

SANMOTION

SERVO SYSTEMS

R **ADVANCED
MODEL**

DC 48 V 30 W-200 W



SANYO DENKI

SANMOTION R

SERVO SYSTEMS

ADVANCED MODEL

Supply Voltage **DC48V**

Servo Amplifier

AMP. Capacity 25A · 40A

Servo Motor R

Flange Size 40mm · 60mm

Rated Output 30W · 50W · 80W · 100W · 200W



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Features

Modl Number
Nomenclature

Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Option

Features

Incredibly Small and Light

In seeking to make the servo amplifier smaller and lighter, we have achieved in downsizing the capacity by approximately 30% and mass by approximately 31% while maintaining the same high performance as our conventional product*, the AC power input servo amplifier. With a height of 116mm, width of 30mm, depth of 70mm and mass of 0.23kg, it can be installed into equipment in tight installation spaces and improves system miniaturization.



* Our conventional product...AC Servo Amplifier [SANMOTION R] Model Number : RS2A01A

Low Voltage Specification

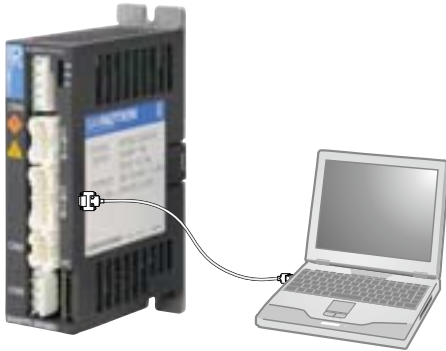
The power source inputs for the main circuits have DC48V, a highly safe, low voltage and low risk of electrical shock specification. Equipment can also be operated in conformance with the low voltage directive, one of the EU directives. This amplifier is best suited for semiconductor manufacturing equipment, small-size robots, the chip mounting industry, machine tool optional shaft and transfers with low voltage specification.

High Precision and Low Vibration

Servo motors come standard with high resolution encoders up to 17 bit (131,072 divisions). Also, cogging torque is low and high precision control with low vibration is possible.

Easy Setup

The setup software allows you to set parameters and view graphical displays of monitored waveforms for position, velocity and torque using a PC.



Examples of functions



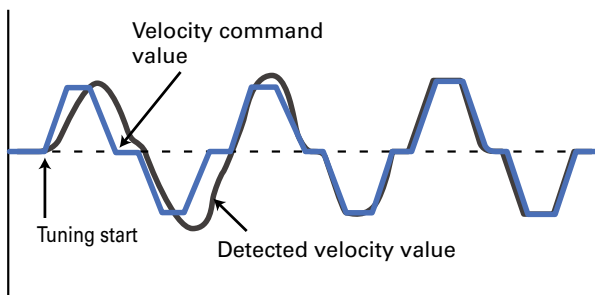
System analysis



Parameter configuration

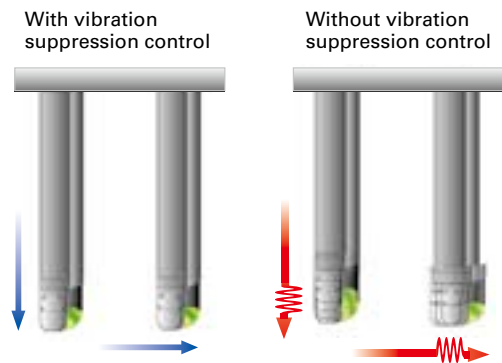
Auto-Tuning

The servo amplifier automatically adjusts for the optimum servo gain and filter frequency in real time during operation.



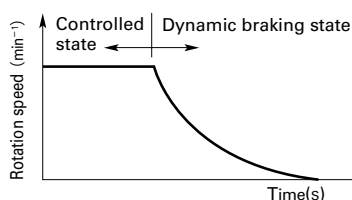
Vibration Suppression Control

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 can be selected.



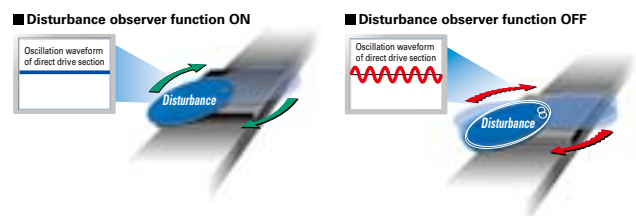
Built-in Dynamic Brake

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.



Disturbance Suppression

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



Standard Model Number List

■ Servo Amplifier

Power Input	Encoder Type	Amp. capacity	Model Number
DC48V	Serial encoder	40A	RF2G21A0A00

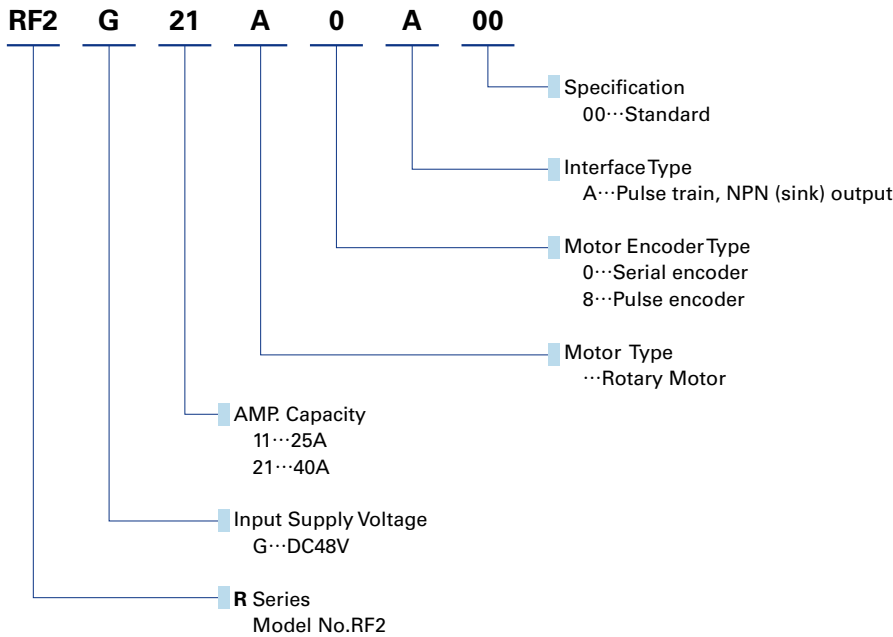
■ Servo Motor

Power Input	Encoder Type	Rated Output	Motor Flange Size	Holding Brake	Model Number
DC48V	Battery backup method absolute encoder (PA035C)	30W	40mm sq.	–	R2GA04003FXP00
				Yes (DC24V)	R2GA04003FCP00
		50W	40mm sq.	–	R2GA04005FXP00
				Yes (DC24V)	R2GA04005FCP00
		80W	40mm sq.	–	R2GA04008DXP00
				Yes (DC24V)	R2GA04008DCP00
		100W	60mm sq.	–	R2GA06010DXP00
				Yes (DC24V)	R2GA06010DCP00
		200W	60mm sq.	–	R2GA06020DXP00
				Yes (DC24V)	R2GA06020DCP00
	Absolute encoder for incremental System (PA035S)	30W	40mm sq.	–	R2GA04003FXH00
				Yes (DC24V)	R2GA04003FCH00
		50W	40mm sq.	–	R2GA04005FXH00
				Yes (DC24V)	R2GA04005FCH00
		80W	40mm sq.	–	R2GA04008DXH00
				Yes (DC24V)	R2GA04008DCH00
		100W	60mm sq.	–	R2GA06010DXH00
				Yes (DC24V)	R2GA06010DCH00
		200W	60mm sq.	–	R2GA06020DXH00
				Yes (DC24V)	R2GA06020DCH00

For specifications on other models, please contact us.

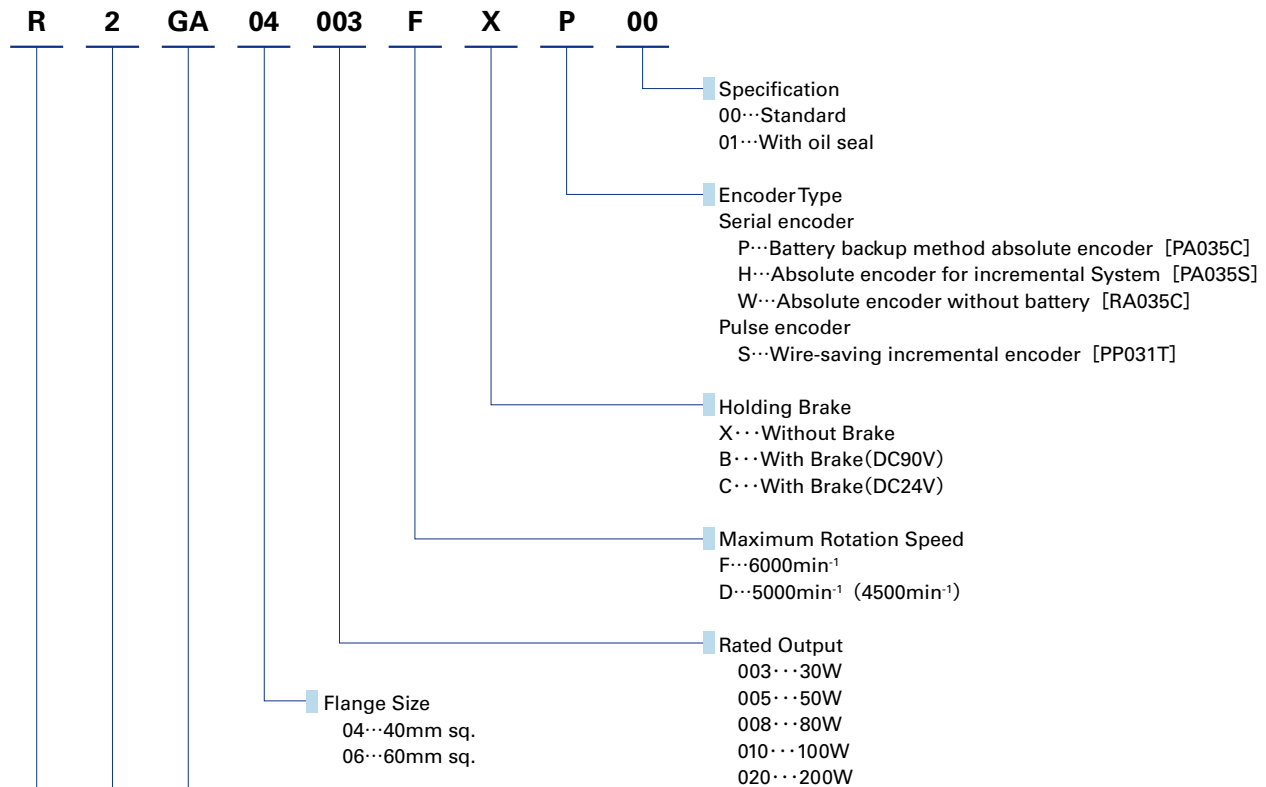
Servo Amplifier

Example: The model number below is for the RF2 Servo Amplifier (R-series RF2 Amplifier, DC48V input specification) with 40A amplifier capacity and serial encoder.



Servo Motor

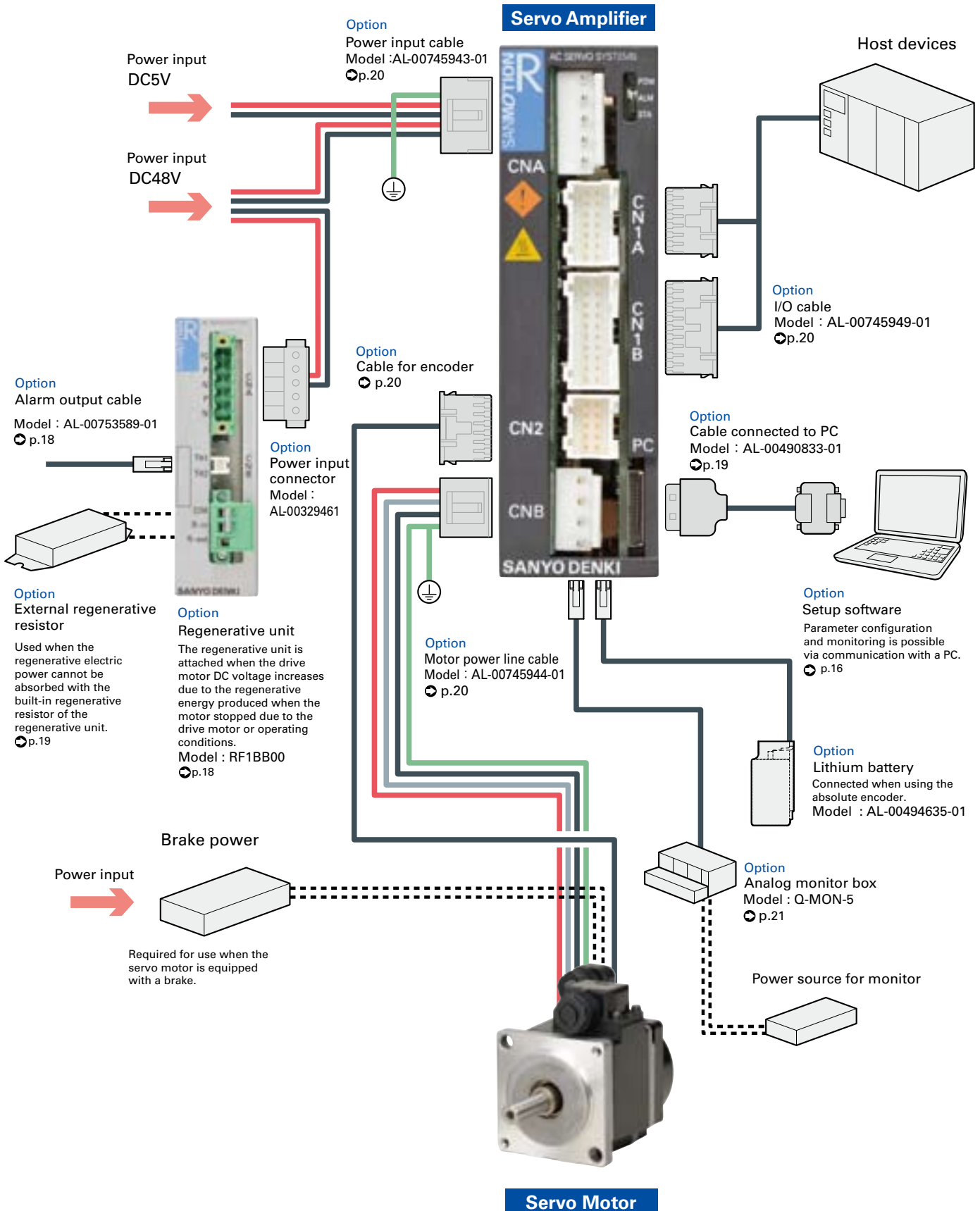
Example: The standard specification model number below is for the R2-series Servo Motor (DC48V specification) with a 40mm flange size, 30W rated output, 6000min⁻¹ maximum rotation speed, without brake and battery backup method absolute encoder.



Encoder Specification

Model	Partition number/rotations	Multiple rotation	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	8000 (2000P/R)	—	Wire-saving incremental encoder Max. 40000 (Numbers of division/Rotations)

System Configuration



Servo Amplifier Specification

Control function	Position control	
Control system	POWER-MOS-FET : PWM control, sine wave drive	
Main circuit power supply	DC48V ± 10% ^{Note1)}	
Control power supply	DC5V ± 5% ^{Note2)}	
Environment	Operating ambient temperature	0 to 40°C ^{Note3)}
	Storage temperature	-20 to +65°C
	Operating and storage humidity	90% RH or less (No condensation)
	Height above sea level	1000m or less
	Vibration	4.9m/sec ² Frequency range: 10 to 55Hz in X, Y, and Z direction each, within 2H
	Impact (shock)	19.6m/sec ²
Configuration	Tray shape, external power supply	
Mass	0.23kg ± 10%	
Frequency characteristic	1200Hz (For high-speed sampling mode)	
Speed control range	1:5000 (Built-in speed command)	
Protection functions	Over current, Current detection error, Overload, Amplifier overheating, External overheating, Over voltage, Main circuit power low voltage, Control power supply low voltage, Encoder error, Over speed, Speed control error, Speed feedback error, Excessive position deviation, Position command pulse error, Built-in memory error, Parameter error, CPU error	
Display	Status display, Alarm display, Power-supplied-state display	
Dynamic brake circuit	Built-in	
Regeneration processing	Option	
Analog monitor	Option	

Note1) Enter the voltage within specification ranges to the power source voltage of the main circuit.

Note2) The control power source is used as the power source to the encoder. Even if the voltage input is within the specification field, when the wiring is long to the encoder, the voltage may decrease as a result of the wiring and the encoder may not operate properly.

Note3) Use within the operation ambient temperature range.

Features

Modl Number
Nomenclature

Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Option

Standard Specifications

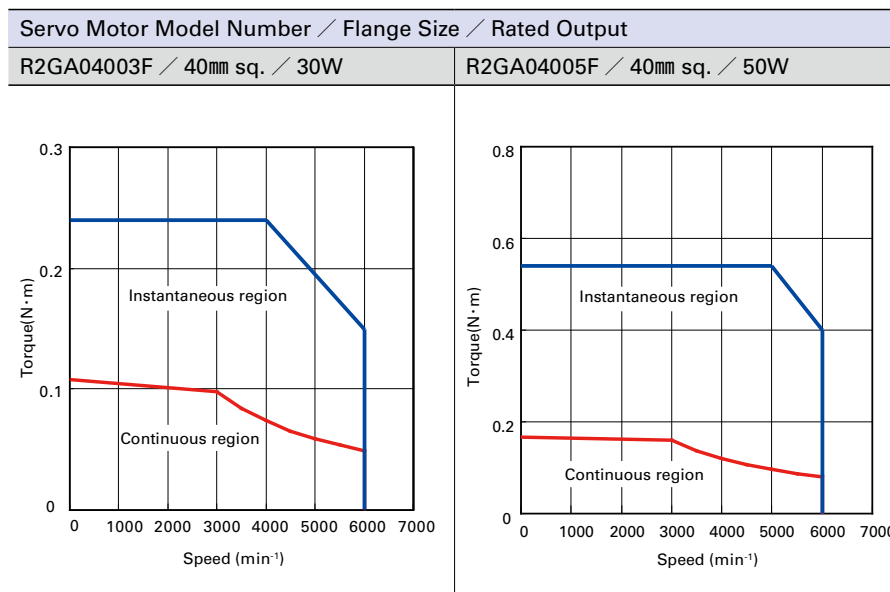
Servo Amplifier Model Number				RF2G21A0A00	
Servo Motor Model Number / 《 》 Flange Size in mm				R2GA04003F 《40mm sq.》	R2GA04005F 《40mm sq.》
Category	Status	Symbol	Unit		
Rated Output	★	P_R	W	30	50
Rated Speed	★	N_R	min^{-1}	3000	3000
Maximum Speed	★	N_{max}	min^{-1}	6000	6000
Rated Torque	★	T_R	$\text{N} \cdot \text{m}$	0.098	0.159
Continuous Torque at Stall	★	T_S	$\text{N} \cdot \text{m}$	0.108	0.167
Peak Torque at Stall	★	T_P	$\text{N} \cdot \text{m}$	0.24	0.54
Rated Armature Current	★	I_R	Arms	1.9	3.8
Armature Current at Stall	★	I_S	Arms	2.0	3.9
Peak Armature Current at Stall	★	I_P	Arms	4.8	13.7
Torque Constant	☆	K_T	$\text{N} \cdot \text{m} / \text{Arms}$	0.0582	0.047
Voltage Constant Per Phase	☆	$K_{E\phi}$	$\text{mV} / \text{min}^{-1}$	2.03	1.64
Phase Resistance	☆	R_ϕ	Ω	1	0.33
Rated Power Rate	★	Q_R	kW / s	3.9	6.7
Electrical Time Constant	☆	t_e	ms	0.55	0.58
Mechanical Time Constant (Not including Encoder)	☆	t_m	ms	2.2	1.7
Rotor Moment of Inertia (Not including Encoder)		J_M	$\times 10^{-4} \text{kg} \cdot \text{m}^2 (\text{GD}^2 / 4)$	0.0247	0.0376
Rotor Moment of Inertia (Absolute Encoder)		J_S	$\times 10^{-4} \text{kg} \cdot \text{m}^2 (\text{GD}^2 / 4)$	0.0033	0.0033
Mass including Encoder		WE	kg	0.23	0.27
Brake Static Friction Torque		TB	$\text{N} \cdot \text{m}$	0.32 min.	
Brake Rated Voltage		VB	V	DC90V/DC24V \pm 10%	
Brake Rated Current		IB	A	0.07/0.27	
Rotor Moment of Inertia (Brake)		JB	$\times 10^{-4} \text{kg} \cdot \text{m}^2 (\text{GD}^2 / 4)$	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	

Note 1) The constant is the number at the time of the installation of the $t6 \times \square 250\text{mm}$ heat dissipation aluminum plate.

Note 2) ★ items and velocity-torque characteristics denote the values after temperature increase and saturation. ☆ indicates the value at 20°C.

Note 3) Each value is a typical value.

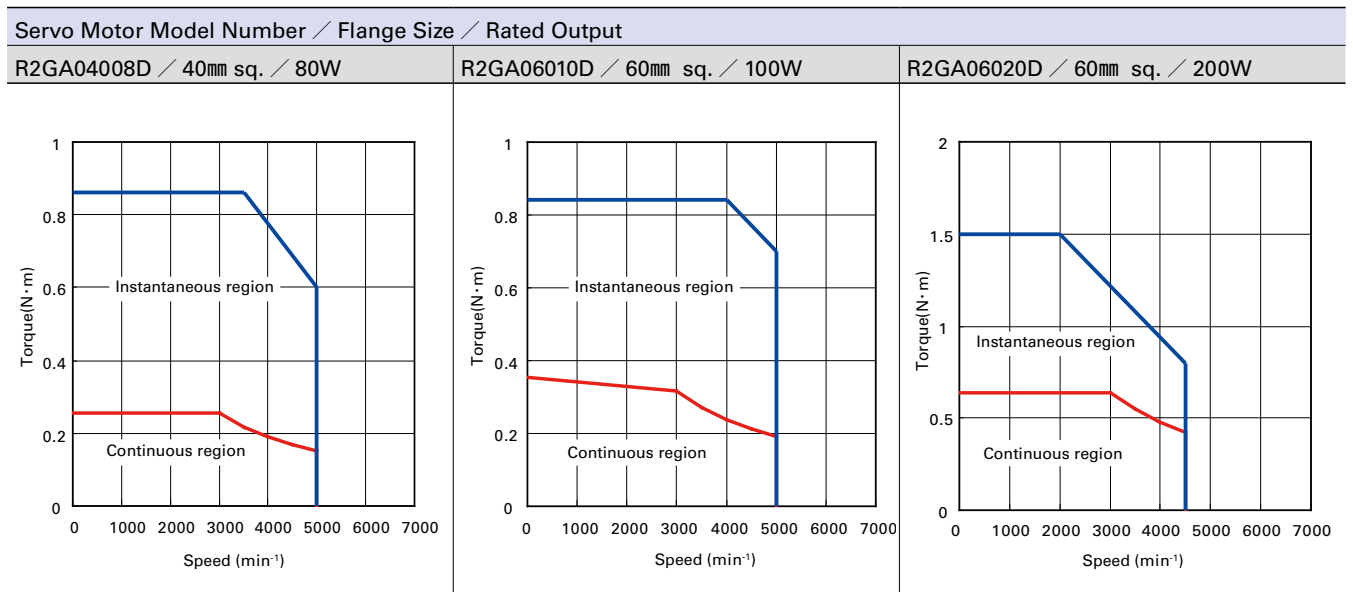
Speed • Torque Characteristics



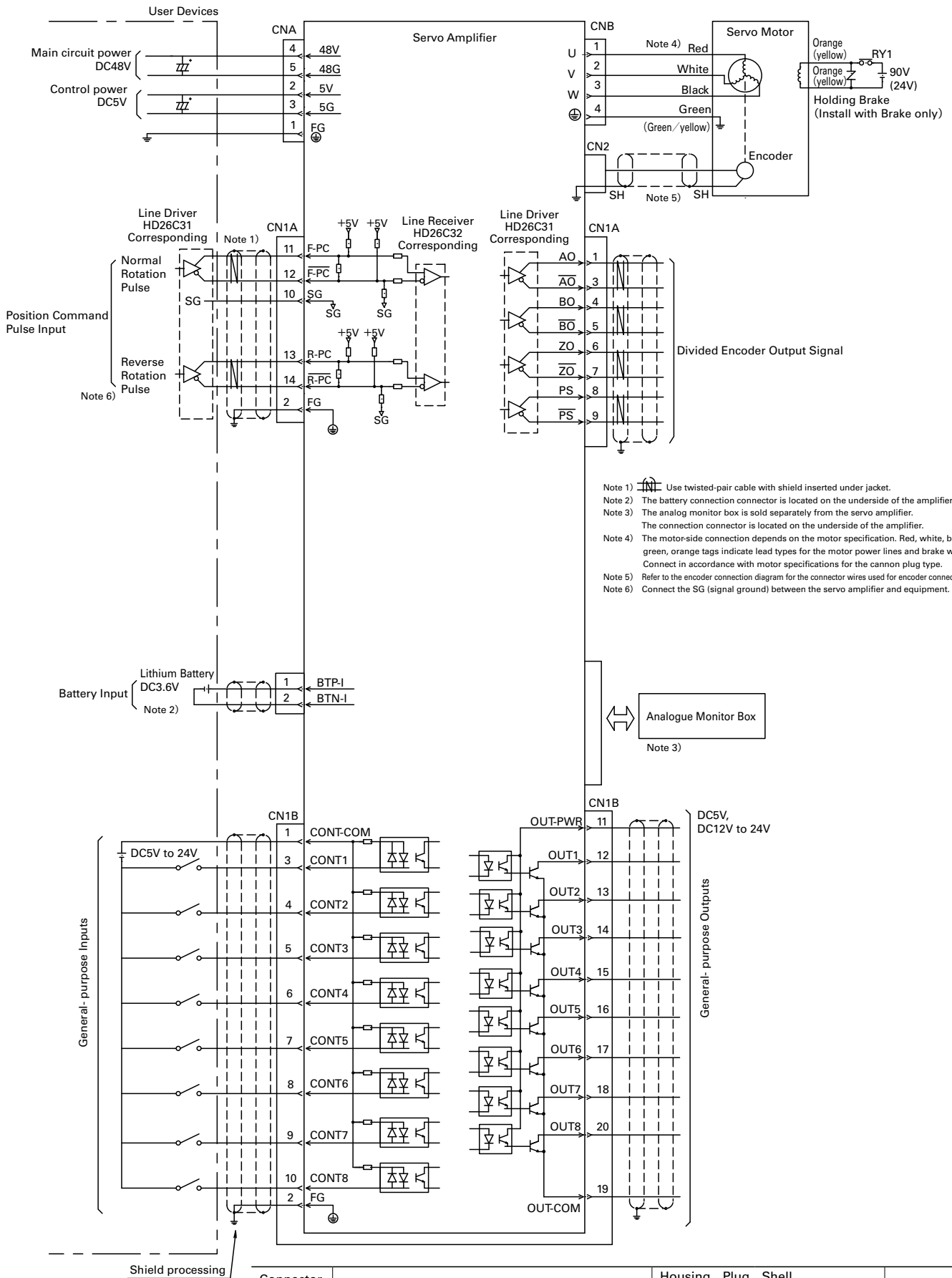
Note 5) The characteristics are valid for when the main power source input voltage is DC48V and the distance between the servo amplifier and servo motor is 2m.

Note 6) With servo systems having a low voltage specification, i.e., the input voltage is low, the distance between the servo amplifier and servo motor is long, and the wire diameter of the cable is thin, the tendency for motor torque to decrease is highly visible compared to AC200V servo systems. When selecting the motor, select the acceleration torque, deceleration torque and effective torque with torque to spare.

RF2G21A0A00			Servo Amplifier Model Number		
R2GA04008D 《40mm sq.》	R2GA06010D 《60mm sq.》	R2GA06020D 《60mm sq.》	Servo Motor Model Number / () Flange Size in mm		
			Unit	Symbol	Status
80	100	200	W	P _R	★
3000	3000	3000	min ⁻¹	N _R	★
5000	5000	4500	min ⁻¹	N _{max}	★
0.255	0.318	0.637	N · m	T _R	★
0.255	0.353	0.637	N · m	T _S	★
0.86	0.84	1.5	N · m	T _P	★
4.1	5.1	6	Arms	I _R	★
4.1	5.5	6	Arms	I _S	★
14.1	14.1	14.1	Arms	I _P	★
0.0693	0.0673	0.117	N · m / Arms	K _T	☆
2.42	2.35	4.07	mV / min ⁻¹	K _{Eφ}	☆
0.32	0.19	0.19	Ω	R _φ	☆
10	8.6	19	kW / s	Q _R	★
0.72	1.7	2.1	ms	te	☆
1.3	1.5	0.92	ms	tm	☆
0.0627	0.117	0.219	× 10 ⁻⁴ kg · m ² (GD ² / 4)	J _M	
0.0033	0.0033	0.0033	× 10 ⁻⁴ kg · m ² (GD ² / 4)	J _S	
0.39	0.59	0.84	kg	WE	
0.32 min.	0.36 min.	1.37 min.	N · m	TB	
DC90V/DC24V ± 10%			V	VB	
0.07/0.27	0.07/0.27	0.11/0.32	A	IB	
0.0078	0.06	0.06	× 10 ⁻⁴ kg · m ² (GD ² / 4)	JB	
0.23	0.3	0.35	kg	W	
Operating Temperature: 0 to 40° C, Relative Humidity: 90% Maximum, no condensation					



External Wiring Diagram

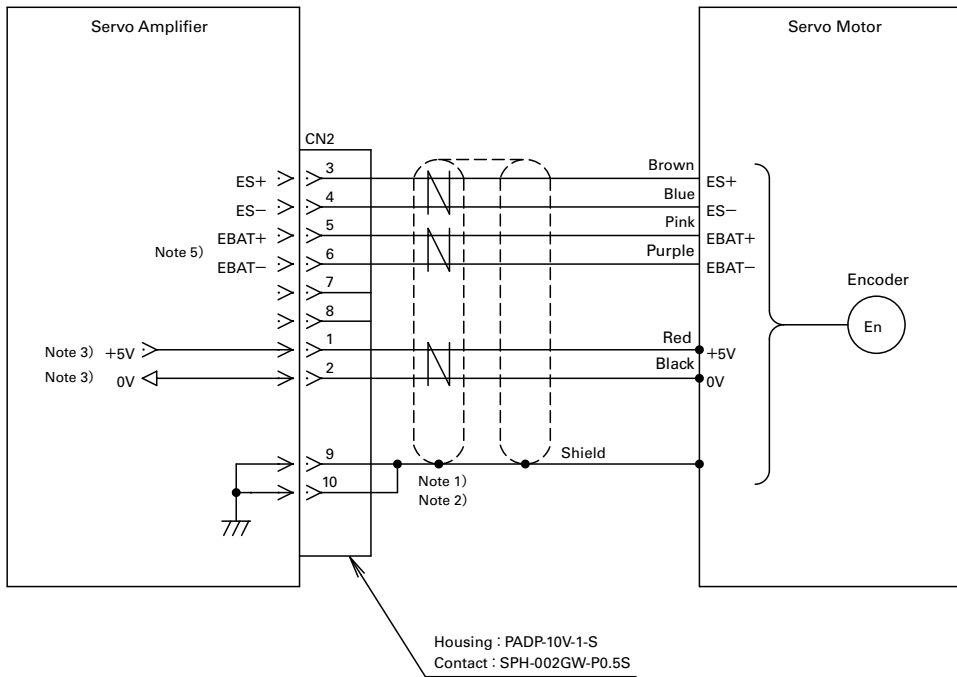


External power sources must be supplied by the customer.

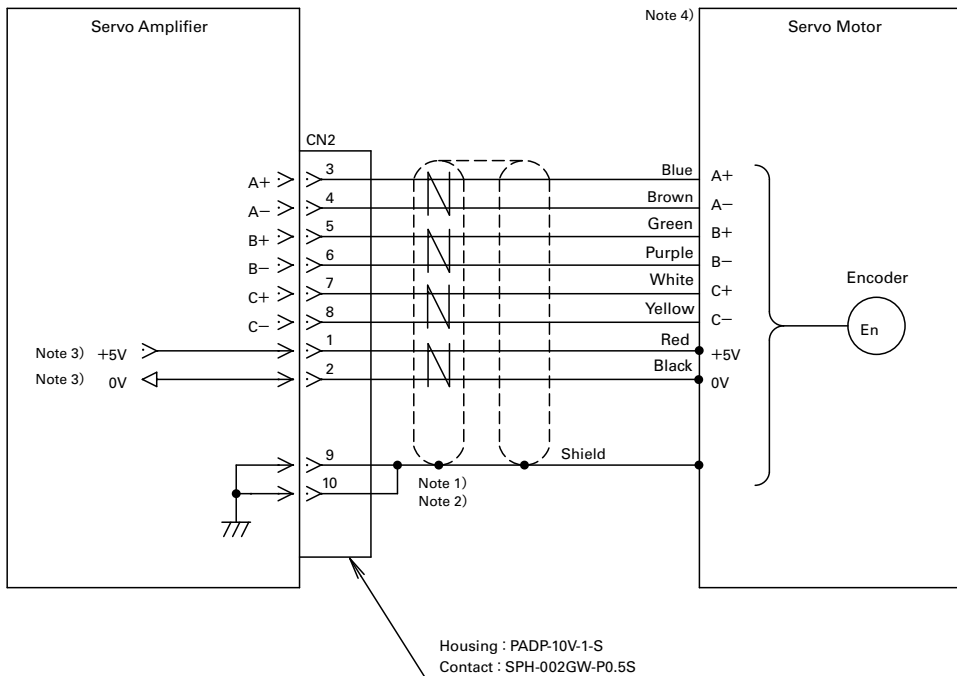
Connector Number	Title	Housing, Plug, Shell		Manufacturer
		Housing	Contact	
CNA	Main power source, control power source input connector	VHR-5N	SVH-41T-P1.1	J.S.T.Mfg. Co.,Ltd.
CNB	Servo motor power line connector	VHR-4N	SVH-41T-P1.1	
CN1A	Connector for host equipment line receiver and driver signal	PADP-14V-1-S	SPH-002GW-P0.5S	
CN1B	Connector for general host equipment I/O signal	PADP-20V-1-S	SPH-002GW-P0.5S	
CN2	Encoder signal connector	PADP-10V-1-S	SPH-002GW-P0.5S	

Encoder Connection Diagram

Serial encoder



Pulse encoder



Note 1) Use twisted-pair cable with shield inserted under jacket.

Note 2) Connect the outer layer shield wire to CN2 pins 9 and 10, and connect the outer layer shield wire to ground on the encoder side.

Note 3) Allowable connection distance between the servo amplifier and encoder varies depending on the electric wire diameter of the cable used (impedance).
For long cables, the 5V power source on the encoder side decreases based on the cable impedance.

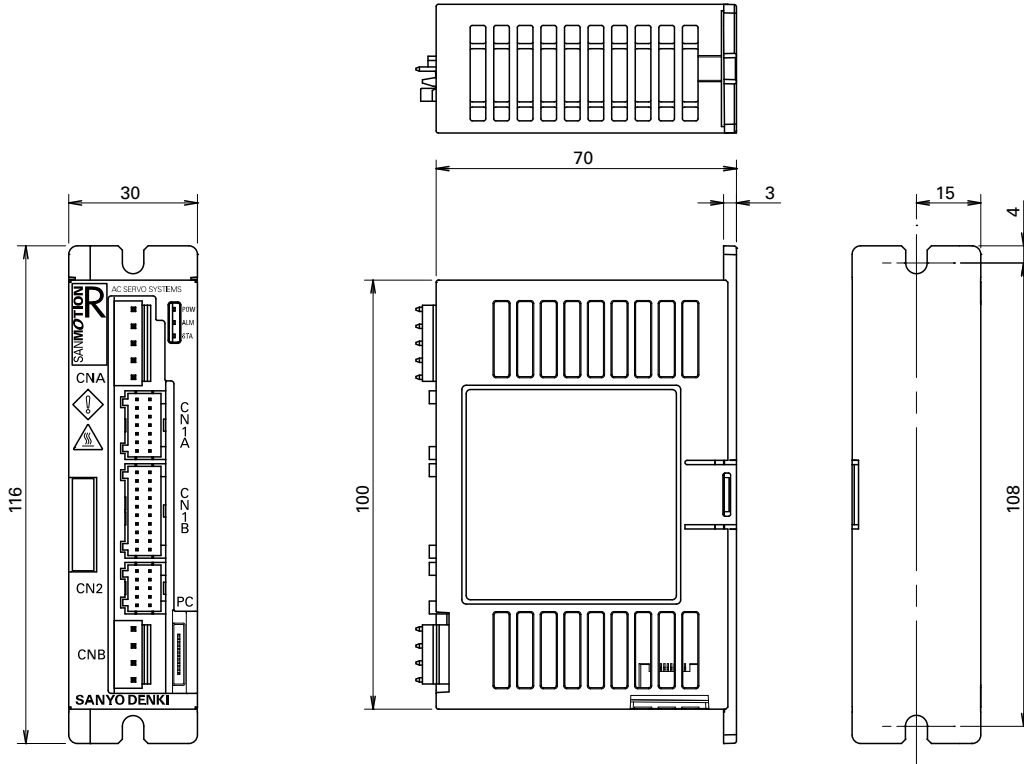
Encoder power source specification is $5V \pm 5\%$. Measure the voltage on the encoder side, and select cable and the number of power source wires so that they will fall within range specifications.

Note 4) The description of the encoder signal wire in the diagram is shown for the standard encoder lead wire type.

When the non-standard encoder is used there may be differences depending on the encoder specifications so, check the encoder specification sheets being used.

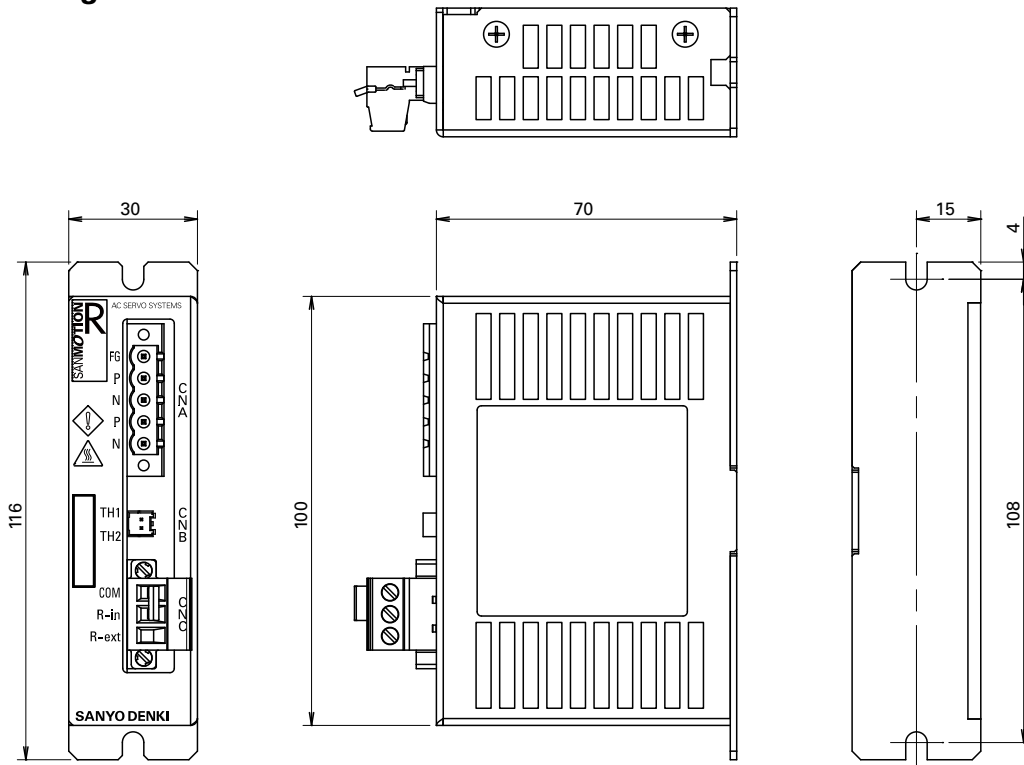
Note 5) When the Absolute encoder for incremental system or absolute encoder without battery is used, battery lines (EBAT+, EBAT-) are not required.

■ Servo Amplifier



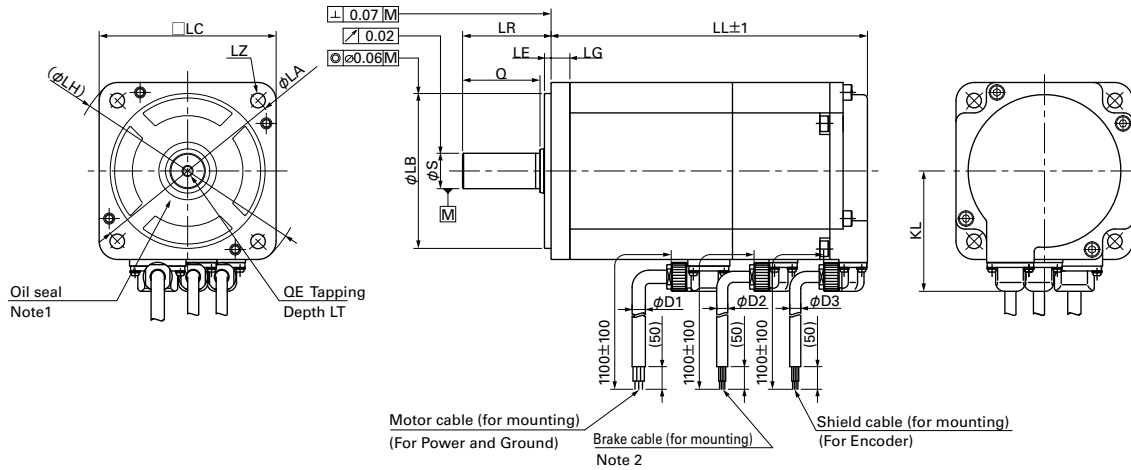
Mass : 0.23kg

■ Regenerative unit



Mass : 0.2kg

Servo Motor



MODEL	Oil seal ^{Note 1}	Without brake		With brake						
		LL	LL	LG	KL	LA	LB	LE	LH	LC
① R2GA04003***	—	51.5	87.5	5	35.4	46	0 30-0.021	2.5	56	40
	Yes	56.5	92.5							
② R2GA04005***	—	56.5	92.5	6	44.6	70	0 50-0.025	3	82	60
	Yes	61.5	97.5							
③ R2GA04008***	—	72	108	6	44.6	70	0 50-0.025	3	82	60
	Yes	77	113							
④ R2GA06010***	—	58.5	82.5	6	44.6	70	0 50-0.025	3	82	60
	Yes	65.5	89.5							
⑤ R2GA06020***	—	69.5	97.5	6	44.6	70	0 50-0.025	3	82	60
	Yes	76.5	104.5							

	LZ	LR	S	Q	QE	LT	D1	D2	D3
①	2- $\phi 4.5$	25	0 6-0.008	20	—	—	6	5	5
②			0 8-0.009						
③			0 8-0.009						
④	4- $\phi 5.5$	25	0 8-0.009	20	—	—	6	5	5
⑤			0 14-0.011						

*The dimensions for all battery backup systems included with the absolute encoder.

Note 1) The total length of the motor varies when an oil seal is necessary.

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

Note 3) A reduced rated value may be required for the attached oil seal and brake. Please contact us.

Features

Mod Number
Nomenclature

Specifications

External Wiring Diagram

Encoder Wiring Diagram

Dimensions

Setup Software

Option

Setup Software

Software that can set the servo system parameters from the PC. Servo system startup, test runs, etc. can be performed easily. Downloading can be performed from the product information on our homepage.
 URL : <http://www.sanyodenki.co.jp>

Title: R ADVANCED MODEL Setup Software



Start-up Screen

■ Main functions

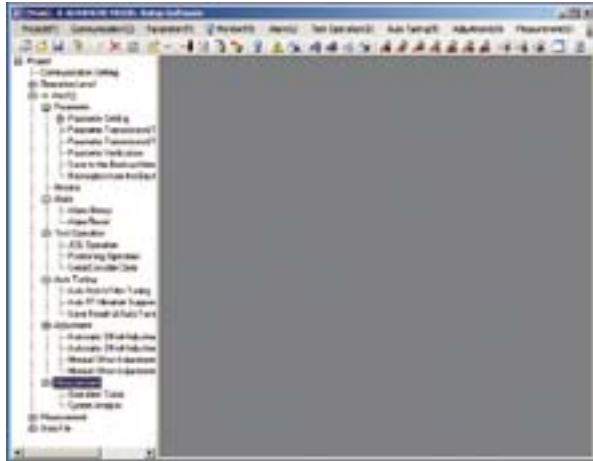
- Various parameter settings for the servo amplifier
- Servo amplifier status display
- Alarm display, abort
- Executing trial runs
- Auto tuning vibration control frequency, etc.
- Adjusts the offset of analog commands

* Use the optional PC connection cable (model number: AL-00490833-01) to connect the servo amplifier and the RS-232C port on the PC.

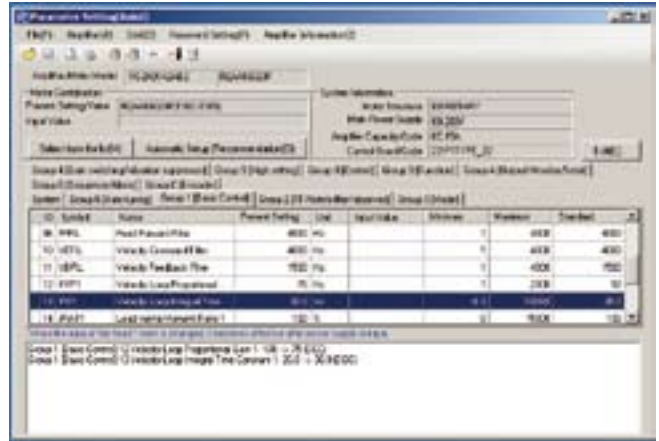
■ Supported OS

Windows 98/SE/Me/2000/XP/Vista

* Check our homepage for details of supported versions.



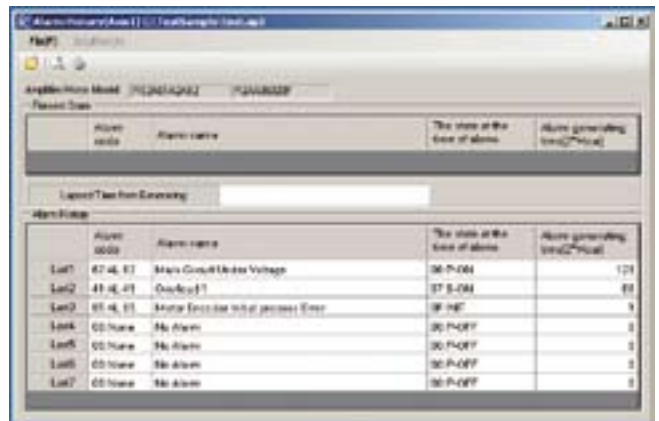
Main Screen



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



Monitor Display
 Observe Operation and Input / Output signal status



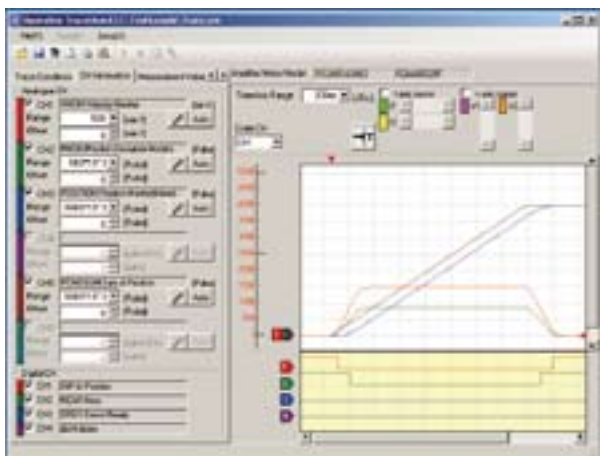
Alarm Record
 Current and past alarm occurrence can be checked.



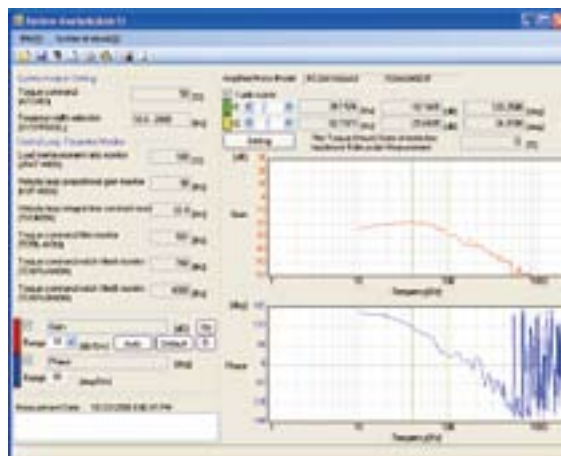
JOG Operation
Can simplify servo motor test runs by entering the speed commands from a PC.



Positioning Control Operation
Position can be moved by setting the feed velocity and pulse number of the servo motor.



Operation Trace
Graphically displays the servo motor speed, torque and internal status.



System Analysis
Analyzes servo system frequency characteristics

■ Regenerative unit

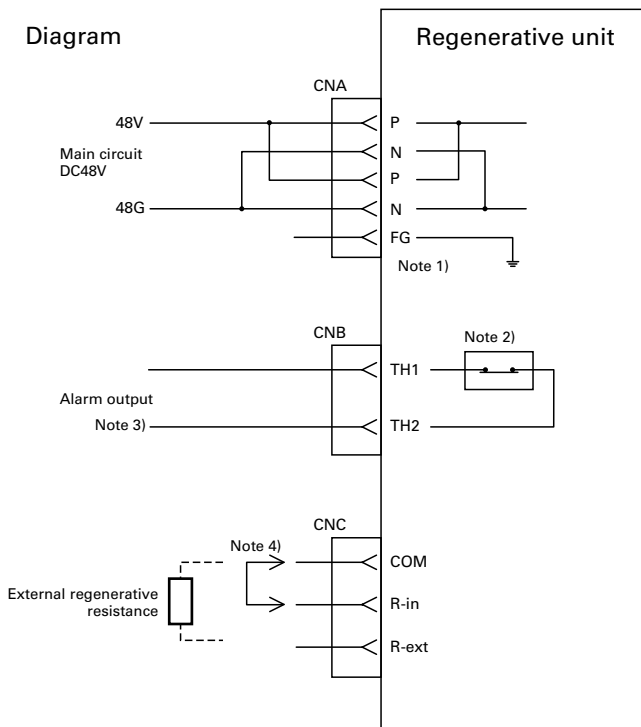
A regeneration unit required to absorb voltage increases according to servo system operating conditions.

Model No.	RF1BB00	
Power supply	Power supplied by main circuit power (DC48V)	
Regenerative performance	Regenerative initiation voltage	55V ± 1.5V
	Hysteresis width	2V ± 0.5V
	Built-in regenerative resistance	30Ω ± 5%
	Allowable absorbed power for built-in regenerative resistance	7W
Environment	Operating ambient temperature	0 to 40°C
	Storage temperature	-20 to +65°C
	Operating and storage humidity	90% RH or less (No condensation)
	Height above sea level	1000m or less
	Vibration	4.9m / sec ² Frequency range: 10 to 55Hz Within 2Hs in direction X, Y, and Z respectively.
Impact(Shock)	19.6m / sec ²	
Structure	Tray type	
Mass	0.18kg ± 10%	
Protective feature	Resistance overheat detection with built-in thermostat (Signal output at contact point B) ^{Note1)}	

Note1) Please detect contacting signal output for thermostat, and then stop servo motor operation by yourself.

Dimensions p.14

Diagram



Note 1) Terminal P and N by two respectively are provided to CAN.

Note 2) A thermal guard for overheat detection.

Specification	
Contact point type	B-contacting (brake)
Maximum switching voltage	DC30V
Maximum switching current	DC0.1A
Maximum switching electrical power	1W
Minimum switching current	0.1mA/1V DC

Note 3) The customer loads the alarm output signal and shuts off the power input for the main circuit by stopping servo motor operation when overheat is detected.

Note 4) When the regenerative power cannot be absorbed with the built-in regenerative resistor, use an external regenerative resistor. In this instance, remove the short bar between the COM-R-in and install the resistor between the COM-R-ext.

Power input Connector

			Model	Manufacturer	Manufacturer's Part No.	Housing	Contact
CNA	Power source input	Connector	AL-00329461-01	PHOENIX CONTACT	MSTB2.5/5-STF-5.08	-	-
CNB	Alarm output	Cable and connector	AL-00753589-01	J.S.T. Mfg. Co., Ltd.	-	PAP-02V-S	SPHD-001G-P0.5

· The connector for the CNC attaches to the regenerative unit.

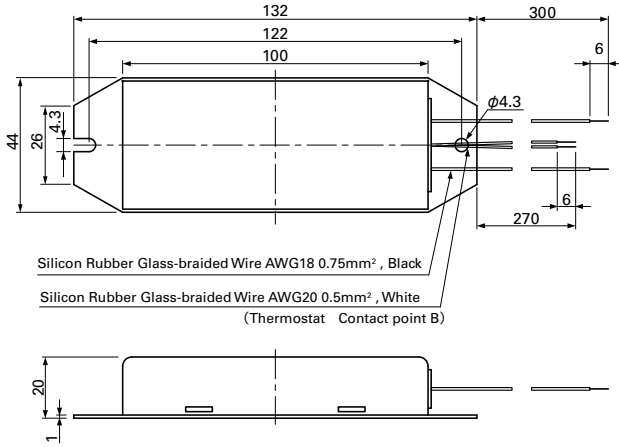
· Alarm output cable (with connector)

External Regenerative Resistor

Used when the regenerative electric power cannot be absorbed with the built-in regenerative resistor of the regenerative unit.

Model No. : REGIST-080W50B

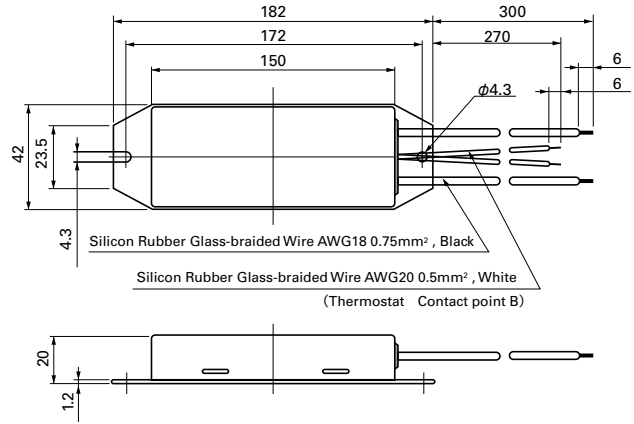
Dimensions (Unit : mm)



Mass : 0.19kg

Model No. : REGIST-120W50B

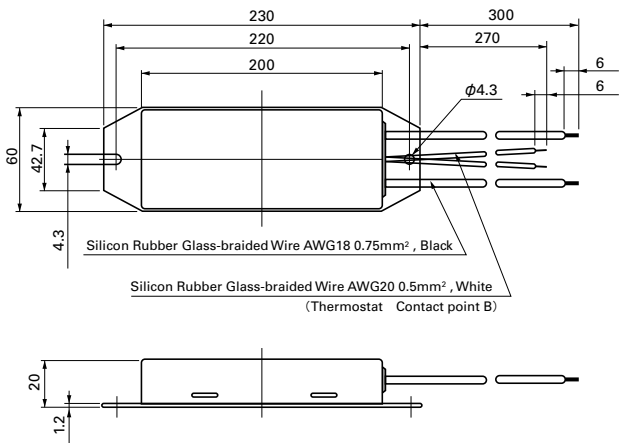
Dimensions (Unit : mm)



Mass : 0.24kg

Model No. : REGIST-220W50B

Dimensions (Unit : mm)



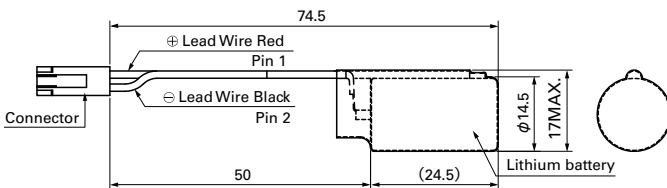
Mass : 0.44kg

Lithium battery

Connected when using the absolute encoder.

Model No. : AL-00494635-01

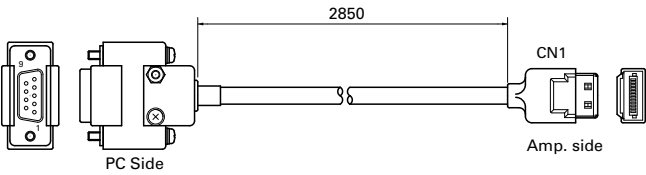
Dimensions (Unit : mm)



Mass : 0.02kg

PC Interface Cable Model No. : AL-00490833-01

Dimensions (Unit : mm)

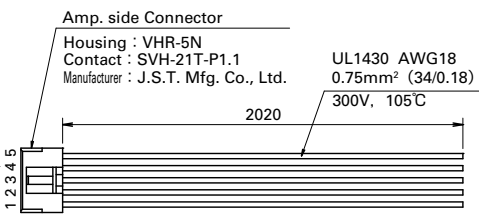


Mass : 0.14kg

A note regarding RS-232C communications:
The user must provide a PC for computer interface.
Parameter settings may require adjustment.

Power input cable Model No. : AL-00745943-01

Dimensions (Unit : mm)

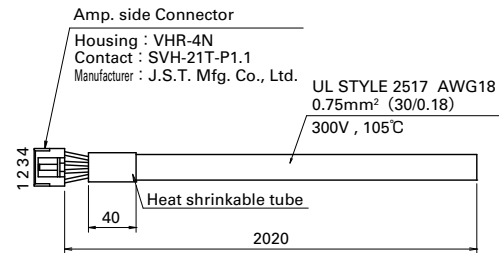


Mass : 0.2kg

Connector NO.	Pin NO.	Code (Name)	Title	Wire color
CNA	1	FG	Frame ground	Green
	2	5V	5V-control power	Yellow
	3	SG	Control power ground	Gray
	4	P	DC48V-main power	Red
	5	N	Main power ground	Blue

Motor power cable Model No. : AL-00745944-01

Dimensions (Unit : mm)



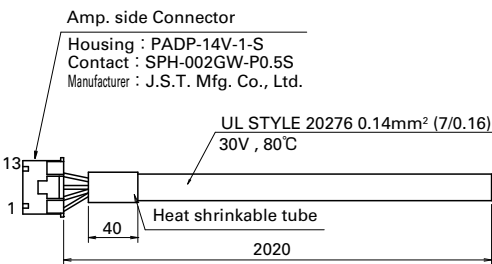
Mass : 0.2kg

Connector NO.	Pin NO.	Code (Name)	Title	Wire color
CNB	1	U	Phase U	Red
	2	V	Phase V	White
	3	W	Phase W	Black
	4	FG	Frame ground	Yellow (Green)

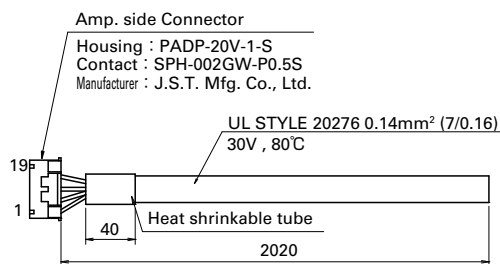
I/O cable CN1A (14 pin) and CN1B (20 pin) sets. Model No. : AL-00745949-01

Dimensions (Unit : mm)

For CN1A



For CN1B



Mass : 0.33kg

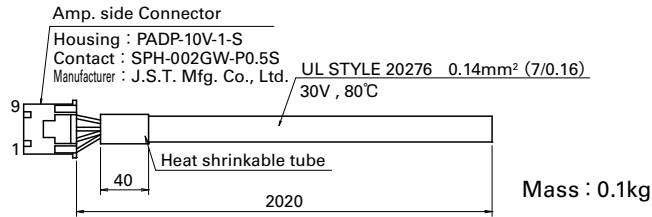
Connector NO.	Pin NO.	Code (Name)	Wire color	
CN1A	1	AO	Blue	Twisted wire
	3	A \bar{O}	White	
	4	BO	Green	
	5	B \bar{O}	White	Twisted wire
	6	ZO	Yellow	
	7	Z \bar{O}	White	Twisted wire
	8	PS	Red	
	9	P \bar{S}	White	Twisted wire
	11	F-PC	Blue	
	12	F-PC	Brown	Twisted wire
	13	R-PC	Yellow	
	14	R-PC	Brown	Twisted wire
	10	SG	Purple	
	2	FG	Drain wire	

Connector NO.	Pin NO.	Code (Name)	Wire color	
CN1B	1	IN-COM	Blue	Twisted wire
	3	CONT1	Yellow	
	4	CONT2	White	
	5	CONT3	Green	
	6	CONT4	White	Twisted wire
	7	CONT5	Red	
	8	CONT6	White	Twisted wire
	9	CONT7	Purple	
	10	CONT8	White	Twisted wire
	11	OUT-PWR	Blue	
	19	OUT-COM	Brown	Twisted wire
	12	OUT1	Yellow	
	13	OUT2	Brown	
	14	OUT3	Green	
	15	OUT4	Brown	Twisted wire
	16	OUT5	Red	
	17	OUT6	Brown	Twisted wire
	18	OUT7	Purple	
	20	OUT8	Brown	Twisted wire
	2	FG	Drain wire	

Encoder Cable

Serial encoder model : AL-00745946-01, Pulse encoder Model : AL-00745945-01

Dimensions (Unit : mm)



Serial encoder

Connector NO.	Pin NO.	Code (Name)	Wire color	
CN2	1	+5V	Red	Twisted wire
	2	SG	White	
	3	ES +	Blue	Twisted wire
	4	ES -	White	
	5	BAT +	Yellow	Twisted wire
	6	BAT -	White	
	7			
	8			
	9			
	10	FG	Drain wire	Shield

Pulse encoder

Connector NO.	Pin NO.	Code (Name)	Wire color	
CN2	1	+5V	Red	Twisted wire
	2	SG	White	
	3	A	Blue	Twisted wire
	4	\bar{A}	White	
	5	B	Green	Twisted wire
	6	\bar{B}	White	
	7	C	Yellow	Twisted wire
	8	\bar{C}	White	
	9			
	10	FG	Drain wire	Shield

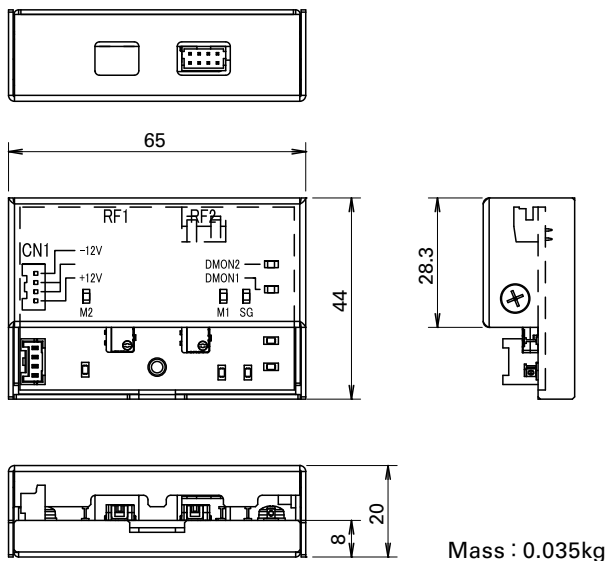
Analog monitor box

We offer monitor box for use in monitoring operating wave profile with measuring equipment.

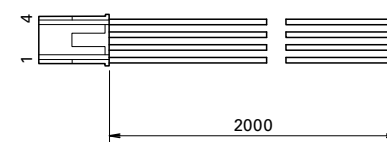
Model No.	Q-MON-5
Power Supply	$\pm 12V \pm 5\%$, externally-supplied (Power supply is user-prepared.)
Monitor channel	Analog $\times 2$ CH, digital $\times 2$ CH, signal is to be selected according to setup software.
Output voltage range, Output error	DC $\pm 8V$ max, Within $\pm 20\%$
Offset voltage	Within $\pm 100mV$
Output resistance	1k Ω
Load	Within 2mA

Cable "2m" connected to servo amplifier and power input cable are supplied.

Dimensions (Unit : mm)



Power-supply cable



Connector NO.	Pin NO.	Color	Definition
CN1	1	Red	+12V
	2	Black	SG
	3	Black	SG
	4	Blue	- 12V

A series of horizontal dashed lines for writing, consisting of 28 lines spaced evenly down the page.

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	<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p style="font-size: small;">Feeding Speed [m/sec] vs Time [sec]</p> <p>Acceleration α: ___ G ___ [m/s²]</p> <p>Feeding Speed V: ___ [m/s]</p> <p>Moving Distance D: ___ [m] (Stroke)</p> <p>Time intervals: t_1, t_2, t_3</p> </div> <div style="width: 35%; font-size: x-small;"> <p>[Reference formula]</p> <p>$1G=9.8[m/s^2], 1[m/s^2] \approx 0.1G$</p> <p>$\alpha[m/s^2]=V[m/sec] \div t_1[sec]$</p> <p>$D[m]=V[m/sec] \times (t_1+t_2)[sec]$</p> </div> </div>																								
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	<table style="width: 100%; font-size: x-small;"> <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>	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		
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<table style="width: 100%; font-size: x-small;"> <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>	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					
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<table style="width: 100%; font-size: x-small;"> <tr> <td>μ (friction coefficient between sheet and shilding-surface/support-section/roll)</td><td></td><td>ρ_1 (specific gravity of roll-1 material)</td><td>kg/cm³</td><td></td><td></td> </tr> <tr> <td>ρ_2 (specific gravity of roll-2 material)</td><td>kg/cm³</td><td>κ (internal friction coefficient of preload nut)</td><td></td><td></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><td></td><td></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><td></td><td></td> </tr> </table>	μ (friction coefficient between sheet and shilding-surface/support-section/roll)		ρ_1 (specific gravity of roll-1 material)	kg/cm ³			ρ_2 (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 denki-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.)																								

■ 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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*Remarks : Specifications Are Subject To Change Without Notice.

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