# Analog Voltage/Pulse Train Reference Type SERVOPACKs SGDV- 0 01 (For Rotary Servomotors) SGDV- 0 05 (For Linear Servomotors)

**Model Designations** 

$\varSigma$ -VSe	ries	1st+2nd+ 4th 3rd digits digit	5th+6th	7th	8th+9th+	11th+1: digits	2th 13	th
SGDV			uigits	uigit	Tour digits	uigita		
SERVO	PACK	J						
1st+2nd+	3rd digits	Current	4th digit	Power Sup	oply Voltage		8th+9th+	10th digits Options (hardwa
Voltage	Code	Applicable Servomotor Max. Capacity kW	Code	S	pecifications		Code	Specifications
	R70 <sup>*1</sup>	0.05	Α	Three-pha	se 200 VAC		000	Base-mounted (standard)
	R90*1	0.1	D	Three-pha	se 400 VAC		001	Rack-mounted <sup>*3</sup>
	1R6*1	0.2					002	Varnished
	2R8*1	0.4					003	Rack-mounted <sup>3</sup> and Varnish
	3R8	0.5	5th+6th di	gits Interfa	ace		000	Single-phase 200 VAC input
	5R5*1	0.75	Code		necifications		008	(Model: SGDV-120A01A0080
Three-	7R6	1.0	Oute	Anglenishe			020	Dynamic brake (400 V SERVOPACKs
phase	120 <sup>*2</sup>	1.5	01	(for rotary ser	vomotors)	ice type		
200 V	180	2.0		Analog voltas			11th+12th	digits Options (software)
	200	3.0	05	(for linear ser	/omotors)	ice type	Code	Specifications
	330	5.0		(			0000	Standard
	470	6.0	7th digit	Design De	vision Order		00	Standard
	550	7.5		Designine	vision Order		19th digit	Optiona (paramatar)
	590	11	A, B				Tour digit	Options (parameter)
	780	15					Code	Specifications
	1R9	0.5					0	Standard
	3R5	1.0						
	5R4	1.5						
	8R4	2.0						
Three-	120	3.0						
pnase 400 V	170	5.0						
100 4	210	6.0						
	260	7.5	*1: These an	plifiers can be	oowered with sin	ale or three	-phase	
	280	11	*2: Single-ph	ase 200 VAC	SERVOPACKs are	also availat	ble. (Model:	SGDV-120A01A008000)
			+0.000000					

# **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.

\*: The rated voltage is 220 to 230 VAC for the SGDV-120A01A008000 SERVOPACK.

# Ratings

#### Single-phase 200 V

SERVOPACK Model SGDV-		R70A	R90A	1R6A	2R8A	5R5A	120A*
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current A	Arms	0.66	0.91	1.6	2.8	5.5	11.6
Max. Output Current A	Arms	2.1	2.9	5.8	9.3	16.9	28
Regenerative Resistors		None or external Built-in or external					
Main Circuit*	Single-phase 200 to 230 VAC+10% to -15% 50/60 Hz						
Control Circuit*		Single-phase 200 to 230 VAC+10% to -15% 50/60 Hz					

#### 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	Arms	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	Arms	2.1	2.9	5.8	9.3	11	16.9	17	28	42	56	84	110	130	140	170
Regenerative Resistors		1	None or	externa	ıl	Built-in or external External										
Main Circuit		Three-phase 200 to 230 VAC+10% to -15% 50/60 Hz														
Control Circuit				Single-phase 200 to 230 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 Arms	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Max. Output Current Arms	5.5	8.5	14	20	28	42	55	65	70	85
Regenerative Resistors			Built-in o	r external			External			
Main Circuit	Three-phase 380 to 480 VAC+10% to -15% 50/60 Hz									
Control Circuit	24 VDC ±15%									

Note: The entire over voltage category is  ${\rm I\hspace{-.1em}I}{\rm I}$  .

#### 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-Motor Speed Characteristics.

\*: The dotted line indicates the characteristics of a combination of SGDV-200A SERVOPACKs and SGMGV-30A servomotors.

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# **Specifications**

Items	Items			Specifications				
Control Method			IGBT PWM control, si	ne-wave driven				
			Serial encoder: 13-bit	(incremental encoder)				
	Rotary Servomotors		: 17-bit	(incremental/absolute encoder)				
			: 20-bit (incremental/absolute encoder)					
Feedback			Absolute linear scale					
	With Linear Servome	otors	(The signal resolution varies depending on the absolute linear scale.)					
			The signal resolution varies depending on the incremental linear scale or serial converter unit \					
	Ambient Temperatur	2	(The signal resolution values depending on the incremental linear scale or serial converter unit.)					
	Storago Tomporatur							
	Auchieut Lluuridite	3	-20 10 +05 C					
	Ambient Humidity		90%RH or less	With no freezing or condensation				
	Storage Humidity		90%RH or less					
	Vibration Resistance	)	4.9 m/s <sup>2</sup>					
Operating	Shock Resistance		19.6 m/s <sup>2</sup>					
Conditions	Protection Class		IP10	An environment that satisfies the following conditions. • Free of corrosive or flammable gases				
				Free of exposure to water, oil, or chemicals				
	Pollution Degree		2	<ul> <li>Free of dust, salts, or iron dust</li> </ul>				
	Altitude		1000 m or less					
			Do not use SEBVOPA	CKs in the following locations:				
	Others		I ocations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity					
		<u>.</u>	UL508C	······, ···, ··· ; ····, ··· ; ···· ; ···· ; ···· ; ···· ; ···· ; ···· ; ···· ; ···· ; ···· ; ···· ; ···· ; ···				
Applicable Standards			EN50178, EN55011/A2	2 group1 classA, EN61000-6-2, EN61800-3, EN61800-5-1,				
			EN954-1, IEC61508-1 to 4					
Mounting			Standard: Base-mount	ted				
			Optional: Rack-mount	ed, Duct-ventilated				
	Speed Control Rang	e	1:5000 (The lower limit	t of the speed control range must be lower than the point at				
			which the rated torque	e does not cause the servomotor to stop.)				
	Speed	Load Fluctuation	0% to 100% load: ±0.0	01% max. (at rated speed)				
Performance	Regulation*1	Voltage Fluctuation	Rated voltage: ±10% :	0% (at rated speed)				
		Temperature Fluctuation	25±25 C : ±0.1% max. (at rated speed)					
	Torque Control Toler	Torque Control Tolerance (Repeatability)		±1%				
	Soft Start Time Setti	ng	0 to 10 s (can be set individually for acceleration and deceleration.)					
	BS-422A	Interface	Digital operator (JUSP-OI	P05A-1-E), personal computer (can be connected with SigmaWin+)				
	Communications	1:N communications	RS-422A port: N=15 m	ax. available				
Communications		Axis address setting	Set by parameters					
	USB	Interface	Personal computer (ca	an be connected with SigmaWin+.)				
	Communications	Communications Standard	Compliant with USB1.1 standard (12 Mbps)					
Display			CHARGE indicator					
			Number of points: 2					
			Output voltage: ±10 VI	DC (linearity effective range ±8 V)				
Analog Monitor			Resolution: 16 bit					
			Max output current: +	ο) 10 mΔ				
			Settling time (±1%): 1.	2 ms (Tvp)				
		·	Activated when a serv	o alarm or overtravelling (OT) occurs, or when the power				
Dynamic Brake (DB)			supply for the main cir	cuit or servomotor is OFF.				
Regenerative Processing			Included (For more inf	ormation, refer to the previous page.)				
Overtravelling (OT) Pre	evention		Dynamic brake stop at F	P-OT or N-OT, deceleration to a stop, or free run to a stop				
Protective Functions	Protective Functions			age, low voltage, overload, regeneration error , etc.				
Utility Functions	Utility Functions			n history, JOG operation, origin search, etc.				
		Input	/HWBB1, /HWBB2: Baseblock signal for power module					
Safety Functions		Output	EDM1: Status monitor	(fixed output) of built-in safety circuit				
		Applicable Standards <sup>*2</sup>	EN954 category 3 IEC	61508 SIL2				
Option Module			Fully-closed Module					

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\*1: Speed regulation is defined as follows:

Speed regulation = No-load motor speed-Total load motor speed × 100% Rated motor speed

The motor speed may change due to voltage fluctuation or temperature fluctuation. The ratio of speed changes to the rated speed represent speed regulation due to voltage and temperature fluctuations. \*2: Perform risk assessment for the system and confirm that the safety requirements for the standards are fulfilled before using the HWBB function.

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## **Specifications**

#### Rotary Servomotors

Items				Specifications				
	Encodor Ou	itout Bulaca		Phase A, pha	ase B, phase C: line driver output			
	Encoder OL	Ilput Puises		The number	of dividing pulse: Any setting ratio is available.			
			Fixed Input	SEN signal				
				Number of				
				Channels	7 channels			
					Servo ON (/S-ON)			
	Sequence Input				<ul> <li>Internal set speed selection (/SPD-D, /SPD-A, /SPD-B)</li> </ul>			
			Input Signals		Proportional control (/P-CON)			
			which can be	Functions	• Forward run prohibited (P-OT), reverse run prohibited (N-OT)			
			allocated		Control selection (/C-SEL)     Zero elemping (/ZCLAMP)			
			allocated	Functions	Alarm reset (/ALM-RST)			
					Reference pulse inhibit (/INHIBIT)			
					• Forward external torque limit (/P-CL), reverse external torque limit (/N-CL)			
1/O Signai					Gain selection (/G-SEL)			
			Final Output	0				
			Fixed Output	Servo alarm	(ALM), alarm code (ALOT, ALO2, ALO3) outputs			
				Number of	3 channels			
				Channels				
					Positioning completion (/COIN)     Speed limit detection (//LT)			
					Speed coincidence detection (/V-CMP)			
	Sequence C	Output	Output Signals which		• Brake (/BK)			
			can be allocated	Functions	Rotation detection (/TGON)			
					Warning (/WARN)     Sonio roady (/S. RDV)			
					• Near (/NEAR)			
					Torque limit detection (/CLT)			
				Positive and negative logic can be changed.				
Panel Operator		Display Unit	Five 7-segm	ent LEDs				
· · · · · · · · · · · · · · · · · · ·			Switch	Four push s	vitches			
			Reference Voltage	• Max. input	voltage: ±12 V (forward torque reference with positive reference)			
Torque Control	Input Signa	ls		raciony setting: 3 VDC at rated torque (input gain setting can be changed.)				
			Input Impedance					
	0.00.17		Circuit Time Constant	16 µs				
	Soft Start I	ime Setting	1	0 to 10 s (can be set individually for acceleration and deceleration.)				
			Reference Voltage	• Max. Input	voltage: ±12 V (forward speed reference with positive reference)			
	Input Signa	ls		• Factory setting: 6 VDC at rated speed (Input gain setting can be changed.)				
Speed Control			Circuit Time Constant					
			Potation Direction Selection	30 µs	ol cignol			
	Internal Set	Speed		With forward	or orginal			
	Control		Speed Selection	Servomotor	stops or another control method is used when both are OFF			
	Feedforwar	d Compensat	tion	0 to 100%				
	Positioning	Completed V	Vidth Setting	0 to 1073741	824 reference units			
	- controlling			Select one o	f them:			
			Туре	Sign + pulse tr	ain. CW + CCW pulse train, or two-phase pulse train with 90° phase differential			
			Form	For line drive				
				Line driver	.,, -p			
Position Control		Reference		Line ariver				
Control Control	Input	Pulse	Max. Input Pulse	Two-phase	e pulse train with 90°phase differential:1 Mpps			
	Signals		Frequency*	Open Collec	tor			
				Sign + pul	se train. CW + CCW pulse train: 200 kpps			
				Two-phase	e pulse train with 90°phase differential: 200 kpps			
				Position erro	r clear			
		Clear Signa	l	For line drive	er, open collector			

\*: If the maximum reference frequency exceeds 1 Mpps, use a shielded cable for I/O signals and ground both ends of the shield. Connect the shield at the SERVOPACK to the connector shell. SGDV-001/05

# **Specifications**

#### Linear Servomotors

Items				Specification	ıs			
	Encoder		e	Phase A, pha	ase B, phase C: line driver output			
			3	The number	of dividing pulse: Any setting ratio is available.			
			Fixed Input	SEN signal				
				Number of	7 channels			
				Channels	7 chamers			
					• Servo ON (/S-ON)			
					Internal set speed selection (/SPD-D, /SPD-A, /SPD-B)     Proportional control (/P-CON)			
					Forward run prohibited (P-OT), Reverse run prohibited (N-OT)			
	Sequence	Input	Input Signals which can be allocated		Control selection (/C-SEL)			
				Functions	• Zero clamping (/ZCLAMP)			
					Reference pulse inhibit (/INHIBIT)			
					• Forward external force limit (/P-CL), Reverse external force limit (/N-CL)			
I/O Signal					Gain selection (/G-SEL)			
					Polarity detection (P-DET)     Positive and pegative logic can be changed			
			Fixed Output	Servo alarm	(ALM), alarm code (ALO1, ALO2, ALO3) outputs			
				Number of				
				Channels	3 channels			
				Positioning completion (/COIN)				
					Speed limit detection (/VLT)			
	Sequence	Output	Output Signals which		Speed coincidence detection (/V-CMP)     Brake (/BK)			
			can be allocated	E	Servomotor movement detection (/TGON)			
				Functions	Warning (/WARN)			
					• Servo ready (/S-RDY)			
					Force limit detection (/CLT)			
					Positive and negative logic can be changed.			
Panel Operator			Display Unit	Five 7-segme	ent LEDs			
			Switch	Four push switches				
			Reference Voltage	Max. input voltage: ±12 V (forward force reference with positive reference)     Eastern setting: 2 VDC at rated force (Input gain setting can be abarged)				
Force Control	Input Sign	als		Factory setting: 3 VDC at rated force (input gain setting can be changed.)  About 14 k0				
			Input Impedance	About 14 KΩ				
	Soft Start	Timo Sotting		10 μs	n ha sat individually for accoloration and decoloration )			
	Son Start	nine Setting	9		voltage: +12 V (ferward speed reference with positive reference)			
			Reference Voltage	Factory set	ting: 6 VDC at rated speed (Input gain setting can be changed.)			
	Input Sign	als	Input Impedance	About 14 kO				
Speed Control			Circuit Time Constant	30 µs				
			Movement Direction Selection	With P contr	ol signal			
	Internal Se	et Speed		With forward	l/reverse external force limit signal (speed 1 to 3 selection). Servomotor			
	Control		Speed Selection	stops or ano	ther control method is used when both are OFF.			
	Feedforwa	rd Compens	sation	0 to 100%				
	Positioning	g Completed	d Width Setting	0 to 1073741	824 reference units			
			Type	Select one o	f them:			
			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Sign + pulse tr	ain, forward + reverse pulse train, two-phase pulse train with 90°phase differential			
			Form	For line drive	er, open collector			
Position Control		Reference		Line driver	a turin formular in an anna mulan turin 4 Marsa			
001101	Input	Pulse	Max, Input Pulse	Sign + puls	se train, iorward + reverse pulse train: 4 Mpps e pulse train with 90°phase differential 1 Mpps			
	Signals		Frequency*	Open Collect	tor			
				Sign + puls	se train, forward + reverse pulse train: 200 kpps			
				Two-phase pulse train with 90°phase differential: 200 kpps				
		Clear Sign	al	Position erro	r clear			
					a, open collector			

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\*: If the maximum reference frequency exceeds 1 Mpps, use a shielded cable for I/O signals and ground both ends of the shield. Connect the shield at the SERVOPACK to the connector shell.

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# **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	SERVOPACK Model SGDV-	Power Supply Capacity	Output Current	Main Circuit Power Loss	Regenerative Resistor Power Loss	Control Circuit Power Loss	Total Power Loss
	kW		kVA	Arms	W	W	W	W
	0.05	R70A	0.2	0.66	5.2			22.2
	0.1	R90A	0.3	0.91	7.4	_		24.4
Single-phase	0.2	1R6A	0.7	1.6	13.7		17	30.7
200 V	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
	0.05	R70A	0.2	0.66	5.1			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		17	41.0
	0.5	3R8A	1.4	3.8	20.1			45.1
	0.75	5R5A	1.6	5.5	43.8	8		68.8
Three phone	1.0	7R6A	2.3	7.6	53.6			78.6
200 V	1.5	120A	3.2	11.6	65.8	10		97.8
200 V	2.0	180A	4	18.5	111.9	16	22	149.9
	3.0	200A	5.9	19.6	113.8	10		161.4
	5.0	330A	7.5	32.9	263.7	36	27	326.7
	6.0	470A	10.7	46.9	279.4	(180)*1	22	312.4
	7.5	550A	14.6	54.7	357.8			390.8
	11	590A	21.7	58.6	431.7	(350)*2	40	479.7
	15	780A	29.6	78	599.0		40	647.0
	0.5	1R9D	1.1	1.9	24.6			59.6
	1.0	3R5D	2.3	3.5	46.1	14	21	81.1
	1.5	5R4D	3.5	5.4	71.3			106.3
	2.0	8R4D	4.5	8.4	77.9	00	05	130.9
Three-phase	3.0	120D	7.1	11.9	108.7	20	20	161.7
400 V	5.0	170D	11.7	16.5	161.1	36	24	221.1
	6.0	210D	12.4	20.8	172.7	(1.00)*2	07	199.7
	7.5	260D	14.4	25.7	218.6	(180)"3	21	245.6
	11	280D	21.9	28.1	294.6	(250)*4	20	324.6
	15	370D	30.6	37.2	403.8	(300)"4	30	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 SGDV-R70A, -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 SGDV-470A, -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.

(SGDV-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, or 400-V class SERVOPACKs.)

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

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# **Selecting Cables**

# Cables for CN1 CN3 CN5 CN7 CN8 (Analog Voltage/Pulse Train Reference Type SERVOPACKs)



		Length	Order No.	Specifications	Details	
	Connector Kit		JZSP-CSI9-1-E	Soldered	(1)	
		0.5 m	JUSP-TA50PG-E	Terminal Block and Connection Cable		
CN1 Cables for I/O Signals	Connector Terminal Converter Unit	1 m	JUSP-TA50PG-1-E		(2)	
		2 m	JUSP-TA50PG-2-E			
	Cables with Loose Wires at One End	1 m	JZSP-CSI01-1-E	Cable with Loose Wires at Peripheral Devices		
		2 m	JZSP-CSI01-2-E		(3)	
		3 m	JZSP-CSI01-3-E			
CN3	Digital Operator		JUSP-OP05A-1-E	With Connection Cable (1 m)	(4)	
	Digital Operator Converter Cable*1 0.3 m		JZSP-CVS05-A3-E	Cable with Connectors at Both Ends	(5)	
CN7 Connection Cables for	Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends	(6)	
CN5 Cables for Analog Mon	itor	1 m	JZSP-CA01-E		(7)	
CN8 Cable for Safety Function Device	Cables with Connector*2	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3	E=••••••••••••••••••••••••••••••••••••	(8)	
	Connector Kit*3		Contact Tyco Electronics AMP K.K. Product name: Industrial Mini I/O D-shape Type1 Plug Connector Kit Model: 2013595-1			

\*1 : A converter cable is required to use  $\Sigma$ -III series digital operators (model: JUSP-OP05A) for  $\Sigma$ -V series SERVOPACKs. \*2 : 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.

\*3 : Use the connector kit when you make cables yourself.

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# 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	Case		Connector		
Model	Model	Qty	Model	Qty	
JZSP-CSI9-1-E	10350-52Z0-008 <sup>°</sup>	1 set	10150-3000PE <sup>*</sup> (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)









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



Model	Cable Length (L)
JUSP-TA50PG-E	0.5 m
JUSP-TA50PG-1-E	1 m
JUSP-TA50PG-2-E	2 m

(2) Connector Terminal Converter Unit for CN1

# Configurations



• External Dimensions of Cable (Units: mm) SERVOPACK End Connector (50P)



Note: The pin numbers in the SERVOPACK connector and the pin numbers in the terminal block are the same. If assembling cables, refer to • Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CSI01-\_-E Cable on the next page.

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# Selecting Cables Units: mm

- (3) Cable with Loose Wires at One End for  $\ensuremath{\mathsf{CN1}}$ 
  - External Dimensions of Cable (Units: mm)





\* : Manufactured by Sumitomo 3M Ltd.

Model	Cable Length (L)
JZSP-CSI01-1-E	1 m
JZSP-CSI01-2-E	2 m
JZSP-CSI01-3-E	3 m

	SER	VOPAC	K End		Host Cont	oller End
Pin No.	Signal	Wire	M	arking	100	Lead
		Color	Color	Dots		Marker
1	SG	Orange	Red	1		1
3	PL1	Orange	Black	1		3
2	SG	Gray	Red	1		2
4	SEN	Gray	Black	1		4
5	V-REF	White	Red	1		5
6	SG	White	Black	1		6
7	PULS	Yellow	Red	1		7
8	/PULS	Yellow	Black	1		8
9	T-REF	Pink	Red	1		9
10	SG	Pink	Black	1		10
11	SIGN	Orange	Red	2		11
12	/SIGN	Orange	Black	2		12
13		Grav	Bed	2		13
14		White	Red	2		14
15		White	Black	2		15
10	ULR	Crow	Block	2		10
17	-	Vallaw	Diack	2		10
10	-	Yellow	Rea	2		17
10	PL3	Yellow	Баск	2		18
19	PCO	Pink	Red	2		19
20	/PCO	Pink	Black	2		20
21	BAT (+)	Orange	Red	3		21
22	BAT ()	Orange	Black	3		22
23	-	Gray	Red	3		23
24	-	Gray	Black	3		24
25	/V-CMP+	White	Red	3		25
26	/V-CMP-	White	Black	3		26
27	/TGON+	Yellow	Red	3		27
28	/TGON-	Yellow	Black	3		28
29	/S-RDY+	Pink	Red	3		29
30	/S-RDY-	Pink	Black	3		30
31	ALM+	Orange	Red	4		31
32	ALM-	Orange	Black	4		32
33	PAO	Gray	Red	4		33
34	/PAO	Gray	Black	4		34
35	PBO	White	Red	4		35
36	/PBO	White	Black	4		36
37	AL 01	Yellow	Red	4		37
38	ALO2	Yellow	Black	4		38
39	AL O3	Pink	Red	4		39
40	/S-0N	Pink	Black	4		40
41	/P-CON	Orange	Red	5		41
42	P-OT	Orange	Black	5		42
43	N-OT	Grav	Red	5		43
44	ALM-RST	Grav	Black	5		44
45	/P-CI	White	Red	5		45
46	/N-CL	White	Black	5		46
47		Yellow	Bed	5		47
48	+∠4V-IN _	Pink	Red	5		48
49		Pink	Black	5		49
50		Yellow/	Black	5		50
		10100	Diack			
Casa		Chi.	ald		·`♥´∧	
Case		Shi	eiu		≠:I	Represents

• Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CSI01--E Cable

> : Represents twisted-pair wires.

SGDV-01/05

# Selecting Cables



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

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



- (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. SGDV-01/05

EDIES Σ-V SER

# Selecting Cables Units: mm



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)

#### • Dimensional Drawings



#### 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	-



-V SERIES

T\_V SERIE

∑-v series Z

Analog/Pulse Type SERVOPACKs

# **MECHATROLINK-**II Communications **Reference Type SERVOPACKs** SGDV-

# (For Rotary Servomotors) SGDV-

(For Linear Servomotors)



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del D	esigr	nations								
S G	DV	-	R70	А	11	А	000	0	0	0
∑- <b>V</b> Se SGDV SERVO	ries PACK		st+2nd+ and digits	4th digit	5th+6th digits	7th digit	8th+9th+ 10th digit	s 11th dig	+12th gits	13th digit
1st+2nd+	3rd digits	Current		4th digit	Power Supp	ly Voltage		8th+9th+	10th digi	s Options (hardware
Voltage	Code	Applicable Servomotor Max.	Capacity kW	Code	Sp	ecifications		Code		Specifications
	R70 <sup>*1</sup>	0.05		А	Three-phase	200 VAC		000	Base-	mounted (standard)
	R90 <sup>*1</sup>	0.1		D	Three-phase	400 VAC		001	Rack-	mounted*3
	1R6 <sup>⊷</sup>	0.2						002	Varnis	shed
	2R8⁺¹	0.4						003	Rack-	mounted*3 and Varnished
	3R8         0.5           5R5 <sup>-1</sup> 0.75			5th+6th di	igits Interfac	е		008	Single	-phase 200 VAC input
				Code	Sc	ecifications		000	(Mode	I: SGDV-120A11A008000)
Three- 7R6		1.0			MECHATBOLI	MECHATROLINK- communications				ic brake (400 V SERVOPACKs o
phase	120 <sup>-2</sup>	1.5		11	Reference Typ	rvomotors)				
200 V	180	2.0			MECHATROLI	cations	11th+12t	Options (software)		
	200	3.0		15	Reference Typ	rvomotors)	Code		Specifications	
	330	5.0						00	Stand	ard
	470	6.0		7th digit	Design Re	vision Orde	ər			
	550	7.5			2 00.g.1 10			13th diait	Optio	ns (parameter)
	590	11		А, Б					l l	
	780	15						Code		Specifications
	1R9	0.5						0	Stand	ard
	3R5	1.0								
	5R4	1.5								
Throo	8R4	2.0								
phase	120	3.0								
400 V	170	5.0								
	210	6.0								
	260	7.5		*1: These arr	nplifiers can be p	owered with s	ingle or three-	ohase.		
	280	11		*2: Single-ph	ase 200 VAC SE	RVOPACKs a	re also availabl	e. (Model: S	GDV-120	A11A008000)
	070	15		3: SERVOPA	HUNS OF 6 KW OF	more are duct	-ventilated.			

Note: If the option codes digits 8 to 13 are all zeros, they are omitted.

# YASKAWA ∑-V SERIES

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#### Real-time communications

MECHATROLINK-[] communications enable high-speed control for 30 stations at a maximum transmission speed of 10 Mbps in a transmission cycle from 250  $\mu$ s to 4 ms (user setting). Such a high transmission speed allows real-time transmission of various data required for control.

#### Cost savings

Thirty stations can be connected to a single MECHATROLINK-II transmission line, so wiring costs and time are greatly reduced. Also, only one signal connector is required on the host controller. And, the all-digital network eliminates the need for conversion from digital to analog for speed/torque references and for a pulse generator to generate position references.

#### High-precision motion control

The SGDV SERVOPACK when connected to the host controller in the MECHATROLINK-II network provides not only torque, position, and speed control but also synchronized phase control that requires advanced control technology. The control mode can be changed online so that the machine can move smoothly in complex motions with great efficiency.

# Ratings

#### Single-phase 200 V

	R70A	R90A	1R6A	2R8A	5R5A	120A*	
Applicable Servomotor Max. Capacity kW	0.05	0.1	0.2	0.4	0.75	1.5	
Continuous Output Current Arms	0.66	0.91	1.6	2.8	5.5	11.6	
Max. Output Current Arms	2.1	2.9	5.8	9.3	16.9	28	
Regenerative Resistors	None or external Built-in or exter						
Main Circuit*	Single-phase 200 to 230 VAC+10% to -15% 50/60 Hz						
Control Circuit*	Single	e-phase 20	0 to 230 V	AC+10% t	o -15% 50	/60 Hz	

\*: The rated voltage is 220 to 230 VAC for the SGDV-120A11A008000 SERVOPACK.

#### 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	Arms	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	Arms	2.1	2.9	5.8	9.3	11	16.9	17	28	42	56	84	110	130	140	170
Regenerative Resistors			None or	externa		Built-in or external External										
Main Circuit						Three-p	phase 20	00 to 23	0 VAC+	10% to	-15% 50	0/60 Hz				
Control Circuit			Single-phase 200 to 230 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 kV	0.5	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current Arms	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Max. Output Current Arms	5.5	8.5	14	20	28	42	55	65	70	85
Regenerative Resistors			Built-in o	r external				Exte	ernal	
Main Circuit		Three-phase 380 to 480 VAC+10% to -15% 50/60 Hz								
Control Circuit		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-Motor Speed Characteristics.

\*: The dotted line indicates the characteristics of a combination of SGDV-200A SERVOPACKs and SGMGV-30A servomotors.

# **Specifications**

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			Specifications					
Control Method	ł		IGBT PWM control, sine	e-wave driven				
			Serial encoder: 13-bit (in	cremental encoder)				
	Rotary Servomotors		: 17-bit (ir	ncremental/absolute encoder)				
			: 20-bit (ir	ncremental/absolute encoder)				
Feedback			Absolute linear scale					
	With Linear Servomote	ors	(The signal resolution va	aries depending on the absolute linear scale.)				
			Incremental linear scale	an depending on the incremental linear peaks or periol convertor unit.)				
	Anabiant Tanan avatura			es depending on the incrementar linear scale of senar converter unit.)				
	Ambient Temperature		010+550					
	Storage Temperature		- 20 to +85°C					
	Ambient Humidity		90%RH or less	With no freezing or condensation				
	Storage Humidity		90%RH or less					
Vibration Resistance			4.9 m/s <sup>2</sup>					
Operating	Shock Resistance		19.6 m/s <sup>2</sup>					
Conditions	Protection Class		IP10	An environment that satisfies the following conditions. • Free of corrosive or flammable gases				
	Dallation Dannes		0	<ul> <li>Free of exposure to water, oil, or chemicals</li> </ul>				
	Pollution Degree		2	Free of dust, salts, or iron dust				
	Altitude		1000 m or less					
	01		Do not use SERVOPACK	s in the following locations:				
	Others		Locations subject to state	ic electricity noise, strong electromagnetic/magnetic fields, radioactivity				
			UL508C					
Applicable Star	ndards		EN50178, EN55011/A2 g	group1 classA, EN61000-6-2, EN61800-3,				
			EN61800-5-1, EN954-1,	IEC61508-1 to 4				
Mounting			Standard: Base-mounted					
			Optional: Rack-mounted	, Duct-ventilated				
	Speed Control Range		1:5000 (The lower limit o	f the speed control range must be lower than the point at which				
			the rated torque does no	t cause the servomotor to stop.)				
	Speed	Load Fluctuation	0% to 100% load: ±0.01	% max. (at rated speed)				
Performance	Regulation*1	Voltage Fluctuation	Rated voltage: ±10% : 0	% (at rated speed)				
		Temperature Fluctuation	25±25 C : ±0.1% max. (at rated speed)					
	Torque Control Tolerar	nce (Repeatability)	±1%					
	Soft Start Time Setting	g	0 to 10 s (can be set indi	vidually for acceleration and deceleration.)				
	RS-422A	Interface	Digital operator (JUSP-O	P05A-1-E), personal computer (can be connected with SigmaWin+)				
	Communications	1:N communications	RS-422A port: N=15 max	x. available				
Communications		Axis address setting	Set by parameters					
	USB	Interface	Personal computer (can	be connected with SigmaWin+.)				
	Communications	Communications Standard	Compliant with USB1.1	standard (12 Mbps)				
Display			CHARGE indicator					
			Number of points: 2					
			Output voltage: ±10 VDC	G (linearity effective range ±8 V)				
Analog Monitor			Accuracy: $\pm 20 \text{ mV}$ (Typ)					
			Max. output current: ±10	) mA				
			Settling time (±1%): 1.2 i	ms (Typ)				
			Activated when a servo a	alarm or overtravelling (OT) occurs, or when the power supply for				
Dynamic Brake	(DB)		the main circuit or servor	motor is OFF.				
Regenerative P	rocessing		Included (For more inforr	mation, refer to the previous page)				
Overtravelling (	OT) Prevention		Dynamic brake stop at P	-OT or N-OT, deceleration to a stop, or free run to a stop				
Protective Fund	ctions		Overcurrent, Overvoltage	e, low voltage, overload, regeneration error, etc.				
Utility Function	S		Gain adjustment, alarm history, JOG operation, origin search, etc.					
		Input	/HWBB1, /HWBB2: Base	eblock signal for power module				
Safety Function	าร	Output	EDM1: Status monitor (fi	xed output) of built-in safety circuit				
		Applicable Standards*2	EN954 category 3 JEC6	1508 SIL2				
Option Module		- ppricable oranduluo z	Fully-closed Module					

Σ-V

\*1: Speed regulation is defined as follows:

Speed regulation = <u>No-load motor speed</u>-<u>Total load motor speed</u> × 100% Rated motor speed

The motor speed may change due to voltage fluctuation or temperature fluctuation.

The ratio of speed changes to the rated speed represent speed regulation due to voltage and temperature fluctuations.

\*2: Perform risk assessment for the system and confirm that the safety requirements for the standards are fulfilled before using the HWBB function.

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## **Specifications**

## Rotary Servomotors

			Phase A, phase B, phase	C: line driver output		
	Encoder Output Pulses		The number of dividing p	ulse: Any setting ratio is avai	lable.	
		Fixed Input	SEN signal			
			Number of Channels	7 channels		
		Input Signals which can be allocated		Homing deceleration sw	itch signal (/DEC)	
	Sequence Input			• External latch signals (/E	XT 1 to 3)	
			Function	Forward run prohibited (	P-OT), reverse run prohibited (N-OT)	
				Forward external torque li	imit (/P-CL), reverse external torque limit (/N-CL)	
				Positive and negative logic	can be changed.	
		Fixed Output	Servo alarm (ALM)			
I/O Signal			Number of Channels	3 channels		
				Positioning completion (	/COIN)	
				Speed limit detection (/VLT)		
				<ul> <li>Speed coincidence detection (/V-CMP)</li> </ul>		
	0	Outra t Oissa la subist		Brake (/BK)		
	Sequence Output	can be allocated	Function	Rotation detection (/TGC	DN)	
			Function	Warning (/WARN)		
				Servo ready (/S-RDY)		
				Near (/NEAR)		
				Torque limit detection (/CLT)		
				Positive and negative logic can be changed.		
Banal Operator		Display Unit	One 7-segment LED			
Farler Operator		Switch	Rotary switch: 16 position	ns, DIP switch: 4 poles		
		Communications Protocol	MECHATROLINK-		MECHATROLINK-	
		Transmission Speed	10 Mbps		4 Mbps	
MECHATROLIN	IK	Transmission Cycle	250 $\mu$ s, 0.5 to 4.0 ms (mu	Itiple of 0.5 ms)	2 ms	
Communication	าร	Number of Words for	Can be switched betweer	n	17 buton (station	
		Link Transmission	17-bytes /station and 32-	bytes / station.	17-bytes/station	
		Station Address	41H to 5FH (max. numbe	r of slaves: 30)		
		Performance	Position control, speed co	ontrol, and torque control thr	ough MECHATROLINK communications	
Command Met	hod	Command Input	MECHATROLINK comma	inds		
		Command input	(for sequence, motion. da	ata setting/reference. monitor	r. adjustment, and other commands.)	

# Linear Servomotors

Items			Specifications					
	Encodor Output Pulsos		Phase A, phase B, phase	C: line driver output				
	Encoder Output Puises		The number of dividing pu	ulse: Any setting ratio is avail	able.			
		Fixed Input	SEN signal					
			Number of Channels	7 channels				
				Homing deceleration switch signal (/DEC)				
	Sequence Input	Input Signals which can		• External latch signals (/E	XT 1 to 3)			
		be allocated	Function	Forward run prohibited (I	P-OT), reverse run prohibited (N-OT)			
				<ul> <li>Forward external force line</li> </ul>	mit (/P-CL), reverse external force limit (/N-CL)			
				Positive and negative logic	can be changed.			
	Sequence Output	Fixed Output	Servo alarm (ALM)					
I/O Signal			Number of Channels	3 channels				
				Positioning completion (	(COIN)			
				Speed limit detection (/V	LT)			
		Output Signals which can be allocated	Function	Speed coincidence detection (/V-CMP)				
				• Brake (/BK)				
				Servomotor movement c	letection (/TGON)			
				<ul> <li>Warning (/WARN)</li> </ul>				
				Servo ready (/S-RDY)				
				Near (/NEAR)				
				Force limit detection (/CLT)				
				Positive and negative logic can be changed.				
Panel Operator		Display Unit	One 7-segment LED					
		Switch	Rotary switch: 16 position	ns, piano switch: 4 poles				
		Communications Protocol	MECHATROLINK-I		MECHATROLINK-I			
		Transmission Speed	10 Mbps		4 Mbps			
MECHATROLIN	IK	Transmission Cycle	250 µs, 0.5 to 4.0 ms (mu	Itiple of 0.5 ms)	2 ms			
Communication	าร	Number of Words for	Can be switched betweer	ı	17-bytes /station			
		Link Transmission	17-bytes /station and 32-	bytes / station.				
		Station Address	41H to 5FH (max. number	r of slaves: 30)				
		Performance	Position control, speed co	ontrol, and force control through	ugh MECHATROLINK-II communications			
Command Met	hod	Command Input	MECHATROLINK commands and MECHATROLINK-II commands					
		Communa input	(for sequence, motion, da	ta setting/reference, monitor	, adjustment, and other commands.)			

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# 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	SERVOPACK Model SGDV-	Power Supply Capacity	Output Current	Main Circuit Power Loss	Regenerative Resistor Power Loss	Control Circuit Power Loss	Total Power Loss
	kW		kVA	Arms		W		
	0.05	R70A	0.2	0.66	5.2			22.2
	0.1	R90A	0.3	0.91	7.4			24.4
Single-phase	0.2	1R6A	0.7	1.6	13.7	_	17	30.7
200 V	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
	0.05	R70A	0.2	0.66	5.1			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		17	41.0
	0.5	3R8A	1.4	3.8	20.1			45.1
	0.75	5R5A	1.6	5.5	43.8	8		68.8
	1.0	7R6A	2.3	7.6	53.6			78.6
Inree-phase	1.5	120A	3.2	11.6	65.8	10		97.8
200 V	2.0	180A	4	18.5	111.9	10	22	149.9
	3.0	200A	5.9	19.6	113.8	16		161.4
	5.0	330A	7.5	32.9	263.7	36	27	326.7
	6.0	470A	10.7	46.9	279.4	(180)*1	00	312.4
	7.5	550A	14.6	54.7	357.8		33	390.8
	11	590A	21.7	58.6	431.7	(350)*2	10	479.7
	15	780A	29.6	78	599.0		48	647.0
	0.5	1R9D	1.1	1.9	24.6			59.6
	1.0	3R5D	2.3	3.5	46.1	14	21	81.1
	1.5	5R4D	3.5	5.4	71.3			106.3
	2.0	8R4D	4.5	8.4	77.9		05	130.9
Three-phase	3.0	120D	7.1	11.9	108.7	28	25	161.7
400 V	5.0	170D	11.7	16.5	161.1	36	24	221.1
	6.0	210D	12.4	20.8	172.7	(1.00)*0	07	199.7
	7.5	260D	14.4	25.7	218.6	(180)^3	27	245.6
	11	280D	21.9	28.1	294.6	(050)*4	00	324.6
	15	370D	30.6	37.2	403.8	(350)"4	30	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 SGDV-R70A, -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 SGDV-470A, -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.

(SGDV-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, or 400-V class SERVOPACKs.) • Install an external regenerative resistor (optional). For selection details, refer to page 364.

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# **Selecting Cables**

# ●Cables for CN1 CN3 CN5 CN6 CN7 CN8 (MECHATROLINK-II Communications Reference Type SERVOPACKs)



Name		Length	Order No.	Specifications	Details	
	Connector Kit		JZSP-CSI9-2-E	Soldered	(1)	
		0.5 m	JUSP-TA26P-E	Terminal Block and Connection Cable		
CN1 Cables for I/O Signals	Connector Terminal Converter Unit	1 m	JUSP-TA26P-1-E		(2)	
Cables for 1/C olghais		2 m	JUSP-TA26P-2-E			
		1 m	JZSP-CSI02-1-E			
	at One End	2 m	JZSP-CSI02-2-E		(3)	
		3 m	JZSP-CSI02-3-E			
CN3	Digital Operator JUSP-OP05A-1-E With Connection C		With Connection Cable (1 m)	(4)		
	Digital Operator Converter Cable*1	0.3 m	JZSP-CVS05-A3-E	Cable with Connectors at Both Ends	(5)	
CN7 Connection Cabl for Personal Cor	es nputer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends	(10)	
	Cables with Connectors at Both Ends	0.5 to 50 m	JEPMC-W6002-D-E		(7)	
CN6A CN6B MECHATROLINK-I Communication Cable	Cables with Connectors0.5at Both Ends (with FerritetoCore)50 m		JEPMC-W6003-🗌-E		(8)	
	Terminator		JEPMC-W6022-E		(9)	
CN5 Cables for Analog Monitor		1 m	JZSP-CA01-E	SERVOPACK End	(6)	
CN8	Cables with Connector*2 3 m		JZSP-CVH03-03-E JZSP-CVH03-03-E-G3	E	(11)	
Cable for Safety			Contact Tyco Electronics AMP K.K.			
Function Device	Connector kit*3		Product name : Industrial Mini I/O D-shape Type1 Plug Connector Kit Model : 2013595-1			

\*1 : A converter cable is required to use *Σ*-III series digital operators (model: JUSP-OP05A) for *Σ*-V series SERVOPACKs.

\*2 : 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. \*3 : 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	Case		Connector	
Model	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 Cable (Units: mm)



	Terminal Block (40P) M3.5 Screw	Connector Plug (40P) FCN-364P040-AU
7	/	
59.5		
2-3.5 Dia. 3.5	202.5	3.5
	Can be fixed c	m DIN rail

• External Dimensions of Terminal Block (Units: mm)

OF (40P)			
.)	Model	Cable Length (L)	Approx. Mass
<b>`</b>	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.

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# 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

						Host
	SER	VOPACI	K End			Controller End
Din No	Signal	Wire	М	arking	]	Lead
Fillino.	Signai	Color	Color	Dots		Marker
1	/S01+	Blue	Red	1		1
2	/S01-	Blue	Black	1		2
3	ALM+	Pink	Red	1		3
4	ALM-	Pink	Black	1		4
5	5	Green	Red	1		5
6	+24VIN	Green	Black	1		6
7	P-OT	Orange	Red	1	¦	7
8	N-OT	Orange	Black	1		8
9	/DEC	Gray	Red	1		9
10	/EXT1	Gray	Black	1		10
11	/EXT2	Blue	Red	2		11
12	/EXT3	Blue	Black	2		12
13	/S10	Pink	Red	2		13
14	BAT (+)	Green	Red	2		14
15	BAT ()	Green	Black	2		15
16	SG	Pink	Black	2		16
17	PAO	Orange	Red	2		17
18	/PAO	Orange	Black	2		18
19	РВО	Gray	Red	2		19
20	/PBO	Gray	Black	2		20
21	PCO	Blue	Red	3		21
22	/PCO	Blue	Black	3		22
23	/SO2+	Pink	Red	3		23
24	/SO2-	Pink	Black	3		24
25	/SO3+	Green	Red	3		25
26	/SO3-	Green	Black	3		26
-	•				· · ·	

• Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CSI02-\_-E Cable

> ⇒ : Represents twisted-pair

wires.

#### (4) Digital Operator (Model: JUSP-OP05A-1-E) (Units: mm)



Connector: HDR-E14MAG1+(Honda Tsushin Kogyo Co., Ltd.) Case: HDR-E14LPA5(Honda Tsushin Kogyo Co., Ltd.)

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

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

• External Dimensions (Units: mm)



(Honda Tsushin Kogyo Co., Ltd.)

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# **Selecting Cables**

#### (6) Cable for Analog Monitor for CN5 (Model: JZSP-CA01-E)

• External Dimensions (Units: mm)



\*: Manufactured by Hirose Electric Corporation.

3 U 4 1 U 4 2 White Red

View from Cable End

#### Specifications

Pin No.	Cable Color	Signal	Standard Settings
1	Red	Analog Monitor 2	Motor speed : 1V/1000 min-1
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.

(7) MECHATROLINK-II Communications Cable for CN6

(Model: JEPMC-W6002-D-E)

• External Dimensions (Units: mm)

Cable with Connectors at Both Ends



JEPMC-W6002-A5-E	0.5 m
JEPMC-W6002-01-E	1.0 m
JEPMC-W6002-03-E	3.0 m
JEPMC-W6002-05-E	5.0 m
JEPMC-W6002-10-E	10.0 m
JEPMC-W6002-20-E	20.0 m
JEPMC-W6002-30-E	30.0 m
JEPMC-W6002-40-E	40.0 m
JEPMC-W6002-50-E	50.0 m

(8) MECHATROLINK-II Communications Cable for CN6

(Model: JEPMC-W6003- -E)

• External Dimensions (Units: mm)

Cable with Connectors at Both Ends (with Ferrite Core)



Model	Cable Length (L)
JEPMC-W6003-A5-E	0.5 m
JEPMC-W6003-01-E	1.0 m
JEPMC-W6003-03-E	3.0 m
JEPMC-W6003-05-E	5.0 m
JEPMC-W6003-10-E	10.0 m
JEPMC-W6003-20-E	20.0 m
JEPMC-W6003-30-E	30.0 m
JEPMC-W6003-40-E	40.0 m
JEPMC-W6003-50-E	50.0 m

 IMPORTANT
 Use a MECHATROLINK-I communications cable specified by Yaskawa. When using other cables, noise resistance may be reduced, and operation cannot be guaranteed.

#### (9) MECHATROLINK-I Terminator for CN6 (Model : JEPMC-W6022-E)

• External Dimensions (Units: mm)



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**Selecting Cables** 

(10) 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.

#### (11) Cable with Connector for CN8 (Model: JZSP-CVH03-03-E)

• External Dimensions (Units: mm)



Specifications

or Marking Color
-
-
Black
Red
Black
Red
Black
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	-
1)	4	/HWBB1+	Brown	-
	5	/HWBB2-	Green	-
	6	/HWBB2+	Yellow	-
	7	EDM1-	Grey	-
	8	EDM1+	Pink	-

# **MECHATROLINK-III** Communications **Reference Type SERVOPACKs**

# SGDV-(For Rotary Servomotors) SGDV-(For Linear Servomotors)



Мо	del D	esigr	nations								
	S G	DV	, <u> </u>	R70	Α	21	Α	000	0	0	0
	Σ- <b>V</b> Se SGDV SERVO	eries PACK		1st+2nd+ 3rd digits	4th digit	5th6th digits	7th digit	8th+9th+ 10th digit	s 11th dig	12th jits	13th digit
	1st2nd3	rd digits	Current		4th digit	Power Supp	oly Voltage		8th+9th+	0th digits	Options (hardware)
	Voltage	Code	Applicable Servomotor M	lax. Capacity kW	Code	Spe	ecifications		Code		Specifications
		R70*1	0.05		F	Single-phase	e 100 VAC		000	Base-m	ounted (standard)
		R90*1	0.1		Α	Three-phase	200 VAC		001	Rack-m	ounted
		1R6*1	0.2		D	Three-phase	e 400 VAC		002	Varnishe	ed
		2R8*1	0.4						003	Rack-m	ounted and Varnished
		3R8	0.5		5th+6th di	gits Interfac	e		009	Single-p	hase 200 VAC input
		5R5*1	0.75		Code Specifications				008	(Model:	SGDV-120A21A008000)
	Three-	7R6	1.0						020	Dynamic b	rake (400 V SERVOPACKs only)
	phase	120*2	1.5		21	Reference Type (for rotary servomotors)					
	200 V	180	2.0						11th+12th	digits O	ptions (software)
		200	3.0		25	Reference Type (for linear servomotors)			Codo		Specifications
		330	5.0						00	Standar	d
		470	6.0		7th digit	Design De	vision Ord		00	Stanuar	u
		550	7.5			Designine	vision Oru	er	1 Oals alignit	Ontions	(novomotov)
		590	11		А, В				Tour digit	Options	(parameter)
		780	15						Code		Specifications
		1R9	0.5						0	Standar	d
		3R5	1.0								
		5R4	1.5								
		8R4	2.0								
	Three-	120	3.0								
	phase 400 V	170	5.0								
		210	6.0								
		260	7.5		*1· These ar	unlifiers can be r	owered with	single or three	nhaso		
		280	11		*2: Single-ph	ase 200 VAC SE	RVOPACKs a	re also availat	ble. (Model:	SGDV-120A	21A008000)
		370	15		*3: SERVOP	ACKs of 6 kW or	more are duo	t-ventilated.	, ara amitta		

Note: If the option codes digits 8 to 13 are all zeros, they are omitted.

#### Real-time communications

**MECHATROLINK-III** communications enable high-speed control for 62 stations at a transmission speed of 100 Mbps in a transmission cycle from 125  $\mu$ s to 4 ms (user setting). Such a high transmission speed allows real-time transmission of various data required for control.

#### Cost savings

The 62 stations can be connected to a single MECHATROLINK-III transmission line, so wiring costs and time are greatly reduced. Also, only one signal connector is required on the host controller. And, the all-digital network eliminates the need for conversion from digital to analog for speed/torque references and for a pulse generator to generate position references.

#### High-precision motion control

The SGDV SERVOPACK when connected to the host controller in the MECHATROLINK-III network provides not only torque, position, and speed control but also synchronized phase control that requires advanced control technology. The control mode can be changed online so that the machine can move smoothly in complex motions with great efficiency.

\*: The rated voltage is 220 to 230 VAC for the SGDV-120A21A008000 SERVOPACK.

# Ratings

## Single-phase 200 V

SERVOPACK Model SGDV-		R70A	R90A	1R6A	2R8A	5R5A	120A*
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	5.5	11.6
Max. Output Current	Arms	2.1	2.9	5.8	9.3	16.9	28
Regenerative Resistors	None or external Built-in or external						
Main Circuit	Single-phase 200 to 230 VAC+10% to -15% 50/60 Hz						
Control Circuit	Single-phase 200 to 230 VAC+10% to -15% 50/60 Hz						

#### 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	Arms	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	Arms	2.1	2.9	5.8	9.3	11	16.9	17	28	42	56	84	110	130	140	170
Regenerative Resistors		1	None or	externa	ıl	Built-in or external External										
Main Circuit		Three-phase 200 to 230 VAC+10% to -15% 50/60 Hz														
Control Circuit			Single-phase 200 to 230 VAC+10% to -15% 50/60 Hz													

#### Three-phase 400 V

SERVOPACK Model SGDV-	1R9	D 3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Applicable Servomotor Max. Capacity k	V 0.5	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current Arm	<mark>s</mark> 1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Max. Output Current Arn	s 5.5	8.5	14	20	28	42	55	65	70	85
Regenerative Resistors	Built-in or external				External					
Main Circuit		Three-phase 380 to 480 VAC+10% to -15% 50/60 Hz								
Control Circuit		24 VDC ±15%								

Note: The entire over voltage category is  ${\rm I\hspace{-.1em}I}{\rm I}$ .

#### 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-Motor Speed Characteristics.

\*: The dotted line indicates the characteristics of a combination of SGDV-200A SERVOPACKs and SGMGV-30A servomotors.

 $\sum -V$ 

# **Specifications**

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Items			Specifications					
Control Metho	d		IGBT PWM control,	sine-wave driven				
			Serial encoder: 13-bi	t (incremental encoder)				
	Rotary Servomotors		: 17-bi	t (incremental/absolute encoder)				
			: 20-bit (incremental/absolute encoder)					
Feedback			Absolute linear scale					
	With Linear Servomo	tors	(The signal resolution	n varies depending on the absolute linear scale.)				
			Incremental linear sc	ale arrian demonding on the incremental linear code or carial converter unit )				
	A			aries depending on the incremental linear scale or serial converter unit.)				
	Amplent Temperature		0 to +55 C					
	Storage Temperature		-20 to +85°C					
	Ambient Humidity		90%RH or less	With no freezing or condensation				
	Storage Humidity		90%RH or less					
	Vibration Resistance		4.9 m/s					
Operating	Shock Resistance		19.6 m/s					
Conditions	Protection Class		IP10	An environment that satisfies the following conditions. • Free of corrosive or flammable gases				
	Pollution Degree		0	Free of exposure to water, oil, or chemicals				
	Poliution Degree		2	Free of dust, salts, or iron dust				
	Altitude		1000 m or less					
	0"		Do not use SERVOPA	ACKs in the following locations:				
	Others		<ul> <li>Locations subject to s</li> </ul>	tatic electricity noise, strong electromagnetic/magnetic fields, radioactivity				
		UL508C						
Applicable Standards (Pending)		EN50178, EN55011/A	2 group1 classA, EN61000-6-2, EN61800-3,					
			EN61800-5-1, EN954	EN61800-5-1, EN954-1, IEC61508-1 to 4				
Mounting			Standard: Base-mou	nted				
		Optional: Rack-mour						
	Speed Control Range		1:5000 (The lower lim which the rated torqu	it of the speed control range must be lower than the point at the does not cause the servomotor to stop.)				
	Oreard	Load Fluctuation	0% to 100% load: ±0.01% max. (at rated speed)					
Performance	Speed	Voltage Fluctuation	Rated voltage: ±10%	: 0% (at rated speed)				
	riegulation	Temperature Fluctuation	25±25°C : ±0.1% max	x. (at rated speed)				
	Torque Control Tolerance (Repeatability)		±1%					
	Soft Start Time Settin	g	0 to 10 s (can be set individually for acceleration and deceleration.)					
		Interface	Digital operator (JUSP	-OP05A-1-E), personal computer (can be connected with SigmaWin+)				
	RS-422A	1:N communications	RS-422A port: N=15	max. available				
Communications	Communications	Axis address setting	Set by parameters					
	USB	Interface	Personal computer (	can be connected with SigmaWin+.)				
	Communications	Communications Standard	Compliant with USB1	.1 standard (12 Mbps)				
Display			CHARGE indicator					
			Number of points: 2					
			Output voltage: ±10	/DC (linearity effective range ±8 V)				
Analog Monito	r		Resolution: 16 bit					
Analog Monito			Accuracy: ±20 mV (Ty	(q)				
			Max. output current:	±10 mA				
		Settling time (±1%): 1	1.2 ms (Typ)					
Dynamic Brake (DB)			Activated when a ser	vo alarm or overtravelling (O1) occurs, or when the power supply r servemetor is OFF				
Regenerative Processing		Included (For more in	formation refer to the previous page )					
Overtravelling (OT) Prevention			Dynamic broke stop	at P-OT or N-OT deceleration to a stop, or free run to a stop				
Overtravelling (OT) Prevention				tage low voltage evented reconcretion error etc				
Protective Functions			Cein ediustre art	raye, iow voitage, overload, regeneration error, etc.				
Ounty Function	15	Innet	Gain aujustment, alai	m nistory, JOG operation, origin search, etc.				
		input	/HWBB1, /HWBB2: B	asebiock signal for power module				
Safety Functio	ns	Output	EDM1: Status monito	or (fixed output) of built-in safety circuit				
		Applicable Standards (Pending)	EN954 category 3, IE	C61508 SIL2				
Option Module	•		Fully-closed Module					

\*1: Speed regulation is defined as follows:

Speed regulation = No-load motor speed-Total load motor speed × 100% Rated motor speed

The motor speed may change due to voltage fluctuation or temperature fluctuation. The ratio of speed changes to the rated speed represent speed regulation due to voltage and temperature fluctuations. \*2: Perform risk assessment for the system and confirm that the safety requirements for the standards are fulfilled before using the HWBB function.

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# **Specifications**

## Rotary Servomotors

Rents							
	Encodor Output Pulsos	Encoder Output Pulses		C: line driver output			
	Encoder Output Puises		The number of dividing p	ulse: Any setting ratio is available.			
		Fixed Input	SEN signal				
			Number of Channels	7 channels			
		Input Signals which can be allocated		<ul> <li>Homing deceleration switch signal (/DEC)</li> </ul>			
	Sequence Input			• External latch signals (/EXT 1 to 3)			
			Function	<ul> <li>Forward run prohibited (P-OT), reverse run prohibited (N-OT)</li> </ul>			
				<ul> <li>Forward external torque limit (/P-CL), reverse external torque limit (/N-CL)</li> </ul>			
				Positive and negative logic can be changed.			
		Fixed Output	Servo alarm (ALM)	· · ·			
I/O Signal			Number of Channels	3 channels			
				Positioning completion (/COIN)			
	Sequence Output			Speed limit detection (/VLT)			
				Speed coincidence detection (/V-CMP)			
		Output Cinnels which can		• Brake (/BK)			
		be ellegated	Function	Rotation detection (/TGON)			
			Function	Warning (/WARN)			
				Servo ready (/S-RDY)			
				• Near (/NEAR)			
				Torque limit detection (/CLT)			
				Positive and negative logic can be changed.			
Danal Operator		Display Unit	One 7-segment LED (red)	and three LED indicators for MECHATROLINK communications (green)			
		Switch	Rotary switch: 16 positio	ns×2, DIP switch: 4 poles			
		Communications Protocol	MECHATROLINK-III				
		Transmission Speed	100 Mbps				
MECHATROLIN	NK	Transmission Cycle	125 $\mu$ s, 250 $\mu$ s, 500 $\mu$ s,75	0 $\mu$ s, 1 ms to 4 ms (increments of 0.5 ms)			
Communicatio	ns	Number of Words for	Can be switched betwee	n 16-hytes/station 32-hytes/station and 48-hytes/station			
		Link Transmission	Can be switched betwee				
		Station Address	03H to EFH (max. numbe	er of slaves: 62)			
		Performance	Position control, speed of	control, and torque control through MECHATROLINK communications			
Command Met	hod	Command Input	MECHATROLINK comma	ands			
		Command input	(for sequence, motion, da	ata setting/reference, monitor, adjustment, and other commands.)			

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#### Linear Servomotors

			Specifications			
	Encoder Output Bulaco		Phase A, phase B, phase	e C: line driver output		
	Encoder Output Puises		The number of dividing p	oulse: Any setting ratio is available.		
		Fixed Input	SEN signal			
			Number of Channels	7 channels		
		Input Signals which can		<ul> <li>Homing deceleration switch signal (/DEC)</li> </ul>		
	Sequence Input			• External latch signals (/EXT 1 to 3)		
		be allocated	Function	<ul> <li>Forward run prohibited (P-OT), reverse run prohibited (N-OT)</li> </ul>		
				• Forward external force limit (/P-CL), reverse external force limit (/N-CL)		
				Positive and negative logic can be changed.		
		Fixed Output	Servo alarm (ALM)			
I/O Signal			Number of Channels	3 channels		
				Positioning completion (/COIN)		
	Sequence Output	Output Signals which can be allocated		Speed limit detection (/VLT)		
				Speed coincidence detection (/V-CMP)		
				Brake (/BK)		
			Function	<ul> <li>Servomotor movement detection (/TGON)</li> </ul>		
				Warning (/WARN)		
				Servo ready (/S-RDY)		
				• Near (/NEAR)		
				Force limit detection (/CLT)		
				Positive and negative logic can be changed.		
Panel Operato	r	Display Unit	One 7-segment LED (red	) and three LED indicators for MECHATROLINK communications (green)		
		Switch	Rotary switch: 16 positio	ns×2, DIP switch: 4 poles		
		Communications Protocol	MECHATROLINK-III			
		Transmission Speed	100 Mbps			
MECHATROLI	NK	Transmission Cycle	125 μs, 250 μs, 500 μs,75	i0 $\mu$ s, 1 ms to 4 ms (increments of 0.5 ms)		
Communicatio	ns	Number of Words for	Can be switched betwee	n 16-bytes/station, 32-bytes/station and 48-bytes/station.		
		Link Transmission				
		Station Address	03H to EFH (max. numbe	er of slaves: 62)		
		Performance	Position control, speed of	control, and force control through MECHATROLINK communications		
Command Met	hod	Command Input	MECHATROLINK comma	ands		
			(for sequence, motion, d	ata setting/reference, monitor, adjustment, and other commands.)		

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# 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	SERVOPACK Model SGDV-	Power Supply Capacity	Output Current	Main Circuit Power Loss	Regenerative Resistor Power Loss	Control Circuit Power Loss	Total Power Loss
	kW		kVA	Arms		W		
	0.05	R70A	0.2	0.66	5.2			22.2
	0.1	R90A	0.3	0.91	7.4			24.4
Single-phase	0.2	1R6A	0.7	1.6	13.7	_	17	30.7
200 V	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
	0.05	R70A	0.2	0.66	5.1			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		17	41.0
	0.5	3R8A	1.4	3.8	20.1			45.1
	0.75	5R5A	1.6	5.5	43.8	8		68.8
	1.0	7R6A	2.3	7.6	53.6			78.6
Inree-phase	1.5	120A	3.2	11.6	65.8	10		97.8
200 V	2.0	180A	4	18.5	111.9	10	22	149.9
	3.0	200A	5.9	19.6	113.8	16		161.4
	5.0	330A	7.5	32.9	263.7	36	27	326.7
	6.0	470A	10.7	46.9	279.4	(180)*1	00	312.4
	7.5	550A	14.6	54.7	357.8		33	390.8
	11	590A	21.7	58.6	431.7	(350)*2	40	479.7
	15	780A	29.6	78	599.0		48	647.0
	0.5	1R9D	1.1	1.9	24.6			59.6
	1.0	3R5D	2.3	3.5	46.1	14	21	81.1
	1.5	5R4D	3.5	5.4	71.3			106.3
	2.0	8R4D	4.5	8.4	77.9		05	130.9
Three-phase	3.0	120D	7.1	11.9	108.7	28	25	161.7
400 V	5.0	170D	11.7	16.5	161.1	36	24	221.1
	6.0	210D	12.4	20.8	172.7	100 *0	07	199.7
	7.5	260D	14.4	25.7	218.6	180 *3	27	245.6
	11	280D	21.9	28.1	294.6	050 *4	00	324.6
	15	370D	30.6	37.2	403.8	350 ^4	30	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 SGDV-R70A, -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 SGDV-470A, -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.

(SGDV-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, or 400-V class SERVOPACKs.)

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

SGDV-

# **Selecting Cables**

● Cables for CN1 CN3 CN5 CN6 CN7 CN8 (MECHATROLINK-III Communications Reference Type SERVOPACKs)



Na		Length	Order No.	Specifications	Details
	Connector Kit		JZSP-CSI9-2-E	Soldered	(1)
		0.5 m	JUSP-TA26P-E	Terminal Block and Connection Cable	
CN1 Cables for I/O Signals	Connector Terminal	1 m	JUSP-TA26P-1-E		(2)
Cables for 1/O Digitals	Converter Onit	2 m	JUSP-TA26P-2-E		
		1 m	JZSP-CSI02-1-E		
	Cable with Loose wire	2 m	JZSP-CSI02-2-E		(3)
		3 m	JZSP-CSI02-3-E		
	Digital Operator		JUSP-OP05A-1-E	With Connection Cable (1 m)	(4)
CN3	Digital Operator Converter Cable		JZSP-CVS05-A3-E	Cable with Connectors at Both Ends	(5)
		0.3 m	JZSP-CVS07-A3-E	With Lock Screws	(6)
CN7 Connection Cab for Personal Co	les mputer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends	(7)
	Cables with Connectors at Both Ends	0.2 to 50 m	JEPMC- 6012-	E=€€\$00@==	(8)
MECHATROLINK-	Cables with Connectors at Both Ends (With Ferrite Core)	10 to 50 m	JEPMC-W6013-	<b>三•••到</b> □□(酉••=	(9)
	Cable with Loose Wire at One End	0.5 to 50 m	JEPMC-W6014-	⊑-∮截]□	(10)
CN5 Cables for Analog Monitor		1 m	JZSP-CA01-E		(11)
CN8	Cables with Connector	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3	E-\$∰D32	(12)
Cable for Safety			Contact Tyco Electronics A	MP K.K.	
Function Device	Connector kit		Product name : Industrial N	/ini I/O D-shape Type1 Plug Connector Kit	
			Model : 2013595-	1	

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

\*2 : A converter cable with lock screws is required to securely connect the digital operator cable.

\*3 : 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.

\*4 : Use the connector kit when you make cables yourself.

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## 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	Case		Connector		
Model	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)



• Dimensional Drawings of Cable



UFJ			
_	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.

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# 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

11001								
nd Controller I	SERVOPACK End							
Marking	irking	Ma	Wire	Signal	Pin No.			
lor Dots Marker	Dots	Color	Color	orginal	1			
ed 1 1	1	Red	Blue	/S01+	1			
ack 1 i 2	1	Black	Blue	/S01-	2			
ed 1 Vi 1 3	1	Red	Pink	ALM+	3			
ack 1 4	1	Black	Pink	ALM-	4			
ed 1 5	1	Red	Green	5	5			
ack 1 6	1	Black	Green	+24VIN	6			
ed 1 7	1	Red	Orange	P-OT	7			
ack 1 8	1	Black	Orange	N-OT	8			
ed 1 9	1	Red	Gray	/DEC	9			
ack 1 10	1	Black	Gray	/EXT1	10			
ed 2 11	2	Red	Blue	/EXT2	11			
ack 2 12	2	Black	Blue	/EXT3	12			
ed 2 13	2	Red	Pink	/S10	13			
ed 2 14	2	Red	Green	BAT (+)	14			
ack 2 15	2	Black	Green	BAT ()	15			
ack 2 16	2	Black	Pink	SG	16			
ed 2 17	2	Red	Orange	PAO	17			
ack 2 18	2	Black	Orange	/PAO	18			
ed 2 19	2	Red	Gray	PBO	19			
ack 2 20	2	Black	Gray	/PBO	20			
ed 3 21	3	Red	Blue	PCO	21			
ack 3 22	3	Black	Blue	/PCO	22			
ed 3 23	3	Red	Pink	/SO2+	23			
ack 3 24	3	Black	Pink	/SO2-	24			
ed 3 25	3	Red	Green	/SO3+	25			
ack 3 26	3	Black	Green	/SO3-	26			

#### • Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CSI02-\_-E Cable

wires.

# (5) Digital Operator Converter Cable for CN3

(Model: JZSP-CVS05-A3-E) A converter cable is required to use  $\Sigma$ -III series digital operators (model: JUSP-OP05A) for  $\Sigma$ -V series SERVOPACKs.

• External Dimensions (Units: mm)



(Honda Tsushin Kogyo Co., Ltd.)

# 

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

(Units: mm)



Connector: HDR-E14MAG1+(Honda Tsushin Kogyo Co., Ltd.) Case: HDR-E14LPA5(Honda Tsushin Kogyo Co., Ltd.)

#### (6) Digital Operator Converter Cable for CN3 (Model: JZSP-CVS07-A3-E)

A converter cable is required when connecting the digital operator cable while using MECHATROLINK-III Communications SERVOPACK.

2-M3 Screws, Depth 5

(For mounting digital operator)

• External Dimensions (Units: mm)



Connector: HDR-E14FAG1+ (Honda Tsushin Kogyo Co., Ltd.) Cover: HDR-E14LPHD+ (Honda Tsushin Kogyo Co., Ltd.) Connector: HDR-E14MAG1+ (Honda Tsushin Kogyo Co., Ltd.) Cover: HDR-E14LPH (Honda Tsushin Kogyo Co., Ltd.)

# **Selecting Cables**

SGDV-

(7) Connection Cable for Personal Computer for CN7 (Model: JZSP-CVS06-02-E)

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• External Dimensions (Units: mm)



 IMPORTANT
 Use a cable specified by Yaskawa.

 When using other cables, operation cannot be guaranteed.

# (8) MECHATROLINK-III Communications Cable for CN6 (Model: JEPMC-W6012--E)

• External Dimensions (Units: mm)

#### Cables with Connectors at Both Ends



Model	Cable Length (L)
JEPMC-W6012-A2-E	0.2 m
JEPMC-W6012-A5-E	0.5 m
JEPMC-W6012-01-E	1 m
JEPMC-W6012-02-E	2 m
JEPMC-W6012-03-E	3 m
JEPMC-W6012-04-E	4 m
JEPMC-W6012-05-E	5 m
JEPMC-W6012-10-E	10 m
JEPMC-W6012-20-E	20 m
JEPMC-W6012-30-E	30 m
JEPMC-W6012-50-E	50 m

(9) MECHATROLINK-III Communications Cable for CN6 (Model: JEPMC-W6013--E)

• External Dimensions (Units: mm)

Cables with Connectors at Both Ends (With Ferrite Core)



Model	Cable Length (L)
JEPMC-W6013-10-E	10 m
JEPMC-W6013-20-E	20 m
JEPMC-W6013-30-E	30 m
JEPMC-W6013-50-E	50 m
JEPMC-W6013-75-E	75 m

(10) MECHATROLINK-III Communications Cable for CN6 (Model: JEPMC-W6014-□-E)

• External Dimensions (Units: mm)

Cable with Loose Wire at One End



Model	Cable Length (L)
JEPMC-W6014-A5-E	0.5 m
JEPMC-W6014-01-E	1 m
JEPMC-W6014-03-E	3 m
JEPMC-W6014-05-E	5 m
JEPMC-W6014-10-E	10 m
JEPMC-W6014-30-E	30 m
JEPMC-W6014-50-E	50 m

IMPORTANT Use a MECHATROLINK-III communications cable specified by Yaskawa. When using other cables, noise resistance may be reduced, and operation cannot be guaranteed.



# **Selecting Cables**

- (11) 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-1
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.

#### (12) 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	-

# **SERVOPACKs** with Additional Options SGDV-(For Rotary Servomotors) SGDV-(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 SGDV-OZA01A (metal bar, mounting screws and cover).



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# 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/Externa						
Main Circuit (Single Phase)		220 to 230 VAC +10% to -15% 50/60 Hz					0 Hz
Control Circuit (Single Phase)	ingle Phase) 220 to 230 VAC +10% to -15% 50/60 I						0 Hz

\*1: Single-phase 200 VAC SERVOPACKs are also available (base-mounted SERVOPACK model: SGDV-120A A008000, rack-mounted SERVOPACK model:

SGDV-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	C)	Three-phase 200 to 200 VAC +10% to -15% 50/60 Hz														
Control Circuit (Three-phase 200 V	ntrol Circuit (Three-phase 200 VAC)				Single-p	hase 20	00 to 20	0 VAC +	10% to	-15% 5	50/60 Hz	2				

#### 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>ms</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%										
Main Circuit (Three-phase 400 VAC) Control Circuit (24 VDC)	Three-phase 380 to 480 VAC +10% to -15% 50/60 Hz           24 VDC ±15%										

Note: The entire over voltage category is III.

10000

10

1

100

# 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.)				
	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>				
Operating Conditions	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				



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	
	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.)	
Performance		Load Fluctuation	0% to 100% load: ±0.01% max. (at rated speed)	
	Regulation <sup>1</sup>	Voltage Fluctuation	Rated voltage: ±10% : 0% (at rated speed)	
		Temperature Fluctuation	25±25°C : ±0.1% max. (at rated speed)	
	Torque Control To	lerance (Repeatability)	ce (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	Fixed Output	Servo alarm (ALM	Л)
		Output Signals which can be allocated	No. of Channels	3 channels
			Functions	Positioning completion (/COIN)     Speed limit detection (/VLT)     Speed coincidence detection (/V-CMP)     Servomotor rotation detection (/TGON)     Servo ready (/S-RDY)     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 SGDV-R70A, -R90A, -1R6A, -2R8A: External regenerative resistor (optional) 200 VAC SGDV-470A, -550A, -590A, -780A: External regenerative resistor unit (optional) 200 VAC models other than shown above: Built-in regenerative resistor 400 VAC SGDV-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 Output		Input	/HWBB1, /HWBB2: Baseblock signal for power module	
		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:

Speed regulation = No-load motor speed - Total load motor speed × 100% Rated motor speed

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.
# SGDV-DEL/E5

# **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	SERVOPACK Model SGDV	Power Supply Capacity	Output Current	Main Circuit Power Loss	Regenerative Resistor Power Loss	Control Circuit Power Loss	Total Power Loss
	kW		kVA	А		W	W	
Single-phase	0.05	R70A	0.2	0.66	5.2			22.2
	0.1	R90A	0.3	0.91	7.4			24.4
	0.2	1R6A	0.7	1.6	13.7	_	17	30.7
200 V	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
	0.05	R70A	0.2	0.66	5.1			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		17	41.0
	0.5	3R8A	1.4	3.8	20.1			45.1
Three-phase 200 V	0.75	5R5A	1.6	5.5	43.8	8		68.8
	1.0	7R6A	2.3	7.6	53.6			78.6
	1.5	120A	3.2	11.6	65.8	10		97.8
	2.0	180A	4	18.5	111.9	16	22	149.9
	3.0	200A	5.9	19.6	113.8	10		161.4
	5.0	330A	7.5	32.9	263.7	36	27	326.7
	6.0	470A	10.7	46.9	279.4	<b>(180)</b> <sup>*1</sup>	33	312.4
	7.5	550A	14.6	54.7	357.8			390.8
	11	590A	21.7	58.6	431.7	(350) <sup>*2</sup>	48	479.7
	15	780A	29.6	78	599.0		40	647.0
	0.5	1R9D	1.1	1.9	24.6			59.6
	1.0	3R5D	2.3	3.5	46.1	14	21	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
Three-phase	3.0	120D	7.1	11.9	108.7	20	25	161.7
400 V	5.0	170D	11.7	16.5	161.1	36	24	221.1
	6.0	210D	12.4	20.8	172.7	(1 90)*3	07	199.7
	7.5	260D	14.4	25.7	218.6	(100) °	21	245.6
	11	280D	21.9	28.1	294.6	(250)*4	20	324.6
	15	370D	30.6	37.2	403.8	(350) *	30	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 SGDV470A, 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.

#### YASKAWA **<b>Z-V** SERIES



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



Name		Length	Order No.	Specifications	Details
	Connector Kit		JZSP-CSI9-2-E	Soldered	(1)
CN1 Cables for I/O Signals	Connector Terminal Converter Unit		JUSP-TA26P-E	Terminal Block and 0.5 m Connection Cable	(2)
		1 m	JZSP-CSI02-1-E		
	at One End	2 m	JZSP-CSI02-2-E		(3)
		3 m	JZSP-CSI02-3-E		
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)
CN7 Connection Cables for Personal Computer		2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends	(6)
CN5 Cables for Analog Monitor		1 m	JZSP-CA01-E		(7)
CN8 Cables for Safety Functions	Cables with Connector <sup>2</sup> 3 m		JZSP-CVH03-03-E JZSP-CVH03-03-E-G3	E••••••••••••••••••••••••••••••••••••	(8)
	afety 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		

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

\*2 : 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.

\*3 : Use the connector kit when you make cables yourself.

#### (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	Case		Connector	
Model	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)



Pin No.1 Pin No.2 Pin No.12 Pin No.13





(2) Connector Terminal Converter Unit for CN1





· 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-CS102-[]-E Cable on the next page.

#### YASKAWA ∑-V SERIES



# **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

	0ED		(End			Co	Host	Inc
	JEN	Wire		arking	1	00	Lood	1
Pin No.	Signal	Color	Color	Dots			Marker	
1	/BK+	Blue	Red	1		\	1	1
2	/BK-	Blue	Black	1			2	1
3	ALM+	Pink	Red	1		\	3	1
4	ALM-	Pink	Black	1			4	1
5	-	Green	Red	1			5	1
6	+24VIN	Green	Black	1			6	1
7	P-OT	Orange	Red	1	<b> </b> ∔		7	1
8	N-OT	Orange	Black	1			8	1
9	/DEC	Gray	Red	1			9	1
10	/EXT1	Gray	Black	1	<b> </b> +		10	1
11	/EXT2	Blue	Red	2			11	
12	/EXT3	Blue	Black	2			12	1
13	/SI0	Pink	Red	2			13	1
14	BAT (+)	Pink	Black	2		\	14	1
15	BAT ()	Green	Red	2			15	1
16	SG	Green	Black	2			16	1
17	PAO	Orange	Red	2	+++	\	17	1
18	/PAO	Orange	Black	2		^	18	1
19	PBO	Gray	Red	2		./	19	1
20	/PBO	Gray	Black	2		<u> </u>	20	1
21	PCO	Blue	Red	3		\	21	1
22	/PCO	Blue	Black	3			22	1
23	/SO2+	Pink	Red	3		\	23	1
24	/SO2-	Pink	Black	3		<u></u>	24	]
25	/SO3+	Green	Red	3		\	25	1
26	/SO3-	Green	Black	3			26	1
					- ~ ; ;	 	Represents	5

twisted-pair wires.

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

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

· External Dimensions (Units: mm)



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



Connector: HDR-E14MAG1+(Honda Tsushin Kogyo Co., Ltd.) Case: HDR-E14LPA5(Honda Tsushin Kogyo Co., Ltd.)





(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)



\*: Manufactured by Hirose Electric Corporation.

Black Black Black 2 White Red

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)



(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	Black
1)	4	/HWBB1+	White	Red
	5	/HWBB2-	Gray	Black
	6	/HWBB2+	Gray	Red
	7	EDM1-	Orange	Black
	8	EDM1+	Orange	Red

#### 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	-



SERVOPACK external dimensions are described for each model, without option module and with option module, in the following pages.

SERVOPACK	Mounting	Without Option Module	With Option Module
Analog Voltage/Pulse Train Reference SERVOPACK,	Base-mounted	Page 274 to 279	Page 286 to 293
MECHATROLINK-I Communications Reference SERVOPACK,	Rack-mounted*	Page 280 to 285	Page 294 to 301
Command Online Attachable Time SEDVODACK	Base-mounted	-	Page 286 to 293
	Rack-mounted*	-	Page 294 to 301

\*: SERVOPACKs of 6 kW or more are duct-ventilated.

#### Dimensional Drawings

All drawings on the following pages show the exterior of the analog voltage/pulse train SERVOPACK (page 274 to 301) as examples. Refer to the drawings on this page for information (dimensions of connections and front covers) on specific SERVOPACK models.





• Command Option Attachable Type SERVOPACK



MECHATROLINK-I Communications
Reference SERVOPACK







#### Connector

Port	Model	Pin	Manufacturer
CN1*1	10250-52A2PL	50	Sumitomo 3M Ltd.
CN1*2	10226-52A2PL	26	Sumitomo 3M Ltd.
CN2	53984-0671	6	Molex Japan Co., Ltd.
CN3	HDR-EC14LFDTN-SLE-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
CN6	1903815-1	8	Tyco Electronics AMP K.K.
CN6A	1981386-1	8	Tyco Electronics AMP K.K.
CN6B	1981386-1	8	Tyco Electronics AMP K.K.
CN7	MNC23-5K5H00	5	ADVANCED-CONNECTEK INC.
CN8	1981080-1	8	Tyco Electronics AMP K.K.

\*1: For Analog Voltage/Pulse Train Reference Type SERVOPACKs

\*2: For MECHATROLINK-I//III Communications Reference Type SERVOPACKs and INDEXER Module Type SERVOPACKs.

Note: The connectors above or their equivalents are used for SERVOPACKs.

Note: Base-mounted SERVOPACKs can be mounted on a rack by using metal fittings for rack-mounting. Contact your Yaskawa representative for details.

#### -v SERIES Σ-v SERIES -v S

# **SERVOPACK External Dimensions**

# External Dimensions Units: mm (Without Option Module)

#### Base-Mounted SERVOPACKs

(1) Single-phase 100 VAC, Model: SGDV-R70F A, -R90F A, and -2R1F A





Approx. Mass: 1.0 kg

(2) Single-phase 100 VAC, Model: SGDV-2R8F





Approx. Mass: 1.5 kg

(3) Three-phase 200 VAC, Model: SGDV-R70A A, -R90A A, and -1R6A A





g Hole Diagram Approx. Mass: 0.9 kg

### Base-Mounted SERVOPACKs

(4) Three-phase 200 VAC, Model: SGDV-2R8A





Approx. Mass: 1.0 kg

(5) Three-phase 200 VAC, Model: SGDV-3R8A A, -5R5A A, and -7R6A A

Air Flow





Approx. Mass: 1.5 kg

#### (6) Three-phase 200 VAC, Model: SGDV-120A







Approx. Mass: 2.4 kg

(7) Single-phase 200 VAC, Model: SGDV-120A 1A008000 (1.5kW, single-phase input) Three-phase 200 VAC, Model: SGDV-180A A and -200A A







Approx. Mass: 2.8 kg

(8) Three-phase 200 VAC, Model: SGDV-330A





**SERVOPACK External Dimensions** 

# Base-Mounted SERVOPACKs

(9) Three-phase 200 VAC, Model: SGDV-470A A and -550A A



Mounting Hole Diagram

Approx. Mass: 10.2 kg

(10) Three-phase 200 VAC, Model: SGDV-590A A and -780A A



Approx. Mass: 21.3 kg



(11) Three-phase 400 VAC, Model: SGDV-1R9D A, -3R5D A, and -5R4D A

Approx. Mass: 2.7 kg

#### (12) Three-phase 400 VAC, Model: SGDV-8R4D A and -120D A







Mounting Hole Diagram

Approx. Mass: 3.7 kg

#### (13) Three-phase 400 VAC, Model: SGDV-170D







# Base-Mounted SERVOPACKs

(14) Three-phase 400 VAC, Model: SGDV-210D A and -260D A



Mounting Hole Diagram

Approx. Mass: 11.3 kg

(15) Three-phase 400 VAC, Model: SGDV-280D A and -370D A



Mounting Hole Diagram

Approx. Mass: 16.2 kg

#### Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated) (1) Single-phase 100 VAC, Model: SGDV-R70F A001, -R90F A001, and -2R1F A001





Mounting Hole Diagram

(2) Single-phase 100 VAC, Model: SGDV-2R8F A001

Approx. Mass: 1.1 kg



Mounting Hole Diagram Approx. Mass: 1.5 kg

(3) Three-phase 200 VAC, Model: SGDV-R70A A001, -R90A A001, and -1R6A A001



Approx. Mass: 0.9 kg

Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)
 (4) Three-phase 200 VAC, Model: SGDV-2R8A A001



Approx. Mass: 1.0 kg

(5) Three-phase 200 VAC, Model: SGDV-3R8A A001, -5R5A A001, and -7R6A A001



Approx. Mass: 1.5 kg

#### (6) Three-phase 200 VAC, Model: SGDV-120A



Approx. Mass: 2.5 kg



(7) Three-phase 200 VAC, Model: SGDV-180A A001 and -200A A001





Mounting Hole Diagram

Approx. Mass: 3.1 kg







Approx. Mass: 5.0 kg

Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)
 (9) Three-phase 200 VAC, Model: SGDV-470A A001 and -550A A001 (duct-ventilated)



Approx. Mass: 8.5 kg

#### (10) Three-phase 200 VAC, Model: SGDV-590A A001 and -780A A001 (duct-ventilated)



Mounting Hole Diagram

Approx. Mass: 16.3 kg





Approx. Mass: 2.7 kg

(12) Three-phase 400 VAC, Model: SGDV-8R4D A001 and -120D A001







Approx. Mass: 3.7 kg

(13) Three-phase 400 VAC, Model: SGDV-170D A001







Mounting Hole Diagram

Approx. Mass: 5.7 kg 284

Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated) (14) Three-phase 400 VAC, Model: SGDV-210D A001 and -260D A001 (duct-ventilated)



Mounting Hole Diagram

Approx. Mass: 8.1 kg





Mounting Hole Diagram Approx. Mass: 13.4 kg

#### Base-Mounted SERVOPACKs

(1) Single-phase 100 VAC,

Model: SGDVR70F A000000 A, SGDVR90F A000000 A, and SGDV2R1F A000000











Mounting Hole Diagram

Approx. Mass: 1.0 kg\*

#### (2) Single-phase 100 VAC, Model: SGDV2R8F A000000







Approx. Mass: 1.5 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows. • INDEXER Module: 0.2 kg

Fully-closed Module: 0.1 kg

# Base-Mounted SERVOPACKs

(3) Three-phase 200 VAC,

Model: SGDVR70A A000000 SGDVR90A A000000 And SGDV1R6A A000000





Mounting Hole Diagram

2-M4 Screw Holes

Approx. Mass: 0.9 kg\*

(4) Three-phase 200 VAC, Model: SGDV2R8A A000000

Air Flow



Air Flow





Approx. Mass: 1.0 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows. • INDEXER Module: 0.2 kg • Fully-closed Module: 0.1 kg

YASKAWA ∑-V SERIES

# **SERVOPACK External Dimensions**

# External Dimensions Units: mm (With Option Module)

(5) Three-phase 200 VAC,

Model: SGDV3R8A A000000 A SGDV5R5A A000000 A and SGDV7R6A A000000 A



(6) Three-phase 200 VAC, Model: SGDV120A A000000







Approx. Mass: 2.4 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows.

INDEXER Module: 0.2 kg

Fully-closed Module: 0.1 kg

#### Base-Mounted SERVOPACKs

(7) Single-phase 200 VAC, Model: SGDV120A 1A008000 (1.5kW, single-phase input) Three-phase 200 VAC, Model: SGDV180A A000000 and SGDV200A A000000



(8) Three-phase 200 VAC, Model: SGDV330A A000000



\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows. • INDEXER Module: 0.2 kg • Fully-closed Module: 0.1 kg



(9) Three-phase 200 VAC, Model: SGDV470A A000000 and SGDV550A A000000

(10) Three-phase 200 VAC, Model: SGDV590A A000000 and SGDV780A A000000



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Approx. Mass: 21.3 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows.

INDEXER Module: 0.2 kg
 Fully-closed Module: 0.1 kg

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# Base-Mounted SERVOPACKs

(11) Three-phase 400 VAC,

Model: SGDV1R9D A000000 A SGDV3R5D A000000 A and SGDV5R4D A000000



(12) Three-phase 400 VAC, Model: SGDV8R4D A000000 and SGDV120D A000000







4-M5

Approx. Mass: 3.7 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows. • INDEXER Module: 0.2 kg

• Fully-closed Module: 0.1 kg

(40)

Cooling Fan

(13) Three-phase 400 VAC, Model: SGDV170D A000000



(14) Three-phase 400 VAC, Model: SGDV210D A000000 and SGDV260D A000000



Approx. Mass: 11.3 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows.

INDEXER Module: 0.2 kg

• Fully-closed Module: 0.1 kg

### Base-Mounted SERVOPACKs

(15) Three-phase 400 VAC, Model: SGDV280D A000000 and SGDV370D A000000



\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows.

ox. mass of option modules a
 INDEXER Module: 0.2 kg

Fully-closed Module: 0.2 kg

#### Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated) (1) Single-phase 100 VAC,

Model: SGDVR70F A001000 A SGDVR90F A001000 A and SGDV2R1F A001000







Approx. Mass: 1.1 kg\*

(2) Single-phase 100 VAC, Model: SGDV2R8F A001000





\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows. • INDEXER Module: 0.2 kg

Fully-closed Module: 0.1 kg

#### Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated) (3) Three-phase 200 VAC,

Model: SGDVR70A A001000 A SGDVR90A A001000 A and SGDV1R6A A001000







Approx. Mass: 0.9 kg\*

(4) Three-phase 200 VAC, Model: SGDV2R8A A001000









Approx. Mass: 1.0 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows.

INDEXER Module: 0.2 kg

• Fully-closed Module: 0.1 kg

# YASKAWA ∑-V SERIES

# **SERVOPACK External Dimensions**

# External Dimensions Units: mm (With Option Module)

(5) Three-phase 200 VAC,

Model: SGDV3R8A A001000 A, SGDV5R5A A001000 A, and SGDV7R6A A001000







Mounting Hole Diagram

Approx. Mass: 1.5 kg\*

(6) Three-phase 200 VAC, Model: SGDV120A A001000







Approx. Mass: 2.5 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows. • INDEXER Module: 0.2 kg

Fully-closed Module: 0.1 kg

Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)
 (7) Three-phase 200 VAC, Model: SGDV180A A001000 And SGDV200A A001000



#### (8) Three-phase 200 VAC, Model: SGDV330A A001000





\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows. • INDEXER Module: 0.2 kg • Fully-closed Module: 0.1 kg

# **SERVOPACK External Dimensions**

# External Dimensions Units: mm (With Option Module)

#### (9) Three-phase 200 VAC, Model: SGDV470A A001000 and SGDV550A A001000 (duct-ventilated)



Approx. Mass: 8.5 kg\*

#### (10) Three-phase 200 VAC, Model: SGDV590A A001000 and SGDV780A A001000 (duct-ventilated)









Approx. Mass: 16.3 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows.

• INDEXER Module: 0.2 kg

• Fully-closed Module: 0.1 kg

 Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated) (11) Three-phase 400 VAC,

Model: SGDV1R9D A001000 A SGDV3R5D A001000 A and SGDV5R4D A001000



(12) Three-phase 400 VAC, Model: SGDV8R4D A001000 and SGDV120D A001000



 Approx. mass of option modules are not included in this value Approx. mass of option modules are as follows.
 INDEXER Module: 0.2 kg
 Fully-closed Module: 0.1 kg



(13) Three-phase 400 VAC, Model: SGDV170D A001000

(14) Three-phase 400 VAC, Model: SGDV210D A001000 and SGDV260D A001000 (duct-ventilated)



INDEXER Module: 0.2 kg

• Fully-closed Module: 0.1 kg

• Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(15) Three-phase 400 VAC, Model: SGDV280D A001000 and SGDV370D A001000 (duct-ventilated)



Approx. Mass: 13.4 kg\*

\*: Approx. mass of option modules are not included in this value. Approx. mass of option modules are as follows.

INDEXER Module: 0.2 kg

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• Fully-closed Module: 0.1 kg

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**SERVOPACK External Dimensions**