



# AC SERVO DRIVES

## $\Sigma$ -V SERIES

### PRODUCT CATALOG

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$\Sigma$ -V SERIES

$\Sigma$ -V SERIES





Product Line-up Servomotors

◆ Rotary Servomotors (Small Capacity)



SGMJV (Medium Inertia)  
0.159 Nm to 2.39 Nm, 6000 min<sup>-1</sup>



SGMAV (Low Inertia)  
0.159 Nm to 3.18 Nm, 6000 min<sup>-1</sup>



SGMEV (Low and Medium Inertia)  
0.318 Nm to 4.77 Nm, 5000 min<sup>-1</sup>

◆ Rotary Servomotors (Medium Capacity)



SGMGV (Medium Inertia)  
1.96 Nm to 95.4 Nm, 3000 min<sup>-1</sup>



SGMSV (Low Inertia)  
3.18 Nm to 22.3 Nm, 6000 min<sup>-1</sup>



SGMCS (Small Capacity)  
2 to 35 Nm, 250 to 500 min<sup>-1</sup>



SGMCS (Medium Capacity)  
45 to 200 Nm, 250 to 300 min<sup>-1</sup>

◆ Direct Drive Servomotors

◆ Linear Servomotors Linear  $\Sigma$  Series



SGLGW (Coreless Type)  
12.5 to 750 N

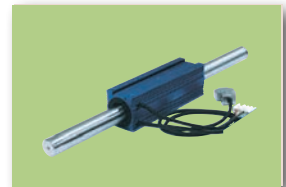


SGLFW (With F-type Iron Core)  
25 to 1120 N



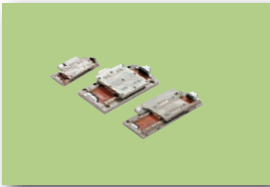
SGLTW (With T-type Iron Core)  
130 to 1300 N

◆ Cylinder Type Linear Servomotor



SGLC  
17 to 180 N

◆ Linear Sliders  $\Sigma$ -Trac Series



SGTMM ( $\Sigma$ -Trac- $\mu$ )  
3.5 to 7 N



SGTMF ( $\Sigma$ -Trac-MAG)  
90 to 200 N



SGT-F  
80 to 1120 N

Product Line-up SERVOPACKs

◆ Analog Voltage/  
Pulse Train Reference



SGDV-□□□□01/05

◆ MECHATROLINK-II  
Communications Reference



SGDV-□□□□11/15

◆ MECHATROLINK-III  
Communications Reference



SGDV-□□□□21/25

◆ With INDEXER



SGDV-□□□□E1/E5 A 100

◆ With EtherCAT



SGDV-□□□□E1/E5 A 200

◆ With CANopen



SGDV-□□□□E1/E5 A □□□

◆ With ETHERNET  
POWERLINK



SGDV-□□□□E1/E5 A □□□

◆ With PROFINET



SGDV-□□□□E1/E5 A □□□

COMING  
SOON

◆ Rotary Servomotors and SERVOPACKs

Rotary Servomotor Model		Capacity	Rated Torque Nm	Instantaneous Peak Torque Nm	Rated Speed min <sup>-1</sup>	Max. Speed min <sup>-1</sup>	SERVOPACK Model SGD□-□□□□		
							Three-phase 200 VAC	Three-phase 400 VAC	
<b>SGMJV</b> (Medium Inertia, Small Capacity) 6000 min <sup>-1</sup> Page 1	SGMJV-A5A	50 W	0.159	0.557	3000	6000	R70A <sup>*1</sup>	-	
	SGMJV-01A	100 W	0.318	1.11			R90A <sup>*1</sup>		
	SGMJV-02A	200 W	0.637	2.23			1R6A <sup>*1</sup>		
	SGMJV-04A	400 W	1.27	4.46			2R8A <sup>*1</sup>		
	SGMJV-08A	750 W	2.39	8.36			5R5A <sup>*1</sup>		
<b>SGMAV</b> (Low Inertia, Small Capacity) 6000 min <sup>-1</sup> Page 15	SGMAV-A5A	50 W	0.159	0.477	3000	6000	R70A <sup>*1</sup>	-	
	SGMAV-01A	100 W	0.318	0.955			R90A <sup>*1</sup>		
	SGMAV-C2A	150 W	0.477	1.43			1R6A <sup>*1</sup>		
	SGMAV-02A	200 W	0.637	1.91			2R8A <sup>*1</sup>		
	SGMAV-04A	400 W	1.27	3.82			5R5A <sup>*1</sup>		
	SGMAV-06A	550 W	1.75	5.25			120A <sup>*2</sup>		
	SGMAV-08A	750 W	2.39	7.16					
<b>SGMEV</b> (Low and Medium Inertia, Small Capacity, optional IP67) 5000 min <sup>-1</sup> Page 31	SGMEV-01A	100 W	0.318	0.955	3000	5000	R90A <sup>*1</sup>	-	
	SGMEV-02A	200 W	0.637	1.91			1R6A <sup>*1</sup>		
	SGMEV-04A	400 W	1.27	3.82			2R8A <sup>*1</sup>		
	SGMEV-08A	750 W	2.39	7.16			5R5A <sup>*1</sup>		
	SGMEV-15A	1.5 kW	4.77	14.3			120A <sup>*2</sup>		
	SGMEV-02D	200 W	0.637	0.191			-	1R9D	
	SGMEV-03D <sup>*3</sup>	300 W	0.955	3.82			-		
	SGMEV-04D	400 W	1.27	3.82			-		
	SGMEV-07D <sup>*3</sup>	650 W	2.07	7.16			-		
	SGMEV-08D	750 W	2.39	7.16			-		3R5D
SGMEV-15D	1.5 kW	4.77	14.3	-	5R4D				
<b>SGMGV</b> (Medium Inertia, Medium Capacity) 3000 min <sup>-1</sup> Page 45	SGMGV-03A	300 W	1.96	5.88	1500	3000	3R8A	-	
	SGMGV-05A	450 W	2.86	8.92			7R6A		
	SGMGV-09A	850 W	5.39	13.8			120A		
	SGMGV-13A	1.3 kW	8.34	23.3			180A		
	SGMGV-20A	1.8 kW	11.5	28.7			330A/200A <sup>*4</sup>		
	SGMGV-30A	2.9 kW 2.4 kW <sup>*4</sup>	18.6 15.1 <sup>*4</sup>	45.1			330A		
	SGMGV-44A	4.4 kW	28.4	71.1			470A		
	SGMGV-55A	5.5 kW	35.0	87.6			550A		
	SGMGV-75A	7.5 kW	48.0	119			590A		
	SGMGV-1AA	11 kW	70.0	175			780A		
	SGMGV-1EA	15 kW	95.4	224					
	SGMGV-03D	300 W	1.96	5.88	1500	3000	-	1R9D	
	SGMGV-05D	450 W	2.86	8.92			3R5D		
	SGMGV-09D	850 W	5.39	13.8			5R4D		
	SGMGV-13D	1.3 kW	8.34	23.3			8R4D		
	SGMGV-20D	1.8 kW	11.5	28.7			120D		
	SGMGV-30D	2.9 kW	18.6	45.1			170D		
	SGMGV-44D	4.4 kW	28.4	71.1			210D		
	SGMGV-55D	5.5 kW	35.0	87.6			260D		
	SGMGV-75D	7.5 kW	48.0	119			280D		
SGMGV-1AD	11 kW	70.0	175	370D					
SGMGV-1ED	15 kW	95.4	224						
<b>SGMSV</b> (Low Inertia, Medium Capacity) 6000 min <sup>-1</sup> Page 69	SGMSV-10A	1.0 kW	3.18	9.54	3000	6000	7R6A	-	
	SGMSV-15A	1.5 kW	4.90	14.7			120A		
	SGMSV-20A	2.0 kW	6.36	19.1			180A		
	SGMSV-25A	2.5 kW	7.96	23.9			200A		
	SGMSV-30A	3.0 kW	9.80	29.4			330A		
	SGMSV-40A	4.0 kW	12.6	37.8	3000	5000	550A	-	
	SGMSV-50A	5.0 kW	15.8	47.6					
	SGMSV-70A	7.0 kW	22.3	54					
	SGMSV-10D	1.0 kW	3.18	9.54			6000		3R5D
	SGMSV-15D	1.5 kW	4.9	14.7			5R4D		
	SGMSV-20D	2.0 kW	6.36	19.1	3000	5000	-	8R4D	
	SGMSV-25D	2.5 kW	7.96	23.9			120D		
	SGMSV-30D	3.0 kW	9.8	29.4					
	SGMSV-40D	4.0 kW	12.6	37.8					
	SGMSV-50D	5.0 kW	15.8	47.6				170D	

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

\*2: Single-phase 200 VAC SERVOPACKs are also available (base-mounted SERVOPACK model: SGD□-120A□□A008000, rack-mounted SERVOPACK model: SGD□-120A□□A009000).

\*3: Different motor length for SGMEV-03D and SGMEV-07D.

\*4: When using SGD□-200A SERVOPACKs with SGMGV-30A servomotors, use these values.

◆ Linear Servomotors and SERVOPACKS

Linear Servomotor Model		Rated Force N	Peak Force N	Peak Speed m/s	SERVOPACK Model SGD□-□□□□	
					Three-phase 200 VAC	Three-phase 400 VAC
<b>SGLGW</b> (Coreless Type, With standard-force magnetic ways) Page 115	SGLGW-30A050C	12.5	40	5.0	R70A*	-
	SGLGW-30A080C	25	80		R90A*	
	SGLGW-40A140C	47	140		1R6A*	
	SGLGW-40A253C	93	280	4.8	2R8A*	
	SGLGW-60A140C	70	220		5R5A*	
	SGLGW-40A365C	140	420	4.0	120A	
	SGLGW-60A253C	140	440		180A	
	SGLGW-60A365C	210	660		200A	
	SGLGW-90A200C	325	1300	4.0	120A	
	SGLGW-90A370C	550	2200		180A	
SGLGW-90A535C	750	3000	200A			
<b>SGLGW</b> (Coreless Type, With high-force magnetic ways) Page 119	SGLGW-40A140C	57	230	4.2	1R6A*	-
	SGLGW-60A140C	85	360		2R8A*	
	SGLGW-40A253C	114	460		3R8A	
	SGLGW-40A365C	171	690		7R6A	
	SGLGW-60A253C	170	720			
<b>SGLFW</b> (With F-type Iron Core) Page 131	SGLFW-20A090A	25	86	5.0	1R6A*	-
	SGLFW-20A120A	40	125		3R8A	
	SGLFW-35A120A	80	220		5R5A*	
	SGLFW-35A230A	160	440		120A	
	SGLFW-50A200B	280	600		200A	
	SGLFW-50A380B	560	1200		4.9	
	SGLFW-1ZA200B	560	1200	4.5		
	SGLFW-1ZA380B	1120	2400		4.5	
	SGLFW-35D120A	80	220	4.5		
	SGLFW-35D230A	160	440		5.0	1R9D
	SGLFW-50D200B	280	600	5.0		3R5D
	SGLFW-50D380B	560	1200		5.0	5R4D
	SGLFW-1ZD200B	560	1200	5.0		120D
	SGLFW-1ZD380B	1120	2400		2.4	8R4D
	SGLFW-1ED380B	1500	3600	2.4		120D
	SGLFW-1ED560B	2250	5400			
<b>SGLTW</b> (With T-type Iron Core) Page 151	SGLTW-20A170A	130	380	5.0	3R8A	-
	SGLTW-35A170A	220	660	4.8	5R5A*	
	SGLTW-35A170H	300	600	3.2	7R6A	
	SGLTW-50A170H	450	900	5.0	120A	
	SGLTW-20A320A	250	760		4.8	
	SGLTW-20A460A	380	1140	3.1	330A	
	SGLTW-35A320A	440	1320		2.5	
	SGLTW-35A320H	600	1200	3.1		
	SGLTW-50A320H	900	1800		3.1	
	SGLTW-35A460A	670	2000	2.5		
	SGLTW-40A400B	670	2600		2.5	
	SGLTW-40A600B	1000	4000	2.5		
	SGLTW-80A400B	1300	5000		2.5	
	SGLTW-80A600B	2000	7500	3.1		
	SGLTW-35D170H	300	600		5.0	
	SGLTW-50D170H	450	900	4.0		
	SGLTW-35D320H	600	1200	5.0		
	SGLTW-50D320H	900	1800	4.0		
	SGLTW-40D400B	670	2600	3.1		
	SGLTW-40D600B	1000	4000			
SGLTW-80D400B	1300	5000				
SGLTW-80D600B	2000	7500				

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

## ◆ Cylinder Type Servomotors (Σ-Stick) and SERVOPACKs

Linear Servomotor Model		Rated Force N	Peak Force N	Peak Speed m/s	SERVOPACK Model SGD□-□□□□	
					Three-phase 200 VAC	
SGLC (Cylinder Type) Page 179	SGLC-D16A085A	17	60	4.0	R70A*	
	SGLC-D16A115A	25	90		R90A*	
	SGLC-D16A145A	34	120		1R6A*	
	SGLC-D20A100A	30	150		2R8A*	
	SGLC-D20A135A	45	225		1R6A*	
	SGLC-D20A170A	60	300		2R8A*	
	SGLC-D25A125A	70	280		1R6A*	
	SGLC-D25A170A	105	420		2R8A*	
	SGLC-D32A165A	90	420		5R5A*	
	SGLC-D25A215A	140	560			
	SGLC-D32A225A	135	630			
	SGLC-D32A285A	180	840			

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

## ◆ Linear Sliders (Σ-Trac) and SERVOPACKs

Linear Slider Model		Rated Force N	Peak Force N	SERVOPACK Model SGD□-□□□□	
				Three-phase 200 VAC	Three-phase 400 VAC
SGTMM (Σ-Trac-μ) Page 201	SGTMM01	3.5	10	R70A	
	SGTMM03	7	25	R90A	
SGTMF (Σ-Trac-MAG) Page 209	SGTMF4A	90	270	1R6A	
	SGTMF4B	120	360		
	SGTMF5A	150	540	5R5A	
	SGTMF5B	200	720		
SGTF * (Σ-Trac-SGT-F) Page 217	SGT-F35A120 □	80	220	1R6A□5A	
	SGT-F35A230 □	160	440	3R8A□5A	
	SGT-F50A200 □	280	600	5R5A□5A	
	SGT-F50A380 □	560	1200	5R5A□5A	
	SGT-F1ZA200 □	560	1200	120A□5A**	
	SGT-F35D120 □	80	220		1R9D□5A
	SGT-F35D230 □	160	440		1R9D□5A
	SGT-F50D200 □	280	600		3R5D□5A
	SGT-F50D380 □	560	1200		5R4D□5A
	SGT-F1ZD200 □	560	1200		5R4D□5A
SGT-F1ZD380 □	1120	2400		120D□5A	

\* Manufactured by YASKAWA Engineering Europe GmbH.

\*\* Single-phase 200 VAC, 1.5 kW, SGD□-120A □ 1A008000

## ◆ Direct Drive Servomotors and SERVOPACKs

Direct Drive Servomotor Model		Rated Torque Nm	Peak Torque Nm	Rated Speed min <sup>-1</sup>	Max. Speed min <sup>-1</sup>	SERVOPACK Model SGD□-□□□□		
						Three-phase 200 VAC		
SGMCS (Small Capacity) Page 97	SGMCS-02B	2	6	200	500	2R8A		
	SGMCS-05B	5	15					
	SGMCS-07B	7	21					
	SGMCS-04C	4	12					
	SGMCS-10C	10	30					
	SGMCS-14C	14	42					
	SGMCS-08D	8	24		150	250	5R5A	
	SGMCS-17D	17	51					
	SGMCS-25D	25	75					
	SGMCS-16E	16	48					
SGMCS-35E	35	105	150	300	7R6A			
SGMCS-45M	45	135						
SGMCS-80M	80	240						
SGMCS-80N	80	240			120A			
SGMCS-1AM	110	330						
SGMCS-1EN	150	450					180A	
SGMCS-2ZN	200	600	200A					



## Recommended Linear Scales

## ◆ Incremental Linear Scales

Output Signal	Manufacturer	Scale Type	Model			Scale Pitch $\mu\text{m}$	Resolution nm	Maximum Speed <sup>*4</sup> m/s	Hall Sensor Input	Linear Motor	Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (serial converter unit)						
1Vp-p Analog Voltage <sup>*2</sup>	HEIDENHAIN Corporation	Open Type	LIDA48□		(JZDP-D003/-D006)	20	78.1	5	○	○	○
					(JZDP-G003/-G006)		4.9	2	○	○	—
			LIDA18□		(JZDP-D003/-D006)	40	156.3	5	○	○	○
					(JZDP-G003/-G006)		9.8	4	○	○	—
	LIF48□		(JZDP-D003/-D006)	4	15.6	1	○	○	○		
			(JZDP-G003/-G006)		1.0	0.4	○	*6	—		
Renishaw plc <sup>*5</sup>	Open Type	RGS20	RGH22B	(JZDP-D005/-D008) (JZDP-G005/-G008)	20	78.1	5	○	○	○	
						4.9	2	○	○	—	
Applicable for Yaskawa's Serial Interface <sup>*3</sup>	Magnescale Co., Ltd. (formerly Sony)	Open Type	SL7□0	PL101-RY		800	97.7	5	—	○	○
				PL101	MJ620-T13				○	○	—
		Sealed Type	SR75-□□□□□LF	—	80	9.8	3.33	—	○	○	
			SR75-□□□□□MF	—	80	78.1	3.33	—	○	○	
			SR85-□□□□□LF	—	80	9.8	3.33	—	○	○	
			SR85-□□□□□MF	—	80	78.1	3.33	—	○	○	

## ◆ Absolute Linear Scale

Output Signal	Manufacturer	Scale Type	Model			Scale Pitch $\mu\text{m}$	Resolution nm	Maximum Speed <sup>*4</sup> m/s	Hall Sensor Input	Linear Motor	Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (serial converter unit)						
Applicable for Yaskawa's Serial Interface <sup>*3</sup>	Magnescale Co., Ltd. (formerly Sony)	Sealed Type	SR77-□□□□□LF	—	80	9.8	3.33	—	○	○	
			SR77-□□□□□MF	—	80	78.1	3.33	—	○	○	
			SR87-□□□□□LF	—	80	9.8	3.33	—	○	○	
			SR87-□□□□□MF	—	80	78.1	3.33	—	○	○	
	Mitutoyo Corporation	Open Type	ST781A	—	256	500	5	—	○	○	
			ST782A	—	256	500	5	—	○	○	
			ST783A	—	51.2	100	5	—	○	○	
			ST784A	—	51.2	100	5	—	○	○	

## ◆ Absolute Rotary Scale

Output Signal	Manufacturer	Scale Type	Model			Scale Pitch $\mu\text{m}$	Resolution bit/rev	Maximum Speed <sup>*4</sup> $\text{min}^{-1}$	Linear Motor	Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (serial converter unit)					
Applicable for Yaskawa's Serial Interface	Magnescale Co., Ltd.	Sealed Type	RU77-4096ADF			—	20	2000	—	○
			RU77-4096AFFT01			—	22	2000	—	○

\*1: Before using the linear scales, contact the manufacturer of the scale for specifications including accuracy, dimensions, and recommended operating conditions.

\*2: The use of Yaskawa serial converter units is required. Output signals are divided into 256 (8-bits multiplier) or 4096 (12-bits multiplier) in the serial converter units.

\*3: Each linear scale has a different multiplier (number of divisions). Before use, write the parameters of the linear servomotors into the linear scales.

\*4: The maximum speed shown is for the linear scale when combined with a Yaskawa SERVOPACK.

Either the maximum speed of the linear servomotor or that of the linear scale in this table limits the maximum speed.

\*5: If the zero-point signal is used with the Renishaw linear scale, the accuracy might be affected, and the zero point might be detected as being at a different position. If so, use BID and DIR signals to send the zero point in one direction.

\*6: Contact your Yaskawa representative.





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## Servomotors

### Rotary Servomotors

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### Read Before Ordering

# Rotary Servomotors

# SGMJV



## Model Designations

### ● Without Gears

**SGMJV - 01 A D A 2 1**

Σ-V Series  
Servomotor  
SGMJV

1st+2nd  
digits

3rd  
digit

4th  
digit

5th  
digit

6th  
digit

7th  
digit

#### 1st+2nd digits Rated Output

Code	Specifications
A5	50 W
01	100 W
02	200 W
04	400 W
08	750 W

#### 3rd digit Power Supply Voltage

Code	Specifications
A	200 VAC

#### 4th digit Serial Encoder

Code	Specifications
3	20-bit absolute (standard)
D	20-bit incremental (standard)
A	13-bit incremental (standard)

#### 5th digit Design Revision Order

Code	Specifications
A	Standard

#### 6th digit Shaft End

Code	Specifications
2	Straight without key (standard)
6	Straight with key and tap (optional)
B	With two flat seats (optional)

#### 7th digit Options

Code	Specifications
1	Without options
C	With holding brake (24 VDC)
E	With oil seal and holding brake (24 VDC)
S	With oil seal

## Features

- Medium inertia
- Instantaneous peak torque (350% of rated torque)
- Mounted high-resolution serial encoder: 13, 20 bits
- Maximum speed: 6,000 min<sup>-1</sup>
- Wide Selection: 50 to 750 W capacity, holding brake options

## Application Examples

- Semiconductor equipment
- Chip mounters
- PCB drilling stations
- Robots
- Material handling machines
- Food processing equipment



Model	SGMJV-08ADA61	SGMJV-04ADA61	SGMJV-01ADA61
Rated Output	750 W	400 W	100 W
Flange Face	80 mm x 80 mm	60 mm x 60 mm	40 mm x 40 mm

Ratings and Specifications

**Time Rating:** Continuous

**Vibration Class:** V15

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Mounting:** Flange-mounted

**Thermal Class:** B

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Totally enclosed, self-cooled, IP65  
(except for shaft opening)

**Ambient Humidity:** 20% to 80% (no condensation)

**Drive Method:** Direct drive

**Rotation Direction:** Counterclockwise (CCW) with forward run reference when viewed from the load side

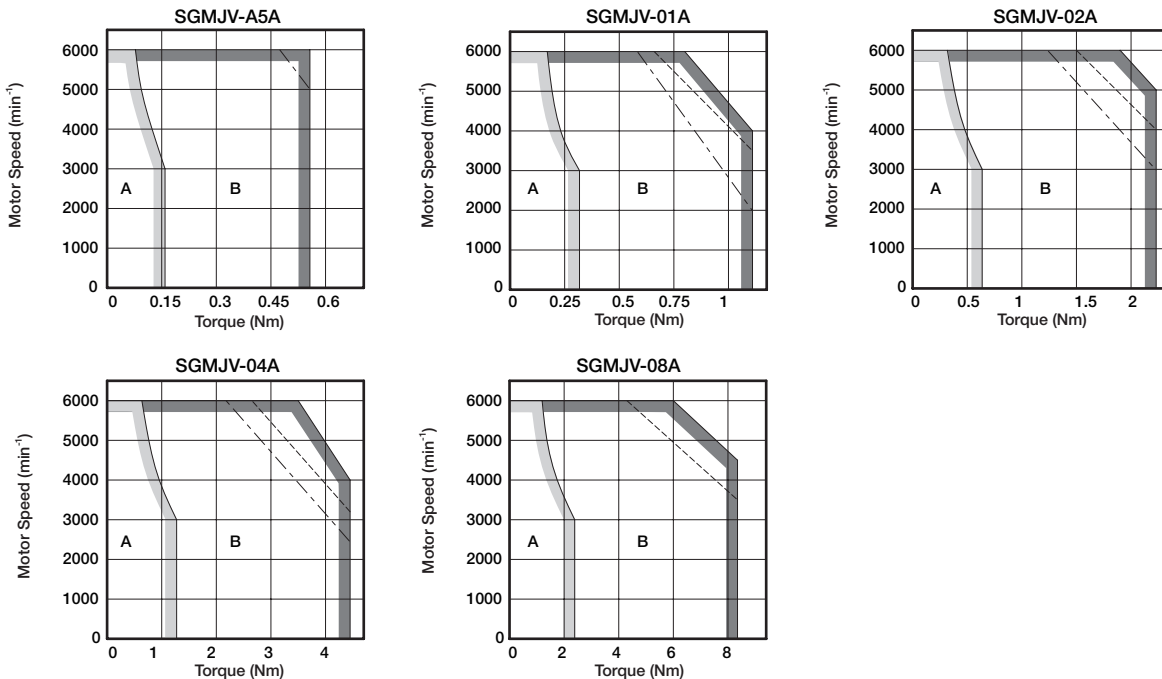
Voltage		230 V				
Servomotor Model: SGMJV-□□□□		A5A	01A	02A	04A	08A
Rated Output <sup>*1</sup>	W	50	100	200	400	750
Rated Torque <sup>*1, *2</sup>	Nm	0.159	0.318	0.637	1.27	2.39
Instantaneous Peak Torque <sup>*1</sup>	Nm	0.557	1.11	2.23	4.46	8.36
Rated Current <sup>*1</sup>	Arms	0.61	0.84	1.6	2.7	4.7
Instantaneous Max. Current <sup>*1</sup>	Arms	2.1	2.9	5.8	9.3	16.9
Rated Speed <sup>*1</sup>	min <sup>-1</sup>	3000				
Max. Speed <sup>*1</sup>	min <sup>-1</sup>	6000				
Torque Constant	Nm/Arms	0.285	0.413	0.435	0.512	0.544
Rotor Moment of Inertia	*10 <sup>-4</sup> kgm <sup>2</sup>	0.0414 (0.0561)	0.0665 (0.0812)	0.259 (0.323)	0.442 (0.506)	1.57 (1.74)
Rated Power Rate <sup>*1</sup>	kW/s	6.11	15.2	15.7	36.5	36.3
Rated Angular Acceleration <sup>*1</sup>	rad/s <sup>2</sup>	38400	47800	24600	28800	15200
Applicable SERVOPACK	SGDV-□□□□	R70□	R90□	1R6A	2R8□	5R5A

\*1: These items and torque-speed characteristics quoted in combination with an SGDV SERVOPACK are at an armature winding temperature of 100°C. Other values quoted are at 20°C.

\*2: Rated torques are continuous allowable torque values at 40°C with an aluminum heat sink of the following dimensions attached.  
SGMJV-A5A, -01A: 200 mm × 200 mm × 6 mm  
SGMJV-02A, -04A, -08A: 250 mm × 250 mm × 6 mm

Note: The values in parentheses are for servomotors with holding brakes.

● Torque-Speed Characteristics [A] : Continuous Duty Zone [B] : Intermittent Duty Zone



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid, dotted, and dashed-dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:

- The solid line: With a three-phase 200 V or a single-phase 230 V SERVOPACK
- The dotted line: With a single-phase 200 V SERVOPACK
- The dashed-dotted line: With a single-phase 100 V SERVOPACK

An SGMJV-A5A servomotor combined with a single-phase 200 V SERVOPACK has the same characteristics as one combined with three-phase 200 V SERVOPACK.

2 When the effective torque is within the rated torque, the servomotor can be used within the intermittent duty zone.

3 When the power cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Speed Characteristics will shrink as the line-to-line voltage drops.



## Ratings and Specifications

### ● Derating Rate for Servomotor Fitted with an Oil Seal

When a motor is fitted with an oil seal, use the following derating rate because of the higher friction torque.

Servomotor Model	A5A	01A	02A	04A	08A
SGMJV-					
Derating Rate %	80	90		95	

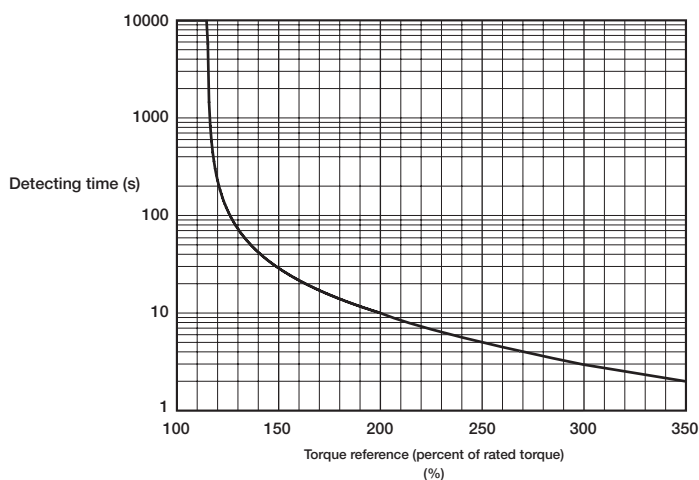
### ● Holding Brake Electrical Specifications

Holding Brake Rated Voltage	Servomotor Model	Servomotor Rated Output W	Holding Brake Specifications					
			Capacity W	Holding Torque Nm	Coil Resistance $\Omega$ (at 20°C)	Rated Current A (at 20°C)	Brake Release Time ms	Brake Operation Time ms
24 VDC $\pm 10\%$ $-10\%$	SGMJV-A5A	50	5.5	0.159	103	0.23	60	100
	SGMJV-01A	100	5.5	0.318	103	0.23	60	100
	SGMJV-02A	200	6	0.637	97.4	0.25	60	100
	SGMJV-04A	400	6	1.27	97.4	0.25	60	100
	SGMJV-08A	750	6.5	2.39	87.7	0.27	80	100

- Notes: 1 The holding brake is only used to hold the load and cannot be used to stop the servomotor.  
 2 The holding brake open time and holding brake operation time vary depending on which discharge circuit is used. Make sure holding brake open time and holding brake operation time are correct for your servomotor.  
 3 A 24-VDC power supply is provided by customers.

### ● Overload Characteristics

The overload detection level is set under hot start conditions at a servomotor ambient temperature of 40°C.



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*.

## Ratings and Specifications

### ● Allowable Load Moment of Inertia at the Motor Shaft

The rotor moment of inertia ratio is the value for a servomotor without a gear and a holding brake.

Servomotor Model		Servomotor Rated Output	Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)
SGMJV-	A5A, 01A	50, 100 W	20 times
	02A	200 W	15 times
	04A, 08A	400, 750 W	10 times

### ● Load Moment of Inertia

The larger the load moment of inertia, the worse the movement response.

The allowable load moment of inertia ( $J_L$ ) depends on the motor capacity, as shown above. This value is provided strictly as a guideline and results may vary depending on servomotor drive conditions.

Use the AC servo drive capacity selection program SigmaJunmaSize+ to check the operation conditions. The program can be downloaded for free from our web site (<http://www.yaskawa.eu.com>).

An overvoltage alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a regenerative overload alarm (A.320). Take one of the following steps if this occurs.

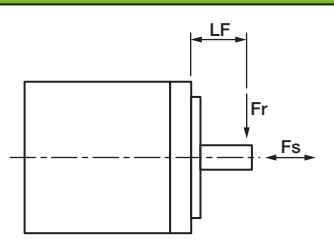
- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the steps above. Refer to *Regenerative resistors* on page 364.

Regenerative resistors are not built into SERVOPACKs for 400 W motors or less.

External regenerative resistors are required when this condition is exceeded or if the allowable loss capacity (W) of the built-in regenerative resistor is exceeded due to regenerative drive conditions when a regenerative resistor is already built in.

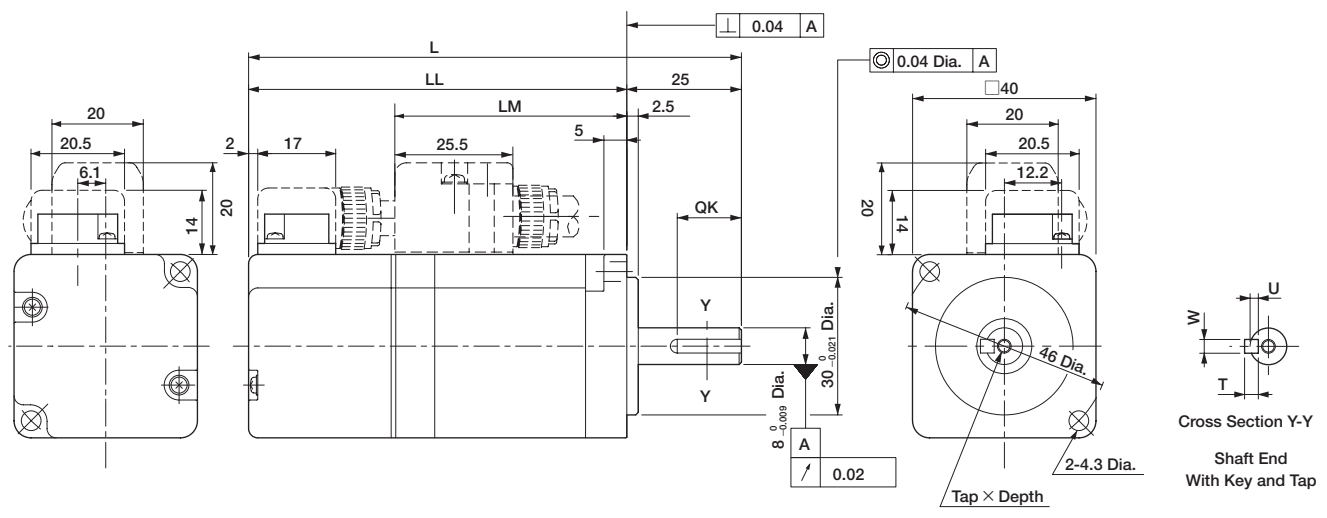
### ● Allowable Radial and Thrust Loads

Design the mechanical system so thrust and radial loads applied to the servomotor shaft end during operation fall within the ranges shown in the table.

Servomotor Model		Allowable Radial Load ( $F_r$ ) N	Allowable Thrust Load ( $F_s$ ) N	LF mm	Reference Diagram
SGMJV-	A5A	78	54	20	
	01A				
	02A	245	74	25	
	04A				
	08A				

External Dimensions Units: mm

(1) 50, 100 W

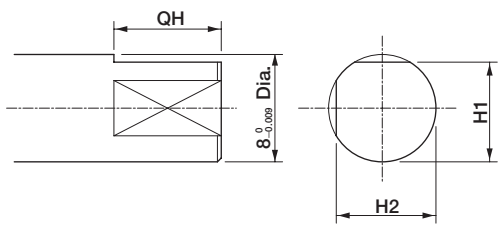


Model SGMJV-	L	LL	LM	Tap x Depth	Key Dimensions				Approx. Mass kg
					QK	U	W	T	
A5A□A21 (A5A□A2C)	94 (139)	69 (114)	37	No tap	No key				0.3 (0.6)
A5A□A61 (A5A□A6C)				M3 x 6L	14	1.8	3	3	
01A□A21 (01A□A2C)	107.5 (152.5)	82.5 (127.5)	50.5	No tap	No key				0.4 (0.7)
01A□A61 (01A□A6C)				M3 x 6L	14	1.8	3	3	

Note: The models and values in parentheses are for servomotors with holding brakes.

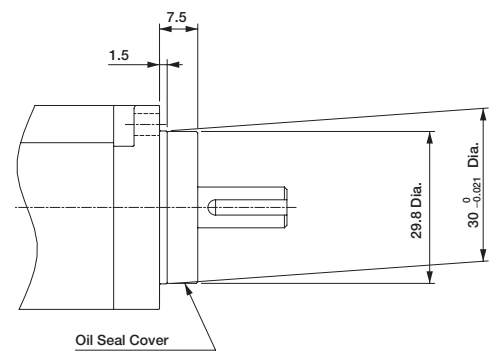
<Shaft End and Other Options>

● With Two Flat Seats



Model SGMJV-	Dimensions of Servomotor with Two Flat Seats mm		
	QH	H1	H2
A5A□AB□	15	7.5	7.5
01A□AB□			

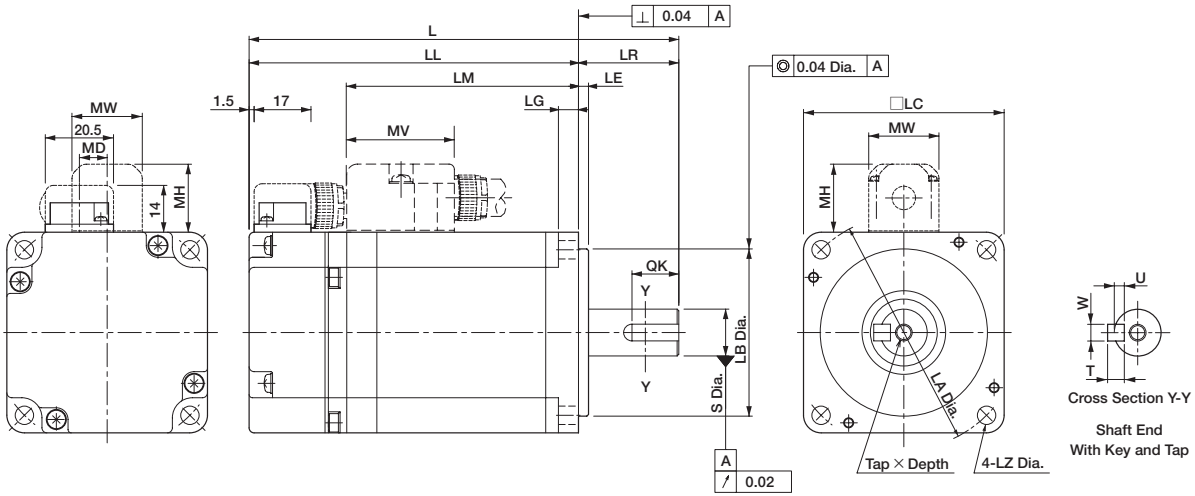
● With an Oil Seal



Notes: 1 The 7th digit of the model designation is "S" or "E."  
2 Key dimensions are the same as those in the table above.

External Dimensions Units: mm

(2) 200 to 750 W

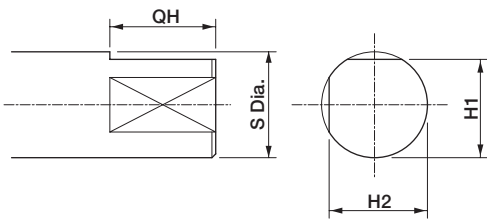


Model SGMJV-	L	LL	LM	Flange Face Dimensions								S	Tap x Depth	Key Dimensions				MD	MW	MH	MV	Approx. Mass kg
				LR	LE	LG	LC	LA	LB	LZ	QK			U	W	T						
02A□A21 (02A□A2C)	110 (150)	80 (120)	51	30	3	6	60	70	50 <sup>0</sup> <sub>-0.025</sub>	5.5	14 <sup>0</sup> <sub>-0.011</sub>	No tap	No key				8.3	23.1	20.4	27.8	0.9 (1.5)	
02A□A61 (02A□A6C)												M5x8L	14	3	5	5						
04A□A21 (04A□A2C)	128.5 (168.5)	98.5 (138.5)	69.5	30	3	6	60	70	50 <sup>0</sup> <sub>-0.025</sub>	5.5	14 <sup>0</sup> <sub>-0.011</sub>	No tap	No key				8.3	23.1	20.4	27.8	1.3 (1.9)	
04A□A61 (04A□A6C)												M5x8L	14	3	5	5						
08A□A21 (08A□A2C)	155 (200)	115 (160)	85	40	3	8	80	90	70 <sup>0</sup> <sub>-0.030</sub>	7	19 <sup>0</sup> <sub>-0.013</sub>	No tap	No key				13.8	30	21.6	23.5	2.7 (3.6)	
08A□A61 (08A□A6C)												M6x10L	22	3.5	6	6						

Note: The models and values in parentheses are for servomotors with holding brakes.

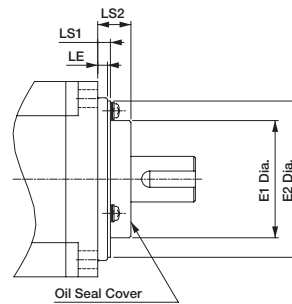
<Shaft End and Other Options>

● With Two Flat Seats



Model SGMJV-	Dimensions of Servomotor with Two Flat Seats mm			
	QH	S	H1	H2
02A□AB□	15	14 <sup>0</sup> <sub>-0.011</sub>	13	13
04A□AB□				
08A□AB□				

● With an Oil Seal



Model SGMJV-	Dimensions of Servomotor with an Oil Seal			
	E1	E2	LS1	LS2
02A, 04A	36	48	4	10
08A	49	66	6	11

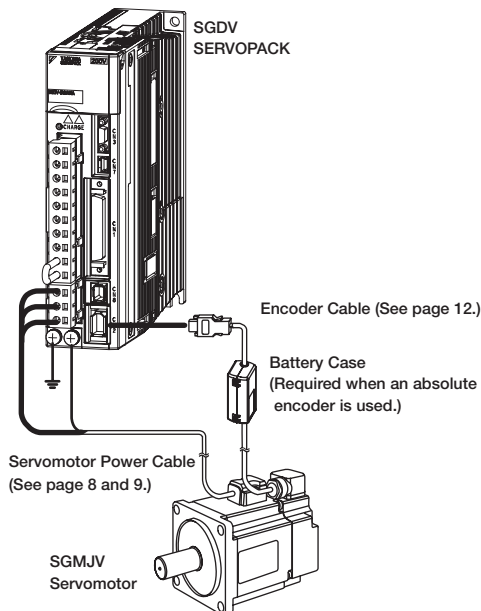
Notes: 1 The 7th digit of the model designation is "S" or "E."  
2 Key dimensions are the same as those in the table above.



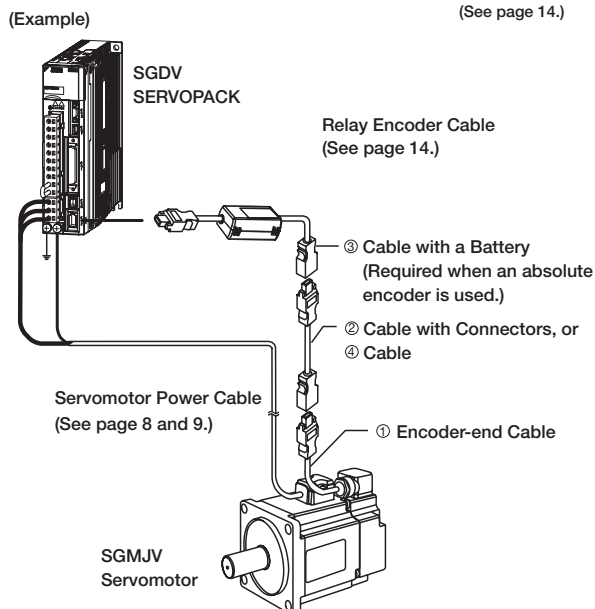
Selecting Cables

● Cables Connections

● Standard Wiring (Max. encoder cable length: 20 m)



● Encoder Cable Extension from 30 to 50 m



⚠ CAUTION

Separate the servomotor power cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.

When the cable length exceeds 20 m, be sure to use a relay encoder cable.

When the power cable length exceeds 20 m, note that the intermittent duty zone of the *Torque-Speed Characteristics* will shrink as the line-to-line voltage drops.

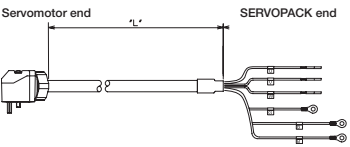
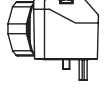
● Servomotor Power Cable

Name	Servomotor Rated Output	Length	Order No.		Specifications	Details
			Standard Type	Flexible Type		
For Servomotor without Holding Brakes	50, 100 W	3 m	JZSP-CSM01-03-E-G#	JZSP-CSM21-03-E-G#		(1)
		5 m	JZSP-CSM01-05-E-G#	JZSP-CSM21-05-E-G#		
		10 m	JZSP-CSM01-10-E-G#	JZSP-CSM21-10-E-G#		
		15 m	JZSP-CSM01-15-E-G#	JZSP-CSM21-15-E-G#		
		20 m	JZSP-CSM01-20-E-G#	JZSP-CSM21-20-E-G#		
	200, 400 W	3 m	JZSP-CSM02-03-E-G#	JZSP-CSM22-03-E-G#		
		5 m	JZSP-CSM02-05-E-G#	JZSP-CSM22-05-E-G#		
		10 m	JZSP-CSM02-10-E-G#	JZSP-CSM22-10-E-G#		
		15 m	JZSP-CSM02-15-E-G#	JZSP-CSM22-15-E-G#		
		20 m	JZSP-CSM02-20-E-G#	JZSP-CSM22-20-E-G#		
	750 W	3 m	JZSP-CSM03-03-E-G#	JZSP-CSM23-03-E-G#		
		5 m	JZSP-CSM03-05-E-G#	JZSP-CSM23-05-E-G#		
		10 m	JZSP-CSM03-10-E-G#	JZSP-CSM23-10-E-G#		
		15 m	JZSP-CSM03-15-E-G#	JZSP-CSM23-15-E-G#		
		20 m	JZSP-CSM03-20-E-G#	JZSP-CSM23-20-E-G#		

Note: The digit "#" of the order number represents the design revision.

(Cont'd)

Selecting Cables

Name	Servomotor Rated Output	Length	Order Nr.		Specifications	Details
			Standard Type	Flexible Type		
For Servomotor with Holding Brakes	50, 100 W	3 m	JZSP-CSM11-03-E-G#	JZSP-CSM31-03-E-G#		(2)
		5 m	JZSP-CSM11-05-E-G#	JZSP-CSM31-05-E-G#		
		10 m	JZSP-CSM11-10-E-G#	JZSP-CSM31-10-E-G#		
		15 m	JZSP-CSM11-15-E-G#	JZSP-CSM31-15-E-G#		
		20 m	JZSP-CSM11-20-E-G#	JZSP-CSM31-20-E-G#		
	200, 400 W	3 m	JZSP-CSM12-03-E-G#	JZSP-CSM32-03-E-G#		
		5 m	JZSP-CSM12-05-E-G#	JZSP-CSM32-05-E-G#		
		10 m	JZSP-CSM12-10-E-G#	JZSP-CSM32-10-E-G#		
		15 m	JZSP-CSM12-15-E-G#	JZSP-CSM32-15-E-G#		
		20 m	JZSP-CSM12-20-E-G#	JZSP-CSM32-20-E-G#		
	750 W	3 m	JZSP-CSM13-03-E-G#	JZSP-CSM33-03-E-G#		
		5 m	JZSP-CSM13-05-E-G#	JZSP-CSM33-05-E-G#		
		10 m	JZSP-CSM13-10-E-G#	JZSP-CSM33-10-E-G#		
		15 m	JZSP-CSM13-15-E-G#	JZSP-CSM33-15-E-G#		
		20 m	JZSP-CSM13-20-E-G#	JZSP-CSM33-20-E-G#		
Servomotor-end Connector Kit	50, 100 W		JZSP-CSM9-1-E-G1		Crimped Type (A crimp tool is required.) 	(3)
	200, 400 W		JZSP-CSM9-2-E-G1			(4)
	750 W		JZSP-CSM9-3-E-G1			(5)

Note: The digit "#" of the order number represents the design revision.

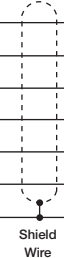
(1) Wiring Specifications for Servomotors without Holding Brakes

SERVOPACK-end Leads		Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Green/Yellow	FG	FG	1
Black 1	Phase W	Phase W	2
Black 2	Phase V	Phase V	3
Black 3	Phase U	Phase U	4
		-	5
		-	6

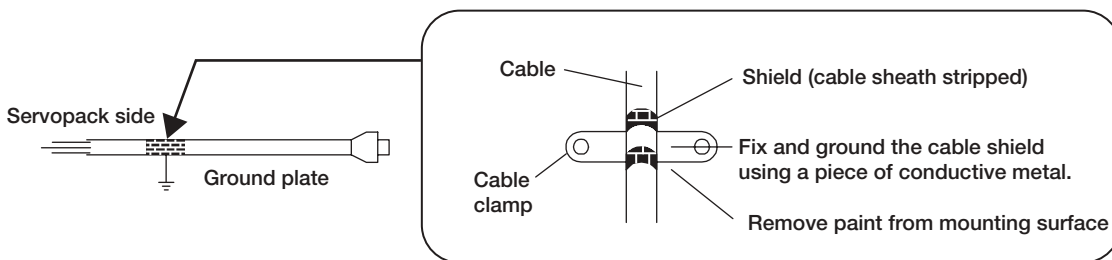
(2) Wiring Specifications for Servomotor with Holding Brakes

SERVOPACK-end Leads		Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Green/Yellow	FG	FG	1
Black 1	Phase W	Phase W	2
Black 2	Phase V	Phase V	3
Black 3	Phase U	Phase U	4
Black 4	Brake	Brake	5
Black 5	Brake	Brake	6
		Shell	FG

Fix shielded cable at servopack end as shown below



Note: No polarity for connection to a holding brake.



Selecting Cables

(3) Servomotor-end Connector Kit Specifications: For 50, 100 W Servomotors

Items	Specifications	External Dimensions mm
Order No.	JZSP-CSM9-1-E-G1 (Cables are not included.)	
Applicable Servomotors	SGMJV-A5A, -01A	
Manufacturer	J.S.T. Mfg. Co., Ltd.	
Receptacle Housing	J1FSN-06V-K (YE)	
Electrical Contact	SJ1F-01GF-P0.8	
Applicable Wire Size	AWG20 to 24	
Outer Diameter of Insulating Sheath	1.11 dia. to 1.53 dia. mm	
Mounting Screw	M2 Pan-head screw	
Applicable Cable Outer Diameter	7±0.3 dia. mm	

Note: A crimp tool (Model no.: YRS-8841) is required. Contact the respective manufacturer for more information.

(4) Servomotor-end Connector Kit Specifications: For 200, 400 W Servomotors

Items	Specifications	External Dimensions mm
Order No.	JZSP-CSM9-2-E-G1 (Cables are not included.)	
Applicable Servomotors	SGMJV-02A, -04A	
Manufacturer	J.S.T. Mfg. Co., Ltd.	
Receptacle Housing	J2FSN-06V-K (YE)	
Electrical Contact	SJ2F-01GF-P1.0	
Applicable Wire Size	AWG20 to 24	
Outer Diameter of Insulating Sheath	1.11 dia. to 1.53 dia. mm	
Mounting Screw	M2 Pan-head screw	
Applicable Cable Outer Diameter	7±0.3 dia. mm	

Note: A crimp tool (Model no.: YRS-8861) is required. Contact the respective manufacturer for more information.

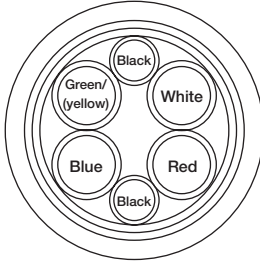
(5) Servomotor-end Connector Kit Specifications: For 750 W Servomotors

Items	Specifications	External Dimensions mm
Order No.	JZSP-CSM9-3-E-G1 (Cables are not included.)	
Applicable Servomotors	SGMJV-08A	
Manufacturer	J.S.T. Mfg. Co., Ltd.	
Receptacle Housing	J3FSN-06V-K (YE)	
Cable Type	Flexible	
Electrical Contact	SJ3F-01GF-P1.8	
Applicable Wire Size	AWG16 to 24	
Outer Diameter of Insulating Sheath	1.53 dia. to 2.5 dia. mm	
Applicable Cable Outer Diameter	8±0.3 dia. mm	

Note: The following crimp tools are required.  
 For power terminals: Model no. YRF-880  
 For brake terminals: Model no. YRF-881  
 Contact the respective manufacturer for more information.

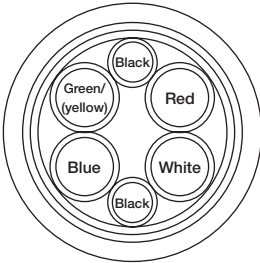
Selecting Cables

(6) Cable Specifications: For 50 to 400 W Servomotors

Items	Standard Type	Flexible Type
Order No.*	JZSP-CSM90-□□-E (50 m max.)	JZSP-CSM80-□□-E (50 m max.)
Specifications	UL2517 (Rating temperature: 105°C) AWG20×6C For power line: AWG20 (0.52 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.53 dia. mm For holding brake line: AWG20 (0.52 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.53 dia. mm	UL2517 (Rating temperature: 105°C) AWG22×6C For power line: AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.37 dia. mm For holding brake line: AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.37 dia. mm
Finished Dimensions	7±0.3 dia. mm	
Internal Configuration and Lead Color		
Yaskawa Standard Specifications (Standard Length)	Cable length: 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, 50 m	

\*: Specify the cable length in □□ of order no.  
 Example: JZSP-CSM90-05-E (5 m)

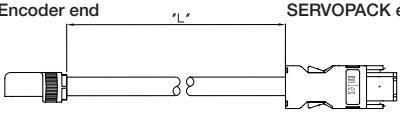
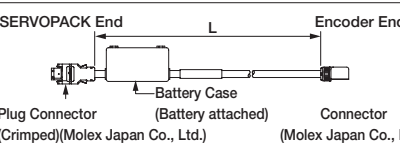


(7) Cable Specifications: For 750 W Servomotors

Items	Standard Type	Flexible Type
Order No.*	JZSP-CSM91-□□-E (50 m max.)	JZSP-CSM81-□□-E (50 m max.)
Specifications	UL2517 (Rating temperature: 105°C) AWG16×4C, AWG20×2C For power line: AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.15 dia. mm For holding brake line: AWG20 (0.52 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.6 dia. mm	UL2517 (Rating temperature: 105°C) AWG16×4C, AWG22×2C For power line: AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.35 dia. mm For holding brake line: AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.37 dia. mm
Finished Dimensions	8±0.3 dia. mm	
Internal Configuration and Lead Color		
Yaskawa Standard Specifications (Standard Length)	Cable length: 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, 50 m	

\*: Specify the cable length in □□ of order no.  
 Example: JZSP-CSM91-05-E (5 m)

Selecting Cables

Encoder Cables (Length: 20 m or less)

Name	Length	Order No.		Specifications	Details
		Standard Type	Flexible Type <sup>1</sup>		
Cable with Connectors (For Incremental Encoder)	3 m	JZSP-CSP01-03-E-G#	JZSP-CSP21-03-G#	Encoder end  SERVOPACK end	(1)
	5 m	JZSP-CSP01-05-E-G#	JZSP-CSP21-05-G#		
	10 m	JZSP-CSP01-10-E-G#	JZSP-CSP21-10-G#		
	15 m	JZSP-CSP01-15-E-G#	JZSP-CSP21-15-G#		
	20 m	JZSP-CSP01-20-E-G#	JZSP-CSP21-20-G#		
Cable with Connectors <sup>2</sup> (For Absolute Encoder, with a Battery Case)	3 m	JZSP-CSP05-03-E-G#	JZSP-CSP25-03-G#	SERVOPACK End  Encoder End Plug Connector (Crimped)(Molex Japan Co., Ltd.) Battery Case (Battery attached) Connector (Molex Japan Co., Ltd.)	(2)
	5 m	JZSP-CSP05-05-E-G#	JZSP-CSP25-05-G#		
	10 m	JZSP-CSP05-10-E-G#	JZSP-CSP25-10-G#		
	15 m	JZSP-CSP05-15-E-G#	JZSP-CSP25-15-G#		
	20 m	JZSP-CSP05-20-E-G#	JZSP-CSP25-20-G#		
SERVOPACK-end Connector Kit		JZSP-CMP9-1-E		Soldered 	(3)
Encoder-end Connector Kit		JZSP-CSP9-2-E		Crimped Type (A crimp tool is required.) 	

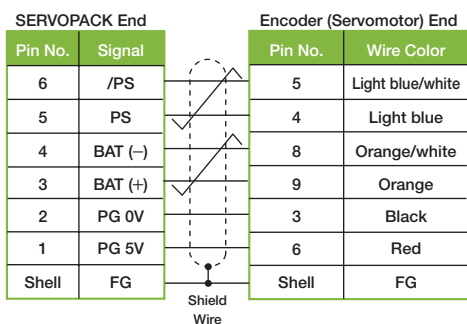
\*1: Use flexible cables for movable sections such as robot arms.

\*2: When the battery is connected to the host controller, no battery case is required. If so, use a cable for incremental encoders.

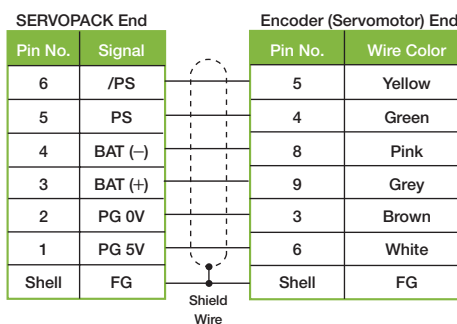
Note: The digit "#" of the order number represents the design revision.

(1) Wiring Specifications for Cable with Connectors (For incremental encoder)

Standard Type

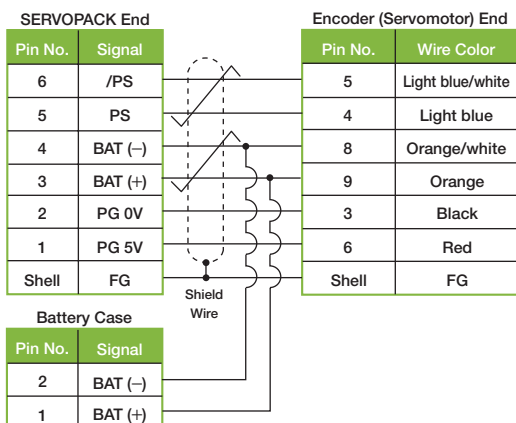


Flexible Type

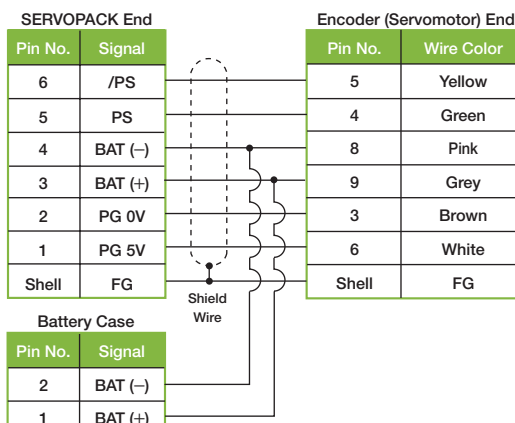


(2) Wiring Specifications for Cable with Connectors (For absolute encoder, with a battery case)

Standard Type

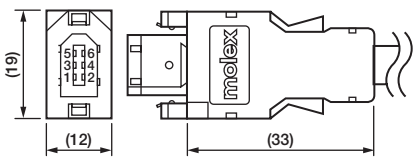
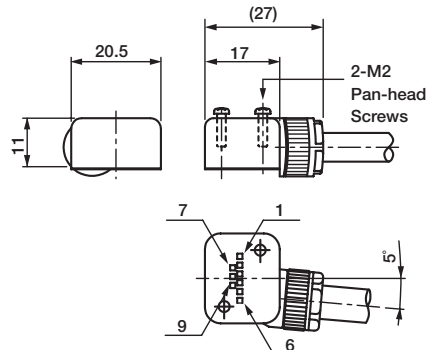


Flexible Type



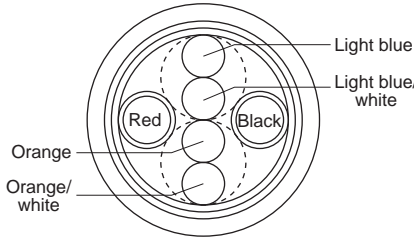
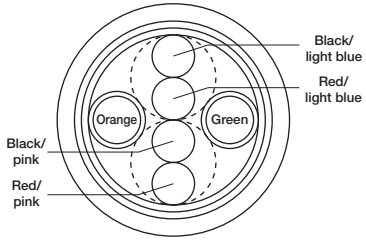
Selecting Cables

(3) SERVOPACK-end/Encoder-end Connector Kit Specifications

Items	SERVOPACK-end Connector Kit	Encoder-end Connector Kit
Order No.	JZSP-CMP9-1-E (Cables are not included.)	JZSP-CSP9-2-E (Cables are not included.)
Manufacturer	Molex Japan Co., Ltd.	Molex Japan Co., Ltd.
Specifications	55100-0670 (soldered) Product Specification: PS-54280	54346-0070 (crimped) Mounting screw: M2 pan-head screw (× 2) Applicable cable outer diameter of applicable cable: 6.3 dia. to 7.7 dia. mm Applicable wire size: AWG22 to 26 Outer diameter of insulating sheath: 1.05 dia. to 1.4 dia. mm Application Specification: AS-54992 Crimping Specification: CS-56161
External Dimensions (Units: mm)		

\*: A crimp tool is required.  
The following crimp tool is applicable for the cables provided by Yaskawa. When using other wire sizes, contact the respective manufacturer for crimp tools.  
Applicable crimp tool for Yaskawa's wire size: Hand Tool Model No. 57175-5000

(4) Cable Specifications

Items	Standard Type	Flexible Type
Order No.*	JZSP-CMP09-□□-E	JZSP-CSP39-□□-E
Cable Length	20 m max.	
Specifications	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.15 dia. mm AWG24 (0.20 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.09 dia. mm	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.35 dia. mm AWG24 (0.20 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.21 dia. mm
Finished Dimensions	6.5 dia. mm	6.8 dia. mm
Internal Configuration and Lead Color		
Yaskawa Standards Specifications (Standard Length)	Cable length: 5 m, 10 m, 15 m, 20 m	

\*: Specify the cable length in □□ of order no.  
Example: JZSP-CMP09-05-E (5 m)

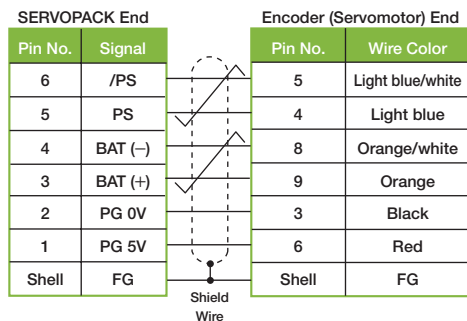
Selecting Cables

● Relay Encoder Cables (For extending from 30 to 50 m)

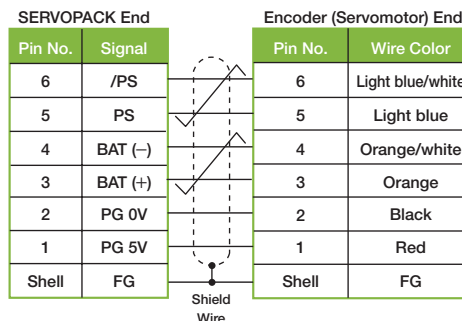
Name	Length	Order No.	Specifications	Details
		Standard Type		
① Encoder-end Cables (For incremental and absolute encoder)	0.3 m	JZSP-CSP11-E	<p>SERVOPACK End 0.3 m Encoder End</p> <p>Plug Connector (Crimped) (Molex Japan Co., Ltd.) Connector (Molex Japan Co., Ltd.)</p>	(1)
② Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E	<p>SERVOPACK End L Encoder End</p> <p>Plug Connector (Crimped) (Molex Japan Co., Ltd.) Socket Connector (Soldered) (Molex Japan Co., Ltd.)</p>	(2)
	40 m	JZSP-UCMP00-40-E		
	50 m	JZSP-UCMP00-50-E		
③ Cable with a Battery Case (Required when an absolute encoder is used*.)	0.3 m	JZSP-CSP12-E	<p>SERVOPACK End 0.3 m Encoder End</p> <p>Plug Connector (Crimped) (Molex Japan Co., Ltd.) Socket Connector (Soldered) (Molex Japan Co., Ltd.)</p> <p>Battery Case (Battery attached)</p>	(3)
④ Cables	30 m	JZSP-CMP19-30-E		(4)
	40 m	JZSP-CMP19-40-E		
	50 m	JZSP-CMP19-50-E		

\*: Not required when connecting a battery to the host controller.

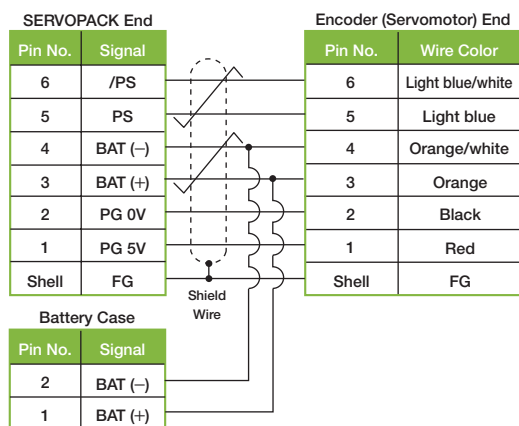
(1) Wiring Specifications for Encoder-end Cable



(2) Wiring Specifications for Cable with Connectors



(3) Wiring Specifications for Cable with a Battery Case



(4) Cable Specifications

Item	Standard Type
Order No.*	JZSP-CMP19-□□-E
Cable Length	50 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG16×2C+AWG26×2P AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.0 dia. mm AWG26 (0.13 mm <sup>2</sup> ) Outer diameter of insulating sheath: 0.91 dia. mm
Finished Dimensions	6.8 dia. mm
Internal Configuration and Lead Colors	<p>Orange, Orange/white, Black, Red, Light Blue, Light Blue/white</p>
Yaskawa Standard Specifications (Standard Length)	Cable length: 30 m, 40 m, 50 m

\*: Specify the cable length in □□ of order no.  
Example: JZSP-CMP19-30-E (30 m)



# Rotary Servomotors

# SGMAV



## Model Designations

### ● Without Gears

**SGMAV - 01 A D A 2 1**

Σ-V Series  
Servomotor  
SGMAV

1st+2nd  
digits

3rd  
digit

4th  
digit

5th  
digit

6th  
digit

7th  
digit

#### 1st+2nd digits Rated Output

Code	Specifications
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	550 W
08	750 W
10	1.0 kW

#### 5th digit Design Revision Order

Code	Specifications
A	Standard

#### 7th digit Options

Code	Specifications
1	Without options
C	With holding brake (24 VDC)
E	With oil seal and holding brake (24 VDC)
S	With oil seal

#### 6th digit Shaft End

Code	Specifications
2	Straight without key (standard)
6	Straight with key and tap (optional)
B	With two flat seats (optional)

#### 3rd digit Power Supply Voltage

Code	Specifications
A	200 VAC

#### 4th digit Serial Encoder

Code	Specifications
3	20-bit absolute (standard)
D	20-bit incremental (standard)

## Features

- Super high power rate (Extremely low inertia)
- Instantaneous peak torque (300% of rated torque)
- Mounted high-resolution serial encoder: 20 bits
- Maximum speed: 6,000 min<sup>-1</sup>
- Wide selection: 50 W to 1.0 kW capacity, holding brake options

## Application Examples

- Semiconductor equipment
- Chip mounters
- PCB drilling stations
- Robots
- Material handling machines
- Food processing equipment



Model	SGMAV-10ADA61	SGMAV-06ADA61	SGMAV-01ADA61
Rated Output	1.0 kW	550 W	100 W
Flange Face	80 mm x 80 mm	60 mm x 60 mm	40 mm x 40 mm

Ratings and Specifications

**Time Rating:** Continuous

**Vibration Class:** V15

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Mounting:** Flange-mounted

**Thermal Class:** B

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Totally enclosed, self-cooled, IP65  
(except for shaft opening)

**Ambient Humidity:** 20% to 80% (no condensation)

**Drive Method:** Direct drive

**Rotation Direction:** Counterclockwise (CCW) with forward run reference when viewed from the load side

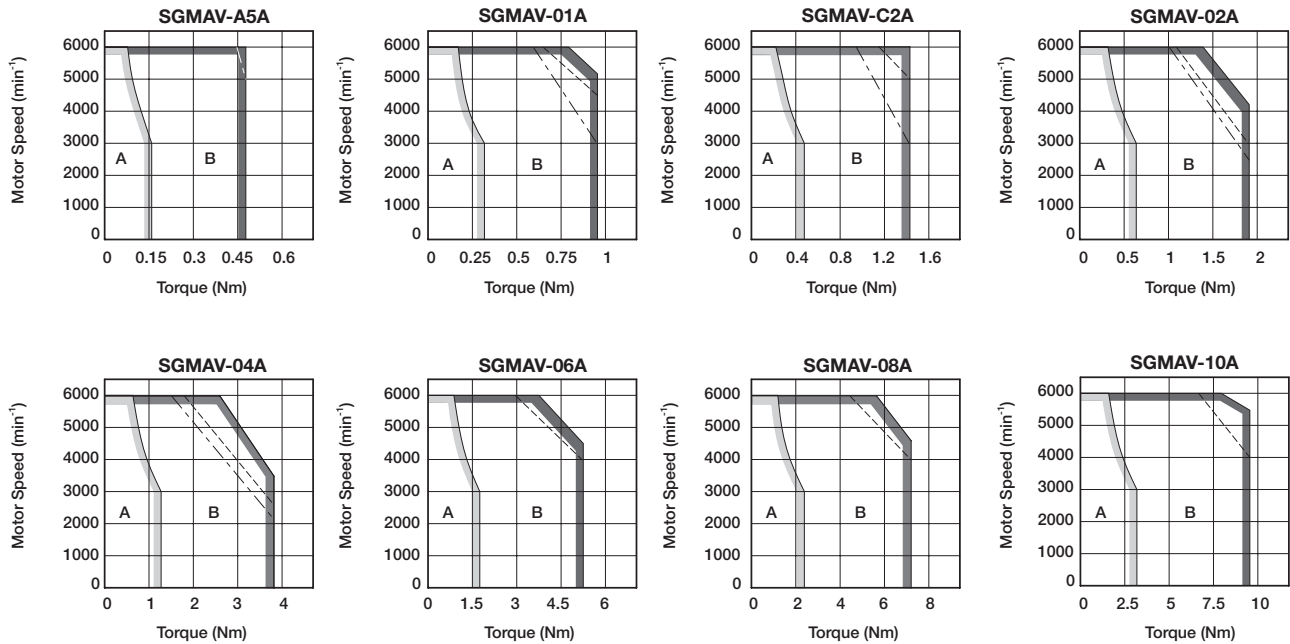
Voltage		230 V							
Servomotor Model: SGMAV-		A5A	01A	C2A	02A	04A	06A	08A	10A
Rated Output <sup>*1</sup>	W	50	100	150	200	400	550	750	1000
Rated Torque <sup>*1, *2</sup>	Nm	0.159	0.318	0.477	0.637	1.27	1.75	2.39	3.18
Instantaneous Peak Torque <sup>*1</sup>	Nm	0.477	0.955	1.43	1.91	3.82	5.25	7.16	9.55
Rated Current <sup>*1</sup>	Arms	0.66	0.91	1.3	1.5	2.6	3.8	5.3	7.4
Instantaneous Max. Current <sup>*1</sup>	Arms	2.1	2.8	4.2	5.3	8.5	12.2	16.6	23.9
Rated Speed <sup>*1</sup>	min <sup>-1</sup>	3000							
Max. Speed <sup>*1</sup>	min <sup>-1</sup>	6000							
Torque Constant	Nm/Arms	0.265	0.375	0.381	0.450	0.539	0.496	0.487	0.467
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	0.0242 (0.0389)	0.0380 (0.0527)	0.0531 (0.0678)	0.116 (0.180)	0.190 (0.254)	0.326 (0.403)	0.769 (0.940)	1.20 (1.41)
Rated Power Rate <sup>*1</sup>	kW/s	10.4	26.6	42.8	35.0	84.9	93.9	74.1	84.3
Rated Angular Acceleration <sup>*1</sup>	rad/s <sup>2</sup>	65800	83800	89900	54900	67000	53700	31000	26500
Applicable SERVOPACK	SGDV-	R70	R90	1R6A		2R8	5R5A	5R5A	120A

\*1: These items and torque-speed characteristics quoted in combination with an SGDV SERVOPACK are at an armature winding temperature of 100°C. Other values quoted are at 20°C.

\*2: Rated torques are continuous allowable torque values at 40°C with an aluminum heat sink of the following dimensions attached.  
 SGMAV-A5A, -01A: 200 mm × 200 mm × 6 mm  
 SGMAV-C2A, -02A, -04A, -06A, -08A: 250 mm × 250 mm × 6 mm  
 SGMAV-10A: 300 mm × 300 mm × 12 mm

Note: The values in parentheses are for servomotors with holding brakes.

● Torque-Speed Characteristics **A**: Continuous Duty Zone **B**: Intermittent Duty Zone



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid, dotted, and dashed-dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:

- The solid line: With a three-phase 200 V or a single-phase 230 V SERVOPACK
- The dotted line: With a single-phase 200 V SERVOPACK
- The dashed-dotted line: With a single-phase 100 V SERVOPACK

An SGMAV-A5A servomotor combined with a single-phase 200 V SERVOPACK has the same characteristics as one combined with a three-phase 200 V SERVOPACK.

2 When the effective torque is within the rated torque, the servomotor can be used within the intermittent duty zone.

3 When the main circuit cable length exceeds 20 m, note that the intermittent duty zone of the *Torque-Speed Characteristics* will shrink as the line-to-line voltage drops.

## Ratings and Specifications

### ● Derating Rate for Servomotor Fitted with an Oil Seal

When a motor is fitted with an oil seal, use the following derating rate because of the higher friction torque.

Servomotor Model SGMV-	A5A	01A	C2A	02A	04A	06A	08A	10A
Derating Rate %	80	90			95			

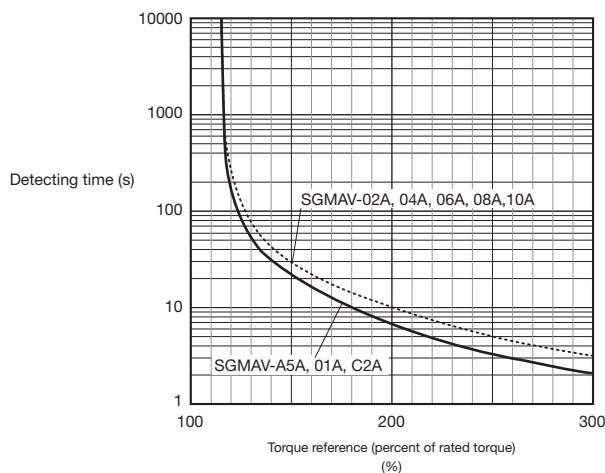
### ● Holding Brake Electrical Specifications

Holding Brake Rated Voltage	Servomotor Model	Servomotor Rated Output W	Holding Brake Specifications					
			Capacity W	Holding Torque Nm	Coil Resistance Ω (at 20°C)	Rated Current A (at 20°C)	Brake Release Time ms	Brake Operation Time ms
24 VDC <sup>+10%</sup> / <sub>-10%</sub>	SGMAV-A5A	50	5.5	0.159	103	0.23	60	100
	SGMAV-01A	100		0.318				
	SGMAV-C2A	150	5.1	0.477	114	0.21	60	100
	SGMAV-02A	200	6	0.637	97.4	0.25	60	100
	SGMAV-04A	400		1.27				
	SGMAV-06A	550	8	1.75	74.3	0.32	80	100
	SGMAV-08A	750	6.5	2.39	87.7	0.27	80	100
	SGMAV-10A	1000	7	3.18	82.8	0.29	80	100

- Notes: 1 The holding brake is only used to hold the load and cannot be used to stop the servomotor.
- 2 The holding brake open time and holding brake operation time vary depending on which discharge circuit is used. Make sure holding brake open time and holding brake operation time are correct for your servomotor.
- 3 A 24-VDC power supply is provided by customers.

### ● Overload Characteristics

The overload detection level is set under hot start conditions at a servomotor ambient temperature of 40°C.



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.

## Ratings and Specifications

### ● Allowable Load Moment of Inertia at the Motor Shaft

The rotor moment of inertia ratio is the value for a servomotor without a gear and a brake.

Servomotor Model		Servomotor Rated Output	Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)
SGMAV-	A5A, 01A, C2A, 02A	50 to 200 W	30 times
	04A, 06A, 08A	400 to 750 W	20 times
	10A	1000 W	10 times

### ● Load Moment of Inertia

The larger the load moment of inertia, the worse the movement response.

The allowable load moment of inertia ( $J_L$ ) depends on the motor capacity, as shown above. This value is provided strictly as a guideline and results may vary depending on servomotor drive conditions.

Use the AC servo drive capacity selection program SigmaJunmaSize+ to check the operation conditions. The program can be downloaded for free from our web site (<http://www.yaskawa.eu.com>).

An overvoltage alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a regenerative overload alarm (A.320). Take one of the following steps if this occurs.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the steps above. Refer to *Regenerative Resistors* on page 364.

Regenerative resistors are not built into SERVOPACKs for 400 W motors or less.

External regenerative resistors are required when this condition is exceeded or if the allowable loss capacity (W) of the built-in regenerative resistor is exceeded due to regenerative drive conditions when a regenerative resistor is already built in.

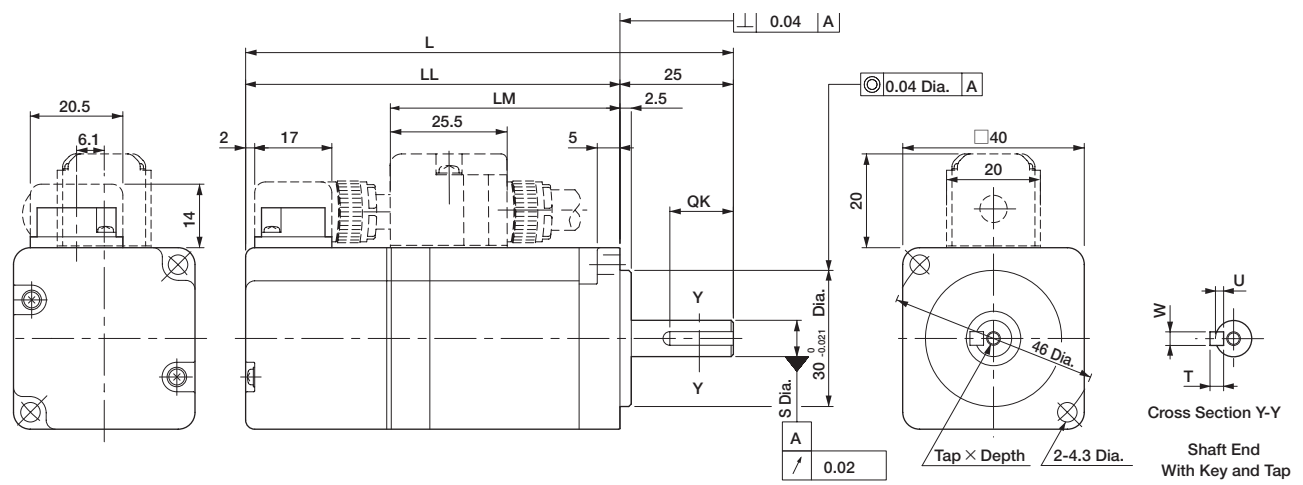
### ● Allowable Radial and Thrust Loads

Design the mechanical system so thrust and radial loads applied to the servomotor shaft end during operation fall within the ranges shown in the table.

Servomotor Model		Allowable Radial Load (Fr) N	Allowable Thrust Load (Fs) N	LF mm	Reference Diagram
SGMAV-	A5A	78	54	20	
	01A				
	C2A				
	02A	245	74	25	
	04A				
	06A				
	08A				
	10A	392	147	35	

External Dimensions Units: mm

(1) 50 to 150 W

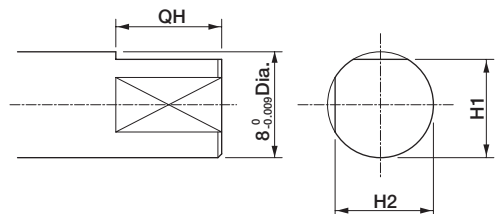


Model SGMAV-	L	LL	LM	S	Tap x Depth	Key Dimensions				Approx. Mass kg
						QK	U	W	T	
A5A□A21 (A5A□A2C)	95.5 (140.5)	70.5 (115.5)	38.5	8 <sup>0</sup> <sub>-0.009</sub> *	No tap	No key				0.3 (0.6)
M3 x 6L					14	1.8	3	3		
A5A□A61 (A5A□A6C)	107.5 (152.5)	82.5 (127.5)	50.5	8 <sup>0</sup> <sub>-0.009</sub>	No tap	No key				0.4 (0.7)
M3 x 6L					14	1.8	3	3		
C2A□A21 (C2A□A2C)	119.5 (164.5)	94.5 (139.5)	62.5	8 <sup>0</sup> <sub>-0.009</sub>	No tap	No key				0.5 (0.8)
M3 x 6L					14	1.8	3	3		

Note: The models and values in parentheses are for servomotors with holding brakes.  
\*: When you need the same shaft diameter as the conventional servomotors, contact your Yaskawa representative.

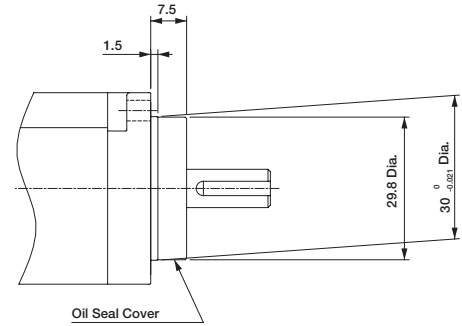
<Shaft End and Other Options>

● With Two Flat Seats



Model SGMAV-	Dimensions of Servomotor with Two Flat Seats		
	QH	H1	H2
A5A□AB□	15	7.5	7.5
O1A□AB□			
C2A□AB□			

● With an Oil Seal



Note: The 7th digit of the model designation is "S" or "E."  
The key dimensions are the same as those in the table above.

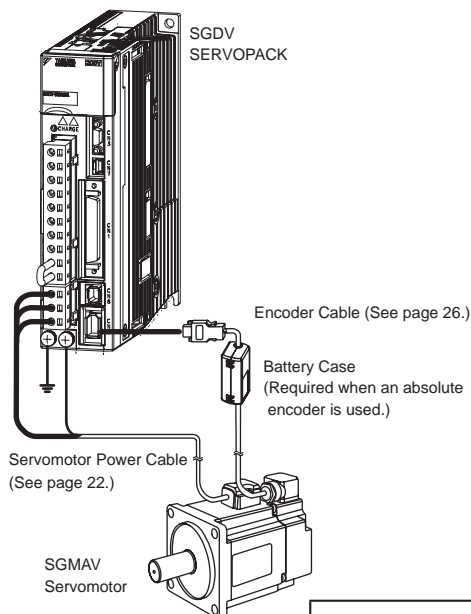




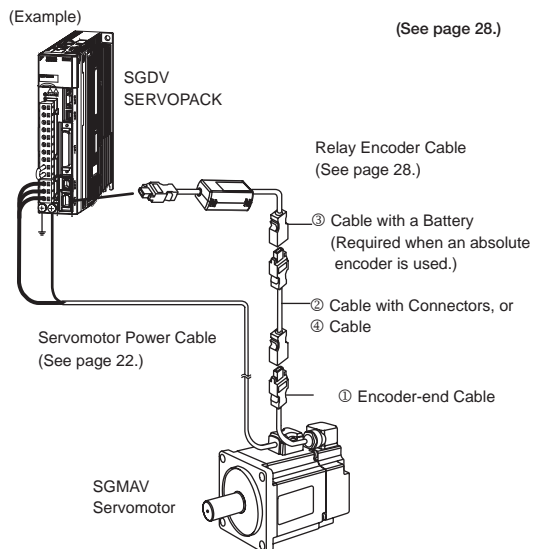
Selecting Cables

● Cables Connections

- Standard Wiring (Max. encoder cable length: 20 m)



- Encoder Cable Extension from 30 to 50 m



**CAUTION**

- Separate the servomotor power cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.
- When the cable length exceeds 20 m, be sure to use a relay encoder cable.
- When the power cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Speed Characteristics will shrink as the line-to-line voltage drops.

● Servomotor Power Cable

Name	Servomotor Rated Output	Length	Order No.		Specifications	Details
			Standard Type	Flexible Type		
For Servomotor without Holding Brakes	50 to 150 W	3 m	JZSP-CSM01-03-E-G#	JZSP-CSM21-03-E-G#		(1)
		5 m	JZSP-CSM01-05-E-G#	JZSP-CSM21-05-E-G#		
		10 m	JZSP-CSM01-10-E-G#	JZSP-CSM21-10-E-G#		
		15 m	JZSP-CSM01-15-E-G#	JZSP-CSM21-15-E-G#		
		20 m	JZSP-CSM01-20-E-G#	JZSP-CSM21-20-E-G#		
	200 to 550 W	3 m	JZSP-CSM02-03-E-G#	JZSP-CSM22-03-E-G#		
		5 m	JZSP-CSM02-05-E-G#	JZSP-CSM22-05-E-G#		
		10 m	JZSP-CSM02-10-E-G#	JZSP-CSM22-10-E-G#		
		15 m	JZSP-CSM02-15-E-G#	JZSP-CSM22-15-E-G#		
		20 m	JZSP-CSM02-20-E-G#	JZSP-CSM22-20-E-G#		
	750 W, 1.0 kW	3 m	JZSP-CSM03-03-E-G#	JZSP-CSM23-03-E-G#		
		5 m	JZSP-CSM03-05-E-G#	JZSP-CSM23-05-E-G#		
		10 m	JZSP-CSM03-10-E-G#	JZSP-CSM23-10-E-G#		
		15 m	JZSP-CSM03-15-E-G#	JZSP-CSM23-15-E-G#		
		20 m	JZSP-CSM03-20-E-G#	JZSP-CSM23-20-E-G#		

Note: The digit "#" of the order number represents the design revision.

(Cont'd)

Selecting Cables

Name	Servomotor Rated Output	Length	Order Nr.		Specifications	Details
			Standard Type	Flexible Type		
For Servomotor with Holding Brakes	50 to 150 W	3 m	JZSP-CSM11-03-E-G#	JZSP-CSM31-03-E-G#		(2)
		5 m	JZSP-CSM11-05-E-G#	JZSP-CSM31-05-E-G#		
		10 m	JZSP-CSM11-10-E-G#	JZSP-CSM31-10-E-G#		
		15 m	JZSP-CSM11-15-E-G#	JZSP-CSM31-15-E-G#		
		20 m	JZSP-CSM11-20-E-G#	JZSP-CSM31-20-E-G#		
	200 to 550 W	3 m	JZSP-CSM12-03-E-G#	JZSP-CSM32-03-E-G#		
		5 m	JZSP-CSM12-05-E-G#	JZSP-CSM32-05-E-G#		
		10 m	JZSP-CSM12-10-E-G#	JZSP-CSM32-10-E-G#		
		15 m	JZSP-CSM12-15-E-G#	JZSP-CSM32-15-E-G#		
		20 m	JZSP-CSM12-20-E-G#	JZSP-CSM32-20-E-G#		
	750 W, 1.0 kW	3 m	JZSP-CSM13-03-E-G#	JZSP-CSM33-03-E-G#		
		5 m	JZSP-CSM13-05-E-G#	JZSP-CSM33-05-E-G#		
		10 m	JZSP-CSM13-10-E-G#	JZSP-CSM33-10-E-G#		
		15 m	JZSP-CSM13-15-E-G#	JZSP-CSM33-15-E-G#		
20 m		JZSP-CSM13-20-E-G#	JZSP-CSM33-20-E-G#			
Servomotor-end Connector Kit	50 to 150 W		JZSP-CSM9-1-E-G1		Crimped Type (A crimp tool is required.)	(3)
	200 to 550 W		JZSP-CSM9-2-E-G1			(4)
	750 W, 1.0 kW		JZSP-CSM9-3-E-G1			(5)

Note: The digit "#" of the order number represents the design revision.

(1) Wiring Specifications for Servomotors without Holding Brakes

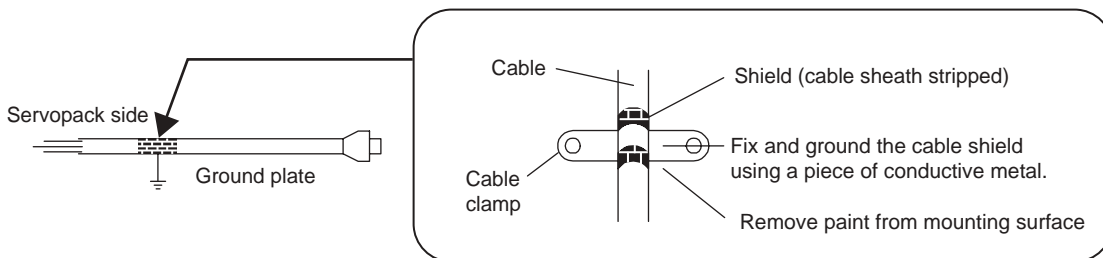
SERVOPACK-end Leads		Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Green/Yellow	FG	FG	1
Black 1	Phase W	Phase W	2
Black 2	Phase V	Phase V	3
Black 3	Phase U	Phase U	4
		-	5
		-	6

(2) Wiring Specifications for Servomotor with Holding Brakes

SERVOPACK-end Leads		Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Green/Yellow	FG	FG	1
Black 1	Phase W	Phase W	2
Black 2	Phase V	Phase V	3
Black 3	Phase U	Phase U	4
Black 4	Brake	Brake	5
Black 5	Brake	Brake	6
		Shell	FG

Fix shielded cable at servopack end as shown below

Note: No polarity for connection to a holding brake.



Selecting Cables

(3) Servomotor-end Connector Kit Specifications: For 50 to 150 W Servomotors

Items	Specifications	External Dimensions mm
Order No.	JZSP-CSM9-1-E-G1 (Cables are not included.)	
Applicable Servomotors	SGMAV-A5A, -01A, -C2A	
Manufacturer	J.S.T. Mfg. Co., Ltd.	
Receptacle Housing	J1FSN-06V-K (YE)	
Electrical Contact	SJ1F-01GF-P0.8	
Applicable Wire Size	AWG20 to 24	
Outer Diameter of Insulating Sheath	1.11 dia. to 1.53 dia. mm	
Mounting Screw	M2 Pan-head screw	
Applicable Cable Outer Diameter	7±0.3 dia. mm	

Note: A crimp tool (Model no.: YRS-8841) is required. Contact the respective manufacturer for more information.

(4) Servomotor-end Connector Kit Specifications: For 200 to 550 W Servomotors

Items	Specifications	External Dimensions mm
Order No.	JZSP-CSM9-2-E-G1 (Cables are not included.)	
Applicable Servomotors	SGMAV-02A, -04A, -06A	
Manufacturer	J.S.T. Mfg. Co., Ltd.	
Receptacle Housing	J2FSN-06V-K (YE)	
Electrical Contact	SJ2F-01GF-P1.0	
Applicable Wire Size	AWG20 to 24	
Outer Diameter of Insulating Sheath	1.11 dia. to 1.53 dia. mm	
Mounting Screw	M2 Pan-head screw	
Applicable Cable Outer Diameter	7±0.3 dia. mm	

Note: A crimp tool (Model no.: YRS-8861) is required. Contact the respective manufacturer for more information.

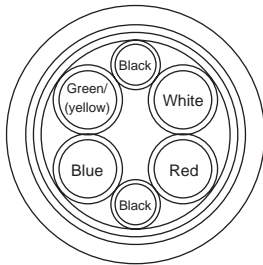
(5) Servomotor-end Connector Kit Specifications: For 750 W, 1.0 kW Servomotors

Items	Specifications	External Dimensions mm
Order No.	JZSP-CSM9-3-E-G1 (Cables are not included.)	
Applicable Servomotors	SGMAV-08A, -10A	
Manufacturer	J.S.T. Mfg. Co., Ltd.	
Receptacle Housing	J3FSN-06V-K (YE)	
Cable Type	Flexible	
Electrical Contact	SJ3F-01GF-P1.8	
Applicable Wire Size	AWG16 to 24	
Outer Diameter of Insulating Sheath	1.53 dia. to 2.5 dia. mm	
Mounting Screw	M2.5 Pan-head screw	
Applicable Cable Outer Diameter	8±0.3 dia. mm	

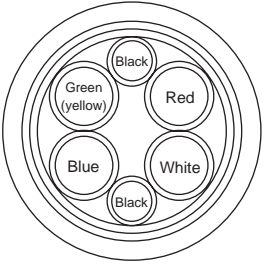
Note: The following crimp tools are required.  
 For power terminals: Model no. YRF-880  
 For brake terminals: Model no. YRF-881  
 Contact the respective manufacturer for more information.

Selecting Cables

(6) Cable Specifications: For 50 to 550 W Servomotors

Items	Standard Type	Flexible Type
Order No.	JZSP-CSM90-□□-E (50 m max.)	JZSP-CSM80-□□-E (50 m max.)
Specifications	UL2517 (Rating temperature: 105°C) AWG20×6C For power line: AWG20 (0.52 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.53 dia. mm For holding brake line: AWG20 (0.52 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.53 dia. mm	UL2517 (Rating temperature: 105°C) AWG22×6C For power line: AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.37 dia. mm For holding brake line: AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.37 dia. mm
Finished Dimensions	7±0.3 dia. mm	
Internal Configuration and Lead Color		
Yaskawa Standard Specifications (Standard Length)	Cable length: 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, 50 m	

(7) Cable Specifications: For 750 W, 1.0 kW Servomotors

Items	Standard Type	Flexible Type
Order No.	JZSP-CSM91-□□-E (50 m max.)	JZSP-CSM81-□□-E (50 m max.)
Specifications	UL2517 (Rating temperature: 105°C) AWG16×4C, AWG20×2C For power line: AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.15 dia. mm For holding brake line: AWG20 (0.52 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.6 dia. mm	UL2517 (Rating temperature: 105°C) AWG16×4C, AWG22×2C For power line: AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.35 dia. mm For holding brake line: AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.37 dia. mm
Finished Dimensions	8±0.3 dia. mm	
Internal Configuration and Lead Color		
Yaskawa Standard Specifications (Standard Length)	Cable length: 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, 50 m	

Selecting Cables

Encoder Cables (Length: 20 m or less)

Name	Length	Order No.		Specifications	Details
		Standard Type	Flexible Type <sup>1</sup>		
Cable with Connectors (For Incremental Encoder)	3 m	JZSP-CSP01-03-E-G#	JZSP-CSP21-03-G#		(1)
	5 m	JZSP-CSP01-05-E-G#	JZSP-CSP21-05-G#		
	10 m	JZSP-CSP01-10-E-G#	JZSP-CSP21-10-G#		
	15 m	JZSP-CSP01-15-E-G#	JZSP-CSP21-15-G#		
	20 m	JZSP-CSP01-20-E-G#	JZSP-CSP21-20-G#		
Cable with Connectors <sup>2</sup> (For Absolute Encoder, with a Battery Case)	3 m	JZSP-CSP05-03-E-G#	JZSP-CSP25-03-G#		(2)
	5 m	JZSP-CSP05-05-E-G#	JZSP-CSP25-05-G#		
	10 m	JZSP-CSP05-10-E-G#	JZSP-CSP25-10-G#		
	15 m	JZSP-CSP05-15-E-G#	JZSP-CSP25-15-G#		
	20 m	JZSP-CSP05-20-E-G#	JZSP-CSP25-20-G#		
SERVOPACK-end Connector Kit		JZSP-CMP9-1-E		Soldered 	(3)
Encoder-end Connector Kit		JZSP-CSP9-2-E		Crimped Type (A crimp tool is required.) 	

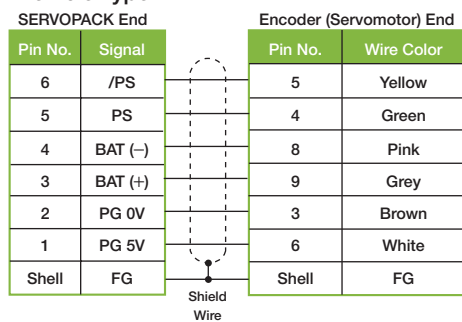
\*1: Use flexible cables for movable sections such as robot arms.

\*2: When the battery is connected to the host controller, no battery case is required. If so, use a cable for incremental encoders.

Note: The digit "#" of the order number represents the design revision.

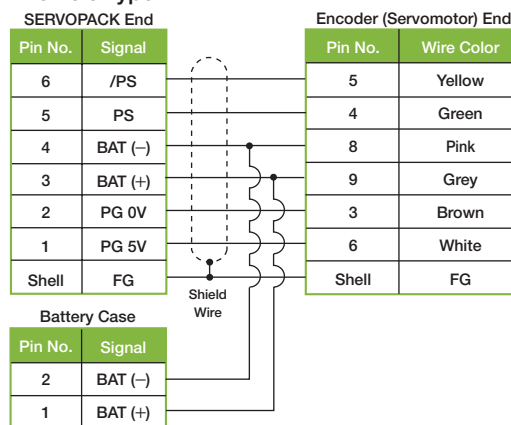
(1) Wiring Specifications for Cable with Connectors (For incremental encoder)

Flexible Type



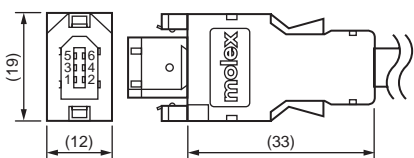
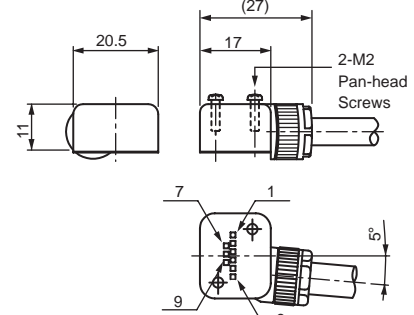
(2) Wiring Specifications for Cable with Connectors (For absolute encoder, with a battery case)

Flexible Type



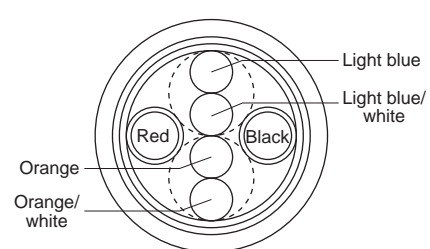
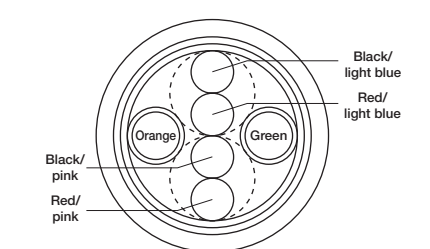
Selecting Cables

(3) SERVOPACK-end/Encoder-end Connector Kit Specifications

Items	SERVOPACK-end Connector Kit	Encoder-end Connector Kit
Order No.	JZSP-CMP9-1-E (Cables are not included.)	JZSP-CSP9-2-E (Cables are not included.)
Manufacturer	Molex Japan Co., Ltd.	Molex Japan Co., Ltd.
Specifications	55100-0670 (soldered) Product Specification: PS-54280	54346-0070 (crimped) Mounting screw: M2 pan-head screw (×2) Outer diameter of applicable cable: 6.3 dia. to 7.7 dia. mm Applicable wire size: AWG22 to 26 Outer diameter of insulating sheath: 1.05 dia. to 1.4 dia. mm Application Specification: AS-54992 Crimping Specification: CS-56161
External Dimensions mm		

\*: A crimp tool is required.  
The following crimp tool is applicable for the cables provided by Yaskawa. When using other wire sizes, contact the respective manufacturer for crimp tools.  
Applicable crimp tool for Yaskawa's wire size: Hand Tool Model No. 57175-5000

(4) Cable Specifications

Items	Standard Type	Flexible Type
Order No.	JZSP-CMP09-□□-E	JZSP-CSP39-□□-E
Cable Length	20 m max.	
Specifications	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.15 dia. mm AWG24 (0.20 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.09 dia. mm	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.35 dia. mm AWG24 (0.20 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.21 dia. mm
Finished Dimensions	6.5 dia. mm	6.8 dia. mm
Internal Configuration and Lead Color		
Yaskawa Standards Specifications (Standard Length)	Cable length: 5 m, 10 m, 15 m, 20 m	

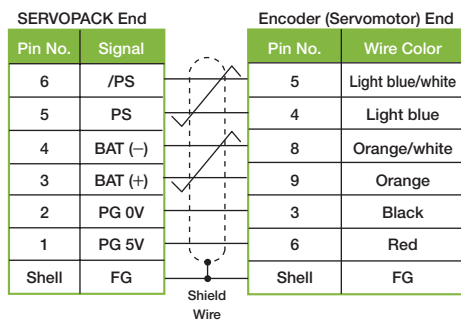
Selecting Cables

● Relay Encoder Cables (For extending from 30 to 50 m)

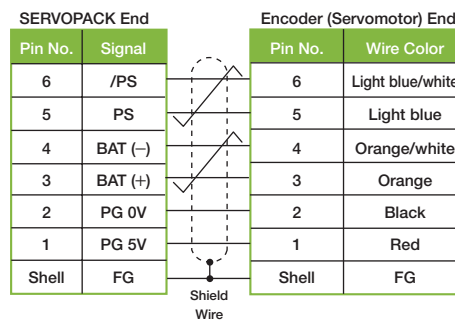
Name	Length	Order No. Standard Type	Specifications	Details
① Encoder-end Cables (For incremental and absolute encoder)	0.3 m	JZSP-CSP11-E	<p>SERVOPACK End 0.3 m Encoder End Plug Connector (Crimped) (Molex Japan Co., Ltd.) Connector (Molex Japan Co., Ltd.)</p>	(1)
② Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E	<p>SERVOPACK End L Encoder End Plug Connector (Crimped) (Molex Japan Co., Ltd.) Socket Connector (Soldered) (Molex Japan Co., Ltd.)</p>	(2)
	40 m	JZSP-UCMP00-40-E		
	50 m	JZSP-UCMP00-50-E		
③ Cable with a Battery Case (Required when an absolute encoder is used*)	0.3 m	JZSP-CSP12-E	<p>SERVOPACK End 0.3 m Encoder End Plug Connector (Crimped) (Molex Japan Co., Ltd.) Battery Case (Battery attached) Socket Connector (Soldered) (Molex Japan Co., Ltd.)</p>	(3)
④ Cables	30 m	JZSP-CMP19-30-E		(4)
	40 m	JZSP-CMP19-40-E		
	50 m	JZSP-CMP19-50-E		

\*: Not required when connecting a battery to the host controller.

(1) Wiring Specifications for Encoder-end Cable



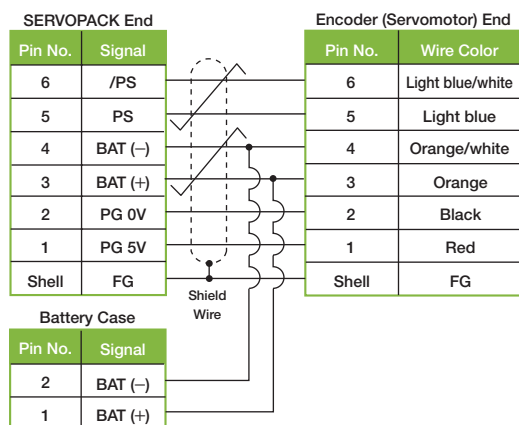
(2) Wiring Specifications for Cable with Connectors





Selecting Cables

(3) Wiring Specifications for Cable with a Battery Case



(4) Cable Specifications

Item	Standard Type
Order No.*	JZSP-CMP19-□□-E
Cable Length	50 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG16×2C+AWG26×2P AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.0 dia. mm AWG26 (0.13 mm <sup>2</sup> ) Outer diameter of insulating sheath: 0.91 dia. mm
Finished Dimensions	6.8 dia. mm
Internal Configuration and Lead Colors	
Yaskawa Standard Specifications (Standard Length)	Cable length: 30 m, 40 m, 50 m

\*: Specify the cable length in □□ of order no.  
Example: JZSP-CMP19-30-E (30 m)



# Rotary Servomotors

# SGMEV



## Model Designations

### ● Without Gears

**SGMEV - 02 D A A 2 1**

$\Sigma$ -V Series  
Servomotor  
SGMEV

1st+2nd  
digits

3rd  
digit

4th  
digit

5th  
digit

6th  
digit

7th  
digit

#### 1st+2nd digits Rated Output

Code	Specifications
Cubic form	01 100 W *
	02 200 W
	04 400 W
	08 750 W
Small flange	15 1.5 kW
	03 300 W **
	07 650 W **

\* : Power Supply Voltage 200 VAC only

\*\* : Power Supply Voltage 400 VAC only

#### 3rd digit Power Supply Voltage

Code	Specifications
A	200 VAC
D	400 VAC

#### 4th digit Serial Encoder

Code	Specifications
3	20-bit absolute (standard)
D	20-bit incremental (standard)

#### 5th digit Design Revision Order

Code	Specifications
A	IP-55 Standard
E	IP-67 water-proof specifications (SGMEV-01, 02, 04, 08, 15)
F	Prepared for oil seal mounting (SGMEV-03, 07)

#### 6th digit Shaft End

Code	Specifications
2	Straight without key (standard)
4	Straight with key (option)
6	Straight with key and tap (option)
8	Straight with tap (option)

#### 7th digit Options

Code	Specifications
1	Without options
C	With holding brake (24 VDC)
E	With oil seal and holding brake (24 VDC)
S	With oil seal

## Features

- Low and medium inertia
- Wide selection: 100 W to 1.5 kW capacity, holding brake option
- Mounted serial encoder: 20 bits, high resolution
- Protective structure: Standard protection IP55, expandable to IP67

## Application Examples

- Transfer machines
- Material handling machines
- Food processing equipment
- Packaging



SGMEV-03DDA61  
(Small flange)

SGMEV-08DDA61  
(Cubic form)



## Ratings and Specifications

**Time Rating:** Continuous

**Vibration Class:** V15

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Mounting:** Flange-mounted

**Thermal Class:** B (130°C)

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Totally enclosed, self-cooled,  
IP55 (except for shaft opening)

**Ambient Humidity:** 20% to 80% (no condensation)

**Drive Method:** Direct drive

**Rotation Direction:** Counterclockwise (CCW) with forward run  
reference when viewed from the load side

## 200-V Class

Servomotor Model: SGMEV-□□□□		01A	02A	04A	08A	15A
Rated Output <sup>*1</sup>	kW	0.1	0.2	0.4	0.75	1.5
Rated Torque <sup>*1, *2</sup>	Nm	0.318	0.637	1.27	2.39	4.77
Instantaneous Peak Torque <sup>*1</sup>	Nm	0.955	1.91	3.82	7.16	14.3
Rated Current <sup>*1</sup>	Arms	0.89	2.0	2.6	4.1	7.5
Instantaneous Max. Current <sup>*1</sup>	Arms	2.8	6.5	8.5	13.9	23.0
Rated Speed <sup>*1</sup>	min <sup>-1</sup>	3000				
Max. Speed <sup>*1</sup>	min <sup>-1</sup>	5000				
Torque Constant	Nm/Arms	0.392	0.349	0.535	0.641	0.687
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	0.0491 (0.0781)	0.193 (0.302)	0.331 (0.440)	2.10 (2.975)	4.02 (4.895)
Rated Power Rate <sup>*1</sup>	kW/s	20.6	21.0	49.0	27.1	56.7
Rated Angular Acceleration <sup>*1</sup>	rad/s <sup>2</sup>	64800	33000	38500	11400	11900
Applicable SERVOPACK	SGDV-□□□□	R90A	1R6A	2R8A	5R5A	120A <sup>*3</sup>

\*1: These items and torque-speed characteristics quoted in combination with an SGDV SERVOPACK are at an armature winding temperature of 100°C. Other values quoted are at 20°C.

\*2: Rated torques are continuous allowable torque values at 40°C with an aluminum heat sink of the following dimensions attached.

SGMEV-01A, -02A, -04A: 250 mm × 250 mm × 6 mm  
SGMEV-08A, -15A: 300 mm × 300 mm × 12 mm

\*3: Single-phase 200 VAC SERVOPACKs are also available (base-mounted SERVOPACK model: SGDV-120A□□A008000, rack-mounted SERVOPACK model: SGDV-120A□□A009000).

Notes: The values in parentheses are for servomotors with holding brakes.

## 400-V Class

Servomotor Model: SGMEV-□□□□		02D	03D	04D	07D	08D	15D
Rated Output <sup>*1</sup>	kW	0.2	0.3	0.4	0.65	0.75	1.5
Rated Torque <sup>*1, *2</sup>	Nm	0.637	0.955	1.27	2.07	2.39	4.77
Instantaneous Peak Torque <sup>*1</sup>	Nm	1.91	3.82	3.82	7.16	7.16	14.3
Rated Current <sup>*1</sup>	Arms	1.4	1.3	1.4	2.2	2.6	4.5
Instantaneous Max. Current <sup>*1</sup>	Arms	4.5	5.1	4.4	7.7	7.8	13.7
Rated Speed <sup>*1</sup>	min <sup>-1</sup>	3000					
Max. Speed <sup>*1</sup>	min <sup>-1</sup>	5000					
Torque Constant	Nm/Arms	0.481	0.837	0.963	1.02	0.994	1.135
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	0.193 (0.302)	0.173 (0.231)	0.331 (0.440)	0.672 (0.812)	2.1 (2.975)	4.02 (4.895)
Rated Power Rate <sup>*1</sup>	kW/s	21.0	52.9	49.0	63.8	27.1	56.7
Rated Angular Acceleration <sup>*1</sup>	rad/s <sup>2</sup>	33000	55300	38500	30800	11400	11900
Applicable SERVOPACK	SGDV-□□□□	1R9D	1R9D	1R9D	3R5D	3R5D	5R4D

\*1: These items and torque-speed characteristics quoted in combination with an SGDV SERVOPACK are at an armature winding temperature of 100°C. Other values quoted are at 20°C.

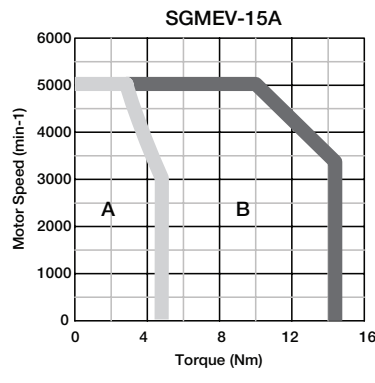
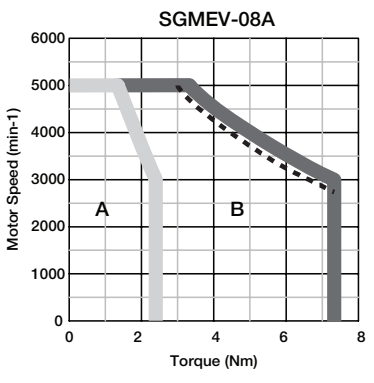
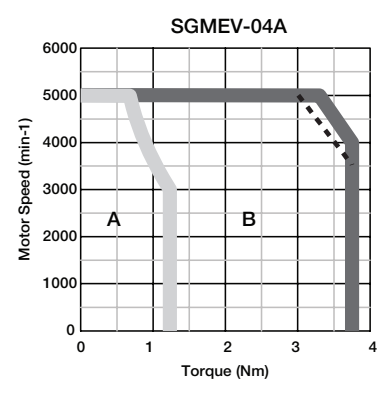
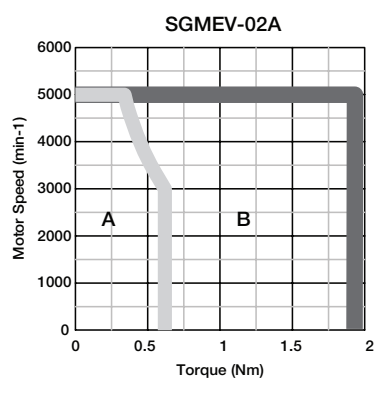
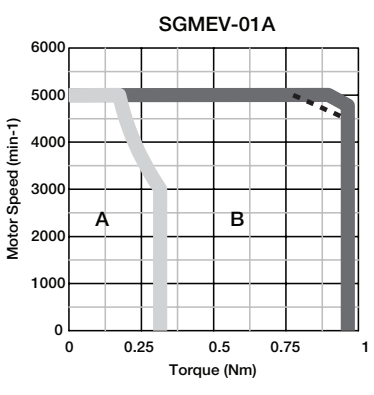
\*2: Rated torques are continuous allowable torque values at 40°C with an aluminum heat sink of the following dimensions attached.

SGMEV-02D, -03D, -04D, -07D: 250 mm × 250 mm × 6 mm  
SGMEV-08D, -15D: 300 mm × 300 mm × 12 mm

Notes: The values in parentheses are for servomotors with holding brakes.

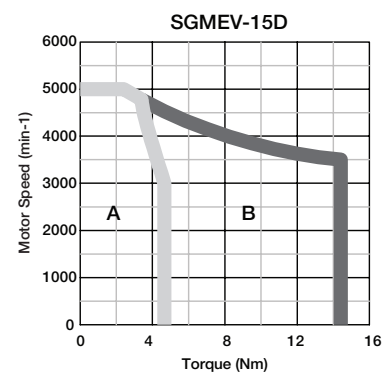
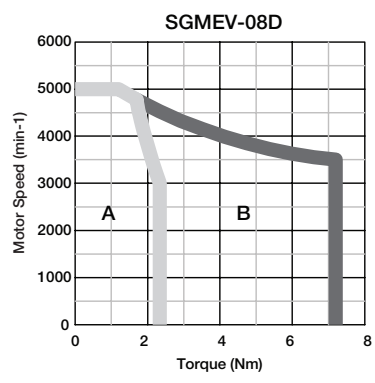
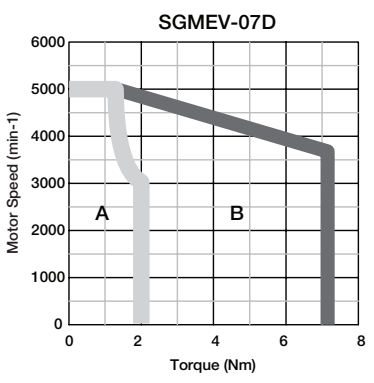
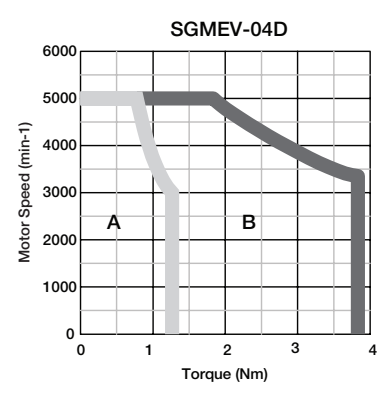
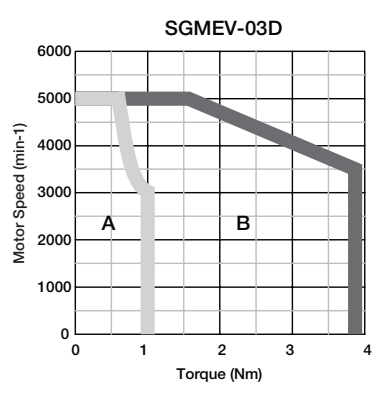
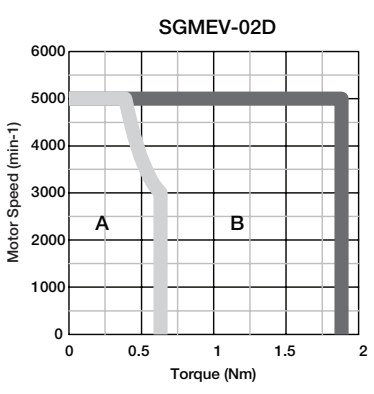
Ratings and Specifications

● Torque-Speed Characteristics (200 V/400 V)    A: Continuous Duty Zone    B: Intermittent Duty Zone



\*1. The solid line of the intermittent duty zone shows the characteristics on three-phase 200 V AC and single-phase 230 V AC, the dotted line on single phase 200 V AC. Regarding to SGMEV-02A, the characteristics on single phase 200 V AC is the same as three-phase 200 V AC and single-phase 230 V AC. Regarding to SGMEV-15A, the input power supply of the servopack "SGDV" is only three-phase 200 V AC.

\*2. The torque-speed characteristics vary on the values of input power supply voltage.



Notes: 1 When the effective torque during intermittent duty is within the rated torque, the servomotor can be used within the intermittent duty zone.  
2 When the power cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Speed Characteristics will shrink as the line-to-line voltage drops.

Ratings and Specifications

● Derating values for Servomotor fitted with an Oil Seal

When a motor is fitted with an oil seal, use the following derating rate due to the higher friction torque.

Servomotor Model SGMEV-	01A	02A, 02D	03D	04A, 04D	07D	08A, 08D	15A, 15D
Derating Rate %	90			95			

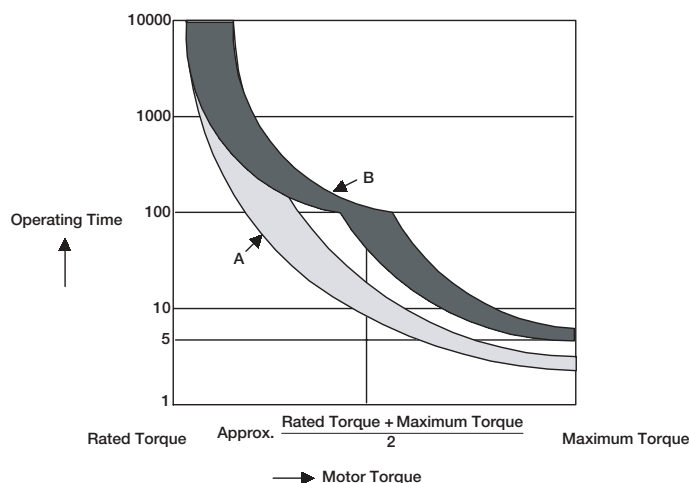
● Holding Brake Electrical Specifications

Servomotor Model	Servomotor Rated Output kW	Holding Brake Specifications					
		Holding Torque Nm	Rated Voltage 24 VDC				
			Capacity W	Coil Resistance Ohm (at 20°C)	Rated Current A (at 20°C)	Brake Release Time ms	Brake Operation Time ms
SGMEV-01	0.1	0.318	6	114	0.25	60	100
SGMEV-02	0.2	0.637	5	115	0.21		
SGMEV-03	0.3	0.955	6.9	83.5	0.29		
SGMEV-04	0.4	1.27	7.6	76	0.32		
SGMEV-07	0.65	2.07	7.7	75.2	0.32		
SGMEV-08	0.75	2.39	7.5	76.8	0.31		
SGMEV-15	1.5	4.77	10	57.6	0.42		

Notes: 1 The holding brake is only used to hold the load and cannot be used to stop the servomotor.  
 2 The holding brake open time and holding brake operation time vary depending on which discharge circuit is used. Make sure holding brake open time and holding brake operation time are correct for your servomotor.  
 3 A 24-VDC power supply is provided by customers.

● Overload Characteristics

The overload detection level is set under hot start conditions at a servomotor ambient temperature of 40°C.



Note: Curve A applies to SGMEV motors up to 400 W  
 Curve B applies to motors with a capacity from 650 W up to 1.5 kW

● Allowable Load Moment of Inertia at the Motor Shaft

The rotor moment of inertia ratio is the value for a servomotor without a gear and a holding brake.

Servomotor Model	Servomotor Rated Output	Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)	
SGMEV-	01A	0.1 kW	25 times
	02A, 02D	0.2 kW	15 times
	03D	0.3 kW	20 times
	04A, 04D	0.4 kW	7 times
	07D	0.65 kW	20 times
	08A, 08D	0.75 kW	5 times
	15A, 15D	1.5 kW	5 times



## Ratings and Specifications

### ● Load Moment of Inertia

The larger the load moment of inertia, the worse the movement response.

The allowable load moment of inertia ( $J_L$ ) depends on the motor capacity, as shown above. This value is provided strictly as a guideline and results may vary depending on servomotor drive conditions.

Use the AC servo drive capacity selection program SigmaJunmaSize+ to check the operation conditions. The program can be downloaded for free from our web site (<http://www.yaskawa.eu.com>).

An overvoltage alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a regenerative overload alarm (A.320). Take one of the following steps if this occurs.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the steps above. Regenerative Resistors are not built into 400 W SGD V-2R8 SERVOPACKs.

### ● Allowable Radial and Thrust Loads

Design the mechanical system so thrust and radial loads applied to the servomotor shaft end during operation fall within the ranges shown in the table.

Servomotor Model		Allowable Radial Load ( $F_r$ ) N	Allowable Thrust Load ( $F_s$ ) N	LF mm	Reference Diagram
SGMEV-	01A	78	49	20	
	02A, 02D	245	68	25	
	03D		74	30	
	04A, 04D		68	25	
	07D	392	147	35	
	08A, 08D				
	15A, 15D				

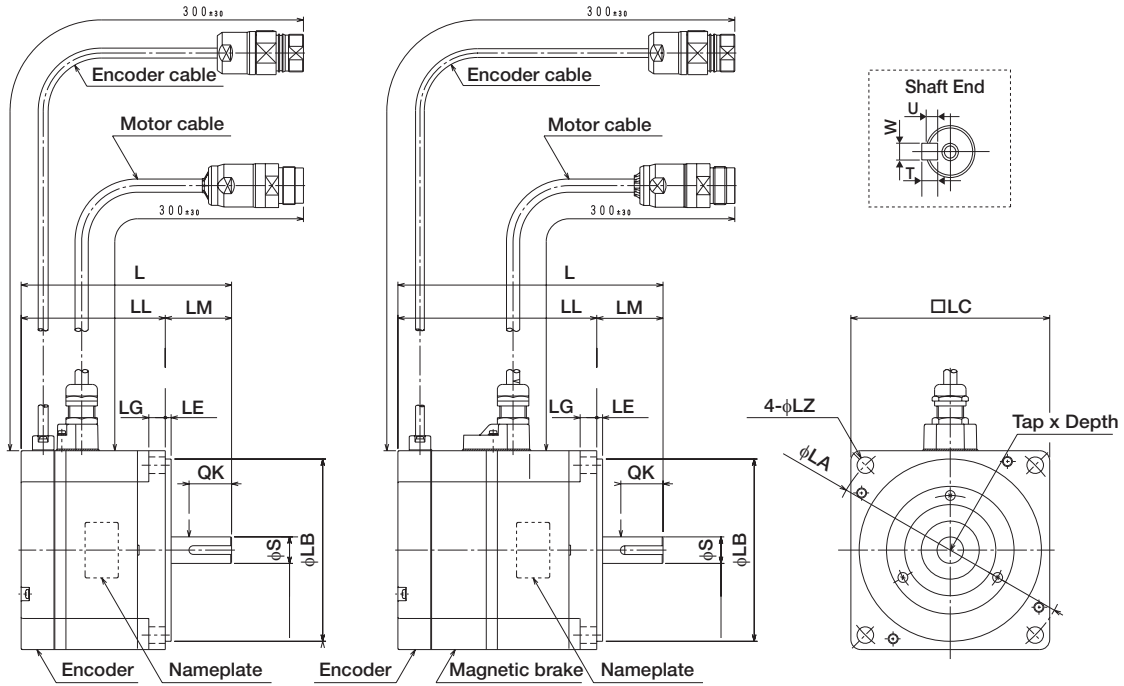
### ● Connector Specifications 200-V Class

Servomotor Model SGMEV-	01A	02A, 04A, 08A	15A
Encoder-end connector	SRUC17GMRWN087		
Pin	021.402.1020		
Manufacturer	Interconnectron		
Servomotor-end connector	SRUC06JMCSN027	SRUC06JMCSN109	SRUC06JMCSN276
Pin	021.423.1020		
Manufacturer	Interconnectron		

### ● Connector Specifications 400-V Class

Servomotor Model SGMEV-	02D, 03D, 04D, 07D, 08D, 15D
Encoder-end connector	SRUC17GMRWN087
Pin	021.402.1020
Manufacturer	Interconnectron
Servomotor-end connector	LRR A06AMRPN182
Pin	021.279.1020
Manufacturer	Interconnectron

External Dimensions SGMEV-02D, -04D, -08D, -15D Units: mm



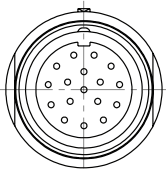
Models without Brake

Models with Brake

Model SGMEV-	L	LL	LM	Flange Face Dimensions						Shaft End Dimensions					Approx. Mass kg	
				LA	LB	LC	LE	LG	LZ	S	QK	W	T	U		Tap x Depth
02D□A61 (02D□A6C)	97 (128.5)	67 (98.5)	30	90	70 <sup>0</sup> <sub>-0.030</sub>	80	3	8	7	14 <sup>0</sup> <sub>-0.011</sub>	16	5	5	3	M5 x 8L	1.4 (1.9)
04D□A61 (04D□A6C)	117 (148.5)	87 (118.5)								19 <sup>0</sup> <sub>-0.011</sub>						2.1 (2.6)
08D□A61 (08D□A6C)	126.5 (160)	86.5 (120)	40	145	110 <sup>0</sup> <sub>-0.035</sub>	120	3.5	10	10	16 <sup>0</sup> <sub>-0.011</sub>	22	6	6	3.5	M6 x 10L	4.2 (4.7)
15D□A61 (15D□A6C)	154.5 (188)	114.5 (148)								19 <sup>0</sup> <sub>-0.013</sub>						6.6 (8.1)

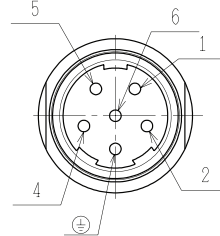
Note: The models with oil seals are of the same configuration.  
The models and values in parentheses are for servomotors with holding brakes.

• Cable Specifications for Encoder-end Connector



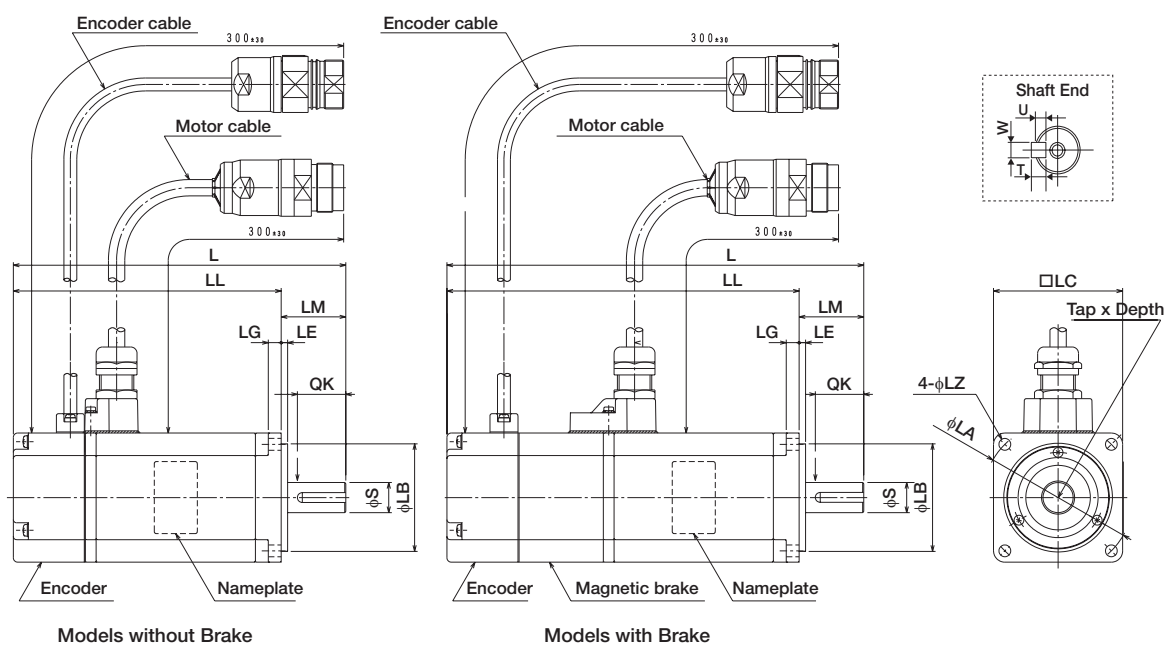
Pin No.	Description	Colour
1	0 V (Battery)	Orange/White
2	3.6 V (Battery)	Orange
3	Data +	Blue
4	Data -	Blue/White
5 - 7	Free	-
8	+ 5 V (Power Supply)	Red
9	0 V (Power Supply)	Black
10 - 17	Free	-
Connector Case	Frame ground	Shield wire

• Cable Specifications for Servomotor-end Connector



Pin No.	Description	Colour
1	Phase U	Red
2	Phase V	White
4	Phase W	Blue
5, 6	Brake and/or Free	Black
⊕	Frame ground	Green/Yellow

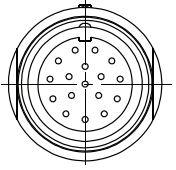
External Dimensions SGMEV-03D, -07D Units: mm



Model SGMEV-	L	LL	LM	Flange Face Dimensions						Shaft End Dimensions					Approx. Mass kg	
				LA	LB	LC	LE	LG	LZ	S	QK	W	T	U		Tap x Depth
03D□A61 (03D□A6C)	154.5 (194)	124.5 (164)	30	70	50 <sup>0</sup> <sub>-0.025</sub>	60	3	6	5.5	14 <sup>0</sup> <sub>-0.011</sub>	20	5	5	3	M5 x 8L	1.7 (2.2)
07D□A61 (07D□A6C)	185 (229.5)	145 (189.5)	40	90	70 <sup>0</sup> <sub>-0.025</sub>	80	3	8	70	16 <sup>0</sup> <sub>-0.011</sub>	30					

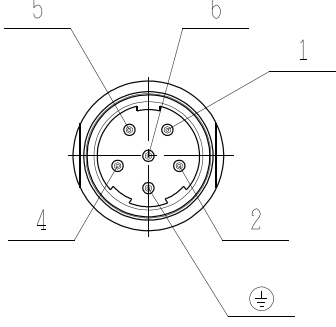
Note: The models with oil seals are of the same configuration.  
The models and values in parentheses are for servomotors with holding brakes.

• Cable Specifications for Encoder-end Connector



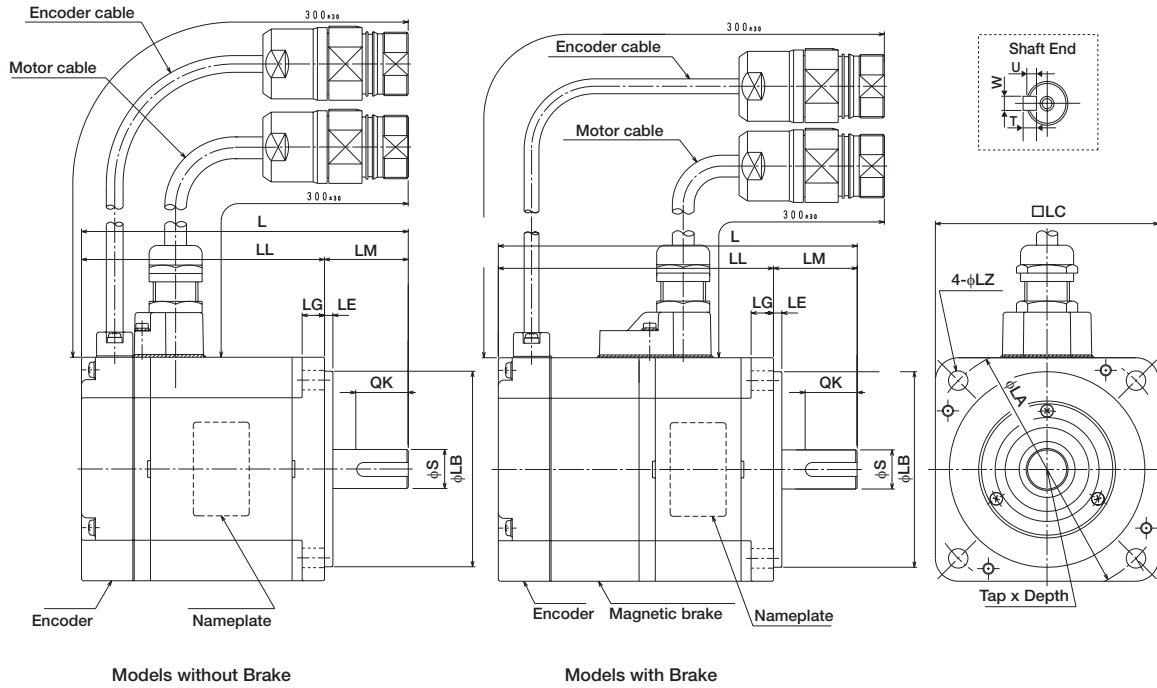
Pin No.	Description	Colour
1	0 V (Battery)	Orange/White
2	3.6 V (Battery)	Orange
3	Data +	Blue
4	Data -	Blue/White
5 - 7	Free	-
8	+ 5 V (Power Supply)	Red
9	0 V (Power Supply)	Black
10 - 17	Free	-
Connector Case	Frame ground	Shield wire

• Cable Specifications for Servomotor-end Connector



Pin No.	Description	Colour
1	Phase U	Red
2	Phase V	White
4	Phase W	Blue
5, 6	Brake and/or Free	Black
⊕	Frame ground	Green/Yellow

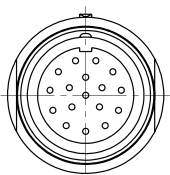
External Dimensions SGMEV-01A, -02A, -04A, -08A, -15A Units: mm



Model SGMEV-	L	LL	LM	Flange Face Dimensions						Shaft End Dimensions						Approx. Mass kg
				LA	LB	LC	LE	LG	LZ	S	QK	W	T	U	Tap x Depth	
01A□A61 (01A□A6C)	87 (116)	62 (91)	25	70	50 <sup>0</sup> <sub>-0.030</sub>	60	3	6		8 <sup>0</sup> <sub>-0.011</sub>	14	3	3	1.8	M3 x 6L	0.7 (0.9)
02A□A61 (02A□A6C)	97 (128.5)	67 (98.5)	30	90	70 <sup>0</sup> <sub>-0.030</sub>	80	6	8	7	14 <sup>0</sup> <sub>-0.011</sub>	16	5	5	3	M5 x 8L	1.4 (1.9)
04A□A61 (04A□A6C)	117 (148.5)	87 (118.5)														2.1 (2.6)
08A□A61 (08A□A6C)	126.5 (160)	86.5 (120)	40	145	110 <sup>0</sup> <sub>-0.035</sub>	120	3.5	10	10	16 <sup>0</sup> <sub>-0.011</sub>	22	6	6	3.5	M6 x 10L	4.2 (4.7)
15A□A61 (15A□A6C)	154.5 (188)	114.5 (148)								6.6 (8.1)						

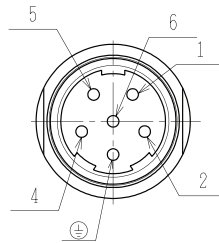
Note: The models with oil seals are of the same configuration.  
The models and values in parentheses are for servomotors with holding brakes.

• Cable Specifications for Encoder-end Connector



Pin No.	Description	Colour
1	0 V (Battery)	Orange/White
2	3.6 V (Battery)	Orange
3	Data +	Blue
4	Data -	Blue/White
5 - 7	Free	-
8	+ 5 V (Power Supply)	Red
9	0 V (Power Supply)	Black
10 - 17	Free	-
Connector Case	Frame ground	Shield wire

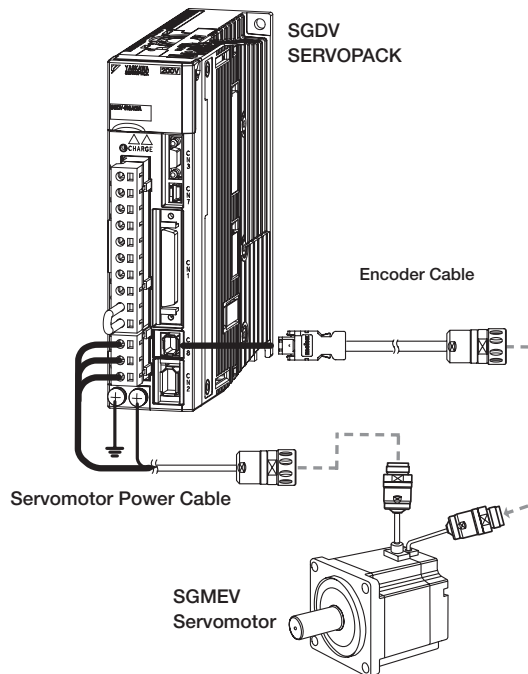
• Cable Specifications for Servomotor-end Connector



Pin No.	Description	Colour
1	Phase U	Red
2	Phase V	White
4	Phase W	Blue
5, 6	Brake and/or Free	Black
⊕	Frame ground	Green/Yellow

Selecting Cables (SGMEV 200-V Class)

- Cables Connections
- Standard Wiring (Max. encoder cable length: 20 m)



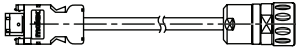
**CAUTION**

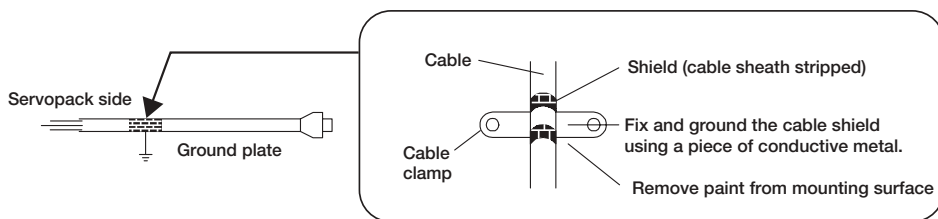
- Separate the servomotor power cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.
- When the power cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Speed Characteristics will shrink as the line-to-line voltage drops.

● Servomotor Power Cable

Servomotor Rated Output	Name	Length	Order No.	Specifications
			Flexible Type*	
0.1 kW 0.75 kW	For Servomotor without Holding Brakes	3 m	DP9325252-3G	
		5 m	DP9325252-5G	
		10 m	DP9325252-10G	
		15 m	DP9325252-15G	
		20 m	DP9325252-20G	
	For Servomotor with Holding Brakes	3 m	DP9325253-3G	
		5 m	DP9325253-5G	
		10 m	DP9325253-10G	
		15 m	DP9325253-15G	
		20 m	DP9325253-20G	
1.5 kW	For Servomotor without Holding Brakes	3 m	DP9325254-3G	
		5 m	DP9325254-5G	
		10 m	DP9325254-10G	
		15 m	DP9325254-15G	
		20 m	DP9325254-20G	
	For Servomotor with Holding Brakes	3 m	DP9325255-3G	
		5 m	DP9325255-5G	
		10 m	DP9325255-10G	
		15 m	DP9325255-15G	
		20 m	DP9325255-20G	

● Encoder Cables (Max. length: 20 m)

Name	Length	Order No.	Specifications
		Flexible Type	
Cables with Connectors on both sides	3 m	DP9325256-3G	
	5 m	DP9325256-5G	
	10 m	DP9325256-10G	
	15 m	DP9325256-15G	
	20 m	DP9325256-20G	



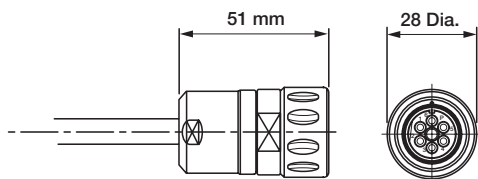
● Connectors

Specification	Model
Hypertac power connector IP67 for 200 VAC SGMEV motors	SPOC-06K-FSDN169
Hypertac encoder connector IP67 for SGMEV motors	SPOC-17H-FRON169
Spare part, Hypertac power connector male for 200 V motors (included with SGMEV motors)	SRUC-06J-MSCN236
Spare part, Hypertac encoder connector male (included with SGMEV motors)	SRUC-17G-MRWN087

● Specification of Motor Connector

● Motor Connector (cable side) with Ground connection

Part-No.	Plug with Cable Clamp
S P U C 06J MS CN 236	Cable diam. 7 mm
S P U C 06J MS CN 020	Cable diam. 9,5 mm
Reference: Original Yaskawa lead	



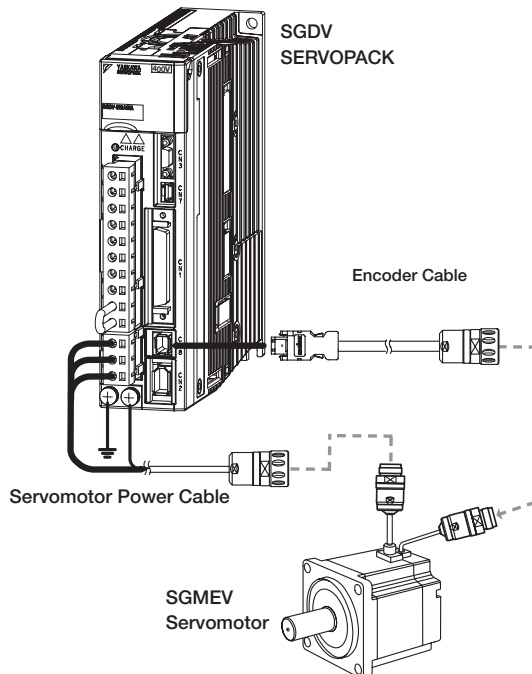
Specifications	
Poles	6
Temperature Range	-25°C up to 125°C
Cable Clamp	shown in table
Type of protection	IP67 connected IP00 not connected
Electrical Performance	
Current Rating	15A, environmental temperature 60°C
Max. Current	23 A cyclic (5 sec on, 10 sec out)
Voltage Rating	250 V
Test Voltage	4000 V
Contact Resistance	< 5 mOhm
Mating Cycles	> 500
Materials	
Body	PA 6.6, glass-fiber reinforced
Insulator	Peek
Contacts	Brass / Gold plated
Seals	FPM
Contacts	
Type	Pin diam. 2
Part-No.	021.421.1020
Termination	solder cup
Latch Retention	> 35 N

Note: Specification in accordance with VDE 0110/0627 - Contamination Level: 3  
Excess voltage category: 3 - Installation altitude < or = 4000 m

Selecting Cables (SGMEV 400-V Class)

● Cables Connections

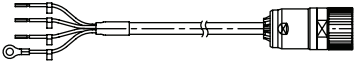
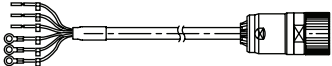
- Standard Wiring (Max. encoder cable length: 20 m)



**CAUTION**

- Separate the servomotor power cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.
- When the power cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Speed Characteristics will shrink as the line-to-line voltage drops.

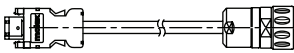
● Servomotor Power Cable

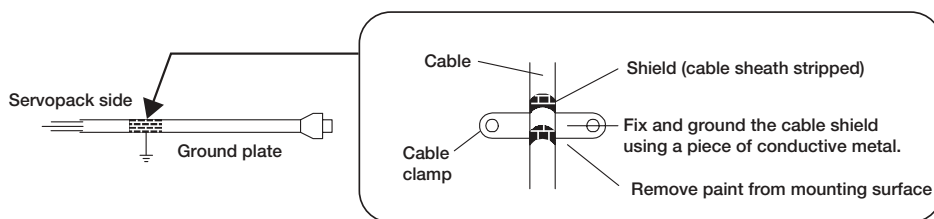
Servomotor Rated Output	Name	Length	Order No.	Specifications
			Flexible Type*	
0.2 kW 1.5 kW	For Servomotor without Holding Brakes	3 m	JZSP-CMM20D15-03G	
		5 m	JZSP-CMM20D15-05G	
		10 m	JZSP-CMM20D15-10G	
		15 m	JZSP-CMM20D15-15G	
		20 m	JZSP-CMM20D15-20G	
	For Servomotor with Holding Brakes	3 m	JZSP-CMM30D15-03G	
		5 m	JZSP-CMM30D15-05G	
		10 m	JZSP-CMM30D15-10G	
		15 m	JZSP-CMM30D15-15G	
		20 m	JZSP-CMM30D15-20G	

\*: These flexible cables are provided as standard equipment.  
 Note: Cables without connectors can be ordered on request.

Selecting Cables (SGMEV 400-V Class)

● Encoder Cables (Max. length: 20 m)

Name	Length	Order No.	Specifications
		Flexible Type	
Cables with Connectors on both sides	3 m	DP9325256-3G	
	5 m	DP9325256-5G	
	10 m	DP9325256-10G	
	15 m	DP9325256-15G	
	20 m	DP9325256-20G	



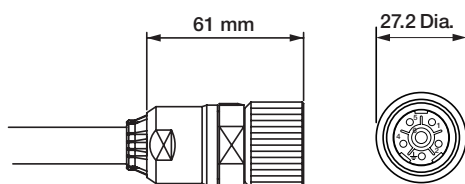
● Connectors

Specification	Model
Hypertac power connector IP67 for SGMEV motors	LPRA-06B-FRBN170
Hypertac encoder connector IP67 for SGMEV motors	SPOC-17H-FRON169
Spare part, Hypertac power connector male for 400 V motors (included with SGMEV motors)	LRRA-06A-MRPN182
Spare part, Hypertac encoder connector male (included with SGMEV motors)	SRUC-17G-MRWN087

● Specification of Motor Connector

● Motor Connector (cable side) with Ground connection

Part-No.
L RR A 06A ...



Specifications	
Poles	6 (5 + PE)
Temperature Range	-40°C up to 125°C
Cable Clamp	not applicable
Type of protection	IP67 connected IP00 not connected
Electrical Performance	
Current Rating	20 A
Voltage Rating	250 V
Test Voltage	4000 V
Contact Resistance	< 3 mOhm
Mating Cycles	> 500
Materials	
Body	Brass / Nickel plated
Insulator	PA 6.6
Contacts	Brass / Nickel plated
Seals	FPM
Contacts	
Type	Pin diam. 2 mm
Part-No.	021.279.1020
Termination	crimp; 0.4 to 2.5 mm <sup>2</sup>
Latch Retention	> 40 N
Tools	
Crimping Tool	B 151; B 179
Positioner	B 165
Contact Insertion	B 117
Contact Removal	B 037 A

Note: Specification in accordance with VDE 0110/0627 - Contamination Level: 3  
Excess voltage category: 3 - Installation altitude < or = 4000 m

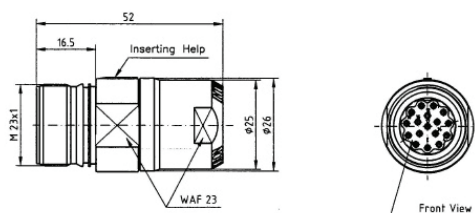


Selecting Cables (SGMEV 200-V and 400-V Class)

● Specification of Encoder Connector

- Encoder Connector (Encoder side)

Part-No.
S RU C 17 MR WN 087



Specifications		
Poles	17	
Temperature Range	-25°C up to 125°C	
Cable Clamp	diam. 5.5 mm	
Type of protection	IP67 connected IP00 not connected	
Electrical Performance		
Current Rating	9 A	
Voltage Rating	20 V	
Test Voltage	800 V	
Contact Resistance	< 5 mOhm	
Mating Cycles	> 500	
Materials		
Body	PA 6.6 glass-fiber reinforced	
Insulator	PBT, glass-fiber reinforced	
Contacts	Brass / Gold plated	
Seals	FPM	
Contacts		
Type	Pin diam. 1 mm	Pin diam. 1 mm
Part-No.	021.311.1020	021.402.1020
Termination	crimp; 0.24 to 1.0 mm <sup>2</sup>	crimp; 0.05 to 0.34 mm <sup>2</sup>
Latch Retention	> 30 N	> 30 N

Note: Specification in accordance with VDE 0110/0627 - Contamination Level: 3  
Excess voltage category: 3 - Installation altitude < or = 4000 m

# Rotary Servomotors

# SGMGV



## Model Designations

### ● Without Gears

**SGMGV - 03 A D A 2 F**

$\Sigma$ -V Series  
Servomotor  
SGMGV

1st+2nd  
digits

3rd  
digit

4th  
digit

5th  
digit

6th  
digit

7th  
digit

#### 1st+2nd digits Rated Output

Code	Specifications
03	300 W
05	450 W
09	850 W
13	1.3 kW
20	1.8 kW
30	2.9 kW
44	4.4 kW
55	5.5 kW
75	7.5 kW
1A	11 kW
1E	15 kW

#### 3rd digit Power Supply Voltage

Code	Specifications
A	200 VAC
D	400 VAC

#### 4th digit Serial Encoder

Code	Specifications
3	20-bit absolute (standard)
D	20-bit incremental (standard)

#### 5th digit Design Revision Order

Code	Specifications
A	Standard

#### 6th digit Shaft End

Code	Specifications
2	Straight without key (standard)
6	Straight with key and tap (optional)

#### 7th digit Options

Code	Specifications
1	Without options (not used in Europe)
F	With dust seal
H	With dust seal and holding brake (24 VDC)
E	With oil seal and holding brake (24 VDC)
S	With oil seal

## Features

- High-speed driving of feed shafts for various machines
- Wide selection: 300 W to 15 kW capacity, holding brake option
- Mounted serial encoder: 20 bits, high resolution
- Protective structure: IP67

## Application Examples

- Machine tools
- Transfer machines
- Material handling machines
- Food processing equipment

Configurations of connectors for the main circuit vary depending on servomotor capacity.



### SGMGV-03/-05

The connectors are used only for Yaskawa servomotors. Order the connectors specified by Yaskawa. Both protective structure IP67 and European Safety Standards compliant connectors are available. For details, refer to page 57 and 58.



### SGMGV-09 to -1E

The connectors for these models are round. The connectors specified by Yaskawa are required. Note that the connectors vary depending on the operation environment of servomotors.

Two types of connectors are available.

- Standard connectors:  
For details, refer to page 61 and 62.
- Protective structure IP67 and European Safety Standards compliant connectors:  
For details, refer to page 63.

Ratings and Specifications

**Time Rating:** Continuous

**Vibration Class:** V15

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Mounting:** Flange-mounted

**Thermal Class:** F

**Withstand Voltage:** 1500 VAC for one minute (200-V Class)  
1800 VAC for one minute (400-V Class)

**Enclosure:** Totally enclosed, self-cooled, IP67  
(except for shaft opening)

**Ambient Humidity:** 20% to 80% (no condensation)

**Drive Method:** Direct drive

**Rotation Direction:** Counterclockwise (CCW) with forward run  
reference when viewed from the load side

200-V Class

Servomotor Model: SGMGV-□□□□		03A	05A	09A	13A	20A	30A	44A	55A	75A	1AA	1EA
Rated Output <sup>*1</sup>	kW	0.3	0.45	0.85	1.3	1.8	2.9 2.4 <sup>*2</sup>	4.4	5.5	7.5	11	15
Rated Torque <sup>*1</sup>	Nm	1.96	2.86	5.39	8.34	11.5	18.6 15.1 <sup>*2</sup>	28.4	35.0	48.0	70.0	95.4
Instantaneous Peak Torque <sup>*1</sup>	Nm	5.88	8.92	13.8	23.3	28.7	45.1	71.1	87.6	119	175	224
Rated Current <sup>*1</sup>	Arms	2.8	3.8	6.9	10.7	16.7	23.8 19.6 <sup>*2</sup>	32.8	42.1	54.7	58.6	78
Instantaneous Max. Current <sup>*1</sup>	Arms	8	11	17	28	42	56	84	110	130	140	170
Rated Speed <sup>*1</sup>	min <sup>-1</sup>	1500										
Max. Speed <sup>*1</sup>	min <sup>-1</sup>	3000									2000	
Torque Constant	Nm/Arms	0.776	0.854	0.859	0.891	0.748	0.848	0.934	0.871	0.957	1.32	1.37
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	2.48 (2.73)	3.33 (3.58)	13.9 (16)	19.9 (22)	26 (28.1)	46 (54.5)	67.5 (76.0)	89.0 (97.5)	125 (134)	242 (261)	303 (341)
Rated Power Rate <sup>*1</sup>	kW/s	15.5 (14.1)	24.6 (22.8)	20.9 (18.2)	35.0 (31.6)	50.9 (47.1)	75.2 (63.5)	119 (106)	138 (126)	184 (172)	202 (188)	300 (283)
Rated Angular Acceleration <sup>*1</sup>	rad/s <sup>2</sup>	7900 (7180)	8590 (7990)	3880 (3370)	4190 (3790)	4420 (4090)	4040 (3410)	4210 (3740)	3930 (3590)	3840 (3580)	2890 (2680)	3150 (2960)
Applicable SERVOPACK	SGDV-□□□□	3R8A	3R8A	7R6A	120A	180A	330A 200A <sup>*2</sup>	330A	470A	550A	590A	780A

\*1: These items and torque-motor speed characteristics quoted in combination with a SERVOPACK are at an armature winding temperature of 20°C.

\*2: When using SGMGV-200A SERVOPACKs with SGMGV-30A servomotors, use these values.

Notes: 1 The values in parentheses are for servomotors with holding brakes.

2 The above specifications show the values under the cooling condition when the following heat sinks are mounted on the servomotors.

SGMGV-03A/-05A: 250 mm × 250 mm × 6 mm (aluminum)

SGMGV-09A/-13A/-20A: 400 mm × 400 mm × 20 mm (iron)

SGMGV-30A/-44A/-55A/-75A: 550 mm × 550 mm × 30 mm (iron)

SGMGV-1AA/-1EA: 650 mm × 650 mm × 35 mm (iron)

400-V Class

Servomotor Model: SGMGV-□□□□		03D	05D	09D	13D	20D	30D	44D	55D	75D	1AD	1ED
Rated Output <sup>*</sup>	kW	0.3	0.45	0.85	1.3	1.8	2.9	4.4	5.5	7.5	11	15
Rated Torque <sup>*</sup>	Nm	1.96	2.86	5.39	8.34	11.5	18.6	28.4	35.0	48.0	70.0	95.4
Instantaneous Peak Torque <sup>*</sup>	Nm	5.88	8.92	13.8	23.3	28.7	45.1	71.1	87.6	119	175	224
Rated Current <sup>*</sup>	Arms	1.4	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Instantaneous Max. Current <sup>*</sup>	Arms	4	5.5	8.5	14	20	28	40.5	52	65	70	85
Rated Speed <sup>*</sup>	min <sup>-1</sup>	1500										
Max. Speed <sup>*</sup>	min <sup>-1</sup>	3000									2000	
Torque Constant	Nm/Arms	1.55	1.71	1.72	1.78	1.50	1.70	1.93	1.80	1.92	2.64	2.74
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	2.48 (2.73)	3.33 (3.58)	13.9 (16)	19.9 (22)	26 (28.1)	46 (54.5)	67.5 (76.0)	89.0 (97.5)	125 (134)	242 (261)	303 (341)
Rated Power Rate <sup>*</sup>	kW/s	15.5 (14.1)	24.6 (22.8)	20.9 (18.2)	35.0 (31.6)	50.9 (47.1)	75.2 (63.5)	119 (106)	138 (126)	184 (172)	202 (188)	300 (283)
Rated Angular Acceleration <sup>*</sup>	rad/s <sup>2</sup>	7900 (7180)	8590 (7990)	3880 (3370)	4190 (3790)	4420 (4090)	4040 (3410)	4210 (3740)	3930 (3590)	3840 (3580)	2890 (2680)	3150 (2960)
Applicable SERVOPACK	SGDV-□□□□	1R9D	1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D

\*: These items and torque-speed characteristics quoted in combination with a SERVOPACK are at an armature winding temperature of 20°C.

Notes: 1 The values in parentheses are for servomotors with holding brakes.

2 The above specifications show the values under the cooling condition when the following heat sinks are mounted on the servomotors.

SGMGV-03D/-05D: 250 mm × 250 mm × 6 mm (aluminum)

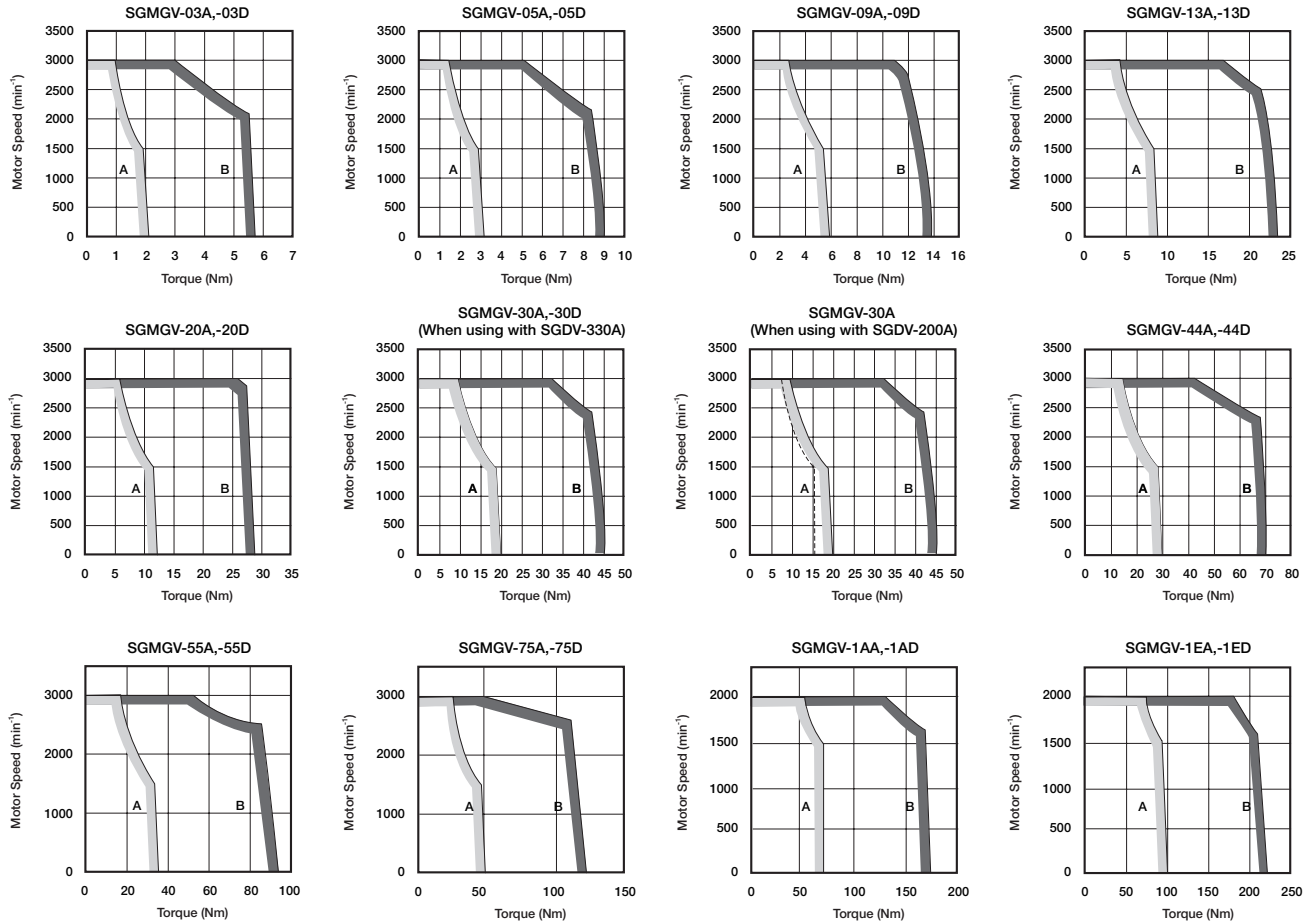
SGMGV-09D/-13D/-20D: 400 mm × 400 mm × 20 mm (iron)

SGMGV-30D/-44D/-55D/-75D: 550 mm × 550 mm × 30 mm (iron)

SGMGV-1AD/-1ED: 650 mm × 650 mm × 35 mm (iron)

Ratings and Specifications

● Torque-Speed Characteristics (200 V/400 V) A: Continuous Duty Zone B: Intermittent Duty Zone



Notes: 1 When the effective torque during intermittent duty is within the rated torque, the servomotor can be used within the intermittent duty zone.  
2 When the power cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Speed Characteristics will shrink as the line-to-line voltage drops.

● Holding Brake Electrical Specifications

Servomotor Model	Servomotor Rated Output kW	Holding Brake Specifications		
		Holding Torque Nm	Rated Voltage 24 VDC	
			Capacity W	Rated Current A (at 20°C)
SGMGV-03	0.3	4.5	10	0.42
SGMGV-05	0.45	4.5	10	0.42
SGMGV-09	0.85	12.7	10	0.41
SGMGV-13	1.3	19.6	10	0.41
SGMGV-20	1.8	19.6	10	0.41
SGMGV-30	2.9	43.1	18.5	0.77
SGMGV-44	4.4	43.1	18.5	0.77
SGMGV-55	5.5	72.6	25	1.05
SGMGV-75	7.5	72.6	25	1.05
SGMGV-1A	11	84.3	32	1.33
SGMGV-1E	15	114.6	35	1.46

Notes: 1 The holding brake is only used to hold the load and cannot be used to stop the servomotor.  
2 The holding brake open time and holding brake operation time vary depending on which discharge circuit is used. Make sure holding brake open time and holding brake operation time are correct for your servomotor.  
3 A 24-VDC power supply is provided by customers.

Ratings and Specifications

● Allowable Load Moment of Inertia at the Motor Shaft

The rotor moment of inertia ratio is the value for a servomotor without a gear and a holding brake.

Servomotor Model	Servomotor Rated Output	Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)
SGMGV-03 to -1E	0.3 to 1.5 kW	5 times

● Load Moment of Inertia

The larger the load moment of inertia, the worse the movement response of the load.

The allowable load moment of inertia ( $J_L$ ) depends on the motor capacity, as shown above. This value is provided strictly as a guideline and results may vary depending on servomotor drive conditions.

Use the AC servo drive capacity selection program SigmaJunmaSize+ to check the operation conditions. The program can be downloaded for free from our web site (<http://www.yaskawa.eu.com>).

An overvoltage alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a regenerative overload alarm (A.320). Take one of the following steps if this occurs.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the steps above. Refer to *Regenerative Resistors* on page 364.

● Allowable Radial and Thrust Loads

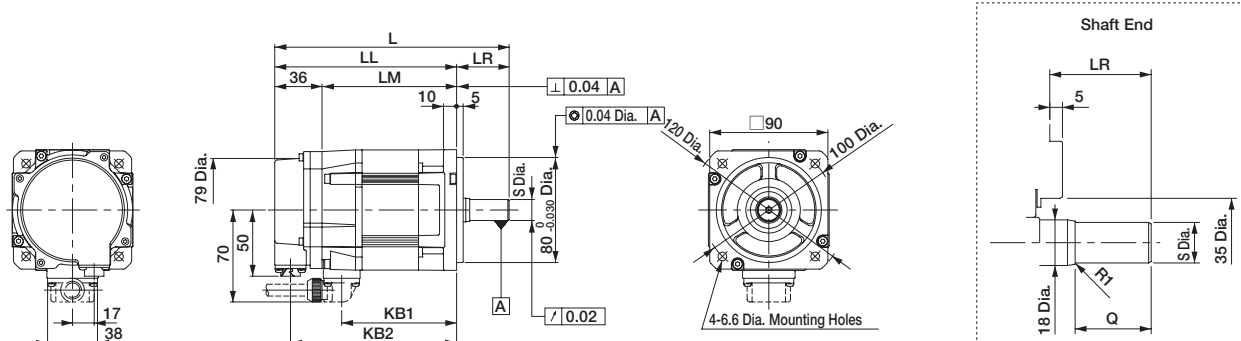
Design the mechanical system so thrust and radial loads applied to the servomotor shaft end during operation fall within the ranges shown in the table.

Servomotor Model	Allowable Radial Load (Fr) N	Allowable Thrust Load (Fs) N	LF mm	Reference Diagram	
SGMGV-	03□□A21	490	98	37	
	05□□A21	490	98	40	
	09□□A21	490	98	58	
	13□□A21	686	343	58	
	20□□A21	980	392	58	
	30□□A21	1470	490	79	
	44□□A21	1470	490	79	
	55□□A21	1764	588	113	
	75□□A21	1764	588	113	
	1A□□A21	1764	588	116	
	1E□□A21	4998	2156	116	

External Dimensions Units: mm

● Without Holding Brakes

(1) 300 W, 450 W

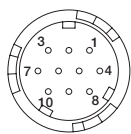


Note: For the specifications of the other shaft ends, refer to page 56.

Model SGMGV-	L	LL	LM	LR	KB1	KB2	Shaft End Dimensions		Approx. Mass kg
							S	Q	
03 □ □ A21	163	126	90	37	75	114	14 <sup>0</sup> <sub>-0.011</sub>	25	2.6
05 □ □ A21	179	139	103	40	88	127	16 <sup>0</sup> <sub>-0.011</sub>	30	3.2

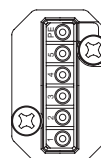
Note: Models with oil seals are of the same configuration.

• Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10-AP10S-□-D (L-shaped)  
 CM10-SP10S-□-D (Straight)  
 (Boxes (□) indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

• Cable Specifications for Servomotor-end Connector



PE	FG (Frame ground)
5	—
4	—
3	Phase U
2	Phase V
1	Phase W

Manufacturer: Japan Aviation Electronics Industry, Ltd.

With an Absolute Encoder

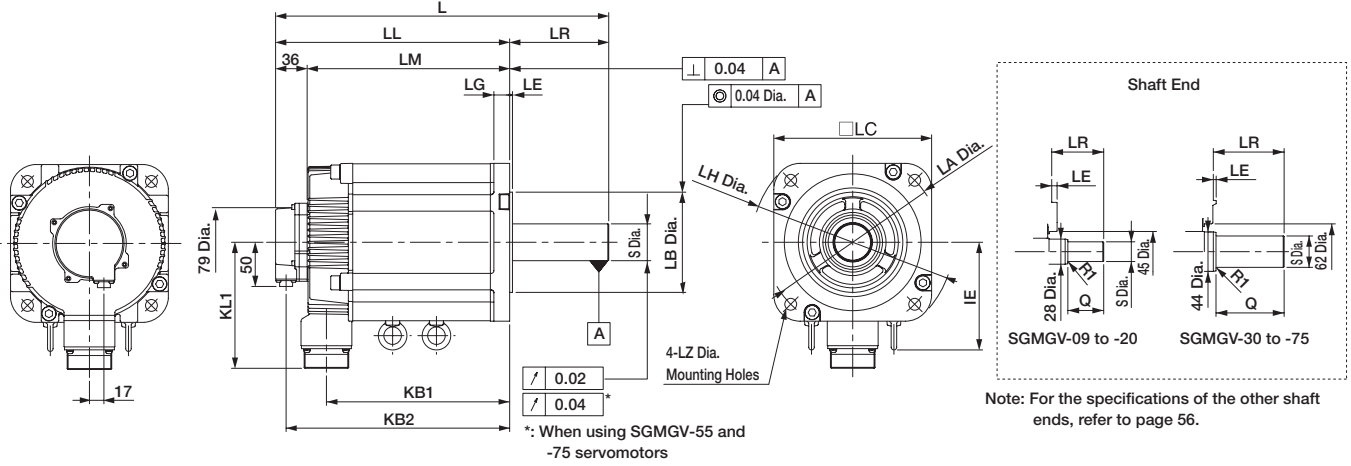
1	PS	6	BAT (+)
2	/PS	7	—
3	—	8	—
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

With an Incremental Encoder

1	PS	6	—
2	/PS	7	—
3	—	8	—
4	PG 5V	9	PG 0V
5	—	10	FG (Frame ground)

External Dimensions Units: mm

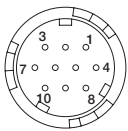
(2) 850 W to 7.5 kW



Model SGMGV-	L	LL	LM	LR	KB1	KB2	IE	KL1	Flange Face Dimensions							Shaft End Dimensions		Approx. Mass kg
									LA	LB	LC	LE	LG	LH	LZ	S	Q	
09□□A21	195	137	101	58	83	125	-	104	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	12	165	9	19 <sup>0</sup> <sub>-0.013</sub>	40	5.5
13□□A21	211	153	117	58	99	141	-	104	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	12	165	9	22 <sup>0</sup> <sub>-0.013</sub>	40	7.1
20□□A21	229	171	135	58	117	159	-	104	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	12	165	9	24 <sup>0</sup> <sub>-0.013</sub>	40	8.6
30□□A21	239	160	124	79	108	148	-	134	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	230	13.5	35 <sup>+0.01</sup> <sub>0</sub>	76	13.5
44□□A21	263	184	148	79	132	172	-	134	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	230	13.5	35 <sup>+0.01</sup> <sub>0</sub>	76	17.5
55□□A21	334	221	185	113	163	209	123	144	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	230	13.5	42 <sup>0</sup> <sub>-0.016</sub>	110	21.5
75□□A21	380	267	231	113	209	255	123	144	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	230	13.5	42 <sup>0</sup> <sub>-0.016</sub>	110	29.5

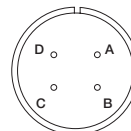
Note: Models with oil seals are of the same configuration.

• Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10-AP10S-□-D (L-shaped)  
 CM10-SP10S-□-D (Straight)  
 (Boxes (□) indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

• Cable Specifications for Servomotor-end Connector



A	Phase U
B	Phase V
C	Phase W
D	FG (Frame ground)

Manufacturer: DDK Ltd.

With an Absolute Encoder

1	PS	6	BAT (+)
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

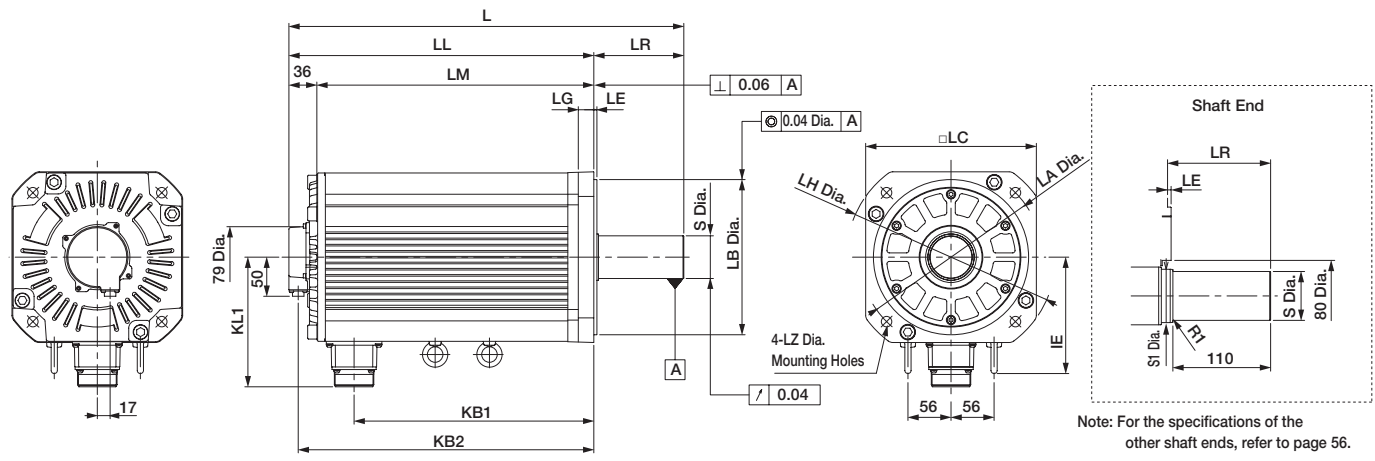
With an Incremental Encoder

1	PS	6	-
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	-	10	FG (Frame ground)



**External Dimensions** Units: mm

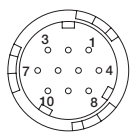
(3) 11 kW, 15 kW



Model SGMGV-	L	LL	LM	LR	KB1	KB2	IE	KL1	Flange Face Dimensions						Shaft End Dimensions		Approx. Mass kg	
									LA	LB	LC	LE	LG	LH	LZ	S		S1
1A□□A21	447	331	295	116	247	319	150	168	235	200 <sup>0</sup> <sub>-0.046</sub>	220	4	20	270	13.5	42 <sup>0</sup> <sub>-0.016</sub>	50	57
1E□□A21	509	393	357	116	309	381	150	168	235	200 <sup>0</sup> <sub>-0.046</sub>	220	4	20	270	13.5	55 <sup>+0.030</sup> <sub>+0.011</sub>	60	67

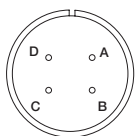
Note: Models with oil seals are of the same configuration.

• Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
Applicable plug (To be provided by the customer)  
Plug: CM10-AP10S-□-D (L-shaped)  
CM10-SP10S-□-D (Straight)  
(Boxes □ indicate a value that varies, depending on cable size.)  
Manufacturer: DDK Ltd.

• Cable Specifications for Servomotor-end Connector



A	Phase U
B	Phase V
C	Phase W
D	FG (Frame ground)

Manufacturer: DDK Ltd.

With an Absolute Encoder

1	PS	6	BAT (+)
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

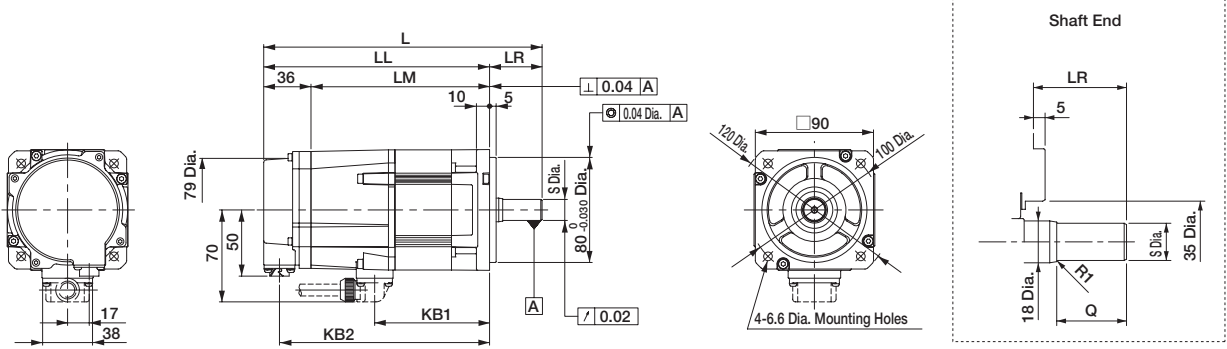
With an Incremental Encoder

1	PS	6	-
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	-	10	FG (Frame ground)

External Dimensions Units: mm

● With Holding Brakes

(1) 300 W, 450 W

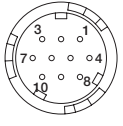


Note: For the specifications of the other shaft ends, refer to page 56.

Model SGMGV-	L	LL	LM	LR	KB1	KB2	Shaft End Dimensions		Approx. Mass kg
							S	Q	
03□□A2□	196	159	123	37	75	147	14 <sup>0</sup> <sub>-0.011</sub>	25	3.6
05□□A2□	212	172	136	40	88	160	16 <sup>0</sup> <sub>-0.011</sub>	30	4.2

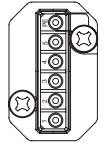
Note: Models with oil seals are of the same configuration.

• Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10-AP10S-□-D (L-shaped)  
 CM10-SP10S-□-D (Straight)  
 (Boxes □ indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

• Cable Specifications for Servomotor-end Connector



PE	FG (Frame ground)
5	Brake terminal
4	Brake terminal
3	Phase U
2	Phase V
1	Phase W

Manufacturer: Japan Aviation Electronics Industry, Ltd.

With an Absolute Encoder

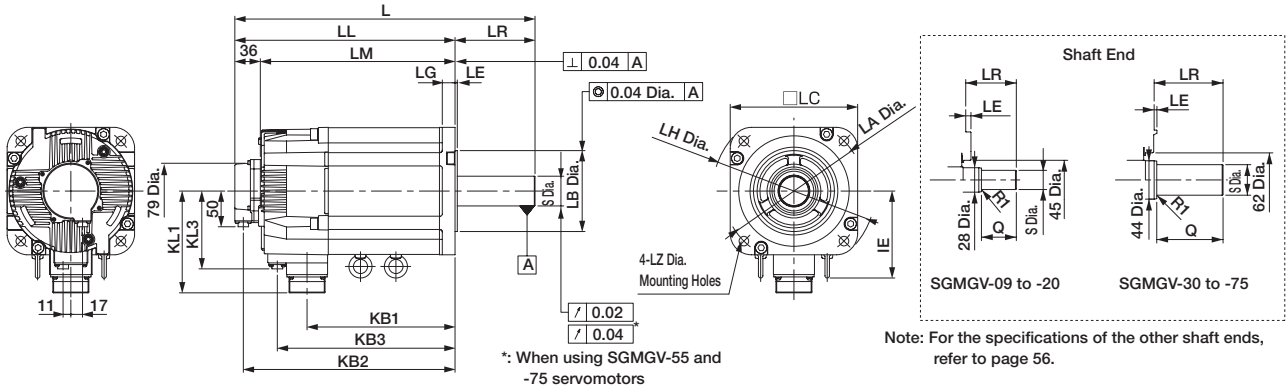
1	PS	6	BAT (+)
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

With an Incremental Encoder

1	PS	6	-
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	-	10	FG (Frame ground)

External Dimensions Units: mm

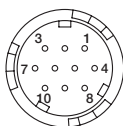
(2) 850 W to 7.5 kW



Model SGMGV-	L	LL	LM	LR	KB1	KB2	KB3	IE	KL1	KL3	Flange Face Dimensions							Shaft End Dimensions		Approx. Mass kg
											LA	LB	LC	LE	LG	LH	LZ	S	Q	
09□□A2□	231	173	137	58	83	161	115	-	104	80	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	12	165	9	19 <sup>0</sup> <sub>-0.013</sub>	40	7.5
13□□A2□	247	189	153	58	99	177	131	-	104	80	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	12	165	9	22 <sup>0</sup> <sub>-0.013</sub>	40	9.0
20□□A2□	265	207	171	58	117	195	149	-	104	80	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	12	165	9	24 <sup>0</sup> <sub>-0.013</sub>	40	11.0
30□□A2□	287	208	172	79	108	196	148	-	134	110	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	230	13.5	35 <sup>+0.01</sup> <sub>0</sub>	76	19.5
44□□A2□	311	232	196	79	132	220	172	-	134	110	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	230	13.5	35 <sup>+0.01</sup> <sub>0</sub>	76	23.5
55□□A2□	378	265	229	113	163	253	205	123	144	110	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	230	13.5	42 <sup>+0.01</sup> <sub>-0.016</sub>	110	27.5
75□□A2□	424	311	275	113	209	299	251	123	144	110	200	114.3 <sup>0</sup> <sub>-0.025</sub>	180	3.2	18	230	13.5	42 <sup>+0.01</sup> <sub>-0.016</sub>	110	35

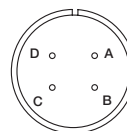
Note: Models with oil seals are of the same configuration.

• Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10-AP10S-□-D (L-shaped)  
 CM10-SP10S-□-D (Straight)  
 (Boxes □ indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

• Cable Specifications for Servomotor-end Connector



A	Phase U
B	Phase V
C	Phase W
D	FG (Frame ground)

Manufacturer: DDK Ltd.

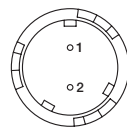
With an Absolute Encoder

1	PS	6	BAT (+)
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

With an Incremental Encoder

1	PS	6	-
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	-	10	FG (Frame ground)

• Cable Specifications for Brake-end Connector



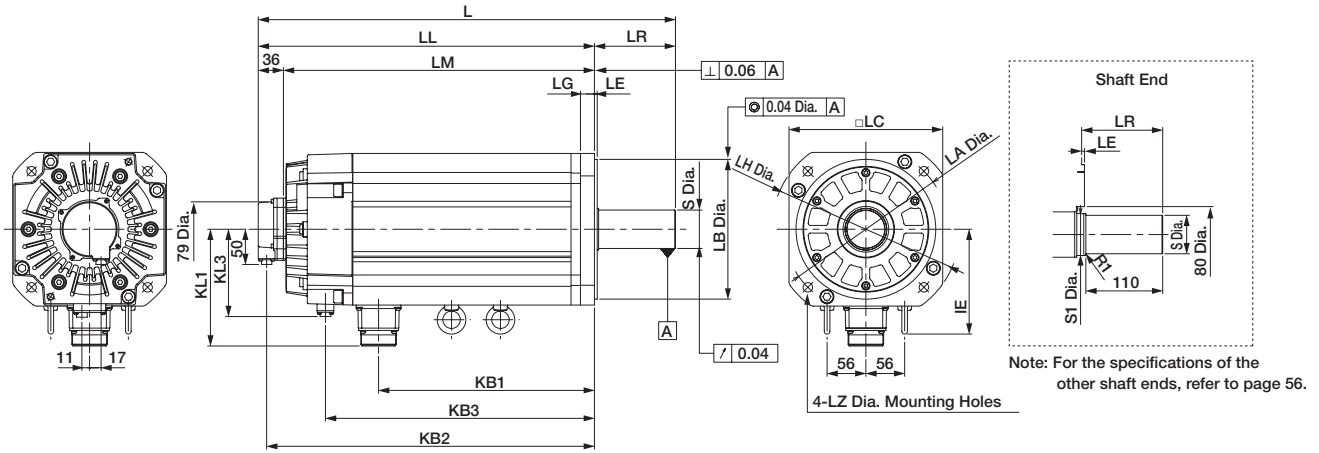
Receptacle: CM10-R2P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10Y-AP2S-□-D-G1 (L-shaped)  
 CM10-SP2S-□-D (Straight)  
 (Boxes □ indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

Brake terminal
Brake terminal

Note: No polarity for connection to the brake terminals

External Dimensions Units: mm

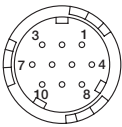
(3) 11 kW, 15 kW



Model SGMGV-	L	LL	LM	LR	KB1	KB2	KB3	IE	KL1	KL3	Flange Face Dimensions						Shaft End Dimensions		Approx. Mass kg	
											LA	LB	LC	LE	LG	LH	LZ	S		S1
1A □ A2 □	498	382	346	116	247	370	315	150	168	125	235	200 <sup>0</sup> <sub>-0.046</sub>	220	4	20	270	13.5	42 <sup>0</sup> <sub>-0.016</sub>	50	65
1E □ A2 □	598	482	446	116	309	470	385	150	168	125	235	200 <sup>0</sup> <sub>-0.046</sub>	220	4	20	270	13.5	55 <sup>+0.030</sup> <sub>-0.011</sub>	60	85

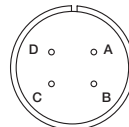
Note: Models with oil seals are of the same configuration.

• Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10-AP10S-□-D (L-shaped)  
 CM10-SP10S-□-D (Straight)  
 (Boxes (□) indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

• Cable Specifications for Servomotor-end Connector



A	Phase U
B	Phase V
C	Phase W
D	FG (Frame ground)

Manufacturer: DDK Ltd.

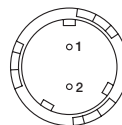
With an Absolute Encoder

1	PS	6	BAT (+)
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

With an Incremental Encoder

1	PS	6	-
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	-	10	FG (Frame ground)

• Cable Specifications for Brake-end Connector



Receptacle: CM10-R2P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10Y-AP2S-□-D-G1 (L-shaped)  
 CM10-SP2S-□-D (Straight)  
 (Boxes (□) indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

Brake terminal
Brake terminal

Note: No polarity for connection to the brake terminals

External Dimensions Units: mm

● Shaft End

SGMGV - □□□□□□□□

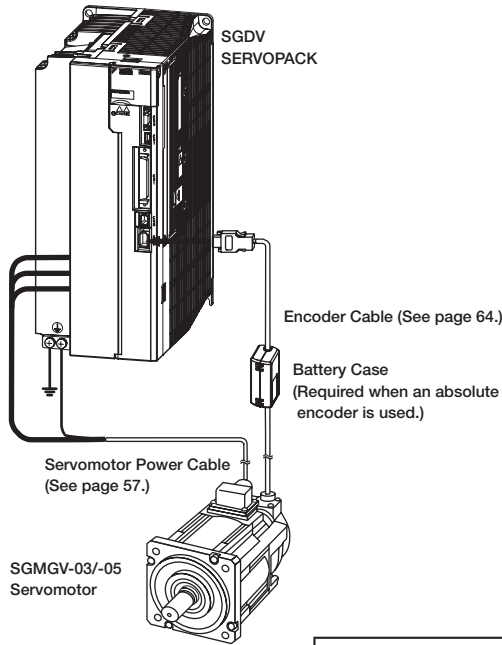
Code	Specifications	Remarks
2	Straight without key	Standard
6	Straight with key and tap for one location (Key slot is JIS B1301-1996 fastening type)	Optional

Shaft End	Model SGMGV-									
	03	05	09	13	20	30/44	55/75	1A	1E	
Code: 2 (Straight without Key)										
	LR	37	40	58	58	58	79	113	116	116
	Q	25	30	40	40	40	76	110	110	110
	S	14 <sup>0</sup> <sub>-0.011</sub>	16 <sup>0</sup> <sub>-0.011</sub>	19 <sup>0</sup> <sub>-0.013</sub>	22 <sup>0</sup> <sub>-0.013</sub>	24 <sup>0</sup> <sub>-0.013</sub>	35 <sup>+0.01</sup> <sub>0</sub>	42 <sup>0</sup> <sub>-0.016</sub>	42 <sup>0</sup> <sub>-0.016</sub>	55 <sup>+0.030</sup> <sub>+0.011</sub>
Code: 6 (Straight with Key and Tap)										
	LR	37	40	58	58	58	79	113	116	116
	Q	25	30	40	40	40	76	110	110	110
	QK	15	20	25	25	25	60	90	90	90
	S	14 <sup>0</sup> <sub>-0.011</sub>	16 <sup>0</sup> <sub>-0.011</sub>	19 <sup>0</sup> <sub>-0.013</sub>	22 <sup>0</sup> <sub>-0.013</sub>	24 <sup>0</sup> <sub>-0.013</sub>	35 <sup>+0.01</sup> <sub>0</sub>	42 <sup>0</sup> <sub>-0.016</sub>	42 <sup>0</sup> <sub>-0.016</sub>	55 <sup>+0.030</sup> <sub>+0.011</sub>
	W	5	5	5	6	8	10	12	12	16
	T	5	5	5	6	7	8	8	8	10
	U	3	3	3	3.5	4	5	5	5	6
	P	M4 Screw, Depth 10	M5 Screw, Depth 12				M12 Screw, Depth 25	M16 Screw, Depth 32	M20 Screw, Depth 40	

Selecting Cables (SGMGV-03 / -05)

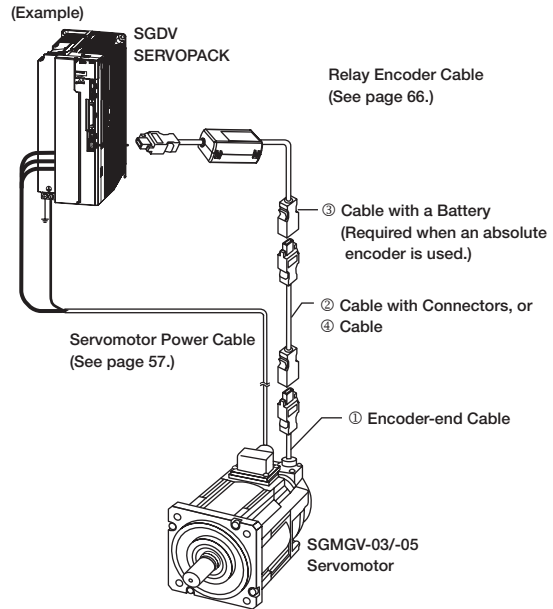
● Cables Connections

- Standard Wiring (Max. encoder cable length: 20 m)



- Encoder Cable Extension from 30 to 50 m

(See page 66.)



**CAUTION**

- Separate the servomotor power cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.
- When the power cable length exceeds 20 m, note that the intermittent duty zone of the *Torque-Speed Characteristics* will shrink as the line-to-line voltage drops.

● Servomotor Power Cable

Servomotor Rated Output	Name	Length	Order No.	Specifications	Details
			Standard (Flexible) Type*		
0.3 kW 0.45 kW	For Servomotor without Holding Brakes	3 m	JZSP-CVM21-03-E-G#		(1)
		5 m	JZSP-CVM21-05-E-G#		
		10 m	JZSP-CVM21-10-E-G#		
		15 m	JZSP-CVM21-15-E-G#		
		20 m	JZSP-CVM21-20-E-G#		
	For Servomotor with Holding Brakes	3 m	JZSP-CVM41-03-E-G#		(2)
		5 m	JZSP-CVM41-05-E-G#		
		10 m	JZSP-CVM41-10-E-G#		
		15 m	JZSP-CVM41-15-E-G#		
		20 m	JZSP-CVM41-20-E-G#		
	Servomotor-end Connector Kit	-	JZSP-CVM9-1-E	Crimped Type (A crimp tool is required.)	(3)

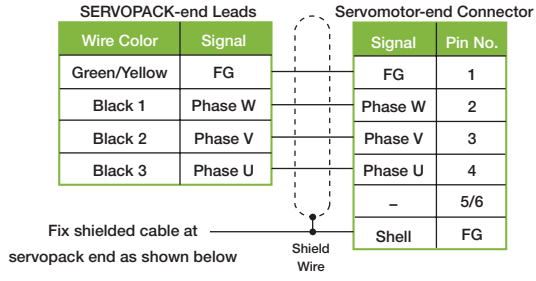
\*: These flexible cables are provided as standard equipment.

(Cont'd)

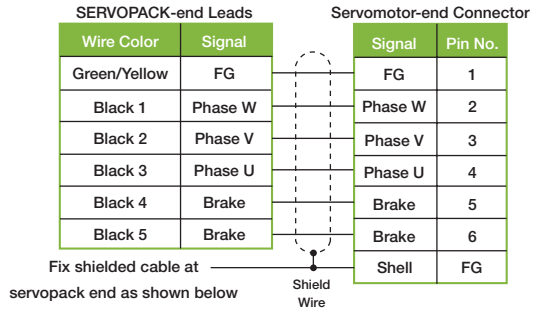
Notes: Cables without connectors can be ordered on request, see (4) for specification. The digit "#" of the order number represents the design revision.

Selecting Cables (SGMGV-03 / -05)

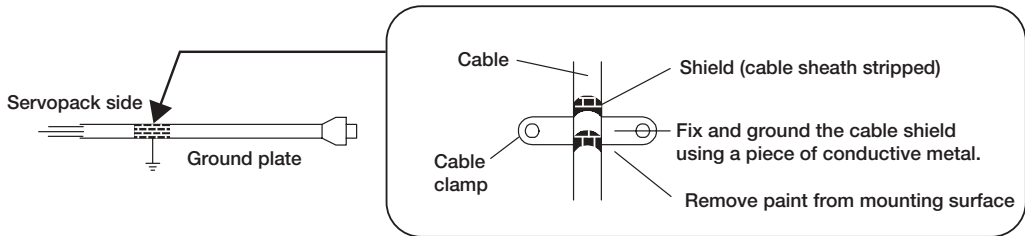
(1) Wiring Specifications for Servomotors without Holding Brakes



(2) Wiring Specifications for Servomotor with Holding Brakes



Note: No polarity for connection to a holding brake.



(3) Servomotor-end Connector Kit Specifications

Items	Specifications	External Dimensions mm
Order No.	JZSP-CVM9-1-E (Cables are not included.)	
Applicable Servomotors	SGMGV-03/-05	
Manufacturer	Japan Aviation Electronics Industry, Ltd.	
Plug	JNYFX06SJ3	
Electrical Contact	ST-TMH-S-C1B	
Applicable Wire Size	AWG18 to 22	
Outer Diameter of Insulating Sheath	1.3 dia. to 1.8 dia.	
Mounting Screw	M3 Pan head screw	
Applicable Cable Outer Diameter	6.9 dia. to 8.3 dia.	

Note: A crimp tool (Model no. : CT160-3-TMH5B) is required. Contact the respective manufacturer for more information.

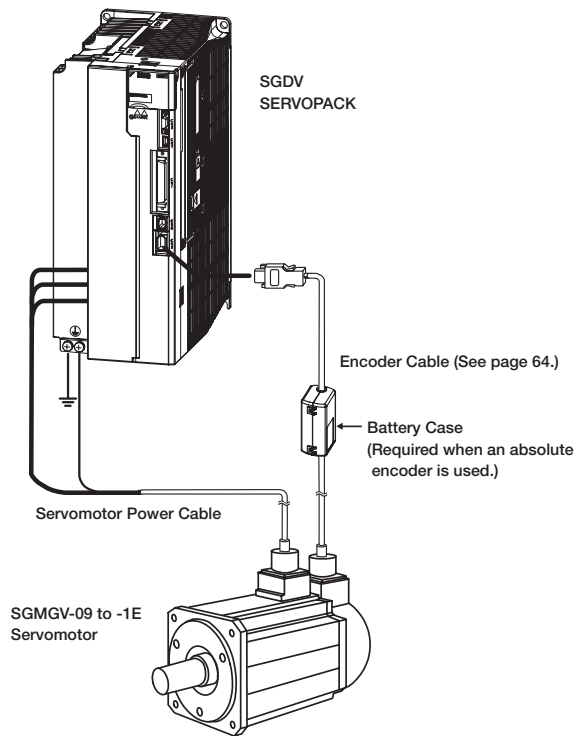
(4) Cable Specifications (Flexible Type)

Items	For Servomotor without Holding Brakes (4 wires)	For Servomotor with Holding Brakes (6 wires)
Cable Length	50 m max.	
Specifications	UL2586 (Rating temperature: 105°C) AWG20×4C For power line: AWG20 (0.55 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.77 dia.	UL2586 (Rating temperature: 105°C) AWG20×6C For power line: AWG20 (0.55 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.77 dia. For holding brake line: AWG20 (0.55 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.77 dia.
Finished Dimensions	7.3±0.3 dia.	7.4±0.3 dia.
Internal Configuration and Lead Color		

Selecting Cables (SGMGV-09 to -1E)

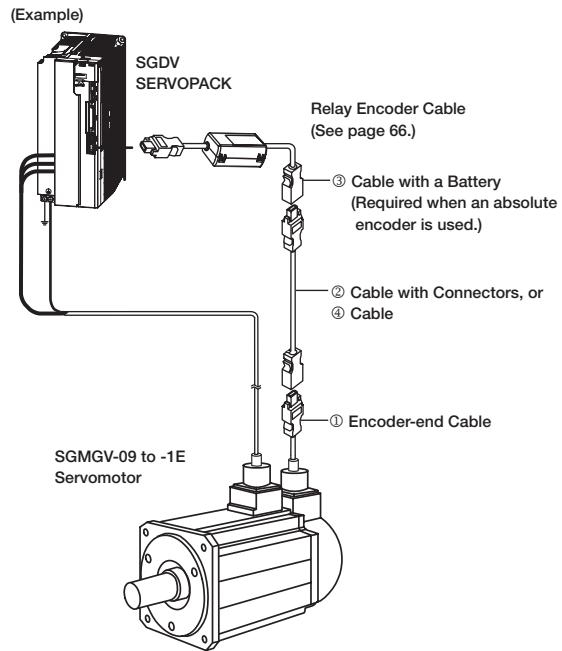
● Cables Connections

- Standard Wiring (Max. encoder cable length: 20 m)



- Encoder Cable Extension from 30 to 50 m

(See page 66.)



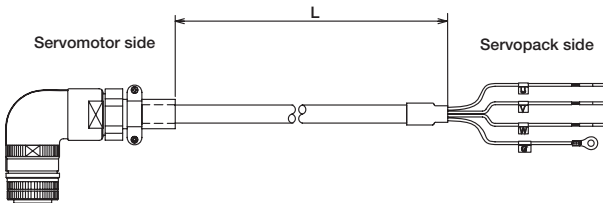
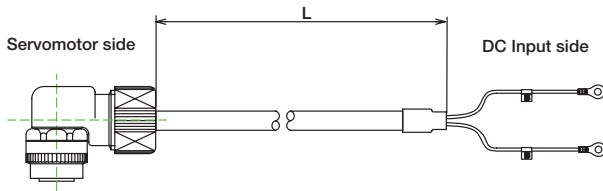
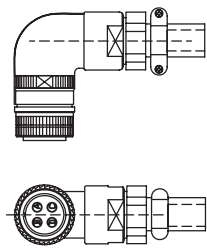
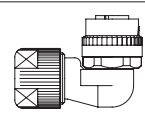
⚠ CAUTION

- Separate the servomotor power cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.
- When the power cable length exceeds 20 m, note that the intermittent duty zone of the *Torque-Speed Characteristics* will shrink as the line-to-line voltage drops.



Selecting Cables (SGMGV-09 to -1E)

● Servomotor Power Cable

Name	Servomotor Rated Output	Length	Order No.	Specifications	Details
			Flexible Type		
For Servomotor without Holding Brakes	0.85 kW	3 m	JZSP-CVMCA11-03-E-G#		(1)
		5 m	JZSP-CVMCA11-05-E-G#		
		10 m	JZSP-CVMCA11-10-E-G#		
		15 m	JZSP-CVMCA11-15-E-G#		
		20 m	JZSP-CVMCA11-20-E-G#		
	1.3 to 1.8 kW	3 m	JZSP-CVMCA12-03-E-G#		
		5 m	JZSP-CVMCA12-05-E-G#		
		10 m	JZSP-CVMCA12-10-E-G#		
		15 m	JZSP-CVMCA12-15-E-G#		
		20 m	JZSP-CVMCA12-20-E-G#		
	2.9 kW to 4.4 kW	3 m	JZSP-CVMCA13-03-E-G#		
		5 m	JZSP-CVMCA13-05-E-G#		
		10 m	JZSP-CVMCA13-10-E-G#		
		15 m	JZSP-CVMCA13-15-E-G#		
		20 m	JZSP-CVMCA13-20-E-G#		
	5.5 kW	3 m	JZSP-CVMCA14-03-E-G#		
		5 m	JZSP-CVMCA14-05-E-G#		
		10 m	JZSP-CVMCA14-10-E-G#		
		15 m	JZSP-CVMCA14-15-E-G#		
		20 m	JZSP-CVMCA14-20-E-G#		
7.5 kW to 11 kW	3 m	JZSP-CVMCA15-03-E-G#			
	5 m	JZSP-CVMCA15-05-E-G#			
	10 m	JZSP-CVMCA15-10-E-G#			
	15 m	JZSP-CVMCA15-15-E-G#			
	20 m	JZSP-CVMCA15-20-E-G#			
15 kW	3 m	JZSP-CVMCA16-03-E-G#			
	5 m	JZSP-CVMCA16-05-E-G#			
	10 m	JZSP-CVMCA16-10-E-G#			
	15 m	JZSP-CVMCA16-15-E-G#			
	20 m	JZSP-CVMCA16-20-E-G#			
For Servomotor with Holding Brakes	0.85 kW to 15 kW	3 m	JZSP-CVB12Y-03-E-G#		(2)
		5 m	JZSP-CVB12Y-05-E-G#		
		10 m	JZSP-CVB12Y-10-E-G#		
		15 m	JZSP-CVB12Y-15-E-G#		
		20 m	JZSP-CVB12Y-20-E-G#		
Servomotor-end Connector Kit	0.85 kW to 1.8 kW	CE05-6A18-10SD-D (plug), CE18BA-S-D (Back shell), CE05-18BS-S-D (Adapter shell), CE3057-10A-1-D (clamp)			(3)
	2.9 kW to 4.4 kW	CE05-6A22-22SD-D (plug), CE22BA-S-D (Back shell), CE05-22BS-S-D (Adapter shell), CE3057-12A-1-D (clamp)			
	5.5 kW to 15 kW	CE05-6A32-17SD-D (plug), CE05-32BSSC-S-D (Shell), CE3057-20A-X-D (clamp)			
Holding Brake Connector Kit	0.85 kW to 15 kW	CM10Y-AP2S-M-D-G1			

Note: The digit "#" of the order number represents the design revision.

Selecting Cables (SGMGV-09 to -1E)

● Servomotor Power Cable (200-V Class)

Customers must assemble the servomotor's power cables and attach connectors to connect the SERVOPACKs and the SGMGV servomotors.

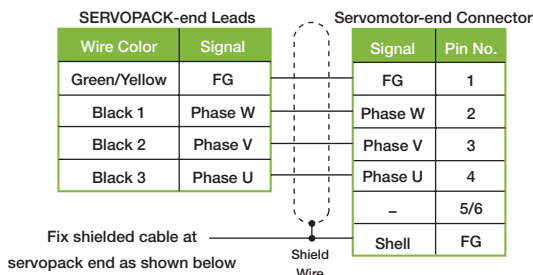
The connectors specified by Yaskawa are required. Note that the connectors vary depending on the operation environment of servomotors.

Two types of connectors are available.

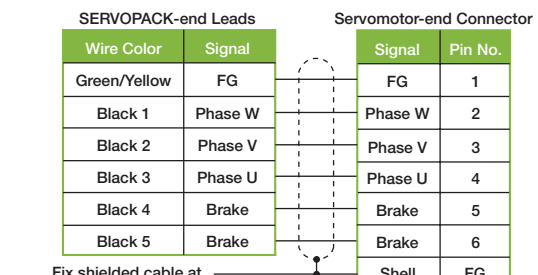
- Standard connectors
- Protective structure IP67 and European Safety Standards compliant connectors

Yaskawa does not specify which cables to use. Use appropriate cables for the connectors.

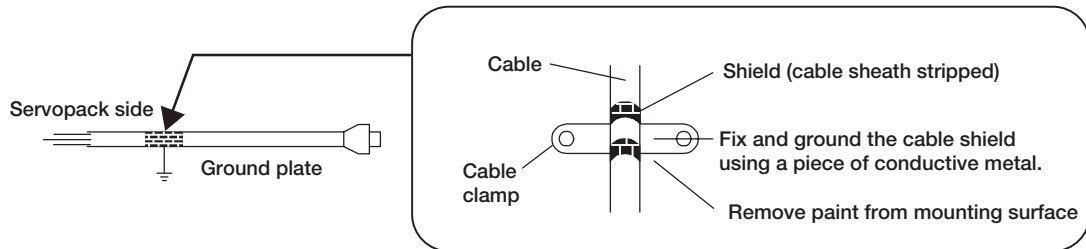
(1) Wiring Specifications for Servomotors without Holding Brakes



(2) Wiring Specifications for Servomotor with Holding Brakes



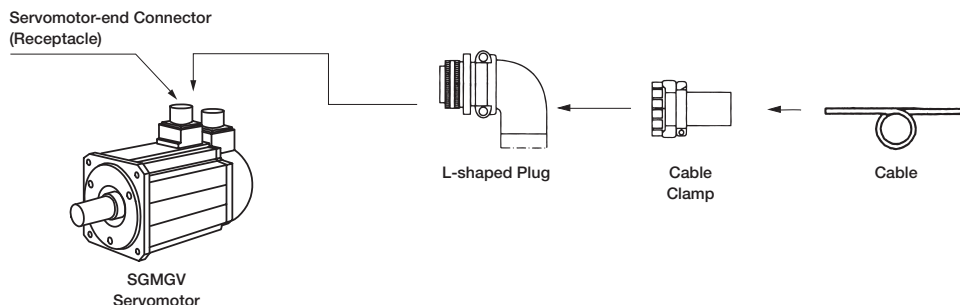
Note: No polarity for connection to a holding brake.



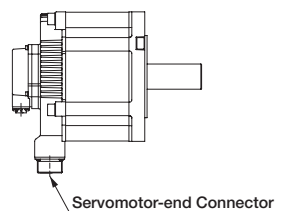
Selecting Cables (SGMGV-09 to -1E)

● Standard Connectors

● Connector Configuration



(1) Without Holding Brakes



Servomotor-end Connector For 0.85 to 15 kW



Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not provided by Yaskawa)	
		L-shaped Plug	Cable Clamp
0.85 1.3 1.8	CE05-2A18-10PD-D (MS3102A18-10P)	MS3108B18-10S	MS3057-10A
2.9 4.4	CE05-2A22-22PD-D (MS3102A22-22P)	MS3108B22-22S	MS3057-12A
5.5 to 15	CE05-2A32-17PD-D (MS3102A32-17P)	MS3108B32-17S	MS3057-20A

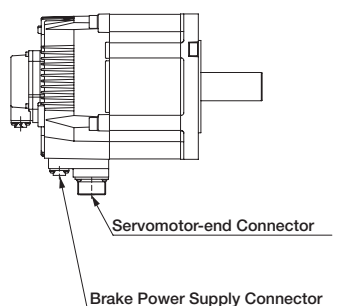
Notes: 1 Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors (not provided by Yaskawa).

2 Servomotor-end connectors (receptacles) can be used with MS plugs. For the model number of the MS receptacle, refer to the receptacle number in parentheses and select the appropriate plug.

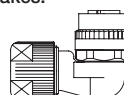
(2) With Holding Brakes

0.85 to 15 kW servomotors require servomotor-end connector and brake power supply connector.

The servomotor-end connector is the same as is used for servomotors without holding brakes.



Brake Power Supply Connector 0.85 to 15 kW



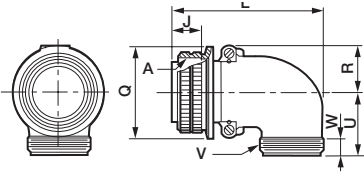
Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not provided by Yaskawa)	
		L-shaped Plug	Manufacturer
0.85 to 15	CM10-R2P-D	CM10Y-AP2S-M-D-G1 Applicable Cable: 6.0 dia. to 9.0 dia.	DDK Ltd.

Selecting Cables (SGMGV-09 to -1E)

● Cable-end Connectors

(1) MS3108B□□-□□S:

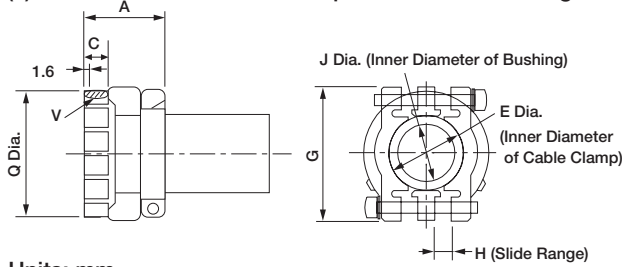
L-shaped Plug



Units: mm

Shell Size	Joint Screw A	Length of Joint Portion J±0.12	Overall Length L max.	Outer Diameter of Joint Nut Q <sup>+0</sup> <sub>-0.38</sub>	R ±0.5	U ±0.5	Cable Clamp Set Screw V	Effective Screw Length W min.
18	1-1/8-18UNEF	18.26	68.27	34.13	20.5	30.2	1-20UNEF	9.53
22	1-3/8-18UNEF	18.26	76.98	40.48	24.1	33.3	1-3/16-18UNEF	9.53
32	2-18UNS	18.26	95.25	56.33	32.8	44.4	1-3/4-18UNS	11.13

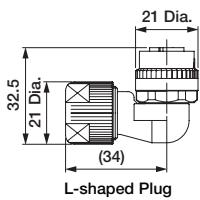
(2) MS3057-□□A : Cable Clamp with Rubber Bushing



Units: mm

Cable Clamp Type	Applicable Connector Shell Size	Overall Length A±0.7	Effective Screw Length C	E Diameter	G±0.7	H	J Diameter	Set Screw V	Outer Diameter Q±0.7 Dia.	Attached Bushing
MS3057-10A	18	23.8	10.3	15.9	31.7	3.2	14.3	1-20UNEF	30.1	AN3420-10
MS3057-12A	20, 22	23.8	10.3	19	37.3	4	15.9	1-3/16-18UNEF	35.0	AN3420-12
MS3057-20A	32	27.8	11.9	31.7	51.6	6.3	23.8	1-3/4-18UNS	51.6	AN3420-20

● Dimensional Drawings of Brake Power Supply

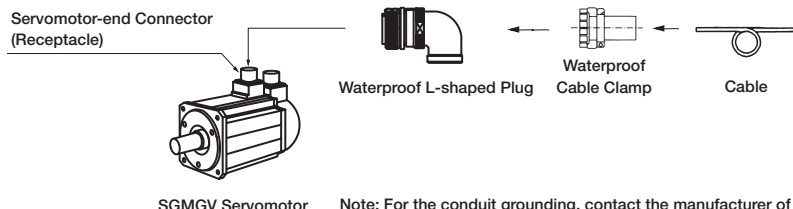


Items	Specifications
Connector Order No.	CM10-□P2S-□-D (Cables are not included.)
Protective Structure	IP67
Manufacturer	DDK Ltd.
Instructions	L-shaped plug (CM10Y-AP2S-□-D-G1): TC-573
Electrical Contact Order No.	Electrical contact (100 pcs in one bag) <ul style="list-style-type: none"> <li>• Crimped type: CM10-#22SC(C3)(D8)-100, Wire size: AWG16 to 20, Outer diameter of sheath: 1.87 to 2.45 dia., Hand tool: 357J-50448T</li> <li>• Soldered type: CM10-#22SC(S2)(D8)-100, Wire size: AWG16 max.</li> </ul> Real contact (4000 pcs on one reel) <ul style="list-style-type: none"> <li>• Crimped type: CM10-#22SC(C3)(D8)-4000, Wire size: AWG 16 to 20, Outer diameter of sheath: 1.87 to 2.45 dia., Semi-automatic tool: AP-A50541T (product name for one set), AP-A50541T-1 (product name for applicator)</li> </ul> Note: The product name of the semi-automatic tool refers to the product name of the press and applicator (crimper) as a set.

Selecting Cables (SGMGV-09 to -1E)

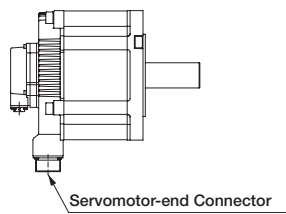
● Protective Structure IP67 and European Safety Standards Compliant Connector

● Connector Configuration



(1) Without Holding Brakes

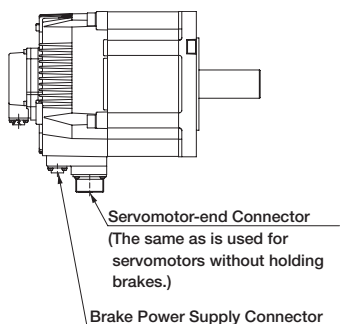
Servomotor-end Connector  
For 0.85 to 15 kW



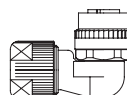
Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not Provided by Yaskawa)			
		L-shaped Plug	Cable Clamp	Applicable Cable Diameter (For Reference)	Manufacturer
0.85	CE05-2A18-10PD-D	CE05-8A18-10SD-D-BAS	CE3057-10A-1-D	10.5 dia. to 14.1 dia.	DDK Ltd.
1.3			CE3057-10A-2-D	8.5 dia. to 11.0 dia.	
1.8			CE3057-10A-3-D	6.5 dia. to 8.7 dia.	
2.9	CE05-2A22-22PD-D	CE05-8A22-22SD-D-BAS	CE3057-12A-1-D	12.5 dia. to 16.0 dia.	
4.4			CE3057-12A-2-D	9.5 dia. to 13.0 dia.	
			CE3057-12A-3-D	6.8 dia. to 10.0 dia.	
	CE3057-12A-7-D	14.5 dia. to 17.0 dia.			
5.5 to 15	CE05-2A32-17PD-D	CE05-8A32-17SD-D-BAS	CE3057-20A-1-D	22 dia. to 23.8 dia.	
			CE3057-20A-2-D	24 dia. to 26.6 dia.	
			CE3057-20A-3-D	22 dia. to 22.5 dia.	

(2) With Holding Brakes

0.85 to 15 kW servomotors require servomotor-end connector and brake power supply connector. The servomotor-end connector is the same as is used for servomotors without holding brakes.



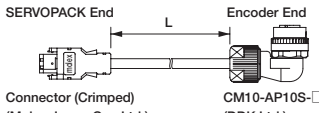
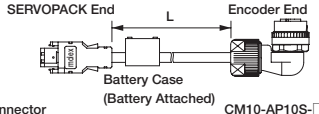


Brake Power Supply Connector  
0.85 to 15 kW



Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not provided by Yaskawa)	
		L-shaped Plug	Manufacturer
0.85 to 15	CM10-R2P-D	CM10Y-AP2S-M-D-G1 Applicable Cable: 6.0 dia. to 9.0 dia.	DDK Ltd.

Selecting Cables

● Encoder Cables (Max. length: 20 m)

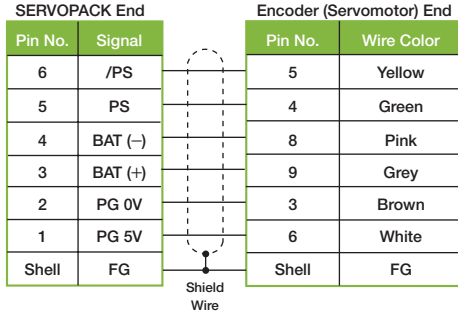
Name	Length (L)	Order No.	Specifications	Details
		Flexible Type		
Encoder Cable with Connectors (For Incremental Encoder)	3 m	JZSP-CVP12-03-E-G#	 <p>SERVOPACK End      Encoder End</p> <p>Connector (Crimped) (Molex Japan Co., Ltd.)      CM10-AP10S-□-D (DDK Ltd.)</p>	(1)
	5 m	JZSP-CVP12-05-E-G#		
	10 m	JZSP-CVP12-10-E-G#		
	15 m	JZSP-CVP12-15-E-G#		
	20 m	JZSP-CVP12-20-E-G#		
Encoder Cable with Connectors (For Absolute Encoder, with a Battery Case)	3 m	JZSP-CVP27-03-E-G#	 <p>SERVOPACK End      Encoder End</p> <p>Connector (Crimped)(Molex Japan Co., Ltd.)      Battery Case (Battery Attached)      CM10-AP10S-□-D (DDK Ltd.)</p>	(2)
	5 m	JZSP-CVP27-05-E-G#		
	10 m	JZSP-CVP27-10-E-G#		
	15 m	JZSP-CVP27-15-E-G#		
	20 m	JZSP-CVP27-20-E-G#		
SERVOPACK-end Connector Kit		JZSP-CMP9-1-E	<p>Soldered</p>  <p>(Molex Japan Co., Ltd.)</p>	(3)
Encoder-end Connectors for Protective Structure IP67 L-shaped Plug		CM10-AP10S-M-D-G1 (Connector Kit including contacts)	 <p>(DDK Ltd.)</p>	-

Note: The digit "#" of the order number represents the design revision.

Selecting Cables

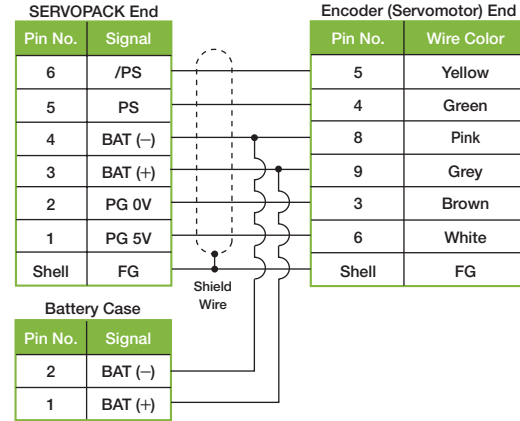
(1) Wiring Specifications for Cable with Connectors  
(For incremental encoder)

• Flexible Type



(2) Wiring Specifications for Cable with Connectors  
(For absolute encoder, with a battery case)

• Flexible Type



(3) SERVOPACK-end Connector Kit Specifications

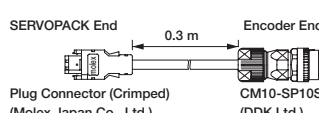
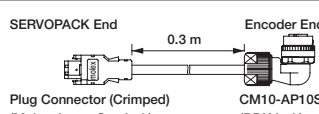
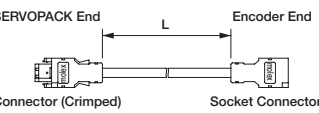
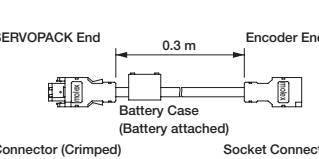

Items	Specifications
Order No.	JZSP-CMP9-1-E
Manufacturer	Molex Japan Co., Ltd.
Connector Model (For standard)	55100-0670 (soldered)
External Dimensions (Units: mm)	

(4) Cable Specifications

Items	Flexible Type
Cable Length	20 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG22×2C + AWG24×2P AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.35 dia. AWG24 (0.20 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.21 dia.
Finished Dimensions	6.8 dia.
Internal Configuration and Lead Color	

Selecting Cables

● Encoder Cables (For extending from 30 to 50 m)

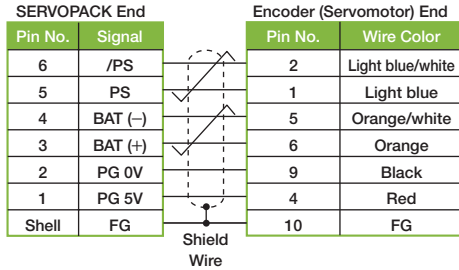
Name	Length	Order No.	Specifications	Details
① Encoder-end Cables (For incremental and absolute encoder)	0.3 m	JZSP-CVP01-E	 <p>SERVOPACK End      0.3 m      Encoder End</p> <p>Plug Connector (Crimped) (Molex Japan Co., Ltd.)      CM10-SP10S-□-D (DDK Ltd.)</p>	(1)
		JZSP-CVP02-E	 <p>SERVOPACK End      0.3 m      Encoder End</p> <p>Plug Connector (Crimped) (Molex Japan Co., Ltd.)      CM10-AP10S-□-D (DDK Ltd.)</p>	
② Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E	 <p>SERVOPACK End      L      Encoder End</p> <p>Connector (Crimped) (Molex Japan Co., Ltd.)      Socket Connector (Soldered) (Molex Japan Co., Ltd.)</p>	(2)
	40 m	JZSP-UCMP00-40-E		
	50 m	JZSP-UCMP00-50-E		
③ Cable with a Battery Case (Required when an absolute encoder is used.)*	0.3 m	JZSP-CSP12-E	 <p>SERVOPACK End      0.3 m      Encoder End</p> <p>Battery Case (Battery attached)</p> <p>Connector (Crimped) (Molex Japan Co., Ltd.)      Socket Connector (Soldered) (Molex Japan Co., Ltd.)</p>	(3)
④ Cables	30 m	JZSP-CMP19-30-E		(4)
	40 m	JZSP-CMP19-40-E		
	50 m	JZSP-CMP19-50-E		

\*: Not required when connecting a battery to the host controller.



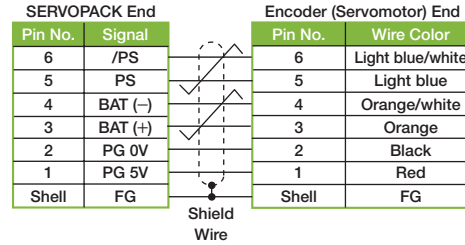
Selecting Cables

(1) Wiring Specifications for Encoder-end Cable  
(For incremental and absolute encoder)

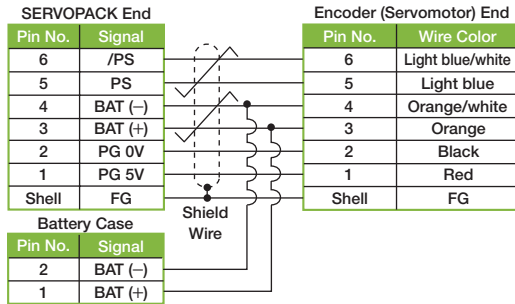


Note: The signals BAT(+) and BAT(-) are used when using an absolute encoder.

(2) Wiring Specifications for Cable with Connectors  
(For incremental and absolute encoder)



(3) Wiring Specifications for Cable with a Battery Case  
(For absolute encoder)



(4) Cable Specifications

Item	Standard Type
Order No.*	JZSP-CMP19-□□-E
Cable Length	50 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG16×2C+AWG26×2P AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.0 dia. AWG26 (0.13 mm <sup>2</sup> ) Outer diameter of insulating sheath: 0.91 dia.
Finished Dimensions	6.8 dia.
Internal Configuration and Lead Colors	
Yaskawa Standard Specifications (Standard Length)	Cable length: 30 m, 40 m, 50 m

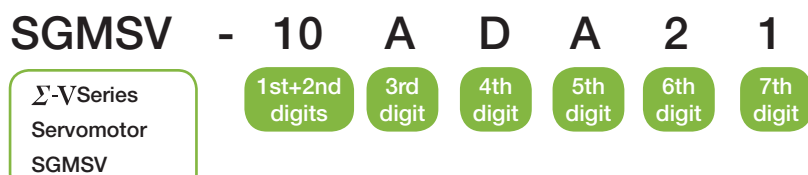
\*: Specify the cable length in □□ of order no.  
Example: JZSP-CMP19-30-E (30 m)

# Rotary Servomotors

# SGMSV



## Model Designations



### 1st+2nd digits Rated Output

Code	Specifications
10	1.0 kW
15	1.5 kW
20	2.0 kW
25	2.5 kW
30	3.0 kW
40	4.0 kW
50	5.0 kW
70	7.0 kW*

\*: Available only for 200-VAC models.

### 3rd digit Power Supply Voltage

Code	Specifications
A	200 VAC
D	400 VAC

### 4th digit Serial Encoder

Code	Specifications
3	20-bit absolute (standard)
D	20-bit incremental (standard)

### 5th digit Design Revision Order

Code	Specifications
A	Standard

### 6th digit Shaft End

Code	Specifications
2	Straight without key (standard)
6	Straight with key and tap (optional)

### 7th digit Options

Code	Specifications
1	Without options (not used in Europe)
F	With dust seal
H	With dust seal and holding brake (24 VDC)
E	With oil seal and holding brake (24 VDC)
S	With oil seal

## Features

- Super high power
- Wide selection: 1.0 kW to 7.0 kW capacity, holding brake option
- Mounted serial encoder: 20 bits, high resolution
- Protective structure: IP67 (Not including the IP22 compliant enclosure for 7.0 kW motor)

## Application Examples

- Chip mounters
- PCB drilling stations
- Machine tool feeders

## Configurations of connectors for the main circuit



### SGMSV-10 to -70

The connectors for these models are round. The connectors specified by Yaskawa are required. Note that the connectors vary depending on the operation environment of servomotors.

Two types of connectors are available.

- Standard connectors  
For details, refer to page 78 to 80.
- Protective structure IP67 and European Safety Standards compliant connectors  
For details, refer to page 81 and 82.

## Ratings and Specifications

**Time Rating:** Continuous

**Vibration Class:** V15

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Mounting:** Flange-mounted

**Thermal Class:** F

**Withstand Voltage:** 1500 VAC for one minute (200-V class)  
 1800 VAC for one minute (400-V class)

**Enclosure:** Totally enclosed, self-cooled, IP67  
 (except for shaft opening)

Note: IP22 for SGMSV-70 servomotors.

**Ambient Humidity:** 20% to 80% (no condensation)

**Drive Method:** Direct drive

**Rotation Direction:** Counterclockwise (CCW) with forward run  
 reference when viewed from the load side

## 200-V Class

Servomotor Model: SGMSV-□□□		10A	15A	20A	25A	30A	40A	50A	70A
Rated Output*	kW	1.0	1.5	2.0	2.5	3.0	4.0	5.0	7.0
Rated Torque*	Nm	3.18	4.90	6.36	7.96	9.80	12.6	15.8	22.3
Instantaneous Peak Torque*	Nm	9.54	14.7	19.1	23.9	29.4	37.8	47.6	54
Rated Current*	Arms	5.7	9.3	12.1	13.8	17.9	25.4	27.6	38.3
Instantaneous Max. Current*	Arms	17	28	42	44.5	56	77	84	105
Rated Speed*	min <sup>-1</sup>	3000							
Max. Speed*	min <sup>-1</sup>	6000	5000						
Torque Constant	Nm/Arms	0.636	0.590	0.561	0.610	0.582	0.519	0.604	0.604
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	1.74 (1.99)	2.00 (2.25)	2.47 (2.72)	3.19 (3.44)	7.00 (9.2)	9.60 (11.8)	12.3 (14.5)	12.3
Rated Power Rate*	kW/s	58 (51)	120 (107)	164 (149)	199 (184)	137 (104)	165 (135)	203 (172)	404
Rated Angular Acceleration*	rad/s <sup>2</sup>	18300 (16000)	24500 (21800)	25700 (23400)	25000 (23100)	14000 (10700)	13100 (10700)	12800 (10900)	18100
Applicable SERVOPACK	SGDV-□□□□	7R6A	120A	180A	200A	200A	330A	330A	550A

\*: These items and torque-motor speed characteristics quoted in combination with a SERVOPACK are at an armature winding temperature of 20°C.

Notes: 1 The values in parentheses are for servomotors with holding brakes.

2 The above specifications show the values under the cooling condition when the following heat sinks are mounted on the servomotors.

SGMSV-10A/-15A/-20A/-25A : 300 mm×300 mm×12 mm (aluminum)

SGMSV-30A/-40A/-50A/-70A : 400 mm×400 mm×20 mm (aluminum)

## 400-V Class

Servomotor Model: SGMSV-□□□		10D	15D	20D	25D	30D	40D	50D
Rated Output*	kW	1.0	1.5	2.0	2.5	3.0	4.0	5.0
Rated Torque*	Nm	3.18	4.9	6.36	7.96	9.8	12.6	15.8
Instantaneous Peak Torque*	Nm	9.54	14.7	19.1	23.9	29.4	37.8	47.6
Rated Current*	Arms	2.8	4.7	6.1	7.4	8.9	12.5	13.8
Instantaneous Max. Current*	Arms	8.5	14	20	25	28	38	42
Rated Speed*	min <sup>-1</sup>	3000						
Max. Speed*	min <sup>-1</sup>	6000	5000					
Torque Constant	Nm/Arms	1.27	1.23	1.18	1.15	1.16	1.06	1.21
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	1.74 (1.99)	2.00 (2.25)	2.47 (2.72)	3.19 (3.44)	7.00 (9.2)	9.60 (11.8)	12.3 (14.5)
Rated Power Rate*	kW/s	58 (51)	120 (107)	164 (149)	199 (184)	137 (104)	165 (135)	203 (172)
Rated Angular Acceleration*	rad/s <sup>2</sup>	18300 (16000)	24500 (21800)	25700 (23400)	25000 (23100)	14000 (10700)	13100 (10700)	12800 (10900)
Applicable SERVOPACK	SGDV-□□□□	3R5D	5R4D	8R4D	120D	120D	170D	170D

\*: These items and torque-speed characteristics quoted in combination with a SERVOPACK are at an armature winding temperature of 20°C.

Notes: 1 The values in parentheses are for servomotors with holding brakes.

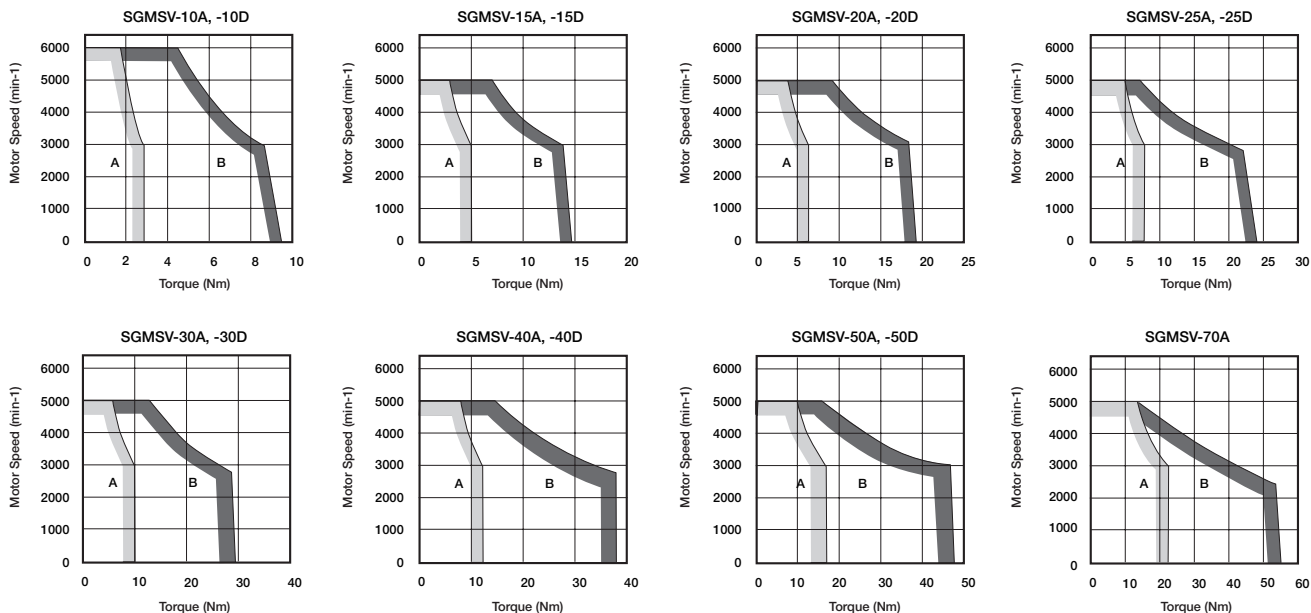
2 The above specifications show the values under the cooling condition when the following heat sinks are mounted on the servomotors.

SGMSV-10D/-15D/-20D/-25D: 300 mm × 300 mm × 12 mm (aluminum)

SGMSV-30D/-40D/-50D : 400 mm × 400 mm × 20 mm (aluminum)

Ratings and Specifications

● Torque-Speed Characteristics (200 V/400 V) **A**: Continuous Duty Zone **B**: Intermittent Duty Zone



Notes: 1 When the effective torque is within the rated torque, the servomotor can be used within the intermittent duty zone.  
 2 When the power cable length exceeds 20 m, note that the intermittent duty zone of the *Torque-Speed Characteristics* will shrink as the line-to-line voltage drops.

● Holding Brake Electrical Specifications

Servomotor Model	Servomotor Rated Output kW	Holding Brake Specifications		
		Holding Torque Nm	Rated Voltage 24 VDC	
			Capacity W	Rated Current A (at 20°C)
SGMSV-10	1.0	7.84	12	0.5
SGMSV-15	1.5	7.84	12	0.5
SGMSV-20	2.0	7.84	12	0.5
SGMSV-25	2.5	10	12	0.5
SGMSV-30	3.0	20	10	0.41
SGMSV-40	4.0	20	10	0.41
SGMSV-50	5.0	20	10	0.41

Notes: 1 The holding brake is only used to hold the load and cannot be used to stop the servomotor.  
 2 The holding brake open time and holding brake operation time vary depending on which discharge circuit is used. Make sure holding brake open time and holding brake operation time are correct for your servomotor.  
 3 A 24 VDC power supply is to be provided by customers.

## Ratings and Specifications

### ● Allowable Load Moment of Inertia at the Motor Shaft

The rotor moment of inertia ratio is the value for a servomotor without a gear and a holding brake.

Servomotor Model	Servomotor Rated Output	Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)
SGMSV-10 to -70	1.0 to 7.0 kW	5 times

### ● Load Moment of Inertia

The larger the load moment of inertia, the worse the movement response.

The allowable load moment of inertia ( $J_L$ ) depends on the motor capacity, as shown above. This value is provided strictly as a guideline and results may vary depending on servomotor drive conditions.

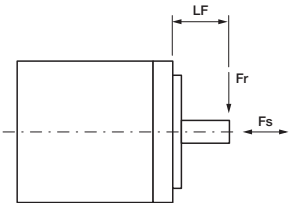
Use the AC servo drive capacity selection program SigmaJunmaSize+ to check the operation conditions. The program can be downloaded for free from our web site (<http://www.yaskawa.eu.com>).

An overvoltage alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a regenerative overload alarm (A.320). Take one of the following steps if this occurs.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the steps above. Refer to *Regenerative Resistors* on page 364.

### ● Allowable Radial and Thrust Loads

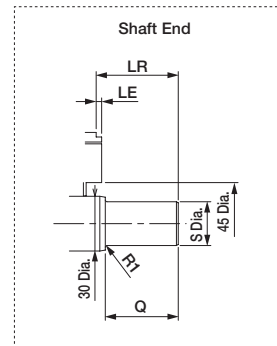
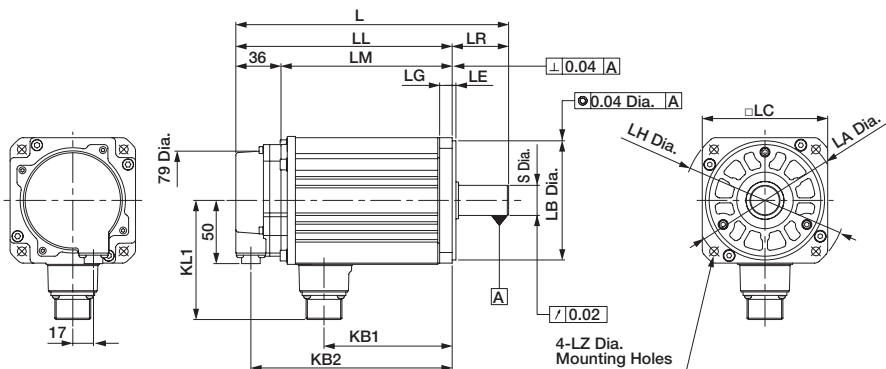
Design the mechanical system so thrust and radial loads applied to the servomotor shaft end during operation fall within the ranges shown in the table.

Servomotor Model	Allowable Radial Load ( $F_r$ ) N	Allowable Thrust Load ( $F_s$ ) N	LF mm	Reference Diagram	
SGMSV-	10□□A21	686	196	45	
	15□□A21				
	20□□A21				
	25□□A21	980	392	63	
	30□□A21				
	40□□A21				
	50□□A21				
70□□A21	1176				

External Dimensions Units: mm

● Without Holding Brakes

(1) 1.0 to 5.0 kW

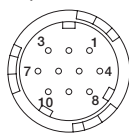


Note: For the specifications of the other shaft ends, refer to page 76.

Model SGMSV-	L	LL	LM	LR	KB1	KB2	KL1	Flange Face Dimensions								Shaft End Dimensions		Approx. Mass kg
								LA	LB	LC	LE	LF	LG	LH	LZ	S	Q	
10□□A21	192	147	111	45	76	135	96	115	95 <sup>0</sup> <sub>-0.035</sub>	100	3	3	10	130	7	24 <sup>0</sup> <sub>-0.013</sub>	40	4.1
15□□A21	202	157	121	45	86	145	96	115	95 <sup>0</sup> <sub>-0.035</sub>	100	3	3	10	130	7	24 <sup>0</sup> <sub>-0.013</sub>	40	4.6
20□□A21	218	173	137	45	102	161	96	115	95 <sup>0</sup> <sub>-0.035</sub>	100	3	3	10	130	7	24 <sup>0</sup> <sub>-0.013</sub>	40	5.4
25□□A21	241	196	160	45	125	184	96	115	95 <sup>0</sup> <sub>-0.035</sub>	100	3	3	10	130	7	24 <sup>0</sup> <sub>-0.013</sub>	40	6.8
30□□A21	259	196	160	63	124	184	114	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	6	12	165	9	28 <sup>0</sup> <sub>-0.013</sub>	55	10.5
40□□A21	296	233	197	63	161	221	114	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	6	12	165	9	28 <sup>0</sup> <sub>-0.013</sub>	55	13.5
50□□A21	336	273	237	63	201	261	114	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	6	12	165	9	28 <sup>0</sup> <sub>-0.013</sub>	55	16.5

Note: Models with oil seals are of the same configuration.

• Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10-AP10S-□-D (L-shaped)  
 CM10-SP10S-□-D (Straight)  
 (Boxes □ indicate a value that varies, depending on cable size.)

Manufacturer: DDK Ltd.

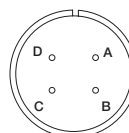
With an Absolute Encoder

1	PS	6	BAT (+)
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

With an Incremental Encoder

1	PS	6	-
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	-	10	FG (Frame ground)

• Cable Specifications for Servomotor-end Connector



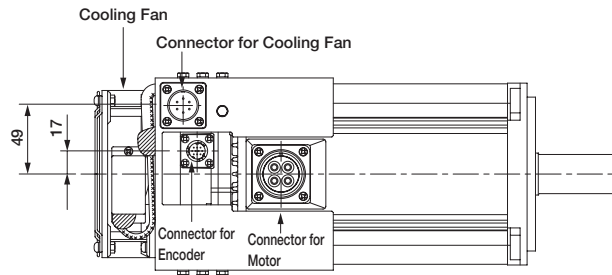
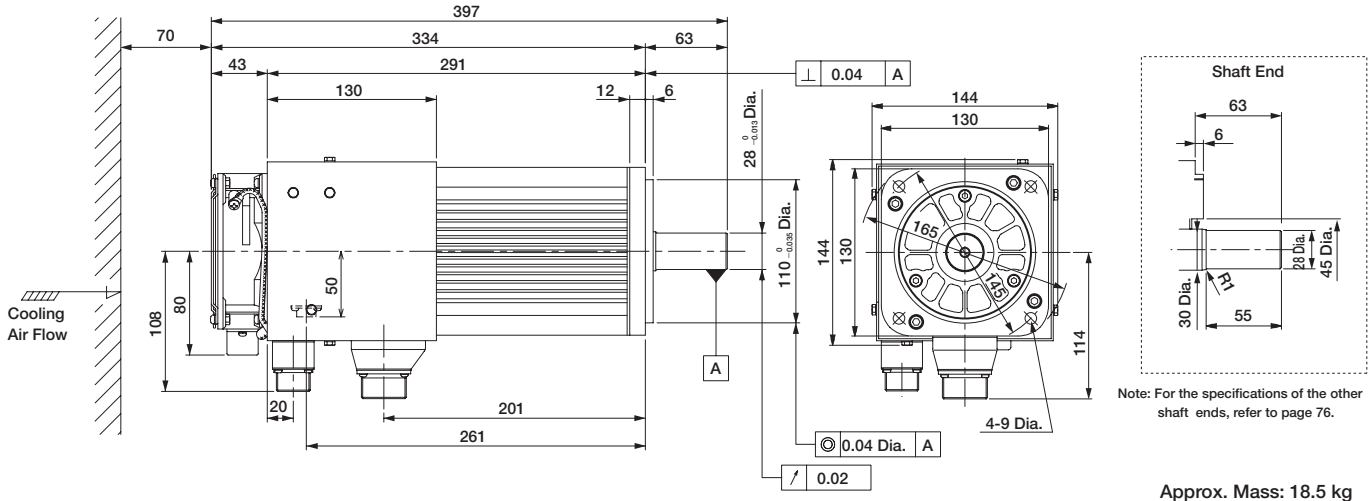
A	Phase U
B	Phase V
C	Phase W
D	FG (Frame ground)

- SGMSV-10 to -25  
Manufacturer: DDK Ltd.
- SGMSV-30 to -50  
Manufacturer: Japan Aviation Electronics Industry, Ltd.

External Dimensions Units: mm

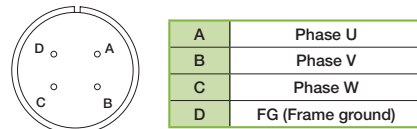
(2) 7.0 kW (only for 200 V servomotors)

Note: Leave a minimum space of 70 mm around the servomotor to allow for a sufficient amount of cooling air.



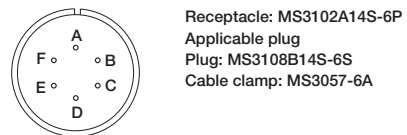
- Specifications of Cooling Fan  
Single-phase 220 V  
50/60 Hz  
17/15 W  
0.11/0.09 A
- Specifications of rotation error detector  
Contact Capacity:  
Max. allowable voltage: 350 V (AC, DC)  
Max. allowable current: 120 mA (AC, DC)  
Max. controllable power: 360 mW  
Alarm Contact:  
ON at normal fan rotation.  
OFF at 1680±100 min-1 or less.  
(OFF during 3 seconds at start-up)

• Cable Specifications for Servomotor-end Connector



Manufacturer: Japan Aviation Electronics Industry, Ltd.

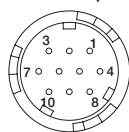
• Cable Specifications for Fan-end Connector



Note: Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors.

A	Fan motor
B	Fan motor
C	-
D	Alarm terminal
E	Alarm terminal
F	FG (Frame ground)

• Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
Applicable plug (To be provided by the customer)  
Plug: CM10-SP10S-□-D (Straight)  
(Boxes (□) indicate a value that varies, depending on cable size.)  
Use straight plugs to avoid interference with the fan cover.  
Manufacturer : DDK Ltd.

With an Absolute Encoder

1	PS	6	BAT (+)
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

With an Incremental Encoder

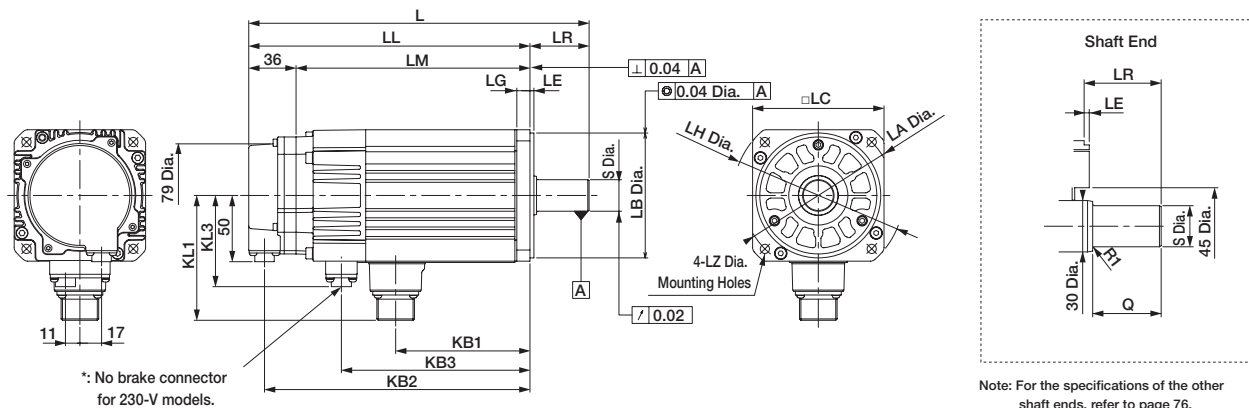
1	PS	6	-
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	-	10	FG (Frame ground)



External Dimensions Units: mm

● With Holding Brakes

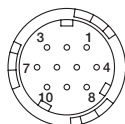
(1) 1.0 to 5.0 kW



Model SGMSV-	L	LL	LM	LR	KB1			KB3*	KL1			Flange Face Dimensions							Shaft End Dimensions		Approx. Mass kg	
					200V	400V	KB2		400V	200V	400V	400V	LA	LB	LC	LE	LF	LG	LH	LZ		S
10 □ □ A2 □	233	188	152	45	67	76	176	118	102	96	69	115	95 <sup>0</sup> <sub>-0.035</sub>	100	3	3	10	130	7	24 <sup>0</sup> <sub>-0.013</sub>	40	5.5
15 □ □ A2 □	243	198	162	45	77	86	186	128	102	96	69	115	95 <sup>0</sup> <sub>-0.035</sub>	100	3	3	10	130	7	24 <sup>0</sup> <sub>-0.013</sub>	40	6
20 □ □ A2 □	259	214	178	45	93	102	202	144	102	96	69	115	95 <sup>0</sup> <sub>-0.035</sub>	100	3	3	10	130	7	24 <sup>0</sup> <sub>-0.013</sub>	40	6.8
25 □ □ A2 □	292	247	211	45	116	125	225	177	102	96	69	115	95 <sup>0</sup> <sub>-0.035</sub>	100	3	3	10	130	7	24 <sup>0</sup> <sub>-0.013</sub>	40	8.7
30 □ □ A2 □	295	232	196	63	114	124	220	176	119	114	81	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	6	12	165	9	28 <sup>0</sup> <sub>-0.013</sub>	55	13
40 □ □ A2 □	332	269	233	63	151	161	257	213	119	114	81	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	6	12	165	9	28 <sup>0</sup> <sub>-0.013</sub>	55	16
50 □ □ A2 □	372	309	273	63	191	201	297	253	119	114	81	145	110 <sup>0</sup> <sub>-0.035</sub>	130	6	6	12	165	9	28 <sup>0</sup> <sub>-0.013</sub>	55	19

\*: No brake connector for 200-V models (there are brake terminals on the servomotor-end connectors).  
 Note: Models with oil seals are of the same configuration.

● Cable Specifications for Encoder-end Connector (20-bit Encoder)



Receptacle: CM10-R10P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10-AP10S-□-D (L-shaped)  
 CM10-SP10S-□-D (Straight)  
 (Boxes (□) indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

With an Absolute Encoder

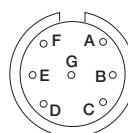
1	PS	6	BAT (+)
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	BAT (-)	10	FG (Frame ground)

With an Incremental Encoder

1	PS	6	-
2	/PS	7	-
3	-	8	-
4	PG 5V	9	PG 0V
5	-	10	FG (Frame ground)

200-V Class

● Cable Specifications for Servomotor-end Connector



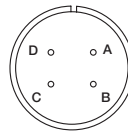
A	Phase U
B	Phase V
C	Phase W
D	FG (Frame ground)
E	Brake terminal
F	Brake terminal
G	-

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Note: No polarity for connection to the brake terminals

400-V Class

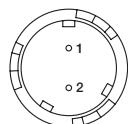
● Cable Specifications for Servomotor-end Connector



A	Phase U
B	Phase V
C	Phase W
D	FG (Frame ground)

● SGMSV-10 to -25  
 Manufacturer: DDK Ltd.  
 ● SGMSV-30 to -50  
 Manufacturer: Japan Aviation Electronics Industry, Ltd.

● Cable Specifications for Brake-end Connector



Receptacle: CM10-R2P-D  
 Applicable plug (To be provided by the customer)  
 Plug: CM10Y-AP2S-□-D-G1 (L-shaped)  
 CM10-SP2S-□-D (Straight)  
 (Boxes (□) indicate a value that varies, depending on cable size.)  
 Manufacturer: DDK Ltd.

Brake terminal
Brake terminal

Note: No polarity for connection to the brake terminals

External Dimensions Units: mm

● Shaft End

SGMSV - □□□□□□□

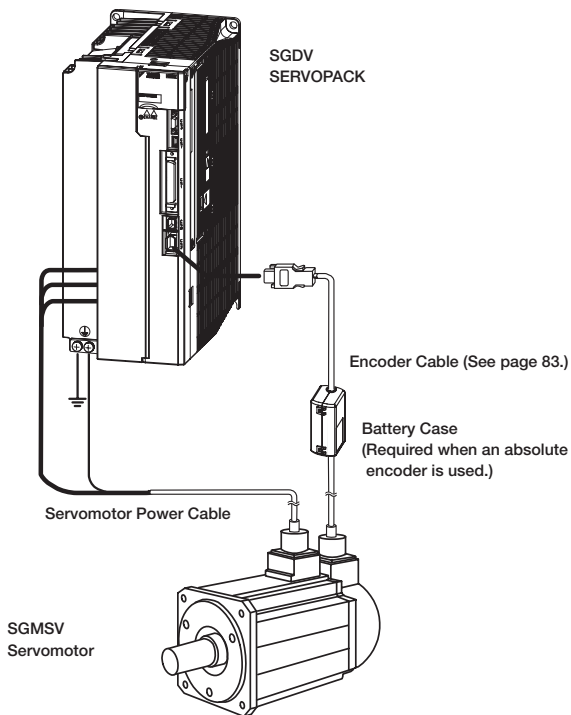
Code	Specifications	Remarks
2	Straight without key	Standard
6	Straight with key and tap for one location (Key slot is JIS B1301-1996 fastening type)	Optional

Code	Specifications	Shaft End	Model SGMSV-								
			10	15	20	25	30	40	50	70	
2	Straight without Key		LR	45				63			
			Q	40				55			
			S	24 <sup>0</sup> <sub>-0.013</sub>				28 <sup>0</sup> <sub>-0.013</sub>			
6	Straight with Key and Tap		LR	45				63			
			Q	40				55			
			QK	32				50			
			S	24 <sup>0</sup> <sub>-0.013</sub>				28 <sup>0</sup> <sub>-0.013</sub>			
			W	8							
			T	7							
			U	4							
P	M8 Screw Depth16										

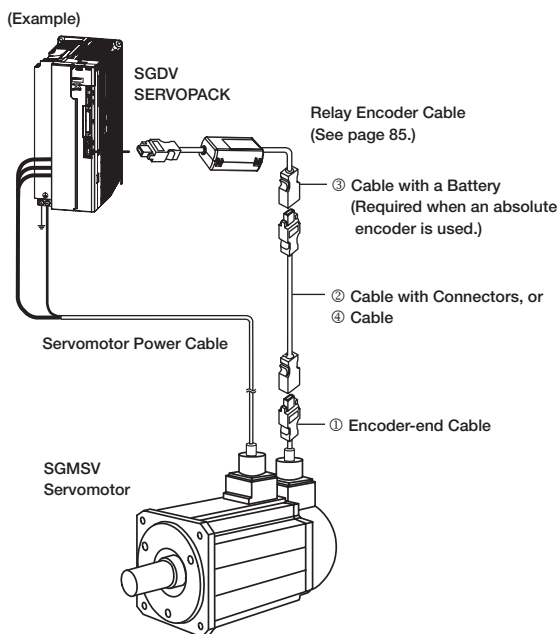
Selecting Cables

● Cables Connections

- Standard Wiring (Max. encoder cable length: 20 m)



- Encoder Cable Extension from 30 to 50 m (See page 85.)



⚠ CAUTION

- Separate the servomotor power cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.
- When the power cable length exceeds 20 m, note that the intermittent duty zone of the *Torque-Speed Characteristics* will shrink as the line-to-line voltage drops.

● Servomotor Power Cable (400-V Class)

Name	Servomotor Rated Output	Length	Order No.	Specifications	Details
			Flexible Type		
For Servomotor without Holding Brakes	1.0 kW to 1.5 kW	3 m	JZSP-CVMCA11-03-E-G#		(1)
		5 m	JZSP-CVMCA11-05-E-G#		
		10 m	JZSP-CVMCA11-10-E-G#		
		15 m	JZSP-CVMCA11-15-E-G#		
		20 m	JZSP-CVMCA11-20-E-G#		
	2.0 kW to 2.5 kW	3 m	JZSP-CVMCA12-03-E-G#		
		5 m	JZSP-CVMCA12-05-E-G#		
		10 m	JZSP-CVMCA12-10-E-G#		
		15 m	JZSP-CVMCA12-15-E-G#		
		20 m	JZSP-CVMCA12-20-E-G#		
	3.0 kW to 5.0 kW	3 m	JZSP-CVMCA13-03-E-G#		
		5 m	JZSP-CVMCA13-05-E-G#		
		10 m	JZSP-CVMCA13-10-E-G#		
		15 m	JZSP-CVMCA13-15-E-G#		
		20 m	JZSP-CVMCA13-20-E-G#		
For Servomotor with Holding Brakes	1.0 kW to 5.0 kW	3 m	JZSP-CVB12Y-03-E-G#		(2)
		5 m	JZSP-CVB12Y-05-E-G#		
		10 m	JZSP-CVB12Y-10-E-G#		
		15 m	JZSP-CVB12Y-15-E-G#		
		20 m	JZSP-CVB12Y-20-E-G#		

Note: The digit "#" of the order number represents the design revision.

Selecting Cables

● Servomotor Power Cable (200-V Class)

Customers must assemble the servomotor's power cables and attach connectors to connect the SERVOPACKs and the SGMSV servomotors.

The connectors for these models are round. The connectors specified by Yaskawa are required. Note that the connectors vary depending on the operation environment of servomotors.

Two types of connectors are available.

- Standard connectors
- Protective structure IP67 and European Safety Standards compliant connectors

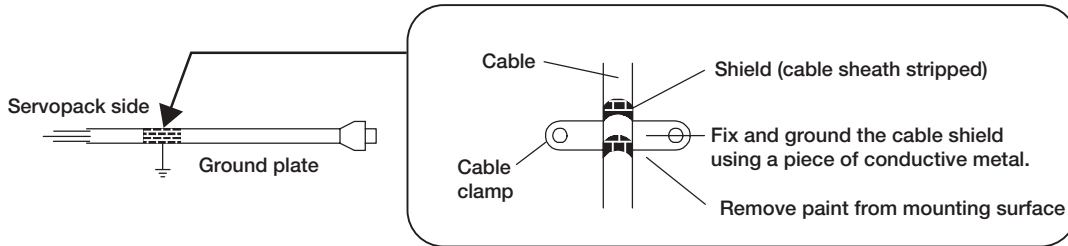
Yaskawa does not specify which cables to use. Use appropriate cables for the connectors.

(1) Wiring Specifications for Servomotors

SERVOPACK-end Leads		Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Green/Yellow	FG	FG	1
Black 1	Phase W	Phase W	2
Black 2	Phase V	Phase V	3
Black 3	Phase U	Phase U	4
		-	5/6
		Shell	FG

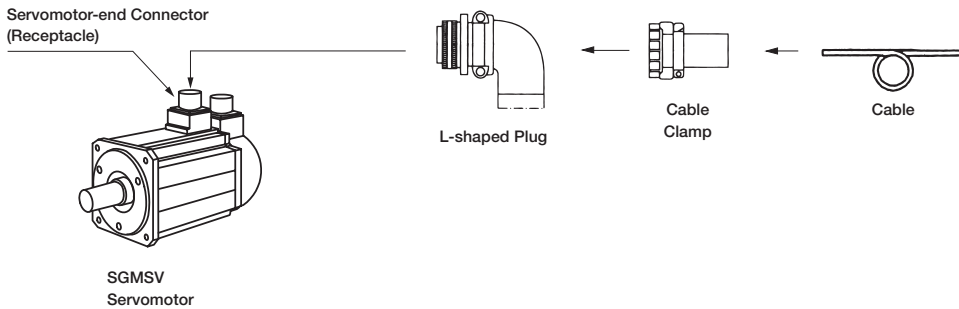
Fix shielded cable at servopack end as shown below

Shield Wire

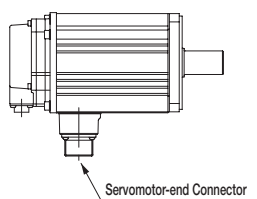


● Standard Connectors

- Connector Configuration



(1) Without Holding Brakes



Servomotor-end Connector For 1.0 to 7.0 kW

Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not provided by Yaskawa)	
		L-shaped Plug	Cable Clamp
1.0 to 2.5	CE05-2A18-10PD-D (MS3102A18-10P)	MS3108B18-10S	MS3057-10A
3.0 to 7.0	JL04HV-2E22-22PE-B-R (MS3102A22-22P)	MS3108B22-22S	MS3057-12A

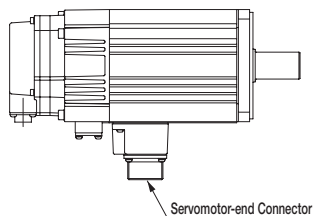
Note: 1 Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors.

2 Servomotor-end connectors (receptacles) can be used with MS plugs. For the model number of the MS receptacle, refer to the receptacle number in parentheses and select the appropriate plug.

Selecting Cables

(2) With Holding Brakes (200 V)

No brake connector for 200-V models  
(there are brake terminals on the servomotor-end connectors).



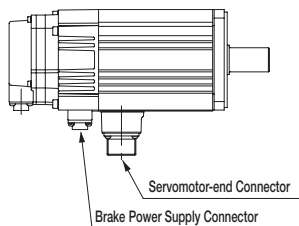
Servomotor-end Connector  
For 1.0 to 5.0 kW



Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not provided by Yaskawa)	
		L-shaped Plug	Cable Clamp
1.0 to 2.5	JL04V-2E20-15PE-B-R (MS3102A20-15P)	MS3108B20-15S	MS3057-12A
3.0 to 5.0	JL04V-2E24-10PE-B-R (MS3102A24-10P)	MS3108B24-10S	MS3057-16A

Note: 1 Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors.  
2 Servomotor-end connectors (receptacles) can be used with MS plugs. For the model number of the MS receptacle, refer to the receptacle number in parentheses and select the appropriate plug.

(3) With Holding Brakes (400 V)



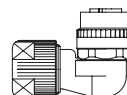
Servomotor-end Connector  
For 1.0 to 5.0 kW



Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not provided by Yaskawa)	
		L-shaped Plug	Cable Clamp
1.0 to 2.5	CE05-2A18-10PD-D (MS3102A18-10P)	MS3108B18-10S	MS3057-10A
3.0 to 5.0	JL04HV-2E22-22PE-B-R (MS3102A22-22P)	MS3108B22-22S	MS3057-12A

Note: 1 Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors.  
2 Servomotor-end connectors (receptacles) can be used with MS plugs. For the model number of the MS receptacle, refer to the receptacle number in parentheses and select the appropriate plug.

Brake Power Supply Connector  
For 1.0 to 5.0 kW

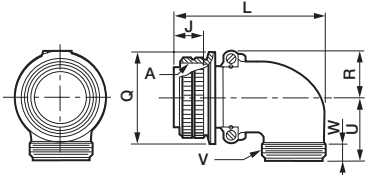


Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not provided by Yaskawa)	
		L-shaped Plug	Manufacturer
1.0 to 5.0	CM10-R2P-D	CM10Y-AP2S-M-D-G1 Applicable Cable: 6.0 dia. to 9.0 dia.	DDK Ltd.

Selecting Cables

• Cable-end Connectors

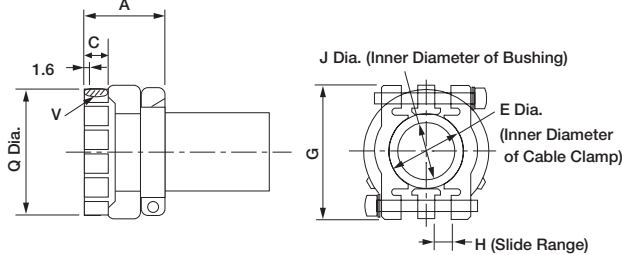
(2) MS3108B□□-□□S : L-shaped Plug



Units: mm

Shell Size	Joint Screw A	Length of Joint Portion J±0.12	Overall Length L max.	Outer Diameter of Joint Nut Q <sup>+0.038</sup> <sub>-0.38</sub>	R ±0.5	U ±0.5	Cable Clamp Set Screw V	Effective Screw Length W min.
18	1-1/8-18UNEF	18.26	68.27	34.13	20.5	30.2	1-20UNEF	9.53
20	1-1/4-18UNEF	18.26	76.98	37.28	22.5	33.3	1-3/16-18UNEF	9.53
22	1-3/8-18UNEF	18.26	76.98	40.48	24.1	33.3	1-3/16-18UNEF	9.53
24	1-1/2-18UNEF	18.26	86.51	43.63	25.6	36.5	1-7/16-18UNEF	9.53

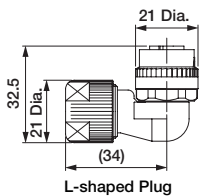
(3) MS3057-□□A : Cable Clamp with Rubber Bushing



Units: mm

Cable Clamp Type	Applicable Connector Shell Size	Overall Length A±0.7	Effective Screw Length C	E Diameter	G±0.7	H	J Diameter	Set Screw V	Outer Diameter Q±0.7 Dia.	Attached Bushing
MS3057-10A	18	23.8	10.3	15.9	31.7	3.2	14.3	1-20UNEF	30.1	AN3420-10
MS3057-12A	20 22	23.8	10.3	19	37.3	4	15.9	1-3/16-18UNEF	35.0	AN3420-12
MS3057-16A	24	26.2	10.3	23.8	42.9	4.8	19.1	1-7/16-18UNEF	42.1	AN3420-16

• Dimensional Drawings of Brake Power Supply

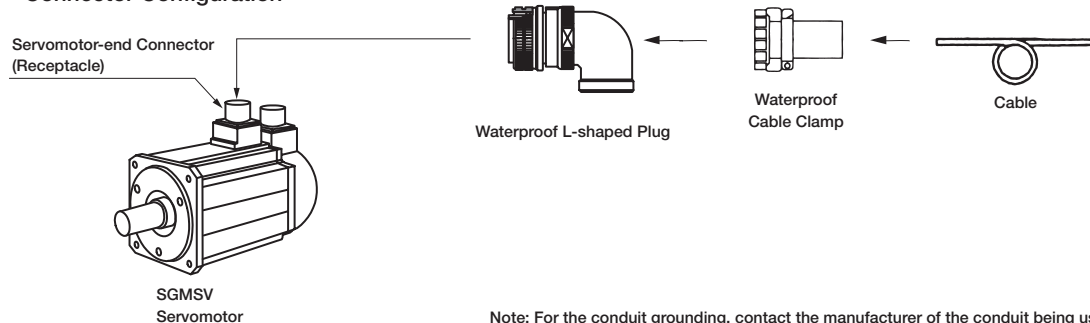


Items	Specifications
Connector Order No.	CM10- □P2S-□ -D (Cables are not included.)
Protective Structure	IP67
Manufacturer	DDK Ltd.
Instructions	L-shaped plug (CM10Y-AP2S- □ -D-G1): TC-573
Electrical Contact Order No.	Electrical contact (100 pcs in one bag) • Crimped type: CM10-#22SC(C3)(D8)-100, Wire size: AWG16 to 20, Outer diameter of sheath: 1.87 to 2.45 dia., Hand tool: 357J-50448T • Soldered type: CM10-#22SC(S2)(D8)-100, Wire size: AWG16 max. Real contact (4000 pcs on one reel) • Crimped type: CM10-#22SC(C3)(D8)-4000, Wire size: AWG 16 to 20, Outer diameter of sheath: 1.87 to 2.45 dia., Semi-automatic tool: AP-A50541T (product name for one set), AP-A50541T-1 (product name for applicator) Note: The product name of the semi-automatic tool refers to the product name of the press and applicator (crimper) as a set.

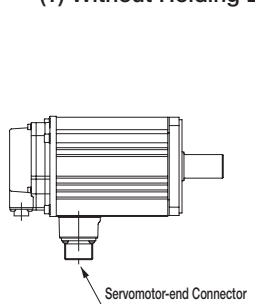
Selecting Cables

● Protective Structure IP67 and European Safety Standards Compliant Connector

● Connector Configuration



(1) Without Holding Brakes



Servomotor-end Connector  
For 1.0 to 7.0 kW

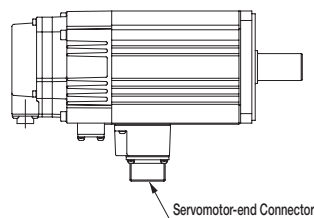


Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not Provided by Yaskawa)				
		Plug	L-shaped Plug	Cable Clamp	Applicable Cable Diameter (For Reference)	Manufacturer
1.0 to 2.5	CE05-2A18-10PD-D	CE05-6A18-10SD-D	CE05-8A18-10SD-D-BAS	CE3057-10A-1-D	10.5 dia. to 14.1 dia.	DDK Ltd.
				CE3057-10A-2-D	8.5 dia. to 11.0 dia.	
				CE3057-10A-3-D	6.5 dia. to 8.7 dia.	
3.0 to 7.0	JL04HV-2E22-22PE-B-R	JL04V-6A22-22SE-R	JL04V-8A22-22SE-EB-R or JA08A-22-22S-J1-EB-R*	JL04-2022CK (09) -R	6.5 Dia. to 9.5 Dia.	Japan Aviation Electronics Industry, Ltd.
				JL04-2022CK (12) -R	9.5 Dia. to 13.0 Dia.	
				JL04-2022CK (14) -R	12.9 Dia. to 15.9 Dia.	

\*: Not compliant with European Safety Standards, but compliant with protective structure IP67.

(2) With Holding Brakes (200 V)

No brake connector for 200-V models (there are brake terminals on the servomotor-end connectors).



Servomotor-end Connector  
For 1.0 to 5.0 kW

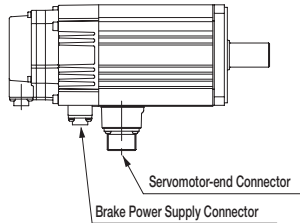


Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not Provided by Yaskawa)				
		Plug	L-shaped Plug	Cable Clamp	Applicable Cable Diameter (For Reference)	Manufacturer
1.0 to 2.5	JL04V-2E20-15PE-B-R	JL04V-6A20-15SE-R	JL04V-8A20-15SE-EB-R	JL04-2022CK (09) -R	6.5 Dia. to 9.5 Dia.	Japan Aviation Electronics Industry, Ltd.
				JL04-2022CK (12) -R	9.5 Dia. to 13.0 Dia.	
				JL04-2022CK (14) -R	12.9 Dia. to 15.9 Dia.	
3.0 to 5.0	JL04V-2E24-10PE-B-R	JL04V-6A24-10SE-R	JL04V-8A24-10SE-EB-R or JA08A-24-10S-J1-EB-R*	JL04-2428CK (11) -R	9.0 Dia. to 12.0 Dia.	Japan Aviation Electronics Industry, Ltd.
				JL04-2428CK (14) -R	12.0 Dia. to 15.0 Dia.	
				JL04-2428CK (17) -R	15.0 Dia. to 18.0 Dia.	
				JL04-2428CK (20) -R	18.0 Dia. to 20.0 Dia.	

\*: Not compliant with European Safety Standards, but compliant with protective structure IP67.

Selecting Cables

(3) With Holding Brakes (400 V)



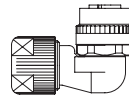
Servomotor-end Connector  
For 1.0 to 5.0 kW



Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not Provided by Yaskawa)				
		Plug	L-shaped Plug	Cable Clamp	Applicable Cable Diameter (For Reference)	Manufacturer
1.0 to 2.5	CE05-2A18-10PD-D	CE05-6A18-10SD-D	CE05-8A18-10SD-D-BAS	CE3057-10A-1-D	10.5 dia. to 14.1 dia.	DDK Ltd.
				CE3057-10A-2-D	8.5 dia. to 11.0 dia.	
				CE3057-10A-3-D	6.5 dia. to 8.7 dia.	
3.0 to 5.0	JL04HV-2E22-22PE-B-R	JL04V-6A22-22SE-R	JL04V-8A22-22SE-EB-R or JA08A-22-22S-J1-EB-R*	JL04-2022CK(09)-R	6.5 Dia. to 9.5 Dia.	Japan Aviation Electronics Industry, Ltd.
				JL04-2022CK(12)-R	9.5 Dia. to 13.0 Dia.	
				JL04-2022CK(14)-R	12.9 Dia. to 15.9 Dia.	

\*: Not compliant with European Safety Standards, but compliant with protective structure IP67.

Brake Power Supply Connector  
For 1.0 to 5.0 kW

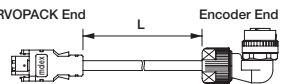
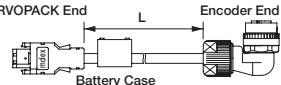
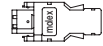
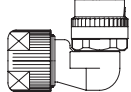


Capacity kW	Servomotor-end Connector (Receptacle)	Cable-end Connector (Not provided by Yaskawa)	
		L-shaped Plug	Manufacturer
1.0 to 5.0	CM10-R2P-D	CM10Y-AP2S-M-D-G1 Applicable Cable: 6.0 dia. to 9.0 dia.	DDK Ltd.



Selecting Cables

● Encoder Cables (Max. length: 20 m)

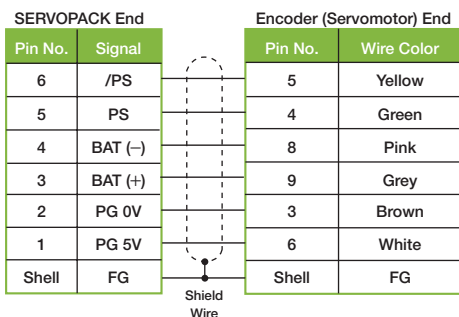
Name	Length (L)	Order No.	Specifications	Details
		Flexible Type		
Encoder Cable with Connectors (For Incremental Encoder)	3 m	JZSP-CVP12-03-E-G#	 <p>SERVOPACK End      Encoder End</p> <p>Connector (Crimped) (Molex Japan Co., Ltd.)      CM10-AP10S-□-D (DDK Ltd.)</p>	(1)
	5 m	JZSP-CVP12-05-E-G#		
	10 m	JZSP-CVP12-10-E-G#		
	15 m	JZSP-CVP12-15-E-G#		
	20 m	JZSP-CVP12-20-E-G#		
Encoder Cable with Connectors (For Absolute Encoder, with a Battery Case)	3 m	JZSP-CVP27-03-E-G#	 <p>SERVOPACK End      Encoder End</p> <p>Connector (Crimped)(Molex Japan Co., Ltd.)      CM10-AP10S-□-D (DDK Ltd.)</p> <p>Battery Case (Battery Attached)</p>	(2)
	5 m	JZSP-CVP27-05-E-G#		
	10 m	JZSP-CVP27-10-E-G#		
	15 m	JZSP-CVP27-15-E-G#		
	20 m	JZSP-CVP27-20-E-G#		
SERVOPACK-end Connector Kit		JZSP-CMP9-1-E	<p>Soldered</p>  <p>(Molex Japan Co., Ltd.)</p>	(3)
Encoder-end Connectors for Protective Structure IP67 L-shaped Plug		CM10-AP10S-M-D-G1 (Connector Kit including contacts)	 <p>(DDK Ltd.)</p>	-

Note: The digit "#" of the order number represents the design revision.

Selecting Cables

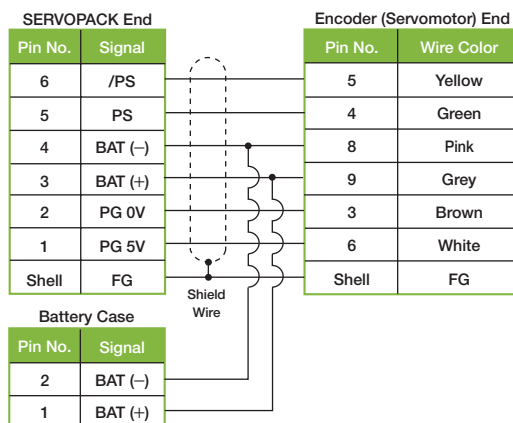
(1) Wiring Specifications for Cable with Connectors  
(For incremental encoder)

• Flexible Type



(2) Wiring Specifications for Cable with Connectors  
(For absolute encoder, with a battery case)

• Flexible Type



(3) SERVOPACK-end Connector Kit Specifications

Items	Specifications
Order No.	JZSP-CMP9-1-E
Manufacturer	Molex Japan Co., Ltd.
Connector Model (For standard)	55100-0670 (soldered)
External Dimensions (Units: mm)	

(4) Cable Specifications

Items	Flexible Type
Cable Length	20 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG22×2C + AWG24×2P AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.35 dia. AWG24 (0.20 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.21 dia.
Finished Dimensions	6.8 dia.
Internal Configuration and Lead Color	

Selecting Cables

Encoder Cables (For extending from 30 to 50 m)

Name	Length	Order No.	Specifications	Details
① Encoder-end Cables (For incremental and absolute encoder)	0.3 m	JZSP-CVP01-E		(1)
		JZSP-CVP02-E		
② Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E		(2)
	40 m	JZSP-UCMP00-40-E		
	50 m	JZSP-UCMP00-50-E		
③ Cable with a Battery Case (For absolute encoder*)	0.3 m	JZSP-CSP12-E		(3)
④ Relay Cables	30 m	JZSP-CMP19-30-E		(4)
	40 m	JZSP-CMP19-40-E		
	50 m	JZSP-CMP19-50-E		

\*: Not required when connecting a battery to the host controller.

(1) Wiring Specifications for Encoder-end Cable  
(For incremental and absolute encoder)

SERVOPACK End		Encoder (Servomotor) End	
Pin No.	Signal	Pin No.	Wire Color
6	/PS	2	Light blue/white
5	PS	1	Light blue
4	BAT (-)	5	Orange/white
3	BAT (+)	6	Orange
2	PG 0V	9	Black
1	PG 5V	4	Red
Shell	FG	10	FG

Shield Wire

Note: The signals BAT(+) and BAT(-) are used when using an absolute encoder.

(3) Wiring Specifications for Cable with a Battery Case  
(For absolute encoder)

SERVOPACK End		Encoder (Servomotor) End	
Pin No.	Signal	Pin No.	Wire Color
6	/PS	6	Light blue/white
5	PS	5	Light blue
4	BAT (-)	4	Orange/white
3	BAT (+)	3	Orange
2	PG 0V	2	Black
1	PG 5V	1	Red
Shell	FG	Shell	FG

Shield Wire

Battery Case	
Pin No.	Signal
2	BAT (-)
1	BAT (+)

(2) Wiring Specifications for Cable with Connectors  
(For incremental and absolute encoder)

SERVOPACK End		Encoder (Servomotor) End	
Pin No.	Signal	Pin No.	Wire Color
6	/PS	6	Light blue/white
5	PS	5	Light blue
4	BAT (-)	4	Orange/white
3	BAT (+)	3	Orange
2	PG 0V	2	Black
1	PG 5V	1	Red
Shell	FG	Shell	FG

Shield Wire

(4) Relay Encoder Cable Specifications

Item	Standard Type
Order No.*	JZSP-CMP19-□□-E
Cable Length	50 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG16×2C+AWG26×2P AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.0 dia. mm AWG26 (0.13 mm <sup>2</sup> ) Outer diameter of insulating sheath: 0.91 dia. mm
Finished Dimensions	6.8 dia.
Internal Configuration and Lead Colors	
Yaskawa Standard Specifications (Standard Length)	Cable length: 30 m, 40 m, 50 m

\*: Specify the cable length in □□ of order no.  
Example: JZSP-CMP19-30-E (30 m)



# Rotary Servomotor General Instructions

## Precautions on Servomotor Installation

Servomotors can be installed either horizontally or vertically.

The service life of the servomotor will be shortened or unexpected problems will occur if the servomotor is installed incorrectly or in an inappropriate location. Always observe the following installation instructions.

**CAUTION**

Do not connect the servomotor directly to a commercial power line. This will damage the servomotor. The servomotor cannot operate without the proper SERVOPACK.

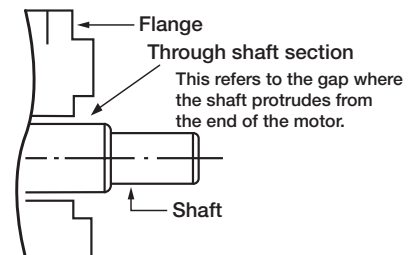
### (1) Installation Environment

Items	Condition
Ambient Temperature	0 to 40°C (no freezing)
Ambient Humidity	20% to 80%RH (no condensation)
Installation Site	<ul style="list-style-type: none"> <li>Free of corrosive or explosive gases.</li> <li>Well-ventilated and free of dust and moisture.</li> <li>Facilitates inspection and cleaning.</li> <li>Elevation :1,000 m max.</li> <li>Free of high magnetic field</li> </ul>
Storage Environment	Store the servomotor in the following environment if it is stored with the power cable disconnected. Ambient temperature during storage: -20 to +60°C (no freezing) Ambient humidity during storage: 20% to 80%RH (no condensation)

### (2) Enclosure

The servomotor enclosure\* is described table as follows.

Model	Without Gears	With Gears
SGMAV, SGMJV	IP65	IP55
SGMEV	IP55 IP67 (optional)	IP55
SGMGV	IP67	-
SGMSV	IP67	-



\*: Except through shaft section. The enclosure specification can be satisfied only when using a specified cable.

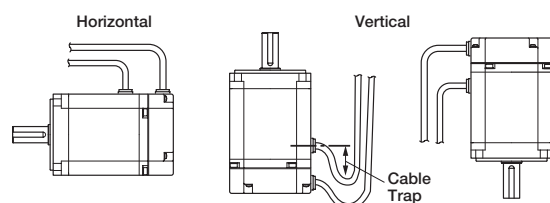
- Do not use servomotors in a location that is subject to oil. If the servomotor is used in a location that is subject to water or oil mist, order a servomotor with an oil seal to seal the through shaft section.

#### Precautions on Using Servomotor with Oil Seal:

- Put the oil surface under the oil seal lip.
- Use an oil seal in favorably lubricated condition.
- When using a servomotor with its shaft upward direction, be sure that oil will not stay in the oil seal lips.

### (3) Orientation

- Servomotors can be installed either horizontally or vertically. When installing servomotors vertically, make cable traps to keep out water. When mounting servomotors with the shaft up, take measures with the connected machine to prevent oil from getting into the servomotors through gear boxes etc.

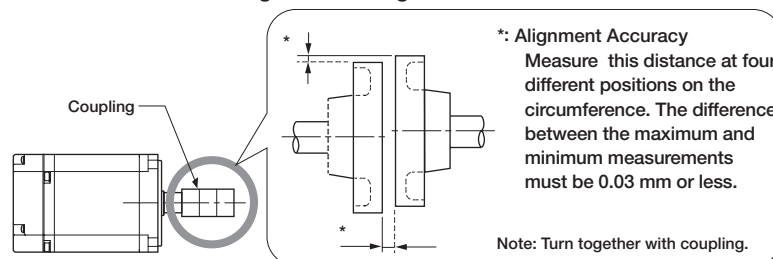


(4) Alignment

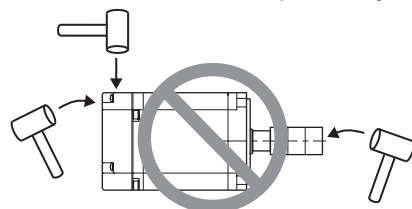
Align the shaft of the servomotor with the shaft of the equipment, and then couple the shafts.

- 1 Install the servomotor so that alignment accuracy falls within the following range.  
Vibration that will damage the bearings and encoders if the shafts are not properly aligned.

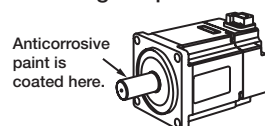
IMPORTANT



- 2 Do not allow any direct impact to the shafts when installing the couplings. Do not hit the area near encoders with a hammer etc., as impacts may damage the encoders.



- 3 Before installation, thoroughly remove the anticorrosive paint from the end of the motor shaft. Only after removing the paint can servomotors be installed on the machines.



(5) Cable Stress

- Make sure there is no bending or tension on the cables themselves, the connections, or the cable lead inlets. Be especially careful to wire encoder cables so that they are not subject to stress because the core wires of encoder cables and power cables are very thin at only 0.2 to 0.3 mm<sup>2</sup>.


(6) Connectors

Observe the following precautions:

- When the connectors are connected to the motor, be sure to connect the end of motor power cables before connecting the encoder cable's end.  
If the encoder cable's end is connected, the encoder may break because of the voltage differences between FG.
- Make sure there is no foreign matters such as dust and metal chips in the connector before connecting.
- Do not apply shock to resin connectors. Otherwise, they may be damaged.
- Make sure of the pin arrangement.
- Be sure not to apply stress on the connector, when using flexible cables. The connector may be damaged by stress.
- When handling a servomotor with its cables connected, hold the servomotor or the connectors and cables will be damaged.
- Fix the cable connector to SGMJV, SGMAV, SGMEV-01/-02/-04 or SGMGV-03/-05 servomotors with screws. Refer to "Cable connections to SGMJV, SGMAV and SGMEV servomotors" or "Cable connections to SGMGV-03/-05 servomotors." Make sure that the connector is securely fixed with screws.  
If the cable connector is not secure, the requirements for the protective structure's specifications may not be met.

Cable Connections to SGMJV and SGMJV Servomotors

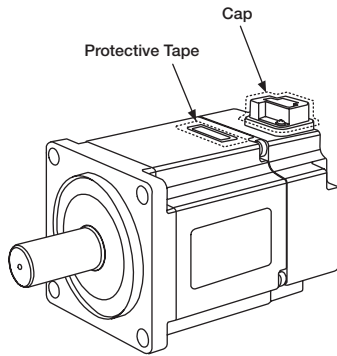
Connect the power cable and encoder cable to SGMJV or SGMJV servomotor in the following manner.



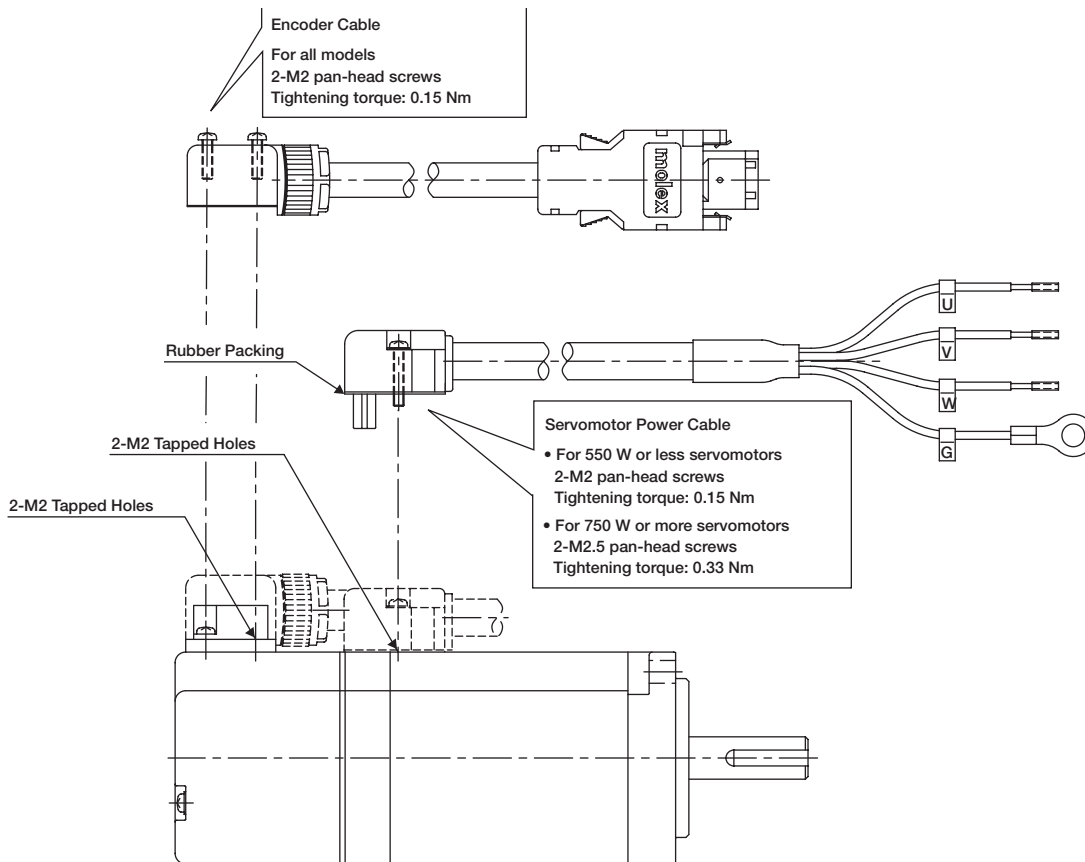
**CAUTION**

Do not directly touch the connector pins provided with the servomotor. Particularly, the encoder may be damaged by static electricity, etc.

**STEP1** Remove the protective tape and cap from the servomotor connector.



**STEP2** Mount the cable connector on the servomotor and fix it with screws as shown in the figure below.




**IMPORTANT**

- First, connect the servomotor to the servomotor power cable end.
  - Do not remove the rubber packing. Mount the connector so that the rubber packing is seated properly.
- If the rubber packing is not seated properly, the requirements for the protective structure specifications may not be met.

Cable Connections to SGMGV-03/-05 Servomotors

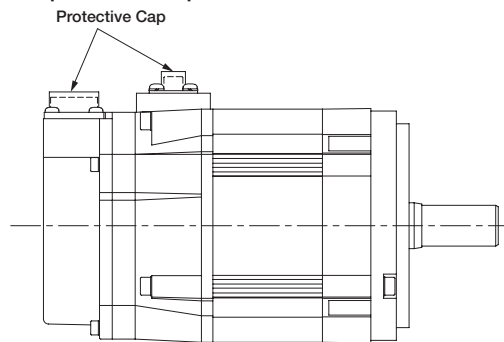
Connect the power cable and encoder cable to SGMGV-03/-05 servomotor in the following manner.



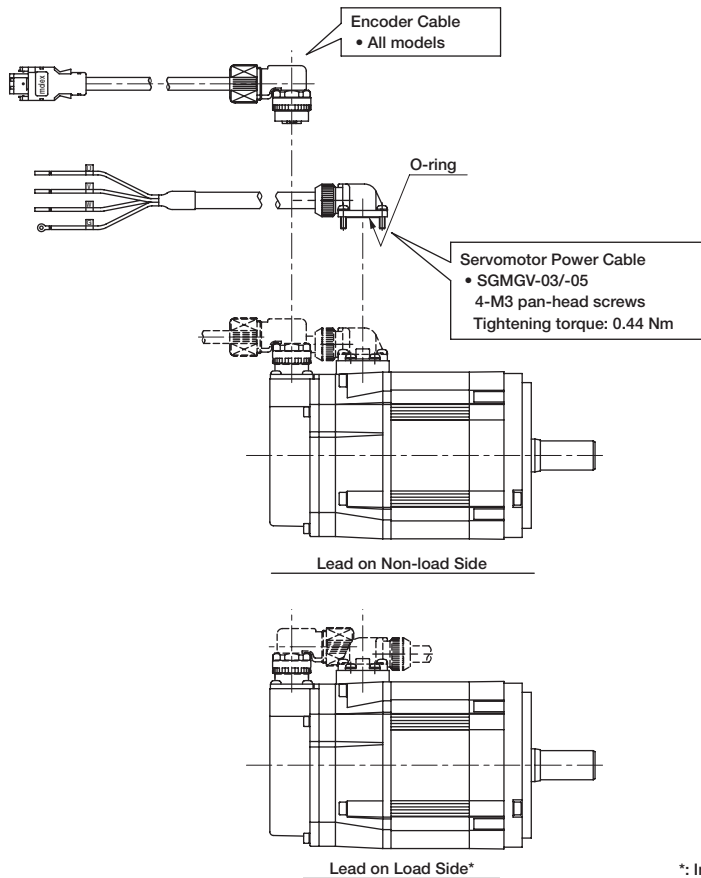
**CAUTION**

Do not directly touch the connector pins provided with the servomotor. Particularly, the encoder may be damaged by static electricity, etc.

**STEP1** Remove the protective cap from the servomotor connector.



**STEP2** Mount the cable connector on the servomotor and fix it with screws as shown in the figure below.



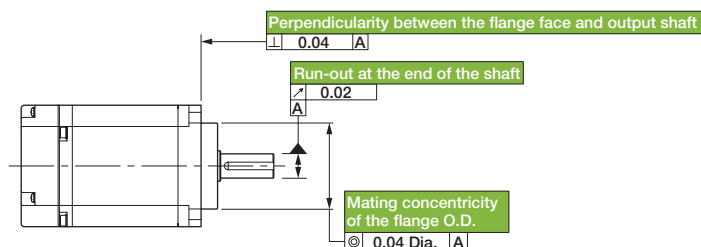
**IMPORTANT**

- First, connect the servomotor to the servomotor power cable end.
- Do not remove the O-ring. Mount the connector so that the O-ring is seated properly. If the O-ring is not seated properly, the requirements for the protective structure specifications may not be met.

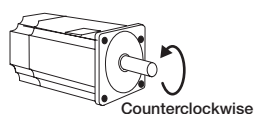
## Mechanical Specifications

### ● Mechanical Tolerance T.I.R. (Total Indicator Reading)

The following figure shows tolerances for the servomotor's output shaft and installation area. For more details on tolerances, refer to the external dimensions of the individual servomotor.

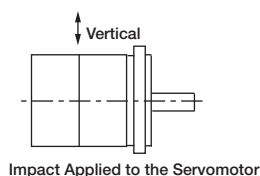


### ● Direction of Servomotor Rotation



Positive rotation of the servomotor without a gear is counterclockwise when viewed from the load. Refer to Ratings and Specifications for each series regarding rotation direction of the servomotor with a gear. The direction of rotation can be reversed by changing the SERVOPACK parameters.

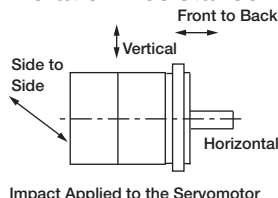
### ● Shock Resistance



Mount the servomotor with the axis horizontal. The servomotor will withstand the following vertical impacts:

- Impact Acceleration: 490 m/s<sup>2</sup>
- Impact occurrences: 2

### ● Vibration Resistance



Mount the servomotor with the axis horizontal. The servomotor will withstand the following vibration acceleration in three directions: Vertical, side to side, and front to back.

Servomotor Model	Vibration Acceleration at Flange
SGMJV, SGMAV, SGMEV	49 m/s <sup>2</sup>
SGMGV -03 to -44, SGMSV -10 to -50	49 m/s <sup>2</sup> (Front to back direction: 24.5 m/s <sup>2</sup> )
SGMGV -55 to -1E	24.5 m/s <sup>2</sup>
SGMSV -70	14.7 m/s <sup>2</sup>

**IMPORTANT**

The amount of vibration the servomotor endures will vary depending on the application. Check the vibration acceleration being applied to your servomotor for each application.

### ● Vibration Class

The vibration class for the servomotors at rated motor speed is V15.

(A vibration class of V15 indicates a total vibration amplitude of 15 μm maximum on the servomotor during rated rotation.)

## Rotor Moment of Inertia

Small-capacity servomotors come in a medium inertia series “SGMJV servomotor,” “SGMEV servomotor” and low inertia series “SGMAV servomotor.” The rotor moment of inertia of SGMJV servomotor and SGMEV servomotor are twice as large as that of SGMAV. Select servomotors based on the specifications of your devices, such as load moment of inertia or machine rigidity.

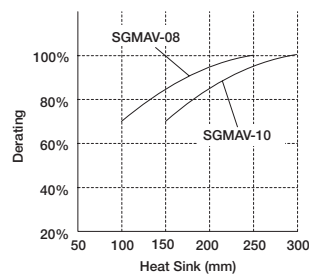
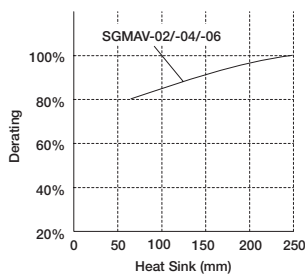
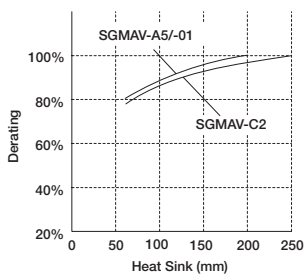
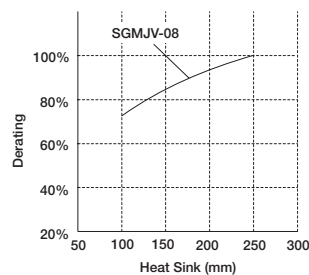
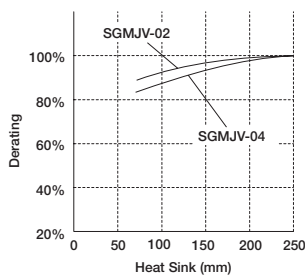
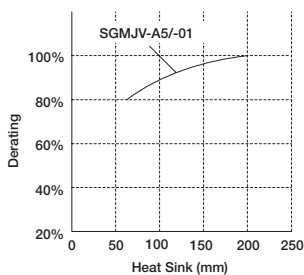
- When the rotor moment of inertia is large:  
Servomotors are capable of corresponding to load changes because of the decrease of the moment of inertia ratio. This has the benefit of reducing settling time and speed ripple. This should also improve control stability of machines with low rigidity.
- When mounting a servomotor with a large rotor moment of inertia to a device with a small load moment of inertia:  
Acceleration/deceleration torque increases and effective load ratio increases. Check the effective load ratio when you select motor capacity.



Servomotor Heating Conditions

The motor rated specifications are continuous allowable values at an ambient temperature of 40°C when servomotors are installed with heat sinks. When the motor is mounted on a small surface, the motor temperature may rise considerably because of the limited heat radiating abilities of the surface. See the following graph for the relation between heat sink size and derating (derating ratio).

**IMPORTANT** The actual temperature rise depends on how the heat sink (servomotor mounting section) is fixed on the installation surface, what material is used for the motor mounting section, and motor speed. Always check the actual motor temperature.



## Holding Brake Delay Time

Holding brakes have motion delay time that varies depending on when the brake is open and when the brake is operating. The following table shows the brake delay time of each servomotor.

**IMPORTANT** Make sure the holding brake delay time is correct for your servomotor.

- Example, switching the holding brakes on the DC side

Model	Voltage	Brake Open Time ms	Brake Operation Time ms	Model	Voltage	Brake Open Time ms	Brake Operation Time ms
SGMAV-A5 to -04	24 V	60	100	SGMGV-55,-75,-1A	24 V	170	80
SGMAV-06 to -10		80	100	SGMGV-1E		250	80
SGMJV-A5 to -04	24 V	60	100	SGMSV-10 to -25		170	80
SGMJV-08		80	100	SGMSV-30 to -50		100	80
SGMGV-03 to -20	24 V	100	80				
SGMGV-30,-44		170	100				

Cables

● Standard Cables

Standard servomotor power cables, encoder cables, and relay cables cannot be used in cases where high flexibility is needed, as when the cables themselves move or are twisted or turned.

R15 min. or 2 times the cable diameter (whichever is greater) is recommended for the bending radius of standard cables. Use flexible cables for flexible applications.

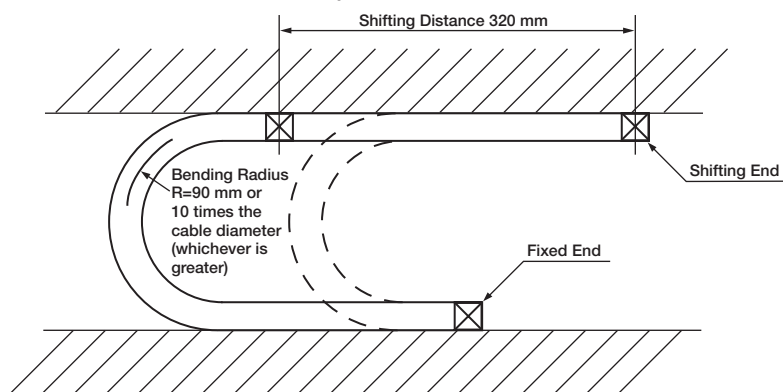
● Flexible Cables

(1) Life of Flexible Cable

The flexible cable supports 10,000,000 or more operations of bending life with the recommended minimum bending radius  $R = 90$  mm or 10 times the cable diameter (whichever is greater) under the following test conditions.

● Conditions

- 1 Repeat moving one end of the cable forward and backward for 320 mm using the test equipment shown in the following figure.
- 2 Connect the lead wires in parallel, and count the number of cable return motion times until a lead wire is disconnected. Note that one reciprocation is counted as one test.



- Notes:
- 1 The life of flexible cable differs largely depending on the amount of mechanical shocks, mounting to the cable, and fixing methods. The life of flexible cable is limited under the specified conditions.
  - 2 The life of flexible cable indicates the number of bending times in which lead wires are electrically conducted and by which no cracks and damages that affects the performance of cable sheathing are caused. Disconnecting the shield wire is not taken into account.

(2) Wiring Precautions

Even if the recommended bending radius  $R$  is followed in the mechanical design, incorrect wiring may cause the early disconnection. Observe the following precautions when wiring.

(a) Cable twisting

Straighten the flexible cables wiring.

Twisted cables cause the early disconnection. Check the indication on the cable surface to make sure that the cable is not twisted.

(b) Fixing method

Do not fix the moving points of the flexible cable, or stress on the fixed points may cause early disconnection. Fix the cable at the minimum number of points. Do not put stress on the servomotor-end and SERVOPACK-end connectors.

(c) Cable length

If the cable length is too long, it may result the cable sagging. If the cable length is too short, excessive tension on the fixed points will cause the early disconnection. Use a flexible cable with the optimum length.

(d) Interference between cables

Avoid interference between cables.

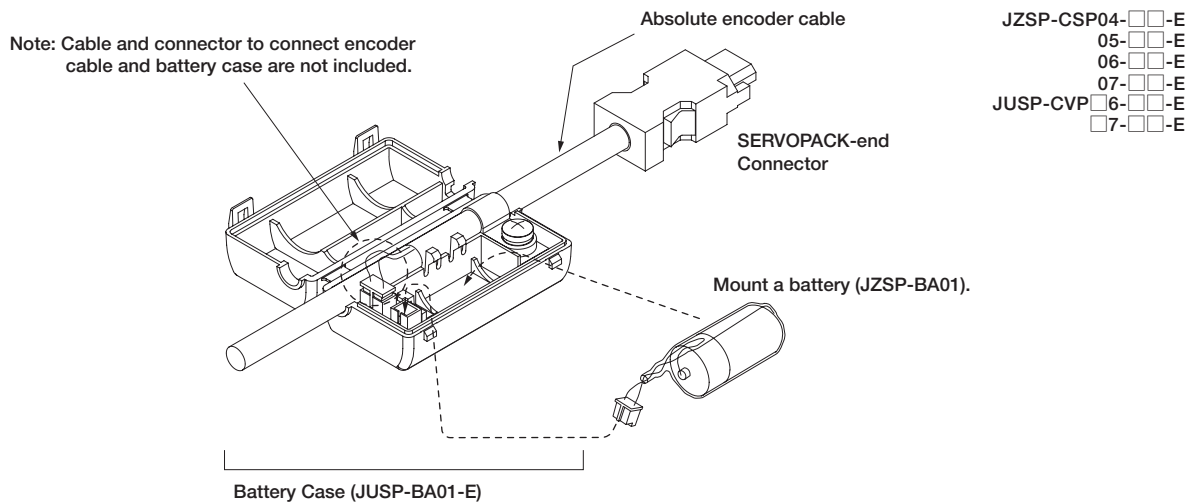
Interference limits the motion of flexible cable, which causes early disconnection. Keep enough distance between cables, or provide a partition when wiring.

Battery Case

● Battery Case (Model: JUSP-BA01-E)

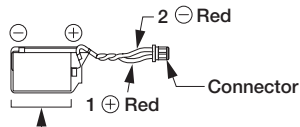
Use this battery case if your battery case needs replacing due to damage etc. This battery case cannot be used with an incremental encoder cable.

**IMPORTANT** 1 The battery case (JUSP-BA01-E) is not provided with a battery. A battery must be purchased separately.  
 2 Install the battery case where the ambient temperature is between 0°C to 55°C.



(1) Mounting a Battery in a Battery Case

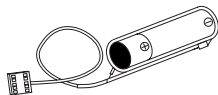
Prepare a lithium battery (JZSP-BA01) and mount in a battery case.



ER3 V Lithium Battery  
 (3.6 V, 1000 mAh, manufactured by Toshiba Battery Co., Ltd.)

(2) Connecting a Battery to the Host Controller

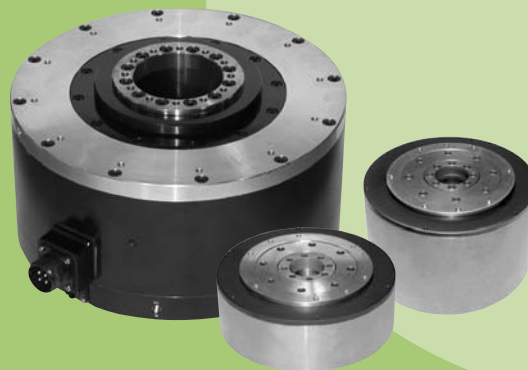
Use a battery that meets the specifications of the host controller. Use an ER6VC3N (3.6 V, 2000 mAh, manufactured by Toshiba Battery Co., Ltd.) or equivalent battery.





# Direct Drive Servomotors

# SGMCS



## Model Designations

SGMCS - 02 B 3 C 1 1

Direct Drive Servomotor SGMCS

1st+2nd digits

3rd digit

4th digit

5th digit

6th digit

7th digit

1st+2nd digits Rated Torque

### ● Small-capacity

Code	Specifications
02	2.0 Nm
04	4.0 Nm
05	5.0 Nm
07	7.0 Nm
08	8.0 Nm
10	10 Nm
14	14 Nm
16	16 Nm
17	17 Nm
25	25 Nm
35	35 Nm

### ● Medium-capacity

Code	Specifications
45	45 Nm
80	80 Nm
1A	110 Nm
1E	150 Nm
2Z	200 Nm

3rd digit Motor Outer Diameter

Code	Specifications
B	135 dia. mm
C	175 dia. mm
D	230 dia. mm
E	290 dia. mm
M	280 dia. mm
N	360 dia. mm

4th digit Serial Encoder

Code	Specifications
3	20-bit absolute (without multiturn data) (standard)
D	20-bit incremental (option)

5th digit Design Revision Order

Code	Specifications
A	Model of servomotor outer diameter code M, N
B	Model of servomotor outer diameter code E
C	Model of servomotor outer diameter code B, C, D

6th digit Flange Specifications

Code	Flange Specifications		Motor Outer Diameter Code (3rd digit)					
	Specifications	Mounted Side	B	C	D	E	M	N
1	C-face	Non-load side	○	○	○	○	-	-
		load end	-	-	-	-	○	○
3	C-face	Non-load side	-	-	-	-	○	○
4	C-face	Non-load side (with cable on side)	○	○	○	○	-	-

○ : Applicable Model

7th digit Option

Code	Specifications
1	Without options

## Features

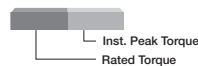
- Directly coupled to a load without a mechanical transmission such as a gear.
- Powerful and smooth operation throughout the speed range from low to high.  
(Instantaneous peak torque: 6 to 600 Nm  
maximum speed: 250 to 500 min<sup>-1</sup>)
- High-resolution, 20-bit encoder for highly precise indexing.
- Easy wiring and piping with the hollow structure.

## Application Examples

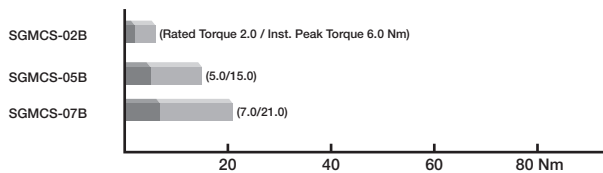
- Semiconductor equipment
- LCD manufacturing equipment
- Units for inspection and testing
- Electronic parts assembling machines
- IC handlers
- Inspection units for integrated circuits
- Automated machines
- Robots

## Rated Torque / Peak Torque

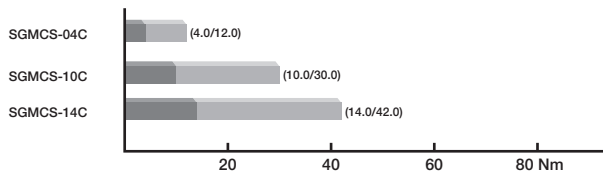
### ● Small-capacity



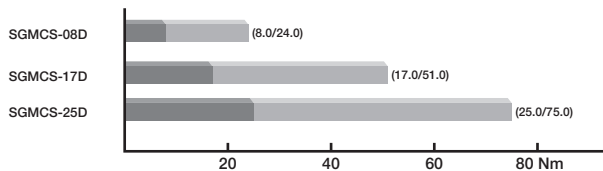
Outer Diameter 135 mm, Inner Diameter 20 mm



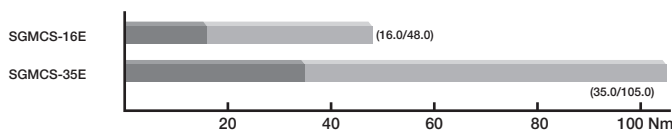
Outer Diameter 175 mm, Inner Diameter 35 mm



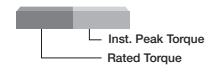
Outer Diameter 230 mm, Inner Diameter 60 mm



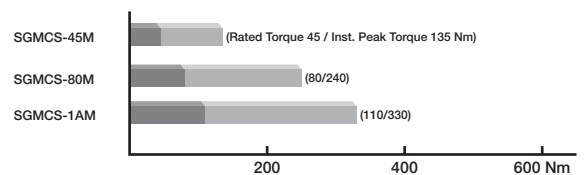
Outer Diameter 290 mm, Inner Diameter 75 mm



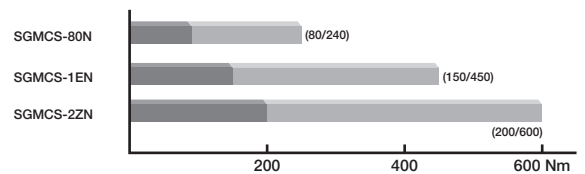
### ● Medium-capacity



Outer Diameter 280 mm, Inner Diameter 75 mm



Outer Diameter 360 mm, Inner Diameter 118 mm



Ratings and Specifications

● Small-capacity Series

**Time Rating:** Continuous

**Vibration Class:** V15

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Mounting:** Flange method

**Thermal Class:** A

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Totally enclosed, self-cooled, IP42 (except for gaps on the rotating section of the shaft)

**Ambient Humidity:** 20% to 80% (no condensation)

**Drive Method:** Direct drive

**Rotation Direction:** Counterclockwise (CCW) with forward run reference when viewed from the load side

Voltage		200 V										
Servomotor Model SGMCS-□□□□□□		02B□□C	05B□□C	07B□□C	04C□□C	10C□□C	14C□□C	08D□□C	17D□□C	25D□□C	16E□□B	35E□□B
Rated Output <sup>*1</sup>	W	42	105	147	84	209	293	168	356	393	335	550
Rated Torque <sup>*1, *2</sup>	Nm	2.0	5.0	7.0	4.0	10.0	14.0	8.0	17.0	25.0	16.0	35.0
Instantaneous Peak Torque <sup>*1</sup>	Nm	6.0	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque <sup>*1</sup>	Nm	2.05	5.15	7.32	4.09	10.1	14.2	8.23	17.4	25.4	16.5	35.6
Rated Current <sup>*1</sup>	Arms	1.8	1.7	1.4	2.2	2.2	2.8	1.9	2.5	2.6	3.3	3.5
Instantaneous Max. Current <sup>*1</sup>	Arms	5.4	5.1	4.1	7.0	7.0	8.3	5.6	7.5	8.0	9.4	10.0
Rated Speed <sup>*1</sup>	min <sup>-1</sup>	200			200			200		150	200	150
Max. Speed <sup>*1</sup>	min <sup>-1</sup>	500			500	400	300	500	350	250	500	250
Torque Constant	Nm/Arms	1.18	3.17	5.44	2.04	5.05	5.39	5.1	7.8	10.8	5.58	11.1
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	28	51	77	77	140	220	285	510	750	930	1430
Rated Power Rate <sup>*1</sup>	kW/s	1.4	4.9	6.4	2.1	7.1	8.9	2.2	5.7	8.3	2.75	8.57
Rated Angular Acceleration <sup>*1</sup>	rad/s <sup>2</sup>	710	980	910	520	710	640	280	330	330	170	240
Absolute Accuracy	second	±15			±15			±15		±15		
Repeatability	second	±1.3			±1.3			±1.3		±1.3		
Applicable SERVOPACK	SGDV-□□□□□	2R8A			2R8A			2R8A		5R5A		

\*1: These items and torque-speed characteristics quoted in combination with an SGDV SERVOPACK are at an armature winding temperature of 100°C. Other values quoted at 20°C.

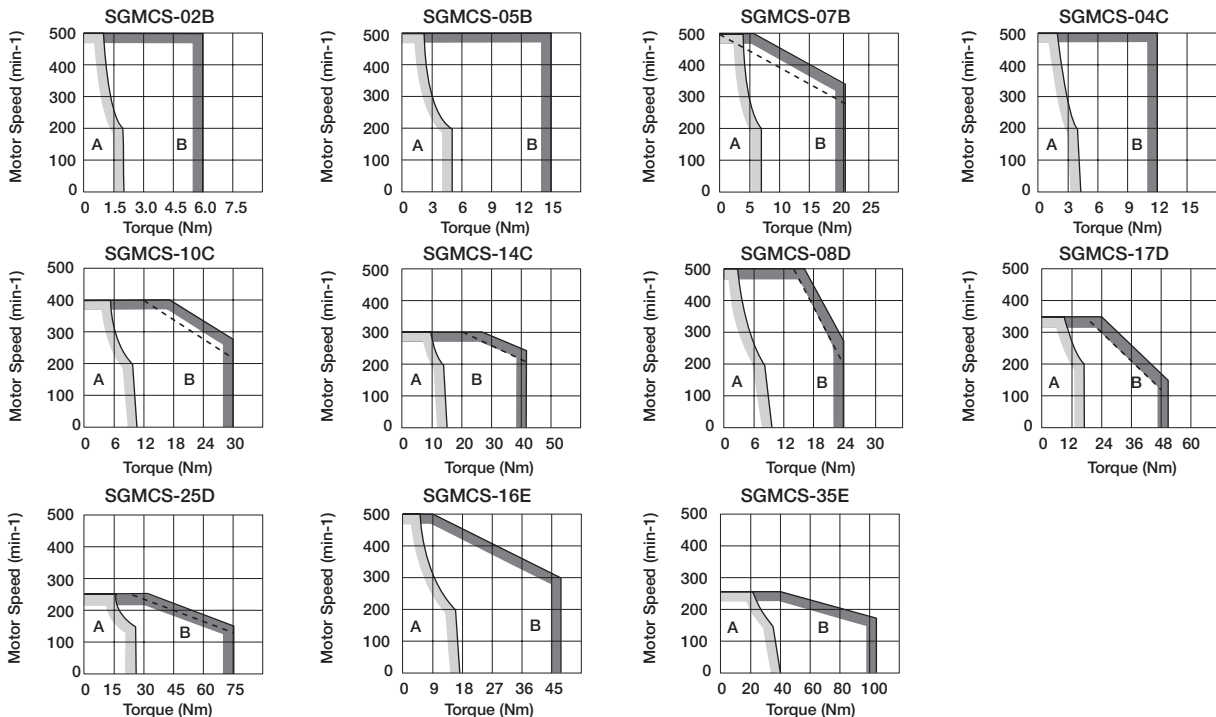
\*2: Rated torques are continuous allowable torque values at 40°C with a steel heat sink attached.

Heat sink: SGMCS-□□□B: 350 mm × 350 mm × 12 mm SGMCS-□□□C: 450 mm × 450 mm × 12 mm  
SGMCS-□□□D: 550 mm × 550 mm × 12 mm SGMCS-□□□E: 650 mm × 650 mm × 12 mm

Notes: 1 SGMCS servomotor with holding brake is not available.

2 For the bearings used in SGMCS servomotors, loss varies according to the bearing temperature. At low temperatures, the amount of heat loss will be large.

● Small-capacity Series: Torque-Speed Characteristics [A] : Continuous Duty Zone [B] : Intermittent Duty Zone



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid and dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:

• The solid line: With a three-phase 200 V SERVOPACK • The dotted line: With a single-phase 100 V SERVOPACK

2 When the effective torque is within the rated torque, the servomotor can be used within the intermittent duty zone.

3 When the power cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Speed Characteristics will shrink as the line-to-line voltage drops.



**Ratings and Specifications**

● **Medium-capacity Series**

**Time Rating:** Continuous

**Vibration Class:** V15

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Mounting:** Flange method

**Thermal Class:** F

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Totally enclosed, self-cooled, IP44  
(except for shaft opening)

**Ambient Humidity:** 20% to 80% (no condensation)

**Drive Method:** Direct drive

**Rotation Direction:** Counterclockwise (CCW) with forward run reference when viewed from the load side

Voltage		200 V					
Servomotor Model SGMCS-□□□□□		45M□A	80M□A	1AM□A	80N□A	1EN□A	2ZN□A
Rated Output <sup>*1</sup>	W	707	1260	1730	1260	2360	3140
Rated Torque <sup>*1, *2</sup>	Nm	45	80	110	80	150	200
Instantaneous Peak Torque <sup>*1</sup>	Nm	135	240	330	240	450	600
Stall Torque <sup>*1</sup>	Nm	45	80	110	80	150	200
Rated Current <sup>*1</sup>	Arms	5.80	9.74	13.4	9.35	17.4	18.9
Instantaneous Max. Current <sup>*1</sup>	Arms	17	28	42	28	56	56
Rated Speed <sup>*1</sup>	min <sup>-1</sup>	150					
Max. Speed <sup>*1</sup>	min <sup>-1</sup>	300			250		
Torque Constant	Nm/Arms	8.39	8.91	8.45	9.08	9.05	11.5
Rotor Moment of Inertia	×10 <sup>-4</sup> kgm <sup>2</sup>	388	627	865	1360	2470	3060
Rated Power Rate <sup>*1</sup>	kW/s	52.2	102	140	47.1	91.1	131
Rated Angular Acceleration <sup>*1</sup>	rad/s <sup>2</sup>	1160	1280	1270	588	607	654
Absolute Accuracy	second	±15			±15		
Repeatability	second	±1.3			±1.3		
Applicable SERVOPACK	SGDV-□□□□□	7R6A	120A	180A	120A	200A	200A

\*1: These items and torque-speed characteristics quoted in combination with an SGDV SERVOPACK are at an armature winding temperature of 20°C.

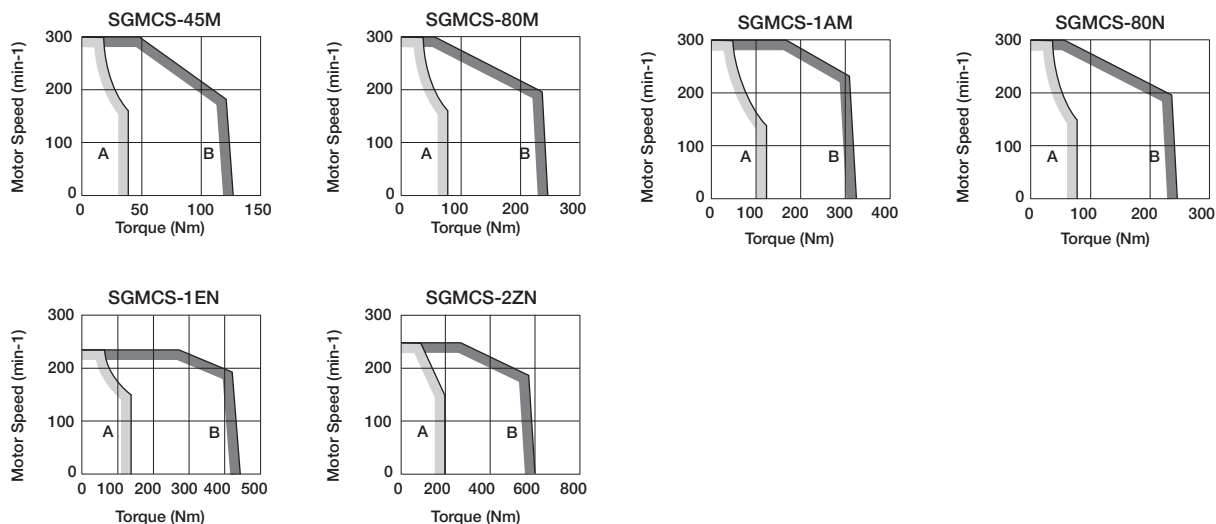
\*2: Rated torques are continuous allowable torque values at 40°C with a steel heat sink attached.

Heat sink: 750 mm × 750 mm × 45 mm

Notes: 1 SGMCS servomotor with holding brake is not available.

2 For the bearings used in SGMCS servomotors, loss varies according to the bearing temperature. At low temperatures, the amount of heat loss will be large.

● **Medium-capacity Series: Torque-Speed Characteristics** **A** : Continuous Duty Zone **B** : Intermittent Duty Zone



Notes: 1 When the effective torque is within the rated torque, the servomotor can be used within the intermittent duty zone.

2 When the power cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Speed Characteristics will shrink as the line-to-line voltage drops.

Direct Drive Servomotors

## Ratings and Specifications

### ● Allowable Load Moment of Inertia at the Motor Shaft

Servomotor Model		Rated Torque Nm	Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)
SGMCS-	02B□C, 05B□C, 07B□C, 04C□C	2.0, 5.0, 7.0, 4.0	10 times
	10C□C	10.0	5 times
	14C□C, 08D□C, 17D□C, 25D□C, 16E□B, 35E□B	14.0, 8.0, 17.0, 25.0, 16.0, 35.0	3 times
	45M□A, 80M□A, 1AM□A, 80N□A, 1EN□A, 2ZN□A	45, 80, 110, 150, 200	3 times

### ● Load Moment of Inertia

The larger the load moment of inertia, the worse the movement response.

The allowable load moment of inertia ( $J_L$ ) depends on the motor capacity, as shown above. This value is provided strictly as a guideline and results may vary depending on servomotor drive conditions.

Use the AC servo drive capacity selection program SigmaJunmaSize+ to check the operation conditions. The program can be downloaded for free from our web site (<http://www.yaskawa.eu.com>).

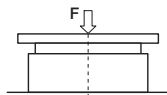
An overvoltage alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a regenerative overload alarm (A.320). Take one of the following steps if this occurs.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the steps above. Refer to *Regenerative Resistors* on page 364.

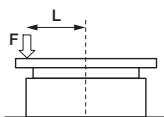
**Mechanical Specifications**

● **Allowable Loads**

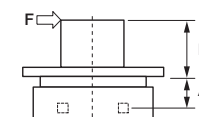
The loads applied while a servomotor is running are roughly classified in the following patterns. Design the machine so that the thrust load and moment load will not exceed the values in the table.



Where F is external force,  
Thrust load:  $F_a = F + \text{Load mass}$   
Moment load:  $M = 0$



Where F is external force,  
Thrust load:  $F_a = F + \text{Load mass}$   
Moment load:  $M = F \times L$



Where F is external force,  
Thrust load:  $F_a = \text{Load mass}$   
Moment load:  $M = F \times (L + A)$

(See the table below for the dimension A of each servomotor model.)

Servomotor Model SGMCS-□	02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E	45M	80M	1AM	80N	1EN	2ZN
Dimension A mm	0			0			0			0		33		37.5			
Allowable Thrust Load (Fa) N	1500			3300			4000			11000		9000		16000			
Allowable Moment Load (M) Nm	40	50	64	70	75	90	93	103	135	250	320	180		350			

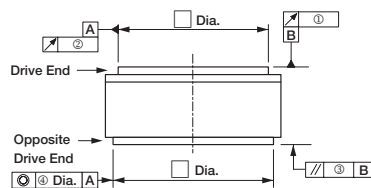
Note: SGMCS-02B to -35E servomotors, set dimensions A to 0 (zero).

● **Mechanical Tolerance**

The following table shows tolerances for the servomotor's output shaft and installation area.

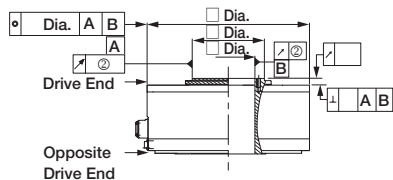
See the dimensional drawing of the individual servomotor for more details on tolerances.

(1) Small-capacity Series



Tolerance T.I.R. (Total Indicator Reading) Units: mm	Servomotor Model SGMCS-										
	02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E
① Run-out of the Surface of the Shaft	0.02		0.02		0.02		0.02		0.02		
② Run-out at the End of the Shaft	0.04		0.04		0.04		0.04		0.04		
③ Perpendicularity between the Flange Face and Output Shaft	0.07		0.07		0.07		0.08		0.08		
④ Coaxiality of Output Axis and Mounting Socket Joint	0.07		0.07		0.07		0.08		0.08		

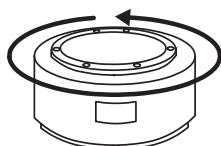
(2) Medium-capacity Series



Tolerance T.I.R. (Total Indicator Reading) Units: mm	Servomotor Model SGMCS-					
	45M	80M	1AM	80N	1EN	2ZN
① Run-out of the Surface of the Shaft	0.02		0.02			
② Run-out at the End of the Shaft	0.04		0.04			
③ Perpendicularity between the Flange Face and Output Shaft	-		-			
④ Coaxiality of Output Axis and Mounting Socket Joint	0.08		0.08			
⑤ Right angle between Flange Face and Output Shaft	0.08		0.08			

● **Direction of Rotation**

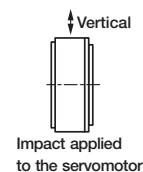
Positive rotation of the servomotor is counterclockwise when viewed from the load.



● **Impact Resistance**

Mount the servomotor with the axis horizontal. The servomotor will withstand the following vertical impacts:

- Impact Acceleration: 490 m/s<sup>2</sup>
- Number of Impacts: 2



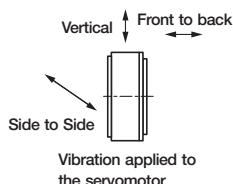
● **Vibration Resistance**

Mount the servomotor with the axis horizontal. The servomotor will withstand the following vibration acceleration in three directions: Vertical, side to side, and front to back.

● **Vibration Class**

The vibration class at rated motor speed is V15. (A vibration class of V15 indicates a total vibration amplitude of 15 μm maximum on the servomotor during rated rotation.)

Servomotor Type	Vibration Acceleration at Flange
Small-capacity Series	49 m/s <sup>2</sup>
Medium-capacity Series	24.5 m/s <sup>2</sup>

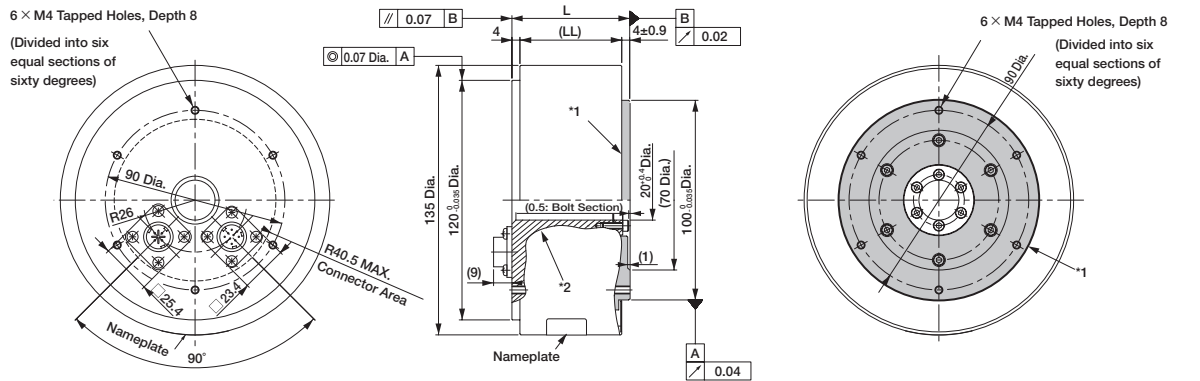


External Dimensions Units: mm

● Small-capacity Series

(1) Rated Torque 2.0 to 7.0 Nm (Outer Diameter 135 mm, Inner Diameter 20 mm)

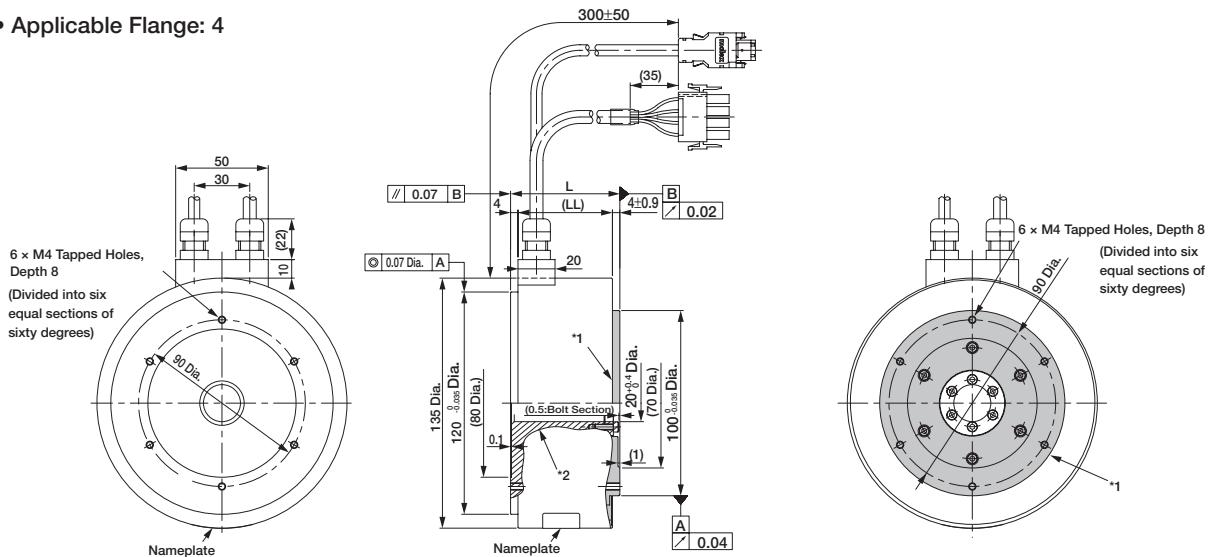
• Applicable Flange: 1



\*1: The shaded section shows the rotating section.  
\*2: The hatched section shows the non-rotating section.

Model SGMCS-	L	(LL)	Approx. Mass kg
02B□C11	59	51	4.8
05B□C11	88	80	5.8
07B□C11	128	120	8.2

• Applicable Flange: 4

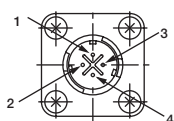


\*1: The shaded section shows the rotating section.  
\*2: The hatched section shows the non-rotating section.

Model SGMCS-	L	(LL)	Approx. Mass kg
02B□C41	59	51	4.8
05B□C41	88	80	5.8
07B□C41	128	120	8.2

● Servomotor Connector for Small-capacity Series Servomotors (Applicable Flange: 1)

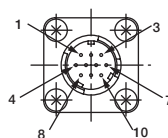
Servomotor-end Connector Specifications



Model: JN1AS04MK2  
Manufacturer: Japan Aviation Electronics Industry, Ltd.  
Applicable plug: JN1DS04FK1  
(Provided by the customer.)

1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (Frame ground)	Green (yellow)

Encoder-end Connector Specifications



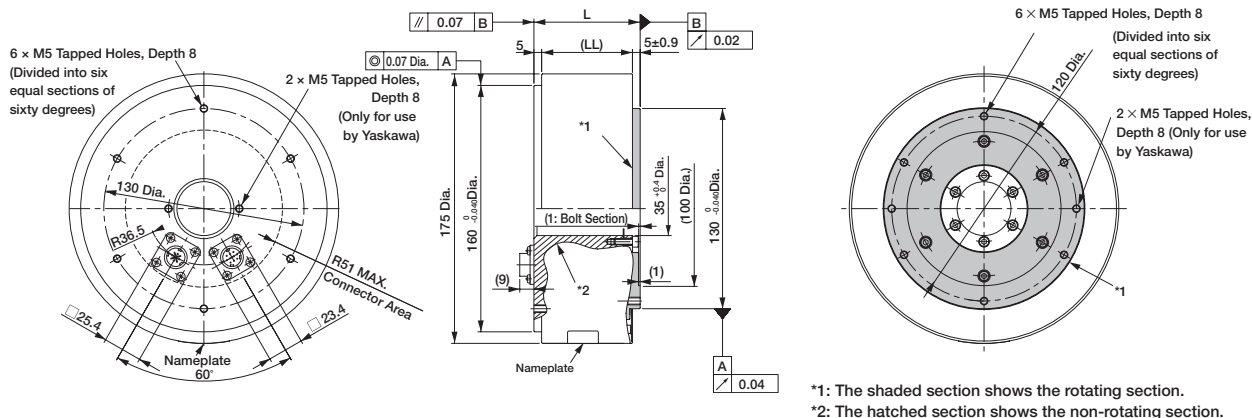
Model: JN1AS10ML1  
Manufacturer: Japan Aviation Electronics Industry, Ltd.  
Applicable plug: JN1DS10SL1  
(Provided by the customer.)

1	PS	Light blue	6	-	-
2	/PS	Light blue/ white	7	FG (Frame ground)	Shield
3	-	-	8	-	-
4	PG5V	Red	9	PG0V	Black
5	-	-	10	-	-

**External Dimensions** Units: mm

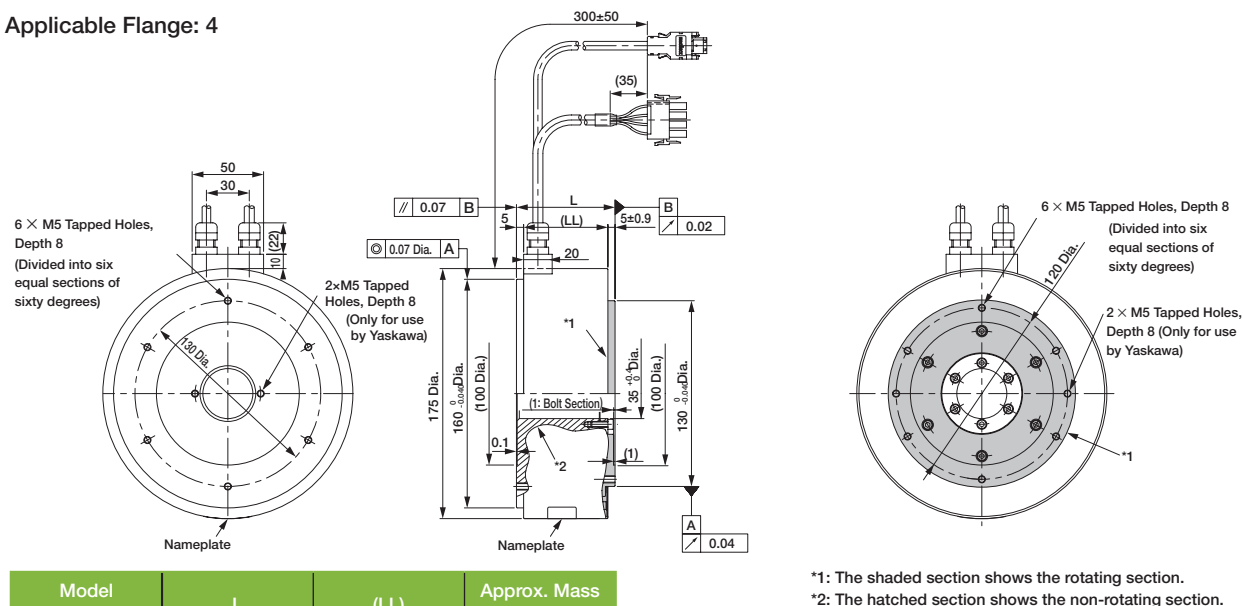
(2) Rated Torque 4.0 to 14.0 Nm (Outer Diameter 175 mm, Inner Diameter 35 mm)

• Applicable Flange: 1



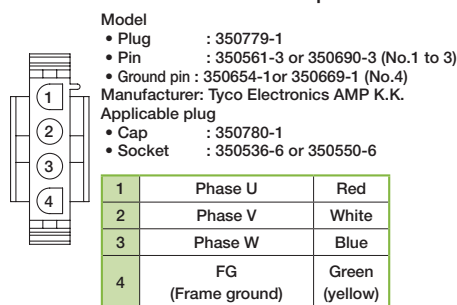
Model SGMCS-	L	(LL)	Approx. Mass kg
04C□C11	69	59	7.2
10C□C11	90	80	10.2
14C□C11	130	120	14.2

• Applicable Flange: 4

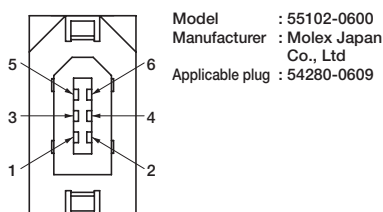


Model SGMCS-	L	(LL)	Approx. Mass kg
04C□C41	69	59	7.2
10C□C41	90	80	10.2
14C□C41	130	120	14.2

• Servomotor Connector (Applicable Flange: 4)  
Servomotor-end Connector Specifications



Encoder-end Connector Specifications

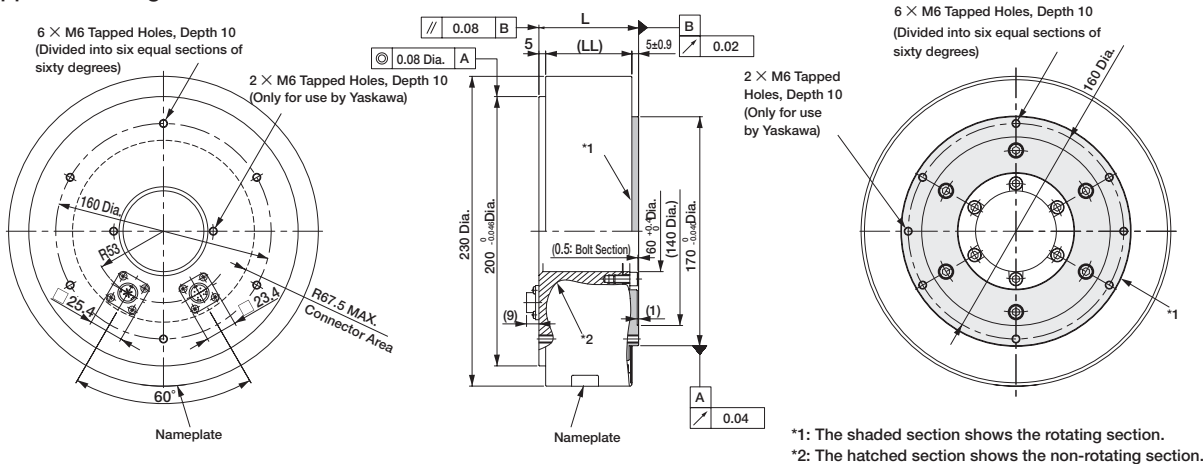


1	PG5V	Red
2	PG0V	Black
3	-	-
4	-	-
5	PS	Light blue
6	/PS	Light blue/white
Connector Case	FG (Frame ground)	Shield

External Dimensions Units: mm

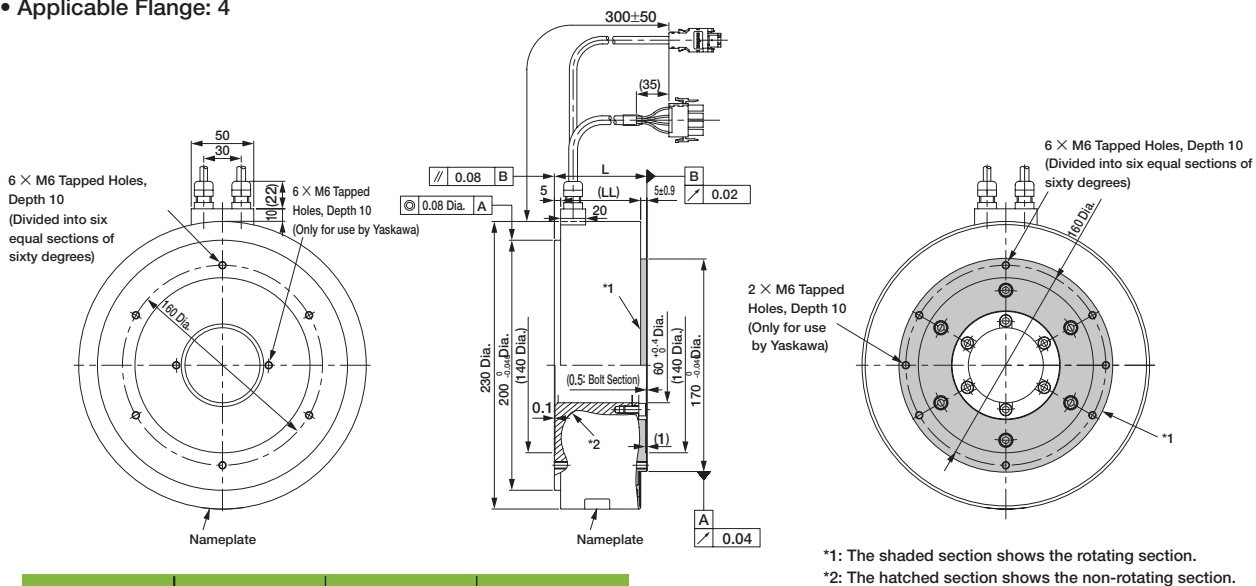
(3) Rated Torque 8.0 to 25.0 Nm (Outer Diameter 230 mm, Inner Diameter 60 mm)

• Applicable Flange: 1



Model SGMCS-	L	(LL)	Approx. Mass kg
08D□C11	74	64	14.0
17D□C11	110	100	22.0
25D□C11	160	150	29.7

• Applicable Flange: 4

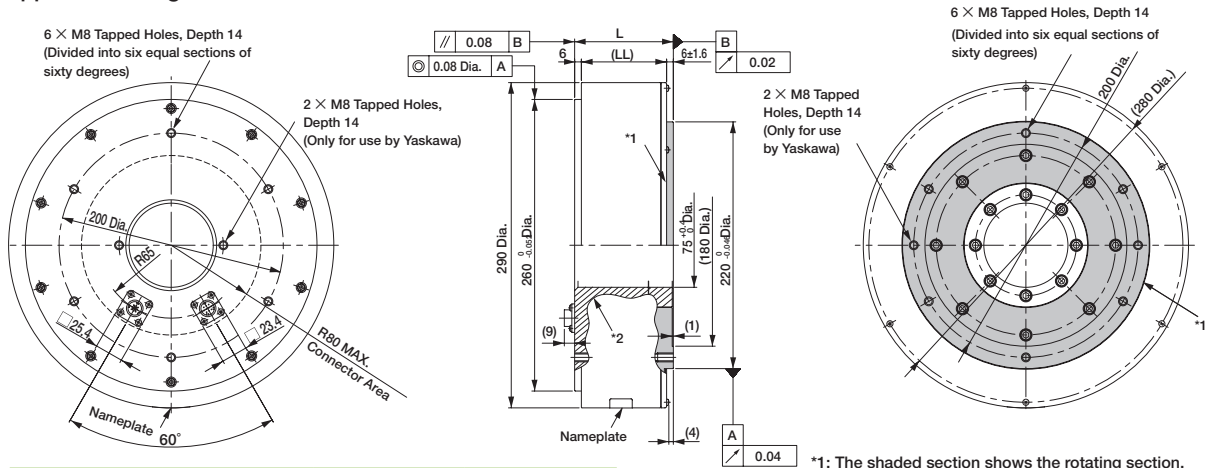


Model SGMCS-	L	(LL)	Approx. Mass kg
08D□C41	74	64	14.0
17D□C41	110	100	22.0
25D□C41	160	150	29.7

**External Dimensions** Units: mm

**(4) Rated Torque 16.0 to 35.0 Nm (Outer Diameter 290 mm, Inner Diameter 75 mm)**

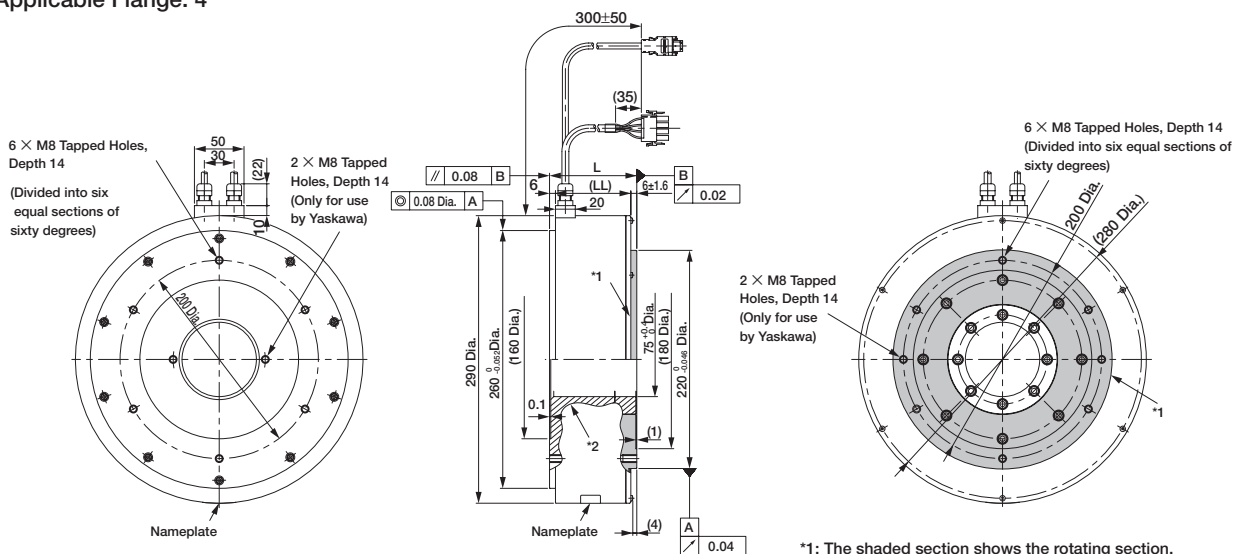
• **Applicable Flange: 1**



Model SGMCS-	L	(LL)	Approx. Mass kg
16E□B11	88	76	26.0
35E□B11	112	100	34.0

\*1: The shaded section shows the rotating section.  
\*2: The hatched section shows the non-rotating section.

• **Applicable Flange: 4**



Model SGMCS-	L	(LL)	Approx. Mass kg
16E□B41	88	76	26.0
35E□B41	112	100	34.0

\*1: The shaded section shows the rotating section.  
\*2: The hatched section shows the non-rotating section.

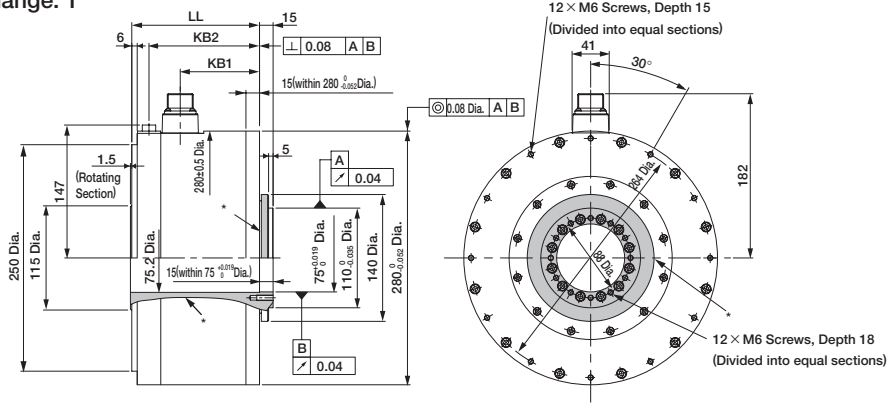


External Dimensions Units: mm

● Medium-capacity Series

(1) Rated Torque 45 to 110 Nm (Outer Diameter 280 mm, Inner Diameter 75 mm)

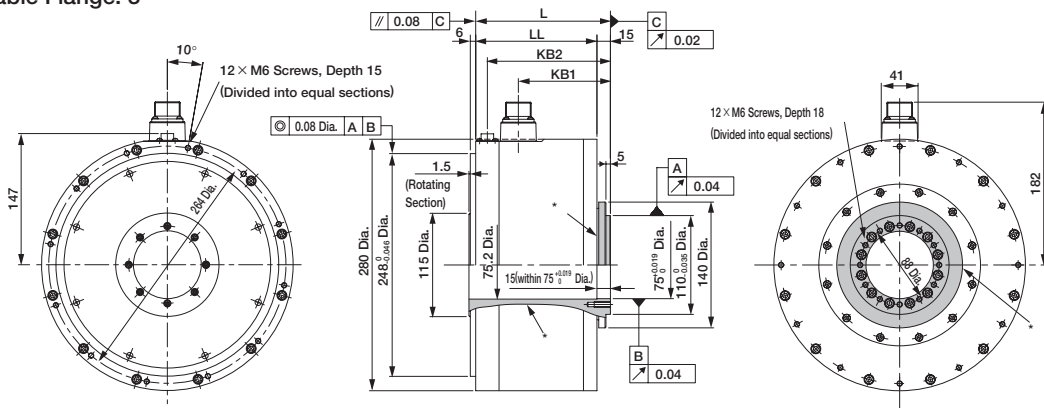
● Applicable Flange: 1



\*: The shaded section shows the rotating section.

Model SGMCS-	LL	KB1	KB2	Approx. Mass kg
45M□A11	141	87.5	122	38
80M□A11	191	137.5	172	45
1AM□A11	241	187.5	222	51

● Applicable Flange: 3

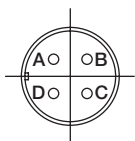


\*: The shaded section shows the rotating section.

Model SGMCS-	L	LL	KB1	KB2	Approx. Mass kg
45M□A31	150	135	102.5	137	38
80M□A31	200	185	152.5	187	45
1AM□A31	250	235	202.5	237	51

● Servomotor Connector for Medium-capacity Series Servomotors (Applicable Flange: 1, 3)

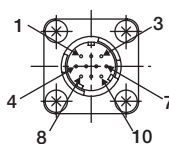
Servomotor-end Connector Specifications  
(Same for All Medium-capacity Models)



Model : CE05-2A18-10PD  
 Manufacturer : DDK Ltd.  
 Applicable plug and cable clamp  
 Plug : CE05-6A18-10SD-B-BSS  
 Cable clamp : CE3057-10A-□(D265)

A	Phase U
B	Phase V
C	Phase W
D	FG (Frame ground)

Encoder-end Connector Specifications  
(Same for All Medium-capacity Models)



Model : JN1AS10ML1  
 Manufacturer : Japan Aviation Electronics Industry, Ltd.  
 Applicable plug : JN1DS10SL1

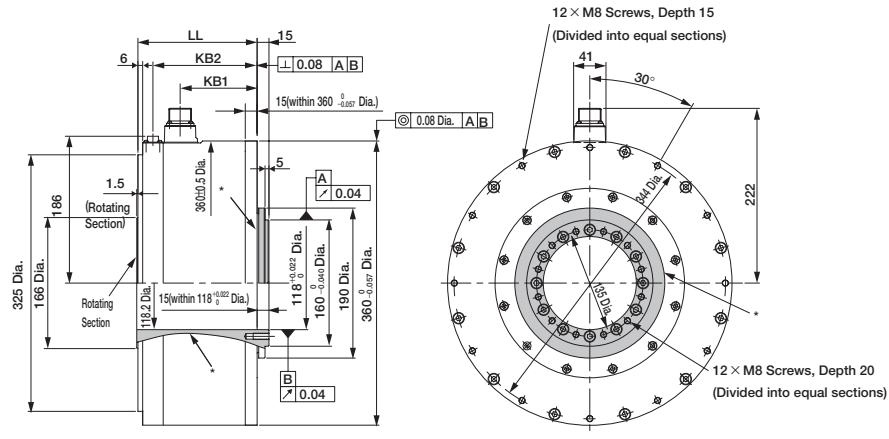
1	PS	6	-
2	/PS	7	FG (Frame ground)
3	-	8	-
4	PG5V	9	PG0V
5	-	10	-



External Dimensions Units: mm

(2) Rated Torque 80 to 200 Nm (Outer Diameter 360 mm, Inner Diameter 118 mm)

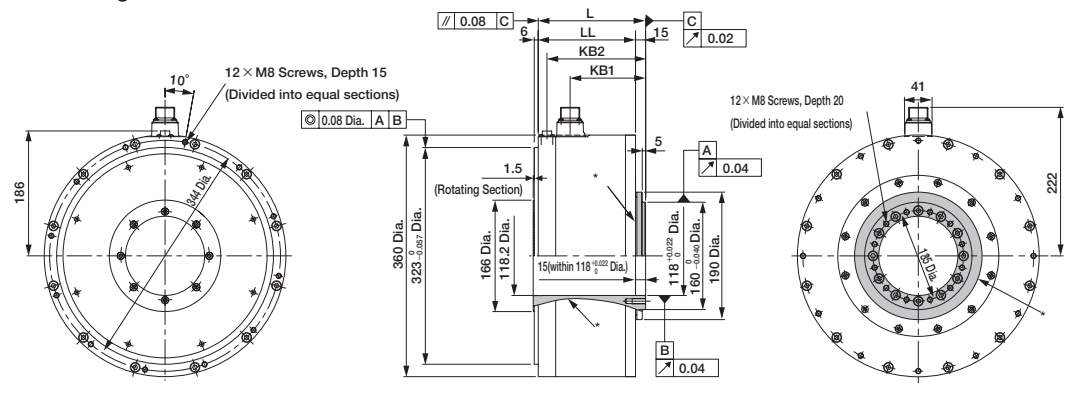
- Applicable Flange: 1



\*: The shaded section shows the rotating section.

Model SGMCS-	LL	KB1	KB2	Approx. Mass kg
80N□A11	151	98	132	50
1EN□A11	201	148	182	68
2ZN□A11	251	198	232	86

- Applicable Flange: 3



\*: The shaded section shows the rotating section.

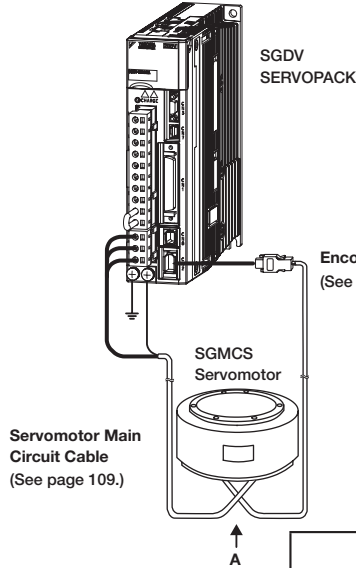
Model SGMCS-	L	LL	KB1	KB2	Approx. Mass kg
80N□A31	160	145	113	147	50
1EN□A31	210	195	163	197	68
2ZN□A31	260	245	213	247	86

Direct Drive Servomotors

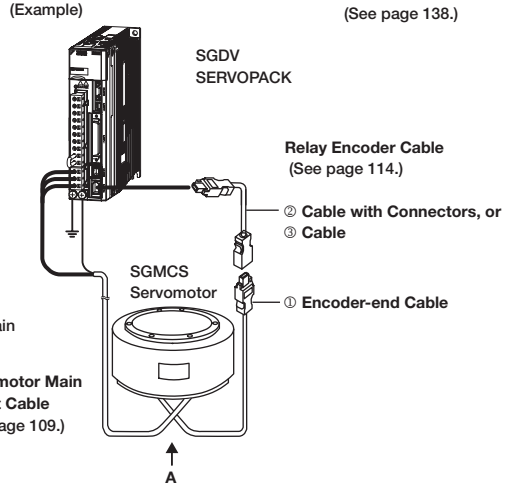
Selecting Cables

● Cables Connections

● Standard Wiring (Max. encoder cable length: 20 m)



● Encoder Cable Extension from 30 to 50 m



**CAUTION**

- Separate the servomotor main circuit cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.
- When the encoder cable length exceeds 20 m, use a relay encoder cable.
- When the main circuit cable length exceeds 20 m, note that the intermittent duty zone of the *Torque-Speed Characteristics* will shrink as the line-to-line voltage drops.

● Servomotor Power Cable

Name	Length (L)	Order No.	Specifications		Details
			Flexible Type <sup>*1</sup>		
Small-capacity Series	Cable with Loose Wire at SERVOPACK End	3 m	JZSP-CSM60-03-E	Applicable Flange*2 : 1 SERVOPACK End Encoder (Servomotor) End 50 mm L M4 Crimped Terminals	(1)
		5 m	JZSP-CSM60-05-E		
		10 m	JZSP-CSM60-10-E		
		15 m	JZSP-CSM60-15-E		
		20 m	JZSP-CSM60-20-E		
	Cable with Loose Wire at SERVOPACK End	3 m	JZSP-CMM01-03-E	Applicable Flange*2 : 4 SERVOPACK End 8.5±0.5 (Exposed core wire) Encoder (Servomotor) End 50 L 35 Sheath to Bind Core Wires Heat-shrinkable Tube M4 Crimped Terminals Cable: UL2517 (AWG20×4C)	(1)
		5 m	JZSP-CMM01-05-E		
		10 m	JZSP-CMM01-10-E		
		15 m	JZSP-CMM01-15-E		
		20 m	JZSP-CMM01-20-E		
	Servomotor-end Connector		JN1DS04FK1	Applicable Flange*2 : 1 Soldered	(2)
			JZSP-CMM9-3-E	Applicable Flange*2 : 4 Crimped Type (A crimp tool is required.)	(3)
	Cables	5 m	JZSP-CSM80-05-E		(4)
		10 m	JZSP-CSM80-10-E		
		15 m	JZSP-CSM80-15-E		
20 m		JZSP-CSM80-20-E			
50 m		JZSP-CSM80-50-E			
Medium-capacity Series: Cables		Contact your Yaskawa representative for cables with connectors and cables and connectors.			(5)

\*1: Use flexible cables for movable sections such as robot arms.

\*2: For applicable flanges, see model designations on page 99.

Note: SGMCS servomotors with holding brakes are not available.

Selecting Cables

(1) Small-capacity Series: Wiring Specifications for Cables

• Applicable Flange: 1

SERVOPACK End		Servomotor End	
Wire Color	Signal	Signal	Pin No.
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Blue	Phase W	Phase W	3
Green(yellow)	FG	FG	4

• Applicable Flange: 4

SERVOPACK End		Servomotor End	
Wire Color	Signal	Signal	Pin No.
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Blue	Phase W	Phase W	3
Green(yellow)	FG	FG	4

(2) Small-capacity Series: Servomotor-end Connector Specifications

Items	Specifications
Manufacturer	Japan Aviation Electronics Industry, Ltd.
Order No.	JN1DS04FK1 (Soldered)
Outer Diameter of Applicable Cable	5.7 dia. to 7.3 dia. mm
External Dimensions mm	

(3) Small-capacity Series: Servomotor-end Connector Kit Specifications

Items	Specifications
Manufacturer	Tyco Electronics AMP K.K.
Order No.	JZSP-CMM9-3-E
Cap	350780-1
Socket	350550-6
Applicable Wire Size	AWG20 to 14
External Dimensions mm	

Note: A crimp tool (Model no.: 90296-2) is required. Contact the respective manufacturer for more information.

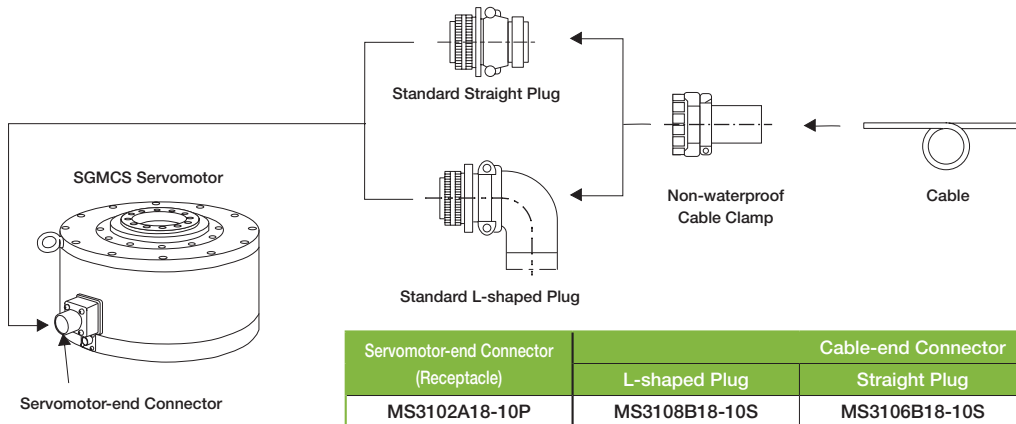
(4) Small-capacity Series: Cable Specifications

Items	Flexible Type
Specifications	UL2517 (Rating temperature: 105°C) AWG22×6C For power line: AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.37 dia. mm For holding brake line: AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.37 dia. mm
Finished Dimensions	7 ± 0.3 mm
Internal Configuration and Lead Color	

\*: Specify the cable length  of order no.  
 Example: JZSP-CSM90-15-E (15 m)

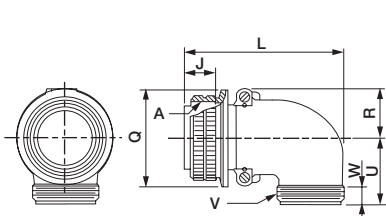
Selecting Cables

(5) Medium-capacity Series (SGMCS-□□M and N): Connector Specifications



Servomotor-end Connector (Receptacle)	Cable-end Connector		
	L-shaped Plug	Straight Plug	Cable Clamp
MS3102A18-10P	MS3108B18-10S	MS3106B18-10S	MS3057-10A

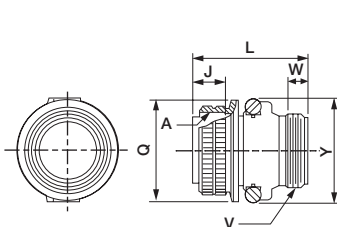
• Dimensional Drawings: MS3108B L-shaped Plug Shell



Units: mm

Model No.	Shell Size	Joint Screw A	Length of Joint Portion J ±0.12	Overall Length L Max.	Outer Diameter of Joint Nut Q <sup>+0</sup> / <sub>-0.38</sub>	R ±0.5	U ±0.5	Cable Clamp Set Screw V	Effective Screw Length W Min.
MS 3108B	18	1 1/8-18UNEF	18.26	68.27	34.13	20.5	30.2	1-20UNEF	9.53

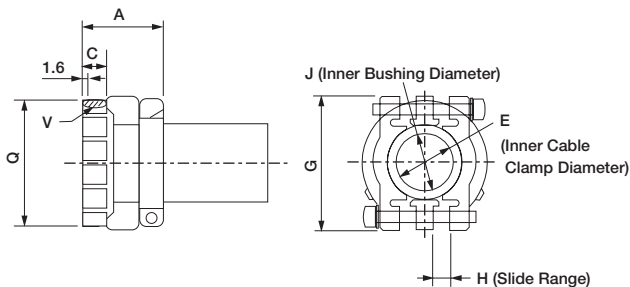
• Dimensional Drawings: MS3106B Straight Plug Shell



Units: mm

Model No.	Shell Size	Joint Screw A	Length of Joint Portion J ±0.12	Overall Length L Max.	Outer Diameter of Joint Nut Q <sup>+0</sup> / <sub>-0.38</sub>	Cable Clamp Set Screw V	Effective Screw Length W Min.	Maximum Width Y Max.
MS 3106B	18	1 1/8-18UNEF	18.26	52.37	34.13	1-20UNEF	9.53	42

• Dimensional Drawings: MS3057-10A Cable Clamp with Rubber Bushing

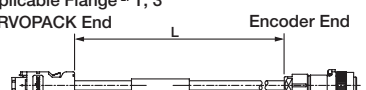
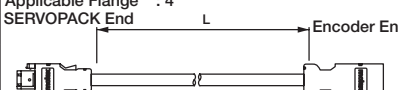
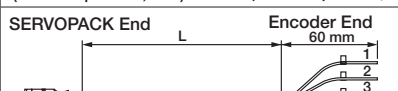
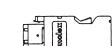

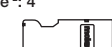


Units: mm

Model No.	Applicable Connector Shell Size	Overall Length A ±0.7	Effective Screw Length C	E	G ±0.7	H	J	Set Screw V	Outer Diameter Q ±0.7	Attached Bushing
MS3057-10A	18	23.8	10.3	15.9	31.7	3.2	14.3	1-20UNEF	30.1	AN3420-10

Selecting Cables

● Encoder Cables and Connectors (Max. length: 20 m)

Name	Length (L)	Order No.	Specifications	Details		
		Flexible Type <sup>1</sup>				
Cable with Connectors (For Incremental and Absolute Encoder)	3 m	JZSP-CSP60-03-E	Applicable Flange <sup>2</sup> : 1, 3 SERVOPACK End  Encoder End Connector (Crimped) (Molex Japan Co., Ltd.) Straight Plug (Crimped) (Japan Aviation Electronics Industry, Ltd.)	(1)		
	5 m	JZSP-CSP60-05-E				
	10 m	JZSP-CSP60-10-E				
	15 m	JZSP-CSP60-15-E				
	20 m	JZSP-CSP60-20-E				
	3 m	JZSP-CMP10-03-E			Applicable Flange <sup>2</sup> : 4 SERVOPACK End  Encoder End Connector (Molex Japan Co., Ltd.) Socket Connector (Molex Japan Co., Ltd.)	(2)
	5 m	JZSP-CMP10-05-E				
	10 m	JZSP-CMP10-10-E				
	15 m	JZSP-CMP10-15-E				
	20 m	JZSP-CMP10-20-E				
Cable with Loose Wire at Encoder End (For Incremental and Absolute Encoder)	3 m	JZSP-CMP13-03-E	SERVOPACK End  Encoder End 60 mm 1 2 3 4 5 6 Connector (Crimped) (Molex Japan Co., Ltd.) Wire Markers	(3)		
	5 m	JZSP-CMP13-05-E				
	10 m	JZSP-CMP13-10-E				
	15 m	JZSP-CMP13-15-E				
	20 m	JZSP-CMP13-20-E				
SERVOPACK-end Connector Kit		JZSP-CMP9-1-E	Soldered  (Molex Japan Co., Ltd.)	(4)		
Encoder-end Connector Kit		JN1DS10SL1 (Straight Plug)	Applicable Flange <sup>2</sup> : 1, 3 Crimped Type (A crimp tool is required.)  (Japan Aviation Electronics Industry, Ltd.)			
		JN1-22-22S-PKG100 (Socket Contact)				
		JZSP-CMP9-2-E	Applicable Flange <sup>2</sup> : 4 Soldered  (Molex Japan Co., Ltd.)			

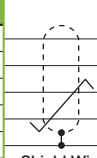
\*1: Use flexible cables for movable sections such as robot arms.  
 \*2: For applicable flanges, see model designations on page 97.

(1) Wiring Specifications for Cable with Connectors

● Applicable Flange: 1, 3

(Standard type)

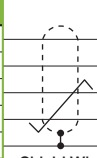
SERVOPACK End		Encoder End	
Pin No.	Signal	Pin No.	Wire Color
1	PG5V	4	Red
2	PG0V	9	Black
5	PS	1	Light blue
6	/PS	2	Light blue/white
Shell	FG	7	FG Shield wire



Note: Be sure to connect the shield wire of encoder cable to the connector case (shell).

(Flexible type)

SERVOPACK End		Encoder End	
Pin No.	Signal	Pin No.	Wire Color
1	PG5V	4	Orange
2	PG0V	9	Green
5	PS	1	Black/light blue
6	/PS	2	Red/light blue
Shell	FG	7	FG Shield wire

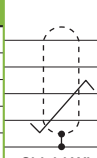


(2) Wiring Specifications for Cable with Connectors

● Applicable Flange: 4

(Standard type)

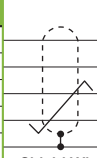
SERVOPACK End		Encoder End	
Pin No.	Signal	Pin No.	Wire Color
1	PG5V	1	Red
2	PG0V	2	Black
5	PS	5	Light blue
6	/PS	6	Light blue/white
Shell	FG	7	FG Shield wire



Note: Be sure to connect the shield wire of encoder cable to the connector case (shell).

(Flexible type)

SERVOPACK End		Encoder End	
Pin No.	Signal	Pin No.	Wire Color
1	PG5V	1	Orange
2	PG0V	2	Green
5	PS	5	Red/light blue
6	/PS	6	Black/light blue
Shell	FG	7	FG Shield wire

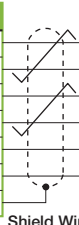


Selecting Cables

(3) Wiring Specifications for Cable with Loose Wire at Encoder End

(Standard type)

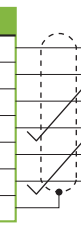
SERVOPACK End		Encoder End	
Pin No.	Signal	Wire Color	Marker
6	/PS	Light blue/white	6
5	PS	Light blue	5
4	BAT(-)	Orange/white	4
3	BAT(+)	Orange	3
2	PG0V	Black	2
1	PG5V	Red	1
Shell	FG		



Shield Wire

(Flexible type)

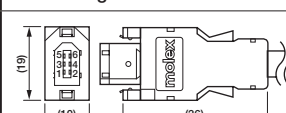
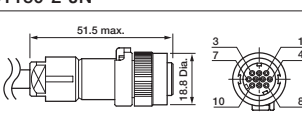
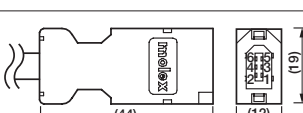
SERVOPACK End		Encoder End	
Pin No.	Signal	Wire Color	Marker
1	PG5V	Orange	1
2	PG0V	Green	2
3	BAT(+)	Red/pink	3
4	BAT(-)	Black/pink	4
5	PS	Red/light blue	5
6	/PS	Black/light blue	6
Shell	FG		



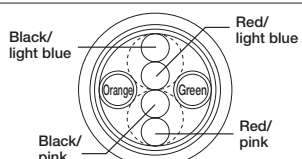
Shield Wire

Notes: 1 The signals BAT(+) and BAT(-) are not needed when using SGMCS servomotors.  
2 Be sure to connect the shield wire of encoder cable to the connector case (shell).

(4) SERVOPACK-end/Encoder-end Connector Kit Specifications

Items	SERVOPACK-end Connector Kit	Encoder-end Connector Kit	
Order No.	JZSP-CMP9-1-E (Cables are not included.)	Tools are not included.	JZSP-CMP9-2-E (Cables are not included.)
Manufacturer	Molex Japan Co., Ltd.	Japan Aviation Electronics Industry, Ltd.	Molex Japan Co., Ltd.
Specifications	55100-0670 (soldered) Product Specification: PS-54280  Note: 55100-0670 (soldered) when using a connector kit	Straight plug: JN1DS10SL1 (crimped) Socket contact type: JN1-22-22S-PKG100 Outer diameter of applicable cable : 5.7 dia. to 7.3 dia. mm Applicable wire size: AWG21 to 25 Outer diameter of insulating sheath: 0.8 dia. to 1.5 dia. mm Crimp tool (hand tool) model: CT150-2-JN	54280-0609 (Soldered) Product Specification: PS-54280
External Dimensions (Units: mm)			

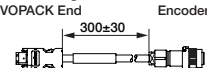
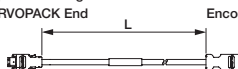

(5) Cable Specifications

Items	Flexible Type
Order No.*	JZSP-CSP39-□□-E
Cable Length	20 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.35 dia. mm AWG24 (0.20 mm <sup>2</sup> ) Outer diameter of insulating sheath: 1.21 dia. mm
Finished Dimensions	6.8 dia. mm
Internal Configuration and Lead Colors	

\* Specify the cable length in □□ of order no.  
Example: JZSP-CSP39-05-E (5 m)

Selecting Cables

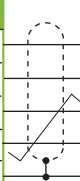
● Relay Encoder Cables (For extending from 30 to 50 m)

Name	Length	Order No. Standard Type	Specifications	Details
① Encoder-end Cables (For incremental and absolute encoder)	0.3 m	JZSP-CSP15-E	Applicable Flange*: 1, 3 SERVOPACK End Encoder End  Plug Connector (Soldered) (Molex Japan Co., Ltd.) Plug (Japan Aviation Electronics Industry, Ltd.)	(1)
② Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E	Applicable Flange*: 4 SERVOPACK End Encoder End  Plug Connector (Crimped) (Molex Japan Co., Ltd.) Socket Connector (Soldered) (Molex Japan Co., Ltd.)	(2)
	40 m	JZSP-UCMP00-40-E		
	50 m	JZSP-UCMP00-50-E		
③ Cables	30 m	JZSP-CMP19-30-E		(3)
	40 m	JZSP-CMP19-40-E		
	50 m	JZSP-CMP19-50-E		

\*: For applicable flanges, see model designations on page 97.

(1) Wiring Specifications for Encoder-end Cable

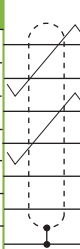
SERVOPACK End		Encoder End	
Pin No.	Signal	Pin No.	Wire Color
1	PG 5V	4	Red
2	PG 0V	9	Black
5	PS	1	Light blue
6	/PS	2	Light blue/white
Shell	FG	7	FG Shield wire



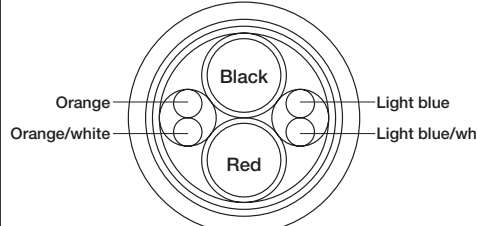
Note: Be sure to connect the shield wire of encoder cable to the connector case (shell).

(2) Wiring Specifications for Cable with Connectors

SERVOPACK End		Encoder End	
Pin No.	Signal	Pin No.	Wire Color
6	/PS	6	Light blue/white
5	PS	5	Light blue
4	BAT (-)	4	Orange/white
3	BAT (+)	3	Orange
2	PG 0V	2	Black
1	PG 5V	1	Red
Shell	FG	Shell	FG



(3) Cable Specifications

Items	Standard Type
Order No.*	JZSP-CMP19-□□-E
Cable Length	50 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG16×2C+AWG26×2P AWG16 (1.31 mm <sup>2</sup> ) Outer diameter of insulating sheath: 2.0 dia.mm AWG26 (0.13 mm <sup>2</sup> ) Outer diameter of insulating sheath: 0.91 dia. mm
Finished Dimensions	6.8 dia. mm
Internal Configuration and Lead Colors	
Yaskawa Standard Specifications (Standard Length)	Cable length: 30 m, 40 m, 50 m

\* Specify the cable length in □□ of order no.  
Example: JZSP-CMP19-30-E (30 m)

# Linear Servomotors

# SGLGW

(Coreless Type)



## Model Designations

### ● Moving Coil

**S G L G W - 30 A 050 C P**

Linear  $\Sigma$  Series  
Linear Servomotor

1st digit

2nd digit

3rd+4th digits

5th digit

6th+7th+8th digits

9th digit

10th digit

11th digit

#### 1st digit Servomotor Type

Code	Specifications
G	Coreless

#### 5th digit Voltage

Code	Specifications
A	200 VAC

#### 10th digit Hall Sensor/Cooling Method

Code	Specifications	Applicable Model
P	With hall sensor	All models
C	Forced cooling	SGLGW
H	With hall sensor and forced cooling	-40A, -60A, -90A
Blank	Without hall sensor	All models

#### 2nd digit Moving Coil/ Magnetic Way

Code	Specifications
W	Moving Coil

#### 6th+7th+8th digits Length of Moving Coil

#### 9th digit Design Revision Order

A, B, C...

#### 3rd+4th digits Magnet Height

#### 11th digit Connector for Main Circuit Cable

Code	Specifications	Applicable Model
Blank	Connector by Tyco Electronics AMP K.K.	All models
D	Connector by Interconnecon GmbH	SGLGW -30A, -40A, -60A

### ● Magnetic Way

**S G L G M - 30 108 A**

Linear  $\Sigma$  Series  
Linear Servomotor

1st digit

2nd digit

3rd+4th digits

5th+6th+7th digits

8th digit

9th digit

#### 1st digit Servomotor Type

(Same as that of the moving coil)

#### 3rd+4th digits Magnet Height

#### 5th+6th+7th digits Length of Magnetic Way

#### 9th digit Options

Code	Specifications	Applicable Model
Blank	standard	All models
-M	High force	SGLGM-40, -60

#### 2nd digit Moving Coil/ Magnetic Way

Code	Specifications
M	Magnetic Way

#### 8th digit Design Revision Order

A, B, C\*...

\*: The coreless linear servomotor has revision CT.

C = without mounting holes on the bottom

CT = with mounting holes on the bottom



## Features

- Direct-feed mechanism for high-speed and high-precision positioning.
- Lack of magnetic attraction force helps extend the life of linear motion guides and minimizes noise.
- Zero cogging for minimal force ripple.

## Application Examples

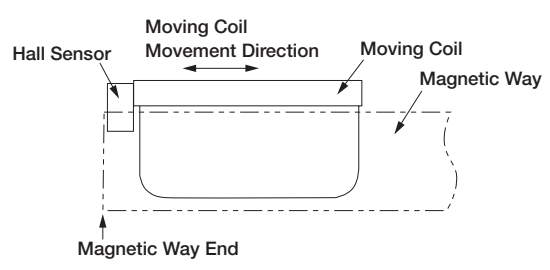
- Feeders and loaders
- Semiconductor equipment
- LCD manufacturing equipment

### ● Precautions on Moving Coil with Hall Sensor

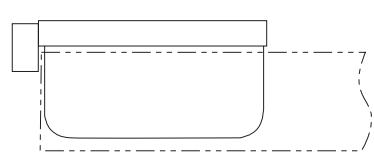
When using a moving coil with a hall sensor, the magnetic way must completely cover the bottom of the hall sensor. Refer to the example showing the correct installation.

When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length of the moving coil and the hall sensor unit. Refer to the following table.

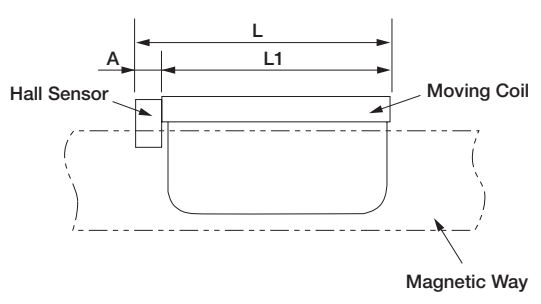
<Correct>



<Incorrect>



The total length of moving coil with hall sensor



Moving Coil Model SGLGW-	Length of Moving Coil L1 (mm)	Length of Hall Sensor Unit A (mm)	Total Length L (mm)
30A050□P□	50	0 (Included in the length of moving coil)	50
30A080□P□	80		80
40A140□P□	140	16	156
40A253□P□	252.5		268.5
40A365□P□	365		381
60A140□P□	140	16	156
60A253□P□	252.5		268.5
60A365□P□	365		381
90A200□P□	199	0 (Included in the length of moving coil)	199
90A370□P□	367		367
90A535□P□	535		535

## Ratings and Specifications

**Time Rating:** Continuous

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Self-cooled, air-cooling (Only self-cooled type available for SGLGW-30A linear servomotor)

**Ambient Humidity:** 20% to 80% (no condensation)

**Allowable Winding Temperature:** 130°C (Thermal class B)

● With Standard-force Magnetic Ways

Linear Servomotor Model SGLGW- <input type="text"/>		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
Peak Speed*	m/s	5	5	5	5	5	4.8	4.8	4.8	4	4	4
Rated Force*	N	12.5	25	47	93	140	70	140	210	325	550	750
Rated Current*	Arms	0.51	0.79	0.8	1.6	2.4	1.2	2.2	3.3	4.4	7.5	10.2
Peak Force*	N	40	80	140	280	420	220	440	660	1300	2200	3000
Peak Current*	Arms	1.62	2.53	2.4	4.9	7.3	3.5	7.0	10.5	17.6	30.0	40.8
Moving Coil Mass	kg	0.10	0.15	0.34	0.60	0.87	0.42	0.76	1.10	2.15	3.6	4.9
Force Constant	N/Arms	26.4	33.9	61.5	61.5	61.5	66.6	66.6	66.6	78.0	78.0	78.0
BEMF Constant	V/(m/s)	8.8	11.3	20.5	20.5	20.5	22.2	22.2	22.2	26.0	26.0	26.0
Motor Constant	N/√W	3.7	5.6	7.8	11.0	13.5	11.1	15.7	19.2	26.0	36.8	45.0
Electrical Time Constant	ms	0.2	0.4	0.4	0.4	0.4	0.5	0.5	0.5	1.4	1.4	1.4
Mechanical Time Constant	ms	7.30	4.78	5.59	4.96	4.77	3.41	3.08	2.98	3.18	2.66	2.42
Thermal Resistance (With heat sink)	K/W	5.19	3.11	1.67	0.87	0.58	1.56	0.77	0.51	0.39	0.26	0.22
Thermal Resistance (Without heat sink)	K/W	8.13	6.32	3.02	1.80	1.23	2.59	1.48	1.15	1.09	0.63	0.47
Magnetic Attraction	N	0	0	0	0	0	0	0	0	0	0	0
Applicable SERVOPACK	SGDV-	R70A	R90A	R90A	1R6A	2R8A	1R6A	2R8A	5R5A	120A	180A	200A

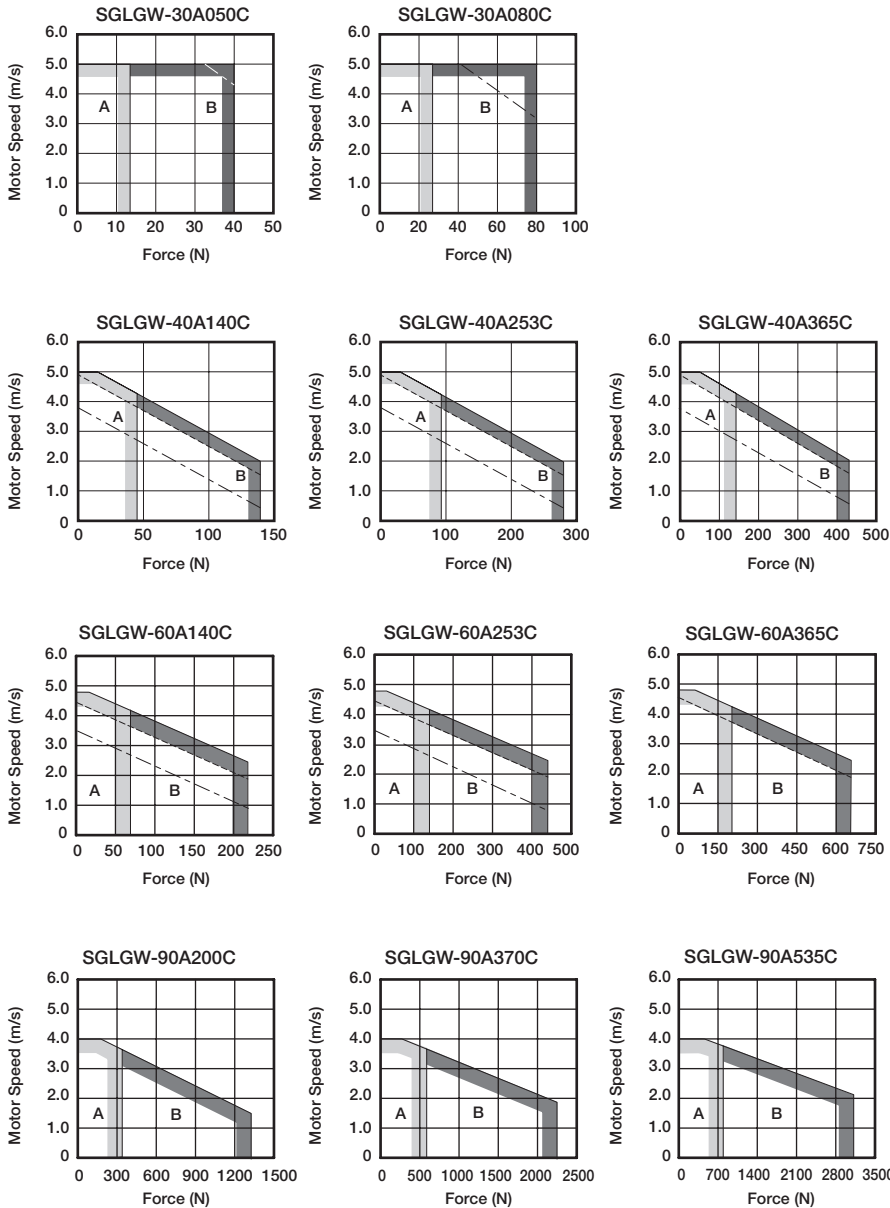
Notes: 1 The items marked with an \* and Force and Speed Characteristics (the table on the next page) are the values at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. The others are at 20°C.

2 The above specifications show the values under the cooling condition when a heat sink (aluminum board) listed in the following table is mounted on the moving coil.

Heat Sink Size	Applicable Models
200 mm × 300 mm × 12 mm	SGLGW-30A050C, -30A080C, -40A140C, -60A140C
300 mm × 400 mm × 12 mm	SGLGW-40A253C, -60A253C
400 mm × 500 mm × 12 mm	SGLGW-40A365C, -60A365C
800 mm × 900 mm × 12 mm	SGLGW-90A200C, -90A370C, -90A535C

**Ratings and Specifications**

- Force and Speed Characteristics **A** : Continuous Duty Zone **B** : Intermittent Duty Zone



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid, dotted, and dashed-dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:

- The solid line: With a three-phase 200 V SERVOPACK
- The dotted line: With a single-phase 200 V SERVOPACK
- The dashed-dotted line: With a single-phase 100 V SERVOPACK

SGLGW-30A050C and SGLGW-30A080C servomotors combined with single-phase 200 V SERVOPACKs have the same characteristics as those combined with three-phase ones.

2 When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.

**Ratings and Specifications**

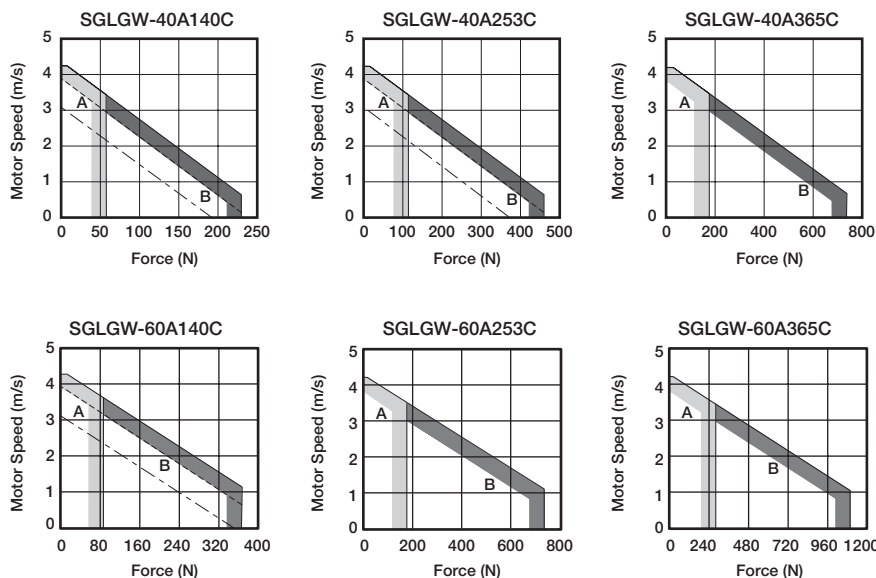
● **With High-force Magnetic Ways**

Linear Servomotor Model SGLGW- <input type="text"/>		40A			60A		
		140C	253C	365C	140C	253C	365C
Peak Speed*	m/s	4.2	4.2	4.2	4.2	4.2	4.2
Rated Force*	N	57	114	171	85	170	255
Rated Current*	Arms	0.8	1.6	2.4	1.2	2.2	3.3
Peak Force*	N	230	460	690	360	720	1080
Peak Current*	Arms	3.2	6.5	9.7	5.0	10.0	14.9
Moving Coil Mass	kg	0.34	0.60	0.87	0.42	0.76	1.10
Force Constant	N/Arms	76.0	76.0	76.0	77.4	77.4	77.4
BEMF Constant	V/(m/s)	25.3	25.3	25.3	25.8	25.8	25.8
Motor Constant	N/√W	9.6	13.6	16.7	12.9	18.2	22.3
Electrical Time Constant	ms	0.4	0.4	0.4	0.5	0.5	0.5
Mechanical Time Constant	ms	3.69	3.24	3.12	2.52	2.29	2.21
Thermal Resistance (With heat sink)	K/W	1.67	0.87	0.58	1.56	0.77	0.51
Thermal Resistance (Without heat sink)	K/W	3.02	1.80	1.23	2.59	1.48	1.15
Magnetic Attraction	N	0	0	0	0	0	0
Applicable SERVOPACK	SGDV-	1R6A	2R8A	3R8A	1R6A	3R8A	7R6A

Notes: 1 The items marked with an \* and *Force and Speed Characteristics* (the table on the next page) are the values at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. The others are at 20°C.  
 2 The above specifications show the values under the cooling condition when a heat sink (aluminum board) listed in the following table is mounted on the moving coil.

Heat Sink Size	200 mm × 300 mm × 12 mm	300 mm × 400 mm × 12 mm	400 mm × 500 mm × 12 mm
SGLGW-40A140C, -60A140C	200 mm × 300 mm × 12 mm	300 mm × 400 mm × 12 mm	400 mm × 500 mm × 12 mm
SGLGW-40A253C, -60A253C	200 mm × 300 mm × 12 mm	300 mm × 400 mm × 12 mm	400 mm × 500 mm × 12 mm
SGLGW-40A365C, -60A365C	200 mm × 300 mm × 12 mm	300 mm × 400 mm × 12 mm	400 mm × 500 mm × 12 mm

● **Force and Speed Characteristics** **A** : Continuous Duty Zone **B** : Intermittent Duty Zone



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid, dotted, and dashed-dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:  
 ● The solid line: With a three-phase 200 V SERVOPACK  
 ● The dotted line: With a single-phase 200 V SERVOPACK  
 ● The dashed-dotted line: With a single-phase 100 V SERVOPACK  
 2 When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.

● **Mechanical Specifications**

(1) **Impact Resistance**

- Impact acceleration: 196 m/s<sup>2</sup>
- Impact occurrences: twice

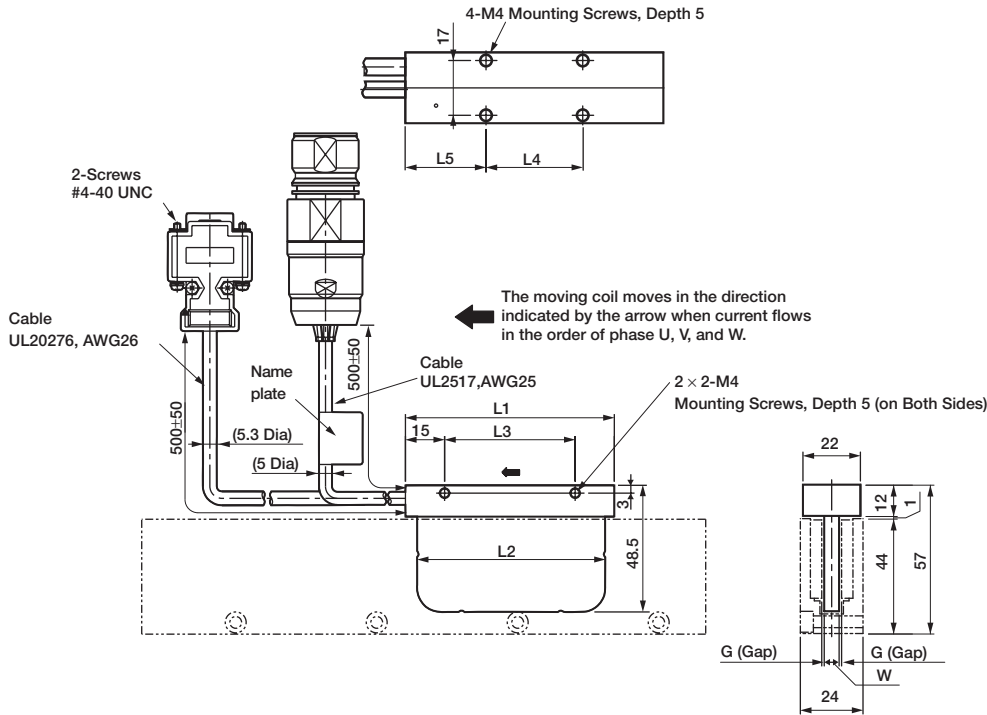
(2) **Vibration Resistance**

- The linear servomotors will withstand the following vibration acceleration in three directions: Vertical, side to side, and front to back.
- Vibration acceleration: 49 m/s<sup>2</sup>

**External Dimensions** Units: mm

(1) SGLGW-30

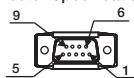
- Moving Coil: SGLGW-30A□□□C□D (With a connector by Interconnectron GmbH)



Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass* kg
30A050C□D	50	48	30	20	20	5.9	0.85	0.14
30A080C□D	80	72	50	30	25	5.7	0.95	0.19

\*: The values indicate the mass of moving coil with a hall sensor unit.

Hall Sensor Connector Specifications



Pin Connector :  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector  
Socket Connector :  
17JE-13090-02 (D8C)  
Stud : 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



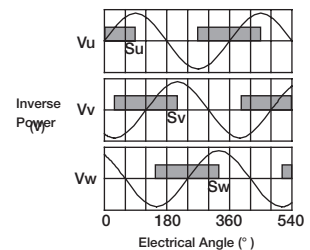
Extension: SROC06JM5CN169  
Pin : 021.423.1020  
by Interconnectron GmbH

The Mating Connector  
Plug : SPUC06KFSDN236  
Socket: 020.030.1020

Pin No.	Signal	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Not used	-
5	Not used	-
6	FG	Green

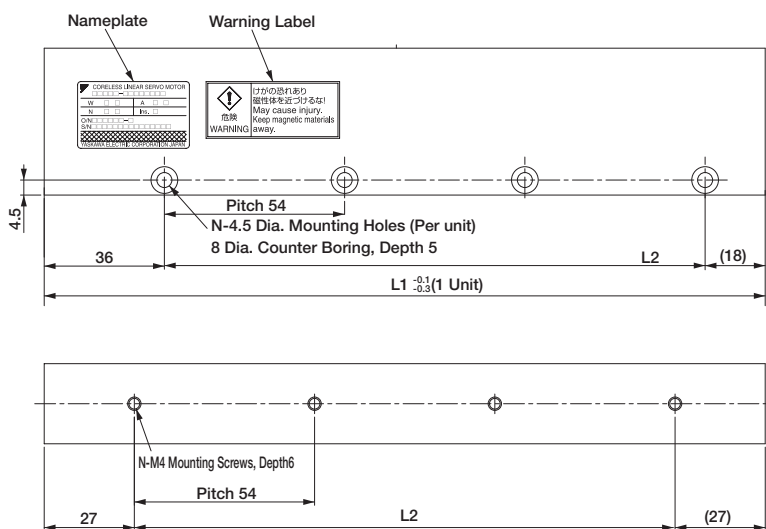
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



**External Dimensions** Units: mm

● Magnetic Way: SGLGM-30□□□A



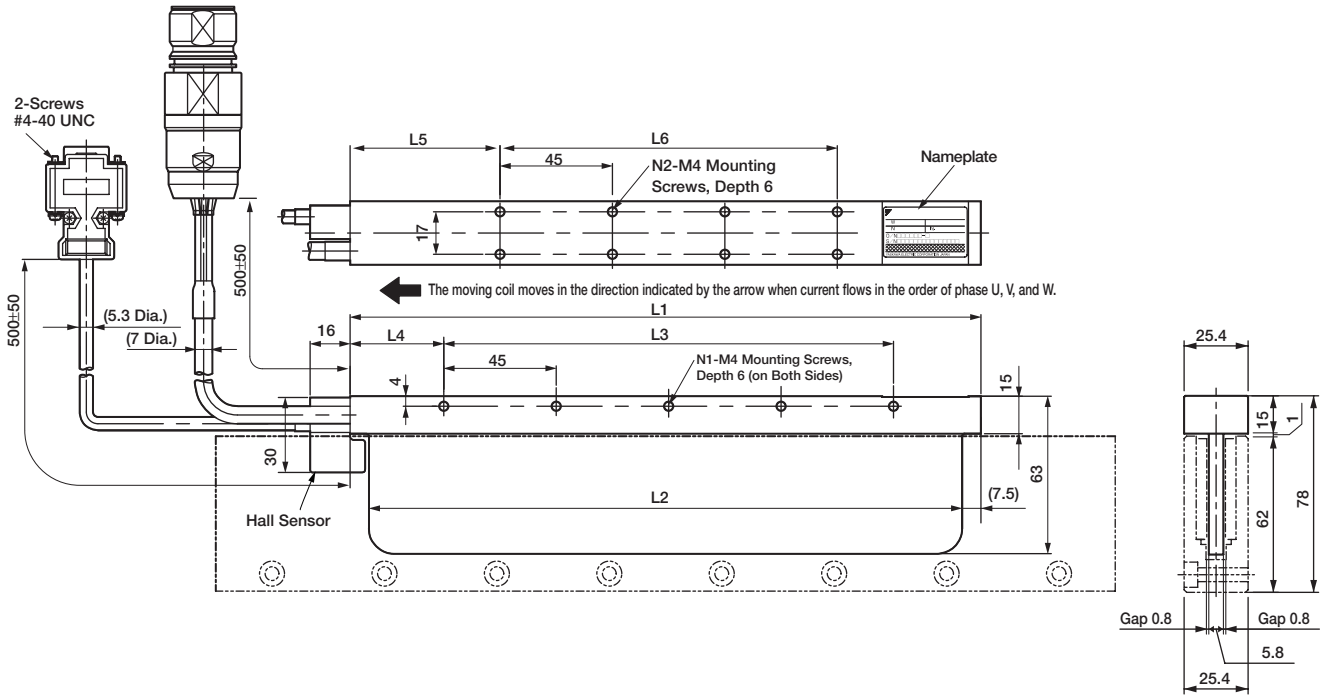
Note: If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass kg
30108A	108	54	2	0.6
30216A	216	162	4	1.1
30432A	432	378	8	2.3

**External Dimensions** Units: mm

(2) SGLGW-40

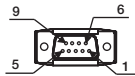
- Moving Coil: SGLGW-40A□□□C□D (With a connector by Interconnectron GmbH)



Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* kg
40A140C□D	140	125	90	30	52.5	45	3	4	0.40
40A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.66
40A365C□D	365	350	315	30	52.5	270	8	14	0.93

\*: The values indicate the mass of moving coil with a hall sensor unit.

Hall Sensor Connector Specifications

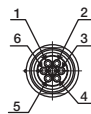


Pin Connector : 17JE-23090-02 (D8C) by DDK Ltd.

The Mating Connector  
Socket Connector : 17JE-13090-02 (D8C)  
Stud : 17L-002C or 17L-002C1

Pin No.	Signal
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



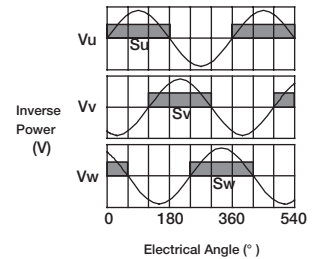
Extension : SROC06JM5CN169  
Pin : 021.423.1020  
by Interconnectron GmbH

The Mating Connector  
Plug : SPUC06KFSDN236  
Socket : 020.030.1020

Pin No.	Signal	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Not used	-
5	Not used	-
6	FG	Green

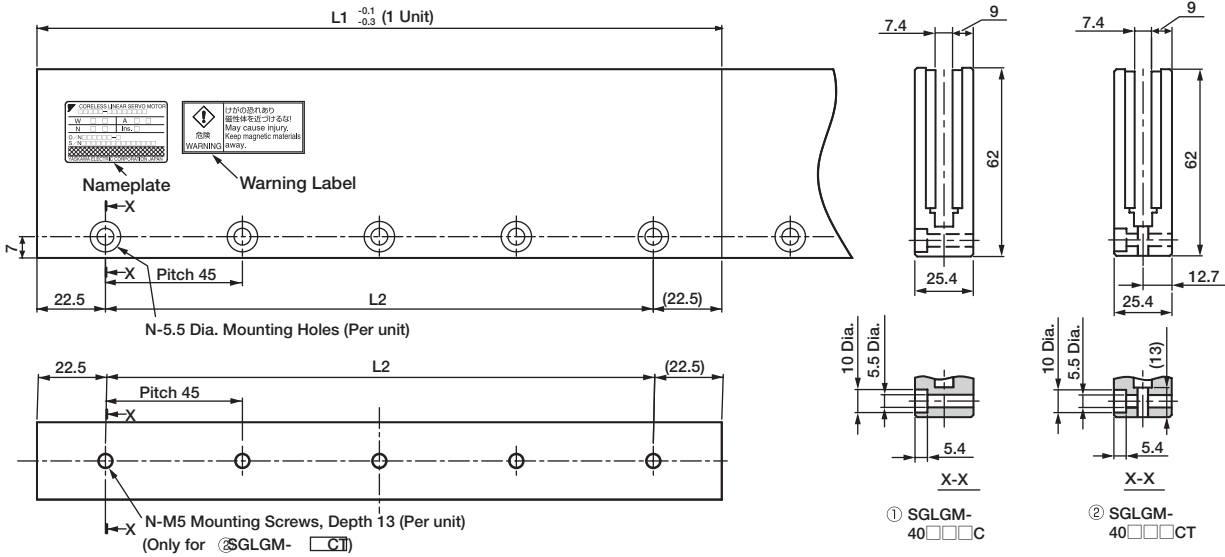
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



**External Dimensions** Units: mm

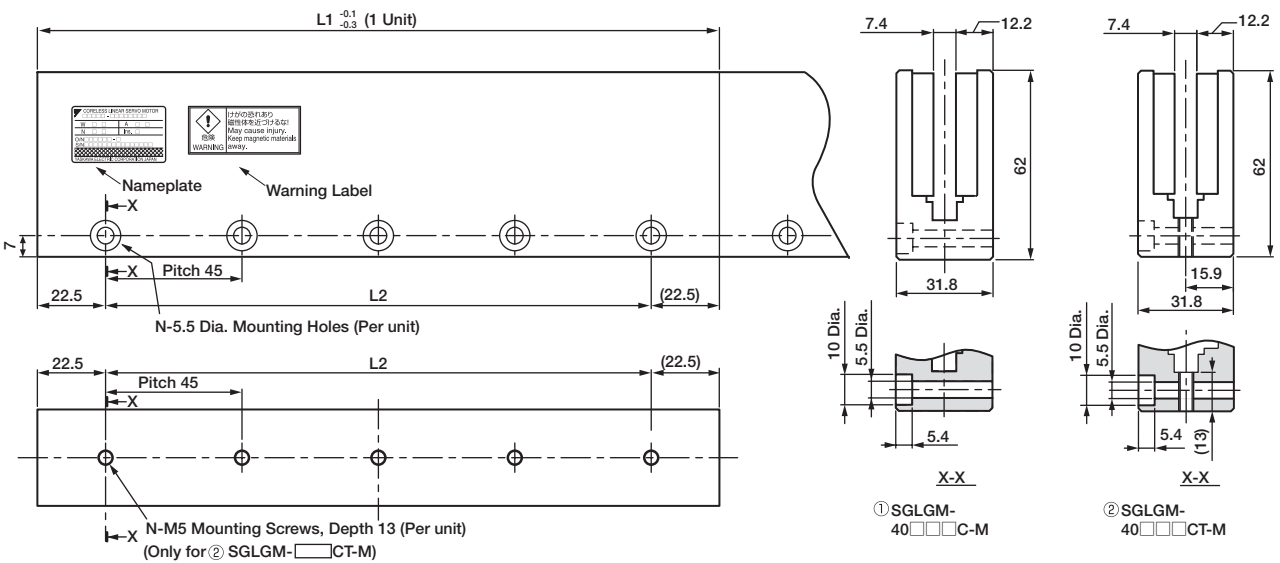
- **Magnetic Way :SGLGM-40□□□C** (Without mounting holes on the bottom)
- SGLGM-40□□□CT** (With mounting holes on the bottom)



Type	Standard-force Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass kg
Standard Force	40090C or 40090CT	90	45	2	0.8
	40225C or 40225CT	225	180	5	2.0
	40360C or 40360CT	360	315	8	3.1
	40405C or 40405CT	405	360	9	3.5
	40450C or 40450CT	450	405	10	3.9

Note: If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

- **High-force Magnetic Way : SGLGM-40□□□C-M** (Without mounting holes on the bottom)
- SGLGM-40□□□CT-M** (With mounting holes on the bottom)



Type	High-force Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass kg
High Force	40090C-M or 40090CT-M	90	45	2	1.0
	40225C-M or 40225CT-M	225	180	5	2.6
	40360C-M or 40360CT-M	360	315	8	4.1
	40405C-M or 40405CT-M	405	360	9	4.6
	40450C-M or 40450CT-M	450	405	10	5.1

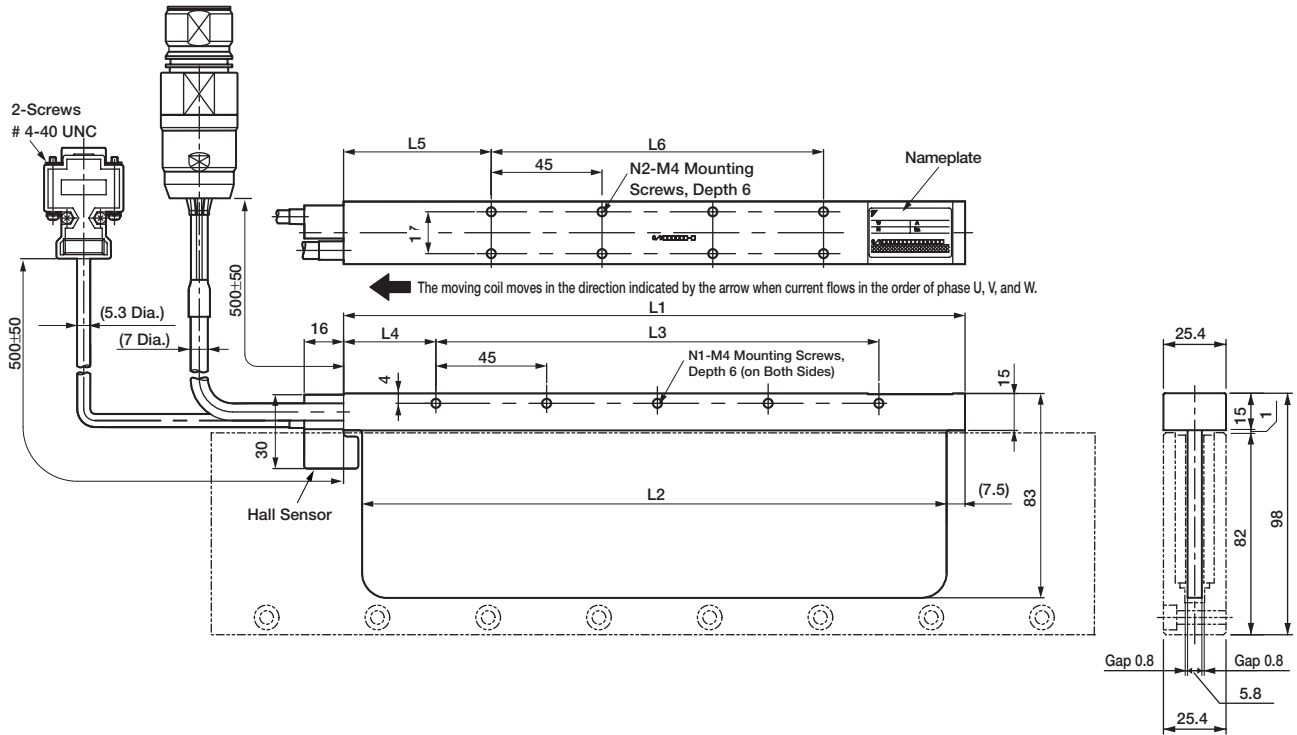
Note: If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.



**External Dimensions** Units: mm

(3) SGLGW-60

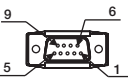
- Moving Coil: SGLGW-60A□□□C□D (With a connector by Interconnectron GmbH)



Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* kg
60A140C□D	140	125	90	30	52.5	45	3	4	0.48
60A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.82
60A365C□D	365	350	315	30	52.5	270	8	14	1.16

\*: The values indicate the mass of moving coil with a hall sensor unit.

Hall Sensor Connector Specifications

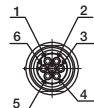


Pin Connector :  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector  
Socket Connector :  
17JE-13090-02 (D8C)  
Stud : 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



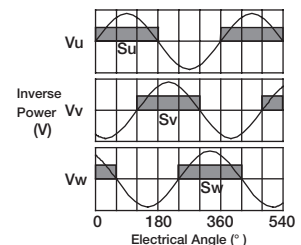
Extension: SROC06JM5CN169  
Pin : 021.423.1020  
by Interconnectron GmbH

The Mating Connector  
Plug : SPUC06KFSDN236  
Socket : 020.030.1020

Pin No.	Signal	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	Not used	-
5	Not used	-
6	FG	Green

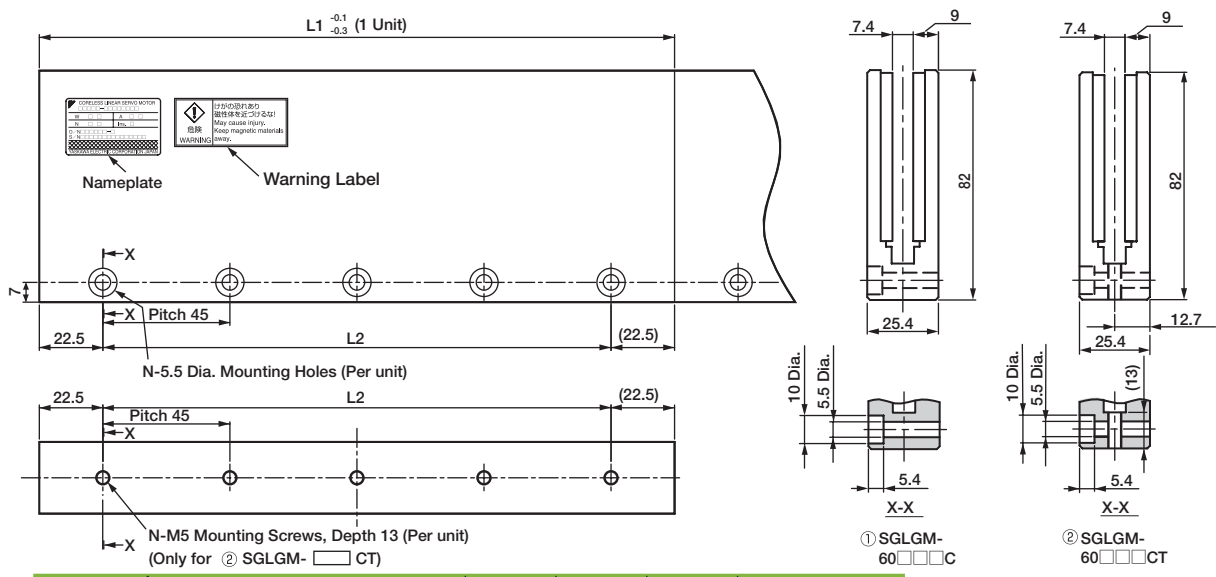
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



**External Dimensions** Units: mm

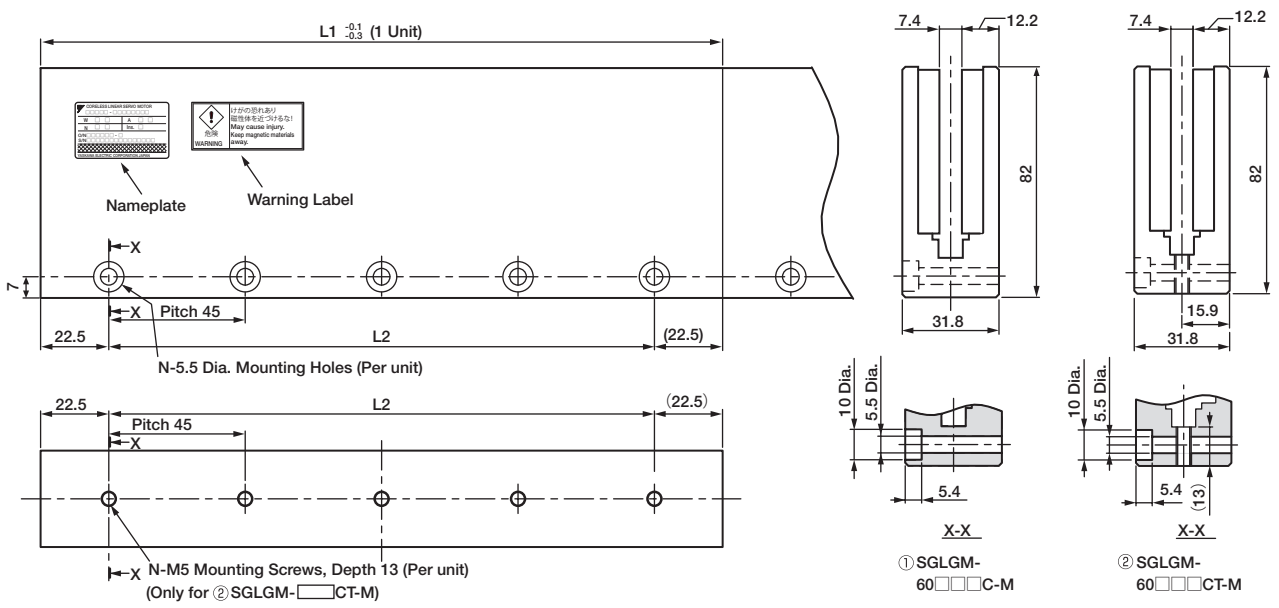
- **Magnetic Way : SGLGM-60□□□C** (Without mounting holes on the bottom)  
**SGLGM-60□□□CT** (With mounting holes on the bottom)



Type	Standard-force Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass kg
Standard Force	60090C or 60090CT	90	45	2	1.1
	60225C or 60225CT	225	180	5	2.6
	60360C or 60360CT	360	315	8	4.1
	60405C or 60405CT	405	360	9	4.6
	60450C or 60450CT	450	405	10	5.1

Note: If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

- **High-force Magnetic Way : SGLGM-60□□□C-M** (Without mounting holes on the bottom)  
**SGLGM-60□□□CT-M** (With mounting holes on the bottom)



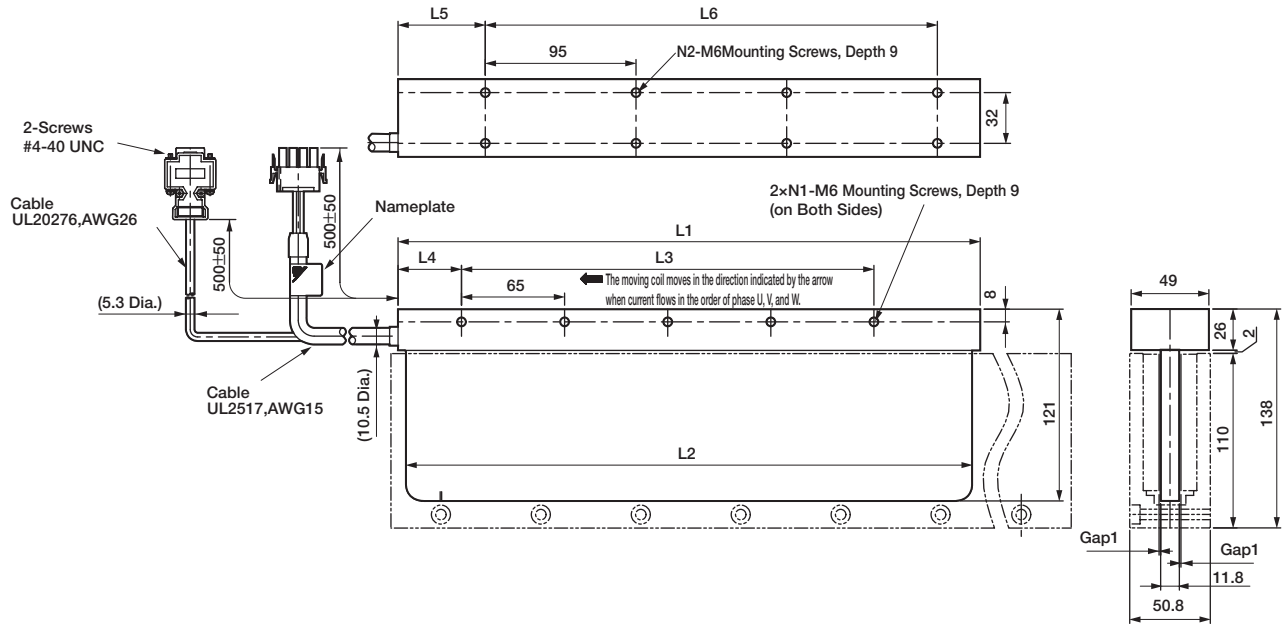
Type	High-force Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass kg
High Force	60090C-M or 60090CT-M	90	45	2	1.3
	60225C-M or 60225CT-M	225	180	5	3.3
	60360C-M or 60360CT-M	360	315	8	5.2
	60405C-M or 60405CT-M	405	360	9	5.9
	60450C-M or 60450CT-M	450	405	10	6.6

Note: If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

**External Dimensions** Units: mm

(4) SGLGW-90

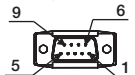
- Moving Coil: SGLGW-90A□□□C□ (With a connector by Tyco Electronics AMP K.K.)



Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* kg
90A200C□	199	189	130	40	60	95	3	4	2.2
90A370C□	367	357	260	40	55	285	5	8	3.65
90A535C□	535	525	455	40	60	380	8	10	4.95

\*: The values indicate the mass of moving coil with a hall sensor unit.

Hall Sensor Connector Specifications



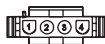
Pin Connector :  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector :  
17JE-13090-02 (D8C)  
Stud : 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Plug : 350779-1  
Pin : 350218-3 or  
350547-3 (No.1 or 3)  
350654-1  
350669-1 (No.4)  
by Tyco Electronics AMP K.K.

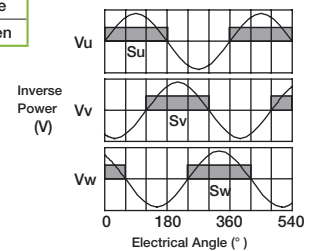
The Mating Connector

Cap : 350780-1  
Socket : 350536-3 or  
350550-3

Pin No.	Signal	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green

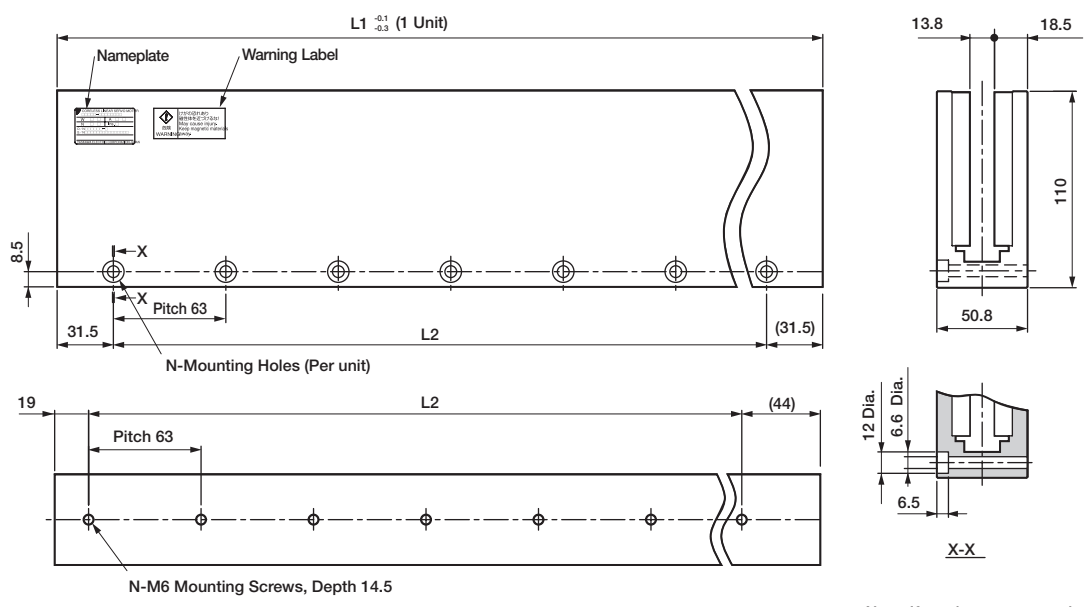
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



**External Dimensions** Units: mm

● Magnetic Way: SGLGM-90□□□A

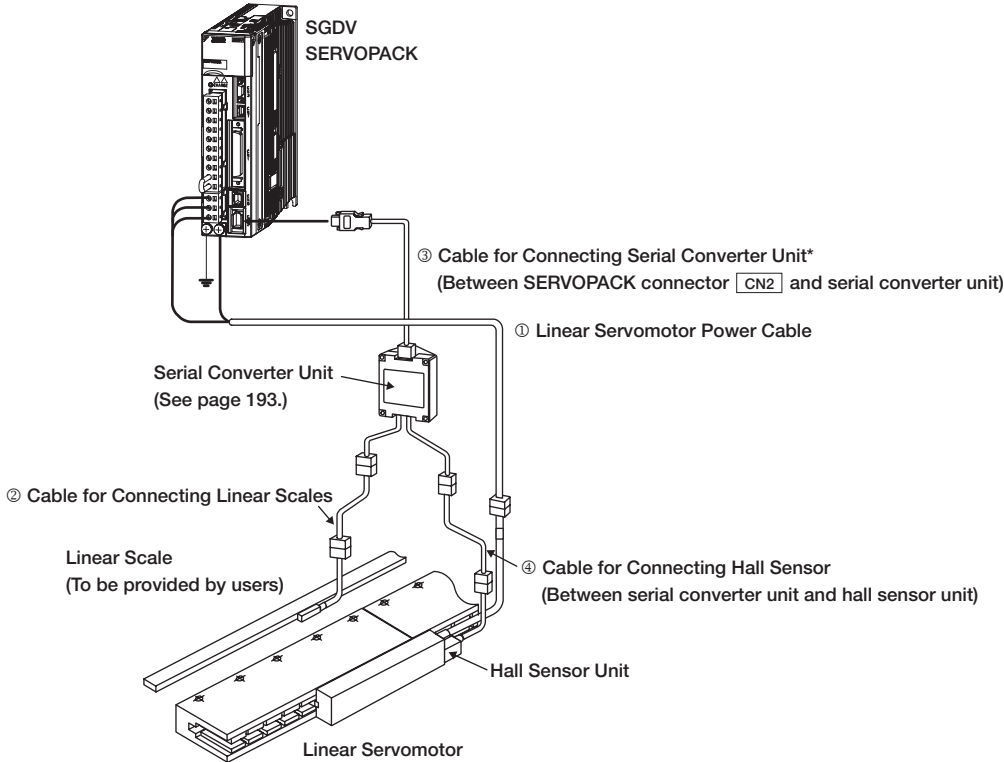


Note: If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

Magnetic Way SGLGM-	L1	L2	N	Approx. Mass kg
90252A	252	189	4	7.3
90504A	504	441	8	14.7

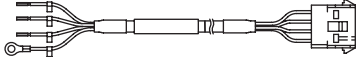

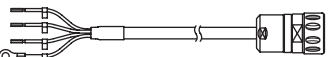
Selecting Cables

● Cables Connections



\*: A serial converter unit can be connected directly to an absolute linear scale.

● Cables

Name	Applicable Linear Servomotor Model	Length	Order No.	Specifications	Details
① Linear Servomotor Power Cables	SGLGW-30, -40, -60	1 m	JZSP-CLN11-01-E	SERVOPACK End      Linear Servomotor End 	(1)
		3 m	JZSP-CLN11-03-E		
		5 m	JZSP-CLN11-05-E		
		10 m	JZSP-CLN11-10-E		
		15 m	JZSP-CLN11-15-E		
	20 m	JZSP-CLN11-20-E	*1		
	SGLGW-90	1 m	JZSP-CLN21-01-E	SERVOPACK End      Linear Servomotor End 	(2)
		3 m	JZSP-CLN21-03-E		
		5 m	JZSP-CLN21-05-E		
		10 m	JZSP-CLN21-10-E		
		15 m	JZSP-CLN21-15-E		
	20 m	JZSP-CLN21-20-E	*1		
	SGLGW -30 □ □ □ □ □ □ □ □ D -40 □ □ □ □ □ □ □ □ D -60 □ □ □ □ □ □ □ □ D	3 m	DP9325252-03G	SERVOPACK End      Linear Servomotor End 	(3)
		5 m	DP9325252-05G		
		10 m	DP9325252-10G		
15 m		DP9325252-15G			
		20 m	DP9325252-20G	*2	

\*1: Connector by Tyco Electronics AMP K.K.

\*2: Connector by Interconnectron GmbH

(Cont'd)

Note: The digit "#" of the order number represents the design revision.

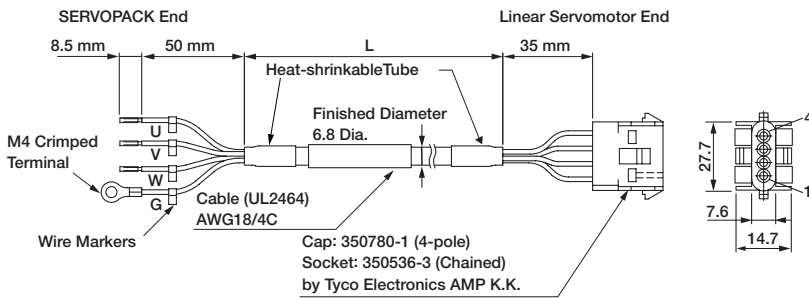
Selecting Cables

● Cables

Name	Applicable Linear Servomotor Model	Length	Order No.	Specifications	Details
② Cables for Connecting Linear Scales*	All models	1 m	JZSP-CLL00-01-E-G#		(4)
		3 m	JZSP-CLL00-03-E-G#		
		5 m	JZSP-CLL00-05-E-G#		
		10 m	JZSP-CLL00-10-E-G#		
		15 m	JZSP-CLL00-15-E-G#		
③ Cables for Connecting Serial Converter Units	All models	1 m	JZSP-CLP70-01-E-G#		(5)
		3 m	JZSP-CLP70-03-E-G#		
		5 m	JZSP-CLP70-05-E-G#		
		10 m	JZSP-CLP70-10-E-G#		
		15 m	JZSP-CLP70-15-E-G#		
		20 m	JZSP-CLP70-20-E-G#		
④ Cables for Connecting Hall Sensors	All models	1 m	JZSP-CLL10-01-E-G#		(6)
		3 m	JZSP-CLL10-03-E-G#		
		5 m	JZSP-CLL10-05-E-G#		
		10 m	JZSP-CLL10-10-E-G#		
		15 m	JZSP-CLL10-15-E-G#		

\*: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.  
Note: The digit "#" of the order number represents the design revision.

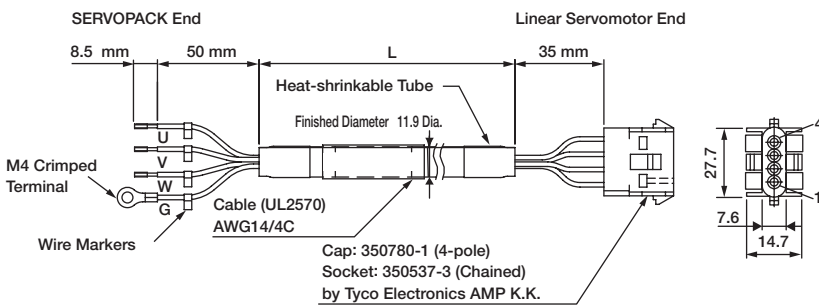
(1) Linear Servomotor Power Cables: JZSP-CLN11-□□-E



• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin. No.
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Blue	Phase W	Phase W	3
Green/yellow	FG	FG	4

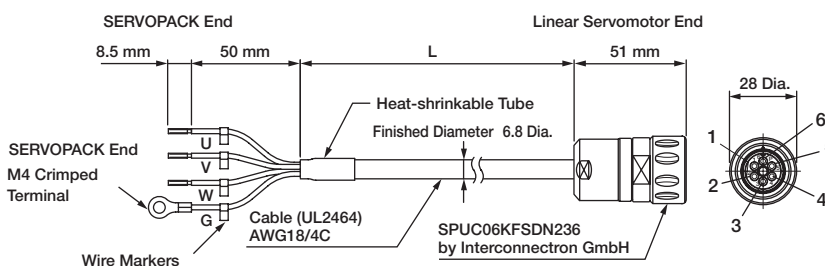
(2) Linear Servomotor Power Cables: JZSP-CLN21-□□-E



• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin. No.
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Blue	Phase W	Phase W	3
Green/yellow	FG	FG	4

(3) Linear Servomotor Power Cables: DP9325252-□□□G

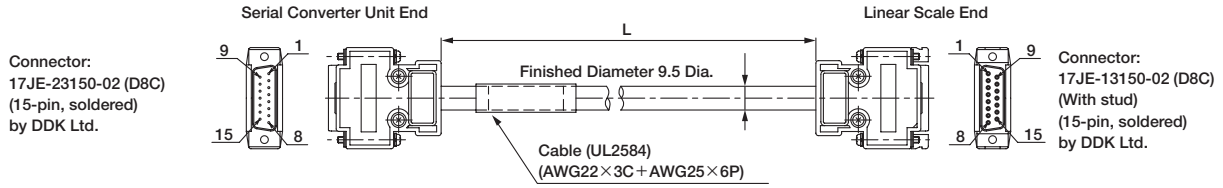


• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin. No.
Black 1	Phase U	Phase U	1
Black 2	Phase V	Phase V	2
Black 3	Phase W	Phase W	3
Green/yellow	FG	—	4
		—	5
		FG	6

Selecting Cables

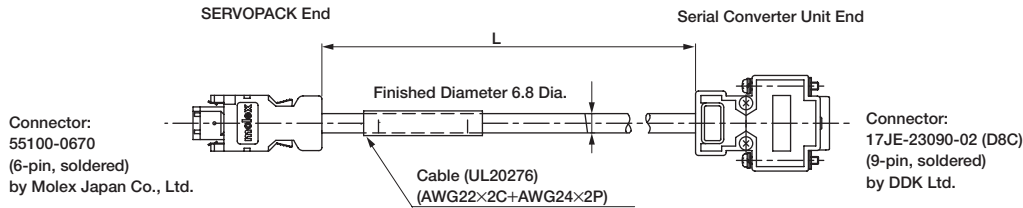
(4) Cables for Connecting Linear Scales: JZSP-CLL00-□□-E-G#



• Wiring Specifications

Serial Converter Unit End		Linear Scale End	
Pin No.	Signal	Pin No.	Signal
1	/Cos (V1-)	1	/Cos (V1-)
2	/Sin (V2-)	2	/Sin (V2-)
3	Ref (V0+)	3	Ref (V0+)
4	+5V	4	+5V
5	5Vs	5	5Vs
6	BID	6	BID
7	Vx	7	Vx
8	Vq	8	Vq
9	Cos (V1+)	9	Cos (V1+)
10	Sin (V2+)	10	Sin (V2+)
11	/Ref (V0-)	11	/Ref (V0-)
12	0V	12	0V
13	0Vs	13	0Vs
14	DIR	14	DIR
15	Inner	15	Inner
Case	Shield	Case	Shield

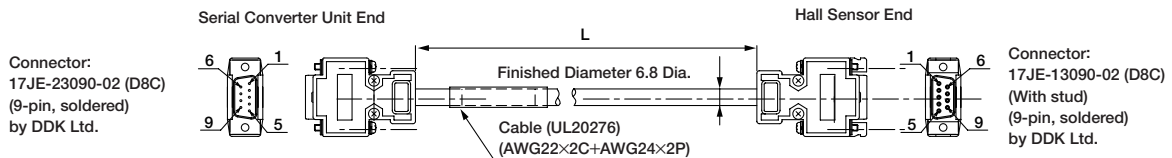
(5) Cables for Connecting Serial Converter Units: JZSP-CLP70-□□-E-G#



• Wiring Specifications

SERVOPACK End			Serial Converter Unit End		
Pin No.	Signal	Wire Color	Pin No.	Signal	Wire Color
1	PG5V	Red	1	+5V	Red
2	PG0V	Black	5	0V	Black
3	-	-	3	-	-
4	-	-	4	-	-
5	PS	Light blue	2	Phase S output	Light blue
6	/PS	Light blue/white	6	Phase /S output	Light blue/white
Shell	Shield	-	Case	Shield	-
			7	-	-
			8	-	-
			9	-	-

(6) Cables for Connecting Hall Sensors: JZSP-CLL10-□□-E-G#



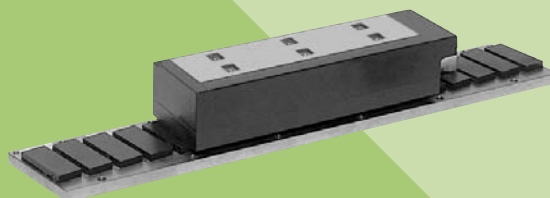
• Wiring Specifications

Serial Converter Unit End		Hall Sensor End	
Pin No.	Signal	Pin No.	Signal
1	+5V	1	+5V
2	Phase U input	2	Phase U input
3	Phase V input	3	Phase V input
4	Phase W input	4	Phase W input
5	0V	5	0V
6	-	6	-
7	-	7	-
8	-	8	-
9	-	9	-
Case	Shield	Case	Shield

# Linear Servomotors

# SGLFW

(With F-type iron core)



## Model Designations

### ● Moving Coil

S G L F W - 20 A 090 A P □

Linear  $\Sigma$  Series Linear Servomotor    1st digit    2nd digit    3rd+4th digits    5th digit    6th+7th+8th digits    9th digit    10th digit    11th digit

#### 1st digit Servomotor Type

Code	Specifications
F	F-type iron core

#### 2nd digit Moving Coil/ Magnetic Way

Code	Specifications
W	Moving Coil

#### 3rd+4th digits Magnet Height

#### 5th digit Voltage

Code	Specifications
A	200 VAC
D	400 VAC

#### 6th+7th+8th digits Length of Moving Coil

#### 9th digit Design Revision Order A, B...

#### 10th digit Hall Sensor

Code	Specifications
P	With hall sensor
Blank	Without hall sensor

#### 11th digit Connector for Main Circuit Cable

Code	Specifications	Applicable Model
Blank	Connector by Tyco Electronics AMP K.K.	All models
D	Connector by Interconnectron GmbH	SGLFW-35,-50,-1Z□200B,-1ZD380B

### ● Magnetic Way

S G L F M - 20 324 A □

Linear  $\Sigma$  Series Linear Servomotor    1st digit    2nd digit    3rd+4th digits    5th+6th+7th digits    8th digit    9th digit

#### 1st digit Servomotor Type (Same as that of the moving coil)

#### 2nd digit Moving Coil/ Magnetic Way

Code	Specifications
M	Magnetic Way

#### 3rd+4th digits Magnet Height

#### 5th+6th+7th digits Length of Magnetic Way

#### 8th digit Design Revision Order A, B...

#### 9th digit Options

Code	Specifications
Blank	Standard
C	With magnet cover



## Features

- Direct-feed mechanism for high-speed and high-precision positioning.
- The magnetic attraction force between the moving and stationary members can be used effectively to increase the rigidity of the linear guidance by preloading the linear motion bearings.
- The magnetic preloading on certain types of compliant linear motion bearings can help increase the system's frequency response, improving its deceleration and settling performances.

## Application Examples

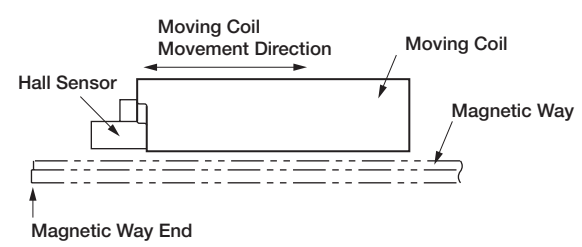
- Feeders and loaders
- Semiconductor equipment
- LCD manufacturing equipment

### ● Precautions on Moving Coil with Hall Sensor

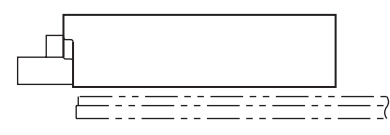
When using a moving coil with a hall sensor, the magnetic way must completely cover the bottom of the hall sensor. Refer to the example showing the correct installation.

When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length of the moving coil and the hall sensor unit. Refer to the following table.

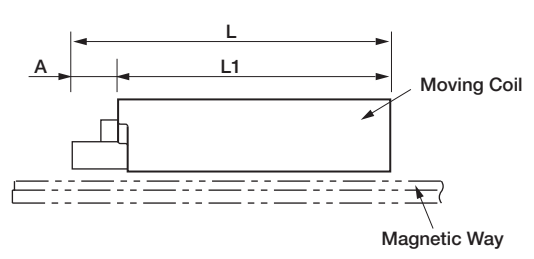
<Correct>



<Incorrect>



### The total length of moving coil with hall sensor



Moving Coil Model SGLFW-	Length of Moving Coil L1 (mm)	Length of Hall Sensor Unit A (mm)	Total Length L (mm)
20A090AP□	91	22	113
20A120AP□	127		149
35□120AP□	127	22	149
35□230AP□	235		257
50□200□P□	215	22	237
50□380□P□	395		417
1Z□200□P□	215	22	237
1Z□380□P□	395		417

## Ratings and Specifications

**Time Rating:** Continuous

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Self-cooled

**Ambient Humidity:** 20% to 80% (no condensation)

**Allowable Winding Temperature:** 130°C (Thermal class B)

### 200-V Class

Linear Servomotor Model SGLFW- <span style="border: 1px solid black; padding: 0 5px;"> </span>		20A		35A		50A		1ZA	
		090A	120A	120A	230A	200B	380B	200B	380B
Peak Speed	m/s	5.0	5.0	5.0	5.0	5.0	5.0	4.9	4.9
Rated Force*	N	25	40	80	160	280	560	560	1120
Rated Current*	Arms	0.70	0.80	1.4	2.8	5.0	10.0	8.7	17.5
Peak Force*	N	86	125	220	440	600	1200	1200	2400
Peak Current*	Arms	3.0	2.9	4.4	8.8	12.4	25.0	21.6	43.6
Moving Coil Mass	kg	0.7	0.9	1.3	2.3	3.5	6.9	6.4	11.5
Force Constant	N/Arms	36.0	54.0	62.4	62.4	60.2	60.2	69.0	69.0
BEMF Constant	V/ (m/s)	12.0	18.0	20.8	20.8	20.1	20.1	23.0	23.0
Motor Constant	N/√W	7.9	9.8	14.4	20.4	34.3	48.5	52.4	74.0
Electrical Time Constant	ms	3.2	3.3	3.6	3.6	15.9	15.8	18.3	18.3
Mechanical Time Constant	ms	11.0	9.3	6.2	5.5	3.0	2.9	2.3	2.1
Thermal Resistance (With Heat Sink)	K/W	4.35	3.19	1.57	0.96	0.56	0.38	0.47	0.2
Thermal Resistance (Without Heat Sink)	K/W	7.69	5.02	4.10	1.94	1.65	0.95	1.3	0.73
Magnetic Attraction	N	314	462	809	1590	1650	3260	3300	6520
Applicable SERVOPACK	SGDV-	1R6	1R6	1R6	3R8	5R5	120A	120A	200A

Notes: 1 The items marked with an \* and *Force and Speed Characteristics* (the table on the next page) are the values at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. The others are at 20°C.

2 The above specifications show the values under the cooling condition when a heat sink (aluminum board) listed in the following table is mounted on the moving coil.

Heat Sink Size	Applicable Models
125 mm × 125 mm × 13 mm	SGLFW-20A090A, -20A120A
254 mm × 254 mm × 25 mm	SGLFW-35A120A, -35A230A
400 mm × 500 mm × 40 mm	SGLFW-50A200B, -50A380B, -1ZA200B
600 mm × 762 mm × 50 mm	SGLFW-1ZA380B

### 400-V Class

Linear Servomotor Model SGLFW- <span style="border: 1px solid black; padding: 0 5px;"> </span>		35D		50D		1ZD		1ED	
		120A	230A	200B	380B	200B	380B	380B	560B
Peak Speed	m/s	4.5	4.5	5.0	5.0	5.0	5.0	2.4	2.4
Rated Force*	N	80	160	280	560	560	1120	1500	2250
Rated Current*	Arms	0.6	1.3	2.3	4.5	4.9	9.8	6.4	9.6
Peak Force*	N	220	440	600	1200	1200	2400	3600	5400
Peak Current*	Arms	2.0	4.0	5.6	11.0	12.3	24.6	18.1	27.2
Moving Coil Mass	kg	1.3	2.3	3.5	6.9	6.4	11.5	20	29
Force Constant	N/Arms	136.0	136.0	134.7	134.7	122.6	122.6	250	250
BEMF Constant	V/ (m/s)	45.3	45.3	44.9	44.9	40.9	40.9	83.2	83.2
Motor Constant	N/√W	14.2	20.1	33.4	47.2	51.0	72.1	95.4	117
Electrical Time Constant	ms	3.7	3.6	15.0	15.0	17.4	17.2	16.9	16.9
Mechanical Time Constant	ms	5.2	5.1	3.2	3.2	2.5	2.2	2.2	2.1
Thermal Resistance (With Heat Sink)	K/W	1.57	0.96	0.56	0.38	0.47	0.2	0.19	0.15
Thermal Resistance (Without Heat Sink)	K/W	4.1	1.94	1.65	0.95	1.3	0.73	0.45	0.37
Magnetic Attraction	N	810	1590	1650	3260	3300	6520	9780	14600
Applicable SERVOPACK	SGDV-	1R9D	1R9D	3R5D	5R4D	5R4D	120D	8R4D	120D

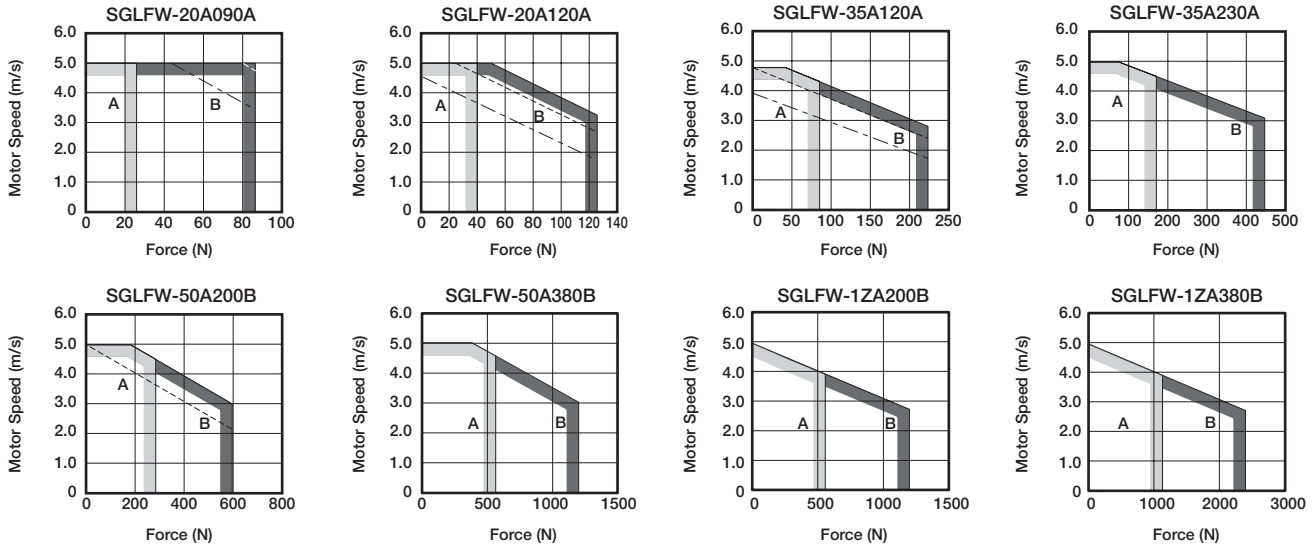
Notes: 1 The items marked with an \* and *Force and Speed Characteristics* (the table on the next page) are the values at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. The others are at 20°C.

2 The above specifications show the values under the cooling condition when a heat sink (aluminum board) listed in the following table is mounted on the moving coil.

Heat Sink Size	Applicable Models
254 mm × 254 mm × 25 mm	SGLFW-35D120A, -35D230A
400 mm × 500 mm × 40 mm	SGLFW-50D200B, -50D380B, -1ZD200B
600 mm × 762 mm × 50 mm	SGLFW-1ZD380B
609 mm × 762 mm × 50 mm	SGLFW-1ED380B, SGLFW-1ED560B

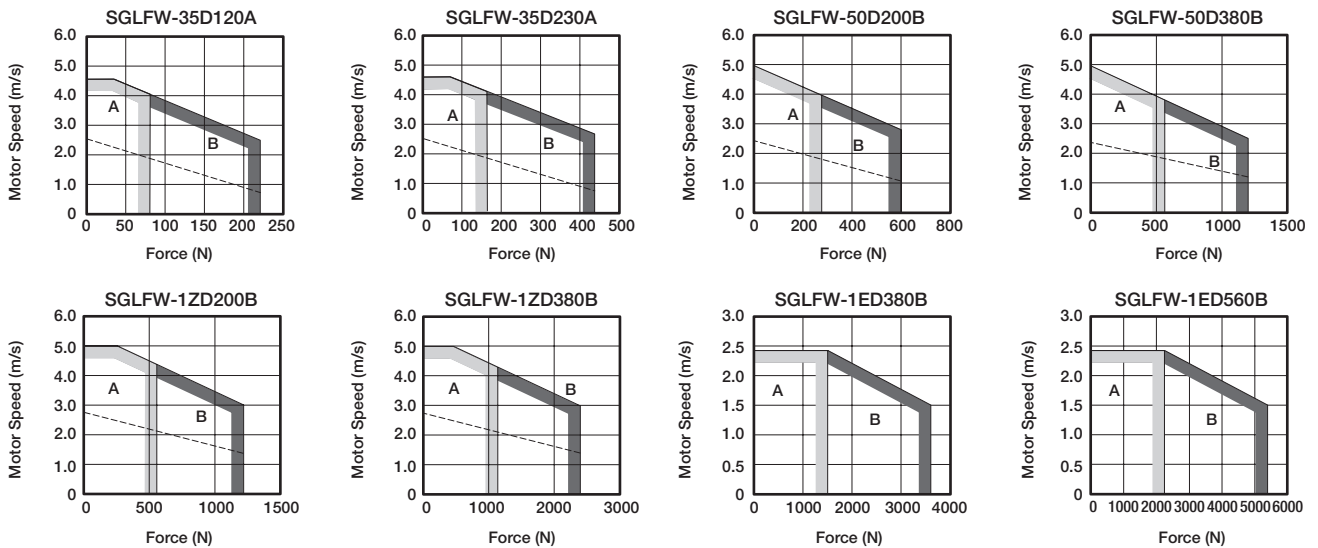
**Ratings and Specifications**

● **Force and Speed Characteristics** **A** : Continuous Duty Zone **B** : Intermittent Duty Zone  
200-V Class



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid, dotted, and dashed-dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:  
 ● The solid line: With a three-phase 200 V SERVOPACK  
 ● The dotted line: With a single-phase 200 V SERVOPACK  
 ● The dashed-dotted line: With a single-phase 100 V SERVOPACK  
 2 When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.

**400-V Class**



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid and dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:  
 ● The solid line: With a three-phase 400 V SERVOPACK  
 ● The dotted line: With a three-phase 200 V SERVOPACK  
 2 When using the servomotor with a three-phase 200-V input power supply, a different serial converter unit is required. For details, contact your Yaskawa representative.  
 3 When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.

● **Mechanical Specifications**

(1) Impact Resistance

- Impact acceleration: 196 m/s<sup>2</sup>
- Impact occurrences: twice

(2) Vibration Resistance

The linear servomotors will withstand the following vibration acceleration in three directions: Vertical, side to side, and front to back.

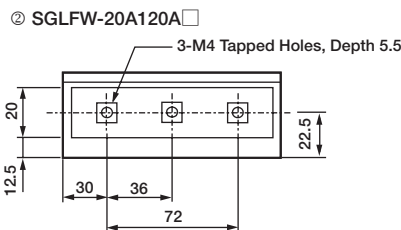
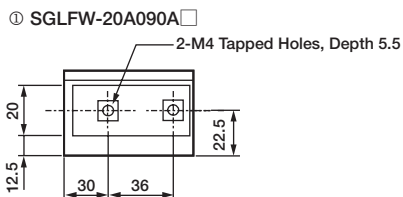
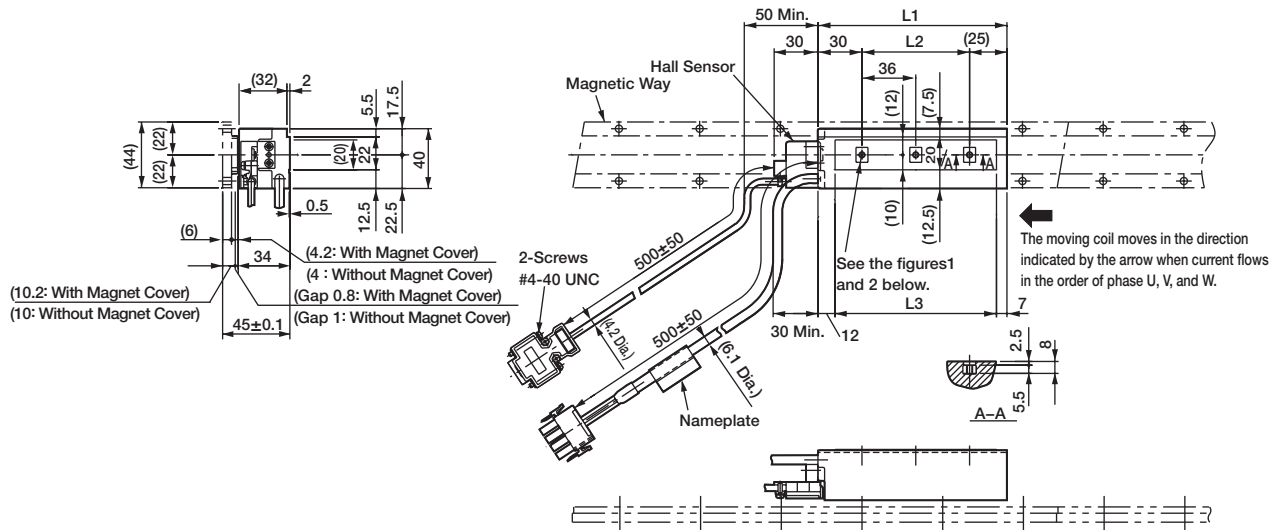
- Vibration acceleration: 49 m/s<sup>2</sup>

Linear Servomotors

**External Dimensions** Units: mm

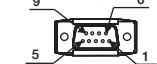
(1) SGLFW-20

- Moving Coil: SGLFW-20A□□□A□ (With a connector by Tyco Electronics AMP K.K.)



Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass kg
20A090A□	91	36	72	0.7
20A120A□	127	72	108	0.9

Hall Sensor Connector Specifications



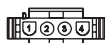
Pin Connector : 17JE-13090-02 (D8C) by DDK Ltd.

The Mating Connector

Socket Connector: 17JE-13090-02 (D8C)  
Stud: 17L-002C or 17L-002C1

Pin No.	Signal
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Plug: 350779-1  
Pin : 350218-3 or 350547-3 (No.1 to 3) 350654-1 350669-1 (No.4)  
by Tyco Electronics AMP K.K.

The Mating Connector

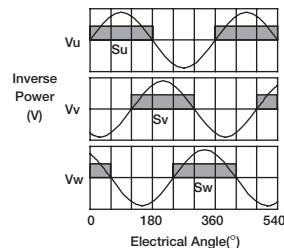
Cap : 350780-1  
Socket: 350536-3 or 350550-3

Pin No.	Signal	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Black
4	FG	Green

Note: Models compatible with connectors by Interconnectron GmbH are also available.

Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.

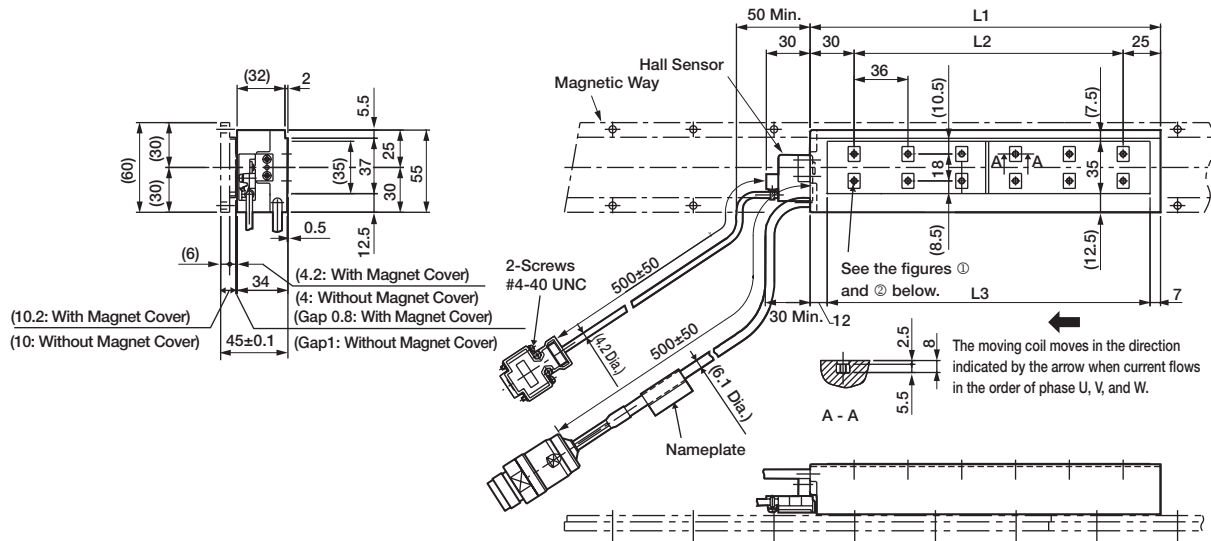




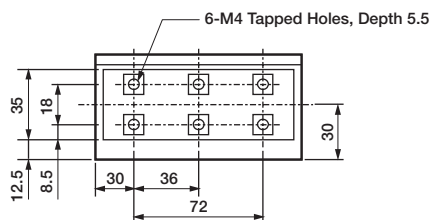
External Dimensions Units: mm

(2) SGLFW-35

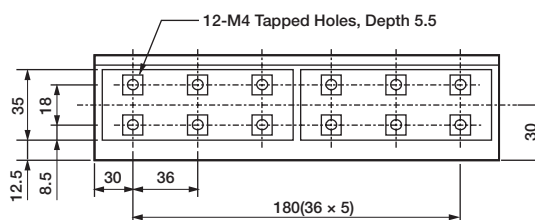
- Moving Coil: SGLFW-35□□□□A□D (With a connector by Interconnectron GmbH)



① SGLFW-35□120A□D

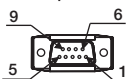


② SGLFW-35□230A□D



Moving Coil Model SGLFW-	L1	L2	L3	N	Approx. Mass kg
35□120A□D	127	72	108	6	1.3
35□230A□D	235	180	216	12	2.3

Hall Sensor Connector Specifications



Pin Connector : 17JE-23090-02 (D8C) by DDK Ltd.

The Mating Connector

Socket Connector: 17JE-13090-02 (D8C) Stud: 17L-002C or 17L-002C1

Pin No.	Signal
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Extension: ARRA06AMRPN182 Pin : 021.279.1020 by Interconnectron GmbH

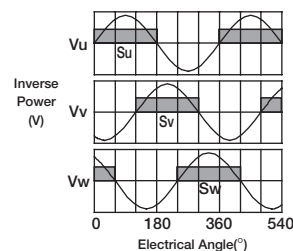
The Mating Connector

Plug : APRA06BFRDN170 Socket: 020.105.1020

Pin No.	Name
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⊕	Ground

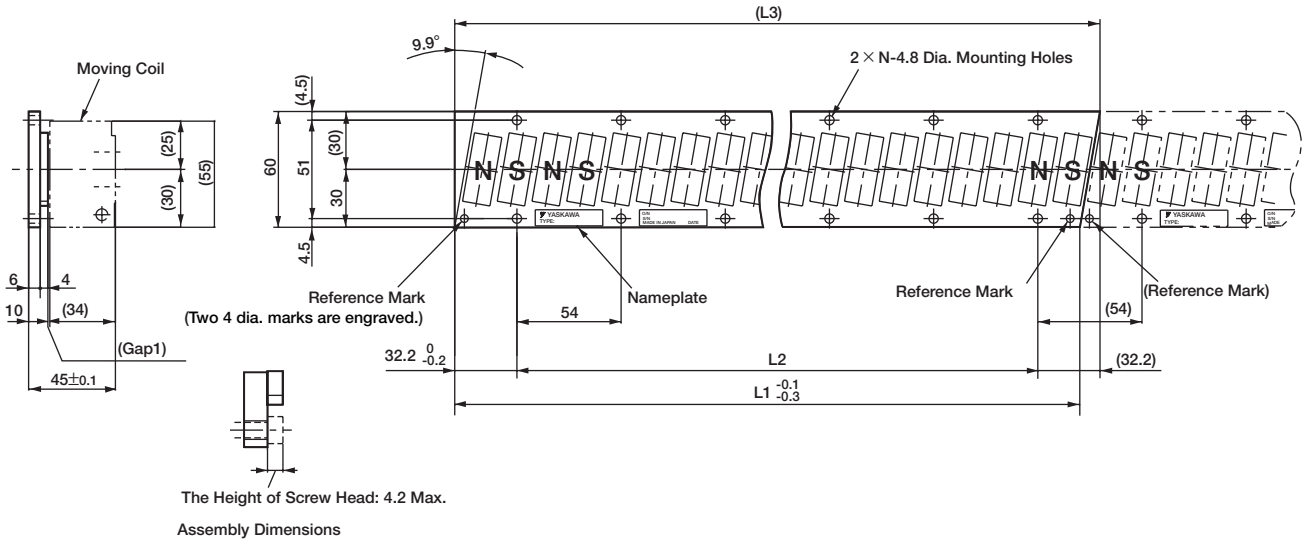
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



External Dimensions Units: mm

• Magnetic Way: SGLFM-35□□□A

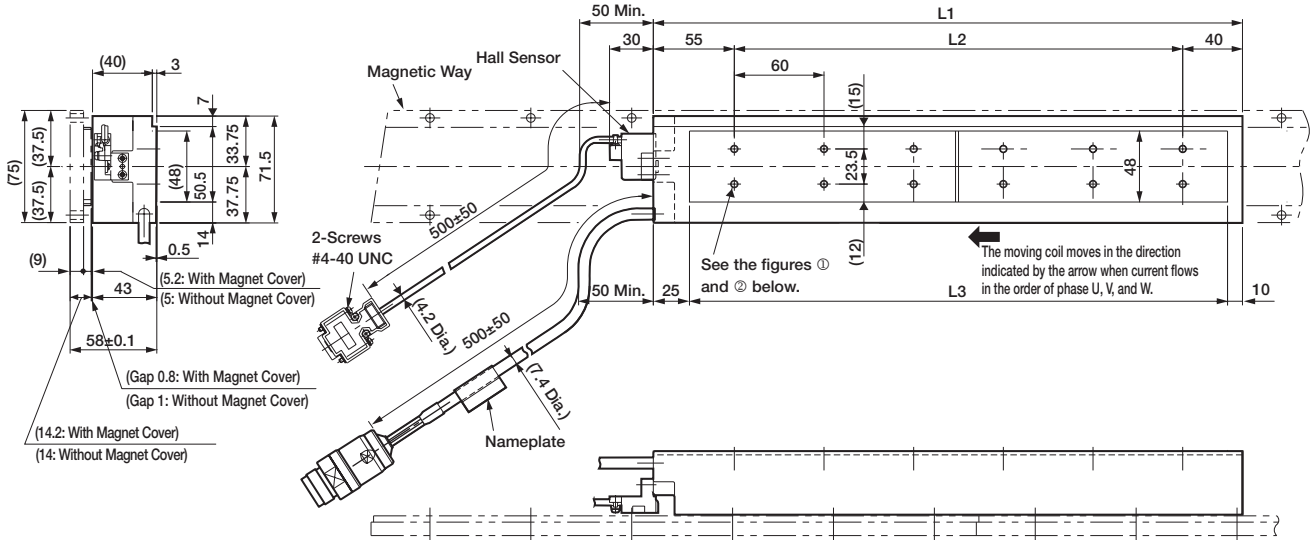


- Notes: 1 Multiple SGLFM-35□□□A magnetic ways can be connected. Connect magnetic ways so that the reference marks match one on the other in the same direction as shown in the figure.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

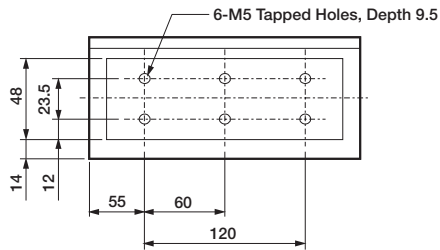
Magnetic Way Model SGLFM-	L1 <sup>-0.1</sup> <sub>-0.3</sub>	L2	(L3)	N	Approx. Mass kg
35324A	324	270 (54×5)	(334.4)	6	1.2
35540A	540	486 (54×9)	(550.4)	10	2
35756A	756	702 (54×13)	(766.4)	14	2.9

External Dimensions Units: mm

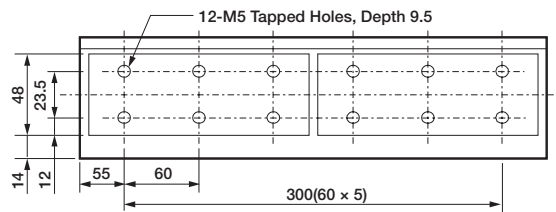
- Moving Coil: SGLFW-50□□□□B□D (With a connector by Interconnectron GmbH)



① SGLFW-50□200B□D

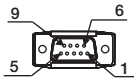


② SGLFW-50□380B□D



Moving Coil Model SGLFW-	L1	L2	L3	N	Approx. Mass kg
50□200B□D	215	120	180	6	3.5
50□380B□D	395	300	360	12	6.9

Hall Sensor  
Connector Specifications



Pin Connector :  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor  
Connector Specifications



Extension: ARRA06AMRPN182  
Pin : 021.279.1020  
by Interconnectron GmbH

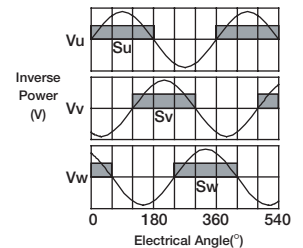
The Mating Connector

Plug : APRA06BFRDN170  
Socket: 020.105.1020

Pin No.	Name
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⊕	Ground

Hall Sensor Output Signals

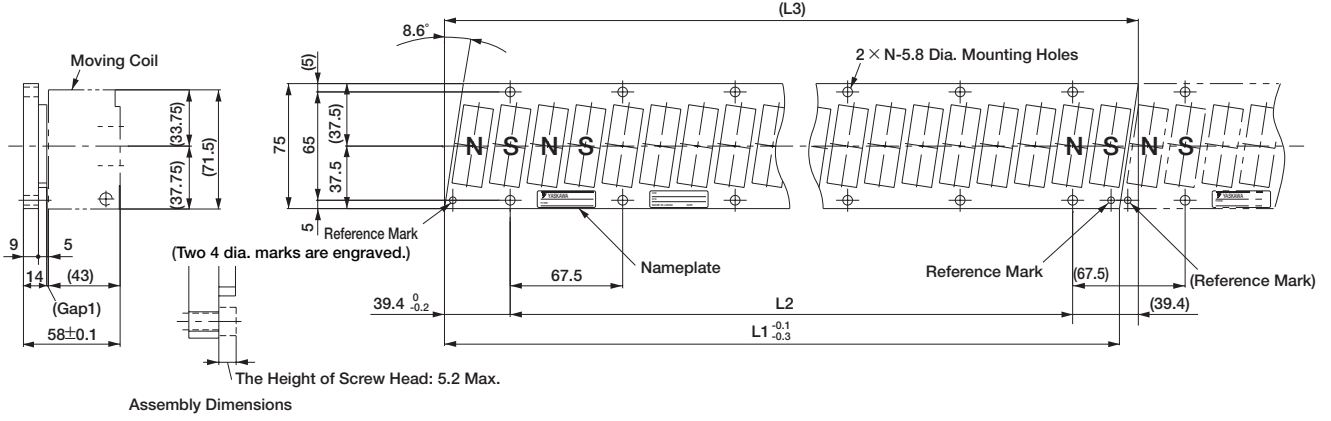
When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.





External Dimensions Units: mm

● Magnetic Way: SGLFM-50□□□A



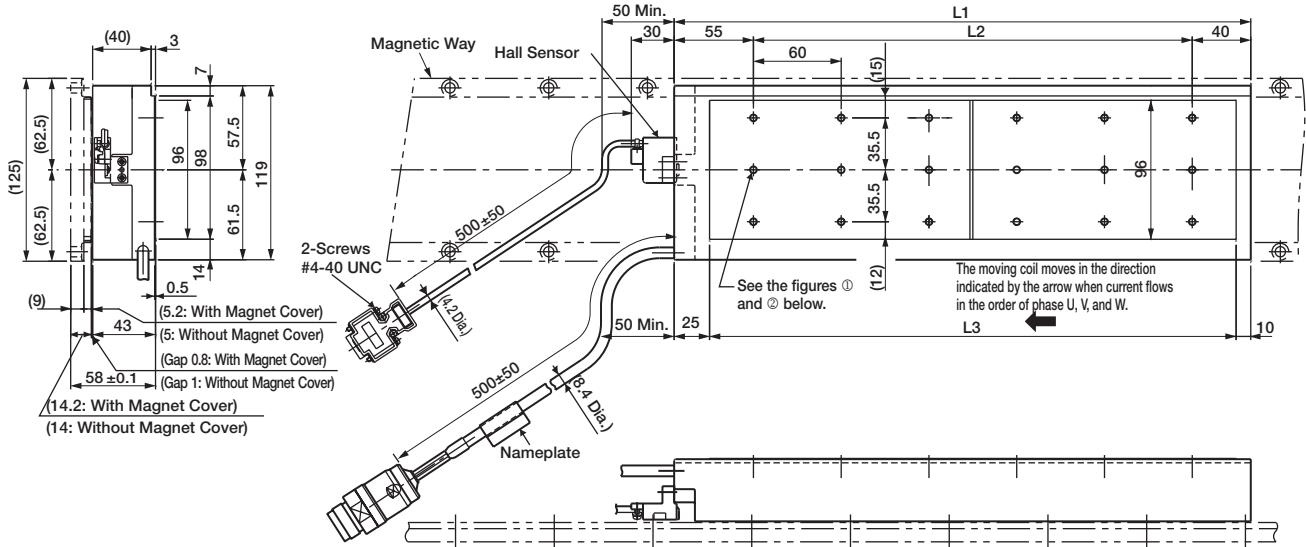
- Notes: 1 Multiple SGLFM-50□□□A magnetic ways can be connected. Connect magnetic ways so that the reference marks match one on the other in the same direction as shown in the figure.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

Magnetic Way Model SGLFM-	L1 <sup>-0.1</sup> <sub>-0.3</sub>	L2	(L3)	N	Approx. Mass kg
50405A	405	337.5 (67.5 × 5)	(416.3)	6	2.8
50675A	675	607.5 (67.5 × 9)	(686.3)	10	4.6
50945A	945	877.5 (67.5 × 13)	(956.3)	14	6.5

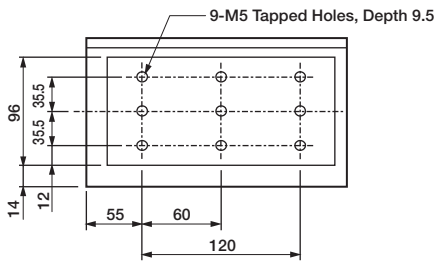
External Dimensions Units: mm

(4) SGLFW-1Z

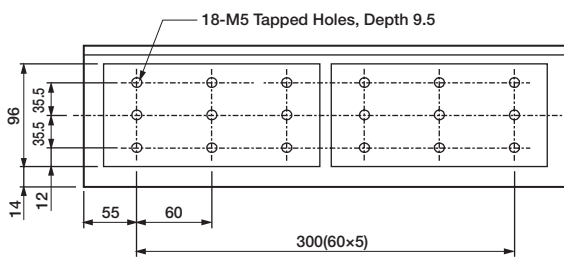
- Moving Coil: SGLFW-1Z□□□□B□D (With a connector by Interconnectron GmbH)



① SGLFW-1Z□200B□D

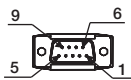


② SGLFW-1ZD380B□D



Moving Coil Model SGLFW-	L1	L2	L3	N	Approx. Mass kg
1Z□200B□D	215	120	180	9	6.4
1ZD380B□D	395	300	360	18	11.5

Hall Sensor  
Connector Specifications



Pin Connector :  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor  
Connector Specifications



Extension: ARRA06AMRPN182  
Pin : 021.279.1020  
by Interconnectron GmbH

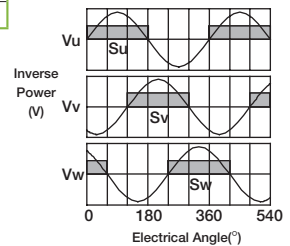
The Mating Connector

Plug : APRA06BFRDN170  
Socket: 020.105.1020

Pin No.	Name
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⊕	Ground

Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.

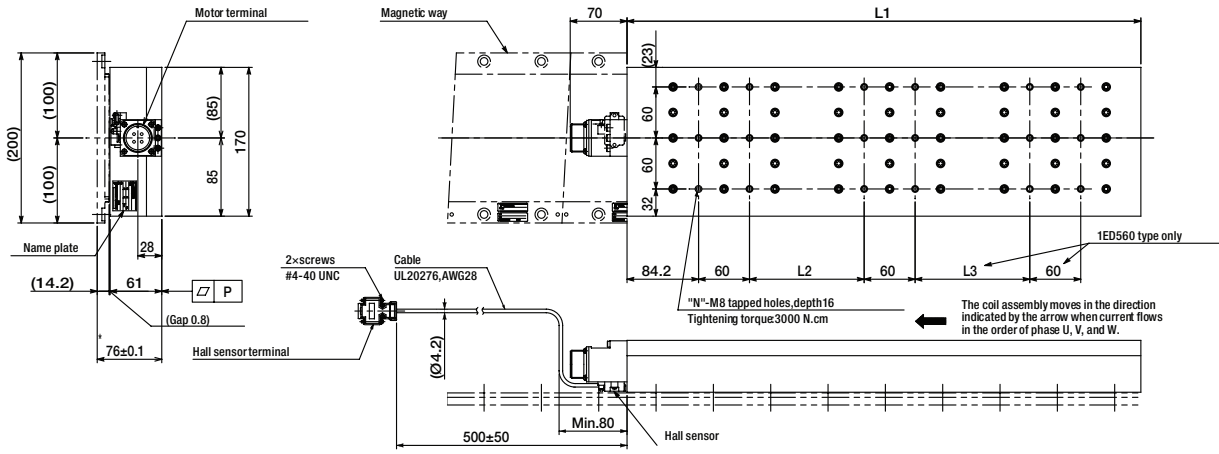




External Dimensions Units: mm

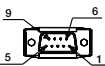
(4) SGLFW-1ED

- Moving Coil: SGLFW-1ED□□□B□ (With a connector by Tyco Electronics AMP K.K.)



Units: mm

Hall sensor Connector specifications



Pin connector type: 17JE-23090-02 (D8C) made by DDK Ltd.

The mating connector  
Socket connector type: 17JE-13090-02 (D8C)  
Stud type: 17L-002C or 17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Motor Connector specifications



Receptacle type: MS3102A-22-22P made by DDK Ltd.

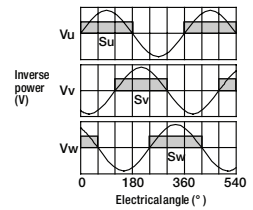
The mating connector

L-shaped plug type: MS3108E22-22S

Pin No.	Name
A	Phase U
B	Phase V
C	Phase W
D	Ground

Hall sensor output signals

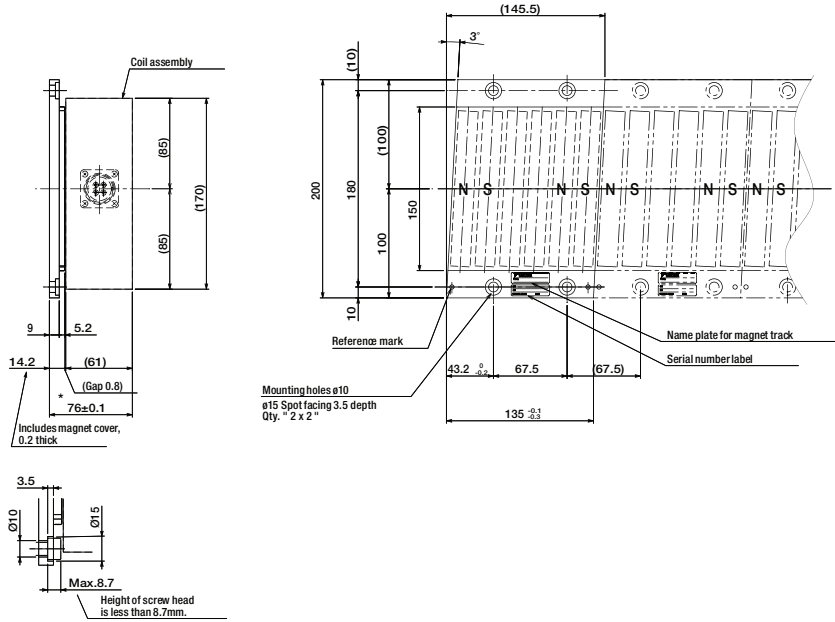
When the coil assembly moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below



Moving Coil Model SGLFW-	L1	L2	L3	N	P	Approx. Mass kg
1ED380B□	390	120	-	12	0.3	20
1ED560B□	600	135	135	18	0.5	29

External Dimensions Units: mm

• Magnetic Way: SGLFM-1E135A



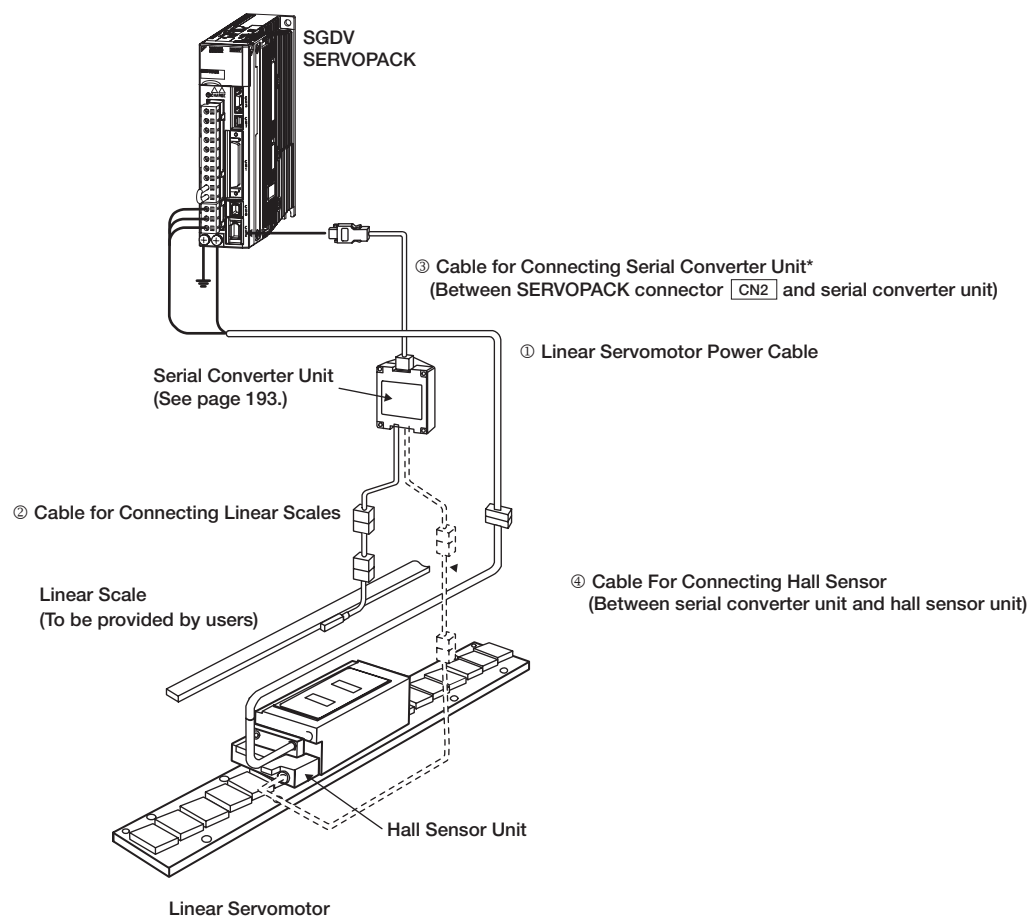
Detail drawing of mounting

- Notes: 1 Multiple SGLFM-1E135A magnetic ways can be connected. Connect magnetic ways so that the reference marks match one on the other in the same direction as shown in the figure.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

Magnetic Way Model SGLFM-	Approx. Mass kg
1E135A	2.5

Selecting Cables

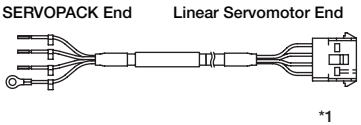
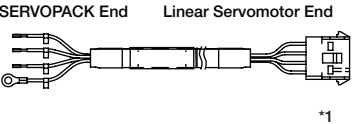
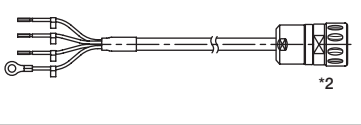
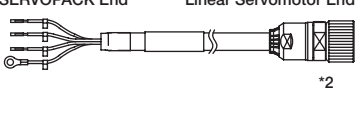
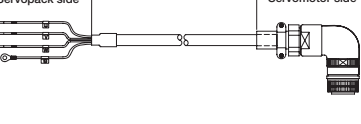
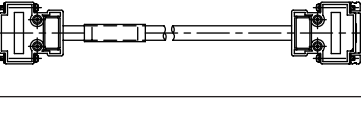
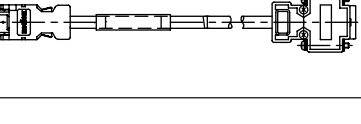

● Cables Connections



\*: A serial converter unit can be connected directly to an absolute linear scale.

Selecting Cables

● Cables

Name	Applicable Linear Servomotor Model	Length	Order No.	Specifications	Details
① Linear Servomotor Power Cables	SGLFW-20, -35	1 m	JZSP-CLN11-01-E	 <p>SERVOPACK End    Linear Servomotor End</p> <p>*1</p>	(1)
		3 m	JZSP-CLN11-03-E		
		5 m	JZSP-CLN11-05-E		
		10 m	JZSP-CLN11-10-E		
		15 m	JZSP-CLN11-15-E		
	SGLFW-50, -1Z	1 m	JZSP-CLN21-01-E	 <p>SERVOPACK End    Linear Servomotor End</p> <p>*1</p>	(2)
		3 m	JZSP-CLN21-03-E		
		5 m	JZSP-CLN21-05-E		
		10 m	JZSP-CLN21-10-E		
		15 m	JZSP-CLN21-15-E		
	SGLFW-35, 50, 1Z A□□□□□D	3 m	DP9325254-03G	 <p>SERVOPACK End    Linear Servomotor End</p> <p>*2</p>	(3)
		5 m	DP9325254-05G		
		10 m	DP9325254-10G		
		15 m	DP9325254-15G		
		20 m	DP9325254-20G		
	SGLFW-35, 50, 1Z D□□□□□D	1 m	JZSP-CMM20D15-01G	 <p>SERVOPACK End    Linear Servomotor End</p> <p>*2</p>	(4)
		3 m	JZSP-CMM20D15-03G		
		5 m	JZSP-CMM20D15-05G		
		10 m	JZSP-CMM20D15-10G		
		15 m	JZSP-CMM20D15-15G		
SGLFW-1E D□□□□□	1 m	JZSP-CVMCA13-01-E-G#	 <p>Servopack side    Servomotor side</p>	(5)	
	3 m	JZSP-CVMCA13-03-E-G#			
	5 m	JZSP-CVMCA13-05-E-G#			
	10 m	JZSP-CVMCA13-10-E-G#			
	15 m	JZSP-CVMCA13-15-E-G#			
② Cables for Connecting Linear Scales <sup>3</sup>	All models	1 m	JZSP-CLL00-01-E-G#	 <p>Serial Converter Unit End    Linear Scale End</p>	(5)
		3 m	JZSP-CLL00-03-E-G#		
		5 m	JZSP-CLL00-05-E-G#		
		10 m	JZSP-CLL00-10-E-G#		
		15 m	JZSP-CLL00-15-E-G#		
③ Cables for Connecting Serial Converter Units	All models	1 m	JZSP-CLP70-01-E-G#	 <p>SERVOPACK End    Serial Converter Unit End</p>	(6)
		3 m	JZSP-CLP70-03-E-G#		
		5 m	JZSP-CLP70-05-E-G#		
		10 m	JZSP-CLP70-10-E-G#		
		15 m	JZSP-CLP70-15-E-G#		
④ Cables for Connecting Hall Sensors	All models	1 m	JZSP-CLL10-01-E-G#	 <p>Serial Converter Unit End    Hall Sensor Unit End</p>	(7)
		3 m	JZSP-CLL10-03-E-G#		
		5 m	JZSP-CLL10-05-E-G#		
		10 m	JZSP-CLL10-10-E-G#		
		15 m	JZSP-CLL10-15-E-G#		

\*1: Connector by Tyco Electronics AMP K.K.

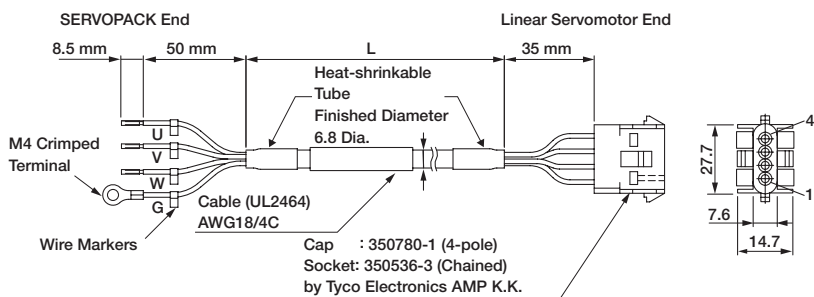
\*2: Connector by Interconnectron GmbH

\*3: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.

Note: The digit "#" of the order number represents the design revision.

Selecting Cables

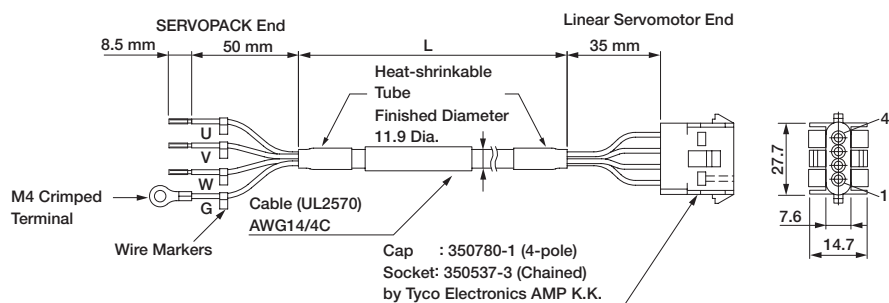
(1) Linear Servomotor Power Cables: JZSP-CLN11-□□-E



• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Blue	Phase W	Phase W	3
Green/yellow	FG	FG	4

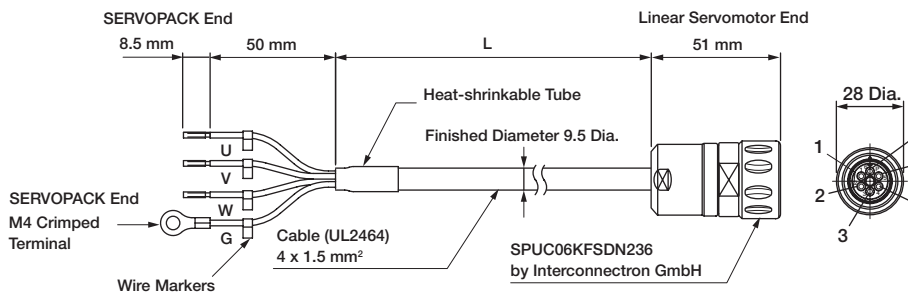
(2) Linear Servomotor Power Cables: JZSP-CLN21-□□-E



• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Blue	Phase W	Phase W	3
Green/yellow	FG	FG	4

(3) Linear Servomotor Power Cables: DP9325254-□□G



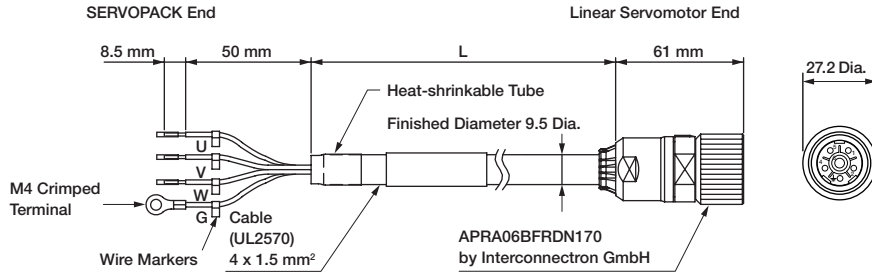
• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Black 1	Phase U	Phase U	1
Black 2	Phase V	Phase V	2
Black 3	Phase W	Phase W	3
Green/yellow	FG	—	4
		—	5
		FG	6



Selecting Cables

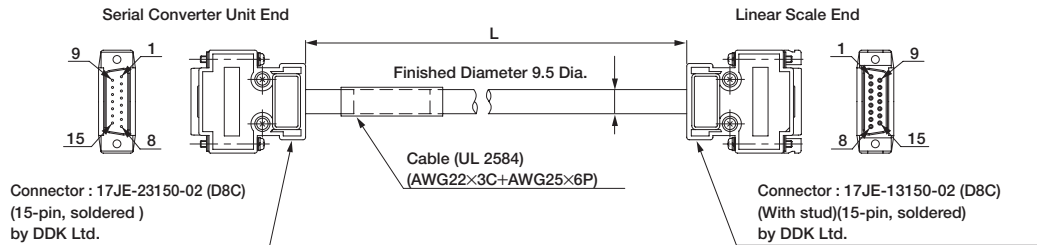
(4) Linear Servomotor Power Cables: JZSP-CLN15-□□-E-G#



• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Black 1	Phase U	Phase U	1
Black 2	Phase V	Phase V	2
Black 3	Phase W	FG	3
Green/yellow	FG	Phase W	4
		—	5
		—	6

(5) Cables for Connecting Linear Scales: JZSP-CLL00-□□-E-G#



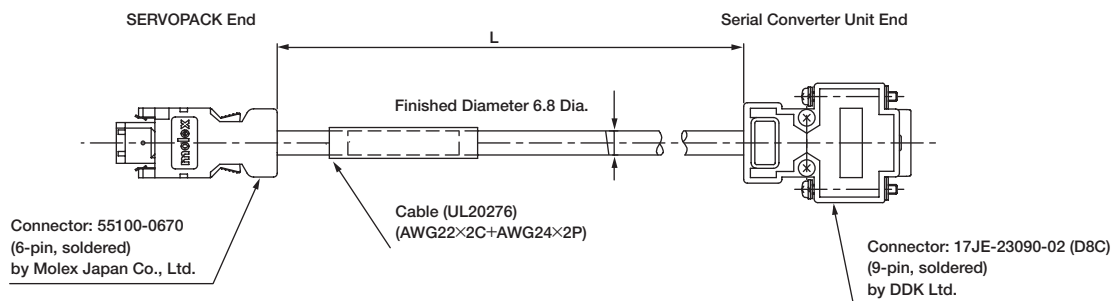
• Wiring Specifications

Serial Converter Unit End		Linear Scale End	
Pin No.	Signal	Pin No.	Signal
1	/Cos (V1-)	1	/Cos (V1-)
2	/Sin (V2-)	2	/Sin (V2-)
3	Ref (V0+)	3	Ref (V0+)
4	+5V	4	+5V
5	5Vs	5	5Vs
6	BID	6	BID
7	Vx	7	Vx
8	Vq	8	Vq
9	Cos (V1+)	9	Cos (V1+)
10	Sin (V2+)	10	Sin (V2+)
11	/Ref (V0+)	11	/Ref (V0-)
12	0V	12	0V
13	0Vs	13	0Vs
14	DIR	14	DIR
15	Inner	15	Inner
Case	Shield	Case	Shield

Linear Servomotors

Selecting Cables

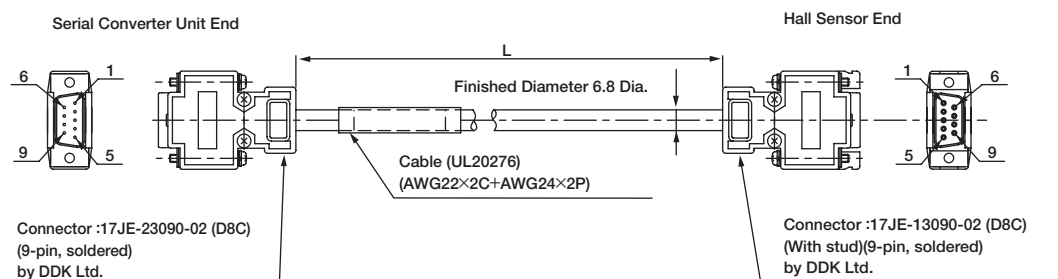
(6) Cables for Connecting Serial Converter Units: JZSP-CLP70-□□-E-G#



• Wiring Specifications

SERVOPACK End			Serial Converter Unit End		
Pin No.	Signal	Wire Color	Pin No.	Signal	Wire Color
1	PG5V	Red	1	+5V	Red
2	PG0V	Black	5	0V	Black
3	-	-	3	-	-
4	-	-	4	-	-
5	PS	Light blue	2	Phase S output	Light blue
6	/PS	Light blue/white	6	Phase /S output	Light blue/white
Shell	Shield	-	Case	Shield	-
			7	-	-
			8	-	-
			9	-	-

(7) Cables for Connecting Hall Sensors: JZSP-CLL10-□□-E-G#



• Wiring Specifications

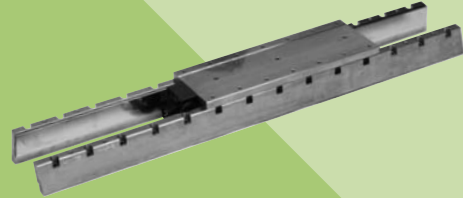
Serial Converter Unit End		Hall Sensor End	
Pin No.	Signal	Pin No.	Signal
1	+5V	1	+5V
2	Phase U input	2	Phase U input
3	Phase V input	3	Phase V input
4	Phase W input	4	Phase W input
5	0V	5	0V
6	-	6	-
7	-	7	-
8	-	8	-
9	-	9	-
Case	Shield	Case	Shield



# Linear Servomotors

# SGLTW

(With T-type iron core)



## Model Designations

### ● Moving Coil

**S** **G** **L** **T** **W** - **20** **A** **170** **A** **P**

Linear  $\Sigma$  Series Linear Servomotor    1st digit    2nd digit    3rd+4th digits    5th digit    6th+7th+8th digits    9th digit    10th digit    11th digit

**1st digit** Servomotor Type

Code	Specifications
T	T-type iron core

**5th digit** Voltage

Code	Specifications
A	200 VAC
D	400 VAC

**10th digit** Hall Sensor

Code	Specifications
P	With hall sensor
Blank	Without hall sensor

**2nd digit** Moving Coil/Magnetic Way

Code	Specifications
W	Moving Coil

**6th+7th+8th digits** Length of Moving Coil

**11th digit** Connector for Main Circuit Cable

Code	Specification	Applicable Model
Blank	Connector by Tyco Electronics AMP K.K.	SGLTW-20A□□□□□ -35A□□□□□ -50A□□□□□
	MS connector	SGLTW-40□□□□□B□ -80□□□□□B□
D	Connector by Interconnectron GmbH	SGLTW-35D□□□□□H□ -50D□□□□□H□

**3rd+4th digits** Magnet Height

**9th digit** Design Revision Order  
A, B...  
H: High-efficiency Type

### ● Magnetic Way

**S** **G** **L** **T** **M** - **20** **324** **A**

Linear  $\Sigma$  Series Linear Servomotor    1st digit    2nd digit    3rd+4th digits    5th+6th+7th digits    8th digit    9th digit

**1st digit** Servomotor Type  
(Same as that of the moving coil)

**3rd+4th digits** Magnet Height

**9th digit** Options

Code	Specifications	Applicable Model
Blank	Standard	All models
C	With magnet cover	Models with core
Y	With base and magnet cover	SGLTM-20, -35*, -40, -80

**2nd digit** Moving Coil/Magnetic Way

Code	Specifications
M	Magnetic Way

**5th+6th+7th digits** Length of Magnetic Way

**8th digit** Design Revision Order  
A, B...  
H: High-efficiency Type

\*: Except for SGLTM-35□□□□H (high-efficiency type).

## Features

- Direct-feed mechanism for high-speed and high-precision positioning.
- Yaskawa's unique construction principles of the TW linear motors negate the effects of the magnetic attraction force between the relative motor members.
- Lack of magnetic attraction helps to extend the life of the linear motion guides and to minimize operation noise.
- Very little cogging.

## Application Examples

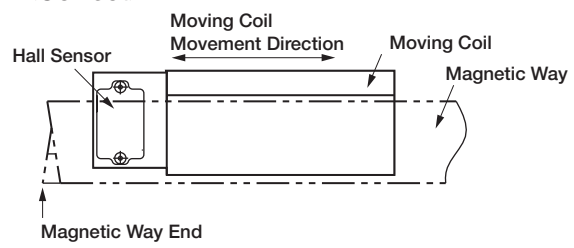
- Feeders and loaders
- Mounters
- Machine tools

### ● Precautions on Moving Coil with Hall Sensor

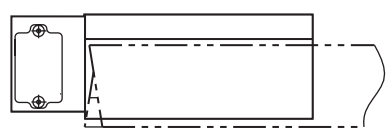
When using a moving coil with a hall sensor, the magnetic way must completely cover the bottom of the hall sensor. Refer to the example showing the correct installation.

When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length of the moving coil and the hall sensor unit. Refer to the following table.

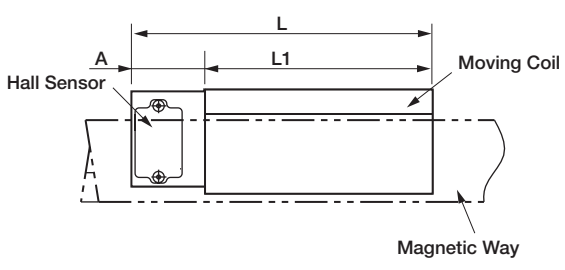
<Correct>



<Incorrect>



The total length of moving coil with hall sensor



Moving Coil Model	Length of Moving Coil L1 (mm)	Length of Hall Sensor Unit A (mm)	Total Length L (mm)	
20A170AP□	170	34	204	
20A320AP□	315		349	
20A460AP□	460		494	
35A170AP□	170	34	204	
35A320AP□	315		349	
35A460AP□	460		494	
35□170HP□	170	34	204	
35□320HP□	315		349	
50□170HP□	170		204	
50□320HP□	315	34	349	
40A400AP□	395		26	421
40A600AP□	585		36	621
80A400AP□	395	26	421	
80A600AP□	585		621	
40□400BP□	395		421	
40□600BP□	575	26	601	
80□400BP□	395		421	
80□600BP□	575		601	

**Ratings and Specifications**

**Time Rating:** Continuous

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Self-cooled

**Ambient Humidity:** 20% to 80% (no condensation)

**Allowable Winding Temperature:** 130°C (Thermal class B)

**200-V Class**

Linear Servomotor Model SGLTW- [ ]		Standard Type										High-efficiency Type			
		20A			35A			40A		80A		35A		50A	
		170A	320A	460A	170A	320A	460A	400B	600B	400B	600B	170H	320H	170H	320H
Peak Speed	m/s	5	5	5	5	5	5	3.1	3.1	2.5	2.5	4.8	4.8	3.2	3.1
Rated Force*	N	130	250	380	220	440	670	670	1000	1300	2000	300	600	450	900
Rated Current*	Arms	2.3	4.4	6.7	3.5	7	10.7	7.3	10.9	11.1	17.1	5.1	10.1	4.9	9.8
Peak Force*	N	380	760	1140	660	1320	2000	2600	4000	5000	7500	600	1200	900	1800
Peak Current*	Arms	7.7	15.4	23.2	12.1	24.2	36.7	39.4	60.6	57.9	86.9	11.9	23.9	11.5	22.9
Moving Coil Mass	kg	2.5	4.6	6.7	3.7	6.8	10	15	23	24	35	4.9	8.8	6	11
Force Constant	N/Arms	61	61	61	67.5	67.5	67.5	99.1	99.1	126	126	64	64	98.5	98.5
BEMF Constant	V/(m/s)	20.3	20.3	20.3	22.5	22.5	22.5	33	33	42	42	21.3	21.3	32.8	32.8
Motor Constant	N/√W	18.7	26.5	32.3	26.7	37.5	46.4	61.4	75.2	94.7	116	37.4	52.9	50.3	71.1
Electrical Time Constant	ms	5.9	5.9	5.9	6.9	6.8	7	15.2	15.2	17	17	15.1	15.1	16.5	16.5
Mechanical Time Constant	ms	7.5	6.5	6.4	5.2	4.8	4.6	4	4	3	3	3.3	3.3	2.8	2.8
Thermal Resistance (With Heat Sink)	K/W	1.01	0.49	0.38	0.76	0.44	0.32	0.24	0.2	0.22	0.18	0.76	0.4	0.61	0.3
Thermal Resistance (Without Heat Sink)	K/W	1.82	1.11	0.74	1.26	0.95	0.61	0.57	0.4	0.47	0.33	1.26	0.83	0.97	0.8
Magnetic Attraction*1	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magnetic Attraction (on one side)*2	N	800	1590	2380	1400	2780	4170	3950	5890	7650	11400	1400	2780	2000	3980
Applicable SERVOPACK	SGDV-	3R8A	7R6A	120A	5R5A	120A	180A	180A	330A	330A	550A	5R5A	120A	5R5A	120A

\*1 : The unbalanced magnetic gap resulted from the moving coil installation condition causes a magnetic attraction on the moving coil.

\*2 : The value indicates the magnetic attraction generated on one side of the magnetic way.

Notes: 1 The items marked with an \* and *Force and Speed Characteristics* (on the next page) are the values at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. The others are at 20°C.

2 The above specifications show the values under the cooling condition when a heat sink (aluminum board) listed in the following table is mounted on the moving coil.

Heat Sink Size	254 mm×254 mm×25 mm : SGLTW-20A170A,-35A170A
	400 mm×500 mm×40 mm : SGLTW-20A320A,-20A460A,-35A170H,-35A320A,-35A320H,-35A460A,-50A170H
	609 mm×762 mm×50 mm : SGLTW-40A400B,-40A600B,-50A320H,-80A400B,-80A600B

**400-V Class**

Linear Servomotor Model SGLTW- [ ]		Standard Type				High-efficiency Type			
		40D		80D		35D		50D	
		400B	600B	400B	600B	170H	320H	170H	320H
Peak Speed	m/s	3.1	3.1	3.1	3.1	5	5	4	4
Rated Force*	N	670	1000	1300	2000	300	600	450	900
Rated Current*	Arms	3.7	5.5	7.2	11.1	3.2	6.5	3.2	6.3
Peak Force*	N	2600	4000	5000	7500	600	1200	900	1800
Peak Current*	Arms	20.7	30.6	37.6	56.4	7.7	15.5	7.4	14.8
Moving Coil Mass	kg	15	23	24	35	4.7	8.8	6	11
Force Constant	N/Arms	196.1	196.1	194.4	194.4	99.6	99.6	153.3	153.3
BEMF Constant	V/(m/s)	65.4	65.4	64.8	64.8	33.2	33.2	51.1	51.1
Motor Constant	N/√W	59.6	73	85.9	105.2	36.3	51.4	48.9	69.1
Electrical Time Constant	ms	14.3	14.4	15.6	15.6	14.3	14.4	15.6	15.6
Mechanical Time Constant	ms	4.3	4.2	3.2	3.2	3.5	3.3	2.5	2.5
Thermal Resistance (With Heat Sink)	K/W	0.24	0.2	0.22	0.18	0.76	0.4	0.61	0.3
Thermal Resistance (Without Heat Sink)	K/W	0.57	0.4	0.47	0.33	1.26	0.83	0.97	0.8
Magnetic Attraction*1	N	0	0	0	0	0	0	0	0
Magnetic Attraction (on one side)*2	N	3950	5890	7650	11400	1400	2780	2000	3980
Applicable SERVOPACK	SGDV-	120D	170D	170D	260D	3R5D	8R4D	3R5D	8R4D

\*1 : The unbalanced magnetic gap resulted from the moving coil installation condition causes a magnetic attraction on the moving coil.

\*2 : The value indicates the magnetic attraction generated on one side of the magnetic way.

Notes: 1 The items marked with an \* and *Force and Speed Characteristics* (on page 157) are the values at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. The others are at 20°C.

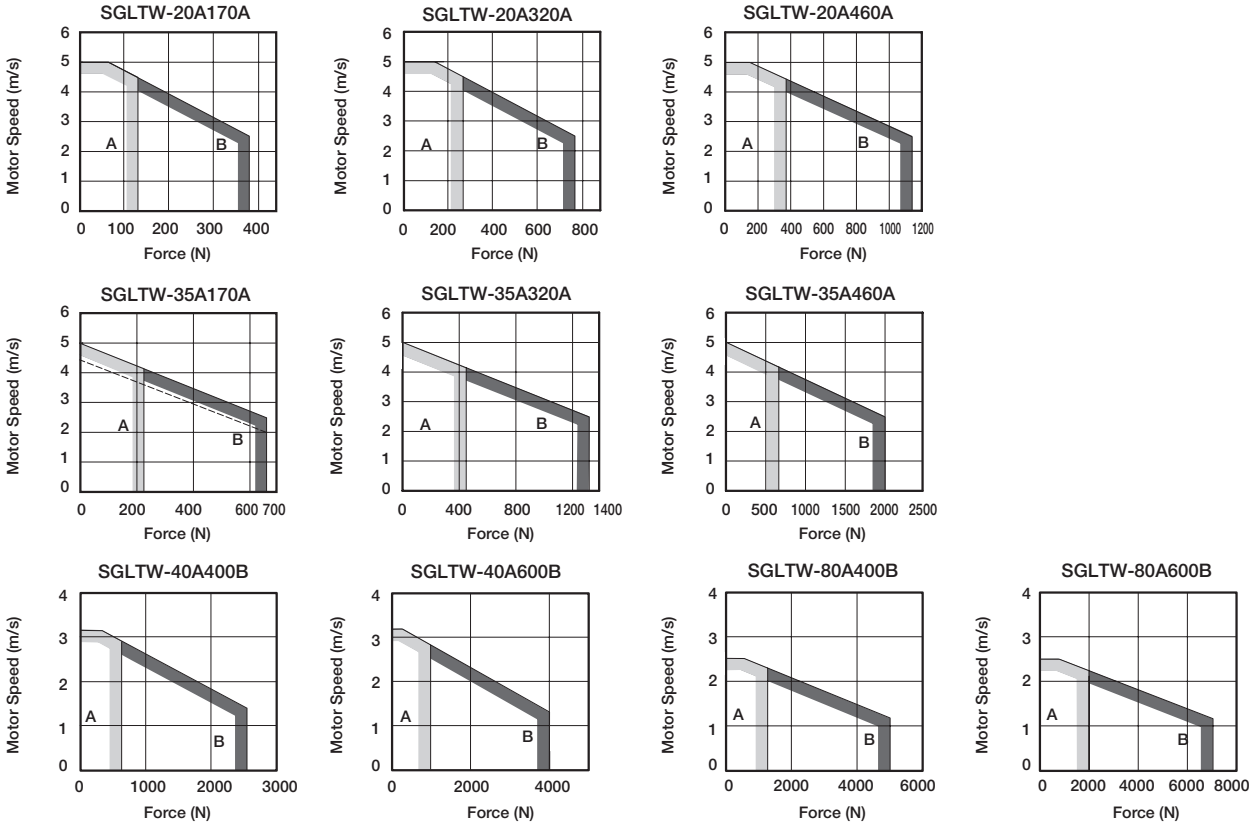
2 The above specifications show the values under the cooling condition when a heat sink (aluminum board) listed in the following table is mounted on the moving coil.

Heat Sink Size	400 mm×500 mm×40 mm : SGLTW-35D170H,-35D320H,-50D170H
	609 mm×762 mm×50 mm : SGLTW-40D400B,-40D600B,-50D320H,-80D400B,-80D600B

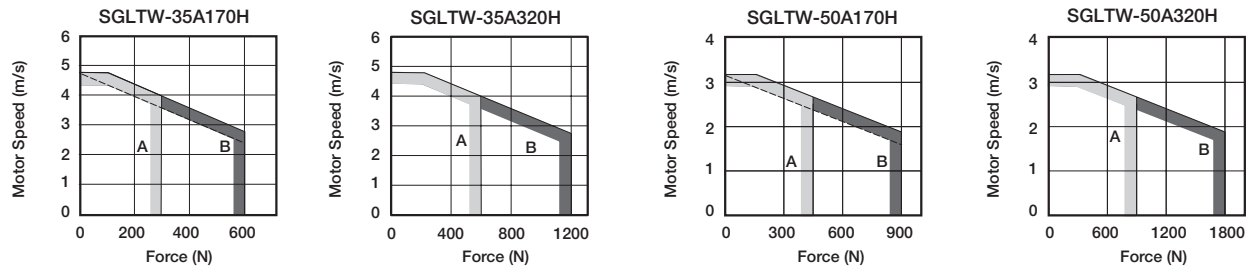
**Ratings and Specifications**

● **Force and Speed Characteristics** **A** : Continuous Duty Zone **B** : Intermittent Duty Zone

**200-V Class Standard Type**



**200-V Class High-efficiency Type**



Notes:1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid and dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:

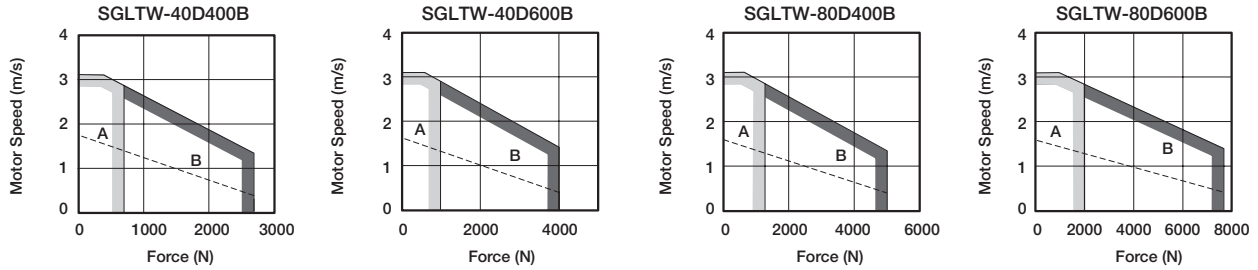
- The solid line: With a three-phase 200 V SERVOPACK
- The dotted line: With a single-phase 200 V SERVOPACK

2 When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.

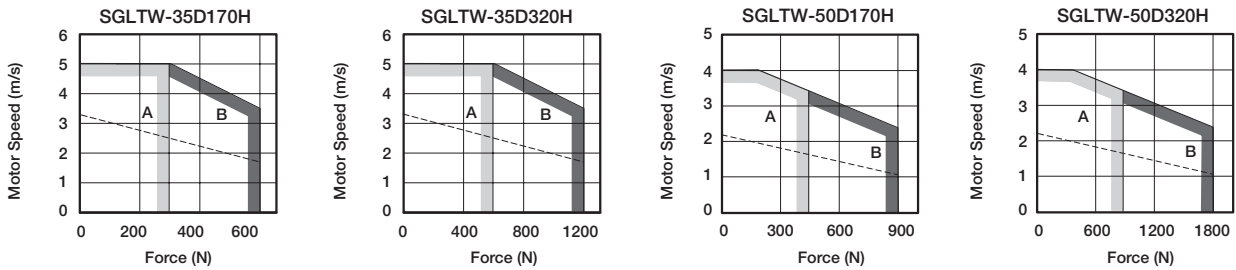
**Ratings and Specifications**

• **Force and Speed Characteristics (cont'd)** [A] : Continuous Duty Zone [B] : Intermittent Duty Zone

**400-V Class Standard Type**



**400-V Class High-efficiency Type**



Notes:1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid and dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:  
 ·The solid line: With a three-phase 400 V SERVOPACK  
 ·The dotted line: With a three-phase 200 V SERVOPACK  
 2 When using the servomotor with a three-phase 200-V input power supply, a different serial converter unit is required. For details, contact your Yaskawa representative.  
 3 When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.

● **Mechanical Specifications**

(1) **Impact Resistance**

- Impact acceleration: 196 m/s<sup>2</sup>
- Impact occurrences: twice

(2) **Vibration Resistance**

The linear servomotors will withstand the following vibration acceleration in three directions: Vertical, side to side, and front to back.

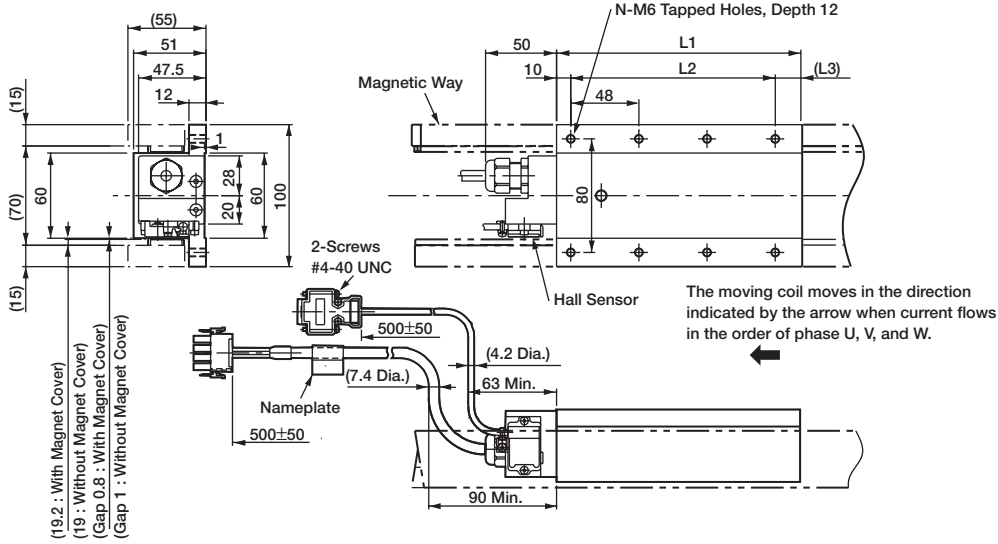
- Vibration acceleration: 49 m/s<sup>2</sup>



**External Dimensions** Units: mm

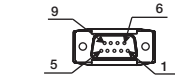
(1) Standard Type SGLTW-20

- Moving Coil: SGLTW-20A□□□A□ (With a connector by Tyco Electronics AMP K.K.)



Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass kg
20A170A□	170	144 (48×3)	(16)	8	2.5
20A320A□	315	288 (48×6)	(17)	14	4.6
20A460A□	460	432 (48×9)	(18)	20	6.7

Hall Sensor Connector Specifications



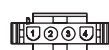
Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Plug: 350779-1  
Pin : 350218-3 or  
350547-3 (No.1 to 3)  
350654-1  
350669-1 (No.4)  
by Tyco Electronics AMP K.K.

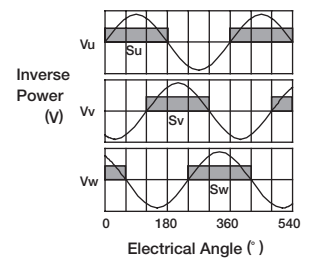
The Mating Connector

Cap : 350780-1  
Socket: 350536-3 or  
350550-3

Pin No.	Signal	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Black
4	Ground	Green

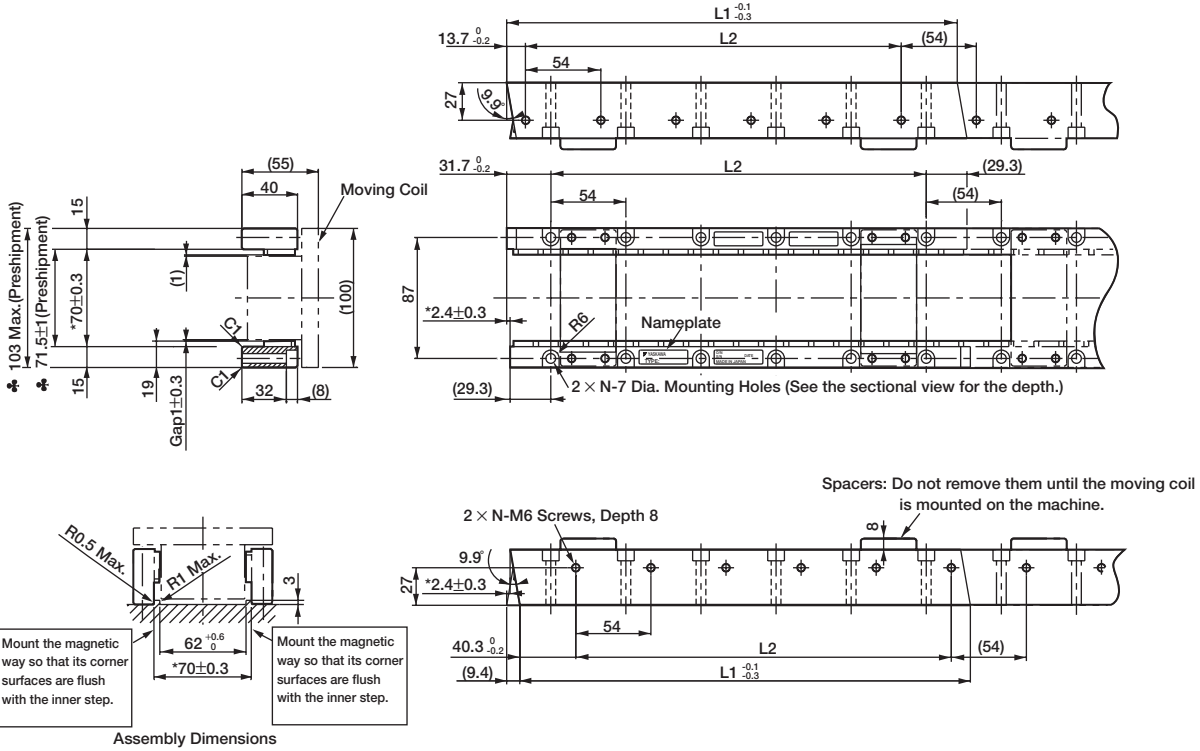
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



**External Dimensions** Units: mm

● Magnetic Way : SGLTM-20□□□A□

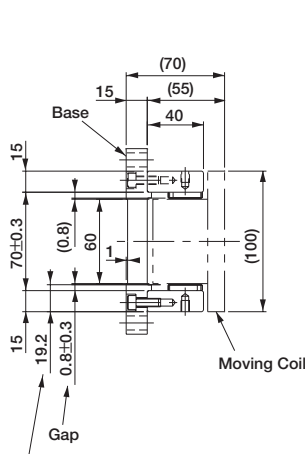


- Notes: 1 Two magnetic ways for both ends of moving coil make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the moving coil is mounted on a machine.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.  
 3 Two magnetic ways in a set can be connected to each other.  
 4 The dimensions marked with an \* are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with a ♣ are the dimensions at preshipment.  
 5 Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.

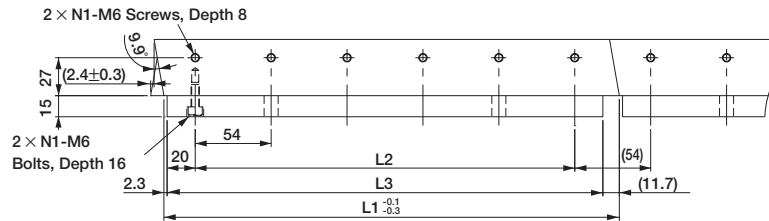
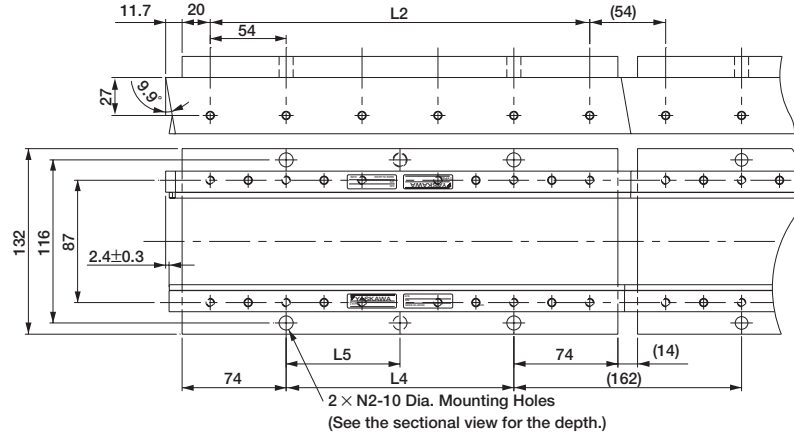
Magnetic Way Model SGLTM-	$L1^{+0.1}_{-0.3}$	$L2$	N	Approx. Mass kg
20324A□	324	270 (54×5)	6	3.4
20540A□	540	486 (54×9)	10	5.7
20756A□	756	702 (54×13)	14	7.9

**External Dimensions** Units: mm

● Magnetic Way with Base: SGLTM-20□□□AY



Includes a 0.2 thick magnet cover.



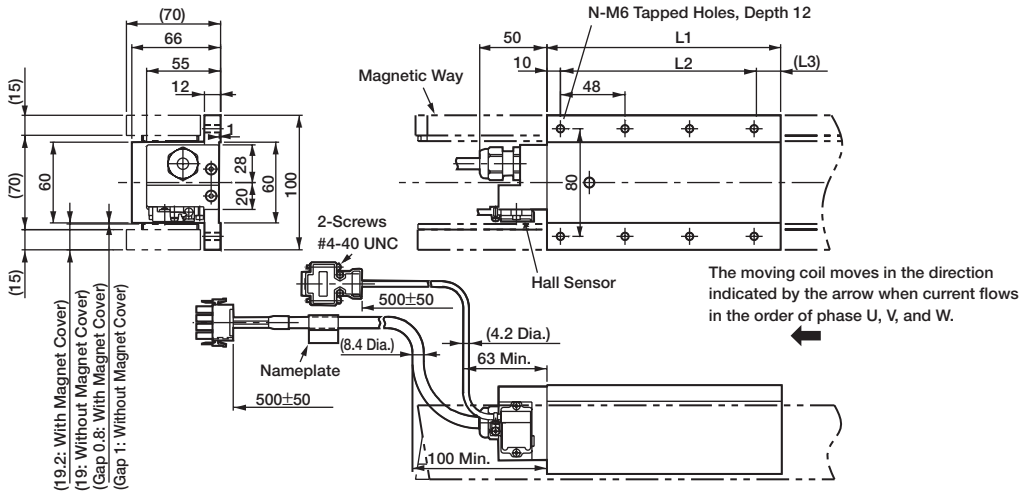
- Notes: 1 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.
- 2 Two magnetic ways in a set can be connected to each other.
- 3 The characteristics of the magnetic way with base are the same as of the magnetic way without base (SGLTM-20□□□A).

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass kg
20324AY	324	270	310	162	162	6	2	5.1
20540AY	540	486	526	378	189	10	3	8.5
20756AY	756	702	742	594	198	14	4	12

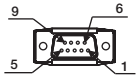
**External Dimensions** Units: mm

(2) Standard Type SGLTW-35

- Moving Coil: SGLTW-35A□□□A□ (With a connector by Tyco Electronics AMP K.K.)



Hall Sensor Connector Specifications



Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Plug: 350779-1  
Pin : 350218-3 or  
350547-3 (No.1 to 3)  
350654-1  
350669-1 (No.4)  
by Tyco Electronics AMP K.K.

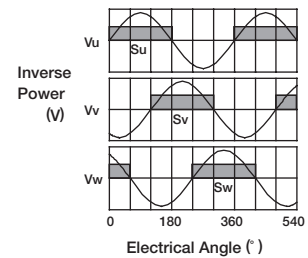
The Mating Connector

Cap : 350780-1  
Socket: 350536-3 or  
350550-3

Pin No.	Signal	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Black
4	Ground	Green

Hall Sensor Output Signals

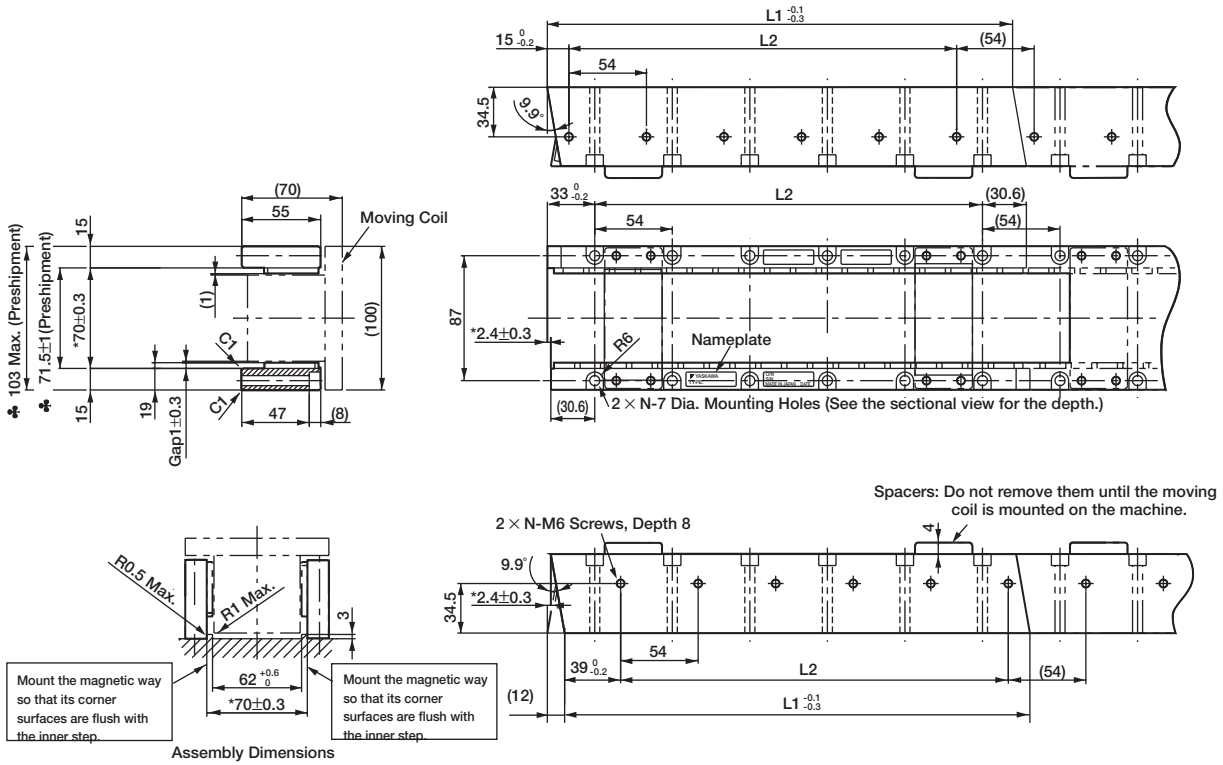
When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals  $S_u$ ,  $S_v$ ,  $S_w$  and the inverse power of each motor phase  $V_u$ ,  $V_v$ ,  $V_w$  becomes as shown in the figure below.



Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass kg
35A170A□	170	144 (48×3)	(16)	8	3.7
35A320A□	315	288 (48×6)	(17)	14	6.8
35A460A□	460	432 (48×9)	(18)	20	10

External Dimensions Units: mm

● Magnetic Way: SGLTM-35□□□A□

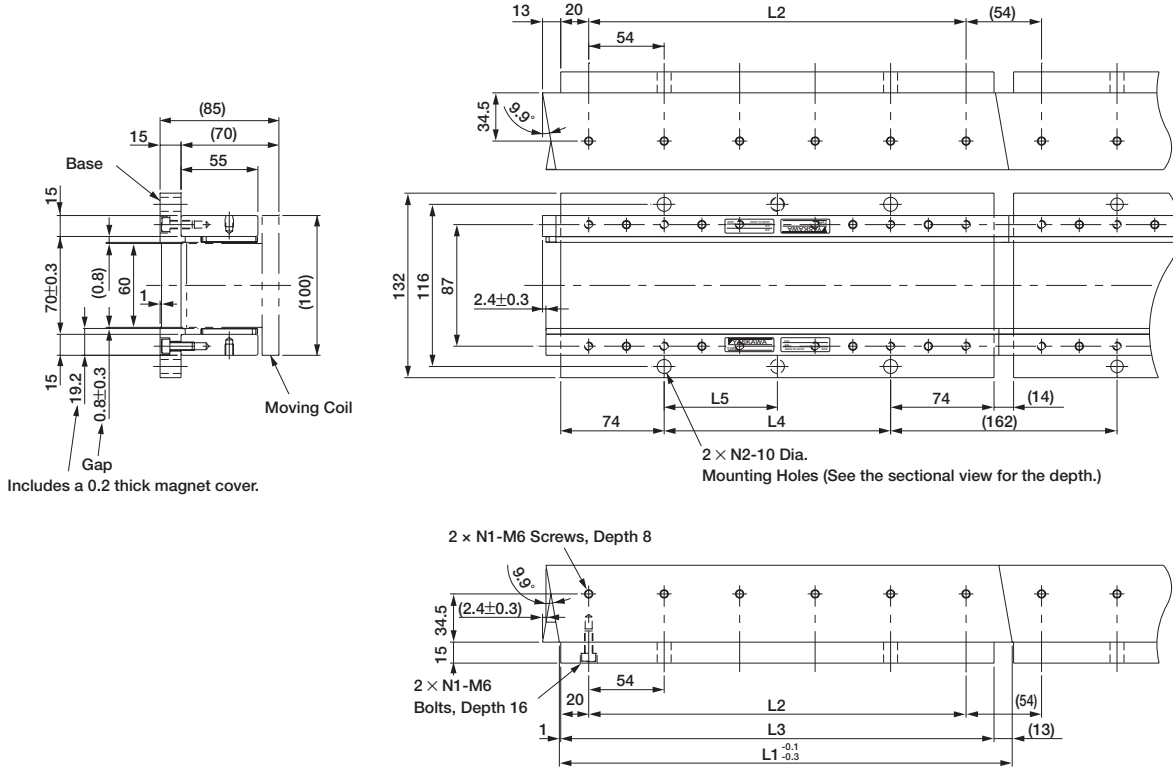


- Notes: 1 Two magnetic ways for both ends of moving coil make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the moving coil is mounted on a machine.  
2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.  
3 Two magnetic ways in a set can be connected to each other.  
4 The dimensions marked with an \* are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with a ♣ are the dimensions at preshipment.  
5 Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.

Magnetic Way Model SGLTM-	L1 <sup>-0.1</sup> <sub>-0.3</sub>	L2	N	Approx. Mass kg
35324A□	324	270 (54×5)	6	4.8
35540A□	540	486 (54×9)	10	8
35756A□	756	702 (54×13)	14	11

External Dimensions Units: mm

● Magnetic Way with Base: SGLTM-35□□□AY



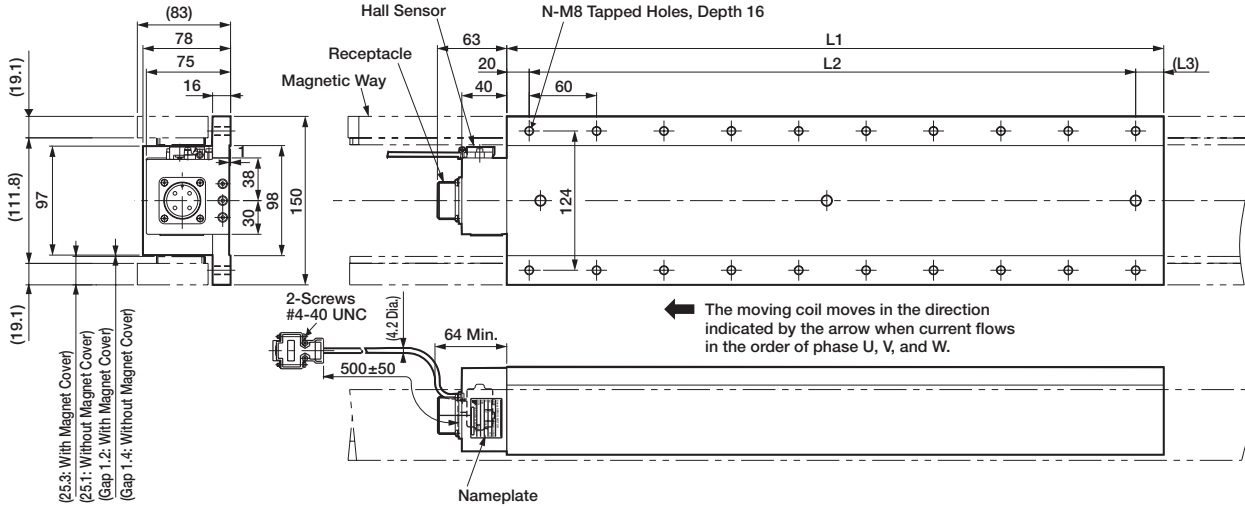
- Notes: 1 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.
- 2 Two magnetic ways in a set can be connected to each other.
- 3 The characteristics of the magnetic way with base are the same as of the magnetic way without base (SGLTM-35□□□A).

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass kg
35324AY	324	270	310	162	162	6	2	6.4
35540AY	540	486	526	378	189	10	3	11
35756AY	756	702	742	594	198	14	4	15

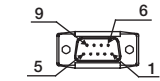
**External Dimensions** Units: mm

(3) Standard Type SGLTW-40

- Moving Coil: SGLTW-40□□□□B□ (With an MS connector)



Hall Sensor Connector Specifications



Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Receptacle type: MS3102A-22-22P  
by DDK Ltd.

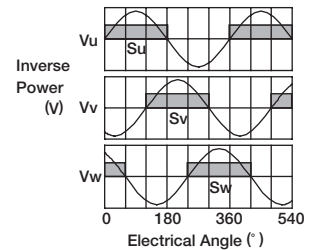
The Mating Connector

L-shaped plug type : MS3108B22-22S  
Straight plug type : MS3106B22-22S  
Cable clamp type : MS3057-12A

Pin No.	Signal
A	Phase U
B	Phase V
C	Phase W
D	Ground

Hall Sensor Output Signals

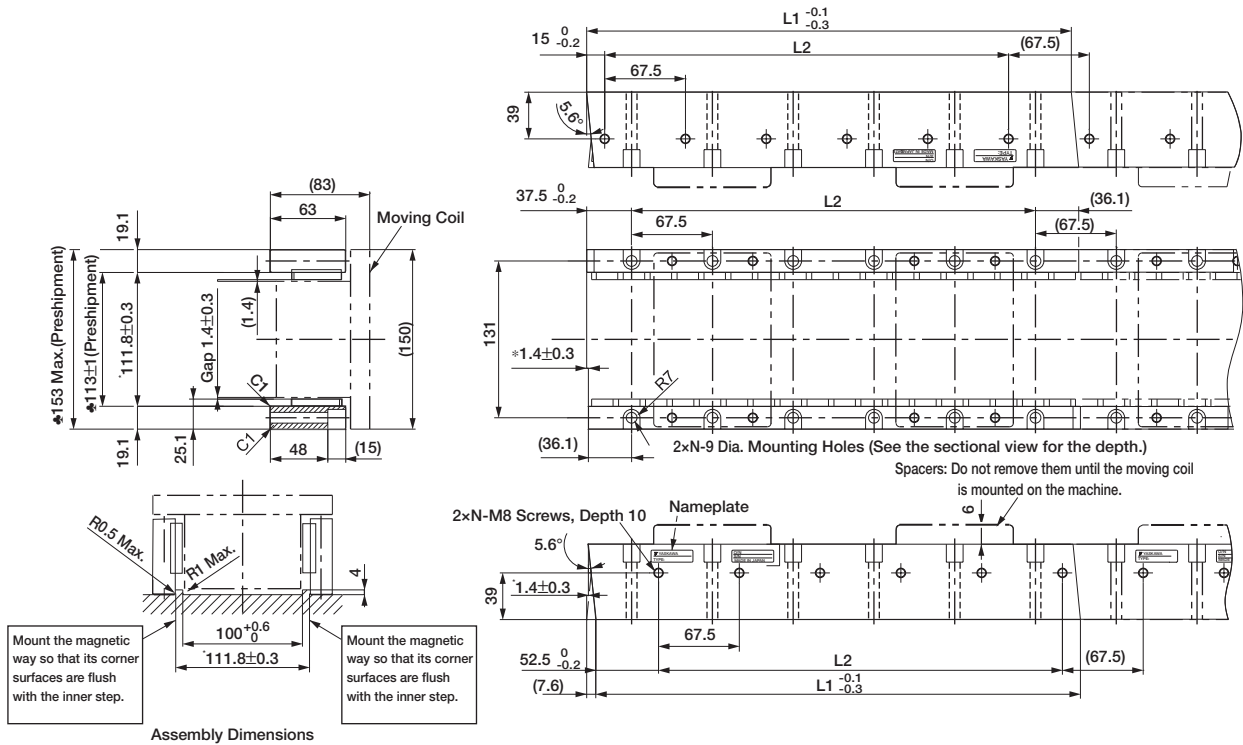
When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass kg
40□400B□	395	360(60×6)	(15)	14	15
40□600B□	575	540(60×9)	(15)	20	22

External Dimensions Units: mm

● Magnetic Way : SGLTM-40□□□A□



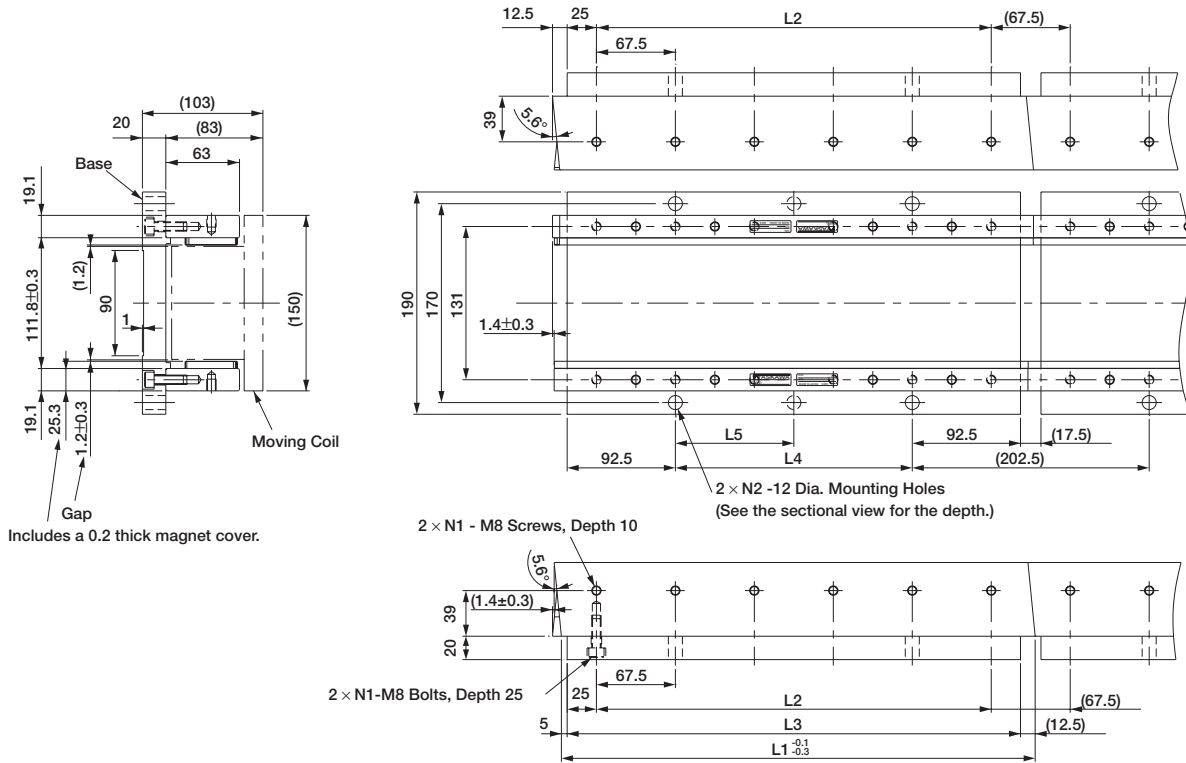
- Notes: 1 Two magnetic ways for both ends of moving coil make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the moving coil is mounted on a machine.
- 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.
- 3 Two magnetic ways in a set can be connected to each other.
- 4 The dimensions marked with an \* are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with a ♣ are the dimensions at preshipment.
- 5 Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.

Magnetic Way Model SGLTM-	L1 <sup>-0.1</sup> <sub>-0.3</sub>	L2	N	Approx. Mass kg
40405A□	405	337.5 (67.5×5)	6	9
40675A□	675	607.5 (67.5×9)	10	15
40945A□	945	877.5 (67.5×13)	14	21



External Dimensions Units: mm

● Magnetic Way with Base: SGLTM-40□□□AY



- Notes: 1 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.
- 2 Two magnetic ways in a set can be connected to each other.
- 3 The characteristics of the magnetic way with base are the same as of the magnetic way without base (SGLTM-40□□□A).

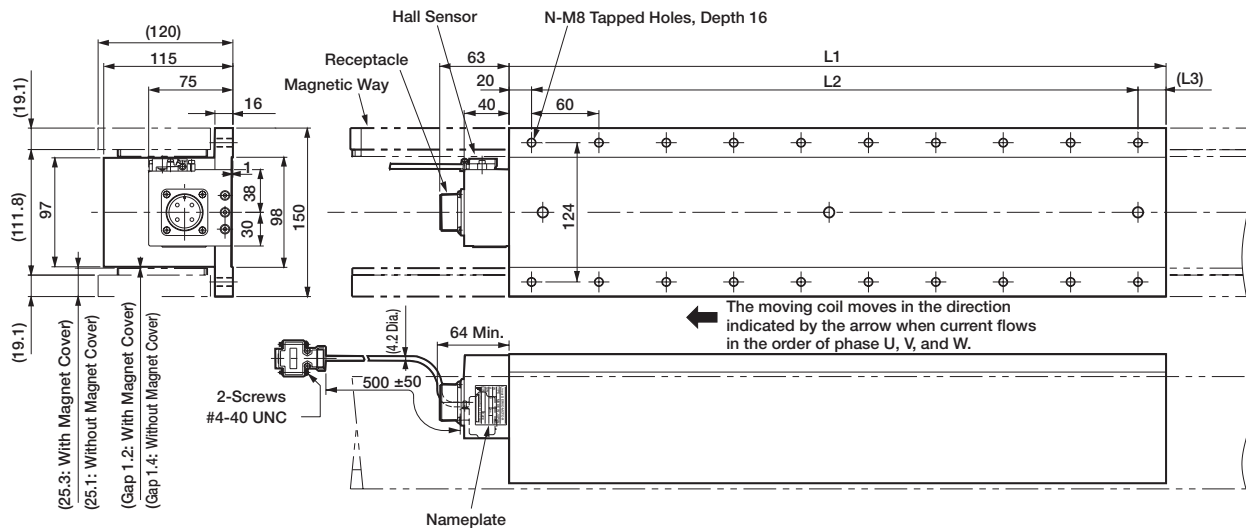
Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass kg
40405AY	405	337.5	387.5	202.5	202.5	6	2	13
40675AY	675	607.5	657.5	472.5	236.25	10	3	21
40945AY	945	877.5	927.5	742.5	247.5	14	4	30

Linear Servomotors

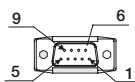
**External Dimensions** Units: mm

(4) Standard Type SGLTW-80

- Moving Coil: SGLTW-80□□□□B□ (With an MS connector)



**Hall Sensor Connector Specifications**



Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

**The Mating Connector**

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

**Linear Servomotor Connector Specifications**



Receptacle type: MS3102A-22-22P  
by DDK Ltd.

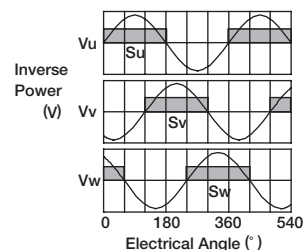
**The Mating Connector**

L-shaped plug type : MS3108B22-22S  
Straight plug type : MS3106B22-22S  
Cable clamp type : MS3057-12A

Pin No.	Signal
A	Phase U
B	Phase V
C	Phase W
D	Ground

**Hall Sensor Output Signals**

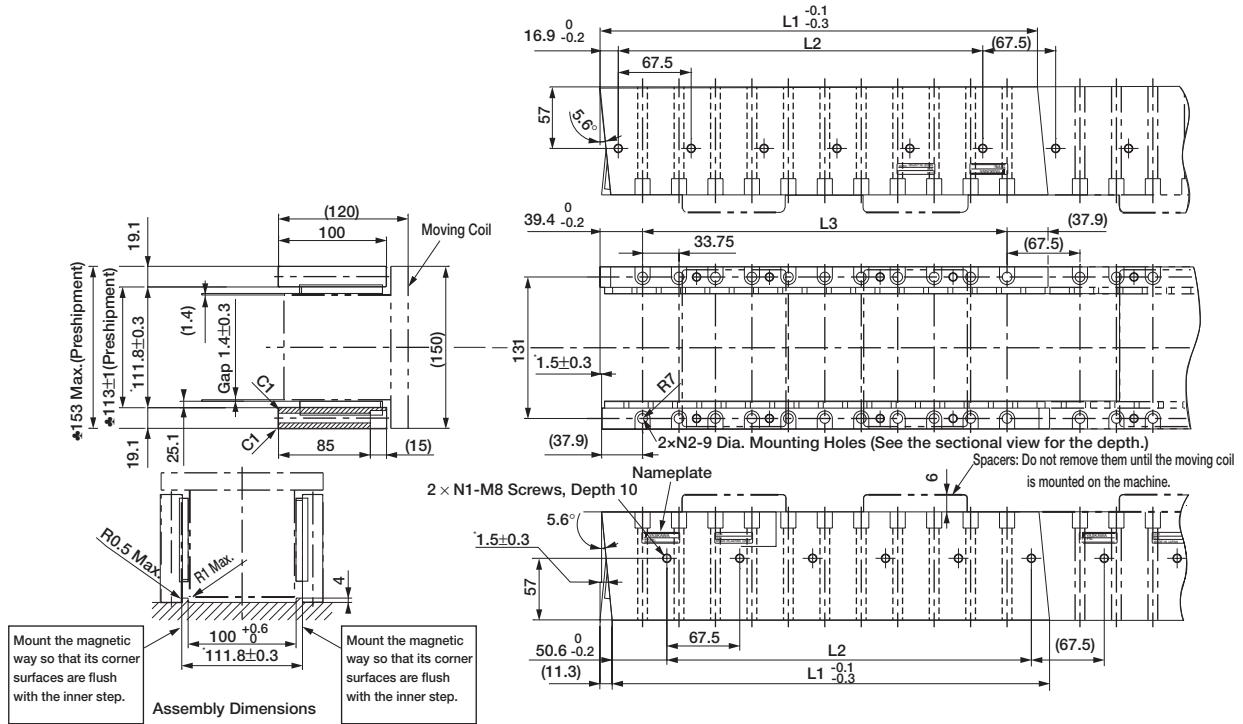
When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals  $S_u$ ,  $S_v$ ,  $S_w$  and the inverse power of each motor phase  $V_u$ ,  $V_v$ ,  $V_w$  becomes as shown in the figure below.



Moving Coil Model SGLTW-	L1	L2	L3	N	Approx. Mass kg
80□400B□	395	360(60×6)	(15)	14	24
80□600B□	575	540(60×9)	(15)	20	35

External Dimensions Units: mm

- Magnetic Way : SGLTM-80□□□A□



- Notes: 1 Two magnetic ways for both ends of moving coil make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the moving coil is mounted on a machine.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.  
 3 Two magnetic ways in a set can be connected to each other.  
 4 The dimensions marked with an \* are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with a ♣ are the dimensions at preshipment.  
 5 Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.

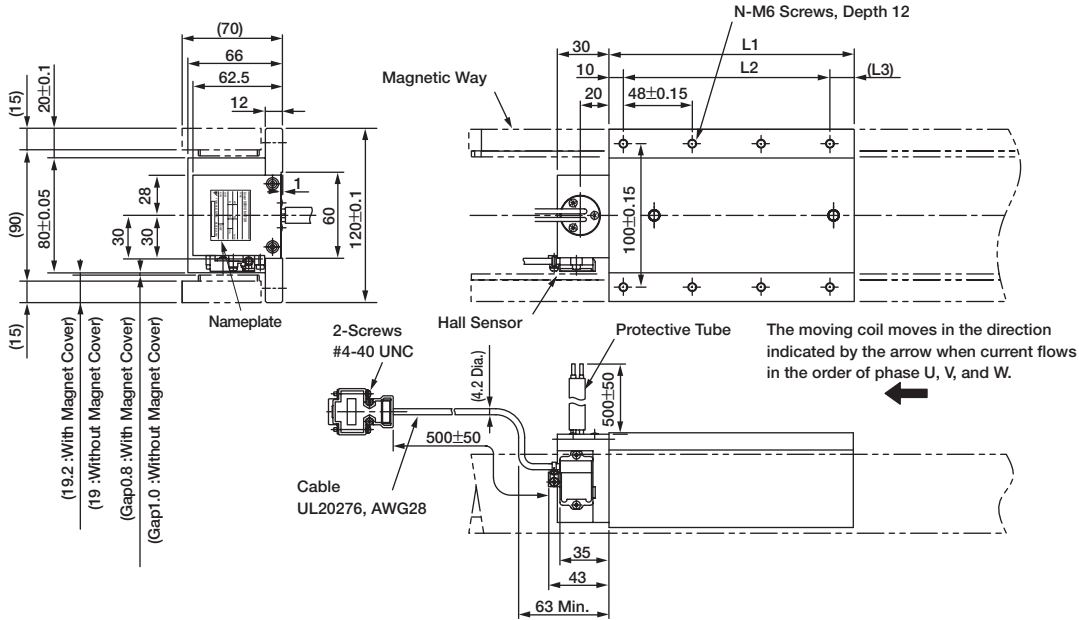
Magnetic Way Model SGLTM-	L1 <sup>-0.1 -0.3</sup>	L2	L3	N1	N2	Approx. Mass kg
80405A□	405	337.5(67.5×5)	337.5(33.75×10)	6	11	14
80675A□	675	607.5(67.5×9)	607.5(33.75×18)	10	19	24
80945A□	945	877.5(67.5×13)	887.5(33.75×26)	14	27	34



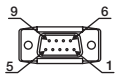
**External Dimensions** Units: mm

(5) High-efficiency Type SGLTW-35A□□□H□

- Moving Coil: SGLTW-35A□□□H□ (Loose Lead Wires without Connectors)



**Hall Sensor Connector Specifications**



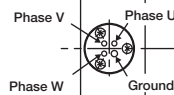
Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector  
Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

**Lead Specifications of Moving Coil**

• If this cable is bent repetitively, the cable will disconnect.

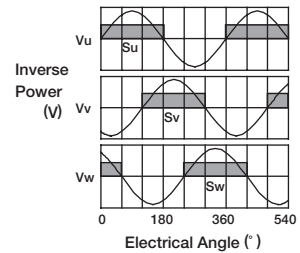


(View from Top of Moving Coil)

Name	Color	Code	Wire Size
Phase U		U	2 mm <sup>2</sup>
Phase V	Black	V	
Phase W		W	
Ground	Green	-	2 mm <sup>2</sup>

**Hall Sensor Output Signals**

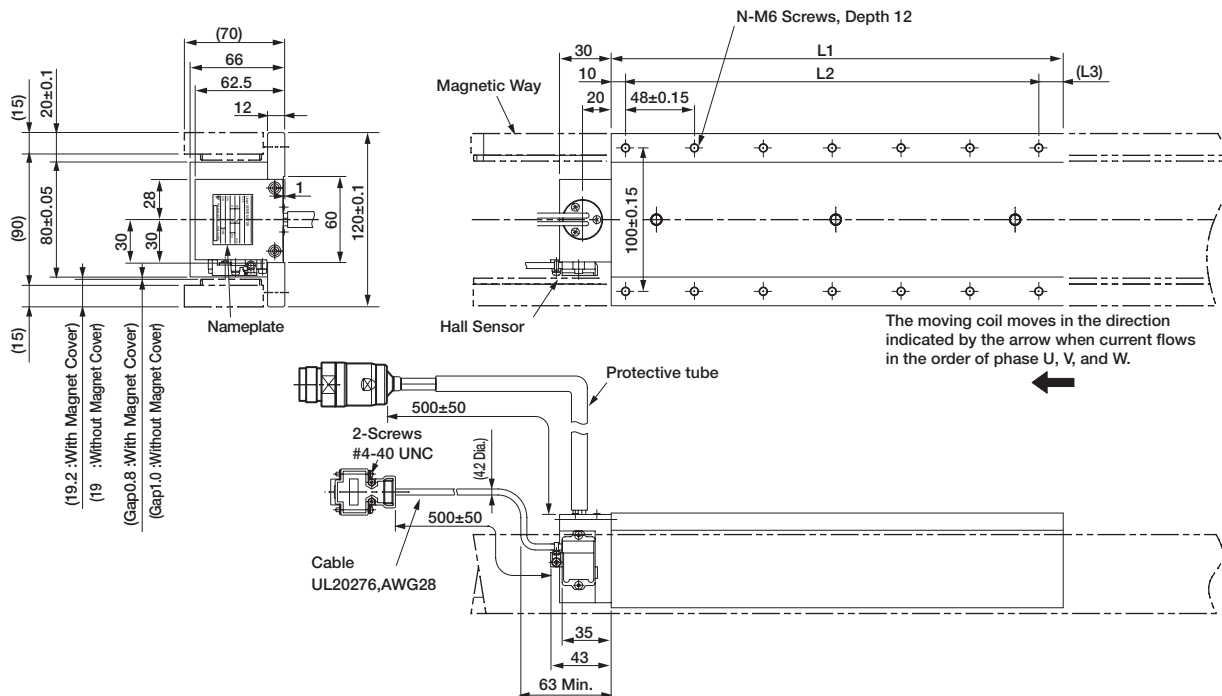
When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals  $S_u$ ,  $S_v$ ,  $S_w$  and the inverse power of each motor phase  $V_u$ ,  $V_v$ ,  $V_w$  becomes as shown in the figure below.



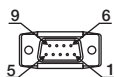
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass kg
35A170H□	170	144 (48×3)	(16)	8	4.7
35A320H□	315	288 (48×6)	(17)	14	8.8

**External Dimensions** Units: mm

• Moving Coil: SGLTW-35D□□□H□D (With a connector by Interconnectron GmbH)



**Hall Sensor Connector Specifications**



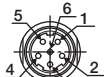
Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

**The Mating Connector**

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

**Linear Servomotor Connector Specifications**



Extension : ARRA06AMRPN182  
Pin : 021.279.1020  
by Interconnectron GmbH

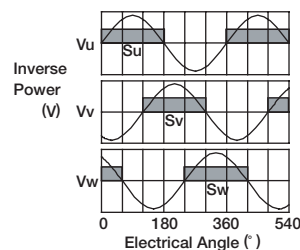
**The Mating Connector**

Plug : APRA06BFRDN170  
Socket : 020.105.1020

Pin No.	Signal
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⊕	Ground

**Hall Sensor Output Signals**

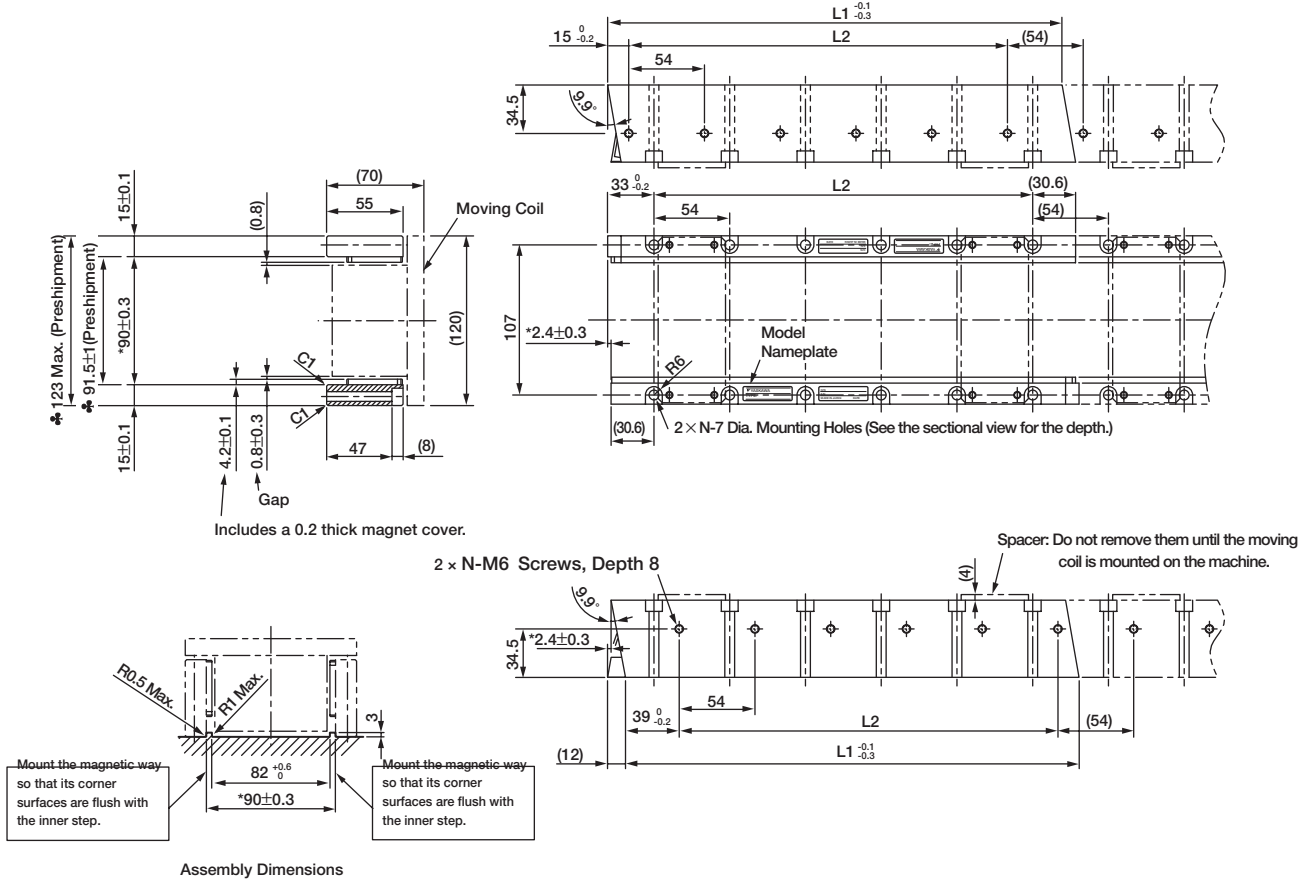
When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals  $S_u$ ,  $S_v$ ,  $S_w$  and the inverse power of each motor phase  $V_u$ ,  $V_v$ ,  $V_w$  becomes as shown in the figure below.



Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass kg
35D170H□D	170	144(48×3)	(16)	8	4.7
35D320H□D	315	288(48×6)	(17)	14	8.8

External Dimensions Units: mm

- Magnetic Way: SGLTM-35□□□H□



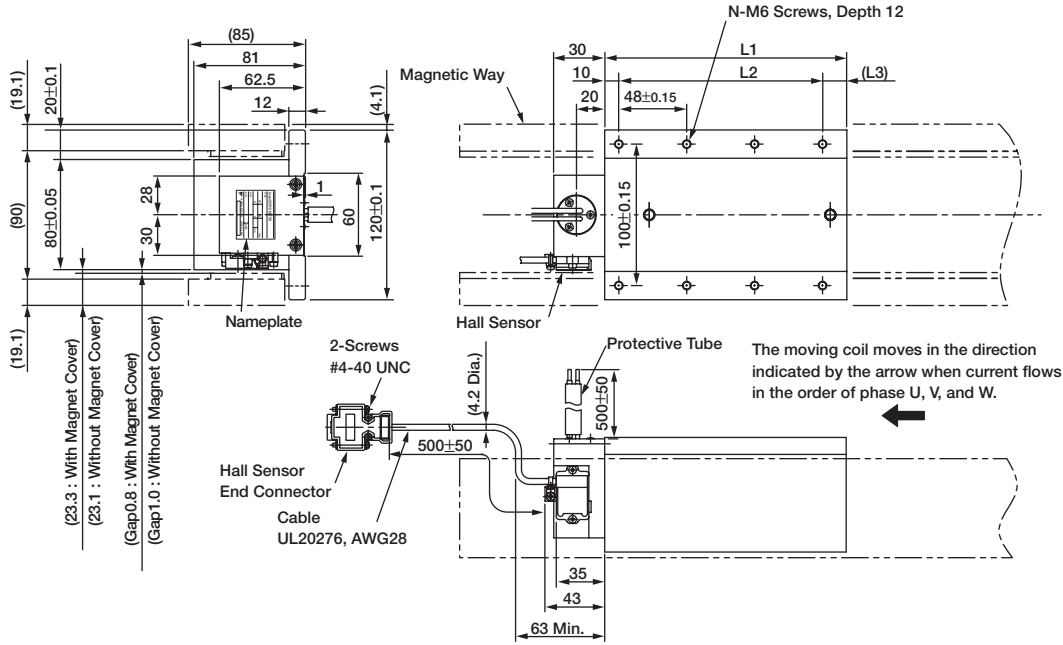
- Notes: 1 Two magnetic ways for both ends of moving coil make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the moving coil is mounted on a machine.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.  
 3 Two magnetic ways in a set can be connected to each other.  
 4 The dimensions marked with an \* are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with a ♣ are the dimensions at preshipment.  
 5 Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.

Magnetic Way Model SGLTM-	L1 <sup>-0.1</sup> <sub>-0.3</sub>	L2	N	Approx. Mass kg
35324H□	324	270 (54×5)	6	4.8
35540H□	540	486 (54×9)	10	8
35756H□	756	702 (54×13)	14	11

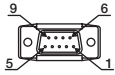
**External Dimensions** Units: mm

**(6) High-efficiency Type SGLTW-50**

- Moving Coil: SGLTW-50A□□□H□ (Loose Lead Wires without Connectors)



**Hall Sensor Connector Specifications**



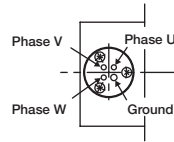
Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector  
Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

**Lead Specifications of Moving Coil**

- If this cable is bent repetitively, the cable will disconnect.

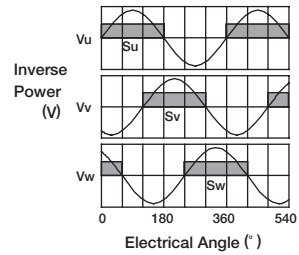


(View from Top of Moving Coil)

Name	Color	Code	Wire Size
Phase U		U	2 mm <sup>2</sup>
Phase V	Black	V	
Phase W		W	
Ground	Green	-	2 mm <sup>2</sup>

**Hall Sensor Output Signals**

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals  $S_u$ ,  $S_v$ ,  $S_w$  and the inverse power of each motor phase  $V_u$ ,  $V_v$ ,  $V_w$  becomes as shown in the figure below.

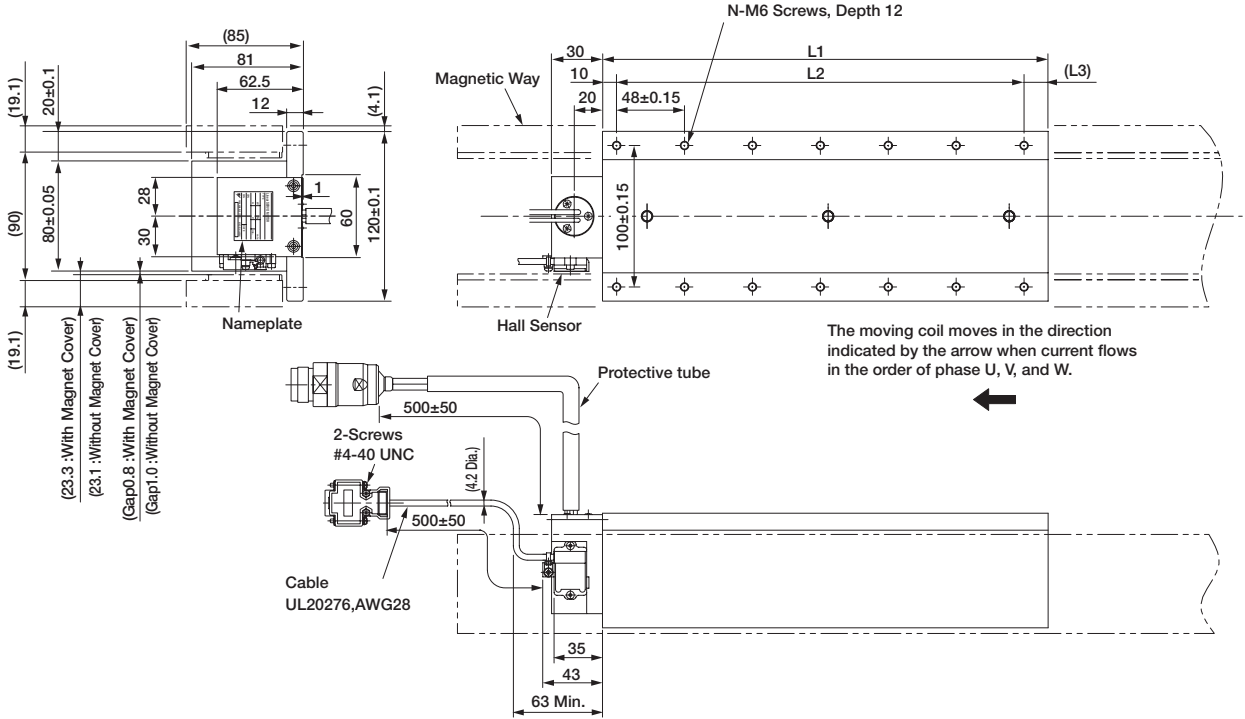


Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass kg
50A170H□	170	144 (48×3)	(16)	8	6
50A320H□	315	288 (48×6)	(17)	14	11



**External Dimensions** Units: mm

- Moving Coil: SGLTW-50D□□□H□D (With a connector by Interconnectron GmbH)



**Hall Sensor Connector Specifications**



Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Signal
1	+5VDC
2	Phase U
3	Phase V
4	Phase W
5	0V
6	Not used
7	Not used
8	Not used
9	Not used

**Linear Servomotor Connector Specifications**



Extension : ARRA06AMRPN182  
Pin : 021.279.1020  
by Interconnectron GmbH

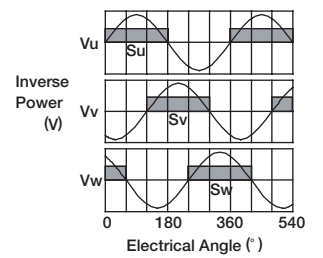
The Mating Connector

Plug : APRA06BFRDN170  
Socket : 020.105.1020

Pin No.	Signal
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⊕	Ground

**Hall Sensor Output Signals**

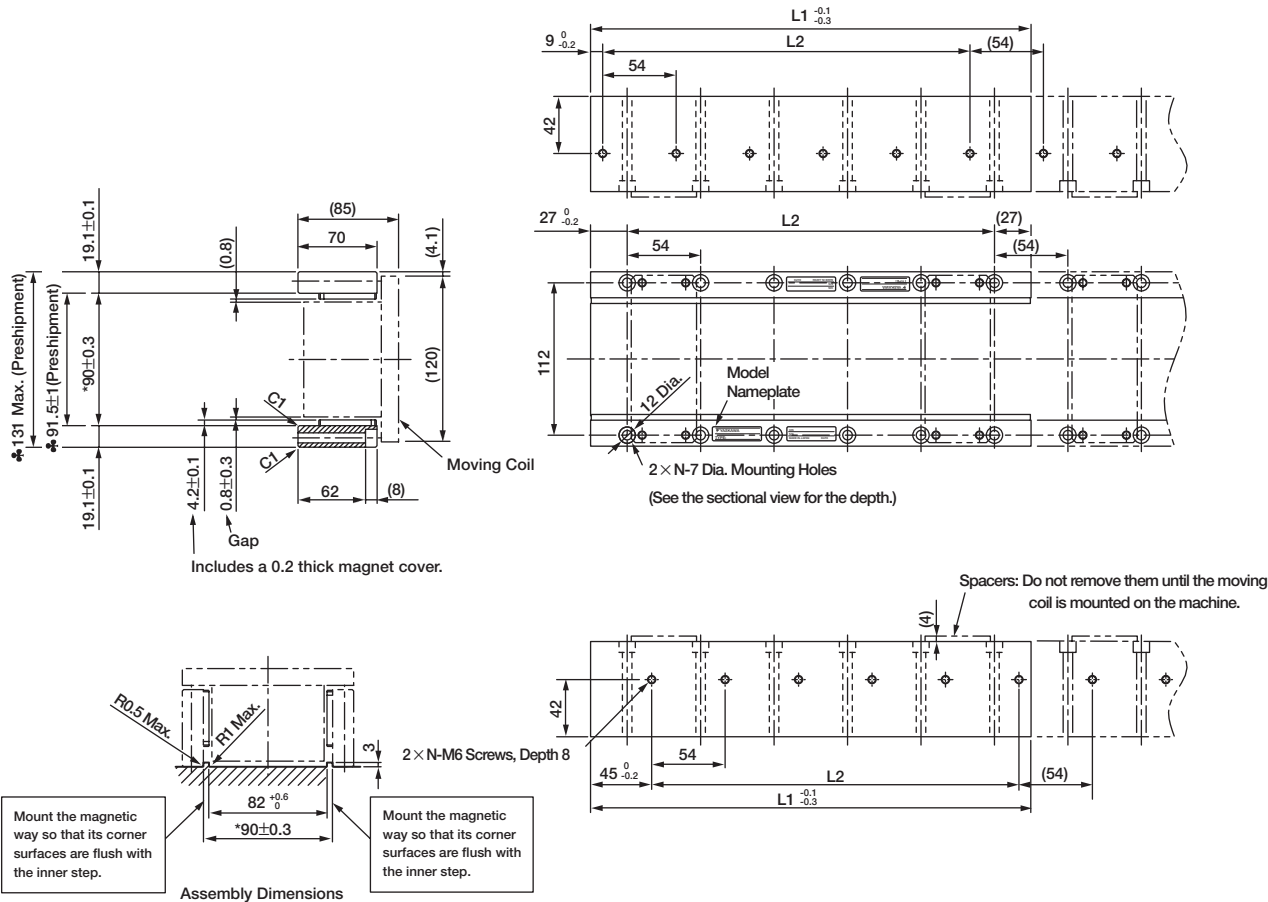
When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals  $S_u$ ,  $S_v$ ,  $S_w$  and the inverse power of each motor phase  $V_u$ ,  $V_v$ ,  $V_w$  becomes as shown in the figure below.



Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass kg
50D170H□D	170	144(48x3)	(16)	8	6
50D320H□D	315	288(48x6)	(17)	14	11

External Dimensions Units: mm

• Magnetic Way: SGLTM-50□□□H□

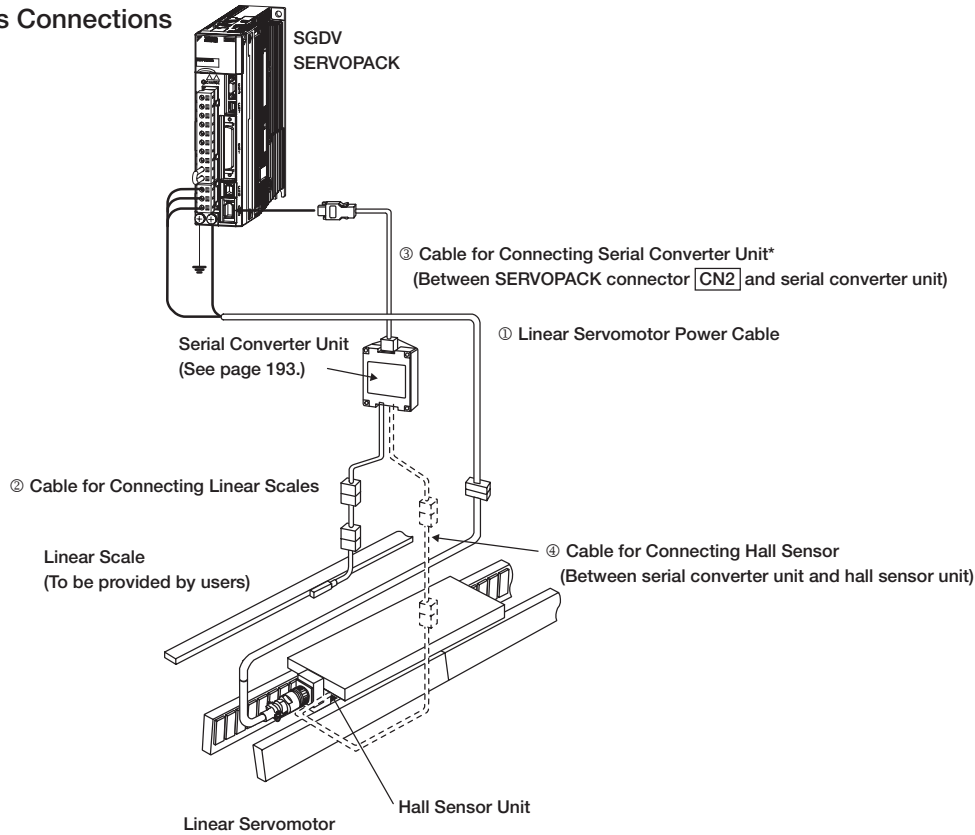


- Notes: 1 Two magnetic ways for both ends of moving coil make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the moving coil is mounted on a machine.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.  
 3 Two magnetic ways in a set can be connected to each other.  
 4 The dimensions marked with an \* are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in Assembly Dimensions. The values with a ♣ are the dimensions at preshipment.  
 5 Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws.

Magnetic Way Model SGLTM-	L1 <sup>±0.1</sup> <sub>±0.3</sub>	L2	N	Approx. Mass kg
50324H□	324	270 (54×5)	6	8
50540H□	540	486 (54×9)	10	13
50756H□	756	702 (54×13)	14	18

Selecting Cables

• Cables Connections



\*: A serial converter unit can be connected directly to an absolute linear scale.

• Cables

Name	Applicable Linear Servomotor Model	Length	Order No.	Specifications	Details
① Linear Servomotor Power Cables	SGLTW -20A□□□□□, -35A□□□□A□	1 m	JZSP-CLN21-01-E	SERVOPACK End      Linear Servomotor End 	(1)
		3 m	JZSP-CLN21-03-E		
		5 m	JZSP-CLN21-05-E		
		10 m	JZSP-CLN21-10-E		
		15 m	JZSP-CLN21-15-E		
		20 m	JZSP-CLN21-20-E		
	SGLTW -40□□□□B□, -80□□□□B□	1 m	JZSP-CLN39-01-E	SERVOPACK End      Linear Servomotor End 	(2)
		3 m	JZSP-CLN39-03-E		
		5 m	JZSP-CLN39-05-E		
		10 m	JZSP-CLN39-10-E		
		15 m	JZSP-CLN39-15-E		
		20 m	JZSP-CLN39-20-E		
	SGLTW -□□A□□□□□D	3 m	DP9325254-03G	SERVOPACK End      Linear Servomotor End 	(3)
		5 m	DP9325254-05G		
		10 m	DP9325254-10G		
		15 m	DP9325254-15G		
		20 m	DP9325254-20G		
	SGLTW -35D□□□H□D, -50D□□□H□D	1 m	JZSP-CMM20D15-01G	SERVOPACK End      Linear Servomotor End 	(4)
		3 m	JZSP-CMM20D15-03G		
		5 m	JZSP-CMM20D15-05G		
10 m		JZSP-CMM20D15-10G			
15 m		JZSP-CMM20D15-15G			
20 m		JZSP-CMM20D15-20G			

\*1: Connector by Tyco Electronics AMP K.K.

\*2: MS connector

\*3: Connector by Interconnectron GmbH

Note: The digit “#” of the order number represents the design revision.

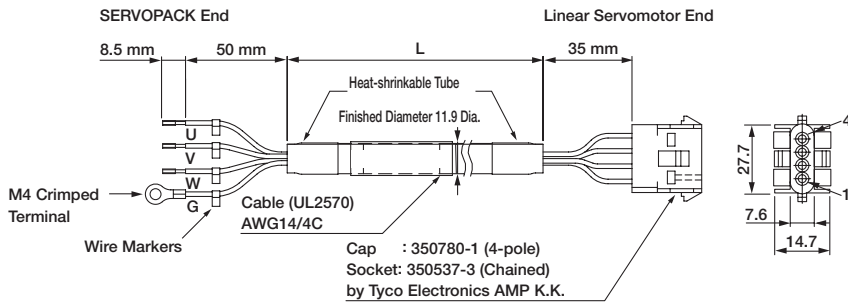
(cont'd)

Selecting Cables

Name	Applicable Linear Servomotor Model	Length	Order No.	Specifications	Details
② Cables for Connecting Linear Scales*	All models	1 m	JZSP-CLL00-01-E-G#		(5)
		3 m	JZSP-CLL00-03-E-G#		
		5 m	JZSP-CLL00-05-E-G#		
		10 m	JZSP-CLL00-10-E-G#		
		15 m	JZSP-CLL00-15-E-G#		
③ Cables for Connecting Serial Converter Units	All models	1 m	JZSP-CLP70-01-E-G#		(6)
		3 m	JZSP-CLP70-03-E-G#		
		5 m	JZSP-CLP70-05-E-G#		
		10 m	JZSP-CLP70-10-E-G#		
		15 m	JZSP-CLP70-15-E-G#		
		20 m	JZSP-CLP70-20-E-G#		
④ Cables for Connecting Hall Sensors	All models	1 m	JZSP-CLL10-01-E-G#		(7)
		3 m	JZSP-CLL10-03-E-G#		
		5 m	JZSP-CLL10-05-E-G#		
		10 m	JZSP-CLL10-10-E-G#		
		15 m	JZSP-CLL10-15-E-G#		

\*: When using serial converter unit JZDP-G00-□□□-E, the maximum cable length is 3 m.  
 Note: The digit "#" of the order number represents the design revision.

(1) Linear Servomotor Power Cables: JZSP-CLN21-□□-E

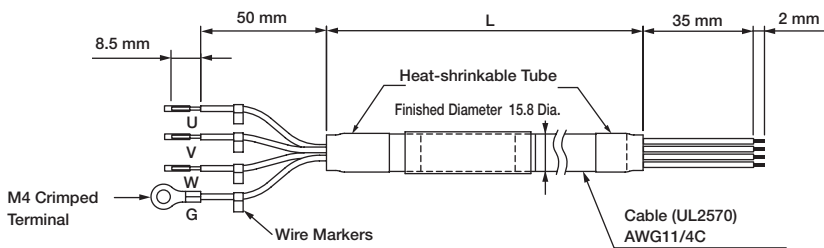


• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Black 1	Phase U	Phase U	1
Black 2	Phase V	Phase V	2
Black 3	Phase W	Phase W	3
Green/yellow	FG	FG	4

(2) Linear Servomotor Power Cables: JZSP-CLN39-□□-E

A connector is not provided on the linear-servomotor end of the power cable (JZSP-CLN39-□□-E). This connector is provided by the customer.

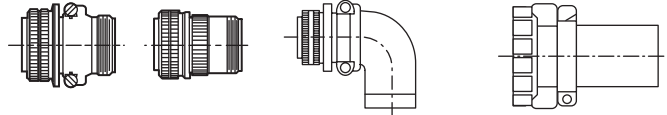


• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Black 1	Phase U	Phase U	1
Black 2	Phase V	Phase V	2
Black 3	Phase W	Phase W	3
Green/yellow	FG	FG	4

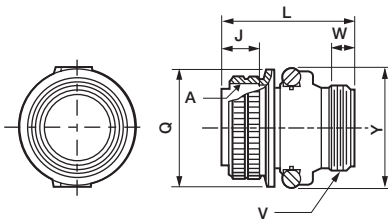
Selecting Cables

● JZSP-CLN39 Cable Connectors



Applicable Linear Servomotor Model	Attached Connector	Plug		Cable Clamp
		Straight	Straight L-shaped	
SGLTW-40, -80	MS3102A22-22P	MS3106B22-22S or MS3106A22-22A	MS3108B22-22S	MS3057-12A

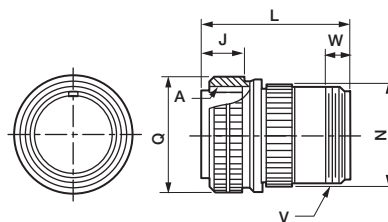
(a) MS3106B: Straight Plug with Front-shell and Back-shell Separated



Units: mm

Shell Size	Joint Screw A	Joint Length J±0.12	Max. Overall Length L	Outer Diameter of Nut Q <sup>+0</sup> <sub>-0.38</sub>	Cable Clamp Mounting Screw V	Min. Effective Screw Length W	Max. Width Y
22	1 3/8 -18UNEF	18.26	55.57	40.48	1 3/16 -18UNEF	9.53	50

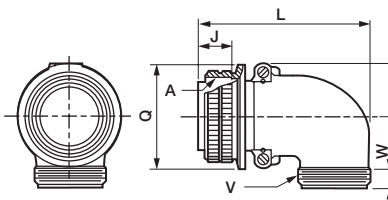
(b) MS3106A: Straight Plug with Solid Shell



Units: mm

Shell Size	Joint Screw A	Joint Length J±0.12	Overall Length L±0.5	Outer Diameter of Nut Q <sup>+0</sup> <sub>-0.38</sub>	Outer Diameter N±0.5	Cable Clamp Mounting Screw V	Min. Effective Screw Length W
22	1 3/8 -18UNEF	18.26	54	40.48	34.99	1 3/16-18UNEF	9.53

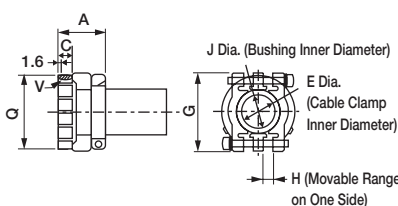
(c) MS3108B: L-shaped Plug with Front-shell and Back-shell Separated



Units: mm

Shell Size	Joint Screw A	Joint Length J±0.12	Max. Overall Length L	R ±0.5	U ±0.5	Outer Diameter of Nut Q <sup>+0</sup> <sub>-0.38</sub>	Cable Clamp Mounting Screw V	Min. Effective Screw Length W
22	1 3/8 -18UNEF	18.26	76.98	24.1	33.3	40.48	1 3/16 -18UNEF	9.53

(d) MS3057-12A: Cable Clamp with Rubber Bushing

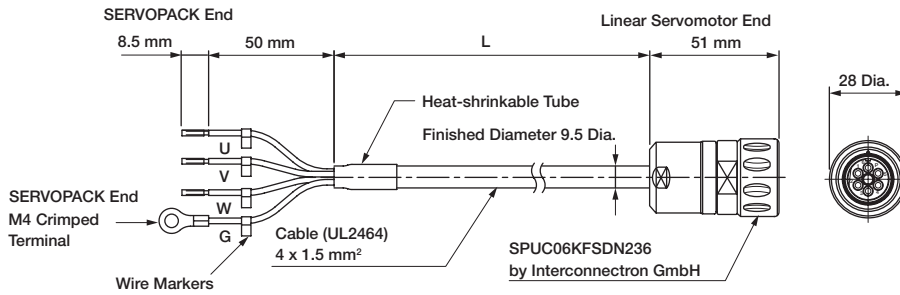


Units: mm

Applicable Shell Size	Overall Length A±0.7	Effective Screw Length C	E	G±0.7	H	J	Mounting Screw V	Outer Diameter Q±0.7	Rubber Bushing Type
20,22	23.8	10.3	19.0	37.3	4.0	15.9	1 3/16 -18UNEF	35.0	AN3420 -12

Selecting Cables

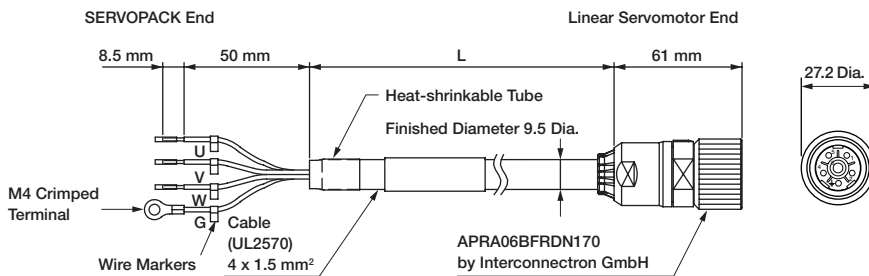
(3) Linear Servomotor Power Cables: DP9325254-□□G



• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Black 1	Phase U	Phase U	1
Black 2	Phase V	Phase V	2
Black 3	Phase W	Phase W	3
Green / yellow	FG	—	4
		—	5
		FG	6

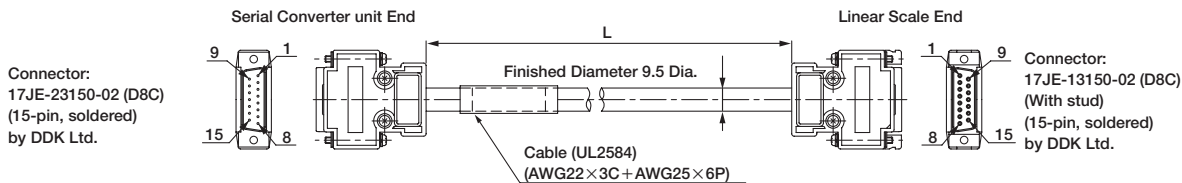
(4) Linear Servomotor Power Cables: JZSP-CMM20D15-□□G



• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Black 1	Phase U	Phase U	1
Black 2	Phase V	Phase V	2
Black 3	Phase W	FG	3
Green / yellow	FG	Phase W	4
		—	5
		—	6

(5) Cables for Connecting Linear Scales: JZSP-CLL00-□□-E-G#

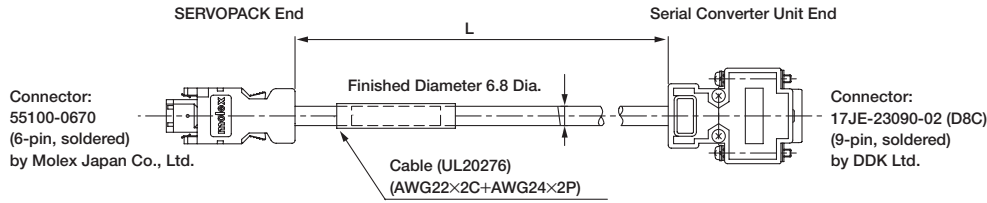


• Wiring Specifications

Serial Converter Unit End		Linear Scale End	
Pin No.	Signal	Pin No.	Signal
1	/Cos (V1-)	1	/Cos (V1-)
2	/Sin (V2-)	2	/Sin (V2-)
3	Ref (V0+)	3	Ref (V0+)
4	+5V	4	+5V
5	5Vs	5	5Vs
6	BID	6	BID
7	Vx	7	Vx
8	Vq	8	Vq
9	Cos (V1+)	9	Cos (V1+)
10	Sin (V2+)	10	Sin (V2+)
11	/Ref (V0+)	11	/Ref (V0-)
12	0V	12	0V
13	0Vs	13	0Vs
14	DIR	14	DIR
15	Inner	15	Inner
Case	Shield	Case	Shield

Selecting Cables

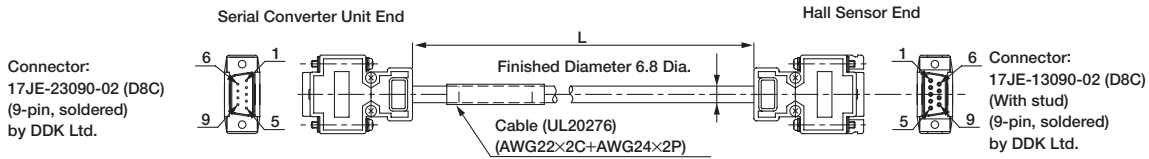
(6) Cables for Connecting Serial Converter Units: JZSP-CLP70-□□-E-G#



• Wiring Specifications

SERVOPACK End			Serial Converter Unit End		
Pin No.	Signal	Wire Color	Pin No.	Signal	Wire Color
1	PG5V	Red	1	+5V	Red
2	PG0V	Black	5	0V	Black
3	—	—	3	—	—
4	—	—	4	—	—
5	PS	Light blue	2	Phase S output	Light blue
6	/PS	Light blue/white	6	Phase /S output	Light blue/white
Shell	Shield	—	Case	Shield	—
			7	—	—
			8	—	—
			9	—	—

(7) Cables for Connecting Hall Sensors: JZSP-CLL10-□□-E-G#



• Wiring Specifications

Serial Converter Unit End		Hall Sensor End	
Pin No.	Signal	Pin No.	Signal
1	+5V	1	+5V
2	Phase U input	2	Phase U input
3	Phase V input	3	Phase V input
4	Phase W input	4	Phase W input
5	0V	5	0V
6	—	6	—
7	—	7	—
8	—	8	—
9	—	9	—
Case	Shield	Case	Shield

# Linear Servomotors

# SGLC

(Cylinder Type)



## Model Designations

### ● Combination of Moving Coil and Magnetic Way

**S G L C - D16 A 085 A P - 750 A**

Linear  $\Sigma$  Series Linear Servomotor (1st digit)      2nd+3rd+4th digits (2nd+3rd+4th digits)      5th digit (5th digit)      6th+7th+8th digits (6th+7th+8th digits)      9th digit (9th digit)      10th digit (10th digit)      11th+12th+13th digits (11th+12th+13th digits)      14th digit (14th digit)

1st digit Servomotor Model

Code	Specifications
C	Cylinder type

2nd+3rd+4th digits Outer Diameter of Magnetic Way

Code	Specifications
D16	16 mm
D20	20 mm
D25	25 mm
D32	32 mm

5th digit Voltage

Code	Specifications
A	200 VAC

6th+7th+8th digits Length of Moving Coil

Code	Specifications	Outer Diameter Code of Magnetic Way
085	85 mm	D16
100	100 mm	D20
115	115 mm	D16
125	125 mm	D25
135	135 mm	D20
145	145 mm	D16
165	165 mm	D32
170	170 mm	D20, D25
215	215 mm	D25
225	225 mm	D32
285	285 mm	D32

9th digit Design Revision Order of Moving Coil  
A, B...

10th digit Hall Sensor

Code	Specifications
P	With hall sensor (all models)

11th+12th+13th digits Length of Magnetic Way  
(See the next page)

14th digit Design Revision Order of Magnetic Way  
A, B...

### ● Moving Coil

**SGL C W - D16 A 085 A P**

Linear  $\Sigma$  Series Linear Servomotor (1st digit)      2nd digit (2nd digit)      3rd+4th+5th digits (3rd+4th+5th digits)      6th digit (6th digit)      7th+8th+9th digits (7th+8th+9th digits)      10th digit (10th digit)      11th digit (11th digit)

1st digit Servomotor Model (Same as above combination.)      3rd+4th+5th digits Outer Diameter of Magnetic Way (Same as above combination.)      10th digit Design Revision Order A, B...

2nd digit Moving Coil/ Magnetic Way

Code	Specifications
W	Moving Coil

6th digit Voltage (Same as above combination.)

7th+8th+9th digits Length of Moving Coil (Same as above combination.)

11th digit Hall Sensor

Code	Specifications
P	With hall sensor (all models)

### ● Magnetic Way

**SGL C M - D16 750 A**

Linear  $\Sigma$  Series Linear Servomotor (1st digit)      2nd digit (2nd digit)      3rd+4th+5th digits (3rd+4th+5th digits)      6th+7th+8th digits (6th+7th+8th digits)      9th digit (9th digit)

1st digit Servomotor Model (Same as above combination.)      3rd+4th+5th digits Outer Diameter of Magnetic Way (Same as above combination.)      9th digit Design Revision Order A, B...

2nd digit Moving Coil/ Magnetic Way

Code	Specifications
M	Magnetic Way

6th+7th+8th digits Length of Magnetic Way (See the next page)

Note: Order the moving coil and magnetic way as a set. Contact your Yaskawa representative before purchasing them separately.



## Features

- Both coil assemblies supported, easy switching from ball screws.
- Compared to ball screw systems, high-speed and high-precision positioning greatly reduces tact time.
- Unlike ball screws, no contact with machines, no lubrication oil, easy maintenance.

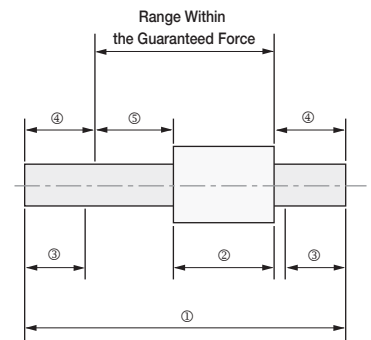
## Application Examples

- Semiconductor equipment
- Electronic parts assembly
- Food packaging machines
- Metal processing machines
- General handling machines

### ◆ Magnetic Way Lengths

Moving Coil Model SGLCW-		Magnetic Way Dimensions mm					
		Standard Specifications				Special Orders	
		Code = ① mm				Length of Magnetic Way mm	
		②	③	④	⑤	Min. to Max.	
D16A	085AP 115AP 145AP	300	85	30	37.5	140	240 to 420 (30 mm increments)
			115			110	
			145			80	
	510	85	45	52.5	320	480 to 750 (30 mm increments)	
		115			290		
		145			260		
		85			560		
		115			530		
		145			500		
D20A	100AP 135AP 170AP	350	100	35	45	160	280 to 490 (35 mm increments)
			135			125	
			170			90	
	590	100	50	60	370	555 to 870 (35 mm increments)	
		135			335		
		170			300		
		100			650		
		135			615		
		170			580		
D25A	125AP 170AP 215AP	450	125	45	57.5	210	360 to 630 (45 mm increments)
			170			165	
			215			120	
	750	125	60	72.5	480	705 to 1110 (45 mm increments)	
		170			435		
		215			390		
		125			840		
		170			795		
		215			750		
D32A	165AP 225AP 285AP	600	165	60	75	285	480 to 840 (60 mm increments)
			225			225	
			285			165	
	1020	165	90	105	645	960 to 1500 (60 mm increments)	
		225			585		
		285			525		
		165			1125		
		225			1065		
		285			1005		

- ① Length of Magnetic Way
- ② Length of Moving Coil
- ③ Position of Support Section
- ④ Range Outside the Guaranteed Force
- ⑤ Effective Strokes



Note: ④ Range outside the guaranteed force: If any part of the moving coil is located within this range, characteristics indicated in *Force and Speed Characteristics* on page 184 cannot be satisfied.

< Calculating Length of Magnetic Way >

- ② Length of Moving Coil (mm)
- ④ Range Outside the Guaranteed Force (mm)
- ⑤ Effective Strokes (mm)

Formula

◆ Length of Magnetic Way  
 $[② + ④ \times 2 + ⑤]$  (mm)

## Ratings and Specifications

**Time Rating:** Continuous

**Insulation Resistance:** 500 VDC, 10 MΩ min.

**Ambient Temperature:** 0 to 40°C

**Excitation:** Permanent magnet

**Withstand Voltage:** 1500 VAC for one minute

**Enclosure:** Self-cooled

**Ambient Humidity:** 20% to 80% (no condensation)

**Allowable Winding Temperature:** 130°C (Thermal class B)

Linear Servomotor Model SGLC-		D16A			D20A			D25A			D32A		
		085A	115A	145A	100A	135A	170A	125A	170A	215A	165A	225A	285A
Peak Speed <sup>3</sup>	m / s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Rated Force <sup>1</sup>	N	17	25	34	30	45	60	70	105	140	90	135	180
Rated Current <sup>1</sup>	Arms	0.59	0.53	0.66	0.98	0.98	1.19	1.42	1.75	3.49	1.57	2.79	2.79
Instantaneous Peak Force <sup>1</sup>	N	60	90	120	150	225	300	280	420	560	420	630	840
Instantaneous Peak Current <sup>1</sup>	Arms	2.07	2.07	2.52	4.90	4.90	5.95	5.68	6.98	12.96	7.32	13.01	13.01
Moving Coil Mass	kg	0.3	0.4	0.5	0.6	0.8	1.0	1.0	1.4	1.8	1.8	2.5	3.2
Force Constant	N / Arms	31.2	46.8	51.3	33.0	49.5	54.3	53.1	64.8	43.2	61.8	52.2	69.6
BEMF Constant	V / (m/s)	10.4	15.6	17.1	11.0	16.5	18.1	17.7	21.6	14.4	20.6	17.4	23.2
Motor Constant	N / $\sqrt{w}$	4.8	5.9	6.7	7.5	9.2	10.4	10.0	12.4	15.4	16.2	20.0	23.0
Electrical Time Constant	ms	0.18	0.18	0.17	0.38	0.32	0.41	0.18	0.59	0.65	0.76	1.18	1.58
Mechanical Time Constant	ms	13.1	11.7	11.3	10.70	9.50	9.30	10.1	9.2	7.6	6.9	6.3	6.0
Thermal Resistance With Heat Sink	K / W	3.35	2.9	1.64	1.66	1.45	1.29	1.00	0.68	0.61	0.77	0.53	0.49
Thermal Resistance Without Heat Sink	K / W	6.79	5.24	4.26	4.35	3.38	2.76	2.99	2.29	1.81	1.87	1.43	1.16
Magnetic Attraction <sup>2</sup>	N	0	0	0	0	0	0	0	0	0	0	0	0
Applicable SERVOPACK	SGDV-	R70A	R70A	R90A	1R6A	1R6A	2R8A	1R6A	2R8A	5R5A	2R8A	5R5A	5R5A

\*1: These items and "Force and Speed Characteristics" are the values at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. The others are at 20°C.

\*2: Logical magnetic attraction acting between the moving coil and the magnetic way. Because of the gap imbalance created after installing the moving coil and the magnetic way, a magnetic attraction is generated.

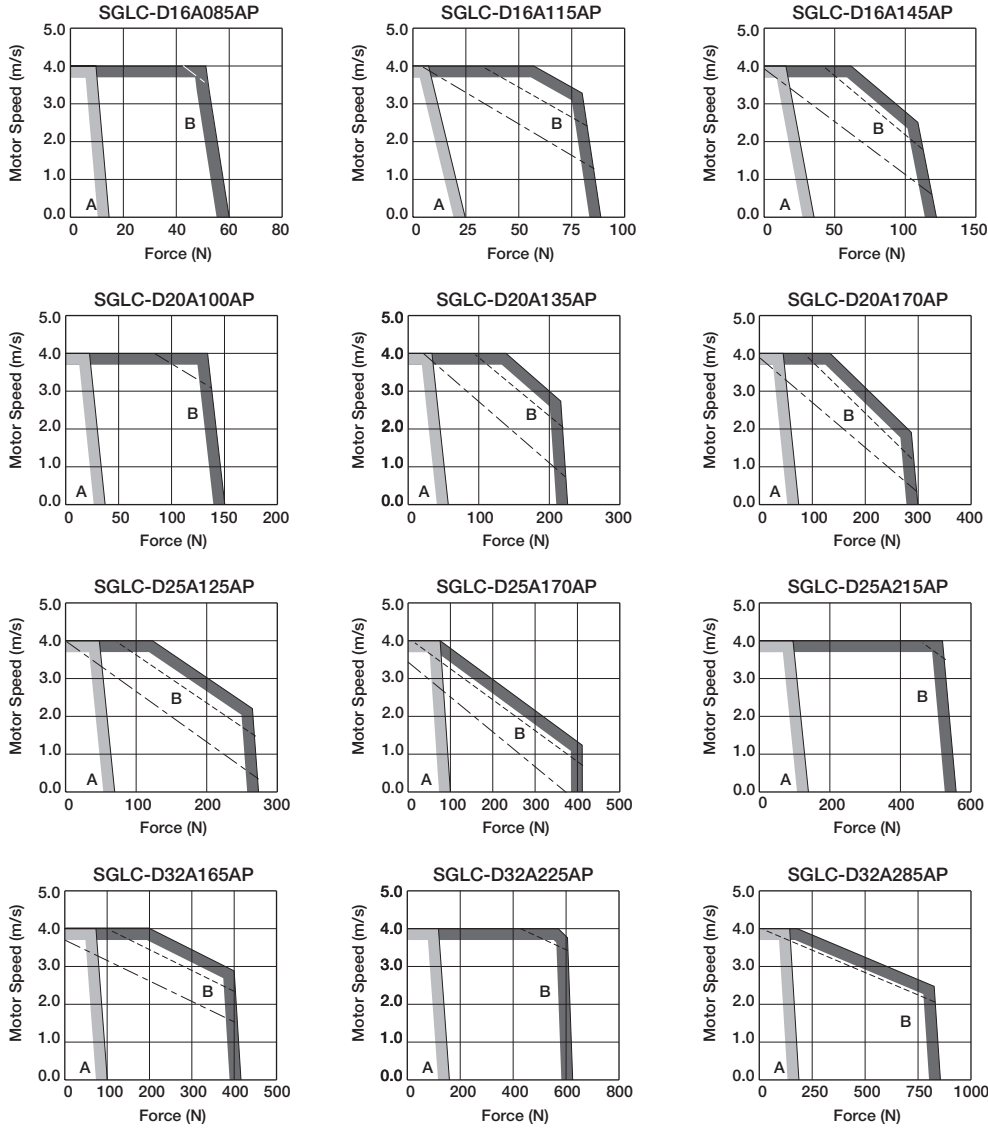
\*3: The rated speed during operation by speed control with an analog voltage reference must be set to 1.5 m/s.

Note: These specifications show the values under the cooling conditions when a heat sink (aluminum board) listed in the following table is mounted on the moving coil.

Heat Sink Size	Applicable Models
100 mm × 200 mm × 12 mm	SGLC-D16A085A, -D16A115A
200 mm × 300 mm × 12 mm	SGLC-D16A145A, -D20A100A, -D20A135A, -D20A170A
300 mm × 400 mm × 12 mm	SGLC-D25A125A, -D32A165A
400 mm × 500 mm × 12 mm	SGLC-D25A170A, -D25A215A, -D32A225A, -D32A285A

**Ratings and Specifications**

● **Force and Speed Characteristics** [A]: Continuous Duty Zone [B]: Intermittent Duty Zone (Note)



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltages. The solid, dotted, and dashed-dotted lines of the intermittent duty zone indicate the characteristics when a servomotor runs with the following combinations:

- The solid line: With a three-phase 200 V SERVOPACK
- The dotted line: With a single-phase 200 V SERVOPACK
- The dashed-dotted line: With a single-phase 100 V SERVOPACK

SGLC-D16A085AP and SGLC-20A100AP servomotors combined with single-phase 200 V SERVOPACKs have the same characteristics as those combined with three-phase ones.

2 When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.

● **Mechanical Specifications of Linear Servomotors**

(1) Impact Resistance

- Impact acceleration: 98 m/s<sup>2</sup>
- Impact occurrences: twice

(2) Vibration Resistance

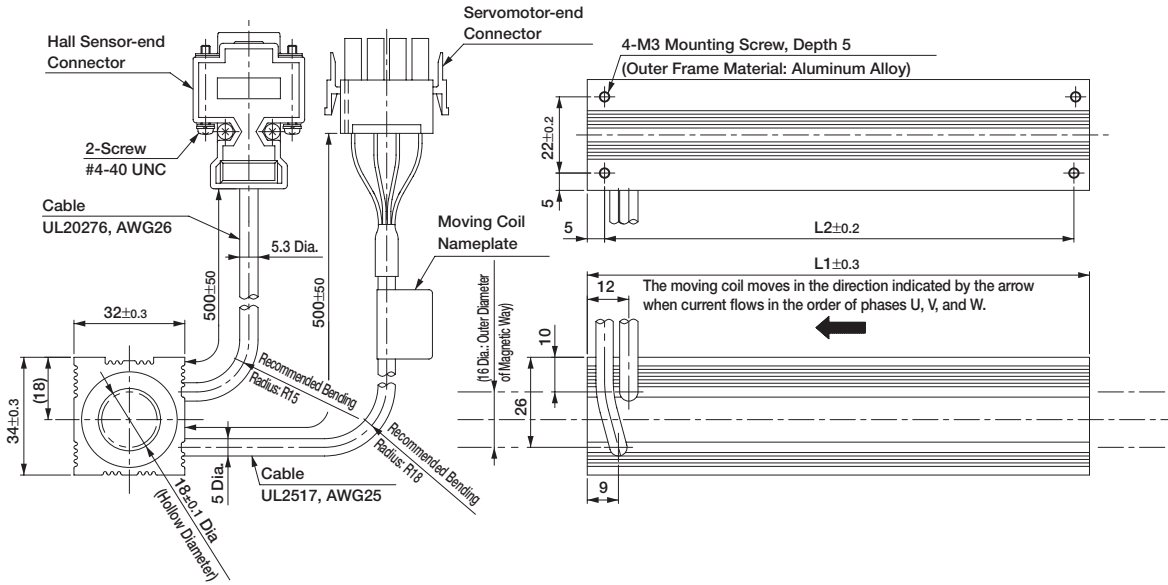
The linear servomotors will withstand the following vibration acceleration in three directions: Vertical, side to side, and front to back.

- Vibration acceleration: Moving Coil: 24.5 m/s<sup>2</sup>  
Magnetic Way: 24.5 m/s<sup>2</sup> in axis direction  
4.9 m/s<sup>2</sup> in vertically and horizontally

External Dimensions Units: mm

(1) SGLC-D16

- Moving Coil: SGLCW-D16A□□□AP (With a connector by Tyco Electronics AMP K.K.)



Moving Coil Model SGLCW-	L1	L2	Approx. Mass* kg
D16A085AP	85	75	0.3
D16A115AP	115	105	0.4
D16A145AP	145	135	0.5

\*: The values indicate the mass of moving coil with a hall sensor unit.

Hall Sensor Connector Specifications



Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Plug: 350779-1  
Pin : 350690-3 or  
350561-3 (No.1 to 3)  
770210-1 (No.4)

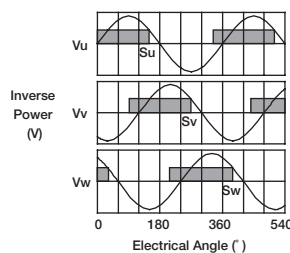
by Tyco  
Electronics AMP K.K.  
The Mating Connector

Cap: 350780-1  
Socket: 350925-1 or  
770673-1

Pin No.	Name	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green

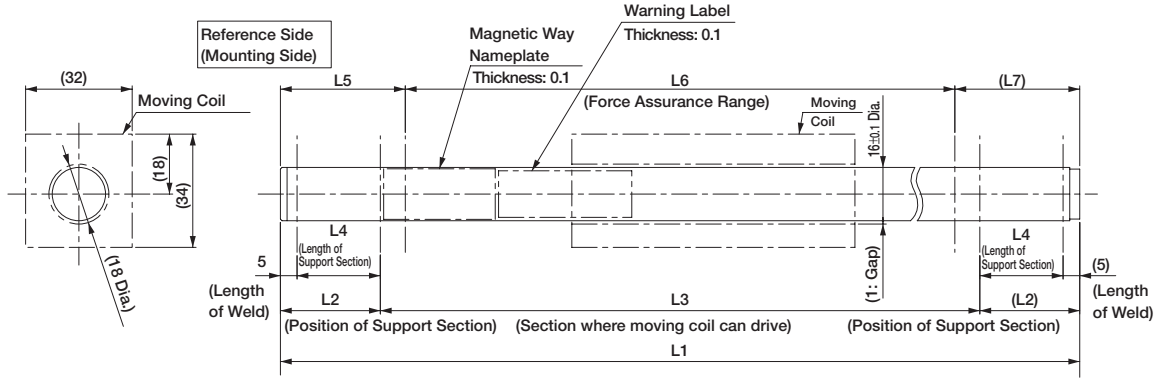
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



External Dimensions Units: mm

● Magnetic Way: SGLCM-D16□□□A



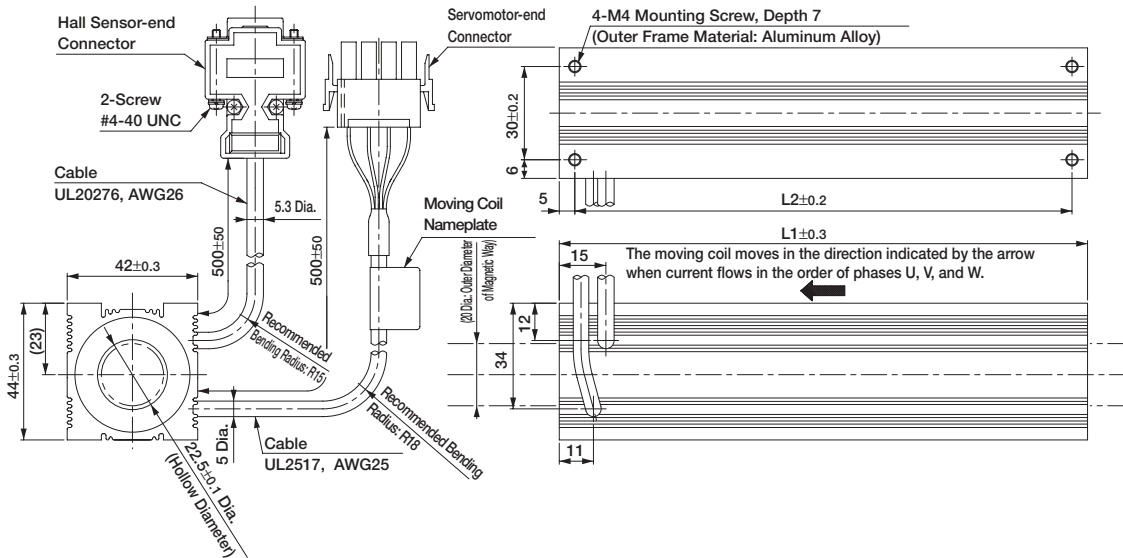
- Notes:1 The magnetic way will become deformed if a magnetic attraction with the moving coil is generated.  
 Take measures over the entire driving range to prevent any interference between the magnetic way and the moving coil after installation.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

Magnetic Way Model SGLCM-	L1	L2	L3	L4	L5	L6	L7	Approx. Mass kg	Remarks
D16240A	240±1.6	30	180	25	37.5±0.3	165±1.2	37.5	0.38	-
D16270A	270±1.6	30	210	25	37.5±0.3	195±1.2	37.5	0.43	-
D16300A	300±1.6	30	240	25	37.5±0.3	225±1.2	37.5	0.48	Standard
D16330A	330±1.6	30	270	25	37.5±0.3	255±1.2	37.5	0.53	-
D16360A	360±1.6	30	300	25	37.5±0.3	285±1.2	37.5	0.58	-
D16390A	390±1.6	30	330	25	37.5±0.3	315±1.2	37.5	0.63	-
D16420A	420±1.6	30	360	25	37.5±0.3	345±1.2	37.5	0.68	-
D16480A	480±2.5	45	390	40	52.5±0.3	375±2.1	52.5	0.75	-
D16510A	510±2.5	45	420	40	52.5±0.3	405±2.1	52.5	0.80	Standard
D16540A	540±2.5	45	450	40	52.5±0.3	435±2.1	52.5	0.85	-
D16570A	570±2.5	45	480	40	52.5±0.3	465±2.1	52.5	0.90	-
D16600A	600±2.5	45	510	40	52.5±0.3	495±2.1	52.5	0.95	-
D16630A	630±2.5	45	540	40	52.5±0.3	525±2.1	52.5	1.0	-
D16660A	660±2.5	45	570	40	52.5±0.3	555±2.1	52.5	1.05	-
D16690A	690±2.5	45	600	40	52.5±0.3	585±2.1	52.5	1.1	-
D16720A	720±2.5	45	630	40	52.5±0.3	615±2.1	52.5	1.15	-
D16750A	750±3	45	660	40	52.5±0.3	645±2.5	52.5	1.2	Standard

External Dimensions Units: mm

(2) SGLC-D20

• Moving Coil: SGLCW-D20A□□□AP (With a connector by Tyco Electronics AMP K.K.)



Moving Coil Model SGLCW-	L1	L2	Approx. Mass* kg
D20A100AP	100	90	0.6
D20A135AP	135	125	0.8
D20A170AP	170	160	1.0

\*: The values indicate the mass of moving coil with a hall sensor unit.

Hall Sensor Connector Specifications



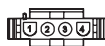
Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket Connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Plug: 350779-1  
Pin : 350690-3 or  
350561-3 (No.1 to 3)  
770210-1 (No.4)

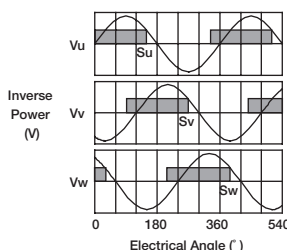
by Tyco  
Electronics AMP K.K.  
The Mating Connector

Cap: 350780-1  
Socket: 350925-1 or  
770673-1

Pin No.	Name	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green

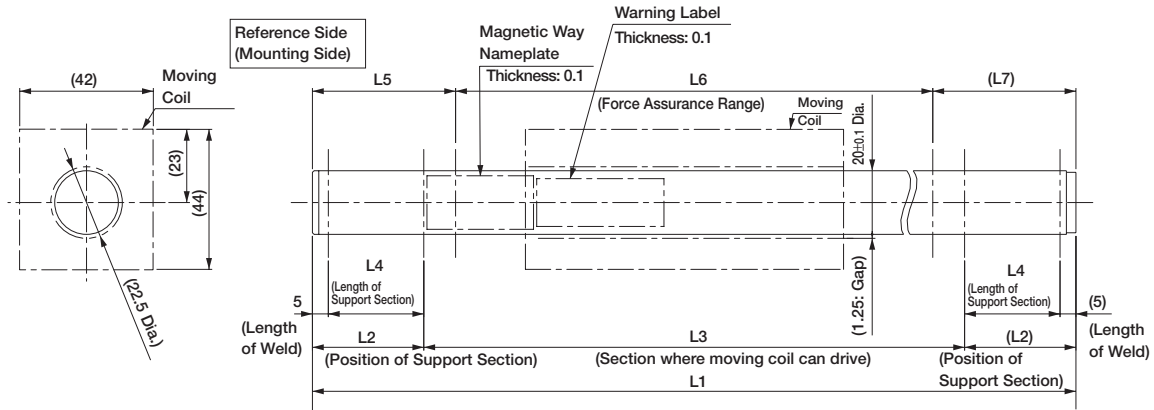
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals Su, Sv, Sw and the inverse power of each motor phase Vu, Vv, Vw becomes as shown in the figure below.



External Dimensions Units: mm

● Magnetic Way: SGLCM-D20□□□A



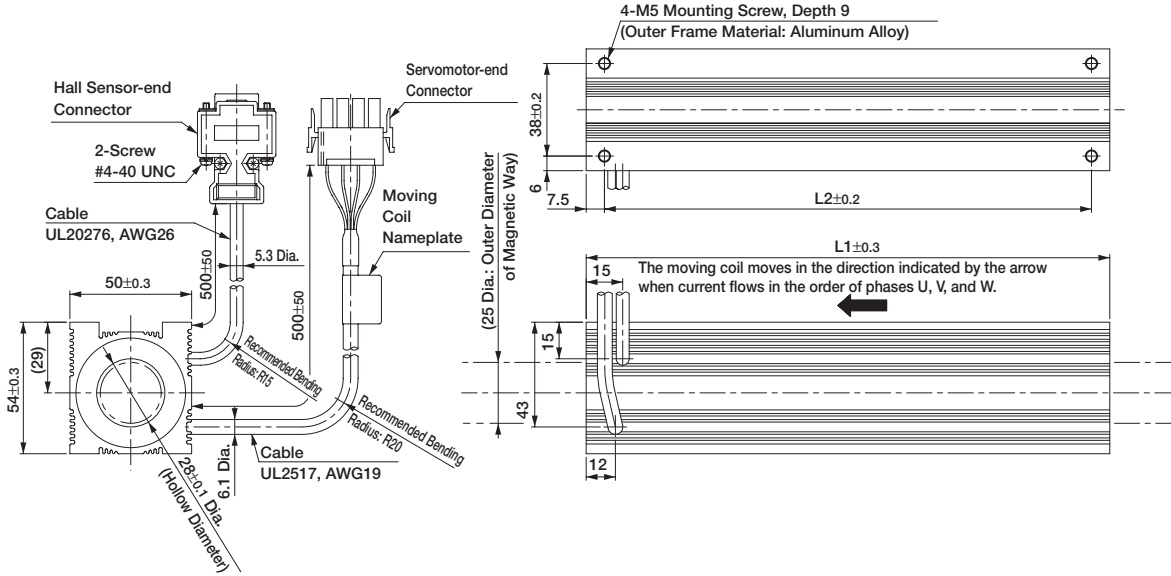
- Notes: 1 The magnetic way will become deformed if a magnetic attraction with the moving coil is generated.  
 Take measures over the entire driving range to prevent any interference between the magnetic way and the moving coil after installation.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

Magnetic Way Model SGLCM-	L1	L2	L3	L4	L5	L6	L7	Approx. Mass kg	Remarks
D20280A	280±1.6	35	210	30	45±0.3	190±1.2	45	0.68	-
D20315A	315±1.6	35	245	30	45±0.3	225±1.2	45	0.77	-
D20350A	350±1.6	35	280	30	45±0.3	260±1.2	45	0.86	Standard
D20385A	385±1.6	35	315	30	45±0.3	295±1.2	45	0.95	-
D20420A	420±1.6	35	350	30	45±0.3	330±1.2	45	1.0	-
D20455A	455±1.6	35	385	30	45±0.3	365±1.2	45	1.1	-
D20490A	490±1.6	35	420	30	45±0.3	400±1.2	45	1.2	-
D20555A	555±2.5	50	455	45	60±0.3	435±2.1	60	1.35	-
D20590A	590±2.5	50	490	45	60±0.3	470±2.1	60	1.45	Standard
D20625A	625±2.5	50	525	45	60±0.3	505±2.1	60	1.55	-
D20660A	660±2.5	50	560	45	60±0.3	540±2.1	60	1.6	-
D20695A	695±2.5	50	595	45	60±0.3	575±2.1	60	1.7	-
D20730A	730±2.5	50	630	45	60±0.3	610±2.1	60	1.8	-
D20765A	765±2.5	50	665	45	60±0.3	645±2.1	60	1.9	-
D20800A	800±2.5	50	700	45	60±0.3	680±2.1	60	2.0	-
D20835A	835±2.5	50	735	45	60±0.3	715±2.1	60	2.1	-
D20870A	870±3	50	770	45	60±0.3	750±2.5	60	2.2	Standard

External Dimensions Units: mm

(3) SGLC-D25

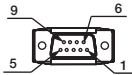
- Moving Coil: SGLCW-D25A□□□AP (With a connector by Tyco Electronics AMP K.K.)



Moving Coil Model SGLCW-	L1	L2	Approx. Mass* kg
D25A125AP	125	110	1.0
D25A170AP	170	153	1.4
D25A215AP	215	200	1.8

\*: The values indicate the mass of moving coil with a hall sensor unit.

Hall Sensor Connector Specifications



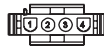
Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Plug: 350779-1  
Pin: (No. 1 to 3)  
350561-3 or 350690-3  
(No. 4)  
350654-1 or 350669-1

by Tyco Electronics AMP K.K.

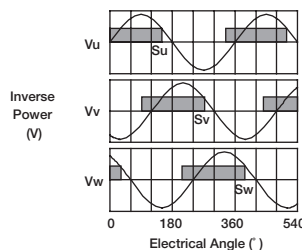
The Mating Connector

Cap : 350780-1  
Socket: 350925-1 or  
770673-1

Pin No.	Name	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green

Hall Sensor Output Signals

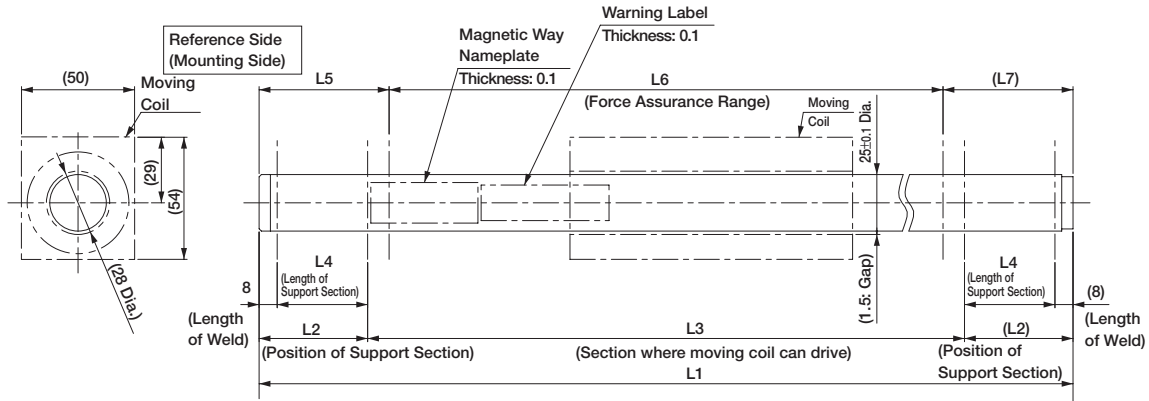
When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals  $S_u$ ,  $S_v$ ,  $S_w$  and the inverse power of each motor phase  $V_u$ ,  $V_v$ ,  $V_w$  becomes as shown in the figure below.





External Dimensions Units: mm

● Magnetic Way: SGLCM-D25□□□A



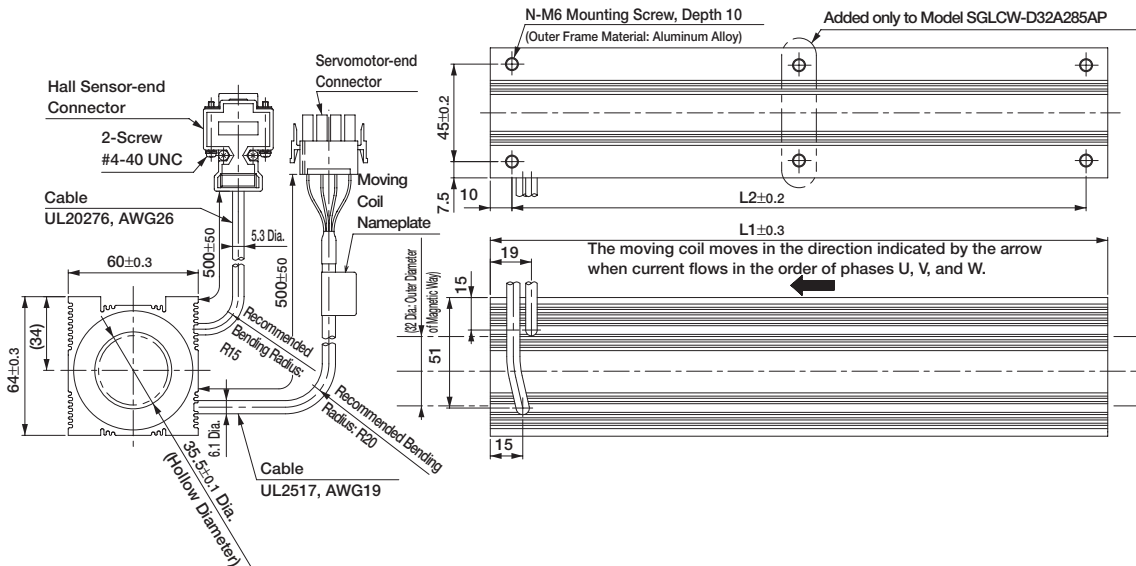
- Notes: 1 The magnetic way will become deformed if a magnetic attraction with the moving coil is generated. Take measures over the entire driving range to prevent any interference between the magnetic way and the moving coil after installation.  
2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

Magnetic Way Model SGLCM-	L1	L2	L3	L4	L5	L6	L7	Approx. Mass kg	Remarks
D25360A	360±1.6	45	270	37	57.5±0.3	245±1.2	57.5	1.5	-
D25405A	405±1.6	45	315	37	57.5±0.3	290±1.2	57.5	1.65	-
D25450A	450±1.6	45	360	37	57.5±0.3	335±1.2	57.5	1.8	Standard
D25495A	495±1.6	45	405	37	57.5±0.3	380±1.2	57.5	1.95	-
D25540A	540±1.6	45	450	37	57.5±0.3	425±1.2	57.5	2.1	-
D25585A	585±1.6	45	495	37	57.5±0.3	470±1.2	57.5	2.25	-
D25630A	630±1.6	45	540	37	57.5±0.3	515±1.2	57.5	2.4	-
D25705A	705±2.5	60	585	52	72.5±0.3	560±2.1	72.5	2.85	-
D25750A	750±2.5	60	630	52	72.5±0.3	605±2.1	72.5	3.0	Standard
D25795A	795±2.5	60	675	52	72.5±0.3	650±2.1	72.5	3.15	-
D25840A	840±2.5	60	720	52	72.5±0.3	695±2.1	72.5	3.3	-
D25885A	885±2.5	60	765	52	72.5±0.3	740±2.1	72.5	3.45	-
D25930A	930±2.5	60	810	52	72.5±0.3	785±2.1	72.5	3.6	-
D25975A	975±2.5	60	855	52	72.5±0.3	830±2.1	72.5	3.75	-
D251020A	1020±2.5	60	900	52	72.5±0.3	875±2.1	72.5	3.9	-
D251065A	1065±2.5	60	945	52	72.5±0.3	920±2.1	72.5	4.05	-
D251110A	1110±3	60	990	52	72.5±0.3	965±2.5	72.5	4.2	Standard

External Dimensions Units: mm

(4) SGLC-D32

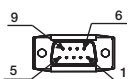
- Moving Coil: SGLCW-D32A□□□AP (With a connector by Tyco Electronics AMP K.K.)



Moving Coil Model SGLCW-	L1	L2	N	Approx. Mass* kg
D32A165AP	165	145	4	1.8
D32A225AP	225	205	4	2.5
D32A285AP	285	265	6	3.2

\*: The values indicate the mass of moving coil with a hall sensor unit.

Hall Sensor Connector Specifications



Pin Connector:  
17JE-23090-02 (D8C)  
by DDK Ltd.

The Mating Connector

Socket connector:  
17JE-13090-02 (D8C)  
Stud: 17L-002C or  
17L-002C1

Pin No.	Name
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear Servomotor Connector Specifications



Plug: 350779-1  
Pin: (No. 1 to 3)  
350561-3 or 350690-3  
(No. 4)  
350654-1 or 350669-1  
by Tyco Electronics AMP K.K.

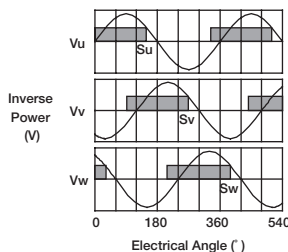
The Mating Connector

Cap: 350780-1  
Socket: 350925-1 or  
770673-1

Pin No.	Name	Wire Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green

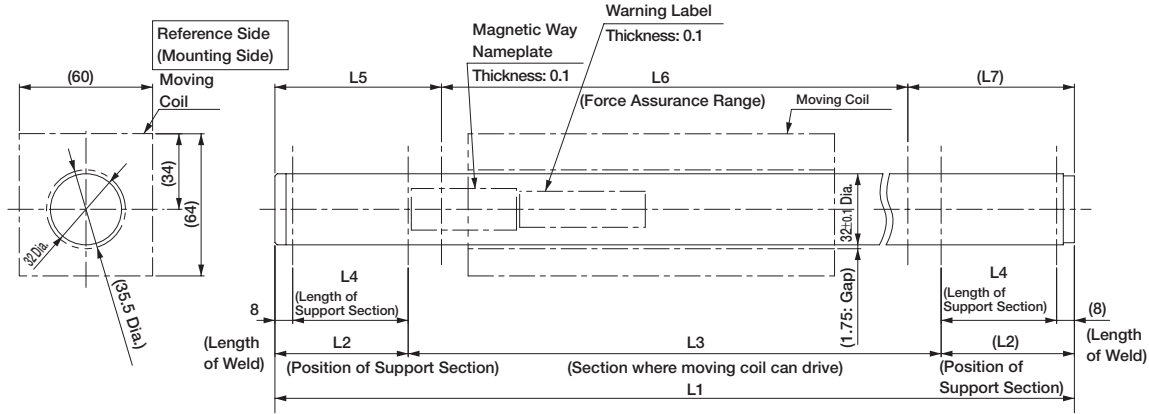
Hall Sensor Output Signals

When the moving coil moves in the direction indicated by the arrow in the figure, the relationship between the hall sensor output signals  $S_u$ ,  $S_v$ ,  $S_w$  and the inverse power of each motor phase  $V_u$ ,  $V_v$ ,  $V_w$  becomes as shown in the figure below.



External Dimensions Units: mm

● Magnetic Way: SGLCM-D32□□□A

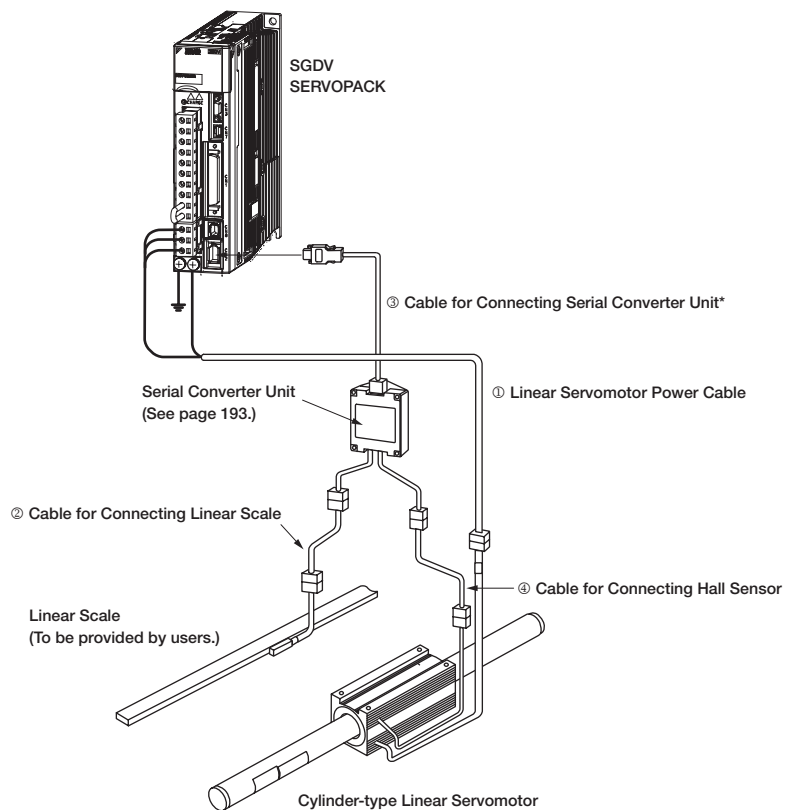


- Notes: 1 The magnetic way will become deformed if a magnetic attraction with the moving coil is generated.  
 Take measures over the entire driving range to prevent any interference between the magnetic way and the moving coil after installation.  
 2 If you have a pacemaker or any other electronic medical device, do not go near the magnetic way of the linear servomotor.

Magnetic Way Model SGLCM-	L1	L2	L3	L4	L5	L6	L7	Approx. Mass kg	Remarks
D32480A	480±1.6	60	360	52	75±0.3	330±1.2	75	3.0	-
D32540A	540±1.6	60	420	52	75±0.3	390±1.2	75	3.4	-
D32600A	600±1.6	60	480	52	75±0.3	450±1.2	75	3.8	Standard
D32660A	660±1.6	60	540	52	75±0.3	510±1.2	75	4.2	-
D32720A	720±1.6	60	600	52	75±0.3	570±1.2	75	4.6	-
D32780A	780±1.6	60	660	52	75±0.3	630±1.2	75	5.0	-
D32840A	840±1.6	60	720	52	75±0.3	690±1.2	75	5.4	-
D32960A	960±2.5	90	780	82	105±0.3	750±2.1	105	5.9	-
D321020A	1020±2.5	90	840	82	105±0.3	810±2.1	105	6.3	Standard
D321080A	1080±2.5	90	900	82	105±0.3	870±2.1	105	6.7	-
D321140A	1140±2.5	90	960	82	105±0.3	930±2.1	105	7.1	-
D321200A	1200±2.5	90	1020	82	105±0.3	990±2.1	105	7.5	-
D321260A	1260±2.5	90	1080	82	105±0.3	1050±2.1	105	7.9	-
D321320A	1320±2.5	90	1140	82	105±0.3	1110±2.1	105	8.3	-
D321380A	1380±2.5	90	1200	82	105±0.3	1170±2.1	105	8.7	-
D321440A	1440±2.5	90	1260	82	105±0.3	1230±2.1	105	9.1	-
D321500A	1500±3	90	1320	82	105±0.3	1290±2.5	105	9.5	Standard

## Selecting Cables

### ● Cables Connections



\*: A serial converter unit can be connected directly to an absolute linear scale.

### ● Cables

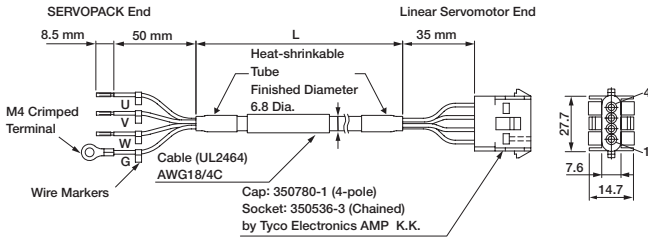
Name	Applicable Linear Servomotor Model	Length	Order No.	Specifications	Details
① Linear Servomotor Power Cables	All models	1 m	JZSP-CLN11-01-E	SERVOPACK End      Linear Servomotor End	(1)
		3 m	JZSP-CLN11-03-E		
		5 m	JZSP-CLN11-05-E		
		10 m	JZSP-CLN11-10-E		
		15 m	JZSP-CLN11-15-E		
② Cables for Connecting Linear Scales*	All models	1 m	JZSP-CLL00-01-E-G#	Serial Converter Unit End      Linear Scale End	(2)
		3 m	JZSP-CLL00-03-E-G#		
		5 m	JZSP-CLL00-05-E-G#		
		10 m	JZSP-CLL00-10-E-G#		
		15 m	JZSP-CLL00-15-E-G#		
③ Cables for Connecting Serial Converter Units	All models	1 m	JZSP-CLP70-01-E-G#	SERVOPACK End      Serial Converter Unit End	(3)
		3 m	JZSP-CLP70-03-E-G#		
		5 m	JZSP-CLP70-05-E-G#		
		10 m	JZSP-CLP70-10-E-G#		
		15 m	JZSP-CLP70-15-E-G#		
		20 m	JZSP-CLP70-20-E-G#		
④ Cables for Connecting Hall Sensors	All models	1 m	JZSP-CLL10-01-E-G#	Serial Converter Unit End      Hall Sensor Unit End	(4)
		3 m	JZSP-CLL10-03-E-G#		
		5 m	JZSP-CLL10-05-E-G#		
		10 m	JZSP-CLL10-10-E-G#		
		15 m	JZSP-CLL10-15-E-G#		

\*: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.

Note: The digit "#" of the order number represents the design revision.

Selecting Cables

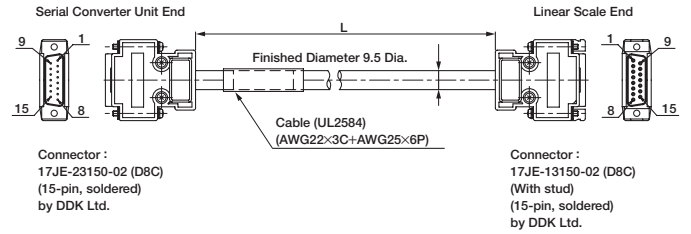
(1) Linear Servomotor Power Cables:  
JZSP-CLN11-□□-E



• Wiring Specifications

SERVOPACK-end Leads		Linear Servomotor-end Connector	
Wire Color	Signal	Signal	Pin. No.
Black 1	Phase U	Phase U	1
Black 2	Phase V	Phase V	2
Black 3	Phase W	Phase W	3
Green/yellow	FG	FG	4

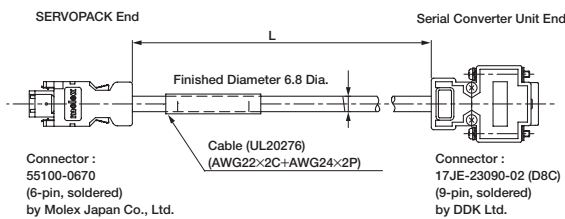
(2) Cables for Connecting Linear Scales:  
JZSP-CLL00-□□-E-G#



• Wiring Specifications

Serial Converter Unit End		Linear Scale End	
Pin No.	Signal	Pin No.	Signal
1	/Cos(V1-)	1	/Cos(V1-)
2	/Sin(V2-)	2	/Sin(V2-)
3	Ref(V0+)	3	Ref(V0+)
4	+5V	4	+5V
5	5Vs	5	5Vs
6	BID	6	BID
7	Vx	7	Vx
8	Vq	8	Vq
9	Cos(V1+)	9	Cos(V1+)
10	Sin(V2+)	10	Sin(V2+)
11	/Ref(V0+)	11	/Ref(V0-)
12	0V	12	0V
13	0Vs	13	0Vs
14	DIR	14	DIR
15	Inner	15	Inner
Case	Shield	Case	Shield

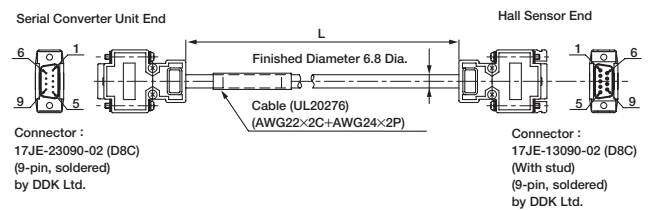
(3) Cables for Connecting Serial Converter Units:  
JZSP-CLP70-□□-E-G#



• Wiring Specifications

SERVOPACK End			Serial Converter Unit End		
Pin No.	Signal	Wire Color	Pin No.	Signal	Wire Color
1	PG5V	Red	1	+5V	Red
2	PG0V	Black	5	0V	Black
3	-	-	3	-	-
4	-	-	4	-	-
5	PS	Light blue	2	Phase S output	Light blue
6	/PS	Light blue/white	6	Phase /S output	Light blue/white
Shell	Shield	-	Case	Shield	-
			7	-	-
			8	-	-
			9	-	-

(4) Cables for Connecting Hall Sensors:  
JZSP-CLL10-□□-E-G#



• Wiring Specifications

Serial Converter Unit End		Hall Sensor End	
Pin No.	Signal	Pin No.	Signal
1	+5V	1	+5V
2	Phase U input	2	Phase U input
3	Phase V input	3	Phase V input
4	Phase W input	4	Phase W input
5	0V	5	0V
6	-	6	-
7	-	7	-
8	-	8	-
9	-	9	-
Case	Shield	Case	Shield



# Linear Servomotor General Instructions

## Serial Converter Unit (Model: JZDP-□00□-□□□-E)

### ● Characteristics and Specifications

Items		JZDP-D00□-□□□-E	JZDP-G00□-□□□-E
Electrical Characteristics	Power Supply Voltage	+ 5.0 V ± 5%, ripple content 5% max.	
	Current Consumption <sup>*1</sup>	120 mA Typ. 350 mA max.	
	Signal Resolution	Input two-phase sine wave: 1/256 pitch	Input two-phase sine wave: 1/4096 pitch
	Max. Response Frequency	250 kHz	100 kHz
	Analog Input Signals <sup>*2</sup> (cos, sin, Ref)	Differential input amplitude: 0.4 to 1.2 V Input signal level: 1.5 to 3.5 V	
	Hall Sensor Input Signal	CMOS level	
	Output Signals <sup>*3</sup>	Position data, hall sensor information, and alarms	
	Output Method	Serial data transmission	
	Output Circuit	Balanced transceiver (SN75LBC176 or the equivalent) Internal terminal resistance: 120 Ω	
Mechanical Characteristics	Approx. Mass	150 g	
	Vibration Resistance	98 m/s <sup>2</sup> max. (10 to 2500 Hz) in three directions	
	Impact Resistance	980 m/s <sup>2</sup> , (11 ms) two times in three directions	
Environmental Conditions	Ambient Temperature	0 to 55°C	
	Storage Temperature	-20 to +80°C	
	Humidity	20% to 90% RH (no condensation)	

\*1: The current consumption of the linear scale and hall sensor is not included in this value.  
The current consumption of linear scale and hall sensor must be taken into consideration for the current capacity of host controller that supplies the power.  
The current consumption of hall sensor: Approx. 40 mA.

\*2: Input a value within the specified range. Otherwise, incorrect position information is output, and the device may be damaged.

\*3: The power is turned on, and the transmission is enabled after 100 ms to 300 ms.

● Model Designations

JZDP - 00 -  - E

Serial Converter Unit Model			
Code	Appearance	Applicable Linear Scale	Hall Sensor
D003 G003		Manufactured by HEIDENHAIN Corp.	None
D005 G005		Manufactured by RENISHAW plc.	None
D006 G006		Manufactured by HEIDENHAIN Corp.	Provided
D008 G008		Manufactured by RENISHAW plc.	Provided

Applicable Linear Servomotor					
Servomotor Model		Symbol	Servomotor Model		Symbol
SGLGW- (Coreless)	30A050C	250	SGLTW- (Iron core, T-type)	20A170A	011
	30A080C	251		20A320A	012
	40A140C	252		20A460A	013
	40A253C	253		35A170A	014
	40A365C	254		35A320A	015
	60A140C	258		35A460A	016
	60A253C	259		35A170H	105
	60A365C	260		35A320H	106
	90A200C	264		50A170H	108
	90A370C	265		50A320H	109
SGLGW- + SGLGM- <input type="text"/> -M (Coreless)	40A140C	255	SGLC-	40A400B	185
	40A253C	256		40A600B	186
	40A365C	257		80A400B	187
	60A140C	261		80A600B	188
	60A253C	262		35D170H	193
	60A365C	263		35D320H	194
SGLFW- (Iron core, F-type)	20A090A	017	50D170H	195	
	20A120A	018	50D320H	196	
	35A120A	019	40D400B	197	
	35A230A	020	40D600B	198	
	50A200B	181	80D400B	199	
	50A380B	182	80D600B	200	
	1ZA200B	183	D16A085AP	354	
	1ZA380B	184	D16A115AP	373	
	35D120A	211	D16A145AP	356	
	35D230A	212	D20A100AP	357	
	50D200B	189	D20A135AP	358	
	50D380B	190	D20A170AP	359	
	1ZD200B	191	D25A125AP	360	
	1ZD380B	192	D25A170AP	374	
	1ED380B	333	D25A215AP	362	
	1ED560B	334	D32A165AP	363	
			D32A225AP	364	
			D32A285AP	365	

Serial Converter Unit (Model: JZDP-□00□-□□□-E)

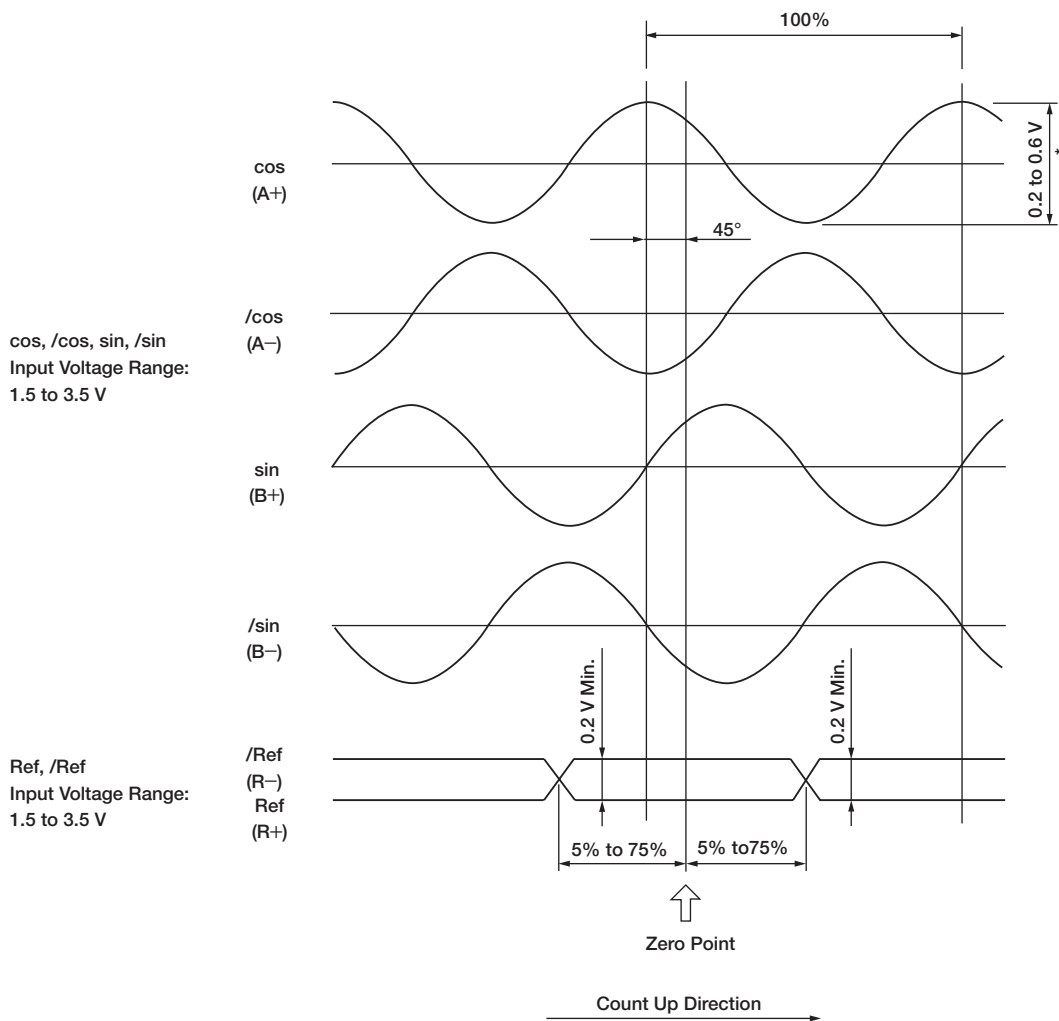
● Analog Signal Input Timing

The following figure shows the input timing of the analog signals.

When the cos and sin signals are shifted 180 degrees, the differential signals are the /cos and /sin signals.

The specifications of the cos, /cos, sin, and /sin signals are identical except for the phase.

Input the signals Ref and /Ref so that they shall cross each other as shown in the figure because they are input into the converter. When they are crossed, the output data will be counted up.



\*:If the analog signal amplitude declines to about 0.35 V because of differential amplitude, the serial converter outputs an alarm.

IMPORTANT

● Precautions

- 1 Never perform insulation resistance and withstand voltage tests.
- 2 When analog signals are input to the serial converter unit, noise influence on the analog signals affects the unit's ability to output correct position information. The analog cable must be as short as possible and shielded.
- 3 Use the serial converter unit without gases such as H<sub>2</sub>S.
- 4 Do not connect or disconnect the unit while power is being supplied, or the unit may be damaged.
- 5 When using multiple axes, use a shield cable for each axis. Do not use a shield cable for multiple axes.

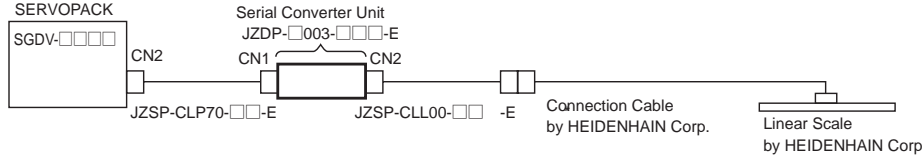


Serial Converter Unit (Model: JZDP-□00□-□□□-E)

● Without Cable for Hall Sensor (For Linear Scale by HEIDENHAIN Corporation)

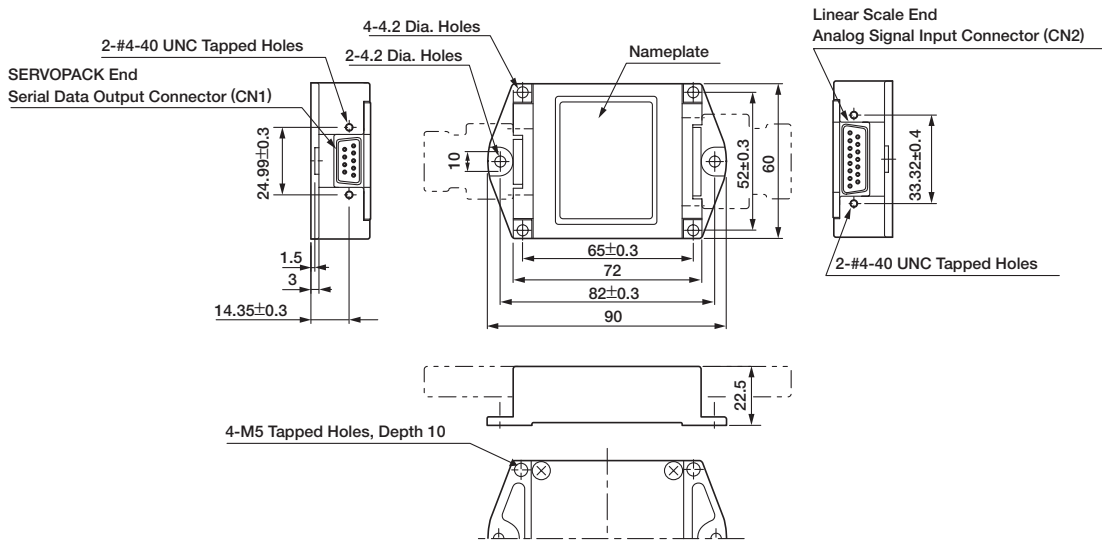
Serial Converter Unit Model: JZDP-□003-□□□-E

(1) Connection Example

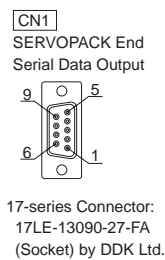


\*: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.

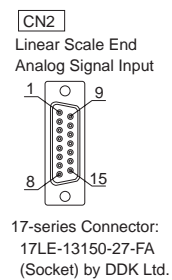
(2) External Dimensions (Units: mm)



Pin No.	Signal
1	+5V
2	Phase S output
3	Not used
4	Not used
5	0V
6	Phase /S output
7	Not used
8	Not used
9	Not used
Case	Shield



Pin No.	Signal
1	cos input (A+)
2	0V
3	sin input (B+)
4	+5V
5	Not used
6	Not used
7	/Ref input (R-)
8	Not used
9	/cos input (A-)
10	0V sensor
11	/sin input (B-)
12	5V sensor
13	Not used
14	Ref input (R+)
15	Not used
Case	Shield



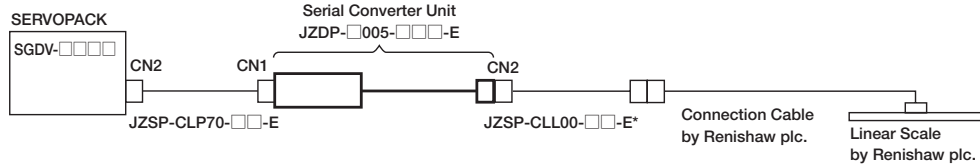
- Notes: 1 Do not use the unused pins.  
 2 Contact HEIDENHAIN Corporation for details of connection cables (analog 1 Vp-p output, D-sub 15-pin, male) by HEIDENHAIN Corporation.  
 3 Use the same terminal for 5-V sensor and phase-W input.  
 4 Phase U, V, and W input are internally pulled up at 10 kΩ.

Serial Converter Unit (Model: JZDP-□00□-□□□-E)

● Without Cable for Hall Sensor (For Linear Scale by Renishaw plc.)

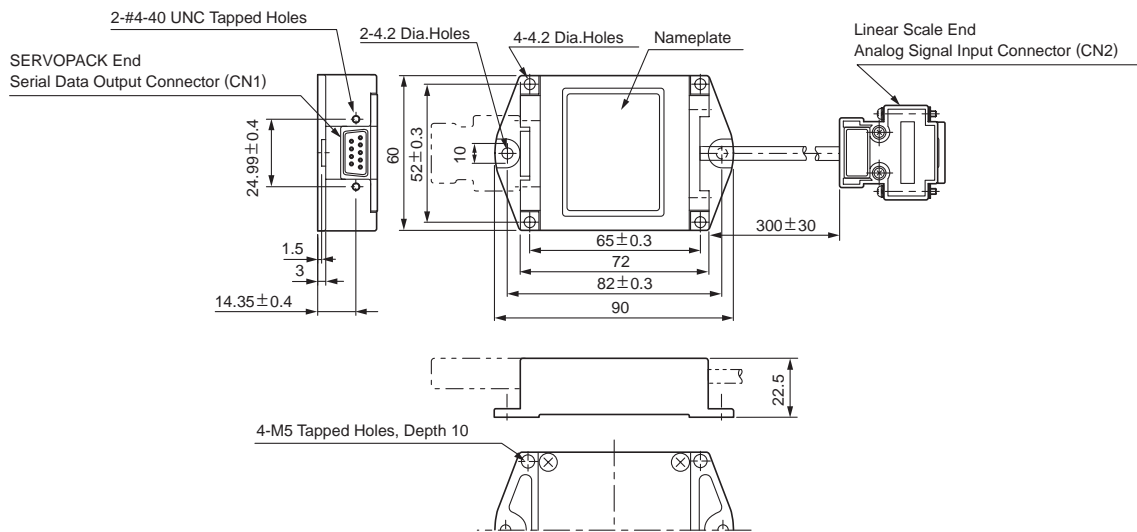
Serial Converter Unit Model: JZDP-□005-□□□-E

(1) Connection Example



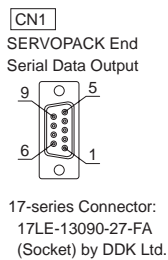
\*: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.

(2) External Dimensions (Units: mm)

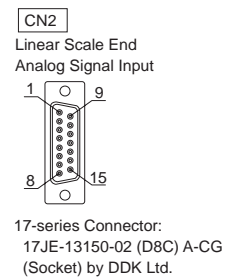


Pin No.	Signal
1	+5V
2	Phase S output
3	Not used
4	Not used
5	0V
6	Phase /S output
7	Not used
8	Not used
9	Not used
Case	Shield

SERVOPACK does not have the function to process Vq signals.



Pin No.	Signal
1	cos input (V1-)
2	sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Not used
7	Not used
8	Not used
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Not used
15	inner (0V)
Case	Shield



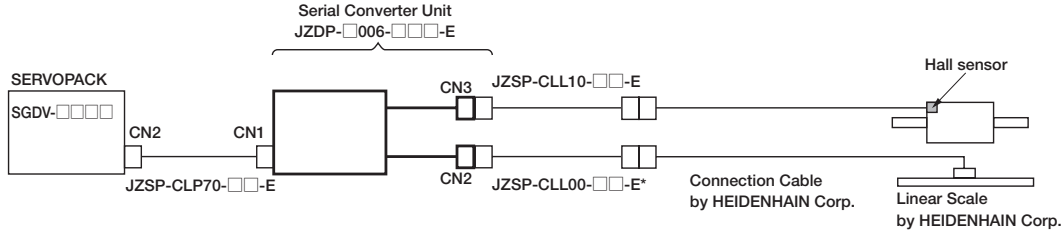
- Notes:
- 1 Do not use the unused pins.
  - 2 Contact Renishaw plc. for details of connection cables (analog 1 Vp-p output, D-sub 15-pin, male) by Renishaw plc. However, the BID and DIR signals are not connected.
  - 3 Use the linear scale-end connector to change the zero point specifications of the linear scale.

Serial Converter Unit (Model: JZDP-□00□-□□□-E)

● With Cable for Hall Sensor (For Linear Scale by HEIDENHAIN Corporation)

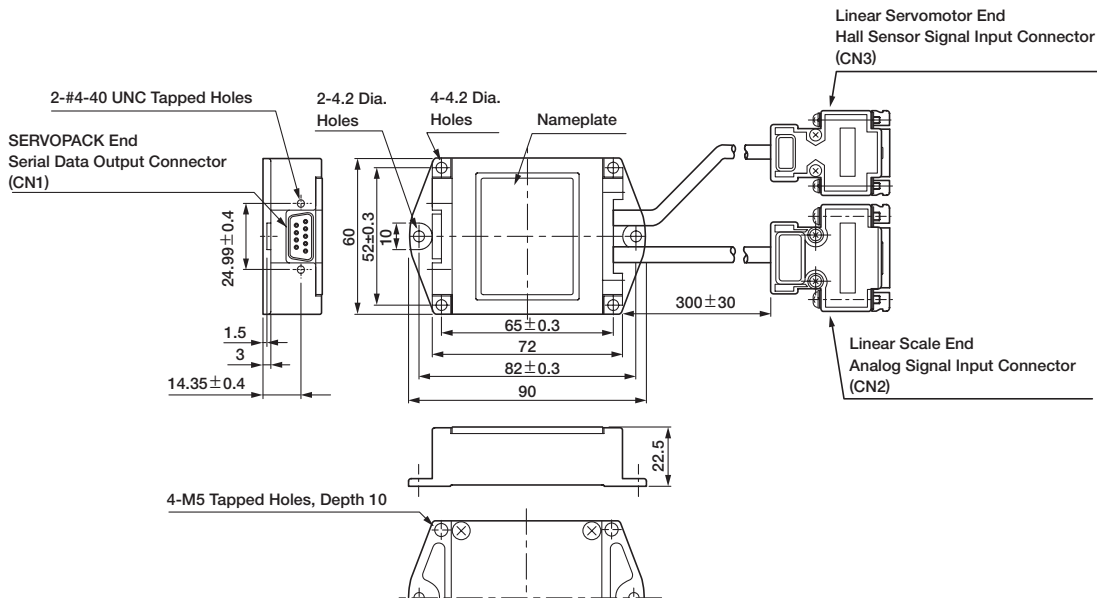
Serial Converter Unit Model: JZDP-□006-□□□-E

(1) Connection Example

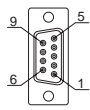


\*: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.

(2) External Dimensions (Units: mm)

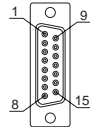


**CN1**  
SERVOPACK End  
Serial Data Output



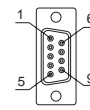
17-series Connector:  
17LE-13090-27-FA  
(Socket) by DDK Ltd.

**CN2**  
Linear Scale End  
Analog Signal Input



17-series Connector:  
17JE-13150-02 (D8C) A-CG  
(Socket) by DDK Ltd.

**CN3**  
Linear Servomotor End  
Hall Sensor Signal Input



17-series Connector:  
17JE-13090-02 (D8C) A-CG  
by DDK Ltd.

Pin No.	Signal
1	+5V
2	Phase S output
3	Not used
4	Not used
5	0V
6	Phase /S output
7	Not used
8	Not used
9	Not used
Case	Shield

Pin No.	Signal
1	cos input (A+)
2	0V
3	sin input (B+)
4	+5V
5	Not used
6	Not used
7	/Ref input (R-)
8	Not used
9	/cos input (A-)
10	0V sensor
11	/sin input (B-)
12	5V sensor
13	Not used
14	Ref input (R+)
15	Not used
Case	Shield

Pin No.	Signal
1	+5V
2	Phase U input
3	Phase V input
4	Phase W input
5	0V
6	Not used
7	Not used
8	Not used
9	Not used
Case	Shield

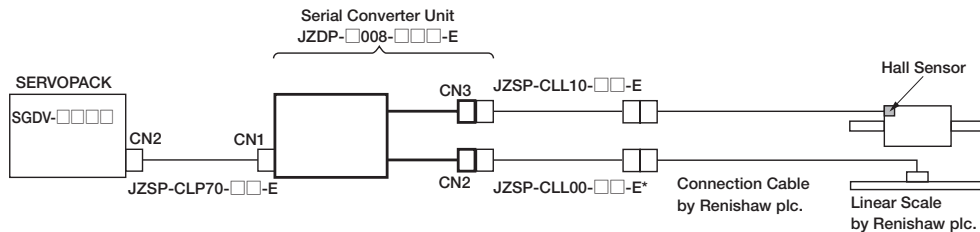
Notes: 1 Do not use the unused pins.  
2 Contact HEIDENHAIN Corporation for details of connection cables (analog 1 Vp-p output, D-sub 15-pin, male) by HEIDENHAIN Corporation.  
3 Phase U, V, and W input are internally pulled up at 10 kΩ.

Serial Converter Unit (Model: JZDP-□00□-□□□-E)

● With Cable for Hall Sensor (For Linear Scale by Renishaw plc.)

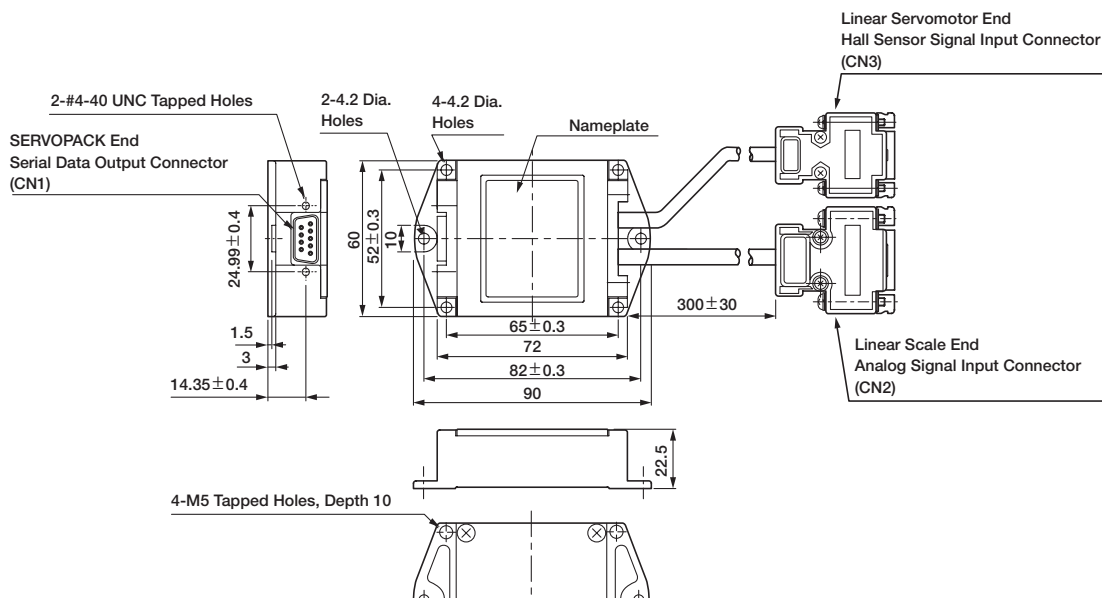
Serial Converter Unit Model: JZDP-□008-□□□-E

(1) Connection Example

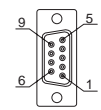


\*: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.

(2) External Dimensions (Units: mm)

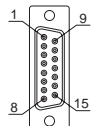


**CN1**  
SERVOPACK End  
Serial Data Output



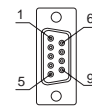
17-series Connector:  
17LE-13090-27-FA  
(Socket) by DDK Ltd.

**CN2**  
Linear Scale End  
Analog Signal Input



17-series Connector:  
17JE-13150-02 (D8C) A-CG  
(Socket) by DDK Ltd.

**CN3**  
Linear Servomotor End  
Hall Sensor Signal Input



17-series Connector:  
17JE-13090-02 (D8C) A-CG  
by DDK Ltd.

Pin No.	Signal
1	+5V
2	Phase S output
3	Not used
4	Not used
5	0V
6	Phase /S output
7	Not used
8	Not used
9	Not used
Case	Shield

Pin No.	Signal
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Not used
7	Not used
8	Not used
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0 V
13	0 Vs
14	Not used
15	Inner
Case	Shield

Pin No.	Signal
1	+5V
2	Phase U input
3	Phase V input
4	Phase W input
5	0V
6	Not used
7	Not used
8	Not used
9	Not used
Case	Shield

- Notes:
- 1 Do not use the unused pins.
  - 2 Contact Renishaw plc. for details of connection cables (analog 1 Vp-p output, D-sub 15-pin, male) by Renishaw plc. However, the BID and DIR signals are not connected.
  - 3 Use the linear scale-end connector to change the zero point specifications of the linear scale.
  - 4 Phase U, V, and W input are internally pulled up at 10 kΩ.

## Flexible Cables

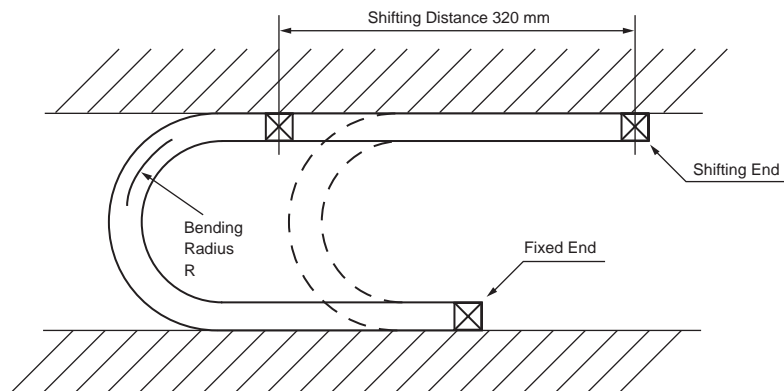
### ● Life of Flexible Cable

The flexible cable supports 10,000,000 or more operations of bending life with the recommended bending radius  $R$  or 10 times the cable diameter (whichever is greater) under the following test conditions.

### ● Conditions

1 Repeat moving one end of the cable forward and backward for 320 mm with using the test equipment shown in the following figure.

2 Connect the lead wires in parallel, and count the number of cable return motion times until a lead wire is disconnected. Note that one reciprocating is counted as one test.



- Notes: 1 The life of flexible cable differs largely depending on the amount of mechanical shocks, mounting to the cable, and fixing methods. The life of flexible cable is limited under the specified conditions.
- 2 The life of flexible cable indicates the number of bending times in which lead wires are electrically conducted and by which no cracks and damages that affects the performance of cable sheathing are caused. Disconnecting the shield wire is not taken into account.

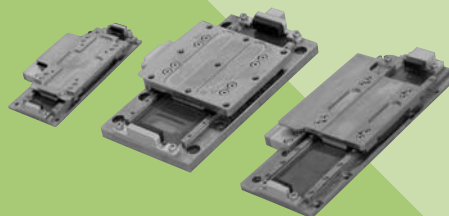
### ● Wiring Precautions

Even if the recommended bending radius  $R$  is respected in the mechanical design, incorrect wiring may cause early disconnection. Observe the following precautions when wiring.

- (1) Cable twisting  
Straighten the flexible cables before wiring.  
Twisted cables cause early disconnection. Check the indication on the cable surface to make sure that the cable is not twisted.
- (2) Fixing method  
Do not fix the moving points of the flexible cable. Stress on the fixed points may cause early disconnection. Fix the cable at the minimum number of points.
- (3) Cable length  
If the cable length is too long, it may cause the cable's sagging. Besides the cable length is too short, it may cause the excessive tension on the fixed points that will cause early disconnection. Use a flexible cable with the optimum length.
- (4) Interference between cables  
Avoid interference between cables.  
Interference limits the motion of flexible cable, which causes early disconnection. Keep enough distance between cables, or provide a partition when wiring.

# Linear Sliders

# $\Sigma$ -Trac- $\mu$



## Model Designations

**S** **G** **T** **M** **M** **03** - **065** **A** **H** **20** **A**

$\Sigma$ -Trac Series Linear Slider    1st digit    2nd digit    3rd+4th digits    5th+6th+7th digits    8th digit    9th digit    10th+11th digits    12th digit    13th digit

### 1st digit

Code	Specifications
M	Moving Magnet Type

### 2nd digit

Code	Specifications
M	Integrally Molded Armature Type

### 3rd+4th digits Peak Force

Code	Specifications
03	25 N
01	10 N

### 5th+6th+7th digits Effective Stroke

Code	Specifications
010	10 mm
025	25 mm
030	30 mm
065	65 mm

### 8th digit Linear Scale Output Form

Code	Specifications
A	Analog output 1 Vp-p

### 9th digit Linear Scale Manufacturer

Code	Specifications
H	HEIDENHAIN Corporation
M	MicroE International Inc.

### 10th+11th digits Linear Scale Resolution

Code	Specifications
20	20 $\mu$ m
04	4 $\mu$ m

### 12th digit Design Revision Order

A, B, C

### 13th digit Options

Code	Specifications
Blank	Without Hall Sensor
P	With hall sensor

## Features

- Ultra-flat profile reduces floorspace requirements.
- For applications requiring short strokes (10 mm to 65 mm)
- Vibration-free transmission device enables high-precision positioning with a repetitive positioning accuracy of  $\pm 0.5 \mu\text{m}$  max.
- Locations of armature coils on fixed side of the stationary member reduce effects of heat on table or workpiece.

## Application Examples

- Semiconductor mounters
- Equipment for biomedical
- Optical testing devices

## Model Classification

### ● Force

SERVOPACK Model SGD-		$\Sigma$ -Trac- $\mu$ Series Linear Sliders							
Single-phase 100 VAC	Three-phase 200 VAC	Model	Force	10 N	20 N	30 N	Rated force	Peak force	
R70F	R70A	SGTMM01							
R90F	R90A	SGTMM03							

### ● Stroke Length

Model	Stroke Length	50 mm	100 mm	150 mm	200 mm
SGTMM01	● 10 mm ● 30 mm				
SGTMM03	● 25 mm ● 65 mm				

SGTMM Linear Sliders

● Ratings and Specifications

Time Rating: Continuous  
 Insulation Resistance: 500 VDC, 10 M $\Omega$  min.  
 Ambient Temperature: 0°C to 40°C  
 Excitation: Permanent magnet  
 Withstand Voltage: 1500 VAC for one minute

Enclosure: Self-cooled  
 Ambient Humidity: 20% to 80% (no condensation)  
 Allowable Winding Temperature: 130°C (Thermal class B)  
 Vibration Resistance: 24.5 m/s<sup>2</sup>  
 Shock Resistance: 294 m/s<sup>2</sup>, 2 times

Linear Slider Model	SGTMM01-010AM20A	SGTMM01-030AM20A	SGTMM03-025AH20AP	SGTMM03-025AH04AP	SGTMM03-065AH20A□	SGTMM03-065AH04AP
Applicable SERVOPACK Model	SGDV-R70F, R70A		R90F, R90A			
Applicable Serial Converter Unit Model	JZDP-□003-242-E		□00□-221-E		□00□-220-E	
Maximum Speed	1.5 m/s		1.0		1.5	
Rated Force	3.5 N	3.5	7	7	7	7
Peak Force	10 N	10	25	25	25	25
Force Constant	9 N/Arms	9	13.2	13.2	12.3	12.3
Motor Constant	1.78 N/ $\sqrt{W}$	1.26	2.29	2.29	1.58	1.58
Maximum Payload*1	1 kg	1	3	3	3	3
Effective Stroke	10 mm	30	25	25	65	65
Resolution	0.078 $\mu$ m (20 $\mu$ m/256)*2		0.016 $\mu$ m (4 $\mu$ m/256)*2		0.078 $\mu$ m (20 $\mu$ m/256)*2	
	0.0049 $\mu$ m (20 $\mu$ m/4096) *3		0.00098 $\mu$ m (4 $\mu$ m/4096) *3		0.0049 $\mu$ m (20 $\mu$ m/4096) *3	
Movable Member Mass	0.1 kg	0.1	0.215	0.215	0.19	0.19
Total Mass (excluding cables)	0.35 kg	0.31	0.62	0.62	0.63	0.63
Repeatability*4	±0.5 $\mu$ m		±0.5		±0.5	

\*1: Values obtained when the acceleration is 4.9 m/s<sup>2</sup>.  
 \*2: The value applies when serial converter unit JZDP-D00□-□□□-E is used.  
 \*3: The value applies when serial converter unit JZDP-G00□-□□□-E is used.  
 \*4: Values obtained when the ambient temperature is constant.

● Performance Curves

● Force - Speed

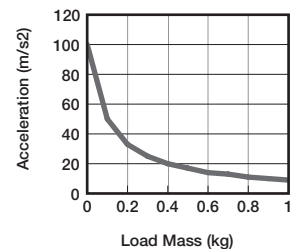
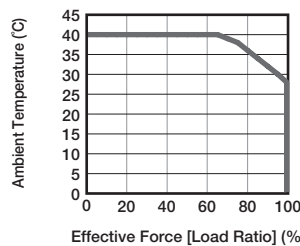
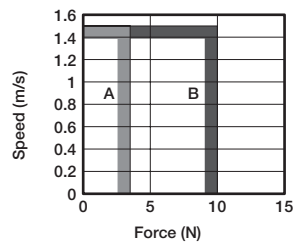
● Effective Force - Ambient Temperature

● Load Mass - Acceleration

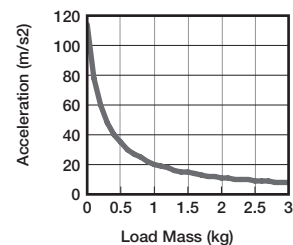
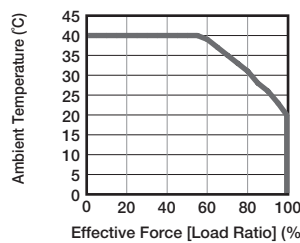
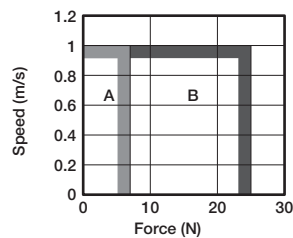
**A**: Continuous Duty Zone  
**B**: Intermittent Duty Zone (Note)

When the linear scale temperature is 50 °C or less.  
 — Ambient temperature

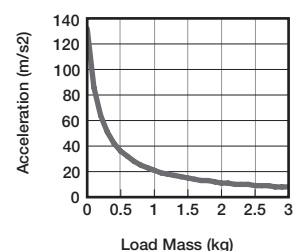
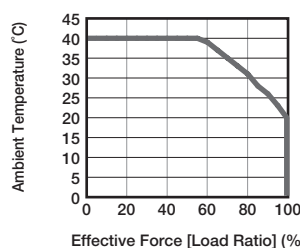
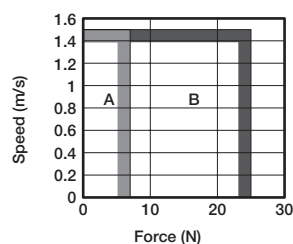
(1) SGTMM01



(2) SGTMM03-025



(3) SGTMM03-065



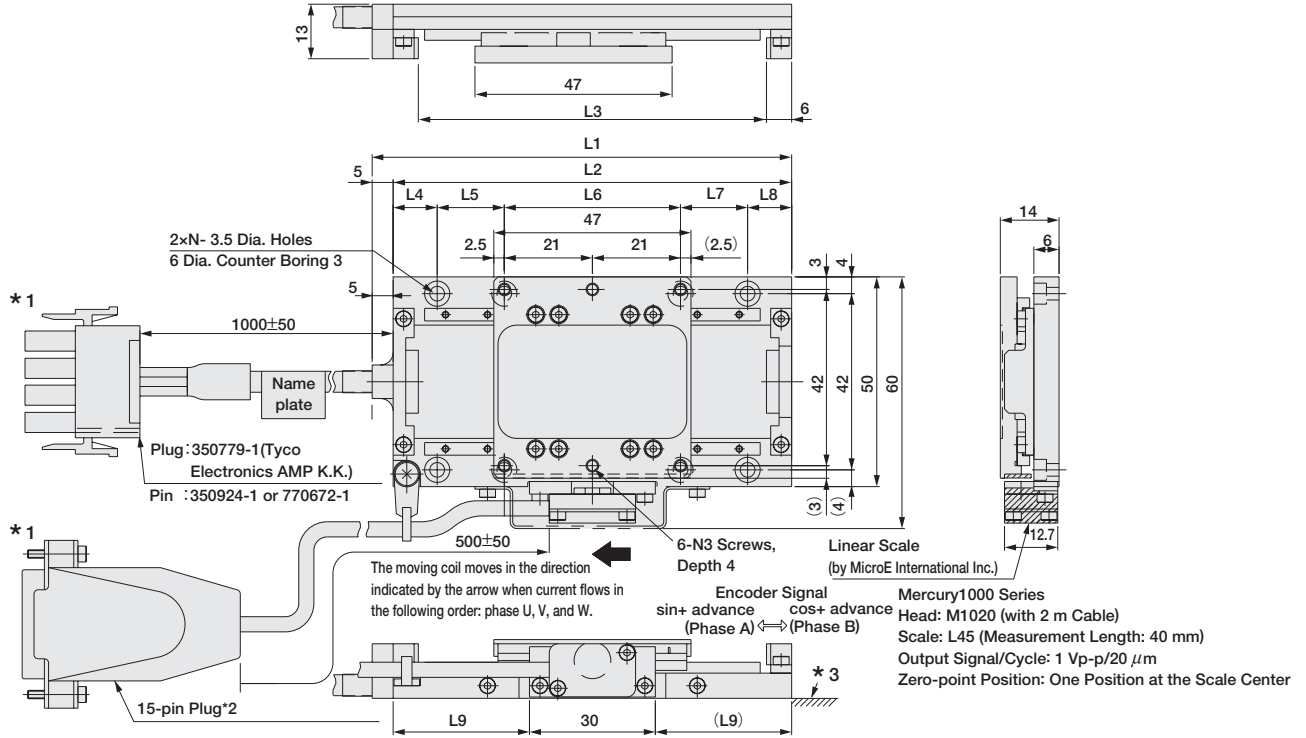
Note: When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.



SGTMM Linear Sliders

● External Dimensions

(1) SGTMM01-010AM20A, -030AM20A



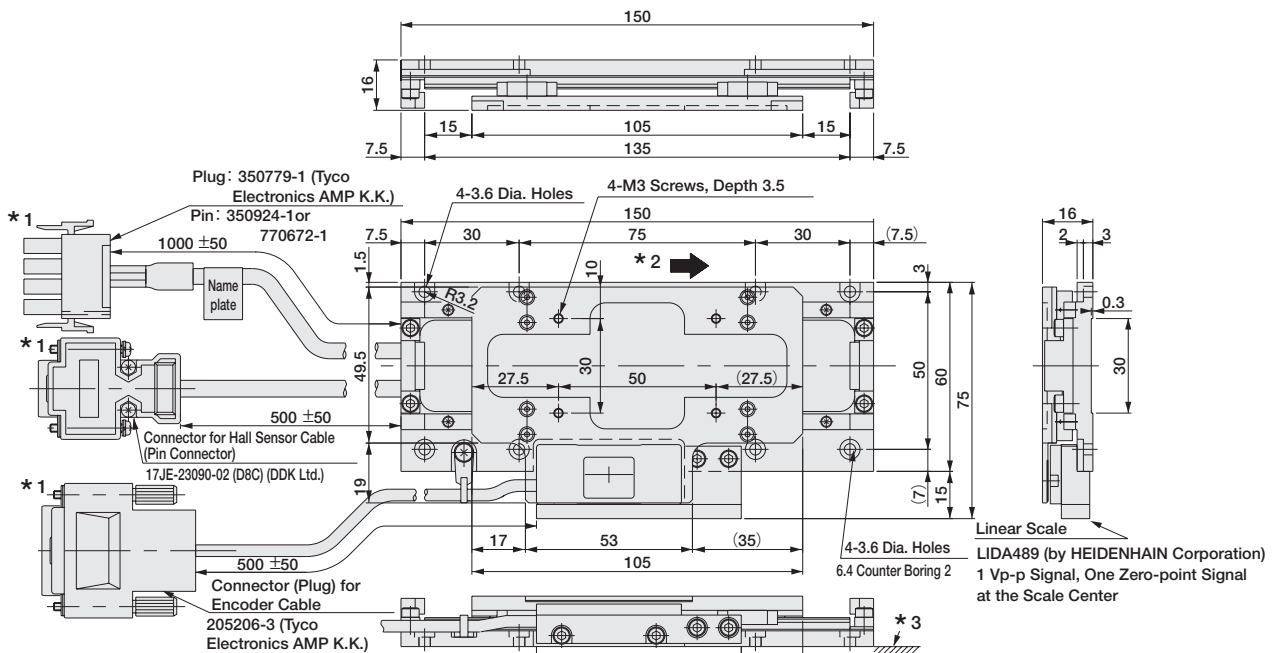
\*1: See the next page for the connector specifications.

\*2: A signal converter cable (JZSP-CLL40) is required between this connector and a cable for connecting the linear scale.

\*3: When installing the linear slider, the surface should be flat with a maximum discrepancy of 0.01 mm (reference value) or an equivalent.

Linear Slider Model	L1	L2	L3	L4	L5	L6	L7	L8	L9	N
SGTMM01-	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
010AM20A	80	75	63	14	42	8	-	11	22.5	3
030AM20A	100	95	83	10.5	16	42	16	10.5	32.5	4

(2) SGTMM03-025AH20AP



\*1: See the next page for the connector specifications.

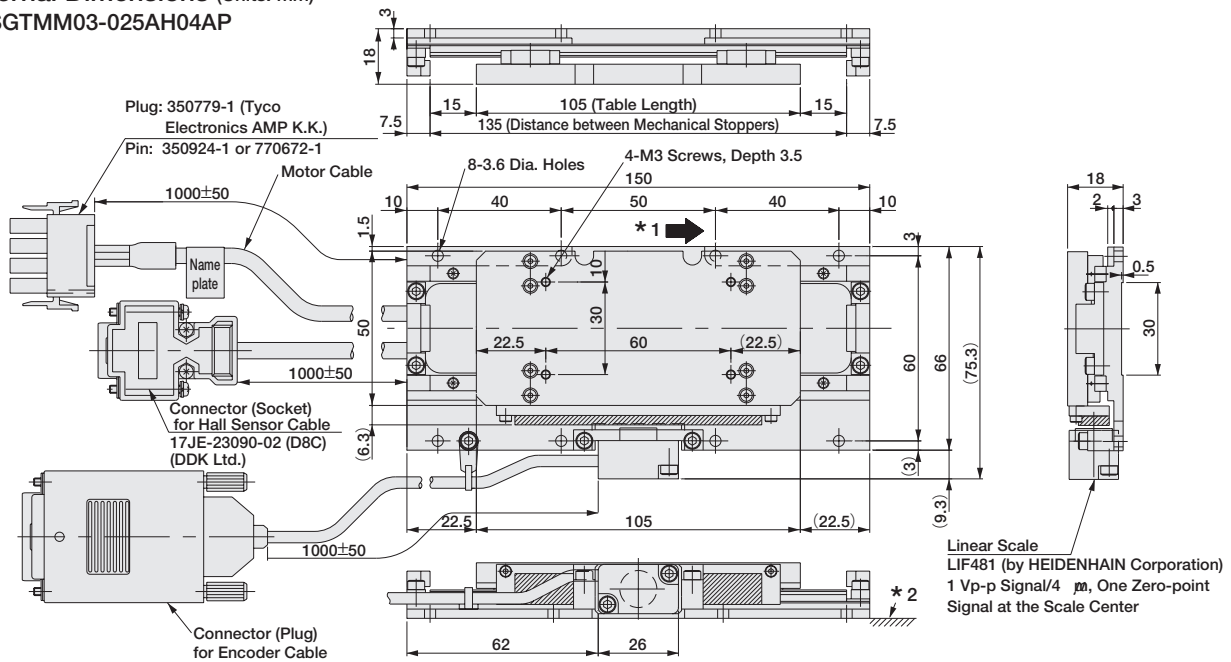
\*2: The moving coil moves in the direction indicated by the arrow when current flows in the following order: phase U, V, and W.

\*3: When installing the linear slider, the surface should be flat with a maximum discrepancy of 0.02 mm (reference value) or an equivalent.

SGTMM Linear Sliders

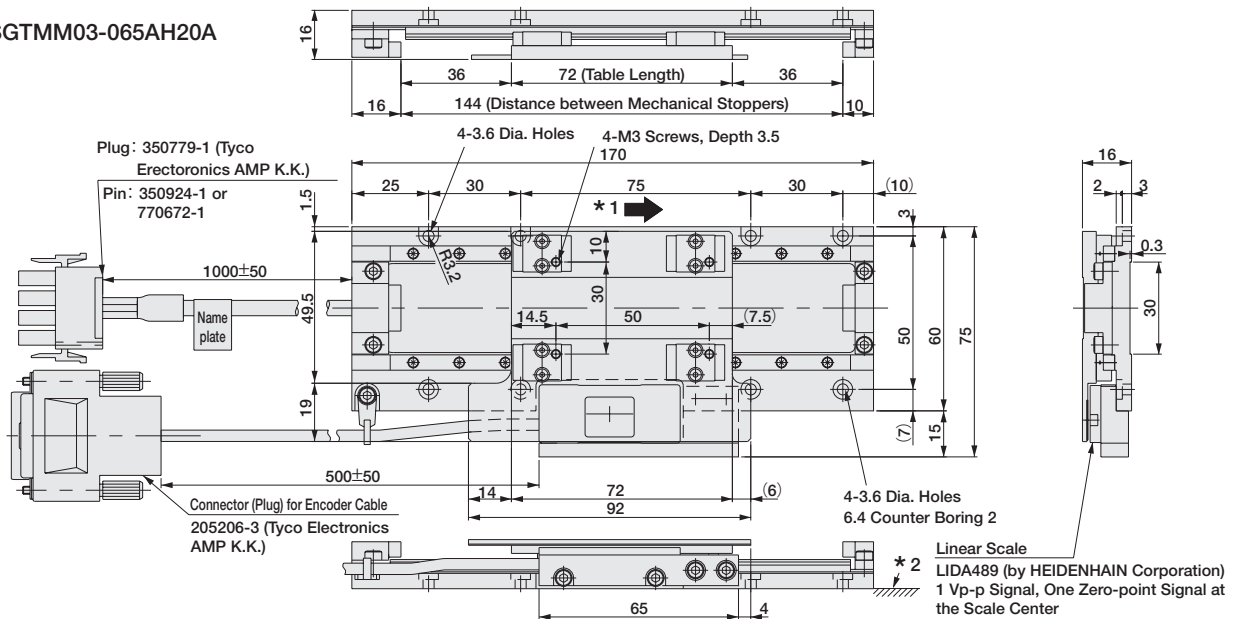
● External Dimensions (Units: mm)

(3) SGTMM03-025AH04AP



- \*1: The moving coil moves in the direction indicated by the arrow when current flows in the following order: phase U, V, and W.
- \*2: When installing the linear slider, the surface should be flat with a maximum discrepancy of 0.02 mm (reference value) or an equivalent.

(4) SGTMM03-065AH20A



- \*1: The moving coil moves in the direction indicated by the arrow when current flows in the following order: phase U, V, and W.
- \*2: When installing the linear slider, the surface should be flat with a maximum discrepancy of 0.02 mm (reference value) or an equivalent.

● Connector Specifications for the  $\Sigma$ -Trac- $\mu$  Series of Linear Sliders (All Models)

For SGTMM01 Linear Sliders

Pin No.	Name	Lead Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green

Pin No.	Signal	Pin No.	Signal
1	IW-	9	N/C
2	IW+	10	N/C
3	Test	11	N/C
4	Transmit	12	+5 V
5	Receive	13	GND
6	Reset	14	Cos-
7	Cos+	15	Sin-
8	Sin+		

For SGTMM03 Linear Sliders

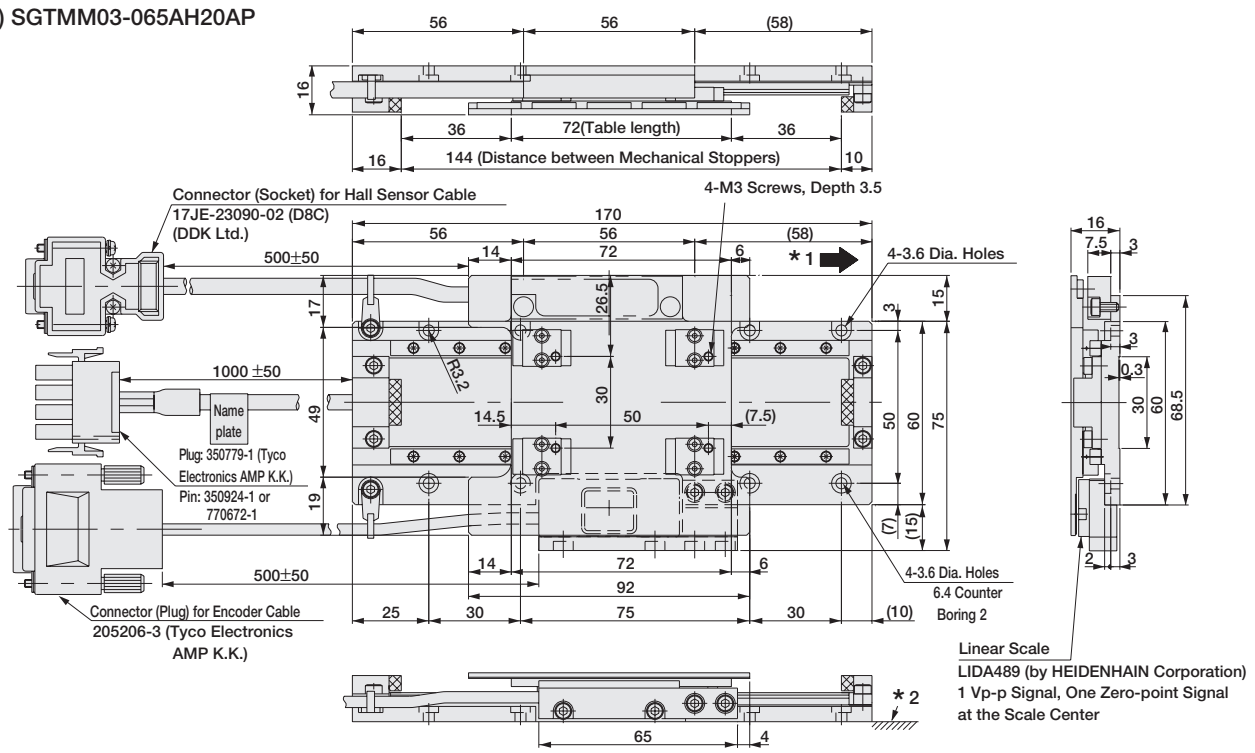
Pin No.	Name	Lead Color
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green

Pin No.	Signal	Pin No.	Signal
1	Cos output (A+)	9	/Cos output (A-)
2	0 V	10	0 V sensor
3	Sin output (B+)	11	/Sin output (B-)
4	+5 V	12	5 V sensor
5	Not used	13	Not used
6	Not used	14	/Ref (R+)
7	/Ref (R-)	15	Not used
8	Not used	Case	Shield

Pin No.	Signal
1	+5V (power supply)
2	Phase-U output
3	Phase-V output
4	Phase-W output
5	0V (power supply)
6	Not used
7	Not used
8	Not used
9	Not used

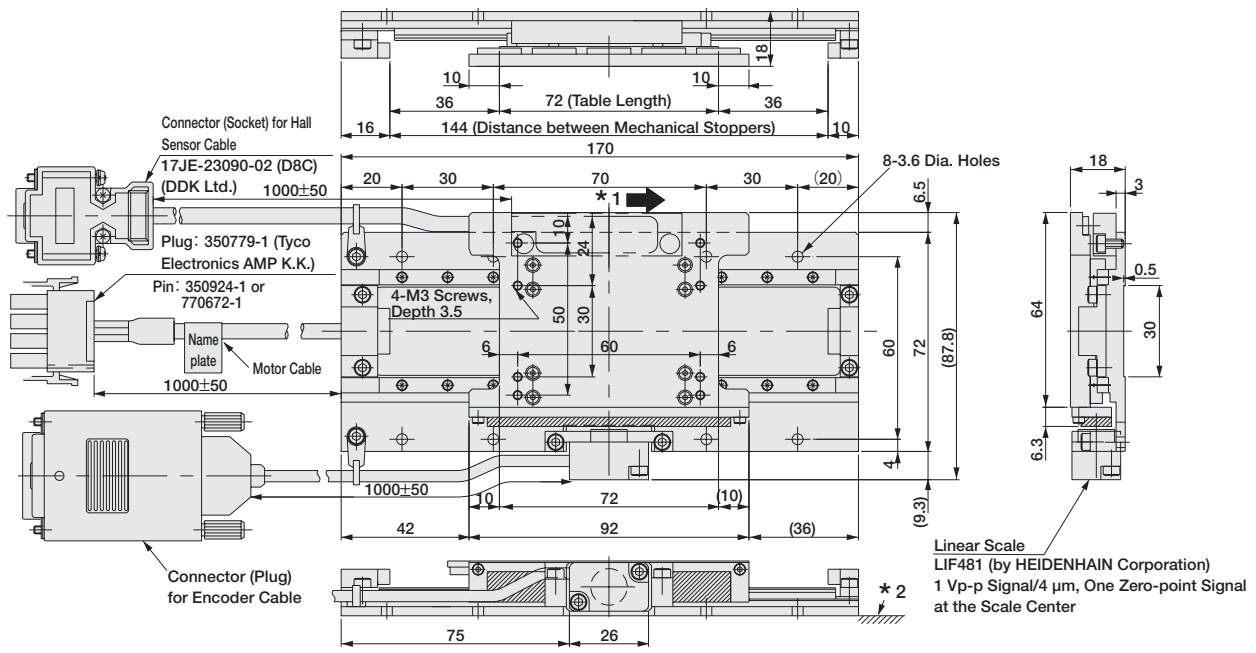
SGTMM Linear Sliders

● External Dimensions (Units: mm)  
(5) SGTMM03-065AH20AP



\*1: The moving coil moves in the direction indicated by the arrow when current flows in the following order: phase U, V, and W.  
\*2: When installing the linear slider, the surface should be flat with a maximum discrepancy of 0.02 mm (reference value) or an equivalent.

(6) SGTMM03-065AH04AP

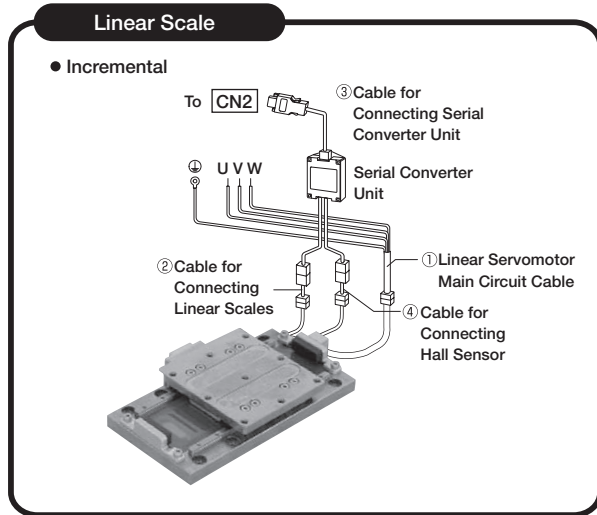
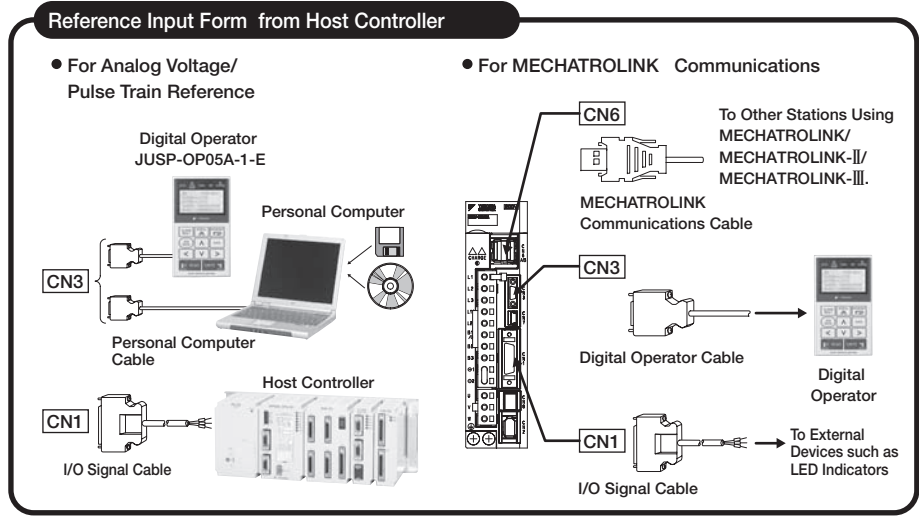
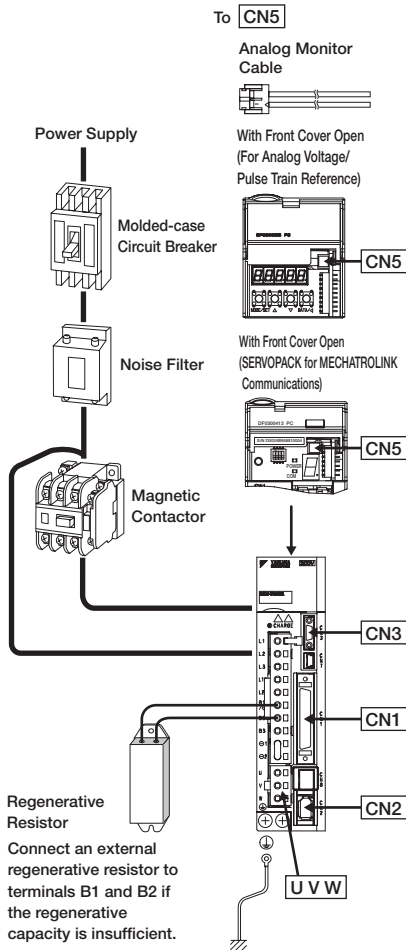


\*1: The moving coil moves in the direction indicated by the arrow when current flows in the following order: phase U, V, and W.  
\*2: When installing the linear slider, the surface should be flat with a maximum discrepancy of 0.02 mm (reference value) or an equivalent.

Linear Sliders

Selecting Cables and Connectors

● Connection diagrams



● Applicable Cables and Connectors

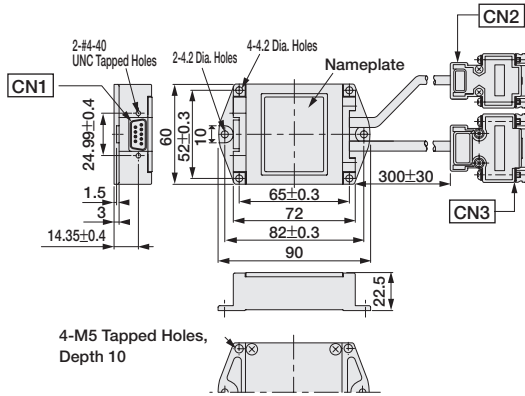
Motor Type	Linear Scale Type	Servo Drive		Motor Cable		Linear Scale Connection Cables			
		$\Sigma$ -Trac- $\mu$ Series Model	SERVOPACK Model SGD-V Single-phase 100 V	SERVOPACK Model SGD-V Three-phase 200 V	SERVOPACK+Motor ① Linear Servomotor Main Circuit Cable (Flexible Type)	Serial Converter Unit Model JZDP- ③ Cable for Connecting Serial Converter Unit (Flexible Type)	③ Cable for Connecting Serial Converter Unit (Flexible Type)	② Cable for Connecting Linear Scales (Flexible Type)	
Moving Magnet (MM)	Incremental	SGTMM01-010AM20A	R70F	R70A	JZSP-CLN11-□□-E-G#	□003-242-E	JZSP-CLP70-□□-E-G# The numbers in the boxes (□□) indicate the cable length. 01 = 1 m 03 = 3 m 05 = 5 m 10 = 10 m 15 = 15 m 20 = 20 m	JZSP-CLL00-□□-E-G# <sup>1</sup> The numbers in the boxes (□□) indicate the cable length. 01 = 1 m 03 = 3 m 05 = 5 m 10 = 10 m 15 = 15 m	Note: For SGTMM01 linear sliders, a JZSP-CLL40-E cable (length: 0.2 m) is also required.
		SGTMM01-030AM20A	R70F	R70A	JZSP-CLN11-□□-E-G#	□003-242-E			
		SGTMM03-025AH20AP	R90F	R90A	JZSP-CLN11-□□-E-G#	□006-221-E			
		SGTMM03-025AH04AP	R90F	R90A	JZSP-CLN11-□□-E-G#	□006-221-E			
		SGTMM03-065AH20A	R90F	R90A	JZSP-CLN11-□□-E-G#	□003-220-E			
		SGTMM03-065AH20AP	R90F	R90A	JZSP-CLN11-□□-E-G#	□006-220-E			
		SGTMM03-065AH04AP	R90F	R90A	JZSP-CLN11-□□-E-G#	□006-220-E			

Note: The digit "#" of the order number represents the design revision.

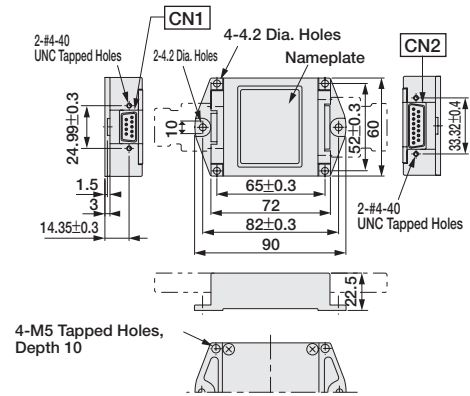
Selecting Cables and Connectors

● Detail Drawings: Serial Converter Units for Linear Scales by HEIDENHAIN Corporation


● JZDP-□006-□□□-E  
(With Hall Sensor Cable)



● JZDP-□003-□□□-E  
(Without Hall Sensor Cable)




● Details on Connectors

**CN1**   
SERVOPACK End  
Serial Data Output


by DDK Ltd.  
17-series Connector:  
17LE-13090-27-FA  
(Socket)

Pin No.	Signal	Pin No.	Signal
1	+5V	6	Phase-S output
2	Phase-S output	7	Not used
3	Not used	8	Not used
4	Not used	9	Not used
5	0V	Case	Shield

**CN2**   
Linear Scale End  
Analog Signal Input

by DDK Ltd.  
17-series Connector:  
17JE-13150-02 (D8C)A-CG  
(Socket)

Pin No.	Signal	Pin No.	Signal
1	cos input (A+)	9	/cos input (A-)
2	0V	10	0 V sensor
3	sin input (B+)	11	/sin input (B-)
4	+5V	12	5 V sensor
5	Not used	13	Not used
6	Not used	14	Ref input (R+)
7	/Ref input (R-)	15	Not used
8	Not used	Case	Shield

**CN3**   
Linear Servomotor End  
Hall Sensor Signal Input

by DDK Ltd.  
17-series Connector:  
17JE-13090-02(D8C) A-CG  
(Socket)

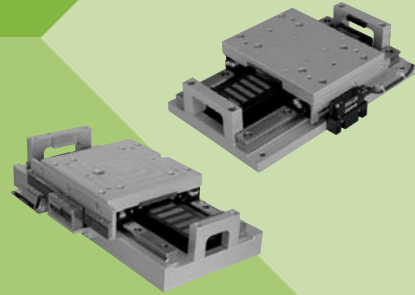
Pin No.	Signal	Pin No.	Signal
1	+5V	6	Not used
2	Phase-U input	7	Not used
3	Phase-V input	8	Not used
4	Phase-W input	9	Not used
5	0V	Case	Shield

Serial Converter Unit+Hall Sensor	Analog Voltage/Pulse Train Reference Type SERVOPACK		MECHATROLINK Communications Reference Type SERVOPACK				Cables for Setting Devices/Monitors
	I/O Signal Connector [CN1]		I/O Signal Connector [CN1]		MECHATROLINK-II Communications Connector [CN6A] or [CN6B]	MECHATROLINK-III Communications Cable [CN6A] or [CN6B]	[CN5] Analog Monitor Cable
④ Cable for Connecting Hall Sensor (Flexible Type)	Connector Terminal Block Converter Unit	Cable with Loose Wires at One End	Connector Terminal Block Converter Unit	Cable with Loose Wires at One End	MECHATROLINK communications cable: JEPMC-W6002-□□-E The numbers in the boxes(□□) indicate the cable length. A5 = 0.5 m 20 = 20 m 01 = 1 m 30 = 30 m 03 = 3 m 40 = 40 m 05 = 5 m 50 = 50 m 10 = 10 m	The numbers in the boxes (□□) indicate the cable length. JEPMC-W6012-□□-E A2 = 0.2 m 05 = 5 m A5 = 0.5 m 10 = 10 m 01 = 1 m 20 = 20 m 02 = 2 m 30 = 30 m 03 = 3 m 50 = 50 m 04 = 4 m JEPMC-6013-□□-E*3 10 = 10 m 50 = 50 m 20 = 20 m 75 = 75 m 30 = 30 m JEPMC-6014-□□-E A5 = 0.5 m 10 = 10 m 01 = 1 m 30 = 30 m 03 = 3 m 50 = 50 m 05 = 5 m	JZSP-CA01-E (1 m)

\*1: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.  
\*2: A connector kit and cable materials are required to assemble cables. For details, refer to SERVOPACKS in this catalog.  
\*3: Currently in pre-release. Will be available soon.

# Linear Sliders

# Σ-Trac-MAG



## Model Designations

### ● With Incremental Linear Scales

**S G T M F4 A - 027 A H 20 A**

Σ-Trac Series  
Linear Slider

1st digit

2nd+3rd digits

4th digit

5th+6th+7th digits

8th digit

9th digit

10th+11th digits

12th digit

1st digit

Code	Specifications
M	Moving Magnet Type

2nd+3rd digits Armature Code  
(Armature not integrally mounted)

Code	Specifications
F4	SGLFW-35A230A-F
F5	SGLFW-50A380A-F

4th digit Table Length

Code	Specifications	Armature Code	Effective Stroke
A	Short	F4	100 mm
		F5	185 mm
B	Long	F4	65 mm
		F5	110 mm

5th+6th+7th digits Peak Force

Code	Specifications
027	270 N
036	360 N
054	540 N
072	720 N

10th+11th digits Linear Scale Resolution

Code	Specifications
20	20 μm

12th digit Design Revision Order  
A, B, C

8th digit Linear Scale Output Form

Code	Specifications
A	Analog output 1 Vp-p

9th digit Linear Scale Manufacturer

Code	Specifications
H	HEIDENHAIN Corporation

### ● With Absolute (ABS) Linear Scales

**S G T M F4 A - 027 ABS 1 A**

Σ-Trac Series  
Linear Slider

1st digit

2nd+3rd digits

4th digit

5th+6th+7th digits

8th+9th+10th digits

11th digit

12th digit

1st digit

(Same as that of the incremental type.)

2nd+3rd digits Armature Code  
(Armature not integrally mounted)  
(Same as that of the incremental type.)

4th digit Table Length

(Same as that of the incremental type.)

5th+6th+7th digits Peak Force  
(Same as that of the incremental type.)

8th+9th+10th digits

Code	Specifications
ABS	With an absolute linear scale

11th digit Linear Scale

Code	Specifications
1	ST781A (by Mitutoyo Corporation, resolution: 0.5 μm)
2	ST783A (by Mitutoyo Corporation, resolution: 0.1 μm)

12th digit Design Revision Order

A, B, C

## Features

- Optimum drive for high-acceleration and high-tact operations because of its lightweight moving member.
- For short strokes (65 mm to 185 mm)
- Cooling units (pipes, etc.) for forced-air or liquid cooling systems can be placed on the fixed side.
- Linear scale options: Incremental or absolute.
- Improved stroke efficiency\*

\*: Ratio of effective stroke to the total length of drive system

## Model Classification

### ● Force

SERVOPACK Model		SGDV-	Σ-Trac-MAG Series Linear Sliders					
Single-phase 100 VAC	Three-phase 200 VAC	Model	Force	200 N	400 N	600 N	800 N	1000 N
2R1F	1R6A	SGTMF4A-027						
2R1F	1R6A	SGTMF4B-036						
-	5R5A	SGTMF5A-054						
-	5R5A	SGTMF5B-072						

Rated force    Peak force

### ● Stroke Length

Model	Stroke Length	50 mm	100 mm	150 mm	200 mm
SGTMF4A-027			● 100 mm		
SGTMF4B-036		● 65 mm			
SGTMF5A-054					● 185 mm
SGTMF5B-072			● 110 mm		



SGTMF4 Linear Sliders

● Ratings and Specifications

Time Rating: Continuous  
 Insulation Resistance: 500 VDC, 10 MΩ min.  
 Ambient Temperature: 0°C to 40°C  
 Excitation: Permanent magnet  
 Withstand Voltage: 1500 VAC for one minute

Enclosure: Self-cooled  
 Ambient Humidity: 20% to 80% (no condensation)  
 Allowable Winding Temperature: 130°C (Thermal class B)  
 Vibration Resistance: 24.5 m/s<sup>2</sup>  
 Shock Resistance: 294 m/s<sup>2</sup>, 2 times

Linear Slider Model		With Incremental Linear Scales		With Absolute Linear Scales	
		SGTMF4A-027AH20A	SGTMF4B-036AH20A	SGTMF4A-027ABS1A	SGTMF4B-036ABS1A
Applicable SERVOPACK Model	SGDV-	2R1F, 1R6A			
Applicable Serial Converter Unit Model	JZDP-	□003-243-E	□003-244-E	-	-
Maximum Speed	m/s	3			
Rated Force	N	90	120	90	120
Peak Force	N	270	360	270	360
Force Constant	N/Arms	66.9	89.2	66.9	89.2
Motor Constant	N/√W	11	14.6	11	14.6
Maximum Payload*1	kg	40	55	40	55
Effective Stroke	mm	100	65	100	65
Resolution	μm	Incremental linear scale: 0.078 (20 μm/256)		Absolute linear scale*3: 0.5	
Movable Member Mass	kg	1.72	2.52	1.72	2.52
Total Mass (excluding cables)	kg	6.8	8.05	6.8	8.05
Repeatability*2	μm	±1.0	±1.0	±1.0	±1.0

\*1: Values obtained when the acceleration is 4.9 m/s<sup>2</sup>.

\*2: Values obtained when the ambient temperature is constant.

\*3: An absolute linear scale with a resolution of 0.1 μm is also available. Contact your Yaskawa representative for details.

● Performance Curves

● Force - Speed

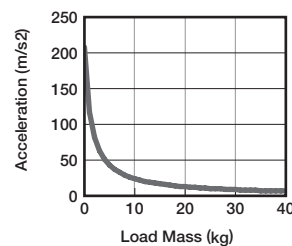
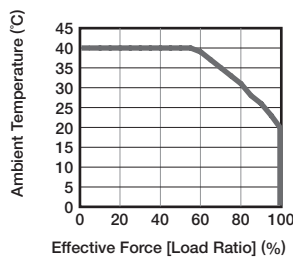
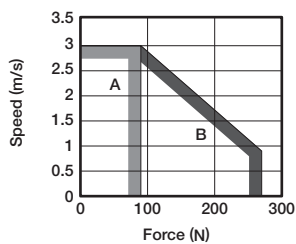
● Effective Force - Ambient Temperature

● Load Mass - Acceleration

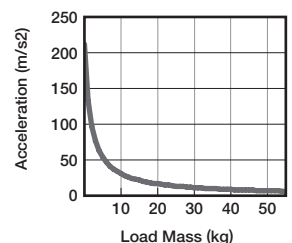
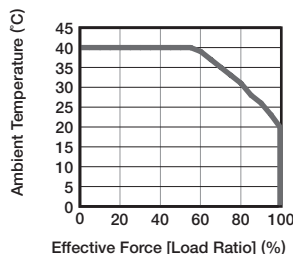
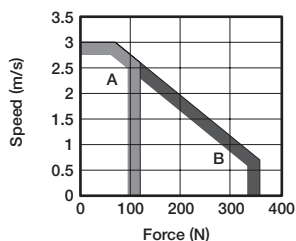
**A** : Continuous Duty Zone  
**B** : Intermittent Duty Zone (Note)

When the sensor temperature is 50 °C or less  
 — Ambient temperature

(1) SGTMF4A-027



(2) SGTMF4B-036



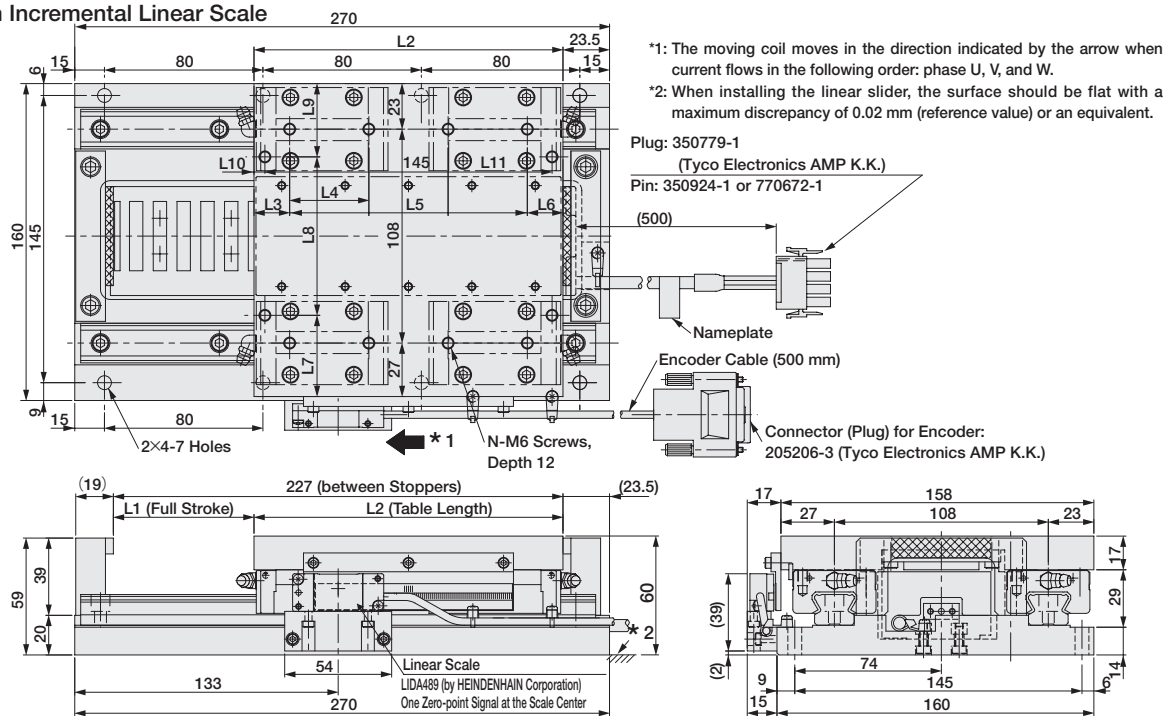
Note: When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.



SGTMF4 Linear Sliders

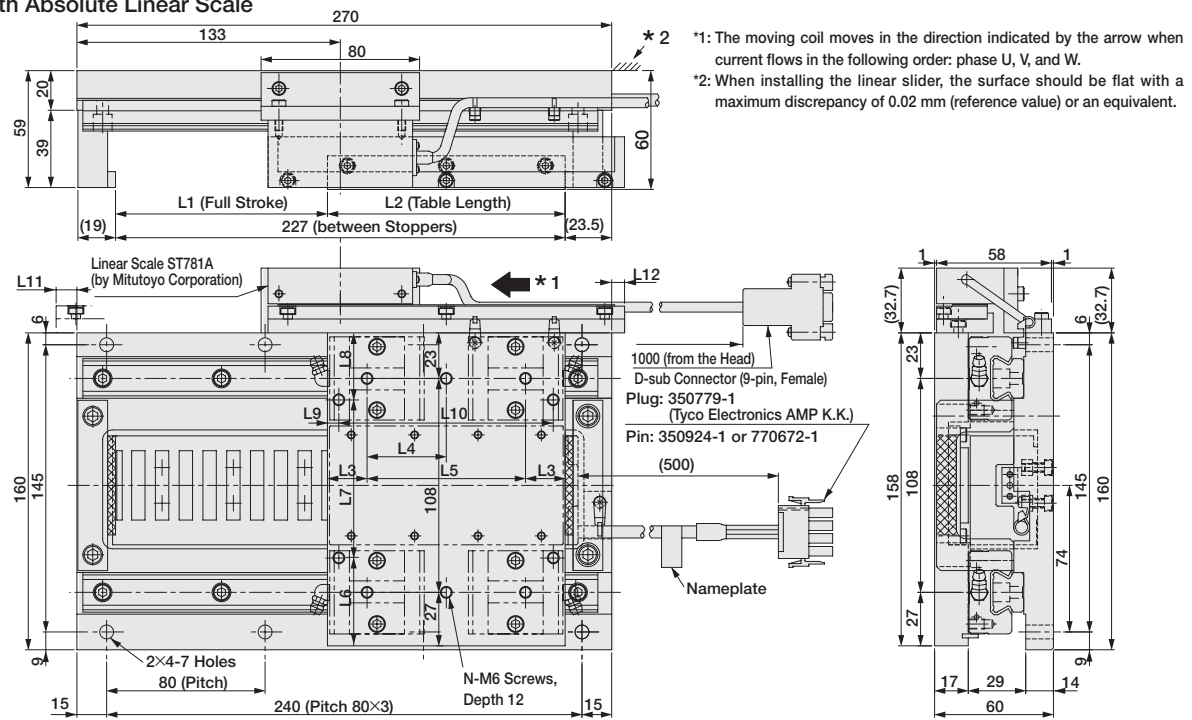
● External Dimensions (Units: mm)

● With Incremental Linear Scale



Linear Slider Model	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	N
SGTMF	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
4A-027AH20A	107	120	20	40	80	20	-	-	-	-	-	6
4B-036AH20A	71	156	18	40	120	18	41	80	37	5.5	145	12

● With Absolute Linear Scale



Linear Slider Model	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	N
SGTMF	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
4A-027ABS1A	107	120	20	40	80	-	-	-	-	-	10.5	6.5	6
4B-036ABS1A	71	156	18	40	120	41	80	37	5.5	145	-	-	12

Linear Sliders

SGTMF5 Linear Sliders

● Ratings and Specifications

Time Rating: Continuous

Insulation Resistance: 500 VDC, 10 MΩ min.

Ambient Temperature: 0°C to 40°C

Excitation: Permanent magnet

Withstand Voltage: 1500 VAC for one minute

Enclosure: Self-cooled

Ambient Humidity: 20% to 80% (no condensation)

Allowable Winding Temperature: 130°C (Thermal class B)

Vibration Resistance: 24.5 m/s<sup>2</sup>

Shock Resistance: 294 m/s<sup>2</sup>, 2 times

Linear Slider Model	With Incremental Linear Scales		With Absolute Linear Scales	
	SGTMF5A-054AH20A	SGTMF5B-072AH20A	SGTMF5A-054ABS1A	SGTMF5B-072ABS1A
Applicable SERVOPACK Model	SGDV-5R5A			
Applicable Serial Converter Unit Model	JZDP-□003-245-E	JZDP-□003-246-E	-	-
Maximum Speed	4		3.7	
Rated Force	150	200	150	200
Peak Force	540	720	540	720
Force Constant	59.4	79.1	59.4	79.1
Motor Constant	18.5	24.7	18.5	24.7
Maximum Payload*1	85	110	85	110
Effective Stroke	185	110	185	110
Resolution	Incremental linear scale: 0.078 (20 μm/256)		Absolute linear scale*3: 0.5	
Movable Member Mass	4.2	6.84	4.2	6.84
Total Mass (excluding cables)	19.8	22.5	19.8	22.5
Repeatability*2	±1.0	±1.0	±1.0	±1.0

\*1: Values obtained when the acceleration is 4.9 m/s<sup>2</sup>.

\*2: Values obtained when the ambient temperature is constant.

\*3: An absolute linear scale with a resolution of 0.1 μm is also available. Contact your Yaskawa representative for details.

● Performance Curves

● Force - Speed

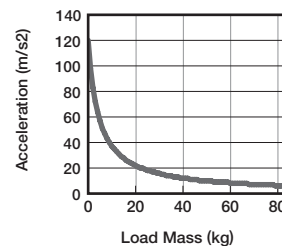
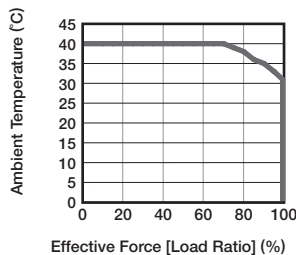
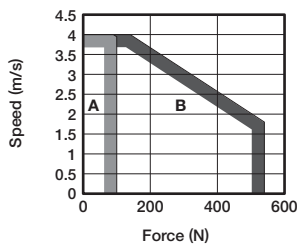
● Effective Force - Ambient Temperature

● Load Mass - Acceleration

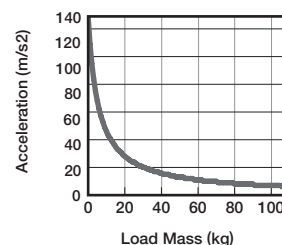
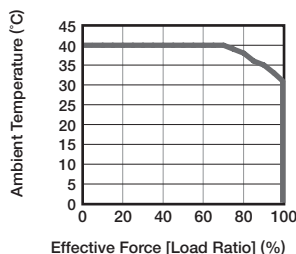
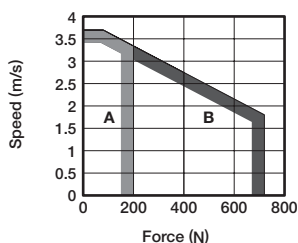
**A**: Continuous Duty Zone  
**B**: Intermittent Duty Zone

When the linear scale temperature is 50 °C or less  
— Ambient temperature

(1) SGTMF5A-054



(2) SGTMF5B-072

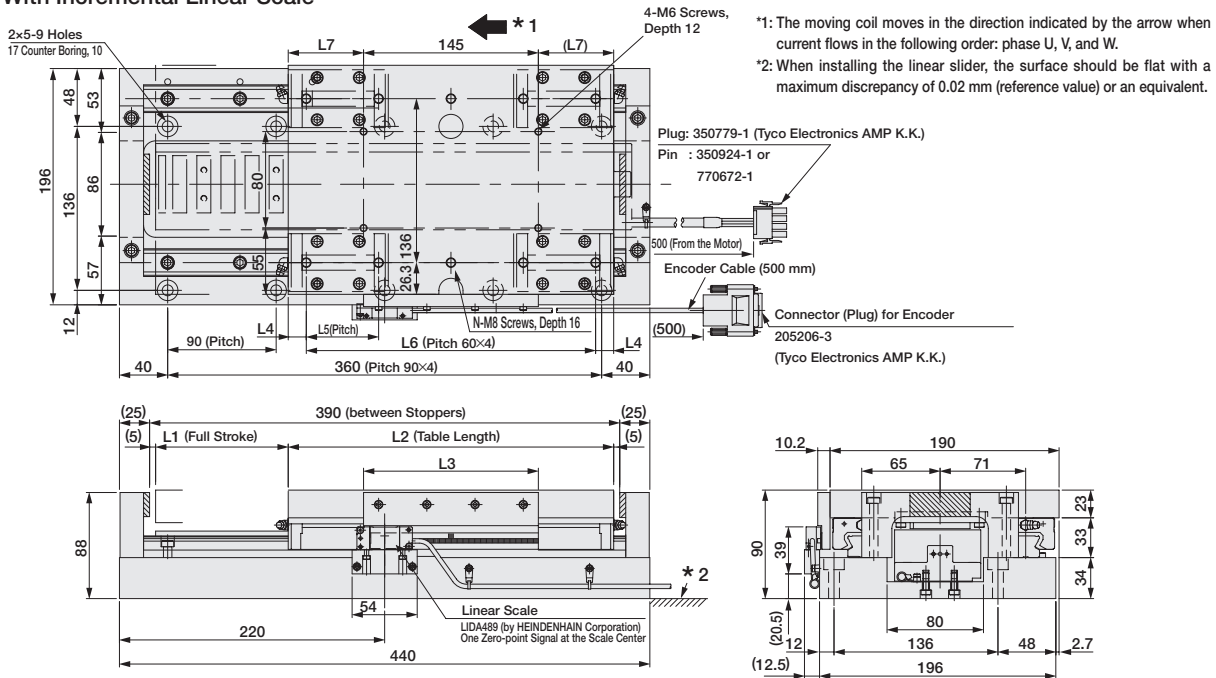


Note: When the effective force is within the rated force, the servomotor can be used within the intermittent duty zone.

SGTMF5 Linear Sliders

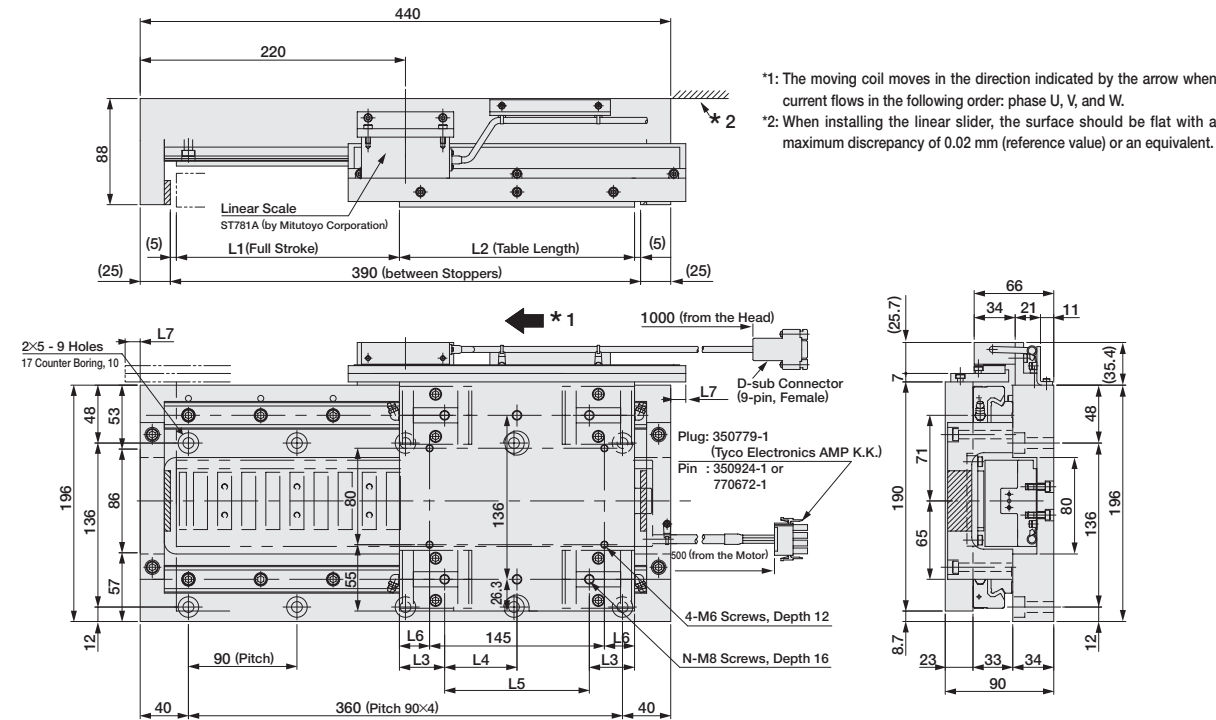
● External Dimensions (Units: mm)

● With Incremental Linear Scale



Linear Slider Model	L1	L2	L3	L4	L5	L6	L7	N
SGTMF	mm	mm	mm	mm	mm	mm	mm	
5A-054AH20A	185	195	220	37.5	60	120	25	6
5B-072AH20A	110	270	145	15	60	240	62.5	10

● With Absolute Linear Scale

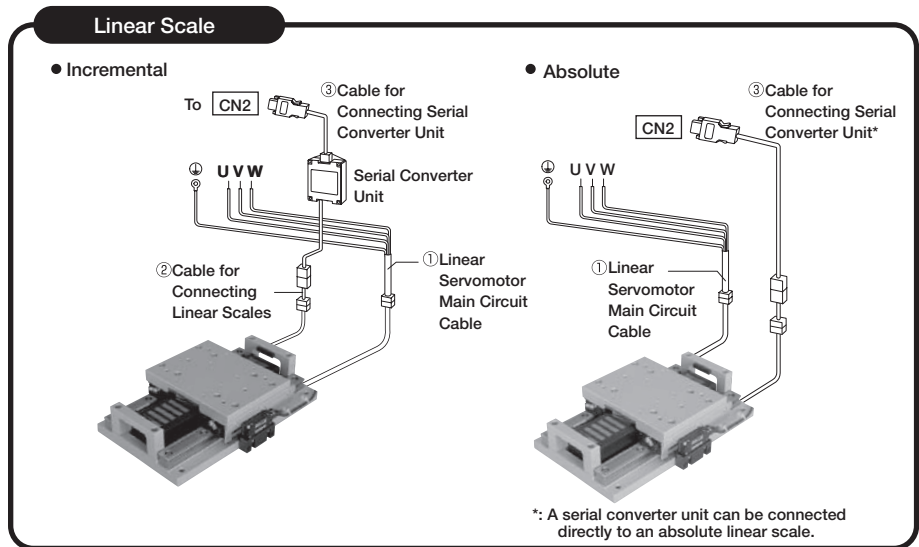
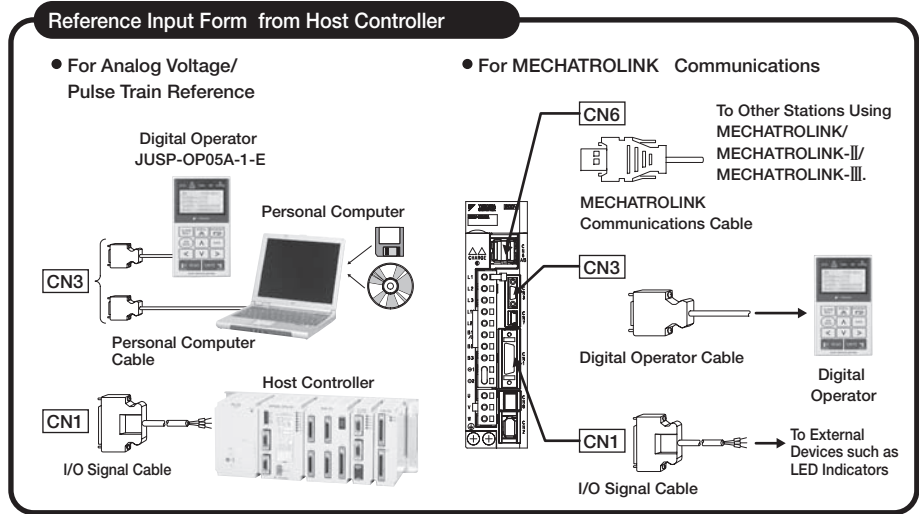
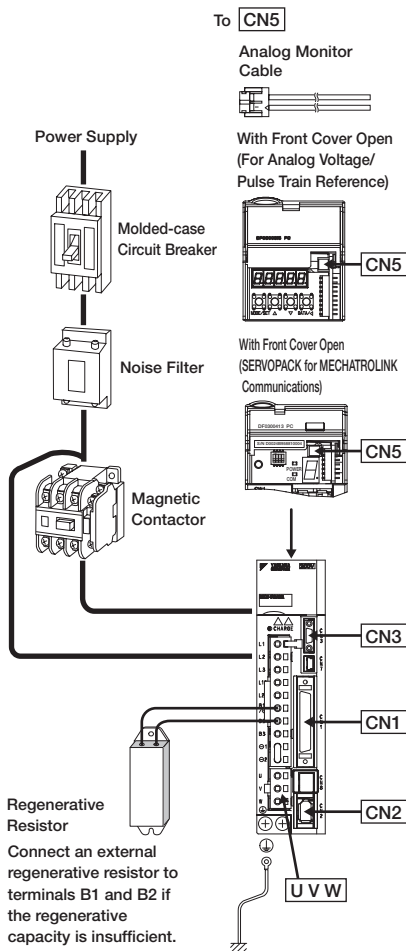


Linear Slider Model	L1	L2	L3	L4	L5	L6	L7	N
SGTMF	mm	mm	mm	mm	mm	mm	mm	
5A-054ABS1A	185	195	37.5	60	120	25	12.5	6
5B-072ABS1A	110	270	15	60	240	62.5	-	10

Linear Sliders

Selecting Cables and Connectors

● Connection diagrams



● Applicable Cables and Connectors

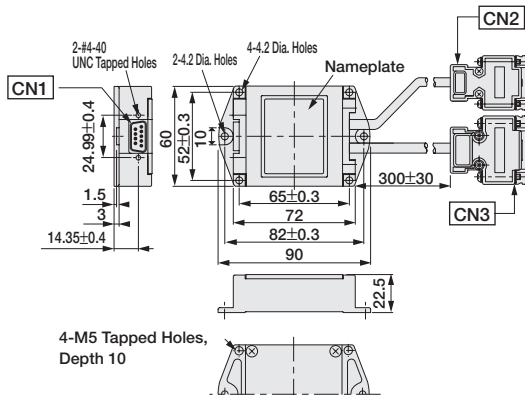
Motor Type	Linear Scale Type	Servo Drive		Motor Cable	Serial Converter Unit Model JZDP-	Linear Scale Connection Cables		
		SERVOPACK Model SGD-V	SERVOPACK+Motor	[CN2]→Serial Converter Unit		Serial Converter Unit→linear scale		
	Σ-Trac-MAG Series Model	Single-phase 100 V	Three-phase 200 V	① Linear Servomotor Main Circuit Cable (Flexible Type)		③ Cable for Connecting Serial Converter Unit (Flexible Type)	② Cable for Connecting Linear Scales (Flexible Type)	
Moving Magnet (MM)	Incremental	SGTMF4A-027AH20A	2R1F	1R6A	JZSP-CLN11-□□-E-G#	□003-243-E	JZSP-CLP70-□□-E-G# The numbers in the boxes(□□) indicate the cable length. 01 = 1 m 03 = 3 m 05 = 5 m 10 = 10 m 15 = 15 m 20 = 20 m	JZSP-CLL00-□□-E-G# <sup>1</sup> The numbers in the boxes(□□) indicate the cable length. 01 = 1 m 03 = 3 m 05 = 5 m 10 = 10 m 15 = 15 m
		SGTMF4B-036AH20A	2R1F	1R6A	JZSP-CLN11-□□-E-G#	□003-244-E		
		SGTMF5A-054AH20A	—	5R5A	JZSP-CLN21-□□-E-G#	□003-245-E		
		SGTMF5B-072AH20A	—	5R5A	JZSP-CLN21-□□-E-G#	□003-246-E		
	Absolute	SGTMF4A-027ABS1A	2R1F	1R6A	JZSP-CLN11-□□-E-G#	—	JZSP-CLP70□□-E [CN2]→Linear Scale	—
		SGTMF4B-036ABS1A	2R1F	1R6A	JZSP-CLN11-□□-E-G#	—		
		SGTMF5A-054ABS1A	—	5R5A	JZSP-CLN21-□□-E-G#	—		
		SGTMF5B-072ABS1A	—	5R5A	JZSP-CLN21-□□-E-G#	—		

Note: The digit "#" of the order number represents the design revision.

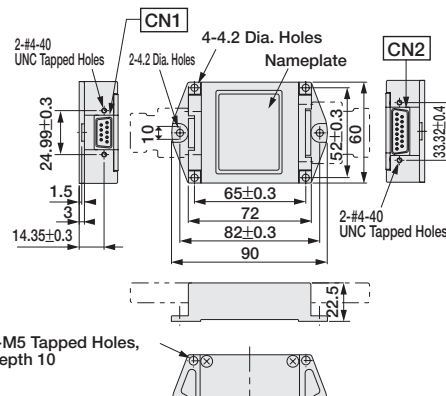
Selecting Cables and Connectors

● Detail Drawings: Serial Converter Units for Linear Scales by HEIDENHAIN Corporation


● JZDP-□006-□□□-E  
(With Hall Sensor Cable)



● JZDP-□003-□□□-E  
(Without Hall Sensor Cable)




● Details on Connectors

**CN1**   
SERVOPACK End  
Serial Data Output


by DDK Ltd.  
17-series Connector:  
17LE-13090-27-FA  
(Socket)

Pin No.	Signal	Pin No.	Signal
1	+5V	6	Phase-/S output
2	Phase-S output	7	Not used
3	Not used	8	Not used
4	Not used	9	Not used
5	0V	Case	Shield

**CN2**   
Linear Scale End  
Analog Signal Input

by DDK Ltd.  
17-series Connector:  
17JE-13150-02 (D8C)A-CG  
(Socket)

Pin No.	Signal	Pin No.	Signal
1	cos input (A+)	9	/cos input (A-)
2	0V	10	0 V sensor
3	sin input (B+)	11	/sin input (B-)
4	+5V	12	5 V sensor
5	Not used	13	Not used
6	Not used	14	Ref input (R+)
7	/Ref input (R-)	15	Not used
8	Not used	Case	Shield

**CN3**   
Linear Servomotor End  
Hall Sensor Signal Input

by DDK Ltd.  
17-series Connector:  
17JE-13090-02(D8C) A-CG  
(Socket)

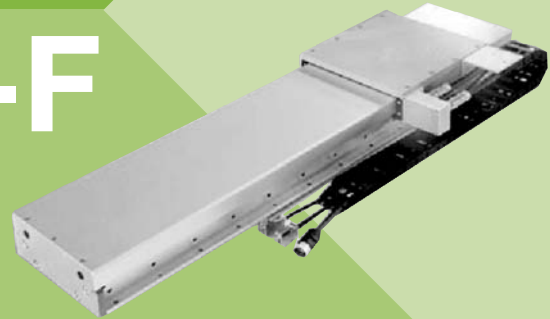
Pin No.	Signal	Pin No.	Signal
1	+5V	6	Not used
2	Phase-U input	7	Not used
3	Phase-V input	8	Not used
4	Phase-W input	9	Not used
5	0V	Case	Shield

Analog Voltage/Pulse Train Reference Type SERVOPACK		MECHATROLINK Communications Reference Type SERVOPACK				Cables for Setting Devices/Monitors
I/O Signal Connector [CN1]		I/O Signal Connector [CN1]		MECHATROLINK-II Communications Connector [CN6A] or [CN6B]	MECHATROLINK-III Communications Cable [CN6A] or [CN6B]	[CN5]
Connector Terminal Block Converter Unit	Cable with Loose Wires at One End	Connector Terminal Block Converter Unit	Cable with Loose Wires at One End			Analog Monitor Cable
JZSP-JA50PG-□-E <sup>2</sup> The number in the box(□) indicates the cable length. None = 0.5 m 1 = 1 m 2 = 2 m	JZSP-CSI01-□-E <sup>2</sup> The number in the box(□) indicates the cable length. 1 = 1 m 2 = 2 m 3 = 3 m	JZSP-JA26P-□-E <sup>2</sup> The number in the box(□) indicates the cable length. None = 0.5 m 1 = 1 m 2 = 2 m	JZSP-CSI02-□-E <sup>2</sup> The number in the box(□) indicates the cable length. 1 = 1 m 2 = 2 m 3 = 3 m	MECHATROLINK communications cable: JEPMC-W6002-□□-E The numbers in the boxes (□□) indicate the cable length. A5 = 0.5 m 20 = 20 m 01 = 1 m 30 = 30 m 03 = 3 m 40 = 40 m 05 = 5 m 50 = 50 m 10 = 10 m	The numbers in the boxes (□□) indicate the cable length. JEPMC-W6012-□□-E A2 = 0.2 m 05 = 5 m A5 = 0.5 m 10 = 10 m 01 = 1 m 20 = 20 m 02 = 2 m 30 = 30 m 03 = 3 m 50 = 50 m 04 = 4 m JEPMC-6013-□□-E <sup>3</sup> 10 = 10 m 50 = 50 m 20 = 20 m 75 = 75 m 30 = 30 m JEPMC-6014-□□-E A5 = 0.5 m 10 = 10 m 01 = 1 m 30 = 30 m 03 = 3 m 50 = 50 m 05 = 5 m	JZSP-CA01-E (1 m)

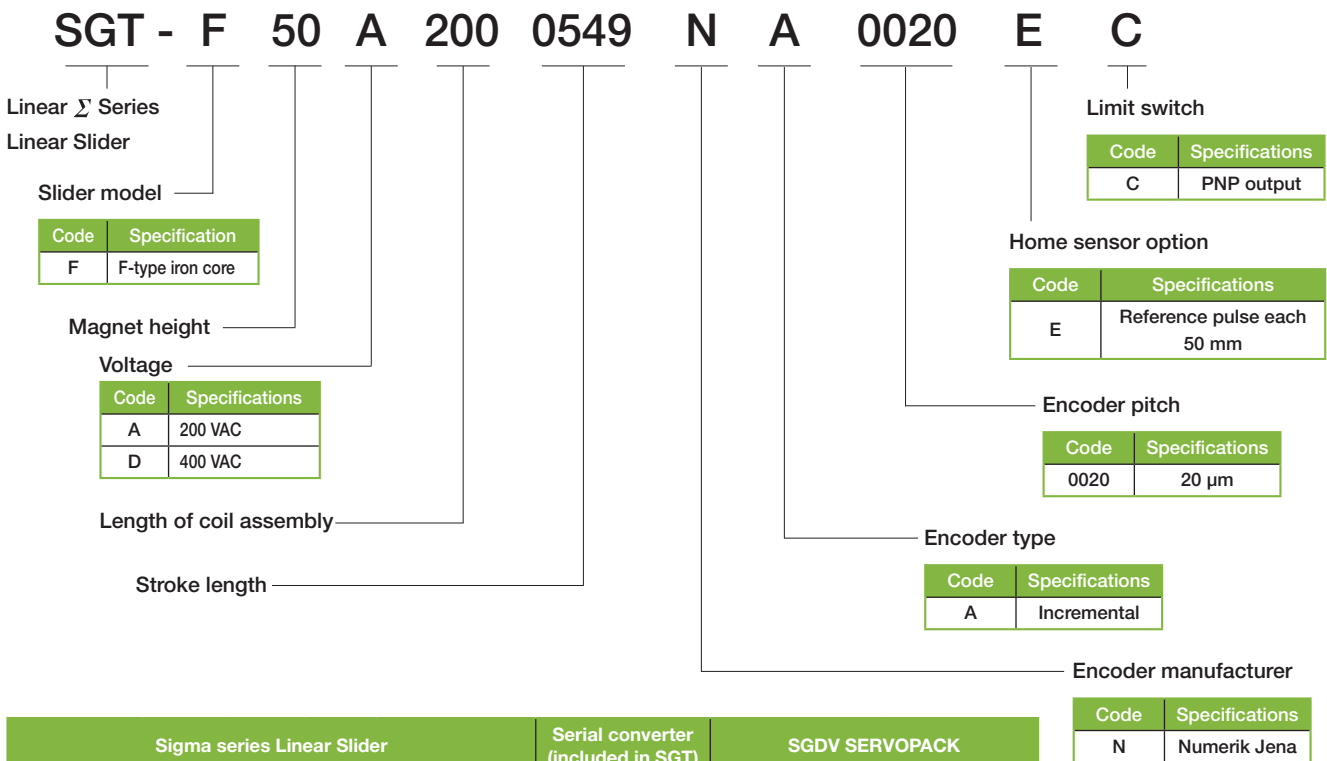
\*1: When using serial converter unit JZDP-G00□-□□□-E, the maximum cable length is 3 m.  
\*2: A connector kit and cable materials are required to assemble cables. For details, refer to SERVOPACKS in this catalog.  
\*3: Currently in pre-release. Will be available soon.

# Linear Sliders

# Σ-Trac-SGT-F



## Model Designations



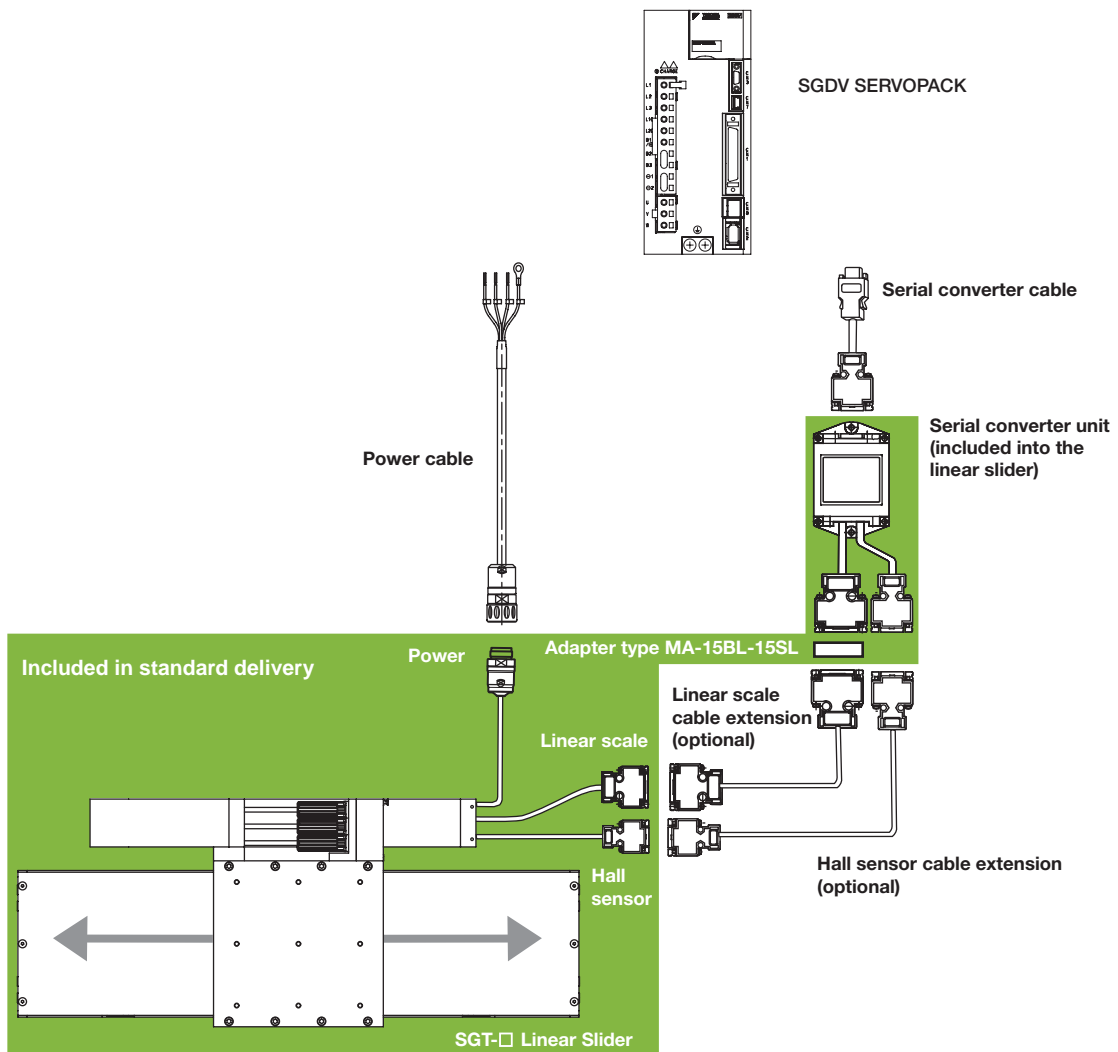
Sigma series Linear Slider					Serial converter (included in SGT)	SGDV SERVOPACK	
Type	Voltage	Rated force	Peak force	Model*	Model JZDP-□008-	200 V (1-phase)	400 V (3-phase)
SGT-□-Linear Slider	200V	80 N	220 N	SGT-F35A120 □	019	SGDV-1R6A□5A	-
		160 N	440 N	SGT-F35A230 □	020	SGDV-3R8A□5A	-
		280 N	600 N	SGT-F50A200 □	181	SGDV-5R5A□5A	-
		560 N	1200 N	SGT-F50A380 □	182	SGDV-5R5A□5A	-
		560 N	1200 N	SGT-F1ZA200 □	183	SGDV-120A□5A**	-
	400V	80 N	220 N	SGT-F35D120 □	211	-	SGDV-1R9D□5A
		160 N	440 N	SGT-F35D230 □	212	-	SGDV-1R9D□5A
		280 N	600 N	SGT-F50D200 □	189	-	SGDV-3R5D□5A
		560 N	1200 N	SGT-F50D380 □	190	-	SGDV-5R4D□5A
		560 N	1200 N	SGT-F1ZD200 □	191	-	SGDV-5R4D□5A
		1120 N	2400 N	SGT-F1ZD380 □	192	-	SGDV-120D□5A

\* Manufactured by YASKAWA Engineering Europe GmbH.  
\*\* Single-phase 200 VAC, 1.5 kW, SGDV-120A □ 1A008000

## Features

- Highly enclosed construction avoids falling parts into the magnets and bearings area.
- Plug and drive, shorten start-up time.
- Long durability, reliable and constant performance after years of use.
- Designed for easy servicing.
- Direct control of the slider using SGDV SERVOPACKs.
- Extremely energy efficient, due to its optimised magnetic circuitry design and high-density winding.
- For special lengths, special specifications and XY systems contact your YASKAWA sales office.
- 200 VAC single-phase  
80 to 560 N (1200 N peak)
- 400 VAC three-phase  
80 to 1200 N (2400 N peak)

## System configuration





Slider Specification

Linear Slider SGT-F□□A (200V)

Voltage		200 V					
Linear Slider model	SGT-	F35A120 □ NA0020	F35A230 □ NA0020	F50A200 □ NA0020	F50A380 □ NA0020	F1ZA200 □ NA0020	
Motor coil specifications	Linear servo motor coil used	SGLFW	35A120A	35A230A	50A200B	50A380B	1ZA200B
	Rated force*1	N	80	160	280	560	560
	Instantaneous peak force*1	N	220	440	600	1200	1200
	Rated current*1	A <sub>rms</sub>	1.4	2.8	5.0	10.0	8.7
	Instantaneous peak current*1	A <sub>rms</sub>	4.4	8.8	12.4	25.0	21.6
	Force constant	N/A <sub>rms</sub>	62.4	62.4	60.2	60.2	69.0
	BEMF constant	V/(m/s)	20.8	20.8	20.1	20.1	23.0
	Motor constant	N/√W	14.4	20.4	34.3	48.5	52.4
	Electrical time constant	ms	3.6	3.6	15.9	15.8	18.3
	Mechanical time constant	ms	6.2	5.5	3.0	2.9	2.3
	Slider specifications	Position accuracy repeatability*2	μm	±1			
Absolute position accuracy*2		μm/100mm	±5				
Linear encoder resolution		μm	40 μm/256, 20 μm/256				
Static friction of the slider*3		N	20	25	30	35	50
Maximum load*3		kg	60	60	80	80	150
Available lengths	m	Standard length up to 2.5m (see dimensions section)/for lengths up to 5m contact your YASKAWA sales office					
Basic specifications	Time rating	Continuous					
	Insulation class	Class B					
	Ambient temperature	0 to +40 °C					
	Ambient humidity	20 to 80% (non-condensing)					
	Insulation resistance	500VDC, 10MΩ min.					
	Excitation	Permanent magnet					
	Dielectric strength	1500VAC for 1 minute					
	Protection methods	Self-cooled					
	Allowable winding temperature	130 °C					

Notes:

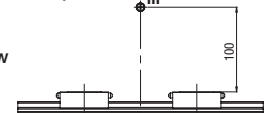
\*1 All values given for items marked with an \*1 and in "force and speed characteristics" graphs are at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. All other values are at 20°C.

\*2 With stable environmental conditions and motor temperature unchanged.

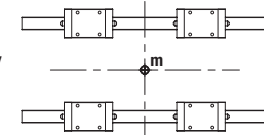
\*3 Items calculated with load position like in figure below.

Centre of mass position

Side view

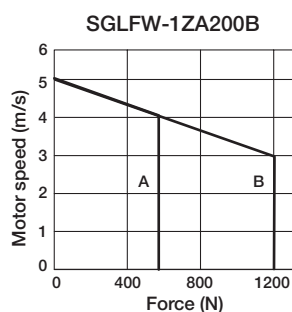
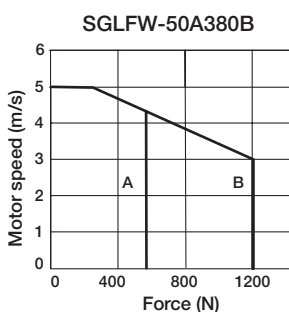
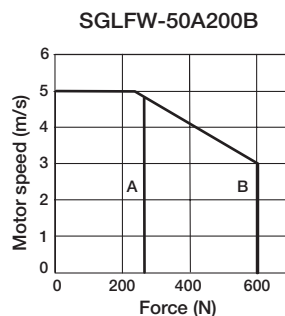
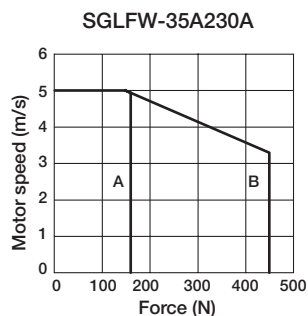
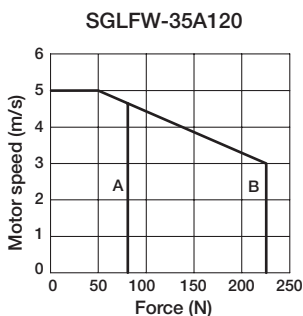


Top view



Force-speed characteristics (200V)

A: Continuous duty zone B: Intermittent duty zone





Slider Specification

Linear Slider SGT-F□□D (400V)

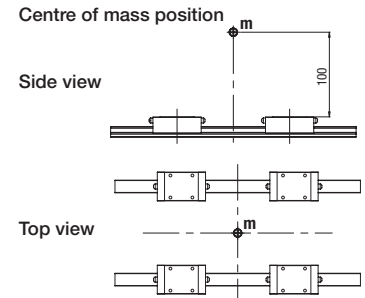
Voltage		400 V						
Linear Slider model	SGT-	F35D120 □ NA0020	F35D230 □ NA0020	F50D20 □ NA0020	F50D380 □ NA0020	F50D200 □ NA0020	F1ZD380 □ NA0020	
Motor coil specifications	Linear servo motor coil used	SGLFW	35D120A	35D230A	50D200B	50A380B	1ZD200B	1ZD380B
	Rated force *1	N	80	160	280	560	560	1120
	Instantaneous peak force *1	N	220	440	600	1200	1200	2400
	Rated current *1	A <sub>rms</sub>	0.7	1.4	2.3	4.5	4.9	9.8
	Instantaneous peak current *1	A <sub>rms</sub>	2.3	4.6	5.6	11.0	12.3	24.6
	Force constant	N/A <sub>rms</sub>	120.2	120.2	134.7	134.7	122.6	122.6
	BEMF constant	V/(m/s)	40.1	40.1	44.9	44.9	40.9	40.9
	Motor constant	N/√W	13.8	19.5	33.4	47.2	51.0	72.1
	Electrical time constant	ms	3.5	3.5	15.0	15.0	17.4	17.2
	Mechanical time constant	ms	5.5	5.5	3.2	3.2	2.5	2.2
Slider specifications	Position accuracy repeatability *2	μm	± 1					
	Absolute position accuracy *2	μm/100 mm	± 5					
	Linear encoder resolution	μm	40 μm/256, 20 μm/256					
	Static friction of the slider *3	N	20	25	30	35	50	60
	Maximum load *3	kg	60	60	80	80	150	150
Available lengths	m	Standard length up to 2.5m (see dimensions section)/for lengths up to 5m contact your YASKAWA sales office						
Basic specifications	Time rating	Continuous						
	Insulation class	Class B						
	Ambient temperature	0 to +40 °C						
	Ambient humidity	20 to 80% (non-condensing)						
	Insulation resistance	500VDC, 10MΩ min.						
	Excitation	Permanent magnet						
	Dielectric strength	1500 VAC for 1 minute						
	Protection methods	Self-cooled						
Allowable winding temperature	130 °C							

Notes:

\*1 All values given for items marked with an \*1 and in "force and speed characteristics" graphs are at a motor winding temperature of 100°C during operation in combination with a SERVOPACK. All other values are at 20°C.

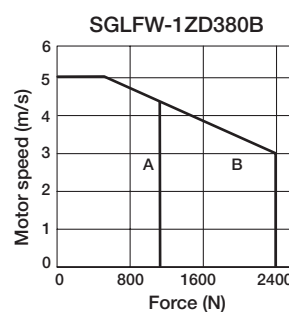
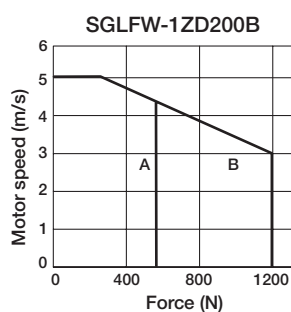
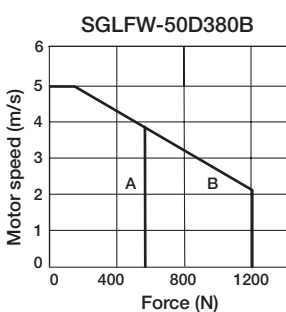
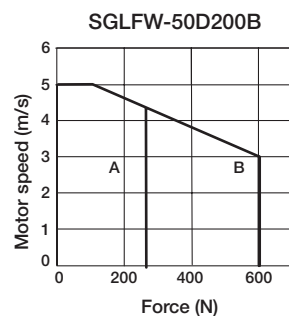
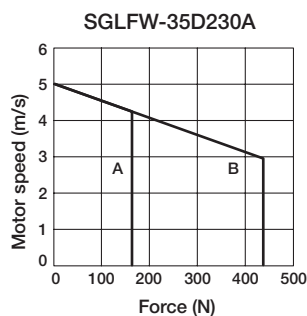
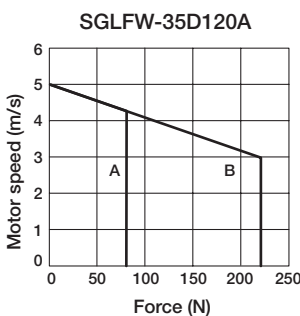
\*2 With stable environmental conditions and motor temperature unchanged.

\*3 Items calculated with load position like in figure below.



Force-speed characteristics (400V)

A: Continuous duty zone B: Intermittent duty zone

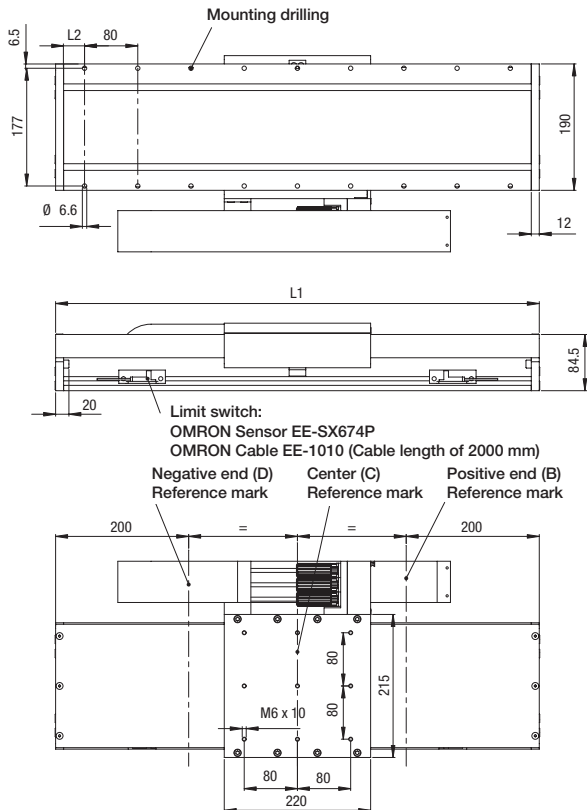


External Dimensions Units: mm

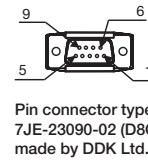
SGT-F35□120□

Linear Slider model*	Effective stroke in mm	L1 in mm	L2 in mm	Weight of moving table including motor coil (kg)	Weight of the complete slider (kg)
SGT-F35□120 0103 NA0020 □C	103	403	29.5	7.6	16
SGT-F35□120 0319 NA0020 □C	319	619	17.5	7.6	19
SGT-F35□120 0427 NA0020 □C	427	727	31.5	7.6	21
SGT-F35□120 0535 NA0020 □C	535	835	45.5	7.6	23
SGT-F35□120 0643 NA0020 □C	643	943	19.5	7.6	25
SGT-F35□120 0751 NA0020 □C	751	1051	33.5	7.6	27
SGT-F35□120 0859 NA0020 □C	859	1159	47.5	7.6	29
SGT-F35□120 0967 NA0020 □C	967	1267	21.5	7.6	31
SGT-F35□120 1075 NA0020 □C	1075	1375	35.5	7.6	33
SGT-F35□120 1183 NA0020 □C	1183	1483	49.5	7.6	35
SGT-F35□120 1291 NA0020 □C	1291	1591	23.5	7.6	36
SGT-F35□120 1399 NA0020 □C	1399	1699	37.5	7.6	38
SGT-F35□120 1507 NA0020 □C	1507	1807	13.5	7.6	40
SGT-F35□120 1615 NA0020 □C	1615	1915	25.5	7.6	42
SGT-F35□120 1723 NA0020 □C	1723	2023	41.5	7.6	44
SGT-F35□120 1831 NA0020 □C	1831	2131	13.5	7.6	46
SGT-F35□120 1939 NA0020 □C	1939	2239	29.5	7.6	48
SGT-F35□120 2047 NA0020 □C	2047	2347	41.5	7.6	50
SGT-F35□120 2155 NA0020 □C	2155	2455	17.5	7.6	52

\* Manufactured by YASKAWA Engineering Europe GmbH.



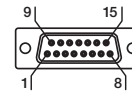
Hall sensor connector



Pin	Description
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

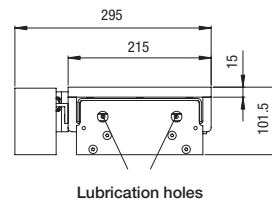
Pin connector type: 7JE-23090-02 (D8C) made by DDK Ltd.

Linear scale connector

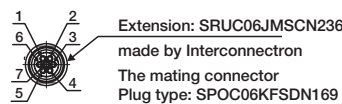


Pin	Description
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Empty
7	Empty
8	Empty
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Empty
15	Inner
Case	Shield

Adapter type: MA-15BL-15SL



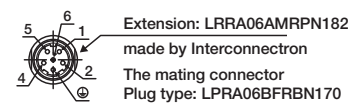
Linear Slider 200V connector specifications SGT-F35A120□



Extension: SRUC06JM5CN236 made by Interconnecron  
The mating connector Plug type: SPOC06KFSDN169

Pin	Description
1	Phase U
2	Phase V
3	Phase W
4	Not used
5	Not used
6	PE
7	Not used

Linear Slider 400V connector specifications SGT-F35D120□



Extension: LRR06AMRPN182 made by Interconnecron  
The mating connector Plug type: LPRA06BFRBN170

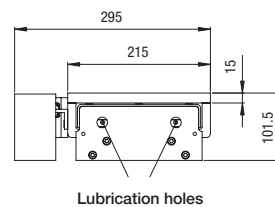
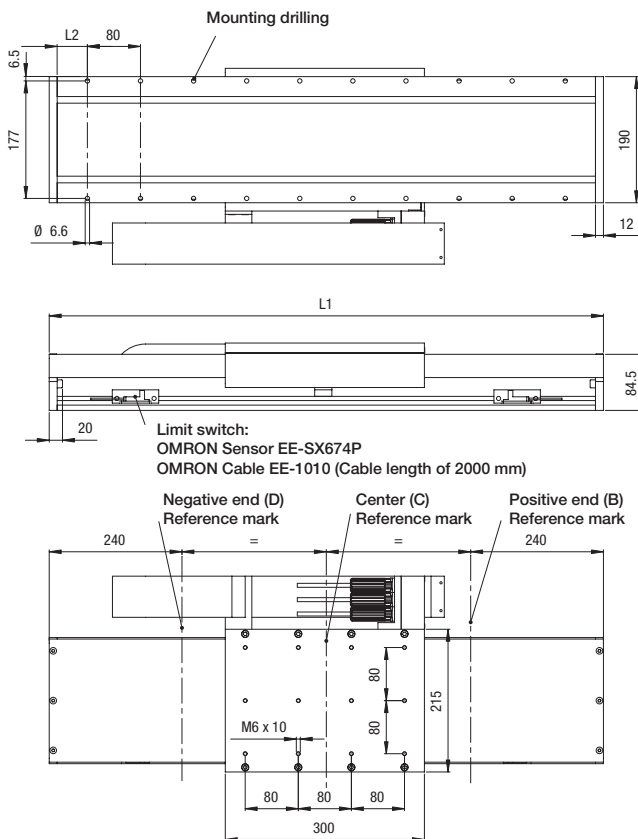
Pin	Description
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⊕	PE

External Dimensions Units: mm

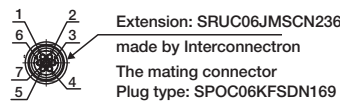
SGT-F35□230□

Linear Slider model*	Effective stroke in mm	L1 in mm	L2 in mm	Weight of moving table including motor coil (kg)	Weight of the complete slider (kg)
SGT-F35□230 0239 NA0020 □C	239	619	17.5	11.5	23
SGT-F35□230 0347 NA0020 □C	347	727	31.5	11.5	25
SGT-F35□230 0455 NA0020 □C	455	835	45.5	11.5	27
SGT-F35□230 0563 NA0020 □C	563	943	19.5	11.5	28
SGT-F35□230 0671 NA0020 □C	671	1051	33.5	11.5	30
SGT-F35□230 0779 NA0020 □C	779	1159	47.5	11.5	32
SGT-F35□230 0887 NA0020 □C	887	1267	21.5	11.5	34
SGT-F35□230 0995 NA0020 □C	995	1375	35.5	11.5	36
SGT-F35□230 1103 NA0020 □C	1103	1483	49.5	11.5	38
SGT-F35□230 1211 NA0020 □C	1211	1591	23.5	11.5	40
SGT-F35□230 1319 NA0020 □C	1319	1699	37.5	11.5	42
SGT-F35□230 1427 NA0020 □C	1427	1807	13.5	11.5	44
SGT-F35□230 1535 NA0020 □C	1535	1915	25.5	11.5	45
SGT-F35□230 1643 NA0020 □C	1643	2023	41.5	11.5	47
SGT-F35□230 1751 NA0020 □C	1751	2131	13.5	11.5	49
SGT-F35□230 1859 NA0020 □C	1859	2239	29.5	11.5	51
SGT-F35□230 1967 NA0020 □C	1967	2347	41.5	11.5	53
SGT-F35□230 2075 NA0020 □C	2075	2455	17.5	11.5	55
SGT-F35□230 2183 NA0020 □C	2183	2563	29.5	11.5	57

\* Manufactured by YASKAWA Engineering Europe GmbH.

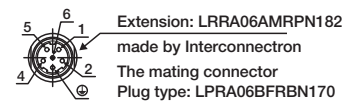


Linear Slider 200V connector specifications SGT-F35A230□



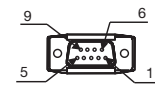
Pin	Description
1	Phase U
2	Phase V
3	Phase W
4	Not used
5	Not used
6	PE ⚡
7	Not used

Linear Slider 400V connector specifications SGT-F35D230□



Pin	Description
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⚡	Ground

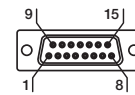
Hall sensor connector



Pin connector type: 7JE-23090-02 (D8C) made by DDK Ltd.

Pin	Description
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear scale connector



Adapter type: MA-15BL-15SL

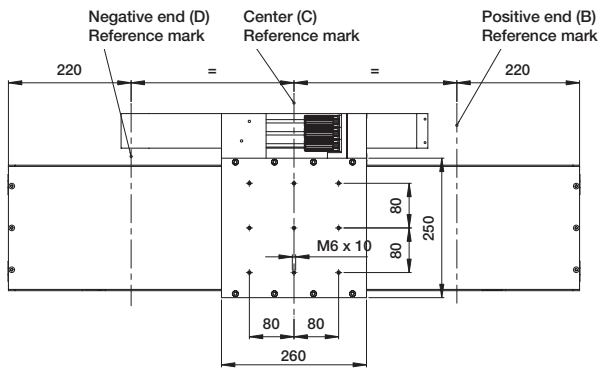
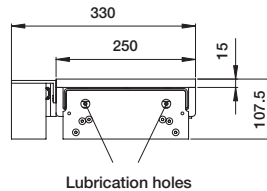
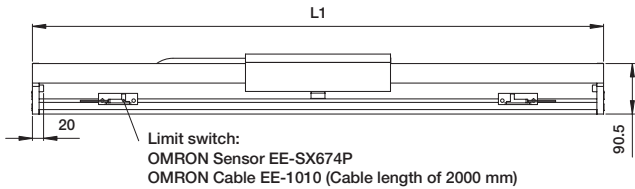
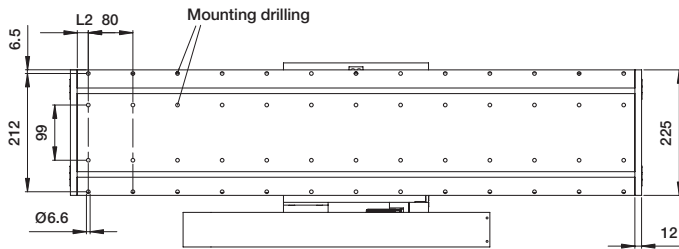
Pin	Description
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Empty
7	Empty
8	Empty
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Empty
15	Inner
Case	Shield

External Dimensions Units: mm

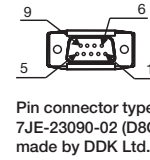
SGT-F50□200□

Linear Slider model*	Effective stroke in mm	L1 in mm	L2 in mm	Weight of moving table including motor coil (kg)	Weight of the complete slider (kg)
SGT-F50□200 0144 NA0020 □C	144	484	30.0	11.2	25
SGT-F50□200 0414 NA0020 □C	414	754	45.0	11.2	31
SGT-F50□200 0549 NA0020 □C	549	889	32.5	11.2	34
SGT-F50□200 0684 NA0020 □C	684	1024	20.0	11.2	37
SGT-F50□200 0819 NA0020 □C	819	1159	47.5	11.2	40
SGT-F50□200 0954 NA0020 □C	954	1294	35.0	11.2	43
SGT-F50□200 1089 NA0020 □C	1089	1429	22.5	11.2	46
SGT-F50□200 1224 NA0020 □C	1224	1564	50.0	11.2	49
SGT-F50□200 1359 NA0020 □C	1359	1699	37.5	11.2	52
SGT-F50□200 1494 NA0020 □C	1494	1834	25.0	11.2	55
SGT-F50□200 1629 NA0020 □C	1629	1969	12.5	11.2	58
SGT-F50□200 1764 NA0020 □C	1764	2104	40.0	11.2	61
SGT-F50□200 1899 NA0020 □C	1899	2239	27.5	11.2	64
SGT-F50□200 2034 NA0020 □C	2034	2374	15.0	11.2	67
SGT-F50□200 2169 NA0020 □C	2169	2509	42.5	11.2	70

\* Manufactured by YASKAWA Engineering Europe GmbH.



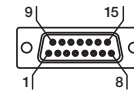
Hall sensor connector



Pin connector type: 7JE-23090-02 (D8C) made by DDK Ltd.

Pin	Description
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

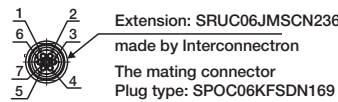
Linear scale connector



Adapter type: MA-15BL-15SL

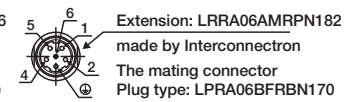
Pin	Description
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Empty
7	Empty
8	Empty
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Empty
15	Inner
Case	Shield

Linear Slider 200V connector specifications SGT-F50A200□



Pin	Description
1	Phase U
2	Phase V
3	Phase W
4	Not used
5	Not used
6	PE ⚡
7	Not used

Linear Slider 400V connector specifications SGT-F50D200□



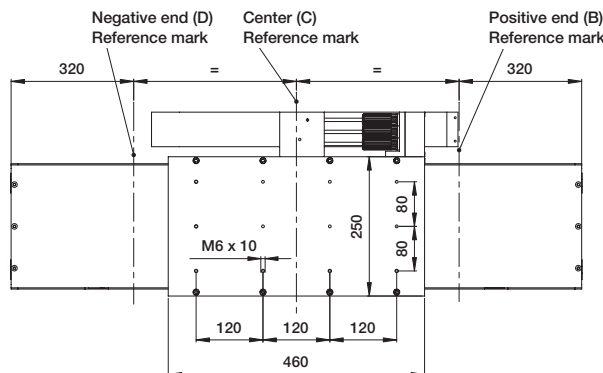
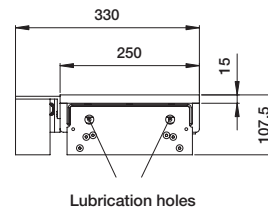
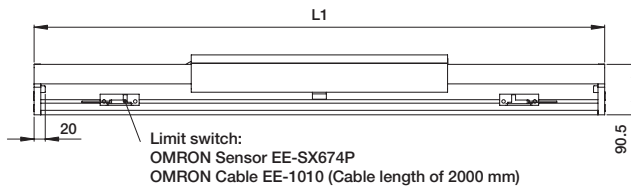
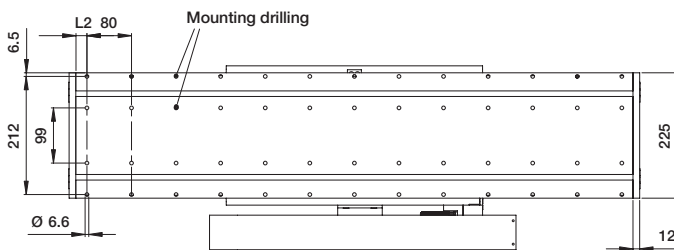
Pin	Description
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⚡	PE

External Dimensions Units: mm

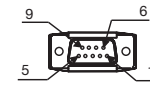
SGT-F50□380□

Linear Slider model*	Effective stroke in mm	L1 in mm	L2 in mm	Weight of moving table including motor coil (kg)	Weight of the complete slider (kg)
SGT-F50□380 0214 NA0020 □C	214	754	45.0	22.5	40
SGT-F50□380 0349 NA0020 □C	349	889	32.5	22.5	43
SGT-F50□380 0484 NA0020 □C	484	1024	20.0	22.5	46
SGT-F50□380 0619 NA0020 □C	619	1159	47.5	22.5	49
SGT-F50□380 0754 NA0020 □C	754	1294	35.0	22.5	52
SGT-F50□380 0889 NA0020 □C	889	1429	22.5	22.5	55
SGT-F50□380 1024 NA0020 □C	1024	1564	50.0	22.5	58
SGT-F50□380 1159 NA0020 □C	1159	1699	37.5	22.5	61
SGT-F50□380 1294 NA0020 □C	1294	1834	25.0	22.5	64
SGT-F50□380 1429 NA0020 □C	1429	1969	12.5	22.5	67
SGT-F50□380 1564 NA0020 □C	1564	2104	40.0	22.5	70
SGT-F50□380 1699 NA0020 □C	1699	2239	27.5	22.5	74
SGT-F50□380 1834 NA0020 □C	1834	2374	15.0	22.5	77
SGT-F50□380 1969 NA0020 □C	1969	2509	42.5	22.5	80
SGT-F50□380 2104 NA0020 □C	2104	2644	30.0	22.5	83

\* Manufactured by YASKAWA Engineering Europe GmbH.



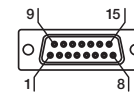
Hall sensor connector



Pin connector type: 7JE-23090-02 (D8C) made by DDK Ltd.

Pin	Description
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

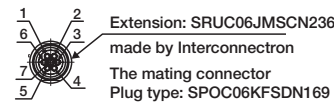
Linear scale connector



Adapter type: MA-15BL-15SL

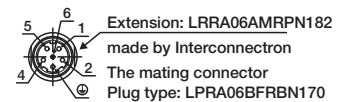
Pin	Description
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Empty
7	Empty
8	Empty
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Empty
15	Inner
Case	Shield

Linear Slider 200V connector specifications SGT-F50A380□



Pin	Description
1	Phase U
2	Phase V
3	Phase W
4	Not used
5	Not used
6	PE ⊕
7	Not used

Linear Slider 400V connector specifications SGT-F50D380□



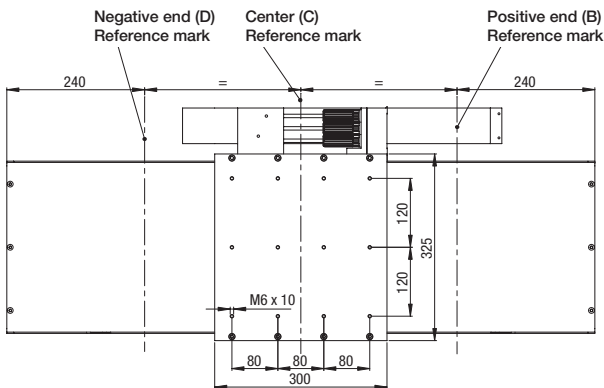
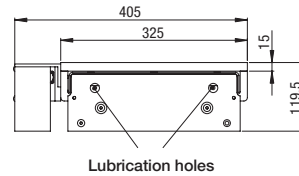
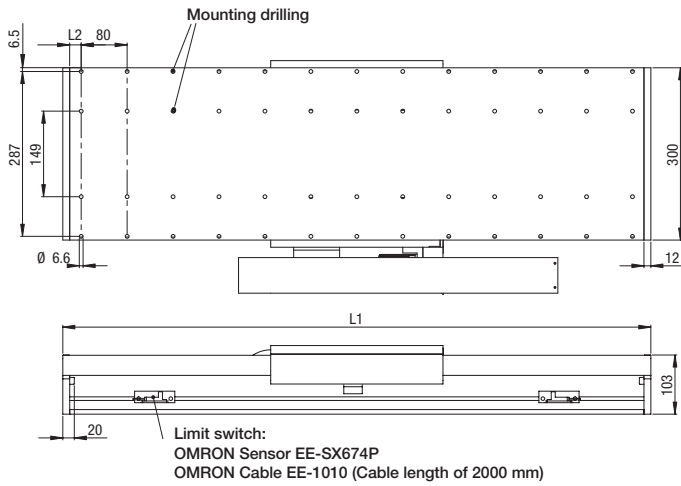
Pin	Description
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⊕	Ground

External Dimensions Units: mm

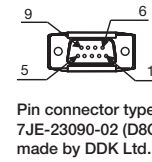
SGT-F1Z□200□

Linear Slider model*	Effective stroke in mm	L1 in mm	L2 in mm	Weight of moving table including motor coil (kg)	Weight of the complete slider (kg)
SGT-F1Z□200 0104 NA0020 □C	104	484	30.0	18	37
SGT-F1Z□200 0374 NA0020 □C	374	754	45.0	18	47
SGT-F1Z□200 0509 NA0020 □C	509	889	32.5	18	52
SGT-F1Z□200 0644 NA0020 □C	644	1024	20.0	18	57
SGT-F1Z□200 0779 NA0020 □C	779	1159	47.5	18	62
SGT-F1Z□200 0914 NA0020 □C	914	1294	35.0	18	67
SGT-F1Z□200 1049 NA0020 □C	1049	1429	22.5	18	72
SGT-F1Z□200 1184 NA0020 □C	1184	1564	50.0	18	77
SGT-F1Z□200 1319 NA0020 □C	1319	1699	37.5	18	82
SGT-F1Z□200 1454 NA0020 □C	1454	1834	25.0	18	87
SGT-F1Z□200 1589 NA0020 □C	1589	1969	12.5	18	92
SGT-F1Z□200 1724 NA0020 □C	1724	2104	40.0	18	97
SGT-F1Z□200 1859 NA0020 □C	1859	2239	27.5	18	102
SGT-F1Z□200 1994 NA0020 □C	1994	2374	15.0	18	107
SGT-F1Z□200 2129 NA0020 □C	2129	2509	42.5	18	111

\* Manufactured by YASKAWA Engineering Europe GmbH.

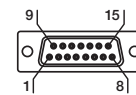


Hall sensor connector



Pin	Description
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

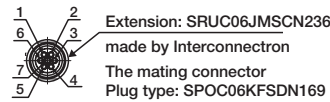
Linear scale connector



Pin	Description
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Empty
7	Empty
8	Empty
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Empty
15	Inner
Case	Shield

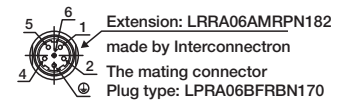
Adapter type: MA-15BL-15SL

Linear Slider 200V connector specifications SGT-F1ZA200□



Pin	Description
1	Phase U
2	Phase V
3	Phase W
4	Not used
5	Not used
6	PE
7	Not used

Linear Slider 400V connector specifications SGT-F1ZD200□



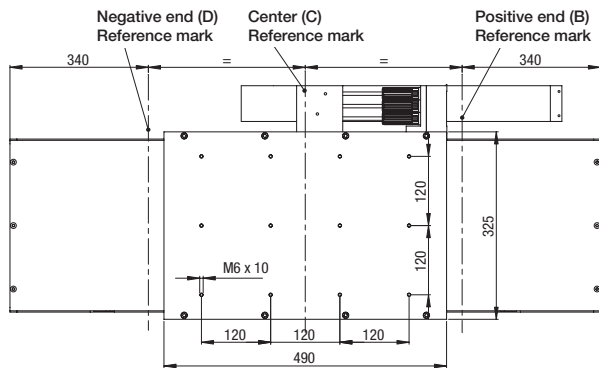
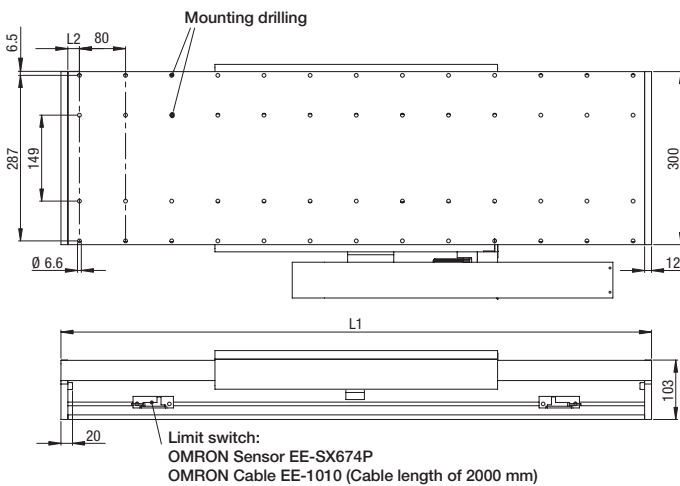
Pin	Description
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
Ⓧ	PE

External Dimensions Units: mm

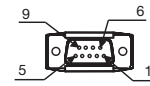
SGT-F1Z□380□

Linear Slider model*	Effective stroke in mm	L1 in mm	L2 in mm	Weight of moving table including motor coil (kg)	Weight of the complete slider (kg)
SGT-F1Z□380 0184 NA0020 □C	184	754	45.0	31	60
SGT-F1Z□380 0319 NA0020 □C	319	889	32.5	31	65
SGT-F1Z□380 0454 NA0020 □C	454	1024	20.0	31	70
SGT-F1Z□380 0589 NA0020 □C	589	1159	47.5	31	75
SGT-F1Z□380 0724 NA0020 □C	724	1294	35.0	31	80
SGT-F1Z□380 0859 NA0020 □C	859	1429	22.5	31	84
SGT-F1Z□380 0994 NA0020 □C	994	1564	50.0	31	89
SGT-F1Z□380 1129 NA0020 □C	1129	1699	37.5	31	94
SGT-F1Z□380 1264 NA0020 □C	1264	1834	25.0	31	99
SGT-F1Z□380 1399 NA0020 □C	1399	1969	12.5	31	104
SGT-F1Z□380 1534 NA0020 □C	1534	2104	40.0	31	109
SGT-F1Z□380 1669 NA0020 □C	1669	2239	27.5	31	114
SGT-F1Z□380 1804 NA0020 □C	1804	2374	15.0	31	119
SGT-F1Z□380 1939 NA0020 □C	1939	2509	42.5	31	124
SGT-F1Z□380 2074 NA0020 □C	2074	2644	30.0	31	129

\* Manufactured by YASKAWA Engineering Europe GmbH.



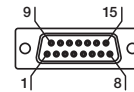
Hall sensor connector



Pin connector type: 7JE-23090-02 (D8C) made by DDK Ltd.

Pin	Description
1	+5V (Power supply)
2	Phase U
3	Phase V
4	Phase W
5	0V (Power supply)
6	Not used
7	Not used
8	Not used
9	Not used

Linear scale connector



Adapter type: MA-15BL-15SL

Pin	Description
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Empty
7	Empty
8	Empty
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Empty
15	Inner
Case	Shield

Linear Slider 400V connector specifications SGT-F1ZD380□



Extension: LRRA06AMRPN182 made by Interconnection The mating connector Plug type: LPRA06BFRBN170

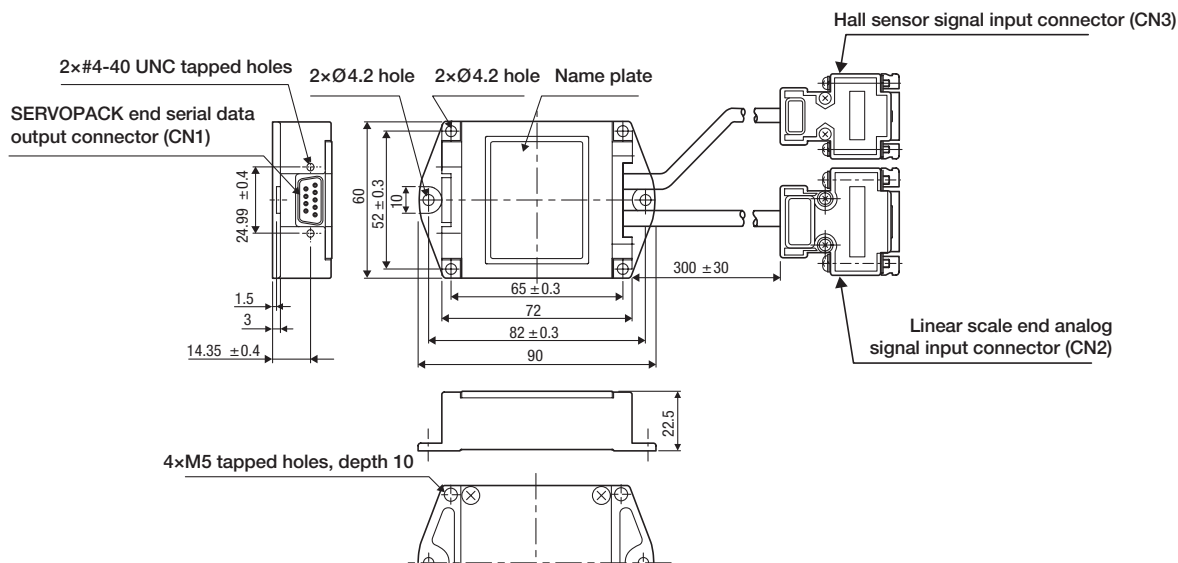
Pin	Description
1	Phase U
2	Phase V
4	Phase W
5	Not used
6	Not used
⊕	PE



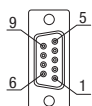
External Dimensions Units: mm

Serial converter unit: JZDP-D008-□□□-E

Items	Specifications	
Electrical characteristics	Power supply voltage	+5.0V $\pm$ 5%, ripple content 5% max.
	Current consumption	120 mA typ., 350 mA max.
	Signal resolution	Input 2-phase sine wave: 1/256 pitch
	Max. response frequency	250 kHz
	Analog input signals (cos, sin, Ref)	Differential input amplitude: 0.4V to 1.2V, input signal level: 1.5V to 3.5V
	Pole sensor input signal	CMOS level
	Output signals	Position data, hall sensor information, and alarms
	Output method	Serial data transmission (HDLC [High-level data link control] protocol format with Manchester codes)
	Transmission cycle	62.5 $\mu$ s
	Output circuit	Balanced transceiver (SN75LBC176 or the equivalent); internal terminal resistance: 120 $\Omega$
Mechanical characteristics	Approx. mass	150 g
	Vibration resistance	98 m/s <sup>2</sup> max. (1 to 2500 Hz) in three directions
	Shock resistance	980 m/s <sup>2</sup> , (11 ms) two times in three directions
Environmental conditions	Operating temperature	0 °C to 55 °C (32 to 131 °F)
	Storage temperature	-20 °C to +80 °C (-4 to +176 °F)
	Humidity	20% to 90% RH (without condensation)

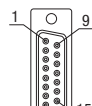


Connector CN1  
SERVOPACK end  
serial data output



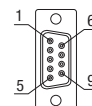
Pin	Description
1	+5V
2	S-phase output
3	Empty
4	Empty
5	0V
6	/S-phase output
7	Empty
8	Empty
9	Empty
Case	Shield

Connector CN2  
Linear scale end  
analog signal input



Pin	Description
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Empty
7	Empty
8	Empty
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Empty
15	Inner shield
Case	Shield

Connector CN3  
Hall sensor signal input



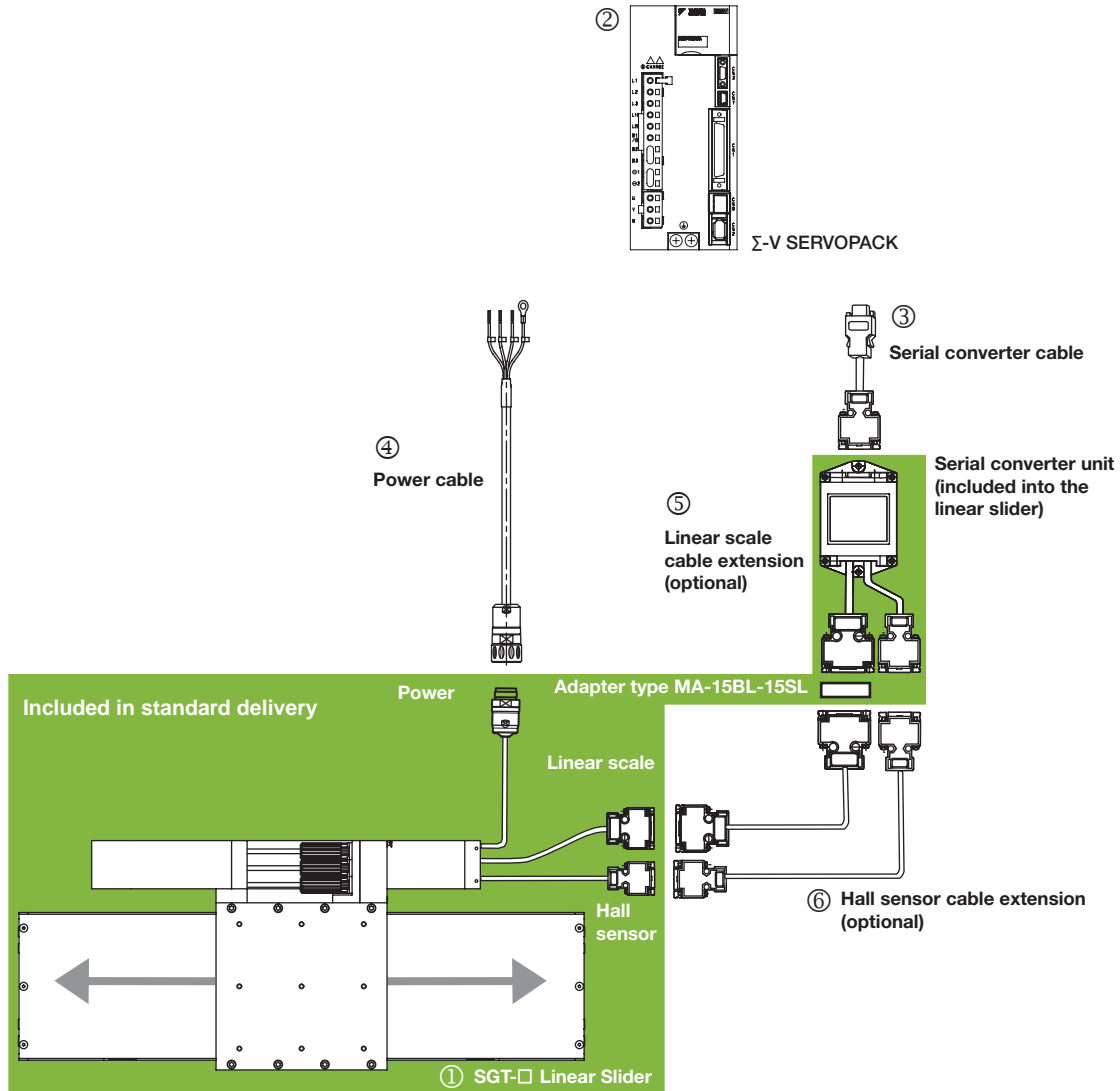
Pin	Description
1	+5V
2	U-phase input
3	V-phase input
4	W-phase input
5	0V
6	Empty
7	Empty
8	Empty
9	Empty
Case	Shield



Ordering instructions

Linear Slider overview

Drive options (refer to SERVOPACK)



SERVOPACK

Note:

② Refer to  $\Sigma$ -V SERVOPACK brochure for detailed drive specifications and selection of drive accessories.

The symbols ①②③... show the recommended sequence to select the servo motor, cables and serial converter for a linear motors system.

Linear Slider SGT-F□

200VAC single-phase

Symbol	Specifications		Model	
	Rated force	Peak force	① Linear Slider model	② SERVOPACK $\Sigma$ -V series
① ②	80 N	220 N	SGT-F35A120 [stroke] NA0020 DC	SGDV-1R6A□5A
	160 N	440 N	SGT-F35A230 [stroke] NA0020 DC	SGDV-3R8A□5A
	280 N	600 N	SGT-F50A200 [stroke] NA0020 DC	SGDV-5R5A□5A
	560 N	1200 N	SGT-F50A380 [stroke] NA0020 DC	SGDV-5R5A□5A
	560 N	1200 N	SGT-F1ZA200 [stroke] NA0020 DC	SGDV-120A□5A*

Note:  
For effective stroke distances available see dimensions section.

\* Single-phase 200 VAC, 1.5 kW, SGDV-120A □ 1A008000

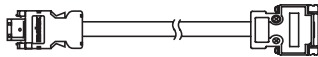
Ordering instructions

Linear Slider SGT-F□  
400VAC three-phase

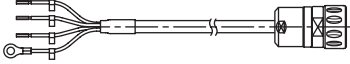
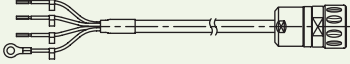

Symbol	Specifications		Model	
	Rated force	Peak force	① Linear Slider model	② SERVOPACK $\Sigma$ -V series
① ②	80 N	220 N	SGT-F35D120 [stroke] NA0020 DC	SGDV-1R9D□5A
	160 N	440 N	SGT-F35D230 [stroke] NA0020 DC	SGDV-1R9D□5A
	280 N	600 N	SGT-F50D200 [stroke] NA0020 DC	SGDV-3R5D□5A
	560 N	1200 N	SGT-F50D380 [stroke] NA0020 DC	SGDV-5R4D□5A
	560 N	1200 N	SGT-F1ZD200 [stroke] NA0020 DC	SGDV-5R4D□5A
	1120 N	2400 N	SGT-F1ZD380 [stroke] NA0020 DC	SGDV-120D□5A

Note:  
For effective stroke distances available see dimensions section.

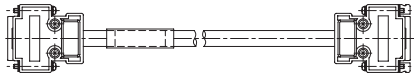
Serial converter cable to SERVOPACK

Symbol	Specifications	Model	Appearance	
③	$\Sigma$ -V SERVOPACK to serial converter cable	3 m	JZSP-CLP70-03-E-G#	
		5 m	JZSP-CLP70-03-E-G#	
		10 m	JZSP-CLP70-03-E-G#	
		15 m	JZSP-CLP70-03-E-G#	
		20 m	JZSP-CLP70-03-E-G#	

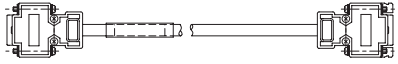
Power cables

Symbol	Specifications	Model	Appearance	
④	For 200 V servo motors SGT-F35A□	3 m	DP9325252-03G	
		5 m	DP9325252-05G	
		10 m	DP9325252-10G	
		15 m	DP9325252-15G	
		20 m	DP9325252-20G	
	For 200 V servo motors SGT-F50A□ SGT-F1ZA200□	3 m	DP9325254-03G	
		5 m	DP9325254-05G	
		10 m	DP9325254-10G	
		15 m	DP9325254-15G	
		20 m	DP9325254-20G	
For 400 V servo motors SGT-F35D□ SGT-F50D200D□ SGT-F50D380□ SGT-F1ZD□	3 m	JZSP-CMM20D15-03G		
	5 m	JZSP-CMM20D15-05G		
	10 m	JZSP-CMM20D15-10G		
	15 m	JZSP-CMM20D15-15G		
	20 m	JZSP-CMM20D15-20G		

Linear scale cable to serial converter

Symbol	Specifications	Model	Appearance	
⑤	Extension cable for linear scale to serial converter (Connector DB-15) (The extension cable is optional)	1 m	JZSP-CLL00-01-E-G#	
		3 m	JZSP-CLL00-03-E-G#	
		5 m	JZSP-CLL00-05-E-G#	
		10 m	JZSP-CLL00-10-E-G#	
		15 m	JZSP-CLL00-15-E-G#	

Hall sensor cable to serial converter

Symbol	Specifications	Model	Appearance	
⑥	Extension cable for hall sensor to serial converter (The extension cable is optional)	1 m	JZSP-CLL10-01-E-G#	
		3 m	JZSP-CLL10-03-E-G#	
		5 m	JZSP-CLL10-05-E-G#	
		10 m	JZSP-CLL10-10-E-G#	
		15 m	JZSP-CLL10-15-E-G#	

Connectors

Specification	Model
Hypertac power connector IP67 (for 200 V motors)	SPOC-06K-FSDN169
Hypertac power connector IP67 (for 400 V motors)	LPRA-06B-FRBN170

Note: The digit "#" of the order number represents the design revision.



# 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 <sup>*1</sup>	0.05
	R90 <sup>*1</sup>	0.1
	1R6 <sup>*1</sup>	0.2
	2R8 <sup>*1</sup>	0.4
	3R8	0.5
	5R5 <sup>*1</sup>	0.75
	7R6	1.0
	120 <sup>*2</sup>	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 <sup>*3</sup>
002	Varnished
003	Rack-mounted <sup>*3</sup> 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 SGD V-□□□□	R70A	R90A	1R6A	2R8A	5R5A	120A*	
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	5.5	11.6
Max. Output Current	Arms	2.1	2.9	5.8	9.3	16.9	28
Regenerative Resistors		None or external			Built-in or 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 SGD V-120A01A008000 SERVOPACK.

### Three-phase 200 V

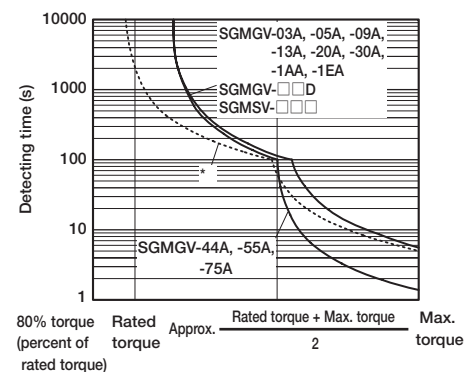
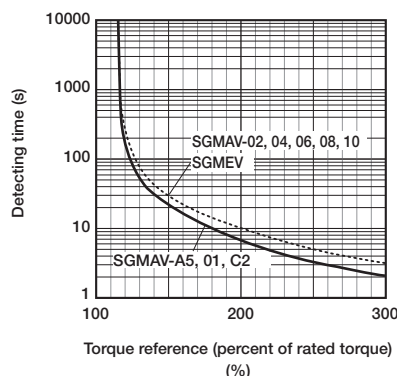
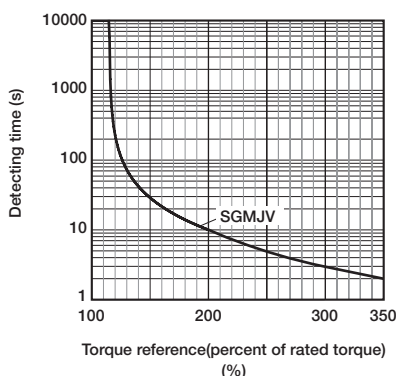
SERVOPACK Model SGD V-□□□□□	R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A	
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6	78
Max. 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 SGD V-□□□□□	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 SGD V-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	
	Storage Humidity	90%RH or less	
	Vibration Resistance	4.9 m/s <sup>2</sup>	
	Shock Resistance	19.6 m/s <sup>2</sup>	
	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 <sup>2</sup>	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		<ul style="list-style-type: none"> <li>• Servo ON (/S-ON)</li> <li>• Internal set speed selection (/SPD-D, /SPD-A, /SPD-B)</li> <li>• Proportional control (/P-CON)</li> <li>• Forward run prohibited (P-OT), reverse run prohibited (N-OT)</li> <li>• Control selection (/C-SEL)</li> <li>• Zero clamping (/ZCLAMP)</li> <li>• Alarm reset (/ALM-RST)</li> <li>• Reference pulse inhibit (/INHIBIT)</li> <li>• Forward external torque limit (/P-CL), reverse external torque limit (/N-CL)</li> <li>• Gain selection (/G-SEL)</li> </ul> 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		<ul style="list-style-type: none"> <li>• Positioning completion (/COIN)</li> <li>• Speed limit detection (/VLT)</li> <li>• Speed coincidence detection (/V-CMP)</li> <li>• Brake (/BK)</li> <li>• Rotation detection (/TGON)</li> <li>• Warning (/WARN)</li> <li>• Servo ready (/S-RDY)</li> <li>• Near (/NEAR)</li> <li>• Torque limit detection (/CLT)</li> </ul> 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	<ul style="list-style-type: none"> <li>• Max. input voltage: <math>\pm 12</math> V (forward torque reference with positive reference)</li> <li>• Factory setting: 3 VDC at rated torque (Input gain setting can be changed.)</li> </ul>	
		Input Impedance	About 14 k $\Omega$	
		Circuit Time Constant	16 $\mu$ s	
Speed Control	Soft Start Time Setting		0 to 10 s (can be set individually for acceleration and deceleration.)	
	Input Signals	Reference Voltage	<ul style="list-style-type: none"> <li>• Max. input voltage: <math>\pm 12</math> V (forward speed reference with positive reference)</li> <li>• Factory setting: 6 VDC at rated speed (Input gain setting can be changed.)</li> </ul>	
		Input Impedance	About 14 k $\Omega$	
		Circuit Time Constant	30 $\mu$ s	
	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.	
Feedforward Compensation		0 to 100%		
Positioning Completed Width Setting		0 to 1073741824 reference units		
Position Control	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
	Sequence Output		Output Signals which can be allocated	Functions
		Fixed Output		Servo alarm (ALM), alarm code (ALO1, ALO2, ALO3) outputs
			Number of Channels	3 channels
		Functions	<ul style="list-style-type: none"> <li>• Positioning completion (/COIN)</li> <li>• Speed limit detection (/VLT)</li> <li>• Speed coincidence detection (/V-CMP)</li> <li>• Brake (/BK)</li> <li>• Servomotor movement detection (/TGON)</li> <li>• Warning (/WARN)</li> <li>• Servo ready (/S-RDY)</li> <li>• Near (/NEAR)</li> <li>• Force limit detection (/CLT)</li> </ul> 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	<ul style="list-style-type: none"> <li>• Max. input voltage: <math>\pm 12</math> V (forward force reference with positive reference)</li> <li>• Factory setting: 3 VDC at rated force (Input gain setting can be changed.)</li> </ul>	
		Input Impedance	About 14 k $\Omega$	
		Circuit Time Constant	16 $\mu$ s	
Speed Control	Soft Start Time Setting		0 to 10 s (can be set individually for acceleration and deceleration.)	
	Input Signals	Reference Voltage	<ul style="list-style-type: none"> <li>• Max. input voltage: <math>\pm 12</math> V (forward speed reference with positive reference)</li> <li>• Factory setting: 6 VDC at rated speed (Input gain setting can be changed.)</li> </ul>	
		Input Impedance	About 14 k $\Omega$	
		Circuit Time Constant	30 $\mu$ s	
	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			45.1
	0.75	5R5A	1.6	5.5	43.8			8
	1.0	7R6A	2.3	7.6	53.6	10	22	78.6
	1.5	120A	3.2	11.6	65.8			97.8
	2.0	180A	4	18.5	111.9	16	27	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		479.7	
15	780A	29.6	78	599.0	48		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.

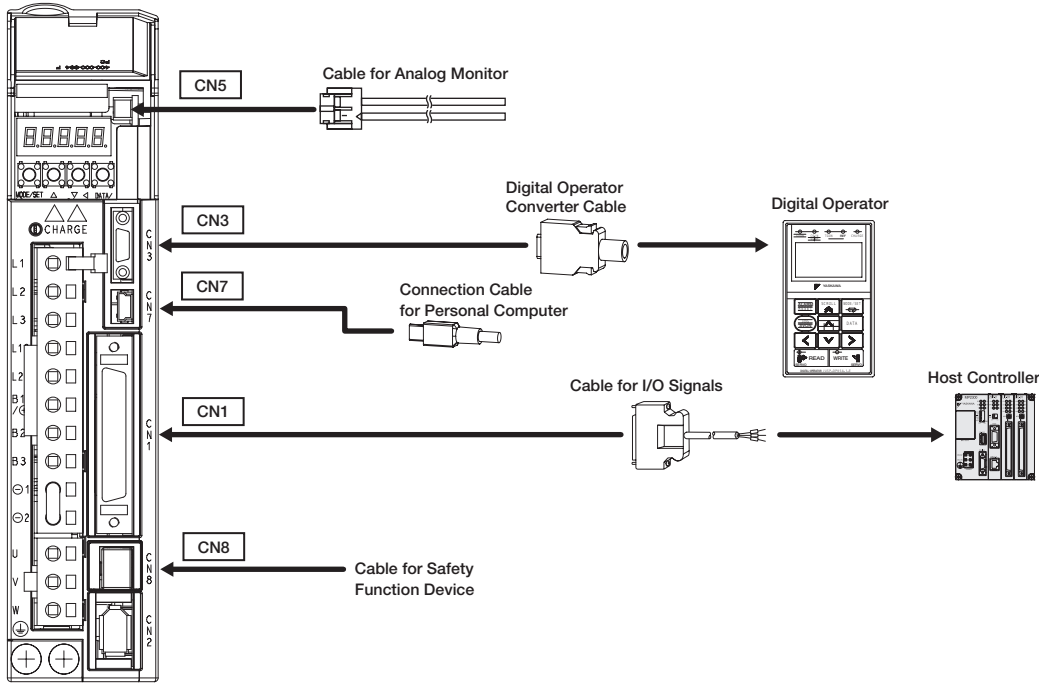
Be sure to connect a regenerative resistor unit (optional) or an external regenerative resistor (optional). For selection details, refer to page 364.





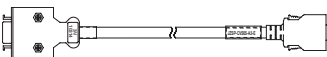


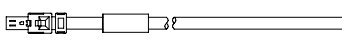
3 Regenerative resistor power losses are allowable losses. Take the following action if this value is exceeded.

- 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	
<b>CN1</b> 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			
<b>CN3</b>	Digital Operator	JUSP-OP05A-1-E	With Connection Cable (1 m) 	(4)	
	Digital Operator Converter Cable*1	0.3 m	Cable with Connectors at Both Ends 	(5)	
<b>CN7</b> Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	(6)	
<b>CN5</b> Cables for Analog Monitor	1 m	JZSP-CA01-E	SERVOPACK End 	(7)	
<b>CN8</b> 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-V-III series digital operators (model: JUSP-OP05A) for Σ-V series SERVOPACKs.

\*2 : When using the safety function, connect this cable to the safety devices.

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

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

## Selecting Cables

### (1) Connector Kit for CN1

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

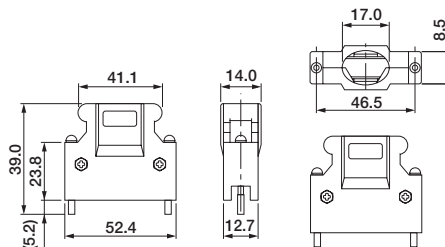
Connector Kit	Case		Connector	
Model	Model	Qty	Model	Qty
JZSP-CSI9-1-E	10350-52Z0-008*	1 set	10150-3000PE* (Soldered)	1

\* : Manufactured by Sumitomo 3M Ltd.

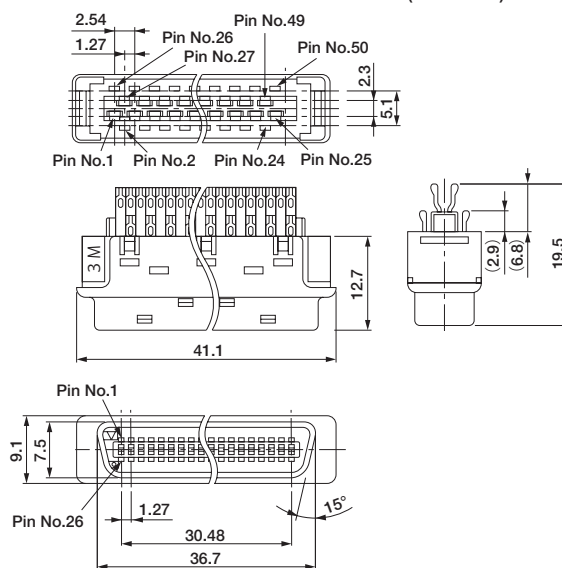
#### • Cable Size

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)

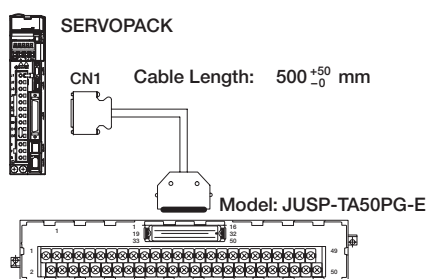


#### • External Dimensions of Connector (Units: mm)

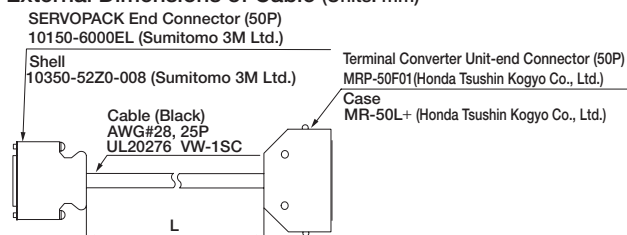


### (2) Connector Terminal Converter Unit for CN1

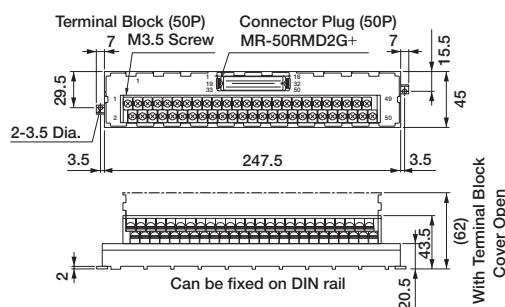
#### • Configurations



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



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



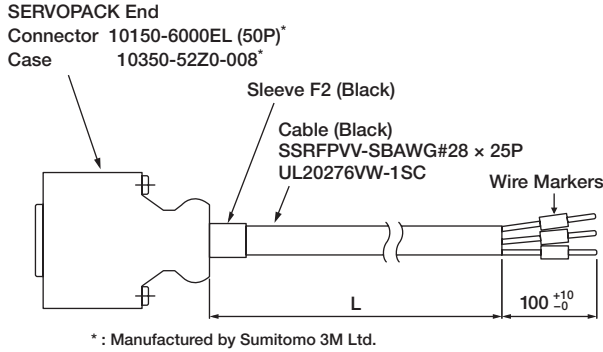
Model	Cable Length (L)
JZSP-TA50PG-E	0.5 m
JZSP-TA50PG-1-E	1 m
JZSP-TA50PG-2-E	2 m

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)



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

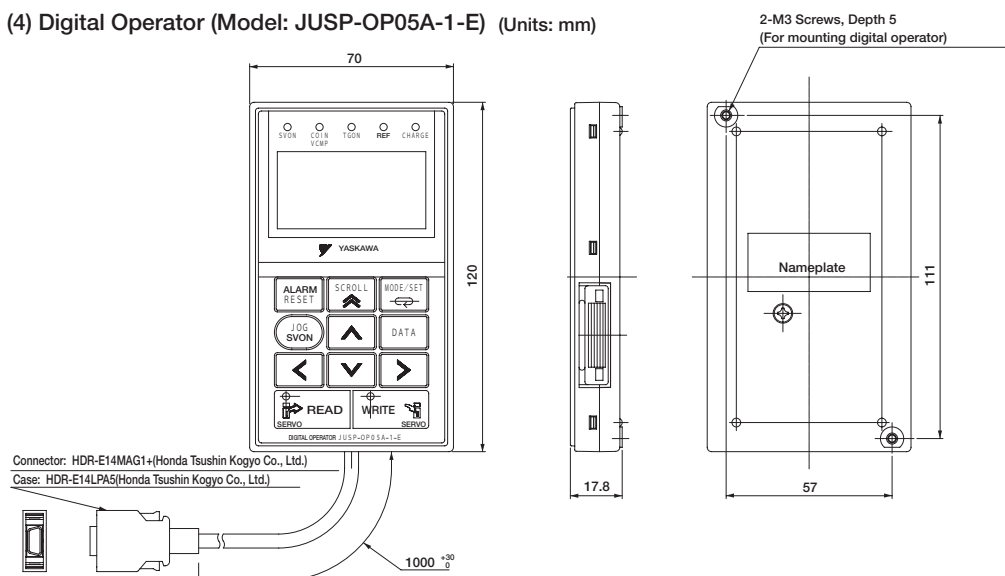
Connection Diagram of JZSP-CSI01-□-E Cable

Pin No.	Signal	Wire Color	Marking		Host Controller End	Lead Marker
			Color	Dots		
1	SG	Orange	Red	1	1	1
3	PL1	Orange	Black	1	3	3
2	SG	Gray	Red	1	2	2
4	SEN	Gray	Black	1	4	4
5	V-REF	White	Red	1	5	5
6	SG	White	Black	1	6	6
7	PULS	Yellow	Red	1	7	7
8	/PULS	Yellow	Black	1	8	8
9	T-REF	Pink	Red	1	9	9
10	SG	Pink	Black	1	10	10
11	SIGN	Orange	Red	2	11	11
12	/SIGN	Orange	Black	2	12	12
13	PL2	Gray	Red	2	13	13
14	/CLR	White	Red	2	14	14
15	CLR	White	Black	2	15	15
16	-	Gray	Black	2	16	16
17	-	Yellow	Red	2	17	17
18	PL3	Yellow	Black	2	18	18
19	PCO	Pink	Red	2	19	19
20	/PCO	Pink	Black	2	20	20
21	BAT (+)	Orange	Red	3	21	21
22	BAT (-)	Orange	Black	3	22	22
23	-	Gray	Red	3	23	23
24	-	Gray	Black	3	24	24
25	/V-CMP+	White	Red	3	25	25
26	/V-CMP-	White	Black	3	26	26
27	/TGON+	Yellow	Red	3	27	27
28	/TGON-	Yellow	Black	3	28	28
29	/S-RDY+	Pink	Red	3	29	29
30	/S-RDY-	Pink	Black	3	30	30
31	ALM+	Orange	Red	4	31	31
32	ALM-	Orange	Black	4	32	32
33	PAO	Gray	Red	4	33	33
34	/PAO	Gray	Black	4	34	34
35	PBO	White	Red	4	35	35
36	/PBO	White	Black	4	36	36
37	ALO1	Yellow	Red	4	37	37
38	ALO2	Yellow	Black	4	38	38
39	ALO3	Pink	Red	4	39	39
40	/S-ON	Pink	Black	4	40	40
41	/P-CON	Orange	Red	5	41	41
42	P-OT	Orange	Black	5	42	42
43	N-OT	Gray	Red	5	43	43
44	/ALM-RST	Gray	Black	5	44	44
45	/P-CL	White	Red	5	45	45
46	/N-CL	White	Black	5	46	46
47	+24V-IN	Yellow	Red	5	47	47
48	-	Pink	Red	5	48	48
49	-	Pink	Black	5	49	49
50	-	Yellow	Black	5	50	50
Case	Shield					

⚡ : Represents twisted-pair wires.

## Selecting Cables

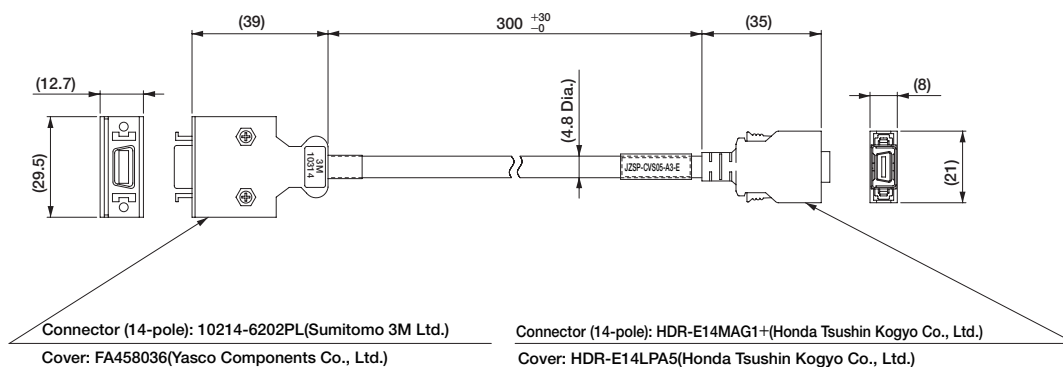
### (4) Digital Operator (Model: JUSP-OP05A-1-E) (Units: mm)



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

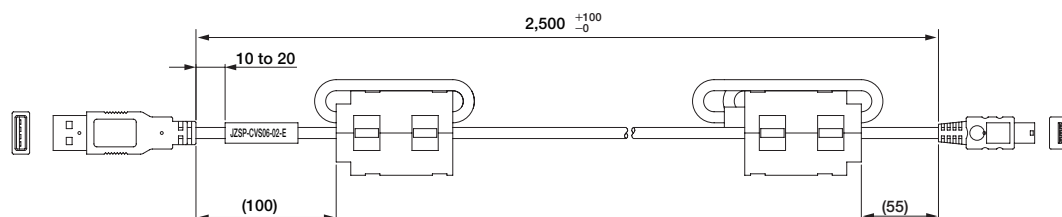
A converter cable is required to use  $\Sigma$ -III series digital operators (model: JUSP-OP05A) for  $\Sigma$ -V series SERVOPACKs.

#### • External Dimensions (Units: mm)



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

#### • External Dimensions (Units: mm)



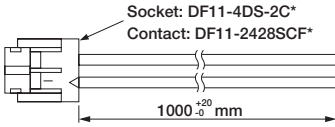
#### IMPORTANT

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

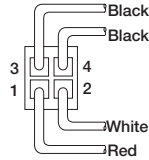
Selecting Cables Units: mm

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

• External Dimensions (Units: mm)



\* : Manufactured by Hirose Electric Corporation.



View from Cable End

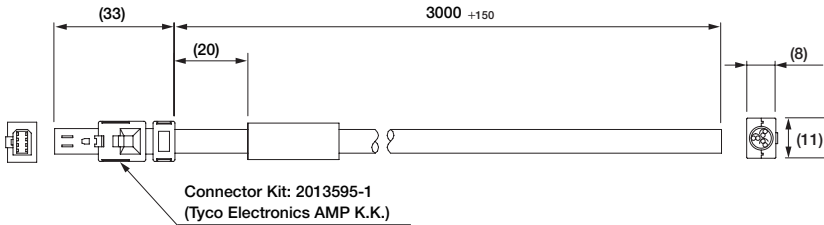
• Specifications

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)

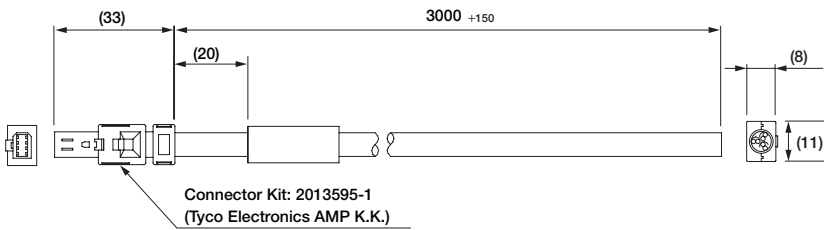


• Specifications

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-**

$\Sigma$ -V Series  
SGDV  
SERVOPACK

**R70**

1st+2nd+3rd digits

**A**

4th digit

**11**

5th+6th digits

**A**

7th digit

**000**

8th+9th+10th digits

**00**

11th+12th digits

**0**

13th digit

1st+2nd+3rd digits Current

Voltage	Code	Applicable Servomotor Max. Capacity kW
Three-phase 200 V	R70 <sup>*1</sup>	0.05
	R90 <sup>*1</sup>	0.1
	1R6 <sup>*1</sup>	0.2
	2R8 <sup>*1</sup>	0.4
	3R8	0.5
	5R5 <sup>*1</sup>	0.75
	7R6	1.0
	120 <sup>*2</sup>	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  $\mu$ s to 4 ms (user setting). Such a high transmission speed allows real-time transmission of various data required for control.

- **Cost savings**

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

- **High-precision motion control**

The SGD V 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 SGD V-□□□□	R70A	R90A	1R6A	2R8A	5R5A	120A*	
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	5.5	11.6
Max. Output Current	Arms	2.1	2.9	5.8	9.3	16.9	28
Regenerative Resistors		None or external			Built-in or 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 SGD V-120A11A008000 SERVOPACK.

### Three-phase 200 V

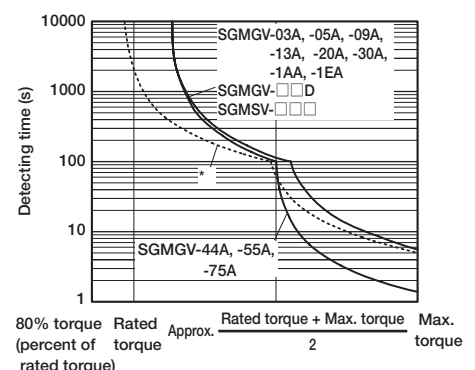
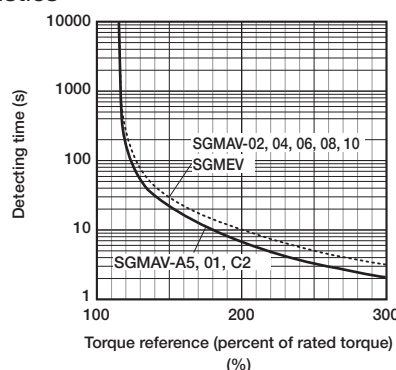
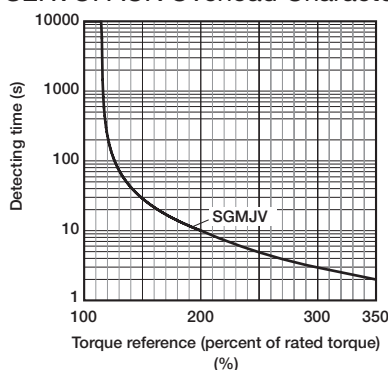
SERVOPACK Model SGD V-□□□□	R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A	
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6	78
Max. 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 SGD V-□□□□	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 $\pm$ 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 SGD V-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 <sup>2</sup>	
	Shock Resistance	19.6 m/s <sup>2</sup>	
	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 <ul style="list-style-type: none"> <li>• Homing deceleration switch signal (/DEC)</li> <li>• External latch signals (/EXT 1 to 3)</li> <li>• Forward run prohibited (P-OT), reverse run prohibited (N-OT)</li> <li>• Forward external torque limit (/P-CL), reverse external torque limit (/N-CL)</li> </ul> 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 <ul style="list-style-type: none"> <li>• Positioning completion (/COIN)</li> <li>• Speed limit detection (/VLT)</li> <li>• Speed coincidence detection (/V-CMP)</li> <li>• Brake (/BK)</li> <li>• Rotation detection (/TGON)</li> <li>• Warning (/WARN)</li> <li>• Servo ready (/S-RDY)</li> <li>• Near (/NEAR)</li> <li>• Torque limit detection (/CLT)</li> </ul> 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 $\mu$ s, 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 <ul style="list-style-type: none"> <li>• Homing deceleration switch signal (/DEC)</li> <li>• External latch signals (/EXT 1 to 3)</li> <li>• Forward run prohibited (P-OT), reverse run prohibited (N-OT)</li> <li>• Forward external force limit (/P-CL), reverse external force limit (/N-CL)</li> </ul> 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 <ul style="list-style-type: none"> <li>• Positioning completion (/COIN)</li> <li>• Speed limit detection (/VLT)</li> <li>• Speed coincidence detection (/V-CMP)</li> <li>• Brake (/BK)</li> <li>• Servomotor movement detection (/TGON)</li> <li>• Warning (/WARN)</li> <li>• Servo ready (/S-RDY)</li> <li>• Near (/NEAR)</li> <li>• Force limit detection (/CLT)</li> </ul> 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 $\mu$ s, 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	10	78.6	
	1.5	120A	3.2	11.6	65.8		97.8	
	2.0	180A	4	18.5	111.9	16	22	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).

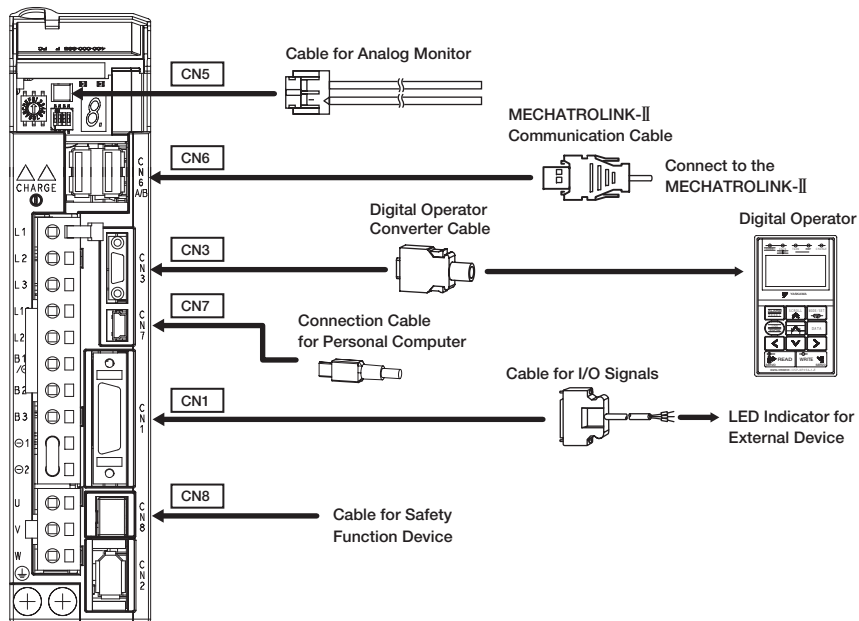
2 SGDV-470A, -550A, -590A, -780A, -210D, -260D, -280D, -370D SERVOPACKs do not have built-in regenerative resistors.



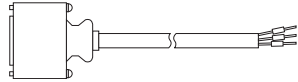

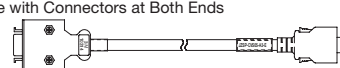
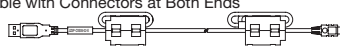



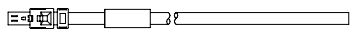
Be sure to connect a regenerative resistor unit (optional) or an external regenerative resistor (optional). For selection details, refer to page 364.

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
<b>CN1</b> 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			
<b>CN3</b>	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)
<b>CN7</b>	Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	(10)
<b>CN6A</b> <b>CN6B</b> 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)
<b>CN5</b> Cables for Analog Monitor		1 m	JZSP-CA01-E	SERVOPACK End 	(6)
<b>CN8</b> 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  $\Sigma$ -III series digital operators (model: JUSP-OP05A) for  $\Sigma$ -V series SERVOPACKs.

\*2 : When using the safety function, connect this cable to the safety devices.

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

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

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.

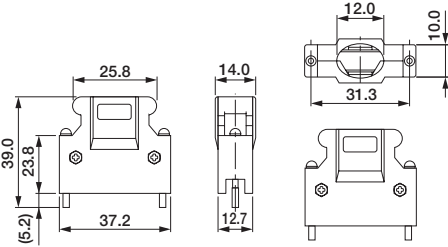
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-2-E	10326-52A0-008*	1 set	10126-3000PE* (Soldered)	1

\* : Manufactured by Sumitomo 3M Ltd.

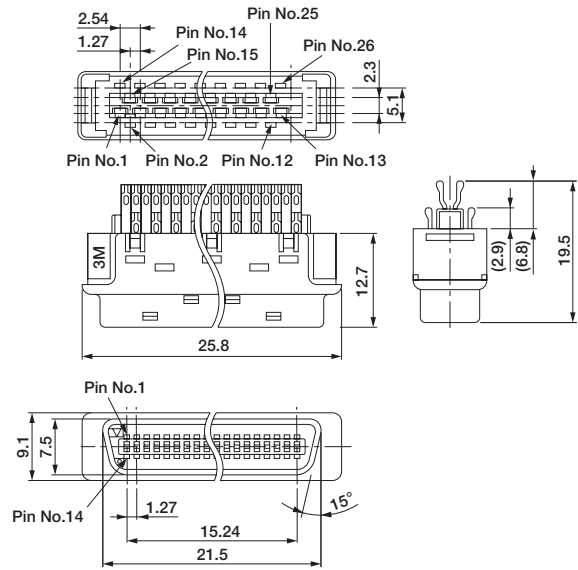
• Cable Size

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)

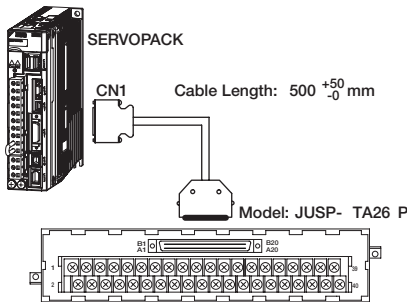


• External Dimensions of Connector (Units: mm)

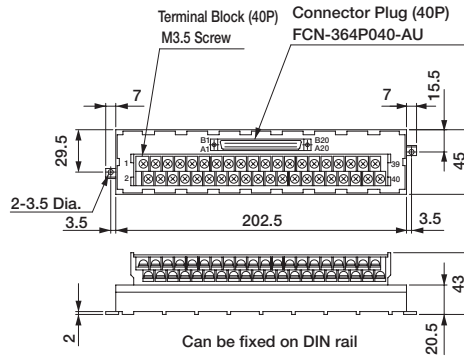


(2) Connector Terminal Converter Unit for CN1

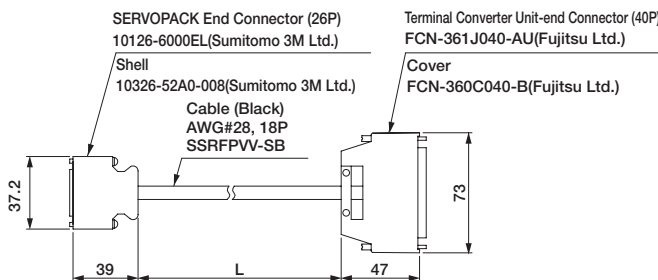
• Configurations



• External Dimensions of Terminal Block (Units: mm)



• External Dimensions of Cable (Units: mm)



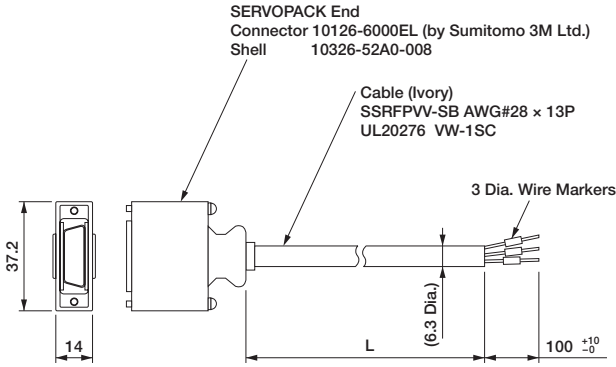
Model	Cable Length (L)	Approx. Mass
JUSP-TA26P-E	0.5 m	100 g
JUSP-TA26P-1-E	1 m	200 g
JUSP-TA26P-2-E	2 m	400 g

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.

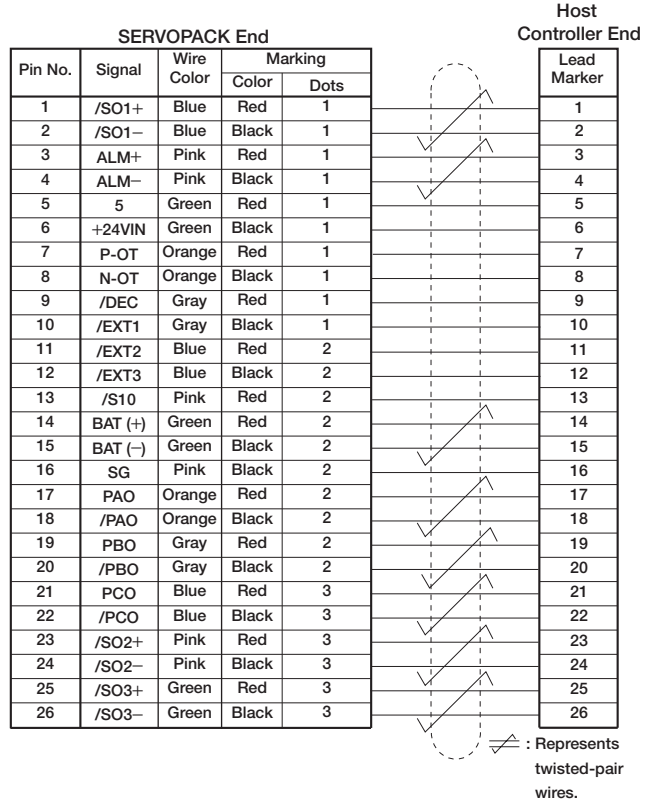
Selecting Cables

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

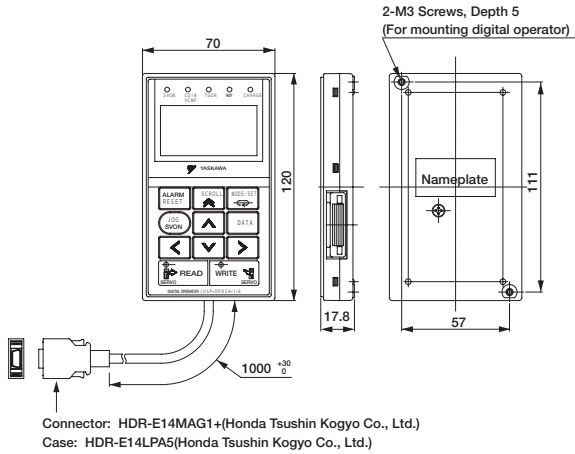


Model	Cable Length
JZSP-CSI02-1-E	1 m
JZSP-CSI02-2-E	2 m
JZSP-CSI02-3-E	3 m

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



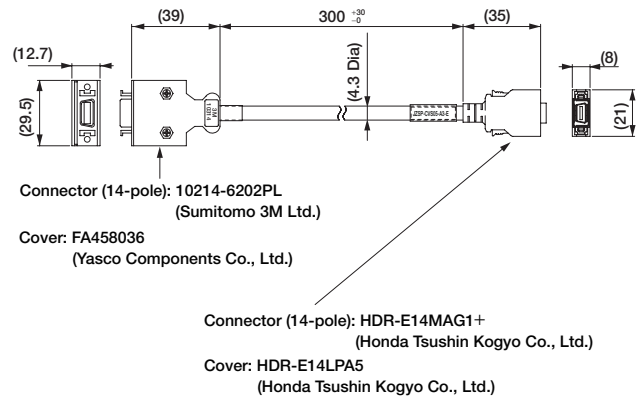
(4) Digital Operator (Model: JZSP-OP05A-1-E)  
(Units: mm)



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

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

● External Dimensions (Units: mm)

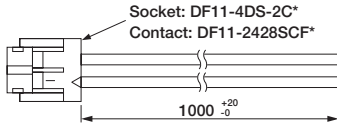




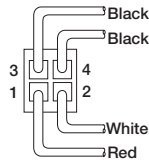
Selecting Cables

(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

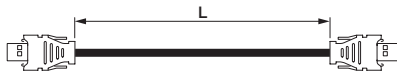
Pin No.	Cable Color	Signal	Standard Settings
1	Red	Analog Monitor 2	Motor speed : 1V/1000 min-1
2	White	Analog Monitor 1	Torque reference : 1V/100% rated torque
3, 4	Black (2 cables)	GND(0V)	-

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

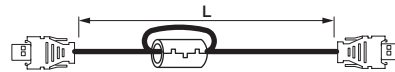


Model	Cable Length(L)
JEPMC-W6002-A5-E	0.5 m
JEPMC-W6002-01-E	1.0 m
JEPMC-W6002-03-E	3.0 m
JEPMC-W6002-05-E	5.0 m
JEPMC-W6002-10-E	10.0 m
JEPMC-W6002-20-E	20.0 m
JEPMC-W6002-30-E	30.0 m
JEPMC-W6002-40-E	40.0 m
JEPMC-W6002-50-E	50.0 m

(8) MECHATROLINK-II Communications Cable for CN6  
(Model: JEPMC-W6003-□□-E)

- External Dimensions (Units: mm)

Cable with Connectors at Both Ends (with Ferrite Core)



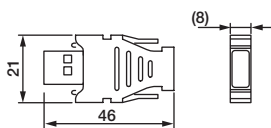
Model	Cable Length (L)
JEPMC-W6003-A5-E	0.5 m
JEPMC-W6003-01-E	1.0 m
JEPMC-W6003-03-E	3.0 m
JEPMC-W6003-05-E	5.0 m
JEPMC-W6003-10-E	10.0 m
JEPMC-W6003-20-E	20.0 m
JEPMC-W6003-30-E	30.0 m
JEPMC-W6003-40-E	40.0 m
JEPMC-W6003-50-E	50.0 m

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)

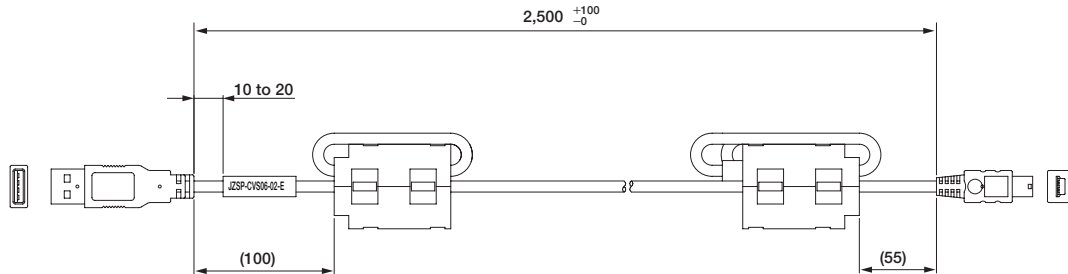




## Selecting Cables

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

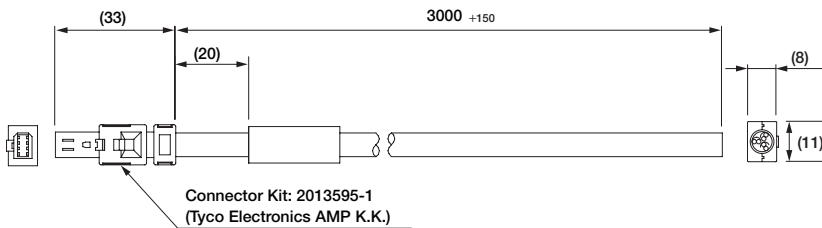
- External Dimensions (Units: mm)



**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)

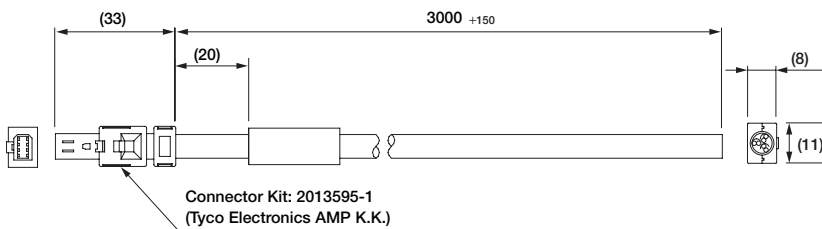


- Specifications

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-**

Σ-V Series  
SGDV  
SERVOPACK

**R70**

1st+2nd+3rd digits

**A**

4th digit

**21**

5th+6th digits

**A**

7th digit

**000**

8th+9th+10th digits

**00**

11th+12th digits

**0**

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
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  $\mu$ s to 4 ms (user setting). Such a high transmission speed allows real-time transmission of various data required for control.

- **Cost savings**

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

- **High-precision motion control**

The SGD V 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 SGD V-□□□□	R70A	R90A	1R6A	2R8A	5R5A	120A*	
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	5.5	11.6
Max. Output Current	Arms	2.1	2.9	5.8	9.3	16.9	28
Regenerative Resistors		None or external			Built-in or 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 SGD V-120A21A008000 SERVOPACK.

### Three-phase 200 V

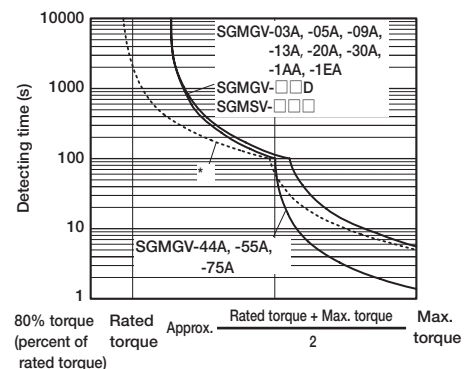
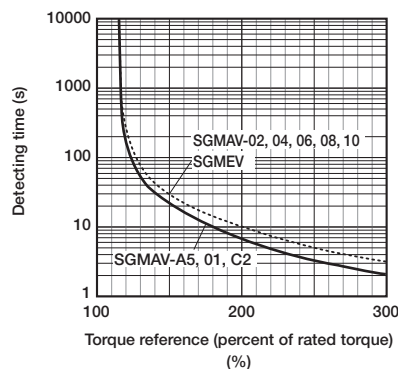
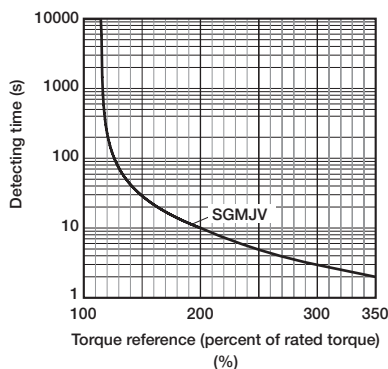
SERVOPACK Model SGD V-□□□□	R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A	
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	Arms	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6	78
Max. 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 SGD V-□□□□	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 $\pm$ 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 SGD V-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
	Sequence Output	Output Signals which can be allocated	Function	<ul style="list-style-type: none"> <li>• Homing deceleration switch signal (/DEC)</li> <li>• External latch signals (/EXT 1 to 3)</li> <li>• Forward run prohibited (/P-OT), reverse run prohibited (/N-OT)</li> <li>• Forward external torque limit (/P-CL), reverse external torque limit (/N-CL)</li> </ul> Positive and negative logic can be changed.
			Fixed Output	Servo alarm (ALM)
	Panel Operator	Display Unit	Number of Channels	3 channels
Switch		Function	<ul style="list-style-type: none"> <li>• Positioning completion (/COIN)</li> <li>• Speed limit detection (/VLT)</li> <li>• Speed coincidence detection (/V-CMP)</li> <li>• Brake (/BK)</li> <li>• Rotation detection (/TGON)</li> <li>• Warning (/WARN)</li> <li>• Servo ready (/S-RDY)</li> <li>• Near (/NEAR)</li> <li>• Torque limit detection (/CLT)</li> </ul> Positive and negative logic can be changed.	
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
	Sequence Output	Output Signals which can be allocated	Function	<ul style="list-style-type: none"> <li>• Homing deceleration switch signal (/DEC)</li> <li>• External latch signals (/EXT 1 to 3)</li> <li>• Forward run prohibited (/P-OT), reverse run prohibited (/N-OT)</li> <li>• Forward external force limit (/P-CL), reverse external force limit (/N-CL)</li> </ul> Positive and negative logic can be changed.
			Fixed Output	Servo alarm (ALM)
	Panel Operator	Display Unit	Number of Channels	3 channels
Switch		Function	<ul style="list-style-type: none"> <li>• Positioning completion (/COIN)</li> <li>• Speed limit detection (/VLT)</li> <li>• Speed coincidence detection (/V-CMP)</li> <li>• Brake (/BK)</li> <li>• Servomotor movement detection (/TGON)</li> <li>• Warning (/WARN)</li> <li>• Servo ready (/S-RDY)</li> <li>• Near (/NEAR)</li> <li>• Force limit detection (/CLT)</li> </ul> Positive and negative logic can be changed.	
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 SGD V-	Power Supply Capacity kVA	Output Current Arms	Main Circuit Power Loss W	Regenerative Resistor Power Loss	Control Circuit Power Loss W	Total Power Loss W
						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	10	78.6	
	1.5	120A	3.2	11.6	65.8		97.8	
	2.0	180A	4	18.5	111.9	16	22	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			324.6
15	370D	30.6	37.2	403.8	350 *4	30	433.8	

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

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

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

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

Notes: 1 SGD V-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 SGD V-470A, -550A, -590A, -780A, -210D, -260D, -280D, -370D SERVOPACKs do not have built-in regenerative resistors.

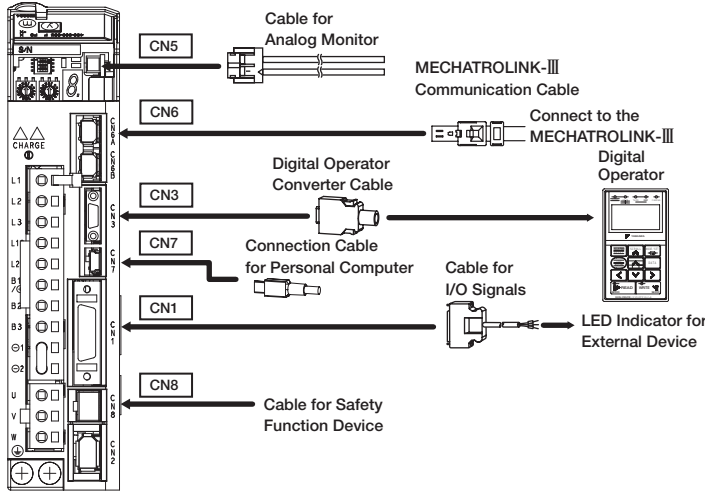
Be sure to connect a regenerative resistor unit (optional) or an external regenerative resistor (optional). For selection details, refer to page 364.

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
<b>CN1</b> 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			
<b>CN3</b>	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)
<b>CN7</b>	Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends	(7)
<b>CN6A</b> <b>CN6B</b> 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)
<b>CN5</b> Cables for Analog Monitor		1 m	JZSP-CA01-E	SERVOPACK End	(11)
<b>CN8</b> 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  $\Sigma$ -III series digital operators (model: JUSP-OP05A) for  $\Sigma$ -V series SERVOPACKs.

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

\*3 : When using the safety function, connect this cable to the safety devices.

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

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



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.

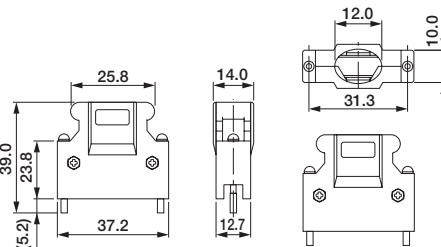
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-2-E	10326-52A0-008*	1 set	10126-3000PE* (Soldered)	1

\* : Manufactured by Sumitomo 3M Ltd.

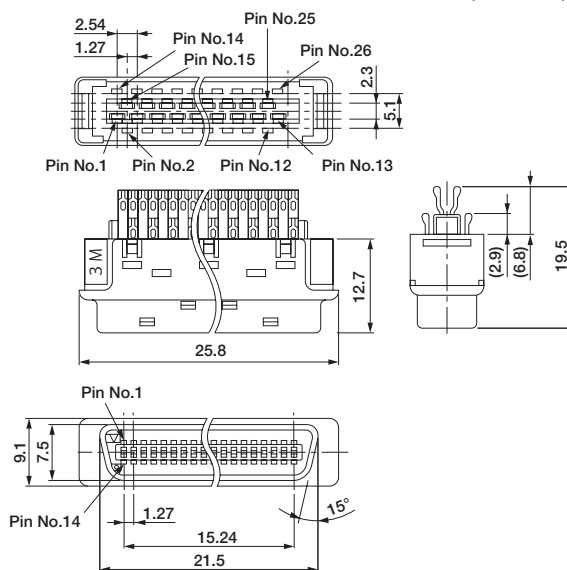
• Cable Size

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)

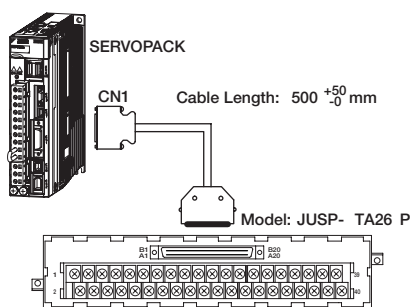


• External Dimensions of Connector (Units: mm)

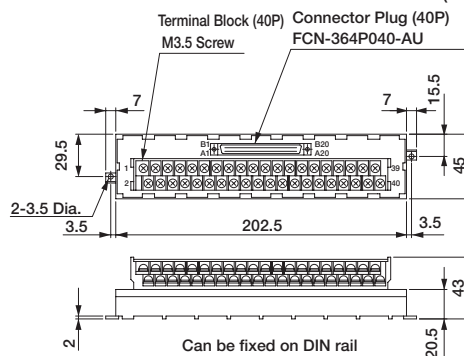


(2) Connector Terminal Converter Unit for CN1

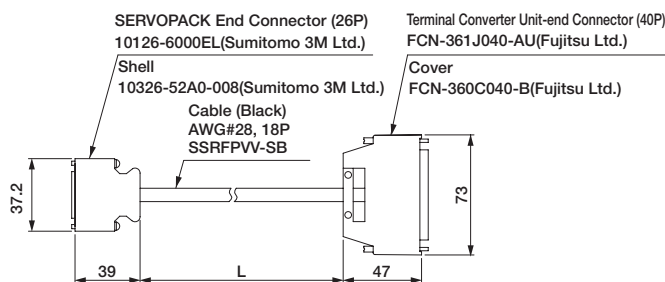
• Configurations



• External Dimensions of Terminal Block (Units: mm)



• Dimensional Drawings of Cable



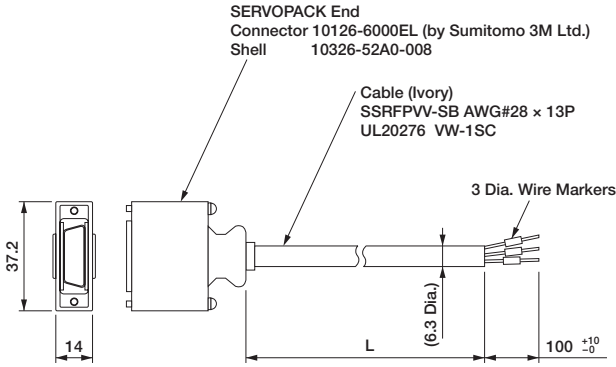
Model	Cable Length (L)	Approx. Mass
JUSP-TA26P-E	0.5 m	100 g
JUSP-TA26P-1-E	1 m	200 g
JUSP-TA26P-2-E	2 m	400 g

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.



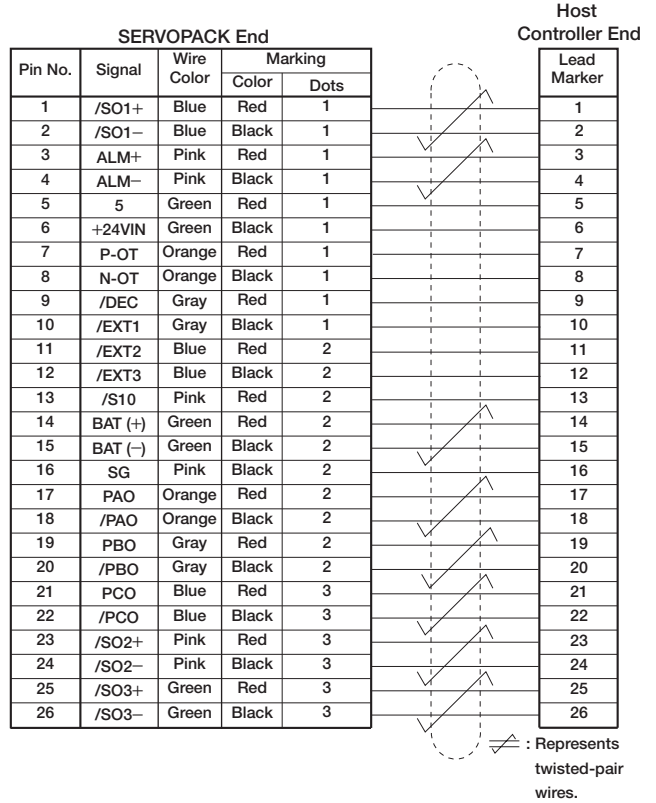
Selecting Cables

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

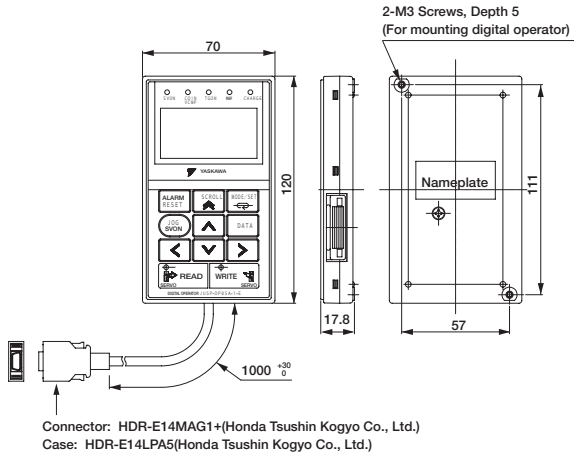


Model	Cable Length
JZSP-CSI02-1-E	1 m
JZSP-CSI02-2-E	2 m
JZSP-CSI02-3-E	3 m

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



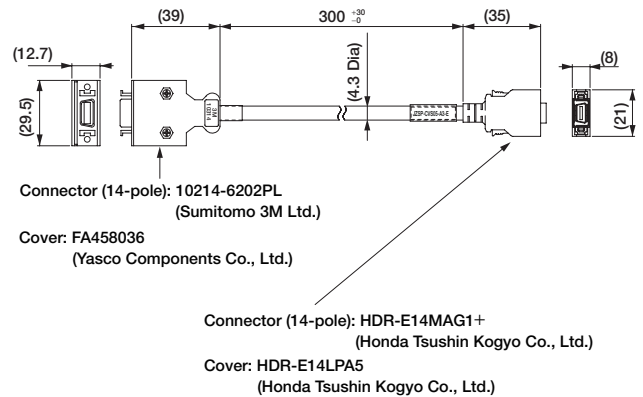
(4) Digital Operator (Model: JUSP-OP05A-1-E)  
(Units: mm)



(5) Digital Operator Converter Cable for CN3

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

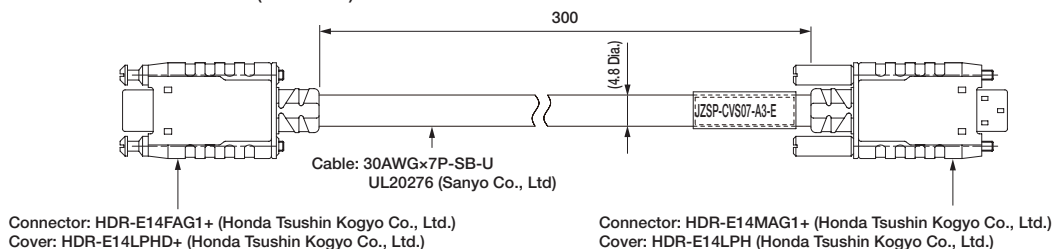
● External Dimensions (Units: mm)



(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.

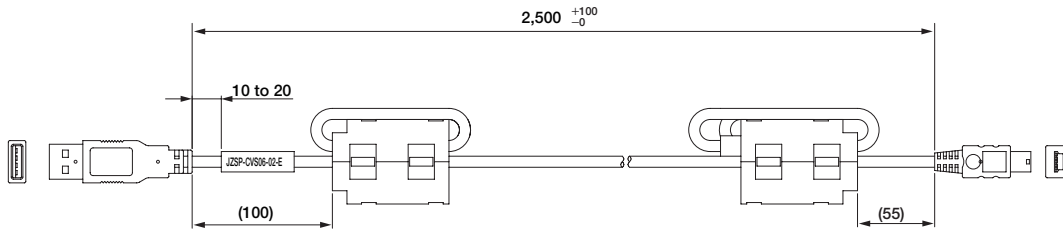
● External Dimensions (Units: mm)



## Selecting Cables

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

- External Dimensions (Units: mm)

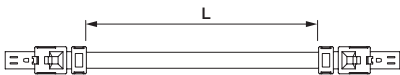


**IMPORTANT** Use a cable specified by Yaskawa.  
When using other cables, operation cannot be guaranteed.

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

- External Dimensions (Units: mm)

Cables with Connectors at Both Ends

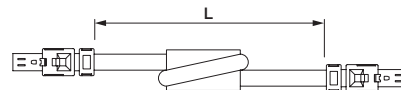


Model	Cable Length (L)
JEPMC-W6012-A2-E	0.2 m
JEPMC-W6012-A5-E	0.5 m
JEPMC-W6012-01-E	1 m
JEPMC-W6012-02-E	2 m
JEPMC-W6012-03-E	3 m
JEPMC-W6012-04-E	4 m
JEPMC-W6012-05-E	5 m
JEPMC-W6012-10-E	10 m
JEPMC-W6012-20-E	20 m
JEPMC-W6012-30-E	30 m
JEPMC-W6012-50-E	50 m

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

- External Dimensions (Units: mm)

Cables with Connectors at Both Ends (With Ferrite Core)

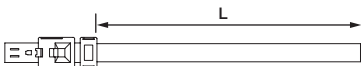


Model	Cable Length (L)
JEPMC-W6013-10-E	10 m
JEPMC-W6013-20-E	20 m
JEPMC-W6013-30-E	30 m
JEPMC-W6013-50-E	50 m
JEPMC-W6013-75-E	75 m

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

- External Dimensions (Units: mm)

Cable with Loose Wire at One End



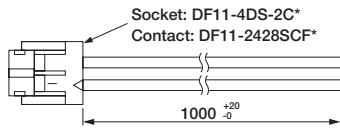
Model	Cable Length (L)
JEPMC-W6014-A5-E	0.5 m
JEPMC-W6014-01-E	1 m
JEPMC-W6014-03-E	3 m
JEPMC-W6014-05-E	5 m
JEPMC-W6014-10-E	10 m
JEPMC-W6014-30-E	30 m
JEPMC-W6014-50-E	50 m

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

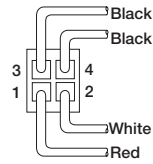
## Selecting Cables

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

#### • External Dimensions (Units: mm)



\* : Manufactured by Hirose Electric Corporation.



View from Cable End

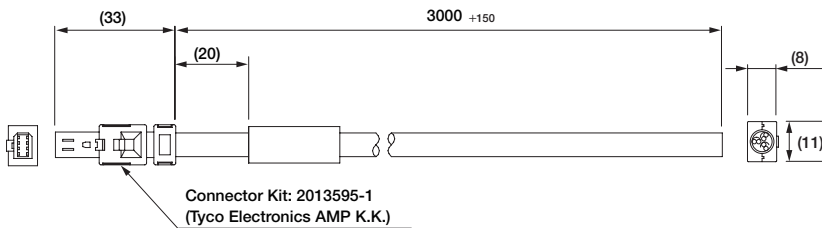
#### • Specifications

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)



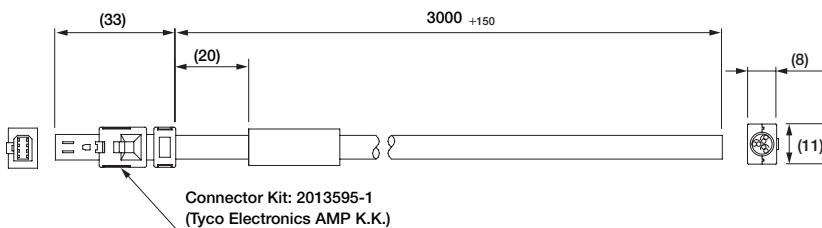
Connector Kit: 2013595-1  
(Tyco Electronics AMP K.K.)

#### • 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)



Connector Kit: 2013595-1  
(Tyco Electronics AMP K.K.)

#### • 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

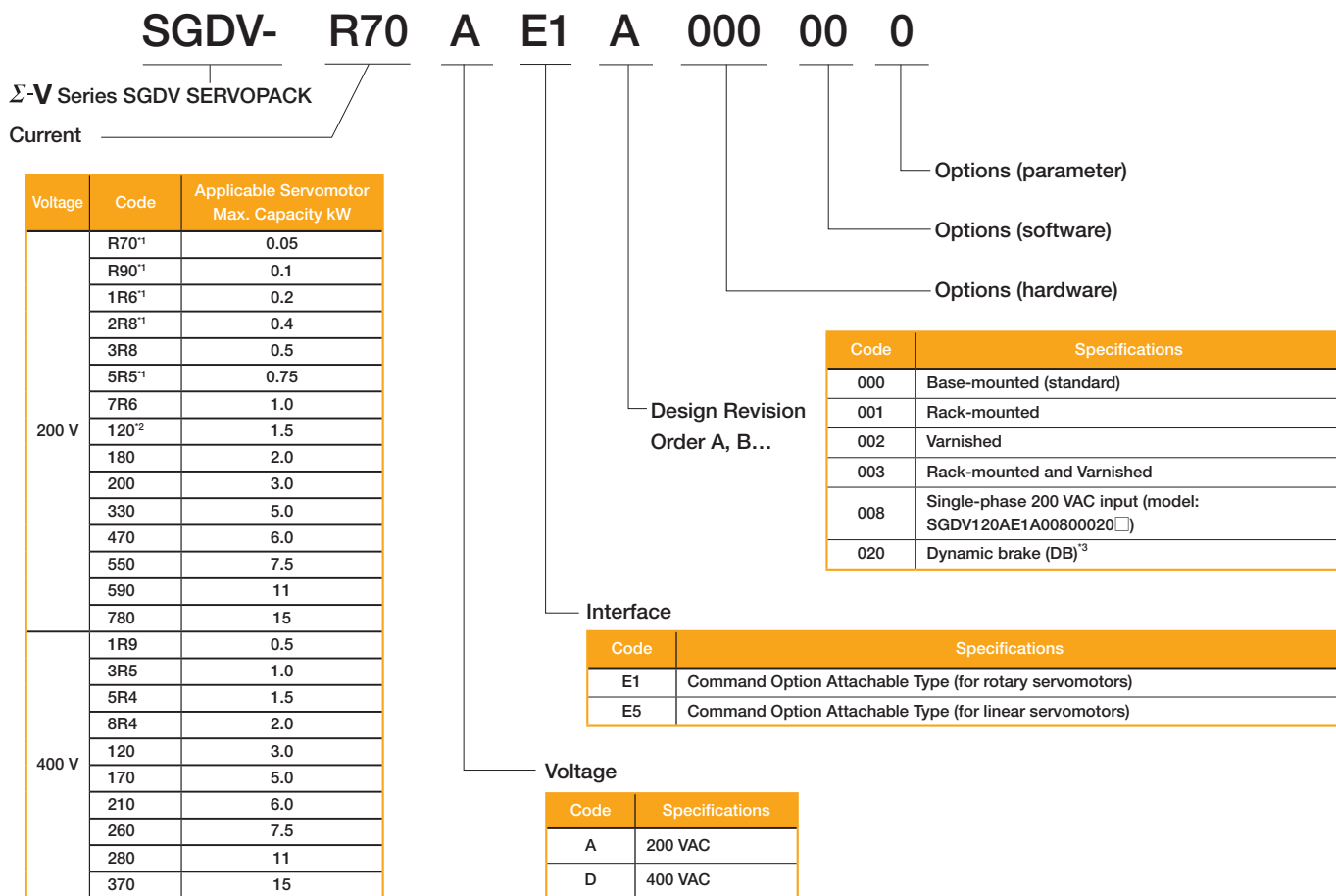
(For Rotary Servomotors)

# SGDV-□□□□E5

(For Linear Servomotors)



## Model Designations



<sup>1</sup> These amplifiers can be powered with single or three-phase.

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

<sup>3</sup>: The specifications differ in accordance with the power supply voltage of the SERVOPACK to be used.

- For 100-V and 200-V SERVOPACKS: The DB function will be disabled when the SERVOPACK stops or the power supply is turned OFF.

- For 400-V SERVOPACK: The DB resistor can be mounted onto the outside of the SERVOPACK. If the DB resistor is not mounted, the DB function will be enabled.

## Features

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

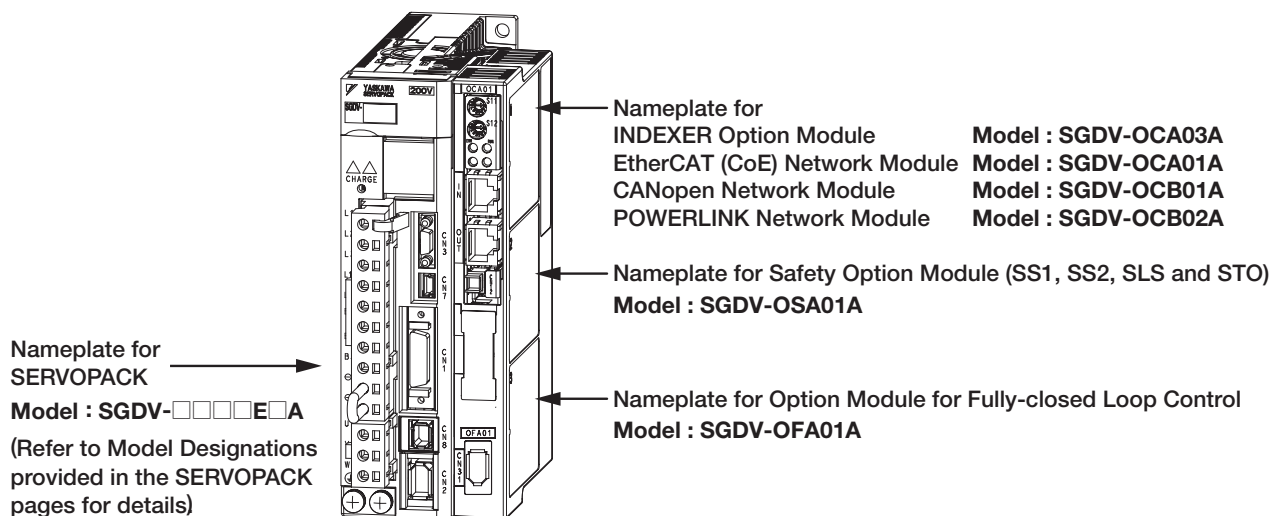
## Product Labeling

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

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

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

Combination Example:



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

## Ratings

## Single-phase 200 V

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

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

## Three-phase 200 V

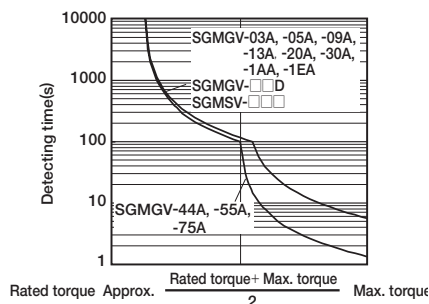
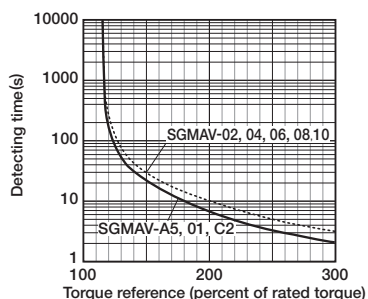
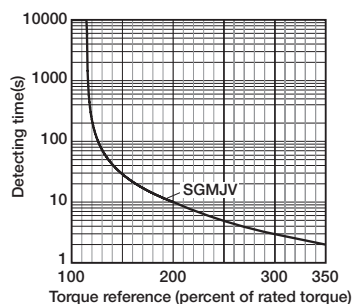
SERVOPACK Model	SGDV□□□□	R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A
Applicable Servomotor Max. Capacity	kW	0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0	6	7.5	11	15
Continuous Output Current	A <sub>rms</sub>	0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9	46.9	54.7	58.6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

## Three-phase 400 V

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

Note: The entire over voltage category is III.

## ● SERVOPACK Overload Characteristics



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

## Specifications

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

## Specifications

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

\*1: Speed regulation is defined as follows:

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

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

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



## Power Supply Capacities and Power Losses

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

Main Circuit Power Supply	Applicable Servomotor Max. Capacity kW	SERVOPACK Model SGD V	Power Supply Capacity kVA	Output Current A	Main Circuit Power Loss W	Regenerative Resistor Power Loss W	Control Circuit Power Loss W	Total Power Loss W		
Single-phase 200 V	0.05	R70A	0.2	0.66	5.2	—	17	22.2		
	0.1	R90A	0.3	0.91	7.4			24.4		
	0.2	1R6A	0.7	1.6	13.7			30.7		
	0.4	2R8A	1.2	2.8	24.9			41.9		
	0.75	5R5A	1.9	5.5	52.7	8	77.7			
	1.5	120A	4	11.6	68.2	10	22	100.2		
Three-phase 200 V	0.05	R70A	0.2	0.66	5.1	—	17	22.1		
	0.1	R90A	0.3	0.91	7.3			24.3		
	0.2	1R6A	0.6	1.6	13.5			30.5		
	0.4	2R8A	1	2.8	24.0			41.0		
	0.5	3R8A	1.4	3.8	20.1	8	17	45.1		
	0.75	5R5A	1.6	5.5	43.8			68.8		
	1.0	7R6A	2.3	7.6	53.6			78.6		
	1.5	120A	3.2	11.6	65.8	10	22	97.8		
	2.0	180A	4	18.5	111.9	16		149.9		
	3.0	200A	5.9	19.6	113.8	16	22	161.4		
	5.0	330A	7.5	32.9	263.7			36	326.7	
	6.0	470A	10.7	46.9	279.4			(180) <sup>1</sup>	33	312.4
	7.5	550A	14.6	54.7	357.8	(350) <sup>2</sup>	48	390.8		
11	590A	21.7	58.6	431.7	479.7					
15	780A	29.6	78	599.0	647.0					
Three-phase 400 V	0.5	1R9D	1.1	1.9	24.6	14	21	59.6		
	1.0	3R5D	2.3	3.5	46.1			81.1		
	1.5	5R4D	3.5	5.4	71.3			106.3		
	2.0	8R4D	4.5	8.4	77.9	28	25	130.9		
	3.0	120D	7.1	11.9	108.7			161.7		
	5.0	170D	11.7	16.5	161.1	36	24	221.1		
	6.0	210D	12.4	20.8	172.7			(180) <sup>3</sup>	27	199.7
	7.5	260D	14.4	25.7	218.6					245.6
	11	280D	21.9	28.1	294.6	(350) <sup>4</sup>	30	324.6		
	15	370D	30.6	37.2	403.8			433.8		

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

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

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

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

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

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

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

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

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

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

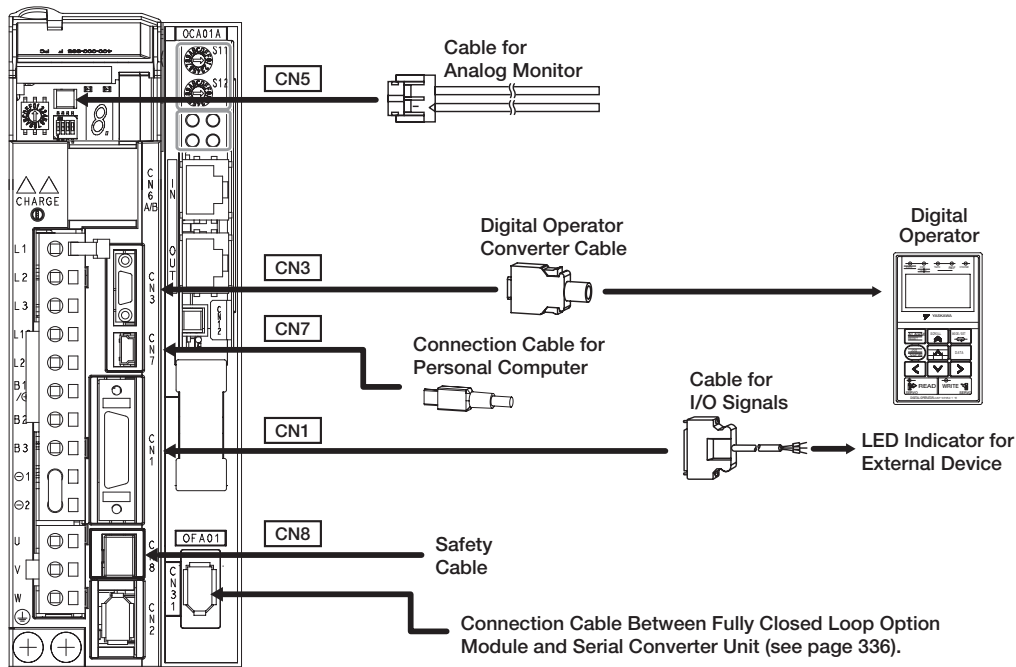
(SGDV3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, or 400 V class SERVOPACKs.)



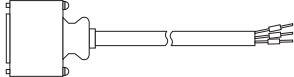

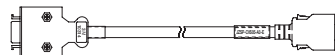


• Install an external regenerative resistor (optional). For selection details, refer to page 364.



## Selecting Cables

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



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

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

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

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

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

## Selecting Cables

## (1) Connector Kit for CN1

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

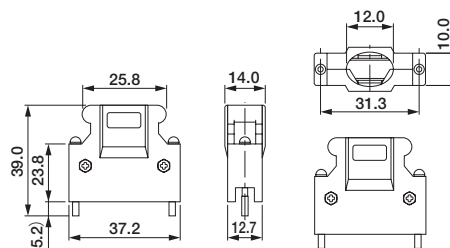
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-2-E	10326-52A0-008*	1 set	10126-3000PE* (Soldered)	1

\* : Manufactured by Sumitomo 3M Ltd.

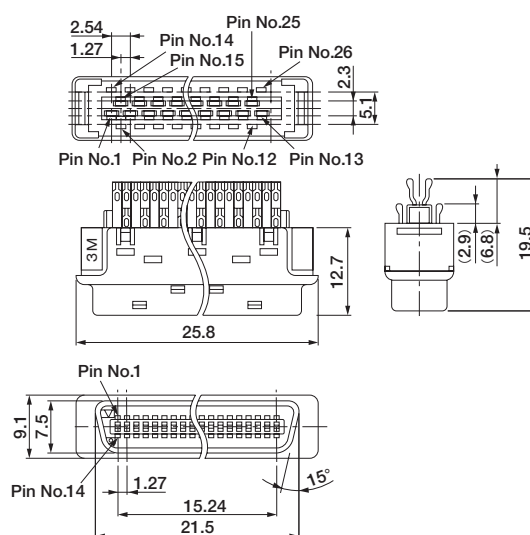
## · Cable Size

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

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

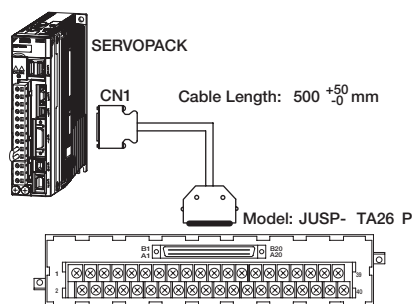


## · External Dimensions of Connector (Units: mm)

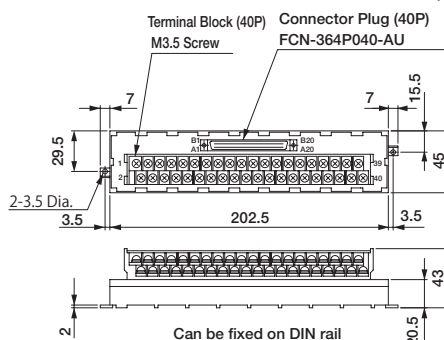


## (2) Connector Terminal Converter Unit for CN1

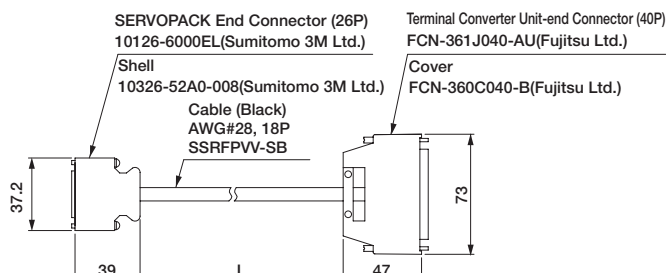
## · Configurations



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



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



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

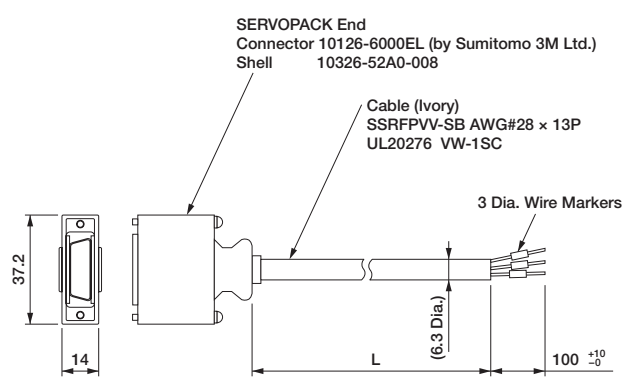
Note: The pin number in the SERVOPACK connector and the pin number in the terminal block are the same. Pin numbers 1 to 26 are used in the terminal block. Do not use a pin number of 27 or higher.

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

Selecting Cables

Selecting Cables

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



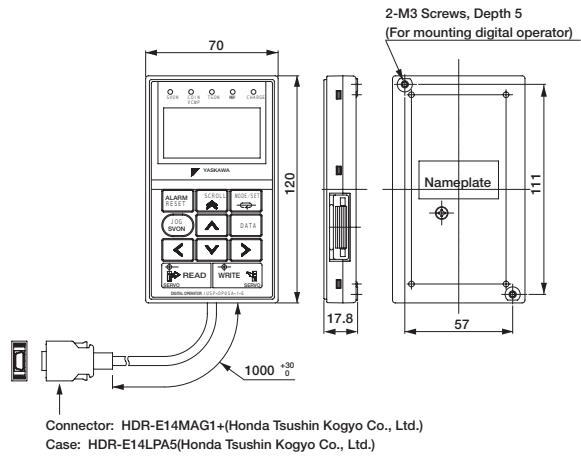
Model	Cable Length
JZSP-CSI02-1-E	1 m
JZSP-CSI02-2-E	2 m
JZSP-CSI02-3-E	3 m

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

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.

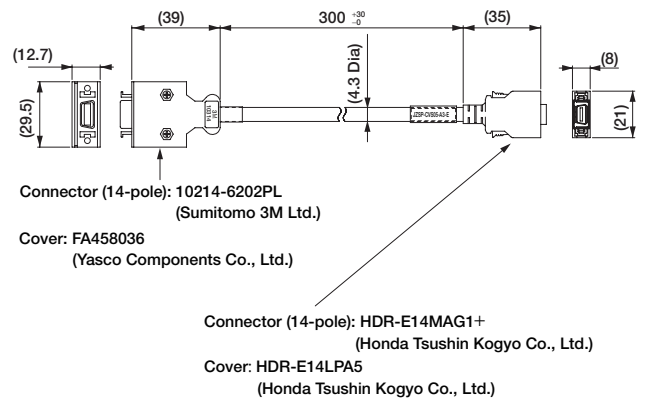
(4) Digital Operator (Model: JZSP-OP05A-1-E)



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

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

External Dimensions (Units: mm)

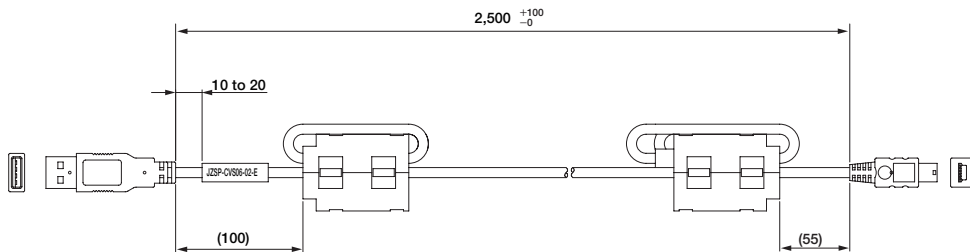


SERVOPACKs with Additional Options

Selecting Cables

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

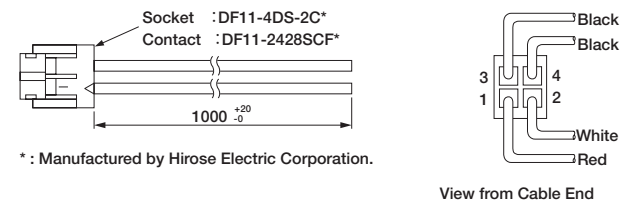
- External Dimensions (Units: mm)



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

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

- External Dimensions (Units: mm)



\* : Manufactured by Hirose Electric Corporation.

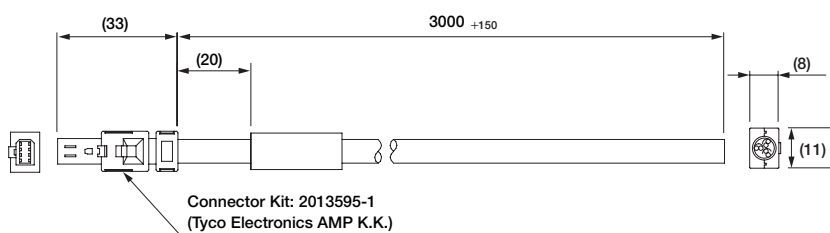
- Specifications

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

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

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

- External Dimensions (Units: mm)

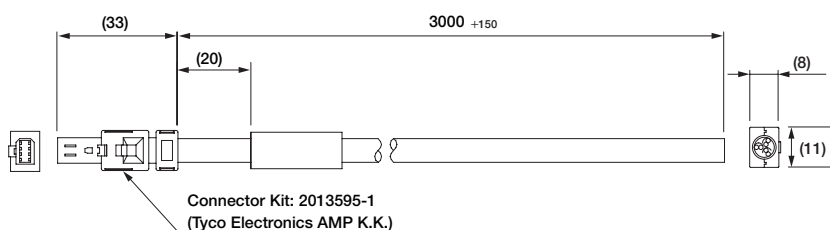


- Specifications

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

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

- External Dimensions (Units: mm)



- Specifications

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





# SERVOPACK External Dimensions

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

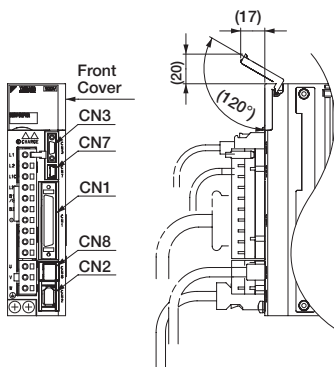
SERVOPACK	Mounting	Without Option Module	With Option Module
Analog Voltage/Pulse Train Reference SERVOPACK, MECHATROLINK-II Communications Reference SERVOPACK, MECHATROLINK-III Communications Reference SERVOPACK	Base-mounted	Page 274 to 279	Page 286 to 293
	Rack-mounted*	Page 280 to 285	Page 294 to 301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

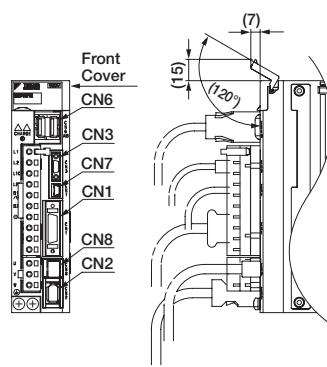
## ● Dimensional Drawings

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.

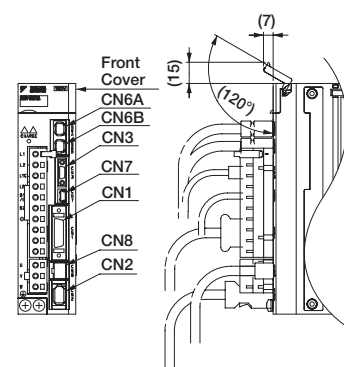
### ● Analog Voltage/Pulse Train Reference SERVOPACK



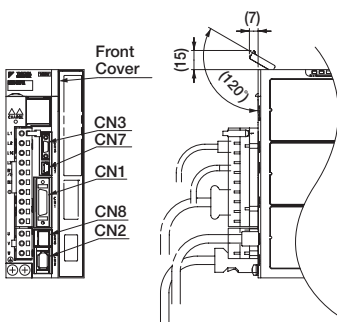
### ● MECHATROLINK-II Communications Reference SERVOPACK



### ● 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.

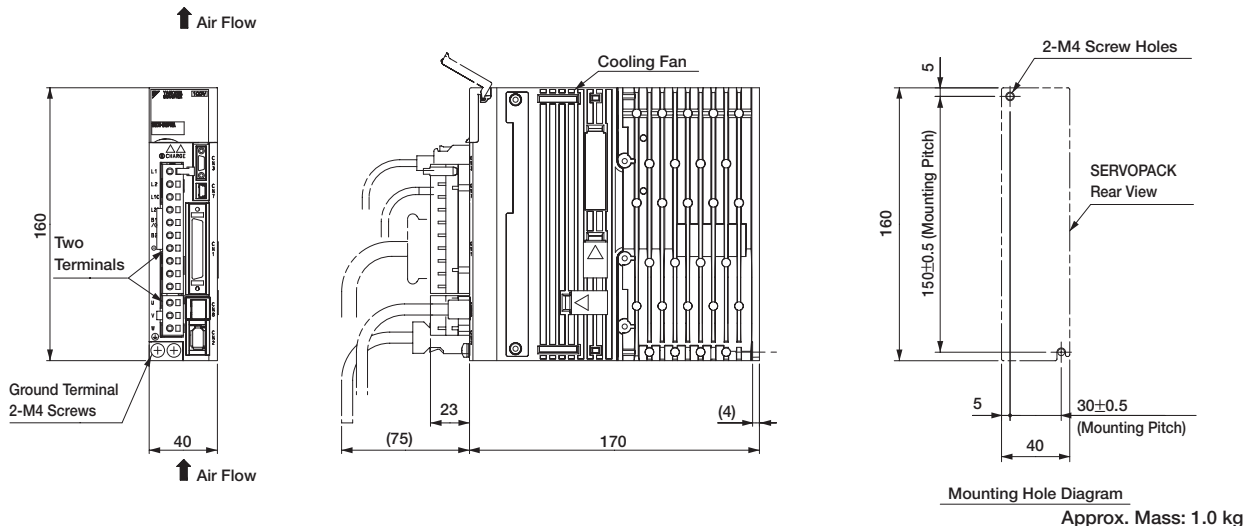
Note: The connectors above or their equivalents are used for SERVOPACKs.

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

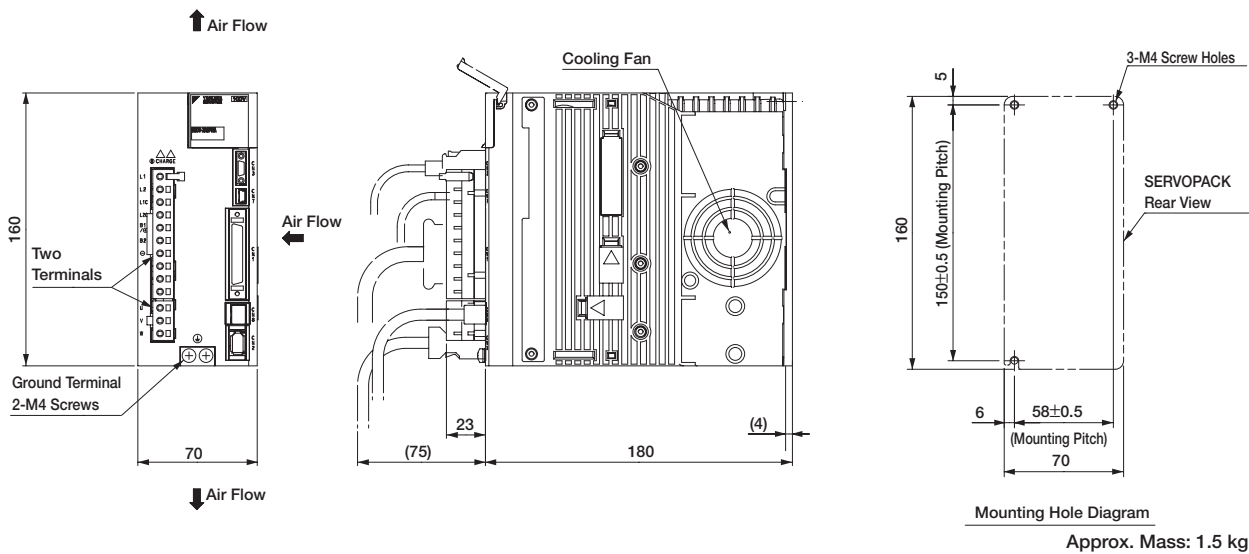
External Dimensions Units: mm (Without Option Module)

● Base-Mounted SERVOPACKS

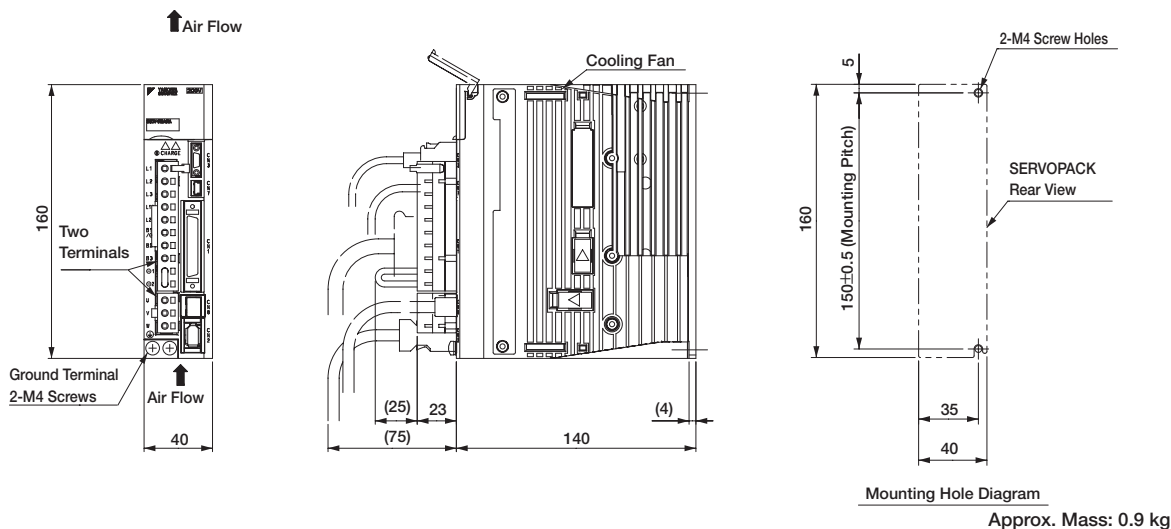
(1) Single-phase 100 VAC, Model: SGDV-R70F□□A, -R90F□□A, and -2R1F□□A



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



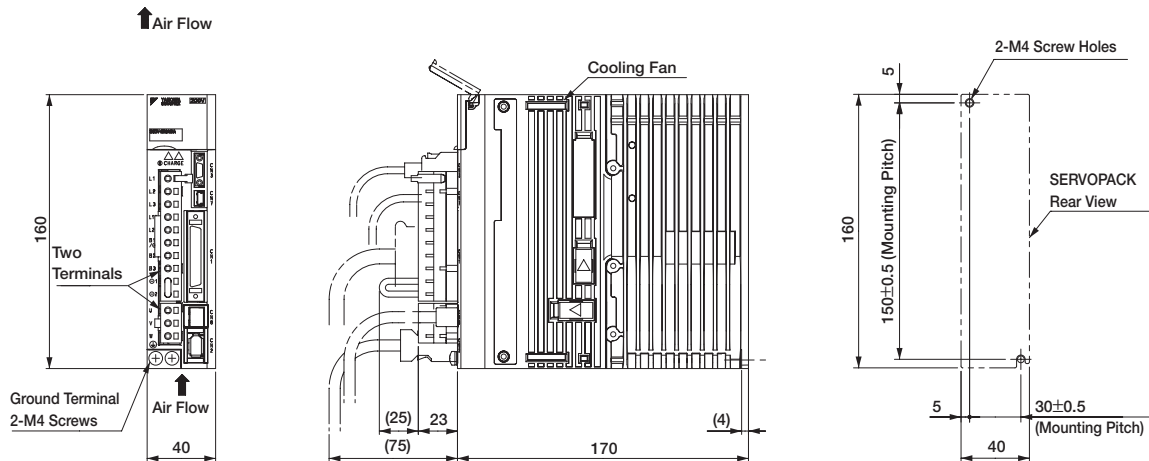
(3) Three-phase 200 VAC, Model: SGDV-R70A□□A, -R90A□□A, and -1R6A□□A



## External Dimensions Units: mm (Without Option Module)

## ● Base-Mounted SERVOPACKs

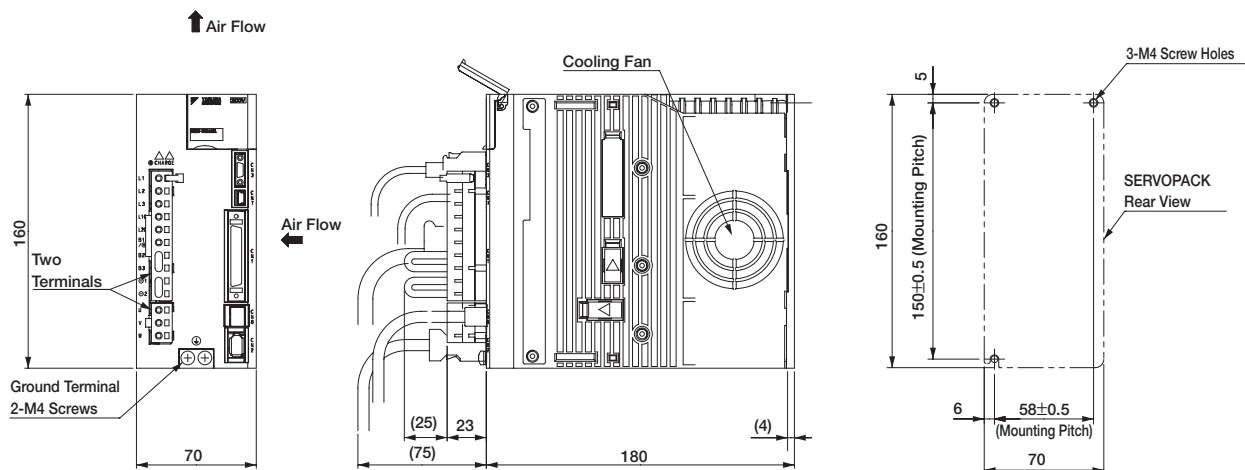
(4) Three-phase 200 VAC, Model: SGDV-2R8A□□A



Mounting Hole Diagram

Approx. Mass: 1.0 kg

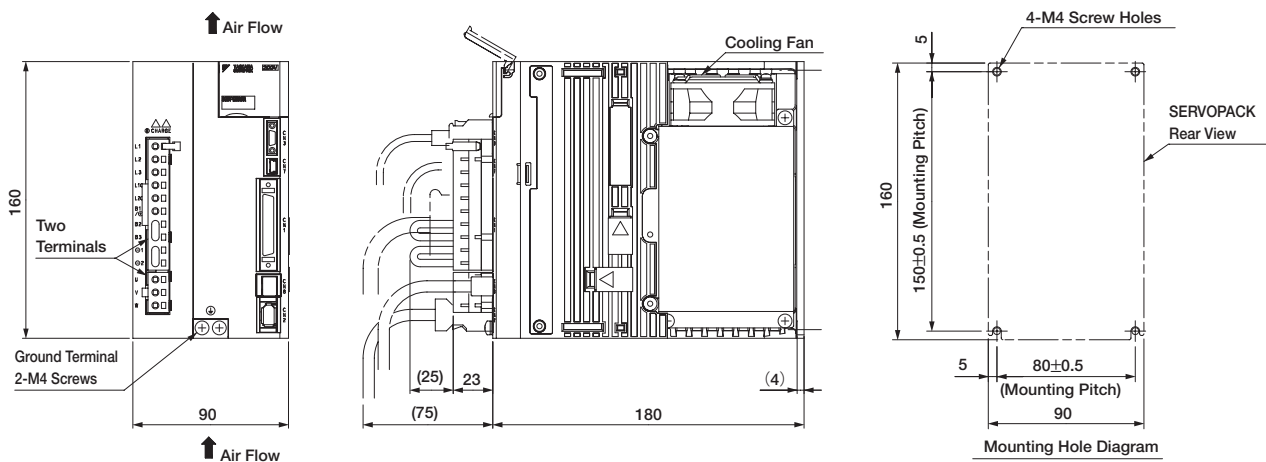
(5) Three-phase 200 VAC, Model: SGDV-3R8A□□A, -5R5A□□A, and -7R6A□□A



Mounting Hole Diagram

Approx. Mass: 1.5 kg

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



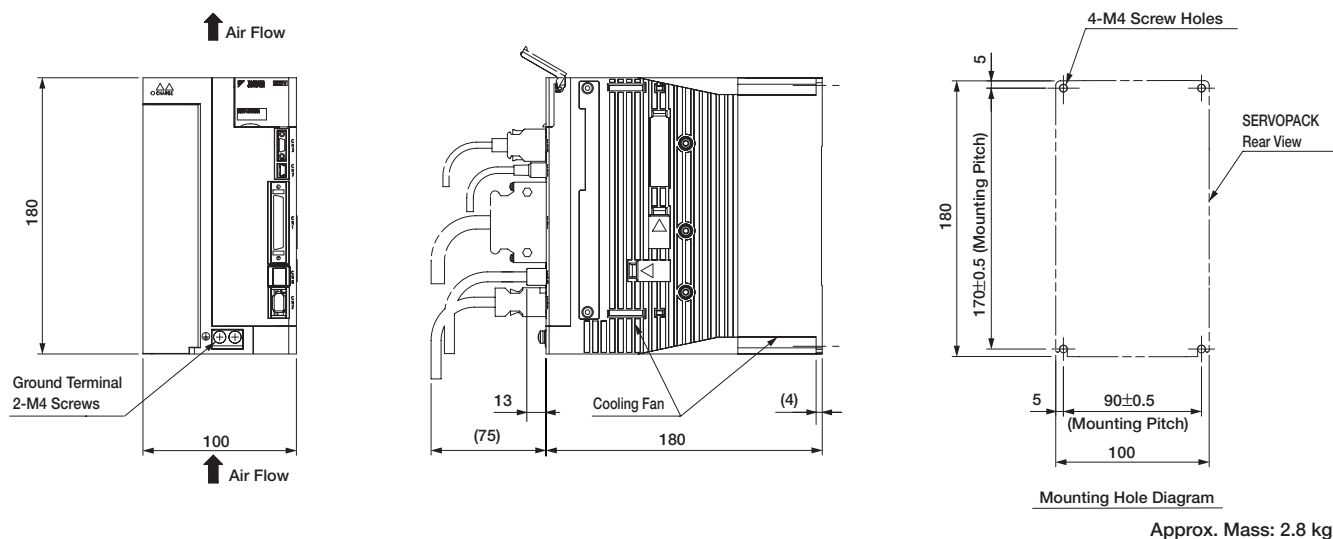
Mounting Hole Diagram

Approx. Mass: 2.4 kg

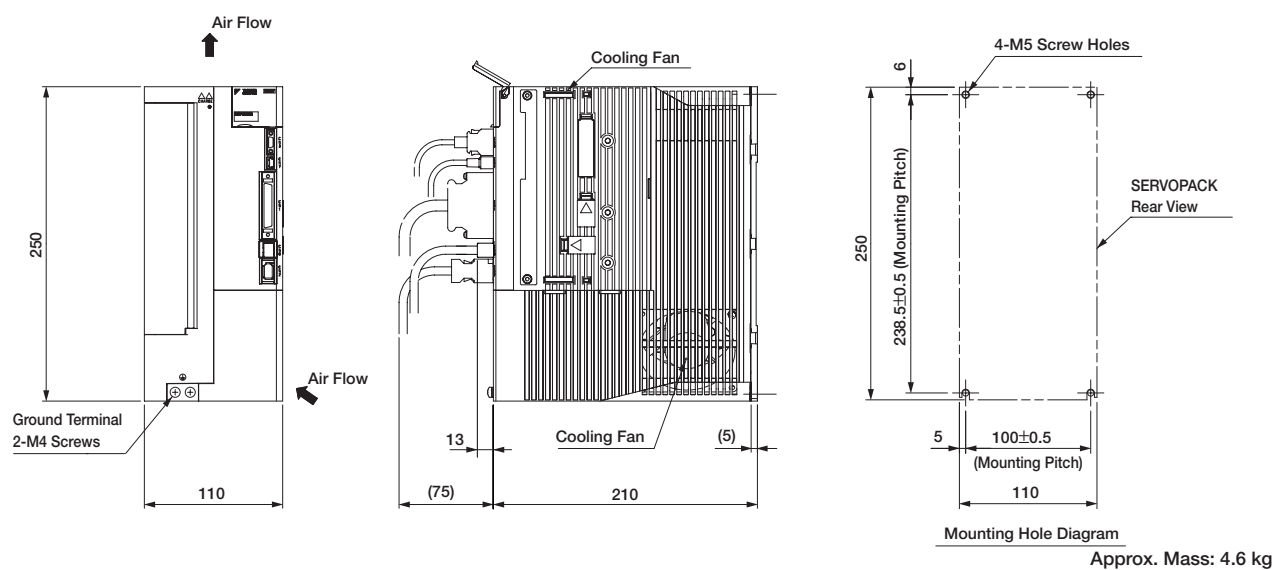


## External Dimensions Units: mm (Without Option Module)

(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



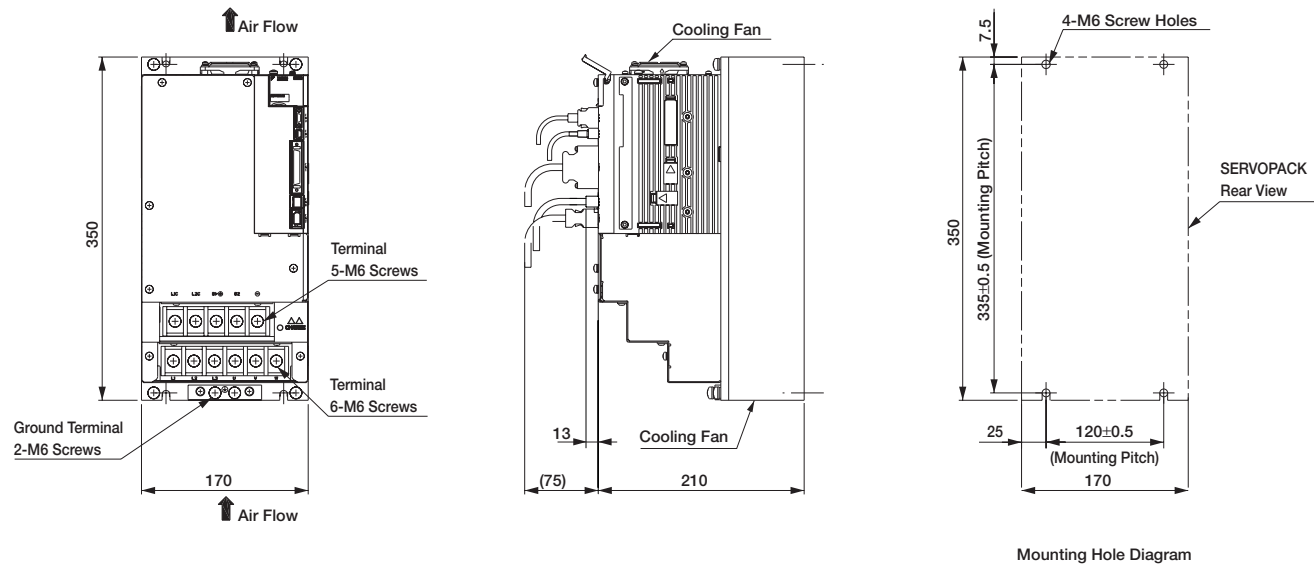
(8) Three-phase 200 VAC, Model: SGDV-330A□□A



## External Dimensions Units: mm (Without Option Module)

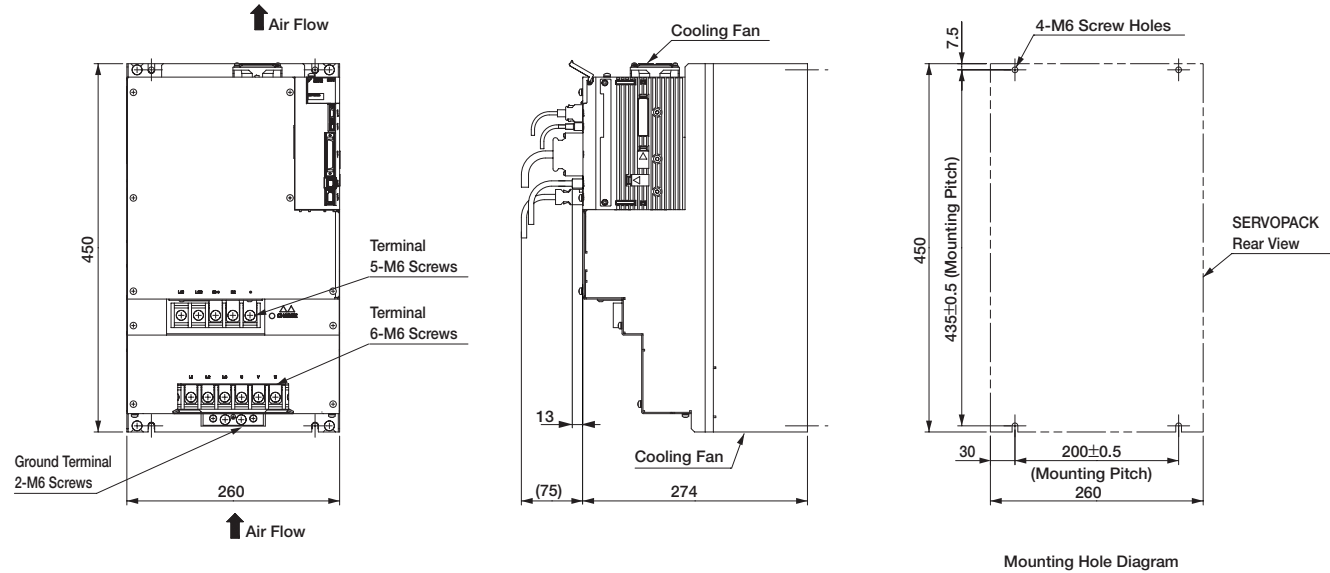
## ● Base-Mounted SERVOPACKs

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



Approx. Mass: 10.2 kg

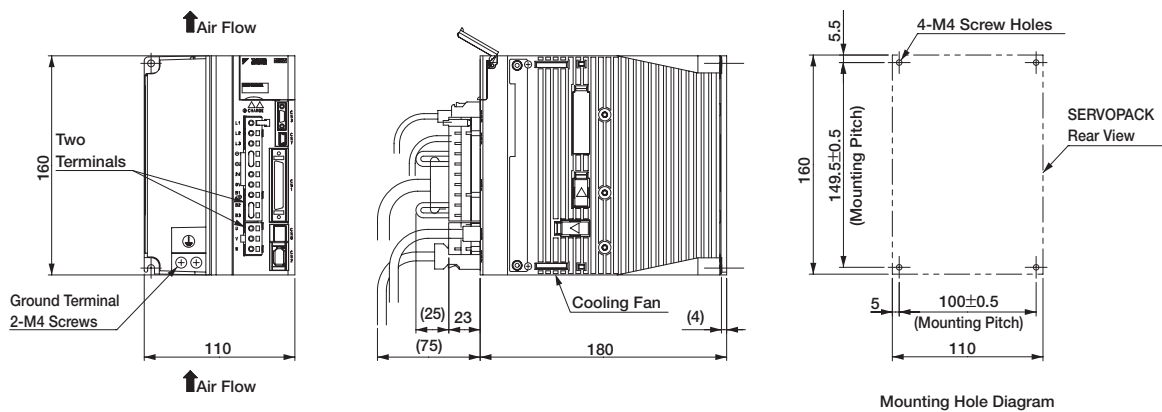
(10) Three-phase 200 VAC, Model: SGDV-590A□□A and -780A□□A



Approx. Mass: 21.3 kg

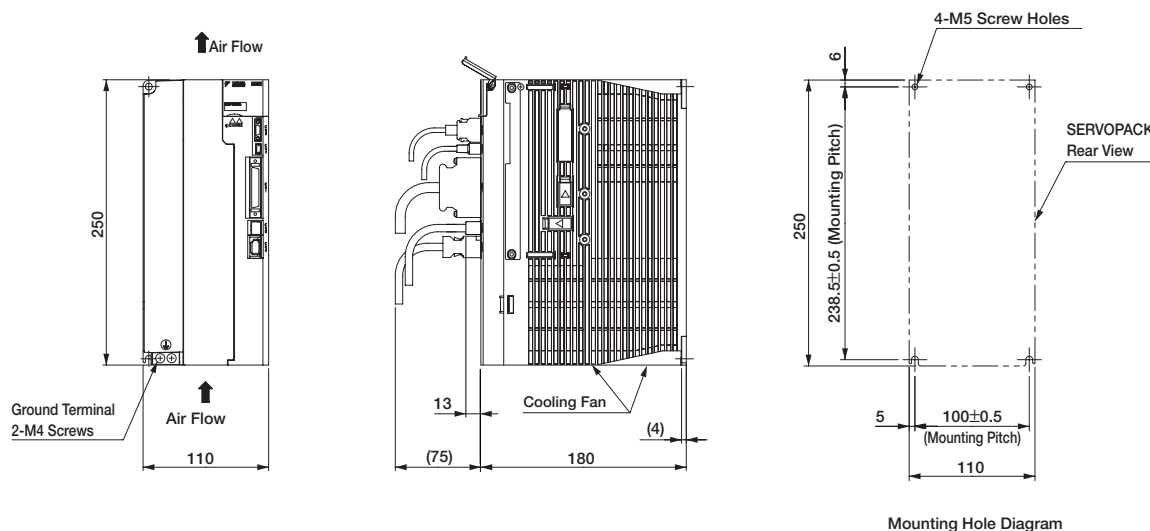
## External Dimensions Units: mm (Without Option Module)

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



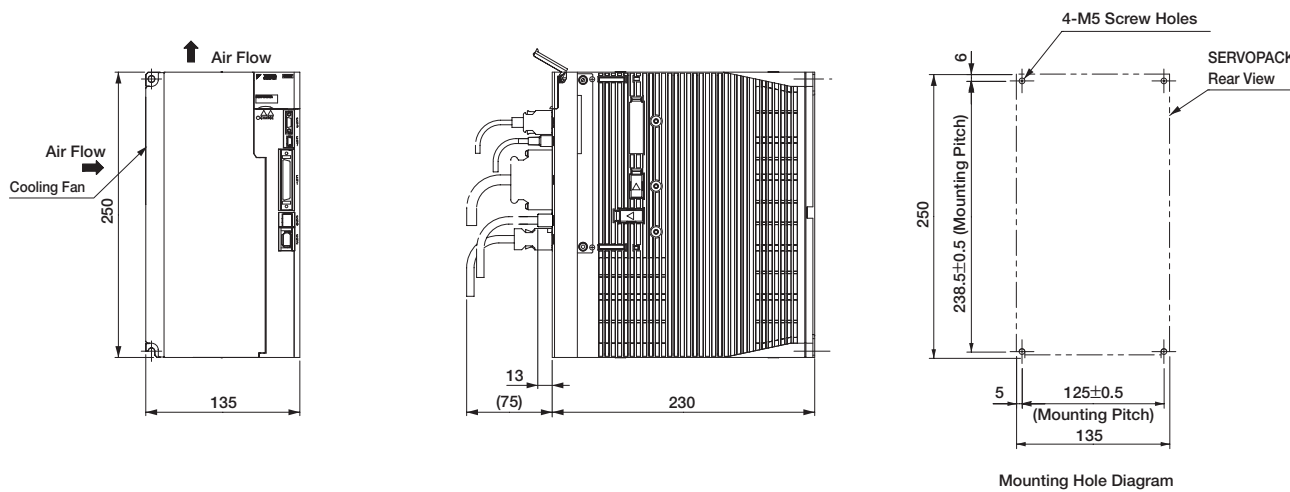
Approx. Mass: 2.7 kg

(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

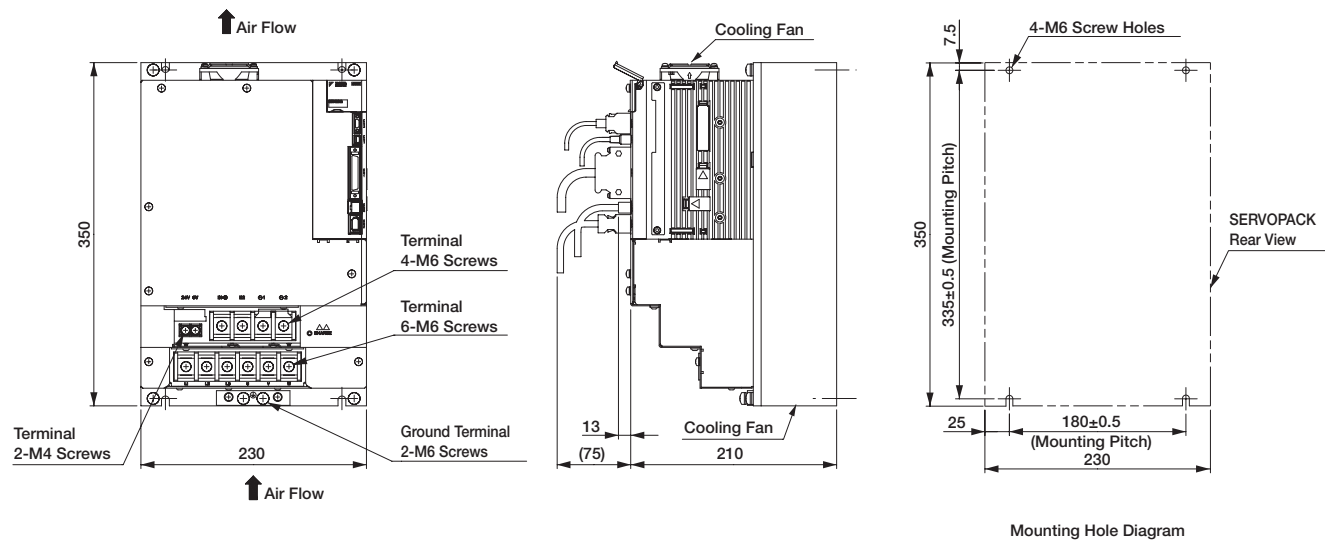


Approx. Mass: 5.6 kg

## External Dimensions Units: mm (Without Option Module)

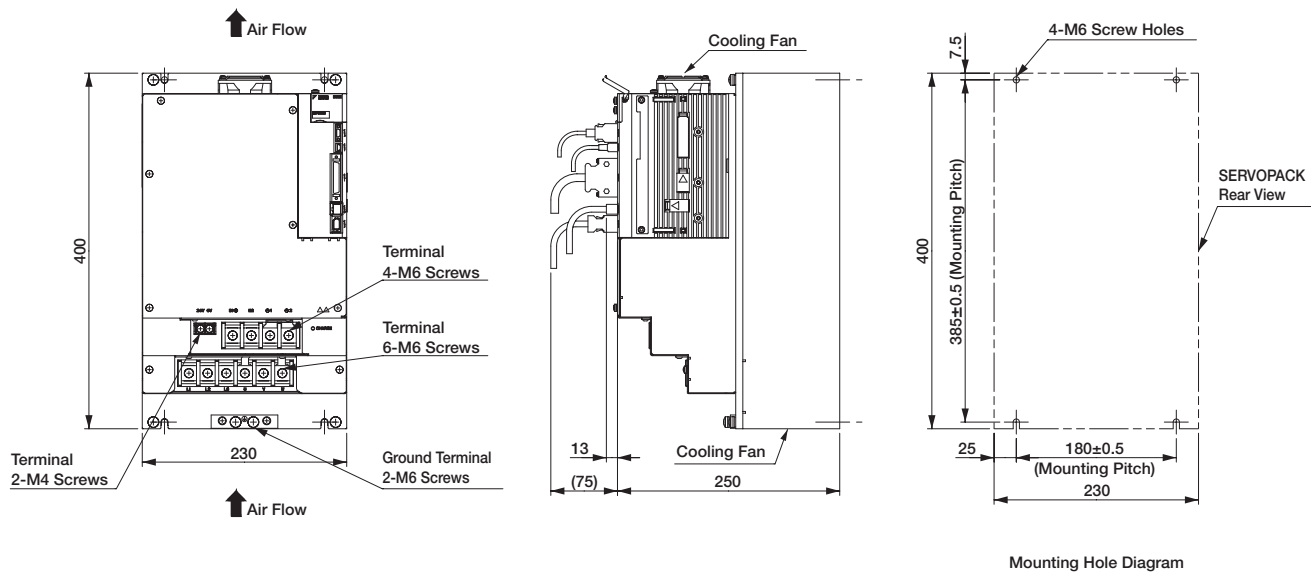
## ● Base-Mounted SERVOPACKs

(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

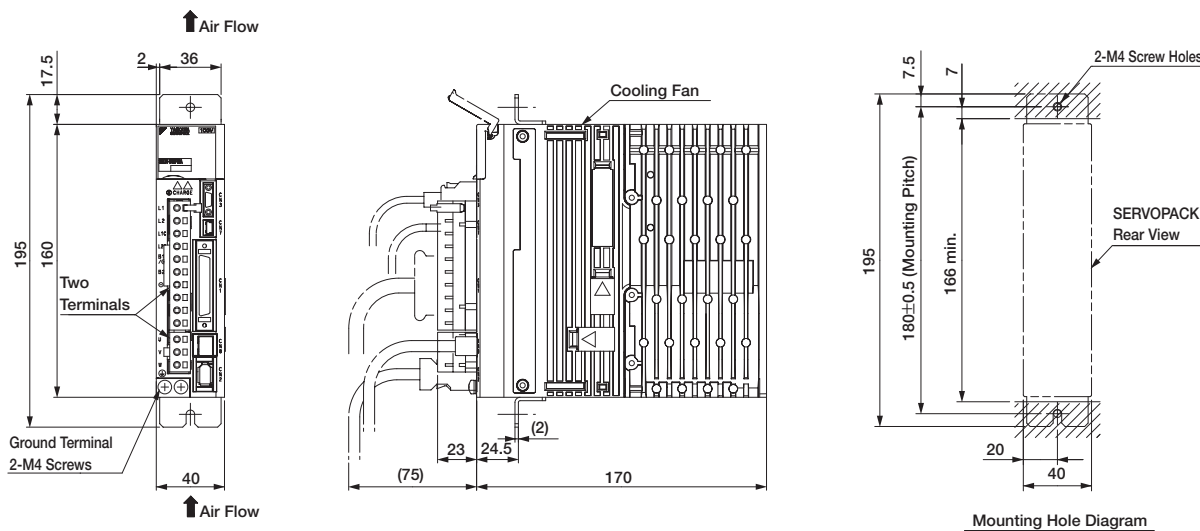


Approx. Mass: 16.2 kg

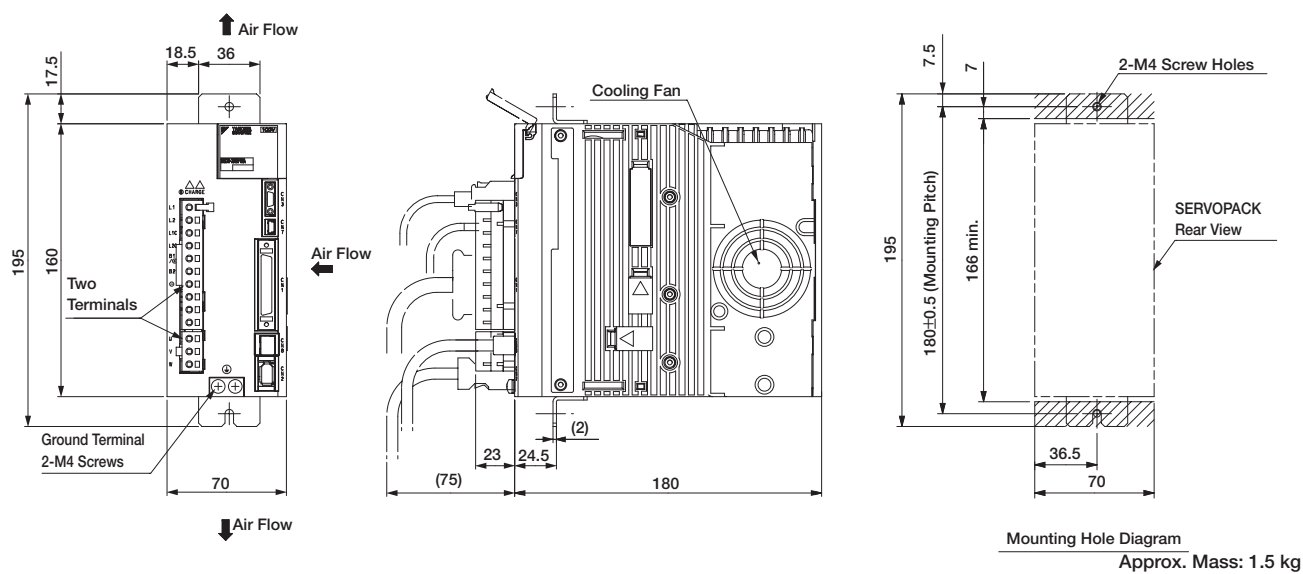
## External Dimensions Units: mm (Without Option Module)

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

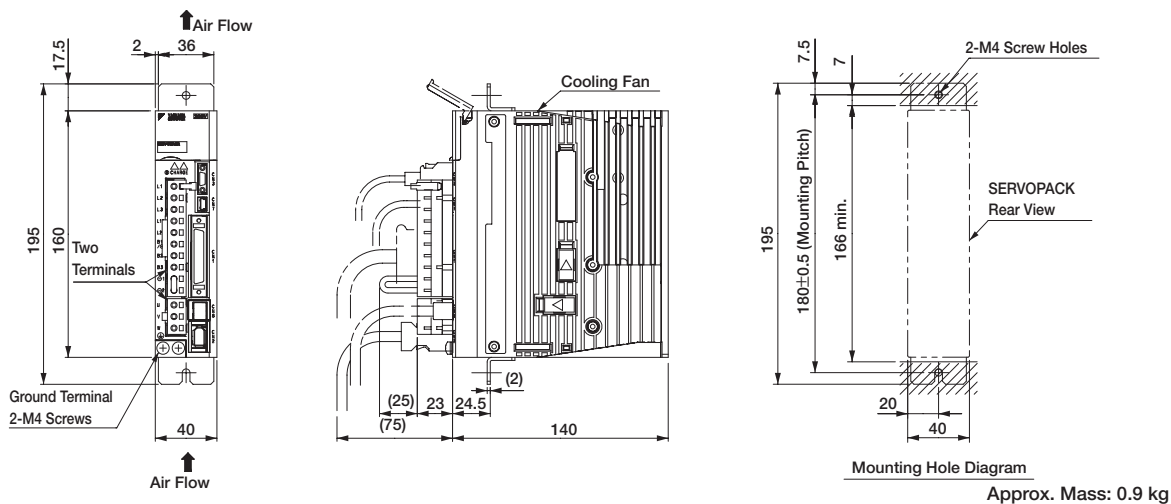
(1) Single-phase 100 VAC, Model: SGDVR70F□□A001, -R90F□□A001, and -2R1F□□A001



(2) Single-phase 100 VAC, Model: SGDVR2R8F□□A001

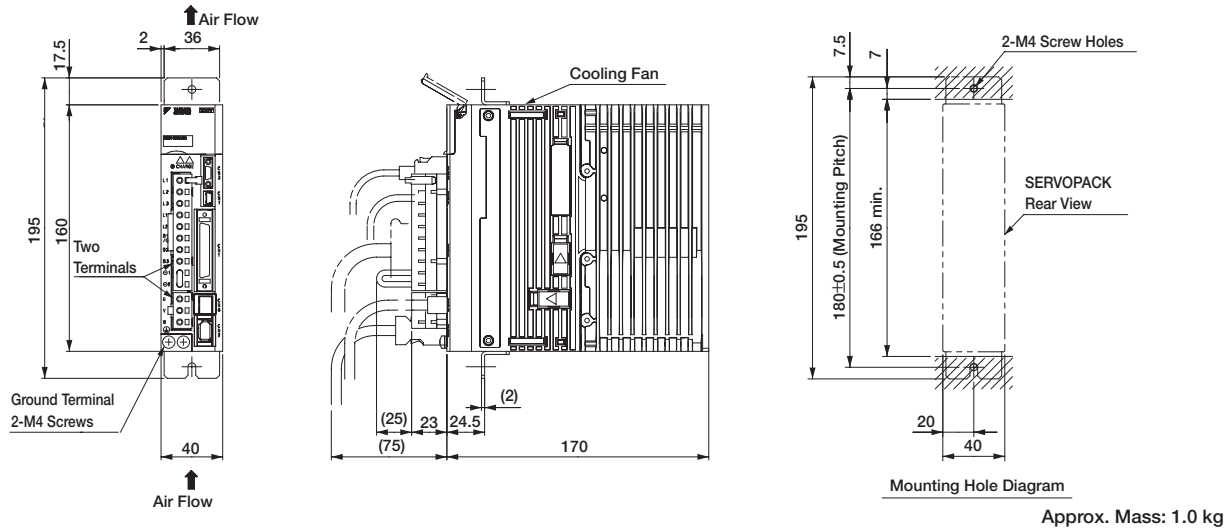
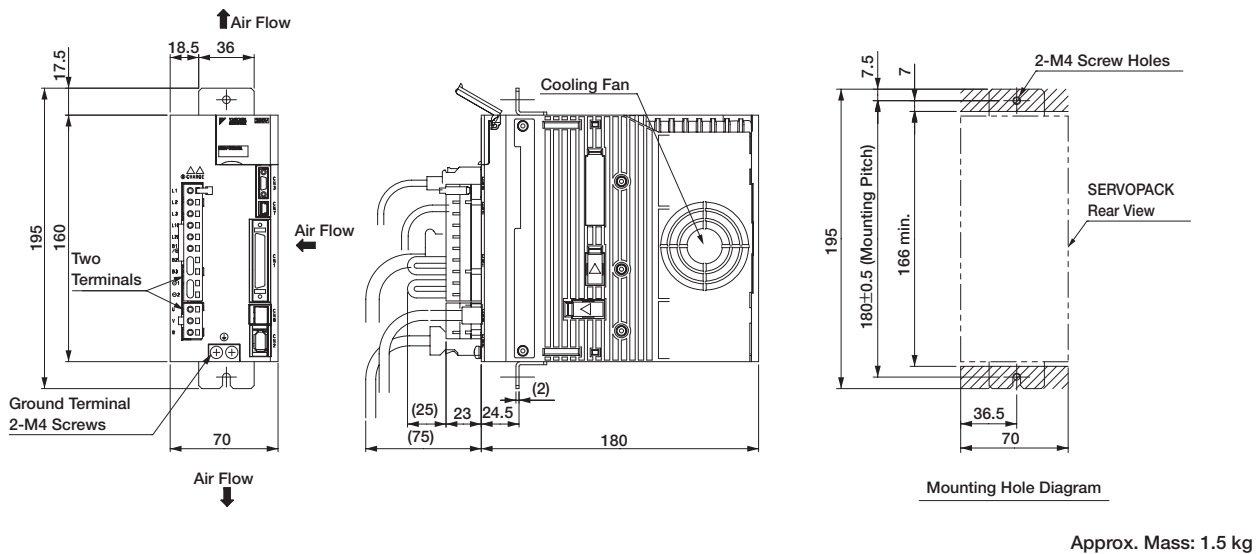
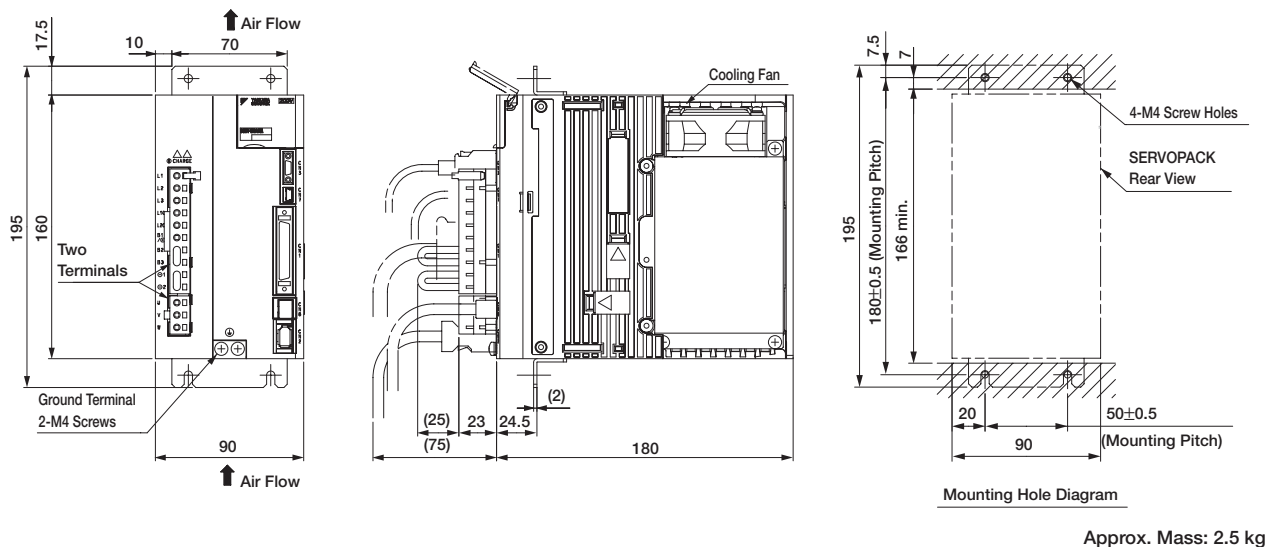


(3) Three-phase 200 VAC, Model: SGDVR70A□□A001, -R90A□□A001, and -1R6A□□A001



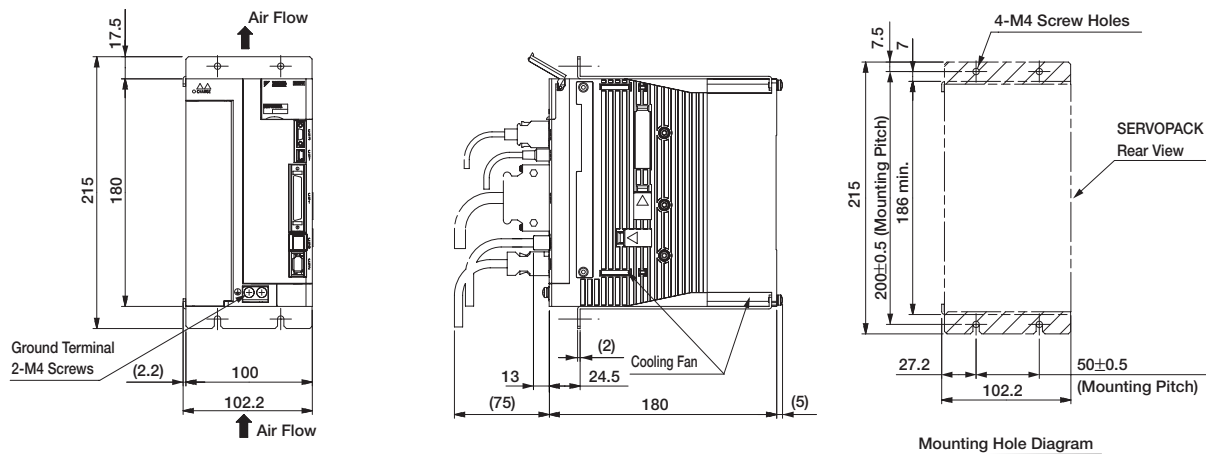
## External Dimensions Units: mm (Without Option Module)

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

(4) Three-phase 200 VAC, Model: SGD<sub>V</sub>-2R8A□□A001(5) Three-phase 200 VAC, Model: SGD<sub>V</sub>-3R8A□□A001, -5R5A□□A001, and -7R6A□□A001(6) Three-phase 200 VAC, Model: SGD<sub>V</sub>-120A□□A001

## External Dimensions Units: mm (Without Option Module)

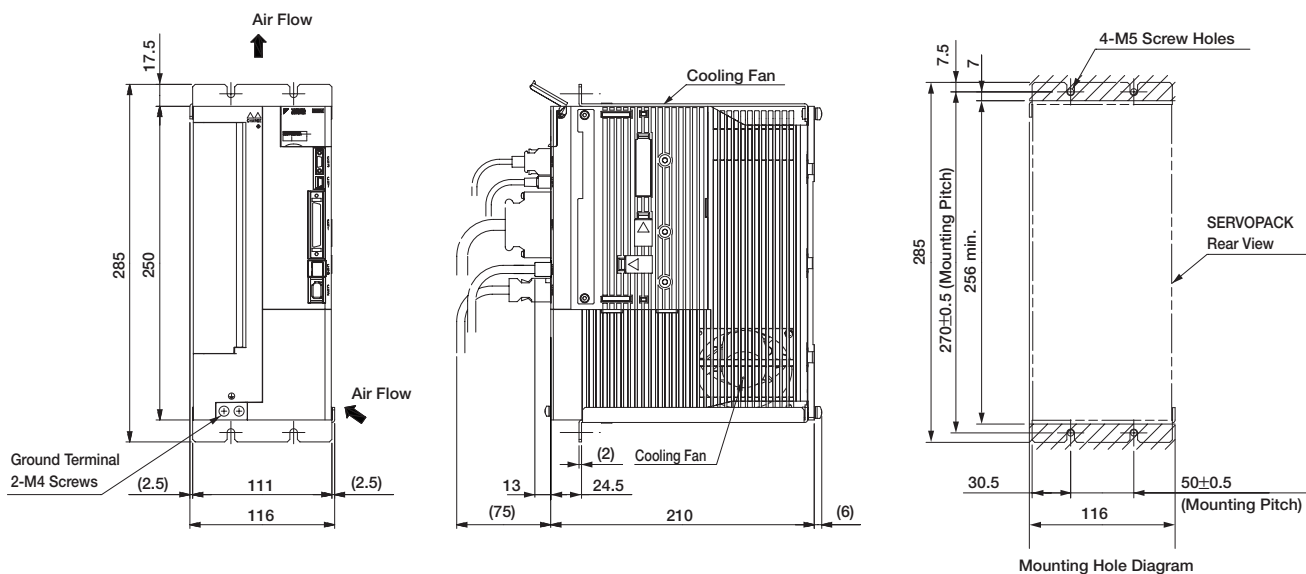
(7) Three-phase 200 VAC, Model: SGDV-180A□□A001 and -200A□□A001



Mounting Hole Diagram

Approx. Mass: 3.1 kg

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



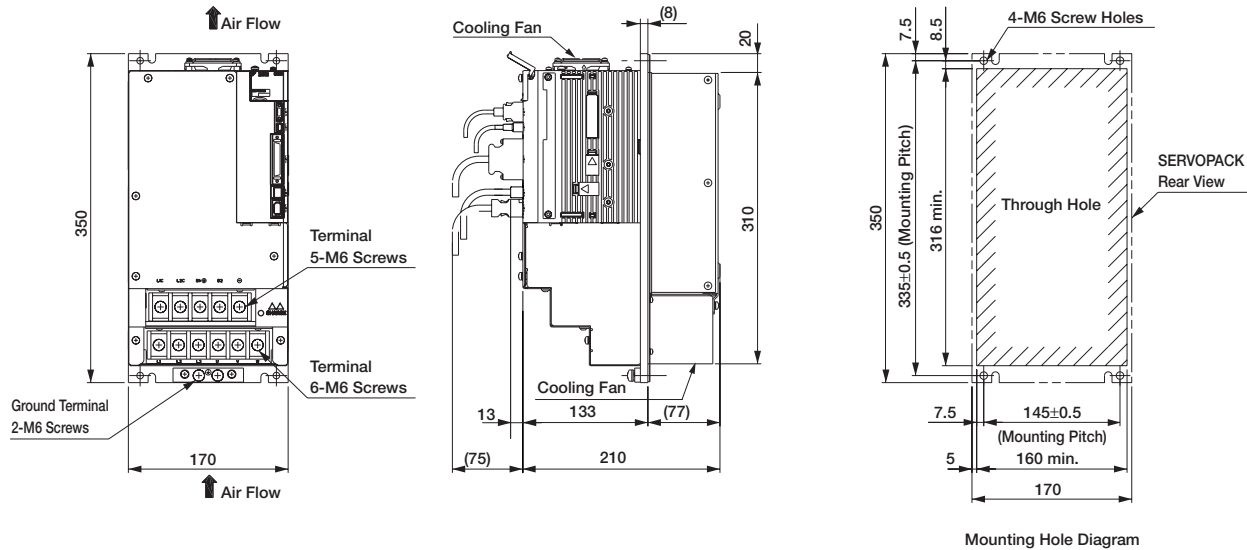
Mounting Hole Diagram

Approx. Mass: 5.0 kg

**External Dimensions** Units: mm (Without Option Module)

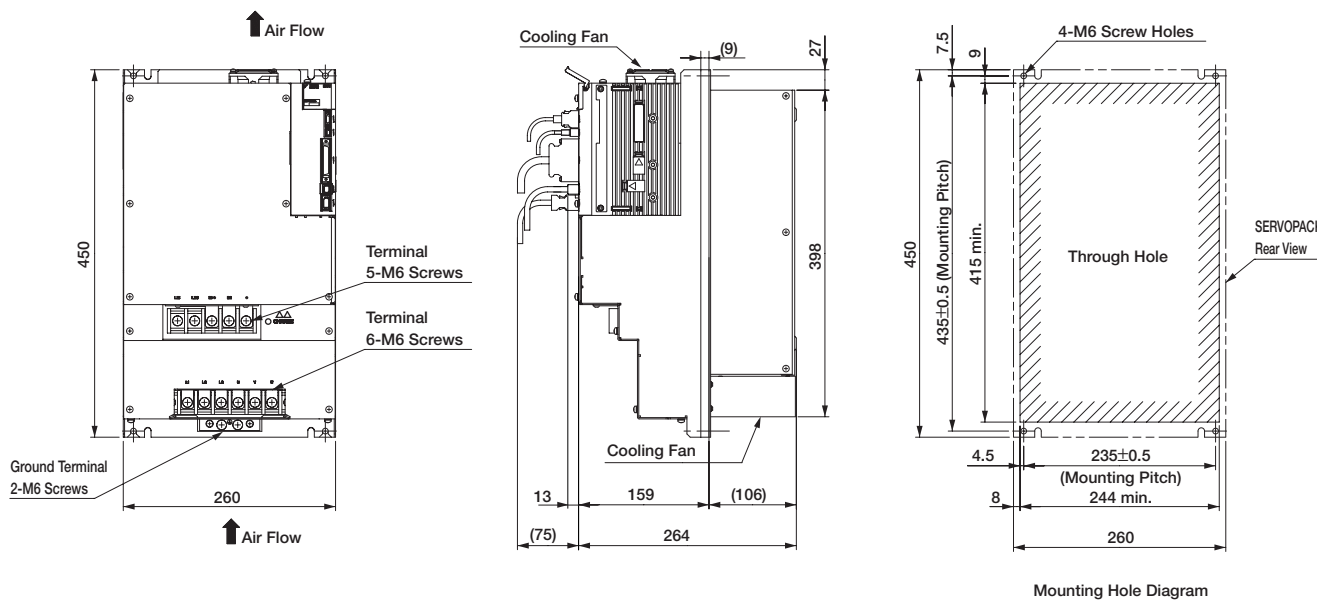
**● Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)**

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



Approx. Mass: 8.5 kg

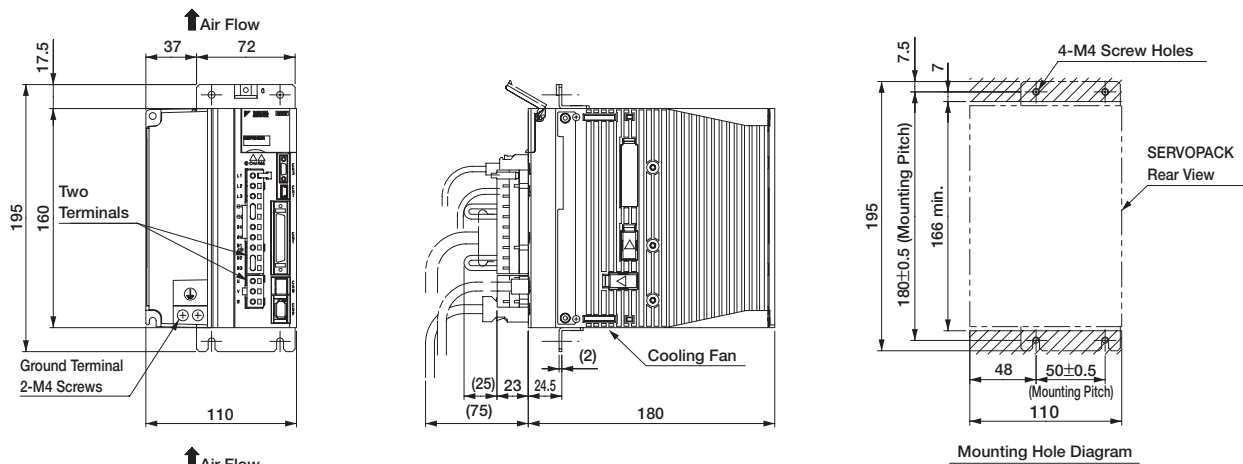
(10) Three-phase 200 VAC, Model: SGDV-590A□□A001 and -780A□□A001 (duct-ventilated)



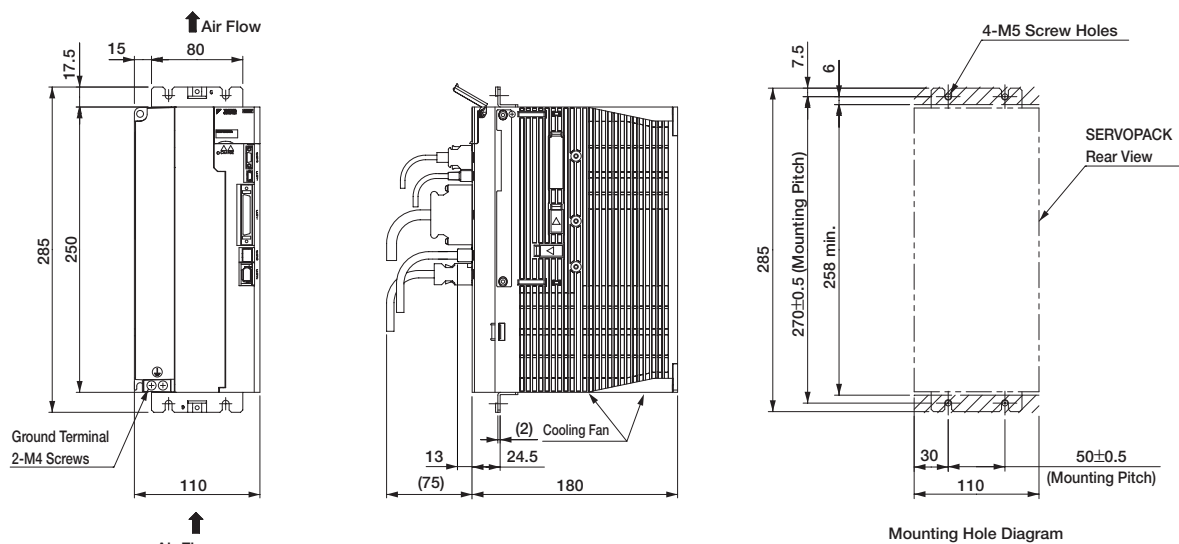
Approx. Mass: 16.3 kg



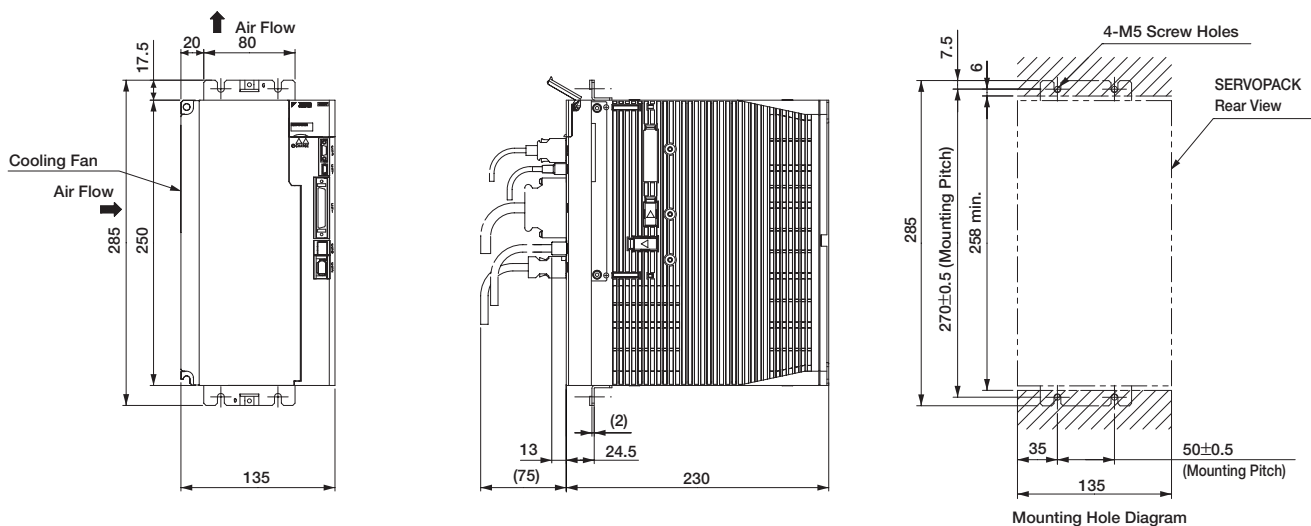
## External Dimensions Units: mm (Without Option Module)

(11) Three-phase 400 VAC, Model: SGD<sub>V</sub>-1R9D□□A001, -3R5D□□A001, and -5R4D□□A001

Approx. Mass: 2.7 kg

(12) Three-phase 400 VAC, Model: SGD<sub>V</sub>-8R4D□□A001 and -120D□□A001

Approx. Mass: 3.7 kg

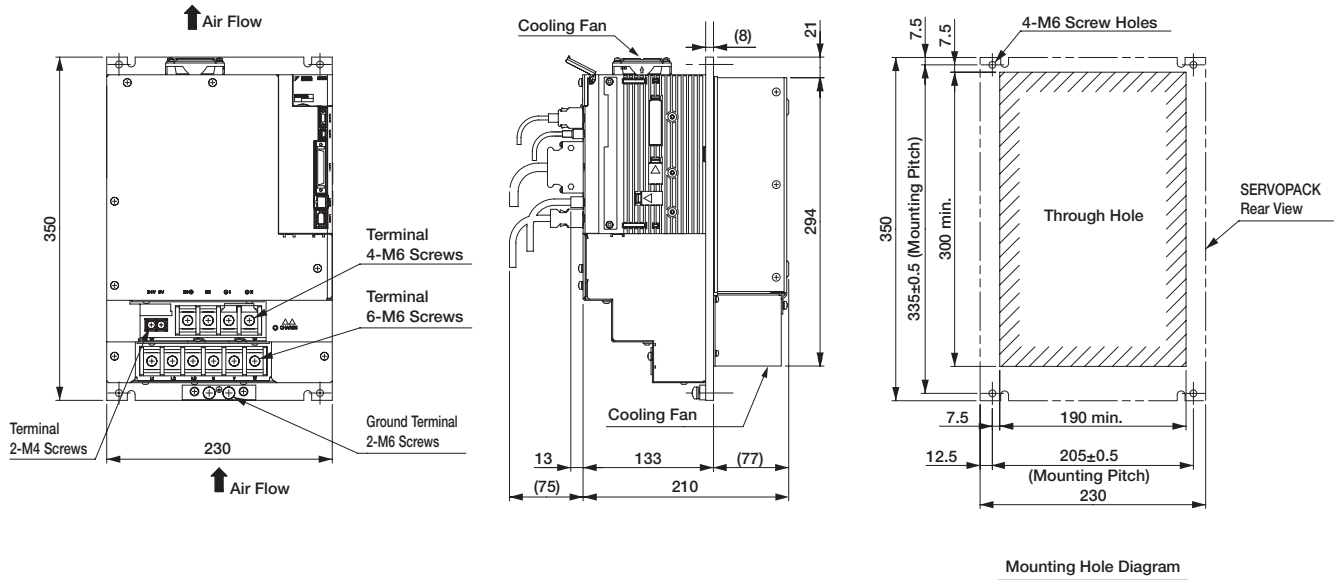
(13) Three-phase 400 VAC, Model: SGD<sub>V</sub>-170D□□A001

Approx. Mass: 5.7 kg

## External Dimensions Units: mm (Without Option Module)

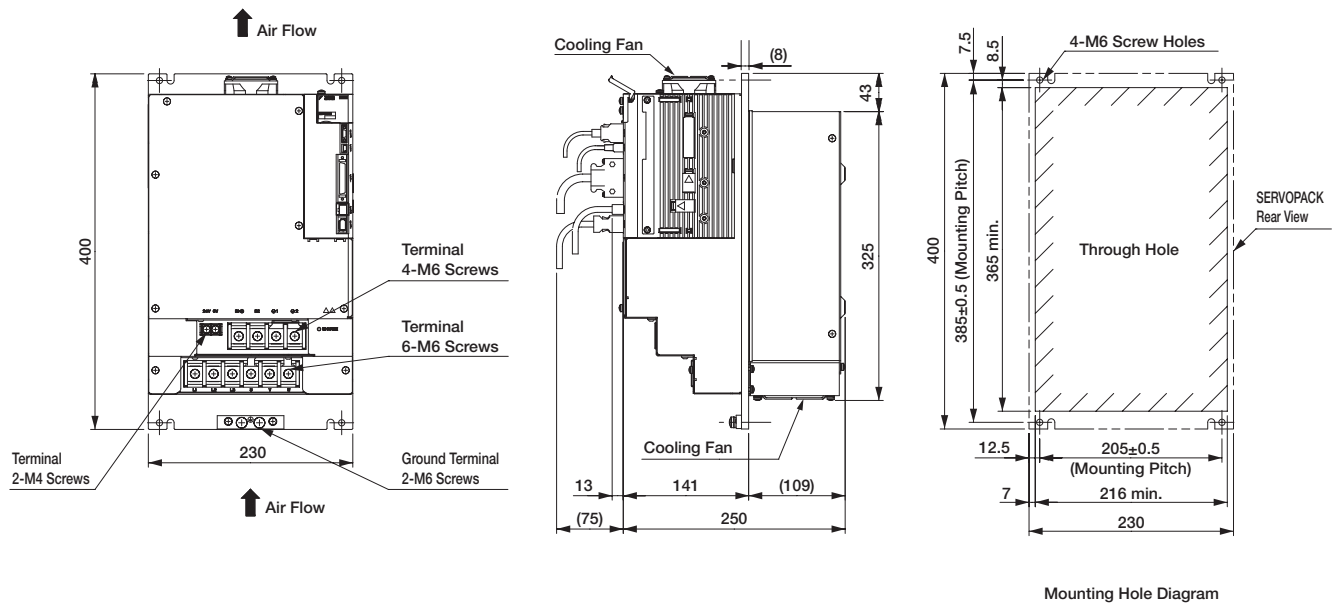
## ● Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

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



Approx. Mass: 8.1 kg

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



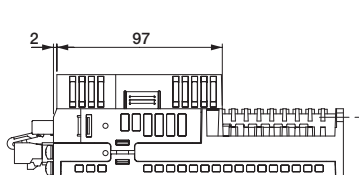
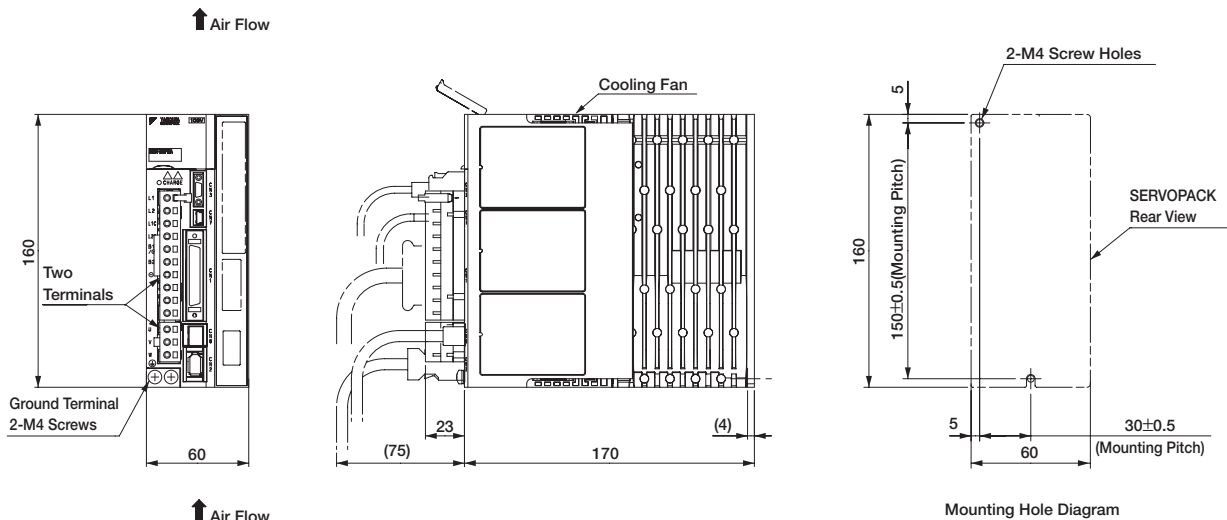
Approx. Mass: 13.4 kg

External Dimensions Units: mm (With Option Module)

● Base-Mounted SERVOPACKs

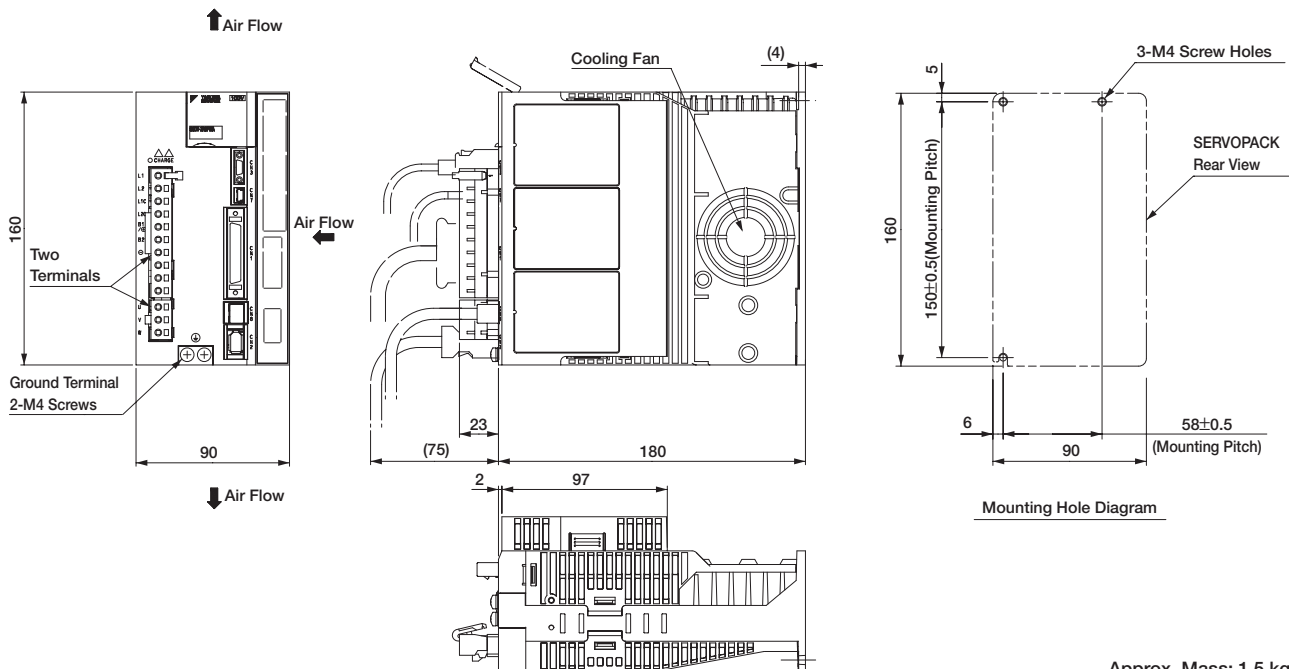
(1) Single-phase 100 VAC,

Model: SGDVR70F□□A00000□□□, SGDVR90F□□A00000□□□, and SGDV2R1F□□A00000□□□



Approx. Mass: 1.0 kg\*

(2) Single-phase 100 VAC, Model: SGDV2R8F□□A00000□□□



Approx. Mass: 1.5 kg\*

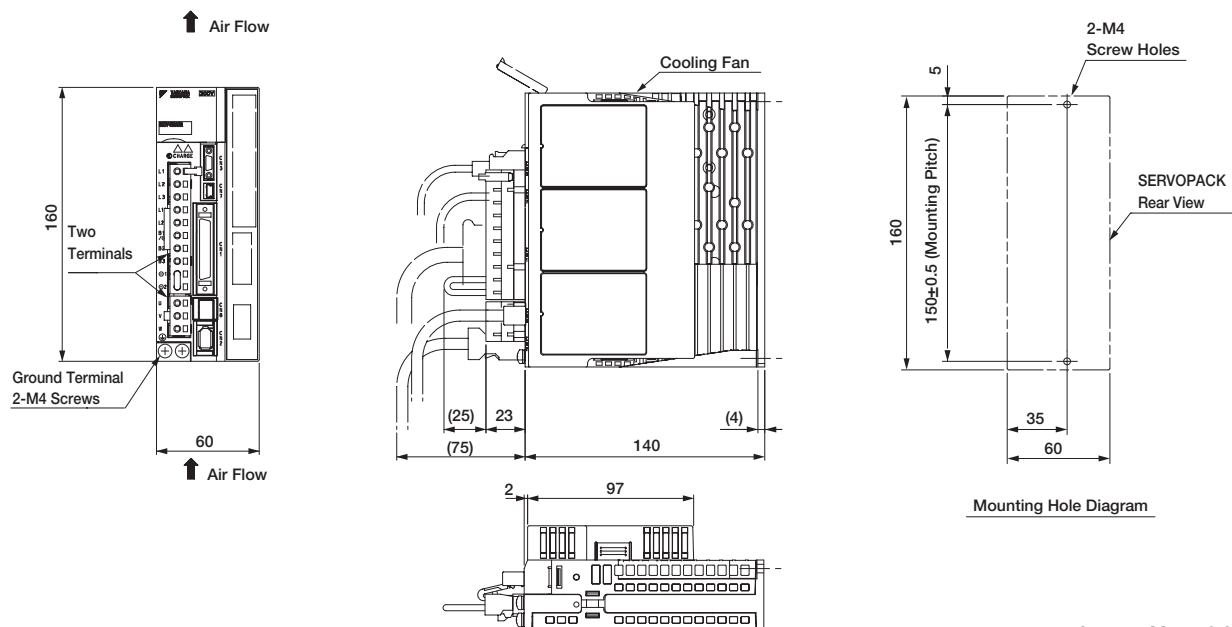
\*: Approx. mass of option modules are not included in this value.  
 Approx. mass of option modules are as follows.  
 • INDEXER Module: 0.2 kg  
 • Fully-closed Module: 0.1 kg

## External Dimensions Units: mm (With Option Module)

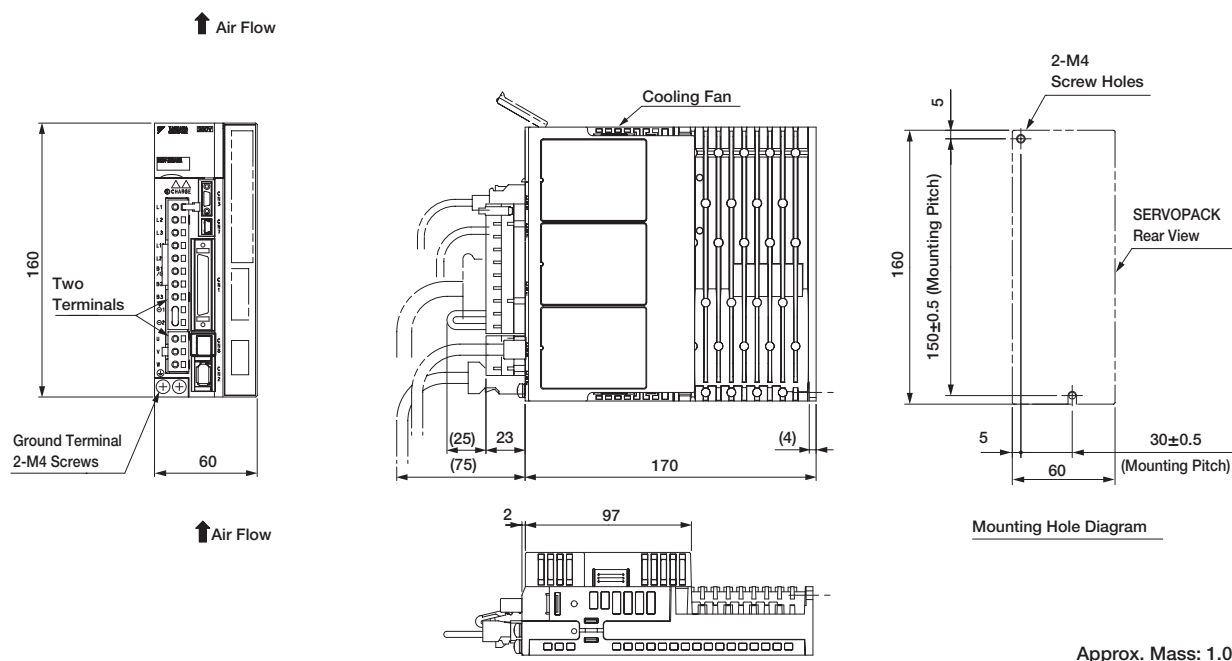
## ● Base-Mounted SERVOPACKs

(3) Three-phase 200 VAC,

Model: SGDVR70A□□A00000□□□□, SGDVR90A□□A00000□□□□, and SGDV1R6A□□A00000□□□□



(4) Three-phase 200 VAC, Model: SGDV2R8A□□A00000□□□□



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

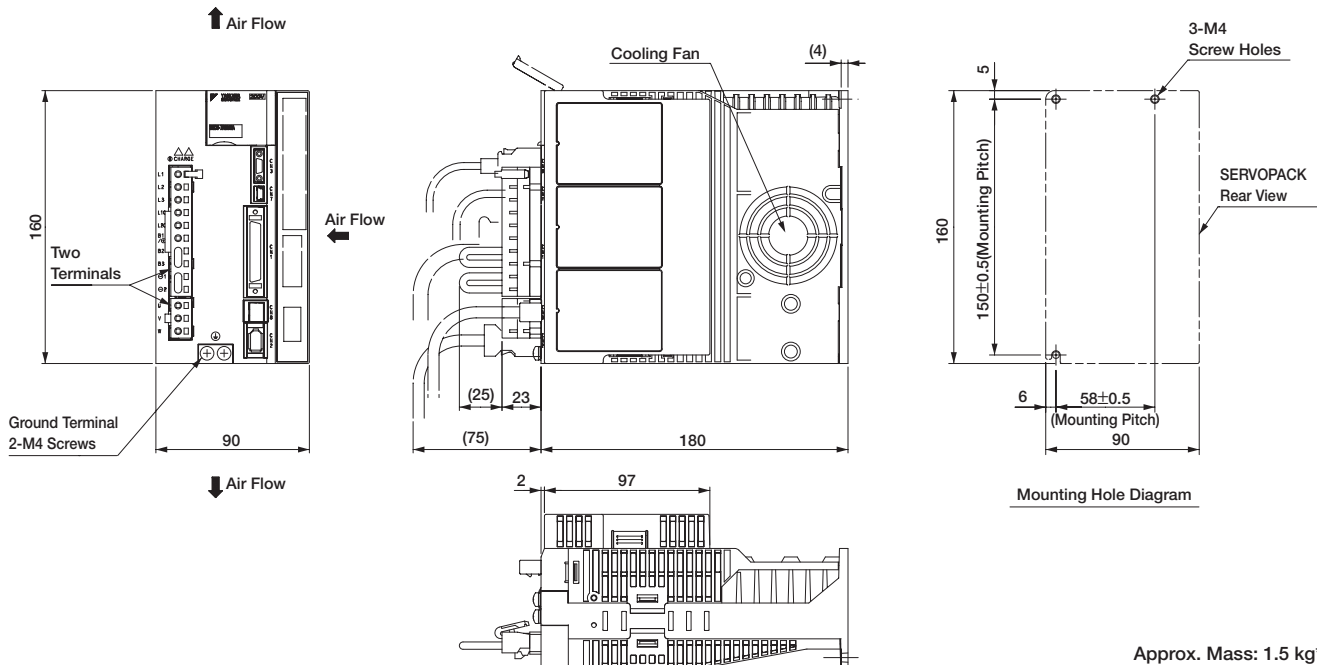
Approx. mass of option modules are as follows.

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

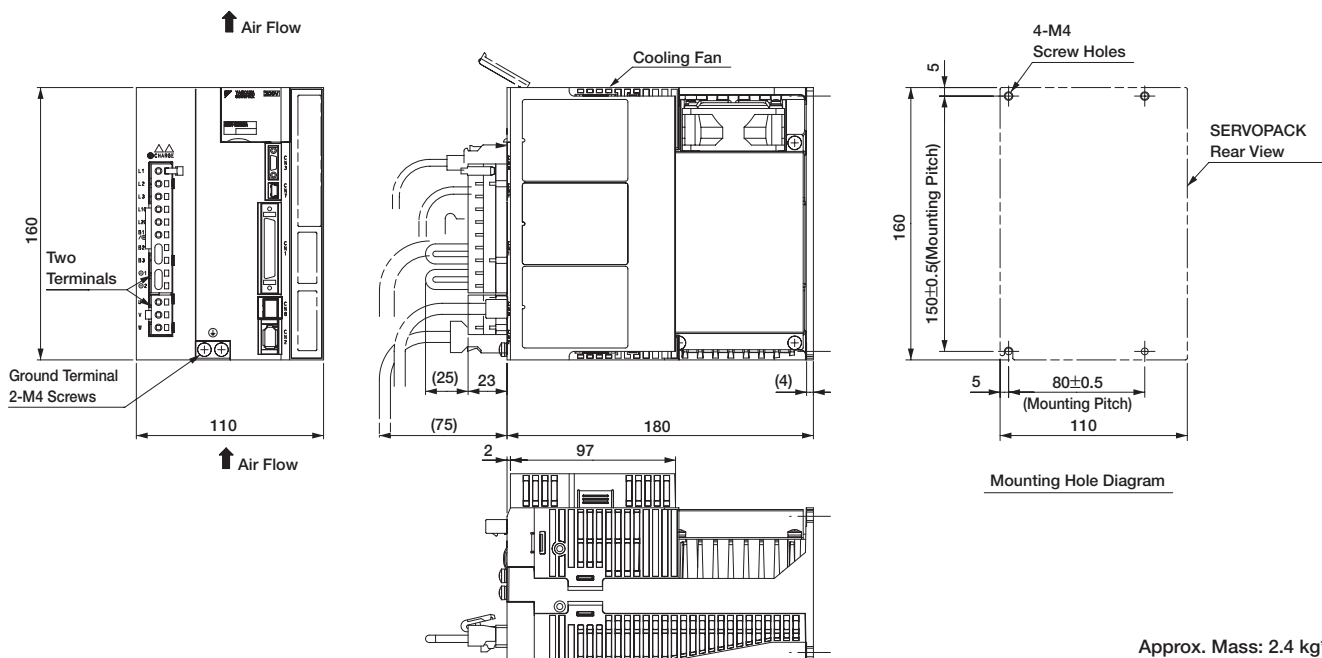
External Dimensions Units: mm (With Option Module)

(5) Three-phase 200 VAC,

Model: SGDV3R8A□□A00000□□□, SGDV5R5A□□A00000□□□, and SGDV7R6A□□A00000□□□



(6) Three-phase 200 VAC, Model: SGDV120A□□A00000□□□



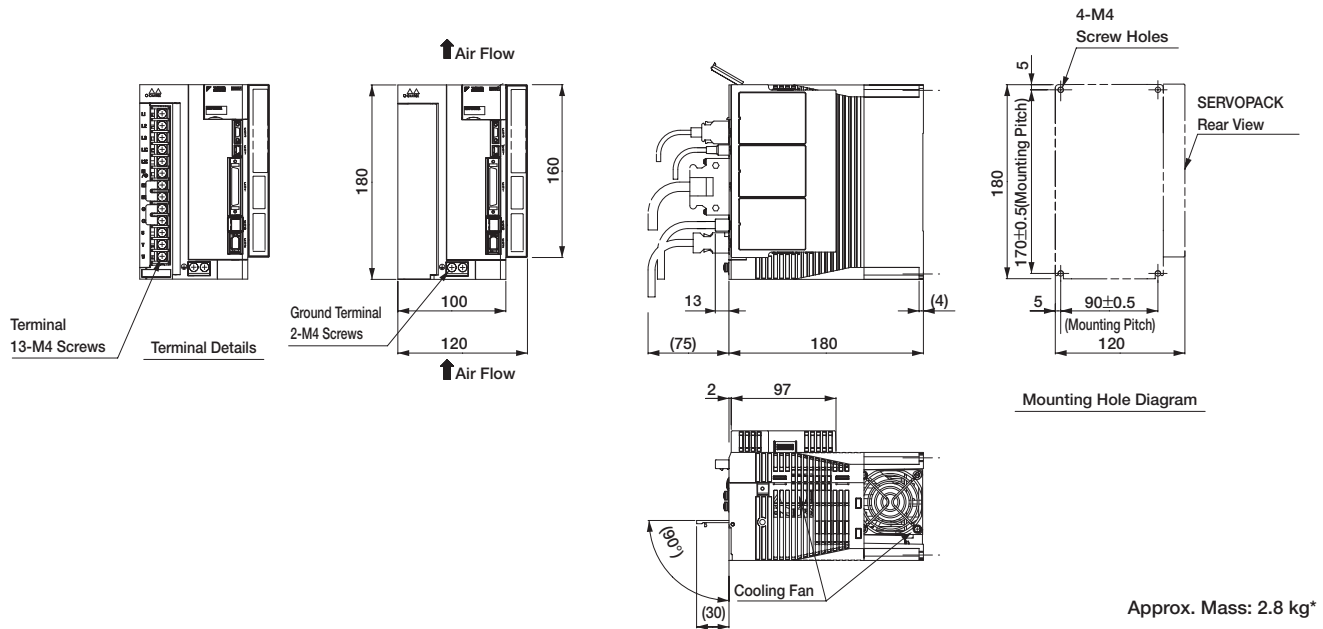
\*: Approx. mass of option modules are not included in this value.  
 Approx. mass of option modules are as follows.  
 • INDEXER Module: 0.2 kg  
 • Fully-closed Module: 0.1 kg

## External Dimensions Units: mm (With Option Module)

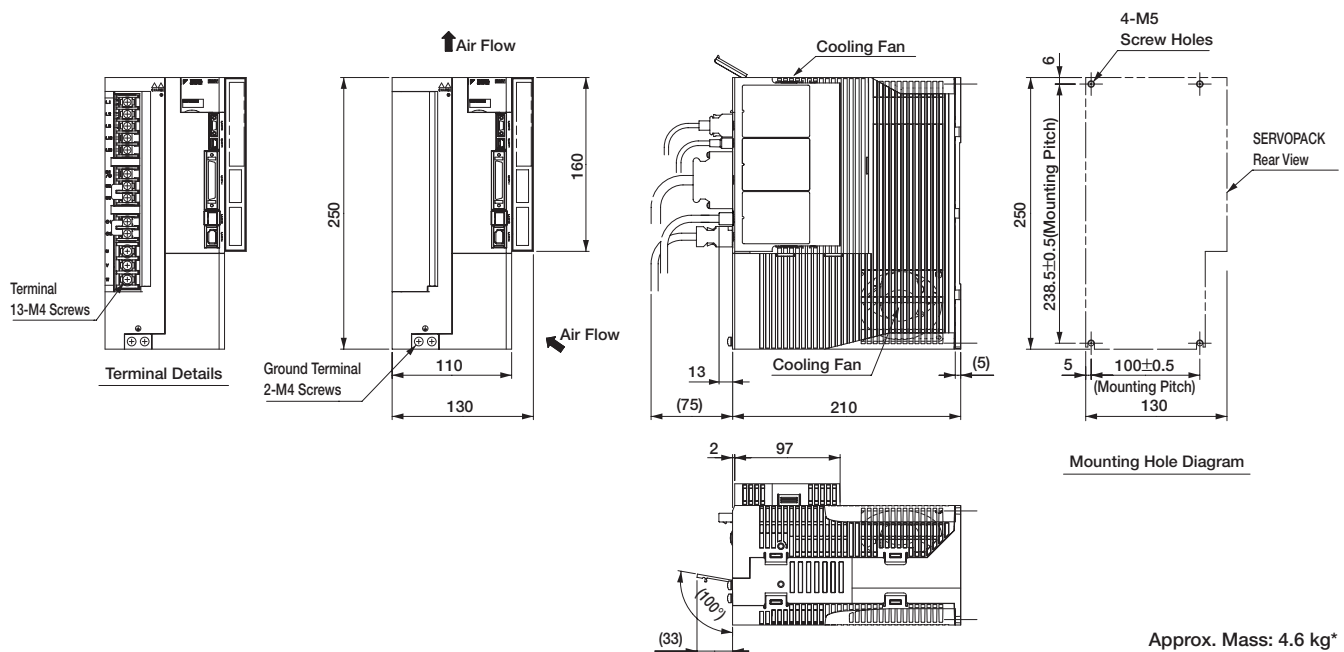
## ● Base-Mounted SERVOPACKs

(7) Single-phase 200 VAC, Model: SGD120A□□1A008000□□□□ (1.5kW, single-phase input)

Three-phase 200 VAC, Model: SGD180A□□□A000000□□□□ and SGD200A□□□A000000□□□□



(8) Three-phase 200 VAC, Model: SGD330A□□□A000000□□□□

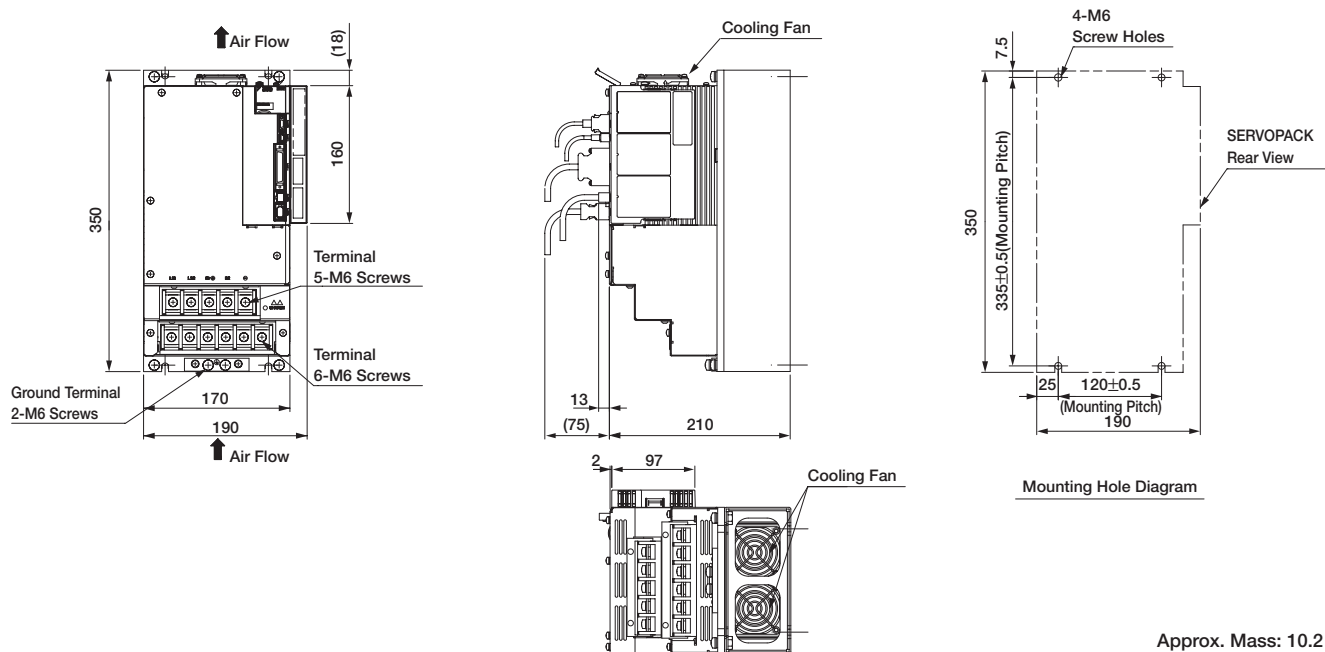


\*: Approx. mass of option modules are not included in this value.  
Approx. mass of option modules are as follows.

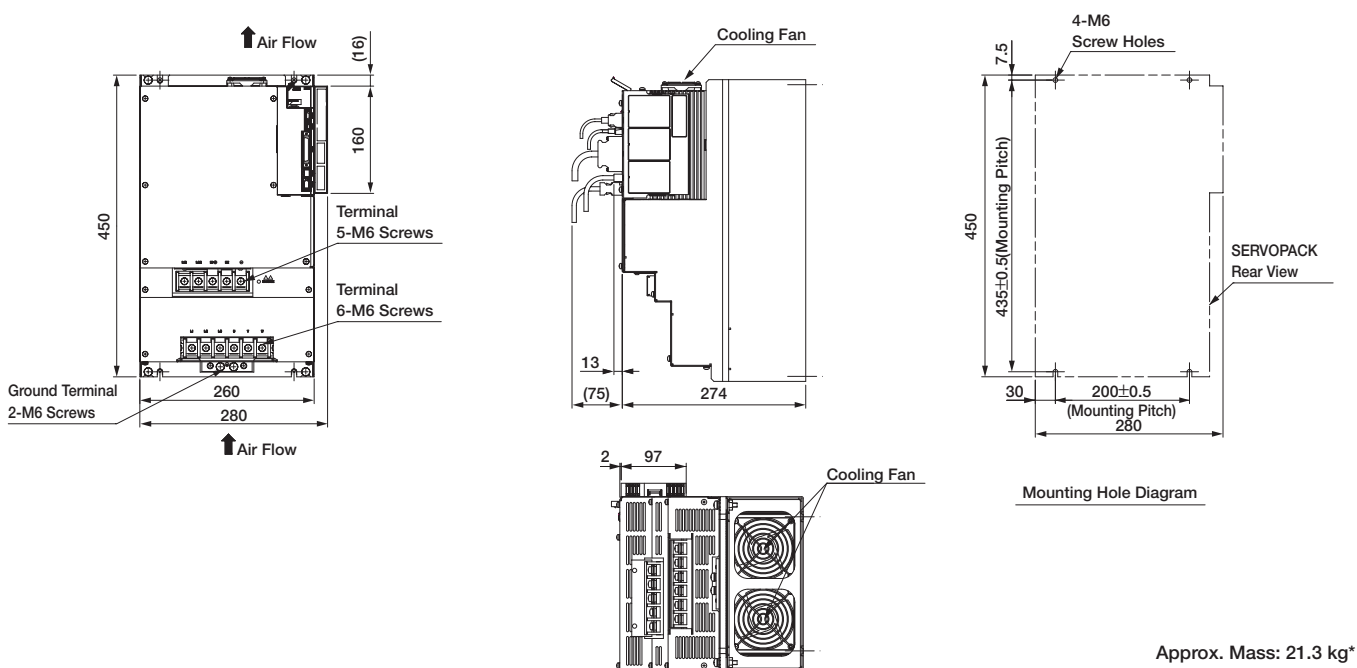
- INDEXER Module: 0.2 kg
- Fully-closed Module: 0.1 kg

## External Dimensions Units: mm (With Option Module)

(9) Three-phase 200 VAC, Model: SGD V470A□□A00000□□□ and SGD V550A□□A00000□□□



(10) Three-phase 200 VAC, Model: SGD V590A□□A00000□□□ and SGD V780A□□A00000□□□



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

Approx. mass of option modules are as follows.

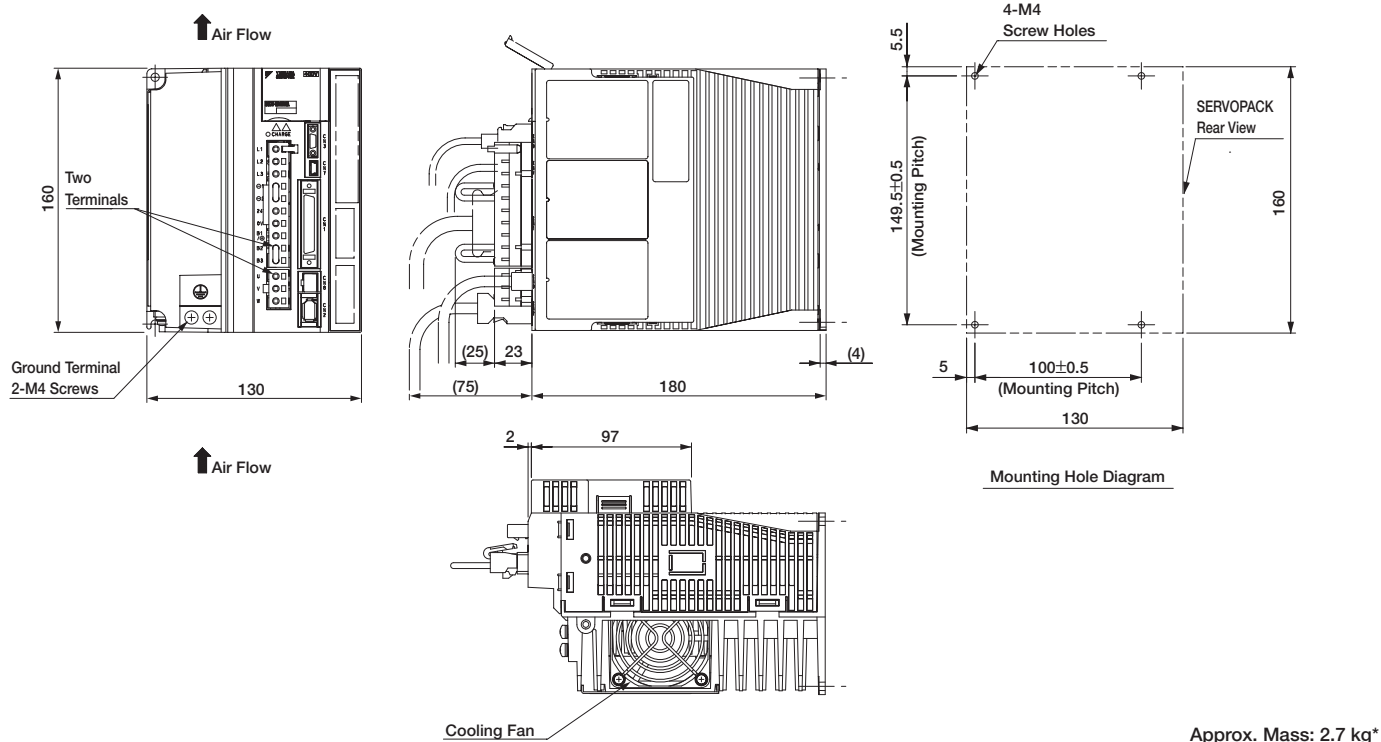
- INDEXER Module: 0.2 kg
- Fully-closed Module: 0.1 kg

## External Dimensions Units: mm (With Option Module)

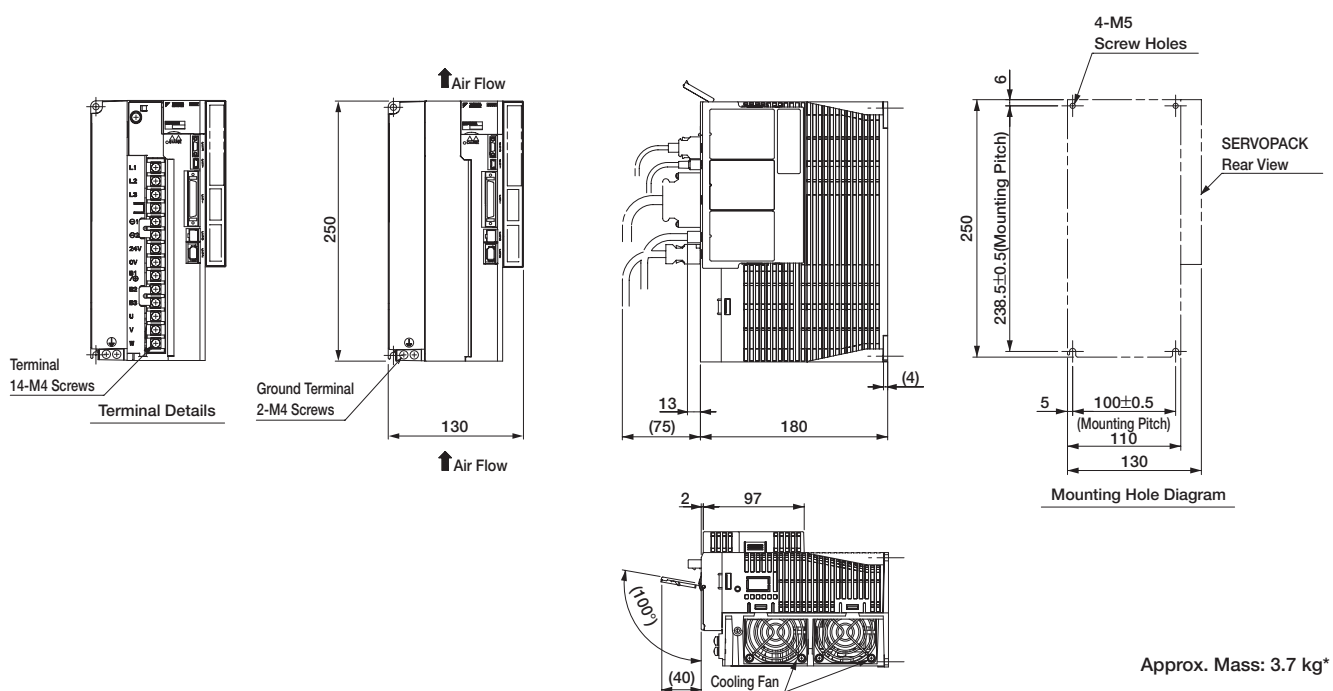
## ● Base-Mounted SERVOPACKs

(11) Three-phase 400 VAC,

Model: SGDV1R9D□□A00000□□□□, SGDV3R5D□□A00000□□□□, and SGDV5R4D□□A00000□□□□



(12) Three-phase 400 VAC, Model: SGDV8R4D□□A00000□□□□ and SGDV120D□□A00000□□□□



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

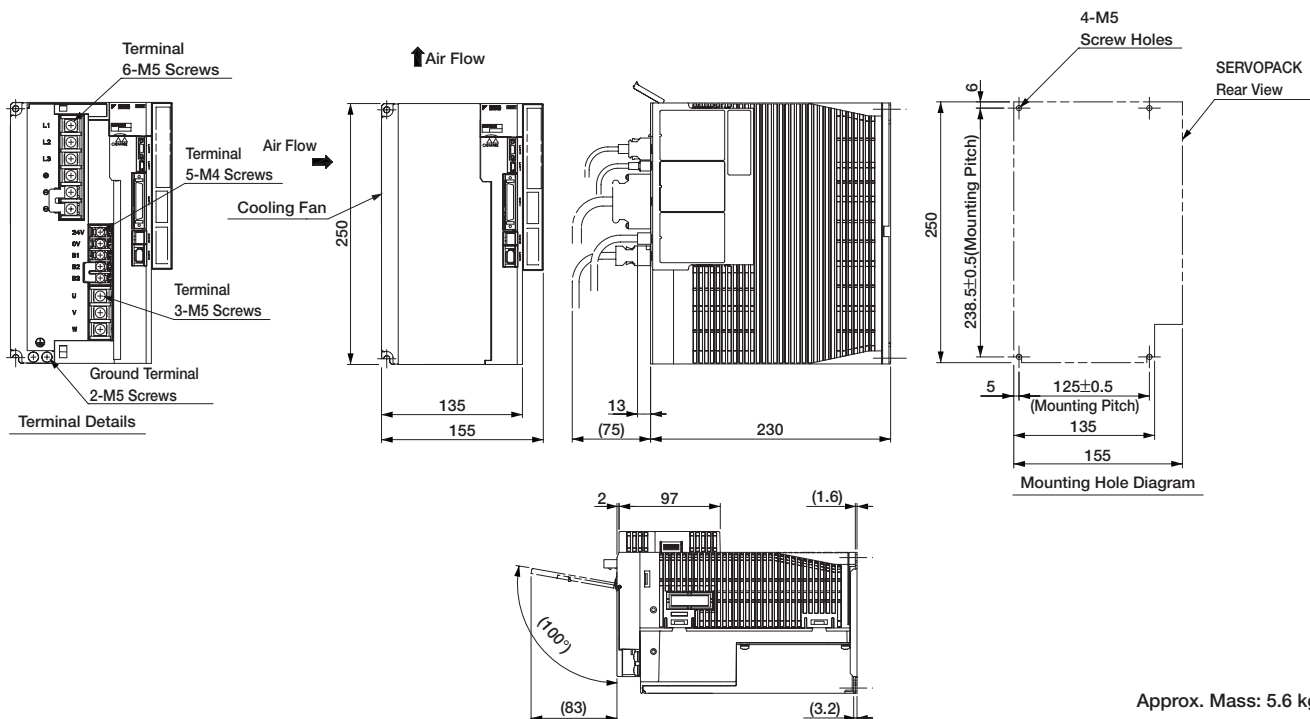
Approx. mass of option modules are as follows.

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

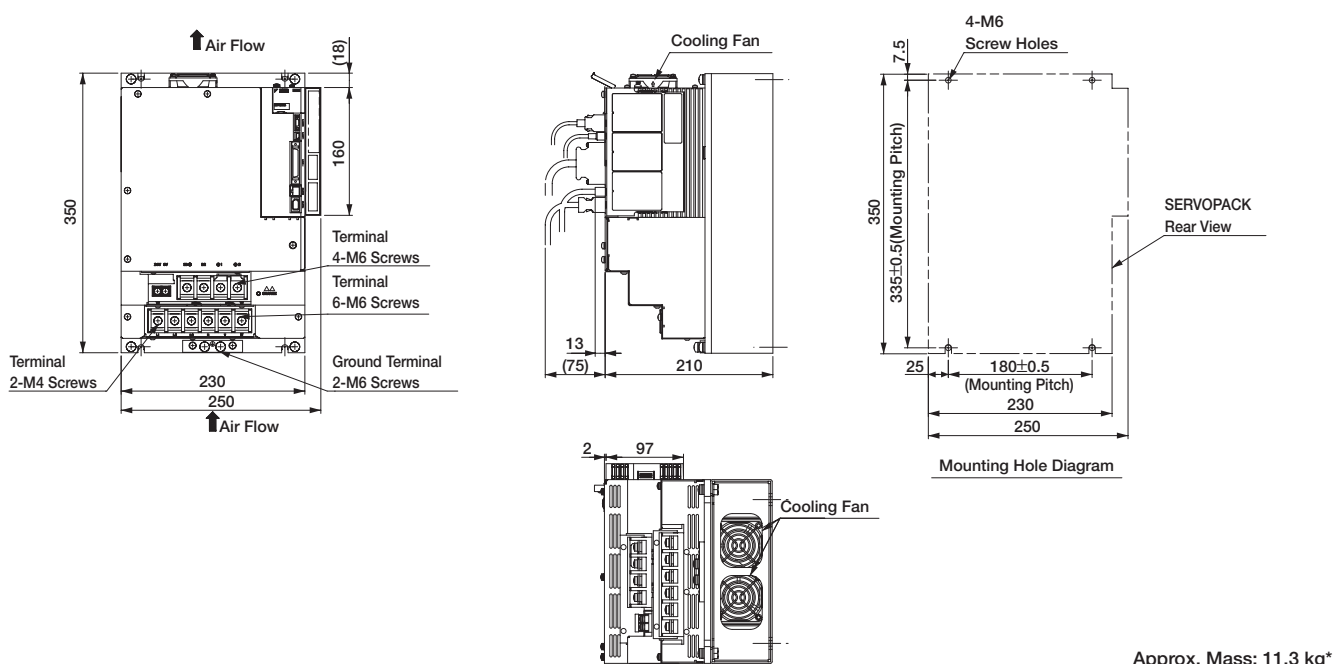


## External Dimensions Units: mm (With Option Module)

(13) Three-phase 400 VAC, Model: SGDV170D□□A00000□□□



(14) Three-phase 400 VAC, Model: SGDV210D□□A00000□□□ and SGDV260D□□A00000□□□



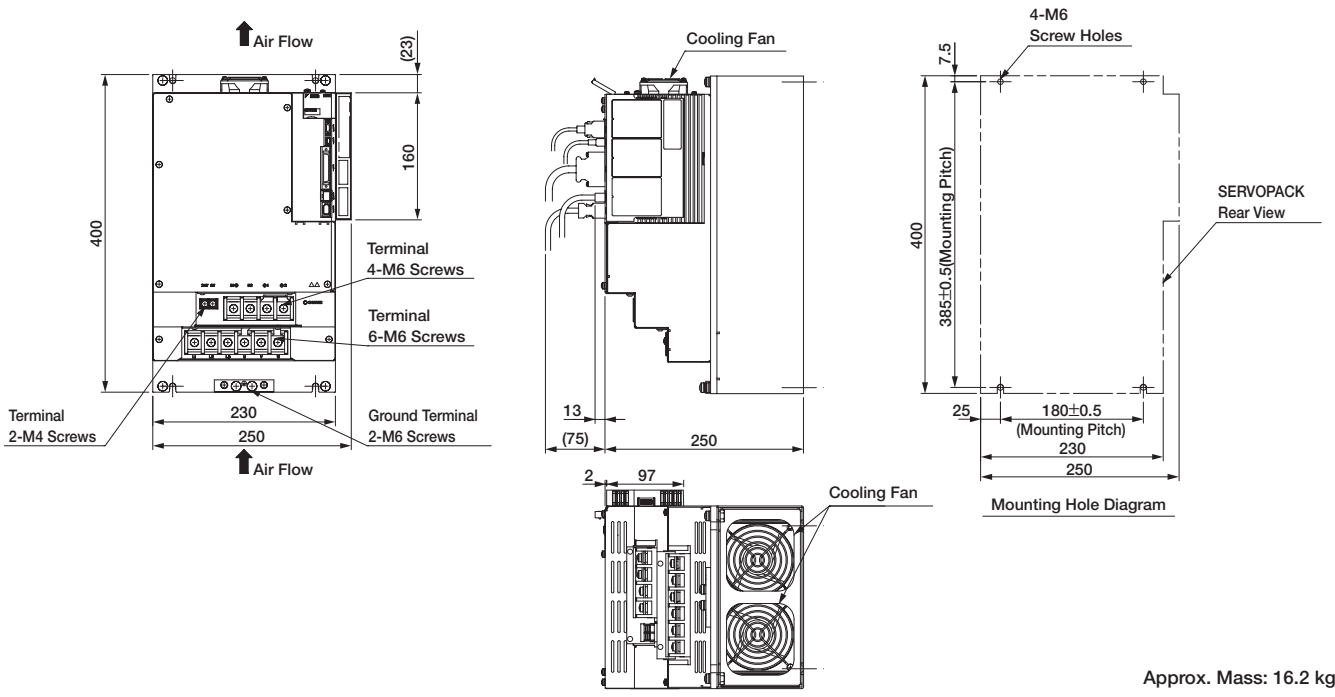
\*: Approx. mass of option modules are not included in this value.  
Approx. mass of option modules are as follows.

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

External Dimensions Units: mm (With Option Module)

● Base-Mounted SERVOPACKs

(15) Three-phase 400 VAC, Model: SGDV280D□□A00000□□□□ and SGDV370D□□A00000□□□□



Approx. Mass: 16.2 kg\*

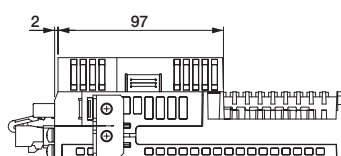
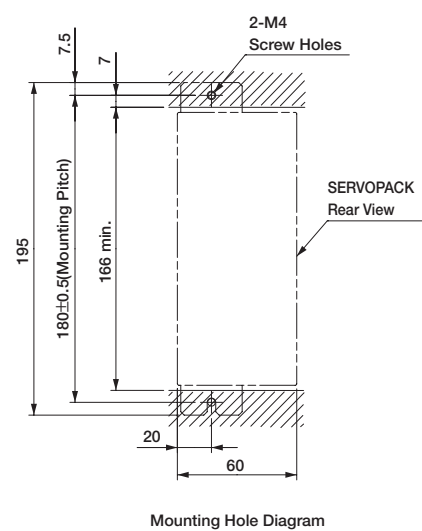
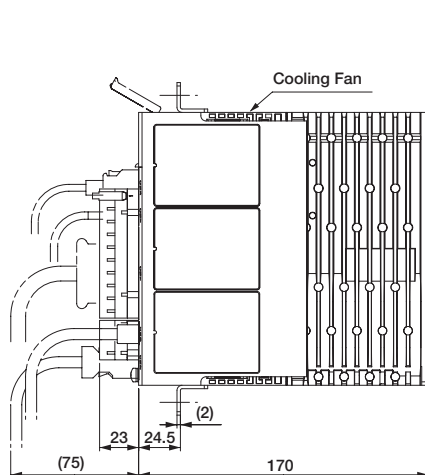
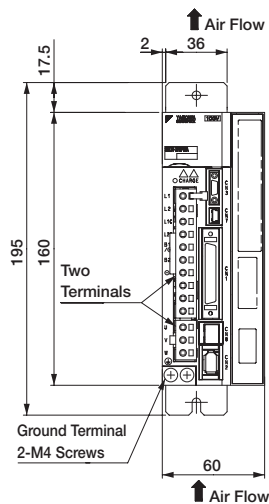
\*: Approx. mass of option modules are not included in this value.  
 Approx. mass of option modules are as follows.  
 • INDEXER Module: 0.2 kg  
 • Fully-closed Module: 0.1 kg

## External Dimensions Units: mm (With Option Module)

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

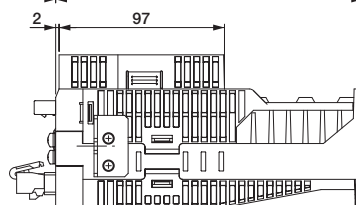
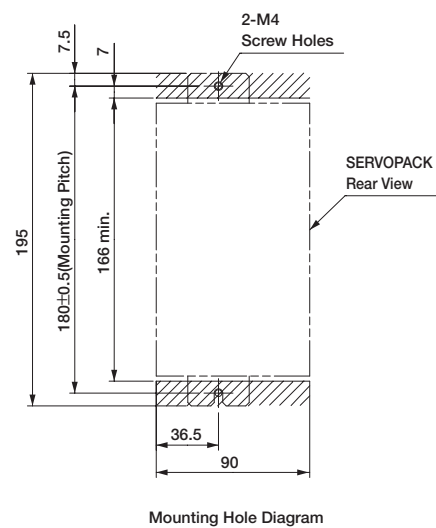
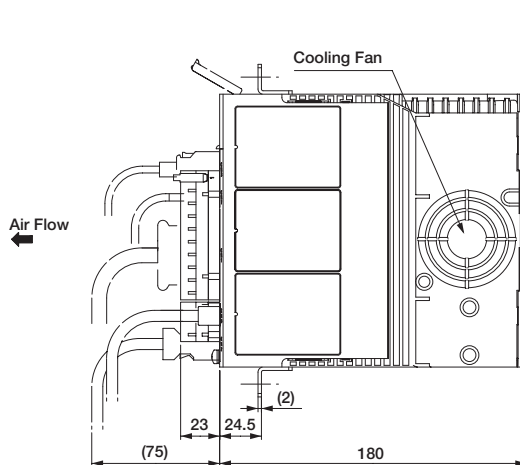
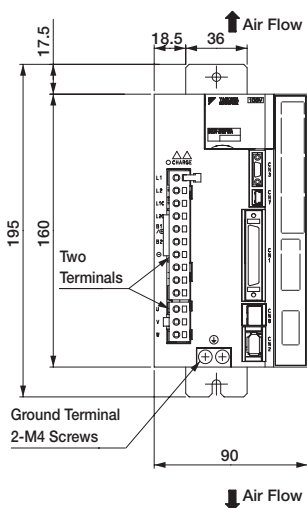
(1) Single-phase 100 VAC,

Model: SGDVR70F□□A00100□□□, SGDVR90F□□A00100□□□, and SGD2R1F□□A00100□□□



Approx. Mass: 1.1 kg\*

(2) Single-phase 100 VAC, Model: SGD2R8F□□A00100□□□



Approx. Mass: 1.5 kg\*

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

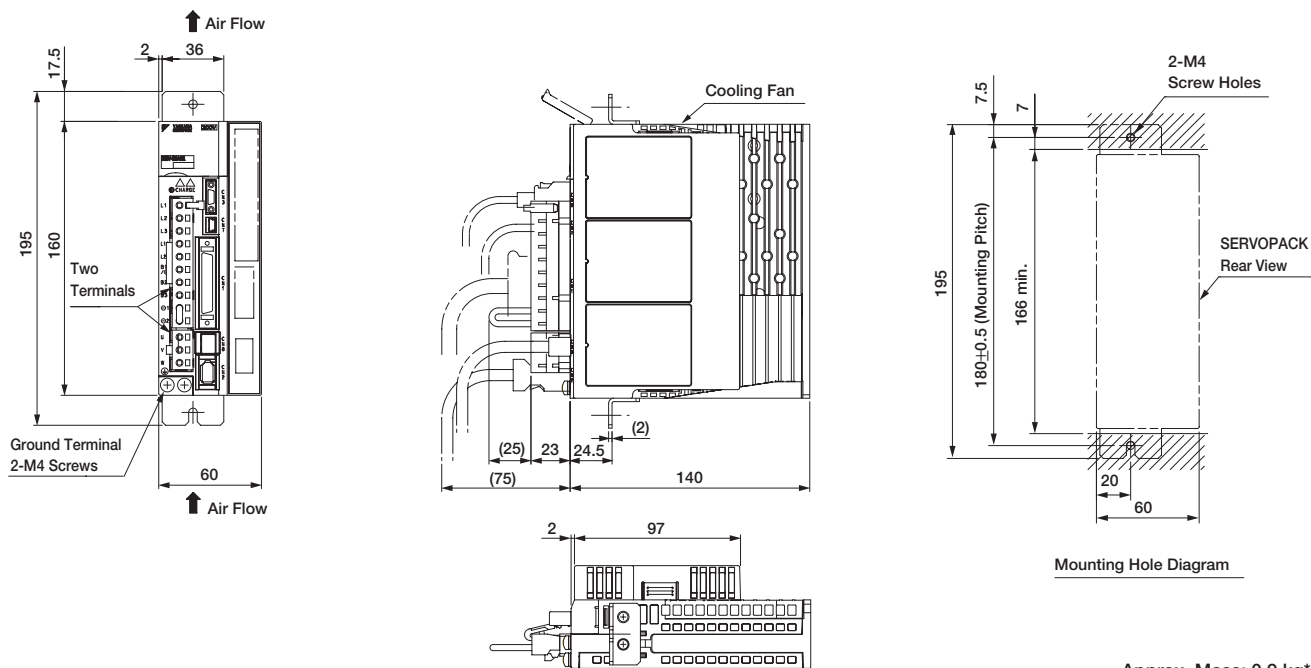
- INDEXER Module: 0.2 kg
- Fully-closed Module: 0.1 kg

## External Dimensions Units: mm (With Option Module)

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

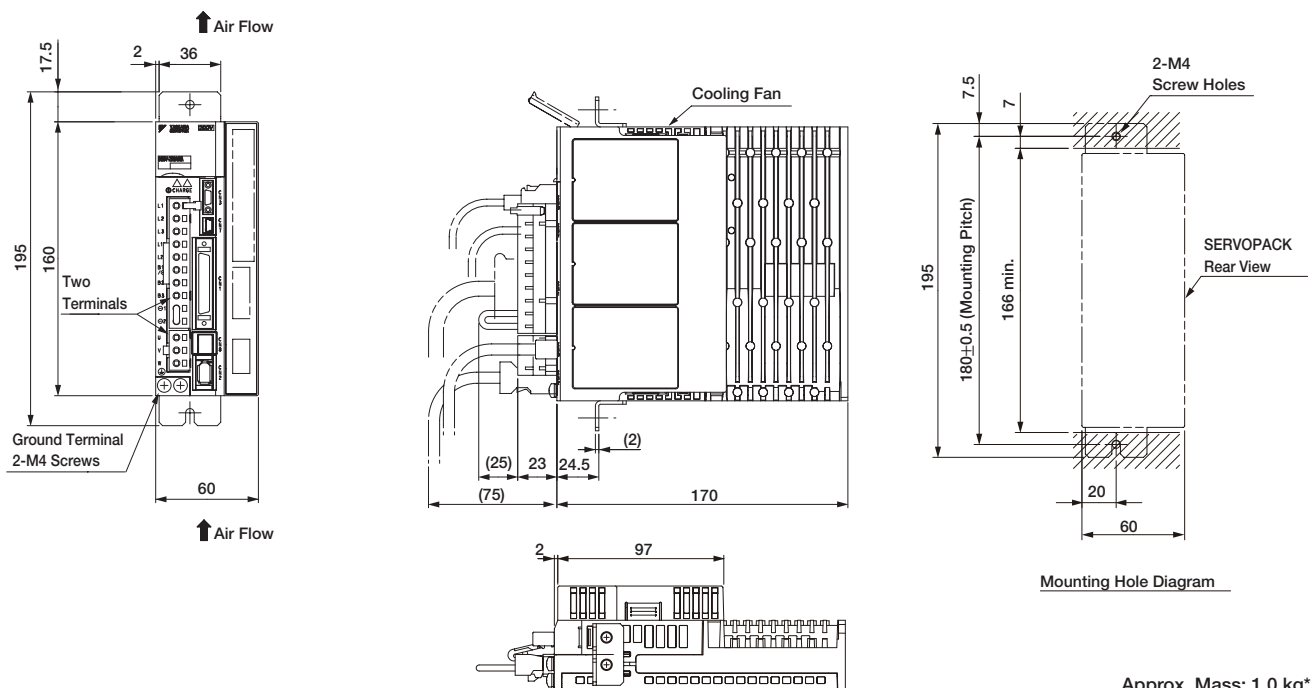
(3) Three-phase 200 VAC,

Model: SGDVR70A□□A001000□□□, SGDVR90A□□A001000□□□, and SGD1R6A□□A001000□□□



Approx. Mass: 0.9 kg\*

(4) Three-phase 200 VAC, Model: SGD1R8A□□A001000□□□



Approx. Mass: 1.0 kg\*

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

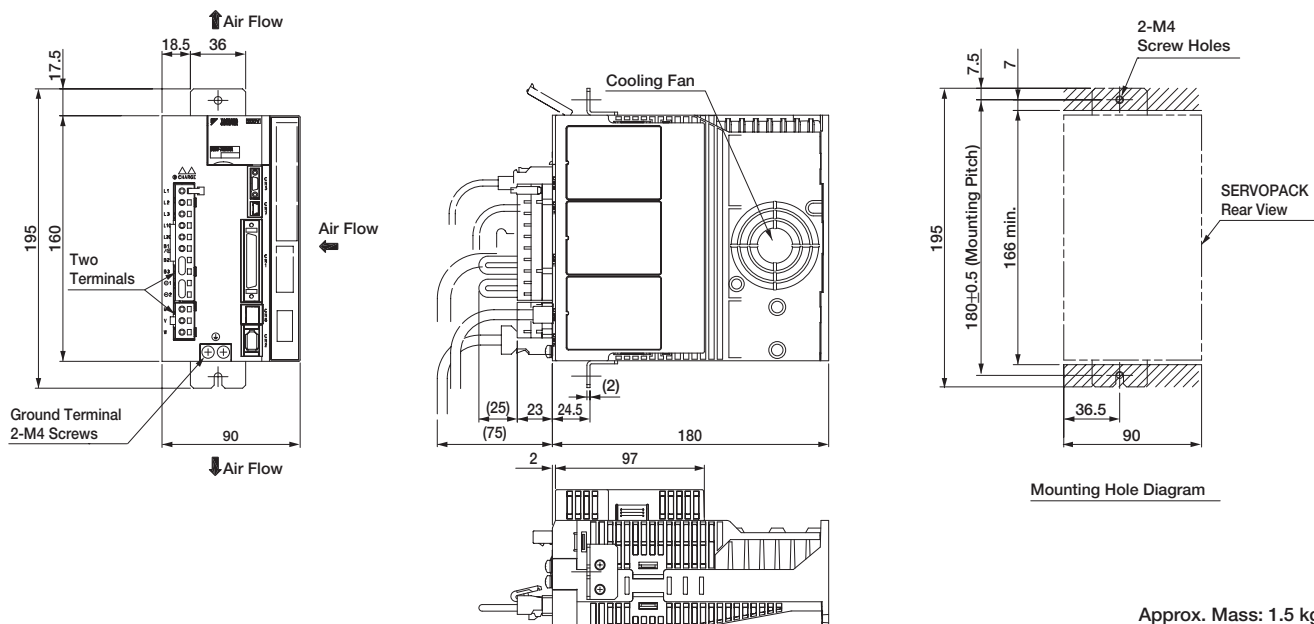
Approx. mass of option modules are as follows.

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

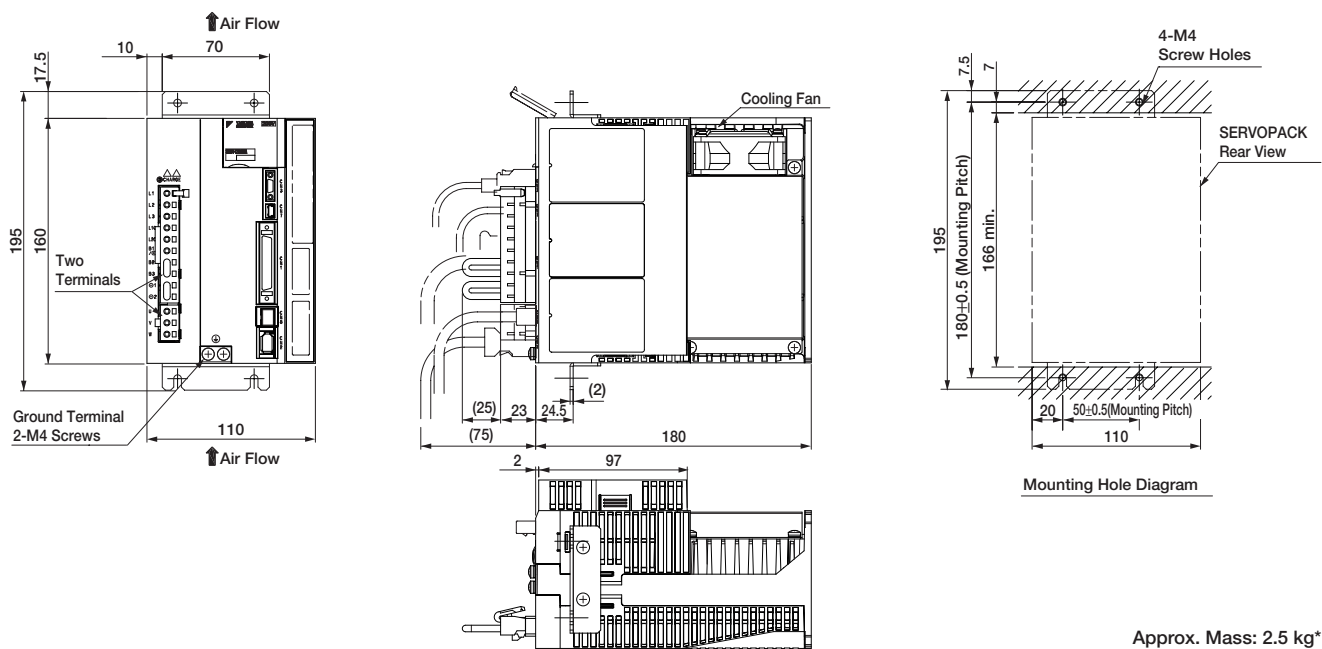
## External Dimensions Units: mm (With Option Module)

(5) Three-phase 200 VAC,

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



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



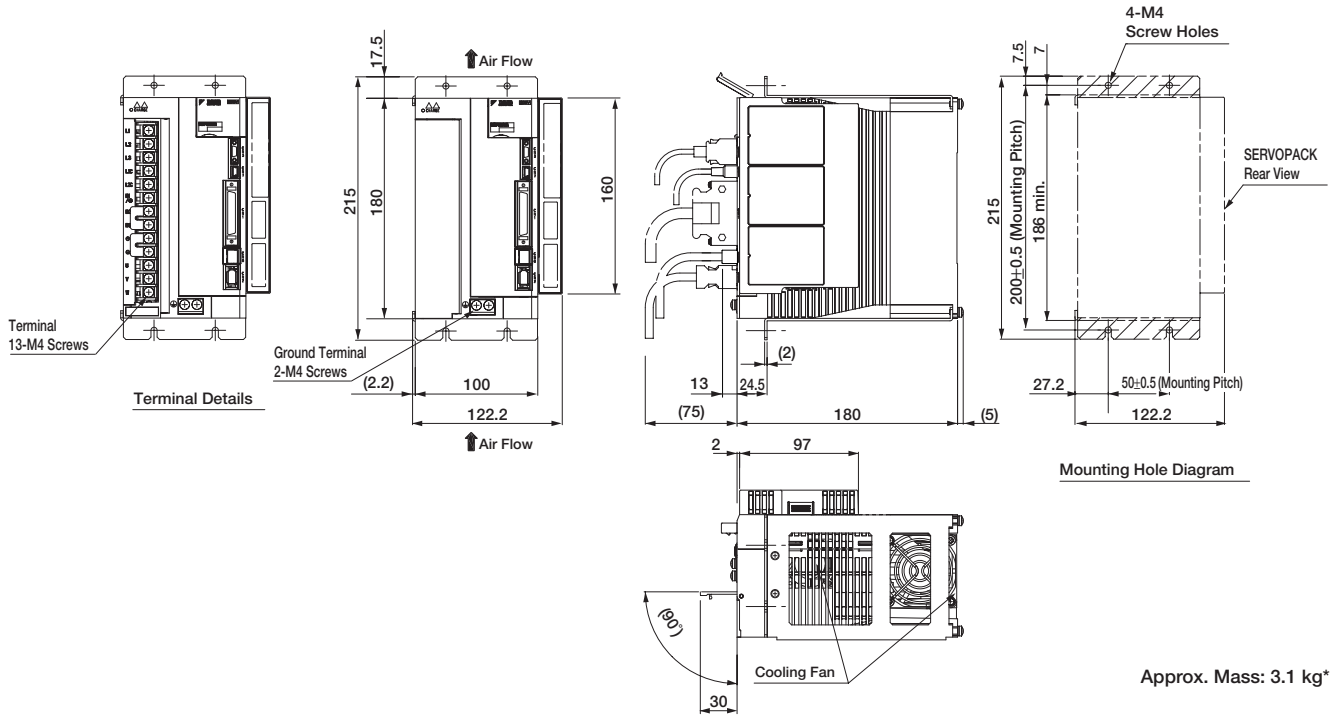
\*: Approx. mass of option modules are not included in this value.  
Approx. mass of option modules are as follows.

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

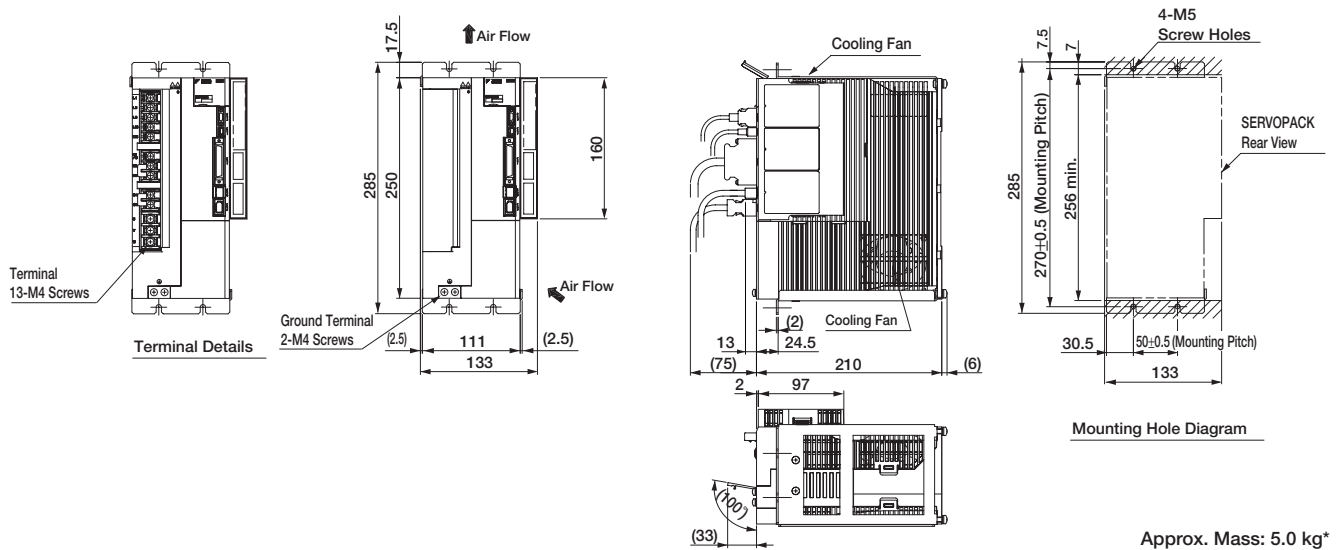
## External Dimensions Units: mm (With Option Module)

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

(7) Three-phase 200 VAC, Model: SGD180A□□A001000□□□ and SGD1200A□□A001000□□□



(8) Three-phase 200 VAC, Model: SGD1330A□□A001000□□□



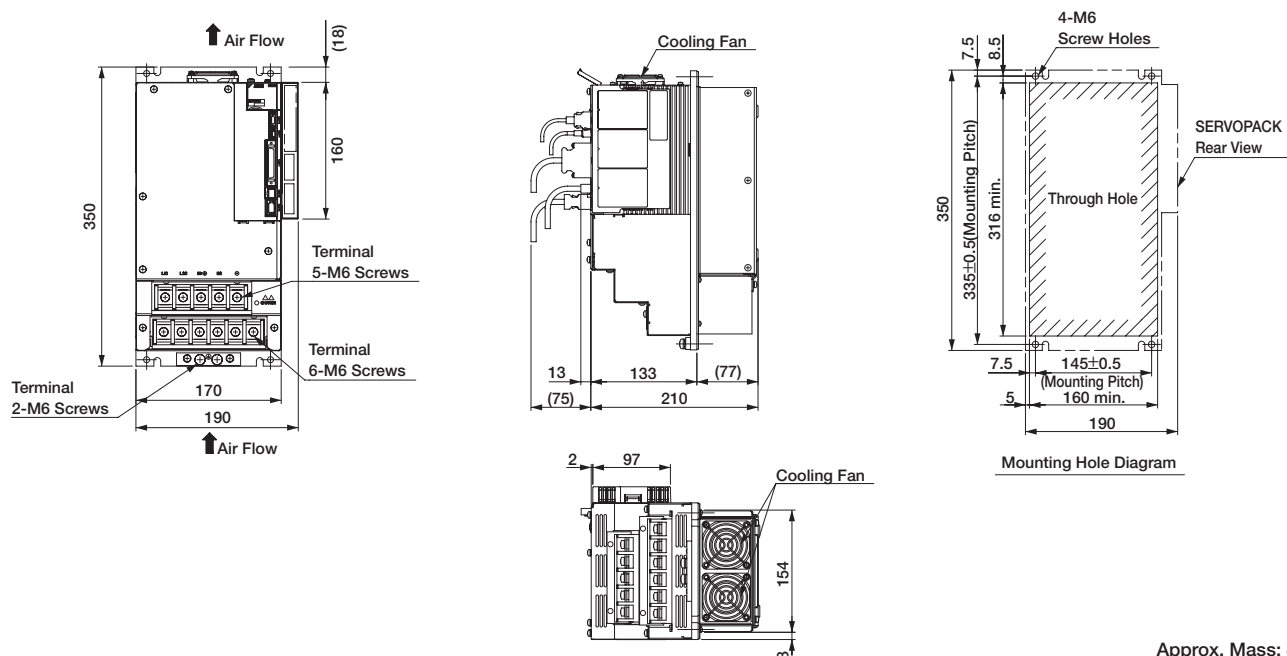
\*: Approx. mass of option modules are not included in this value.

Approx. mass of option modules are as follows.

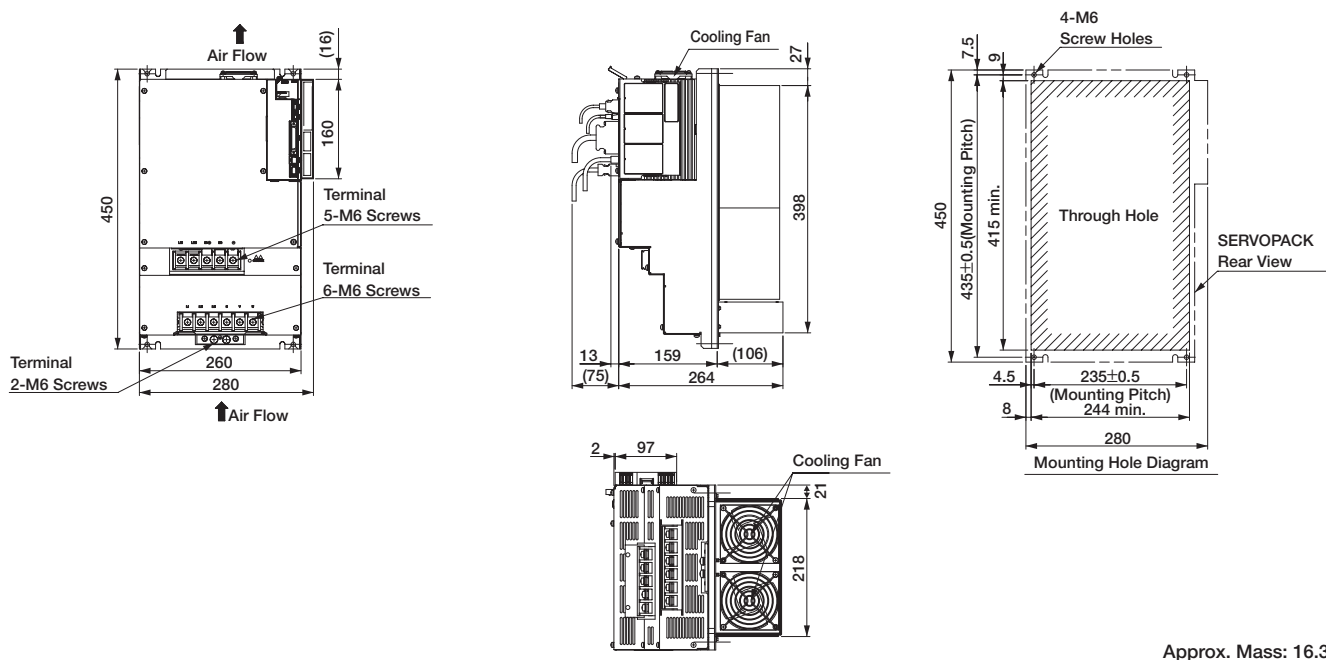
- INDEXER Module: 0.2 kg
- Fully-closed Module: 0.1 kg

## External Dimensions Units: mm (With Option Module)

(9) Three-phase 200 VAC, Model: SGD470A□□A00100□□□ and SGD450A□□A00100□□□ (duct-ventilated)



(10) Three-phase 200 VAC, Model: SGD590A□□A00100□□□ and SGD780A□□A00100□□□ (duct-ventilated)



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

Approx. mass of option modules are as follows.

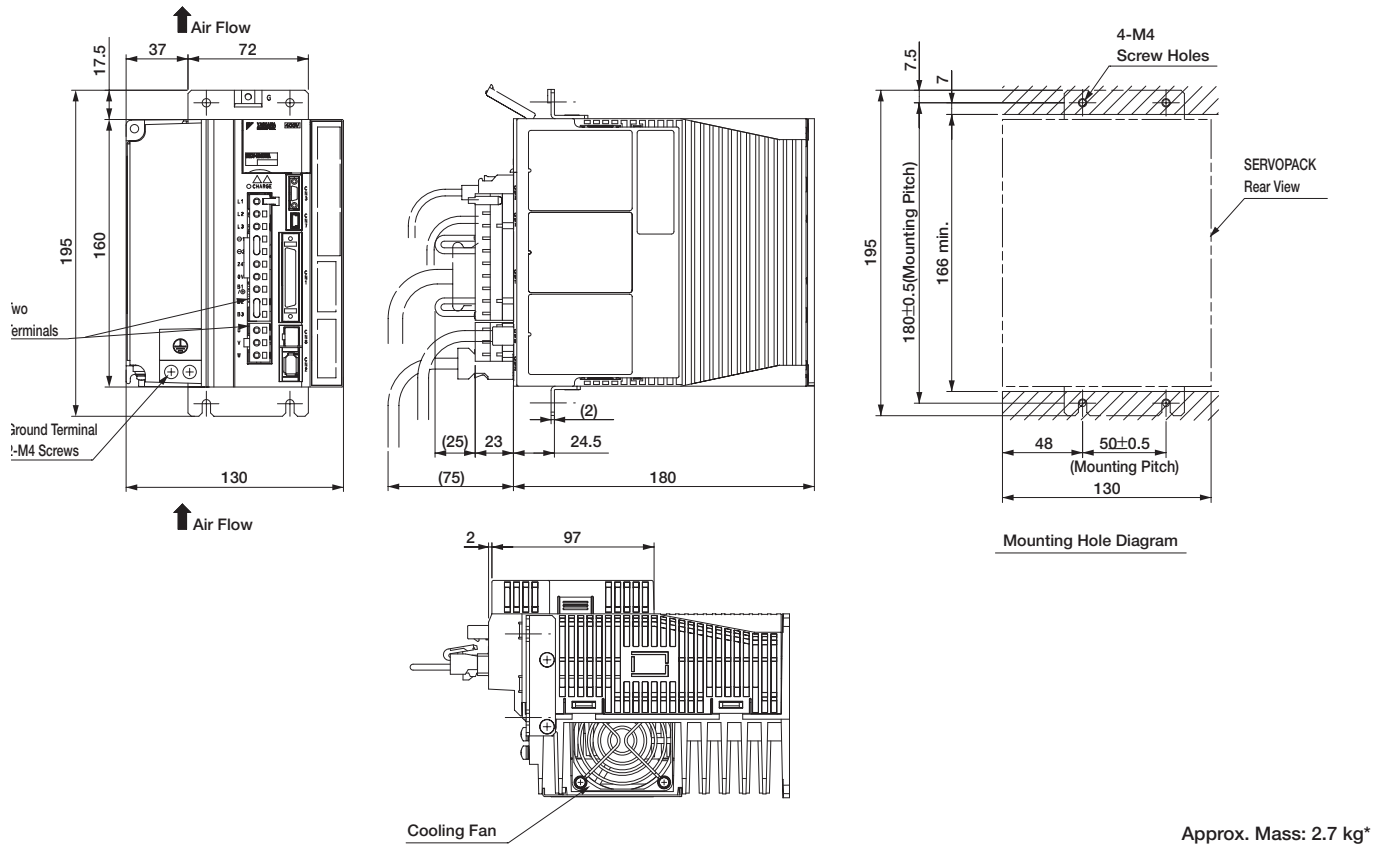
- INDEXER Module: 0.2 kg
- Fully-closed Module: 0.1 kg

## External Dimensions Units: mm (With Option Module)

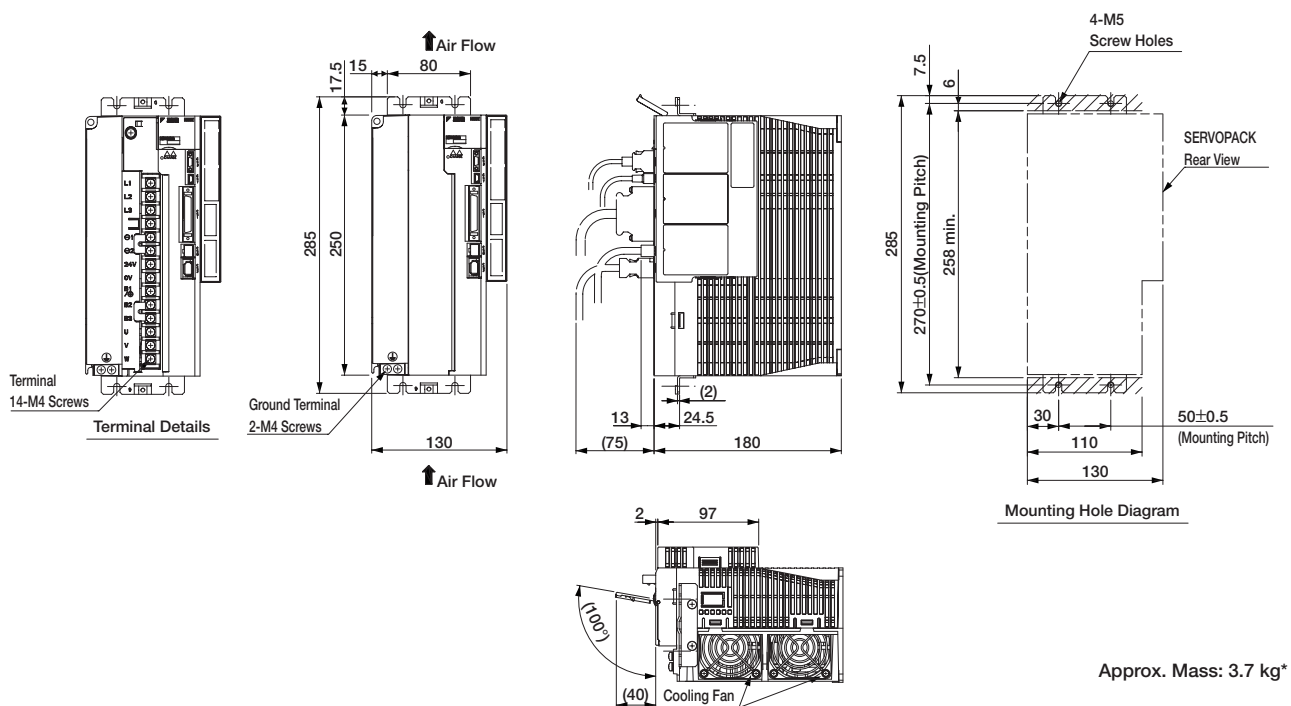
## ● Rack-mounted SERVOPACKs (6 kW or more models: duct-ventilated)

(11) Three-phase 400 VAC,

Model: SGDV1R9D□□A001000□□□, SGDV3R5D□□A001000□□□, and SGDV5R4D□□A001000□□□



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



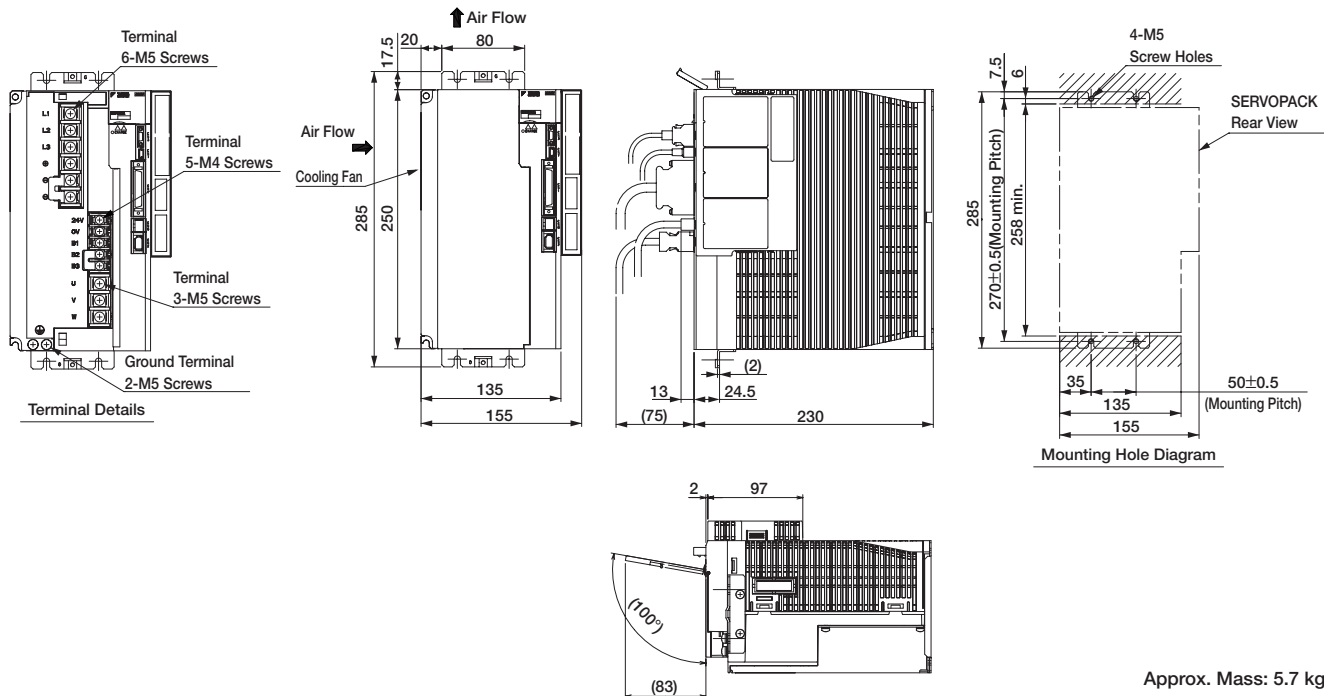
\*: Approx. mass of option modules are not included in this value.  
Approx. mass of option modules are as follows.

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

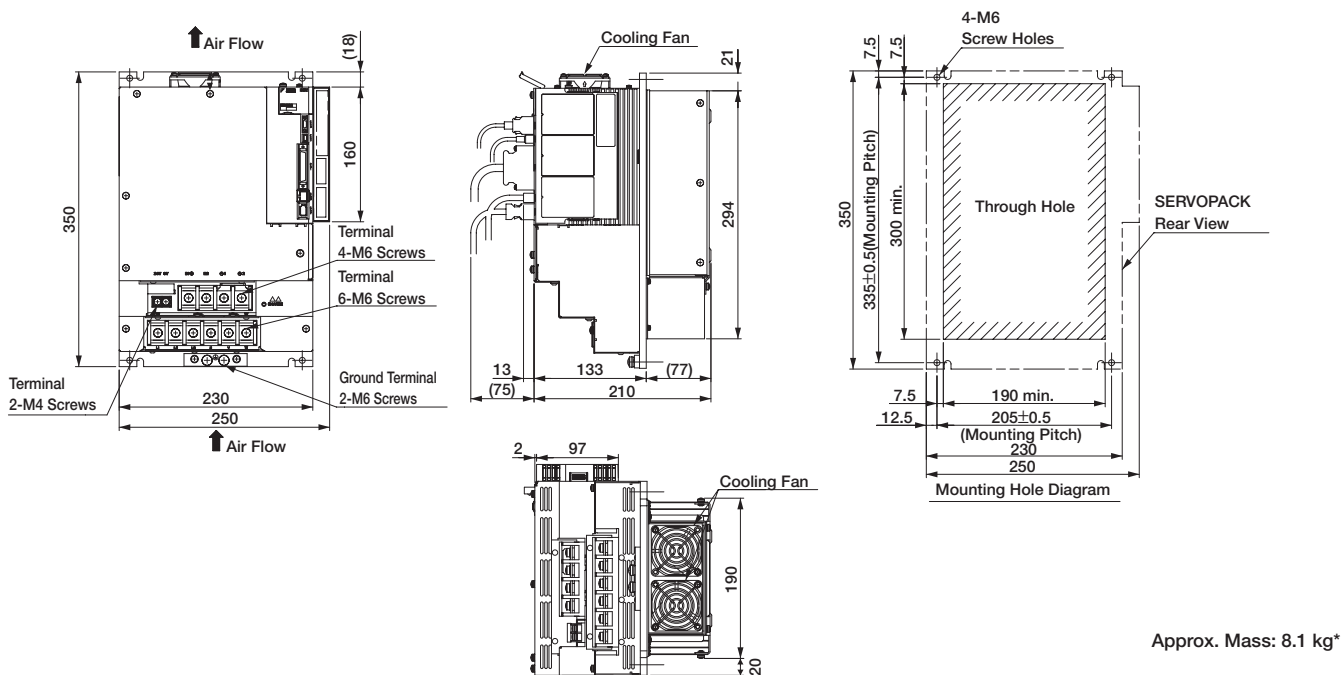


External Dimensions Units: mm (With Option Module)

(13) Three-phase 400 VAC, Model: SGD V170D □ □ A001000 □ □ □ □



(14) Three-phase 400 VAC, Model: SGD V210D □ □ A001000 □ □ □ □ and SGD V260D □ □ A001000 □ □ □ □ (duct-ventilated)

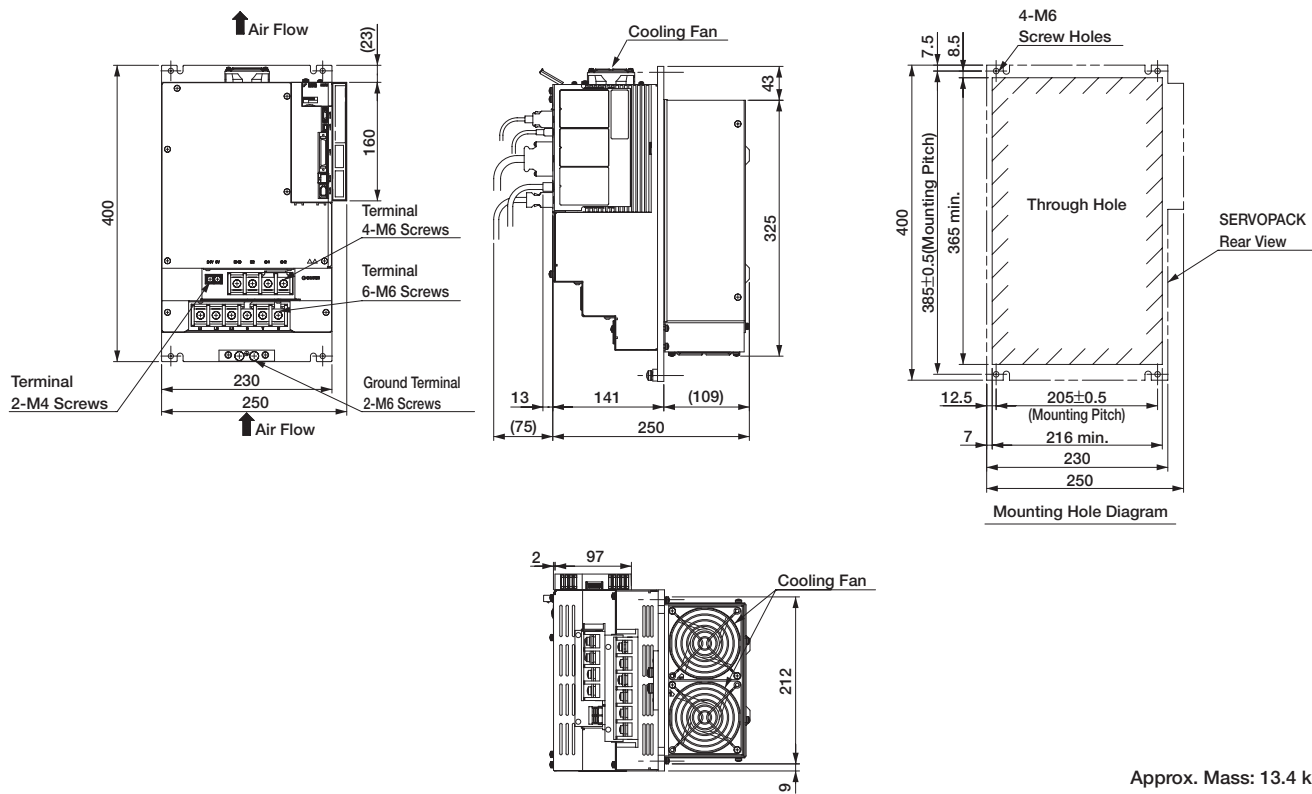


\*: Approx. mass of option modules are not included in this value.  
 Approx. mass of option modules are as follows.  
 • INDEXER Module: 0.2 kg  
 • Fully-closed Module: 0.1 kg

## 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

# $\Sigma$ -V SERIES

## SERVOPACK External Dimensions



# Option Module for EtherCAT (CoE) Communication Reference

## ● System Configuration for EtherCAT (CoE) Communication Reference

### Features

The EtherCAT (CoE) Network Module implements the CANopen drive profile (CiA402) in EtherCAT communication (real-time Ethernet communication).

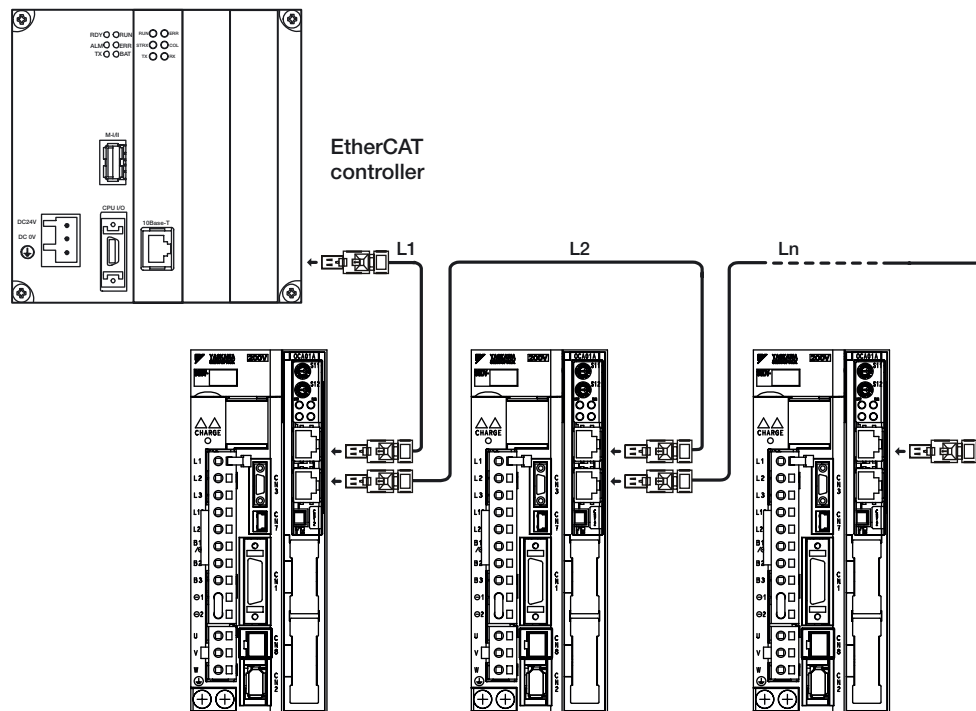
#### ● Topology

Flexible topologies enable the application for various system architectures, such as cascade connection, line connection, star connection, and ring connection.

#### ● Synchronization Control

The Distributed Clock of the EtherCAT synchronizes the controller and the SERVOPACK. (Synchronization jitter between servo axes: 1  $\mu$ s or less)

Note: EtherCAT is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



### Model Designation

**SGDV – OC A01 A**

Series	
SGDV	$\Sigma$ -V Series

1st + 2nd digits: Module Type	
Code	Module
OC	Command option module

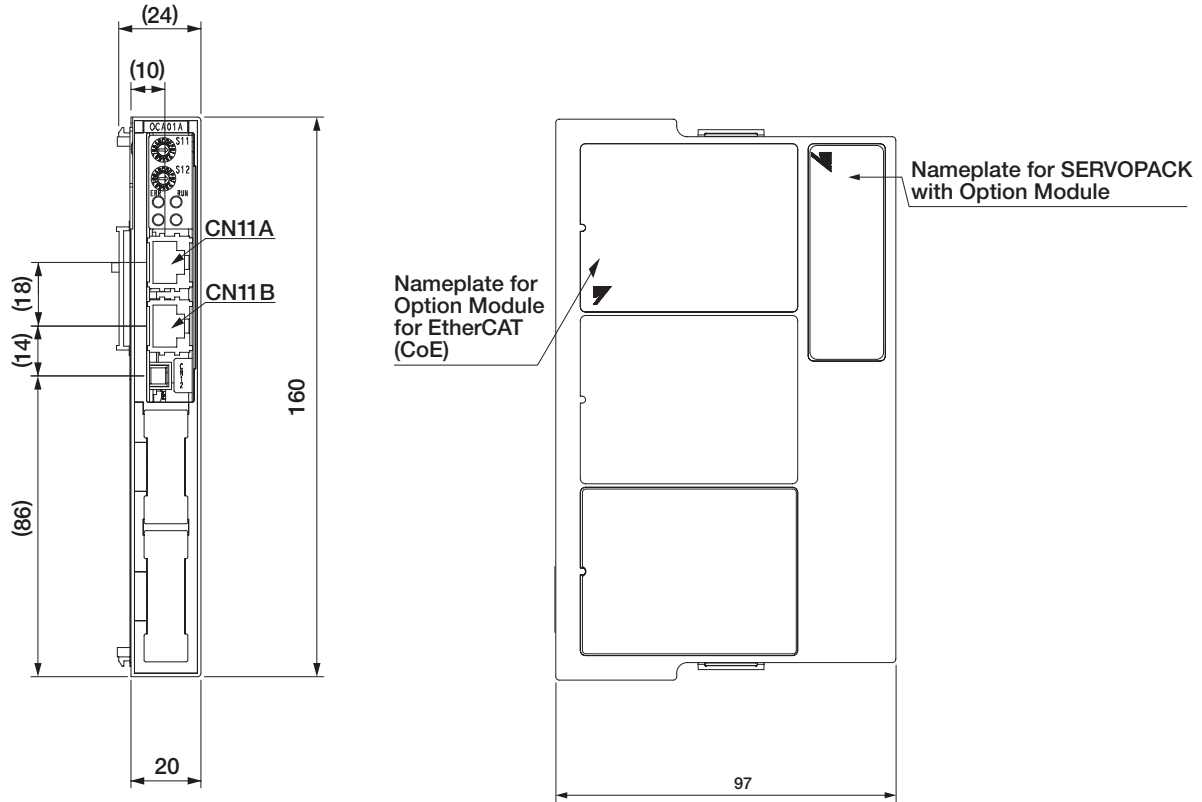
3rd + 4th + 5th digits: Interface Specifications	
Code	Interface
A01	EtherCAT (CoE)

6th digit: Design Revision Order

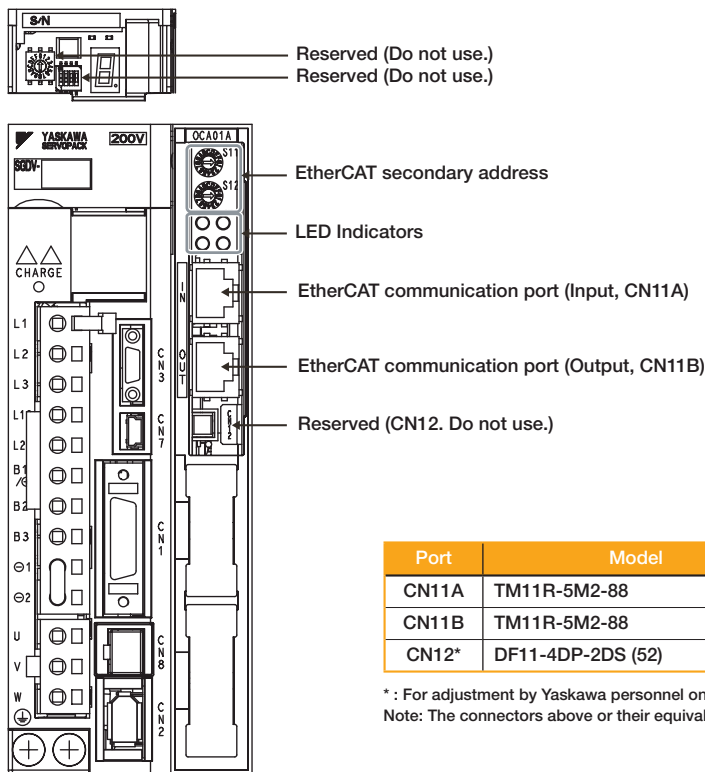
NOTE: Mounting of Option Modules on Amplifiers with Interface Option E1 and E5 requires mounting kit SGDV-OZA01A (metal bar, mounting screws and cover).

## Option Module for EtherCAT (CoE)

● External Dimensions Units: mm



Approx. Mass: 0.1 kg



Front View: With front cover open

### EtherCAT Connector (RJ45)

Connector	Description
CN11A	EtherCAT signal input
CN11B	EtherCAT signal output

● Connector Pin Arrangement

Pin No.	Signal Name	Remarks
1	TD+	Send data
2	TD-	
3	RD+	Receive data
4	-	N.C.*
5	-	N.C.*
6	RD-	Receive data
7	-	N.C.*
8	-	N.C.*

\* Pins denoted as N.C. do not connect to any signal.

Port	Model	Pin	Manufacturer
CN11A	TM11R-5M2-88	8	Hirose Electric Corporation
CN11B	TM11R-5M2-88	8	Hirose Electric Corporation
CN12*	DF11-4DP-2DS (52)	4	Hirose Electric Corporation

\* : For adjustment by Yaskawa personnel only. (Not for customer use)  
 Note: The connectors above or their equivalents are used for SERVOPACKS

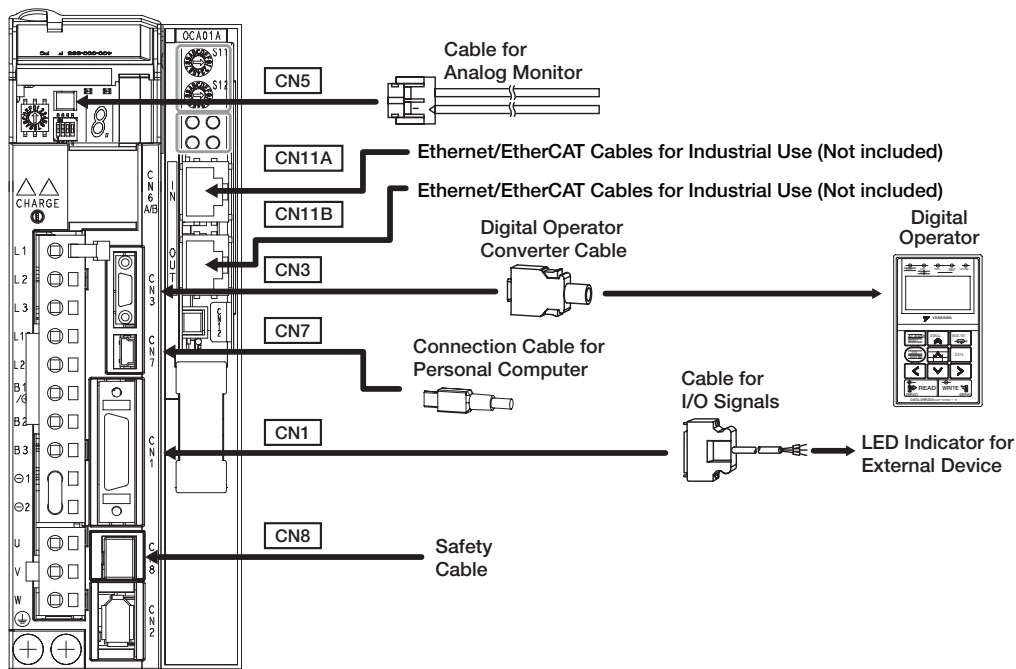
## Specifications of the EtherCAT(CoE) Network Module



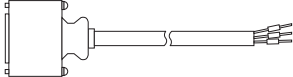

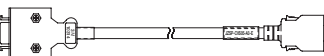


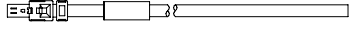
### ● Specifications

Items		Specifications
Power Specifications	Power Supply Method	Supplied from the control power supply of the SGD V SERVOPACK
Operating Conditions	Surrounding Air/Storage Temperature	Surrounding air temperature: 0 to 55°C, Storage temperature: -20 to 85°C
	Ambient/Storage Humidity	90% RH or less (with no freezing or condensation)
	Vibration/Shock Resistance	Vibration resistance: 4.9 m/s <sup>2</sup> , Shock resistance: 19.6 m/s <sup>2</sup>
	Protection Class/ Pollution Degree	Protection class: IP10, pollution degree: 2 Do not use SERVOPACKs in the following locations: <ul style="list-style-type: none"> <li>• Locations subject to corrosive or flammable gases</li> <li>• Locations subject to exposure to water, oil, or chemicals</li> <li>• Locations subject to dust, including iron dust, and salts</li> </ul>
	Altitude	1000 m or less
	Others	Do not use SERVOPACKs in the following locations: <ul style="list-style-type: none"> <li>• Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity</li> </ul>
Conformance Standards		UL508C EN50178, EN55011/A2 Group1 Class A, EN61000-6-2 EN61800-3, EN61800-5-1, EN954-1, IEC61508-1 to 4
RoHS Directive		Compliant
Baud Rate		100 Mbps
Max. No. of Stations		65536 stations
Transmission Cycle		125 μs to 4 ms
Cable Length between Nodes		50 m max.
Topology		Cascade, star, tree, ring, line
Connector		RJ-45
Ethernet/EtherCAT Cables for Industrial Use (CN11A, CN11B)		Category: CAT5e Shield specifications: S/UTP or S/STP Cable length: 50 m maximum
Profile		CANopen (CoE) IEC61800-7 CiA402 Drive Profile
Control Mode		<ul style="list-style-type: none"> <li>• Homing mode</li> <li>• Profile position mode</li> <li>• Interpolated position mode</li> <li>• Profile velocity mode</li> <li>• Profile Torque mode</li> <li>• Cyclic sync position mode</li> <li>• Cyclic sync velocity mode</li> <li>• Cyclic sync torque mode</li> </ul>
Display		EtherCAT RUN indicator (RUN) × 1 EtherCAT ERR indicator (ERR) × 1 EtherCAT Link/Activity indicator × 2
Rotary Switch		Secondary Address : × 2

## Selecting Cables

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



Name	Length	Order No.	Specifications	
<b>CN1</b> Cables for I/O Signals	Connector Kit	JZSP-CSI9-2-E	Soldered 	
	Connector Terminal Converter Unit	JUSP-TA26P-E	Terminal Block and 0.5 m Connection Cable 	
	Cable with Loose wire at One End	1 m	JZSP-CSI02-1-E	
		2 m	JZSP-CSI02-2-E	
3 m		JZSP-CSI02-3-E		
<b>CN3</b>	Digital Operator	JUSP-OP05A-1-E	With Connection Cable (1 m) 	
	Digital Operator Converter Cable <sup>1</sup>	0.3 m	JZSP-CVS05-A3-E Cable with Connectors at Both Ends 	
<b>CN7</b> Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	
<b>CN5</b> Cables for Analog Monitor	1 m	JZSP-CA01-E	SERVOPACK End 	
		JZSP-CVH03-03-E JZSP-CVH03-03-E-G3		
<b>CN8</b> Cables for Safety Functions	Cables with Connector <sup>2</sup>	3 m	Contact Tyco Electronics AMP K.K. Product name : Industrial Mini I/O D-shape Type1 Plug Connector Kit Model : 2013595-1	
	Connector kit <sup>3</sup>			
<b>CN11A</b> <b>CN11B</b> Ethernet/EtherCAT Cables for Industrial Use			Category: CAT5e Shield specifications: S/UTP or S/STP Cable length: 50 m maximum	

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

\*2 : When using the safety function, connect this cable to the safety devices.

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

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



# CANopen Network Module

## ● Product Overview for the CANopen Network Module

The CANopen network module is an add-on board, compatible with  $\Sigma$ -V Series models, which provides an interface for CANopen networking (Network type). The CANopen interface enables the user to achieve high-speed distributed control with a high level of reliability. CANopen is a higher-layer protocol commonly used in automation industry. The specification of this protocol is maintained and developed by the CiA (CAN in Automation) organization ([www.can-cia.org](http://www.can-cia.org)).

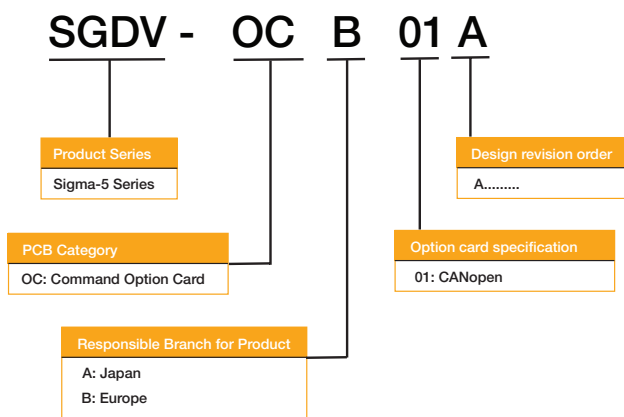
The SGDV-OCB01A offers a wide range of functions based on the following:

- CANopen DS-301 specification
- Drive profiles according to DS-402, V2.0 support the following modes:
  - Profile Position Mode
  - Homing Mode
  - Profile Velocity Mode
  - Profile Torque Mode
  - Interpolated position mode
- Additionally two touch probe functions are implemented
- Rotary switches for setting node ID – up to 127 nodes
- Communication rate of up to 1 Mbps
- Standard 9-pin D-type connector
- Two indicator LEDs according to CiA303-3

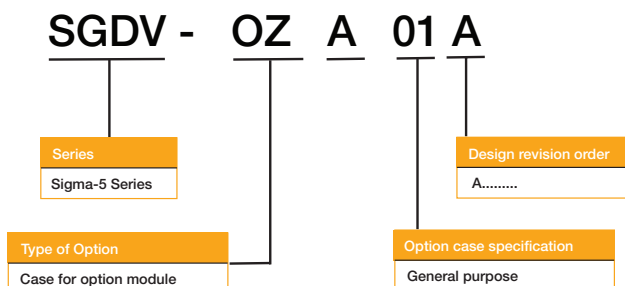
## Model Designation

The network module that is mounted onto the servopack consists of the network card and the housing for the network card.

Model designation for the network card



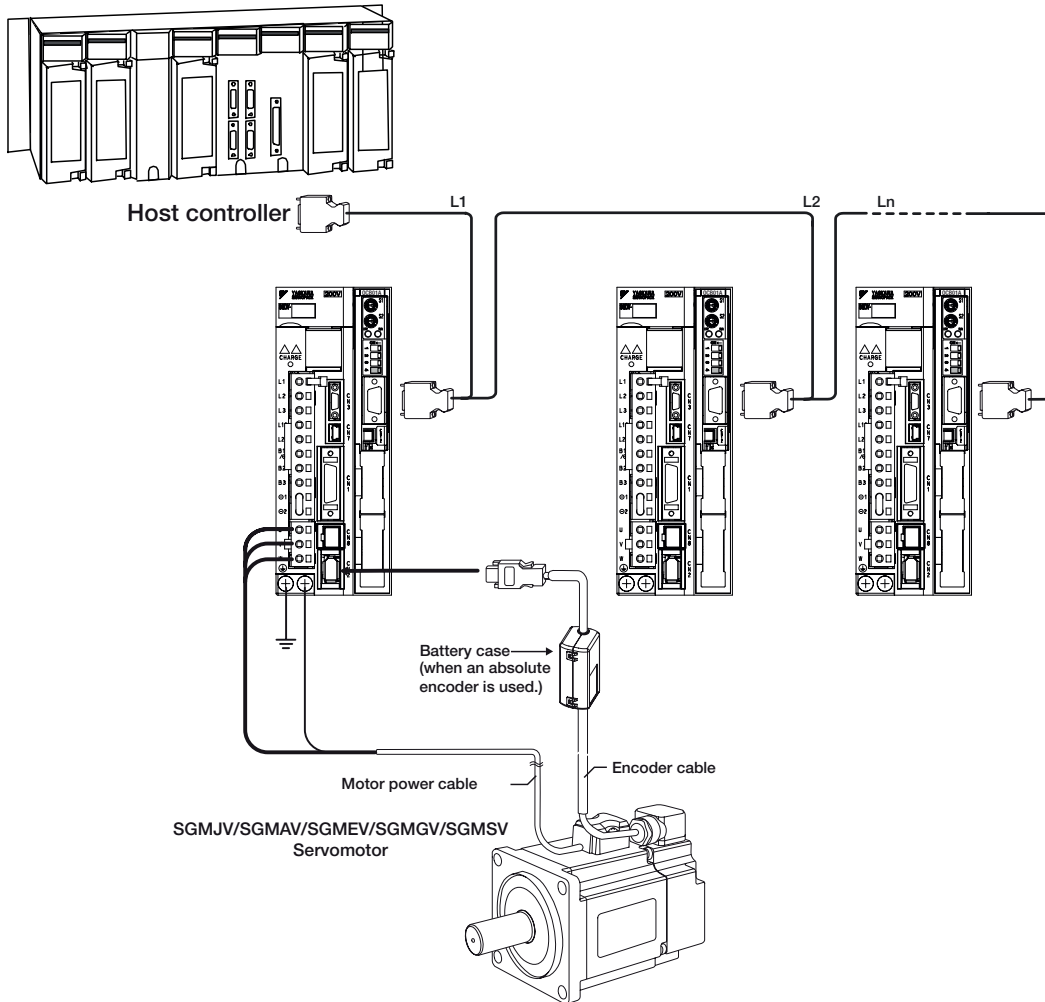
Model designation for the housing



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

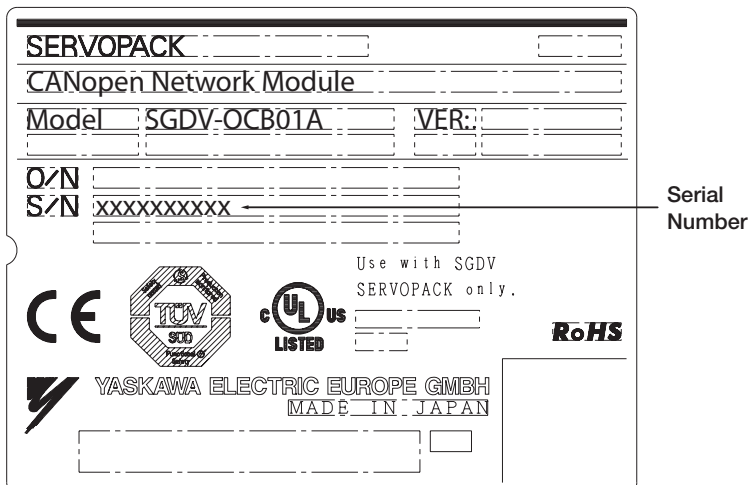


## System Configuration for the CANopen Network Module



- Nameplate

The description and production details of the product are displayed on the network module's nameplate as shown below.



## Hardware Interface of the CANopen Network Module

The table below describes the elements of the SGD-OCB01A hardware interface as displayed in the figure on the right side of the table

No.	Name	Description
1	RUN LED	Indicates the status of the CANopen network state machine.
2	ERROR LED	Indicates the status of the CAN physical layer and indicates errors due to missing CAN messages.
3	S1: Address Switch	Sets the most significant bit of the CAN node address (hexadecimal format).
4	S2: Address Switch	Sets the least significant bit of the CAN node address (hexadecimal format).
5	S3: Baud Rate Selection Switch	Sets the baud rate using the DIP switch S3.
6	CN11 connector	D-SUB 9-Pin Plug CAN Bus Connector
7	CN12 connector	14-Pin high density Serial Port connector



### ● S1 and S2 – Address switches

Each CAN device should be assigned with a unique identification number.

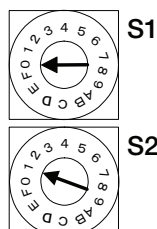
The identification number is referred to as the Node-ID. The Node-ID range is from 1 to 127.

The SGD-OCB01A has two hexadecimal rotary switches for setting the Node ID.

The Node-ID is a combination of two hexadecimal digits.

The following table shows a few examples:

Decimal Address	Switch S1	Switch S2	Hexadecimal Value
01	0	1	01
58	3	A	3A
127	7	F	7F



Either the device must be powered on, or the application or communication must be reset for the newly set address to become effective. The factory default setting for the Node ID is 1.

### ● CAN Connector Terminal Layout

The SGD-OCB01A is connected to the CAN Bus with the CN11 connector.

Connector type: D-type, 9 pin, male.

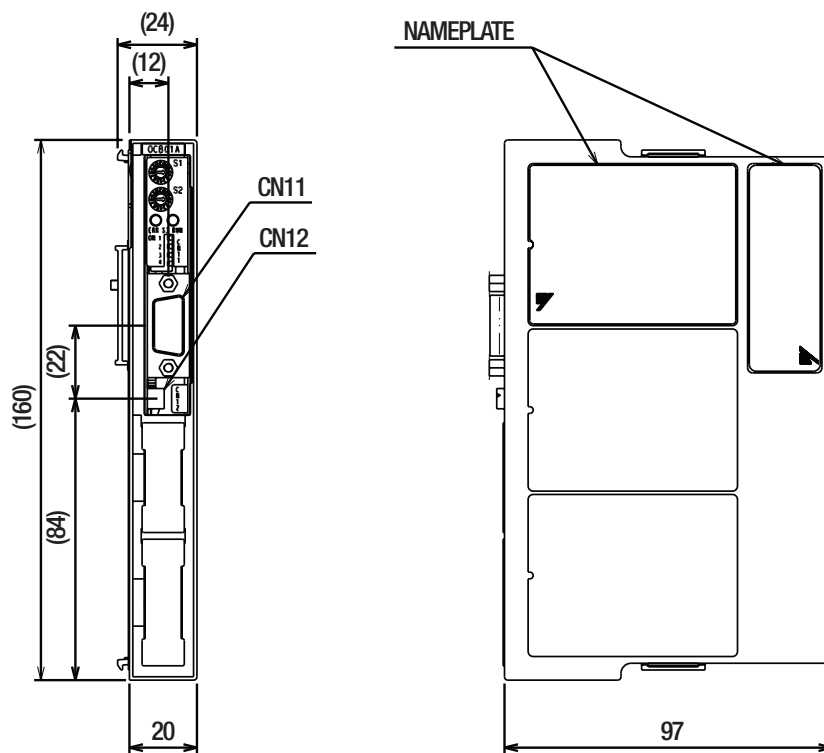
Pin No.	Name
1	NC
2	CAN-L
3	GND
4	NC
5	NC
6	NC
7	CAN -H
8	NC
9	NC
Shield	Connected to CAN cable shield

## Specifications of the CANopen Network Module

### ● Specifications

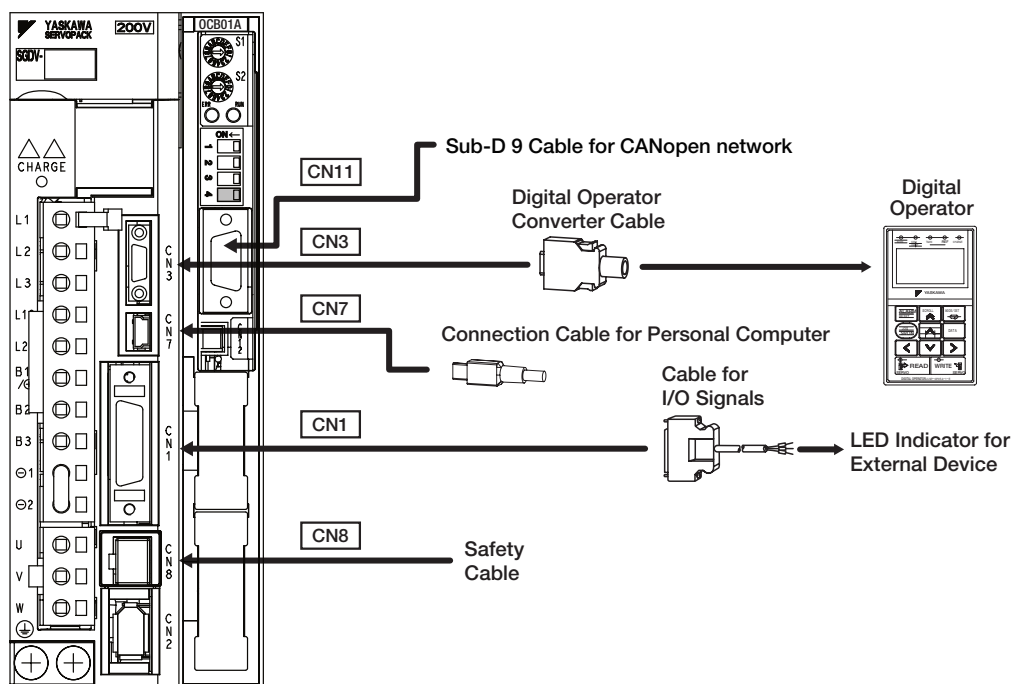
Items	Specifications	
Applicable SERVOPACK	Σ-V Series SGDV-□□□□□E SERVOPACK, all models	
Placement	Attached to the SERVOPACK	
Power Specification	Power Supply Method	
	Supplied from the control power supply of the SGDV SERVOPACK	
Operating Conditions	Surrounding Air/Storage Temperature	Surrounding air temperature: 0 to +55°C, Storage temperature: -20 to +85°C
	Ambient/Storage Humidity	90% RH or less (with no condensation)
	Ambient temperature to ensure long-term reliability	+45 °C or less
	Vibration/Shock Resistance	Vibration resistance: 4.9 m/s <sup>2</sup> or less, Shock resistance: 19.6 m/s <sup>2</sup>
	Protection Class/Pollution Degree	Protection class: IP10, pollution degree: 2 Do not use SERVOPACKs in the following locations: <ul style="list-style-type: none"> <li>• Locations subject to corrosive or flammable gases</li> <li>• Locations subject to exposure to water, oil, or chemicals</li> <li>• Locations subject to dust, including iron dust, and salts</li> </ul>
	Altitude	1000 m or less
	Others	Do not use SERVOPACKs in the following locations: <ul style="list-style-type: none"> <li>• Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity</li> </ul>
Conformance Standards	<ul style="list-style-type: none"> <li>• CiA Specifications</li> <li>• Safety Standard UL508</li> <li>• Material Compliance UL94V-0</li> <li>• WEEE Directive 2002/96/EC</li> <li>• Low Voltage Directive 73/23/EEC</li> <li>• EMC Directive 89/336/EEC</li> </ul>	
RoHS Directive 2002/95/EC	Compliant	
CANopen communication standards	DS-301, V4.02	
CAN bit rates	10, 20, 50, 125, 250, 500, 800, 1000 Kbps	
CAN identifier	Standard 11 bit	
CANopen node-ID	1-127 (set by two rotary switches)	
Connector	Sub-D 9	
SDO communication	1 server	
Block transfer	No	
Segmented transfer	Yes	
Block transfer	No	
PDO communication	Producer and consumer, default setting according to DS-402	
Supported RPDOs	1 to 4	
Supported TPDOs	1 to 4	
SYNC	Consumer	
Time stamp	No	
Emergency messages	Producer	
Node guarding	No	
Heartbeat	Producer and Consumer	
Non-volatile storage	Yes	
CANopen profile for drives	DS-402, V2.0	
Axis types	Linear and Rotary	
Motor type	Brushless AC servo	
Current consumption	0.28 A from 5 V DC Servo Drive supply	



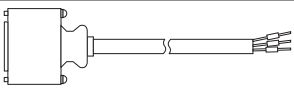

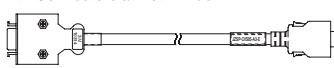

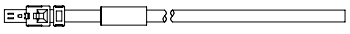
## Dimensions of the CANopen Network Module



## Selecting Cables

- Cables for **CN1** **CN3** **CN7** **CN8** **CN11** for Command Option Attachable Type SERVOPACKS



Name	Length	Order No.	Specifications	
<b>CN1</b> Cables for I/O Signals	Connector Kit	JZSP-CSI9-2-E	Soldered 	
	Connector Terminal Converter Unit	JUSP-TA26P-E	Terminal Block and 0.5 m Connection Cable 	
	Cable with Loose wire at One End	1 m	JZSP-CSI02-1-E	
		2 m	JZSP-CSI02-2-E	
3 m		JZSP-CSI02-3-E		
<b>CN3</b>	Digital Operator	JUSP-OP05A-1-E	With Connection Cable (1 m) 	
	Digital Operator Converter Cable <sup>*1</sup>	0.3 m	JZSP-CVS05-A3-E Cable with Connectors at Both Ends 	
<b>CN7</b> Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	
<b>CN8</b> Cables for Safety Functions	Cables with Connector <sup>*2</sup>	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3 	
	Connector kit <sup>*3</sup>		Contact Tyco Electronics AMP K.K. Product name : Industrial Mini I/O D-shape Type1 Plug Connector Kit Model : 2013595-1	
<b>CN11</b> CANopen Cable for Industrial Use			CANopen cable has a single twisted pair with overall shielding. CANopen has a specified colour code, and it is strongly recommended that this code is maintained. Since CANopen networks run at high data rates, they require cable specifically designed to carry high frequency signals. Low quality cable will attenuate the signals, and may render the signal unreadable for the other nodes on the network. We can only guarantee correct and reliable operation if all other equipment installed on the CANopen network (including the network cable) has been approved by CAN in Automation (CiA).	

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

\*2 : When using the safety function, connect this cable to the safety devices.

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

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



# Option Module for Ethernet Powerlink Communication Reference

## ● Functional principle

Ethernet POWERLINK (EPL) is a communication profile for Real-Time Ethernet (RTE). It extends Ethernet according to the IEEE 802.3 standard with mechanisms to transfer data with predictable timing and precise synchronization. The communication profile meets timing demands typical for high-performance automation and motion applications. It does not change basic principles of the Fast Ethernet Standard IEEE 802.3 but extends it towards Real-Time Ethernet. Thus it is possible to leverage and continue to use any standard Ethernet silicon, infrastructure component or test and measurement equipment like a network analyzer.

The  $\Sigma$ -V series Ethernet POWERLINK Network Module implements the CANopen drive profile DS 402 from CiA402 in Ethernet POWERLINK communication (real-time Ethernet communication).

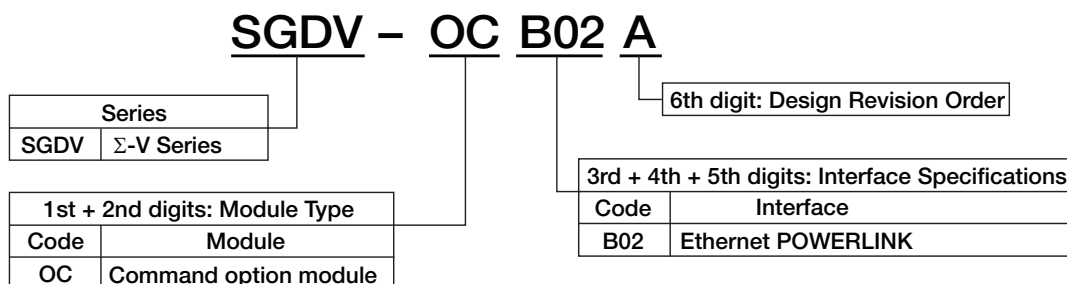
Position, velocity, and torque control can be performed. An appropriate form of system control can be selected, from simple positioning to high-speed, high-precision locus control.

Moreover, the  $\Sigma$ -V high servo control performance, advanced tuning function, and wide range of actuator controls can be performed via Powerlink.

## Features

- Ease-of-Use to be handled by typical automation engineers without in-depth Ethernet network knowledge
- up to 240 networked real-time nodes in one network segment
- deterministic communication guaranteed
- IAONA Real-Time Class 4, highest performance
  - minimum cycle time of  $\leq 200 \mu\text{s}$
  - minimum jitter of  $< 1 \mu\text{s}$ , for precise synchronization of networked nodes
- direct peer-to-peer communication of all nodes (publish/subscribe)
- “Hot Plugging” functionality
- Seamless integration into other networks via routing
- Standard Compliant
  - IEEE 802.3u Fast Ethernet
  - IP based protocols supported, e.g. UDP
  - Integration with CANopen Profiles EN50325-4 for device interoperability

## Model Designation



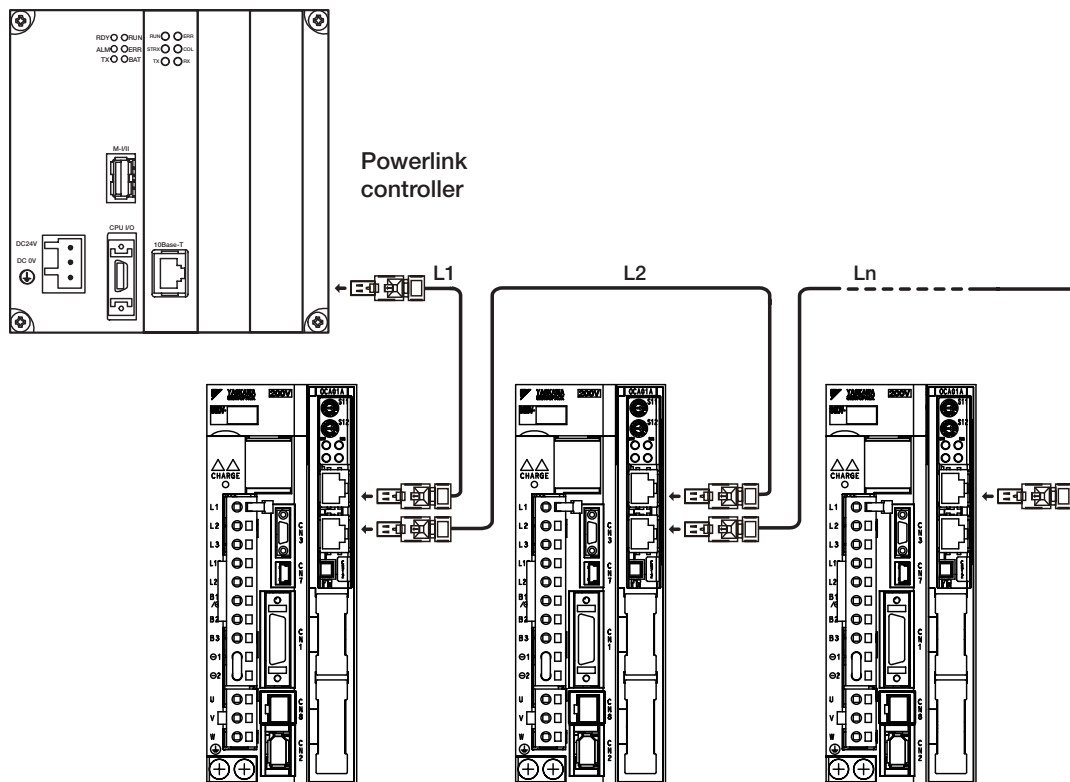
NOTE: Mounting of Option Modules on Amplifiers with Interface Option E1 and E5 requires mounting kit SGDV-OZA01A (metal bar, mounting screws and cover).

## System Configuration for Ethernet Powerlink Communication Reference

The following figure shows an example of connections between a host controller and a SERVOPACK using the Powerlink communication.

Connect the connector of the Powerlink communications cable to the connectors CN11A and CN11B.

Connect CN11A to the master and CN11B to the slave. If reversed, communication will not be successfully performed.



### Powerlink Connector (RJ45)

Connector	Description
CN11A	Powerlink signal input
CN11B	Powerlink signal output

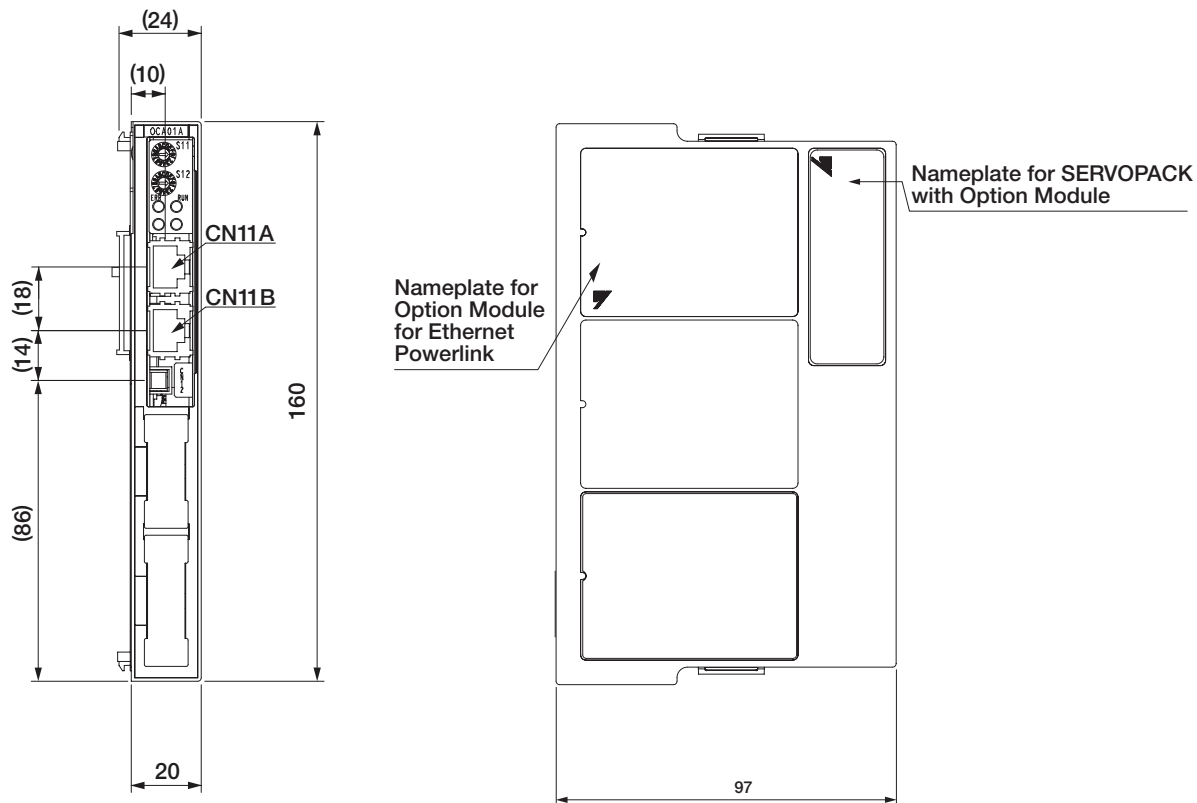
#### • Connector Pin Arrangement

Pin No.	Signal Name	Remarks
1	TD+	Send data
2	TD-	
3	RD+	Receive data
4	-	N.C.*
5	-	N.C.*
6	RD-	Receive data
7	-	N.C.*
8	-	N.C.*

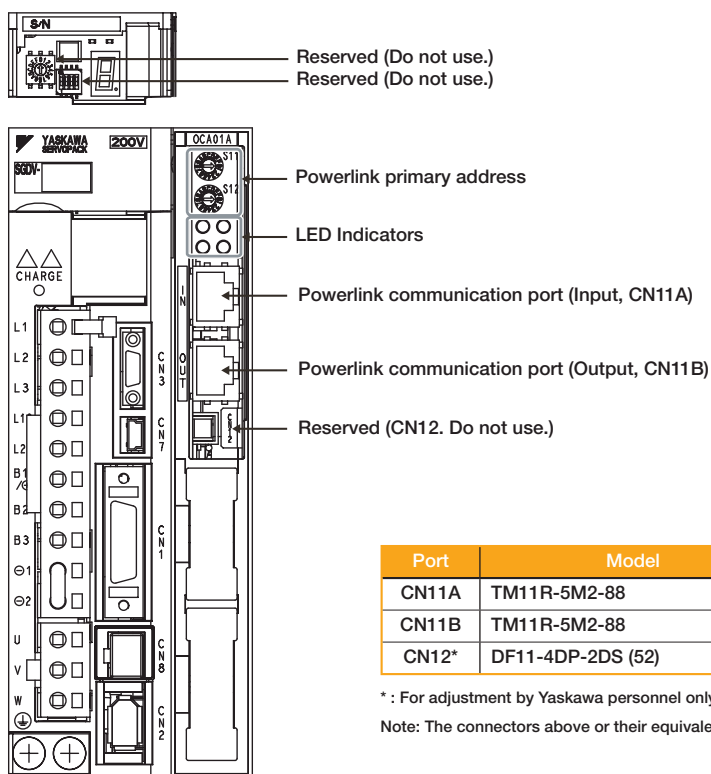
\* Pins denoted as N.C. do not connect to any signal.

External Dimensions Units: mm

● System Configuration for Ethernet Powerlink Communication Reference



Approx. Mass: 0.1 kg



Reserved (Do not use.)  
Reserved (Do not use.)

Powerlink primary address  
LED Indicators  
Powerlink communication port (Input, CN11A)  
Powerlink communication port (Output, CN11B)  
Reserved (CN12. Do not use.)

Port	Model	Pin	Manufacturer
CN11A	TM11R-5M2-88	8	Hirose Electric Corporation
CN11B	TM11R-5M2-88	8	Hirose Electric Corporation
CN12*	DF11-4DP-2DS (52)	4	Hirose Electric Corporation

\* : For adjustment by Yaskawa personnel only. (Not for customer use)

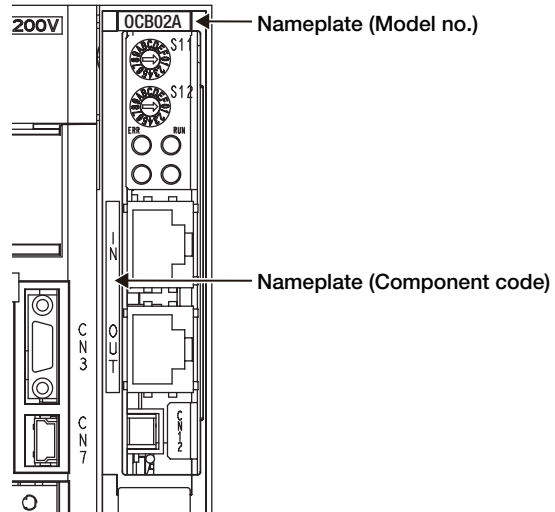
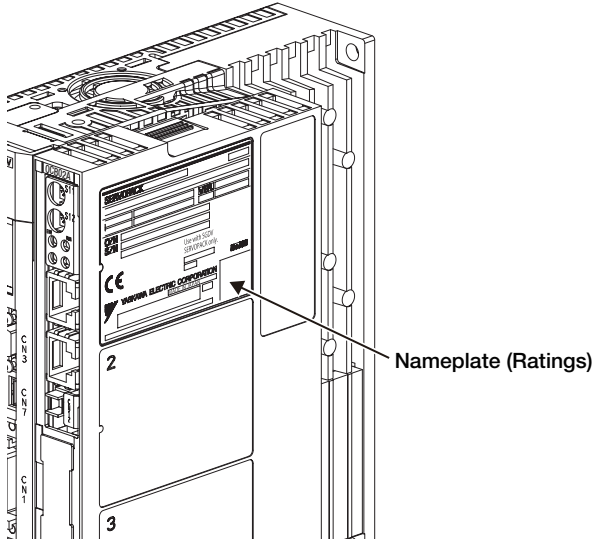
Note: The connectors above or their equivalents are used for SERVOPACKs

Front View: With front cover open

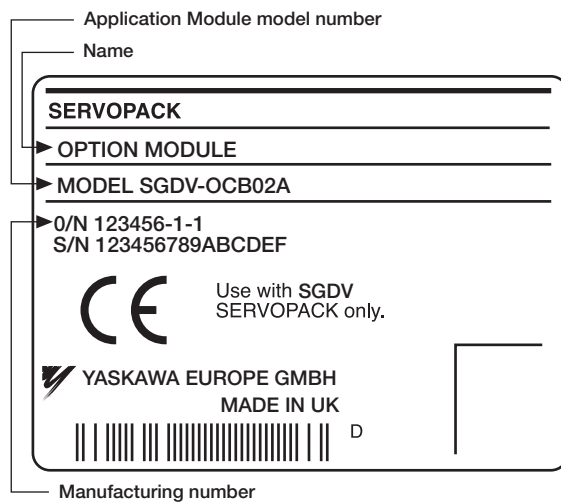
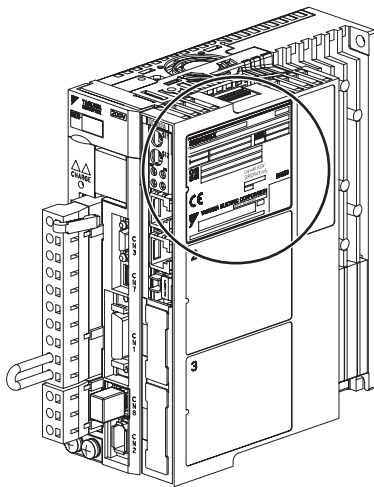


## Nameplate and model designation

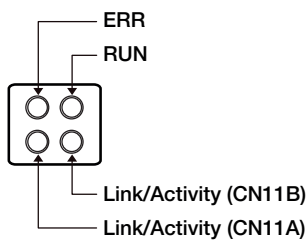
### ● Nameplate (Ratings)



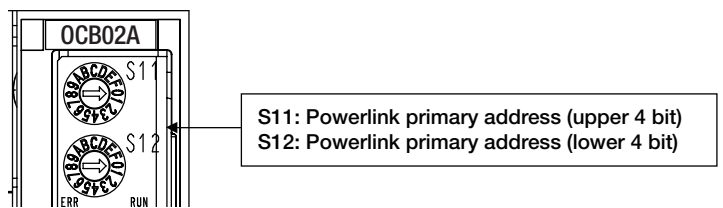
### ● Nameplate Location



### ● LED indicators



### ● Powerlink Primary Address Settings



The Powerlink primary address (Station Alias) can be used for identification or for addressing of a device.

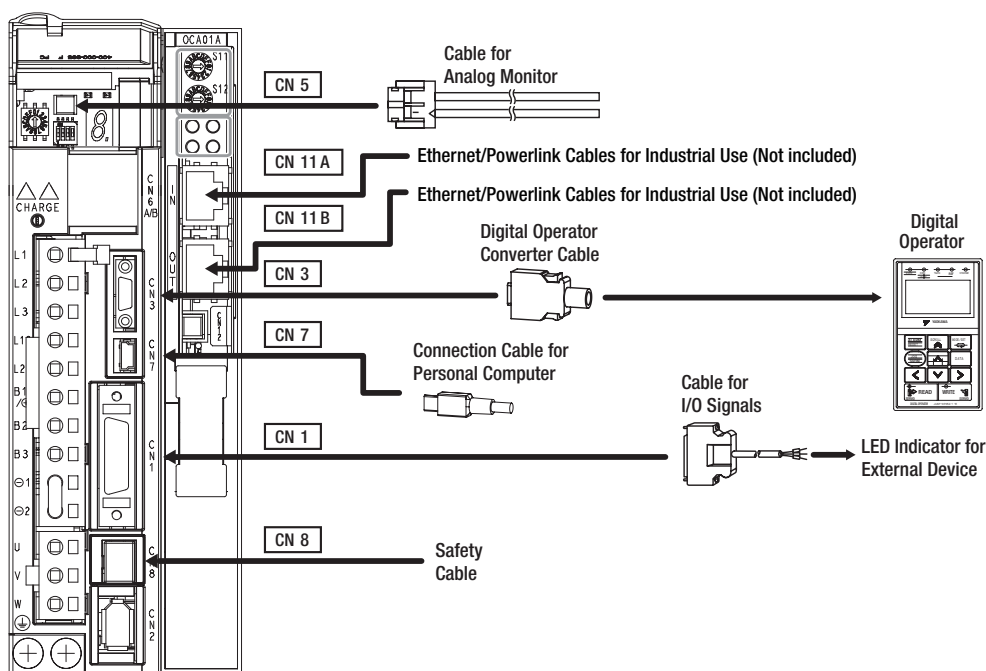
## Specifications of the Ethernet Powerlink Network Module



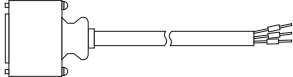

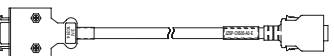


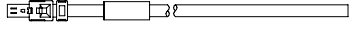
### ● Specifications

Items		Specifications
Power Specifications	Power Supply Method	Supplied from the control power supply of the SGD <sub>V</sub> SERVOPACK
Operating Conditions	Surrounding Air/Storage Temperature	Surrounding air temperature: 0 to 55°C, Storage temperature: -20 to 85°C
	Ambient/Storage Humidity	90% RH or less (with no freezing or condensation)
	Vibration/Shock Resistance	Vibration resistance: 4.9 m/s <sup>2</sup> , Shock resistance: 19.6 m/s <sup>2</sup>
	Protection Class/ Pollution Degree	Protection class: IP10, pollution degree: 2 Do not use SERVOPACKs in the following locations: <ul style="list-style-type: none"> <li>• Locations subject to corrosive or flammable gases</li> <li>• Locations subject to exposure to water, oil, or chemicals</li> <li>• Locations subject to dust, including iron dust, and salts</li> </ul>
	Altitude	1000 m or less
	Others	Do not use SERVOPACKs in the following locations: <ul style="list-style-type: none"> <li>• Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity</li> </ul>
Conformance Standards		UL508C EN50178, EN55011/A2 Group1 Class A, EN61000-6-2 EN61800-3, EN61800-5-1, EN954-1, IEC61508-1 to 4
RoHS Directive		Compliant
Baud Rate		100 Mbps, half-duplex
Max. No. of Stations		240 stations
Transmission Cycle		125 μs to 4 ms
Cable Length between Nodes		100 m max.
Topology		Cascade, star, tree, ring, line
Connector		RJ-45
Ethernet Cables for Industrial Use (CN11A, CN11B)		Category: CAT5e Shield specifications: S/UTP or S/STP Cable length: 50 m maximum
Profile		Ethernet Powerlink version V 2 IEC 61800-7-1/2/3 Committee Draft
Control Mode		<ul style="list-style-type: none"> <li>• Homing mode</li> <li>• Profile position mode</li> <li>• Interpolated position mode</li> <li>• Profile velocity mode</li> <li>• Profile Torque mode</li> </ul>
Display		Powerlink STATUS indicator (green) × 1 Powerlink ERROR indicator (red) × 1 Powerlink Link/Activity indicator × 2
Rotary Switch		Primary Address : × 2

## Selecting Cables

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



Name	Length	Order No.	Specifications	
<b>CN1</b> Cables for I/O Signals	Connector Kit	JZSP-CSI9-2-E	Soldered 	
	Connector Terminal Converter Unit	JUSP-TA26P-E	Terminal Block and 0.5 m Connection Cable 	
	Cable with Loose wire at One End	1 m	JZSP-CSI02-1-E	
		2 m	JZSP-CSI02-2-E	
3 m		JZSP-CSI02-3-E		
<b>CN3</b>	Digital Operator	JUSP-OP05A-1-E	With Connection Cable (1 m) 	
	Digital Operator Converter Cable <sup>1</sup>	0.3 m	JZSP-CVS05-A3-E Cable with Connectors at Both Ends 	
<b>CN7</b> Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	
<b>CN5</b> Cables for Analog Monitor	1 m	JZSP-CA01-E	SERVOPACK End 	
<b>CN8</b> Cables for Safety Functions	Cables with Connector <sup>2</sup>	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3 	
	Connector kit <sup>3</sup>		Contact Tyco Electronics AMP K.K. Product name : Industrial Mini I/O D-shape Type1 Plug Connector Kit Model : 2013595-1	
<b>CN11A</b> <b>CN11B</b> Ethernet/Powerlink Cables for Industrial Use			Category: CAT5e Shield specifications: S/UTP or S/STP Cable length: 50 m maximum	

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

\*2 : When using the safety function, connect this cable to the safety devices.

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

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



# INDEXER Option Module for single-axis positioning

## ● Product Overview for the INDEXER Option Module

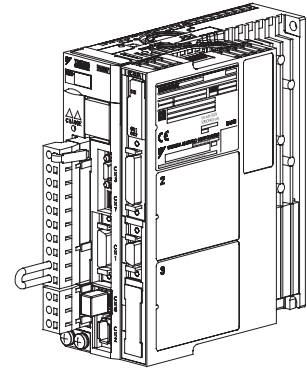
The INDEXER Module is a single-axis positioning device that is equipped with a program table operation function. It is mounted to the side of the SERVOPACK. The INDEXER Module has two reference methods: digital I/O and serial commands.

Digital I/O is structured as a program table (Mode 0) or homing/JOG speed table (Mode 1). If the program table (Mode 0) is being used, the program step selected with the input signal pattern (binary format) can be executed. If the JOG speed table (Mode 1) is being used, the JOG speed selected with the input signal pattern (binary format) can be executed.

With serial commands, ASCII command strings are sent to the INDEXER Module through RS-422 or RS-485 communications and these commands are interpreted and executed immediately.

The support software tool, SigmaWin+, can be used to easily set program tables and parameters or to perform monitoring operations.

These same operations can also be performed using serial commands.



INDEXER Module  
Mounted on  $\Sigma$ -V Series  
SGDV SERVOPACK

### Simple

- Program tables for easy programming and serial commands for easy realization of motion control.
- The setup support tool (SigmaWin+) for Windows enables easy start-up.
- Simple connection to the host controller can be established via the I/O module.

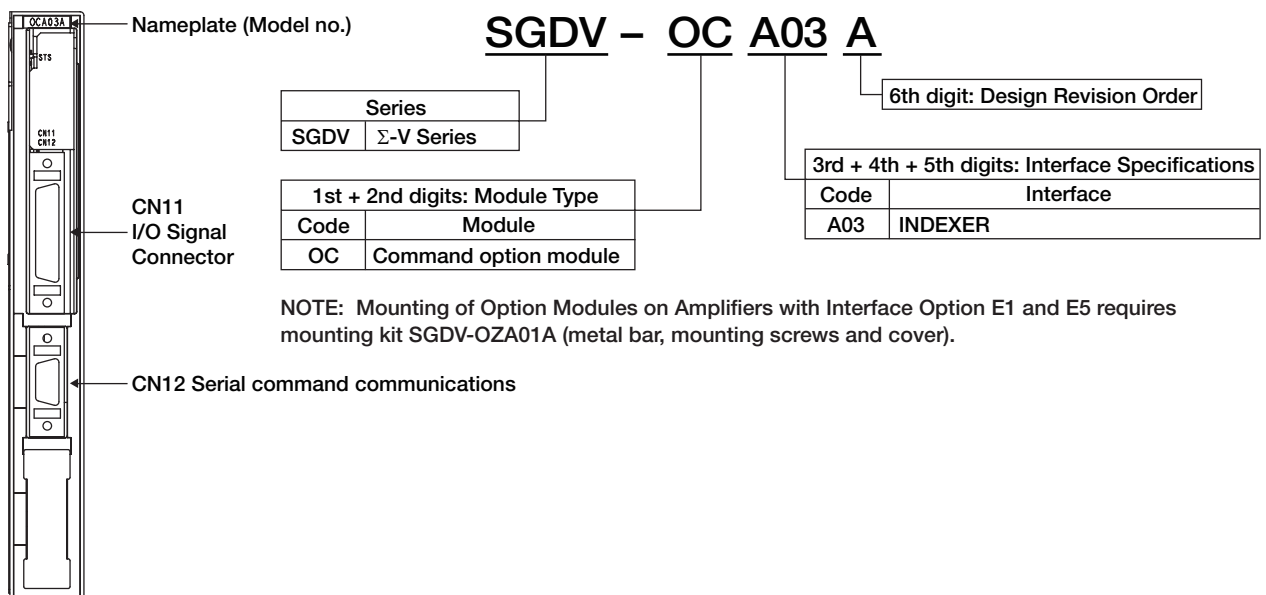
### Smart

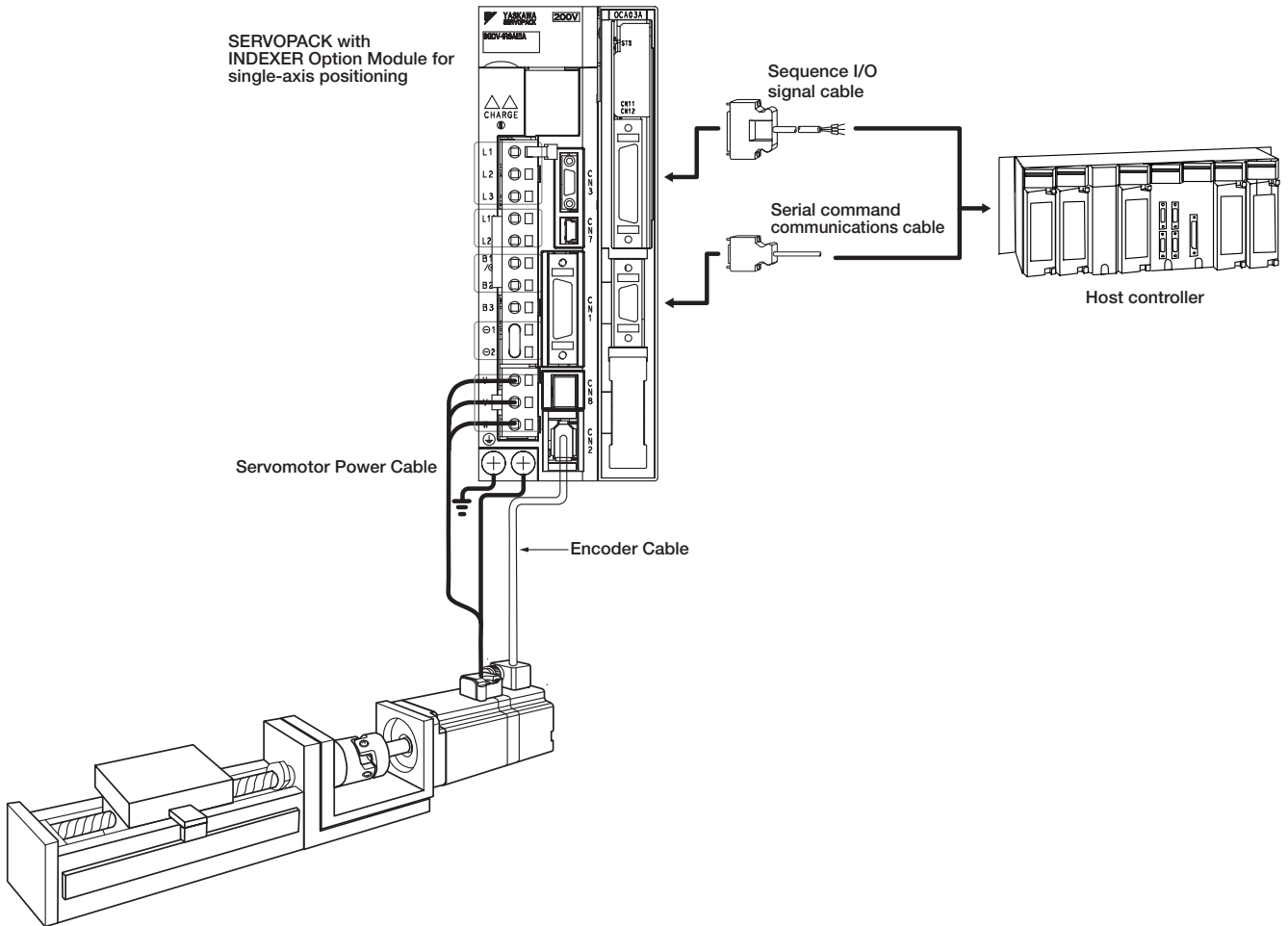
- By using program tables, all required operations (including positioning) can be simplified. For positioning, up to 256 steps can be programmed.
- Various functions, including external positioning, JOG table operation, homing, and programmable signal outputs are provided. I/O points: Input 19 points, Output 16 points

### Speedy

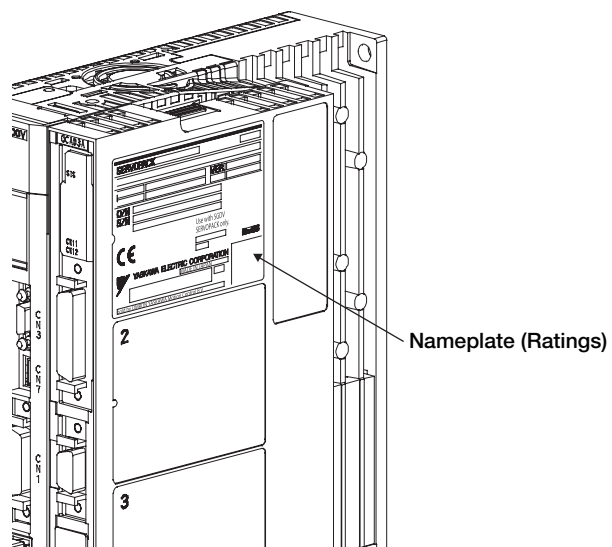
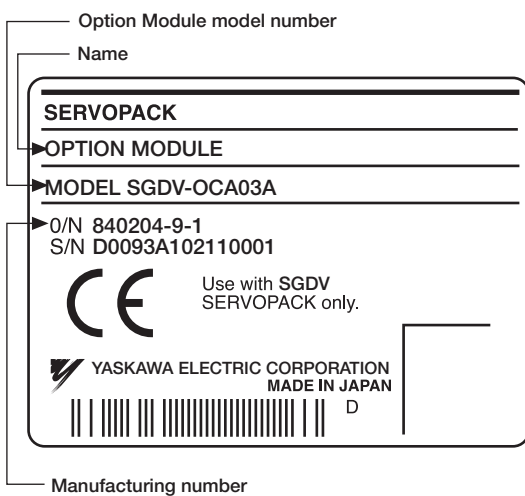
- Reliable high-speed, high-precision positioning when combined with high-performance  $\Sigma$ -V series servo drives.
- Motion control is accomplished without using motion controllers.

## Model Designation





● Nameplate example

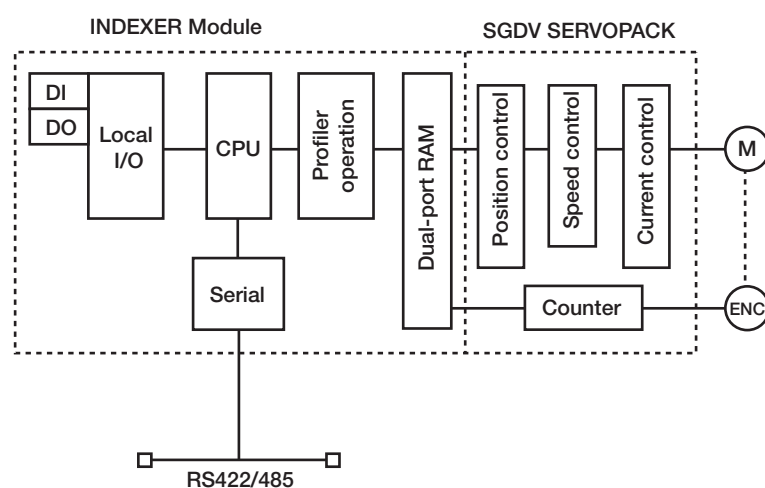


## INDEXER Option Module for single-axis positioning

### ● INDEXER Module Functions

Function	Description
Digital I/O Program Table (Mode 0)	The program step selection input signals (binary format) are used to select the desired positioning data from the program table stored in the INDEXER Module. The INDEXER Module can store up to 256 program steps. The program steps can be linked to create combinations that perform more complex motions.
Digital I/O Homing/JOG Speed Table (Mode 1)	Homing using an incremental encoder and operation using a JOG speed table with up to 16 speed levels can be performed.
Serial Commands	Positioning can be controlled by ASCII command strings received through RS-422 or RS-485 communications. Up to 16 axes can be connected. ASCII commands can also be used to operate using a program table.
Registration	Both the program table and serial commands are equipped with registration functions for external positioning.
Programmable Output Signals	There are 8 output signals (/POUT0 to /POUT7) for which the output status can be specified.
Zone Signals and Zone Table	The programmable output signals (/POUT0 to /POUT4) can also be used as zone signals. Up to 32 zones can be specified in the zone table.

### Block Diagram



### ● Communications Specifications of the CN12 connector

Item	Specifications
Interface	Full duplex (RS-422) or half duplex (RS-485) (Selectable with parameter PnB00.)
Max. Number of Axes	16 axes
Total Cable Length	RS-422/RS-485: 50 m max.
Bit Rate	9600, 19200, or 38400 bps (Selectable with parameter PnB01. Factory setting: 9600 bps)
Synchronization	Start-stop synchronization
Data Format	Start bits: 1 bit
	Data bits: 7 bits, ASCII
	Parity: 1 bit, even parity
	Stop bits: 1 bit
Flow Control	None
Shift Control	None

## Specifications of the INDEXER Option Module

### ● Specifications

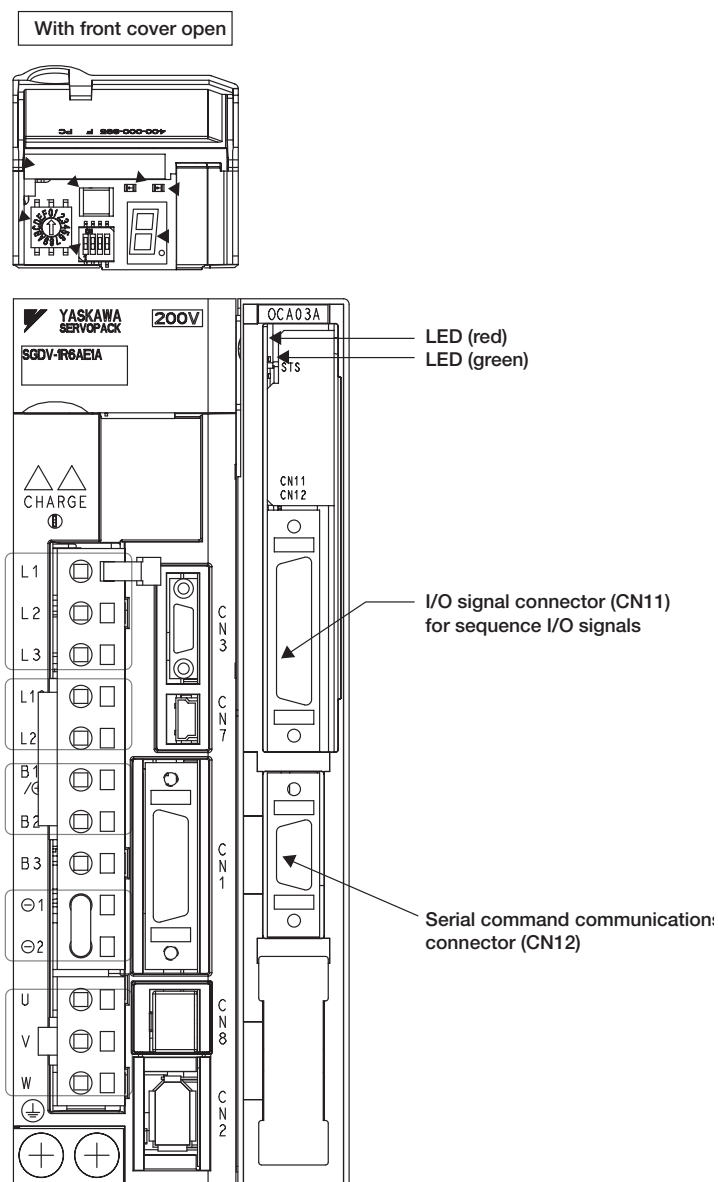
Items		Specifications
Applicable SERVOPACK		Σ-V Series SGD□-□□□□□□□□ SERVOPACK, all models
Placement		Attached to the SERVOPACK
Power Specification	Power Supply Method	Supplied from the control power supply of the SGD□ SERVOPACK
Operating Conditions	Surrounding Air/Storage Temperature	Surrounding air temperature: 0 to +55°C, Storage temperature: -20 to +85°C
	Ambient/Storage Humidity	90% RH or less (with no condensation)
	Vibration/Shock Resistance	Vibration resistance: 4.9 m/s <sup>2</sup> , Shock resistance: 19.6 m/s <sup>2</sup>
	Protection Class/ Pollution Degree	Protection class: IP10, pollution degree: 2 Do not use SERVOPACKs in the following locations: <ul style="list-style-type: none"> <li>• Locations subject to corrosive or explosive gases</li> <li>• Locations subject to exposure to water, oil, or chemicals</li> <li>• Locations subject to dust, including iron dust, and salts</li> </ul>
	Altitude	1000 m or less
	Others	Do not use SERVOPACKs in the following locations: <ul style="list-style-type: none"> <li>• Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity</li> </ul>
Control Method	Program Table Method	Program table positioning in which steps are executed sequentially by commands given through contact input or serial communications Positioning in which station numbers are specified by commands given through contact input or serial communications
	Max. Number of Steps	256
	Max. Number of Tables	256
	Max. Number of Stations	256
	Serial Communications Method	Serial command by 1-channel ASCII code Communications specifications: RS-422/485 (50 m max.) Connection topology: Multi-drop connection (16 axes max.) Baud rate: 9600, 19200, 38400 bps
Other functions		Registration (positioning by external signals), homing
Display Function	LED	Lit during parameter setting, monitoring, executing utility functions, etc.
Applicable Standards*		UL508C EN50178, EN61800-5-1 EN55011 Group1 Class A EN61800-3, EN61000-6-2

\* Applicable when the INDEXER Module is attached to the command option attachable type SERVOPACKs.

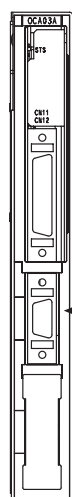
### ● LED Indicators

Status	Red LED	Green LED
Control Power Supply OFF	Not lit	Not lit
Control Power Supply ON	Not lit	Flashing
Normal	Not lit	Lit
Overtravel/Software Limit Activated		
Resetting	-	Flashing
Saving a Table		
Initializing a Table		
Initializing Parameters		
Error	Flashing (2 seconds)	-
Warning	Flashing	-
Alarm	Lit	Not lit

## Part Names of the INDEXER Option Module

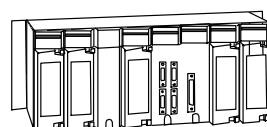


## ● Serial Command Communications Connector (CN12)



Serial commands can be used to perform operations such as positioning, setting parameters and program tables, monitoring, and other operations.

RS-422 or RS-485



Host controller



## I/O signals

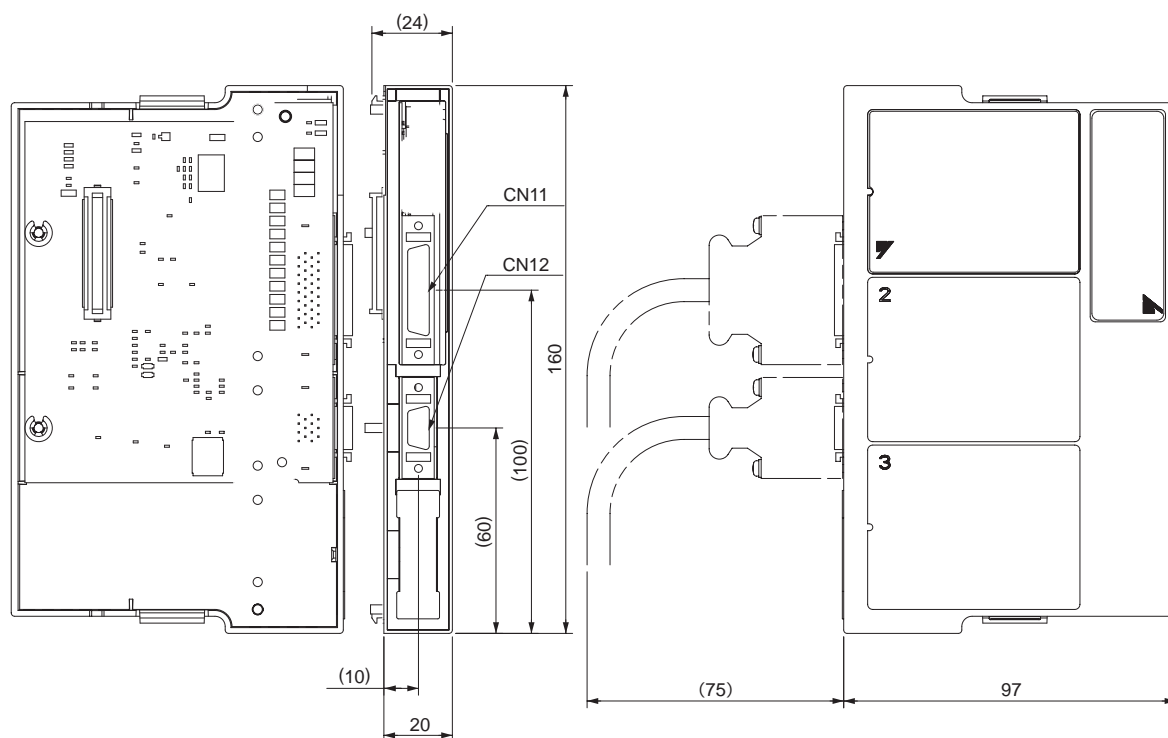
Items		Specifications	
I/O Signal	Input	SERVOPACK End	<ul style="list-style-type: none"> <li>• Servo ON (/S-ON)</li> <li>• Forward run prohibited (P-OT), reverse run prohibited (N-OT)</li> <li>• Homing deceleration limit switch (/DEC)</li> <li>• Alarm reset (/ALM-RST)</li> <li>• Registration latch (/RGRT)</li> </ul>
		Module End	Mode selection (/MODE0/1)
	Mode 0		<ul style="list-style-type: none"> <li>• Starts or interrupts program table operation (/START-STOP)</li> <li>• Resets program table operation (/PGMRES)</li> <li>• Program table selection 0 (/SEL0) to Program table selection 7 (/SEL7)</li> </ul>
	Mode 1	<ul style="list-style-type: none"> <li>• Starts homing (/HOME)</li> <li>• Starts forward JOG operation (/JOGP)</li> <li>• Starts reverse JOG operation (/JOGN)</li> <li>• JOG speed table selection 0 (/JOG0) to JOG speed table selection 3 (/JOG3)</li> </ul>	
Output	SERVOPACK End	<ul style="list-style-type: none"> <li>• Servo alarm (ALM)</li> <li>• Error/warning (/WARN)</li> <li>• Braking (/BK)</li> </ul>	<ul style="list-style-type: none"> <li>• Servo ready (/S-RDY)</li> <li>• Alarm code output 0 to 2 (ALO0 to ALO2)</li> </ul>
	Module End	<ul style="list-style-type: none"> <li>• Positioning completed (/INPOSITION)</li> <li>• Programmable output 0 to 7 (/POUT0 to /POUT7)</li> </ul>	

## ● Program Table Functions

Function	Setting Range	Setting Unit	Description
PGMSTEP	Program step	–	Program step number (0 to 255)
POS	Target position	–99,999,999 to +99,999,999	Reference unit
SPD	Positioning speed	1 to 99,999,999	×1000 reference units/min
RDST	External positioning distance	0 to 99,999,999	Reference unit
RSPD	External positioning speed	1 to 99,999,999	×1000 reference units/min
ACC	Acceleration	1 to 99,999,999	×1000 reference units/min/ms
DEC	Deceleration	1 to 99,999,999	×1000 reference units/min/ms
POUT	Programmable output signals	–	–
EVENT	Pass condition	0 to 99,999 (Waiting time settings)	ms
LOOP	Number of executions	1 to 99,999	–
NEXT	Program step to be executed next	0 to 255	–

## External Dimensions of the INDEXER Option Module

## ● External Dimensions (Units: mm)



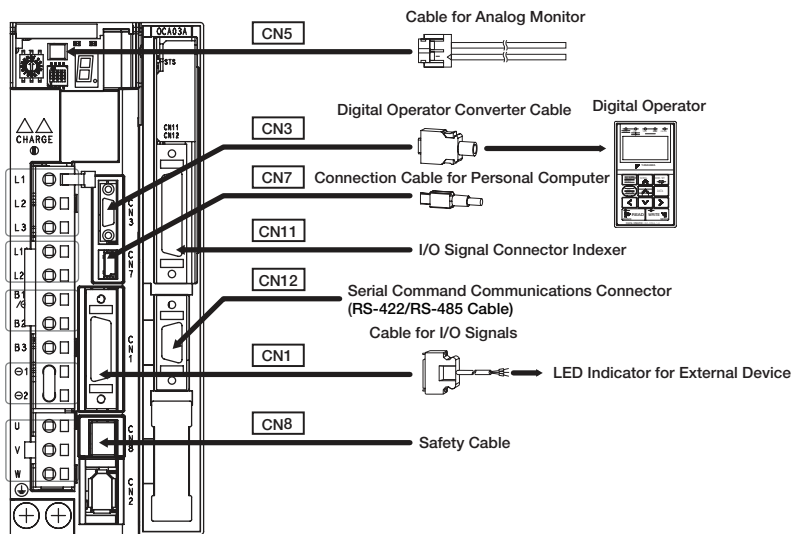
Approx. Mass: 0.2 kg



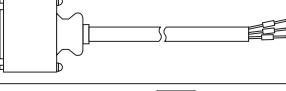

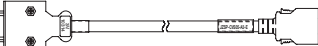
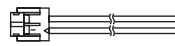
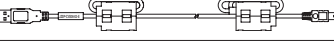
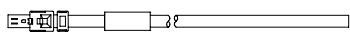

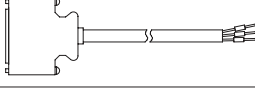
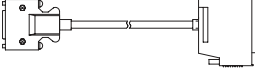

Port	Model	Pin	Manufacturer
CN11	10236-52A2PL	36	Sumitomo 3M Ltd.
CN12	10214-52A2PL	14	Sumitomo 3M Ltd.

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

## Selecting Cables

- Cables for **CN1** **CN3** **CN5** **CN7** **CN8** **CN11** **CN12** for Command Option Attachable Type SERVOPACKS



Name	Length	Order No.	Specifications	
<b>CN1</b> Cables for I/O Signals	Connector Kit	JZSP-CSI9-2-E	Soldered 	
	Connector Terminal Converter Unit	0.5 m	JUSP-TA26P-E	Terminal Block and 0.5 m Connection Cable 
		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	
		2 m	JZSP-CSI02-2-E	
3 m		JZSP-CSI02-3-E		
<b>CN3</b>	Digital Operator	JUSP-OP05A-1-E	With Connection Cable (1 m) 	
	Digital Operator Converter Cable <sup>*1</sup>	0.3 m	JZSP-CVS05-A3-E Cable with Connectors at Both Ends 	
<b>CN5</b> Cables for Analog Monitor	1 m	JZSP-CA01-E	SERVOPACK End 	
<b>CN7</b> Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	
<b>CN8</b> Cables for Safety Functions	Cables with Connector <sup>*2</sup>	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3 	
	Connector kit <sup>*3</sup>		Contact Tyco Electronics AMP K.K. Product name : Industrial Mini I/O D-shape Type1 Plug Connector Kit Model : 2013595-1	
<b>CN11</b> I/O Signal Cable Indexer	Connector kit	DP9420007-E		
	Cable with Loose wire at One End	1 m	JZSP-CVI01-1-E	
		2 m	JZSP-CVI01-2-E	
		3 m	JZSP-CVI01-3-E	
	Cable with Connectors at Both Ends	0.5 m	JUSP-TA36V-E	
		1 m	JUSP-TA36V-1-E	
2 m		JUSP-TA36V-2-E		
<b>CN12</b> Cable for Serial Command	Connector kit	JZSP-CHI9-1		

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

\*2 : When using the safety function, connect this cable to the safety devices.

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

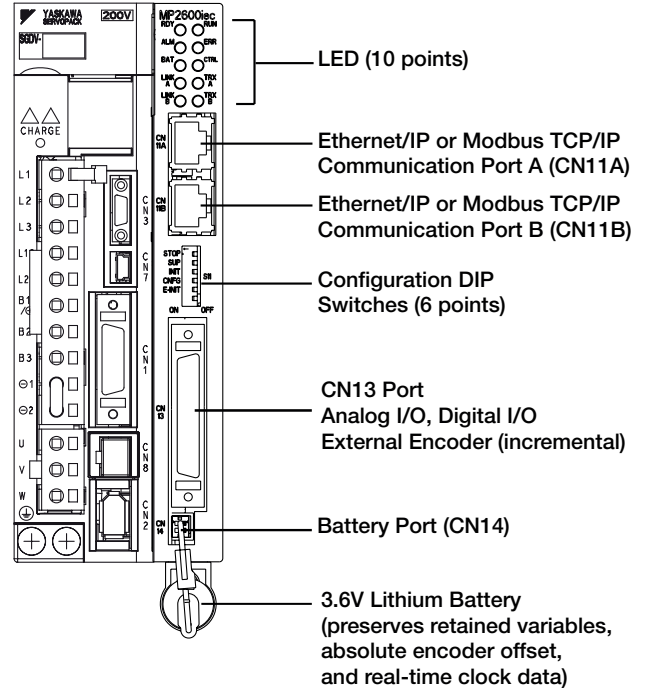
\*3 : Use the connector kit when you make cables yourself.



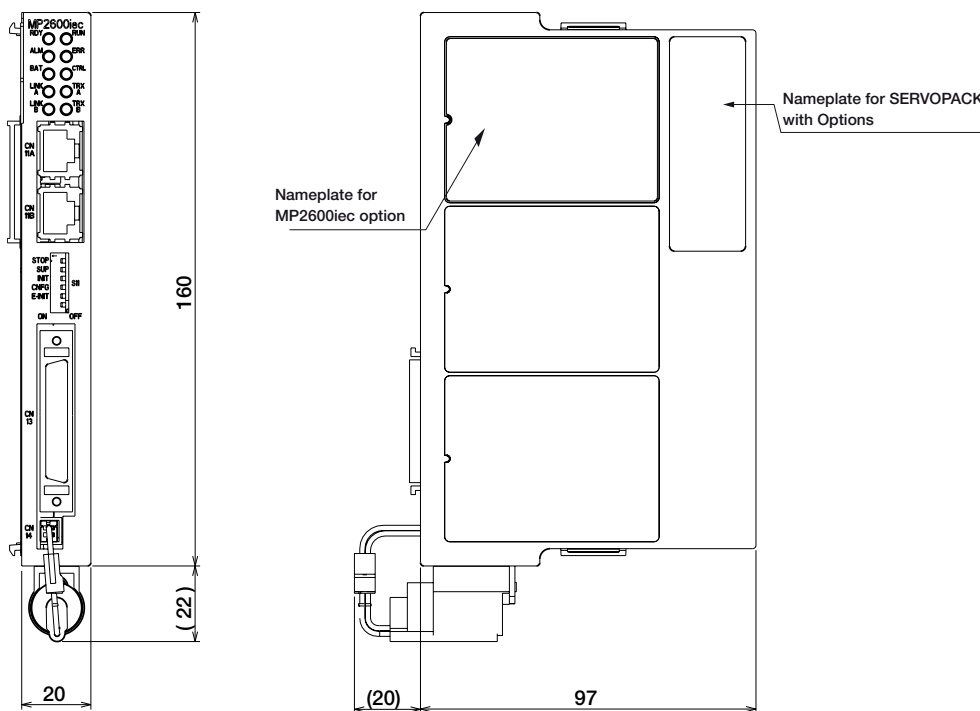
# MP2600iec 1.5 Axis Motion Controller Option

The MP2600iec 1.5 Axis Motion Controller Option for the Sigma-5 amplifier provides a compact, all-in-one, servo/controller package with the following features:

- IEC61131-3 standardized programming environment with PLCOpen function blocks for motion control.
- Auto-tuning, anti-vibration, and other high performance, easy-to-implement servo control features
- Ethernet/IP, Modbus TCP/IP, and OPC Server, which provide connectivity to PLCs, HMIs, SCADA, MES, and ERP
- Scalability with the multi-axis MP2000iec controller platform via the common programming environment, MotionWorks IEC
- Web server that allows for maintenance diagnostics and troubleshooting
- I/O features:
  - 15 digital inputs
  - 11 digital outputs
  - 1 analog input
  - 1 analog output
  - 1 external encoder input
  - 1 external encoder latch



## ● External Dimensions Units: mm



Dimensions in mm.

## Specifications of the MP2600iec Single Axis Machine Controller Option

### ● General Specifications

Items		Specifications
Environmental Conditions	Ambient Operating Temperature	0 to 55°C
	Ambient Storage Temperature	-20°C to +85°C
	Ambient Operating Humidity	90% RH or less (with no condensation)
	Ambient Storage Humidity	90% RH or less (with no condensation)
	Protection Class/Pollution Degree	Protection class: IP10, Pollution degree: 2 An environment that satisfies the following conditions. <ul style="list-style-type: none"> <li>• Free of corrosive or explosive gases</li> <li>• Free of exposure to water, oil or chemicals</li> <li>• Free of dust, salts or iron dust</li> </ul>
	Operating Altitude	1,000 m above sea level or lower
Mechanical Operating Conditions	Vibration Resistance	4.9 m/s <sup>2</sup>
	Shock Resistance	19.6 m/s <sup>2</sup>
	Others	Free of static electricity, strong electromagnetic fields, magnetic fields or exposure to radioactivity


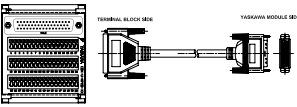
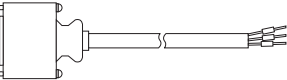
### ● Hardware Specifications

Items		Specifications		
CPU		200 MHz, 32 bit, ARM 9		
Memory	SDRAM		32 MB	
	SRAM		512 kB with battery backup	
	Flash		4 MB flash. Code and parameter storage	
Operator interface		LED	10 LEDs (red and green - operating mode, communication and error status)	
		User Configuration	6x DIP switch (operating mode and communication configuration)	
User I/O	Controller Side (CN13)	Network		2x 100baseTX Ethernet
		Digital input		8 programmable inputs
		Digital output		8 programmable outputs
		Analog input		1 ch., +/- 10V, 16 bit
		Analog output		1 ch., +/- 10V, 16 bit
		Pulse Counter		RS-422-compatible pulse counter input (quadrature, pulse and direction, and up/down counter modes) with 5, 12, and 24V position latch inputs
	Servo Side (CN1)	Sequence Input	Allocated	Number of Inputs: 7 (1 registration input latches external encoder in 5 μs)  Functions: The signal allocation and positive/negative logic can be modified. Forward run prohibited (P-OT), reverse run prohibited (N-OT), forward torque limit (/P-CL), reverse torque limit (/N-CL), general-purpose input signal (/SI0 to /SI6)
			Fixed	Servo Alarm (ALM)
		Sequence Input	Allocated	Number of Outputs: 3  Functions: The signal allocation and positive/negative logic can be modified. Positioning completion (/COIN), speed coincidence detection(/V-CMP), servomotor rotation detection (/TGON), servo ready (/S-RDY), torque limit detection (/CLT), speed limit detection (VLT), brake (/BK), warning (/WARN), near (/NEAR)
Network capability				
OPC (Client and Server required)				
Ethernet/IP				
Modbus/TCP				
Programming standards				
IEC61131/PLCopen				
Diagnostic and configuration interface				
Web interface				
Motion control performance				
1 controlled axis and one external encoder input plus virtual axis				
Servo-Side Safety Functions	Input	/HWBB1, /HWBB2: Baseblock signal for power module		
	Output	EDM1: Status monitor (fixed output) of built-in safety circuit		

\* Allocated I/O can also be used as programmable I/O.

## Selecting Cables

### ● Cable Selection

Name	Length	Order No.	Specifications	Details	
<b>CN13</b> Cables for I/O Signals	Connector Kit		JZSP-CSI9-1-E	Soldered 	(1)
	Connector Terminal Converter Unit	0.5 m	CBK-U-MP2B-A5	Terminal Block and 0.5 m Connection Cable 	(2)
		1 m	CBK-U-MP2B-01		
		3 m	CBK-U-MP2B-03		
	Flying Lead Cable	0.5 m	CFC-U-MP2B-A5		(3)
		1 m	CFC-U-MP2B-01		
		3 m	CFC-U-MP2B-03		
<b>CN11A</b> <b>CN11B</b> Ethernet/EtherCAT Cables for Industrial Use		Category: CAT5e Shield specifications: S/UTP or S/STP Cable length: 50 m maximum			

#### (1) Connector Kit for CN13

Use the following connector and cable to assemble the cable. The CN13 connector kit includes one case and one connector.

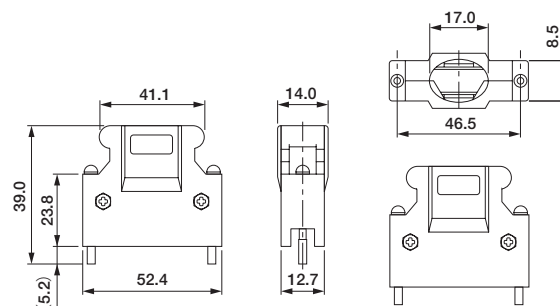
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-1-E	10350-52Z0-008*	1 set	10150-3000PE* (Soldered)	1

\* : Manufactured by Sumitomo 3M Ltd.

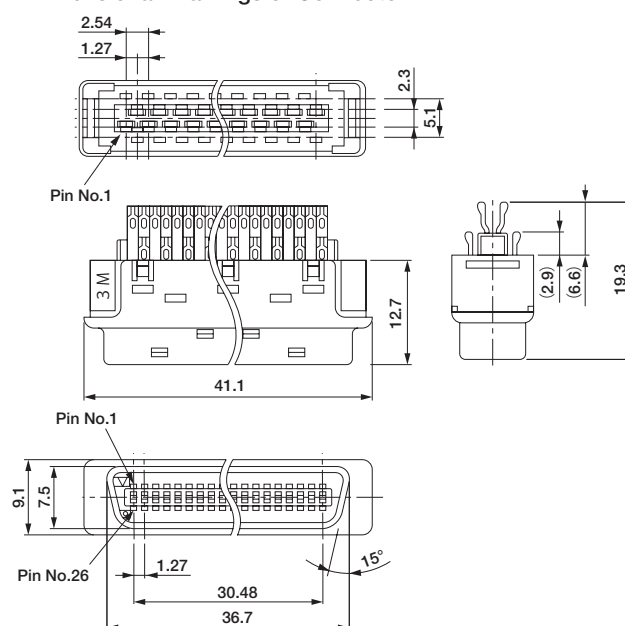
#### · Cable Size

Item	Specifications
Cable	Use twisted-pair or twisted-pair shielded wire.
Applicable Wires	AWG 24, 26, 28, 30
Cable Finished Diameter	16 dia. max.

#### · Dimensional Drawings of Case

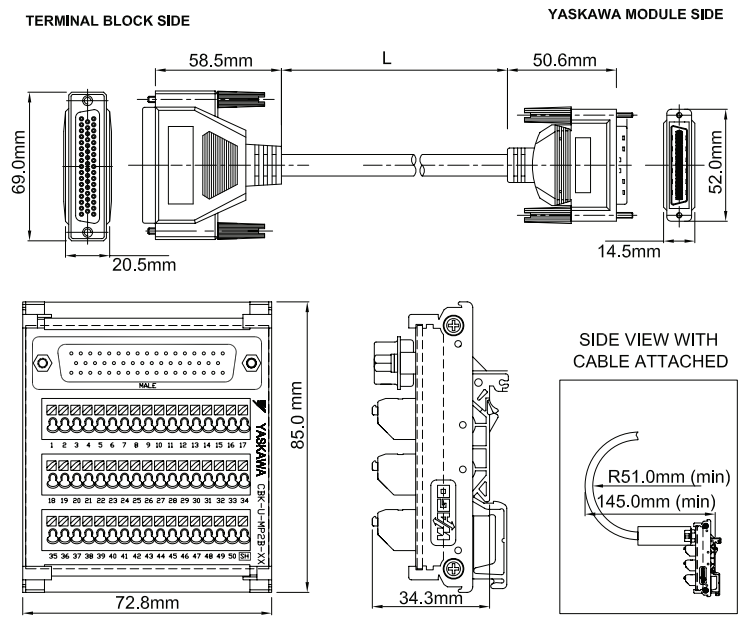


#### · Dimensional Drawings of Connector



Selecting Cables

(2) Connector Terminal Converter Unit for CN13



ITEM#	L = LENGTH (mm)
CBK-U-MP2B-A5	500 +/- 38.1
CBK-U-MP2B-01	1000 +/- 38.1
CBK-U-MP2B-03	3000 +/- 38.1

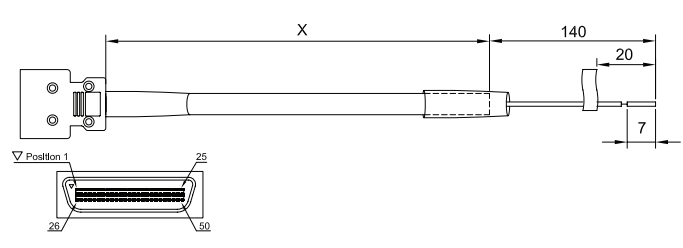
CABLE SPECIFICATION (mm)	
OUTER DIAMETER	8.5 +/- 0.1mm
BENDING RADIUS	6 x O.D. MINIMUM 15 x O.D. FOR LONG TERM RELIABILITY

CBK-U-MP2B-XX Function Chart for MP2600iec

Pin No.	Signal Name	I/O	Function
1	AO	O	Analog output
2	AI	I	Analog input
3	-	-	-
4	PA+	I	Phase A pulse (+)
5	PA-	I	Phase A pulse (-)
6	GND	P	Encoder input ground
7	BAT+	P	Controller SRAM Battery (+)
8	-	-	-
9	PILC5V	I	Phase-C latch pulse (-) for 5VDC input
10	PILC24V	I	Phase-C latch pulse (-) for 24VDC input
11	DO 00-	O	Digital output 0 (-)
12	DO 02-	O	Digital output 2 (-)
13	DICOM	I	Digital input common
14	DI 00	I	Digital input 0
15	DI 02	I	Digital input 2
16	DI 04	I	Digital input 4
17	DI 06	I	Digital input 6
18	DO 04+	O	Digital output 4 (+)
19	DO 06+	O	Digital output 6 (+)
20	-	-	-
21	DO 00+	O	Digital output 0 (+)
22	DO 02+	O	Digital output 2 (+)
23	DO 04+	O	Digital output 4 (+)
24	DO 06+	O	Digital output 6 (+)
25	-	-	-
26	AO GND	O	Analog output ground
27	AI GND	I	Analog input ground
28	-	-	-
29	PB+	I	Phase B pulse (+)
30	PB-	I	Phase B pulse (-)
31	GND	P	Encoder input ground
32	BAT-	P	Controller SRAM Battery (-)
33	-	-	-
34	PILC12V	I	Phase-C latch pulse (-) for 12VDC input
35	PIL	I	Phase-C latch pulse (+)
36	DO 01-	O	Digital output 1 (-)
37	DO 03-	O	Digital output 3 (-)
38	DICOM	I	Digital input common
39	DI 01	I	Digital input 1 - shared with pulse latch input
40	DI 03	I	Digital input 3
41	DI 05	I	Digital input 5
42	DI 07	I	Digital input 7
43	DO 05-	O	Digital output 5 (-)
44	DO 07-	O	Digital output 7 (-)
45	-	-	-
46	DO 01+	O	Digital output 1 (+)
47	DO 03+	O	Digital output 3 (+)
48	DO 05+	O	Digital output 5 (+)
49	DO 07+	O	Digital output 7 (+) - shared w/ position agreement COIN signal
50	-	-	-

I = Input, O = Output, P = Power

(3) Flying Lead Cable for CN13



ITEM NUMBER	X = LENGTH (mm)
CFC-U-MP2B-A5	500
CFC-U-MP2B-01	1000
CFC-U-MP2B-03	3000

CABLE SPECIFICATION (mm)	
OUTER DIAMETER	8.1
BENDING RADIUS	12 O.D.

CFC-U-MP2B-XX Function Chart for MP2600iec

Pin No.	Color (Solid/Band)	Signal Name	I/O	Function
1	BLK/RED	AO	O	Analog output
2	BLK/WHT	AI	I	Analog input
3	RED/GRN	-	-	-
4	BLK/BLU	PA+	I	Phase A pulse (+)
5	BLU/BLK	PA-	I	Phase A pulse (-)
6	RED/BLU	GND	P	Encoder input ground
7	RED/WHT	BAT+	P	Controller SRAM Battery (+)
8	BLK/GRN	-	-	-
9	BLK/YEL	PILC5V	I	Phase-C latch pulse (-) for 5VDC input
10	BLK/ORG	PILC24V	I	Phase-C latch pulse (-) for 24VDC input
11	RED/YEL	DO 00-	O	Digital output 0 (-)
12	RED/GRN	DO 02-	O	Digital output 2 (-)
13	RED/ORG	DICOM	I	Digital input common
14	GRN/WHT	DI 00	I	Digital input 0
15	GRN/BLU	DI 02	I	Digital input 2
16	GRN/YEL	DI 04	I	Digital input 4
17	GRN/BRN	DI 06	I	Digital input 6
18	GRN/ORG	DO 04+	O	Digital output 4 (+)
19	WHT/BLU	DO 06+	O	Digital output 6 (+)
20	WHT/YEL	-	-	-
21	YEL/RED	DO 00+	O	Digital output 0 (+)
22	BRN/RED	DO 02+	O	Digital output 2 (+)
23	ORG/GRN	DO 04+	O	Digital output 4 (+)
24	BLU/WHT	DO 06+	O	Digital output 6 (+)
25	WHT/BRN	-	-	-
26	RED/BLK	AO GND	O	Analog output ground
27	WHT/BLK	AI GND	I	Analog input ground
28	GRN/RED	-	-	-
29	BLK/BRN	PB+	I	Phase B pulse (+)
30	BRN/BLK	PB-	I	Phase B pulse (-)
31	BLU/RED	GND	P	Encoder input ground
32	WHT/RED	BAT-	P	Controller SRAM Battery (-)
33	GRN/BLK	-	-	-
34	ORG/BLK	PILC12V	I	Phase-C latch pulse (-) for 12VDC input
35	YEL/BLK	PIL	I	Phase-C latch pulse (+)
36	WHT/ORG	DO 01-	O	Digital output 1 (-)
37	BLU/YEL	DO 03-	O	Digital output 3 (-)
38	ORG/RED	DICOM	I	Digital input common
39	WHT/GRN	DI 01	I	Digital input 1 - shared with pulse latch input
40	BLU/GRN	DI 03	I	Digital input 3
41	YEL/GRN	DI 05	I	Digital input 5
42	BRN/GRN	DI 07	I	Digital input 7
43	BLU/BRN	DO 05-	O	Digital output 5 (-)
44	BLU/ORG	DO 07-	O	Digital output 7 (-)
45	YEL/WHT	-	-	-
46	ORG/WHT	DO 01+	O	Digital output 1 (+)
47	YEL/BLU	DO 03+	O	Digital output 3 (+)
48	BRN/BLU	DO 05+	O	Digital output 5 (+)
49	ORG/BLU	DO 07+	O	Digital output 7 (+) - shared w/ position agreement COIN signal
50	BRN/WHT	-	-	-

I = Input, O = Output, P = Power

Option Module for MP2600iec

# Option Modules for all SERVOPACKs



## Model Designations

SGDV <sup>(Note)</sup> R70 A 01 A 000 00 0 001

$\Sigma$ -V Series  
SGDV SERVOPACK

Current

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

\*\*\* These amplifiers can be powered with single or three-phase.  
♣ SGD-120A□□A008000□□□□, a special version of the 1.5kW amplifier can be used for single-phase operation.

Voltage

Code	Specifications
A	230 VAC
D	400 VAC

Option Module

Code	Specifications
001	Option module for fully-closed loop control
010	Safety module
□□□	Universal Feedback Card Type 1
□□□	Universal Feedback Card Type 2

Options (parameter)

Code	Specifications
0	standard

Options (software)

Code	Specifications
00	standard

Options (hardware)

Code	Specifications
000	Base-mounted (standard)
001	Rack-mounted*1
002	Varnished
003	Rack-mounted*1 and Varnished
008	Single-phase 230 V AC input (model: SGD-120A1A008000)
020	Dynamic brake (400V SERVOPACKs only)

Design Revision Order

A, B...

Interface

Code	Specifications
01	Analog voltage/pulse train reference type (for rotary servomotors)
05	Analog voltage/pulse train reference type (for linear servomotors)
11	MECHATROLINK-II communications reference type (for rotary servomotors)
15	MECHATROLINK-II communications reference type (for linear servomotors)
21	MECHATROLINK-III communications reference type (for rotary servomotors)
25	MECHATROLINK-III communications reference type (for linear servomotors)
E1	Command Option Attachable Type (for rotary servomotors)
E5	Command Option Attachable Type (for linear servomotors)

Note: The model number of a SERVOPACK with option modules is not hyphenated after SGD.

\*1 : SERVOPACKs of 6 kW or more are duct-ventilated.





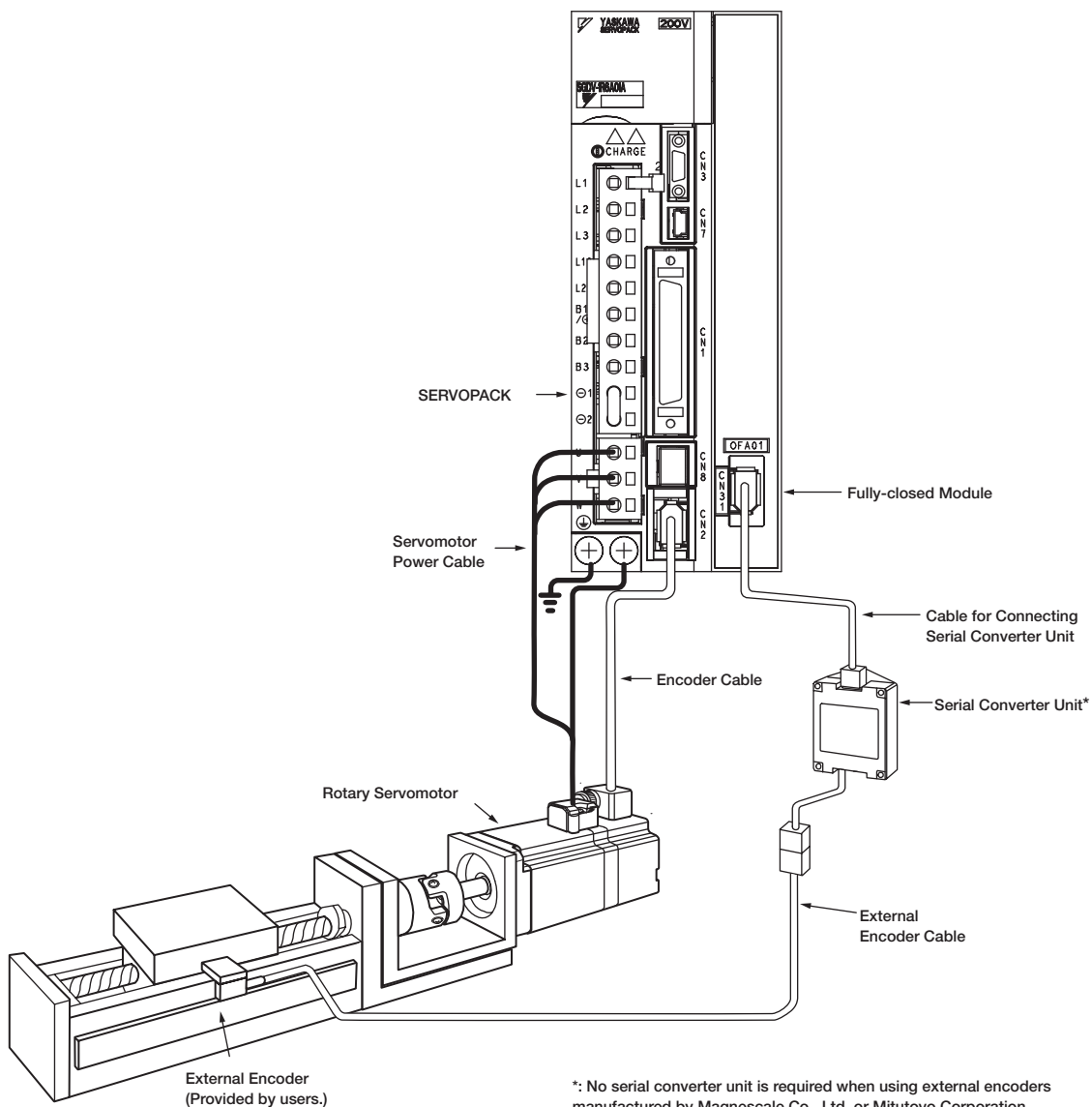


# Option Module for Fully-closed Loop Control

## ● System Configuration for Fully-closed Loop Control

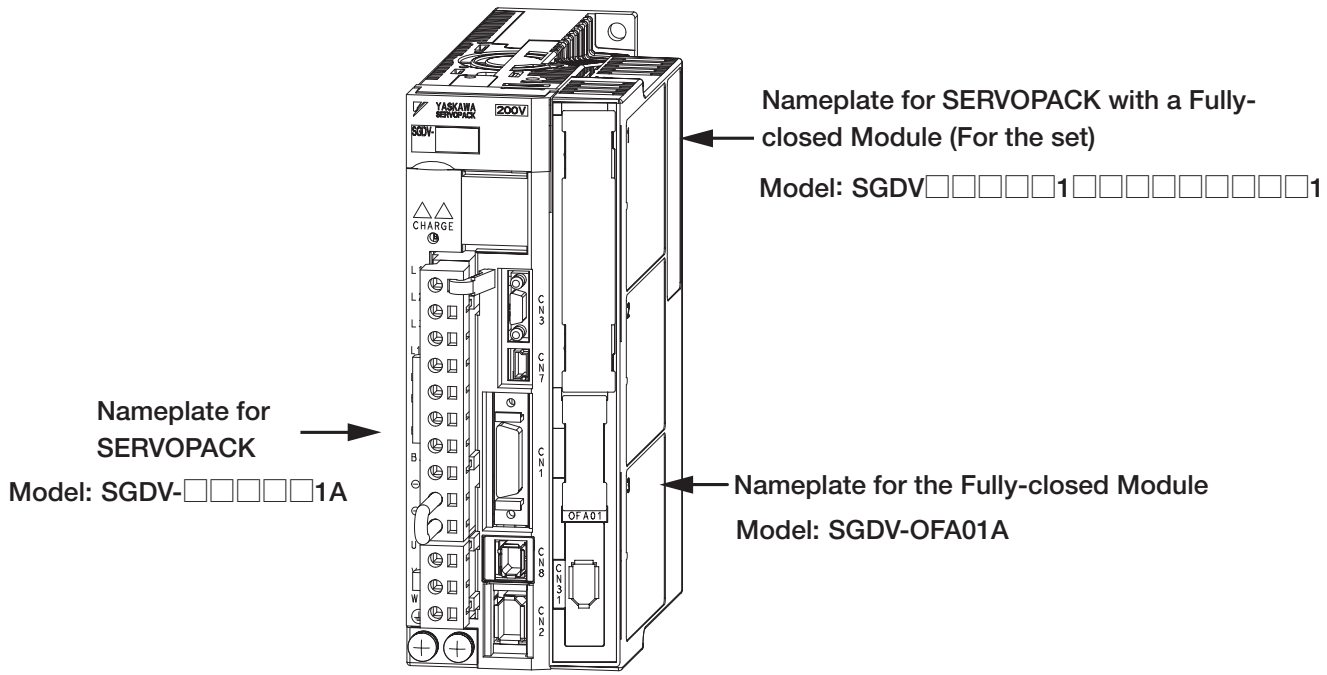
A Fully-closed Module is required when using rotary servomotors with fully-closed loop control. Install the module on the SERVOPACK before using it.

- High-precision and high-response positioning with using position feedback from a detector (such as an external encoder) installed on the machine.
- High resolution with external encoders (linear scales)

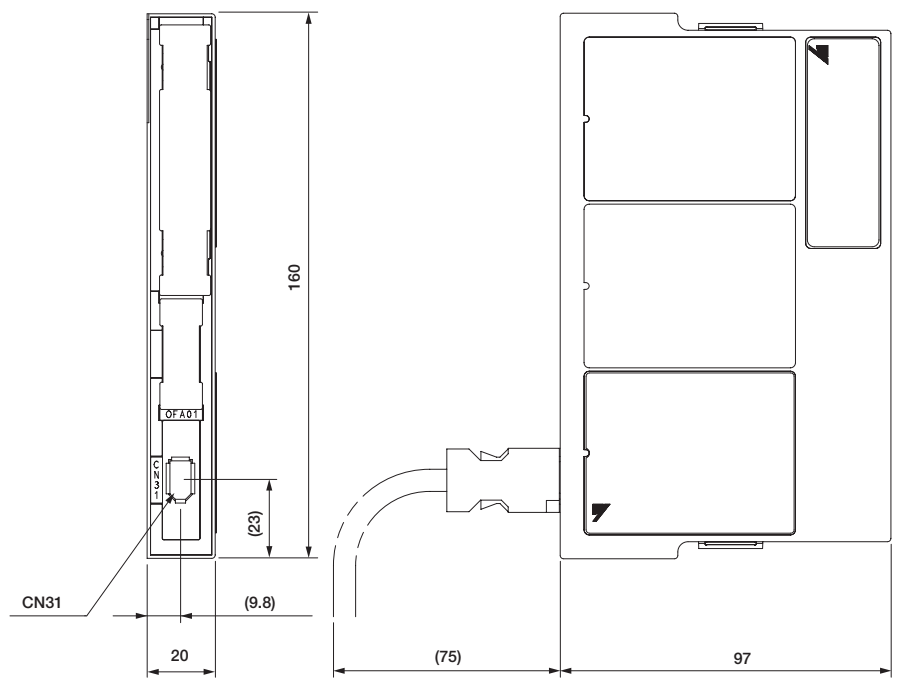


## ● Model Designation

**SGDV-OFA01A**



External Dimensions Units: mm



Approx. Mass: 0.1 kg

Connector


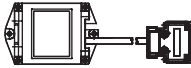
Port	Model	Pin	Manufacturer
CN31	53984-0671	6	Molex Japan Co., Ltd.

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

## Serial Converter Units

## ● Model Designations

JZDP - D00□ - 000 - E

Serial Converter Unit Model			
Code	Appearance	Applicable External Encoder	Hall Sensor
D003		Manufactured by HEIDENHAIN Corporation	None
D005		Manufactured by Renishaw plc.	None

Note: Using the serial converter unit JZDP-A□□□ with SGDV SERVOPACK will void our guarantee.

## Characteristics and Specifications

Items	JZDP-D00□-000-E	
Electrical Characteristics	Power Supply Voltage	+5.0 V±5%, ripple content 5% max.
	Current Consumption <sup>1</sup>	120 mA typ. 350 mA max.
	Signal Resolution	Input two-phase sine wave: 1/256 pitch
	Max. Response Frequency	250 kHz
	Analog Input Signals <sup>2</sup> (cos, sin, Ref)	Differential input amplitude: 0.4 to 1.2 V Input signal level: 1.5 to 3.5 V
	Output Signal <sup>3</sup>	Position data, alarms
Mechanical Characteristics	Output Method	Serial data communications
	Output Circuit	Balanced type transceiver (SN75LBC176 or the equivalent), internal terminating resistor: 120 Ω
	Approx. Mass	150 g
Environmental Conditions	Vibration Resistance	98 m/s <sup>2</sup> max. (10 to 2500 Hz) in three directions
	Impact Resistance	980 m/s <sup>2</sup> , (11 ms) two times in three directions
Environmental Conditions	Surrounding Air Temperature	0 to 55°C
	Storage Temperature	-20 to 80°C
	Humidity	20% to 90%RH (no condensation)

\*1: The current consumption of the linear scale and hall sensor is not included in this value. The current consumption of linear scale and hall sensor must be taken into consideration for the current capacity of host controller that supplies the power. The current consumption of hall sensor: Approx. 40 mA.

\*2: Input a value within the specified range. Otherwise, incorrect position information is output, and the device may be damaged.

\*3: The transmission is enabled 100 to 300 ms after the power turns on.

## ● Analog Signal Input Timing

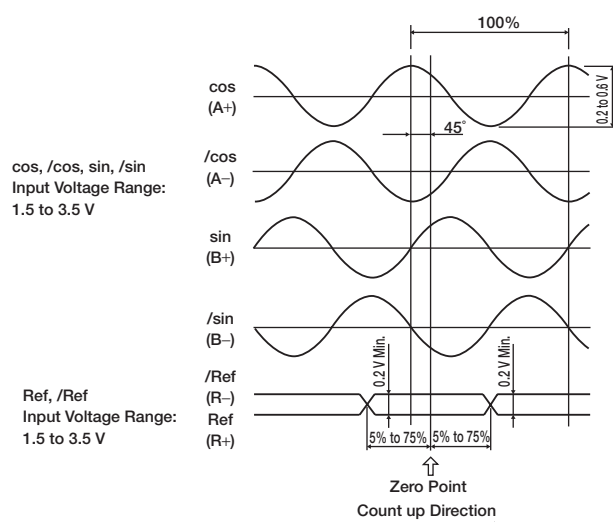
The following figure shows the input timing of the analog signals.

When the cos and sin signals are shifted 180 degrees, the differential signals are the /cos and /sin signals.

The specifications of the cos, /cos, sin, and /sin signals are identical except for the phase.

Input the signals Ref and /Ref so that they shall cross each other as shown in the figure because they are input into the converter.

When they are crossed, the output data will be counted up.



## IMPORTANT

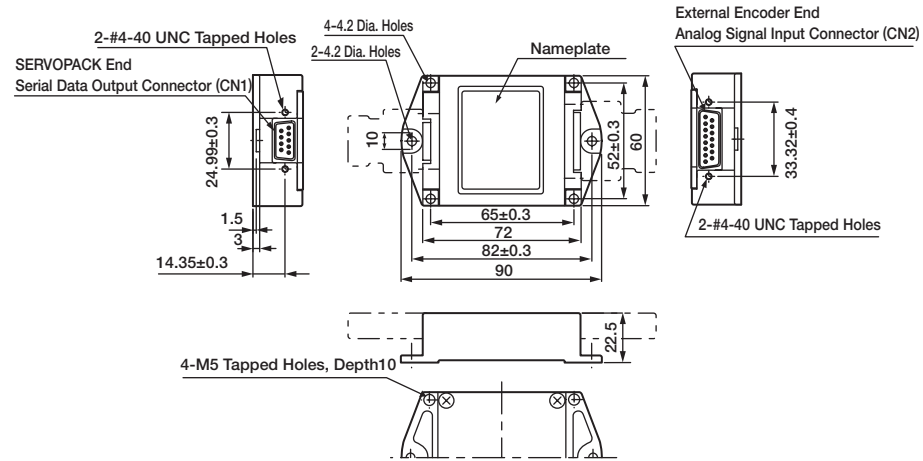
## ● Precautions

- 1 Never perform insulation resistance and withstand voltage tests.
- 2 When analog signals are input to the serial converter unit, noise influence on the analog signals affects the unit's ability to output correct position information. The analog cable must be as short as possible and shielded.
- 3 Do not connect or disconnect the unit while power is being supplied, or the unit may be damaged.
- 4 When using multiple axes, use a shield cable for each axis. Do not use a shield cable for multiple axes.

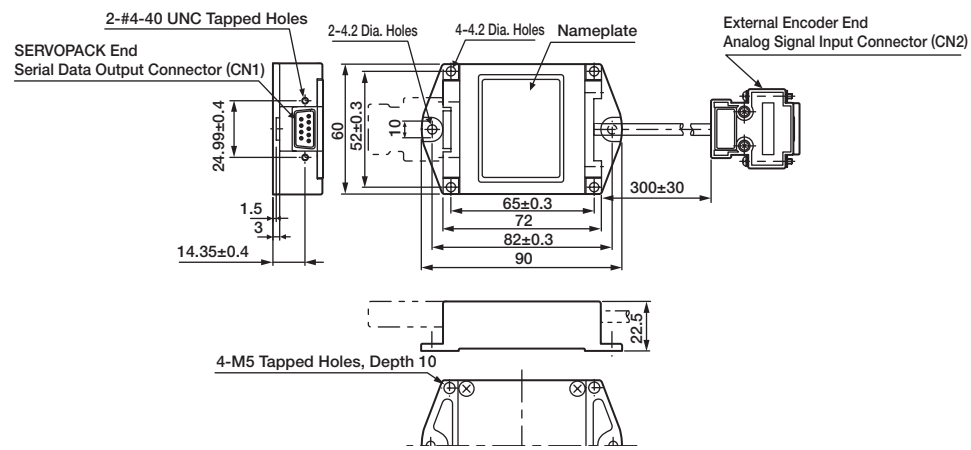
**Serial Converter Units** Units: mm

● External Dimensions

(1) Model: JZDP-D003-000-E



(2) Model: JZDP-D005-000-E



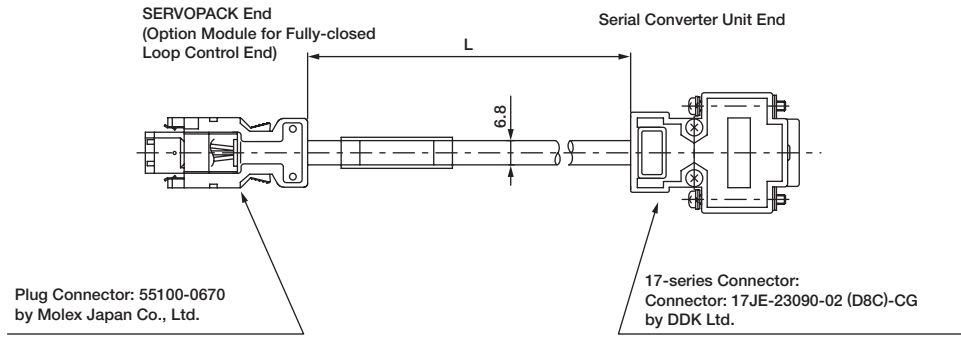
● Connection Cables

• Recommended Cables

Name	Application	Model	Length
Cable for Connecting Serial Converter Unit	Connection between SERVOPACK (Option module for fully-closed loop control) connector CN31 and serial converter unit	JZSP-CLP70-03-E-G#	3 m
		JZSP-CLP70-05-E-G#	5 m
		JZSP-CLP70-10-E-G#	10 m
		JZSP-CLP70-15-E-G#	15 m
		JZSP-CLP70-20-E-G#	20 m

Note: The digit "#" of the order number represents the design revision.

• Dimensional Drawing



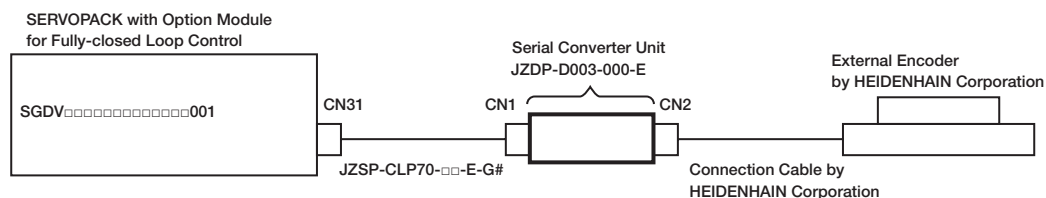
Option Module for Fully-closed Loop Control

## Serial Converter Units

### ● Connection Examples

#### (1) Connection Example with External Encoder by HEIDENHAIN Corporation

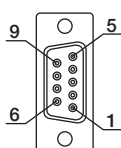
- Model: JZDP-D003-000-E



Pin No.	Signal
1	+5V
2	Phase S output
3	Not used
4	Not used
5	0V
6	Phase /S output
7	Not used
8	Not used
9	Not used
Case	Shield

CN1

SERVOPACK End  
Serial Data Output

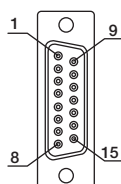


17-series Connector:  
17LE-13090-27-FA  
(Socket) by DDK Ltd.

Pin No.	Signal
1	cos input (A+)
2	0V
3	sin input (B+)
4	+5V
5	Not used
6	Not used
7	/Ref input (R-)
8	Not used
9	/cos input (A-)
10	0V sensor
11	/sin input (B-)
12	5V sensor
13	Not used
14	Ref input (R+)
15	Not used
Case	Shield

CN2

External Encoder End  
Analog Signal Input



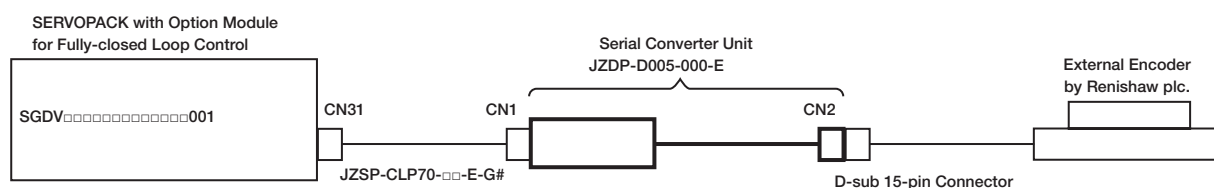
17-series Connector:  
17LE-13150-27-FA  
(Socket) by DDK Ltd.

Notes: 1 Do not use the unused pins.

2 The external encoder (analog 1 Vp-p output, D-sub 15-pin) by HEIDENHAIN Corporation can be directly connected.

#### (2) Connection Example with External Encoder by Renishaw plc.

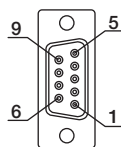
- Model : JZDP-D005-000-E



Pin No.	Signal
1	+5V
2	Phase S output
3	Not used
4	Not used
5	0V
6	Phase /S output
7	Not used
8	Not used
9	Not used
Case	Shield

CN1

SERVOPACK End  
Serial Data Output

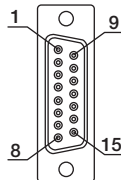


17-series Connector:  
17LE-13090-27-FA  
(Socket) by DDK Ltd.

Pin No.	Signal
1	/cos input (V1-)
2	/sin input (V2-)
3	Ref input (V0+)
4	+5V
5	5Vs
6	Not used
7	Not used
8	Not used
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0V
13	0Vs
14	Not used
15	Inner (0V)
Case	Shield

CN2

External Encoder End  
Analog Signal Input



17-series Connector:  
17JE-13150-02 (D8C) A-CG  
(Socket) by DDK Ltd.

SERVOPACK does not have  
the function to process Vq signals.

Notes: 1 Do not use the unused pins.

2 The external encoder (analog 1 Vp-p output, D-sub 15-pin) by Renishaw plc. can be directly connected. However, the BID and DIR signals are not connected.

3 Use the external encoder-end connector to change the home position specifications of the external encoder.

## Serial Converter Units

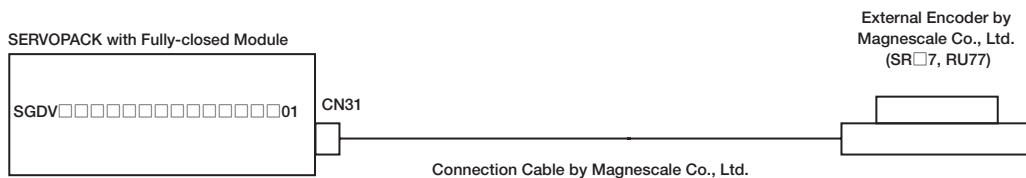
## (3) Connection Example with External Encoder by Mitutoyo Corporation (Model: ABS ST78□A)

When using this external encoder, serial converter units are not required.



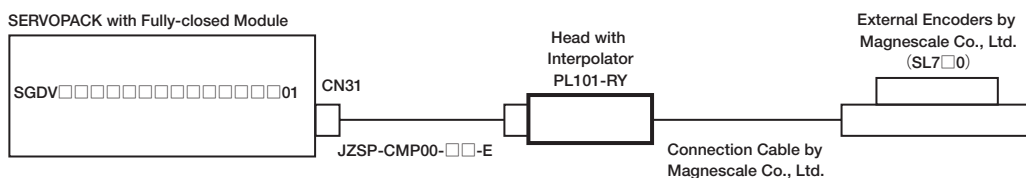
## (4) Connection Example with External Encoders by Magnescale Co., Ltd. (Model: SR7, RU77)

When using this external encoders, serial converter units are not required.



## (5) Connection Example with External Encoders by Magnescale Co., Ltd. (Model: SL7□0)

When using this external encoders, serial converter units are not required.



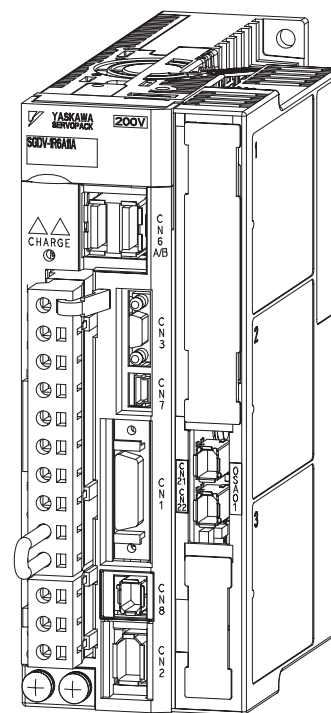


# Safety Module

## • Functional safety for Sigma-5 servo drives

### Features

- Machine movements represent a major source of hazard for operators and staff members carrying out maintenance tasks. The potential dangers posed by these movements affect the operational safety of machines and installations and have to be included in safety considerations.
- Besides the protective equipment which is required in normal operation mode, there are more situations in which machine operators must be protected by mechanisms internal to the drive and the control unit: safe machine states are necessary during commissioning, setup mode and troubleshooting. Occasionally it might even be necessary for persons to work in the processing area of machines during operation of machines and installations.
- Avoiding injury to persons in these situations and ensuring the safe operation of a machine during all possible operating states is absolutely essential.
- Highly dynamic motion control applications require fast reaction times and real-time capable communication of the safety technology to prevent uncontrolled movements if an error occurs. Integrated safety functions ensure protection for the operator without affecting the performance of the machine.
- Compared to conventional safety technology, the integrated safety technology (STO, safe torque off) and the advanced safety option of the Sigma-5 servo drives considerably increase the functionality and availability of your machine.



The Sigma-5-series Safety Module is an Option Module that is connected to a Sigma-5-series SERVOPACK. The Safety Module is equipped with four functions to provide machine safety. These functions reduce risks during usage of the machine by protecting people from hazardous operations of movable machine parts. The stopping function that is defined in functional safety standards can be achieved with these four functions. By using the Hard Wire BaseBlock function of the SERVOPACK, the four safety functions described on the next page, which are defined in functional safety standards, can be achieved.

## • Model Designation

**SGDV – OS A01 A**

Series	
SGDV	Σ-V Series

1st + 2nd digits: Module Type	
Code	Module
OS	Safety option module

3rd + 4th + 5th digits: Interface Specifications	
Code	Interface
A01	Safety module

6th digit: Design Revision Order

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



## Applicable Standards and Functions

### Compliance with Safety Standards

Safety Standards	Applicable Standards	Products	
		SERVOPACK	SERVOPACK + Safety Module
Safety of Machinery	EN ISO13849-1:2008 EN 954-1 IEC 60204-1	○	○
Functional Safety	IEC 61508 Series IEC 62061 IEC 61800-5-2	○	○
EMC	IEC 61326-3-1	○	○

The module is designed to meet the following safety standards:

- IEC and EN 61508: Functional safety of safety-related electric, electronic and programmable electronic systems
- IEC and EN 62061: Safety of machinery, Functional safety of safety-related electrical, electronic and programmable electronic control systems
- ISO and EN ISO 13849-1: Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
- IEC and EN 61800-5-2: Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional

## System Configurations

### ● System Configuration When Using the Safety Module

Name		Model	Ref. Page
Option Module Only	SERVOPACK		
	Analog Voltage/Pulse Train Reference	SGDV-□□□□0□A	Page 231
	MECHATROLINK-III Communications Reference	SGDV-□□□□1□A	Page 243
	Command Option Attachable Type	SGDV-□□□□E□A	Page 263
	Safety Module	SGDV-OSA01A	Page 339
	Option Case Kit	SGDV-OZA01A Note: One option case kit is required for each SERVOPACK.	
Rotary Servomotor	SGMJV model	SGMJV-□□□□□□□□	Page 1
	SGMAV model	SGMAV-□□□□□□□□	Page 15
	SGMEV model	SGMPS-□□□□□□□□	Page 31
	SGMGV model	SGMGV-□□□□□□□□	Page 45
	SGMSV model	SGMSV-□□□□□□□□	Page 69
	SGMCS model	SGMCS-□□□□□□□□	Page 97
Cable	Servomotor Main Circuit Cable	Refer to Selecting Cables in this catalog for details of cables for individual models of rotary servomotors.	
	Encoder Cable		
Linear Servomotors	SGLGW model	SGLGW-□□□□□□□□□□	Page 115
	SGLFW model	SGLFW-□□□□□□□□□□	Page 131
	SGLTW model	SGLTW-□□□□□□□□□□	Page 151
	SGLC model	SGLC-□□□□□□□□□□-□□□□	Page 179
Cable	Linear Servomotor Main Circuit Cable	Refer to Selecting Cables in this catalog for details of cables for individual models of linear servomotors.	
	Cable for Connecting Linear Scales		
	Cable for Connecting Serial Converter Unit		
	Cable for Connecting Hall Sensor		
Serial Converter Units	Encoders by Heidenhain Corporation	JZDP-D003-□□□-E, JZDP-D006-□□□-E	Page 335
		JZDP-G003-□□□-E, JZDP-G006-□□□-E	
	Encoders by Renishaw Plc.	JZDP-D005-□□□-E, JZDP-D008-□□□-E	
		JZDP-G005-□□□-E, JZDP-G008-□□□-E	
Cable	Cable for Connecting Serial Converter Unit	JZSP-CLP70-□□□-E-G#	Page 336

Note: 1. The following encoders cannot be connected to SERVOPACKs with a Safety Module.

- External encoders by Mitutoyo Corporation: ABS ST78□A□

- External encoders by Magnescale Co., Ltd. (Formerly Sony Manufacturing Systems Corporation): SL7□0, SR□7, and RU77

2. The following option modules cannot be used with SERVOPACKs with a Safety Module.

- Option module for fully-closed loop control

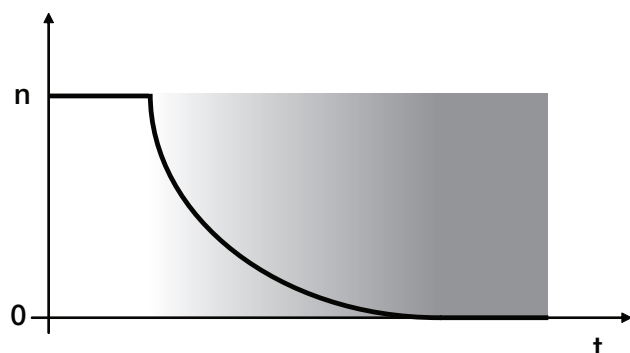
- INDEXER option module

3. MECHATROLINK-III communications reference SERVOPACKs cannot be used with the Safety Module.

4. The digit "#" of the order number represents the design version.

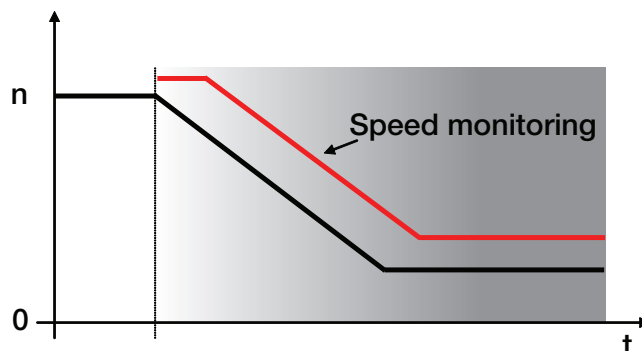
## Safety functions

### Safe BaseBlock Function (SBB) Safe Torque Off (STO)



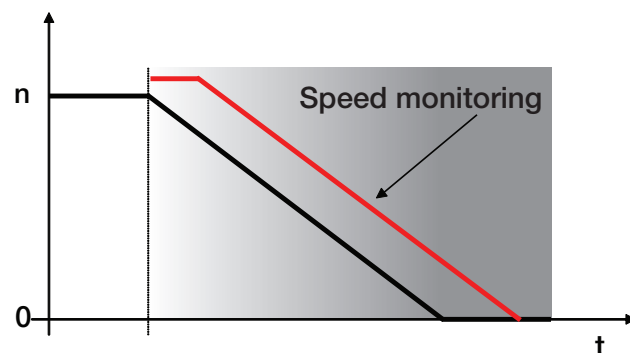
This safety function is equivalent to the **Safe Torque Off (STO)** function defined in IEC 61800-5-2. Prevents torque from being generated by the motor. This function is integrated within the drive itself as standard. It shuts OFF the power supply to the motor by executing the HWBB function of the SERVOPACK according to the state of the input signals.

### Safely Limited Speed with Delay Function (SLS-D) Safely Limited Speed (SLS)



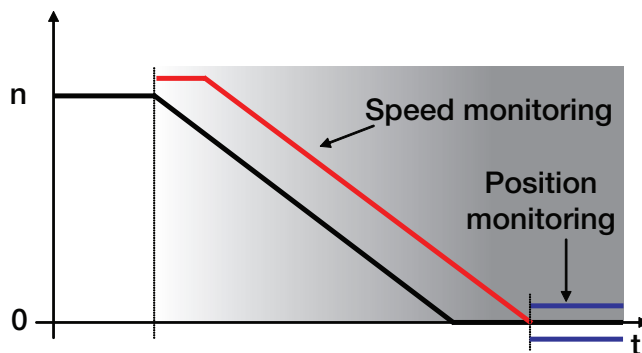
This safety function is equivalent to the **Safely-Limited Speed (SLS)** function defined in IEC 61800-5-2. Prevents the motor from exceeding a programmable speed limit. The safety input enables the SERVOPACK monitoring of the deceleration, then it monitors the motor speed. This function monitors the deceleration of the motor until the specified time according to the state of the input signal. It monitors the motor speed to make sure that it is within the allowable range.

### Safe BaseBlock with Delay Function (SBB-D) Safe Stop 1 (SS1)



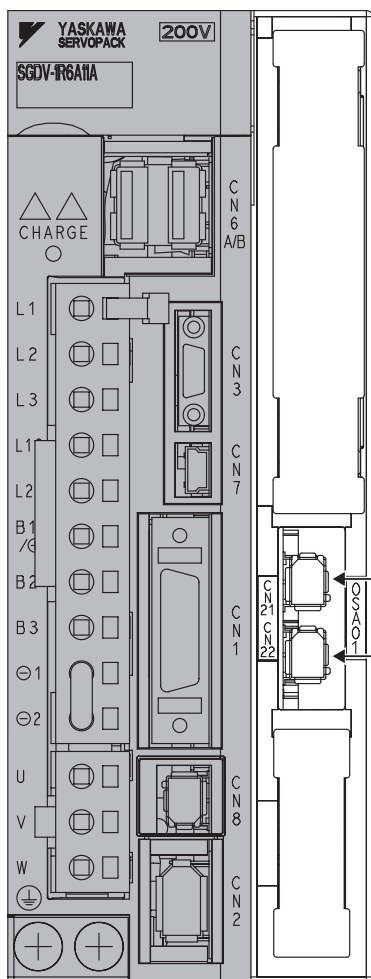
This safety function is equivalent to the **Safe Stop 1 (SS1)** function defined in IEC 61800-5-2. Initiates motor deceleration and executes Safe Torque Off function after a specified time delay. In the event of any fault, Safe Torque Off is initiated. Monitors the deceleration of the motor until the specified time according to the state of the input signal. It shuts OFF the power supply to the motor by executing the HWBB function of the SERVOPACK. 2 operation modes can be set: Monitoring only or Controlling & Monitoring. Active Mode: SERVOPACK controls motor deceleration and monitors the deceleration operation.

### Safe Position Monitor with Delay Function (SPM-D) Safe Stop 2 (SS2)



This safety function is equivalent to the **Safe Stop 2 (SS2)** function defined in IEC 61800-5-2. Initiates and monitors the deceleration of the motor. At standstill, or after a programmable delay, the Safe Operating Stop function is applied. Starts deceleration of the motor and prevents the motor from stopping at a distance greater than the allowable deviation from the specified position after a specified time has passed. Monitors the deceleration of the motor until the specified time according to the state of the input signal. It monitors the position after the motor has stopped. 2 operation modes can be set: Monitoring only or Controlling & Monitoring. Active Mode: SERVOPACK controls motor deceleration and monitors the deceleration operation, then it switches to position monitoring. A holding brake cannot be made redundant.

## Part names of the safety module



## Connector

Port	Model	Pin	Manufacturer
CN21	1981080-1	8	Tyco Electronics AMP K.K.
CN22	1981080-1	8	Tyco Electronics AMP K.K.

Note: 1. The connectors above or their equivalents are used for SERVOPACKs.

2. Refer to the user's manual of the Safety Module for information on installation standards.

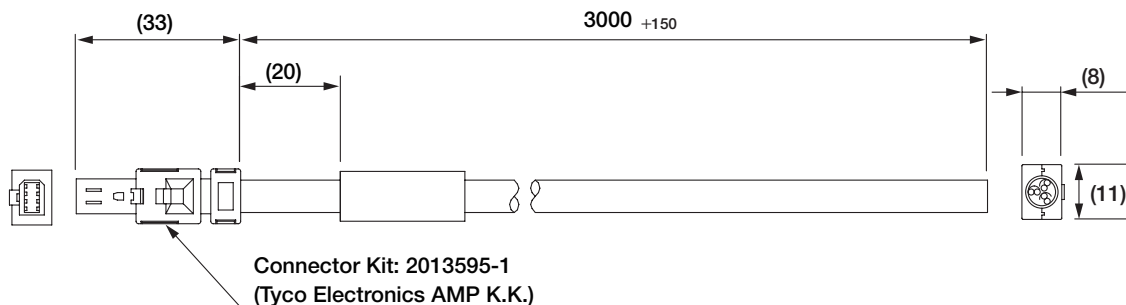
Signal	Pin No.	Name	Function
-	1	-	-
-	2	-	-
/SRI-A1-	3	Safety Request Input Signal A1	Input signal for Safety Function A
/SRI-A1+	4		
/SRI-A2-	5	Safety Request Input Signal A2	
/SRI-A2+	6		
EDM-A-	7	External Device Monitor Output Signal A	Output signal indicates that Safety Function A activates without failure.
EDM-A+	8		

I/O connector for the Safety Function A (CN2)

I/O connector for the Safety Function B (CN2)

Signal	Pin No.	Name	Function
-	1	-	-
-	2	-	-
/SRI-B1-	3	Safety Request Input Signal B1	Input signal for Safety Function B
/SRI-B1+	4		
/SRI-B2-	5	Safety Request Input Signal B2	
/SRI-B2+	6		
EDM-B-	7	External Device Monitor Output Signal B	Output signal indicates that Safety Function B activates without failure.
EDM-B+	8		

## Cable with Connector for CN21 and CN22 (Model: JZSP-CVH03-03-E)



## • Specifications Model JZSP-CVH03-03-E

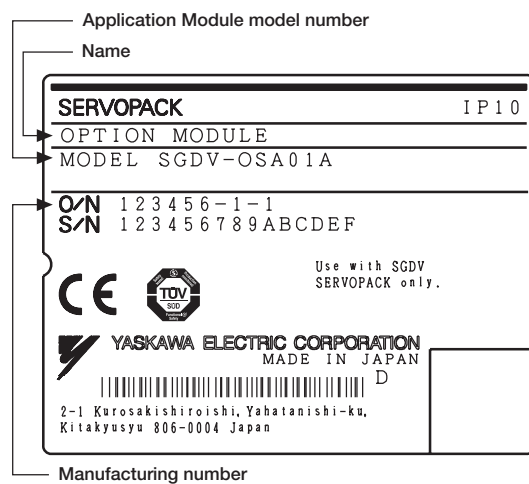
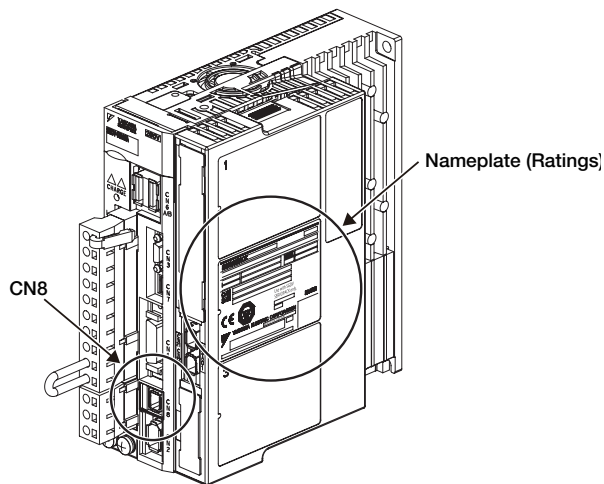
Pin No.	Signal	Lead Color	Marking Color
1	Not used	-	-
2	Not used	-	-
3	/HWBB1-	White	Black
4	/HWBB1+	White	Red
5	/HWBB2-	Gray	Black
6	/HWBB2+	Gray	Red
7	EDM1-	Orange	Black
8	EDM1+	Orange	Red

## • Specifications Model JZSP-CVH03-03-E-G3

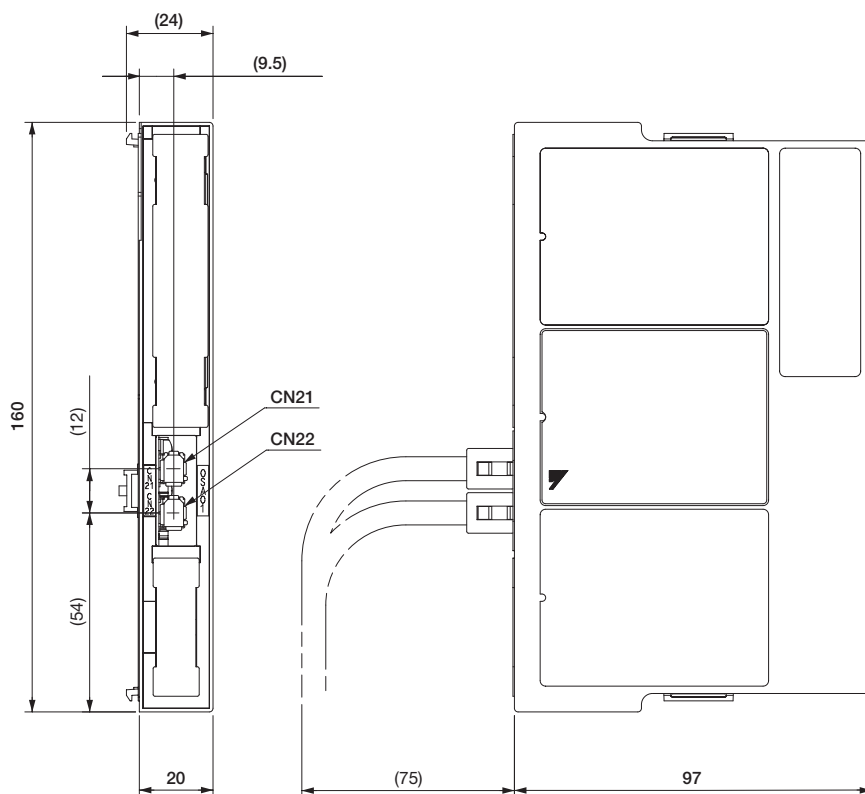
Pin No.	Signal	Lead Color	Marking Color
1	Not used	-	-
2	Not used	-	-
3	/HWBB1-	White	-
4	/HWBB1+	Brown	-
5	/HWBB2-	Green	-
6	/HWBB2+	Yellow	-
7	EDM1-	Grey	-
8	EDM1+	Pink	-

Nameplate and External Dimensions

• Nameplate (Ratings) and Model Designation



• External Dimensions Units: mm



Approx. Mass: 0.11 kg

## Specifications of the Safety Module

## ● Specifications

Items		Specifications	
Applicable SERVOPACK	Σ-V Series	Rotational motor	SGDV-□□□□01 (analog pulse model) SGDV-□□□□11 (M-II model) SGDV-□□□□E1 (command option attachable type)
		Linear motor	SGDV-□□□□05 (analog pulse model) SGDV-□□□□15 (M-II model) SGDV-□□□□E5 (command option attachable type)
Placement		Attached to the SERVOPACK	
Power Specifications	Power Supply Method	Supplied from the control power supply of the SGD V SERVOPACK	
Operating Conditions	Ambient/Storage Temperature	Ambient temperature: 0 to +55°C, Storage temperature: -20 to +85°C	
	Ambient/Storage Humidity	90% RH or less (with no freezing or condensation)	
	Vibration/Shock Resistance	Vibration resistance: 4.9 m/s <sup>2</sup> , Shock resistance: 19.6 m/s <sup>2</sup>	
	Protection Class/Pollution Degree	Protection class: IP10, pollution degree: 2 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	
	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	
Compliance with North American Safety Standards, European Directives, and Safety Standards (SERVOPACK + Safety Module)			
North American Safety Standards		UL508C	
European Directives	Machinery Directive (2006/42/EC)	EN ISO 13849-1: 2008 - EN 954-1	
	EMC Directive (2004/108/EC)	EN 55011/A2 2007 Group 1, Class A - EN 61000-6-2 - EN 61800-3	
	Low Voltage Directive (2006/95/EC)	EN 50178 - EN 61800-5-1	
Safety Standards	Safety of Machinery	EN ISO 13849-1 - EN 954-1 - IEC 60204-1	
	Functional Safety	IEC 61508-1 to -7 - IEC 62061 - IEC 61800-5-2	
	EMC Directive	IEC 61326-3-1	
Safety Function		IEC 61800-5-2	IEC 60204-1
		Safe Torque Off (STO)	Stop Category 0
		Safe Stop 1 (SS1)	Stop Category 1
		Safe Stop 2 (SS2)	Stop Category 2
		Safely Limited Speed (SLS)	
Safety Function Module		2 channels	
	Function A	Input signal: Two channels (redundant signals), output signal: one channel	
	Function B	Input signal: Two channels (redundant signals), output signal: one channel	
Safe Performance			
	Safety Integrity Level	IEC 61508, IEC 62061	SIL2, SILCL2
	Probability of Dangerous Failure per Hour	IEC 61508, IEC 62061	PFH · 3.3x10 <sup>-7</sup> [1/h] (3.3% of SIL2)
	Category	IEC 954-1	Category 3
	Performance Level	EN ISO 13849-1	PLd (Category 2)
	Mean Time to Dangerous Failure of Each Channel	EN ISO 13849-1	MTTFd: High
	Average Diagnostic Coverage	EN ISO 13849-1	DCave: Medium
	Proof Test Interval	10 years	

## Specifications of the Safety Module

## ● Specifications (cont'd)

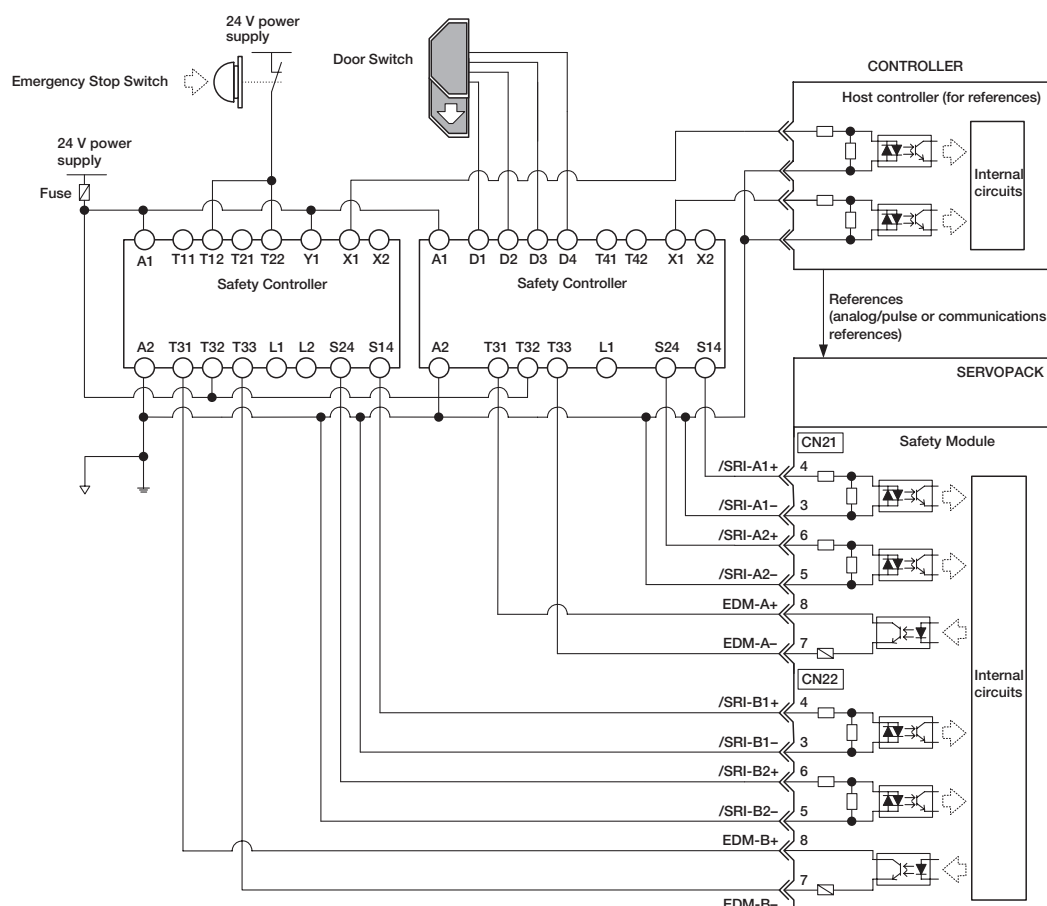
Items		Specifications		
Safety Functions	Number of Functions:		2	
	Safety Function A	Inputs	Number of Channels	2
			Function	Safety Request Input Signal (SRI-A1, SRI-A2)
		Output	Number of Channels	1
			Function	External Device Monitor Output Signal (EDM-A)
	Safety Function B	Inputs	Number of Channels	2
			Function	Safety Request Input Signal (SRI-B1, SRI-B2)
		Output	Number of Channels	1
Function			External Device Monitor Output Signal (EDM-B)	
Stopping Methods	Safety Functions (IEC61800-5-2)		Function names of Safety Module	
	Safe Torque Off (STO)		Safe BaseBlock Function (SBB function)	
	Safe Stop 1 (SS1)		Safe BaseBlock with Delay Function (SBB-D function)	
	Safe Stop 2 (SS2)		Safe Position Monitor with Delay Function (SPM-D function)	
	Safely-Limited Speed (SLS)		Safely Limited Speed with Delay Function (SLS-D function)	
Others		Active Mode Function		
Response Time		Max. 200 ms		
Proof Test Interval		10 years		

## ● System Configuration Example

The safety functions are set to operate under the following conditions:

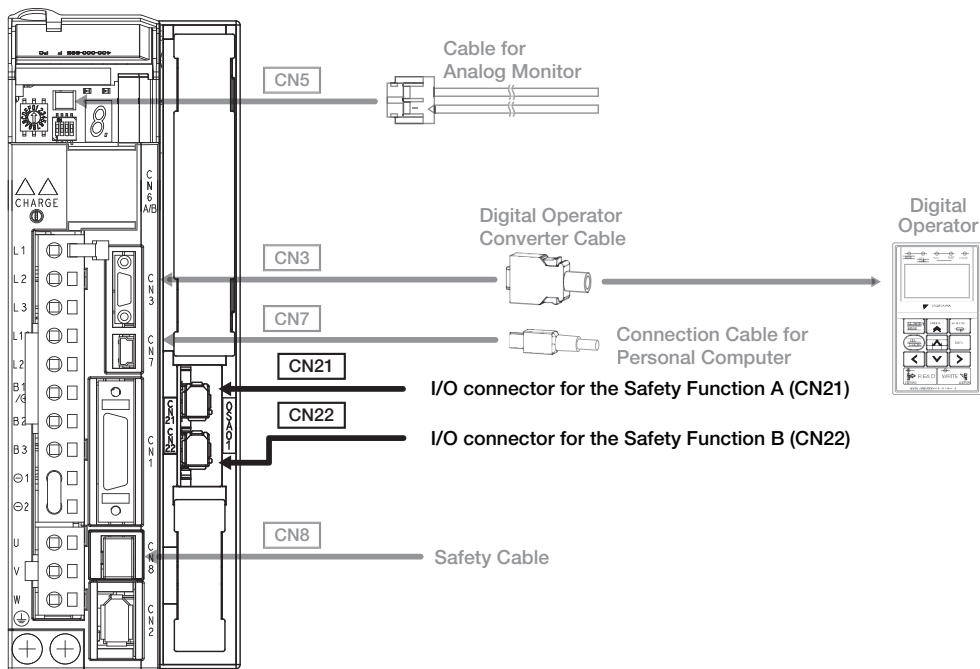
Safety Function A: Safety Function A (SLS-D function) operates when the door switch opens.


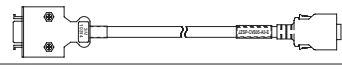


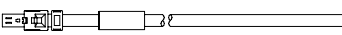
Safety Function B: Safety Function B (SBB-D function) operates when the emergency stop switch is pressed.



## Selecting Cables

- Cables for **CN1** **CN3** **CN5** **CN7** **CN8** **CN21** **CN22** for Sigma-5 SERVOPACKs



Name	Length	Order No.	Specifications
<b>CN3</b>	Digital Operator	JZSP-OP05A-1-E	With Connection Cable (1 m) 
	Digital Operator Converter Cable <sup>1</sup>	0.3 m	Cable with Connectors at Both Ends 
<b>CN7</b>	Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E Cable with Connectors at Both Ends 
<b>CN5</b>	Cables for Analog Monitor	1 m	JZSP-CA01-E SERVOPACK End 
<b>CN21</b> <b>CN22</b>	Cables with Connector <sup>2</sup>	3 m	JZSP-CVH03-03-E JZSP-CVH03-03-E-G3 
	Connector kit <sup>3</sup>		Contact Tyco Electronics AMP K.K. Product name : Industrial Mini I/O D-shape Type1 Plug Connector Kit Model : 2013595-1

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

\*2 : When using the safety function, connect this cable to the safety devices.

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

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



# Wiring Main Circuit and Peripheral Devices

## Wiring Main Circuit

### ● Typical Main Circuit Wiring Examples

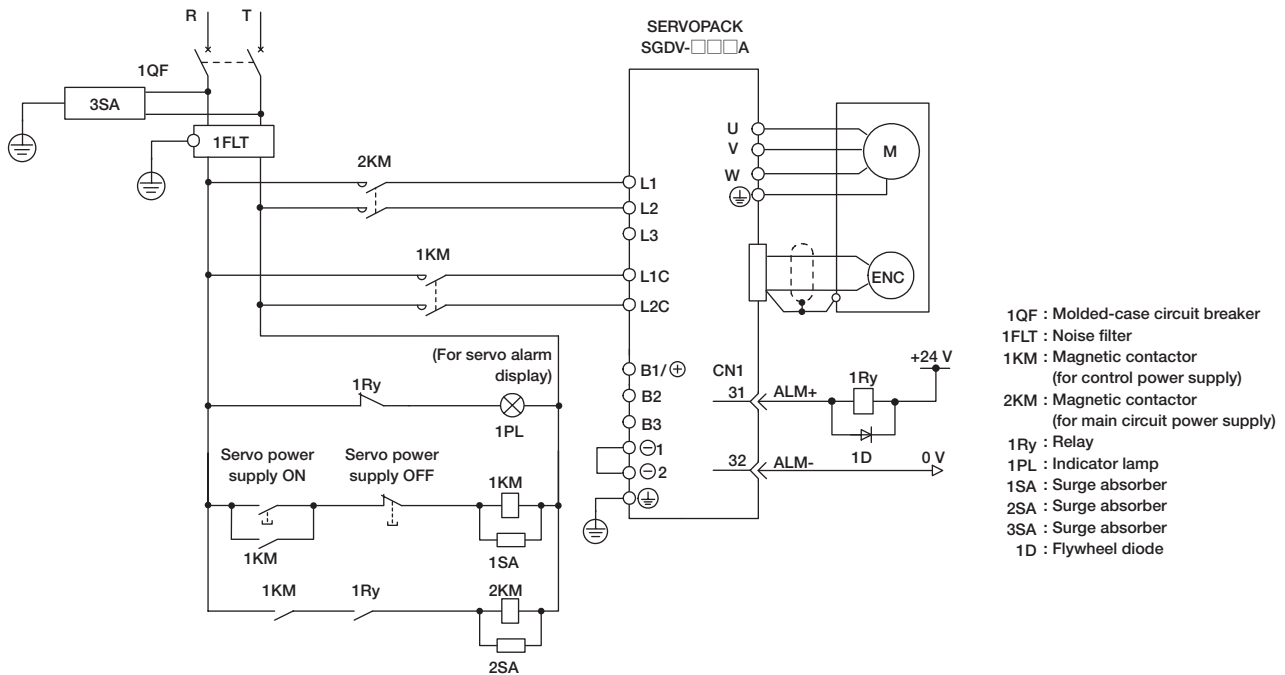
This section describes the typical main circuit wiring examples.



**WARNING**

After turning OFF the power, do not touch the power terminals while charge indicator is still ON. High residual voltage may still remain in the SERVOPACK. When the voltage is discharged, the charge indicator will turn OFF. Make sure the charge indicator is OFF before starting wiring or inspection.

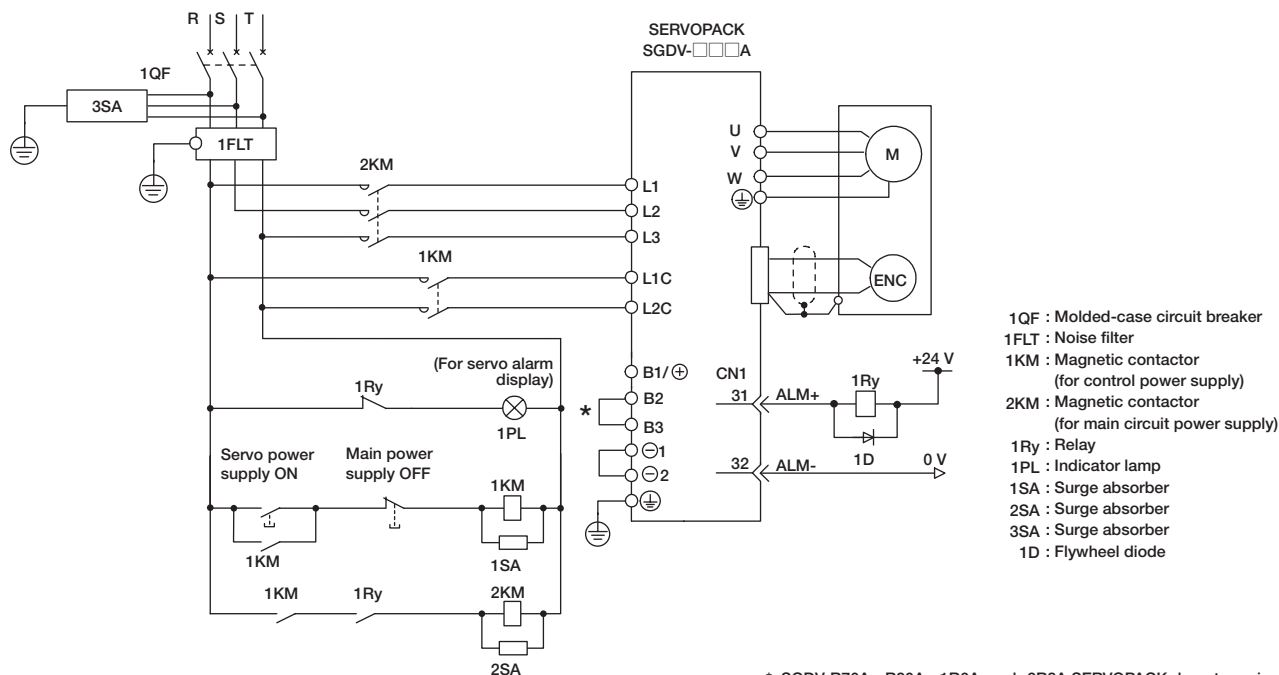
### ● Single-phase 200 V





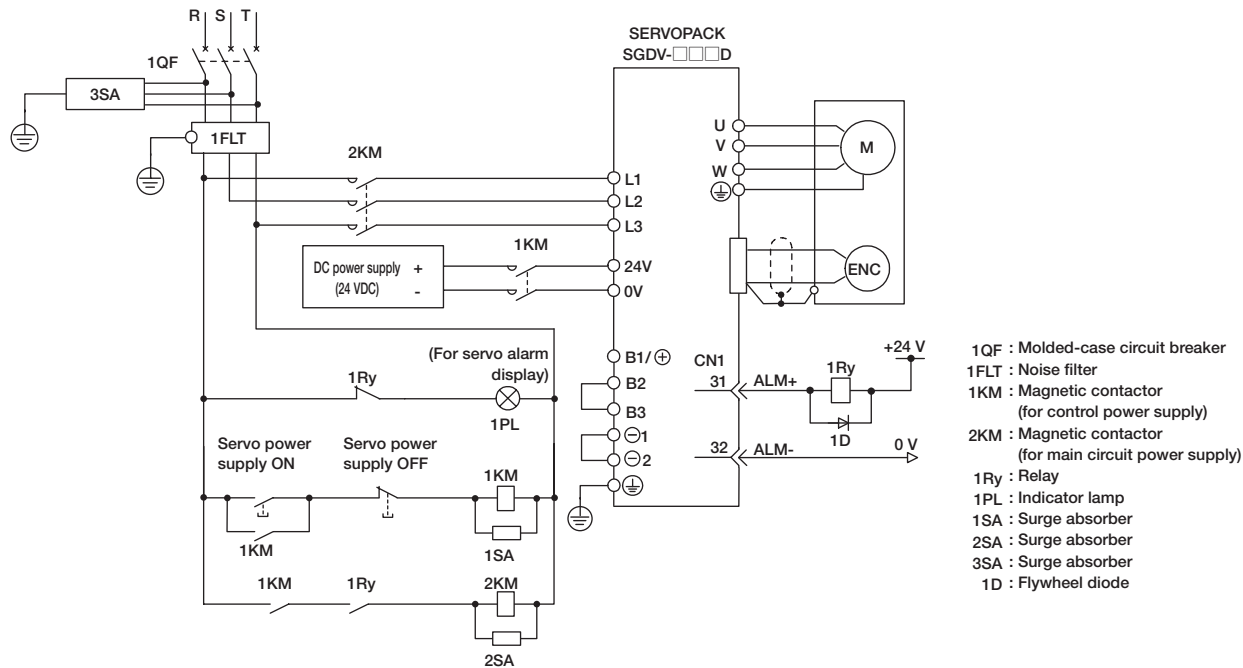
## Wiring Main Circuit

## ● Three-phase 200 V



\*: SGDV-R70A, -R90A, -1R6A, and -2R8A SERVOPACK do not require short-circuiting between B2 and B3. Do not short-circuit B2-B3.  
 Note: Every SERVOPACK of SGDV-470A, -550A, -590A, and -780A requires a specified external regenerative unit.

## ● Three-phase 400 V



Note: Every SERVOPACK of SGDV-210D, -260D, -280D, and -370D requires a specified external regenerative unit.

## Wiring Main Circuit

### ● General Precautions for Wiring

#### IMPORTANT

- Use a molded-case circuit breaker (QF) or fuse to protect the Main Circuit.  
The SERVOPACK connects directly to a commercial power supply; it is not isolated by a transformer or other device.  
Always use a molded-case circuit breaker (QF) or fuse to protect the servo system from accidents involving different power system voltages or other accidents.
- Install a ground fault detector.  
The SERVOPACK does not have a built-in protective circuit for grounding. To configure a safer system, install a ground fault detector against overloads and short-circuiting, or install a ground fault detector combined with a molded-case circuit breaker.
- Do not turn power ON and OFF frequently.  
The power supply in the SERVOPACK contains a capacitor, which causes a high charging current to flow when power is turned ON. Frequently turning power ON and OFF will cause the main circuit elements in the SERVOPACK to deteriorate.

To ensure safe, stable application of the servo system, observe the following precautions when wiring.

Observe the following precautions when wiring the main circuit.

- Use shielded twisted-pair wires or shielded multi-core twisted-pair wires for signal lines and encoder lines.
- The maximum wiring length is 3 m for signal lines and 50 m for encoder lines.

Observe the following precautions when wiring the ground.

- Use a cable as thick as possible (at least 2.0 mm<sup>2</sup>)
- Ground the 100-V and the 200-V SERVOPACK to a resistance of 100 Ω or less. Ground the 400-V SERVOPACK to a resistance of 10 Ω or less.
- Be sure to ground at only one point.
- Ground the servomotor directly if the servomotor is insulated from the machine.

The signal cable conductors are as thin as 0.2 mm<sup>2</sup> or 0.3 mm<sup>2</sup>. Do not impose excessive bending force or tension.

### ● Precautions When Using the SERVOPACK with a DC Power Input

When using the SERVOPACK with a DC power input, refer to 3.1.5 *Precautions When using the SERVOPACK with a DC power input* on “AC Servo Drives  $\Sigma$ -V Series USER’S MANUAL Design and Maintenance.” (manual no. SIEP S800000 45)

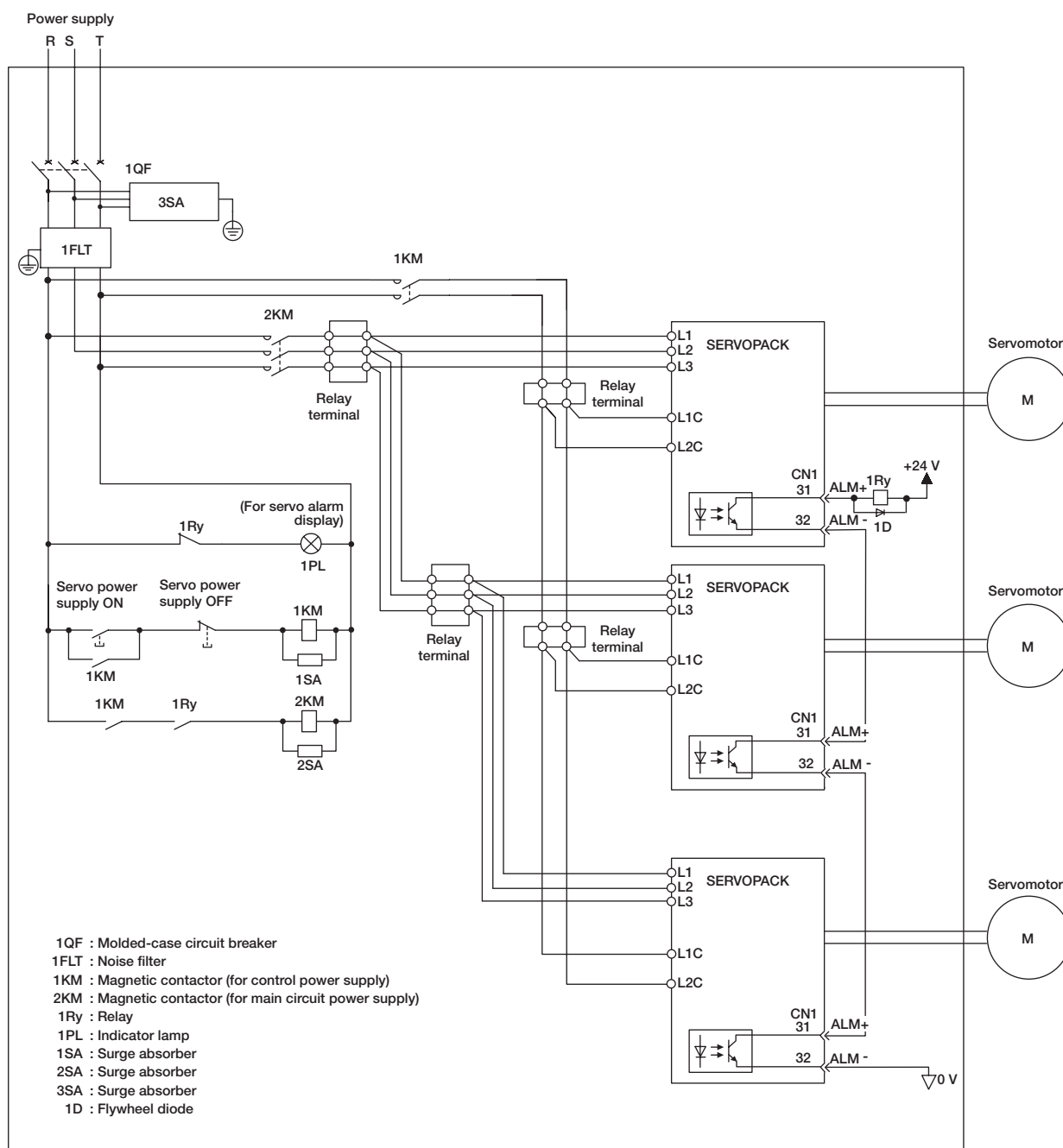
## Wiring Main Circuit

### ● Precautions When Using More Than One SERVOPACK

This section shows an example of the wiring when more than one SERVOPACK is used and the precautions.

#### ● Wiring Example

Connect the alarm output (ALM) terminals for the three SERVOPACKs in series to enable alarm detection relay 1RY to operate. When a SERVOPACK alarm is activated, the ALM output signal transistor is turned OFF.



### ● Precautions

Multiple servos can share a single molded-case circuit breaker (QF) or noise filter. Always select a QF or noise filter that has enough capacity for the total power capacity (load conditions) of those servos.

## SERVOPACK Main Circuit Wire

### ● Single-phase, 200 V

Cables	Terminal Symbol	SERVOPACK Model SGDV-					
		R70A	R90A	1R6A	2R8A	5R5A	120A*
Main Circuit Power Cable	L1, L2	HIV1.25			HIV2.0		HIV3.5
Servomotor Main Circuit Cable	U, V, W	HIV1.25				HIV2.0	
Control Power Cable	L1C, L2C	HIV1.25					
External Regenerative Resistor Cable	B1/⊕, B2	HIV1.25					
Ground Cable	⊕	HIV2.0 min.					

\*: The official model number is SGDV-120A□1A008000.

### ● Three-phase, 200 V

Cables	Terminal Symbol	SERVOPACK Model SGDV-														
		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A	470A	550A	590A	780A
Main Circuit Power Cable	L1, L2, L3	HIV1.25			HIV2.0				HIV3.5		HIV5.5	HIV8	HIV14	HIV22		
Servomotor Main Circuit Cable	U, V, W	HIV1.25			HIV2.0				HIV3.5	HIV5.5	HIV8.0	HIV14		HIV22		
Control Power Cable	L1C, L2C	HIV1.25														
External Regenerative Resistor Cable	B1/⊕, B2	HIV1.25							HIV2.0	HIV3.5	HIV5.5	HIV8		HIV22		
Ground Cable	⊕	HIV2.0 min.														

### ● Three-phase, 400 V

Cables	Terminal Symbol	SERVOPACK Model SGDV-											
		1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D		
Main Circuit Power Cable	L1, L2, L3	HIV1.25			HIV2.0			HIV3.5		HIV5.5	HIV8	HIV14	
Servomotor Main Circuit Cable	U, V, W	HIV1.25			HIV2.0			HIV3.5	HIV5.5		HIV8	HIV14	
Control Power Cable	24V, 0V	HIV1.25											
External Regenerative Resistor Cable	B1/⊕, B2	HIV1.25					HIV2.0	HIV3.5		HIV5.5	HIV8		
Ground Cable	⊕	HIV2.0 min.											

### ● Wire Type

Code	Wire Type		Allowable Conductor Temperature °C
	Name		
PVC	Polyvinyl chloride insulated wire		–
IV	600 V polyvinyl chloride insulated wire		60
HIV	600 V grade heat-resistant polyvinyl chloride insulated wire		75

The following table shows the size and allowable currents for the wires. Use a wire whose specifications meet or are less than the values in the table.

### ● 600 V grade heat-resistant polyvinyl chloride insulated wires

Nominal Cross Section Diameter mm <sup>2</sup>	AWG size	Allowable Current at Ambient Temperatures A		
		30 °C	40 °C	50 °C
0.5	20	6.6	5.6	4.5
0.75	–	8.8	7	5.5
0.9	18	9	7.7	6
1.25	17 to 16	12	11	8.5
2.0	14	23	20	16
3.5	12 to 11	33	29	24
5.5	10 to 9	43	38	31
8.0	8	55	49	40
14.0	6 to 5	79	70	57
22.0	4 to 3	91	81	66

Note: The values in the table are only for reference.

#### IMPORTANT

- 1 Wire sizes are selected for three cables per bundle at 40°C ambient temperature with the rated current.
- 2 Use a wire with a minimum withstand voltage of 600 V for the main circuit.
- 3 If wires are bundled in PVC or metal ducts, take into account the reduction of the allowable current.
- 4 Use a heat-resistant wire under high ambient or panel temperatures, where polyvinyl chloride insulated wires will rapidly deteriorate.

## Molded-case Circuit Breaker and Fuse Capacity

Main Circuit Power Supply	Applicable Servomotor Max. Capacity kW	SERVOPACK Model SGDv-	Power Supply Capacity per SERVOPACK kVA	Current Capacity		Inrush Current			
				Main Circuit Arms	Control Circuit Arms	Main Circuit A0-p	Control Circuit A0-p		
Single-phase 200 V	0.05	R70A	0.2	2	0.2	33	70		
	0.1	R90A	0.3	2					
	0.2	1R6A	0.7	3					
	0.4	2R8A	1.2	5					
	0.75	5R5A	1.9	9					
	1.5	120A*	4	16			0.25	33	
Three-phase 200 V	0.05	R70A	0.2	1.0	0.2	33	70		
	0.1	R90A	0.3	1.0					
	0.2	1R6A	0.6	2.0					
	0.4	2R8A	1	3.0					
	0.5	3R8A	1.4	3.0					
	0.75	5R5A	1.6	6.0					
	1.0	7R6A	2.3	6.0					
	1.5	120A	3.2	7.3			0.25	33	
	2.0	180A	4	9.7					
	3.0	200A	5.9	15					
	5.0	330A	7.5	25			0.3	65.5	
	6.0	470A	10.7	29					
	7.5	550A	14.6	37					
	11	590A	21.7	54			0.45	109	48
	15	780A	29.6	73					
Three-phase 400 V	0.5	1R9D	1.1	1.4	1.2	17	-		
	1.0	3R5D	2.3	2.9					
	1.5	5R4D	3.5	4.3					
	2.0	8R4D	4.5	5.8	1.4	34			
	3.0	120D	7.1	8.6					
	5.0	170D	11.7	14.5					
	6.0	210D	12.4	17.4	1.5	34			
	7.5	260D	14.4	21.7					
	11	280D	21.9	31.8					
	15	370D	30.6	43.4	1.7	68			

\*: The official model number is SGDv-120A□1A008000.

Notes: 1 To comply with the low voltage directive, connect a fuse to the input side. Select the fuse or molded-case circuit breaker for the input side from among models that are compliant with UL standards.

The table above also provides the net values of current capacity and inrush current. Select a fuse and a molded-case circuit breaker which meet the breaking characteristics shown below.

· Main circuit, control circuit: No breaking at three-times the current values of the table for 5 s.

· Inrush current: No breaking at the same current values of the table for 20 ms.

2 In accordance with UL standards, the following restrictions apply.

SERVOPACK SGDv-	Restrictions
120A□1A008000, 180A, 200A	Available rated current for molded-case circuit breaker: 40 A or less
330A	<ul style="list-style-type: none"> <li>Available rated current for non-time delay fuse: 70 A or less</li> <li>Available rated current for time delay fuse: 40 A or less</li> <li>Do not use single wires.</li> </ul>
470A, 550A	<ul style="list-style-type: none"> <li>Available rated current for molded-case circuit breaker: 60 A or less</li> <li>Available rated current for non-time delay fuse or time delay fuse: 60 A or less</li> </ul>
590A, 780A	<ul style="list-style-type: none"> <li>Available rated current for molded-case circuit breaker: 100 A or less</li> <li>Available rated current for non-time delay fuse or time delay fuse: 100 A or less (Available rated current for class J non-time delay or faster fuse: 125 A or less)</li> </ul>
210D, 260D	<ul style="list-style-type: none"> <li>Available rated current for molded-case circuit breaker: 60 A or less</li> <li>Available rated current for non-time delay fuse: 60 A or less</li> <li>Available rated current for time delay fuse: 35 A or less</li> </ul>
280D, 370D	<ul style="list-style-type: none"> <li>Available rated current for molded-case circuit breaker: 80 A or less</li> <li>Available rated current for non-time delay fuse: 125 A or less</li> <li>Available rated current for time delay fuse: 75 A or less</li> </ul>

## Noise Filters

### ● Noise Filter Selection

Main Circuit Power Supply	SERVOPACK Model SGDV-	Recommended Noise Filter			Details
		Model	Specifications	Leakage Current	
Single-phase 200 V	R70A, R90A, 1R6A	FN2070-6/07	Single-phase 250V 6A	0.734 mA 230VAC/50Hz	(1)
	2R8A	FN2070-10/07	Single-phase 250V 10A		
	5R5A	FN2070-16/07	Single-phase 250V 16A		
	120A	FN350-30/33	Single-phase 250V 30A	5.4 mA 230VAC/50Hz	
Three-phase 200 V	R70A,R90A,1R6A 2R8A,3R8A	FN258L-7/07	Three-phase 480V 7A	0.5 mA 440VAC/50Hz	(2)
	5R5A,7R6A	FN258L-16/07	Three-phase 480V 16A	0.8 mA 440VAC/50Hz	
	120A,180A	HF3020C-UQC	Three-phase 480V 20A	10 mA 400VAC/50Hz	
	200A	HF3030C-UQC	Three-phase 480V 30A		
	330A, 470A	HF3050C-UQC	Three-phase 480V 50A		
	550A	HF3060C-UQC	Three-phase 480V 60A		
	590A, 780A	HF3100C-UQB	Three-phase 480V 100A	(3)	
Three- phase 400 V	1R9D,3R5D,5R4D	FN258L-7/07	Three-phase 480V 7A	0.8 mA	(2)
	8R4D,120D	FN258L-16/07	Three-phase 480V 16A	440VAC/50Hz	
	170D	FMAC-0934-5010	Three-phase 480V 35A	160 mA 440VAC/50Hz	(3)
	210D, 260D	HF3050C-UQC	Three-phase 480V 50A	10 mA	(2)
	280D, 370D	HF3080C-UQC	Three-phase 480V 80A	400VAC/50Hz	(3)

Note: RoHS-compliant models are not available. Contact the manufactures when in need of an RoHS-compliant model.

#### IMPORTANT

Some noise filters have large leakage currents. The grounding measures taken also affect the extent of the leakage current. If necessary, select an appropriate leakage current detector or leakage current breaker taking into account the grounding measures that are used and leakage current from the noise filter. Contact the manufacturer of the noise filter for details.

### ● Noise Filter Selection (Footprint models)

Main Circuit Power Supply	SERVOPACK Model SGDV-	Part number	Rated power	Rated current	Max. rated voltage	Leakage current Nom / Max		
Single-phase 230 V	R70A	RF-1005-SG5	50 W	5 A	Single-phase 250 V	3.5 mA		
	R90A		100 W					
	1R6A		200 W					
	2R8A		400 W					
	5R5A	RF-1009-SG5	750 W	9 A			Single-phase 250 V	3.5 mA
	120A	RF-1016-SG5	1500 W	16 A			Single-phase 250 V	3.5 mA
Three-phase 400 V	1R9D	RF-3004-SG5	500 W	4.3 A	Three-phase 480 V	0.3 mA / 29 mA		
	3R5D		1000 W					
	5R4D		1500 W					
	8R4D	RF-3008-SG5	2000 W	8.6 A	Three-phase 480 V	0.3 mA / 28 mA		
	120D	3000 W						
	170D	RF-3012-SG5	5000 W	14.5 A	Three-phase 480 V	0.3 mA / 28 mA		
	210D	RF-3022-SG5	6000 W	22 A	Three-phase 480 V	0.3 mA / 40 mA		
	260D		7500 W					
	280D	RF-3044-SG5	11000 W	44 A	Three-phase 480 V	0.3 mA / 40 mA		
	370D		15000 W					

## Noise Filters

- External Dimensions (Units: mm)  
(1) FN Type (by Schaffner EMC, Inc.)

Model		FN2070-6/07	FN2070-10/07	FN2070-16/07	
Dimensional Drawings	Top View		Side View 	Top View 	Side View 
	Connection Lead				
External Dimensions	Code	Dimensions			
	A	113.5±1	156±1	119±0.5	
	B	57.5±1		85.5±1	
	C	45.4±1.2		57.6±1	
	D	94±1	130.5±1	98.5±1	
	F	103±0.3	143±0.3	109±0.3	
	J	25±0.2		40±0.2	
	K	8.4±0.5		8.6±0.5	
	L	32.4±0.5		-	
	M	4.4±0.1	5.3±0.1	4.4±0.1	
	N	6±0.1		7.4±0.1	
	P	0.9±0.1		1.2±0.1	
	Q	-		66±0.3	
R	-		51±0.2		
S	38±0.5		-		

Model	FN350-30/33
Dimensional Drawings	Side View 
	Top View 

## Noise Filters

## ● External Dimensions (Units: mm)

## (2) FN Type and HF Type (by Schaffner EMC, Inc.)

Model	FN Type [by Schaffner EMC, Inc.]		HF Type [by SOSHIN ELECTRIC CO., LTD.]		
	FN258L-7/07	FN258L-16/07	HF3020C-UQC HF3030C-UQC	HF3050C-UQC HF3060C-UQC	
Dimensional Drawings					
	Code	Dimensions	Dimensions	Dimensions	
External Dimensions	A	255±1	305±1	236	256
	B	126±0.8	142±0.8	221	241
	C	50±0.6	55±0.6	206	226
	D	225±0.8	275±0.8	184	204
	E	240±0.5	290±0.5	105	115
	F	25±0.3	30±0.3	90	100
	G	6.5±0.2		76	86
	H	300±10		122	127
	J	1±0.1		5.5x7 Dia.	5.5x7 Dia.
	K	-		M5	M5
	L	9±1		M5	M5
	M	-		16	16
	N	-		13	13
	O	M5		51.4	51.4
P	AWG16	AWG14	13	13	
Q	-		61.1	61.1	

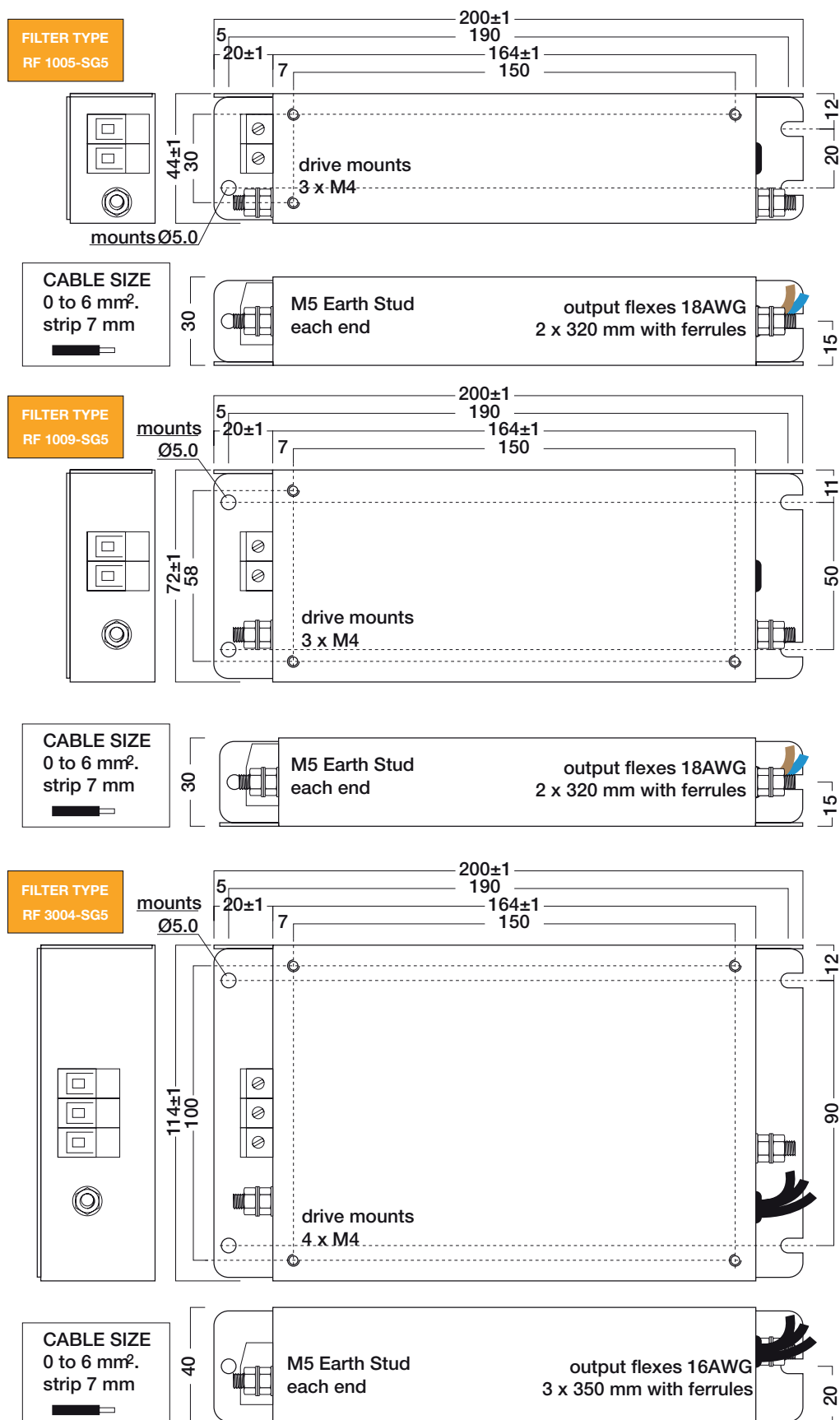
## (3) HF Type and FMAC Type

Model	HF Type [by SOSHIN ELECTRIC CO., LTD.]	FMAC Type [by Schurter, Inc.]
	HF3080C-UQC HF3100C-UQB	FMAC-0934-5010
External Dimensions		



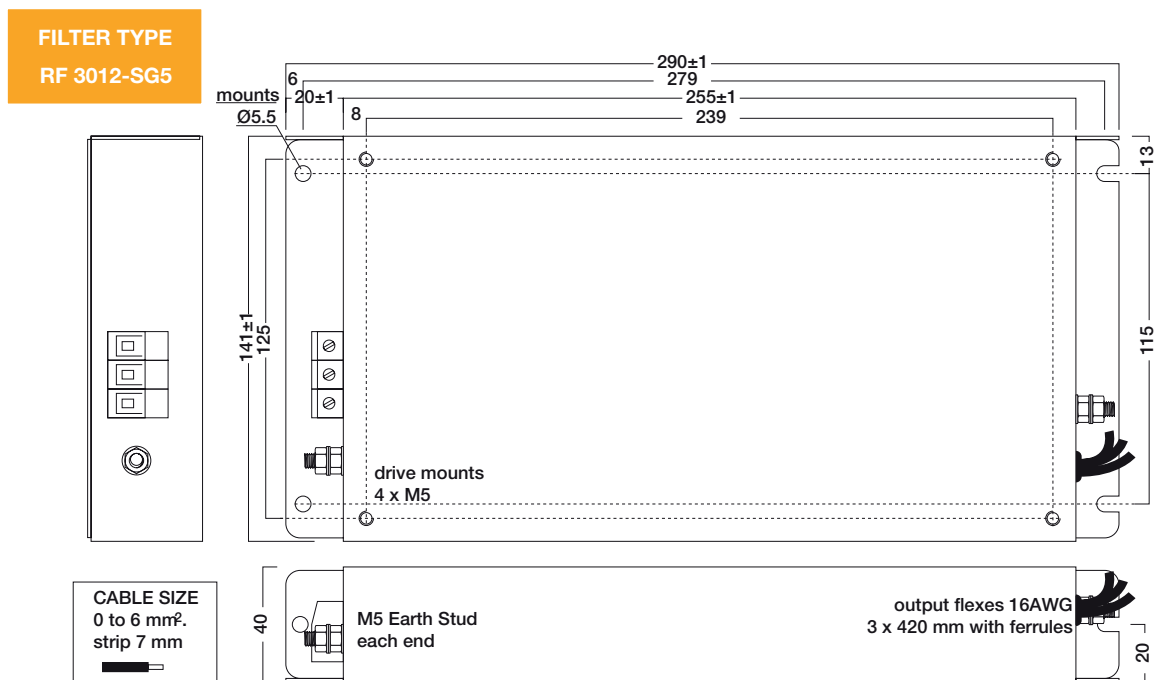
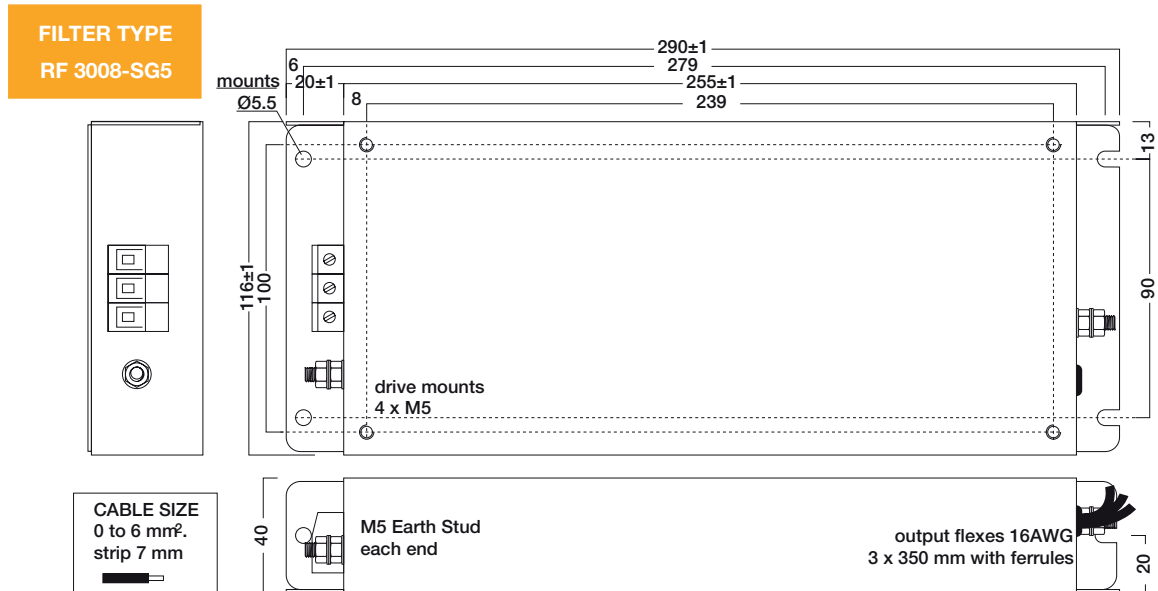
## Noise Filters

- External Dimensions (Units: mm)  
Footprint models (by Rasmi Electronics Ltd.)



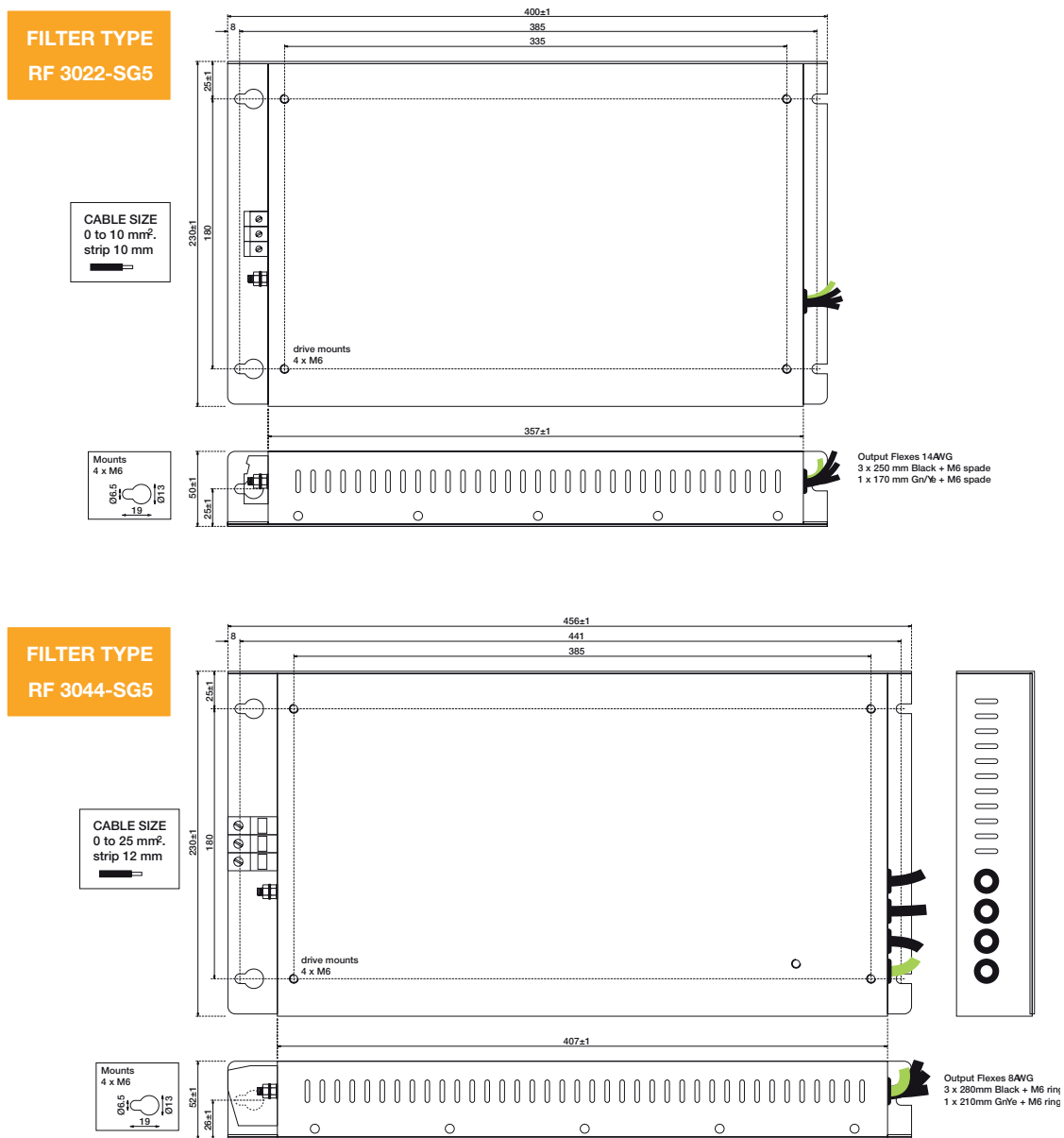
## Noise Filters

- External Dimensions (Units: mm)  
Footprint models (by Rasmi Electronics Ltd.)



## Noise Filters

- External Dimensions (Units: mm)  
Footprint models (by Rasmi Electronics Ltd.)



## Surge Absorber

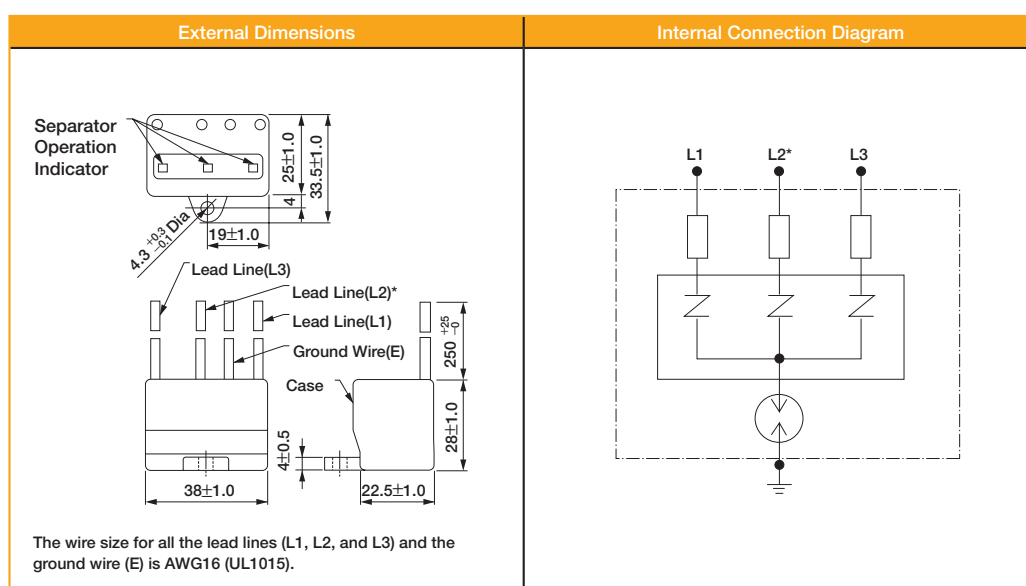
## ● Surge Absorber Selection

The surge absorber (for lightning surge) absorbs lightning surge and prevents faulty operation in or damage to electronic circuits.

Main Circuit Power Supply	SERVOPACK Model SGDV-	Recommended Surge Absorber
Single-phase 200 V	□□□A	LT-C12G801WS
Three-phase 200 V	□□□A	LT-C32G801WS
Three-phase 400 V	□□□D	LT-C35G102WS

## ● External Dimensions (Units: mm)

Model: LT-C32G801WS, LT-C35G102WS, LT-C12G801WS [by SOSHIN ELECTRIC CO., LTD.]



\*: No L2 is on the LT-C12G801WS surge absorber.

## Magnetic Contactors

### ● Magnetic Contactor Selection

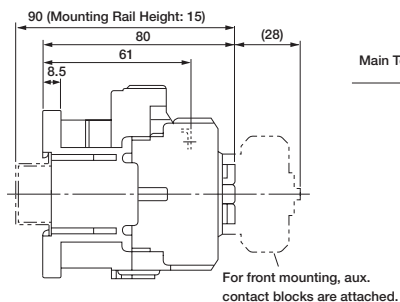
A magnetic contactor is required to make the AC power to SERVOPACK ON/OFF sequence externally. Be sure to attach a surge absorber (for switching surge) (surge absorber unit etc.) to the excitation coil of the magnetic contactor.

Main Circuit Power Supply	SERVOPACK Model SGDV-	Magnetic Contactor	
		Model	Specifications
Single-phase 200 V	R70A, R90A, 1R6A, 2R8A	SC-03	(RoHS)
	5R5A	SC-4-1	(RoHS)
	120A	SC-5-1	(RoHS)
Three-phase 200 V	R70A, R90A, 1R6A, 2R8A, 3R8A	SC-03	(RoHS)
	5R5A, 7R6A, 120A	SC-4-1	(RoHS)
	180A, 200A	SC-5-1	(RoHS)
	330A, 470A	SC-N1	(RoHS)
	550A	SC-N2	(RoHS)
	590A	SC-N2S	(RoHS)
	780A	SC-N3	(RoHS)
Three-phase 400 V	1R9D, 3R5D, 5R4D	SC-4-1/G	Coil 24 VDC (RoHS)
	8R4D, 120D	SC-5-1/G	Coil 24 VDC (RoHS)
	170D, 260D	SC-N1/G	Coil 24 VDC (RoHS)
	280D, 370D	SC-N2S/G	Coil 24 VDC (RoHS)

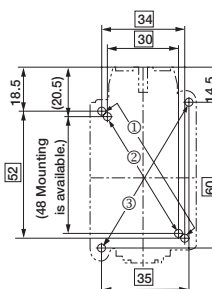
Note: Contact Fuji Electric FA Components & Systems Co., Ltd.

### ● External Dimensions (Units: mm)

#### ● SC-03



#### Mounting Hole Dimensions



Aux. Contact	Structure
1a	
1b	

● Mounting methods : The following methods ①, ②, ③ are available.

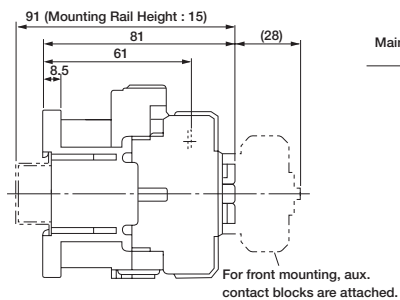
- ① ...34 × (48 to) 52
- ② ...30 × 48
- ③ ...35 × 60

● Mounting screw : 2-M4

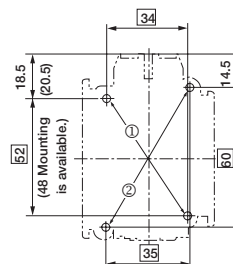
Use the two mounting holes on the diagonal line to mount a contactor.

Approx. Mass : 0.32 kg

#### ● SC-4-1



#### Mounting Hole Dimensions



Aux. Contact	Structure
1a	
1b	

● Mounting methods : The following methods ①, ② are available.

- ① ...34 × (48 to) 52
- ② ...35 × 60

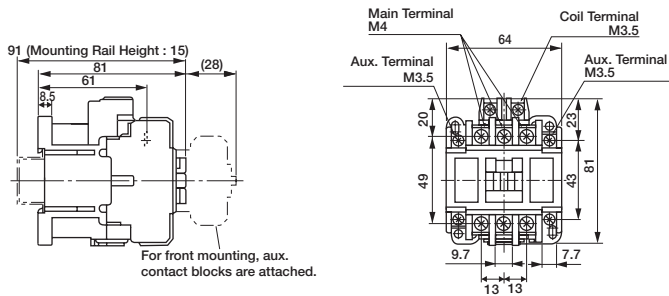
● Mounting screw : 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

Approx. Mass : 0.36 kg

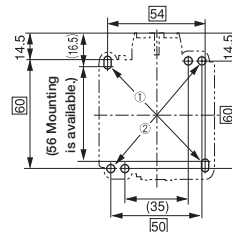
Magnetic Contactor

• SC-5-1



For front mounting, aux. contact blocks are attached.

Mounting Hole Dimensions



Aux. Contact	Structure
2a	
1a1b	
2b	

• Mounting methods : The following methods ①, ② are available.

①...54 × (56 to) 60

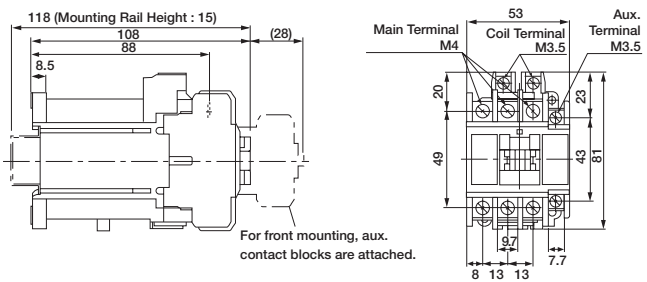
②...50 × 60

• Mounting screw : 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

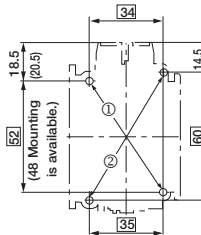
Approx. Mass : 0.38 kg

• SC-4-1/G



For front mounting, aux. contact blocks are attached.

Mounting Hole Dimensions



Aux. Contact	Structure
1a	
1b	

• Mounting methods : The following methods ①, ② are available.

①...34 × (48 to) 52

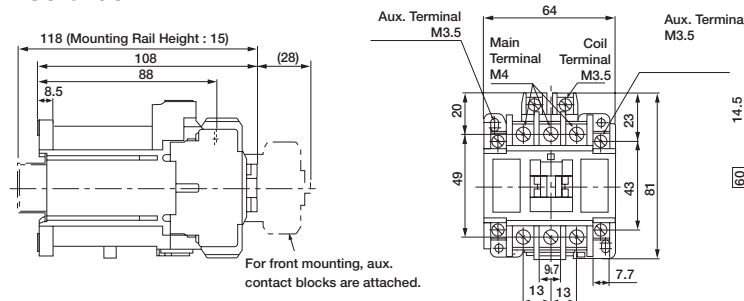
②...35 × 60

• Mounting screw : 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

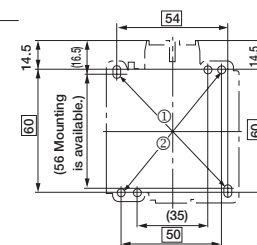
Approx. Mass : 0.6 kg

• SC-5-1/G



For front mounting, aux. contact blocks are attached.

Mounting Hole Dimensions



Aux. Contact	Structure
2a	
1a1b	
2b	

• Mounting methods : The following methods ①, ② are available.

①...54 × (56 to) 60

②...50 × 60

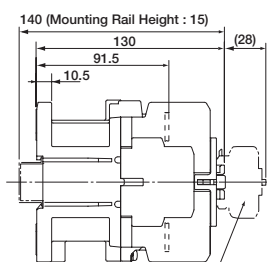
• Mounting screw : 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

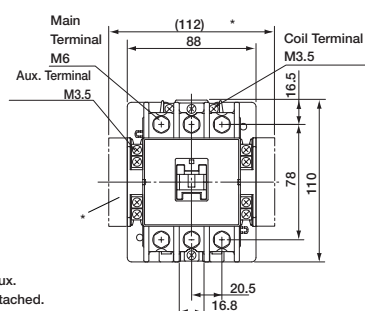
Approx. Mass : 0.62 kg

## Magnetic Contactor

## • SC-N2S/G

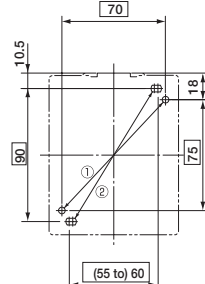


For front mounting, aux. contact blocks are attached.

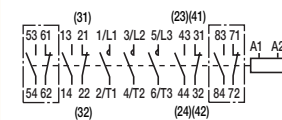


\*: For two side mounting, aux. contact blocks are attached.

## Mounting Hole Dimensions



## Structure



Approx. Mass: 1.4 kg

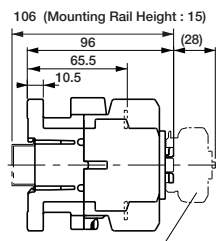
• Mounting methods : The following methods ①, ② are available.

①...70 × 75 ②...(55 to) 65 × 90

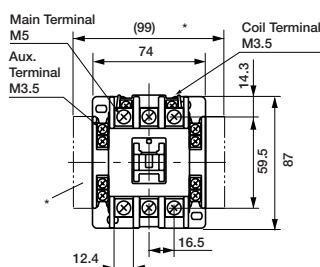
• Mounting screw : 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

## • SC-N1, SC-N2

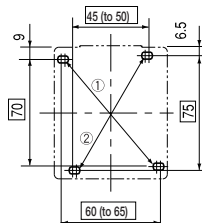


For front mounting, aux. contact blocks are attached.

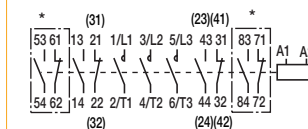


\*: For two side mounting, aux. contact blocks attached.

## Mounting Hole Dimensions



## Structure



\*: These contacts are used if the auxiliary contacts consist of four normally open (NO) and four normally close (NC) contacts.

Note: The terminals of the auxiliary contacts are numbered differently than conventional terminals. The numbers in parentheses use the conventional method.

Approx. Mass: 0.59 kg

• Mounting methods :

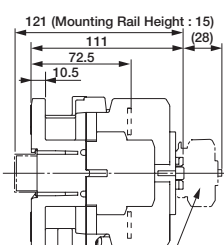
The following methods ①, ② are available.

①...70 × 75 ②...(55 to) 65 × 90

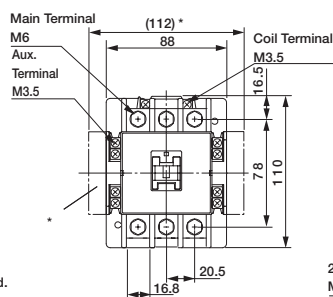
• Mounting screw : 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

## • SC-N2S, SC-N3

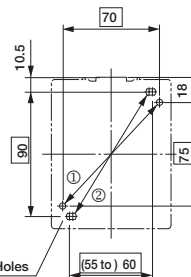


For front mounting, aux. contact blocks are attached.



\*: For two side mounting, aux. contact blocks attached.

## Mounting Hole Dimensions



2-M4 Mounting Holes

• Mounting methods :

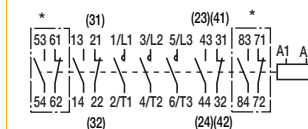
The following methods ①, ② are available.

①...70 × 75 ②...(55 to) 60 × 90

• Mounting screw : 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

## Structure

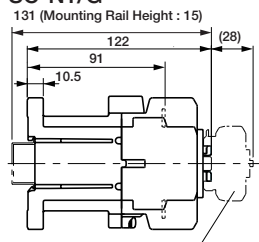


\*: These contacts are used if the auxiliary contacts consist of four normally open (NO) and four normally close (NC) contacts.

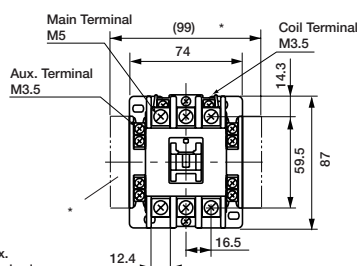
Note: The terminals of the auxiliary contacts are numbered differently than conventional terminals. The numbers in parentheses use the conventional method.

Approx. Mass: 1.1 kg

## • SC-N1/G

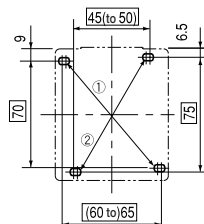


For front mounting, aux. contact blocks are attached.



\*: For two side mounting, aux. contact blocks attached.

## Mounting Hole Dimensions



• Mounting methods :

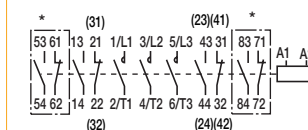
The following methods ①, ② are available

①...(60 to)65 × 70 ②...45 (to 50) × 70

• Mounting screw : 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

## Structure



\*: These contacts are used if the auxiliary contacts consist of four normally open (NO) and four normally close (NC) contacts.

Note: The terminals of the auxiliary contacts are numbered differently than conventional terminals. The numbers in parentheses use the conventional method.

Approx. Mass: 0.82 kg

## AC/DC Reactors

### ● Selection

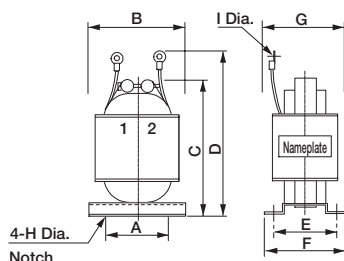
If power supply harmonic suppression is needed, connect a DC reactor between the three-phase 200 V or three-phase 400 V SERVOPACK main circuit terminals  $\ominus 1$  and  $\ominus 2$ . Also, connect an AC reactor to a single-phase 100 V or 200 V SERVOPACK main circuit terminal L1 in series.

Select AC/DC reactors according to the rating of the SERVOPACK.

Main Circuit Power Supply	SERVOPACK SGD V-	AC/DC Reactor Model	Inductance mH	Rated Current A
Single-phase 200 V	R70A, R90A	X5071	40.0	0.85
	1R6A	X5070	20.0	1.65
	2R8A	X5069	10.0	3.3
	5R5A	X5079	4.0	5.3
	120A	X5078	2.5	10.5
Three-phase 200 V	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	X5061	2.0	4.8
	120A, 180A	X5060	1.5	8.8
	200A	X5059	1.0	14.0
	330A	X5068	0.47	26.8
	470A, 550A, 590A, 780A	-	-	-
Three-phase 400 V	1R9D	X5074	4.7	1.5
	3R5D, 5R4D	X5075	3.3	4.5
	8R4D, 120D	X5076	2.2	8.6
	170D	X5077	1.5	14.1
	210D, 260D, 280D, 370D	-	-	-

Note: RoHS-compliant models are not available. The last digit of an RoHS-compliant model number is R. Contact the manufacturers when selecting an RoHS-compliant model.

### ● External Dimensions (Units: mm)



AC/DC Reactor Model	External Dimensions									Approx. Mass kg
	A	B	C	D	E	F	G	H Dia.	I Dia.	
X5059	50	74	125	140	35	45	60	5	5.3	1.1
X5060	40	59	105	140	35	45	60	5	5.3	1.1
X5061	35	52	80	95	35	45	50	4	4.3	0.5
X5068	50	74	125	155	53	66	75	5	6.4	1.9
X5069	40	59	105	125	45	60	65	4	4.3	1.0
X5070	40	59	100	120	35	45	50	4	4.3	0.8
X5071	35	52	80	95	30	40	45	4	4.3	0.5
X5074	30	47	70	85	28	38	45	4	4.3	0.3
X5075	40	59	100	120	40	50	55	4	4.3	0.9
X5076	50	74	125	140	35	45	60	5	4.3	1.1
X5077	50	74	125	155	53	66	75	5	5.3	1.9
X5078	50	74	125	155	60	70	80	5	5.3	2.0
X5079	50	74	125	140	35	45	60	5	4.3	1.2

## Holding Brake Power Supply Unit

### ● Holding Brake Power Supply Unit

#### IMPORTANT

- We recommend opening or closing the circuit for the holding brake's power supply so that switching will occur on the AC side of the holding brake power supply unit. This will reduce brake operation time compared to switching on the DC side.
- When switching on the DC side, install an extra surge absorber (for lightning surge) apart from the surge absorber (for lightning surge) built in the brake circuit near the brake coil, in order to prevent damage to the brake coil from surge voltage.
- Holding brake power supply units for 24 VDC are not provided by Yaskawa. Please obtain these from other manufacturers. Do not connect holding brake power supply units for different output voltages to SERVOPACKs. Overcurrent may result in burning.



## Regenerative Resistors

### ● Regenerative Power and Regenerative Resistance

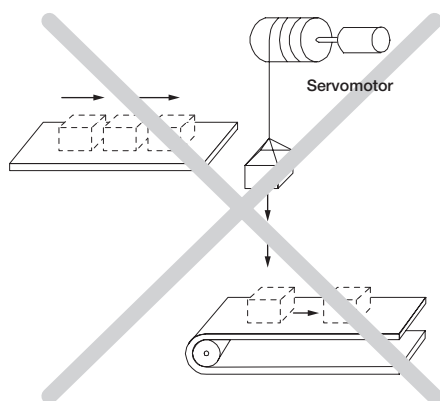
The rotational energy of the driven machine such as a servomotor is returned to the SERVOPACK. This is called regenerative power. The regenerative power is absorbed by charging the smoothing capacitor, but when the chargeable energy is exceeded, the regenerative power is further consumed by the regenerative resistor.

The servomotor is driven in regeneration state in the following circumstances:

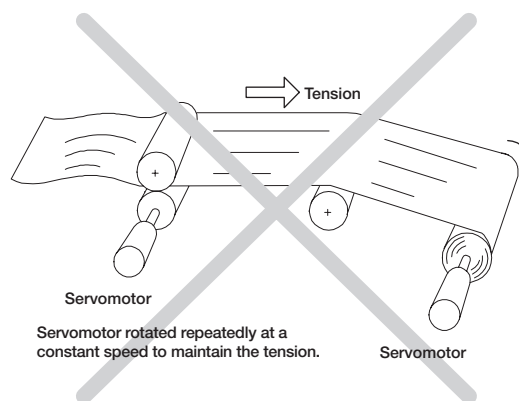
- While decelerating to a stop during acceleration and deceleration operation.
- Continuous operation on the vertical axis.
- During continuous operation with the servomotor rotated from the load side (negative load).

A servomotor may not be operated with an overhanging load, which tends to continuously rotate the motor. The following figures show a typical example of such a load.

- DO NOT use the servomotor with the Vertical Axis Motor Drive without Counterweight



- DO NOT use the servomotor with the Feeding Motor Drive



#### IMPORTANT

- Never operate servomotors with an overhanging load. Doing so will cause the SERVOPACKs' regenerative brake to be applied continuously and the regenerative energy of the load may exceed the allowable range causing damage to the SERVOPACK.
- The regenerative brake capacity of the SGDv SERVOPACKs is rated for short-term operation approximately equivalent to the time it takes to decelerate to a stop.

External regenerative resistors are sometimes required by the AC servo drive capacity selection program SigmaJunmaSize+. When using an external regenerative resistor, parameter Pn600 must be set.

For details, refer to 3.6.2 *Setting Regenerative Resistor Capacity* on “ $\Sigma$ -V Series User's Manual Design and Maintenance.” (manual no. SIEP S800000 45)

## Regenerative Resistors

### ● Regenerative Resistor Selection

Select regenerative resistors in the following manner. External resistors are to be provided by users.

Voltage	SERVOPACK Model SGDV-	Built-in Regenerative Resistor	Necessity of External Regenerative Resistors	Necessity of External Regenerative Resistors
Single- phase 200 V	R70A, R90A, 1R6A, 2R8A	None	Basically Not Required	No built-in regenerative resistor is provided, however, normally an external regenerative resistor is not required. Install external regenerative resistors when the smoothing capacitor in SERVOPACK cannot process all the regenerative power.
	5R5A, 120A	Standard Equipment*1	Basically Not Required	A built-in regenerative resistor is provided as standard. Install external regenerative resistors when the built-in regenerative resistor cannot process all the regenerative power.
Three- phase 200 V	R70A, R90A, 1R6A, 2R8A	None	Basically Not Required	No built-in regenerative resistor is provided, however, normally an external regenerative resistor is not required. Install external regenerative resistors when the smoothing capacitor in SERVOPACK cannot process all the regenerative power.
	3R8A, 5R5A, 7R6A 120A, 180A, 200A, 330A	Standard Equipment*1	Basically Not Required	A built-in regenerative resistor is provided as standard. Install external regenerative resistors when the built-in regenerative resistor cannot process all the regenerative power.
	470A, 550A 590A, 780A	None	Required*2	No built-in regenerative resistor is provided, so the external regenerative resistor is required. If the external resistor is not connected with the SERVOPACK, the alarm A.300 is detected as a regeneration error alarm.
Three- phase 400 V	1R9D, 3R5D, 5R4D 8R4D, 120D, 170D	Standard Equipment*1	Basically Not Required	A built-in regenerative resistor is provided as standard. Install external regenerative resistors when the built-in regenerative resistor cannot process all the regenerative power.
	210D, 260D, 280D, 370D	None	Required*2	No built-in regenerative resistor is provided, so the external regenerative resistor is required. If the external resistor is not connected with the SERVOPACK, the alarm A.300 is detected as a regeneration error alarm.

\*1: For specifications of built-in regenerative resistors, refer to the next page.

\*2: Regenerative resistor units are available. For details, refer to page 366.

### ● Specifications of Built-in Regenerative Resistor

The following table shows the specifications of the SERVOPACK's built-in resistor and the amount of regenerative power (average values) that it can process.

Applicable SERVOPACK SGDV-		Specifications of Built-in Resistor		Regenerative Power Processed by Built-in Resistor*1 W	Minimum Allowable Resistance Ω
		Resistance Ω	Capacity W		
Single-phase 200 V	R70A, R90A, 1R6A, 2R8A	–	–	–	40
	5R5A	50	40	8	40
	120A	20	50	10	20
Three-phase 200 V	R70A, R90A, 1R6A, 2R8A	–	–	–	40
	3R8A, 5R5A, 7R6A	50	40	8	40
	120A	20	50	10	20
	180A, 200A	12	80	16	12
	330A	8	180	36	8
	470A	(6.25) <sup>2</sup>	(880) <sup>2</sup>	(180) <sup>2</sup>	5.8
	550A, 590A, 790A	(3.13) <sup>3</sup>	(1760) <sup>3</sup>	(350) <sup>3</sup>	2.9
Three-phase 400 V	1R9D, 3R5D, 5R4D	108	70	14	73
	8R4D, 120D	45	140	28	44
	170D	32	180	36	28
	210D, 260D	(18) <sup>4</sup>	(880) <sup>4</sup>	(180) <sup>4</sup>	18
	280D, 370D	(14.25) <sup>5</sup>	(1760) <sup>5</sup>	(350) <sup>5</sup>	14.25

\*1: The average regenerative power that can be handled is 20% of the rated capacity of the regenerative resistor built into the SERVOPACK.

\*2: For the optional JUSP-RA04-E regenerative resistor unit.

\*3: For the optional JUSP-RA05-E regenerative resistor unit.

\*4: For the optional JUSP-RA18-E regenerative resistor unit.

\*5: For the optional JUSP-RA19-E regenerative resistor unit.

## Regenerative Resistors

### ● References for External Resistor (by Iwaki Musen Kenkyusho Co., Ltd.)

Model	Specifications
RH120	70 W, 1 to 100 Ω
RH150	90 W, 1 to 100 Ω
RH220□	120 W, 1 to 100 Ω
RH300C	200 W, 1 to 10 kΩ
RH500	300 W, 1 to 30 Ω

Notes: 1 Contact the manufacturers when in need of an RoHS-compliant model.  
 2 When using an external regenerative resistor, parameter Pn600 must be set.  
 For details, refer to 3.6.2 Setting Regenerative Resistor Capacity on “Σ-V Series User's Manual Design and Maintenance.” (manual no. SIEP S800000 45)

RH120(N)	10Ω	K
Model	Tolerance	
N: Noninductive Winding	Code	Tolerance
	K	±10%
	J	±5%
	H	±3%

### ● Specifications

Resistance Tolerance	K : ±10%, J : ±5%, H : ±3%
Temperature Resistance Characteristics	±400PPM / °C (20 Ω max.), ±260PPM / °C (20 Ω min.)
Withstand Voltage	2000 VAC / min. ΔR: ± (0.1%+0.05 Ω)
Insulation Resistance	500 VDC, 20 MΩ min.
Short-time Overload	When 10 times of rated power is applied for five seconds, ΔR: ± (2%+0.05 Ω)
Life	1000 hours of repeating the operation ON for 90 minutes and OFF for 30 minutes, ΔR: ± (5%+0.05 Ω)
Heat Resistance	Not ignite after having applied 10 times of rated power for one minute
Operating temperature	-25°C to +150°C

### ● External Dimensions (Units: mm)

RH120, 150, 220		RH220B																																												
	<table border="1"> <thead> <tr> <th>Model</th> <th>Rated Power</th> <th>Resistance</th> </tr> </thead> <tbody> <tr> <td>RH120</td> <td>70 W</td> <td>1 Ω to 100 Ω</td> </tr> <tr> <td>RH150</td> <td>90 W</td> <td>1 Ω to 100 Ω</td> </tr> <tr> <td>RH220</td> <td>120 W</td> <td>1 Ω to 100 Ω</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Dimensions</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> <th>G</th> </tr> </thead> <tbody> <tr> <td>RH120</td> <td>182</td> <td>150</td> <td>172</td> <td>16</td> <td>42</td> <td>22</td> <td>20</td> </tr> <tr> <td>RH150</td> <td>212</td> <td>180</td> <td>202</td> <td>16</td> <td>44</td> <td>24</td> <td>30</td> </tr> <tr> <td>RH220</td> <td>230</td> <td>200</td> <td>220</td> <td>15</td> <td>60</td> <td>24</td> <td>20</td> </tr> </tbody> </table>	Model	Rated Power	Resistance	RH120	70 W	1 Ω to 100 Ω	RH150	90 W	1 Ω to 100 Ω	RH220	120 W	1 Ω to 100 Ω	Dimensions	A	B	C	D	E	F	G	RH120	182	150	172	16	42	22	20	RH150	212	180	202	16	44	24	30	RH220	230	200	220	15	60	24	20	<p>Lead wire length: L = 500        Rated power: 120 W        Resistance: 1 Ω to 100 Ω</p>
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RH220	230	200	220	15	60	24	20																																							
<p>Lead wire length: L = 300        Rated power: 200 W        Resistance: 1 Ω to 10 kΩ</p>	<p>Lead wire length: L = 450        Rated power: 300 W        Resistance: 1 Ω to 30 Ω</p>																																													

## External Regenerative Resistor

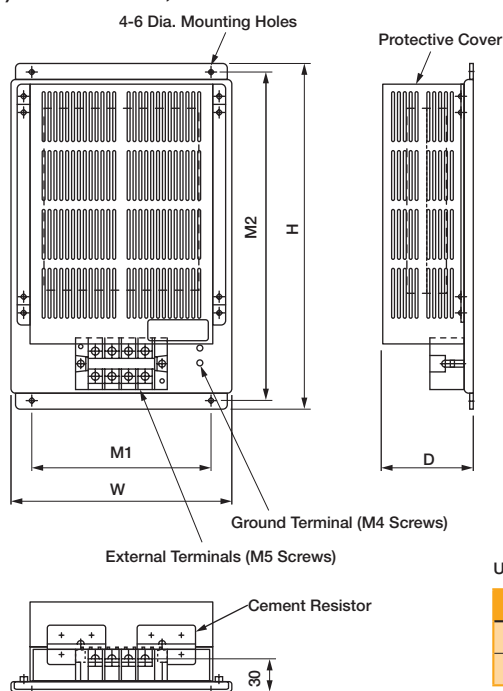
### ● Regenerative Resistor Unit

SERVOPACK Model SGDv-	Regenerative Resistor Unit Model	Specifications	Allowable Power Loss
470A	JUSP-RA04-E	6.25 $\Omega$ , 880 W	180 W
550A, 590A, 780A	JUSP-RA05-E	3.13 $\Omega$ , 1760 W	350 W
210D, 260D	JUSP-RA18-E	18 $\Omega$ , 880 W	180 W
280D, 370D	JUSP-RA19-E	14.25 $\Omega$ , 1760 W	350 W

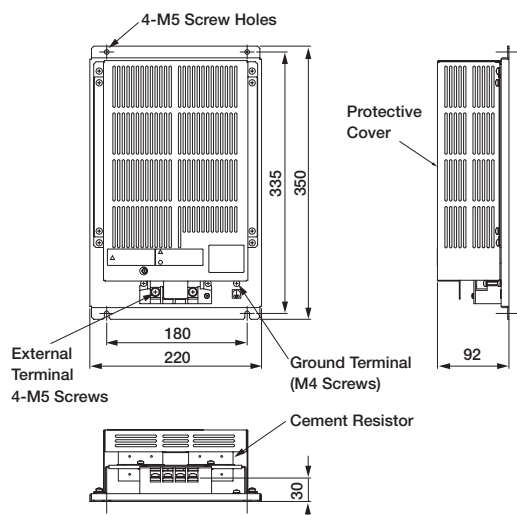
Note: Only when using the regenerative resistors above, parameter Pn600 does not need to be set.

### ● External Dimensions

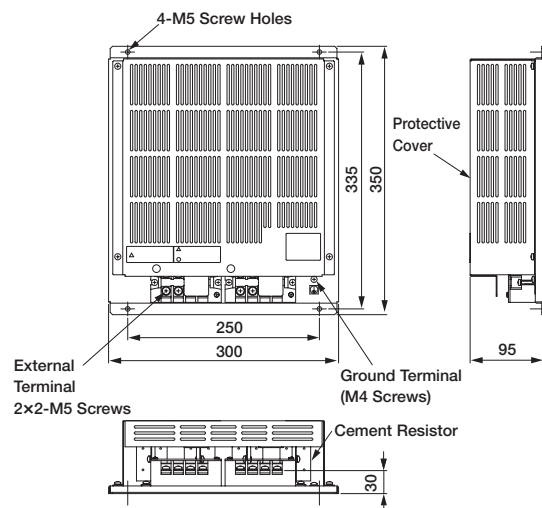
#### (1) JUSP-RA04-E, -RA05-E



#### (2) JUSP-RA18-E



#### (3) JUSP-RA19-E







# Selecting Servomotor Capacity and Regenerative Capacity

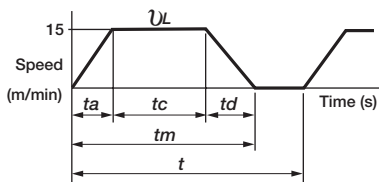
## Servomotor Capacity Selection Examples

Use the AC servo drive capacity selection program SigmaJunmaSize+ to select servomotor capacity. The program can be downloaded for free from our web site (<http://www.yaskawa.eu.com>).

### ● Selection Example for Speed Control

	<ul style="list-style-type: none"> <li>• Load speed: <math>v_L = 15</math> m/min</li> <li>• Linear motion section mass: <math>m = 250</math> kg</li> <li>• Ball screw length: <math>l_B = 1.0</math> m</li> <li>• Ball screw diameter: <math>d_B = 0.02</math> m</li> <li>• Ball screw lead: <math>P_B = 0.01</math> m</li> <li>• Ball screw material density: <math>\rho = 7.87 \times 10^3</math> kg/m<sup>3</sup></li> <li>• Gear ratio: <math>1/2</math> (<math>R = 2</math>)</li> </ul>	<ul style="list-style-type: none"> <li>• Gear + coupling moment of inertia : <math>J_G = 0.40 \times 10^{-4}</math> kgm<sup>2</sup></li> <li>• Feeding times: <math>n = 40</math> times/min</li> <li>• Feeding distance: <math>l = 0.275</math> m</li> <li>• Feeding time: <math>tm = 1.2</math> s max.</li> <li>• Friction coefficient: <math>\mu = 0.2</math></li> <li>• Mechanical efficiency: <math>\eta = 0.9</math> (90%)</li> </ul>
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#### (1) Speed Diagram



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

where  $t_a = t_d$

$$t_a = t_m - \frac{60l}{v_L} = 1.2 - \frac{60 \times 0.275}{15} = 1.2 - 1.1 = 0.1 \text{ (s)}$$

$$t_c = 1.2 - 0.1 \times 2 = 1.0 \text{ (s)}$$

#### (2) Rotation Speed

- Load axis rotation speed  $n_L = \frac{v_L}{P_B} = \frac{15}{0.01} = 1500 \text{ (min}^{-1}\text{)}$

- Motor shaft rotation speed Gear ratio  $1/R = 1/2$  ( $R=2$ )  
Therefore,  $n_M = n_L \times R = 1500 \times 2 = 3000 \text{ (min}^{-1}\text{)}$

#### (3) Load torque

$$T_L = \frac{9.8 \mu \times m \times P_B}{2\pi R \times \eta} = \frac{9.8 \times 0.2 \times 250 \times 0.01}{2\pi \times 2 \times 0.9} = 0.43 \text{ (Nm)}$$

#### (4) Load Moment of Inertia

- Linear motion section  $J_{L1} = m \left( \frac{P_B}{2\pi R} \right)^2 = 250 \times \left( \frac{0.01}{2\pi \times 2} \right)^2 = 1.58 \times 10^{-4} \text{ (kgm}^2\text{)}$

- Ball screw  $J_B = \frac{\pi}{32} \rho \times l_B \times d_B^4 \times \frac{1}{R^2} = \frac{\pi}{32} \times 7.87 \times 10^3 \times 1.0 \times (0.02)^4 \times \frac{1}{2^2} = 0.31 \times 10^{-4} \text{ (kgm}^2\text{)}$

- Coupling  $J_G = 0.40 \times 10^{-4} \text{ (kgm}^2\text{)}$

- Load moment of inertia at motor shaft  $J_L = J_{L1} + J_B + J_G = (1.58 + 0.31 + 0.40) \times 10^{-4} = 2.29 \times 10^{-4} \text{ (kgm}^2\text{)}$

#### (5) Load Moving Power

$$P_O = \frac{2\pi n_M \times T_L}{60} = \frac{2\pi \times 3000 \times 0.43}{60} = 135 \text{ (W)}$$

## Servomotor Capacity Selection Examples

## (6) Load Acceleration Power

$$P_a = \left( \frac{2\pi}{60} n_M \right)^2 \frac{J_L}{t_a} = \left( \frac{2\pi}{60} \times 3000 \right)^2 \times \frac{2.29 \times 10^{-4}}{0.1} = 226 \text{ (W)}$$

## (7) Servomotor Provisional Selection

- (a) Selecting Conditions
- $T_L \leq$  Motor rated torque
  - $\frac{(P_o + P_a)}{2} <$  Provisionally selected servomotor rated output  $< (P_o + P_a)$
  - $n_M \leq$  Motor rated speed
  - $J_L \leq$  Allowable load moment of inertia

The followings satisfy the conditions.

- Servomotor SGMJV-02A

## (b) Specifications of the Provisionally Selected Servomotor

- Rated output : 200 (W)
- Rated motor speed : 3000 ( $\text{min}^{-1}$ )
- Rated torque : 0.637 (Nm)
- Instantaneous peak torque : 2.23 (Nm)
- Servomotor moment of inertia :  $0.259 \times 10^{-4}$  ( $\text{kgm}^2$ )
- Allowable load moment of inertia :  $0.259 \times 10^{-4} \times 15 = 3.885 \times 10^{-4}$  ( $\text{kgm}^2$ )

## (8) Verification on the Provisionally Selected Servomotor

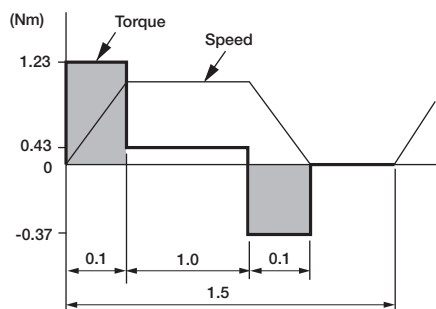
- Required acceleration torque:  $T_P = \frac{2\pi n_M (J_M + J_L)}{60 t_a} + T_L = \frac{2\pi \times 3000 \times (0.259 + 2.29) \times 10^{-4}}{60 \times 0.1} + 0.43$   
 $\cong 1.23 \text{ (Nm)} < \text{Instantaneous peak torque} \bullet \bullet \bullet \text{ Satisfactory}$

- Required deceleration torque:  $T_S = \frac{2\pi n_M (J_M + J_L)}{60 t_d} - T_L = \frac{2\pi \times 3000 \times (0.259 + 2.29) \times 10^{-4}}{60 \times 0.1} - 0.43$   
 $\cong 0.37 \text{ (Nm)} < \text{Instantaneous peak torque} \bullet \bullet \bullet \text{ Satisfactory}$

- Torque effective value:  $T_{rms} = \sqrt{\frac{T_P^2 \times t_a + T_L^2 \times t_c + T_S^2 \times t_d}{t}} = \sqrt{\frac{(1.23)^2 \times 0.1 + (0.43)^2 \times 1.0 + (0.37)^2 \times 0.1}{1.5}}$   
 $\cong 0.483 \text{ (Nm)} < \text{Rated torque} \bullet \bullet \bullet \text{ Satisfactory}$

## (9) Result

The provisionally selected servomotor is confirmed to be applicable.  
The torque diagram is shown below.

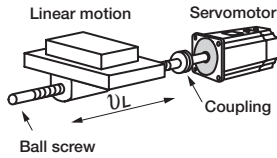


## Servomotor Capacity Selection Examples

Use the AC servo drive capacity selection program SigmaJunmaSize+ to select servomotor capacity. The program can be downloaded for free from our web site (<http://www.yaskawa.eu.com>).

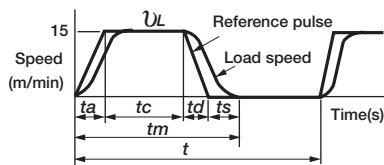
### ● Selection Example for Position Control

#### Mechanical Specifications



- Load speed:  $v_L = 15$  m/min
- Linear motion section mass:  $m = 80$  kg
- Ball screw length:  $l_B = 0.8$  m
- Ball screw diameter:  $d_B = 0.016$  m
- Ball screw lead:  $P_B = 0.005$  m
- Ball screw material density:  $\rho = 7.87 \times 10^3$  kg/m<sup>3</sup>
- Coupling mass:  $m_C = 0.3$  kg
- Coupling outer diameter:  $d_C = 0.03$  m
- Positioning times:  $n = 40$  times/min
- Positioning distance:  $l = 0.25$  m
- Positioning time:  $t_m = 1.2$  s max.
- Electrical stop accuracy:  $\delta = \pm 0.01$  mm
- Friction coefficient:  $\mu = 0.2$
- Mechanical efficiency:  $\eta = 0.9$  (90%)

#### (1) Speed Diagram



$$t = \frac{60}{n} = \frac{60}{40} = 1.5(\text{s})$$

$$\text{Where } t_a = t_d, t_s = 0.1(\text{s})$$

$$t_a = t_m - t_s - \frac{60l}{v_L} = 1.2 - 0.1 - \frac{60 \times 0.25}{15} = 0.1(\text{s})$$

$$t_c = 1.2 - 0.1 - 0.1 \times 2 = 0.9(\text{s})$$

#### (2) Rotation Speed

- Load axis rotation speed  $n_L = \frac{v_L}{P_B} = \frac{15}{0.005} = 3000$  (min<sup>-1</sup>)

- Motor shaft rotation speed with direct coupling: Gear ratio  $1/R = 1/1$

$$\text{Therefore, } n_M = n_L \times R = 3000 \times 1 = 3000 \text{ (min}^{-1}\text{)}$$

#### (3) Load Torque

$$T_L = \frac{9.8\mu \times m \times P_B}{2\pi R \times \eta} = \frac{9.8 \times 0.2 \times 80 \times 0.005}{2\pi \times 1 \times 0.9} = 0.139 \text{ (Nm)}$$

#### (4) Load Moment of Inertia

- Linear motion section  $J_{L1} = m \left( \frac{P_B}{2\pi R} \right)^2 = 80 \times \left( \frac{0.005}{2\pi \times 1} \right)^2 = 0.507 \times 10^{-4} \text{ (kgm}^2\text{)}$

- Ball screw  $J_B = \frac{\pi}{32} \rho \times l_B \times d_B^4 = \frac{\pi}{32} \times 7.87 \times 10^3 \times 0.8 \times (0.016)^4 = 0.405 \times 10^{-4} \text{ (kgm}^2\text{)}$

- Coupling  $J_C = \frac{1}{8} m_C \times d_C^2 = \frac{1}{8} \times 0.3 \times (0.03)^2 = 0.338 \times 10^{-4} \text{ (kg x m}^2\text{)}$

- Load moment of inertia at the motor shaft

$$J_L = J_{L1} + J_B + J_C = 1.25 \times 10^{-4} \text{ (kgm}^2\text{)}$$



## Servomotor Capacity Selection Examples

## (5) Load Moving Power

$$P_o = \frac{2\pi n_M \times T_L}{60} = \frac{2\pi \times 3000 \times 0.139}{60} = 43.7 \text{ (W)}$$

## (6) Load Acceleration Power

$$P_a = \left( \frac{2\pi}{60} n_M \right)^2 \frac{J_L}{t_a} = \left( \frac{2\pi}{60} \times 3000 \right)^2 \times \frac{1.25 \times 10^{-4}}{0.1} = 123.4 \text{ (W)}$$

## (7) Provisionally Servomotor Selection

- (a) Selecting Conditions
- $T_L \leq$  Motor rated torque
  - $\frac{(P_o + P_a)}{2} <$  Provisionally selected servomotor rated output  $< (P_o + P_a)$
  - $n_M \leq$  Motor rated speed
  - $J_L \leq$  Allowable load moment of inertia

The followings satisfy the conditions.

- Servomotor SGMJV-01A

## (b) Specifications of Servomotor

- Rated output : 100 (W)
- Rated motor speed : 3000 ( $\text{min}^{-1}$ )
- Rated torque : 0.318 (Nm)
- Instantaneous peak torque : 1.11 (Nm)
- Servomotor rotor moment of inertia :  $0.0665 \times 10^{-4}$  ( $\text{kgm}^2$ )
- Allowable load moment of inertia :  $0.0665 \times 10^{-4} \times 20 = 1.33 \times 10^{-4}$  ( $\text{kgm}^2$ )
- Encoder resolution : 20 bit (1048576P/rev)

## (8) Verification on Provisionally Selected Servomotor

$$\begin{aligned} \bullet \text{ Required acceleration torque: } T_P &= \frac{2\pi n_M (J_M + J_L)}{60 t_a} + T_L = \frac{2\pi \times 3000 \times (0.0665 + 1.25) \times 10^{-4}}{60 \times 0.1} + 0.139 \\ &\approx 0.552 \text{ (Nm)} < \text{Instantaneous peak torque} \bullet \bullet \bullet \text{ Satisfactory} \end{aligned}$$

$$\begin{aligned} \bullet \text{ Required deceleration torque: } T_S &= \frac{2\pi n_M (J_M + J_L)}{60 t_d} - T_L = \frac{2\pi \times 3000 \times (0.0665 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139 \\ &\approx 0.275 \text{ (Nm)} < \text{Instantaneous peak torque} \bullet \bullet \bullet \text{ Satisfactory} \end{aligned}$$

$$\begin{aligned} \bullet \text{ Torque effective value: } T_{rms} &= \sqrt{\frac{T_P^2 \times t_a + T_L^2 \times t_c + T_S^2 \times t_d}{t}} = \sqrt{\frac{(0.552)^2 \times 0.1 + (0.139)^2 \times 0.9 + (0.275)^2 \times 0.1}{1.5}} \\ &\approx 0.192 \text{ (N}\cdot\text{m)} < \text{Rated torque} \bullet \bullet \bullet \text{ Satisfactory} \end{aligned}$$

The above confirms that the provisionally selected servomotor is sufficient. In the next step, their performance in position control are checked.

## Servomotor Capacity Selection Examples

### (9) Position Detection Resolution

Position detection unit uses a  $\Delta\ell = 0.01$  mm/pulse.

The number of pulses per motor rotation must be less than resolution of the encoder (P/rev).

$$\text{The number of pulses per revolution (pulse)} = \frac{PB}{\Delta(\ell)} = \frac{5 \text{ mm}}{0.01 \text{ mm}} = 500 < \text{encoder resolution [1048576 (P/rev)]}$$

### (10) Reference Pulse Frequency

$$v_s = \frac{1000 v_L}{60 \times \Delta\ell} = \frac{1000 \times 15}{60 \times 0.01} = 25,000(\text{pps})$$

Confirm that the maximum input pulse frequency\* is greater than the reference pulse frequency.

\*: Refer to 1.3.3 Speed/Position/Torque Control of Σ-V Series USER'S MANUAL Design and Maintenance (manual no. SIEP S800000 45).

The above results confirm that the selected servomotor is applicable for the position control.

## Selecting Regenerative Resistors

### (1) Simple Calculation

When driving a servomotor with the horizontal axis, check the external regenerative resistor requirements using the calculation method shown below.

#### (a) SGD V-R70A, -R90A, -1R6A, and -2R8A SERVOPACKS

These SERVOPACKS do not have built-in regenerative resistors. The energy that can be charged with capacitors is shown in the following table. If the rotational energy in the servomotor exceeds these values, then connect an external regenerative resistor.

Voltage	Applicable SERVOPACK	Regenerative Energy that Can be Processed (joules)	Remarks
Three-phase 200 V	SGDV-R70A, -R90A, -1R6A	24.2	Value when main circuit input voltage is 200 VAC
	SGDV-2R8A	31.7	

Calculate the rotational energy ( $E_s$ ) in the servomotor from the following equation:

$$E_s = J \times (nm)^2 / 182 \text{ (joules)}$$

$$J = J_M + J_L$$

- $J_M$ : Servomotor rotor moment of inertia ( $\text{kgm}^2$ )
- $J_L$ : Load converted to shaft moment of inertia ( $\text{kgm}^2$ )
- $nm$ : Rotation speed used by servomotor ( $\text{min}^{-1}$ )

#### (b) SGD V-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -1R9D, -3R5D, -5R4D, -8R4D, -120D, -170D SERVOPACKS

These SERVOPACKS have built-in regenerative resistors. The allowable frequencies for just the servomotor in acceleration and deceleration operation, during the rotation speed cycle from 0 ( $\text{min}^{-1}$ ) to the maximum rotation speed to 0, are summarized in the following table.

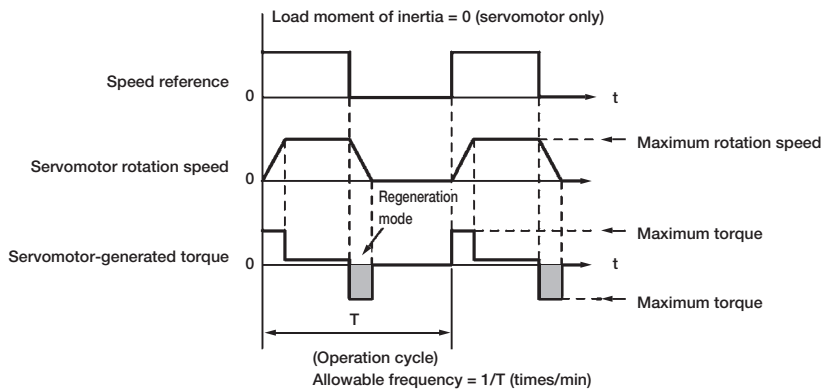
Convert the data into the values obtained with actual rotation speed and load moment of inertia to determine whether an external regenerative resistor is needed.

Voltage	Servomotor Model	Allowable Frequencies in Regenerative Mode (time/min)													
		03	05	06	08	09	10	13	15	20	25	30	40	44	50
Three-phase 200 V	SGMJV-□□	-	-	-	15	-	-	-	-	-	-	-	-	-	-
	SGMAV-□□	-	-	74	31	-	20	-	-	-	-	-	-	-	-
	SGMGV-□□A	39	29	-	-	6	-	6	-	7	-	9*	-	6	-
Three-phase 400 V	SGMSV-□□A	-	-	-	-	-	13	-	21	28	21	10	16	-	12
	SGMGV-□□D	68	51	-	-	10	-	8	-	13	-	7	-	6	-
Three-phase 400 V	SGMSV-□□D	-	-	-	-	-	24	-	30	49	38	17	16	-	12

\*: This value is "4," when used in combination with SGD V-200A SERVOPACK.

## Selecting Regenerative Resistors

### Operating Conditions for Allowable Regenerative Frequency Calculation



Use the following equation to calculate the allowable frequency for regeneration mode operation

$$\text{Allowable frequency} = \frac{\text{Allowable frequency for Servomotor only}}{(1+n)} \times \left( \frac{\text{Max. rotation speed}}{\text{Rotation speed}} \right)^2 \text{ (time/min)}$$

- $n = J_L / J_M$
- $J_M$ : Servomotor rotor moment of inertia ( $\text{kgm}^2$ )
- $J_L$ : Load converted to shaft moment of inertia ( $\text{kgm}^2$ )

### (c) SGDV-470A, -550A, -590A, -780A, -210D, -260D, -280D, -370D SERVOPACKs

These SERVOPACKs do not have built-in regenerative resistors. The following table shows the allowable regenerative frequencies when the JUSP-RA04-E, JUSP-RA05-E, JUSP-RA18-E or JUSP-RA19-E regenerative resistor is used together with an applicable SERVOPACK.

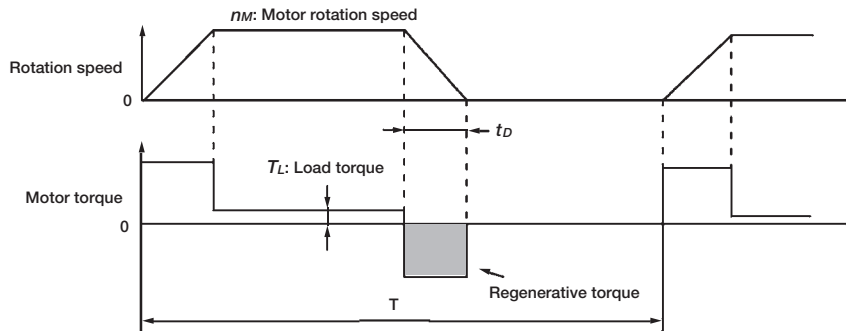
The servomotor driving conditions and the conversion equation for the allowable regenerative frequencies to the rotation speed and load moment of inertia are the same as that shown in (b) on the previous page.

Voltage	Servomotor Model	Allowable Frequencies in Regenerative Mode (time/min)				
		55	70	75	1A	1E
Three-phase 200 V	SGMGV-□□A	24	-	34	39	31
	SGMSV-□□A	-	124	-	-	-
Three-phase 400 V	SGMGV-□□D	24	-	17	39	31

## Selecting Regenerative Resistors

## (2) Calculating the Regenerative Energy

This section shows the procedure for calculating the regenerative resistor capacity when acceleration and deceleration operation is as shown in the following diagram



## ● Calculation Procedure

The procedure for calculating the regenerative capacity is as follows:

Step	Item	Symbol	Equation
1	Calculate the rotational energy of the servomotor.	$E_s$	$E_s = Jn_m^2 / 182$
2	Calculate the energy consumed by load loss during the deceleration period	$E_L$	$E_L = (\pi/60)n_m T_l t_d$
3	Calculate the energy lost from servomotor winding resistance.	$E_M$	(Value calculated from (4) Servomotor Winding Resistance Loss diagrams) $\times t_d$
4	Calculate the SERVOPACK energy that can be absorbed.	$E_C$	Calculate from (3) SERVOPACK's Absorbable Energy diagrams.
5	Calculate the energy consumed by the regenerative resistor.	$E_K$	$E_K = E_s - (E_L + E_M + E_C)$
6	Calculate the required regenerative resistor capacity (W).	$W_K$	$W_K = E_K / (0.2 \times T)$

Note: 1 The "0.2" in the equation for calculating  $W_K$  is the value for when the regenerative resistor's utilized load ratio is 20%.

2 The units for the various symbols are as follows:

$E_s$  to  $E_K$ : Energy joules (J)

$W_K$ : Regenerative resistor required capacity (W)

$J$ :  $(=J_M + J_L)(\text{kg}\cdot\text{m}^2)$

$n_m$ : Servomotor rotation speed (min<sup>-1</sup>)

$T_l$ : Load torque (N·m)

$t_d$ : Deceleration stopping time (s)

$T$ : Servomotor repeat operation period (s)

If the above calculation determines that the amount of regenerative power ( $W_K$ ) processed by the built-in resistor is not exceeded, then an external regenerative resistor is not required. Refer to Specifications of Built-in Regenerative Resistor on page 364 for regenerative resistors built into SERVOPACKs. If the amount of regenerative power that can be processed by the built-in resistor is exceeded, then install an external regenerative resistor for the capacity (W) obtained from the above calculation.

If the energy consumed by load loss (in step 2 above) is unknown, then perform the calculation using  $E_L = 0$ .

When the operation period in regeneration mode is continuous, add the following items to the above calculation procedure in order to find the required capacity (W) for the regenerative resistor.

- Energy for continuous regeneration mode operation period:  $E_G$  (joules)
- Energy consumed by regenerative resistor:  $E_K = E_s - (E_L + E_M + E_C) + E_G$
- Required capacity of regenerative resistor:  $W_K = E_K / (0.2 \times T)$

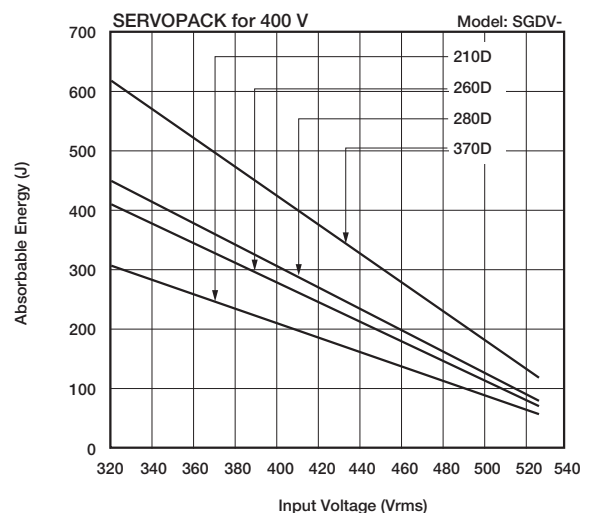
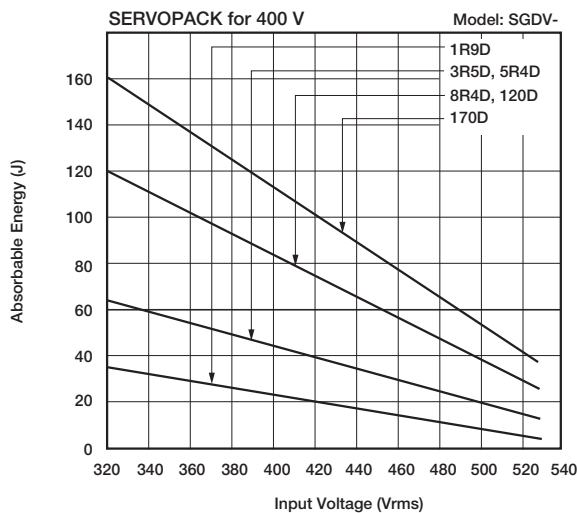
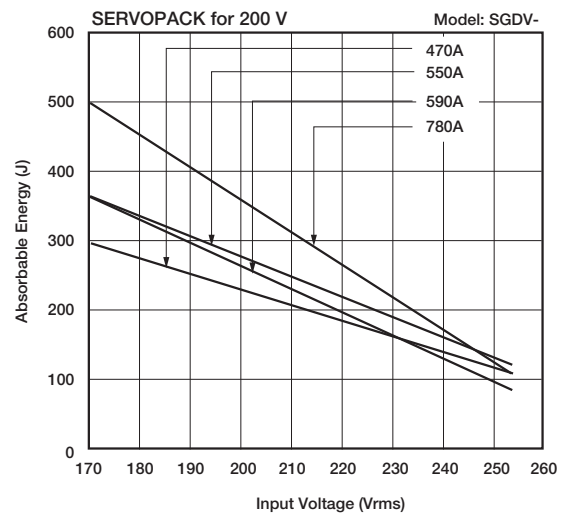
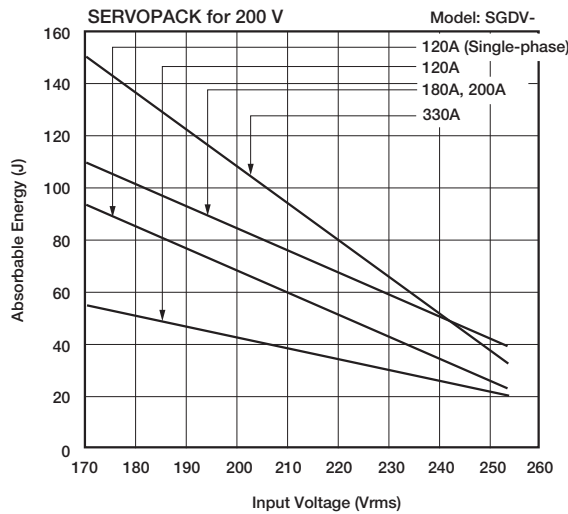
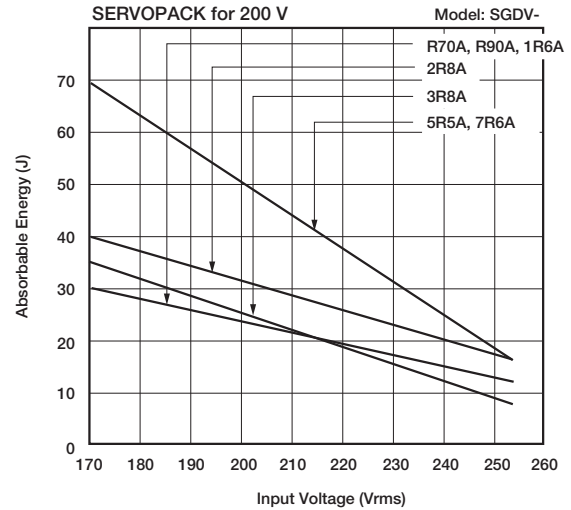
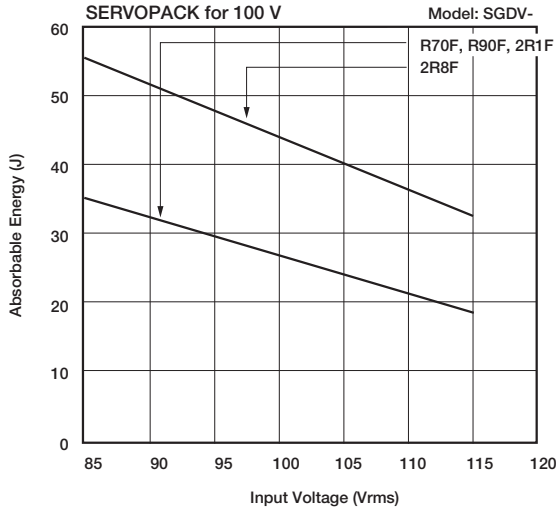
Here,  $E_G = (2\pi/60) n_m G t_G$

- $T_G$ : Servomotor's generated torque in continuous regeneration mode operation period (Nm)
- $n_m G$ : Servomotor rotation speed for same operation period as above (min<sup>-1</sup>)
- $t_G$ : Same operation period as above(s)

## Selecting Regenerative Resistors

### (3) SERVOPACK's Absorbable Energy

The following diagrams show the relationship between the SERVOPACK's input power supply voltage and its absorbable energy.

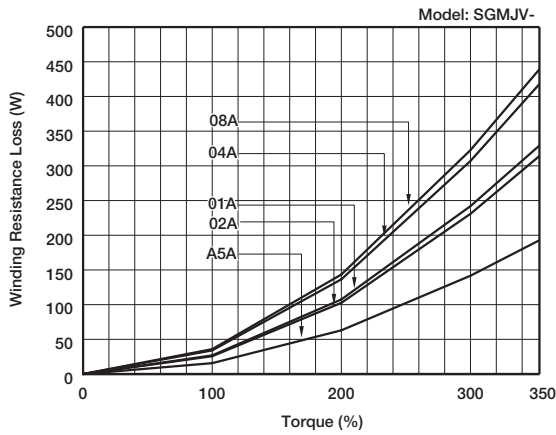


## Selecting Regenerative Resistors

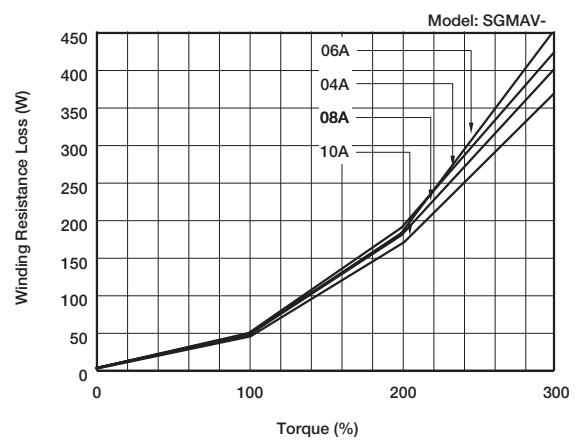
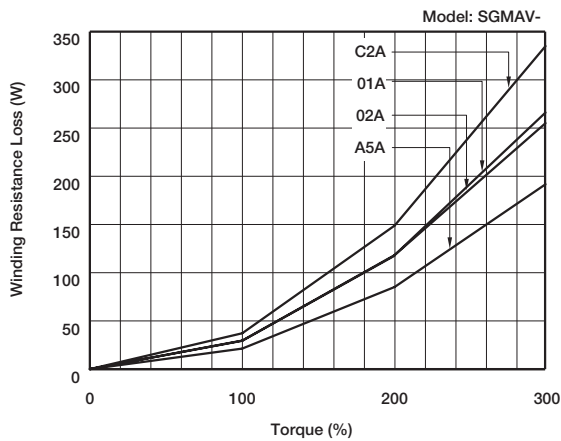
### (4) Servomotor Winding Resistance Loss

The following diagrams show the relationship, for each servomotor, between the servomotor's generated torque and the winding resistance loss.

#### (a) SGMJV Rotary Servomotors

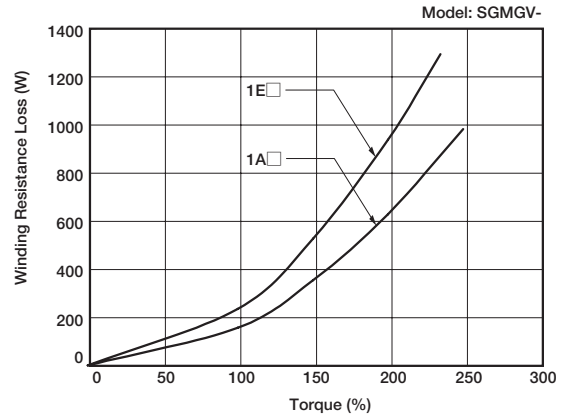
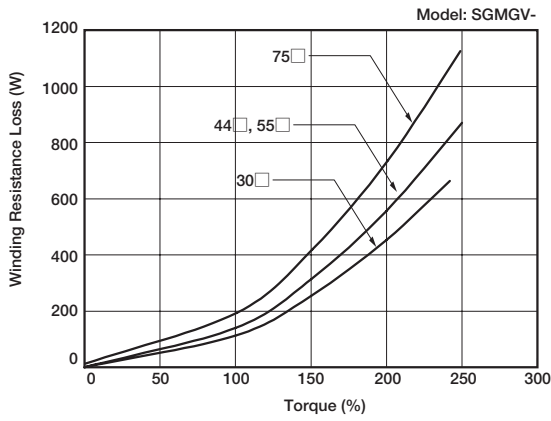
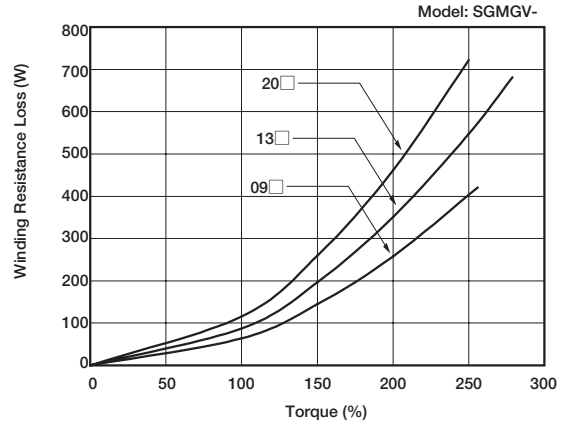
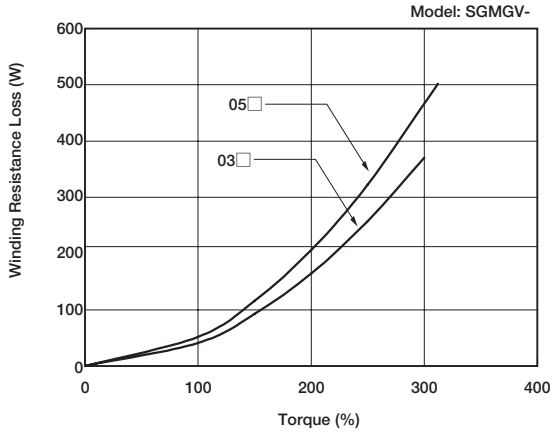


#### (b) SGMAV Rotary Servomotors

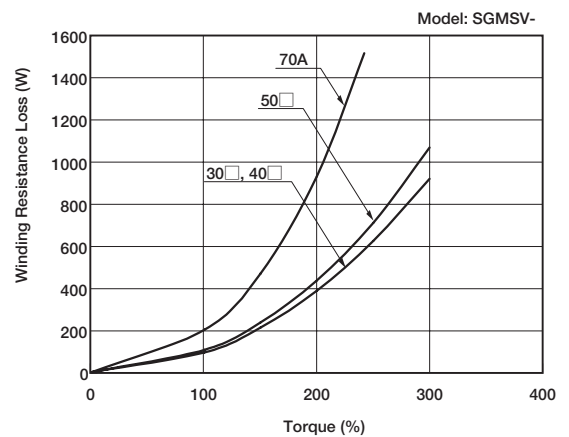
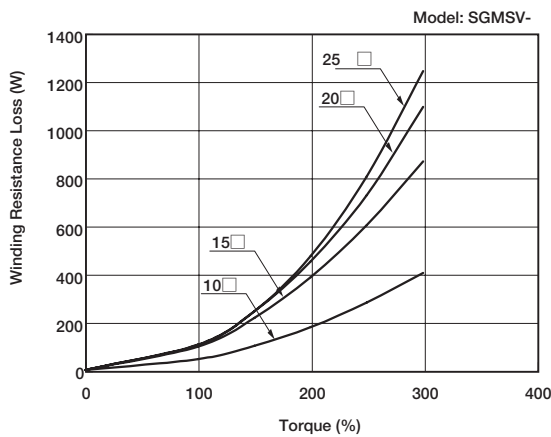


## Selecting Regenerative Resistors

### (d) SGMGV Rotary Servomotors



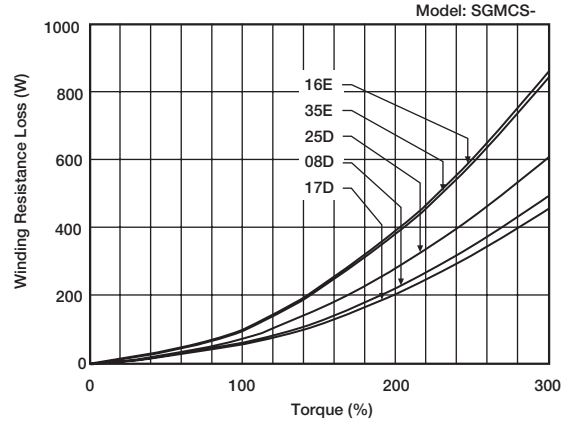
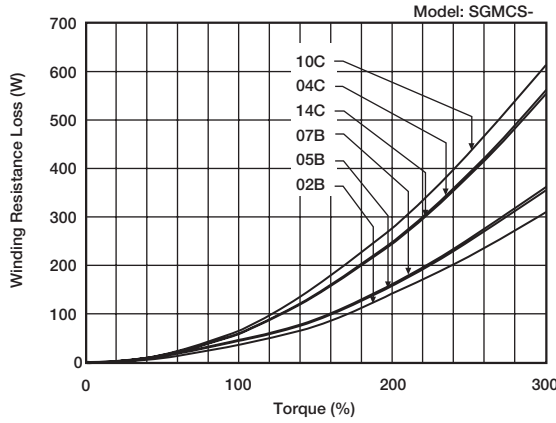
### (e) SGMSV Rotary Servomotors



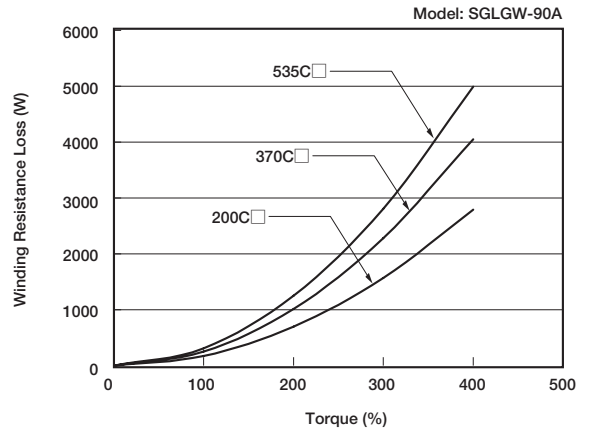
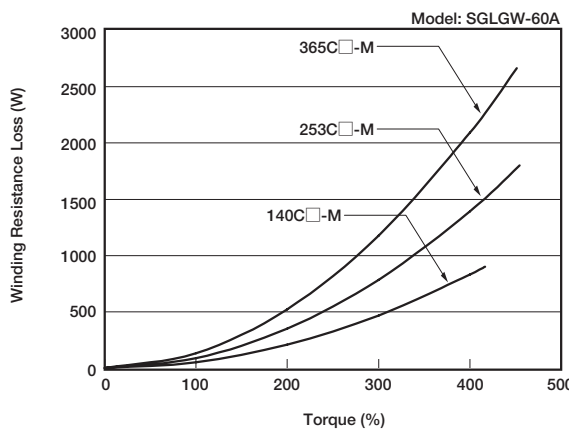
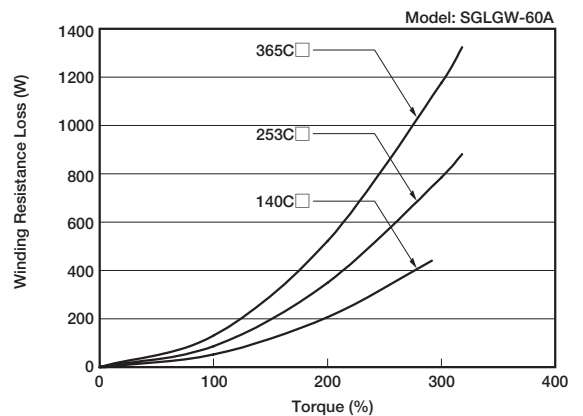
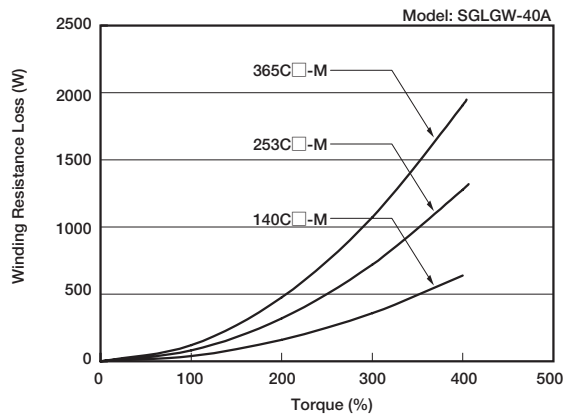
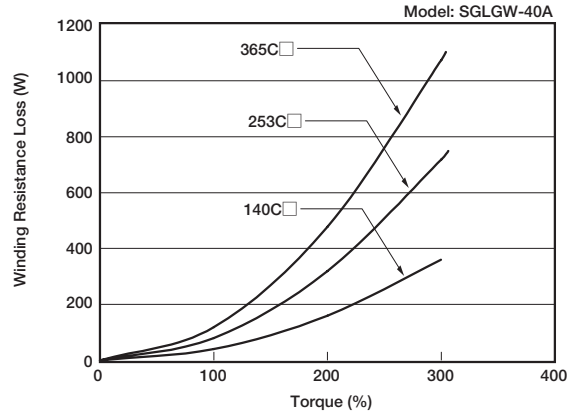
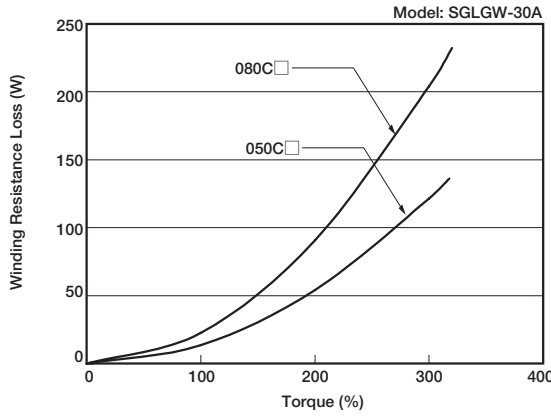


## Selecting Regenerative Resistors

(f) SGMCS Direct Drive Servomotors

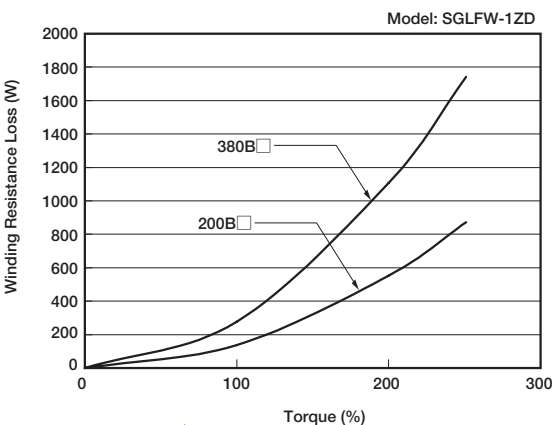
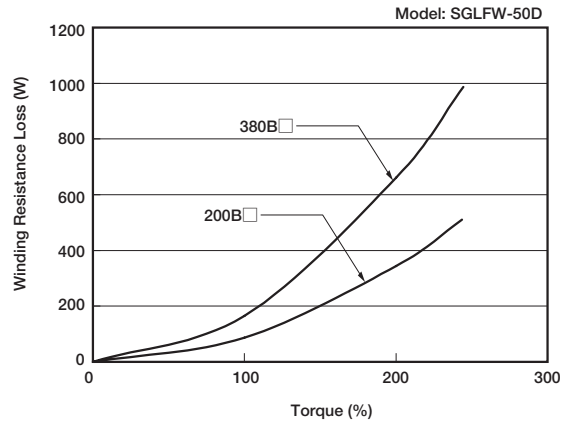
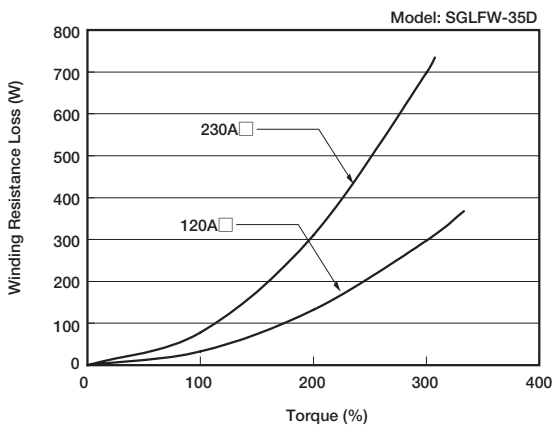
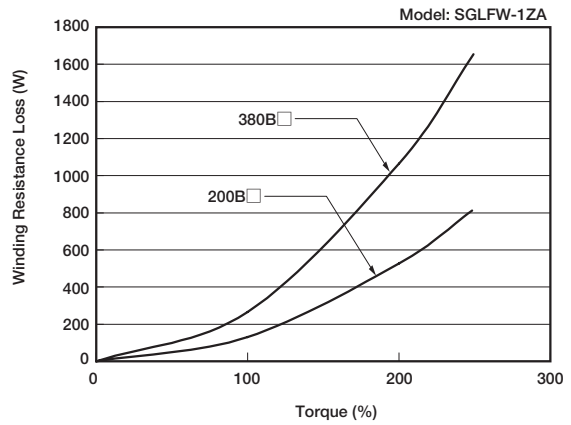
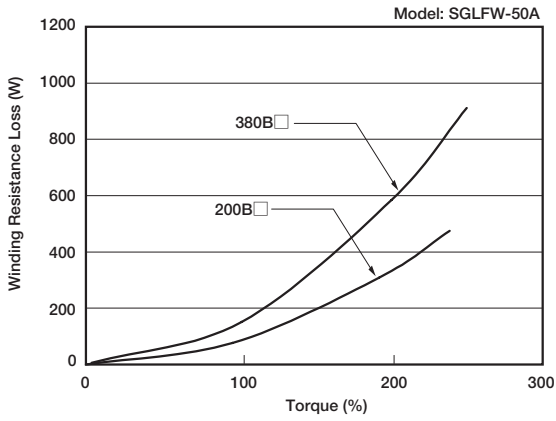
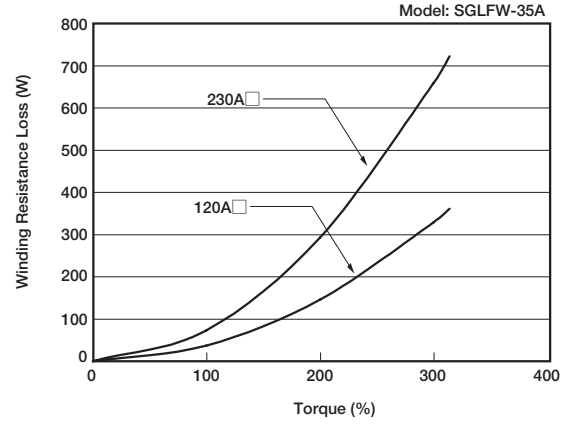
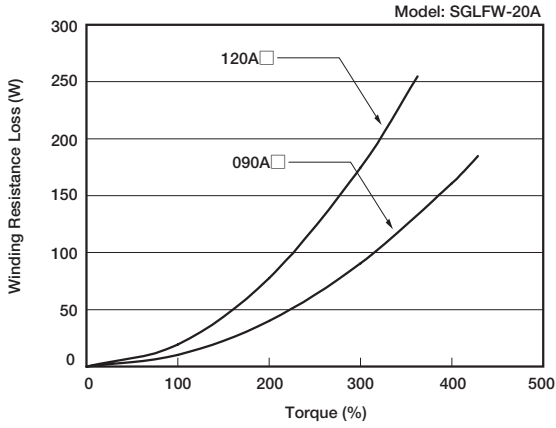


(g) SGLGW Linear Servomotors



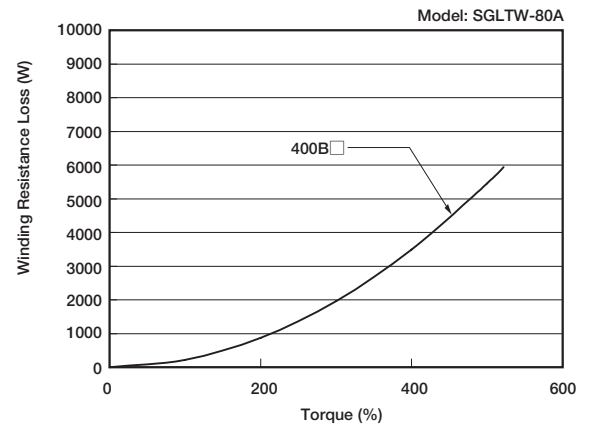
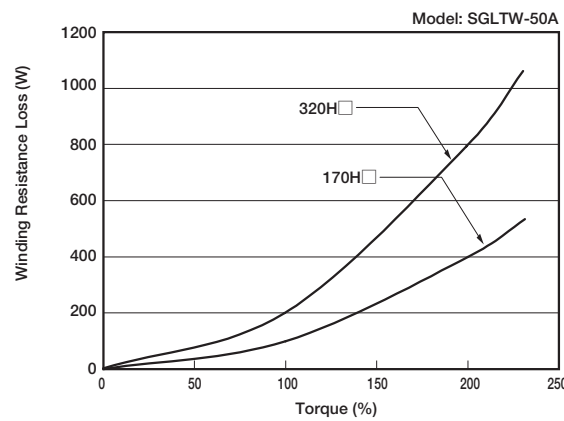
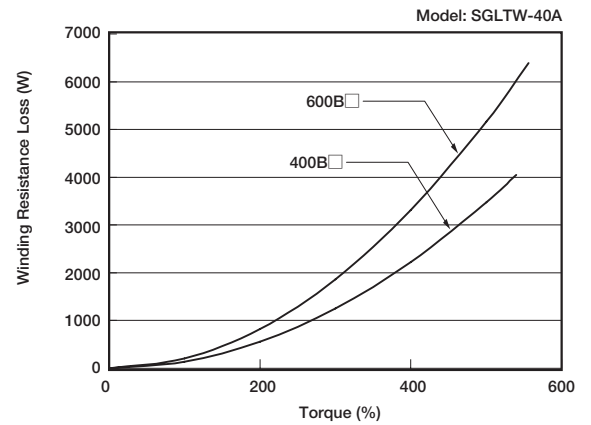
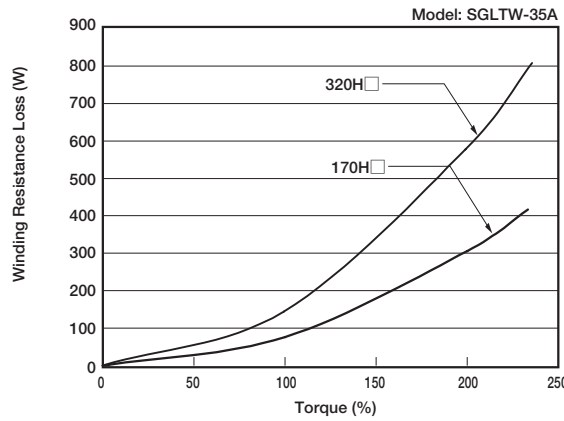
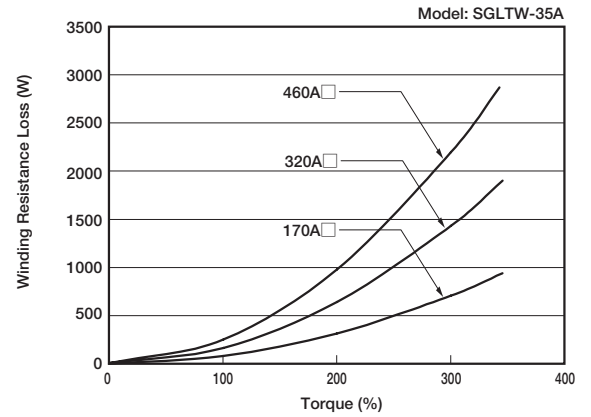
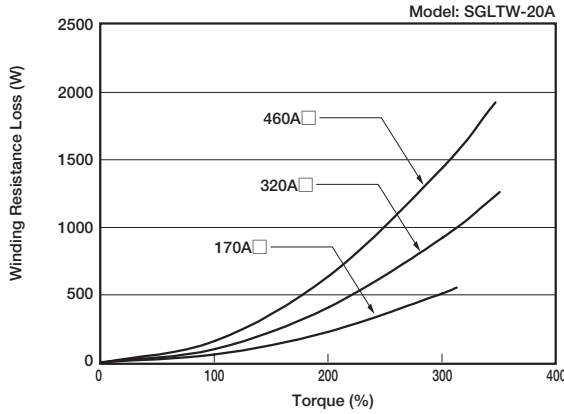
## Selecting Regenerative Resistors

### (h) SGLFW Linear Servomotors



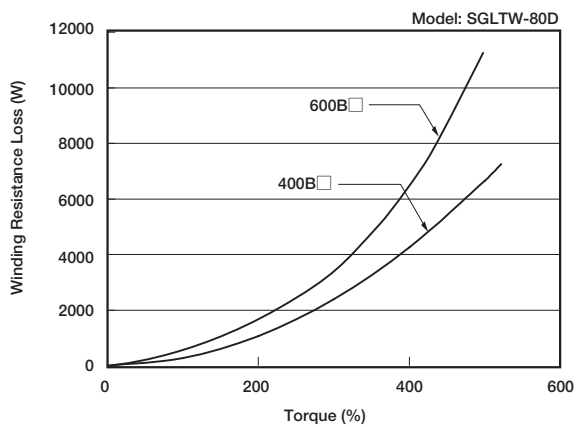
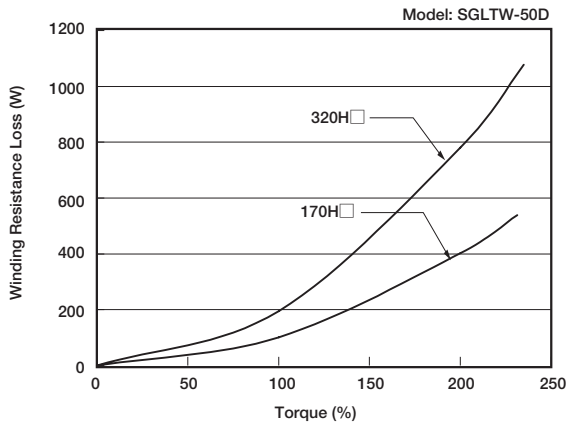
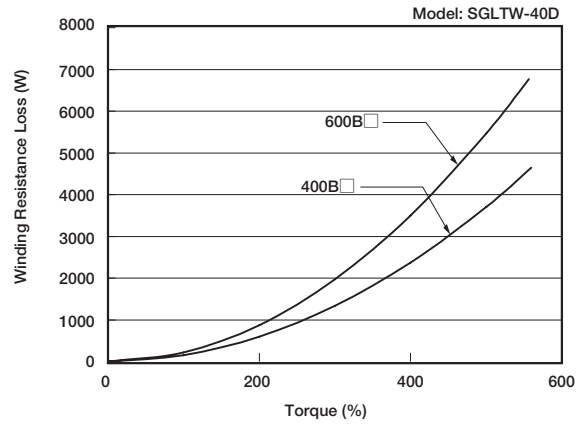
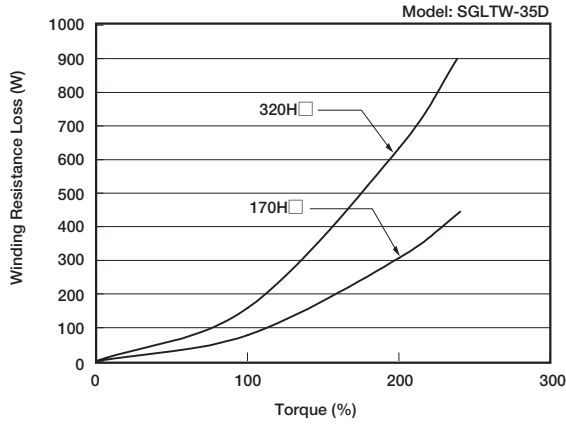
## Selecting Regenerative Resistors

### (i) SGLTW Linear Servomotors

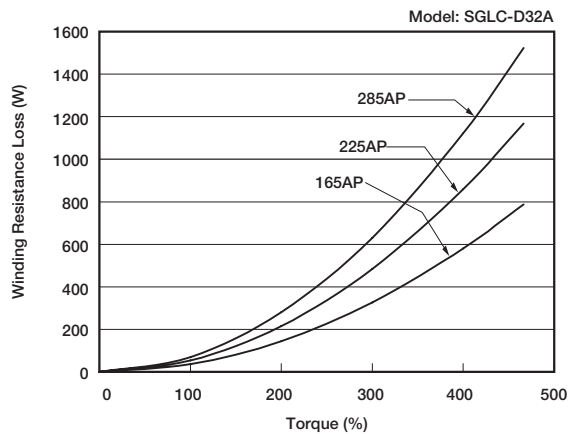
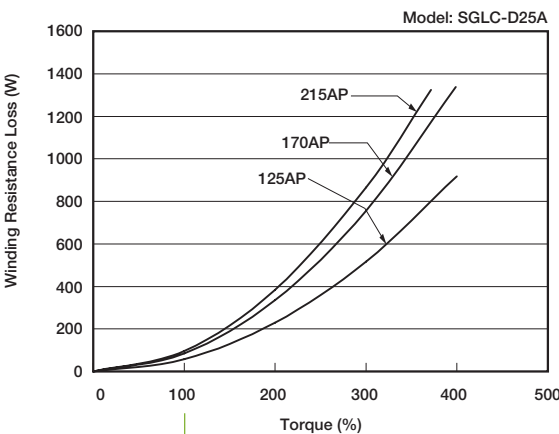
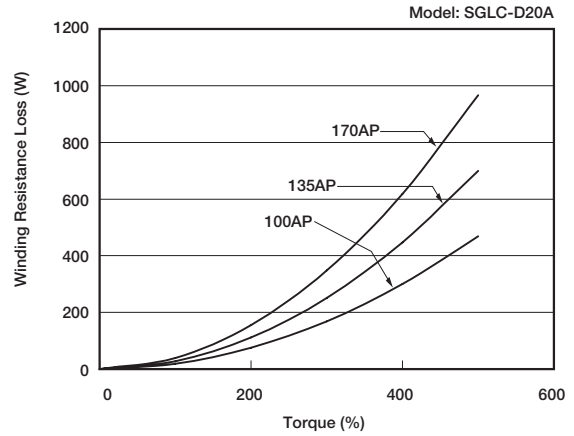
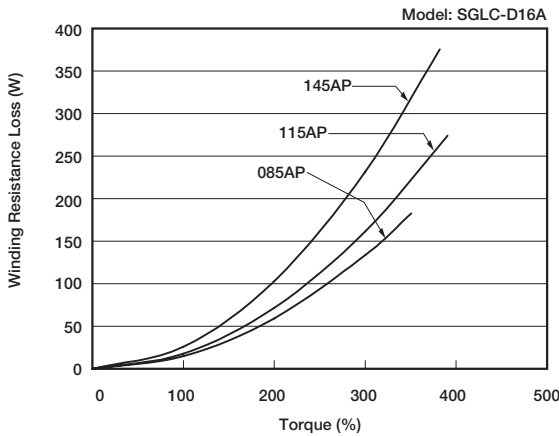


## Selecting Regenerative Resistors

### (i) SGLTW Linear Servomotors (cont'd)

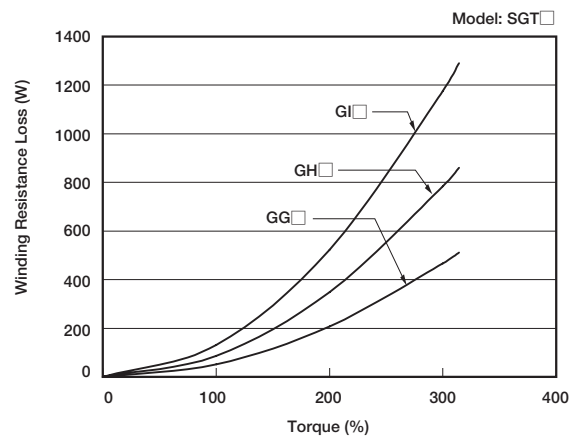
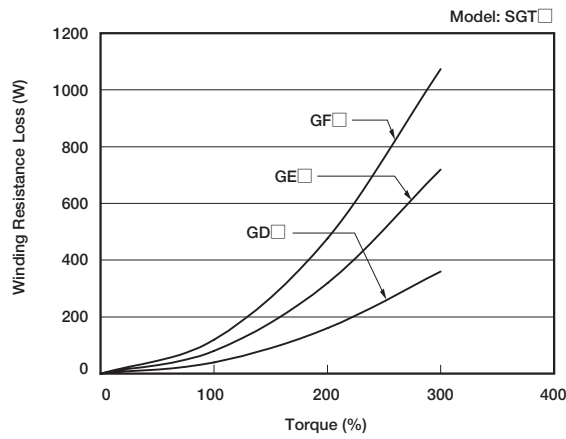
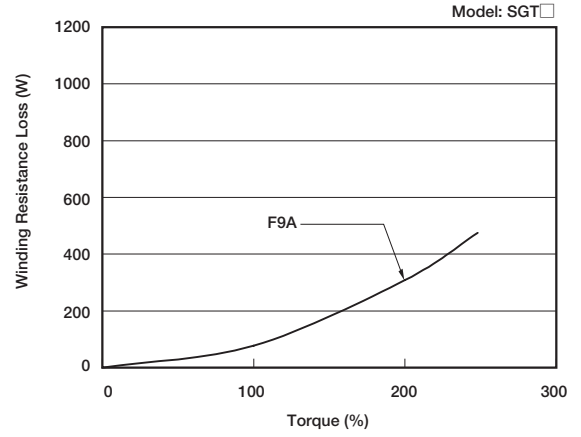
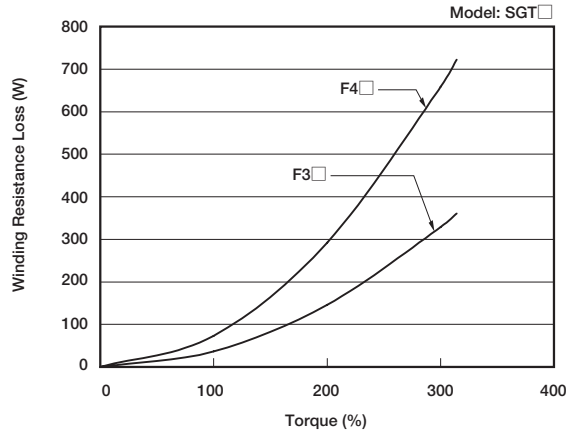


### (j) SGLC Cylinder Type Linear Servomotors



## Selecting Regenerative Resistors

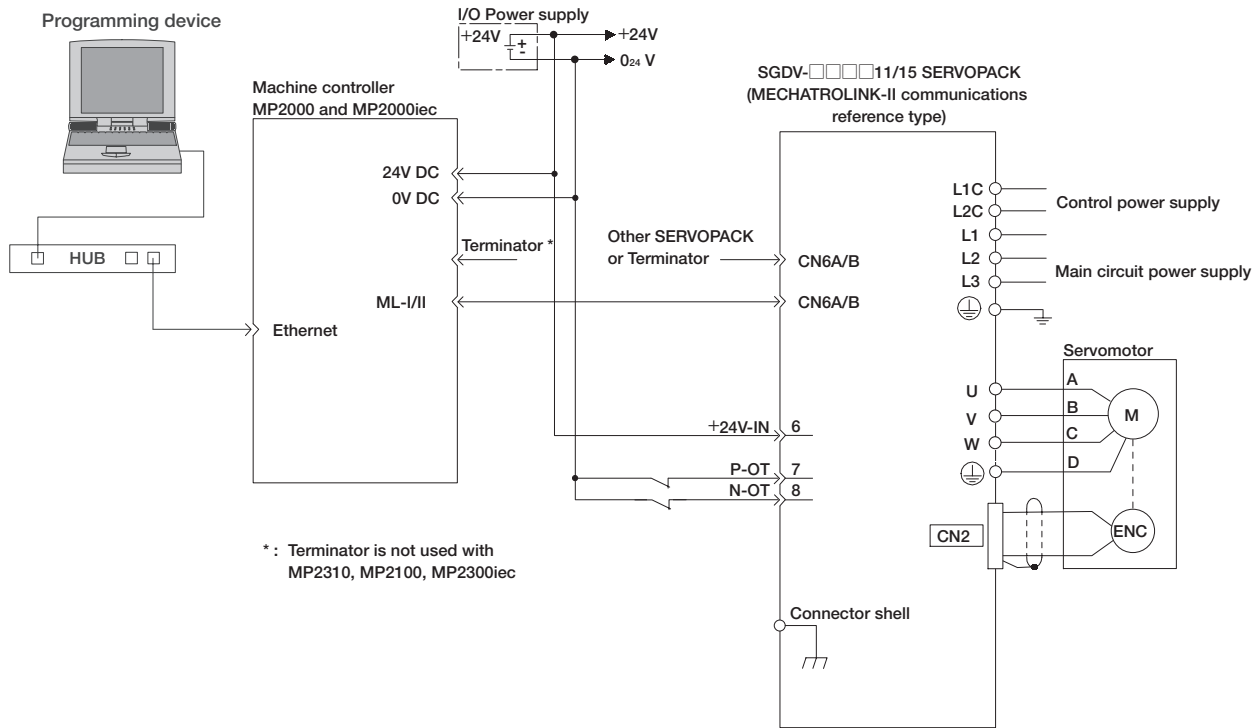
(k) SGT Linear Sliders





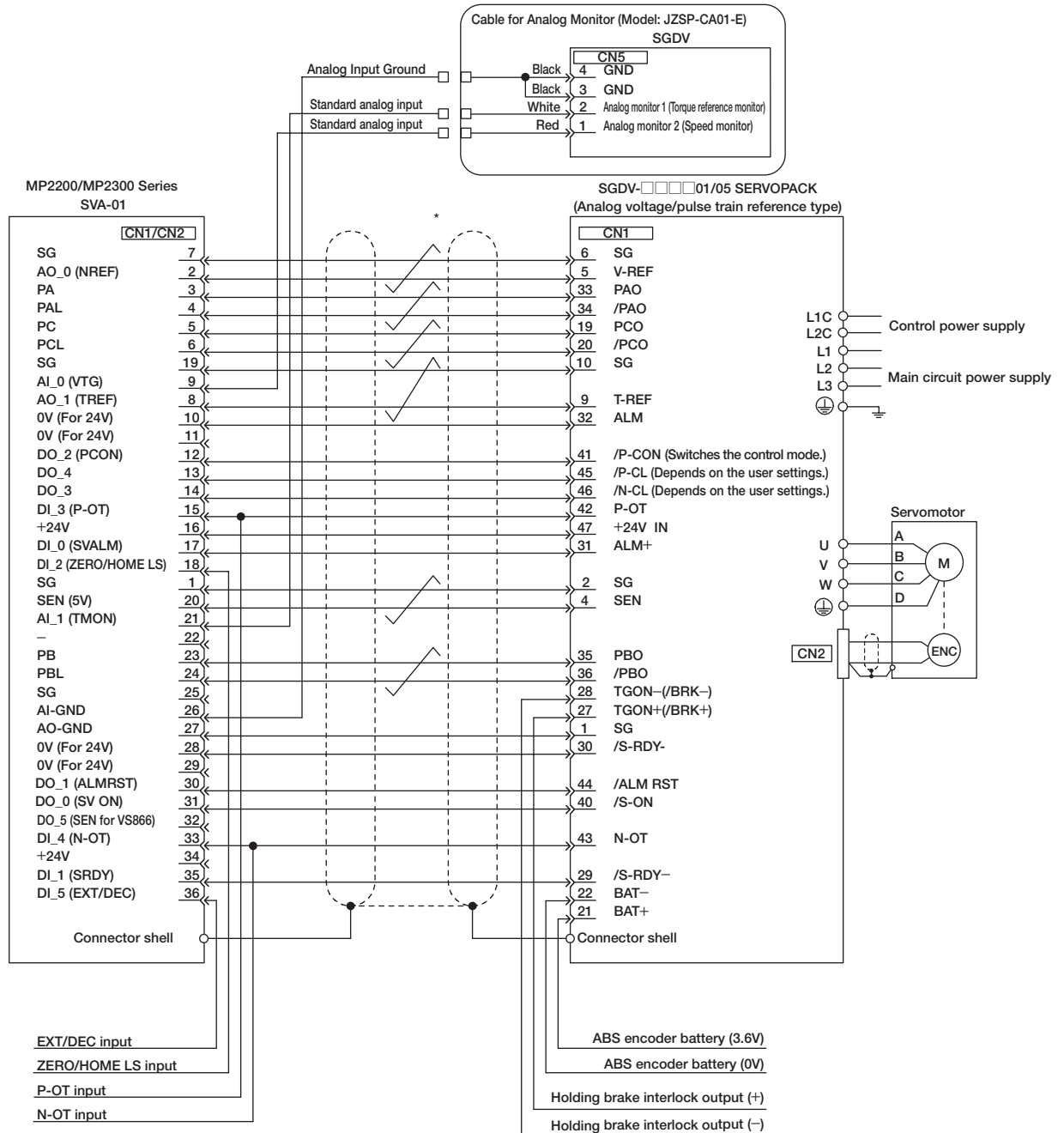
# Connection to Host Controller

## Example of Connection to Machine Controller MP2000 and MP2000iec



- Notes:
- 1 Only signals applicable to Machine Controller MP2000 and MP2000iec and Yaskawa's SGD V SERVOPACK are shown in the diagram.
  - 2 The main circuit power supply is a three-phase 200 VAC SERVOPACK input in the example.
  - 3 Note that incorrect connection will cause damage to the Machine Controller and SERVOPACK. Take particular care to wire correctly.
  - 4 The above connection diagram shows only X-axis connection. When using another axes, make connection to the SERVOPACK in the same way.
  - 5 The normally closed (N.C.) input terminals not to be used at the Machine Controller I/O connector section must be short-circuited at the connector.

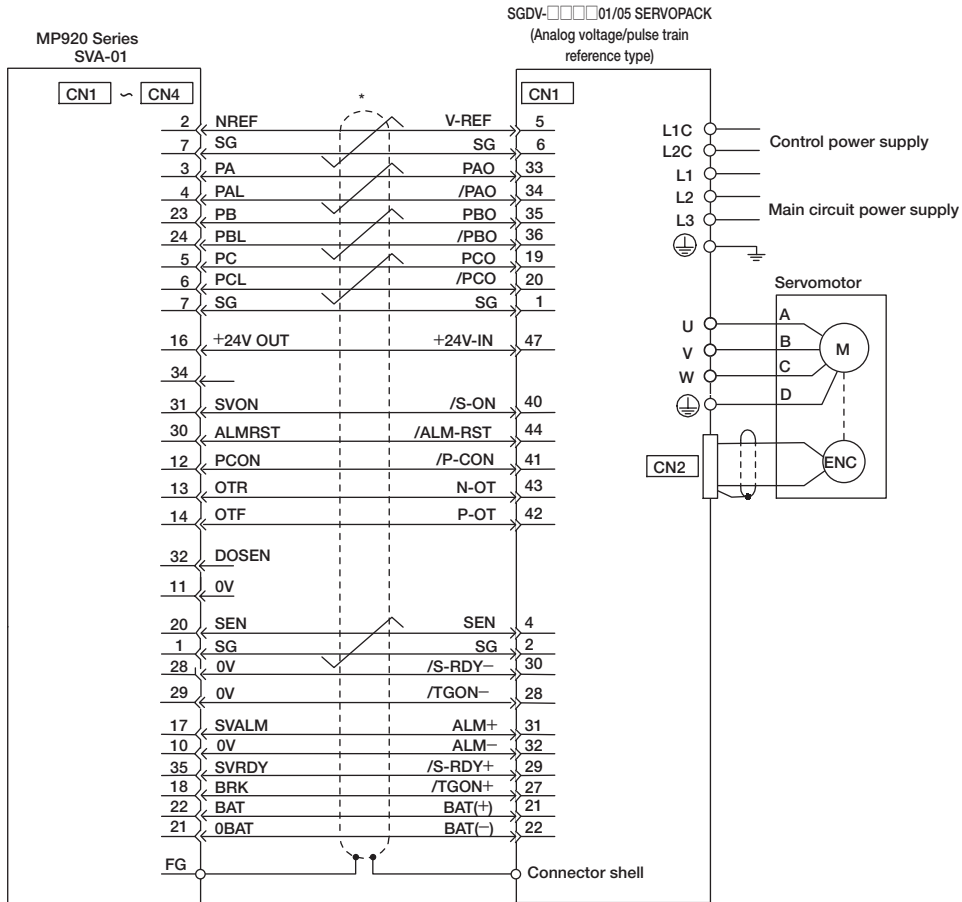
## Example of Connection to MP2200 / MP2300 Motion Module SVA-01



\*: represents shielded twisted-pair wires.

- Notes: 1 Connection cables (model: JEPMC-W 2040-□□) to connect the SERVOPACK to the MP2200/MP2300 are provided by Yaskawa.
- 2 Only signals applicable to MP2200 / MP2300 Motion Module SVA-01 and Yaskawa's SGD SERVOPACK are shown in the diagram.
- 3 The main circuit power supply is a three-phase 200 VAC SERVOPACK input in the example.
- 4 Note that incorrect connection will cause damage to the Machine Controller and SERVOPACK. Take particular care to wire correctly.
- 5 Open the signal lines not to be used.
- 6 The above connection diagram shows only X-axis connection. When using another axes, make connection to the SERVOPACK in the same way.
- 7 The normally closed (N.C.) input terminals not to be used at the Machine Controller I/O connector section must be short-circuited at the connector.
- 8 Make the setting so that the servo can be turned ON/OFF by the /S-ON signal.
- 9 The SERVOPACK has a built-in safety function to protect prevent anyone in the vicinity from being injured by unexpected motion. But, in order to use the function, the circuit for CN8 is required to be configured. When not using the function, use SERVOPACKS with the Safety Jumper Connector connected.

## Example of Connection to MP920 4-axes Analog Module SVA-01



\*: represents shielded twisted-pair wires.

- Notes: 1 Connection cables (model: JEPMC-W6050-□□) to connect the SERVOPACK to the MP920 are provided by Yaskawa.  
 2 Only signals applicable to MP920 4-axes Analog Module SVA-01 and Yaskawa's SGD-V SERVOPACK are shown in the diagram.  
 3 The main circuit power supply is a three-phase 200 VAC SERVOPACK input in the example.  
 4 Note that incorrect connection will cause damage to the Machine Controller and SERVOPACK. Take particular care to wire correctly.  
 5 Open the signal lines not to be used.  
 6 The above connection diagram shows only X-axis connection. When using another axes, make connection to the SERVOPACK in the same way.  
 7 The normally closed (N.C.) input terminals not to be used at the Machine Controller I/O connector section must be short-circuited at the connector.  
 8 Make the setting so that the servo can be turned ON/OFF by the /S-ON signal.  
 9 The SERVOPACK has a built-in safety function to protect prevent anyone in the vicinity from being injured by unexpected motion. But, in order to use the function, the circuit for CN8 is required to be configured. When not using the function, use SERVOPACKs with the Safety Jumper Connector connected.





# Connection to Host Controller



# Read Before Ordering

## (1) Details of Warranty

### ● Warranty Period

The warranty period for a product that was purchased (hereafter called “delivered product”) is one year from the time of delivery to the location specified by the customer or 18 months from the time of shipment from the Yaskawa factory, whichever is sooner.

### ● Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the warranty period above. This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.

This warranty does not cover failures that result from any of the following causes.

1. Improper handling, abuse, or use in unsuitable conditions or in environments not described in product catalogs or manuals, or in any separately agreed-upon specifications
2. Causes not attributable to the delivered product itself
3. Modifications or repairs not performed by Yaskawa
4. Abuse of the delivered product in a manner in which it was not originally intended
5. Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
6. Events for which Yaskawa is not responsible, such as natural or human-made disasters

## (2) Limitations of Liability

1. Yaskawa shall in no event be responsible for any damage or loss of opportunity to the customer that arises due to failure of the delivered product.
2. Yaskawa shall not be responsible for any programs (including parameter settings) or the results of program execution of the programs provided by the user or by a third party for use with programmable Yaskawa products.
3. The information described in product catalogs or manuals is provided for the purpose of the customer purchasing the appropriate product for the intended application. The use thereof does not guarantee that there are no infringements of intellectual property rights or other proprietary rights of Yaskawa or third parties, nor does it construe a license.
4. Yaskawa shall not be responsible for any damage arising from infringements of intellectual property rights or other proprietary rights of third parties as a result of using the information described in catalogs or manuals.

## (3) Suitability for Use

1. It is the customer’s responsibility to confirm conformity with any standards, codes, or regulations that apply if the Yaskawa product is used in combination with any other products.
2. The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
3. Consult with Yaskawa to determine whether use in the following applications is acceptable. If use in the application is acceptable, use the product with extra allowance in ratings and specifications, and provide safety measures to minimize hazards in the event of failure.
  - Outdoor use, use involving potential chemical contamination or electrical interference, or use in conditions or environments not described in product catalogs or manuals
  - Nuclear energy control systems, combustion systems, railroad systems, aviation systems, vehicle systems, medical equipment, amusement machines, and installations subject to separate industry or government regulations
  - Systems, machines, and equipment that may present a risk to life or property
  - Systems that require a high degree of reliability, such as systems that supply gas, water, or electricity, or systems that operate continuously 24 hours a day
  - Other systems that require a similar high degree of safety
4. Never use the product for an application involving serious risk to life or property without first ensuring that the system is designed to secure the required level of safety with risk warnings and redundancy, and that the Yaskawa product is properly rated and installed.
5. The circuit examples and other application examples described in product catalogs and manuals are for reference. Check the functionality and safety of the actual devices and equipment to be used before using the product.
6. Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

## (4) Specifications Change

The names, specifications, appearance, and accessories of products in product catalogs and manuals may be changed at any time based on improvements and other reasons. The next editions of the revised catalogs or manuals will be published with updated code numbers. Consult with your Yaskawa representative to confirm the actual specifications before purchasing a product.

# Notes

## Notes

# Notes

# Σ-V SERIES PRODUCT CATALOG

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

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