-in functions

Protection functions	Over current, Current detection error, Overload, Regeneration error, Amplifier overheating, External overheating, 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, Excessive position, Position command pulse error, Built-in memory error, Parameter error
LED display	Status display, Monitor display, Alarm display, Parameter setting, Adjustment mode
Dynamic brake circuit	Built-in
Regeneration process circuit	Built-in
Monitor	Speed monitor (VMON) 2.0V±10% （at 1000min^{-1}）
	Current monitor (IMO) 2.0V±10% （at 100%）

Safety standard

Servo amplifier type	Safety standards		
All models	UL ratings	UL508C	
	EN standards	Low-voltage directive	・EN61800−5−1
		EMC directive	・EN55011 G1 ClassA ・EN61000−6−2 ・EN61800−3
Model with safety function	Function safety standards	・IEC61508, SIL2 ・IEC62061, SILCL2	・ISO13849−1, Cat. 3, PL＝d ・EN954−1, Cat. 3

EtherCAT interface specifications

Physical layer	IEC61158-2 IEEE802.3u 100BASE-TX
Data link layer	IEC61158-3,-4 Type12
Application layer	IEC61158-5,-6 Type12
Device profile	IEC61800-7 Profile type1(CiA402) ・CoE (CANopen over EtherCAT) ・FoE (File access over EtherCAT)
Communication port	RJ45 connector (2 ports)
Baud rate	100 Mbps (Full duplex)
Max. No. of nodes	65535 nodes
Transmission distance/topology	Max. 100 m (between nodes)/Daisy-chain
Cable	Twisted-pair CAT5e (straight or cross)
Communication object	SDO (Service Data Object) PDO (Process Data Object)
PDO length	Output：Max.64Byte, Input：Max.64Byte Total: Max. 128 Bytes
Synchronization function	SYNC0 Event Synchronization Mode (DC Mode),Synchronous with SM2 Event Mode, Asynchronous Mode
Operation mode	Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Homing Mode, Cycle Sync Position Mode, Cycle Sync Velocity Mode, Cycle Sync Torque Mode
LED indicator	Port 0/1 link display, RUN display, error display
General Input/Output	2 inputs, 2 outputs （4 total)

Servo Amplifier + R2 Servo Motor

input voltage AC200V Power supply range AC170V to AC253V

Item	Symbol		Unit	Specification		
Servo Amplifier Model				RS2A01＊＊		
Capacity			A	15		
Rated power supply			kVA	0.2	0.2	0.4
Servo motor model				R2AA04003F	R2AA04005F	R2AA04010F
Flange Size			mm	40	40	40
Rated Output	★	P_R	kW	0.03	0.05	0.1
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 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		$K_{E\phi}$	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
Roter Moment of Inertia (Not including Encoder)		J_M	$\times10^{-4}kg\cdot m^2(GD^2/4)$	0.0247	0.0376	0.0627
Roter Moment of Inertia (Encoder)		J_S	$\times10^{-4}kg\cdot m^2(GD^2/4)$	0.0033 Note1)		
Mass Note1)		WE	kg	0.35	0.39	0.51
Brake Mass		W	kg	0.27	0.27	0.27
Electrical Time Constant		te	ms	0.55	0.67	0.82
Mechanical Time Constant (Not including Encoder)		tm	ms	2.2	1.7	0.97
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		
Roter Moment of Inertia (Brake)		JB	$\times10^{-4}kg\cdot m^2(GD^2/4)$	0.0078		

Note 1) This is a 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]
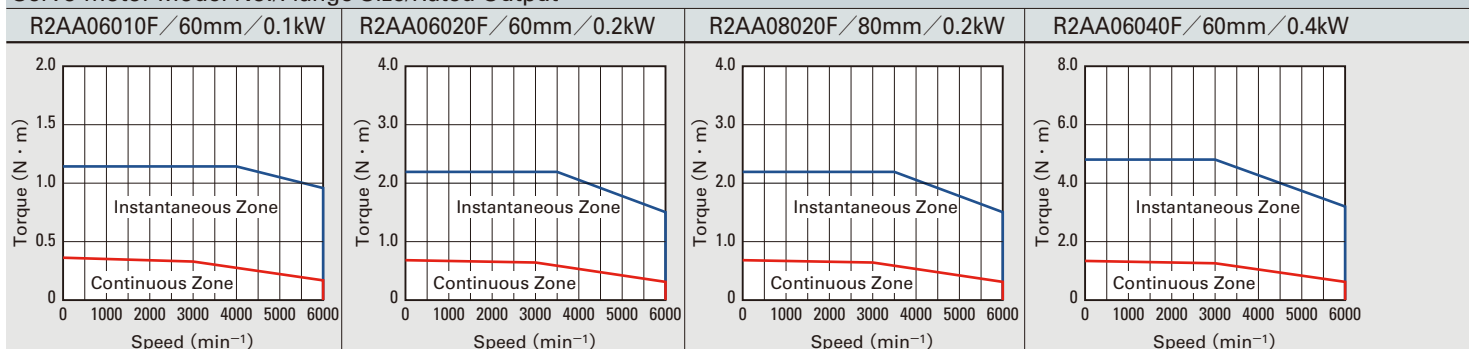Note 2) It is the constant for the installation on the t6x250mm size aluminum board for the heat radiation.

Note 3) Items with ★and velocity - torque characteristics indicate values after temperature rise saturation. The others indicate values at 20℃.
Note 4) Each value indicates TYP.
＊ A reduction in the rating might be needed if an oil seal and Brake is attached. Please consult with us about the details.
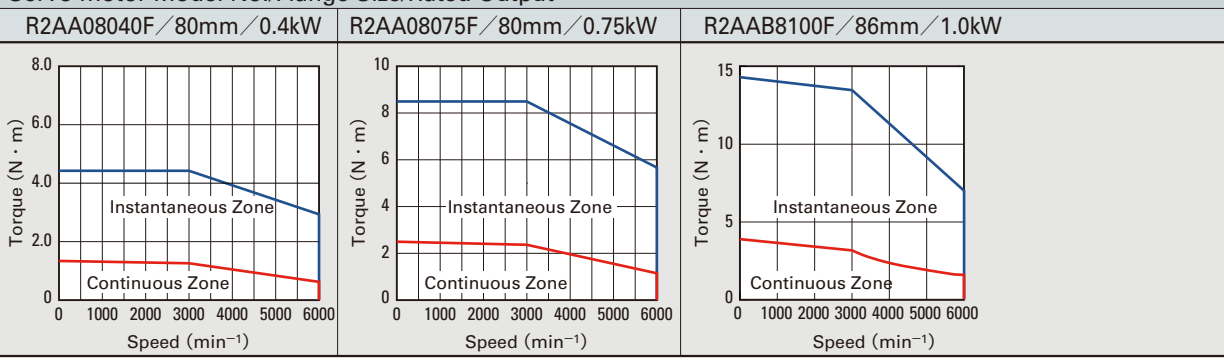
Speed-Torque Characteristics

Servo motor Model No./Flange Size/Rated Output		
R2AA04003F／40mm／0.03kW	R2AA04005F／40mm／0.05kW	R2AA04010F／40mm／0.1kW

It is value when the input power supply is AC200V three-phase circuit. The area decreases momentarily when the power supply voltage is less than 200V. Please contact us when the servo amplifier power supply is less than AC200V.

Features and Functions
Model No. List・Model Number Nomenclature
System Configuration
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External Wiring Diagram
Encoder Wiring Diagram
Dimensions
Setup Software
Optional Equipment

Servo Amplifier + **R2 Servo Motor**

input voltage AC200V Power supply range AC170V to AC253V

Item	Symbol	Unit	Specification			
Servo Amplifier Model			RS2A01＊＊			RS2A03＊＊
Capacity		A	15			30
Rated power supply		k VA	0.4	0.8	0.8	1.0
Servo motor model			R2AA06010F	R2AA06020F	R2AA08020F	R2AA06040F
Flange Size		mm	60	60	80	60
Rated Output	★	P_R	kW	0.1	0.2	0.2	0.4
Rated Speed	★	N_R min^{-1}	3000	3000	3000	3000
Maximum Speed	★	N_{max} min^{-1}	6000	6000	6000	6000
Rated Torque	★	T_R N·m	0.318	0.637	0.637	1.27
Continuous Torque at Stall	★	T_S N·m	0.353	0.686	0.686	1.37
Peak Torque at Stall	★	T_P N·m	1.13	2.2	2.2	4.8
Rated Armature Current	★	I_R Arms	0.86	1.5	1.5	2.8
Armature Current at Stall	★	I_S Arms	0.86	1.6	1.5	2.8
Peak Armature Current at Stall	★	I_P Arms	3.5	5.6	4.8	10.8
Torque Constant		K_T N·m/Arms	0.375	0.476	0.516	0.524
Voltage Constant Per Phase		$K_{E\phi}$ mV/min^{-1}	13.1	16.6	18.0	18.3
Phase Resistance		R_ϕ Ω	4.8	2.7	2.3	1.36
Rated Power Rate	★	Q_R kW/s	8.6	19	8	39
Roter Moment of Inertia (Not including Encoder)		J_M ×10^{-4}kg·m^2(GD^2/4)	0.117	0.219	0.52	0.412
Roter Moment of Inertia (Encoder)		J_S ×10^{-4}kg·m^2(GD^2/4)	0.0033 Note1)			
Mass Note1)		WE kg	0.71	0.96	1.3	1.4
Brake Mass		W kg	0.34	0.39	0.89	0.39
Electrical Time Constant		te ms	2	2.6	2.2	3.2
Mechanical Time Constant (Not including Encoder)		tm ms	1.2	0.78	1.3	0.61
Brake Static Friction Torque		TB N·m	0.36 MIN.	1.37 MIN.	2.55 MIN.	1.37 MIN.
Brake Rated Voltage		VB V	DC90V / DC24V ± 10%			
Brake Rated Current		IB A	0.07 / 0.27	0.11 / 0.32	0.12 / 0.37	0.11 / 0.32
Roter Moment of Inertia (Brake)		JB ×10^{-4}kg·m^2(GD^2/4)	0.06	0.06	0.25	0.06

Note 1) This is a 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]
Note 2) It is the constant for the installation on the t6x250mm size aluminum board for the heat radiation.
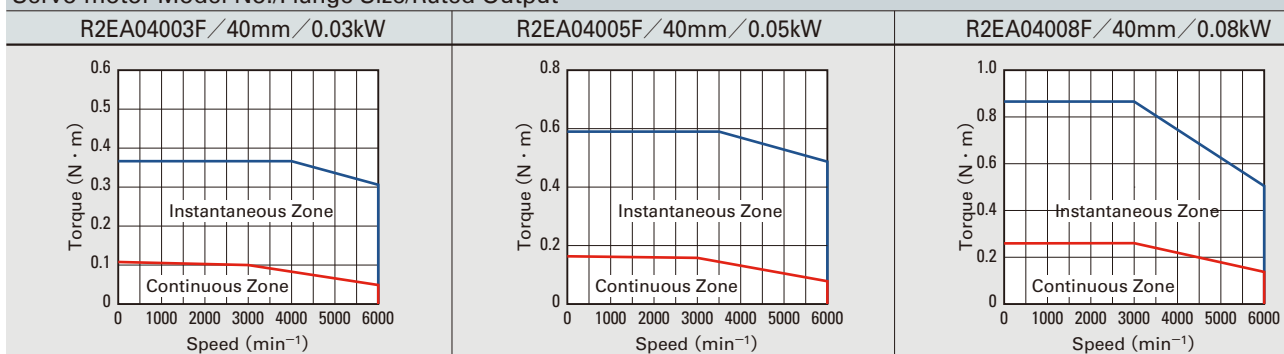Only in the case of the servo motor with model number R2AAB8100F, the constant
is for installation on the t12×305mm size aluminum board for heat radiation.

Note 3) Items with ★and velocity - torque characteristics indicate values
after temperature rise saturation. The others indicate values at 20℃.
Note 4) Each value indicates TYP.
＊ A reduction in the rating might be needed if an oil seal and
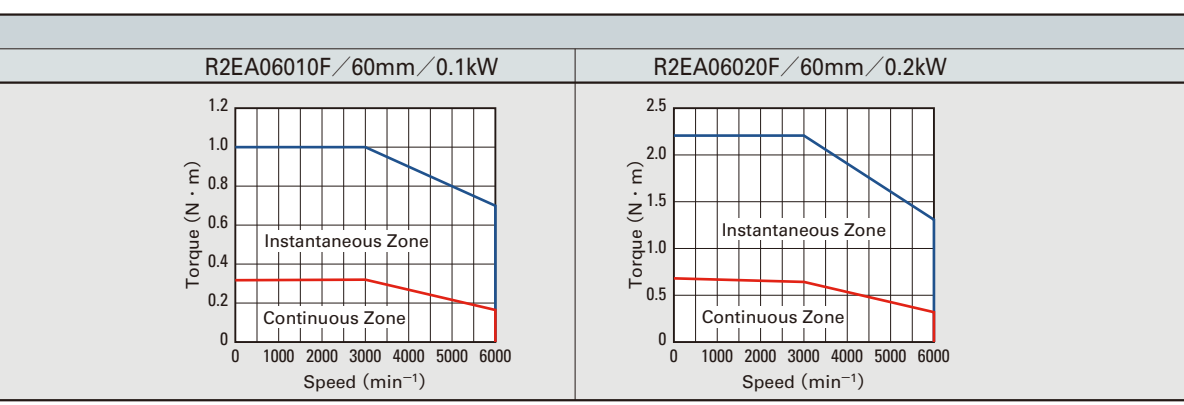Brake is attached. Please consult with us about the details.

Speed-Torque Characteristics

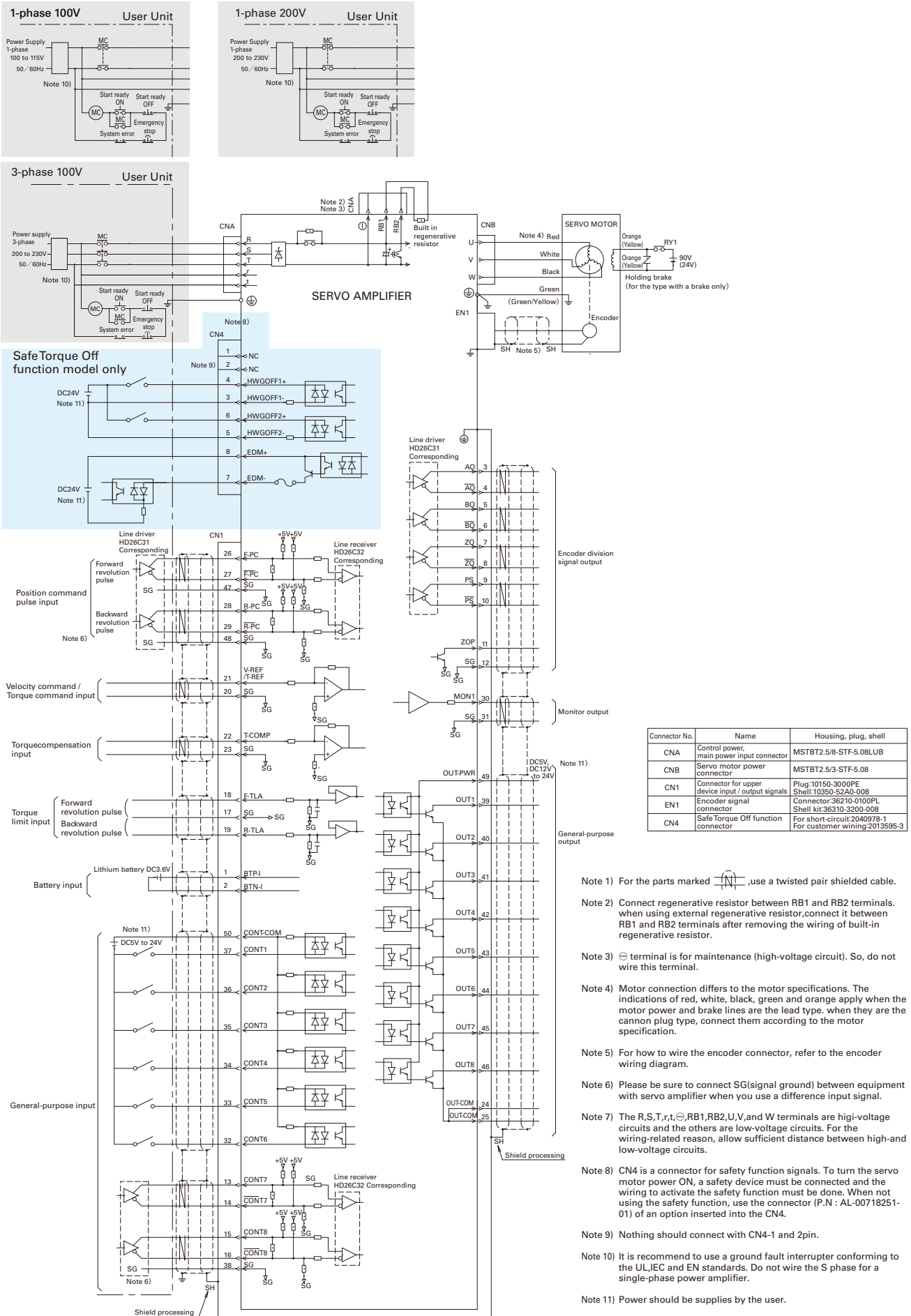| Servo motor Model No./Flange Size/Rated Output			
R2AA06010F／60mm／0.1kW	R2AA06020F／60mm／0.2kW	R2AA08020F／80mm／0.2kW	R2AA06040F／60mm／0.4kW

It is value when the input power supply is AC200V three-phase circuit. The area decreases momentarily when the power supply voltage is less than 200V.
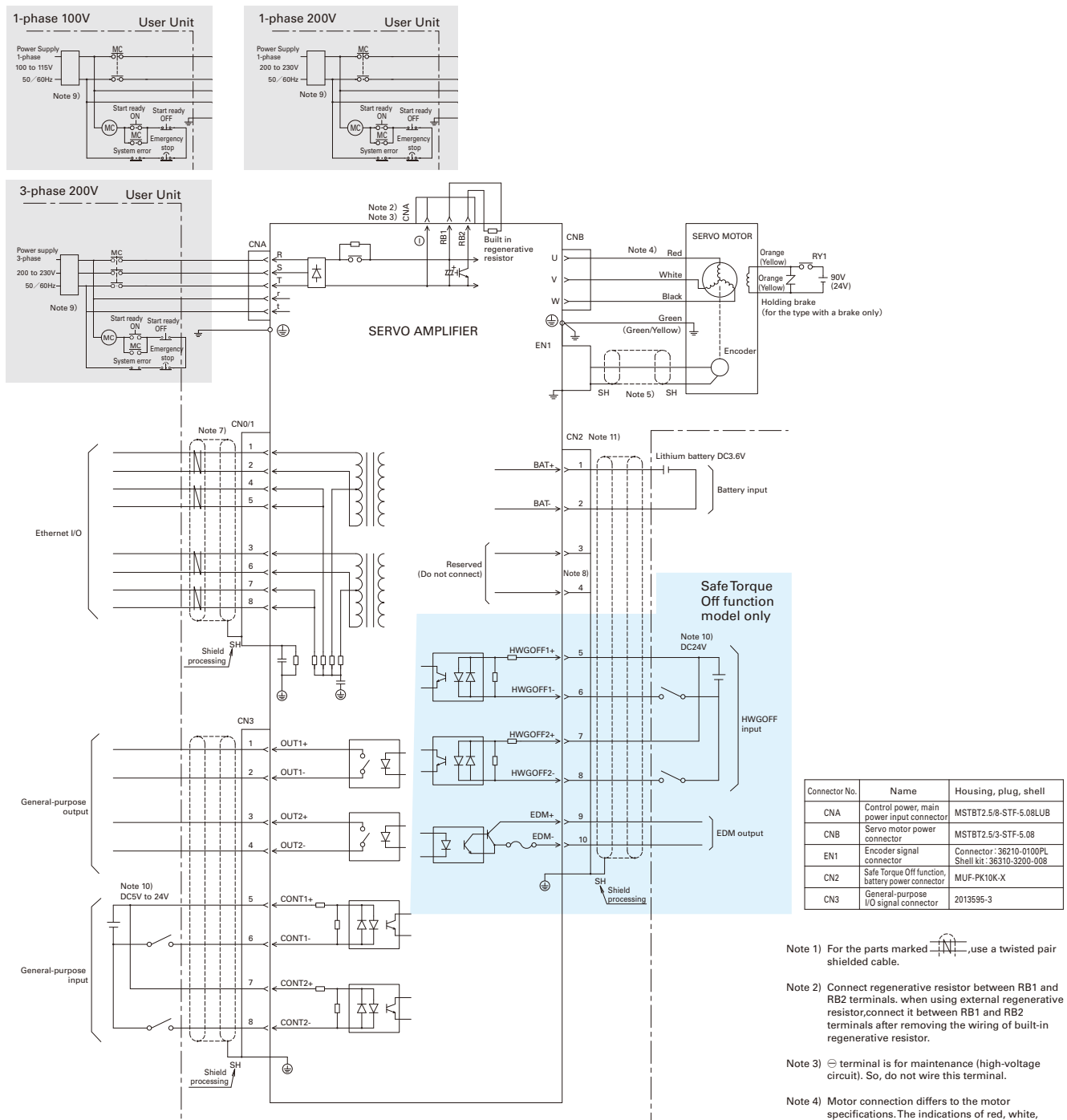Please contact us when the servo amplifier power supply is less than AC200V.

R2AA08040F	R2AA08075F	R2AAB8100F	Unit	Symbol		Item
RS2A03✱✱		RS2A05✱✱				Servo Amplifier Model
30		50	A			Capacity
1.0	1.7	2.5	kVA			Rated power supply
R2AA08040F	R2AA08075F	R2AAB8100F				Servo motor model
80	80	86	mm			Flange Size
0.4	0.75	1.0	kW	P_R	★	Rated Output
3000	3000	3000	min^{-1}	N_R	★	Rated Speed
6000	6000	6000	min^{-1}	N_{max}	★	Maximum Speed
1.27	2.39	3.18	N·m	T_R	★	Rated Torque
1.37	2.55	3.92	N·m	T_S	★	Continuous Torque at Stall
4.4	8.5	14.3	N·m	T_P	★	Peak Torque at Stall
2.6	4.6	6.0	Arms	I_R	★	Rated Armature Current
2.6	4.6	6.8	Arms	I_S	★	Armature Current at Stall
8.9	15.5	25.7	Arms	I_P	★	Peak Armature Current at Stall
0.559	0.559	0.582	N·m/Arms	K_T		Torque Constant
19.5	19.5	20.3	mV/min^{-1}	$K_{E\phi}$		Voltage Constant Per Phase
0.93	0.4	0.44	Ω	R_ϕ		Phase Resistance
16	31	42	kW/s	Q_R	★	Rated Power Rate
1.04	1.82	2.38	$\times 10^{-4}$kg·m^2(GD^2/4)	J_M		Roter Moment of Inertia (Not including Encoder)
0.0033 Note1)			$\times 10^{-4}$kg·m^2(GD^2/4)	J_S		Roter Moment of Inertia (Encoder)
1.7	2.7	3.6	kg	W_E		Mass Note1)
0.89	0.89	0.84	kg	W		Brake Mass
2.5	3	4.3	ms	te		Electrical Time Constant
0.93	0.7	0.93	ms	tm		Mechanical Time Constant (Not including Encoder)
2.55 MIN.		3.92 MIN.	N·m	T_B		Brake Static Friction Torque
DC90V / DC24V ± 10%			V	V_B		Brake Rated Voltage
0.12 / 0.37		0.30 / 0.09	A	I_B		Brake Rated Current
0.25		0.34	$\times 10^{-4}$kg·m^2(GD^2/4)	J_B		Roter Moment of Inertia (Brake)

Servo motor Model No./Flange Size/Rated Output

R2AA08040F／80mm／0.4kW	R2AA08075F／80mm／0.75kW	R2AAB8100F／86mm／1.0kW

Features and Functions
Model No. List・Model Number Nomenclature
System Configuration
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External Wiring Diagram
Encoder Wiring Diagram
Dimensions
Setup Software
Optional Equipment

Specification

Servo Amplifier ＋ R2 Servo Motor

input voltage AC100V Power supply range AC85V to AC127V

Item	Symbol	Unit	Specification		
Servo Amplifier Model			RS2E01＊＊		
Capacity		A	15		
Rated power supply		kVA	0.2	0.2	0.3
Servo motor model			R2EA04003F	R2EA04005F	R2EA04008F
Flange Size		mm	40	40	40
Rated Output	★ P_R	kW	0.03	0.05	0.08
Rated Speed	★ N_R	min^{-1}	3000	3000	3000
Maximum Speed	★ N_{max}	min^{-1}	6000	6000	6000
Rated Torque	★ T_R	N·m	0.098	0.159	0.255
Continuous Torque at Stall	★ T_S	N·m	0.108	0.167	0.255
Peak Torque at Stall	★ T_P	N·m	0.37	0.59	0.86
Rated Armature Current	★ I_R	Arms	0.94	1.2	1.3
Armature Current at Stall	★ I_S	Arms	1.0	1.3	1.3
Peak Armature Current at Stall	★ I_P	Arms	3.7	4.9	4.5
Torque Constant	K_T	N·m/Arms	0.116	0.142	0.22
Voltage Constant Per Phase	$K_{E\phi}$	mV/min^{-1}	4.04	4.97	7.7
Phase Resistance	R_ϕ	Ω	4.0	3.0	2.9
Rated Power Rate	★ Q_R	kW/s	3.9	6.7	10
Roter Moment of Inertia (Not including Encoder)	J_M	$\times10^{-4}kg·m^2(GD^2/4)$	0.0247	0.0376	0.0627
Roter Moment of Inertia (Encoder)	J_S	$\times10^{-4}kg·m^2(GD^2/4)$	0.0033 Note1)		
Mass Note1)	WE	kg	0.35	0.39	0.51
Brake Mass	W	kg	0.27	0.27	0.27
Electrical Time Constant	te	ms	0.55	0.67	0.81
Mechanical Time Constant (Not including Encoder)	tm	ms	2.2	1.7	0.98
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		
Roter Moment of Inertia (Brake)	JB	$\times10^{-4}kg·m^2(GD^2/4)$	0.0078		

Note 1) This is a 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]
Note 2) It is the constant for the installation on the t6x250mm size aluminum board for the heat radiation.

Note 3) Items with ★and velocity - torque characteristics indicate values after temperature rise saturation. The others indicate values at 20℃.
Note 4) Each value indicates TYP.
＊ A reduction in the rating might be needed if an oil seal and Brake is attached. Please consult with us about the details.

Speed-Torque Characteristics

Servo motor Model No./Flange Size/Rated Output		
R2EA04003F／40mm／0.03kW	R2EA04005F／40mm／0.05kW	R2EA04008F／40mm／0.08kW

It is value when the input power supply is AC100V. The area decreases momentarily when the power supply voltage is less than 100V.

Features and Functions

Model No. List · Model Number Nomenclature

System Configuration

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External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

		Unit	Symbol		Item
RS2E01∗∗	RS2E03∗∗				Servo Amplifier Model
15	30	A			Capacity
0.4	0.6	kVA			Rated power supply
R2EA06010F	R2EA06020F				Servo motor model
60	60	mm			Flange Size
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 Torque at Stall
1.0	2.2	N·m	T_P	★	Peak Torque at Stall
1.7	3.1	Arms	I_R	★	Rated Armature Current
1.7	3.2	Arms	I_S	★	Armature Current at Stall
5.6	11.9	Arms	I_P	★	Peak Armature Current at Stall
0.206	0.224	N·m/Arms	K_T		Torque Constant
7.2	7.82	mV/min^{-1}	$K_{E\phi}$		Voltage Constant Per Phase
1.5	0.6	Ω	R_ϕ		Phase Resistance
8.6	19	kW/s	Q_R	★	Rated Power Rate
0.117	0.219	$\times 10^{-4} kg \cdot m^2 (GD^2/4)$	J_M		Roter Moment of Inertia (Not including Encoder)
0.0033 Note1)		$\times 10^{-4} kg \cdot m^2 (GD^2/4)$	J_S		Roter Moment of Inertia (Encoder)
0.71	0.96	kg	W_E		Mass Note1)
0.34	0.39	kg	W		Brake Mass
1.9	2.6	ms	t_e		Electrical Time Constant
1.2	0.79	ms	t_m		Mechanical Time Constant (Not including Encoder)
0.36 MIN.	1.37 MIN.	N·m	T_B		Brake Static Friction Torque
DC90V / DC24V ± 10%		V	V_B		Brake Rated Voltage
0.07 / 0.27	0.11 / 0.32	A	I_B		Brake Rated Current
0.06		$\times 10^{-4} kg \cdot m^2 (GD^2/4)$	J_B		Roter Moment of Inertia (Brake)

R2EA06010F／60mm／0.1kW	R2EA06020F／60mm／0.2kW
Torque (N·m) — Instantaneous Zone / Continuous Zone — Speed (min^{-1}) 0–6000	Torque (N·m) — Instantaneous Zone / Continuous Zone — Speed (min^{-1}) 0–6000

Analog/Pulse input type

Connector No.	Name	Housing, plug, shell
CNA	Control power, main power input connector	MSTBT2.5/8-STF-5.08LUB
CNB	Servo motor power connector	MSTBT2.5/3-STF-5.08
CN1	Connector for upper device input / output signals	Plug:10150-3000PE Shell:10350-52A0-008
EN1	Encoder signal connector	Connector:36210-0100PL Shell kit:36310-3200-008
CN4	Safe Torque Off function connector	For short-circuit:2040978-1 For customer wiring:2013595-3

Note 1) For the parts marked ⊣Ñ⊢ , use a twisted pair shielded cable.

Note 2) Connect regenerative resistor between RB1 and RB2 terminals. when using external regenerative resistor,connect it between RB1 and RB2 terminals after removing the wiring of built-in regenerative resistor.

Note 3) ⊖ terminal is for maintenance (high-voltage circuit). So, do not wire this terminal.

Note 4) Motor connection differs to the motor specifications. The indications of red, white, black, green and orange apply when the motor power and brake lines are the lead type. when they are the cannon plug type, connect them according to the motor specification.

Note 5) For how to wire the encoder connector, refer to the encoder wiring diagram.

Note 6) Please be sure to connect SG(signal ground) between equipment with servo amplifier when you use a difference input signal.

Note 7) The R,S,T,r,t,⊖,RB1,RB2,U,V,and W terminals are higi-voltage circuits and the others are low-voltage circuits. For the wiring-related reason, allow sufficient distance between high-and low-voltage circuits.

Note 8) CN4 is a connector for safety function signals. To turn the servo motor power ON, a safety device must be connected and the wiring to activate the safety function must be done. When not using the safety function, use the connector (P.N : AL-00718251-01) of an option inserted into the CN4.

Note 9) Nothing should connect with CN4-1 and 2pin.

Note 10) It is recommend to use a ground fault interrupter conforming to the UL,IEC and EN standards. Do not wire the S phase for a single-phase power amplifier.

Note 11) Power should be supplies by the user.

EtherCAT interface type

Features and Functions

Model No. List · Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

1-phase 100V — User Unit
Power Supply 1-phase 100 to 115V 50/60Hz
Note 9)
Start ready ON / Start ready OFF
MC / Emergency stop
System error

1-phase 200V — User Unit
Power Supply 1-phase 200 to 230V 50/60Hz
Note 9)
Start ready ON / Start ready OFF
MC / Emergency stop
System error

3-phase 200V — User Unit
Power supply 3-phase 200 to 230V 50/60Hz
Note 9)
Start ready ON / Start ready OFF
MC / Emergency stop
System error

CNA R S T r t
Note 2) Note 3) CNA RB1 RB2 Built in regenerative resistor
SERVO AMPLIFIER

CNB U V W Note 4) Red / White / Black / Green (Green/Yellow)
SERVO MOTOR
Orange (Yellow) / Orange (Yellow) RY1 90V (24V)
Holding brake (for the type with a brake only)
EN1 Encoder
SH Note 5) SH

Note 7) CN0/1
Ethernet I/O
1 2 4 5 3 6 7 8
Shield processing SH

CN2 Note 11)
BAT+ 1 Lithium battery DC3.6V
BAT- 2 Battery input
Reserved (Do not connect) 3
Note 8) 4

Safe Torque Off function model only
Note 10) DC24V
HWGOFF1+ 5
HWGOFF1- 6
HWGOFF2+ 7
HWGOFF2- 8
HWGOFF input
EDM+ 9
EDM- 10
EDM output
SH Shield processing

CN3
General-purpose output
OUT1+ 1
OUT1- 2
OUT2+ 3
OUT2- 4

Note 10) DC5V to 24V
General-purpose input
CONT1+ 5
CONT1- 6
CONT2+ 7
CONT2- 8
Shield processing SH

Connector No.	Name	Housing, plug, shell
CNA	Control power, main power input connector	MSTBT2.5/8-STF-5.08LUB
CNB	Servo motor power connector	MSTBT2.5/3-STF-5.08
EN1	Encoder signal connector	Connector : 36210-0100PL Shell kit : 36310-3200-008
CN2	Safe Torque Off function, battery power connector	MUF-PK10K-X
CN3	General-purpose I/O signal connector	2013595-3

Note 1) For the parts marked ⌇, use a twisted pair shielded cable.

Note 2) Connect regenerative resistor between RB1 and RB2 terminals. when using external regenerative resistor, connect it between RB1 and RB2 terminals after removing the wiring of built-in regenerative resistor.

Note 3) ⊖ terminal is for maintenance (high-voltage circuit). So, do not wire this terminal.

Note 4) Motor connection differs to the motor specifications. The indications of red, white, black, green and orange apply when the motor power and brake lines are the lead type. when they are the cannon plug type, connect them according to the motor specification.

Note 5) For how to wire the encoder connector, refer to the encoder wiring diagram.

Note 6) R,S,T,t,r,⊖, P,DL1,DL2,RB1,RB2,U,V,W are high-voltage circuits, all other lines are low-voltage. Ensure sufficient distance between the high- and low-voltage circuits.

Note 7) Use a TIA category 5e or better shielded twisted pair (STP) cable.

Note 8) Nothing should connect with CN2-3 and 4pin.

Note 9) It is recommend to use a ground fault interrupter conforming to the UL,IEC and EN standards. Do not wire the S phase for a single-phase power amplifier.

Note 10) Power should be supplies by the user.

Note 11) CN2 is a Safe Torque Off function connector. If it is not connected to the safety device to enable the Safe Torque Off function to work, the servo does not turn on (the motor is not energized).

Serial Encoder

・Battery backup type absolute encoder [PA035C]
・Absolute encoder for incremental system [PA035S]
・Batteryless absolute encoder [RA035C]

Note1) Use a twisted-pair shielded cable.
Note2) The maximum cable lengths under the conductor size of the power supply cable (5V,SG).

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

Conductor resistance is different by conductor specifications.

Note3) When the Absolute encoder for incremental system or absolute encoder without battery is used, battery lines (EBAT+, EBAT-) are not required.

Pulse Encoder

・Wire-saving incremental encoder [PP031T]

Note1) Use a twisted-pair shielded cable.
Note2) The maximum cable lengths under the conductor size of the power supply cable (5V,SG).

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

Conductor resistance is different by conductor specifications.

PNP output

Servo Amplifier — Host unit

Out Power — DC24V

50mA max

Out 1 to 8
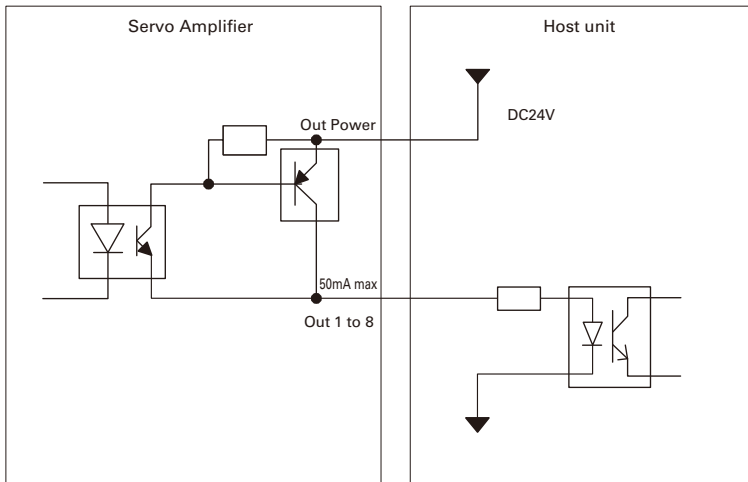
The output port counts are differentdepending on the specification.

NPN output

Servo Amplifier — Host unit

Out Power

Out 1 to 8

Out Common — Maximum current

DC5V·········· 10mA
DC12 to 15V····· 30mA
DC24V·········· 50mA
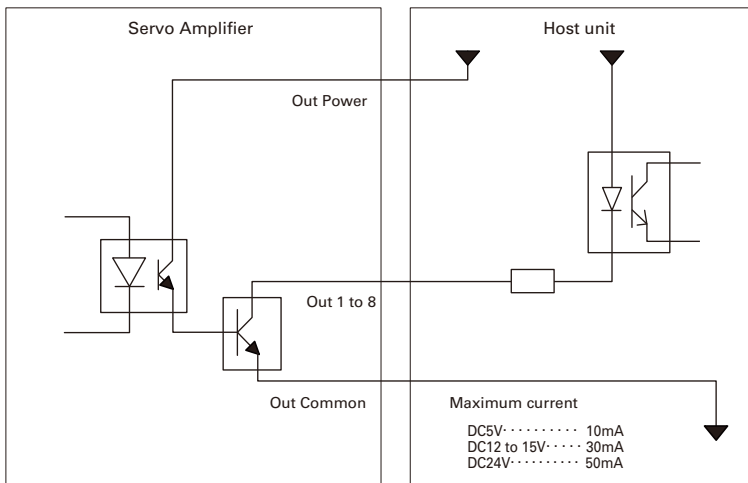
The output port counts are differentdepending on the specification.

Photo relay output
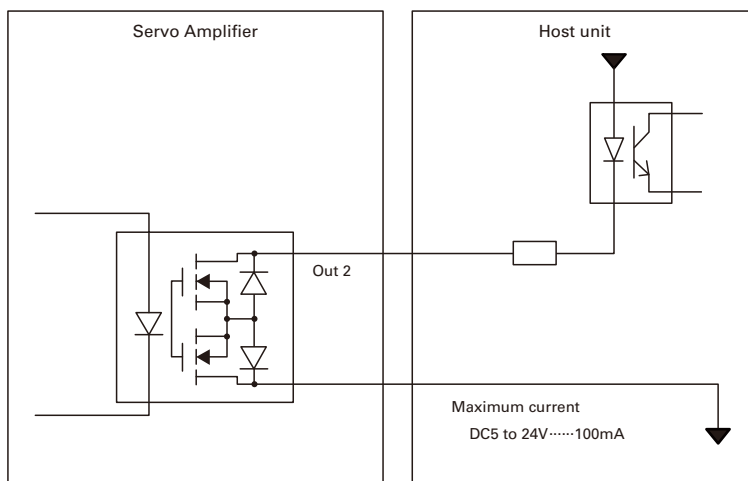
Servo Amplifier — Host unit

Out 2

Maximum current

DC5 to 24V······100mA

Features and Functions

Model No. List・Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

24

15A

Mass : 0.75kg

Analog/
Pulse input type

EtherCAT
interface type

30A

Mass : 0.9kg

Analog/
Pulse input type

EtherCAT
interface type

Cooling fan

Wind
direction

50A

Mass : 1.65kg

Cooling fan

Wind
direction

Analog/
Pulse input type

EtherCAT
interface type

25
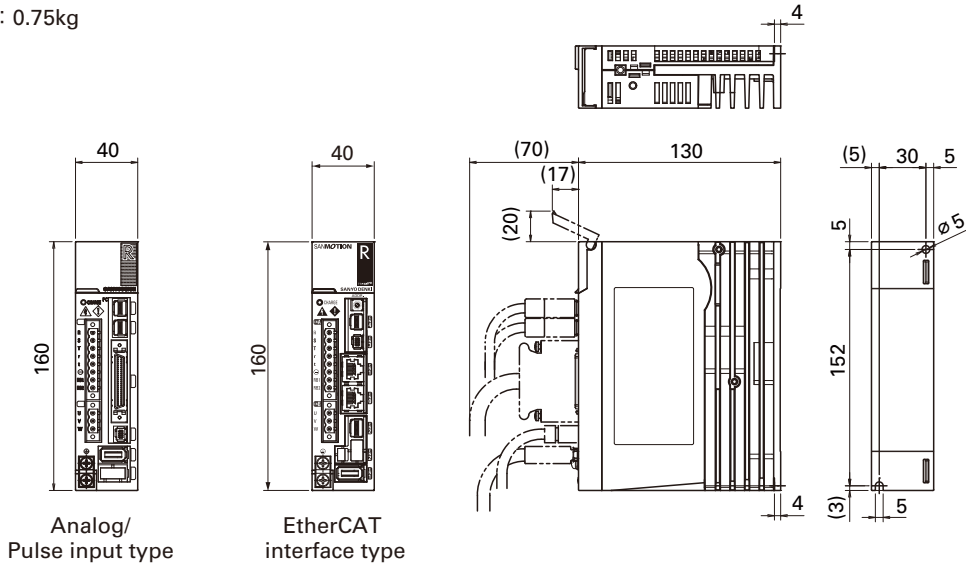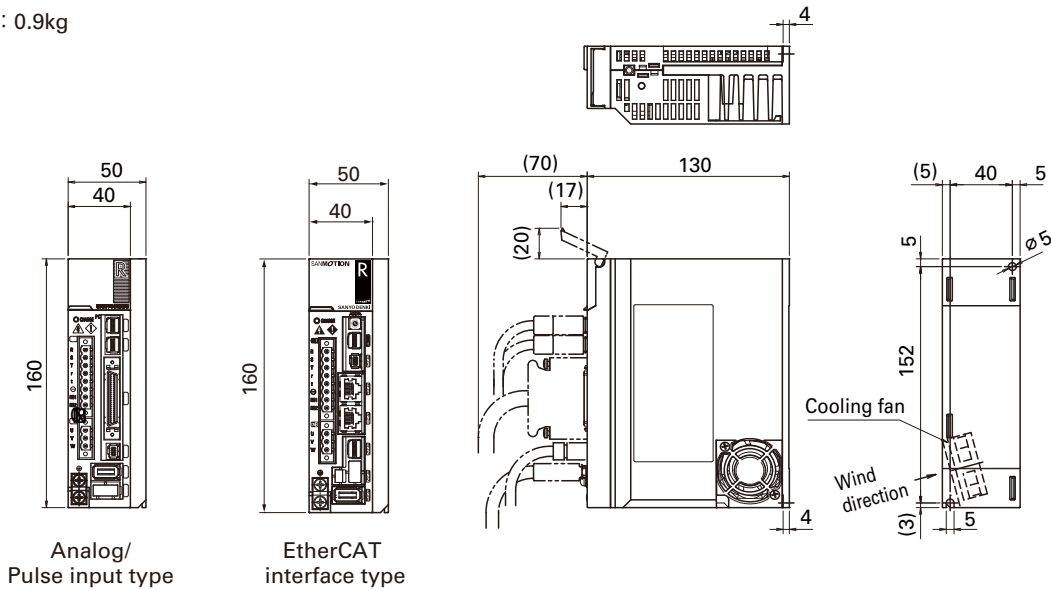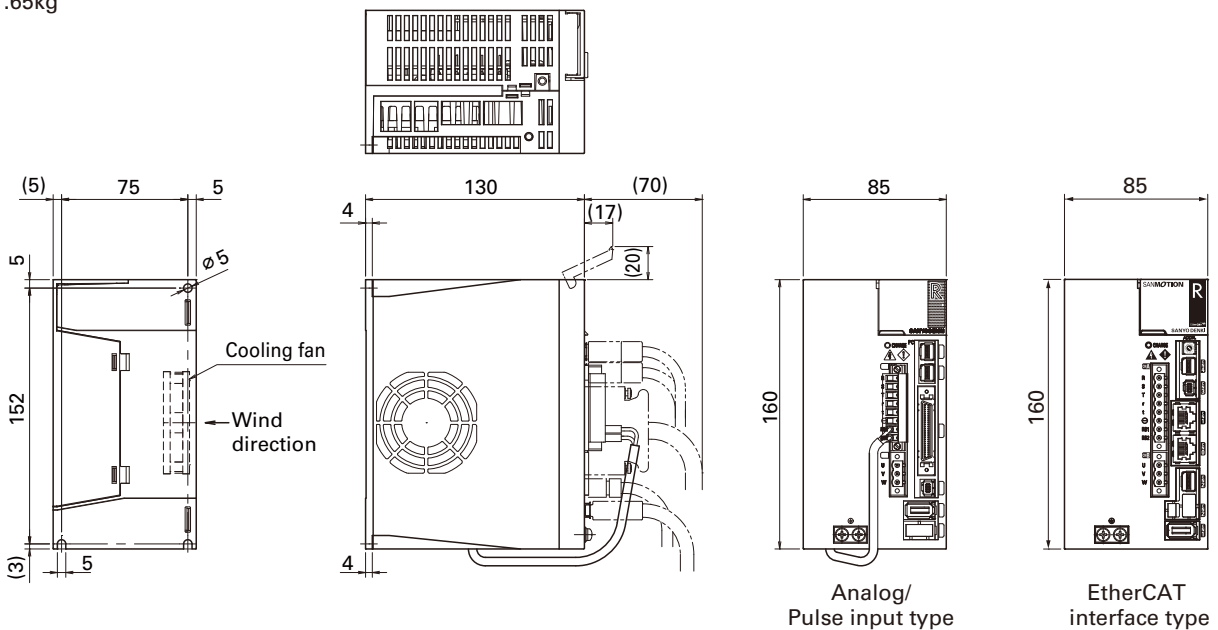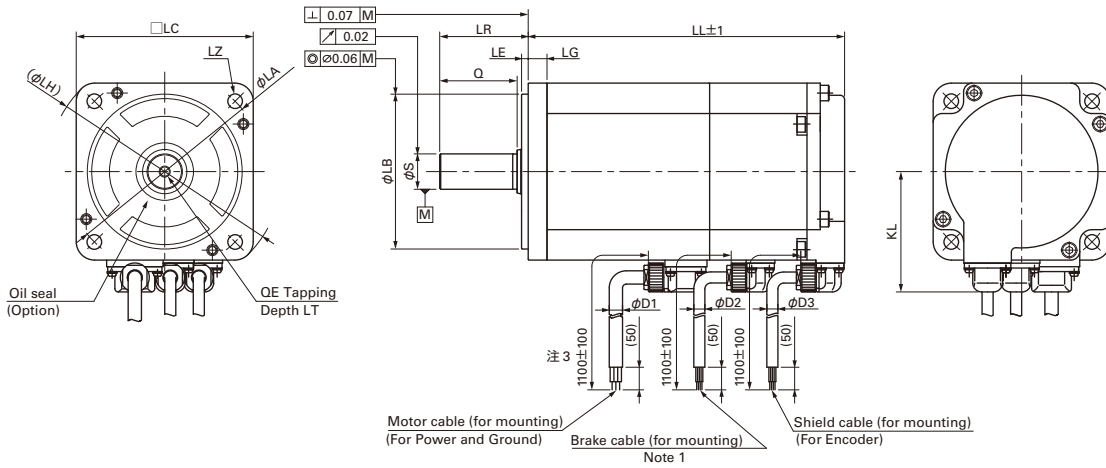
※ Dimensions with brake but without relay cable connector

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

MODEL	Battery backup method absolute encoder				LG	KL	LA	LB	LE	LH	LC	LZ	LR
	W/out oil seal		With oil seal Note 1										
	W/out brake	With brake	W/out brake	With brake									
	LL	LL	LL	LL									
R2□A04003 △□◇	51.5	87.5	56.5	92.5	5	35.4	46	0 30-0.021	2.5	56	40	2-Ø4.5	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	4-Ø5.5	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		108	80	4-Ø6.6	30
R2AA06040 △□◇	95.5	123.5	102.5	130.5	6	44.6	70	0 50-0.025		82	60	4-Ø5.5	
R2AA08040 △□◇	78.3	114	85.3	121	8	54.4	90	0 70-0.030	3	108	80	4-Ø6.6	
R2AA08075 △□◇	107.3	143	114.3	150									40
R2AAB8100 △□◇	137	163	137	163	8	59.4	100	0 80-0.030	3	115.5	86	4-Ø6.6	35

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		—	—			
R2□A06020 △□◇	0 14-0.011	25	M5	12			
R2AA08020 △□◇							
R2AA06040 △□◇							
R2AA08040 △□◇			M5	12			
R2AA08075 △□◇	0 16-0.011	35					
R2AAB8100 △□◇	0 16-0.011	30	M5	12			

Note 1: The total length of the motor varies when an oil seal is necessary. (Excluding 86mm sq.)
Note 2: Brake connectors (cables) are not supplied for models without brakes.
Note 3: The cable length of the motor with relay cable connector is 200±30mm. The connector is attached to the end of the cable.

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

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

SANMOTION

AC SERVO SYSTEMS

R

ADVANCED MODEL

R-ADVANCED MODEL-Setup Software
For Windows 98 SE/Me, Windows 2000 Professional,
Windows XP, Windows Vista

Copyright(C)2008 SANYODENKI CO.,LTD.
SANYO DENKI CO.,LTD.

Start-up Screen

Setup Software Title：

R ADVANCED MODEL-Setup Software

Main Functions

Servo amplifier parameter setting
Servo amplifier status display
Alarm display and reset
Test run execution
Auto-tuning of vibration control frequency, etc.
Analog command offset adjustment

※Use the optional PC connection cable (model number: AL-00689703-01) to connect the servo amplifier and the RS-232C port on the PC.

Supported OS

Windows　98/SE/Me/2000/XP/Vista

※See our website for details of supported versions.

Main Screen
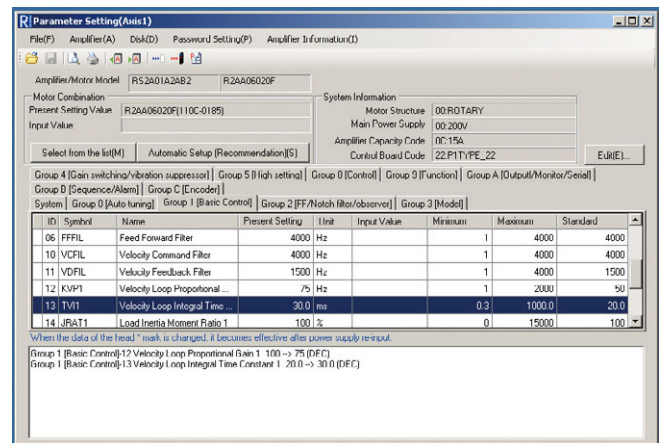
Configuration parameters
Enables parameter loading, saving, etc., via PC connection

Monitor Display
Observe Operation and Input/Output signal status
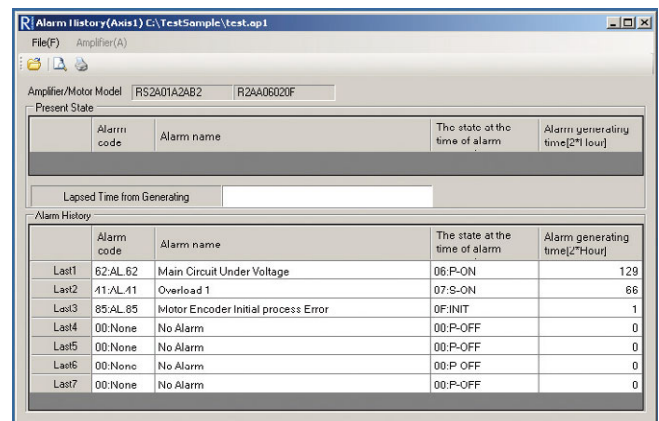
Alarm Record Display
Current and past alarm occurrence can be checked.

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Features and Functions

Model No. List • Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment
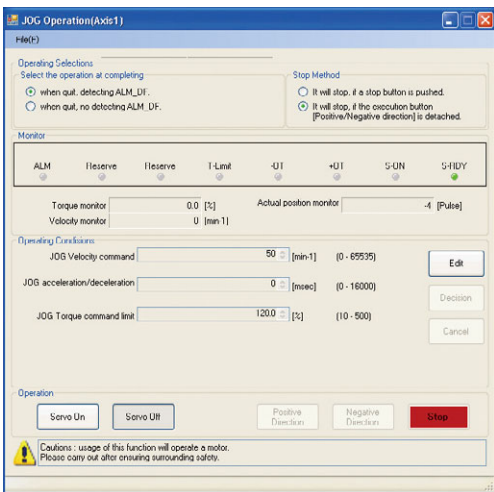
JOG Operation
Simplifies motor operation and the issuing of speed commands from a PC
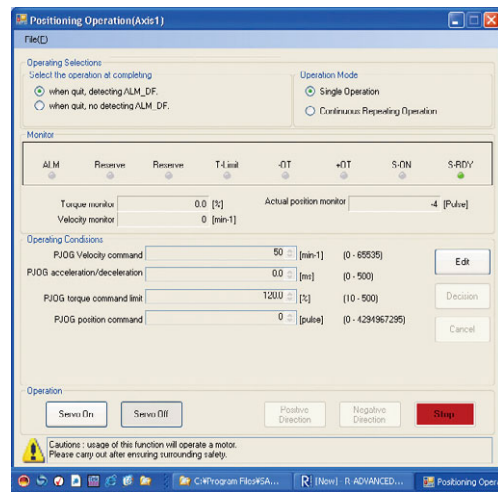
Positioning Control Operation
The position can be moved by setting the feed velocity and the pulse number of the servo motor.
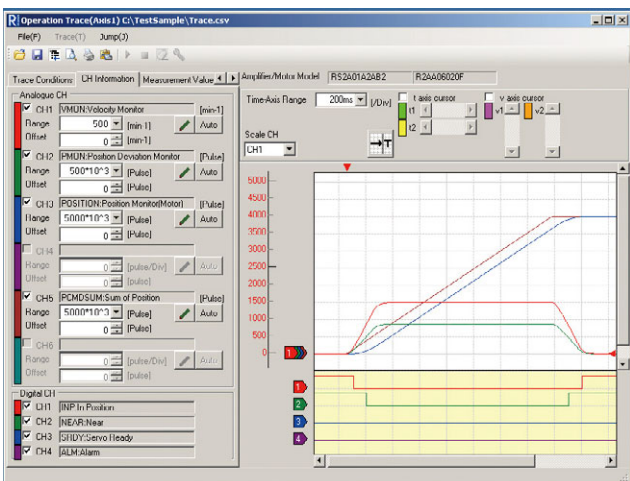
Operation Trace
Graphically displays servo motor speed, current, and internal status
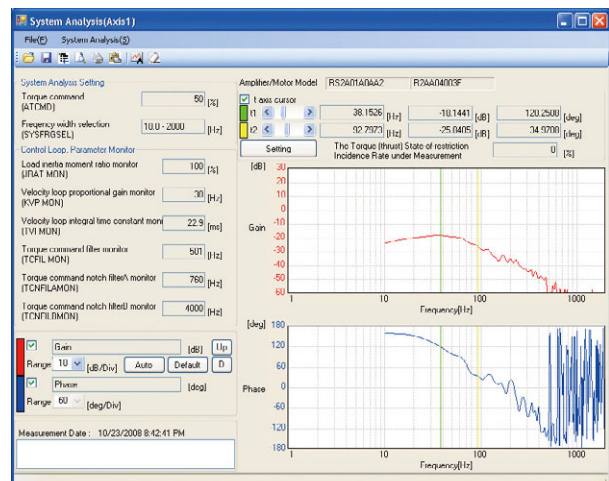
System Analysis
Analyzes servo system frequency characteristics

28

Connectors for Servo Amplifier   Analog/Pulse input type

Single Connectors

Connector number	Intended use	Model number	Manufacturer model number	Manufacturer
CN1	To connect host equipment	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	For servo motor connection	AL-Y0004079-01	MSTBT2.5/3-STF-5.08	
CN4 Note 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	

Note1) When wiring for CN4 is not performed, make sure to insert safety device connector (for short-circuiting) to CN4 on servo amplifier.

Connector sets   (No safe-torque-off function)

Connector number	Intended use	Model number	Applicable servo amplifier model number	Remarks
CN1,EN1,CNA,CNB	Standard	AL-00723282	RS2***A0*L0/RS2***A8*L0	Without regenerative resistance
CN1,EN1,CNB		AL-00723284	RS2***A0*A0/RS2***A8*A0	With regenerative resistance
CN1,EN1,EN2,CNA,CNB	For fully closed control system	AL-00723286	RS2***A2*L0/RS2***AA*L0	Without regenerative resistance
CN1,EN1,EN2,CNB		AL-00723288	RS2***A2*A0/RS2***AA*A0	With regenerative resistance
CN1,EN1	A set for low-voltage	AL-00723290	RS2***A0**0/RS2***A8**0	—
CNA,CNB	A set for high-voltage	AL-00696037	RS2***A**L0	Without regenerative resistance

Connector sets   (With safe-torque-off function)

Connector number	Intended use	Model number	Applicable servo amplifier model number	Remarks
CN1,EN1,CNA,CNB,CN4	Standard	AL-00723155	RS2***A0*L2/RS2***A8*L2	Without regenerative resistance
CN1,EN1,CNB,CN4		AL-00723156	RS2***A0*A2/RS2***A8*A2	With regenerative resistance
CN1,EN1,EN2,CNA,CNB,CN4	For fully closed control system	AL-00723157	RS2***A2*L2/RS2***AA*L2	Without regenerative resistance
CN1,EN1,EN2,CNB,CN4		AL-00723158	RS2***A2*A2/RS2***AA*A2	With regenerative resistance
CN1,EN1,CN4	A set for low-voltage	AL-00723159	RS2***A0**2/RS2***A8**2	—

✓ CN4 of the connector set is for safety device connection (wiring) with model number AL-00718252-01.

Connector for Servo Amplifier   EtherCAT interface type

Single Connectors

Connector number	Intended use	Model number	Manufacturer model number	Manufacturer
CN0,CN1	Ethernet For host unit connection	Not provided by our company. Please use shielded type modular plug (RJ-45) corresponding to the CAT5e standard.		
EN1,EN2	For encoder connection	AL-00632607	36210-0100PL 36310-3200-008	Sumitomo 3M Limited
CNA	For input power supply, regenerative resistor connection	AL-00686902-01	MSTBT2.5/8-STF-5.08LUB	Phoenix Contact.K.K
CNB	For servo motor connection	AL-Y0004079-01	MSTBT2.5/3-STF-5.08	Phoenix Contact.K.K
CN2	For safety device connection	AL-Y0004290-02	MUF-PK10K-X	J.S.T Mfg Co.,Ltd.
CN3	For general I/O	AL-00718252-01	2013595-3	Tyco Electronics Japan G.K.

Connector sets

Connector number	Intended use	Model number	Applicable servo amplifier model number	Remarks
CNA,CNB,EN1,CN2,CN3	Standard	AL-00734194	RS2***A0KL*/RS2***A8KL*	Without regenerative resistance
CNB,EN1,CN2,CN3		AL-00734196	RS2***A0KA*/RS2***A8KA*	With regenerative resistance
CNA,CNB,EN1,EN2,CN2,CN3	For fully closed control system	AL-00734195	RS2***A2KL*/RS2***AAKL*	Without regenerative resistance
CNB,EN1,EN2,CN2,CN3		AL-00734197	RS2***A2KA*/RS2***AAKA*	With regenerative resistance

Setup software, Serial Communication Relation

Connector No.	Item		Our model
1) Cable for personal computer communications	Between personal computer and servo amplifier	Analog / Pulse input type : CN2 EtherCAT interface type : CN4	AL-00689703-01
2) Amplifier communication cable (0.2m)[Note 1]	Servo Amplifier (CN2) ⇔ Servo Amplifier (CN3)		AL-00695974-01
3) Amplifier communication cable (3.0m)[Note 1]			AL-00695974-02
4) Communication converter [Note 1]	RS232C ⇔ RS-422		SAU-024-01
5) Connector with terminating resistor[Note 1]	RS-422 Terminating resistor for communication		AL-00695977-01

Dimentions (Unit : mm)

1) Cable for personal computer communications（Model No.：AL-00689703-01）
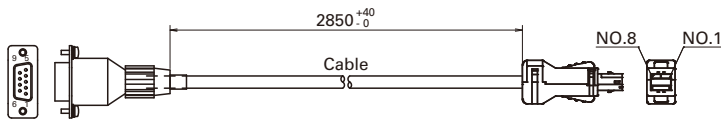
2) Amplifier communication cable（0.2m）（Model No.：AL-00695974-01）[Note 1]
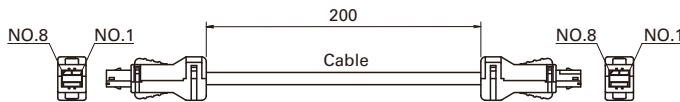
3) Amplifier communication cable（3.0m）（Model No.：AL-00695974-02）[Note 1]
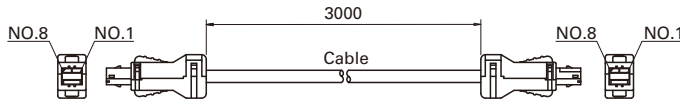
4) Communication converter（Model No.：SAU-024-01）[Note 1]
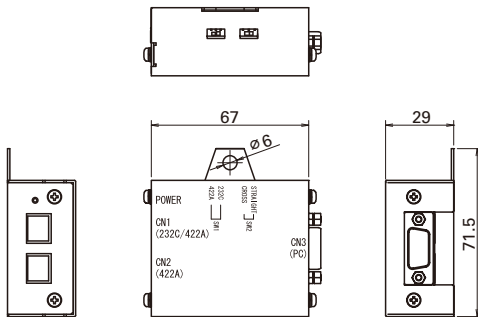
5) Connector with terminating resistor（Model No.：AL-00695977-01）[Note 1]
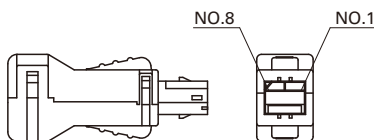
Note 1)　Optional connector dedicated for analog/pulse input type.

Features and Functions

Model No. List・Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

Battery for Battery Backup Method Absolute Encoder Relation

Name	Item	Our model No.
1) Encoder relay cable with battery unit, with connectors on both ends	–	AL-00731792-01
2) Encoder relay cable with battery unit, with connectors on one ends	–	AL-00697960-□□
3) Replacement batteries	Lithium battery : ER3VLY Toshiba Consumer Marketing Ltd.	AL-00697958-01

Dimensions (Unit : mm)

1) Encoder relay cable with battery unit, with connectors on both ends（Model No. : AL-00731792-01)

3) Replacement batteries (Model No. : AL-00697958-01)
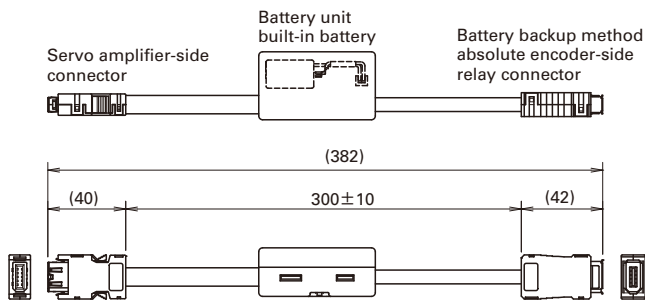
2) Encoder relay cable with battery unit, with connectors on one ends（Model No. : AL-00697960-□□)
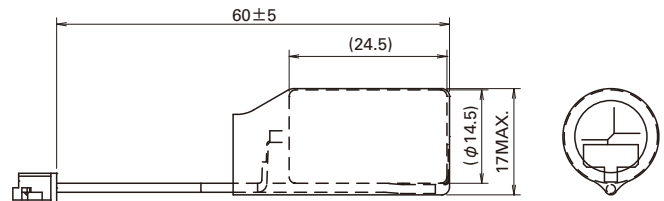
	Model No.	L [m]
1	AL-00697960-01	3
2	AL-00697960-02	5
3	AL-00697960-03	10
4	AL-00697960-04	15
5	AL-00697960-05	20
6	AL-00697960-06	25

Analog Monitor Relation

Name	Item	Our 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) Dedicated Cable (Model No. : Q-MON-3)
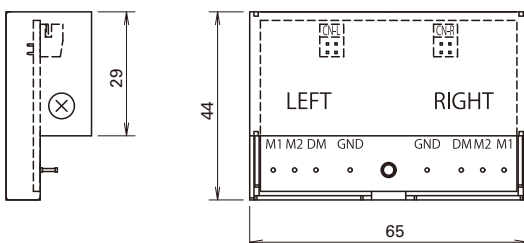
2) Monitor Box (Model No. : AL-00690525-01)
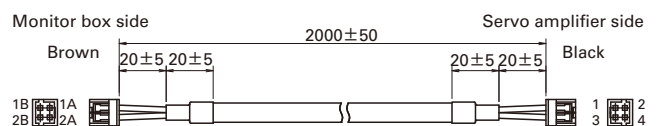
Note1) 2 units of the dedicated cables per above 2) (PN# AL-00690525-01) are attached to Monitor Box (PN#Q-MON-3).

External Regenerative Resistor Dimensions （Unit: mm）

Silicon Rubber Glass-braided Wire AWG20 0.5mm², White (Thermostat)

Silicon Rubber Glass-braided Wire AWG18 0.75mm², Black
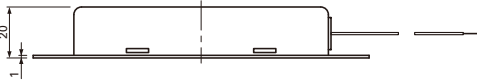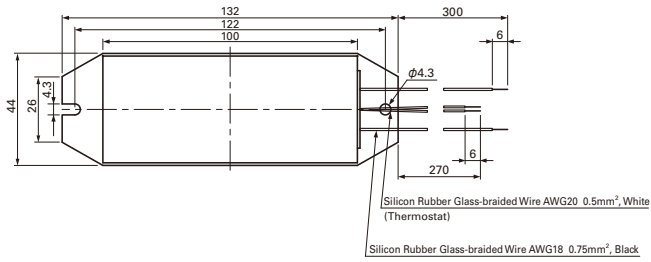
Mass：0.19kg

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

Silicon Rubber Glass-braided Wire AWG20 0.5mm², White (Thermostat)

Silicon Rubber Glass-braided Wire AWG18 0.75mm², Black
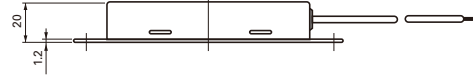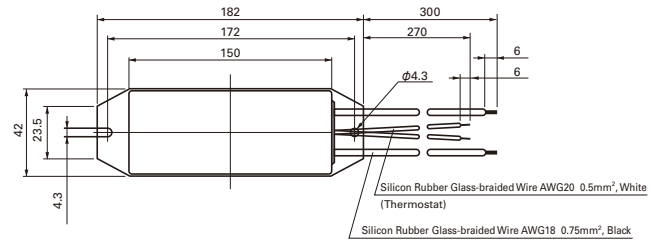
Mass：0.24kg

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

Silicon Rubber Glass-braided Wire AWG20 0.5mm², White (Thermostat)

Silicon Rubber Glass-braided Wire AWG18 0.75mm², Black
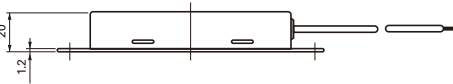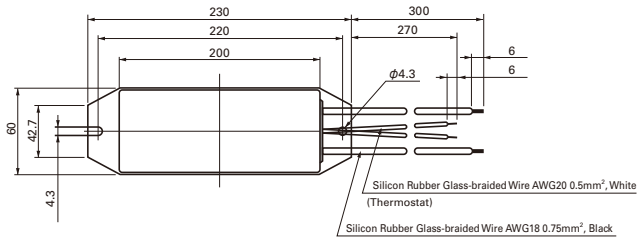
Mass：0.44kg

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

2-φ4.5
Ground Mark
2-M3
Thermostat
Read wire AWG24 0.2mm², White
Solderless terminal (for M5)
Read wire AWG14 2mm², White
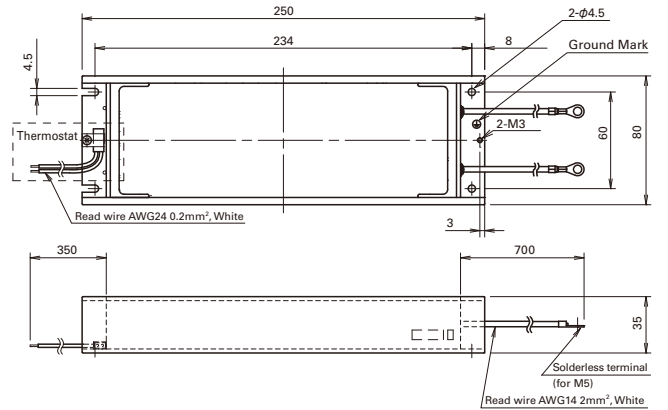
Mass：1.5kg

	Model No.	Thermostat
1	REGIST-500CW20B	Normal close
2	REGIST-500CW10B	Normal close

Features and Functions

Model No. List・Model Number Nomenclature

System Configuration

Standard Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Optional Equipment

Servo motor relay cable

For power

For brake

Ring tongue terminal for M4
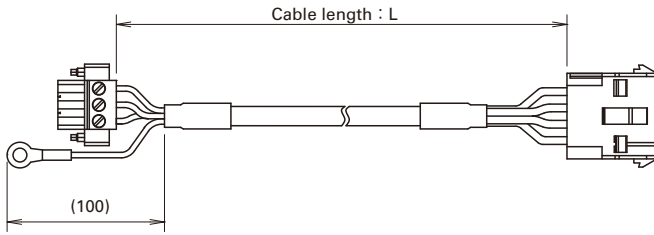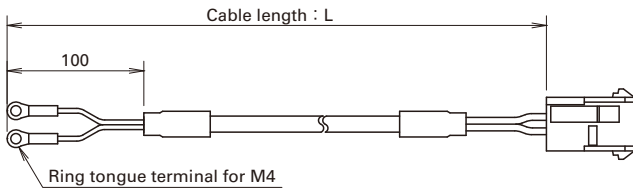
For encoder

	Model No.		Cable length : L
For power	For brake	For encoder	(m)
RS-CM4-01-R	RS-CB3-01-R	RS-CA4-01-R	1
RS-CM4-02-R	RS-CB3-02-R	RS-CA4-02-R	2
RS-CM4-03-R	RS-CB3-03-R	RS-CA4-03-R	3
RS-CM4-05-R	RS-CB3-05-R	RS-CA4-05-R	5
RS-CM4-10-R	RS-CB3-10-R	RS-CA4-10-R	10

Servo motor with relay cable connector
200V System

Rated output	Motor flange size	Holding brake	Model No.	Remark
30W	40mm sq.	−	R2AA04003FXPA0	
30W	40mm sq.	yes (DC24V)	R2AA04003FCPA0	
50W	40mm sq.	−	R2AA04005FXPA0	
50W	40mm sq.	yes (DC24V)	R2AA04005FCPA0	
100W	40mm sq.	−	R2AA04010FXPA0	
90W	40mm sq.	yes (DC24V)	R2AA04010FCPA0	90% lower rating
100W	60mm sq.	−	R2AA06010FXPA0	
100W	60mm sq.	yes (DC24V)	R2AA06010FCPA0	
200W	60mm sq.	−	R2AA06020FXPA0	
200W	60mm sq.	yes (DC24V)	R2AA06020FCPA0	
400W	60mm sq.	−	R2AA06040FXPA0	
360W	60mm sq.	yes (DC24V)	R2AA06040FCPA0	90% lower rating
750W	80mm sq.	−	R2AA08075FXPA0	
750W	80mm sq.	yes (DC24V)	R2AA08075FCPA0	

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

Inquiry Check Sheet

For more information regarding any products or services described here in, please contact your nearest office listed on the back of this catalog.
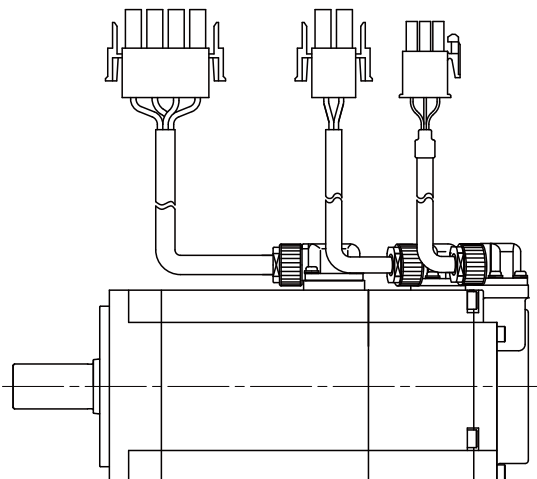
To SANYO DENKI Co.,LTD.

Date ：_____

Company: _____
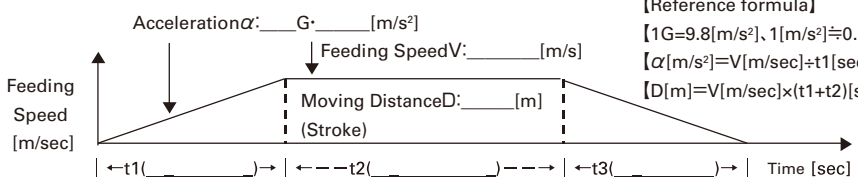
Department: _____

Name: _____

Tel: _____   FAX: _____

E-mail: _____

	Item	Contents
❶	Name of target equipment	Equipment name, category (transport, processing, test, other)
❷	Name of servo axis	Axis name, axial mechanism (horizontal/vertical), brake mechanism (yes/no)
❸	Current condition of above axis	Manufacturer Name (　　) Series Name (　　) Motor Capacity (　　) Hydraulic, Mechanical, or New System (　　)
❹	Positioning accuracy	±　　mm·±　　μm
❺	Operation pattern	Accelerationα:____G·_____[m/s²]　Feeding SpeedV:_____[m/s]　Moving DistanceD:_____[m] (Stroke)　Feeding Speed [m/sec]　←t1(_____)→ ←－－t2(_____)－－→ ←t3(_____)→ Time [sec]　【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]】
❻	Mechanism	Ball-screw/screw-rotation type (horizontal/vertical), ball-screw/nut-rotation type (horizontal/vertical), rack and pinion (horizontal/vertical), belt/chain (horizontal/vertical), rotary table, roll feed, other
❼	Mechanical structure	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·m²　JC(coupling inertia)　kg·m² JN(nut inertia)　kg·m²　JO(other motor-axis conversion inertia)　kg·m² 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(pully thickness)　mm Dt(table diameter)　mm　Dh(table-support dianeter)　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·cm³ μ(friction coefficient between sheet and shiliding-surface/support-section/roll)　ρ1(specific gravity of roll-1 material)　kg／cm³ ρ2(specific gravity of roll-2 material)　kg／cm³　κ(internal friction coefficient of preload nut) η(mechanical efficiency)　JL(load inertia of motor-axis conversion)　kg·m² TF(friction torque of motor axis conversion)　N·m　Tu(imbalance torque of motor axis conversion)　N·m
❽	Speed reducer	Customer-provided (　／　)·Sanyo denki standard(planet/spur/no-backlash-planet　／　) other(　／　)
❾	Encoder type	Encoder type specified (yes / no) Yes:(Wiring saving incremental encoder, battery backup absolute encoder, absolute encoder for incremental system, battery-less absolute encoder) Resolution(　　　　　)
❿	Input format	Position , velocity , torque , other (　　　　　)
⓫	Host equipment (controller)	Sequencer , laptop , customer-developed product , Sanyo dennki-provided , other (　　　　)
⓬	Usage environment and other requirements	Cutting , clean-room use , anti-dust measures , other (　　　　)
⓭	Estimated production	Single product: (　　　　) units/mouth (　　　　) units/year
⓮	Development schedule	Prototype period: (　　)Year (　　) Month Production period: (　　)Year (　　) Month
⓯	Various measures	Related documentation (already submitted; send later by mail) Visit/PR desired (yes / no) Meeting desired (yes / no)
⓰	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.

ECO PRODUCTS

■ **Precautions For Adoption**

⚠ **Cautions**

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.