

# SERVOPACKs with Additional Options

# SGDV-□□□□E1

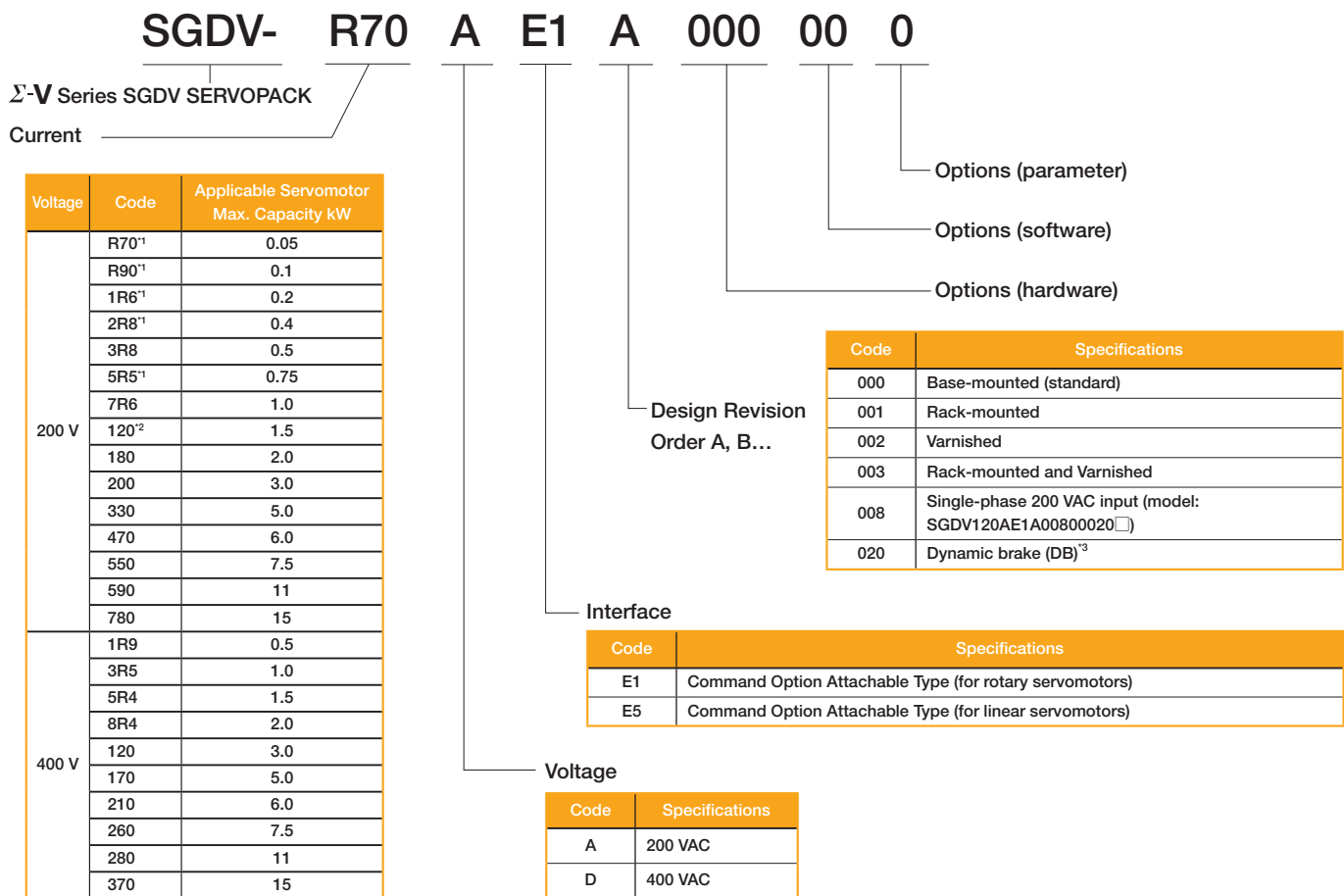
(For Rotary Servomotors)

# SGDV-□□□□E5

(For Linear Servomotors)



## Model Designations



<sup>1</sup> These amplifiers can be powered with single or three-phase.  
<sup>2</sup> SGDV-120A□□A008000□□□□, a special version of the 1.5 kW amplifier can be used for single-phase operation.

<sup>3</sup>: The specifications differ in accordance with the power supply voltage of the SERVOPACK to be used.  
 - For 100-V and 200-V SERVOPACKS: The DB function will be disabled when the SERVOPACK stops or the power supply is turned OFF.  
 - For 400-V SERVOPACK: The DB resistor can be mounted onto the outside of the SERVOPACK. If the DB resistor is not mounted, the DB function will be enabled.

## Features

- Unprecedented ease-of-use through cutting-edge technology  
New tuning-less function means no adjustment needed.  
Impressive load regulation with strengthened vibration suppression function.
- Slashed setup time  
Setup wizard function and wiring conformation function of engineering tool SigmaWin+ allows easy setup just by watching the monitor.
- High response characteristics at 1 kHz min.  
New advanced autotuning.  
Reduced positioning time through model following control, and smooth machine control enabled by vibration suppression function.
- Connectivity to INDEXER Option Module for single-axis positioning, EtherCAT (CoE) Network Option Module, CANopen Network Module, Powerlink Network Module and MP2600iec Single Axis Controller Option Module.

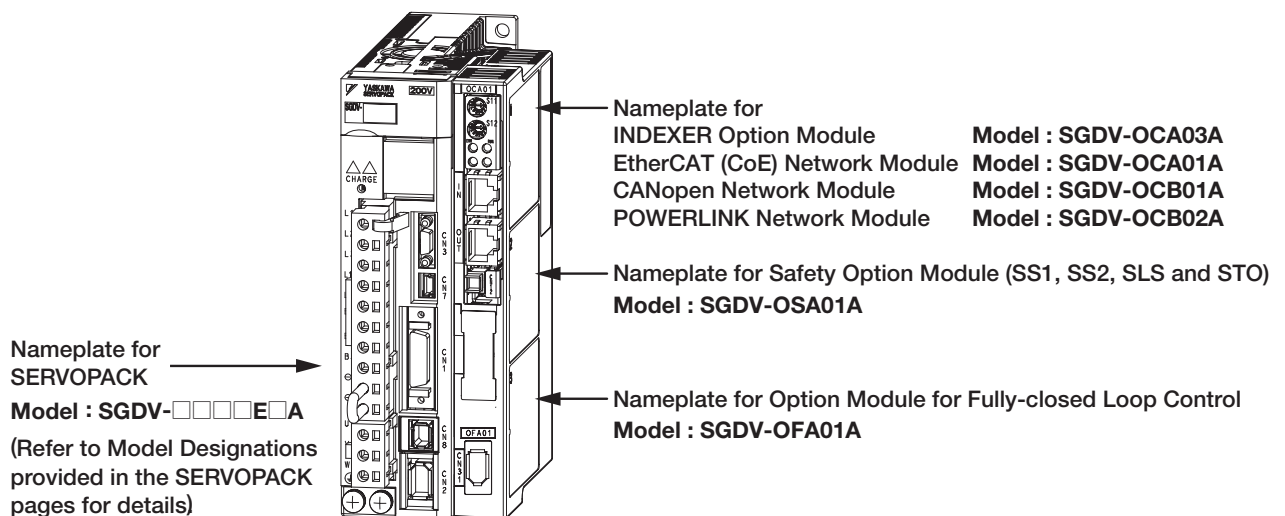
## Product Labeling

The three digit option module code allows for expandability of the servo amplifier's functionality. Each digit of the code defines a different type of option

- First Digit (Control Architecture): compatible with various communication interfaces or single-axis control architectures.
- Second Digit (Safety): compatible with EN60204-1 stop category 1 and 2 (stop category 0 is standard)
- Third Digit (Feedback): compatible with fully-closed loop control

NOTE: Amplifiers with Interface Option E1 and E5 can accommodate option modules that utilize all 3 digits of the Option Module Code.

Combination Example:



NOTE: Mounting of Option Modules on Amplifiers with Interface Option E1 and E5 requires mounting kit SGDVOZA01A (metal bar, mounting screws and cover).

## Ratings

## Single-phase 200 V

SERVOPACK Model	SGDV□□□□	R70A	R90A	1R6A	2R8A	5R5A	120A <sup>*1</sup>
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current	A <sub>rms</sub>	0.66	0.91	1.6	2.8	5.5	11.6
Max. Output Current	A <sub>rms</sub>	2.1	2.9	5.8	9.3	16.9	28
Regenerative Resistor		None/External			Built-in/External		
Main Circuit (Single Phase)		220 to 230 VAC +10% to -15% 50/60 Hz					
Control Circuit (Single Phase)		220 to 230 VAC +10% to -15% 50/60 Hz					

\*1: Single-phase 200 VAC SERVOPACKs are also available (base-mounted SERVOPACK model: SGD-120A□□A008000, rack-mounted SERVOPACK model: SGD-120A□□A009000).

## Three-phase 200 V

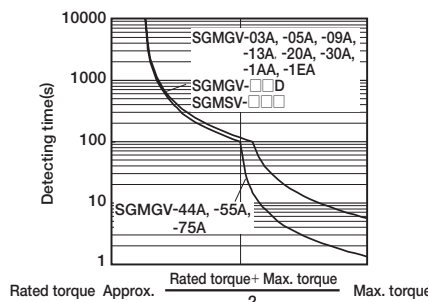
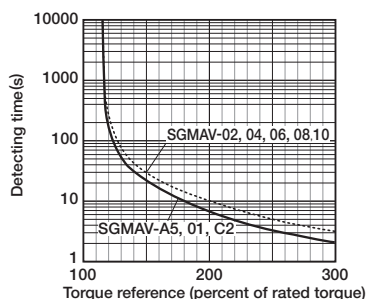
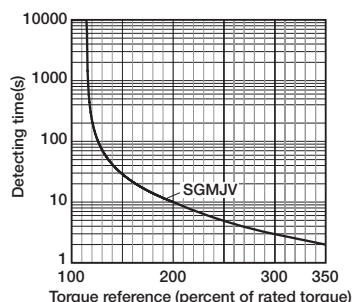
SERVOPACK Model	SGDV□□□□	R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	A <sub>rms</sub>	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6	78
Max. Output Current	A <sub>rms</sub>	2.1	2.9	5.8	9.3	11	16.9	17	28	42	56	84	110	130	140	170
Regenerative Resistor		None/External			Built-in/External				External							
Main Circuit (Three-phase 200 VAC)		Three-phase 200 to 200 VAC +10% to -15% 50/60 Hz														
Control Circuit (Three-phase 200 VAC)		Single-phase 200 to 200 VAC +10% to -15% 50/60 Hz														

## Three-phase 400 V

SERVOPACK Model	SGDV□□□□	1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D	
Applicable Servomotor Max. Capacity	kW	0.5	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15	
Continuous Output Current	A <sub>rms</sub>	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.4	28.1	37.2	
Max. Output Current	A <sub>rms</sub>	5.5	8.5	14	20	28	42	55	65	70	85	
Regenerative Resistor		Built-in/External					External					
Main Circuit (Three-phase 400 VAC)		Three-phase 380 to 480 VAC +10% to -15% 50/60 Hz										
Control Circuit (24 VDC)		24 VDC ±15%										

Note: The entire over voltage category is III.

## ● SERVOPACK Overload Characteristics



Note: Overload characteristics shown above do not guarantee continuous duty of 100% or more output. Use a servomotor with effective torque within the continuous duty zone of *Torque-Speed Characteristics*.

## Specifications

Items	Specifications
Control Method	IGBT PWM control, sine-wave driven
Feedback	Rotary Servomotors Serial encoder: 13-bit (incremental encoder) : 20-bit (incremental/absolute encoder)
	Linear Servomotors Absolute linear scale (The signal resolution varies depending on the absolute linear scale.) Incremental linear scale (The signal resolution varies depending on the incremental linear scale or serial converter unit.)
Operating Conditions	Surrounding/Storage Temperature Surrounding temperature: 0 to +55°C, storage temperature: -20 to +85°C
	Ambient/Storage Humidity 90% RH or less (no freezing or condensation)
	Vibration/Shock Resistance Vibration resistance: 4.9 m/s <sup>2</sup> , Shock resistance: 19.6 m/s <sup>2</sup>
	Protection class/Pollution degree Protection class: IP 10, pollution degree: 2 Do not use SERVOPACKs in the following locations: ·Locations subject to corrosive or flammable gases ·Locations subject to exposure to water, oil, or chemicals ·Locations subject to dust, including iron dust, and salts
	Others Do not use SERVOPACKs in the following locations: ·Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity
Altitude	1000 m or less

## Specifications

Items		Specifications		
Compliant Standards		UL508C EN50178, EN55011/A2 group 1 class A, EN61000-6-2, EN61800-3, EN61800-5-1, EN954-1, IEC61508-1 to 4		
Configuration		Standard: Base-mounted; Optional: Rack-mounted, Duct-ventilated		
Performance	Speed Control Range		1:5000 (The lowest speed of the speed control range is the speed at which the servomotor will not stop with a rated torque load.)	
	Speed Regulation <sup>*1</sup>	Load Fluctuation	0% to 100% load: ±0.01% max. (at rated speed)	
		Voltage Fluctuation	Rated voltage: ±10% : 0% (at rated speed)	
		Temperature Fluctuation	25±25°C : ±0.1% max. (at rated speed)	
Torque Control Tolerance (Repeatability)		±1%		
I/O Signals	Encoder Output Pulses		Phase A, phase B, phase C: line driver output The number of dividing pulse: Any setting ratio is available.	
	Sequence Input	Input Signals which can be allocated	No. of Channels	7 channels
			Functions	· Forward run prohibited (P-OT), · Forward external torque limit (/P-CL), Reverse run prohibited (N-OT) · reverse external torque limit (/N-CL) · General-purpose input signal (/SI0 to /SI6) <sup>*2</sup> Signal allocations can be performed, and positive and negative logic can be changed.
	Sequence Output	Output Signals which can be allocated	Fixed Output	
			Servo alarm (ALM)	
			No. of Channels	3 channels
Functions		· Positioning completion (/COIN) · Speed limit detection (/VLT) · Speed coincidence detection (/V-CMP) · Brake (/BK) · Servomotor rotation detection (/TGON) · Warning (/WRAN) · Servo ready (/S-RDY) · Near (/NEAR) · Torque limit detection (/CLT) Signal allocations can be performed, and positive and negative logic can be changed.		
Communications	RS-422A Communications	Interface	Digital operator (JUSP-OP05A-1-E), personal computer (can be connected with SigmaWin+)	
		1:N communications	RS-422A port: N=15 max. available	
		Axis address setting	Set by parameters	
	USB Communications	Interface	Personal computers (can be connected with SigmaWin+)	
		Communications Standard	Compliant with USB 1.1 standard (12 Mbps)	
Display		CHARGE and POWER (seven-segment display)		
Analog Monitor		Number of points: 2 Output voltage: ±10 VDC (linearity effective range ±8 V) Resolution: 16 bit Accuracy: ±20 mV (Typ) Max. output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)		
Dynamic Brake (DB)		Activated when the power supply for the main circuit or the SERVOPACK is OFF, when overtravel (OT) or a servo alarm occurs, or during a hardwired base block.		
Regenerative Processing		200 VAC SGDVB-R70A, -R90A, -1R6A, -2R8A: External regenerative resistor (optional) 200 VAC SGDVB-470A, -550A, -590A, -780A: External regenerative resistor unit (optional) 200 VAC models other than shown above: Built-in regenerative resistor 400 VAC SGDVB-210D, -260D, -280D, -370D: External regenerative resistor unit (optional) 400 VAC models other than shown above: Built-in regenerative resistor		
Overtravel (OT) Prevention		Dynamic brake stop at P-OT or N-OT, deceleration to a stop, or free run to a stop		
Protective Functions		Overcurrent, Overvoltage, low voltage, overload, regeneration error		
Utility Functions		Gain adjustment, alarm history, JOG operation, origin search, etc.		
Safety Functions	Input	/HWBB1, /HWBB2: Baseblock signal for power module		
	Output	EDM1: Status monitor (fixed output) of built-in safety circuit		
Option Modules		Fully-closed option module, EtherCAT (CoE), INDEXER module, CANopen Network Module, Powerlink Option Module, MP2600iec 1.5 axis controller		

\*1: Speed regulation is defined as follows:

$$\text{Speed regulation} = \frac{\text{No-load motor speed} - \text{Total load motor speed}}{\text{Rated motor speed}} \times 100\%$$

The motor speed may change due to voltage variations or temperature variation. The ratio of speed changes to the rated speed represent speed regulation due to voltage and temperature fluctuations.

\*2: For details on the functions of the general-purpose input signals /SI0 to /SI6, refer to the manual of the Command Option Module being used.

## Power Supply Capacities and Power Losses

The following table shows SERVOPACK's power supply capacities and power losses at the rated output.

Main Circuit Power Supply	Applicable Servomotor Max. Capacity kW	SERVOPACK Model SGD V	Power Supply Capacity kVA	Output Current A	Main Circuit Power Loss W	Regenerative Resistor Power Loss W	Control Circuit Power Loss W	Total Power Loss W	
Single-phase 200 V	0.05	R70A	0.2	0.66	5.2	—	17	22.2	
	0.1	R90A	0.3	0.91	7.4			24.4	
	0.2	1R6A	0.7	1.6	13.7			30.7	
	0.4	2R8A	1.2	2.8	24.9			41.9	
	0.75	5R5A	1.9	5.5	52.7	8	77.7		
	1.5	120A	4	11.6	68.2	10	22	100.2	
Three-phase 200 V	0.05	R70A	0.2	0.66	5.1	—	17	22.1	
	0.1	R90A	0.3	0.91	7.3			24.3	
	0.2	1R6A	0.6	1.6	13.5			30.5	
	0.4	2R8A	1	2.8	24.0			41.0	
	0.5	3R8A	1.4	3.8	20.1	8	17	45.1	
	0.75	5R5A	1.6	5.5	43.8			68.8	
	1.0	7R6A	2.3	7.6	53.6			78.6	
	1.5	120A	3.2	11.6	65.8	10	22	97.8	
	2.0	180A	4	18.5	111.9	16		149.9	
	3.0	200A	5.9	19.6	113.8	16	22	161.4	
	5.0	330A	7.5	32.9	263.7			36	326.7
	6.0	470A	10.7	46.9	279.4			(180) <sup>1</sup>	33
	7.5	550A	14.6	54.7	357.8	(350) <sup>2</sup>	33	390.8	
11	590A	21.7	58.6	431.7	479.7				
15	780A	29.6	78	599.0	647.0				
Three-phase 400 V	0.5	1R9D	1.1	1.9	24.6	14	21	59.6	
	1.0	3R5D	2.3	3.5	46.1			81.1	
	1.5	5R4D	3.5	5.4	71.3			106.3	
	2.0	8R4D	4.5	8.4	77.9	28	25	130.9	
	3.0	120D	7.1	11.9	108.7			161.7	
	5.0	170D	11.7	16.5	161.1	36	24	221.1	
	6.0	210D	12.4	20.8	172.7			199.7	
	7.5	260D	14.4	25.7	218.6			(180) <sup>3</sup>	27
	11	280D	21.9	28.1	294.6	(350) <sup>4</sup>	30	324.6	
	15	370D	30.6	37.2	403.8			433.8	

\*1: For the optional JUSP-RA04-E regenerative resistor unit.

\*2: For the optional JUSP-RA05-E regenerative resistor unit.

\*3: For the optional JUSP-RA18-E regenerative resistor unit.

\*4: For the optional JUSP-RA19-E regenerative resistor unit.

Notes: 1 SGDVR70A, R90A, 1R6A, and 2R8A SERVOPACKs do not have built-in regenerative resistors.

If the regenerative energy exceeds the specified value, connect an external regenerative resistor (optional).

2 SGD V470A, 550A, 590A, 780A, 210D, 260D, 280D, 370D SERVOPACKs do not have built-in regenerative resistors.

Be sure to connect a regenerative resistor unit (optional) or an external regenerative resistor (optional). For selection details, refer to page 364.

3 Regenerative resistor power losses are allowable losses. Take the following action if this value is exceeded.

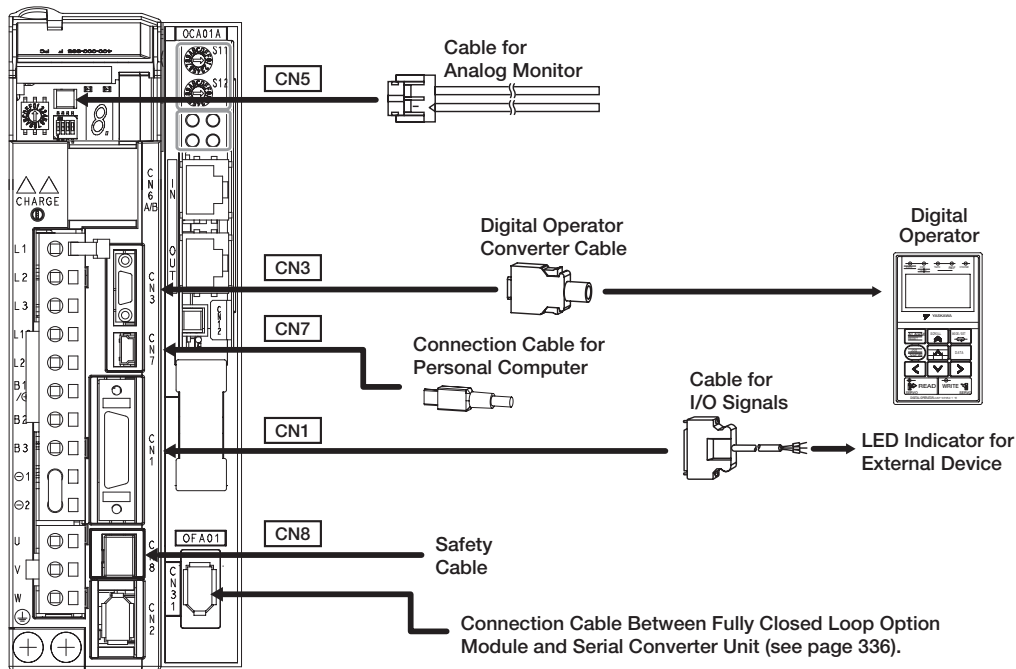
• Remove the lead or short bar that is short-circuiting the SERVOPACK main circuit terminal B2 and B3.



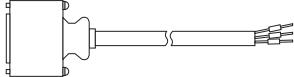

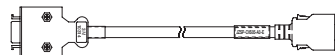


(SGDV3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, or 400 V class SERVOPACKs.)

• Install an external regenerative resistor (optional). For selection details, refer to page 364.

## Selecting Cables

- Cables for **CN1** **CN3** **CN5** **CN7** **CN8** **CN11** for Option Module Type SERVOPACKs



Name	Length	Order No.	Specifications	Details	
<b>CN1</b> Cables for I/O Signals	Connector Kit	JZSP-CSI9-2-E	Soldered 	(1)	
	Connector Terminal Converter Unit	JUSP-TA26P-E	Terminal Block and 0.5 m Connection Cable 	(2)	
	Cable with Loose wire at One End	1 m	JZSP-CSI02-1-E		(3)
		2 m	JZSP-CSI02-2-E		
3 m		JZSP-CSI02-3-E			
<b>CN3</b>	Digital Operator	JUSP-OP05A-1-E	With Connection Cable (1 m) 	(4)	
	Digital Operator Converter Cable <sup>1</sup>	0.3 m	JZSP-CVS05-A3-E	Cable with Connectors at Both Ends 	(5)
<b>CN7</b> Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	(6)	
<b>CN5</b> Cables for Analog Monitor	1 m	JZSP-CA01-E	SERVOPACK End 	(7)	
<b>CN8</b> Cables for Safety Functions	Cables with Connector <sup>2</sup>	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3	(8)	
	Connector kit <sup>3</sup>	Contact Tyco Electronics AMP K.K. Product name : Industrial Mini I/O D-shape Type1 Plug Connector Kit Model : 2013595-1			

<sup>1</sup> : A converter cable is required to use  $\Sigma$ -III series digital operators (model: JUSP-OP05A) for  $\Sigma$ -V series SERVOPACKs.

<sup>2</sup> : When using the safety function, connect this cable to the safety devices.

Even when not using the safety function, use SERVOPACKs with the Safe Jumper Connector (model: JZSP-CVH05-E) connected.

<sup>3</sup> : Use the connector kit when you make cables yourself.

## Selecting Cables

## (1) Connector Kit for CN1

Use the following connector and cable to assemble the cable. The CN1 connector kit includes one case and one connector.

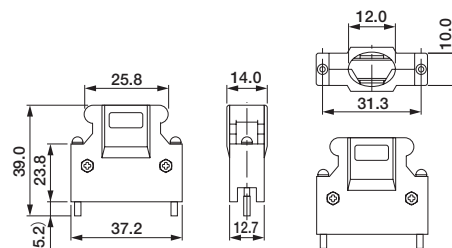
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-2-E	10326-52A0-008*	1 set	10126-3000PE* (Soldered)	1

\* : Manufactured by Sumitomo 3M Ltd.

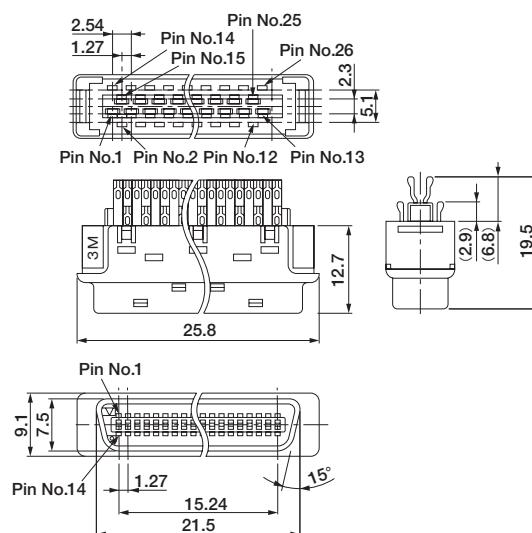
## · Cable Size

Item	Specifications
Cable	Use twisted-pair or twisted-pair shielded wire.
Applicable Wires	AWG24, 26, 28, 30
Cable Finished Diameter	16 dia. max.

## · External Dimensions of Case (Units: mm)

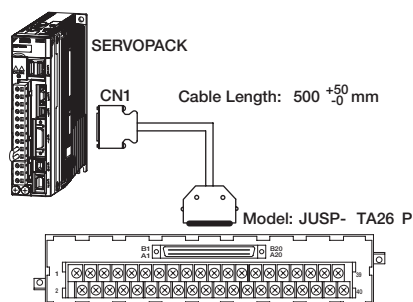


## · External Dimensions of Connector (Units: mm)

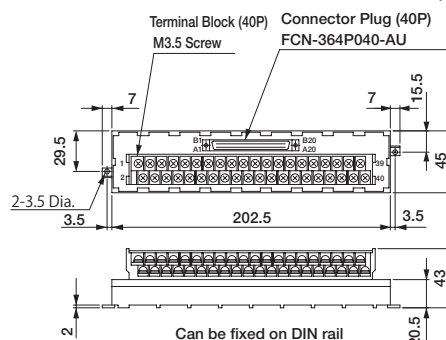


## (2) Connector Terminal Converter Unit for CN1

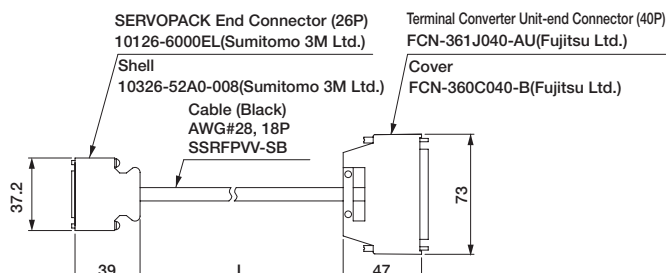
## · Configurations



## · External Dimensions of Terminal Block (Units: mm)



## · External Dimensions of Cable (Units: mm)



Model	Cable Length (L)	Approx. Mass
JUSP-TA26P-E	0.5 m	100 g
JUSP-TA26P-1-E	1 m	200 g
JUSP-TA26P-2-E	2 m	400 g

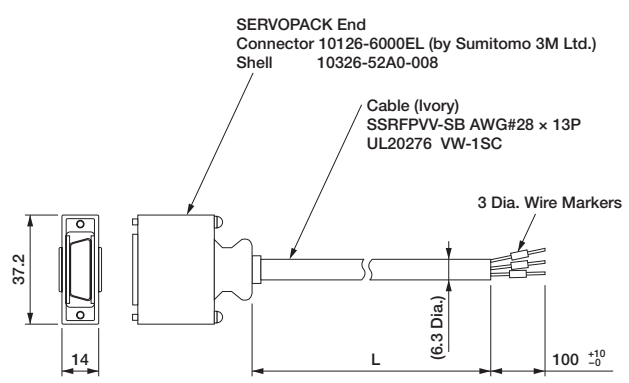
Note: The pin number in the SERVOPACK connector and the pin number in the terminal block are the same. Pin numbers 1 to 26 are used in the terminal block. Do not use a pin number of 27 or higher.

If assembling cables, refer to ● Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CSI02-□-E Cable on the next page.

Selecting Cables

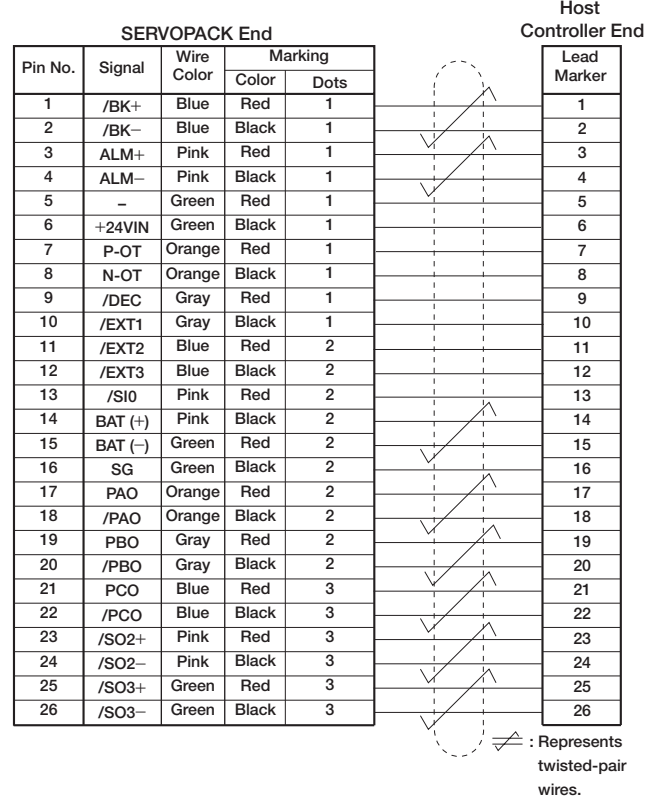
Selecting Cables

(3) Cable with Loose Wires at One End for CN1  
External Dimensions of Cable (Units: mm)

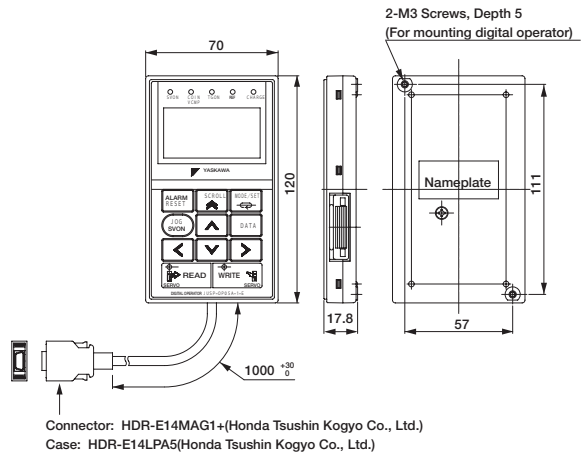


Model	Cable Length
JZSP-CSI02-1-E	1 m
JZSP-CSI02-2-E	2 m
JZSP-CSI02-3-E	3 m

● Cable with Loose Wires at One End for CN1  
Connection Diagram of JZSP-CSI02-□-E Cable



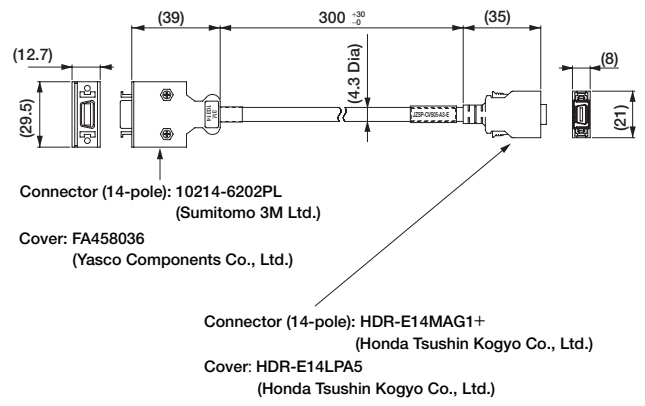
(4) Digital Operator (Model: JZSP-OP05A-1-E)



(5) Digital Operator Converter Cable for CN3  
(Model: JZSP-CVS05-A3-E)

A converter cable is required to use Σ-III series digital operators (model: JZSP-OP05A) for Σ-V series SERVOPACKs.

External Dimensions (Units: mm)



SERVOPACKs with Additional Options

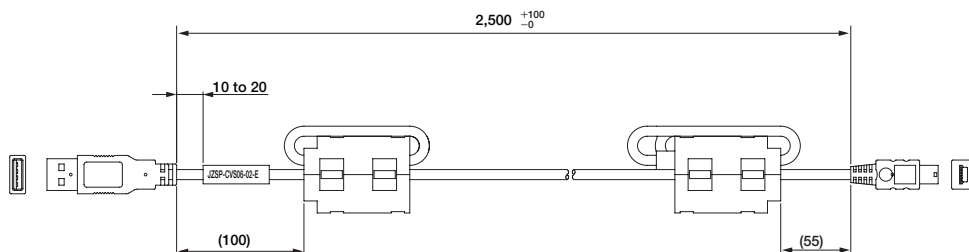


## Selecting Cables

### (6) Connection Cable for Personal Computer for CN7

(Model: JZSP-CVS06-02-E)

- External Dimensions (Units: mm)



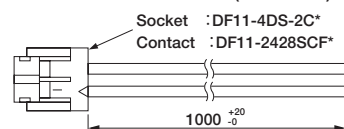
**IMPORTANT**

Use a cable specified by Yaskawa. When using other cables, operation cannot be guaranteed.

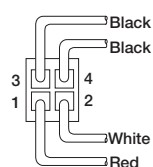
### (7) Cable for Analog Monitor for CN5

(Model: JZSP-CA01-E)

- External Dimensions (Units: mm)



\* : Manufactured by Hirose Electric Corporation.



View from Cable End

- Specifications

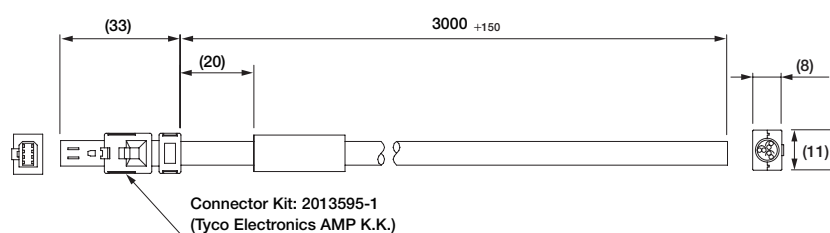
Pin No.	Cable Color	Signal	Standard Settings
1	Red	Analog Monitor 2	Motor speed : 1V/1000 min <sup>-1</sup>
2	White	Analog Monitor 1	Torque reference : 1V/100% rated torque
3, 4	Black (2 cables)	GND(0V)	-

Note : The specifications above are factory settings. Monitor specifications can be changed by changing parameters Pn006 and Pn007.

### (8) Cable with Connector for CN8

(Model: JZSP-CVH03-03-E)

- External Dimensions (Units: mm)

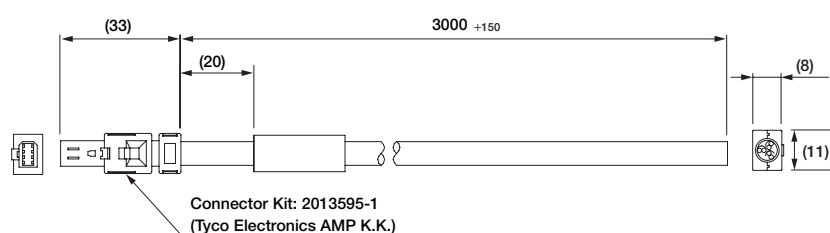


- Specifications

Pin No.	Signal	Lead Color	Marking Color
1	Not used	-	-
2	Not used	-	-
3	/HWBB1-	White	Black
4	/HWBB1+	White	Red
5	/HWBB2-	Gray	Black
6	/HWBB2+	Gray	Red
7	EDM1-	Orange	Black
8	EDM1+	Orange	Red

(Model: JZSP-CVH03-03-E-G3)

- External Dimensions (Units: mm)



- Specifications

Pin No.	Signal	Lead Color	Marking Color
1	Not used	-	-
2	Not used	-	-
3	/HWBB1-	White	-
4	/HWBB1+	Brown	-
5	/HWBB2-	Green	-
6	/HWBB2+	Yellow	-
7	EDM1-	Grey	-
8	EDM1+	Pink	-

