Analog Voltage/Pulse Train Reference Type SERVOPACKs

SGDV-□□□□01

(For Rotary Servomotors)

SGDV-□□□□05

(For Linear Servomotors)

Model Designations

S G D V- R70 A 01 A 000 00 0

Σ-V Series SGDV SERVOPACK	1st+2nd+3rd digits	4th digit	5th+6th digits	7th digit	8th+9th+10th digits	11th+12th digits	13th digit

1st+2nd+3rd digits Current

Voltage	Code	Applicable Servomotor Max. Capacity kW
Three-phase 200 V	R70*1	0.05
	R90*1	0.1
	1R6*1	0.2
	2R8*1	0.4
	3R8	0.5
	5R5*1	0.75
	7R6	1.0
	120*2	1.5
	180	2.0
	200	3.0
	330	5.0
	470	6.0
	550	7.5
	590	11
	780	15
Three-phase 400 V	1R9	0.5
	3R5	1.0
	5R4	1.5
	8R4	2.0
	120	3.0
	170	5.0
	210	6.0
	260	7.5
	280	11
	370	15

4th digit Power Supply Voltage

Code	Specifications
A	Three-phase 200 VAC
D	Three-phase 400 VAC

5th+6th digits Interface

Code	Specifications
01	Analog voltage/pulse train reference type (for rotary servomotors)
05	Analog voltage/pulse train reference type (for linear servomotors)

7th digit Design Revision Order

A, B...

8th+9th+10th digits Options (hardware)

Code	Specifications
000	Base-mounted (standard)
001	Rack-mounted*3
002	Varnished
003	Rack-mounted*3 and Varnished
008	Single-phase 200 VAC input (Model: SGDV-120A01A008000)
020	Dynamic brake (400 V SERVOPACKs only)

11th+12th digits Options (software)

Code	Specifications
00	Standard

13th digit Options (parameter)

Code	Specifications
0	Standard

*1: These amplifiers can be powered with single or three-phase.
*2: Single-phase 200 VAC SERVOPACKs are also available. (Model: SGDV-120A01A008000)
*3: SERVOPACKs of 6 kW or more are duct-ventilated.
Note: If the option codes digits 8 to 13 are all zeros, they are omitted.

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.

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					

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

Three-phase 200 V

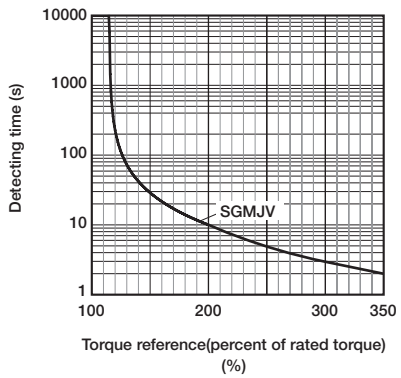
SERVOPACK Model SGDV-□□□□		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6	78
Max. 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 external				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														

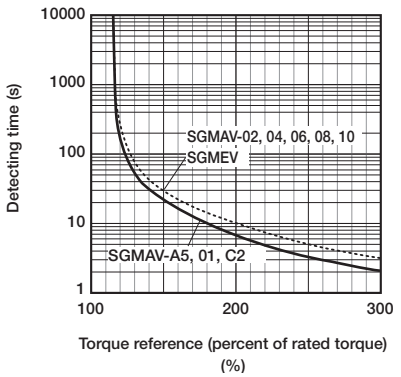
Three-phase 400 V

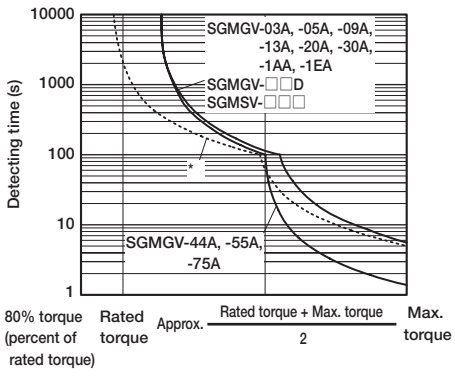
SERVOPACK Model SGDV-□□□□		1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Applicable Servomotor Max. Capacity	kW	0.5	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Max. Output Current	Arms	5.5	8.5	14	20	28	42	55	65	70	85
Regenerative Resistors		Built-in 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 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

Items			Specifications	
Control Method			IGBT PWM control, sine-wave driven	
Feedback	Rotary Servomotors		Serial encoder: 13-bit (incremental encoder) : 17-bit (incremental/absolute encoder) : 20-bit (incremental/absolute encoder)	
	With Linear Servomotors		Absolute linear scale (The signal resolution varies depending on the absolute linear scale.) Incremental linear scale (The signal resolution varies depending on the incremental linear scale or serial converter unit.)	
Operating Conditions	Ambient 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/s²	
	Shock Resistance		19.6 m/s²	
	Protection Class		IP10	An environment that satisfies the following conditions. • Free of corrosive or flammable gases • Free of exposure to water, oil, or chemicals • Free of dust, salts, or iron dust
	Pollution Degree		2	
	Altitude		1000 m or less	
	Others		Do not use SERVOPACKs in the following locations: • Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity	
Applicable Standards			UL508C EN50178, EN55011/A2 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	
Performance	Speed Control Range		1:5000 (The lower limit of the speed control range must be lower than the point at which the rated torque does not cause the servomotor to stop.)	
	Speed Regulation*1	Load Fluctuation	0% to 100% load: ±0.01% max. (at rated speed)	
		Voltage Fluctuation	Rated voltage: ±10% : 0% (at rated speed)	
		Temperature Fluctuation	25±25°C : ±0.1% max. (at rated speed)	
	Torque Control Tolerance (Repeatability)		±1%	
	Soft Start Time Setting		0 to 10 s (can be set individually for acceleration and deceleration.)	
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 computer (can be connected with SigmaWin+.)	
		Communications Standard	Compliant with USB1.1 standard (12 Mbps)	
Display			CHARGE indicator	
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 a servo alarm or overtravelling (OT) occurs, or when the power supply for the main circuit or servomotor is OFF.	
Regenerative Processing			Included (For more information, 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 Functions			Overcurrent, Overvoltage, low voltage, overload, regeneration error , etc.	
Utility Functions			Gain adjustment, alarm history, JOG operation, origin search, etc.	
Safety Functions		Input	/HWBB1, /HWBB2: Baseblock signal for power module	
		Output	EDM1: Status monitor (fixed output) of built-in safety circuit	
		Applicable Standards*2	EN954 category 3 IEC61508 SIL2	
Option Module			Fully-closed Module	

*1: Speed regulation is defined as follows:

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

The motor speed may change due to voltage 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.

Specifications

● Rotary Servomotors

Items				Specifications	
I/O Signal	Encoder Output Pulses			Phase A, phase B, phase C: line driver output The number of dividing pulse: Any setting ratio is available.	
	Sequence Input		Fixed Input	SEN signal	
			Input Signals which can be allocated	Number of Channels	7 channels
				Functions	• 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) • Control selection (/C-SEL) • Zero clamping (/ZCLAMP) • Alarm reset (/ALM-RST) • Reference pulse inhibit (/INHIBIT) • Forward external torque limit (/P-CL), reverse external torque limit (/N-CL) • Gain selection (/G-SEL) Positive and negative logic can be changed.
	Sequence Output		Fixed Output	Servo alarm (ALM), alarm code (ALO1, ALO2, ALO3) outputs	
			Output Signals which can be allocated	Number of Channels	3 channels
				Functions	• Positioning completion (/COIN) • Speed limit detection (/VLT) • Speed coincidence detection (/V-CMP) • Brake (/BK) • Rotation detection (/TGON) • Warning (/WARN) • Servo ready (/S-RDY) • Near (/NEAR) • Torque limit detection (/CLT) Positive and negative logic can be changed.
Panel Operator			Display Unit	Five 7-segment LEDs	
			Switch	Four push switches	
Torque Control	Input Signals		Reference Voltage	• Max. input voltage: ±12 V (forward torque reference with positive reference) • Factory setting: 3 VDC at rated torque (Input gain setting can be changed.)	
			Input Impedance	About 14 kΩ	
			Circuit Time Constant	16 μs	
Speed Control	Soft Start Time Setting			0 to 10 s (can be set individually for acceleration and deceleration.)	
	Input Signals		Reference Voltage	• Max. input voltage: ±12 V (forward speed reference with positive reference) • Factory setting: 6 VDC at rated speed (Input gain setting can be changed.)	
			Input Impedance	About 14 kΩ	
			Circuit Time Constant	30 μs	
	Internal Set Speed Control		Rotation Direction Selection	With P control signal	
			Speed Selection	With forward/reverse external torque limit signal (speed 1 to 3 selection). Servomotor stops or another control method is used when both are OFF.	
Position Control	Feedforward Compensation			0 to 100%	
	Positioning Completed Width Setting			0 to 1073741824 reference units	
	Input Signals	Reference Pulse	Type	Select one of them: Sign + pulse train, CW + CCW pulse train, or two-phase pulse train with 90°phase differential	
			Form	For line driver, open collector	
			Max. Input Pulse Frequency*	Line driver Sign + pulse train, CW + CCW pulse train: 4 Mpps Two-phase pulse train with 90°phase differential:1 Mpps Open Collector Sign + pulse train, CW + CCW pulse train: 200 kpps Two-phase pulse train with 90°phase differential: 200 kpps	
		Clear Signal		Position error clear For line driver, 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.

Specifications

● Linear Servomotors

Items				Specifications
I/O Signal	Encoder Output Pulses			Phase A, phase B, phase C: line driver output The number of dividing pulse: Any setting ratio is available.
	Sequence Input	Fixed Input		SEN signal
		Input Signals which can be allocated	Number of Channels	7 channels
			Functions	• 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) • Control selection (/C-SEL) • Zero clamping (/ZCLAMP) • Alarm reset (/ALM-RST) • Reference pulse inhibit (/INHIBIT) • Forward external force limit (/P-CL), Reverse external force limit (/N-CL) • Gain selection (/G-SEL) • Polarity detection (P-DET) Positive and negative logic can be changed.
	Sequence Output	Fixed Output		Servo alarm (ALM), alarm code (ALO1, ALO2, ALO3) outputs
		Output Signals which can be allocated	Number of Channels	3 channels
			Functions	• Positioning completion (/COIN) • Speed limit detection (/VLT) • Speed coincidence detection (/V-CMP) • Brake (/BK) • Servomotor movement detection (/TGON) • Warning (/WARN) • Servo ready (/S-RDY) • Near (/NEAR) • Force limit detection (/CLT) Positive and negative logic can be changed.
Panel Operator		Display Unit		Five 7-segment LEDs
		Switch		Four push switches
Force Control	Input Signals	Reference Voltage		• Max. input voltage: ±12 V (forward force reference with positive reference) • Factory setting: 3 VDC at rated force (Input gain setting can be changed.)
		Input Impedance		About 14 kΩ
		Circuit Time Constant		16 μs
Speed Control	Soft Start Time Setting			0 to 10 s (can be set individually for acceleration and deceleration.)
	Input Signals	Reference Voltage		• Max. input voltage: ±12 V (forward speed reference with positive reference) • Factory setting: 6 VDC at rated speed (Input gain setting can be changed.)
		Input Impedance		About 14 kΩ
		Circuit Time Constant		30 μs
	Internal Set Speed Control	Movement Direction Selection		With P control signal
		Speed Selection		With forward/reverse external force limit signal (speed 1 to 3 selection). Servomotor stops or another control method is used when both are OFF.
Position Control	Feedforward Compensation			0 to 100%
	Positioning Completed Width Setting			0 to 1073741824 reference units
	Input Signals	Reference Pulse	Type	Select one of them: Sign + pulse train, forward + reverse pulse train, two-phase pulse train with 90°phase differential
			Form	For line driver, open collector
			Max. Input Pulse Frequency*	Line driver Sign + pulse train, forward + reverse pulse train: 4 Mpps Two-phase pulse train with 90°phase differential:1 Mpps Open Collector Sign + pulse train, forward + reverse pulse train: 200 kpps Two-phase pulse train with 90°phase differential: 200 kpps
		Clear Signal		Position error clear For line driver, 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.

Power Supply Capacities and Power Losses

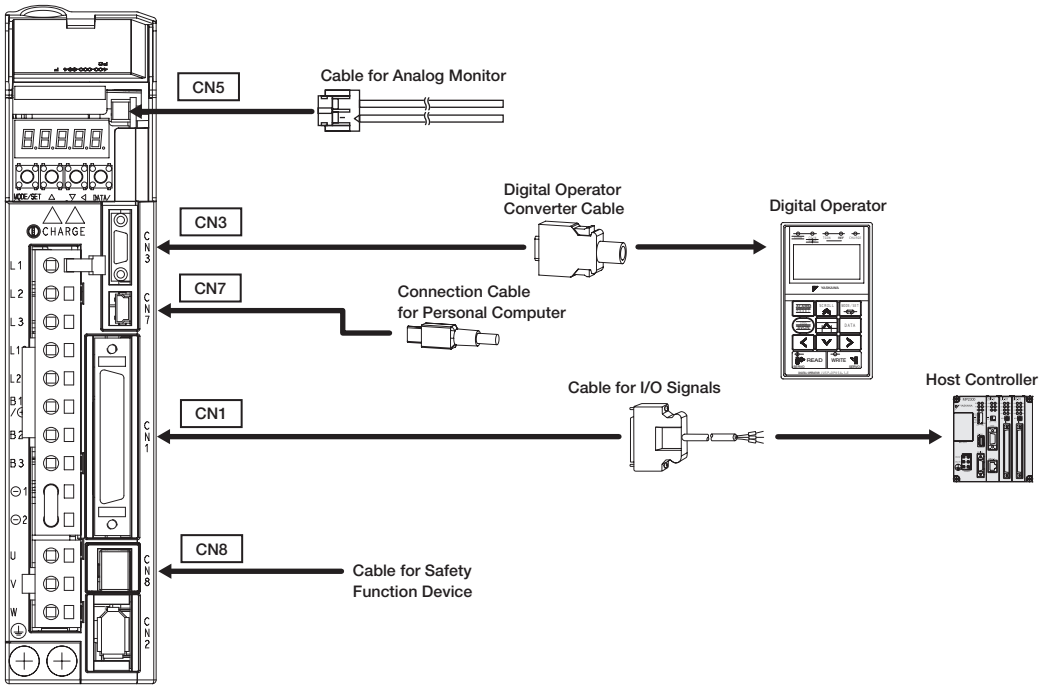
The following table shows SERVOPACK's power supply capacities and power losses at the rated output.

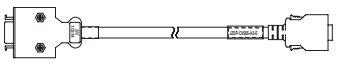
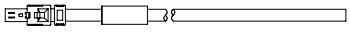
Main Circuit Power Supply	Applicable Servomotor Max. Capacity kW	SERVOPACK Model SGDV-	Power Supply Capacity kVA	Output Current Arms	Main Circuit Power Loss W	Regenerative Resistor Power Loss W	Control Circuit Power Loss W	Total Power Loss W
Single-phase 200 V	0.05	R70A	0.2	0.66	5.2	—	17	22.2
	0.1	R90A	0.3	0.91	7.4			24.4
	0.2	1R6A	0.7	1.6	13.7			30.7
	0.4	2R8A	1.2	2.8	24.9			41.9
	0.75	5R5A	1.9	5.5	52.7	8		77.7
	1.5	120A	4	11.6	68.2	10	22	100.2
Three-phase 200 V	0.05	R70A	0.2	0.66	5.1	—	17	22.1
	0.1	R90A	0.3	0.91	7.3			24.3
	0.2	1R6A	0.6	1.6	13.5			30.5
	0.4	2R8A	1	2.8	24.0			41.0
	0.5	3R8A	1.4	3.8	20.1	8		45.1
	0.75	5R5A	1.6	5.5	43.8			68.8
	1.0	7R6A	2.3	7.6	53.6			78.6
	1.5	120A	3.2	11.6	65.8	10	22	97.8
	2.0	180A	4	18.5	111.9	16		149.9
	3.0	200A	5.9	19.6	113.8			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	33	312.4
	7.5	550A	14.6	54.7	357.8	(350)*2		390.8
	11	590A	21.7	58.6	431.7		48	479.7
	15	780A	29.6	78	599.0			647.0
Three-phase 400 V	0.5	1R9D	1.1	1.9	24.6	14	21	59.6
	1.0	3R5D	2.3	3.5	46.1			81.1
	1.5	5R4D	3.5	5.4	71.3			106.3
	2.0	8R4D	4.5	8.4	77.9	28	25	130.9
	3.0	120D	7.1	11.9	108.7			161.7
	5.0	170D	11.7	16.5	161.1	36	24	221.1
	6.0	210D	12.4	20.8	172.7	(180)*3	27	199.7
	7.5	260D	14.4	25.7	218.6			245.6
	11	280D	21.9	28.1	294.6	(350)*4	30	324.6
	15	370D	30.6	37.2	403.8			433.8

*1: For the optional JUSP-RA04-E regenerative resistor unit.
*2: For the optional JUSP-RA05-E regenerative resistor unit.
*3: For the optional JUSP-RA18-E regenerative resistor unit
*4: For the optional JUSP-RA19-E regenerative resistor unit.
Notes: 1 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.

Selecting Cables

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



Name		Length	Order No.	Specifications	Details
CN1 Cables for I/O Signals	Connector Kit		JZSP-CSI9-1-E	Soldered 	(1)
	Connector Terminal Converter Unit	0.5 m	JUSP-TA50PG-E	Terminal Block and Connection Cable 	(2)
		1 m	JUSP-TA50PG-1-E		
		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 	(3)
		2 m	JZSP-CSI01-2-E		
		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 Monitor		1 m	JZSP-CA01-E	SERVOPACK End 	(7)
CN8 Cable for Safety Function Device	Cables with Connector*2	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3		(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 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.

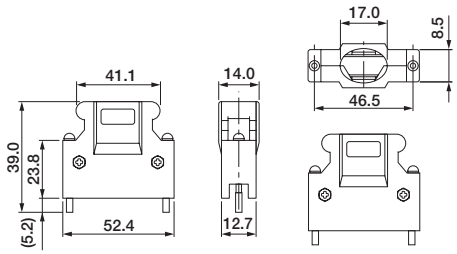
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-1-E	10350-52Z0-008*	1 set	10150-3000PE* (Soldered)	1

* : Manufactured by Sumitomo 3M Ltd.

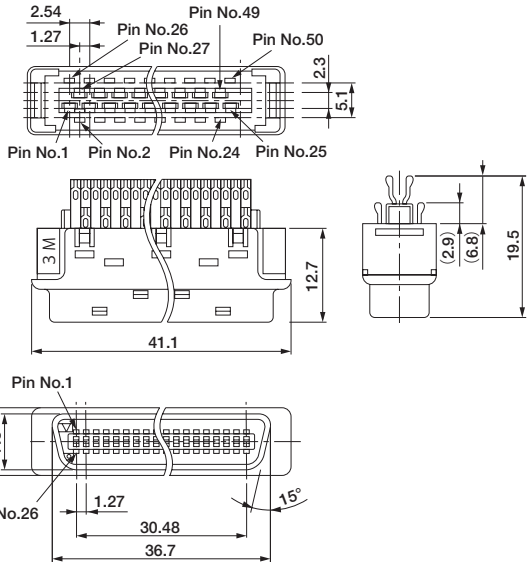
• Cable Size

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

• External Dimensions of Case (Units: mm)

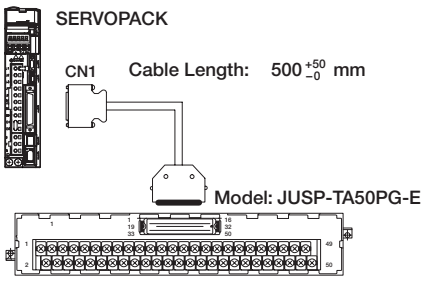


• External Dimensions of Connector (Units: mm)

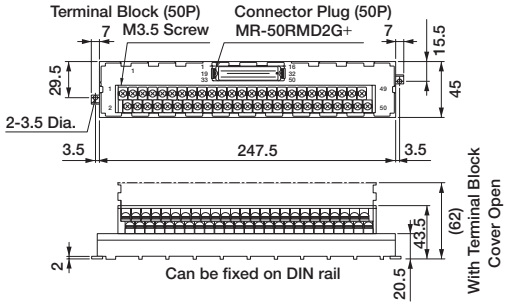


(2) Connector Terminal Converter Unit for CN1

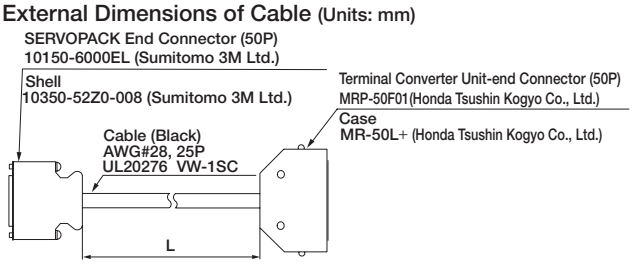
• Configurations



• External Dimensions of Terminal Block (Units: mm)



• External Dimensions of Cable (Units: mm)



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

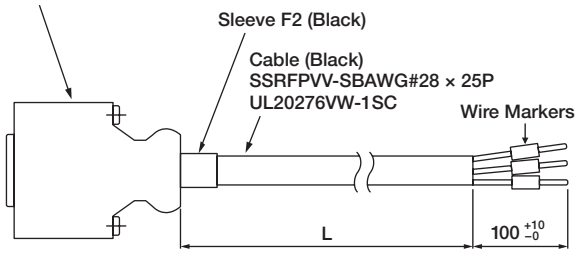
Note: The pin numbers in the SERVOPACK connector and the pin numbers in the terminal block are the same. If assembling cables, refer to ●*Cable with Loose Wires at One End for CN1 Connection Diagram* of JZSP-CSI01-□-E Cable on the next page.

Selecting Cables Units: mm

(3) Cable with Loose Wires at One End for CN1

• External Dimensions of Cable (Units: mm)

SERVOPACK End
Connector 10150-6000EL (50P)*
Case 10350-52Z0-008*



* : 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

● Cable with Loose Wires at One End for CN1

Connection Diagram of JZSP-CSI01-□-E Cable

SERVOPACK End

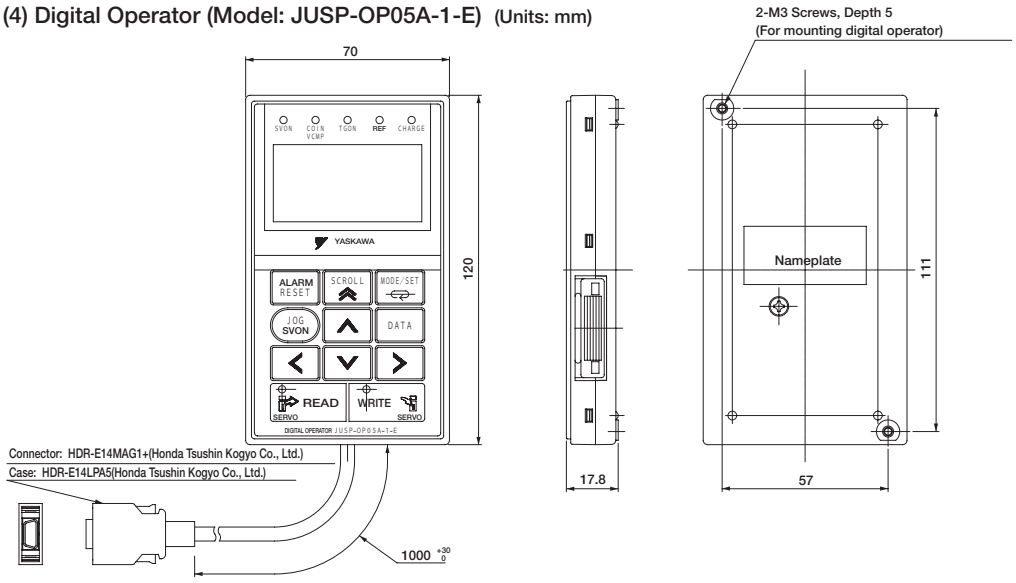
Pin No.	Signal	Wire Color	Marking		Lead Marker
			Color	Dots	
1	SG	Orange	Red	1	1
3	PL1	Orange	Black	1	3
2	SG	Gray	Red	1	2
4	SEN	Gray	Black	1	4
5	V-REF	White	Red	1	5
6	SG	White	Black	1	6
7	PULS	Yellow	Red	1	7
8	/PULS	Yellow	Black	1	8
9	T-REF	Pink	Red	1	9
10	SG	Pink	Black	1	10
11	SIGN	Orange	Red	2	11
12	/SIGN	Orange	Black	2	12
13	PL2	Gray	Red	2	13
14	/CLR	White	Red	2	14
15	CLR	White	Black	2	15
16	–	Gray	Black	2	16
17	–	Yellow	Red	2	17
18	PL3	Yellow	Black	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	ALO1	Yellow	Red	4	37
38	ALO2	Yellow	Black	4	38
39	ALO3	Pink	Red	4	39
40	/S-ON	Pink	Black	4	40
41	/P-CON	Orange	Red	5	41
42	P-OT	Orange	Black	5	42
43	N-OT	Gray	Red	5	43
44	/ALM-RST	Gray	Black	5	44
45	/P-CL	White	Red	5	45
46	/N-CL	White	Black	5	46
47	+24V-IN	Yellow	Red	5	47
48	–	Pink	Red	5	48
49	–	Pink	Black	5	49
50	–	Yellow	Black	5	50
Case	Shield				

Host Controller End

: Represents twisted-pair wires.

Selecting Cables

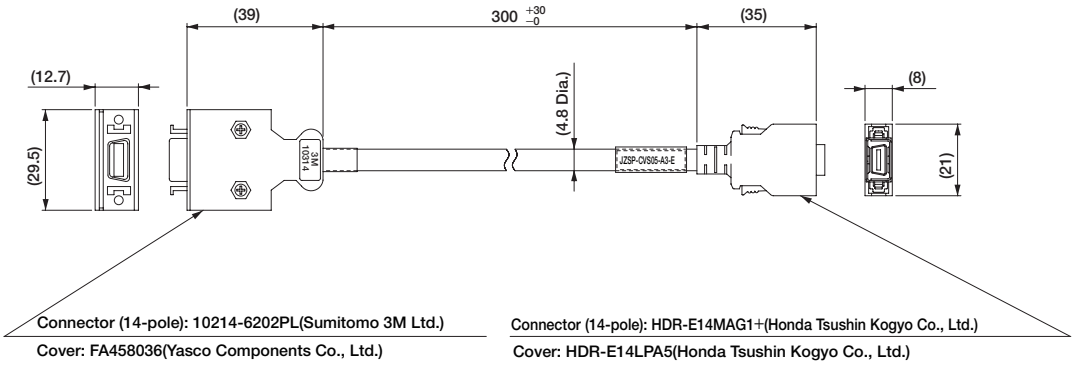
(4) Digital Operator (Model: JUSP-OP05A-1-E) (Units: mm)



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

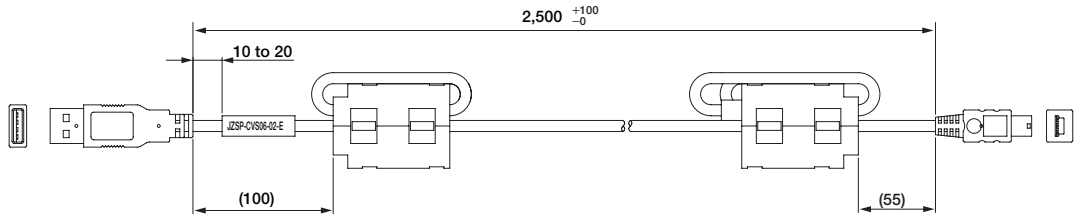
A converter cable is required to use Σ-Ⅲ series digital operators (model: JUSP-OP05A) for Σ-Ⅴ series SERVOPACKs.

- External Dimensions (Units: mm)



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

- External Dimensions (Units: mm)

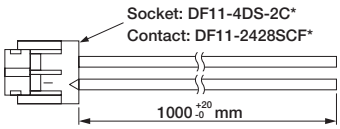


IMPORTANT Use a cable specified by Yaskawa.
When using other cables, operation cannot be guaranteed.

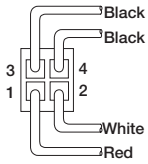
Selecting Cables Units: mm

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

• External Dimensions (Units: mm)



* : Manufactured by Hirose Electric Corporation.



View from Cable End

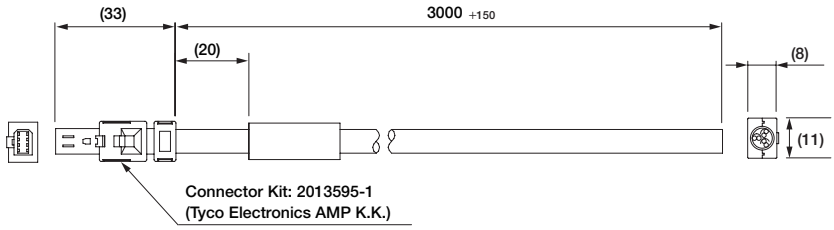
• Specifications

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

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

• External Dimensions (Units: mm)

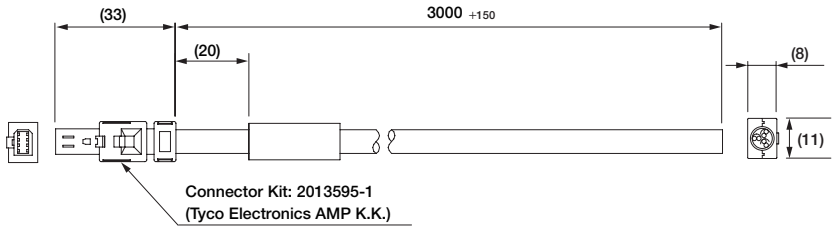


• Specifications

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	–

MECHATROLINK-Ⅱ Communications Reference Type SERVOPACKs

SGDV-□□□□11

(For Rotary Servomotors)

SGDV-□□□□15

(For Linear Servomotors)

Model Designations

S G D V- R70 A 11 A 000 00 0

1st+2nd+3rd digits	4th digit	5th+6th digits	7th digit	8th+9th+10th digits	11th+12th digits	13th digit
R70	A	11	A	000	00	0

Σ-**V** Series
SGDV
SERVOPACK

1st+2nd+3rd digits Current

Voltage	Code	Applicable Servomotor Max. Capacity kW
Three-phase 200 V	R70*1	0.05
	R90*1	0.1
	1R6*1	0.2
	2R8*1	0.4
	3R8	0.5
	5R5*1	0.75
	7R6	1.0
	120*2	1.5
	180	2.0
	200	3.0
	330	5.0
	470	6.0
	550	7.5
	590	11
	780	15
Three-phase 400 V	1R9	0.5
	3R5	1.0
	5R4	1.5
	8R4	2.0
	120	3.0
	170	5.0
	210	6.0
	260	7.5
	280	11
	370	15

4th digit Power Supply Voltage

Code	Specifications
A	Three-phase 200 VAC
D	Three-phase 400 VAC

5th+6th digits Interface

Code	Specifications
11	MECHATROLINK- communications Reference Type (for rotary servomotors)
15	MECHATROLINK- communications Reference Type (for linear servomotors)

7th digit Design Revision Order

A, B...

8th+9th+10th digits Options (hardware)

Code	Specifications
000	Base-mounted (standard)
001	Rack-mounted*3
002	Varnished
003	Rack-mounted*3 and Varnished
008	Single-phase 200 VAC input (Model: SGDV-120A11A008000)
020	Dynamic brake (400 V SERVOPACKs only)

11th+12th digits Options (software)

Code	Specifications
00	Standard

13th digit Options (parameter)

Code	Specifications
0	Standard

*1: These amplifiers can be powered with single or three-phase.
*2: Single-phase 200 VAC SERVOPACKs are also available. (Model: SGDV-120A11A008000)
*3: SERVOPACKs of 6 kW or more are duct-ventilated.
Note: If the option codes digits 8 to 13 are all zeros, they are omitted.

Features

● Real-time communications

MECHATROLINK-Ⅱ communications enable high-speed control for 30 stations at a maximum transmission speed of 10 Mbps in a transmission cycle from 250 μs 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

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					

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

Three-phase 200 V

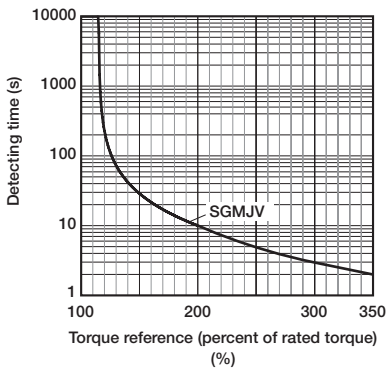
SERVOPACK Model SGDV-□□□□		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6	78
Max. 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 external				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														

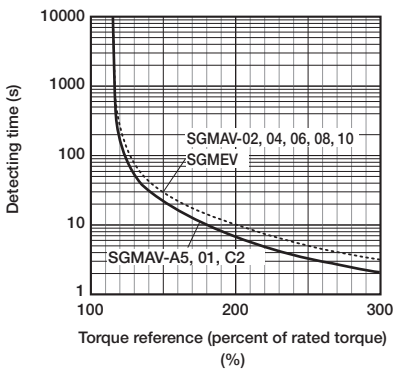
Three-phase 400 V

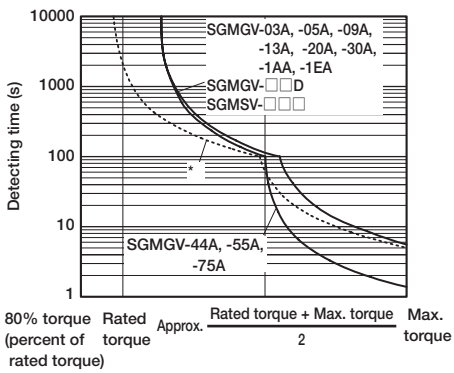
SERVOPACK Model SGDV-□□□□		1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Applicable Servomotor Max. Capacity	kW	0.5	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Max. Output Current	Arms	5.5	8.5	14	20	28	42	55	65	70	85
Regenerative Resistors		Built-in 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 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

Items			Specifications	
Control Method			IGBT PWM control, sine-wave driven	
Feedback	Rotary Servomotors		Serial encoder: 13-bit (incremental encoder) : 17-bit (incremental/absolute encoder) : 20-bit (incremental/absolute encoder)	
	With Linear Servomotors		Absolute linear scale (The signal resolution varies depending on the absolute linear scale.) Incremental linear scale (The signal resolution varies depending on the incremental linear scale or serial converter unit.)	
Operating Conditions	Ambient 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/s²	
	Shock Resistance		19.6 m/s²	
	Protection Class		IP10	An environment that satisfies the following conditions. • Free of corrosive or flammable gases • Free of exposure to water, oil, or chemicals • Free of dust, salts, or iron dust
	Pollution Degree		2	
	Altitude		1000 m or less	
	Others		Do not use SERVOPACKs in the following locations: • Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity	
Applicable Standards			UL508C EN50178, EN55011/A2 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	
Performance	Speed Control Range		1:5000 (The lower limit of the speed control range must be lower than the point at which the rated torque does not cause the servomotor to stop.)	
	Speed Regulation*1	Load Fluctuation	0% to 100% load: ±0.01% max. (at rated speed)	
		Voltage Fluctuation	Rated voltage: ±10% : 0% (at rated speed)	
		Temperature Fluctuation	25±25°C : ±0.1% max. (at rated speed)	
	Torque Control Tolerance (Repeatability)		±1%	
	Soft Start Time Setting		0 to 10 s (can be set individually for acceleration and deceleration.)	
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 computer (can be connected with SigmaWin+.)	
		Communications Standard	Compliant with USB1.1 standard (12 Mbps)	
Display			CHARGE indicator	
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 a servo alarm or overtravelling (OT) occurs, or when the power supply for the main circuit or servomotor is OFF.	
Regenerative Processing			Included (For more information, 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 Functions			Overcurrent, Overvoltage, low voltage, overload, regeneration error, etc.	
Utility Functions			Gain adjustment, alarm history, JOG operation, origin search, etc.	
Safety Functions		Input	/HWBB1, /HWBB2: Baseblock signal for power module	
		Output	EDM1: Status monitor (fixed output) of built-in safety circuit	
		Applicable Standards*2	EN954 category 3, IEC61508 SIL2	
Option Module			Fully-closed Module	

*1: Speed regulation is defined as follows:

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

The motor speed may change due to voltage 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.

Specifications

● Rotary Servomotors

Items			Specifications	
I/O Signal	Encoder Output Pulses		Phase A, phase B, phase C: line driver output The number of dividing pulse: Any setting ratio is available.	
	Sequence Input	Fixed Input	SEN signal	
		Input Signals which can be allocated	Number of Channels	7 channels
			Function	• Homing deceleration switch signal (/DEC) • External latch signals (/EXT 1 to 3) • Forward run prohibited (P-OT), reverse run prohibited (N-OT) • Forward external torque limit (/P-CL), reverse external torque limit (/N-CL) Positive and negative logic can be changed.
	Sequence Output	Fixed Output	Servo alarm (ALM)	
		Output Signals which can be allocated	Number of Channels	3 channels
			Function	• Positioning completion (/COIN) • Speed limit detection (/VLT) • Speed coincidence detection (/V-CMP) • Brake (/BK) • Rotation detection (/TGON) • Warning (/WARN) • Servo ready (/S-RDY) • Near (/NEAR) • Torque limit detection (/CLT) Positive and negative logic can be changed.
Panel Operator		Display Unit	One 7-segment LED	
		Switch	Rotary switch: 16 positions, DIP switch: 4 poles	
MECHATROLINK Communications		Communications Protocol	MECHATROLINK-	MECHATROLINK-
		Transmission Speed	10 Mbps	4 Mbps
		Transmission Cycle	250 μs, 0.5 to 4.0 ms (multiple of 0.5 ms)	2 ms
		Number of Words for Link Transmission	Can be switched between 17-bytes /station and 32-bytes / station.	17-bytes /station
		Station Address	41H to 5FH (max. number of slaves: 30)	
Command Method		Performance	Position control, speed control, and torque control through MECHATROLINK communications	
		Command Input	MECHATROLINK commands (for sequence, motion, data setting/reference, monitor, adjustment, and other commands.)	

● Linear Servomotors

Items			Specifications	
I/O Signal	Encoder Output Pulses		Phase A, phase B, phase C: line driver output The number of dividing pulse: Any setting ratio is available.	
	Sequence Input	Fixed Input	SEN signal	
		Input Signals which can be allocated	Number of Channels	7 channels
			Function	• Homing deceleration switch signal (/DEC) • External latch signals (/EXT 1 to 3) • Forward run prohibited (P-OT), reverse run prohibited (N-OT) • Forward external force limit (/P-CL), reverse external force limit (/N-CL) Positive and negative logic can be changed.
	Sequence Output	Fixed Output	Servo alarm (ALM)	
		Output Signals which can be allocated	Number of Channels	3 channels
			Function	• Positioning completion (/COIN) • Speed limit detection (/VLT) • Speed coincidence detection (/V-CMP) • Brake (/BK) • Servomotor movement detection (/TGON) • Warning (/WARN) • 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 positions, piano switch: 4 poles	
MECHATROLINK Communications		Communications Protocol	MECHATROLINK-Ⅱ	MECHATROLINK-Ⅰ
		Transmission Speed	10 Mbps	4 Mbps
		Transmission Cycle	250 μs, 0.5 to 4.0 ms (multiple of 0.5 ms)	2 ms
		Number of Words for Link Transmission	Can be switched between 17-bytes /station and 32-bytes / station.	17-bytes /station
		Station Address	41H to 5FH (max. number of slaves: 30)	
Command Method		Performance	Position control, speed control, and force control through MECHATROLINK-Ⅱ communications	
		Command Input	MECHATROLINK commands and MECHATROLINK-Ⅱ commands (for sequence, motion, data setting/reference, monitor, adjustment, and other commands.)	

Power Supply Capacities and Power Losses

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

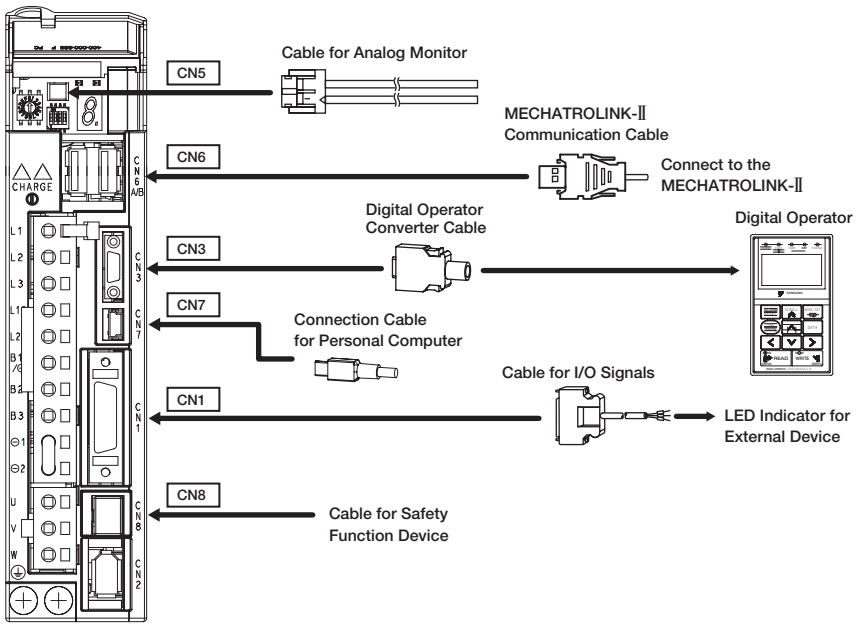
Main Circuit Power Supply	Applicable Servomotor Max. Capacity kW	SERVOPACK Model SGDV-	Power Supply Capacity kVA	Output Current Arms	Main Circuit Power Loss W	Regenerative Resistor Power Loss W	Control Circuit Power Loss W	Total Power Loss W
Single-phase 200 V	0.05	R70A	0.2	0.66	5.2	—	17	22.2
	0.1	R90A	0.3	0.91	7.4			24.4
	0.2	1R6A	0.7	1.6	13.7			30.7
	0.4	2R8A	1.2	2.8	24.9			41.9
	0.75	5R5A	1.9	5.5	52.7	8		77.7
	1.5	120A	4	11.6	68.2	10	22	100.2
Three-phase 200 V	0.05	R70A	0.2	0.66	5.1	—	17	22.1
	0.1	R90A	0.3	0.91	7.3			24.3
	0.2	1R6A	0.6	1.6	13.5			30.5
	0.4	2R8A	1	2.8	24.0			41.0
	0.5	3R8A	1.4	3.8	20.1	8		45.1
	0.75	5R5A	1.6	5.5	43.8			68.8
	1.0	7R6A	2.3	7.6	53.6			78.6
	1.5	120A	3.2	11.6	65.8	10	22	97.8
	2.0	180A	4	18.5	111.9	16		149.9
	3.0	200A	5.9	19.6	113.8			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	33	312.4
	7.5	550A	14.6	54.7	357.8	(350)*2		390.8
	11	590A	21.7	58.6	431.7		48	479.7
	15	780A	29.6	78	599.0			647.0
Three-phase 400 V	0.5	1R9D	1.1	1.9	24.6	14	21	59.6
	1.0	3R5D	2.3	3.5	46.1			81.1
	1.5	5R4D	3.5	5.4	71.3			106.3
	2.0	8R4D	4.5	8.4	77.9	28	25	130.9
	3.0	120D	7.1	11.9	108.7			161.7
	5.0	170D	11.7	16.5	161.1	36	24	221.1
	6.0	210D	12.4	20.8	172.7	(180)*3	27	199.7
	7.5	260D	14.4	25.7	218.6			245.6
	11	280D	21.9	28.1	294.6	(350)*4	30	324.6
	15	370D	30.6	37.2	403.8			433.8

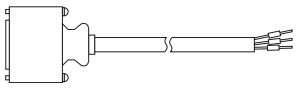
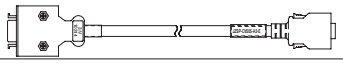
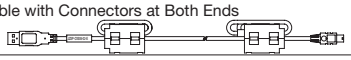
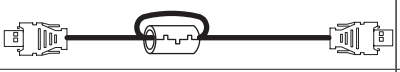
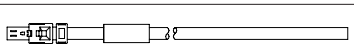
*1: For the optional JUSP-RA04-E regenerative resistor unit.
*2: For the optional JUSP-RA05-E regenerative resistor unit.
*3: For the optional JUSP-RA18-E regenerative resistor unit.
*4: For the optional JUSP-RA19-E regenerative resistor unit.

Notes: 1 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.

Selecting Cables

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



Name		Length	Order No.	Specifications	Details
CN1 Cables for I/O Signals	Connector Kit		JZSP-CSI9-2-E	Soldered 	(1)
	Connector Terminal Converter Unit	0.5 m	JUSP-TA26P-E	Terminal Block and Connection Cable 	(2)
		1 m	JUSP-TA26P-1-E		
		2 m	JUSP-TA26P-2-E		
	Cable with Loose wire at One End	1 m	JZSP-CSI02-1-E		(3)
		2 m	JZSP-CSI02-2-E		
		3 m	JZSP-CSI02-3-E		
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 	(10)
CN6A CN6B MECHATROLINK-Ⅱ Communication Cable	Cables with Connectors at Both Ends	0.5 to 50 m	JEPMC-W6002-□□-E		(7)
	Cables with Connectors at Both Ends (with Ferrite Core)	0.5 to 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 Cable for Safety Function Device	Cables with Connector*2	3 m	**JZSP-CVH03-03-E** **JZSP-CVH03-03-E-G3**		(11)
	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 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.

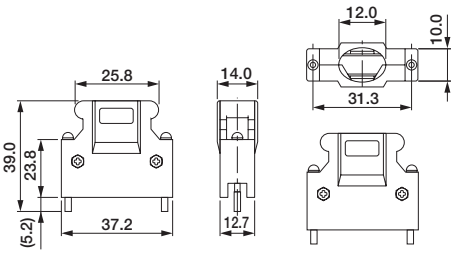
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-2-E	10326-52A0-008*	1 set	10126-3000PE* (Soldered)	1

* : Manufactured by Sumitomo 3M Ltd.

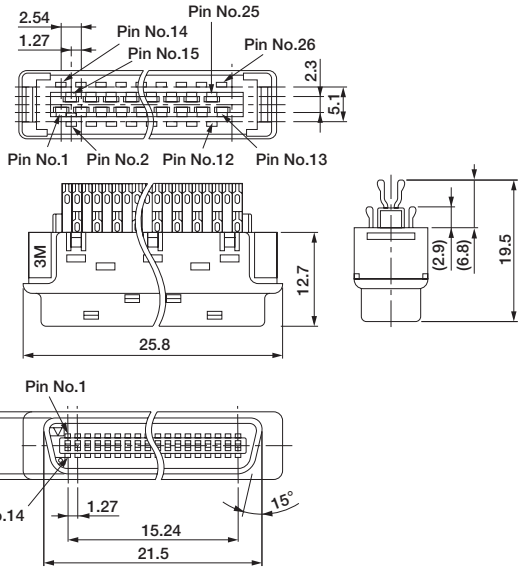
• Cable Size

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

• External Dimensions of Case (Units: mm)

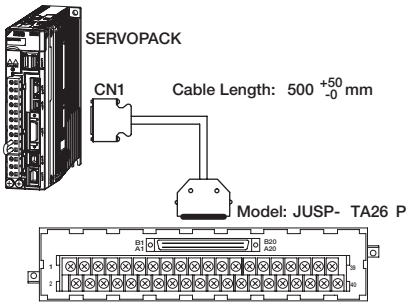


• External Dimensions of Connector (Units: mm)

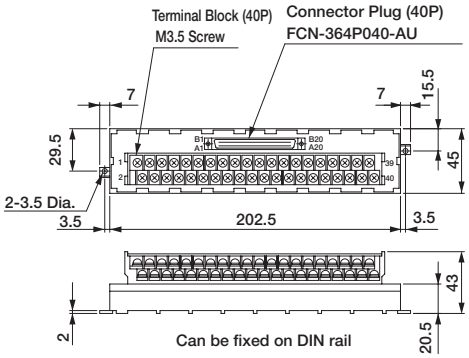


(2) Connector Terminal Converter Unit for CN1

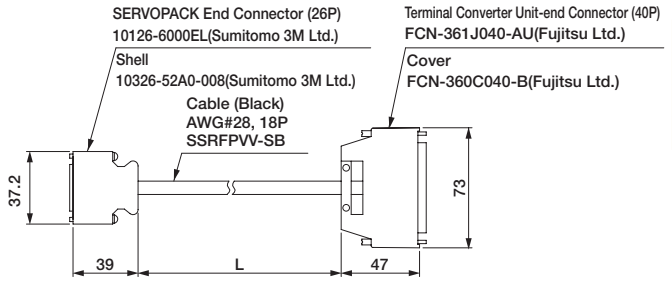
• Configurations



• External Dimensions of Terminal Block (Units: mm)



• External Dimensions of Cable (Units: mm)



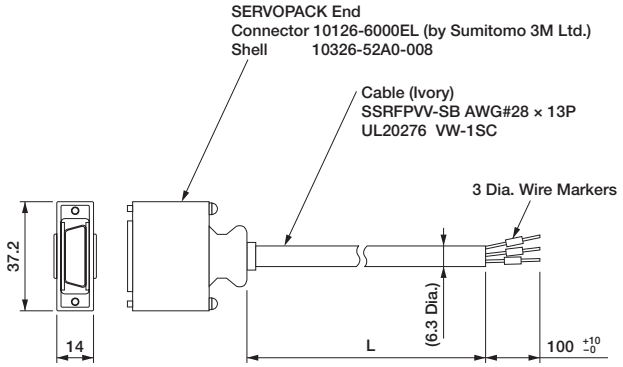
Model	Cable Length (L)	Approx. Mass
JUSP-TA26P-E	0.5 m	100 g
JUSP-TA26P-1-E	1 m	200 g
JUSP-TA26P-2-E	2 m	400 g

Note: The pin number in the SERVOPACK connector and the pin number in the terminal block are the same. Pin numbers 1 to 26 are used in the terminal block. Do not use a pin number of 27 or higher.
If assembling cables, refer to ●*Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CSI02-□-E Cable* on the next page.

Selecting Cables

(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

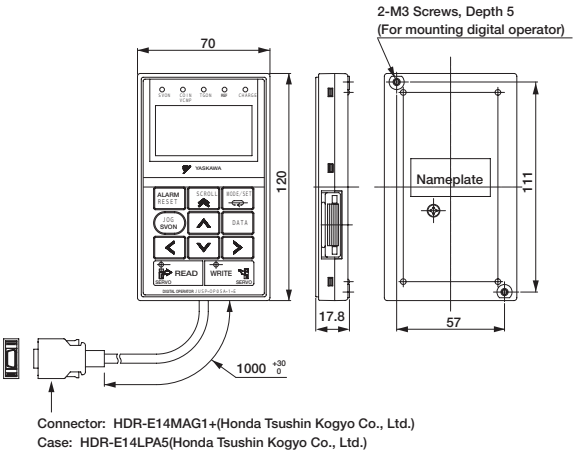
Connection Diagram of JZSP-CSI02-□-E Cable

SERVOPACK End					Host Controller End
Pin No.	Signal	Wire Color	Marking		Lead Marker
			Color	Dots	
1	/SO1+	Blue	Red	1	1
2	/SO1−	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	PBO	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

: Represents twisted-pair wires.

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

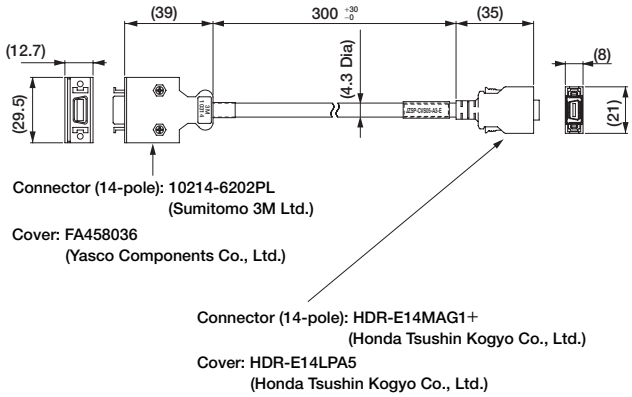
(Units: mm)



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

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

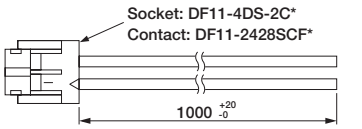
• External Dimensions (Units: mm)



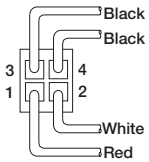
Selecting Cables

(6) 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.

(7) MECHATROLINK-Ⅱ Communications Cable for CN6 (Model: JEPMC-W6002-□□-E)

- External Dimensions (Units: mm)

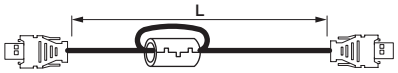
Cable with Connectors at Both Ends

Model	Cable Length(L)
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)

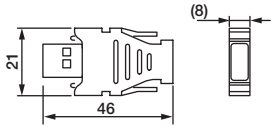


Model	Cable Length (L)
JEPMC-W6003-A5-E	0.5 m
JEPMC-W6003-01-E	1.0 m
JEPMC-W6003-03-E	3.0 m
JEPMC-W6003-05-E	5.0 m
JEPMC-W6003-10-E	10.0 m
JEPMC-W6003-20-E	20.0 m
JEPMC-W6003-30-E	30.0 m
JEPMC-W6003-40-E	40.0 m
JEPMC-W6003-50-E	50.0 m

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

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

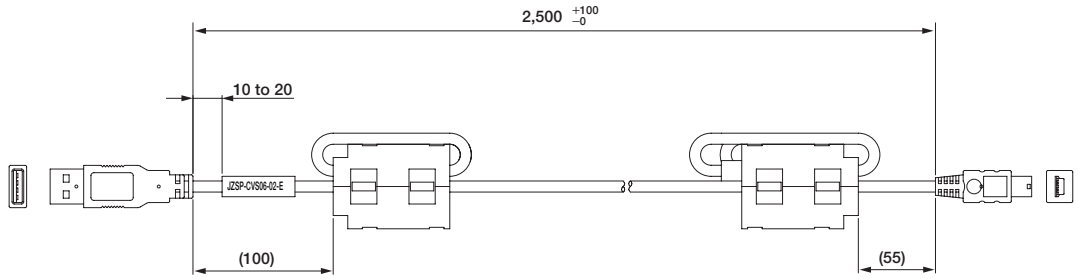
- External Dimensions (Units: mm)



Selecting Cables

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

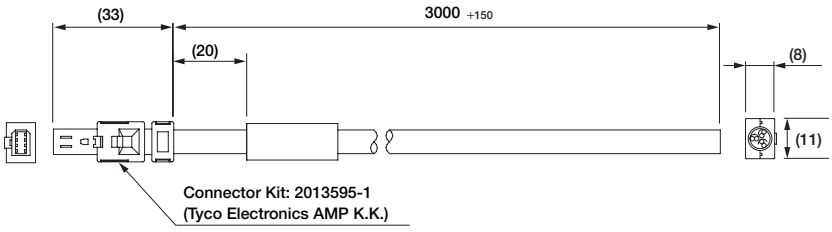
• External Dimensions (Units: mm)



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)

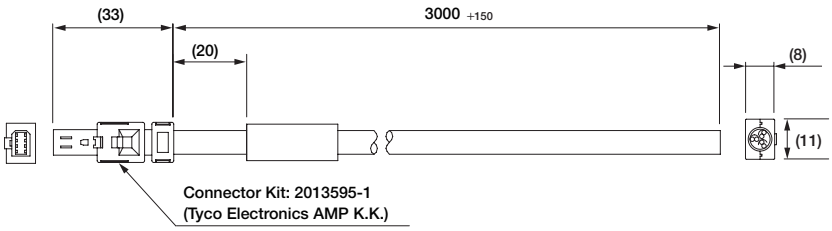


• Specifications

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	–

MECHATROLINK-Ⅲ Communications Reference Type SERVOPACKs

SGDV-□□□□21
(For Rotary Servomotors)

SGDV-□□□□25
(For Linear Servomotors)

Model Designations

S G D V- R70 A 21 A 000 00 0

- S G D V-: Σ-V Series, SGDV, SERVOPACK
- R70: 1st+2nd+3rd digits
- A: 4th digit
- 21: 5th6th digits
- A: 7th digit
- 000: 8th+9th+10th digits
- 00: 11th12th digits
- 0: 13th digit

1st2nd3rd digits Current

Voltage	Code	Applicable Servomotor Max. Capacity kW
Three-phase 200 V	R70*1	0.05
	R90*1	0.1
	1R6*1	0.2
	2R8*1	0.4
	3R8	0.5
	5R5*1	0.75
	7R6	1.0
	120*2	1.5
	180	2.0
	200	3.0
	330	5.0
	470	6.0
	550	7.5
	590	11
	780	15
Three-phase 400 V	1R9	0.5
	3R5	1.0
	5R4	1.5
	8R4	2.0
	120	3.0
	170	5.0
	210	6.0
	260	7.5
	280	11
	370	15

4th digit Power Supply Voltage

Code	Specifications
F	Single-phase 100 VAC
A	Three-phase 200 VAC
D	Three-phase 400 VAC

5th+6th digits Interface

Code	Specifications
21	MECHATROLINK-Ⅲ communications Reference Type (for rotary servomotors)
25	MECHATROLINK-Ⅲ communications Reference Type (for linear servomotors)

7th digit Design Revision Order

A, B...

8th+9th+10th digits Options (hardware)

Code	Specifications
000	Base-mounted (standard)
001	Rack-mounted
002	Varnished
003	Rack-mounted and Varnished
008	Single-phase 200 VAC input (Model: SGDV-120A21A008000)
020	Dynamic brake (400 V SERVOPACKs only)

11th+12th digits Options (software)

Code	Specifications
00	Standard

13th digit Options (parameter)

Code	Specifications
0	Standard

*1: These amplifiers can be powered with single or three-phase.
*2: Single-phase 200 VAC SERVOPACKs are also available. (Model: SGDV-120A21A008000)
*3: SERVOPACKs of 6 kW or more are duct-ventilated.
Note: If the option codes digits 8 to 13 are all zeros, they are omitted.

Features

● 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 μs 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.

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					

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

Three-phase 200 V

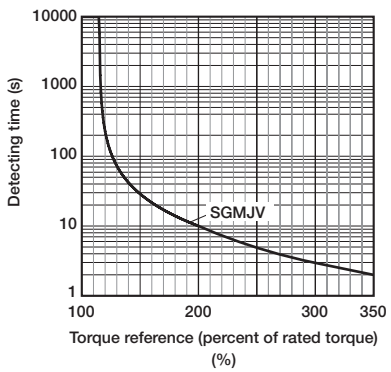
SERVOPACK Model SGDV-□□□□		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6	78
Max. 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 external				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														

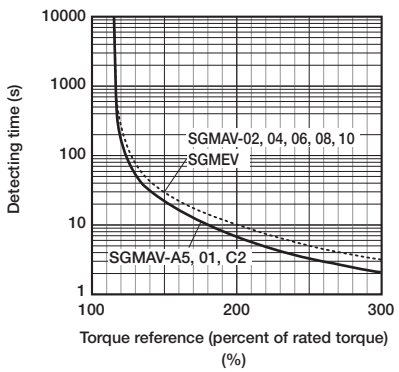
Three-phase 400 V

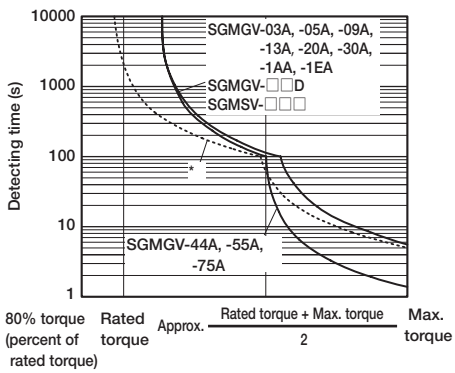
SERVOPACK Model SGDV-□□□□		1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Applicable Servomotor Max. Capacity	kW	0.5	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Max. Output Current	Arms	5.5	8.5	14	20	28	42	55	65	70	85
Regenerative Resistors		Built-in 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 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

Items			Specifications	
Control Method			IGBT PWM control, sine-wave driven	
Feedback	Rotary Servomotors		Serial encoder: 13-bit (incremental encoder) : 17-bit (incremental/absolute encoder) : 20-bit (incremental/absolute encoder)	
	With Linear Servomotors		Absolute linear scale (The signal resolution varies depending on the absolute linear scale.) Incremental linear scale (The signal resolution varies depending on the incremental linear scale or serial converter unit.)	
Operating Conditions	Ambient 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	
	Shock Resistance		19.6 m/s	
	Protection Class		IP10	An environment that satisfies the following conditions. • Free of corrosive or flammable gases • Free of exposure to water, oil, or chemicals • Free of dust, salts, or iron dust
	Pollution Degree		2	
	Altitude		1000 m or less	
	Others		Do not use SERVOPACKs in the following locations: • Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity	
Applicable Standards (Pending)			UL508C EN50178, EN55011/A2 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	
Performance	Speed Control Range		1:5000 (The lower limit of the speed control range must be lower than the point at which the rated torque does not cause the servomotor to stop.)	
	Speed Regulation	Load Fluctuation	0% to 100% load: ±0.01% max. (at rated speed)	
		Voltage Fluctuation	Rated voltage: ±10% : 0% (at rated speed)	
		Temperature Fluctuation	25±25°C : ±0.1% max. (at rated speed)	
	Torque Control Tolerance (Repeatability)		±1%	
	Soft Start Time Setting		0 to 10 s (can be set individually for acceleration and deceleration.)	
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 computer (can be connected with SigmaWin+.)	
		Communications Standard	Compliant with USB1.1 standard (12 Mbps)	
Display			CHARGE indicator	
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 a servo alarm or overtravelling (OT) occurs, or when the power supply for the main circuit or servomotor is OFF.	
Regenerative Processing			Included (For more information, 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 Functions			Overcurrent, Overvoltage, low voltage, overload, regeneration error, etc.	
Utility Functions			Gain adjustment, alarm history, JOG operation, origin search, etc.	
Safety Functions		Input	/HWBB1, /HWBB2: Baseblock signal for power module	
		Output	EDM1: Status monitor (fixed output) of built-in safety circuit	
		Applicable Standards (Pending)	EN954 category 3, IEC61508 SIL2	
Option Module			Fully-closed Module	

*1: Speed regulation is defined as follows:

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

The motor speed may change due to voltage 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.

Specifications

● Rotary Servomotors

Items			Specifications	
I/O Signal	Encoder Output Pulses		Phase A, phase B, phase C: line driver output The number of dividing pulse: Any setting ratio is available.	
	Sequence Input	Fixed Input	SEN signal	
		Input Signals which can be allocated	Number of Channels	7 channels
			Function	• Homing deceleration switch signal (/DEC) • External latch signals (/EXT 1 to 3) • Forward run prohibited (P-OT), reverse run prohibited (N-OT) • Forward external torque limit (/P-CL), reverse external torque limit (/N-CL) Positive and negative logic can be changed.
	Sequence Output	Fixed Output	Servo alarm (ALM)	
		Output Signals which can be allocated	Number of Channels	3 channels
			Function	• Positioning completion (/COIN) • Speed limit detection (/VLT) • Speed coincidence detection (/V-CMP) • Brake (/BK) • Rotation detection (/TGON) • Warning (/WARN) • Servo ready (/S-RDY) • Near (/NEAR) • Torque limit detection (/CLT) Positive and negative logic can be changed.
Panel Operator		Display Unit	One 7-segment LED (red) and three LED indicators for MECHATROLINK communications (green)	
		Switch	Rotary switch: 16 positions×2, DIP switch: 4 poles	
MECHATROLINK Communications		Communications Protocol	MECHATROLINK-Ⅲ	
		Transmission Speed	100 Mbps	
		Transmission Cycle	125 μs, 250 μs, 500 μs,750 μs, 1 ms to 4 ms (increments of 0.5 ms)	
		Number of Words for Link Transmission	Can be switched between 16-bytes/station, 32-bytes/station and 48-bytes/station.	
		Station Address	03H to EFH (max. number of slaves: 62)	
Command Method		Performance	Position control, speed control, and torque control through MECHATROLINK communications	
		Command Input	MECHATROLINK commands (for sequence, motion, data setting/reference, monitor, adjustment, and other commands.)	

● Linear Servomotors

Items			Specifications	
I/O Signal	Encoder Output Pulses		Phase A, phase B, phase C: line driver output The number of dividing pulse: Any setting ratio is available.	
	Sequence Input	Fixed Input	SEN signal	
		Input Signals which can be allocated	Number of Channels	7 channels
			Function	• Homing deceleration switch signal (/DEC) • External latch signals (/EXT 1 to 3) • Forward run prohibited (P-OT), reverse run prohibited (N-OT) • Forward external force limit (/P-CL), reverse external force limit (/N-CL) Positive and negative logic can be changed.
	Sequence Output	Fixed Output	Servo alarm (ALM)	
		Output Signals which can be allocated	Number of Channels	3 channels
			Function	• Positioning completion (/COIN) • Speed limit detection (/VLT) • Speed coincidence detection (/V-CMP) • Brake (/BK) • Servomotor movement detection (/TGON) • Warning (/WARN) • 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 (red) and three LED indicators for MECHATROLINK communications (green)	
		Switch	Rotary switch: 16 positions×2, DIP switch: 4 poles	
MECHATROLINK Communications		Communications Protocol	MECHATROLINK-Ⅲ	
		Transmission Speed	100 Mbps	
		Transmission Cycle	125 μs, 250 μs, 500 μs,750 μs, 1 ms to 4 ms (increments of 0.5 ms)	
		Number of Words for Link Transmission	Can be switched between 16-bytes/station, 32-bytes/station and 48-bytes/station.	
		Station Address	03H to EFH (max. number of slaves: 62)	
Command Method		Performance	Position control, speed control, and force control through MECHATROLINK communications	
		Command Input	MECHATROLINK commands (for sequence, motion, data setting/reference, monitor, adjustment, and other commands.)	

Power Supply Capacities and Power Losses

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

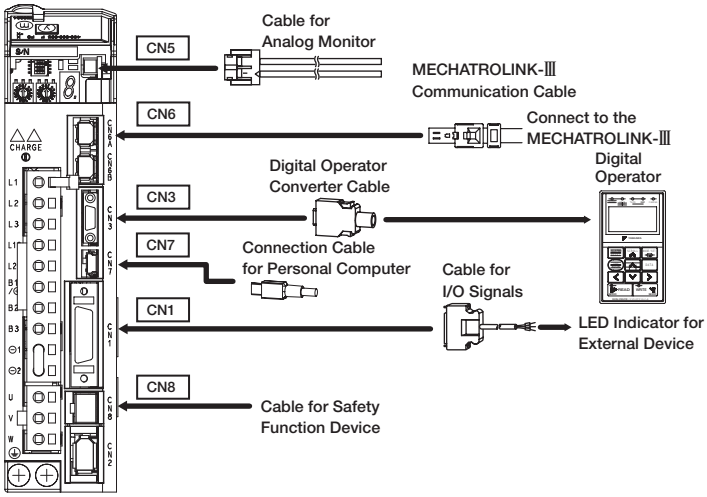
Main Circuit Power Supply	Applicable Servomotor Max. Capacity kW	SERVOPACK Model SGDV-	Power Supply Capacity kVA	Output Current Arms	Main Circuit Power Loss W	Regenerative Resistor Power Loss W	Control Circuit Power Loss W	Total Power Loss W
Single-phase 200 V	0.05	R70A	0.2	0.66	5.2	—	17	22.2
	0.1	R90A	0.3	0.91	7.4			24.4
	0.2	1R6A	0.7	1.6	13.7			30.7
	0.4	2R8A	1.2	2.8	24.9			41.9
	0.75	5R5A	1.9	5.5	52.7	8		77.7
	1.5	120A	4	11.6	68.2	10	22	100.2
Three-phase 200 V	0.05	R70A	0.2	0.66	5.1	—	17	22.1
	0.1	R90A	0.3	0.91	7.3			24.3
	0.2	1R6A	0.6	1.6	13.5			30.5
	0.4	2R8A	1	2.8	24.0			41.0
	0.5	3R8A	1.4	3.8	20.1	8		45.1
	0.75	5R5A	1.6	5.5	43.8			68.8
	1.0	7R6A	2.3	7.6	53.6			78.6
	1.5	120A	3.2	11.6	65.8	10	22	97.8
	2.0	180A	4	18.5	111.9	16		149.9
	3.0	200A	5.9	19.6	113.8			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	33	312.4
	7.5	550A	14.6	54.7	357.8	(350)*2		390.8
	11	590A	21.7	58.6	431.7		48	479.7
	15	780A	29.6	78	599.0			647.0
Three-phase 400 V	0.5	1R9D	1.1	1.9	24.6	14	21	59.6
	1.0	3R5D	2.3	3.5	46.1			81.1
	1.5	5R4D	3.5	5.4	71.3			106.3
	2.0	8R4D	4.5	8.4	77.9	28	25	130.9
	3.0	120D	7.1	11.9	108.7			161.7
	5.0	170D	11.7	16.5	161.1	36	24	221.1
	6.0	210D	12.4	20.8	172.7	180 *3	27	199.7
	7.5	260D	14.4	25.7	218.6			245.6
	11	280D	21.9	28.1	294.6	350 *4	30	324.6
	15	370D	30.6	37.2	403.8			433.8

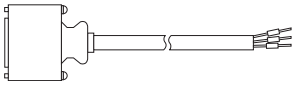
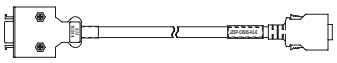
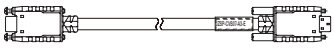
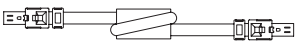
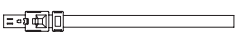
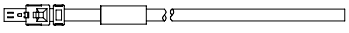
*1: For the optional JUSP-RA04-E regenerative resistor unit.
*2: For the optional JUSP-RA05-E regenerative resistor unit.
*3: For the optional JUSP-RA18-E regenerative resistor unit
*4: For the optional JUSP-RA19-E regenerative resistor unit.

Notes: 1 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.

Selecting Cables

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



Name		Length	Order No.	Specifications	Details
CN1 Cables for I/O Signals	Connector Kit		JZSP-CSI9-2-E	Soldered 	(1)
	Connector Terminal Converter Unit	0.5 m	JUSP-TA26P-E	Terminal Block and Connection Cable 	(2)
		1 m	JUSP-TA26P-1-E		
		2 m	JUSP-TA26P-2-E		
	Cable with Loose wire at One End	1 m	JZSP-CSI02-1-E		(3)
		2 m	JZSP-CSI02-2-E		
		3 m	JZSP-CSI02-3-E		
CN3	Digital Operator		JUSP-OP05A-1-E	With Connection Cable (1 m) 	(4)
	Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E	Cable with Connectors at Both Ends 	(5)
			JZSP-CVS07-A3-E	With Lock Screws 	(6)
CN7 Connection Cables for Personal Computer		2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	(7)
CN6A CN6B MECHATROLINK-Ⅲ Communication Cable	Cables with Connectors at Both Ends	0.2 to 50 m	JEPMC- 6012-□□-		(8)
	Cables with Connectors at Both Ends (With Ferrite Core)	10 to 50 m	JEPMC-W6013-□□-E		(9)
	Cable with Loose Wire at One End	0.5 to 50 m	JEPMC-W6014-□□-E		(10)
CN5 Cables for Analog Monitor		1 m	JZSP-CA01-E	SERVOPACK End 	(11)
CN8 Cable for Safety Function Device	Cables with Connector	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3		(12)
	Connector kit		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 Σ-Ⅲ series digital operators (model: JUSP-OP05A) for Σ-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.

Selecting Cables

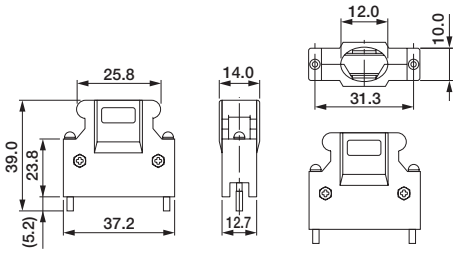
(1) Connector Kit for CN1

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

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

* : Manufactured by Sumitomo 3M Ltd.

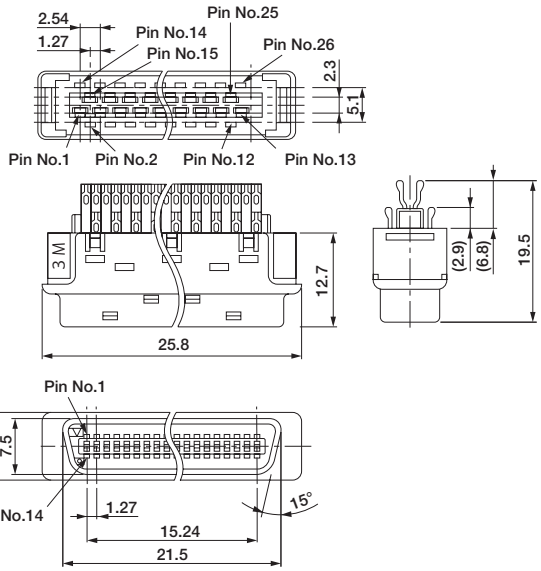
• External Dimensions of Case (Units: mm)



• Cable Size

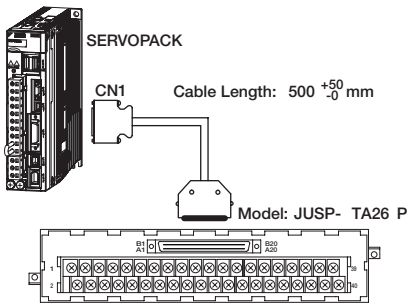
Item	Specifications
Cable	Use twisted-pair or twisted-pair shielded wire.
Applicable Wires	AWG24, 26, 28, 30
Cable Finished Diameter	16 dia. max.

• External Dimensions of Connector (Units: mm)

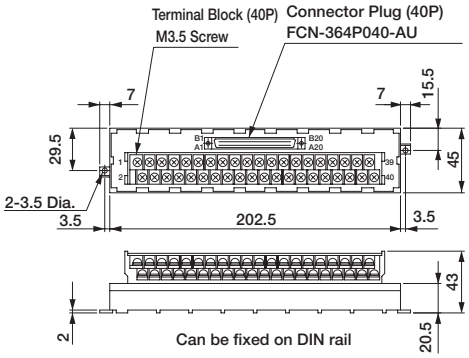


(2) Connector Terminal Converter Unit for CN1

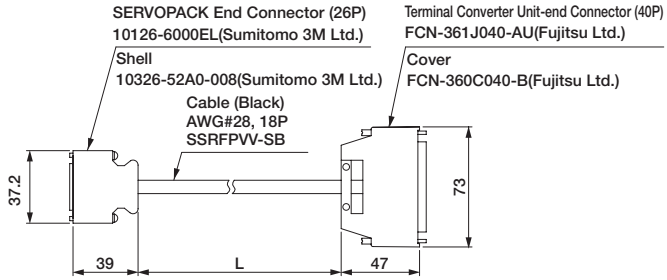
• Configurations



• External Dimensions of Terminal Block (Units: mm)



• Dimensional Drawings of Cable

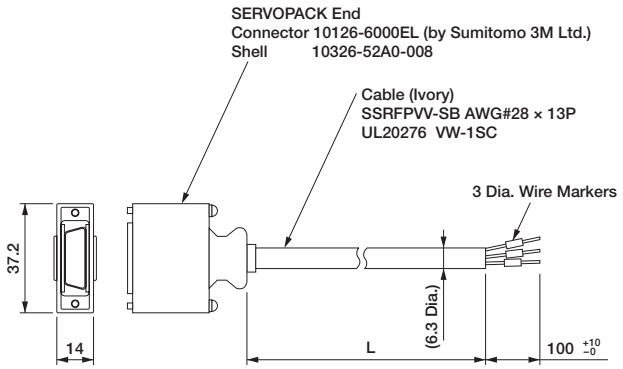


Model	Cable Length (L)	Approx. Mass
JUSP-TA26P-E	0.5 m	100 g
JUSP-TA26P-1-E	1 m	200 g
JUSP-TA26P-2-E	2 m	400 g

Note: The pin number in the SERVOPACK connector and the pin number in the terminal block are the same. Pin numbers 1 to 26 are used in the terminal block. Do not use a pin number of 27 or higher.
If assembling cables, refer to ●*Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CSI02-□-E Cable* on the next page.

Selecting Cables

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



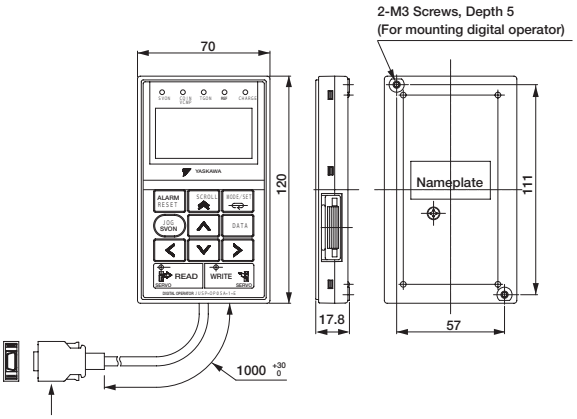
Model	Cable Length
JZSP-CSI02-1-E	1 m
JZSP-CSI02-2-E	2 m
JZSP-CSI02-3-E	3 m

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

SERVOPACK End					Host Controller End
Pin No.	Signal	Wire Color	Marking		Lead Marker
			Color	Dots	
1	/SO1+	Blue	Red	1	1
2	/SO1–	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	PBO	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

: Represents twisted-pair wires.

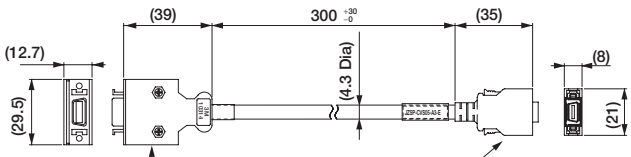
(4) Digital Operator (Model: JUSP-OP05A-1-E)
(Units: mm)



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 Σ-Ⅲ series digital operators (model: JUSP-OP05A) for Σ-Ⅴ series SERVOPACKs.

● External Dimensions (Units: mm)

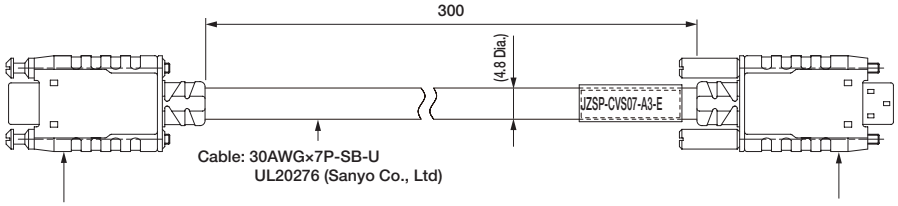


Connector (14-pole): 10214-6202PL
(Sumitomo 3M Ltd.)
Cover: FA458036
(Yasco Components Co., Ltd.)

Connector (14-pole): HDR-E14MAG1+
(Honda Tsushin Kogyo Co., Ltd.)
Cover: 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.

● External Dimensions (Units: mm)



Cable: 30AWG×7P-SB-U
UL20276 (Sanyo Co., Ltd)

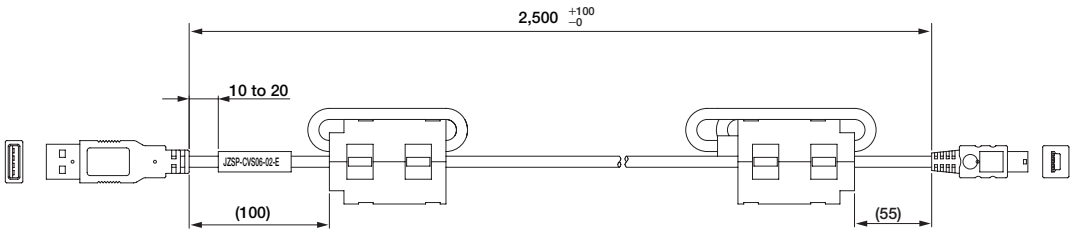
Connector: HDR-E14FAG1+ (Honda Tsushin Kogyo Co., Ltd.)
Cover: HDR-E14LPHD+ (Honda Tsushin Kogyo Co., Ltd.)

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

Selecting Cables

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

• External Dimensions (Units: mm)

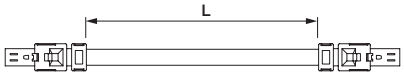


IMPORTANT Use a cable specified by Yaskawa.
When using other cables, operation cannot be guaranteed.

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

● External Dimensions (Units: mm)

Cables with Connectors at Both Ends

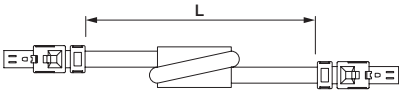


Model	Cable Length (L)
JEPMC-W6012-A2-E	0.2 m
JEPMC-W6012-A5-E	0.5 m
JEPMC-W6012-01-E	1 m
JEPMC-W6012-02-E	2 m
JEPMC-W6012-03-E	3 m
JEPMC-W6012-04-E	4 m
JEPMC-W6012-05-E	5 m
JEPMC-W6012-10-E	10 m
JEPMC-W6012-20-E	20 m
JEPMC-W6012-30-E	30 m
JEPMC-W6012-50-E	50 m

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

● External Dimensions (Units: mm)

Cables with Connectors at Both Ends (With Ferrite Core)

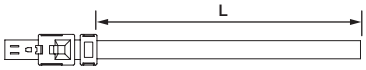


Model	Cable Length (L)
JEPMC-W6013-10-E	10 m
JEPMC-W6013-20-E	20 m
JEPMC-W6013-30-E	30 m
JEPMC-W6013-50-E	50 m
JEPMC-W6013-75-E	75 m

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

● External Dimensions (Units: mm)

Cable with Loose Wire at One End



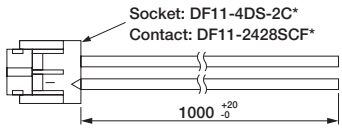
Model	Cable Length (L)
JEPMC-W6014-A5-E	0.5 m
JEPMC-W6014-01-E	1 m
JEPMC-W6014-03-E	3 m
JEPMC-W6014-05-E	5 m
JEPMC-W6014-10-E	10 m
JEPMC-W6014-30-E	30 m
JEPMC-W6014-50-E	50 m

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

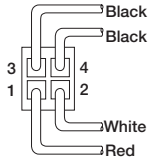
Selecting Cables

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

● External Dimensions (Units: mm)



* : Manufactured by Hirose Electric Corporation.



View from Cable End

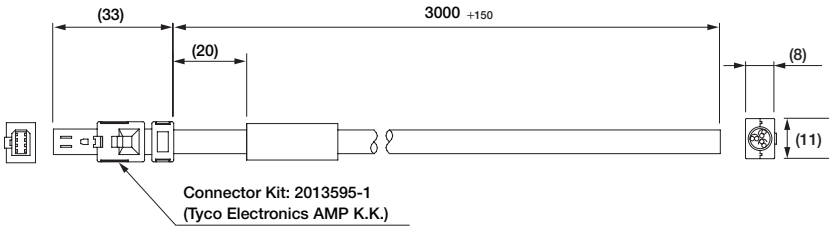
• Specifications

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)

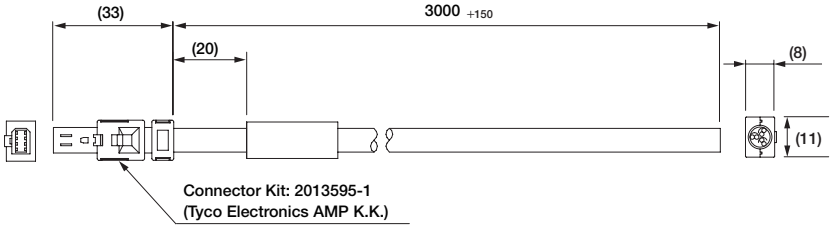


• Specifications

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-□□□□E1
(For Rotary Servomotors)

SGDV-□□□□E5
(For Linear Servomotors)

Model Designations

SGDV- R70 A E1 A 000 00 0

Σ-V Series SGDV SERVOPACK

Current

Voltage	Code	Applicable Servomotor Max. Capacity kW
200 V	R70*1	0.05
	R90*1	0.1
	1R6*1	0.2
	2R8*1	0.4
	3R8	0.5
	5R5*1	0.75
	7R6	1.0
	120*2	1.5
	180	2.0
	200	3.0
	330	5.0
	470	6.0
	550	7.5
	590	11
	780	15
400 V	1R9	0.5
	3R5	1.0
	5R4	1.5
	8R4	2.0
	120	3.0
	170	5.0
	210	6.0
	260	7.5
	280	11
	370	15

Voltage

Code	Specifications
A	200 VAC
D	400 VAC

Interface

Code	Specifications
E1	Command Option Attachable Type (for rotary servomotors)
E5	Command Option Attachable Type (for linear servomotors)

Design Revision Order A, B...

Options (hardware)

Code	Specifications
000	Base-mounted (standard)
001	Rack-mounted
002	Varnished
003	Rack-mounted and Varnished
008	Single-phase 200 VAC input (model: SGDV120AE1A00800020□)
020	Dynamic brake (DB)*3

Options (software)

Options (parameter)

*1 These amplifiers can be powered with single or three-phase.

*2 SGDV-120A□□A008000□□□, a special version of the 1.5 kW amplifier can be used for single-phase operation.

*3 : 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.

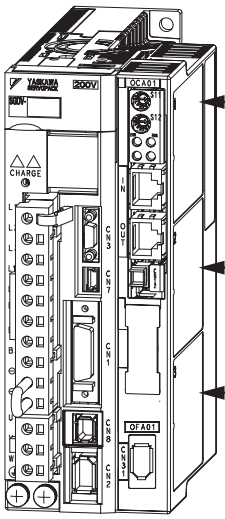
Product Labeling

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:



Nameplate for SERVOPACK
Model : SGDV-□□□□E□A
(Refer to Model Designations provided in the SERVOPACK pages for details)

Nameplate for
INDEXER Option Module **Model : SGDV-OCA03A**
EtherCAT (CoE) Network Module **Model : SGDV-OCA01A**
CANopen Network Module **Model : SGDV-OCB01A**
POWERLINK Network Module **Model : SGDV-OCB02A**

Nameplate for Safety Option Module (SS1, SS2, SLS and STO)
Model : SGDV-OSA01A

Nameplate for Option Module for Fully-closed Loop Control
Model : SGDV-OFA01A

NOTE: Mounting of Option Modules on Amplifiers with Interface Option E1 and E5 requires mounting kit SGDV-OZA01A (metal bar, mounting screws and cover).

SGDV-□□□□E1/E5

Ratings

Single-phase 200 V

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

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

Three-phase 200 V

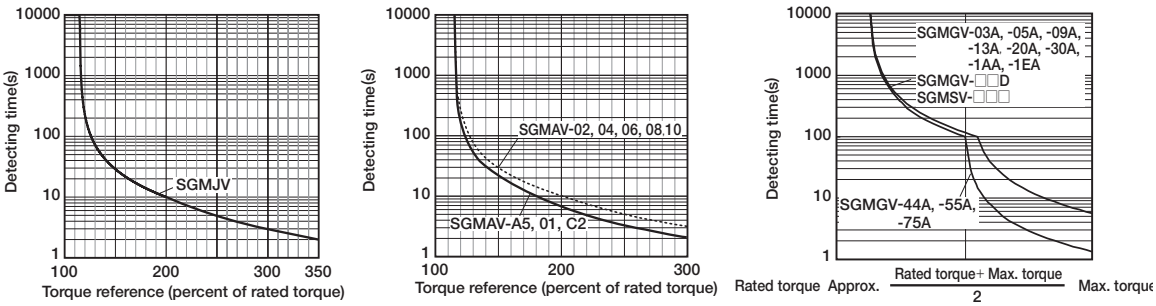
SERVOPACK Model SGDV□□□□		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	A_{rms}	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6	78
Max.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

Three-phase 400 V

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

Note: The entire over voltage category is Ⅲ.

● SERVOPACK Overload Characteristics



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

Specifications

Items		Specifications
Control Method		IGBT PWM control, sine-wave driven
Feedback	Rotary Servomotors	Serial encoder: 13-bit (incremental encoder) : 20-bit (incremental/absolute encoder)
	Linear Servomotors	Absolute linear scale (The signal resolution varies depending on the absolute linear scale.) Incremental linear scale (The signal resolution varies depending on the incremental linear scale or serial converter unit.)
Operating Conditions	Surrounding/Storage Temperature	Surrounding temperature: 0 to +55℃, storage temperature: -20 to +85℃
	Ambient/Storage Humidity	90% RH or less (no freezing or condensation)
	Vibration/Shock Resistance	Vibration resistance: 4.9 m/s², Shock resistance: 19.6 m/s²
	Protection class/Pollution degree	Protection class: IP 10, pollution degree: 2 Do not use SERVOPACKs in the following locations: ·Locations subject to corrosive or flammable gases ·Locations subject to exposure to water, oil, or chemicals ·Locations subject to dust, including iron dust, and salts
	Others	Do not use SERVOPACKs in the following locations: ·Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity
	Altitude	1000 m or less

Specifications

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

*1: Speed regulation is defined as follows:

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

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

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

Power Supply Capacities and Power Losses

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

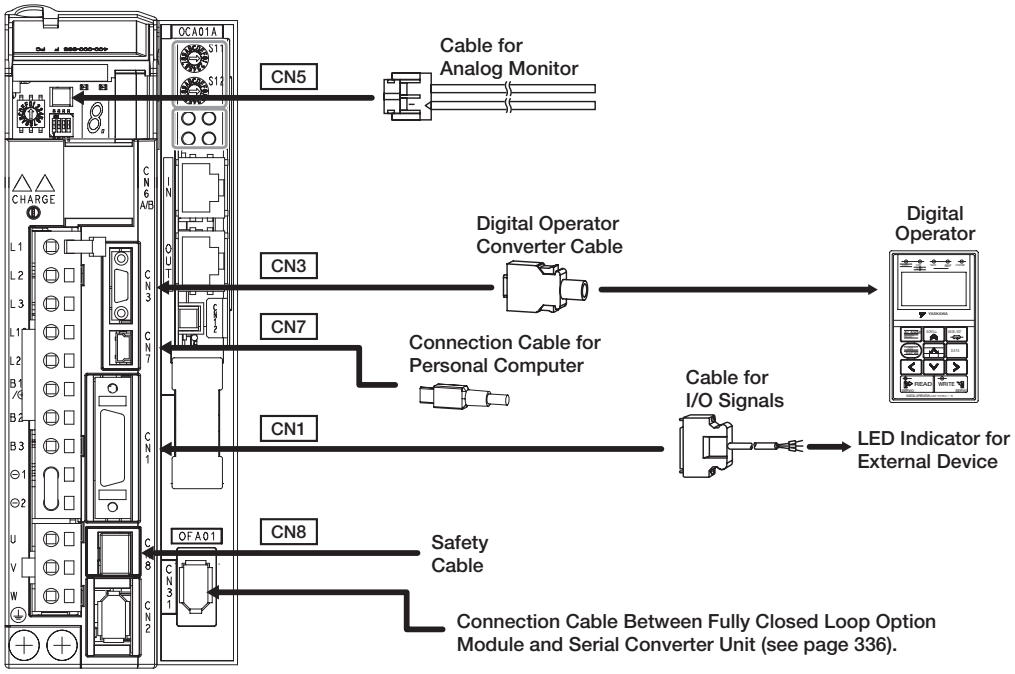
Main Circuit Power Supply	Applicable Servomotor Max. Capacity kW	SERVOPACK Model SGDV	Power Supply Capacity kVA	Output Current A	Main Circuit Power Loss W	Regenerative Resistor Power Loss W	Control Circuit Power Loss W	Total Power Loss W
Single-phase 200 V	0.05	R70A	0.2	0.66	5.2	—	17	22.2
	0.1	R90A	0.3	0.91	7.4			24.4
	0.2	1R6A	0.7	1.6	13.7			30.7
	0.4	2R8A	1.2	2.8	24.9			41.9
	0.75	5R5A	1.9	5.5	52.7	8		77.7
	1.5	120A	4	11.6	68.2	10	22	100.2
Three-phase 200 V	0.05	R70A	0.2	0.66	5.1	—	17	22.1
	0.1	R90A	0.3	0.91	7.3			24.3
	0.2	1R6A	0.6	1.6	13.5			30.5
	0.4	2R8A	1	2.8	24.0			41.0
	0.5	3R8A	1.4	3.8	20.1	8		45.1
	0.75	5R5A	1.6	5.5	43.8			68.8
	1.0	7R6A	2.3	7.6	53.6			78.6
	1.5	120A	3.2	11.6	65.8	10	22	97.8
	2.0	180A	4	18.5	111.9	16		149.9
	3.0	200A	5.9	19.6	113.8			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	33	312.4
	7.5	550A	14.6	54.7	357.8	(350)*2		390.8
	11	590A	21.7	58.6	431.7		48	479.7
	15	780A	29.6	78	599.0			647.0
Three-phase 400 V	0.5	1R9D	1.1	1.9	24.6	14	21	59.6
	1.0	3R5D	2.3	3.5	46.1			81.1
	1.5	5R4D	3.5	5.4	71.3			106.3
	2.0	8R4D	4.5	8.4	77.9	28	25	130.9
	3.0	120D	7.1	11.9	108.7			161.7
	5.0	170D	11.7	16.5	161.1	36	24	221.1
	6.0	210D	12.4	20.8	172.7	(180)*3	27	199.7
	7.5	260D	14.4	25.7	218.6			245.6
	11	280D	21.9	28.1	294.6	(350)*4	30	324.6
	15	370D	30.6	37.2	403.8			433.8

*1: For the optional JUSP-RA04-E regenerative resistor unit.
*2: For the optional JUSP-RA05-E regenerative resistor unit.
*3: For the optional JUSP-RA18-E regenerative resistor unit.
*4: For the optional JUSP-RA19-E regenerative resistor unit.

Notes: 1 SGDVR70A, R90A, 1R6A, and 2R8A SERVOPACKs do not have built-in regenerative resistors.
If the regenerative energy exceeds the specified value, connect an external regenerative resistor (optional).
2 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.

Selecting Cables

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



Name		Length	Order No.	Specifications	Details
CN1 Cables for I/O Signals	Connector Kit		JZSP-CSI9-2-E	Soldered	(1)
	Connector Terminal Converter Unit		JUSP-TA26P-E	Terminal Block and 0.5 m Connection Cable	(2)
	Cable with Loose wire at One End	1 m	JZSP-CSI02-1-E		(3)
		2 m	JZSP-CSI02-2-E		
		3 m	JZSP-CSI02-3-E		
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 Monitor		1 m	JZSP-CA01-E	SERVOPACK End	(7)
CN8 Cables for Safety Functions	Cables with Connector*2	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3		(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 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.

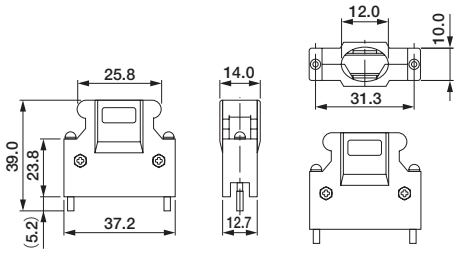
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-2-E	10326-52A0-008*	1 set	10126-3000PE* (Soldered)	1

* : Manufactured by Sumitomo 3M Ltd.

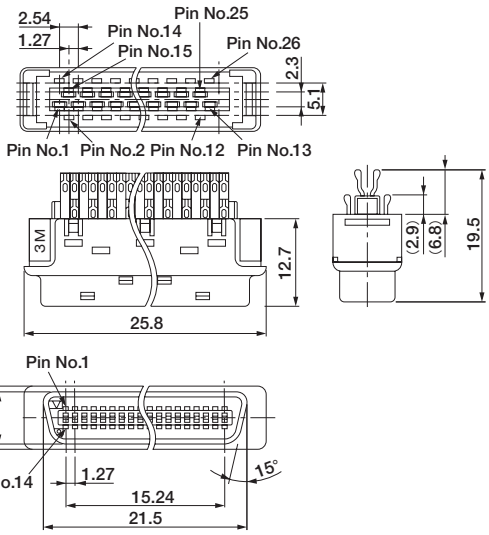
· Cable Size

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

· External Dimensions of Case (Units: mm)

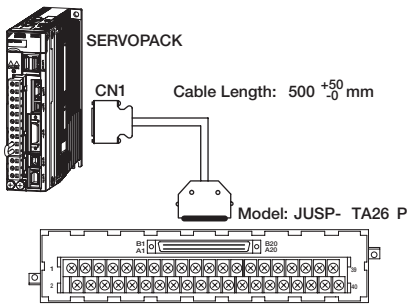


· External Dimensions of Connector (Units: mm)

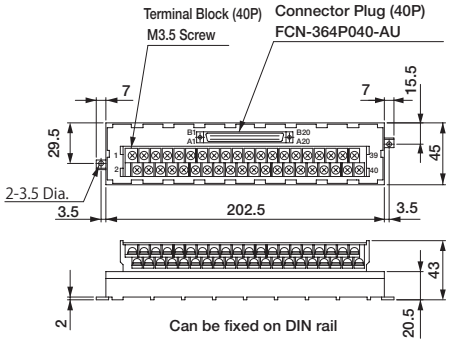


(2) Connector Terminal Converter Unit for CN1

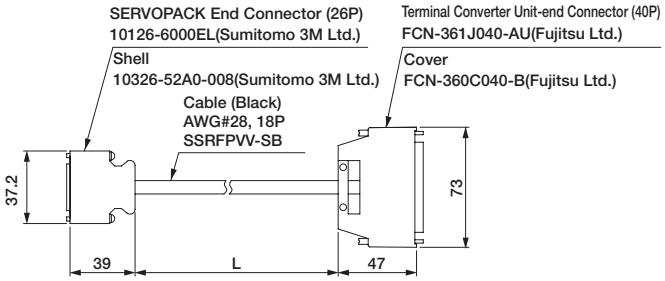
· Configurations



· External Dimensions of Terminal Block (Units: mm)



· External Dimensions of Cable (Units: mm)



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

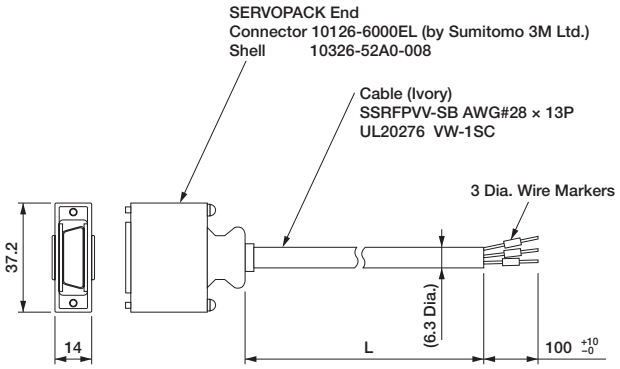
Note: The pin number in the SERVOPACK connector and the pin number in the terminal block are the same. Pin numbers 1 to 26 are used in the terminal block. Do not use a pin number of 27 or higher.
If assembling cables, refer to ●*Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CSI02-□-E Cable* on the next page.

Selecting Cables

Selecting Cables

(3) Cable with Loose Wires at One End for CN1

External Dimensions of Cable (Units: mm)



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

● Cable with Loose Wires at One End for CN1

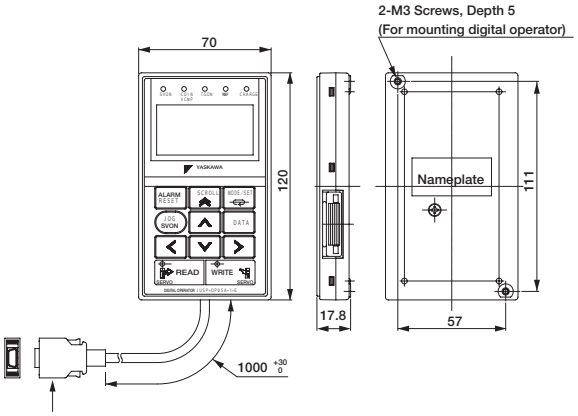
Connection Diagram of JZSP-CSI02-□-E Cable

SERVOPACK End

Pin No.	Signal	Wire Color	Marking		Host Controller End Lead Marker
			Color	Dots	
1	/BK+	Blue	Red	1	1
2	/BK−	Blue	Black	1	2
3	ALM+	Pink	Red	1	3
4	ALM−	Pink	Black	1	4
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	/SI0	Pink	Red	2	13
14	BAT (+)	Pink	Black	2	14
15	BAT (−)	Green	Red	2	15
16	SG	Green	Black	2	16
17	PAO	Orange	Red	2	17
18	/PAO	Orange	Black	2	18
19	PBO	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

: Represents twisted-pair wires.

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

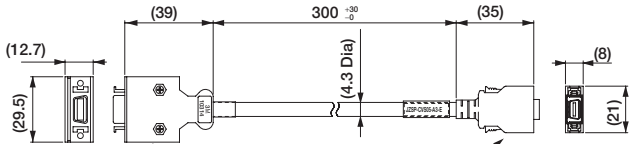


Connector: HDR-E14MAG1+(Honda Tsushin Kogyo Co., Ltd.)
Case: HDR-E14LPA5(Honda Tsushin Kogyo Co., Ltd.)

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

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

· External Dimensions (Units: mm)



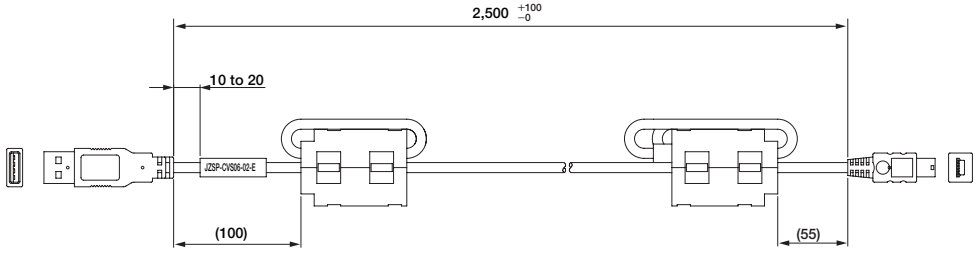
Connector (14-pole): 10214-6202PL
(Sumitomo 3M Ltd.)
Cover: FA458036
(Yasco Components Co., Ltd.)

Connector (14-pole): HDR-E14MAG1+
(Honda Tsushin Kogyo Co., Ltd.)
Cover: HDR-E14LPA5
(Honda Tsushin Kogyo Co., Ltd.)

Selecting Cables

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

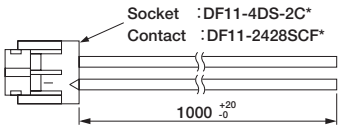
· External Dimensions (Units: mm)



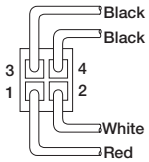
IMPORTANT Use a cable specified by Yaskawa. When using other cables, operation cannot be guaranteed.

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

· External Dimensions (Units: mm)



* : Manufactured by Hirose Electric Corporation.



View from Cable End

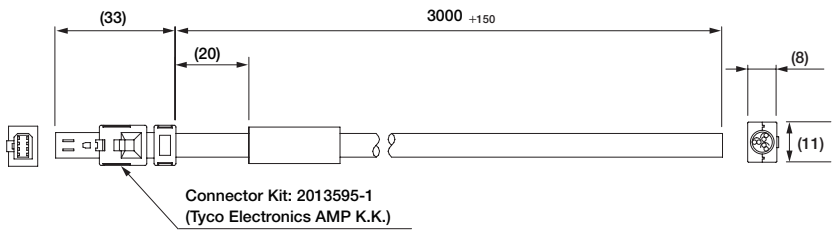
· Specifications

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

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

· External Dimensions (Units: mm)

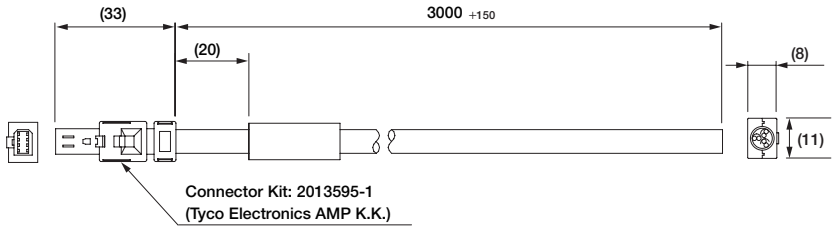


• Specifications

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

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

• External Dimensions (Units: mm)



• Specifications

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

SERVOPACK External Dimensions

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

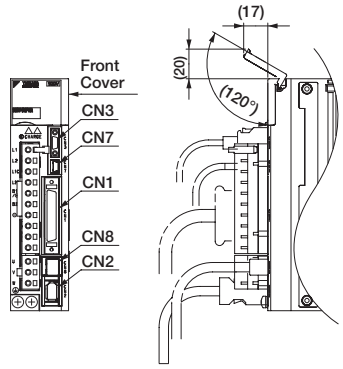
SERVOPACK	Mounting	Without Option Module	With Option Module
Analog Voltage/Pulse Train Reference SERVOPACK, MECHATROLINK-Ⅱ Communications Reference SERVOPACK, MECHATROLINK-Ⅲ Communications Reference SERVOPACK	Base-mounted	Page 274 to 279	Page 286 to 293
	Rack-mounted*	Page 280 to 285	Page 294 to 301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

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

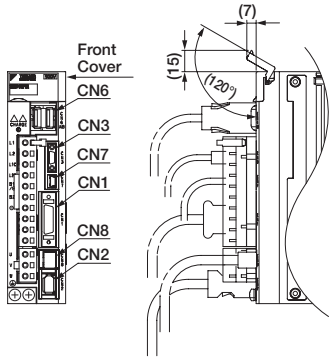
● Dimensional Drawings

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.

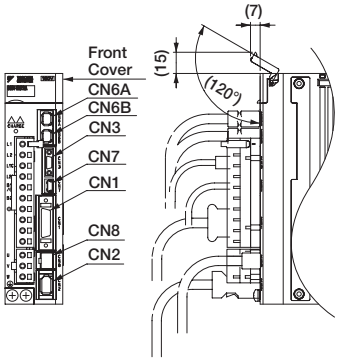
● Analog Voltage/Pulse Train Reference SERVOPACK



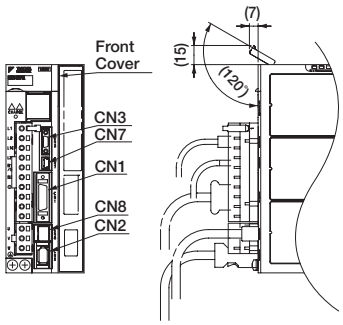
● MECHATROLINK-Ⅱ Communications Reference SERVOPACK



● MECHATROLINK-Ⅲ Communications Reference SERVOPACK



● Command Option Attachable Type 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-Ⅱ/Ⅲ Communications Reference Type SERVOPACKs and INDEXER Module Type SERVOPACKs.

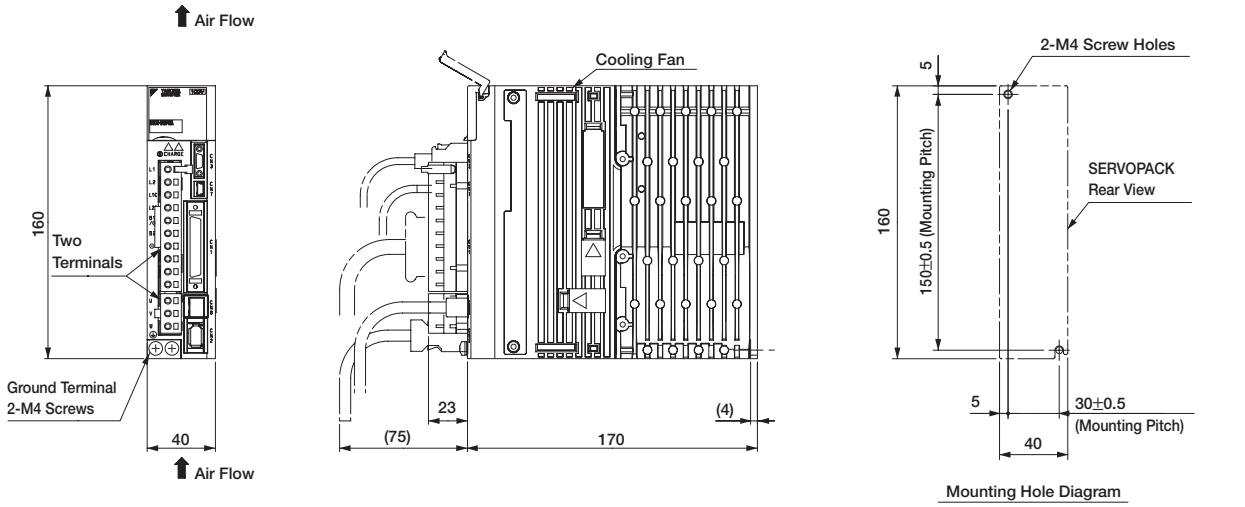
Note: The connectors above or their equivalents are used for SERVOPACKs.

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

External Dimensions Units: mm (Without Option Module)

● Base-Mounted SERVOPACKs

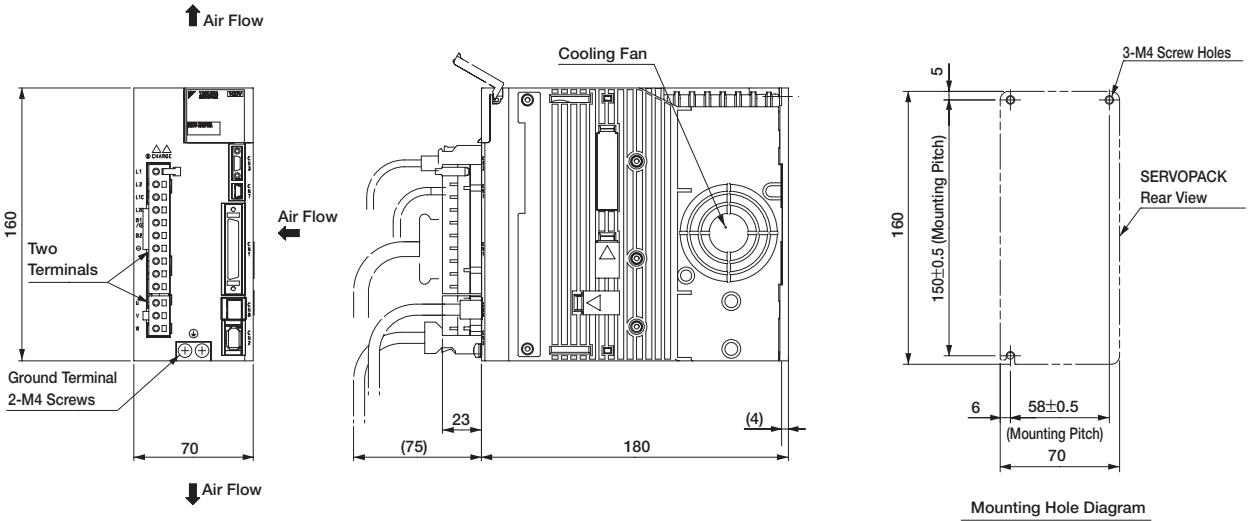
(1) Single-phase 100 VAC, Model: SGDV-R70F□□A, -R90F□□A, and -2R1F□□A



Mounting Hole Diagram

Approx. Mass: 1.0 kg

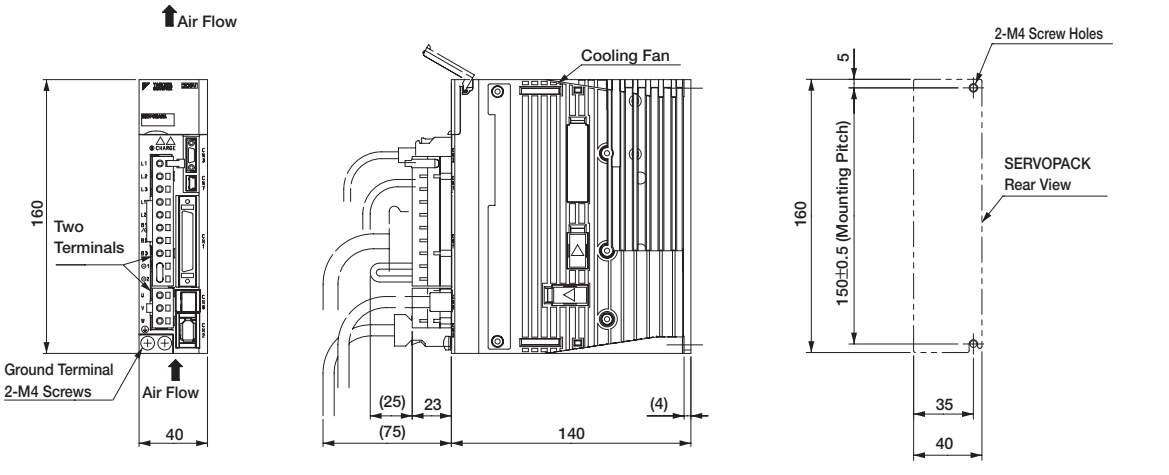
(2) Single-phase 100 VAC, Model: SGDV-2R8F□□A



Mounting Hole Diagram

Approx. Mass: 1.5 kg

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



Mounting Hole Diagram

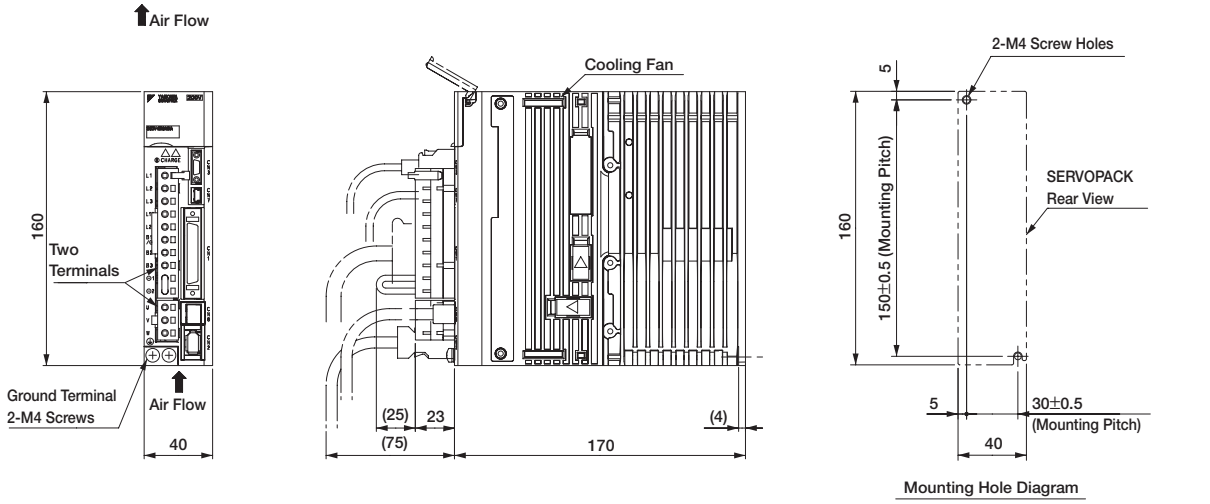
Approx. Mass: 0.9 kg

SERVOPACK External Dimensions

External Dimensions Units: mm (Without Option Module)

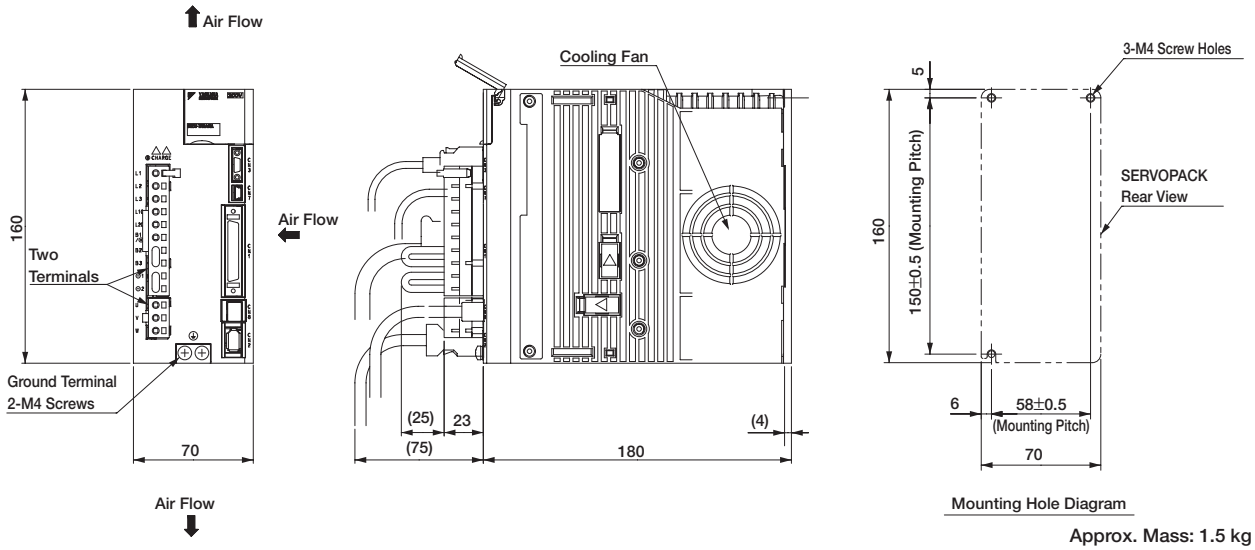
●Base-Mounted SERVOPACKs

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



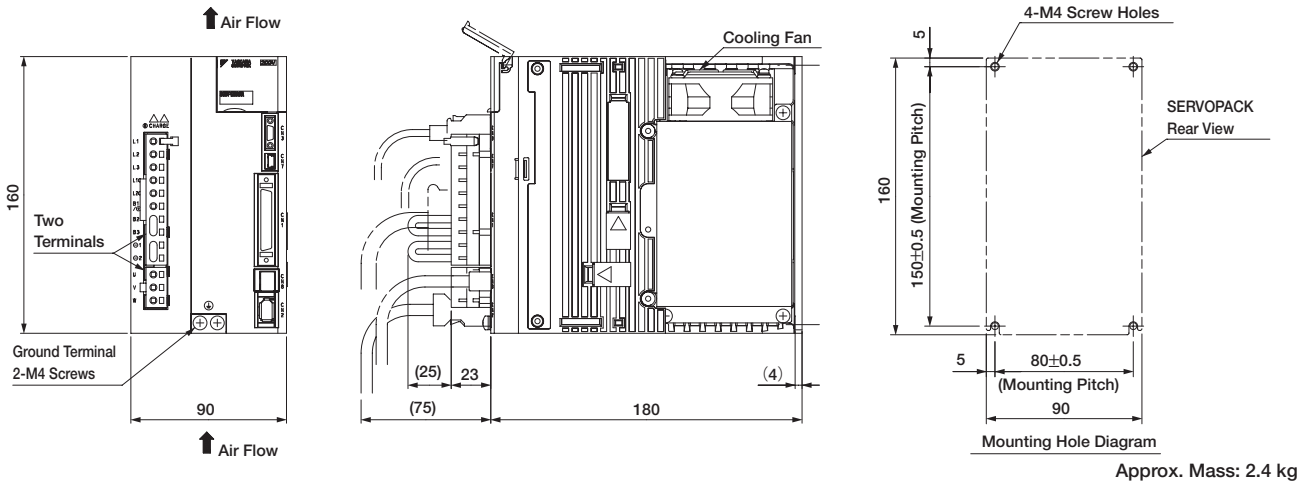
Approx. Mass: 1.0 kg

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



Approx. Mass: 1.5 kg

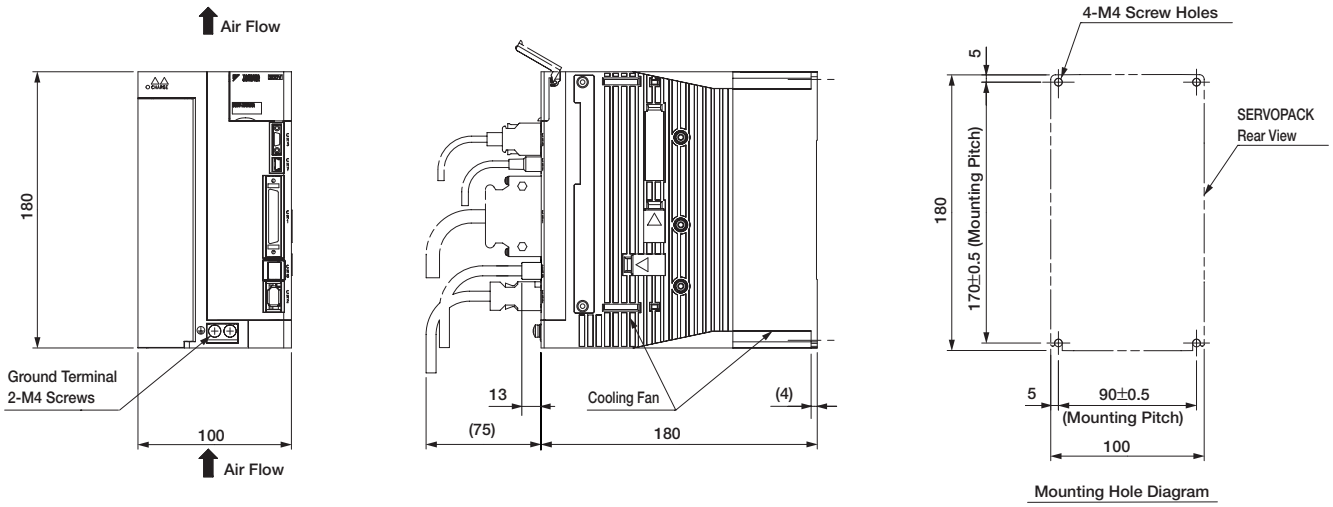
(6) Three-phase 200 VAC, Model: SGDV-120A□□A



Approx. Mass: 2.4 kg

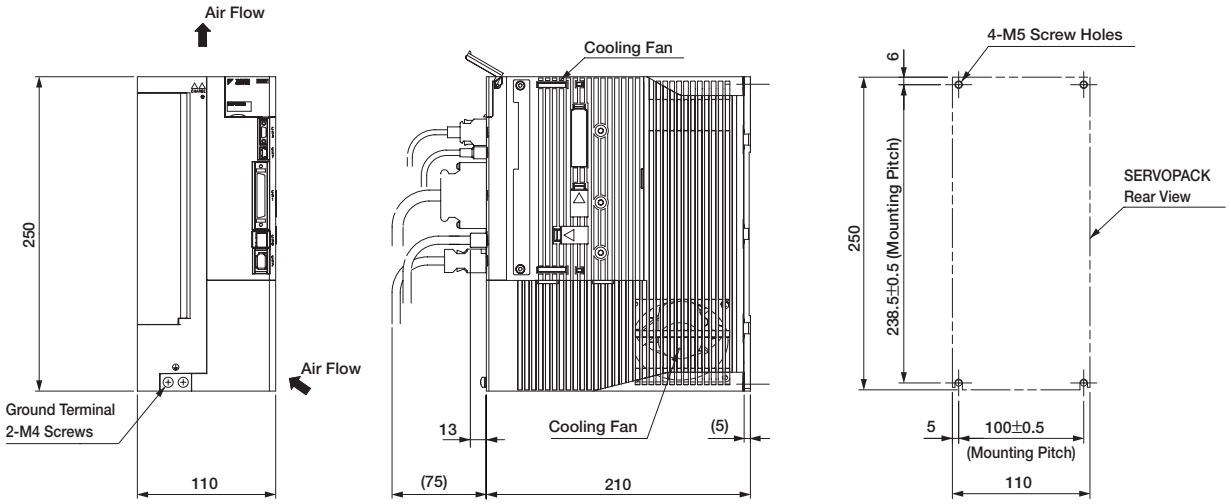
External Dimensions Units: mm (Without Option Module)

(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□□A

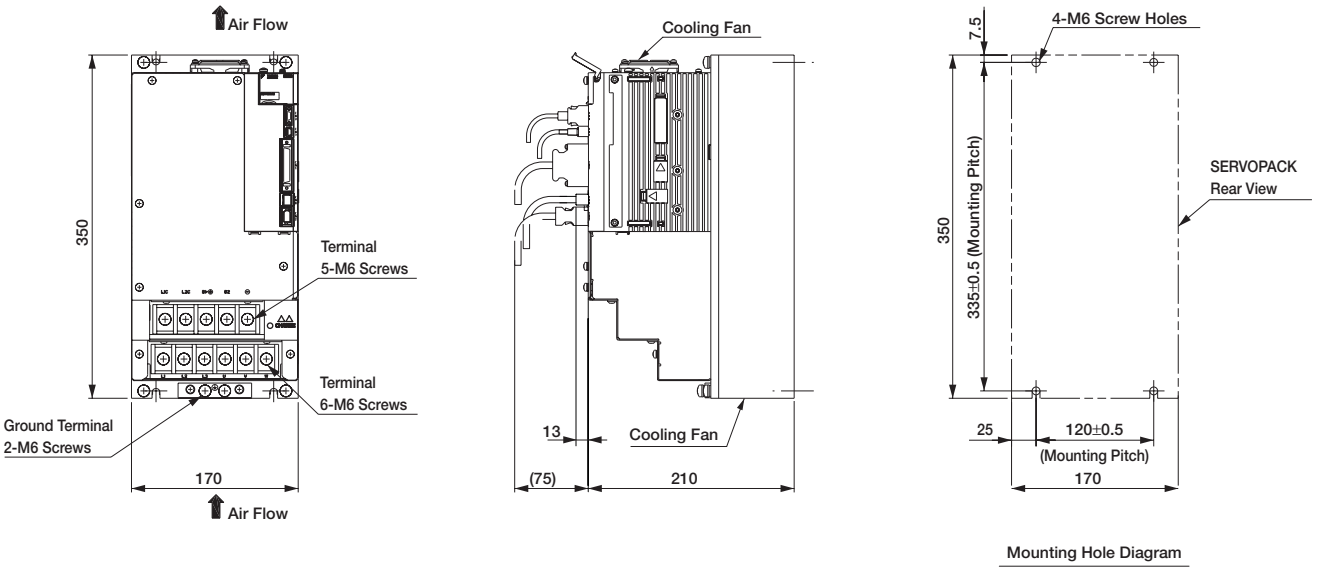


Approx. Mass: 4.6 kg

External Dimensions Units: mm (Without Option Module)

●Base-Mounted SERVOPACKs

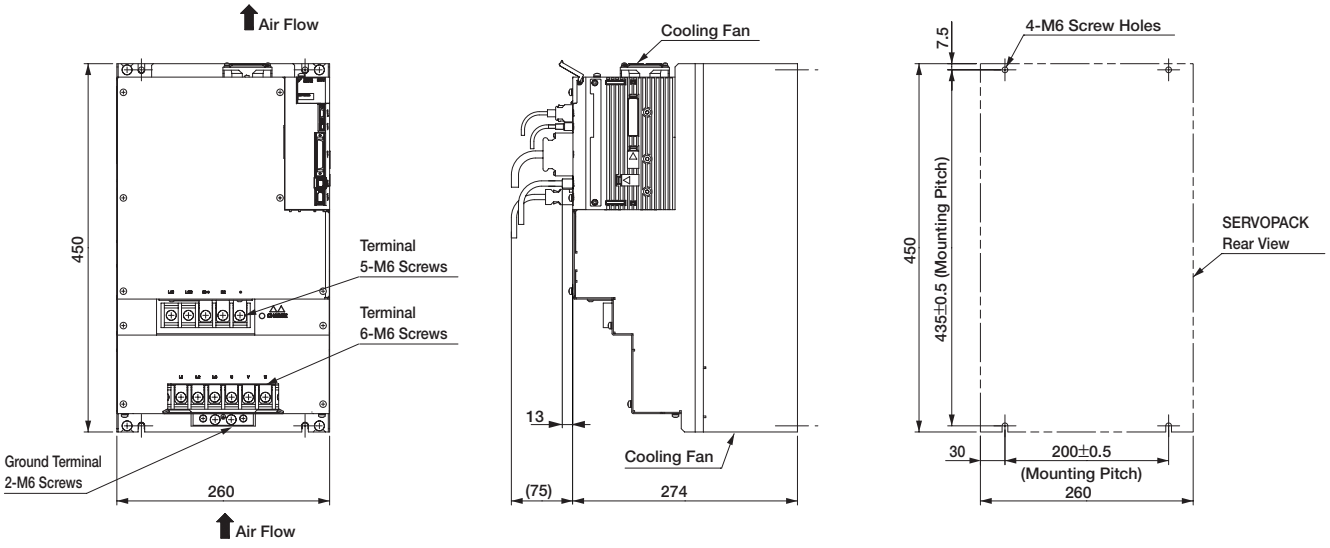
(9) Three-phase 200 VAC, Model: SGDV-470A□□A and -550A□□A



Mounting Hole Diagram

Approx. Mass: 10.2 kg

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

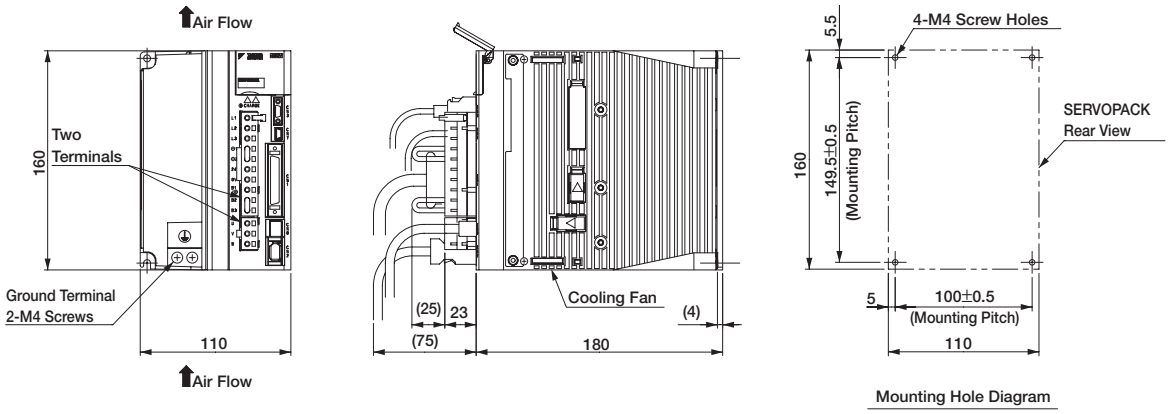


Mounting Hole Diagram

Approx. Mass: 21.3 kg

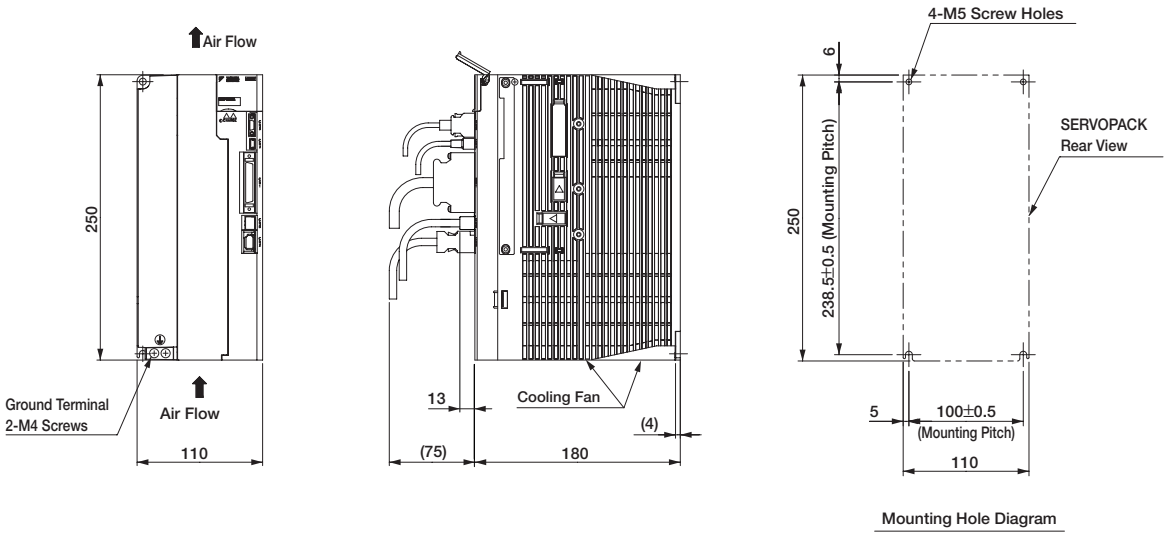
External Dimensions Units: mm (Without Option Module)

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



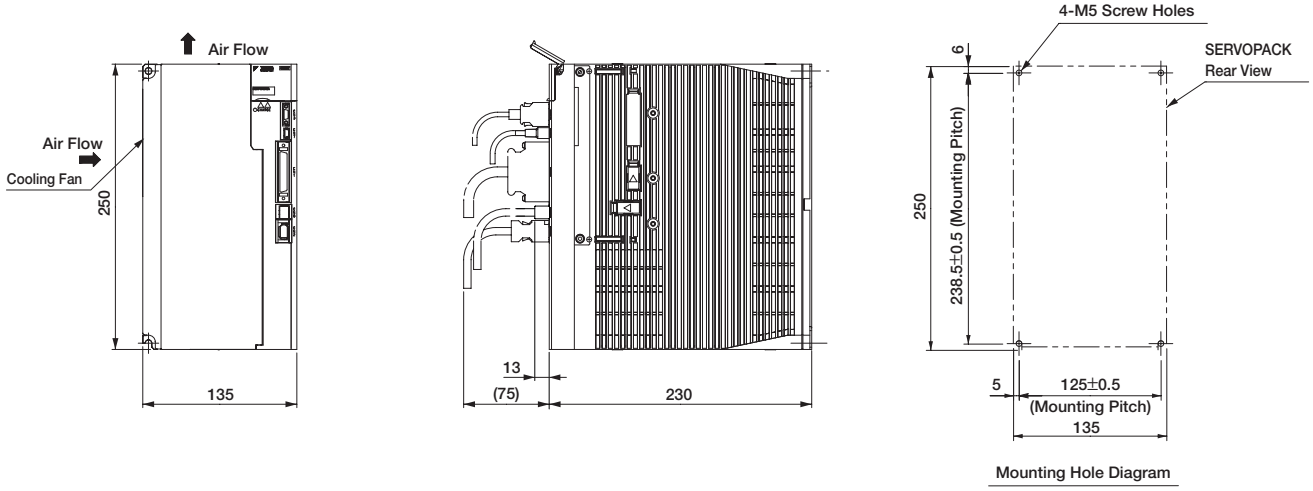
Approx. Mass: 2.7 kg

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



Approx. Mass: 3.7 kg

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

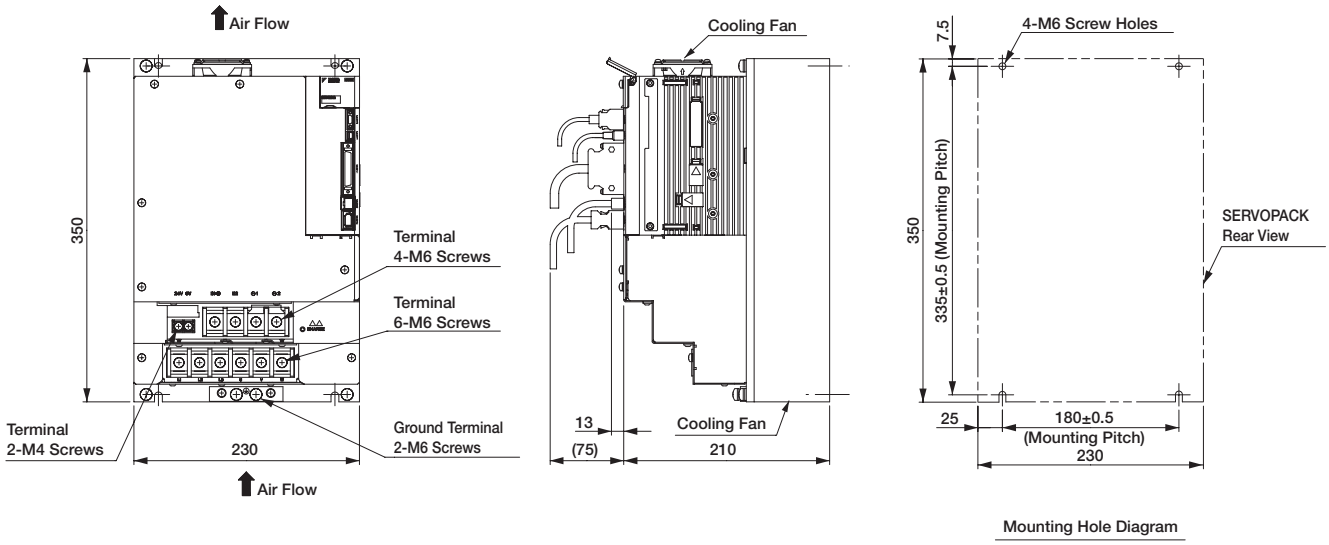


Approx. Mass: 5.6 kg

External Dimensions Units: mm (Without Option Module)

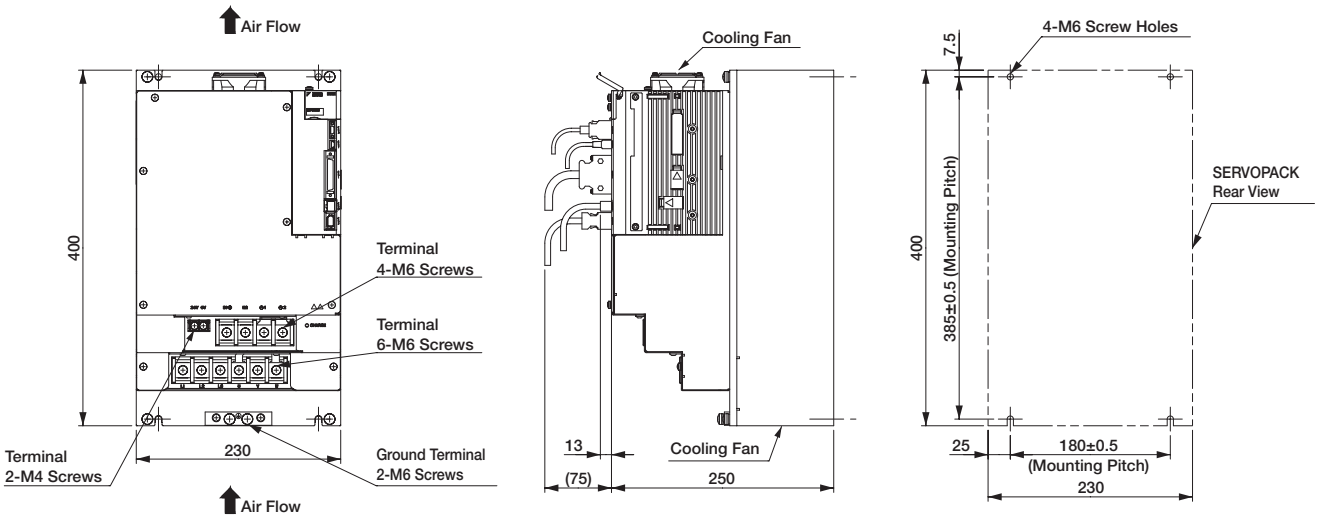
●Base-Mounted SERVOPACKs

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



Approx. Mass: 11.3 kg

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

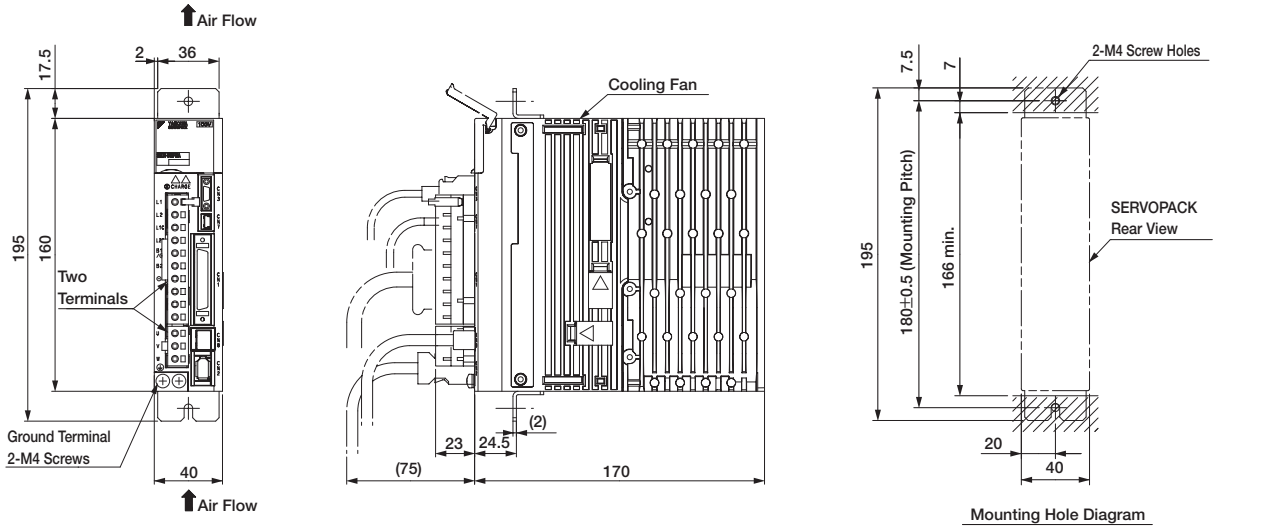


Approx. Mass: 16.2 kg

External Dimensions Units: mm (Without Option Module)

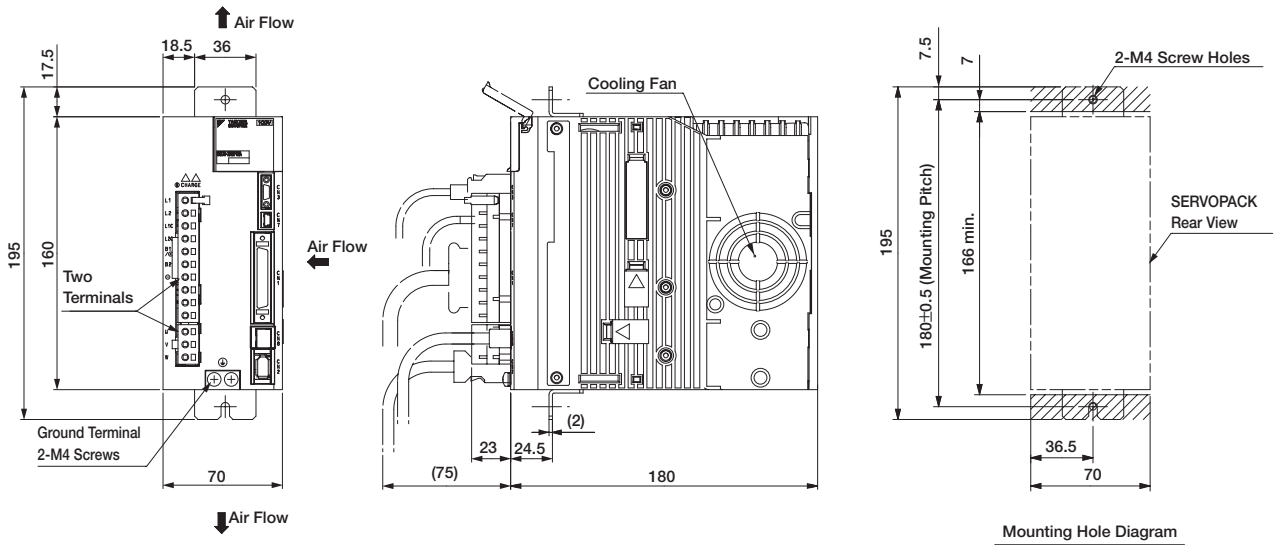
●Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(1) Single-phase 100 VAC, Model: SGDV-R70F□□A001, -R90F□□A001, and -2R1F□□A001



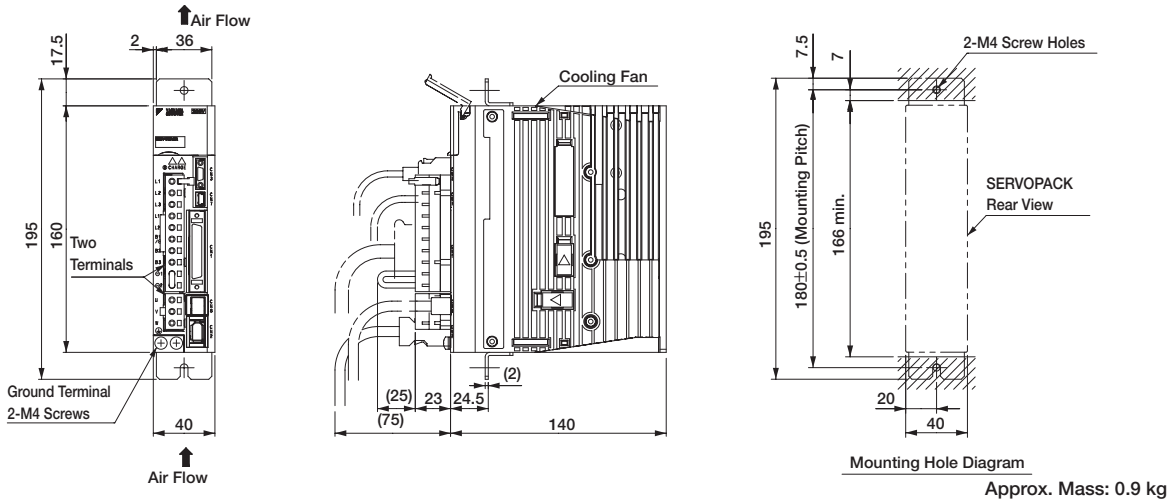
Approx. Mass: 1.1 kg

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



Approx. Mass: 1.5 kg

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



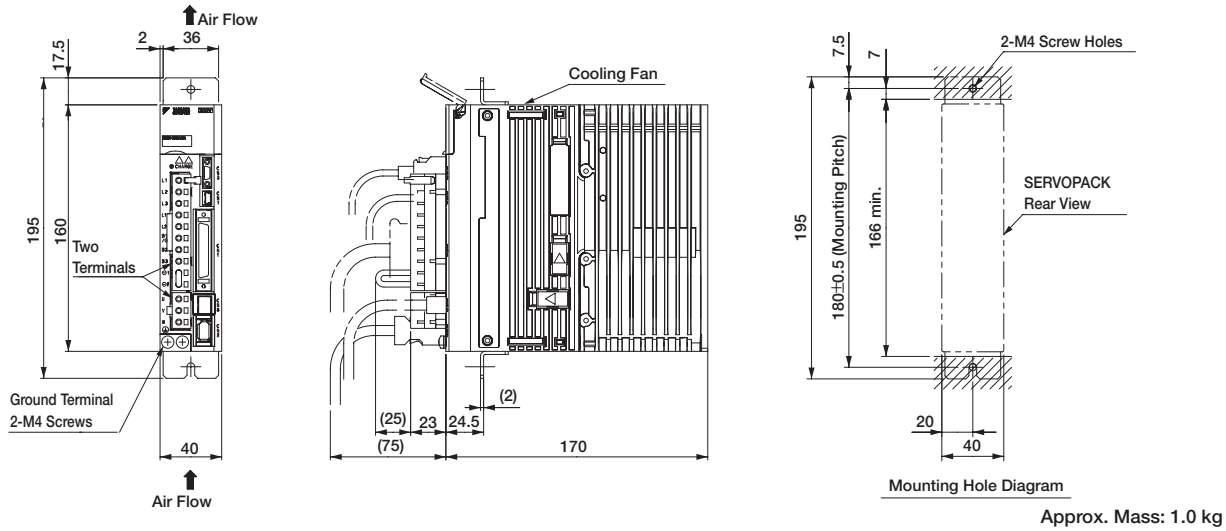
Approx. Mass: 0.9 kg

SERVOPACK External Dimensions

External Dimensions Units: mm (Without Option Module)

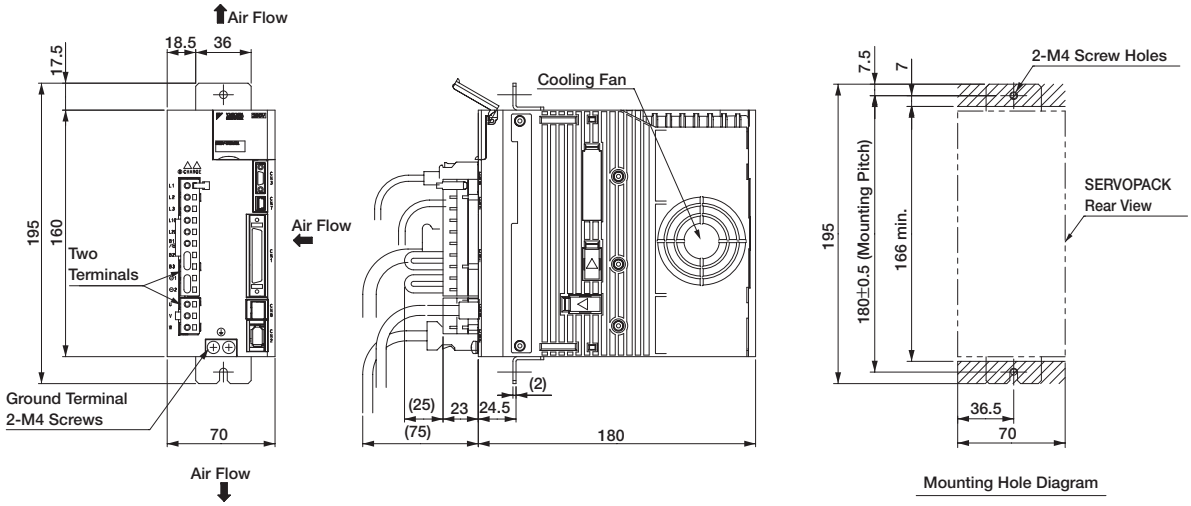
●Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(4) Three-phase 200 VAC, Model: SGDV-2R8A□□A001



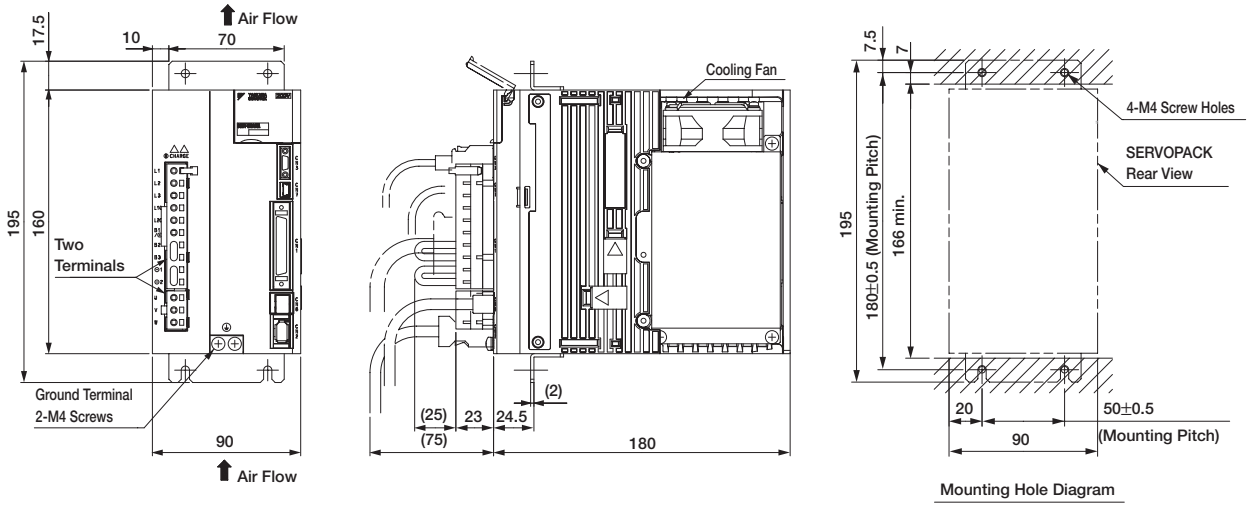
Approx. Mass: 1.0 kg

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



Approx. Mass: 1.5 kg

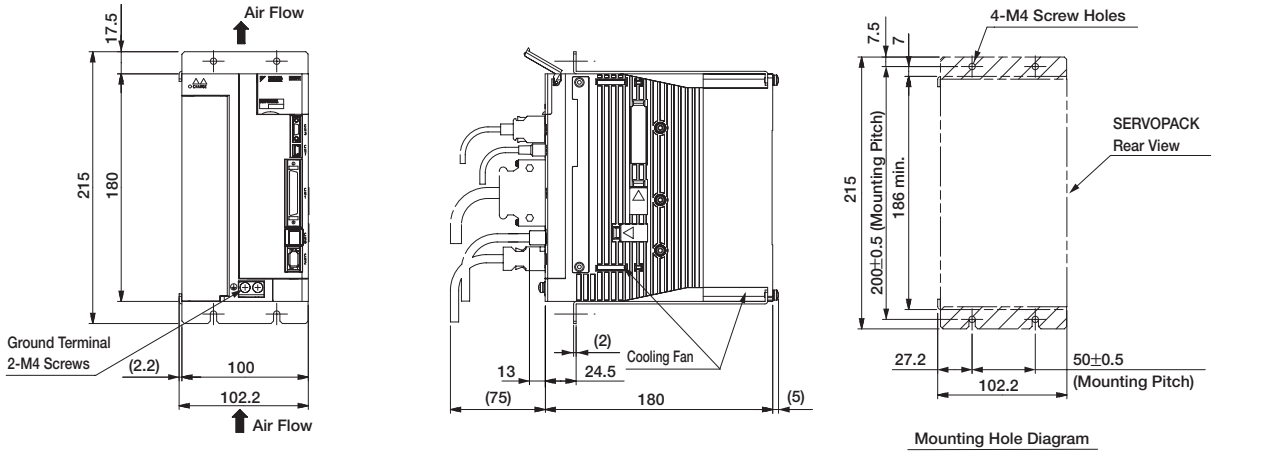
(6) Three-phase 200 VAC, Model: SGDV-120A□□A001



Approx. Mass: 2.5 kg

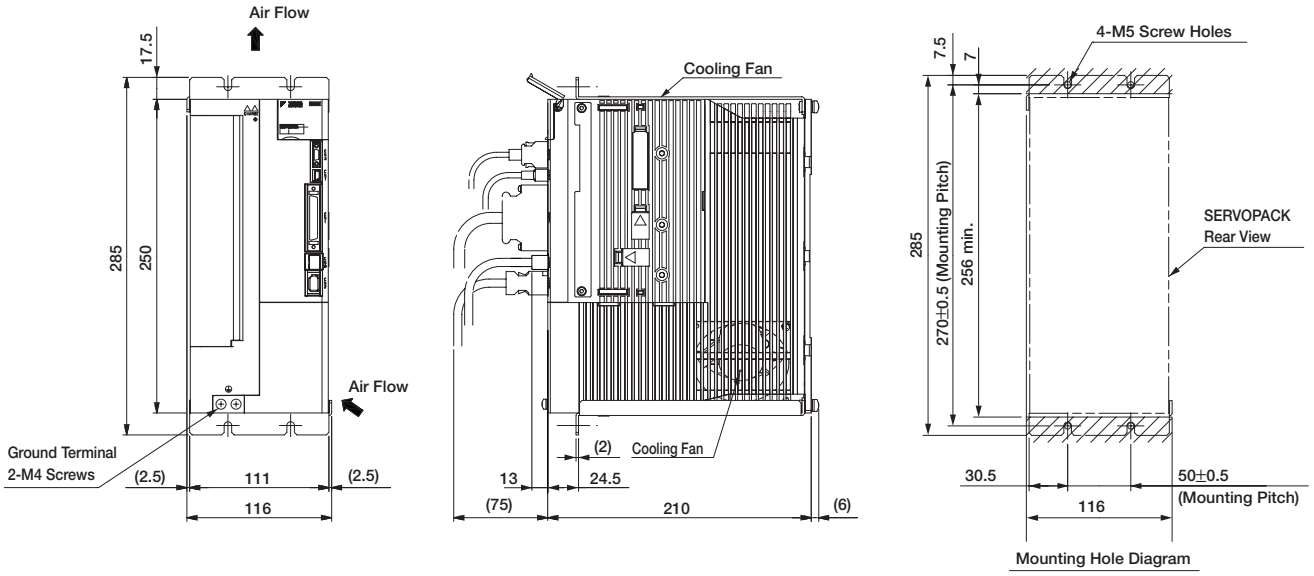
External Dimensions Units: mm (Without Option Module)

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



Approx. Mass: 3.1 kg

(8) Three-phase 200 VAC, Model: SGDV-330A□□A001



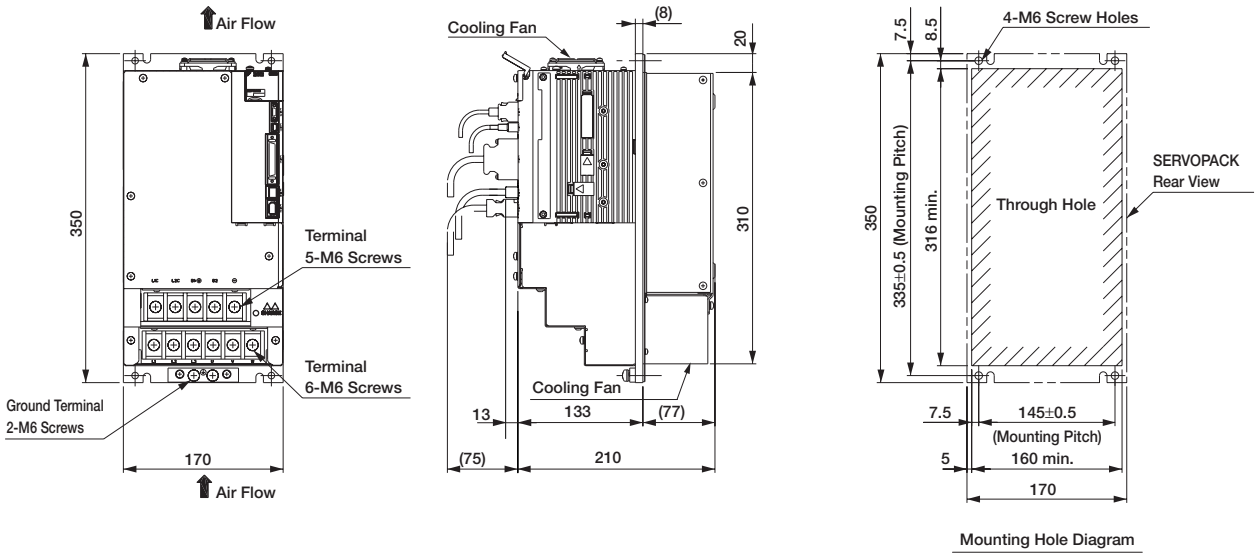
Approx. Mass: 5.0 kg

SERVOPACK External Dimensions

External Dimensions Units: mm (Without Option Module)

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

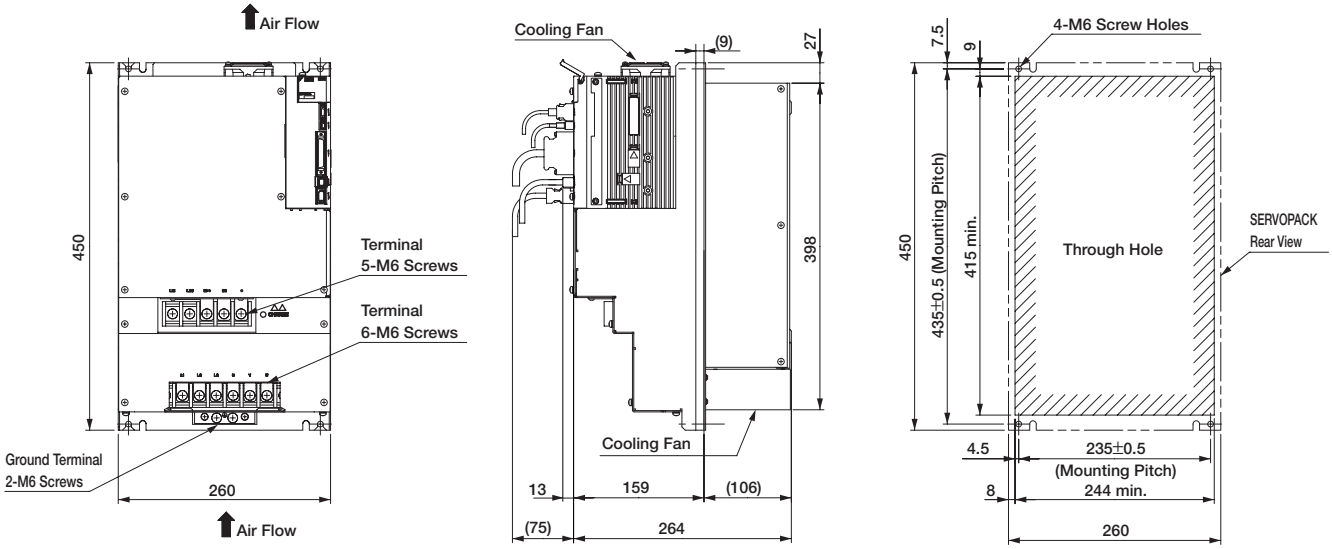
(9) Three-phase 200 VAC, Model: SGDV-470A□□A001 and -550A□□A001 (duct-ventilated)



Mounting Hole Diagram

Approx. Mass: 8.5 kg

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

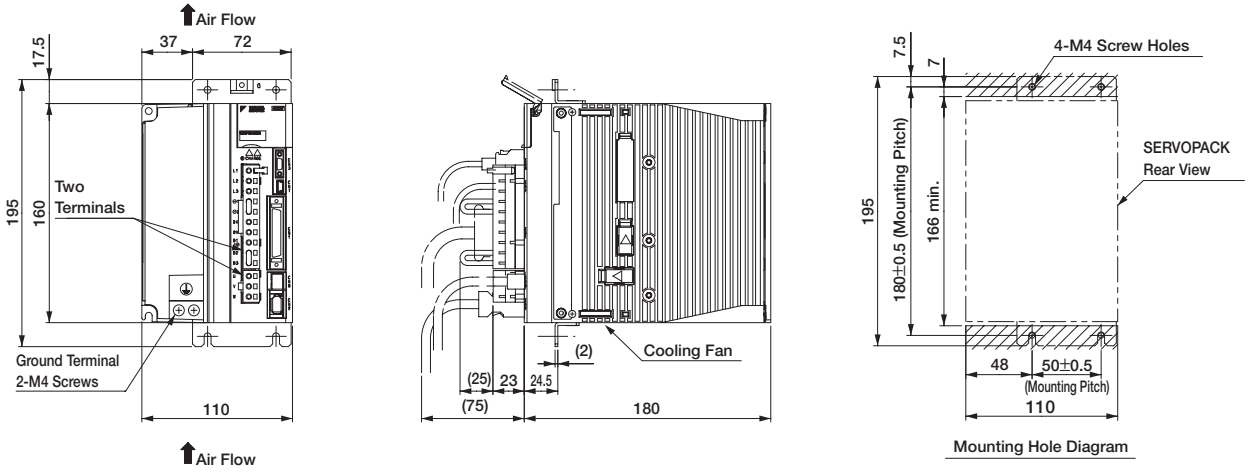


Mounting Hole Diagram

Approx. Mass: 16.3 kg

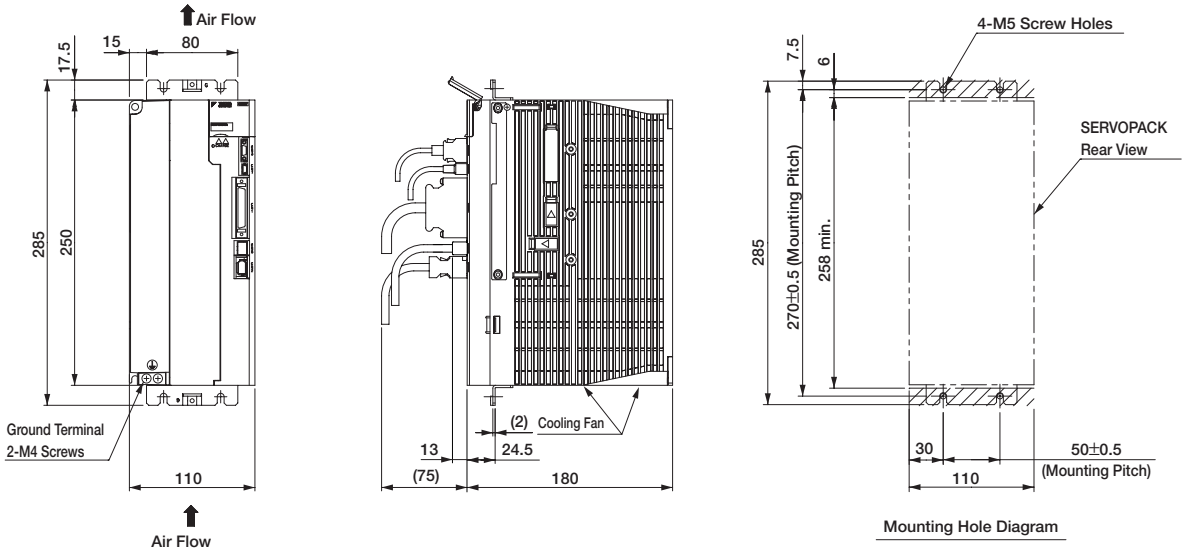
External Dimensions Units: mm (Without Option Module)

(11) Three-phase 400 VAC, Model: SGDV-1R9D□□A001, -3R5D□□A001, and -5R4D□□A001



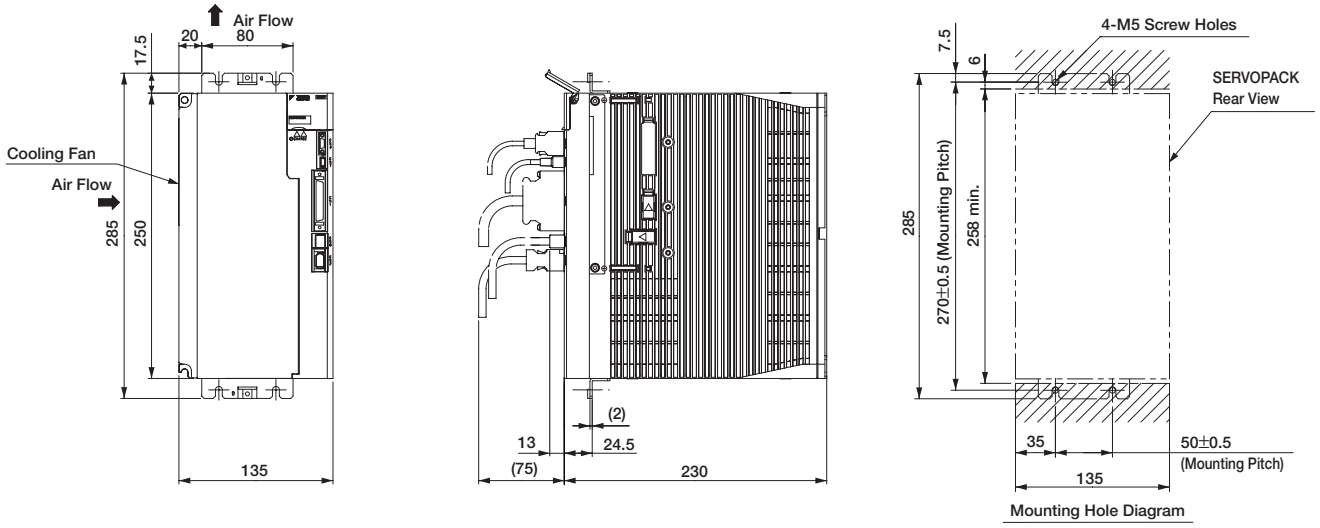
Approx. Mass: 2.7 kg

(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

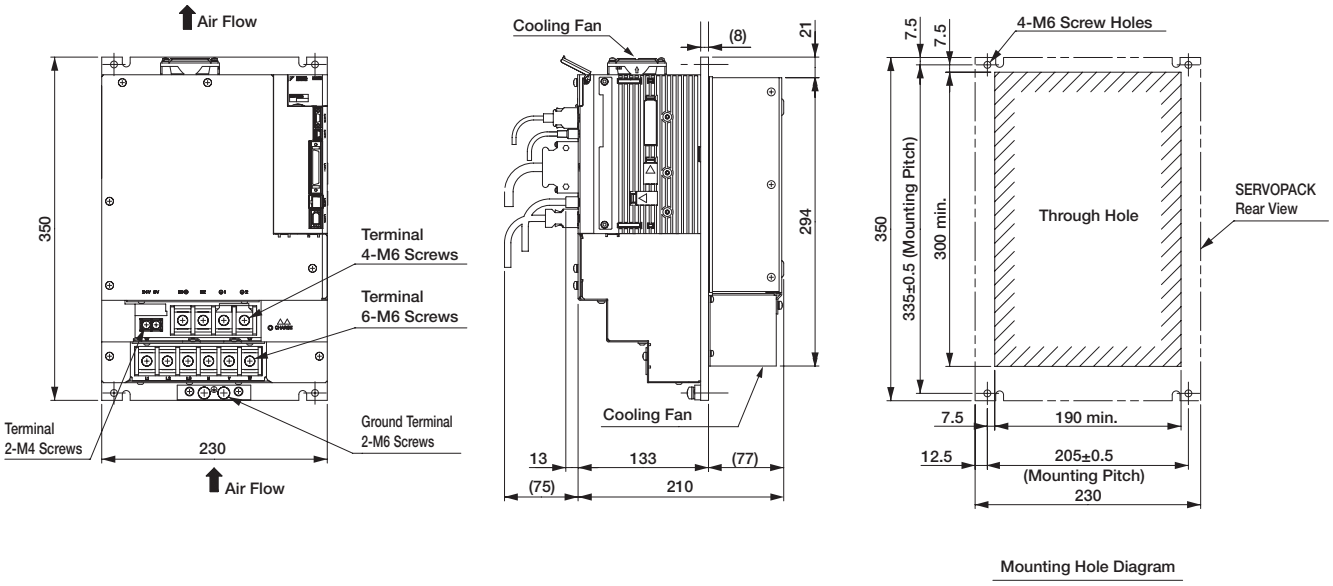


Approx. Mass: 5.7 kg

External Dimensions Units: mm (Without Option Module)

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

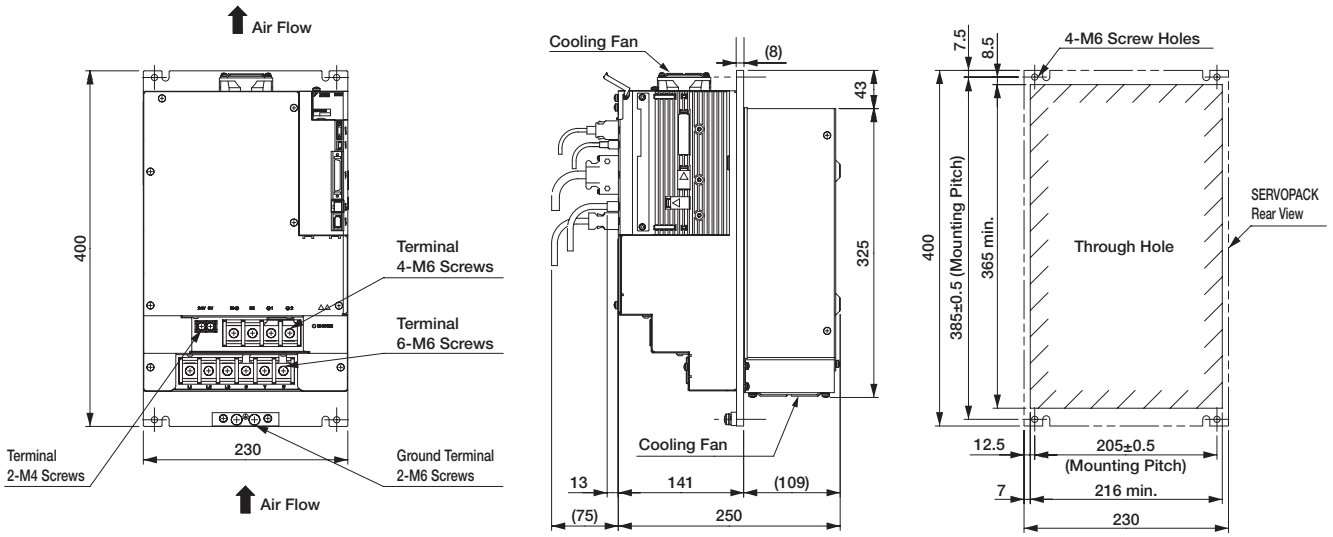
(14) Three-phase 400 VAC, Model: SGDV-210D□□A001 and -260D□□A001 (duct-ventilated)



Mounting Hole Diagram

Approx. Mass: 8.1 kg

(15) Three-phase 400 VAC, Model: SGDV-280D□□A001 and -370D□□A001 (duct-ventilated)



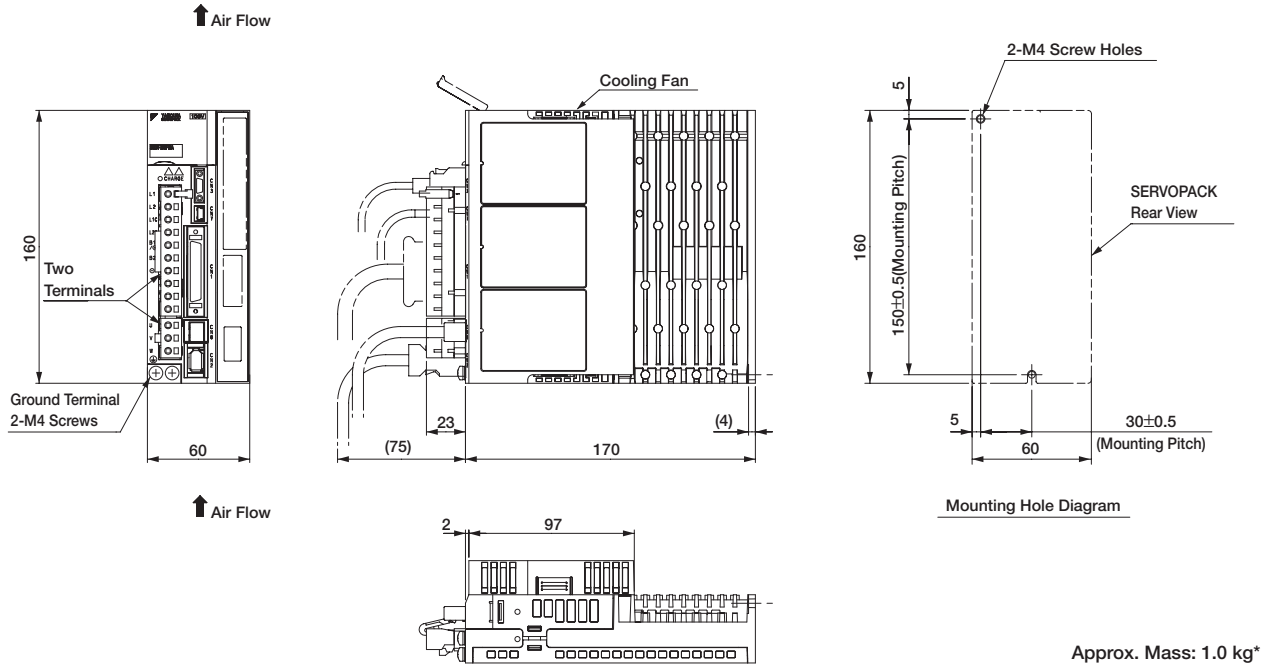
Mounting Hole Diagram

Approx. Mass: 13.4 kg

External Dimensions Units: mm (With Option Module)

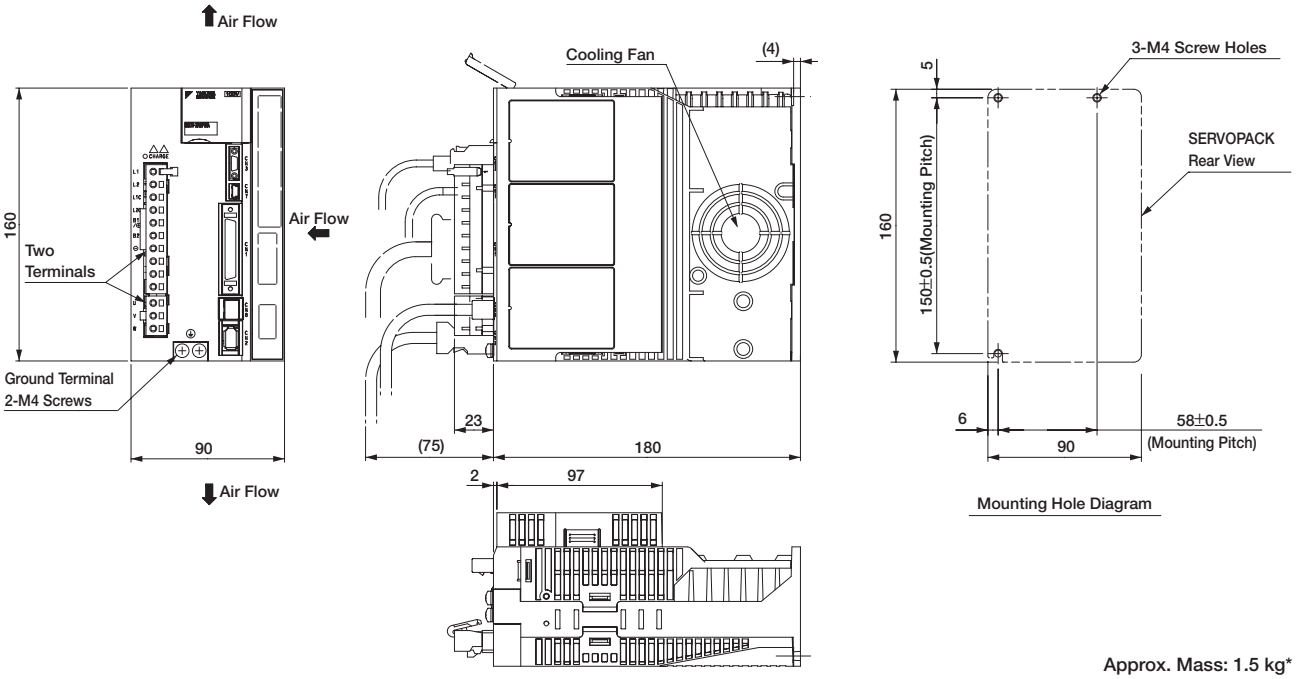
●Base-Mounted SERVOPACKs

(1) Single-phase 100 VAC,
Model: SGDVR70F□□A000000□□□, SGDVR90F□□A000000□□□, and SGDV2R1F□□A000000□□□



Approx. Mass: 1.0 kg*

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



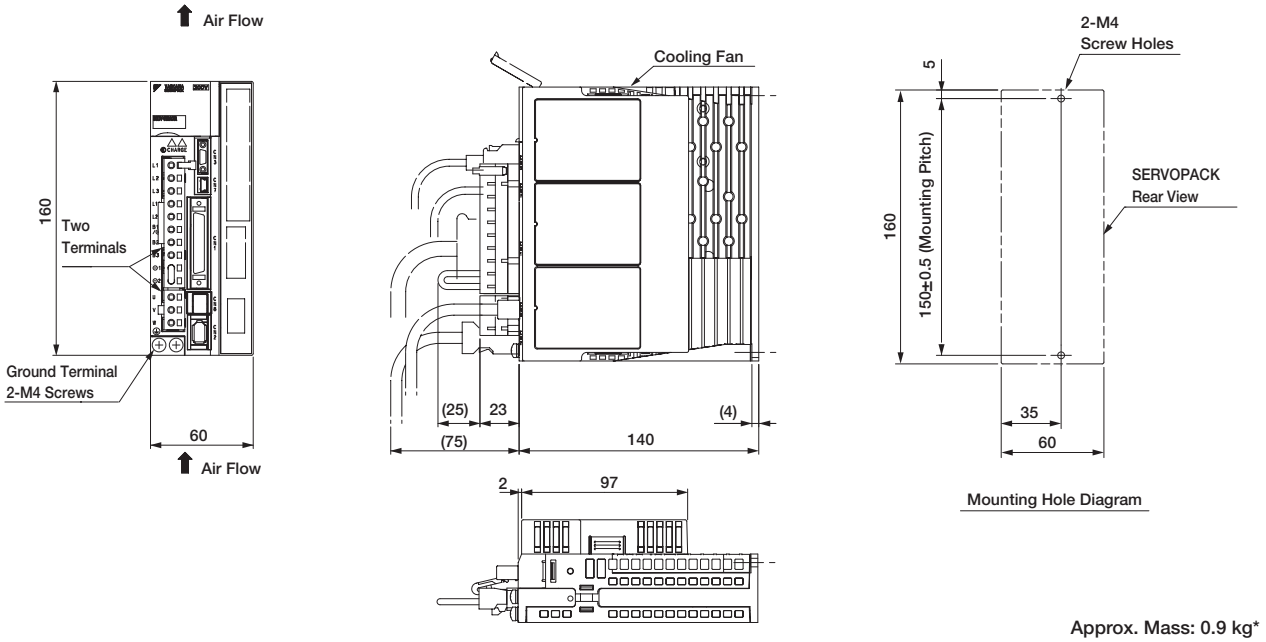
Approx. Mass: 1.5 kg*

*: 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

External Dimensions Units: mm (With Option Module)

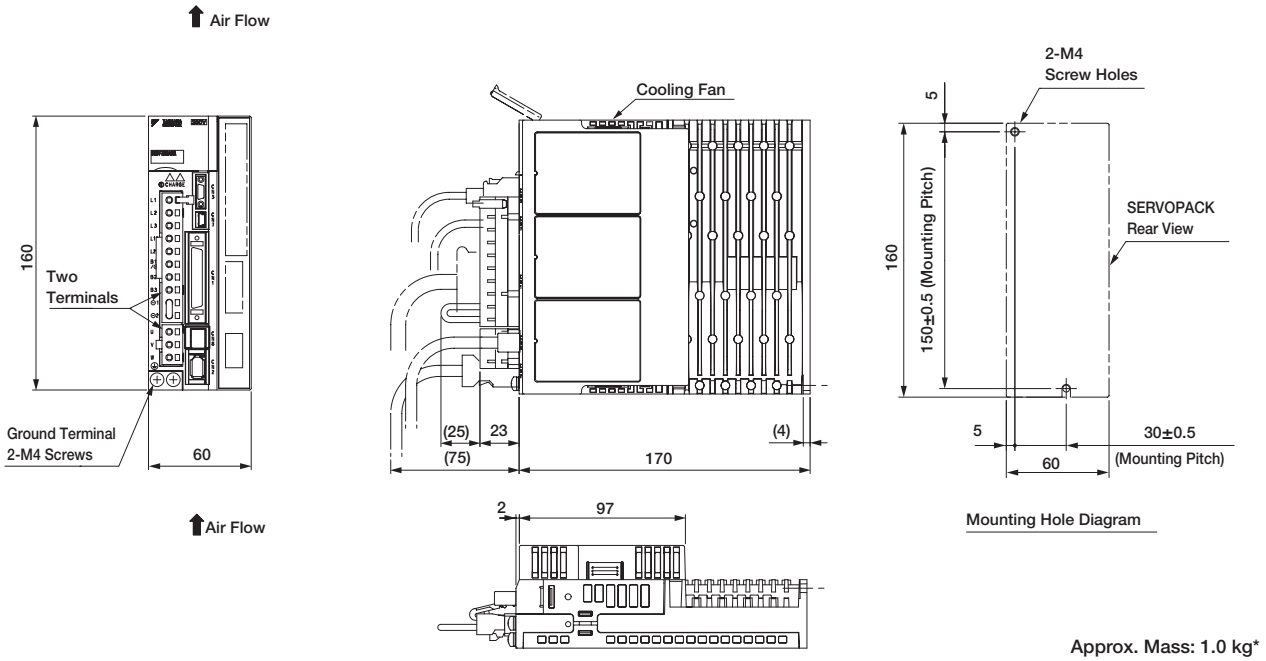
●Base-Mounted SERVOPACKs

(3) Three-phase 200 VAC,
Model: SGDVR70A□□A000000□□□, SGDVR90A□□A000000□□□, and SGDV1R6A□□A000000□□□



Approx. Mass: 0.9 kg*

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

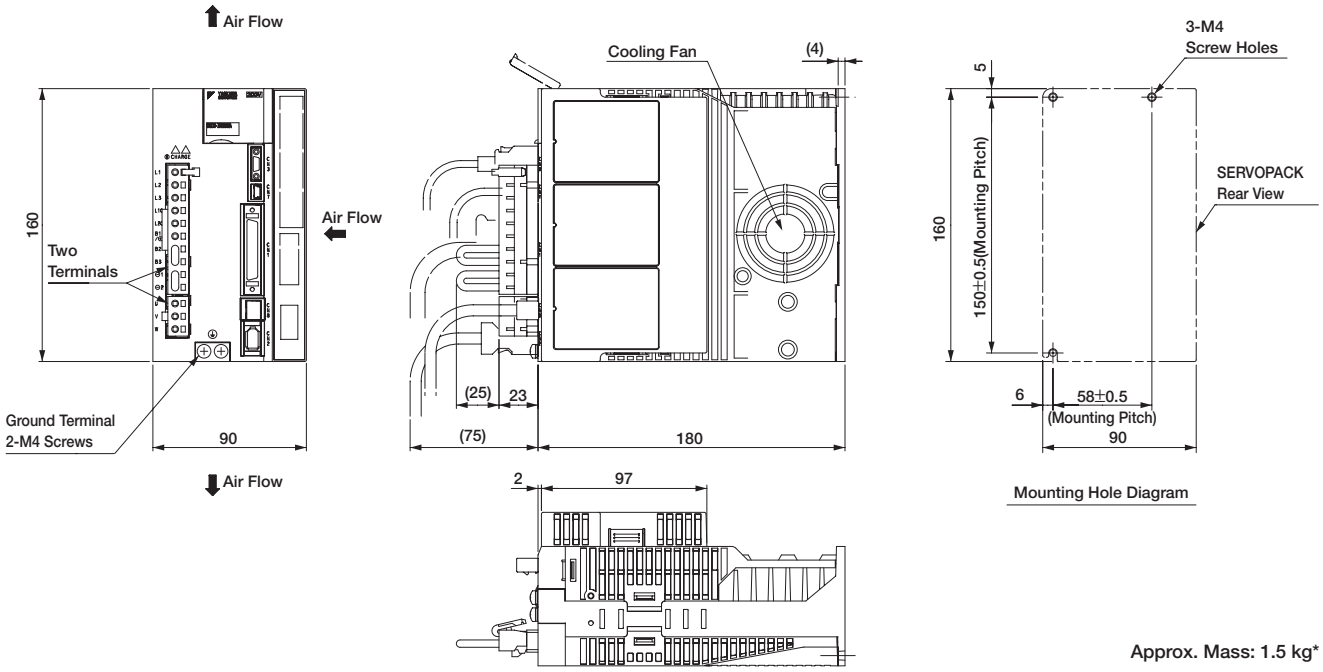


Approx. Mass: 1.0 kg*

*: 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

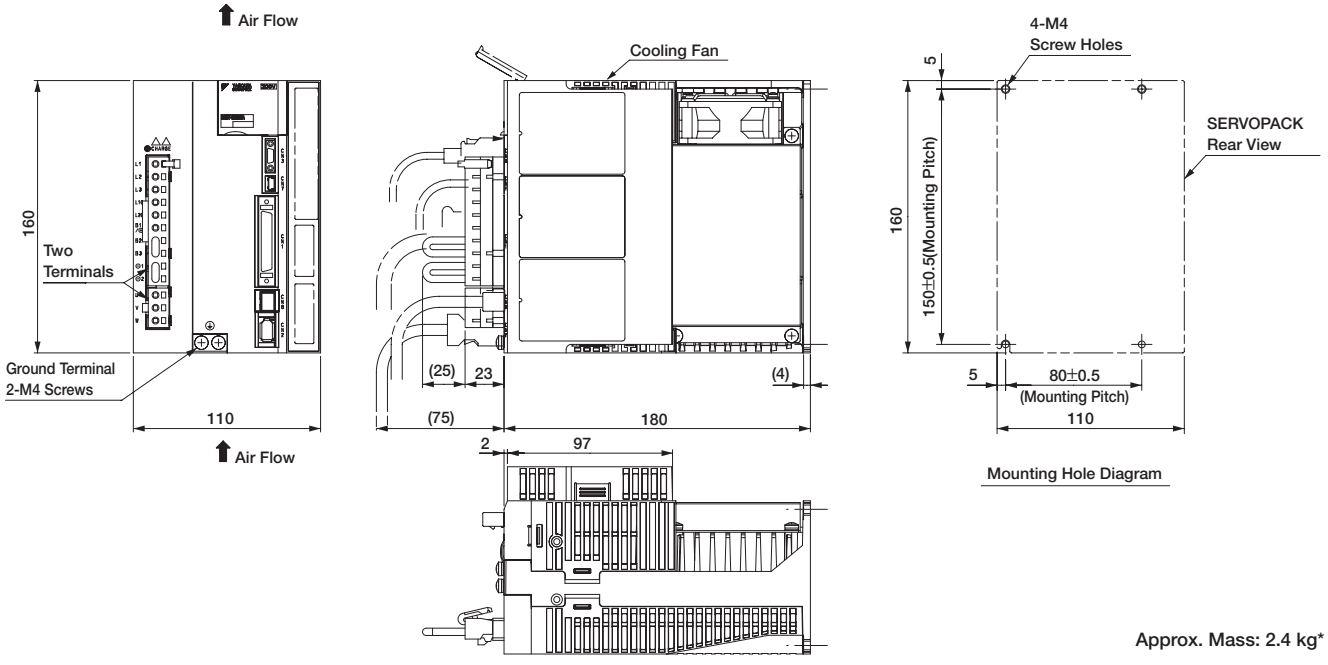
External Dimensions Units: mm (With Option Module)

(5) Three-phase 200 VAC,
Model: SGDV3R8A□□A000000□□□, SGDV5R5A□□A000000□□□, and SGDV7R6A□□A000000□□□



Approx. Mass: 1.5 kg*

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



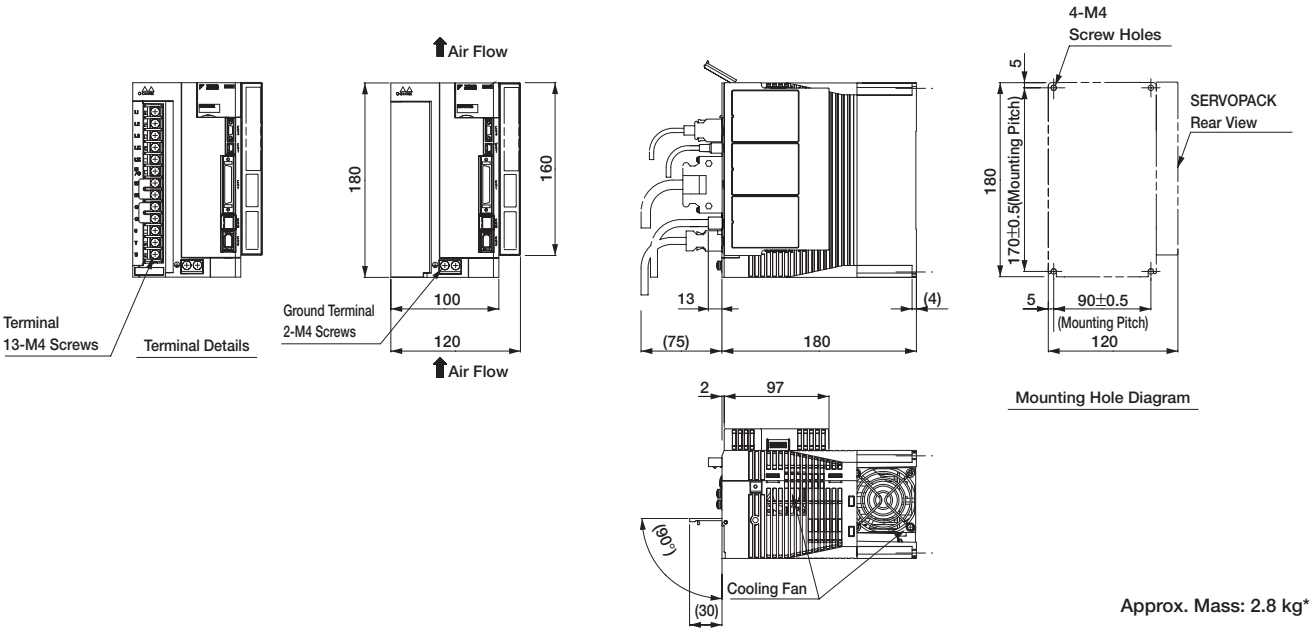
Approx. Mass: 2.4 kg*

*: 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

External Dimensions Units: mm (With Option Module)

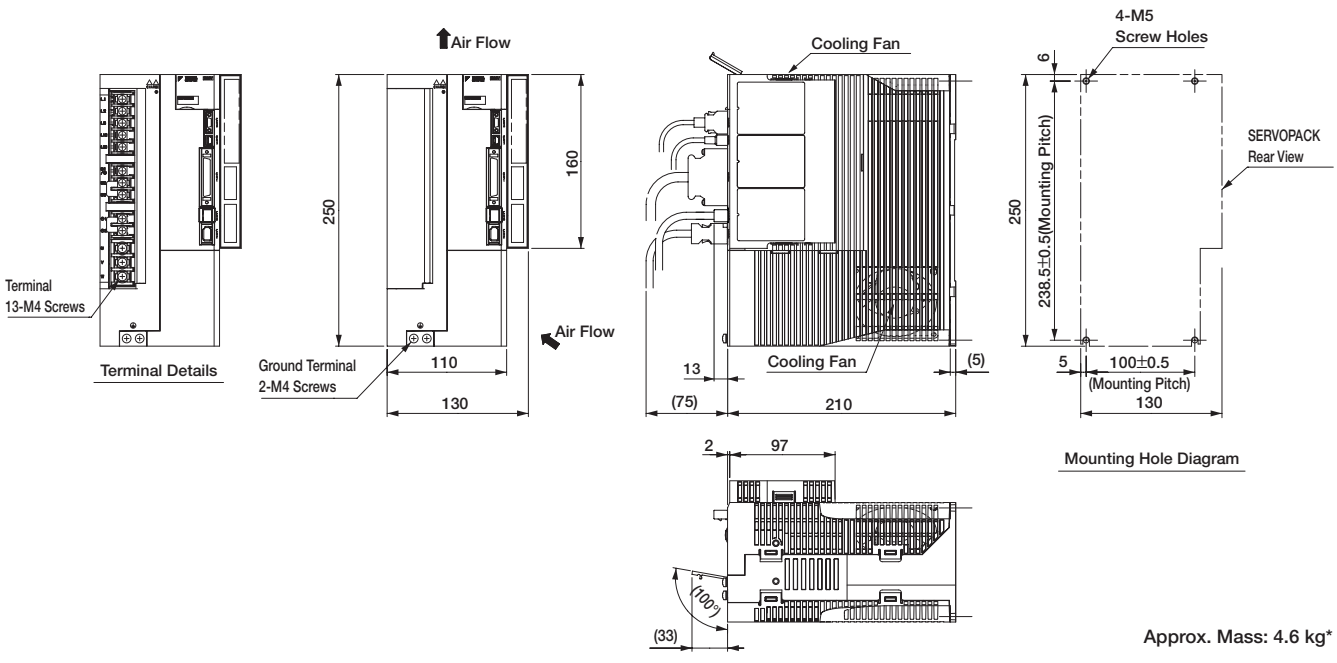
● Base-Mounted SERVOPACKs

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



Approx. Mass: 2.8 kg*

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

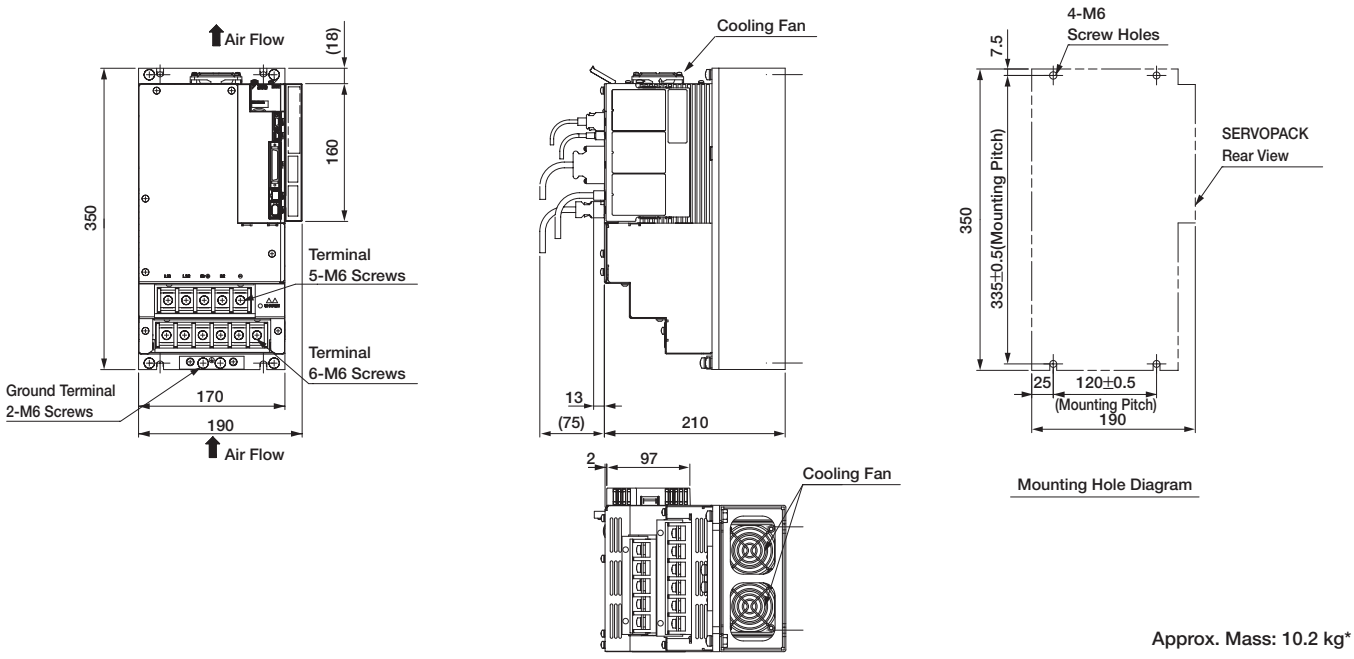


Approx. Mass: 4.6 kg*

*: 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

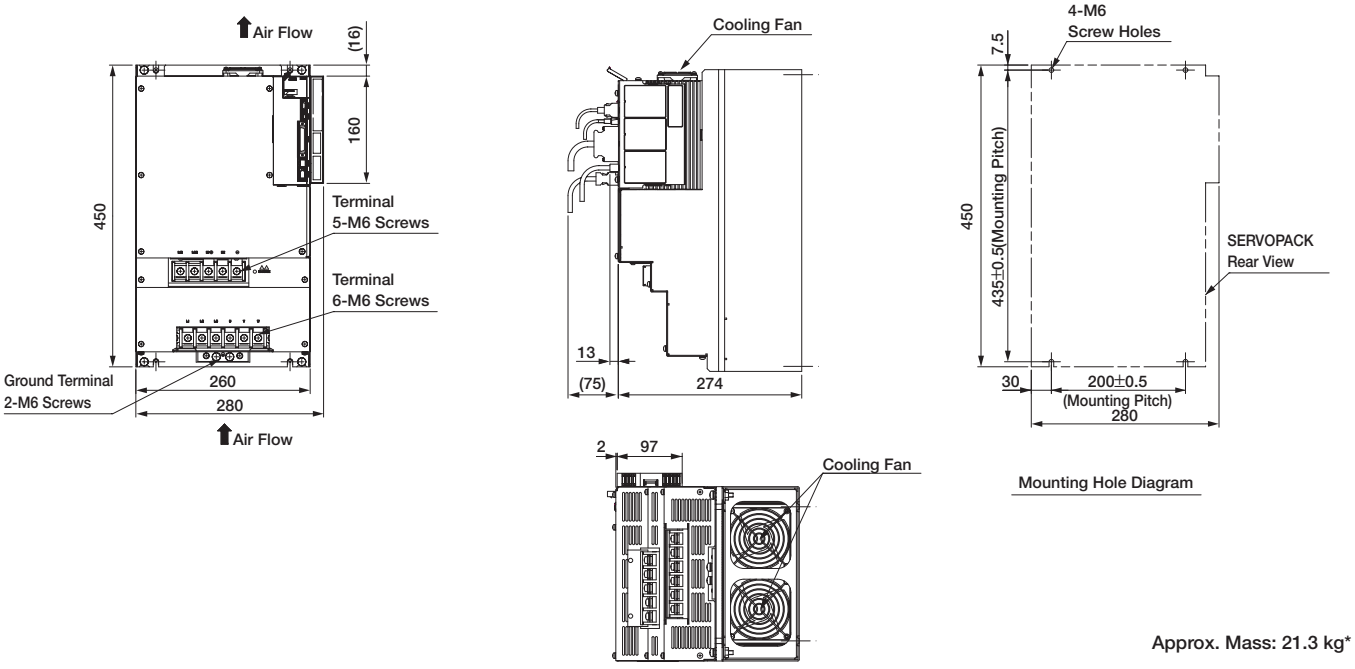
External Dimensions Units: mm (With Option Module)

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



Approx. Mass: 10.2 kg*

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



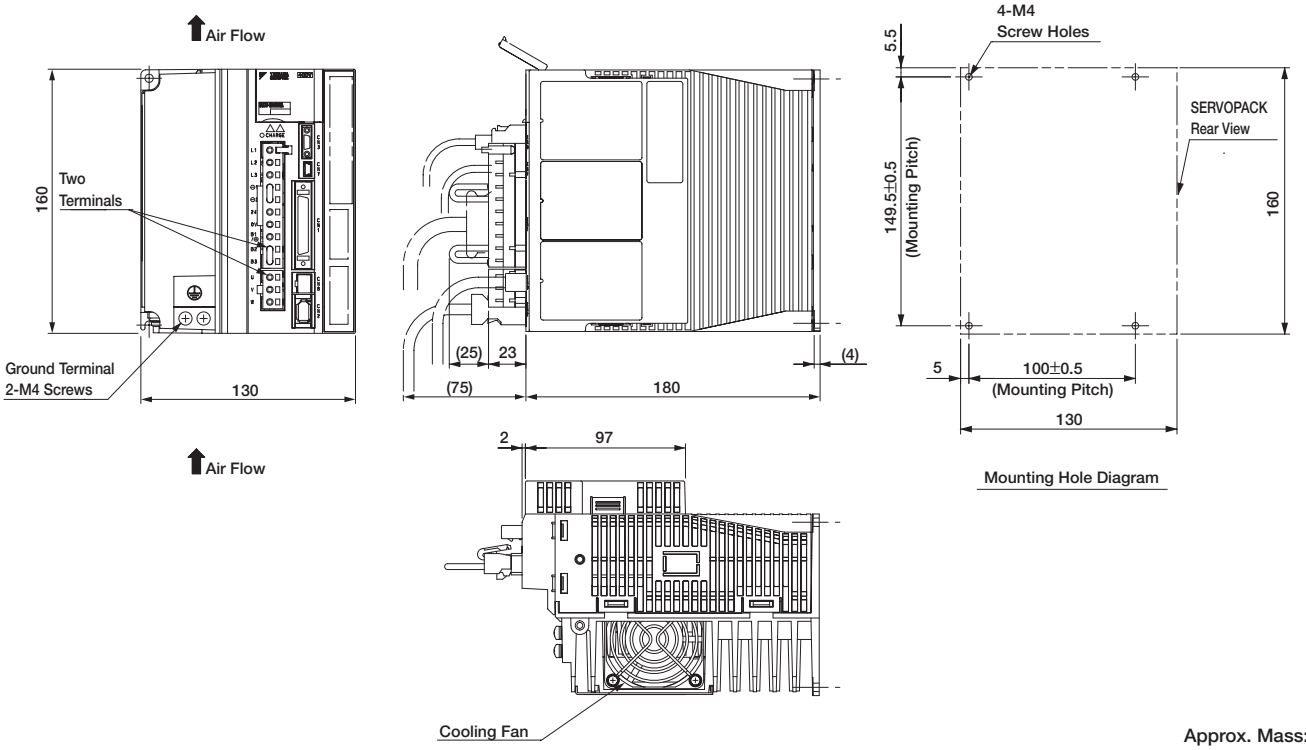
Approx. Mass: 21.3 kg*

*: 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

External Dimensions Units: mm (With Option Module)

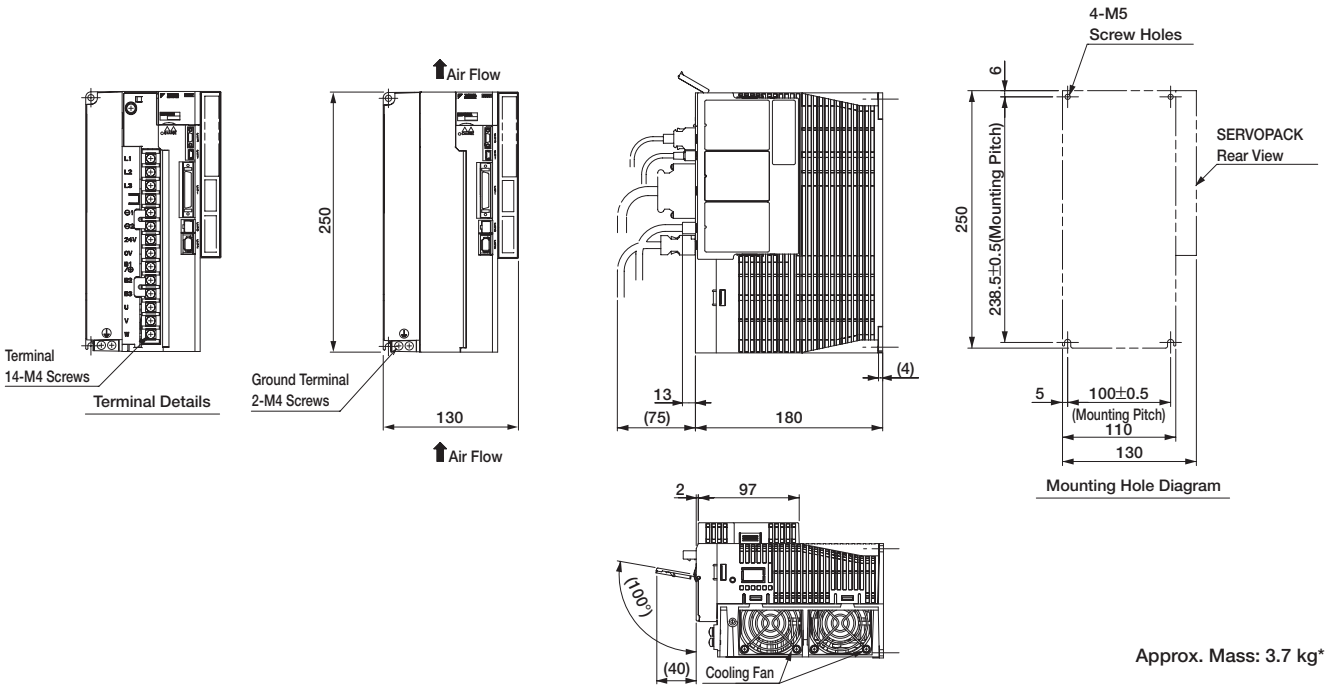
● Base-Mounted SERVOPACKs

(11) Three-phase 400 VAC,
Model: SGDV1R9D□□A000000□□□, SGDV3R5D□□A000000□□□, and SGDV5R4D□□A000000□□□



Approx. Mass: 2.7 kg*

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

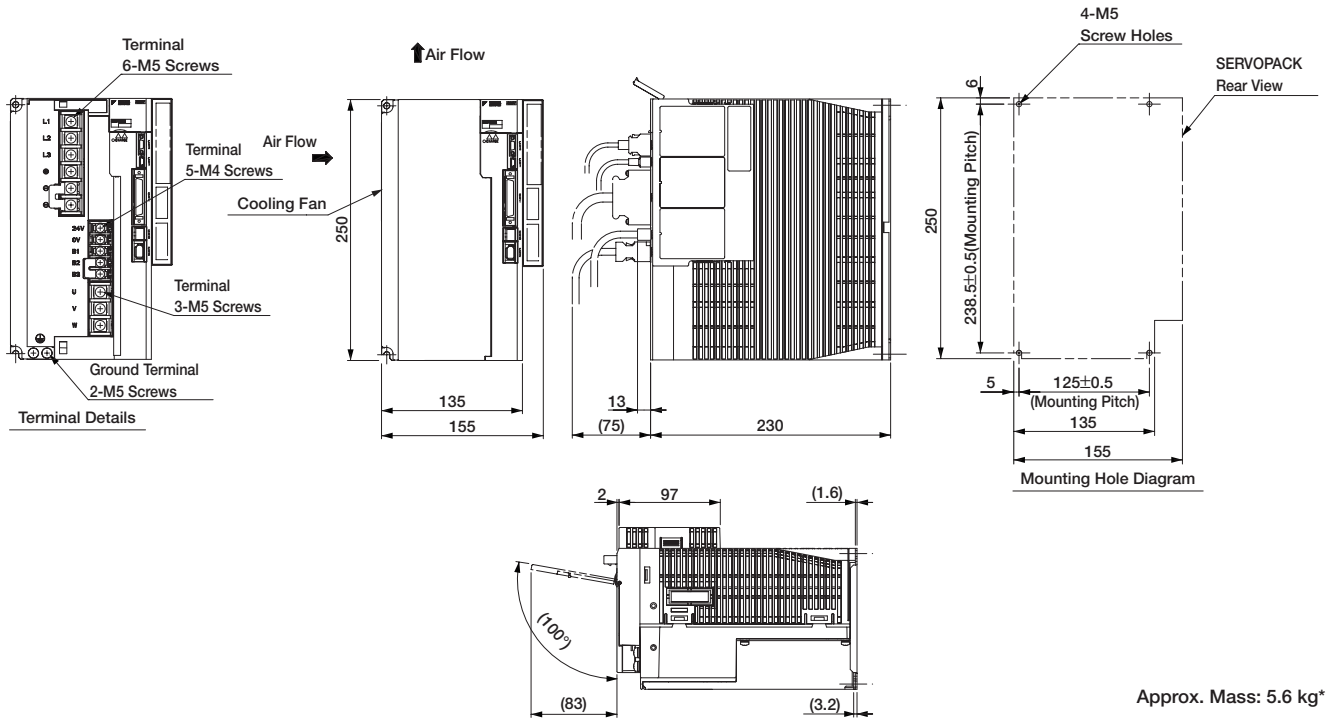


Approx. Mass: 3.7 kg*

*: 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

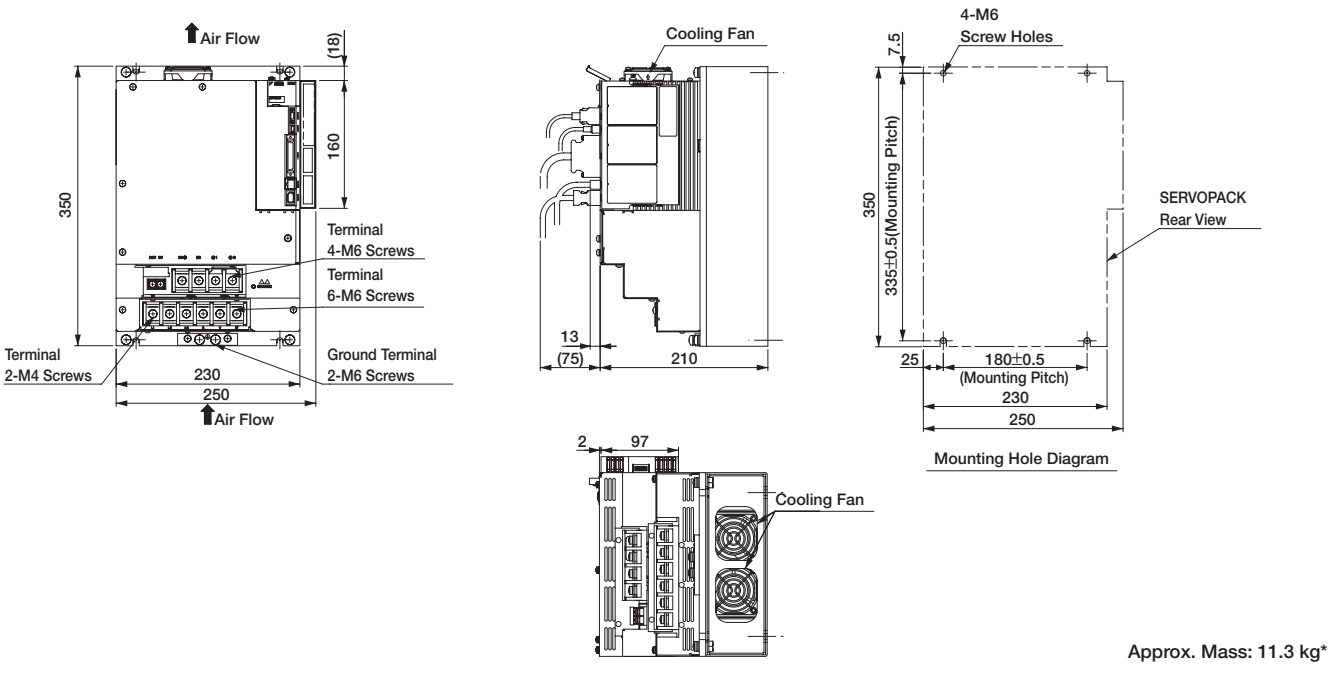
External Dimensions Units: mm (With Option Module)

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



Approx. Mass: 5.6 kg*

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



Approx. Mass: 11.3 kg*

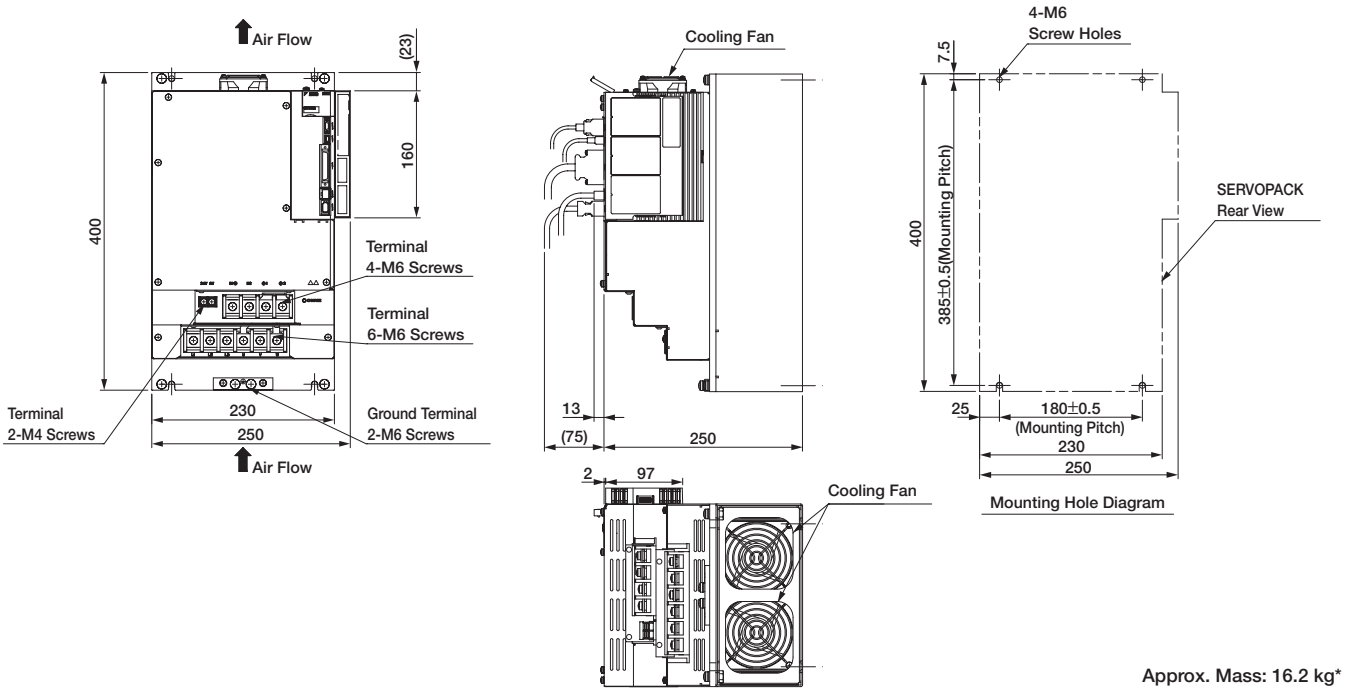
*: Approx. mass of option modules are not included in this value.
Approx. mass of option modules are as follows.
- INDEXER Module: 0.2 kg
- Fully-closed Module: 0.1 kg

SERVOPACK External Dimensions

External Dimensions Units: mm (With Option Module)

● Base-Mounted SERVOPACKs

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



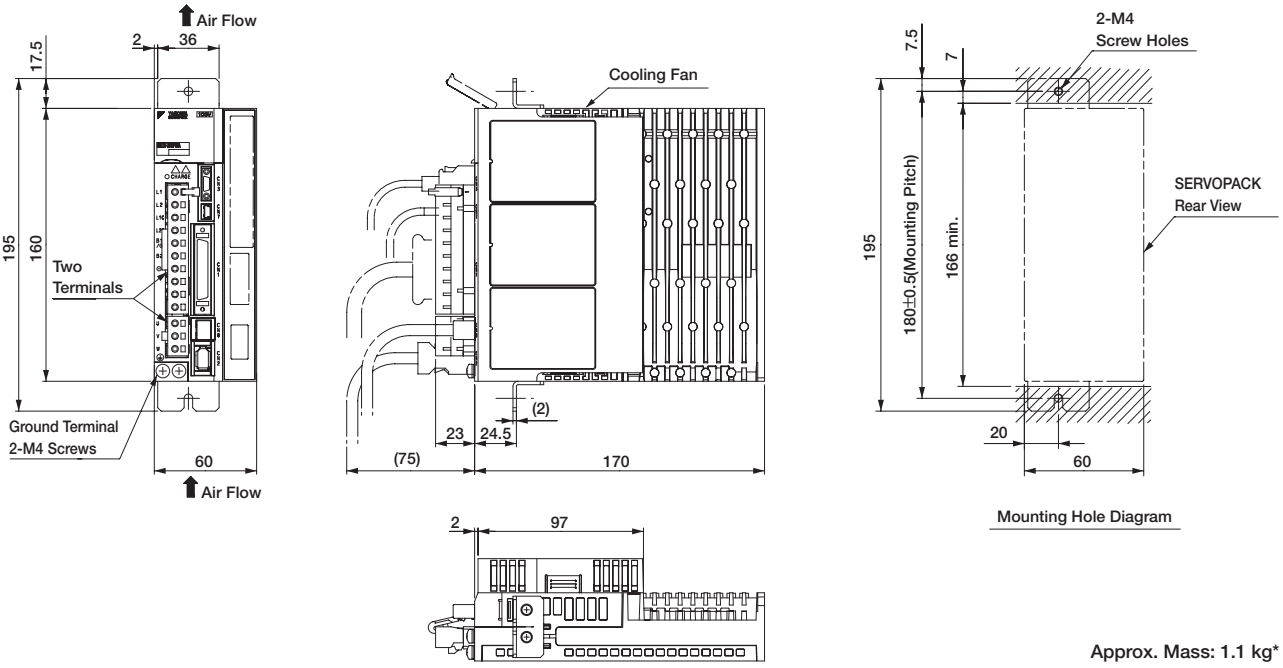
Approx. Mass: 16.2 kg*

*: 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

External Dimensions Units: mm (With Option Module)

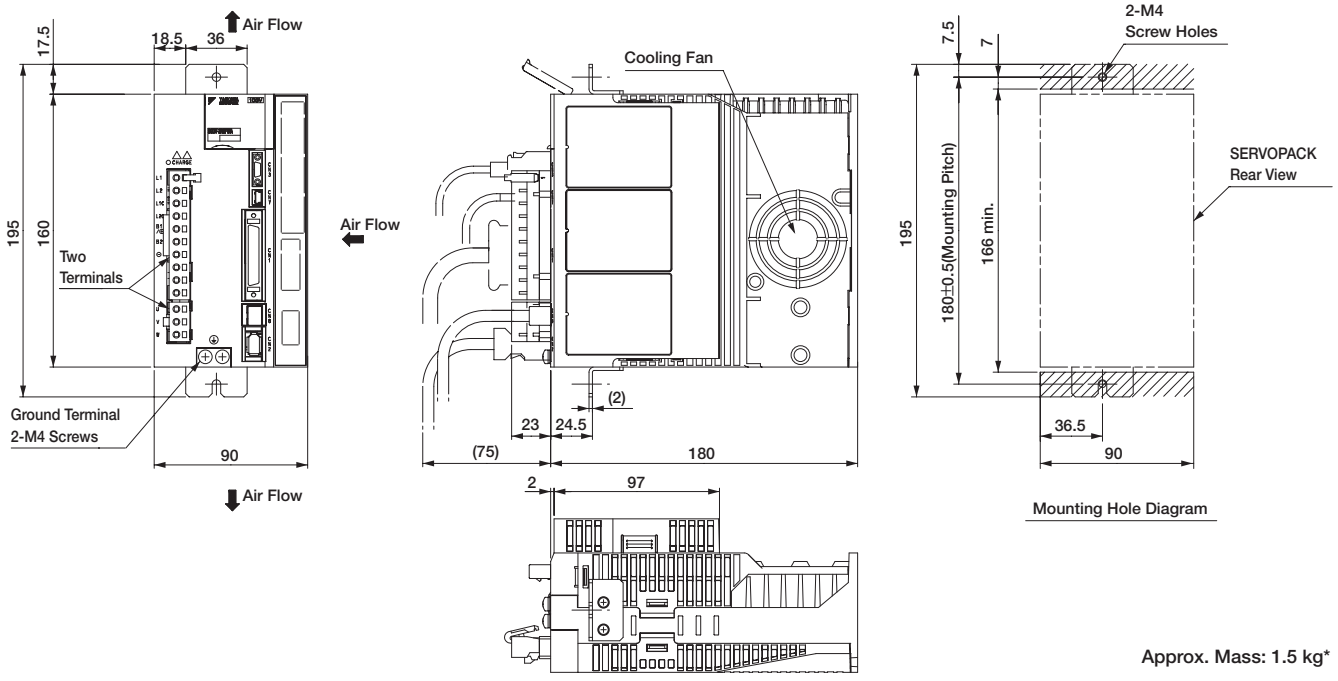
● Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(1) Single-phase 100 VAC,
Model: SGDVR70F□□A001000□□□, SGDVR90F□□A001000□□□, and SGDV2R1F□□A001000□□□



Approx. Mass: 1.1 kg*

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



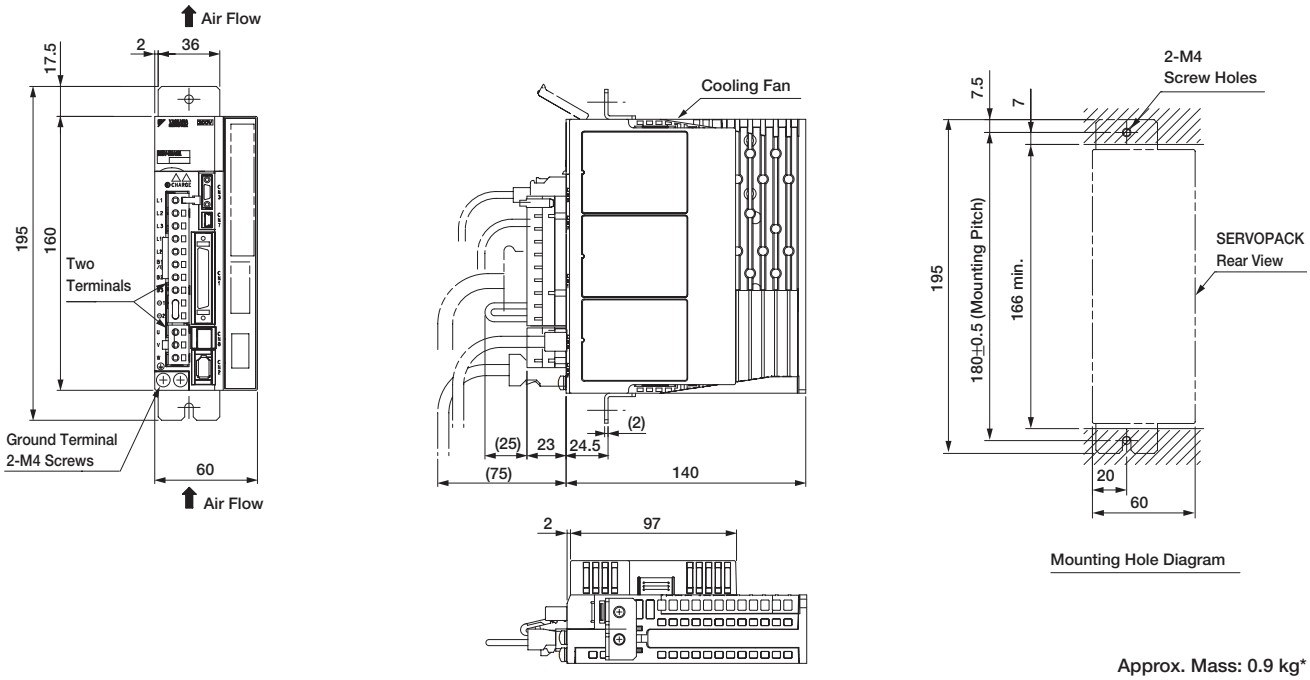
Approx. Mass: 1.5 kg*

*: 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

External Dimensions Units: mm (With Option Module)

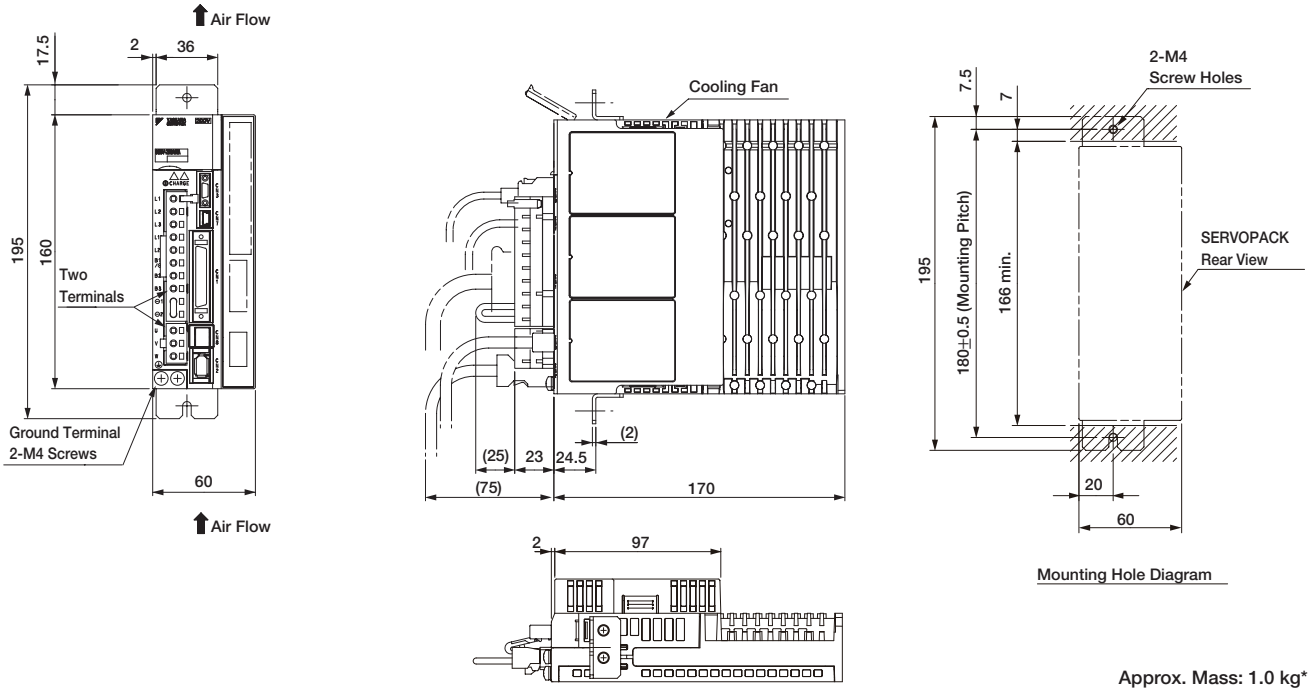
● Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(3) Three-phase 200 VAC,
Model: SGDVR70A□□A001000□□□, SGDVR90A□□A001000□□□, and SGDV1R6A□□A001000□□□



Approx. Mass: 0.9 kg*

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

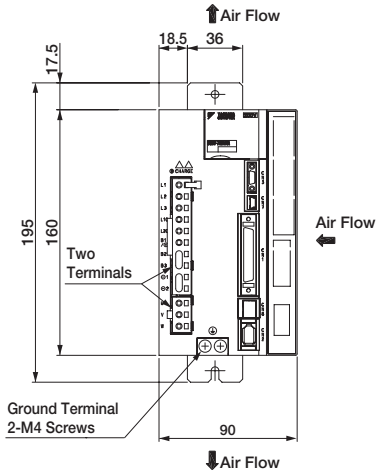


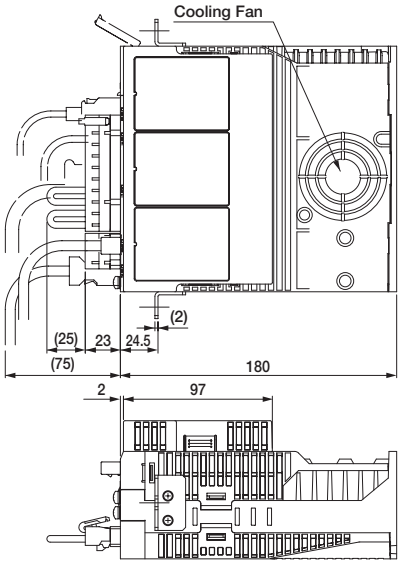
Approx. Mass: 1.0 kg*

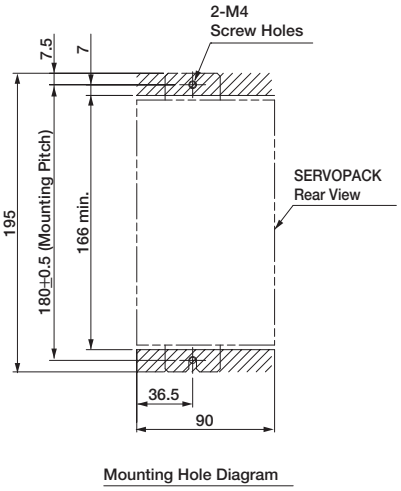
*: Approx. mass of option modules are not included in this value.
Approx. mass of option modules are as follows.
- INDEXER Module: 0.2 kg
- Fully-closed Module: 0.1 kg

External Dimensions Units: mm (With Option Module)

(5) Three-phase 200 VAC, Model: SGDV3R8A□□A001000□□□, SGDV5R5A□□A001000□□□, and SGDV7R6A□□A001000□□□



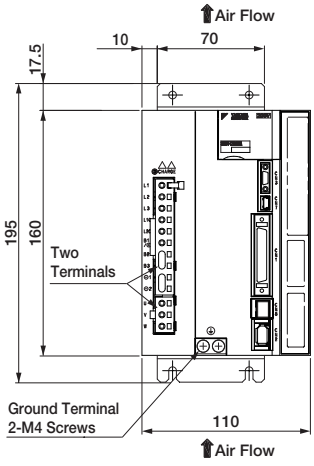


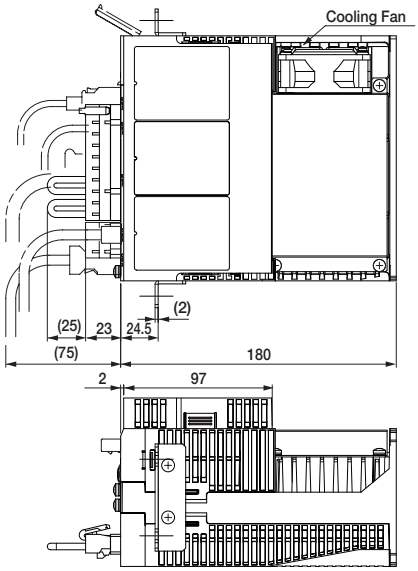


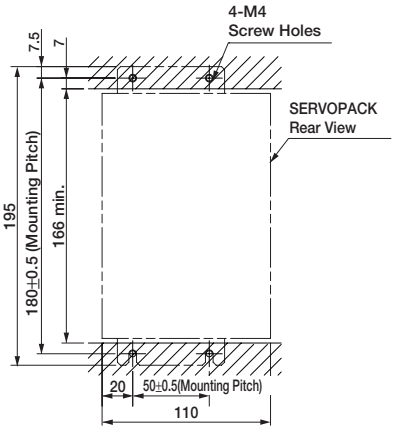
Mounting Hole Diagram

Approx. Mass: 1.5 kg*

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







Mounting Hole Diagram

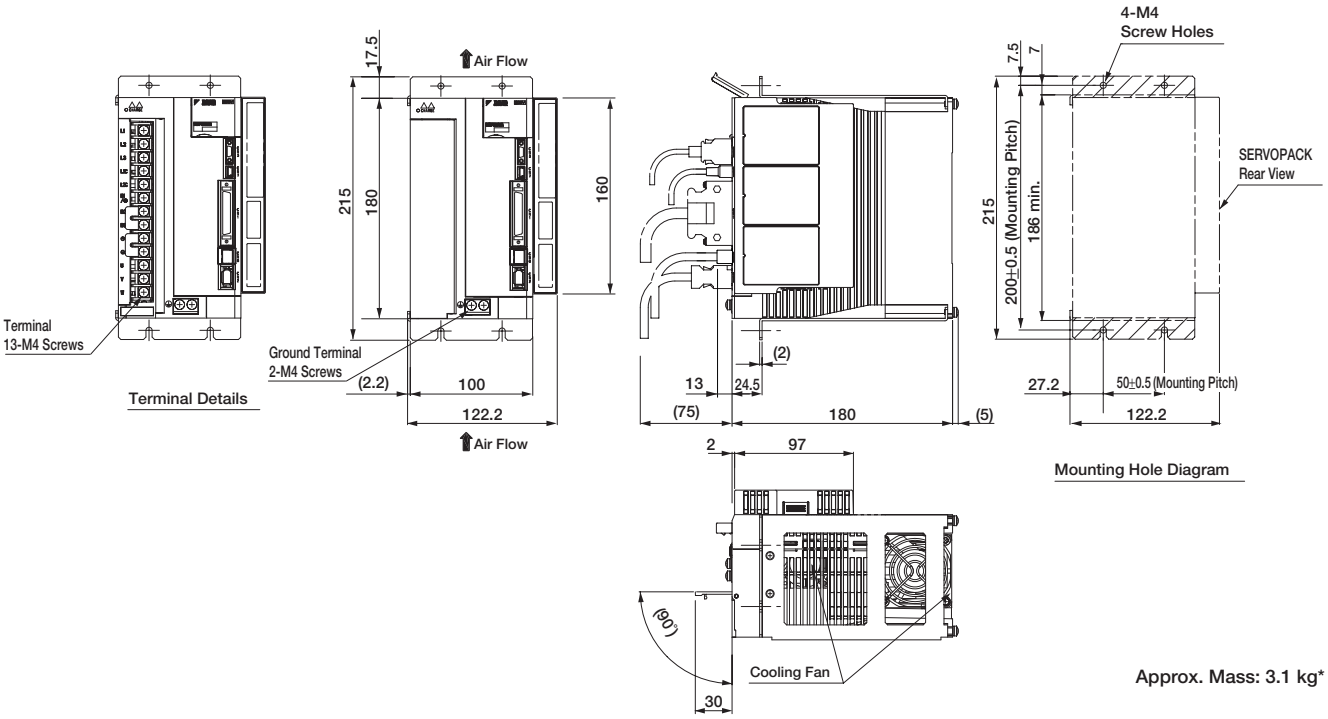
Approx. Mass: 2.5 kg*

*: 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

External Dimensions Units: mm (With Option Module)

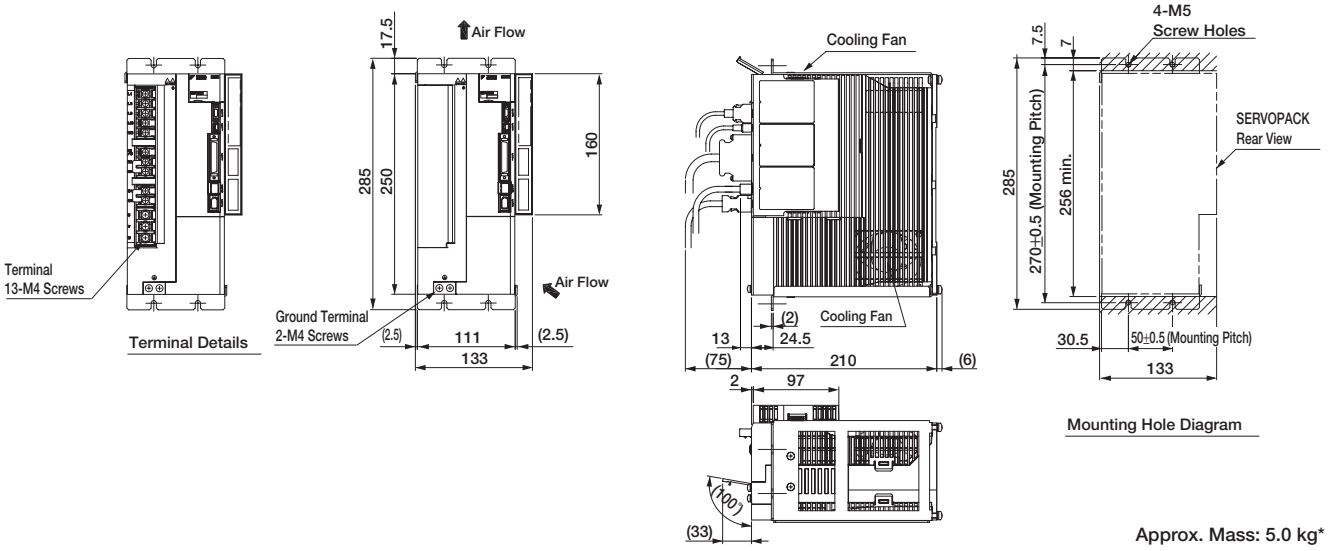
● Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(7) Three-phase 200 VAC, Model: SGDV180A□□A001000□□□ and SGDV200A□□A001000□□□



Approx. Mass: 3.1 kg*

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

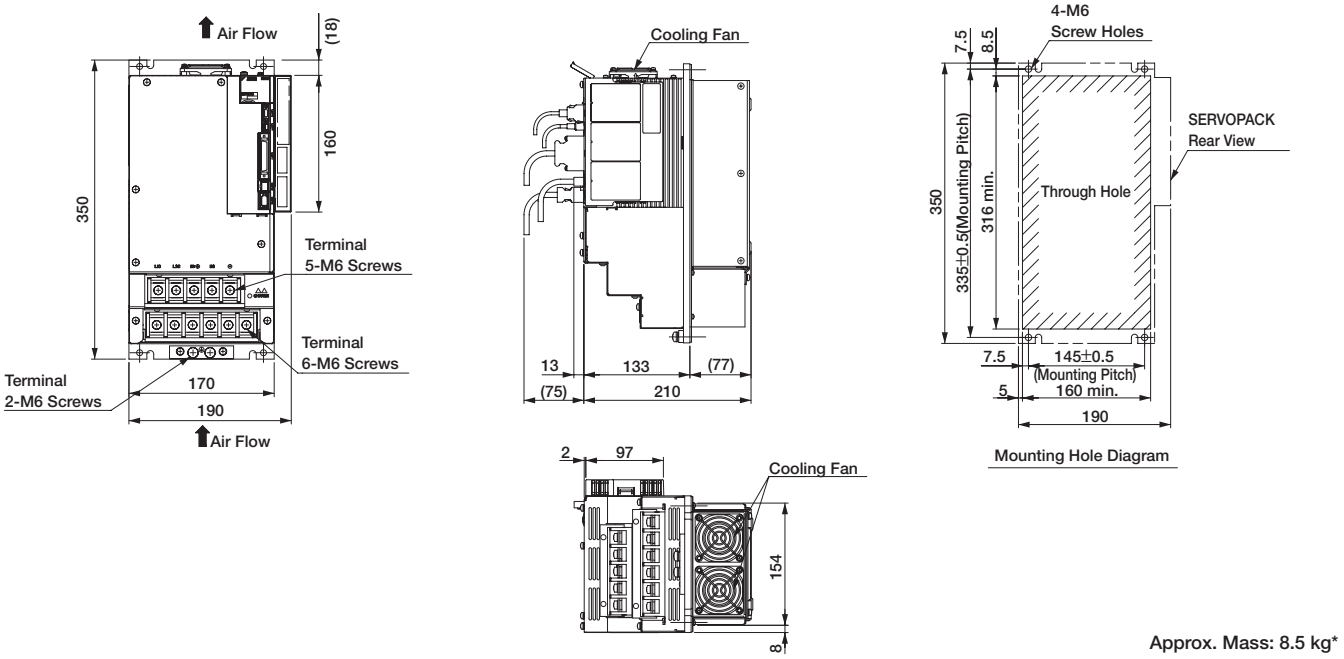


Approx. Mass: 5.0 kg*

*: 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

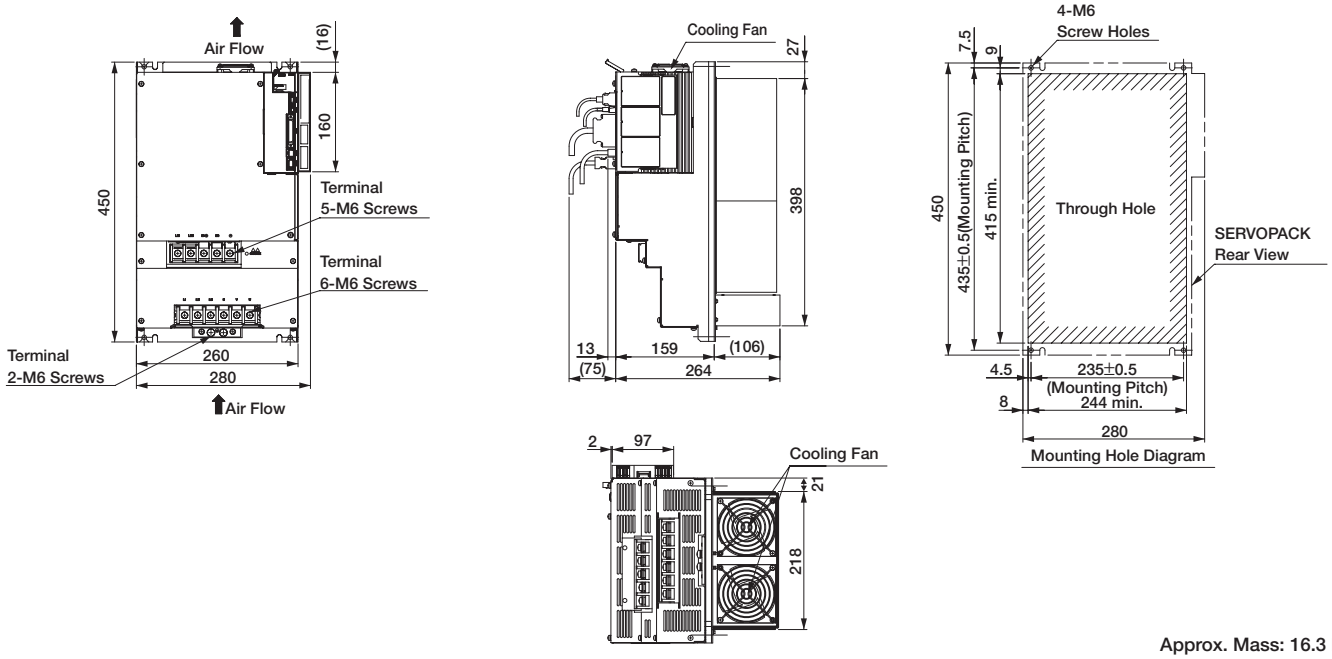
External Dimensions Units: mm (With Option Module)

(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)



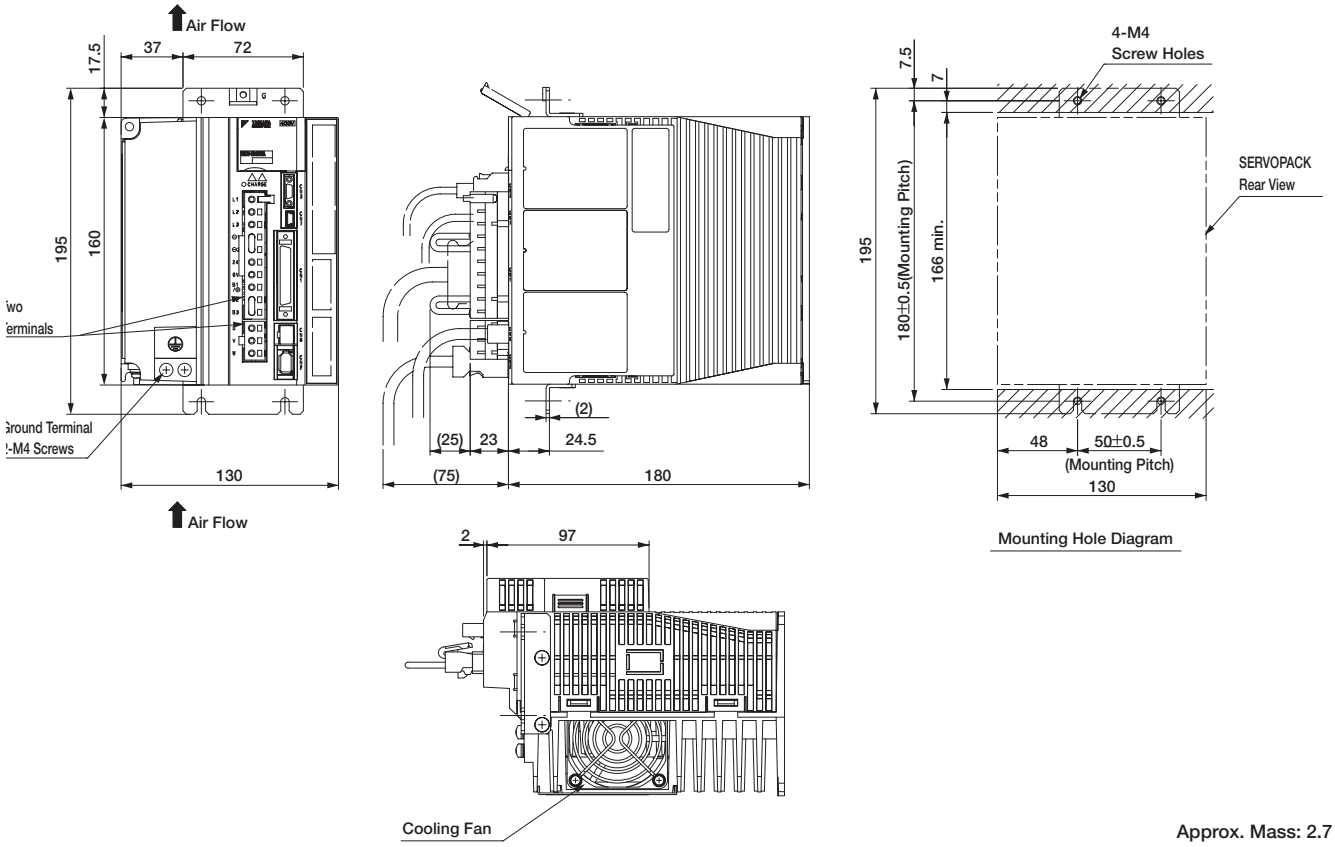
Approx. Mass: 16.3 kg*

*: 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

External Dimensions Units: mm (With Option Module)

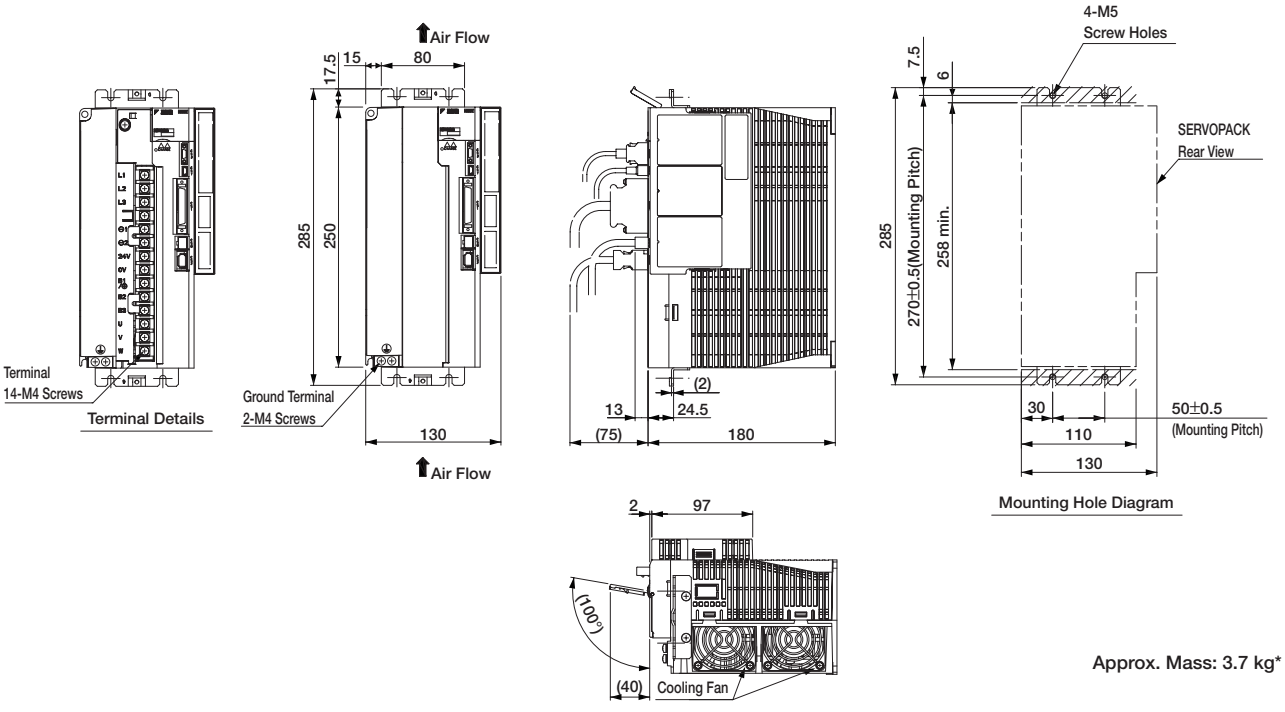
● Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(11) Three-phase 400 VAC,
Model: SGDV1R9D□□A001000□□□, SGDV3R5D□□A001000□□□, and SGDV5R4D□□A001000□□□



Approx. Mass: 2.7 kg*

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

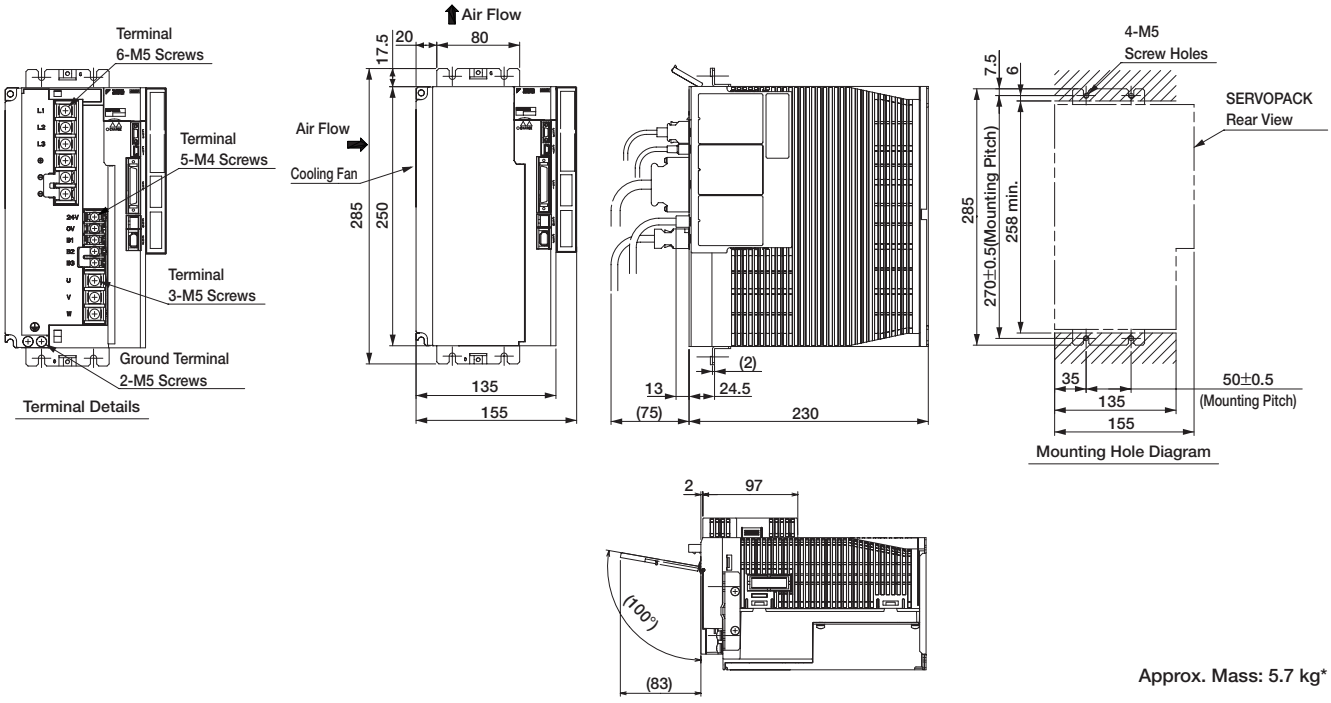


Approx. Mass: 3.7 kg*

*: 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

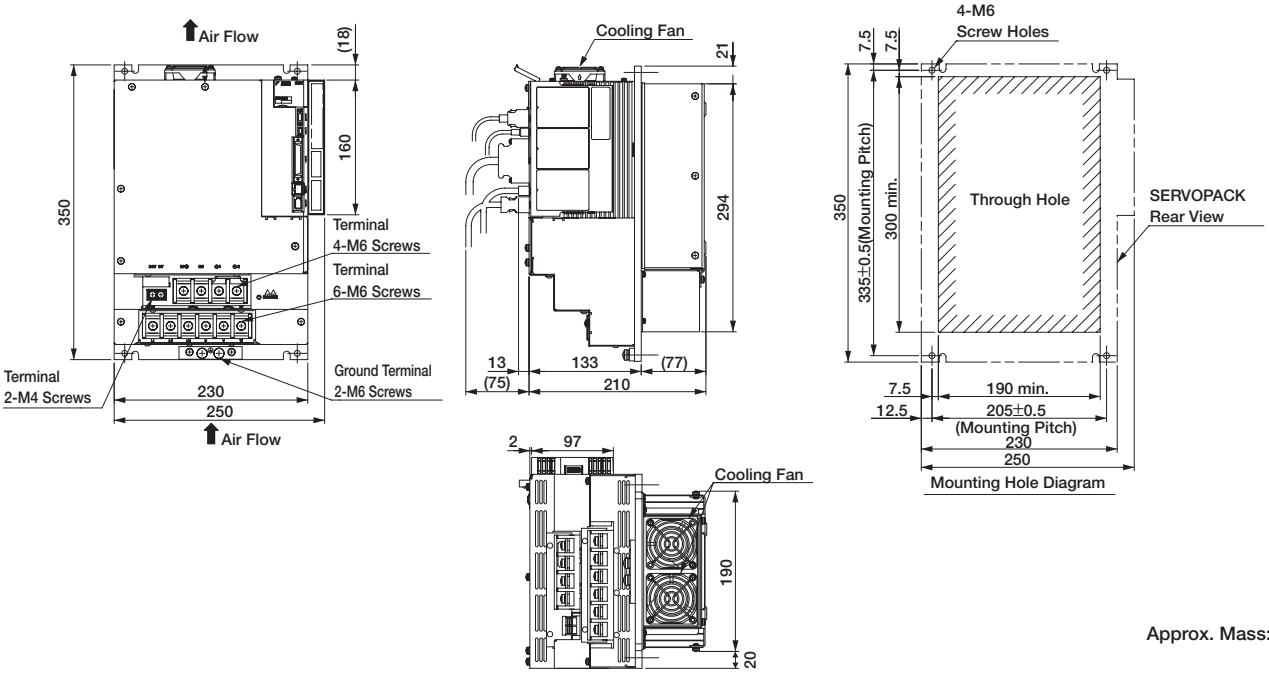
External Dimensions Units: mm (With Option Module)

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



Approx. Mass: 5.7 kg*

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



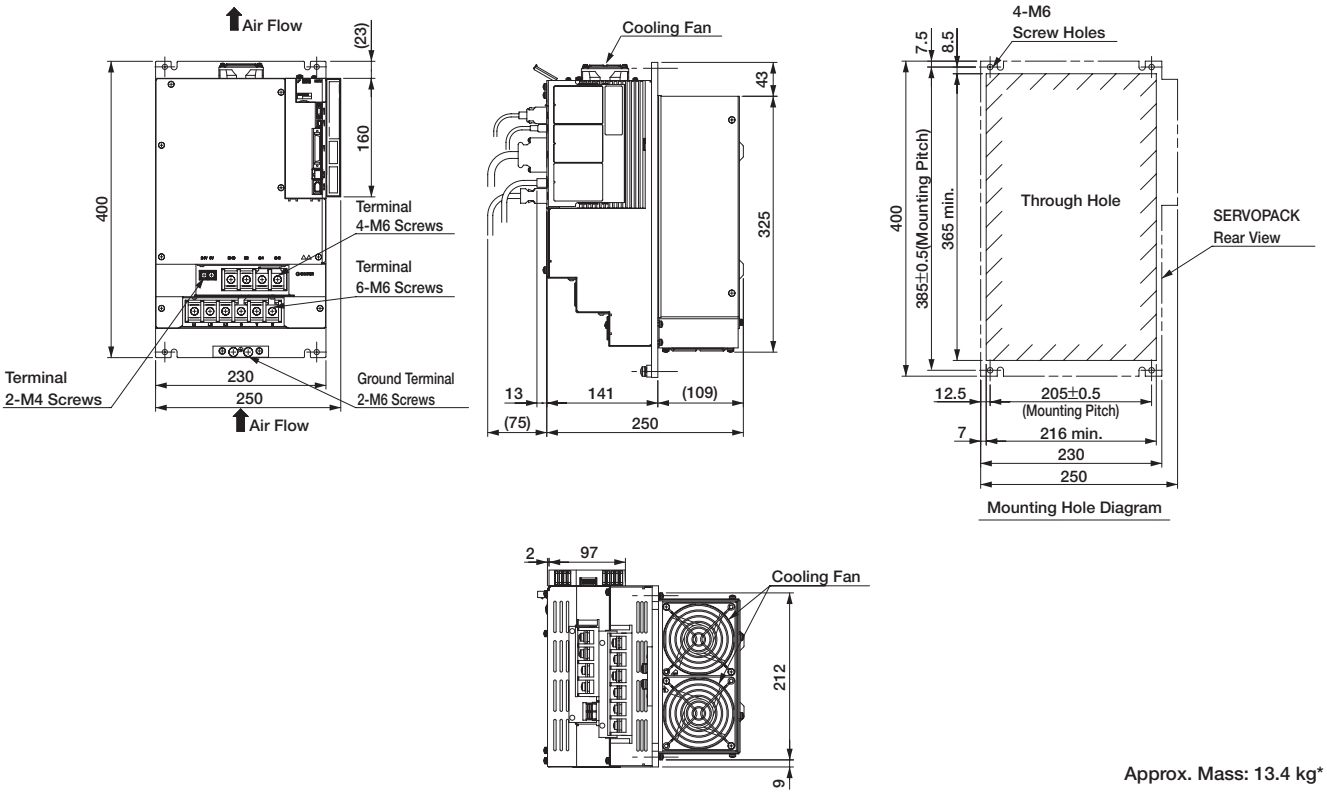
Approx. Mass: 8.1 kg*

*: 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

External Dimensions Units: mm (With Option Module)

● 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
- Fully-closed Module: 0.1 kg