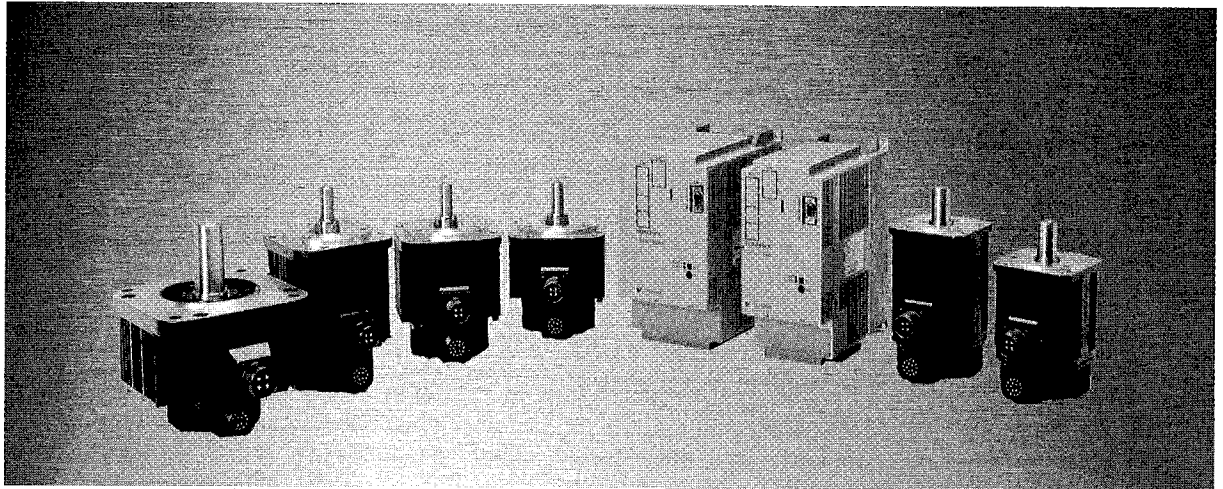


Σ Series SGM□/SGDB USER'S MANUAL

AC Servodrives

SGMG/SGMS/SGMD/SGMP Servomotors
SGDB-□N SERVOPACK




YASKAWA


MANUAL NO. SIE-S800-26.4B



Safety Information

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

 **WARNING** Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.

 **CAUTION** Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

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Preface

Based on Yaskawa servo manufacturing technology and servo application technology accumulated over the last half a century, Yaskawa has launched the AC Servo Series that, together with its rich line of products, meets the needs of the modern needs of FA and FMS in their application to machining tools and robots.

AC Servos not only provide stable, highly accurate, and high-speed response control even under adverse environments, but also provide such features as easy application, flexibility, and easy maintain. The new Yaskawa AC Servos can be used in various servo fields, including machining tools and robots.

Features

- The base-mounted SERVOPACKS are provided as a single unit compatible with either incremental encoders or absolute encoders.
- Positioning via the MECHATROLINK High-speed Field Network.
- Electronic gear function provided.
- For incremental encoders, there are now only 9 lines to wire between the encoder and the SERVOPACK (previously 15 lines).
- Wiring is reduced by a reduction in the number of I/O from 15 to 6.
- Distributed system design is now possible with a maximum cable length of 50 m (previously 3 m).

Related Manuals

Refer to the following manuals as required

Read this manual carefully to ensure the proper use of the SERVOPACKS. Also, keep this manual in a safe place so that it can be referred to whenever necessary.

Manual Name	Manual No.	Contents
MECHATROLINK Systems User's Manual	SIE-S800-26.1	Gives a detailed description of the MECHATROLINK Network.
MECHATROLINK Servo Command User's Manual	SIE-S800-26.2	Provides a detailed description of the MECHATROLINK servo commands.

Safety Precautions

The following precautions are for checking products upon delivery, installation, wiring, operation, maintenance and inspections.

■ Checking Products on Delivery

CAUTION

- Be sure to use the specified Servomotor and SERVOPACK combination.
Fire or damage may result if the wrong combination is used.


■ Installation

CAUTION

- Do not use the products in or near environments exposed to moisture, corrosive gases, flammable gases, or other flammable materials.
Electric shock or fire may result.

■ Wiring

WARNING

- Be sure to ground the SERVOPACK ground terminal  less than 100 Ω .
Electric shock or fire may result if the SERVOPACK is not grounded properly.

CAUTION

- Do not connect a three-phase power supply to the U, V, and W output terminals of the SERVOPACK.
Injury or fire may result.
- Make sure the power supply and Servomotor output terminals are securely tightened.
Fire may result if terminals are loose.

■ Operation **WARNING**

- Do not touch rotating parts of the Servomotor during operation.
Injury may result.

 **CAUTION**

- In order to avoid accidents, do not connect the Servomotor shaft to the controlled equipment during the trial operation.
Injury may result.
- Be sure to set the proper user constants for the controlled equipment prior to starting operation with the Servomotor connected to the equipment.
Equipment overrun or damage may result without proper settings prior to the start of operation.
- Always set up an emergency stop prior to starting operation with the Servomotor connected to the equipment.
Injury may result if an emergency stop is not readily available.
- Do not touch the heat sink area during operation.
Severe burns due to high temperatures may result.

■ Maintenance and Inspection **WARNING**

- Do not touch areas inside the SERVOPACK.
Electric shock may result.
- Make sure the panel cover is attached when power is ON.
Electric shock may result if the panel cover is left open.
- Turn OFF power and wait 5 minutes before touching terminals.
Electric shock from residual voltage may result if terminals are touched within 5 minutes of turning OFF power.

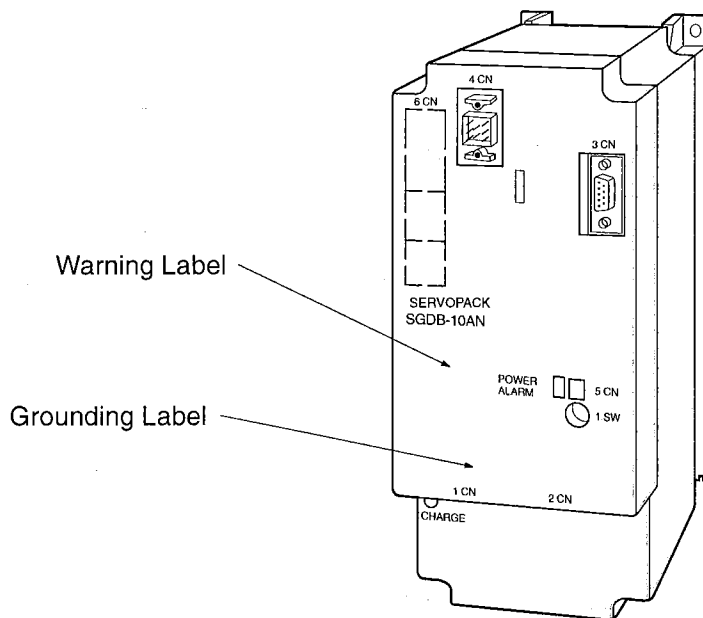
 **CAUTION**

- Do not disassemble the Servomotor.
Electric shock or injury may result.
- Do not change wiring with the power turned ON.
Electric shock or injury may result.

■ General Precautions

Note the following to ensure safe application.

- The drawings presented in this manual are sometimes shown without covers or protective guards. Always replace the cover or protective guard as specified first, and then operate the products in accordance with the manual.
- The drawings presented in this manual are typical examples and may not match the product you received.
- This manual is subject to change due to product improvement, specification modification, and manual improvement. When this manual is revised, the manual code is updated and the new manual is published as a next edition. The edition number appears on the front and back covers.
- If the manual must be ordered due to loss or damage, inform your nearest Yaskawa representative or one of the offices listed on the back of this manual.
- Yaskawa will not take responsibility for the results of unauthorized modifications of this product. Yaskawa shall not be liable for any damages or troubles resulting from unauthorized modification.



Warning Label



Grounding Label



Warning Label and Grounding Label Sticker Attachment Positions

1

Configuration and Models

This chapter describes the configuration and model numbers for Servo-drives.

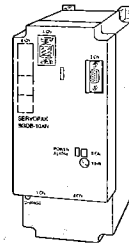
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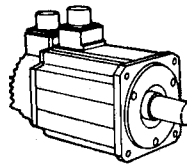
1.1 Configuration

Servodrives are configured using a SERVOPACK (Controller) and Servomotors.

- SGDB-□□AN SERVOPACK



- AC Servomotor



1.2 Model Numbers

1.2.1 Servomotor Model Numbers

■ SGMP Servomotors

SGMP - 15 A 3 1 2 □

Σ-Series

SGMP: SGMP Servomotor

Servomotor Capacity

04: 400 W, 08: 750 W, 15: 1.5 kW

Supply Voltage

A: 200 V

Options

- B: With brake
- D: With brake and shaft seal
- P: Drip-proof
- S: With shaft seal

Shaft Specifications

- 2: Straight without key
- 4: Straight with key
- 6: Straight with key and tap

Design Revision Order

Encoder Specification

- 3: 2048 P/R incremental encoder
- W: 12-bit absolute encoder (special order)

■ SGMG/SGMS/SGMD Servomotors

SGM - 03 A 2 A A

Σ-Series

SGMG: SGMG Servomotor
 SGMS: SGMS Servomotor
 SGMD: SGMD Servomotor

Servomotor Capacity

03: 0.3 kW, 05: 0.45 kW, 06: 0.6 kW
 09: 0.85 kW/0.9 kW, 10: 1.0 kW
 12: 1.2 kW, 13: 1.3 kW, 15: 1.5 kW
 20: 1.8 kW/2.0 kW, 22: 2.2 kW
 30: 2.9 kW/3.0 kW, 32: 3.2 kW
 40: 4.0 kW, 44: 4.4 kW, 50: 5.0 kW
 55: 5.5 kW, 60: 6.0 kW, 75: 7.5 kW
 1A: 11 kW, 1E: 15 kW

Supply Voltage

A: 200 V

Encoder Specification

2: 8192 P/R incremental encoder
 6: 4096 P/R incremental encoder
 W: 12-bit absolute encoder
 S: 15-bit absolute encoder

Lead Specification

Blank: Standard connector

Options

Blank: Standard
 1: Standard
 (with a lead specification)
 S: With shaft seal
 B: With 90 VDC brake
 C: With 24 VDC brake
 F: With shaft seal
 and 90 VDC brake
 G: With shaft seal
 and 24 VDC brake

Shaft Specification

Blank: Standard
 [Straight without key]
 A: Standard [Straight without key]
 (with an optional/lead specification)
 B: Straight with key, with axis end tap (1)
 C: Taper 1/10, with parallel key
 D: Taper 1/10, with woodruff key
 (G Series 05 and 09 only)

Rated Motor Speed

A: SGMG 1500 r/min
 SGMS 3000 r/min
 SGMD 2000 r/min
 B: SGMG 1000 r/min

1

1.2.2 SERVOPACK Model Numbers

SGDB - 10 A N - □

Σ-Series
SGDB SERVOPACK

Rated Output

05: 0.5 kW, 10: 1.0 kW, 15: 1.5 kW
20: 2.0 kW, 30: 3.0 kW, 50: 5.0 kW
60: 6.0 kW, 75: 7.5 kW, 1A: 11.0 kW
1E: 15.0 kW

Supply Voltage

A: 200 V

Options

P: Duct ventilation

Command Interface Type

N: MECHATROLINK

1

2

Ratings and Characteristics

2

This chapter provides Servodrive ratings, specifications, and torque-speed characteristics.

For SGM Servomotors (400 W, 750 W) and SGMP Servomotors (400 W, 750 W), refer to “Σ Series SGM/SGMP/SGD-□N USER’S MANUAL” (SIE-S800-26.3).

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2.1 Ratings and Specifications of SGMG Servomotors for Rated Speed 1500 r/min

2.1.1 Ratings and Specifications

- Time Rating: Continuous
- Enclosure: Totally enclosed, self cooled, IP67 (except shaft-through section)
- Excitation: Permanent magnet
- Insulation Class: Class F
- Drive Method: Direct drive
- Vibration Class: 15 μm or below
- Ambient Temperature: 0 to 40°C
- Mounting: Flange method
- Withstand Voltage: 1500 VAC
- Ambient Humidity: 20% to 80% (with no condensation)
- Insulation Resistance: 500 VDC, 10 M Ω min.

Table 2.1 Ratings and Specifications of SGMG Servomotors for Rated Speed 1500 r/min

Servomotor Model: SGMG-		05A□A	09A□A	13A□A	20A□A	30A□A	44A□A	55A□A	75A□A	1AA□A	1EA□A
Rated Output*1	kW (HP)	0.45 (0.6)	0.85 (1.1)	1.3 (1.7)	1.8 (2.4)	2.9 (3.9)	4.4 (5.9)	5.5 (7.4)	7.5 (10)	11 (15)	15 (20)
	Rated Torque*1*2	N·m	2.84	5.39	8.34	11.5	18.6	28.4	35.0	48.0	70.0
lb·in		25	48	74	102	165	252	310	425	620	845
Instantaneous Peak Torque*1	N·m	8.92	13.8	23.3	28.7	45.1	71.1	87.6	119	175	224
	lb·in	79	122	207	254	404	630	775	1050	1550	1988
Rated Current*1	A (rms)	3.8	7.1	10.7	16.7	23.8	32.8	42.1	54.7	58.6	78.0
Instantaneous Max Current*1	A (rms)	11	17	28	42	56	84	110	130	140	170
Rated Speed*1	r/min	1500									
Instantaneous Max Speed*1	r/min	3000								2000	
Torque Constant*1	N·m/A (rms)	0.82	0.83	0.84	0.73	0.83	0.91	0.88	0.93	1.25	1.32
	lb·in/A (rms)	7.3	7.3	7.4	6.5	7.3	8.0	7.8	8.2	11	11.7
Moment of Inertia [J _M]	kg·m ² × 10 ⁻⁴	7.24	13.9	20.5	31.7	46.0	67.5	89.0	125	281	315
	lb·in·s ² × 10 ⁻³	6.41	12.3	18.2	28.1	40.7	59.8	78.8	111	249	279
Rated Power Rate*1	kW/s	11.2	20.9	33.8	41.5	75.3	120	137	184	174	289
Rated Angular Acceleration*1	rad/s ²	3930	3880	4060	3620	4050	4210	3930	3850	2490	3030

Servomotor Model: SGMG-		05A□A	09A□A	13A□A	20A□A	30A□A	44A□A	55A□A	75A□A	1AA□A	1EA□A
Inertia Time Constant	ms	5.1	3.1	2.8	2.1	1.9	1.3	1.3	1.1	1.2	0.98
Inductive Time Constant	ms	5.1	5.3	6.3	12.5	12.5	15.7	16.4	18.4	22.6	27.2

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

* 2. These characteristics are for a Servomotor with one of the following heat sink (steel plate) attached for cooling.

05A□A to 13A□A Servomotor: 400 × 400 × 20 mm (15.75 × 15.75 × 0.79 in) W × H × D

20A□A to 75A□A Servomotor: 550 × 550 × 30 mm (21.65 × 21.65 × 1.18 in) W × H × D

1AA□A Servomotor: 650 × 650 × 35 mm (25.59 × 25.59 × 1.38 in) W × H × D

IMPORTANT

The ratings and specifications shown on the previous page are for standard Servomotors.

For Servomotors with holding brakes, add the values in the following table to the moment of inertia values in the above table. Other characteristics may also change slightly.

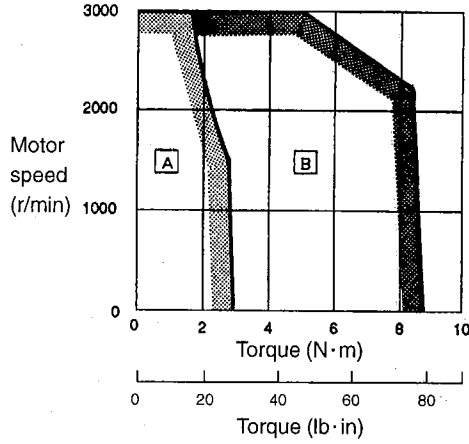
Servomotor Model: SGMG			05A□A	09A□A	13A□A	20A□A	30A□A	44A□A	55A□A	75A□A	1AA□A	1EA□A
With Holding Brake 90 VDC	Added Moment of Inertia	kg · m ² × 10 ⁻⁴	1.85			7.75			7.75		13.2	37.5
		oz · in · s ² × 10 ⁻³	26			110			110		187	532
	Static Friction Torque	N · m (oz · in)	4.41 (624)	12.7 (1798)		43.1 (6103)			72.6 (10280)		84.3 (11937)	114.7 (16242)

2

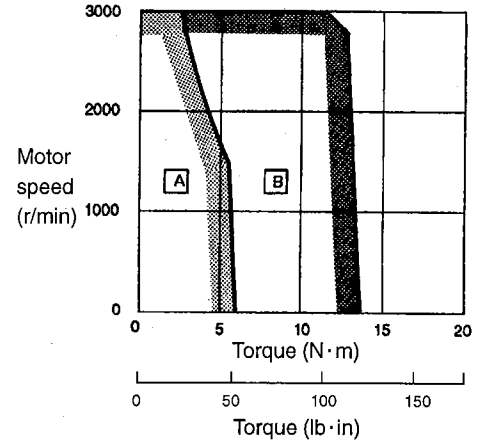
**SGMG Servomotor (Rated Motor Speed of 1500 r/min)
Torque-Motor Speed Characteristics**

2

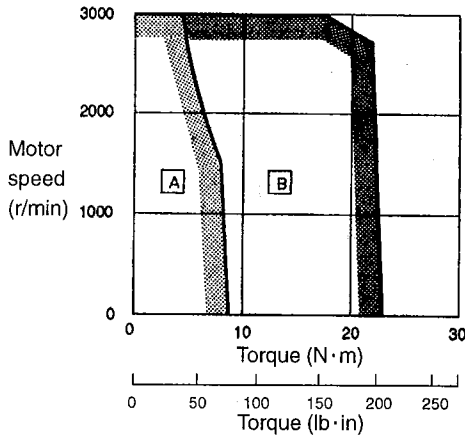
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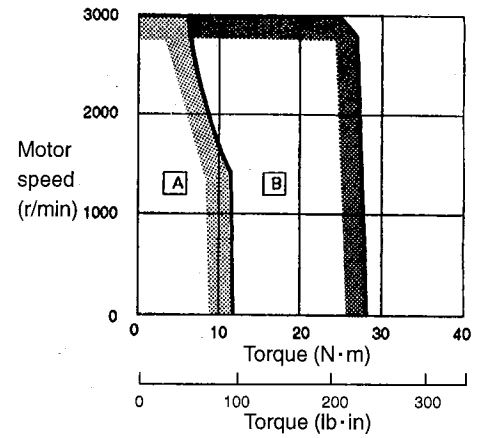
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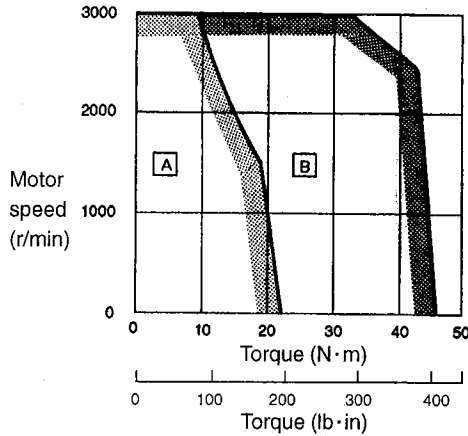
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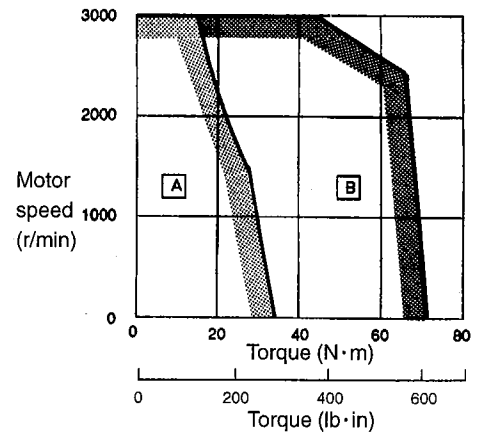
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SGMG-30A□A

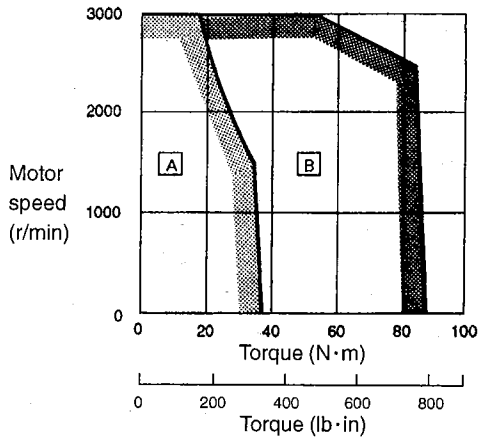


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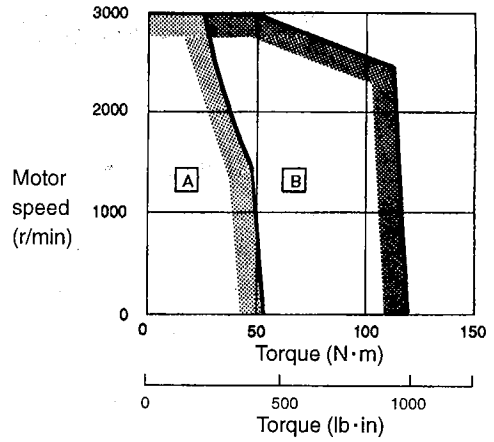


A : Continuous Duty Zone
B : Intermittent Duty Zone

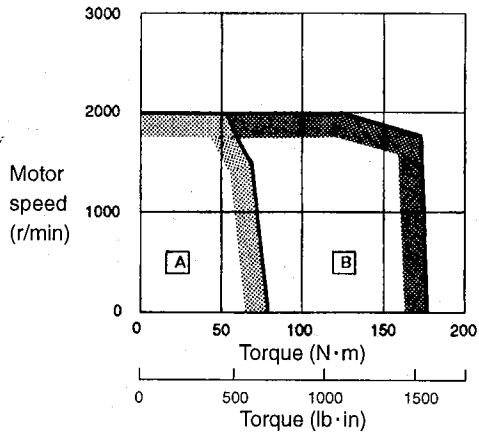
SGMG-55A□A



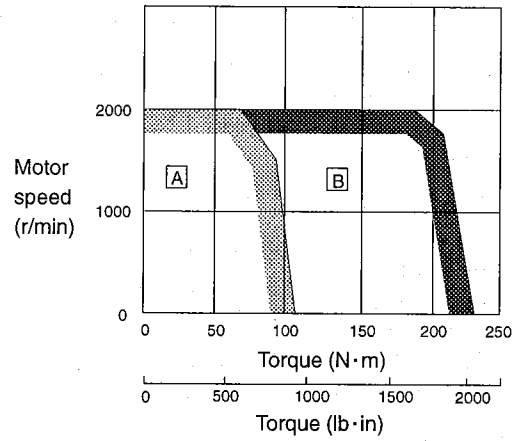
SGMG-75A□A



SGMG-1AA□A



SGMG-1EA□A



- A** : Continuous Duty Zone
- B** : Intermittent Duty Zone

2.2 Ratings and Specifications of SGMG Servomotors for Rated Speed 1000 r/min

2.2.1 Ratings and Specifications

- Time Rating: Continuous
- Enclosure: Totally enclosed, self-cooled, IP67 (except shaft-through section)
- Excitation: Permanent magnet
- Insulation Class: Class F
- Drive Method: Direct drive
- Vibration Class: 15 μm or below
- Ambient Temperature: 0 to 40°C
- Mounting: Flange method
- Withstand Voltage: 1500 VAC
- Ambient Humidity: 20% to 80% (with no condensation)
- Insulation Resistance: 500 VDC, 10 M Ω min.

Table 2.2 Ratings and Specifications of SGMG Servomotors for Rated Speed 1000 r/min

Servomotor Model: SGMG-		03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	44A□B	60A□B
Rated Output* ¹	kW (HP)	0.3 (0.4)	0.6 (0.8)	0.9 (1.2)	1.2 (1.6)	2.0 (2.7)	3.0 (4.0)	4.4 (5.9)	6.0 (8.0)
Rated Torque* ^{1*2}	N·m	2.84	5.68	8.62	11.5	19.1	28.4	41.9	57.2
	lb·in	25	50	76	102	169	252	372	508
Instantaneous Peak Torque* ¹	N·m	7.17	14.1	19.3	28.0	44.0	63.7	107	129
	lb·in	63	125	171	248	390	564	947	1140
Rated Current* ¹	A (rms)	3.0	5.7	7.6	11.6	18.5	24.8	32.9	46.9
Instantaneous Max Current* ¹	A (rms)	7.3	13.9	16.6	28	42	56	84	110
Rated Speed* ¹	r/min	1000							
Instantaneous Max Speed* ¹	r/min	2000							
Torque Constant* ¹	N·m/A (rms)	1.03	1.06	1.21	1.03	1.07	1.19	1.34	1.26
	lb·in/A (rms)	9.12	9.38	10.7	9.12	9.47	10.5	11.9	11.2
Moment of Inertia [J _M]	kg·m ² × 10 ⁻⁴	7.24	13.9	20.5	31.7	46.0	67.5	89.0	125
	lb·in·s ² × 10 ⁻³	6.41	12.3	18.2	28.1	40.7	59.8	78.8	111
Rated Power Rate* ¹	kW/s	11.2	23.2	36.3	41.5	79.4	120	198	262
Rated Angular Acceleration* ¹	rad/s ²	3930	4080	4210	3620	4150	4210	4710	4590
Inertia Time Constant	ms	5.1	3.8	2.8	2.0	1.7	1.4	1.3	1.1
Inductive Time Constant	ms	5.1	4.7	5.7	13.5	13.9	15.5	14.6	16.5

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

* 2. These characteristics are for a Servomotor with one of the following heat sink (steel plate) attached for cooling.

03A□B to 09A□B Servomotor: 400 × 400 × 20 mm (15.75 × 15.75 × 0.79 in) W × H × D

12A□B to 60A□B Servomotor: 550 × 550 × 30 mm (21.65 × 21.65 × 1.18 in) W × H × D

IMPORTANT

The ratings and specifications shown on the previous page are for standard Servomotors.

For Servomotors with holding brakes, add the values in the following table to the moment of inertia values in the above table. Other characteristics may also change.

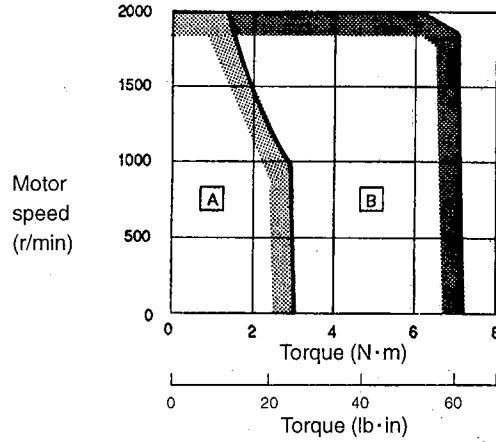
Servomotor Model: SGMG			03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	44A□B	60A□B
With Holding Brake 90 VDC	Added Moment of Inertia	$\text{kg} \cdot \text{m}^2 \times 10^{-4}$	1.85			7.75			7.75	
		$\text{oz} \cdot \text{in} \cdot \text{s}^2 \times 10^{-3}$	26.2			110			110	
	Static Friction Toque	N·m (oz·in)	4.41 (624)	12.7 (1798)	43.1 (6103)			72.6 (10280)		

2

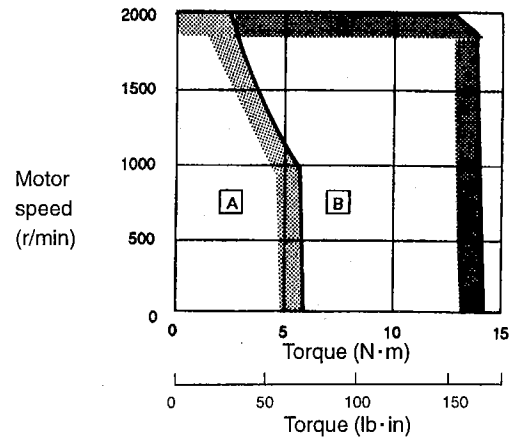
**SGMG Servomotor (Rated Motor Speed of 1000 r/min)
Torque-Motor Speed Characteristics**

2

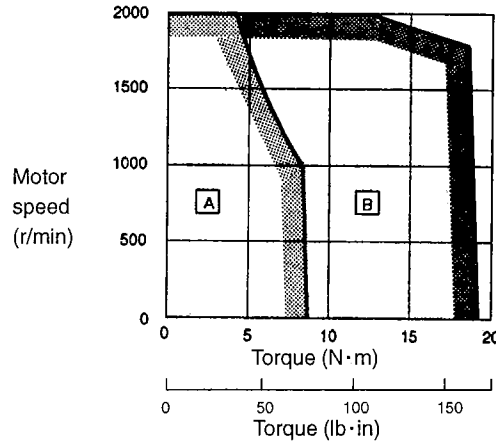
SGMG-03A□B



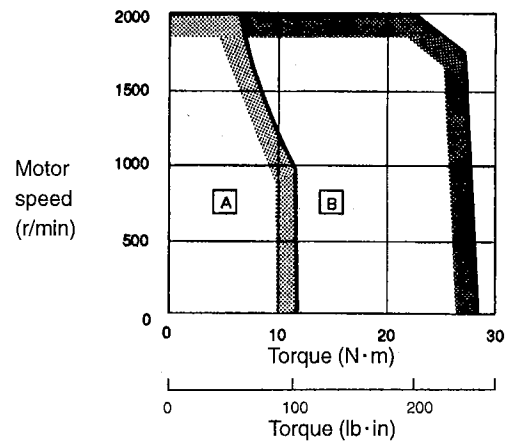
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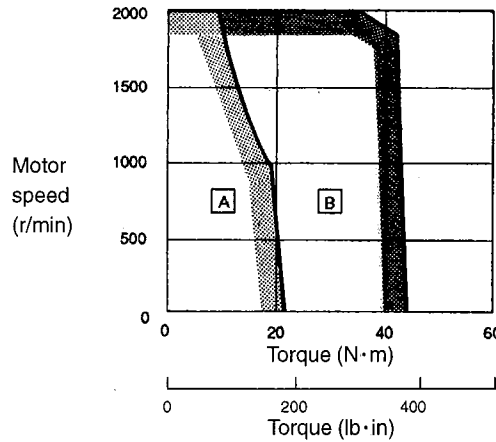
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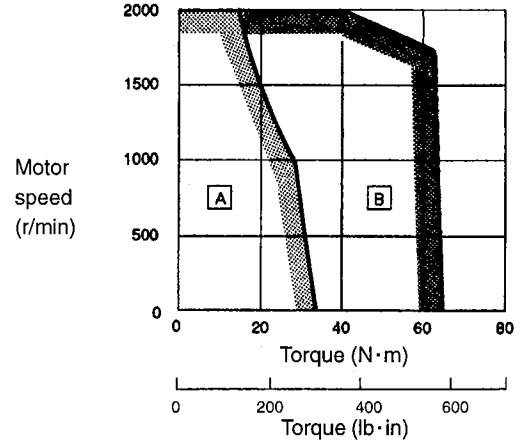
SGMG-12A□B



SGMG-20A□B

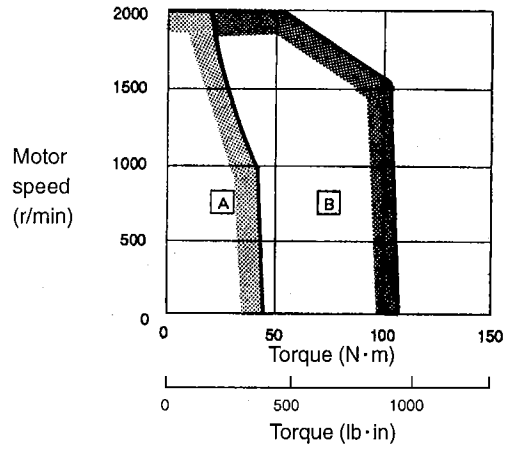


SGMG-30A□B

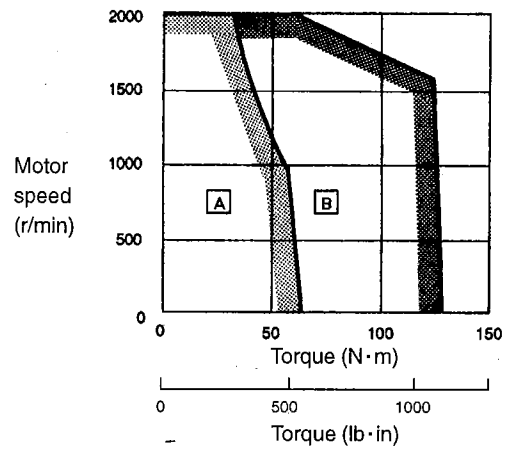


A : Continuous Duty Zone
B : Intermittent Duty Zone

SGMG-44A□B



SGMG-60A□B



- A : Continuous Duty Zone
- B : Intermittent Duty Zone

2.3 SGMS Servomotor Ratings and Specifications

2.3.1 Ratings and Specifications

- Time Rating: Continuous
- Enclosure: Totally enclosed, self cooled, IP67 (except shaft-through section)
- Excitation: Permanent magnet
- Insulation Class: Class F
- Drive Method: Direct drive
- Vibration Class: 15 μm or below
- Ambient Temperature: 0 to 40°C
- Mounting: Flange method
- Withstand Voltage: 1500 VAC
- Ambient Humidity: 20% to 80% (with no condensation)
- Insulation Resistance: 500 VDC, 10 M Ω min.

Table 2.3 SGMS Servomotor Ratings and Specifications

Servomotor Model: SGMS-		10A□A	15A□A	20A□A	30A□A	40A□A	50A□A
Rated Output* ¹	kW (HP)	1.0 (1.3)	1.5 (2.0)	2.0 (2.7)	3.0 (4.0)	4.0 (5.4)	5.0 (6.7)
Rated Torque* ^{1*2}	N·m	3.18	4.9	6.36	9.8	12.6	15.8
	lb·in	28.2	43	56.4	87	112	140
Instantaneous Peak Torque* ¹	N·m	9.54	14.7	19.1	29.4	37.8	47.6
	lb·in	84.4	130	169	260	336	422
Rated Current* ¹	A (rms)	5.7	9.5	12.4	18.8	24.3	28.2
Instantaneous Max Current* ¹	A (rms)	17	28	42	56	77	84
Rated Speed* ¹	r/min	3000					
Instantaneous Max Speed* ¹	r/min	4500					
Torque Constant* ¹	N·m/A (rms)	0.636	0.573	0.559	0.573	0.55	0.61
	lb·in/A (rms)	5.6	5.1	5.0	5.1	4.9	5.4
Moment of Inertia [J _M]	kg·m ² × 10 ⁻⁴	1.74	2.47	3.19	7.00	9.60	12.3
	lb·in·s ² × 10 ⁻³	1.54	2.19	2.82	6.20	8.50	10.9
Rated Power Rate* ¹	kW/s	57.9	97.2	127	137	166	202
Rated Angular Acceleration* ¹	rad/s ²	18250	19840	19970	14000	13160	12780
Inertia Time Constant	ms	0.87	0.71	0.58	0.74	0.60	0.57
Inductive Time Constant	ms	7.1	7.7	8.3	13.13	14.1	14.7

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

* 2. These characteristics are for a Servomotor with one of the following heat sink (steel plate) attached for cooling.

10A□A to 20A□A Servomotor: 300 × 300 × 12 mm (11.81 × 11.81 × 0.47 in) W × H × D

30A□A to 50A□A Servomotor: 400 × 400 × 20 mm (15.75 × 15.75 × 0.79 in) W × H × D

IMPORTANT

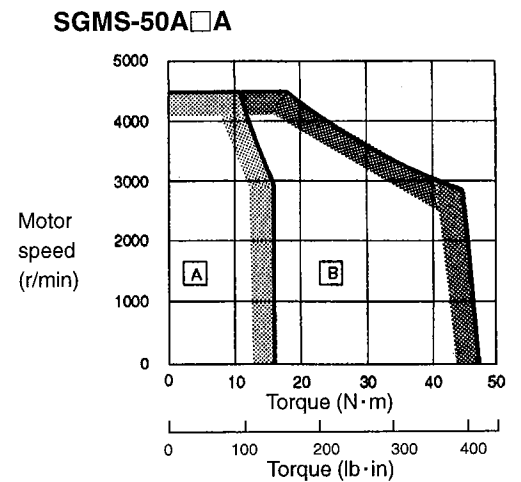
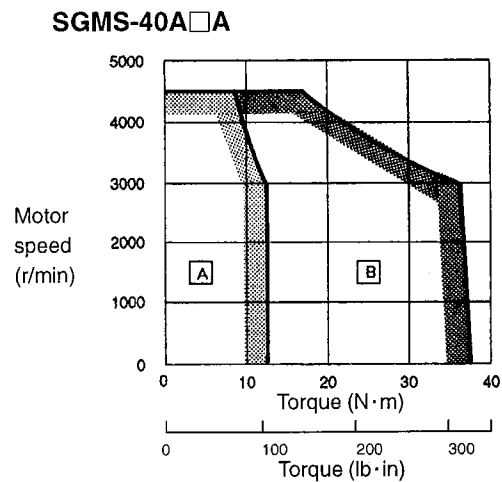
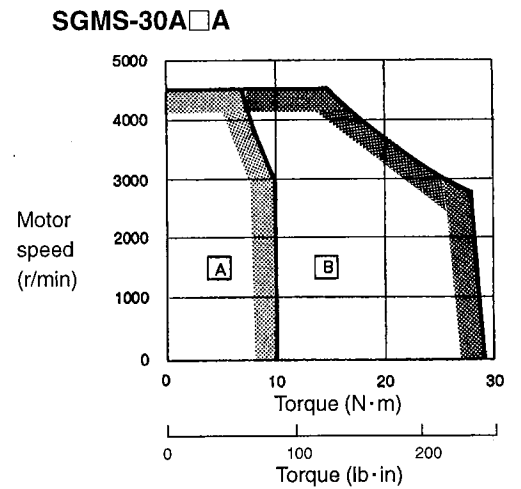
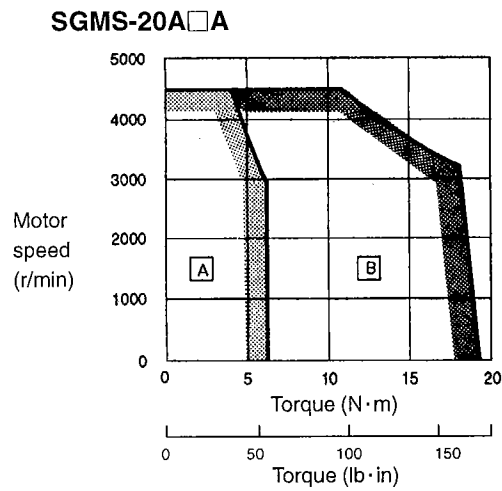
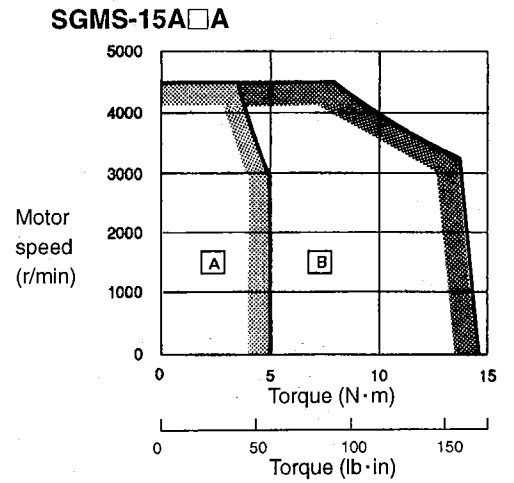
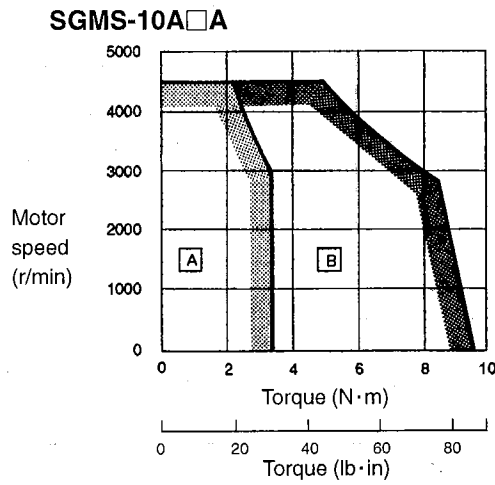
The ratings and specifications shown on the previous page are for standard Servomotors.

For Servomotors with holding brakes, add the values in the following table to the moment of inertia values in the above table. Other characteristics may also change.

Servomotor Model: SGMG			10A□A	15A□A	20A□A	30A□A	40A□A	50A□A
With Holding Brake 90 VDC	Added Moment of Inertia	$\text{kg} \cdot \text{m}^2 \times 10^{-4}$	0.215			1.85		
		$\text{oz} \cdot \text{in} \cdot \text{s}^2 \times 10^{-3}$	3.05			26.2		
	Static Friction Torque	N·m (oz·in)	7.84 (1110)			20 (2832)		

2

■ SGMS Servomotor Torque Motor Speed Characteristics



□A : Continuous Duty Zone
 □B : Intermittent Duty Zone

2.4 SGMD Servomotor Ratings and Specifications (with Holding Brake)

2.4.1 Ratings and Specifications

- Time Rating: Continuous
- Enclosure: Totally enclosed, self cooled, IP67 (except shaft-through section)
- Excitation: Permanent magnet
- Insulation Class: Class F
- Drive Method: Direct drive
- Vibration Class: 15 μm or below
- Ambient Temperature: 0 to 40°C
- Mounting: Flange method
- Withstand Voltage: 1500 VAC
- Ambient Humidity: 20% to 80% (with no condensation)
- Holding Brake: 90 VDC
Static wear torque: 3kgf·m
- Insulation Resistance: 500 VDC, 10 M Ω min.

2

Table 2.4 SGMD Servomotor Ratings and Specifications (with Holding Brake)

Servomotor Model: SGMD-		22A□AAB	32A□AAB	40A□AAB
Rated Output* ¹	kW (HP)	2.2 (2.9)	3.2 (4.3)	4.0 (5.4)
Rated Torque* ¹⁺²	N·m	10.5	15.3	19.1
	lb·in	93	135	169
Instantaneous Peak Torque* ¹	N·m	36.7	53.5	66.9
	lb·in	326	474	592
Rated Current* ¹	A (rms)	15.7	20.9	22.8
Instantaneous Max Current* ¹	A (rms)	54	73	77
Rated Speed* ¹	r/min	2000		
Instantaneous Max Speed* ¹	r/min	3000		
Torque Constant* ¹	N·m/A (rms)	0.72	0.78	0.93
	lb·in/A (rms)	6.4	6.9	8.2
Moment of Inertia [J _M]	kg·m ² × 10 ⁻⁴	51.0	68.6	86.2
	lb·in·s ² × 10 ⁻³	45.2	60.8	76.4
Rated Power Rate* ¹	kW/s	21.6	34.1	42.3
Rated Angular Acceleration* ¹	rad/s ²	2060	2230	2220
Inertia Time Constant	ms	3.3	3.3	2.0
Inductive Time Constant	ms	16.2	16.2	17.8

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

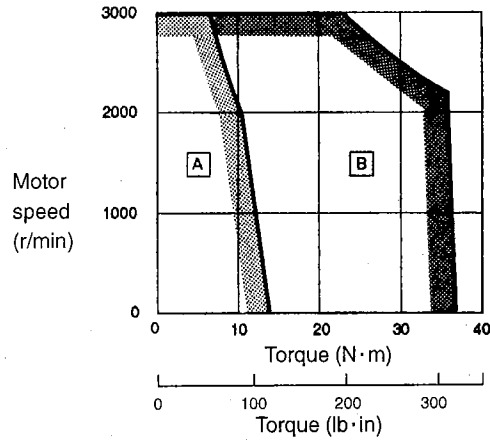
* 2. These characteristics are for a Servomotor with one of the following heat sink (steel plate) attached for cooling.

22A□AAB to 40A□AAB Servomotor: 650 × 650 × 35 mm
(25.59 × 25.59 × 1.38 in) W × H × D

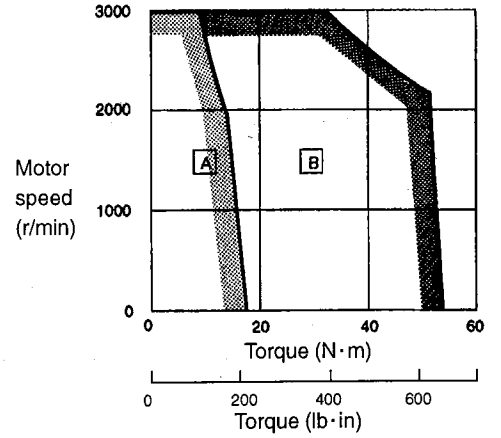
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■ SGMD Servomotor Torque Motor Speed Characteristics

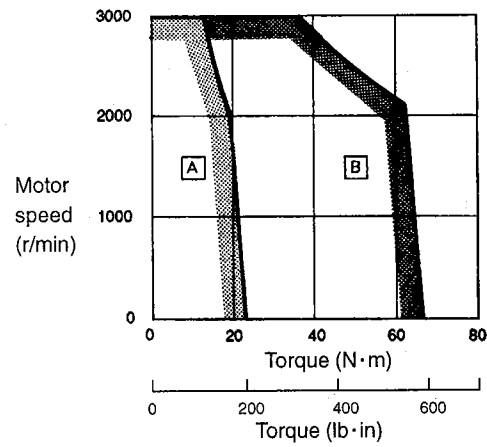
SGMD-22A □ AAB



SGMD-32A □ AAB



SGMD-40A □ AAB



- A : Continuous Duty Zone
- B : Intermittent Duty Zone

2.5 SGMP Servomotor (1.5 kW) Ratings and Specifications

2.5.1 Ratings and Specifications

- Time Rating: Continuous
- Enclosure: Totally enclosed, self cooled
- Excitation: Permanent magnet
- Insulation Class: Class B
- Drive Method: Direct drive
- Vibration Class: 15 μm or below
- Ambient Temperature: 0 to 40°C
- Mounting: Flange method
- Withstand Voltage: 1500 VAC per 1 min
- Ambient Humidity: 20% to 80% (with no condensation)
- Insulation Resistance: 500 VDC, 10 M Ω min.

Table 2.5 SGMP Servomotor (1.5 kW) Ratings and Specifications

Servomotor Model: SGMP-		15A
Rated Output *	kW (HP)	1.5 (2.0)
Rated Torque *	N·m	4.77
	lb·in	42.2
Instantaneous Peak Torque *	N·m	14.3
	lb·in	126.6
Rated Current *	A (rms)	7.5
Instantaneous Max. Current *	A (rms)	28.0
Rated Speed *	r/min	3000
Instantaneous Max. Speed *	r/min	4500
Torque Constant *	N·m/A (rms)	0.687
	lb·in/A (rms)	6.08
Moment of Inertia [J_M]	$\text{kg}\cdot\text{m}^2 \times 10^{-4}$	4.03
	$\text{oz}\cdot\text{in}\cdot\text{s}^2 \times 10^{-3}$	3.57
Rated Power Rate *	kW/s	56.6
Rated Angular Acceleration *	rad/s ²	11800
Inertia Time Constant	ms	0.5
Inductive Time Constant	ms	22

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

Note These characteristics are for a Servomotor with a 300 × 300 × 12 mm (9.84 × 9.84 × 0.24 in.) W × H × D heat sink attached for cooling.

IMPORTANT

The ratings and specifications shown above are for standard Servomotors.

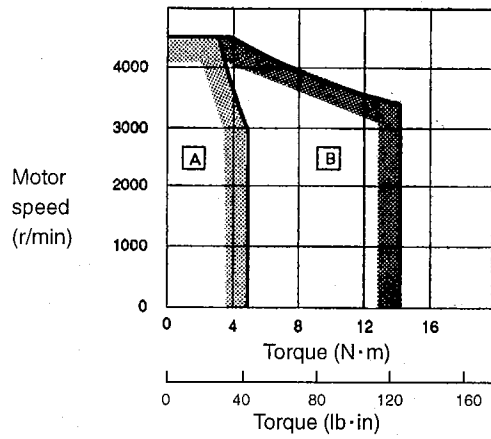
For Servomotors with holding brakes, add the values in the following table to the moment of inertia values in the above table. Other characteristics may also change.

Servomotor Model: SGMG			15A
With Holding Brake, 90 VDC	Added Moment of Inertia	$\text{kg} \cdot \text{m}^2 \times 10^{-4}$	0.875
		$\text{oz} \cdot \text{in} \cdot \text{s}^2 \times 10^{-3}$	12.4
	Static Friction Torque	N·m (oz·in)	7.45 (1055)

■ SGMP Servomotor (1.5 kW) Torque Motor Speed Characteristics

2

SGMP-15A



A : Continuous Duty Zone
B : Intermittent Duty Zone

2.6 SERVOPACK Ratings and Specifications

2.6.1 Ratings and Specifications

The ratings and specifications for the SGDB SERVOPACK are shown below. Refer to them as required when selecting a SERVOPACK. Refer to the specifications listed in the table for combination with the appropriate model of Servomotor.

Table 2.6 SERVOPACK and Applicable Servomotors

SERVOPACK SGDB-		05	10	15	20	30	50	60	75	1A	1E	
Applicable Servomotor	SGMG- (1500 r/min)	05A	09A	13A	20A	30A	44A	55A	75A	1AA	1EA	
	SGMG- (1000 r/min)	03A	06A 09A	12A	20A	30A	44A	60A	—	—	—	
	SGMS-	—	10A	15A	20A	30A	40A 50A	—	—	—	—	
	SGMD-	—	—	—	—	22A	32A 40A	—	—	—	—	
	SGMP-	04A	08A	15A	—	—	—	—	—	—	—	
Basic Specifications	Power Supply	Main Circuit *1	Three-phase, 200 to 230 VAC $\begin{matrix} +10 \\ -15 \end{matrix}$ %, 50/60 Hz									
		Control Circuit *1	Single-phase, 200 to 230 VAC $\begin{matrix} +10 \\ -15 \end{matrix}$ %, 50/60 Hz									
	Control Method		Three-phase, full-wave rectification IGBT-PWM (sine-wave driven)									
	Feedback		Incremental encoder, absolute encoder									
	Conditions	Operating Temp.*2/ Storage Temp. *2		0 to 55°C/−20 to 85°C								
		Ambient/Storage Humidity		90% RH or less (with no condensation)								
		Vibration, Shock Resistance		4.9 m/s ² /19.6 m/s ² (16.08 ft/s ² /64.30 ft/s ²)								
	Configuration		Base mounted (duct ventilation with optional specification)									
	Approx. mass [kg (lb)]		4 (8.82)		5 (11.0)		8 (17.6)	15 (33.1)		23 (50.7)		
Reference Method	Operation Specifications		Positioning by serial commands									
	Reference Input		MECHATROLINK communication, 4 Mbps, 2 ms cycle Serial Commands: Operation, movement (positions/speeds), interpolation, synchronization, parameter reads, parameter writes, and monitor outputs									
Position Control Functions		<ul style="list-style-type: none"> • Online speed/position loop gain changes (by changing parameter). • Setting acceleration/deceleration method (linear, exponential, or S-curve) (by specifying a command). • Conversion function for positioning units and feedback pulses. • Feedforward compensation and bias setting (by changing user constant). • Positioning near and completed outputs (read via a command). 										

Ratings and Characteristics

2.6.1 Ratings and Specifications

SERVOPACK SGDB-		05	10	15	20	30	50	60	75	1A	1E
Monitoring		Using the monitor command, monitoring of various positions, speeds, position error torque, SERVOPACK status, and alarm contents is possible.									
I/O Signals	Sequence Inputs	Forward overtravel prohibit (P-OT), reverse overtravel prohibit (N-OT), external latch (EXT), and zero point return deceleration limit switch (DEC)									
	Sequence Outputs	Break interlock (BK) and Servo alarm (ALM)									
Built-in Functions	Dynamic Brake (DB)	Incorporating DB that is activated for main power OFF, Servo alarms, and overtravel									
	Regenerative Processing	Built in. For 60 to 1A models, an external regenerative resistor must be mounted.									
	Overtravel (OT)	Motor is stopped by deceleration stopping when P-OT/N-OT or soft overtravel (P-SOT/N-SOT) is activated.									
	Protective Functions	Overcurrent, ground, overload, overvoltage, overspeed, overrun, origin error, hardware error, encoder error, excessive position error, and MECHATROLINK communication error									
	Indicators	LED of POWER, ALARM, CHARGE, MECHATROLINK communication									
	Others	Not available for Digital Operator or personal computer.									

2

2.7 Combined Specifications

The following specifications for combinations of SGDB SERVOPACKS and SGMG, SGMS, SGMD and SGMP Servomotors.

2.7.1 Standard Combinations

Table 2.7 SERVOPACK and Servomotor Combination Specifications.

SGMG Series	SERVOPACK Model SGDB-		05AN	10AN		15AN	20AN	30AN	50AN		60AN	
	Applicable Servomotor	Model SGMG-	03A□ B	06A□ B	09A□ B	12A□ B	20A□ B	30A□ B	44A□B		60A□B	
	Motor Capacity (kW)	0.3	0.6	0.9	1.2	2.0	3.0	4.4		6.0		
	Rated/Max. Motor Speed	1000/2000 r/min										
	Applicable Encoder	Standard: Incremental encoder at 8192 P/R										
	Allowable Load Inertia* (kg·m ² ×10 ⁻⁴) (oz·in·s ² ×10 ⁻³)	36.2 (513)	69.5 (984)	103 (1459)	159 (2252)	230 (3257)	338 (4786)	445 (6302)		625 (8851)		
	Continuous Output Current A (rms)	3.0	5.7	7.6	11.6	18.5	24.8	32.9		46.9		
	Maximum Output Current A (rms)	7.3	13.9	16.6	28	42	56	84		110		
SGMG Series	SERVOPACK Model SGDB-		05AN	10AN	15AN	20AN	30AN	50AN	60AN	75AN	1AAAN	1EAN
	Applicable Servomotor	Model SGMG-	05A□ A	09A□ A	13A□ A	20A□ A	30A□ A	44A□ A	55A□ A	75A□ A	1AA□ A	1EA□ A
	Motor Capacity (kW)	0.45	0.85	1.3	1.8	2.9	4.4	5.5	7.5	11	15	
	Rated/Max. Motor Speed	1500/3000 r/min								1500/2000 r/min		
	Applicable Encoder	Standard: Incremental encoder at 8192 P/R										
	Allowable Load Inertia* J _L (kg·m ² ×10 ⁻⁴) (oz·in·s ² ×10 ⁻³)	36.2 (513)	69.5 (984)	103 (1459)	159 (2252)	230 (3257)	338 (4786)	445 (6302)	625 (8851)	1405 (19896)	1575 (22304)	
	Continuous Output Current A (rms)	3.8	7.1	10.7	16.7	23.8	32.8	42.1	54.7	58.6	78.6	
	Maximum Output Current A (rms)	11	17	28	42	56	84	110	130	140	170	

Ratings and Characteristics

2.7.1 Standard Combinations

SGMD Series	SERVOPACK Model SGDB-	30AN	50AN	
	Applicable Servomotor	Model SGMD-	22A□A	32A□A
Motor Capacity (kW)		2.2	3.2	4.0
Rated/Max. Motor Speed		2000/3000 r/min		
Applicable Encoder		Standard: Absolute encoder at 1024 P/R		
Allowable Load Inertia* J_L ($\text{kg} \cdot \text{m}^2 \times 10^{-4}$) ($\text{oz} \cdot \text{in} \cdot \text{s}^2 \times 10^{-3}$)		255 (3611)	343 (4857)	431 (6103)
Continuous Output Current A (rms)		15.7	20.9	22.8
Maximum Output Current A (rms)		54	73	77

* The allowable load inertia is five times the SGMG and SGMD Servomotor's moment of inertia.



2

SERVOPACK Model SGDB-		10AN	15AN	20AN	30AN	50AN	
Applicable Servomotor	Model SGMS-	10A□A	15A□A	20A□A	30A□A	40A□A	50A□A
	Motor Capacity (kW)	1.0	1.5	2.0	3.0	4.0	5.0
	Rated/Max. Motor Speed	3000/4500 r/min					
	Applicable Encoder	Standard: Incremental encoder at 4096 P/R					
	Allowable Load Inertia* J_L ($\text{kg} \cdot \text{m}^2 \times 10^{-4}$) ($\text{oz} \cdot \text{in} \cdot \text{s}^2 \times 10^{-3}$)	8.7 (123)	12.4 (176)	16.0 (227)	35.0 (496)	48.0 (680)	62.0 (878)
Continuous Output Current A (rms)	5.7	9.5	12.4	18.8	24.3	28.2	
Maximum Output Current A (rms)	17	28	42	56	77	84	
SERVOPACK Model SGDB-		15AN					
Applicable Servomotor	Model SGMP-	15A□					
	Motor Capacity (kW)	1.5					
	Rated/Max. Motor Speed	3000/4500 r/min					
	Applicable Encoder	Standard: Incremental encoder at 2048 P/R					
	Allowable Load Inertia* J_L ($\text{kg} \cdot \text{m}^2 \times 10^{-4}$) ($\text{oz} \cdot \text{in} \cdot \text{s}^2 \times 10^{-3}$)	20.2 (286)					
Continuous Output Current A (rms)	7.5						
Maximum Output Current A (rms)	23.0						

* The allowable load inertia is five times the SGMG and SGMD Servomotor's moment of inertia.

2.7.2 Peripheral Device Combinations

Table 2.8 Peripheral Device Combinations

SERVOPACK Model	Applicable Servomotor Model	Power Supply Capacity per SERVOPACK ^{*1} (kVA)	MCCB or Fuse Power Supply Capacity ^{*2} (A)	Applicable Noise Filter (Reference Filter Structure)	Recommended Noise Filter ^{*3}	Power ON/OFF Contactor
SGDB-05AN	SGMG-03A□B	0.65	5	(Applicable) 	LF-310 (10 A)	HI-15E5 (30 A)
	SGMG-05A□A	1.1				
	SGMP-04A					
	SGM-04A					
SGDB-10AN	SGMG-06A□B	1.5	8		LF-315 (15 A)	
	SGMG-09A□A	2.0				
	SGMG-09A□B					
	SGMS-10A□A					
	SGMP-08A					
	SGM-08A					
SGDB-15AN	SGMG-13A□A	2.5	10			
	SGMG-12A□B					
	SGMS-15A□A					
	SGMP-15A					
SGDB-20AN	SGMG-20A□A	4.0	12	(Not applicable) 	LF-320 (20 A)	HI-18E (35 A)
	SGMG-20A□B					
	SGMS-20A□A					
SGDB-30AN	SGMG-30A□A	5.0	18		LF-330 (30 A)	
	SGMG-30A□B					
	SGMS-30A□A					
	SGMD-22A□A					
SGDB-50AN	SGMD-32A□A	7.0	24		LF-340 (40 A)	
	SGMG-44A□A					
	SGMG-44A□B					
	SGMS-40A□A					
	SGMD-40A□A	7.5	28			
	SGMS-50A□A					
SGDB-60AN	SGMG-55A□A	12.5	32		LF-350 (50 A)	
	SGMG-60A□A					
SGDB-75AN	SGMG-75A	15.0	41		LF-360 (60 A)	HI-30E (65 A)
SGDB-1AAN	SGMG-1AA	19.0	60		LF-380K (80 A)	HI-35E (65 A)
SGDB-1EAN	SGMG-1EA	30.0	80		FN258-100	HI-50E (100 A)

* 1. Values for the rated load

* 2. Shut off characteristics (at 25°C): 200%: 2 s min., 700%: 0.01 s min.

* 3. A Tokin Corp. noise filter or a SCHAFFNER noise filter (FN258-100) is recommended. Tokin Corp. noise filters are available from Yaskawa Control Co.,

3

Servodrive Characteristics

3

This chapter provides information on the characteristics of SERVOPACKS and Servomotors.

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3.1 Overload Characteristics

The SERVOPACK has a built-in overload protective function to protect the SERVOPACK and Servomotor from overload. Allowable power for the SERVOPACK is therefore limited by the overload protective function as shown in *Fig. 3.1*.

The overload detection level quoted under hot start conditions at a motor ambient temperature of 40°C cannot be modified.

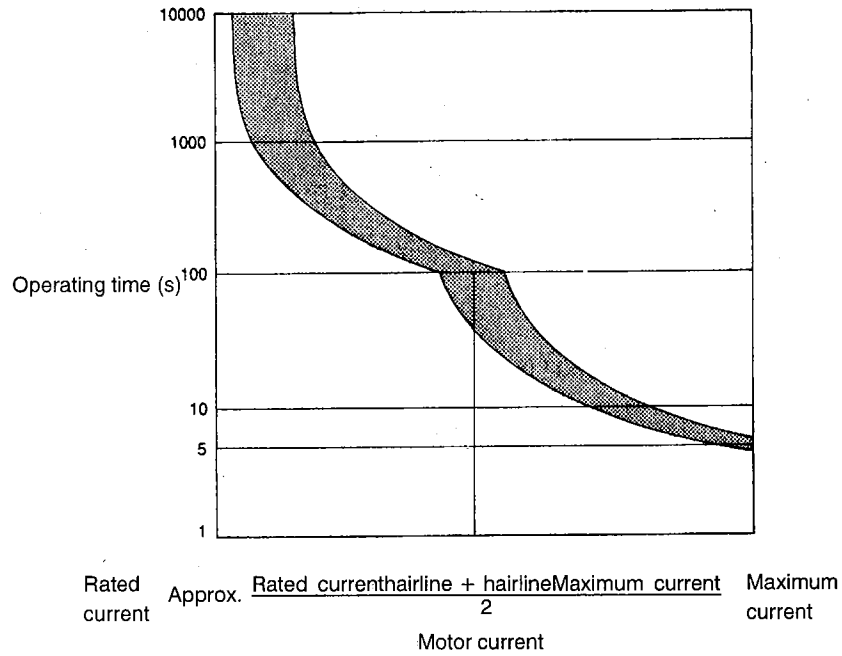


Figure 3.1 Overload Characteristics

3.2 Starting and Stopping Time

The motor starting (t_r) and stopping time (t_f) with a constant load are calculated using the following equations. Motor viscous torque and friction torque have been ignored.

$$\text{Starting time: } t_r = 104.7 \times \frac{N_R(J_M + J_L)}{K_t \cdot I_R(\alpha - \beta)} [\text{ms}]$$

$$\text{Stopping time: } t_f = 104.7 \times \frac{N_R(J_M + J_L)}{K_t \cdot I_R(\alpha + \beta)} [\text{ms}]$$

N_R : Rated motor speed (r/min)

J_M : Motor moment of inertia (kg/m^2)...(GD $^2_M/4$)

J_L : Load converted to shaft moment of inertia (kg/m^2)...(GD $^2_L/4$)

T_{PM} : Maximum instantaneous motor torque obtained in combination with SERVOPACK (N·m)

T_L : Load torque (N·m)

3

To convert the motor current value into an equivalent torque value, use the following formula:
Motor torque constant \times motor current value (effective value)

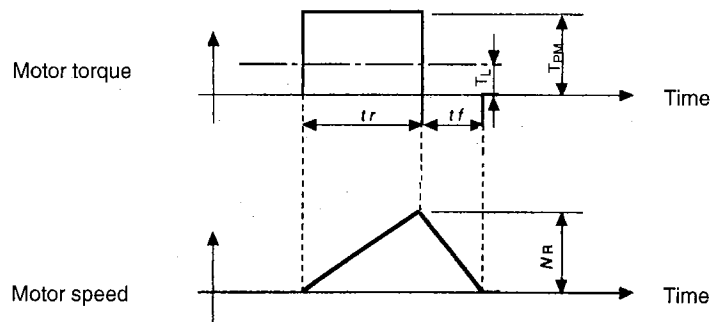


Figure 3.2 Motor Torque – Motor Speed Timing Chart

3.3 Allowable Repeatability

Running and stopping repeatability are limited by the Servomotor.

3.3.1 Allowable Repeatability as Limited by the Servomotor

Running and stopping repeatability vary with motor conditions, such as the load conditions and running time. A typical example is given below (See 3.2 "Starting and Stopping Time" for details on symbols.).

■ With Motor Idling or Stopped

The most common example is the operating cycle shown in Fig. 3.3 where rms frequency for motor armature current is lower than the rated motor current. If we assume that T is the operating cycle, then the range for T will satisfy the following equation.

$$T \geq \frac{I_p^2 (tr + tf) + I_L^2 ts}{I_R^2} \quad (s)$$

I_R : Motor rated current (A)

$\alpha = I_p/I_R$: Acceleration/deceleration current coefficient

[I_p : Acceleration/deceleration current (acceleration/deceleration current α times larger than motor rated current) (A)]

$\beta = I_L/I_R$: Load current coefficient

[I_L : Current equivalent to load torque (load current β times larger than motor rated current) (A)]

Find I_p , tr , and tf that satisfy the equation above when cycle time (T) is already known.

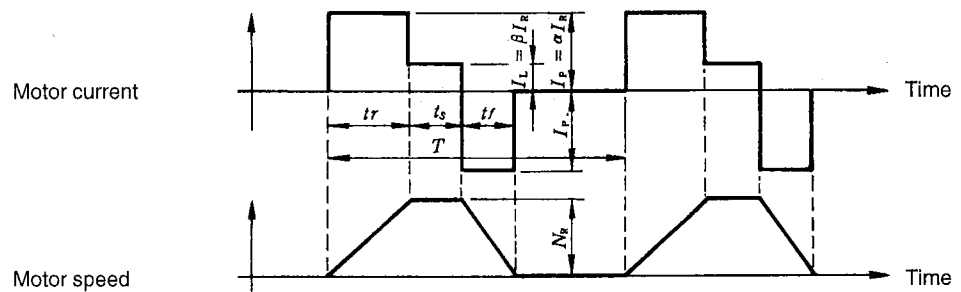


Figure 3.3 Motor Current – Motor Speed Timing Chart

■ With Motor Stopped without Idling Except during Acceleration or Deceleration

The timing chart for motor armature current and motor speed is shown in Fig. 3.4. If we assume that allowable repeatability is n , then n can be found using the equation given below.

$$n = 286.5 \times \frac{T_R}{N_R(J_M + J_L)} (1/\alpha - \beta^2/\alpha^3) \quad [\text{times per minute}]$$

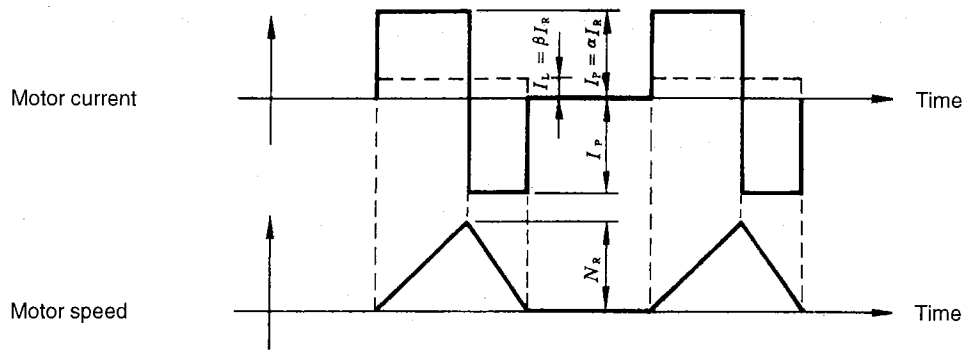


Figure 3.4 Motor Current - Motor Speed Timing Chart

■ With Motor Constantly Cycling through Acceleration, Idling, and Deceleration without Stopping

The timing chart for motor armature current and motor speed is shown in Fig 3.5. If we assume that allowable repeatability is n (times per minute), then n can be found using the equation given below.

3

$$n = 286.5 \times \frac{T_R}{N_R(J_M + J_L)} (1/\alpha - \beta^2/\alpha) \text{ [times per minute]}$$

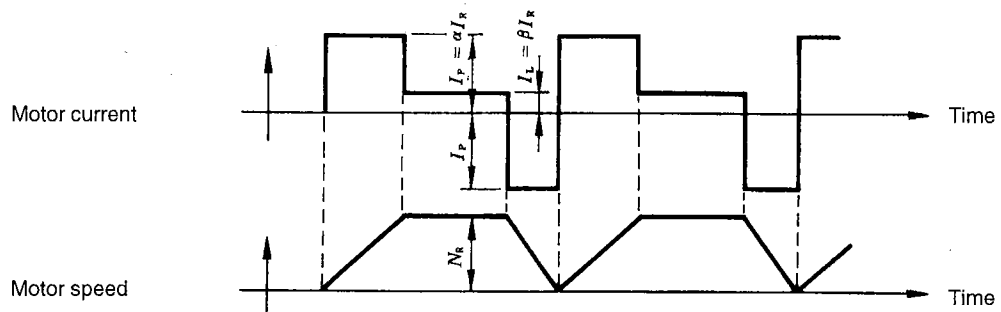


Figure 3.5 Motor Current - Motor Speed Timing Chart

3.4 Large-amplitude Frequency Characteristics

When looking at frequency characteristics with a SERVOPACK and Motor combination, the motor speed amplitude is limited by the peak current through the SERVOPACK. The relationship between motor speed (N) and frequency (f) is expressed using the equation given below.

$$N = 1.52 \times \frac{\alpha \cdot T_R}{(J_M + J_L)f} [r/min]$$

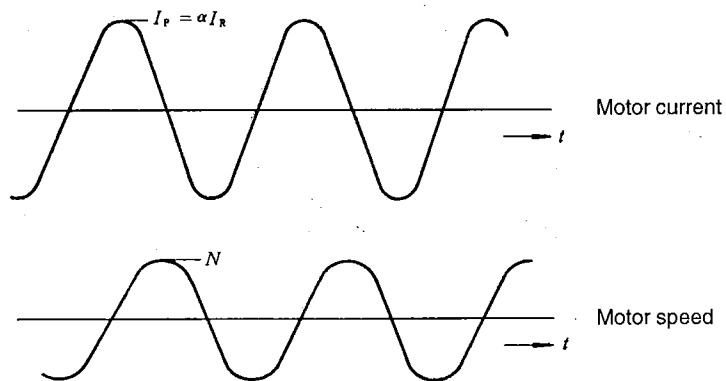


Figure 3.6 Motor Current – Motor Speed Timing Chart

3

3.5 Mechanical Characteristics

3.5.1 Mechanical Strength

An AC Servomotor can withstand instantaneous peak torque on the output shaft of up to 300% of the motor rating.

3.5.2 Allowable Radial and Thrust Load

The output shaft allowable loads of AC Servomotors are shown below.

Use mechanical designs where thrust and radial loads do not exceed the values below during motor operation.

Table 3.1 Allowable Radial Load, Allowable Thrust Load for SGM Servomotors

Servomotor Type	Allowable Radial Load Fr [N(lb)]	Allowable Thrust Load Fs [N(lb)]	LR [mm (in)]	Reference Diagram
SGMG-05A□A	490 (110)	98 (22)	58 (2.28)	
-09A□A	490 (110)	98 (22)		
-13A□A	686 (154)	343 (77)		
-20A□A	1176 (265)	490 (110)	79 (3.11)	
-30A□A	1470 (331)	490 (110)		
-44A□A	1470 (331)	490 (110)		
-55A□A	1764 (397)	588 (132)	113 (44.49)	
-75A□A	1764 (397)	588 (132)		
-1AA□A	1764 (397)	588 (132)	116 (4.57)	
-1EA□A	4998 (1125)	2156 (485)		
SGMG-03A□B	490 (110)	98 (22)	58 (2.28)	
-06A□B	490 (110)	98 (22)		
-09A□B	686 (154)	343 (77)		
-12A□B	1176 (265)	490 (110)	79 (3.11)	
-20A□B	1470 (331)	490 (110)		
-30A□B	1470 (331)	490 (110)		
-44A□B	1764 (397)	588 (132)	113 (44.49)	
-60A□B	1764 (397)	588 (132)		
SGMS-10A	686 (154)	196 (44)	45 (1.77)	
-15A	686 (154)	196 (44)		
-20A	686 (154)	196 (44)		
-30A	980 (221)	392 (88)	63 (2.48)	
-44A	1176 (265)	392 (88)		
-50A	1176 (265)	392 (88)		
SGMD-22A	1176 (265)	490 (110)	55 (2.17)	
-32A	1176 (265)	490 (110)		
-40A	1176 (265)	490 (110)	65 (2.56)	
SGMP-15A	490 (110)	147 (33)	35 (1.38)	

Note Radial and thrust load limit value are the sum of the loads generated by the motor torque and external loads applied to the shaft.

3.5.3 Mechanical Tolerances

Tolerances for AC Servomotor output shaft and installation are shown in *Table 3.2*.

Table 3.2 Mechanical Tolerances

Tolerance (T.I.R.)		Reference Diagram
Perpendicularity between the flange face and output shaft	0.04 mm (0.0016 in) (A)	
Mating concentricity of flange O.D.	0.04 mm (0.0016 in) (B)	
Run-out at the end of the shaft	0.02 mm (0.0008 in) (C)	

Note T.I.R. = Total Indicator Reading

3.5.4 Direction of Motor Rotation

AC Servomotor rotation when a positive direction instruction (and direction instruction) is input is counterclockwise as viewed from the load end of the shaft.

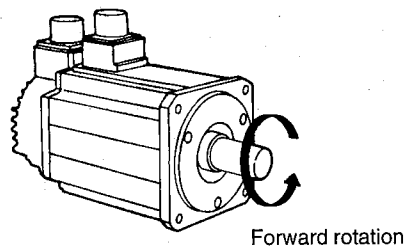


Figure 3.7 Direction of Rotation for Positive Direction Instruction Input

3.5.5 Impact Resistance

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

- Impact Acceleration: 490 m/s² (50 G)
 - Number of Impacts: 2
- (SGMP-15A)
- Impact Acceleration: 98 m/s² (10 G)

3

- Number of Impacts: 2

Since a precision detector is attached to the shaft at the end opposite the load end, do not subject the shaft to direct impact as this may damage the encoder.

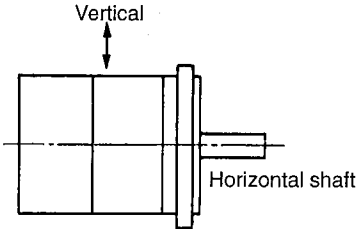


Figure 3.8 Impact Measurement

3.5.6 Vibration Resistance

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The Servomotor will withstand a vibration acceleration of 24.5 m/s^2 (2.5 G) in the vertical, transverse, and longitudinal directions (See Fig. 3.9) when the axis of the Servomotor is mounted horizontally.

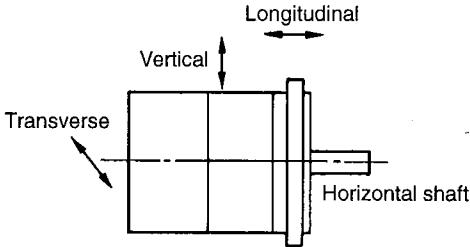


Figure 3.9 Vibration Resistance Measurement

3.5.7 Vibration Class

The vibration class of the AC Servomotor is $15 \mu\text{m}$ or below at the rated speed (See Fig. 3.10).

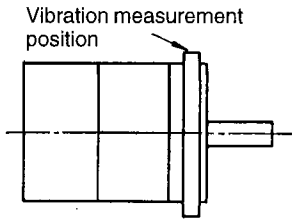


Figure 3.10 Vibration Measurement

SGM□ Servomotors have a precision encoder on the end of the shaft opposite the load. Do not apply shock directly to the shaft; direct shock can damage this encoder.

4

Configuration and Connections

This chapter provides information on the configuration and connections of Servodrives.

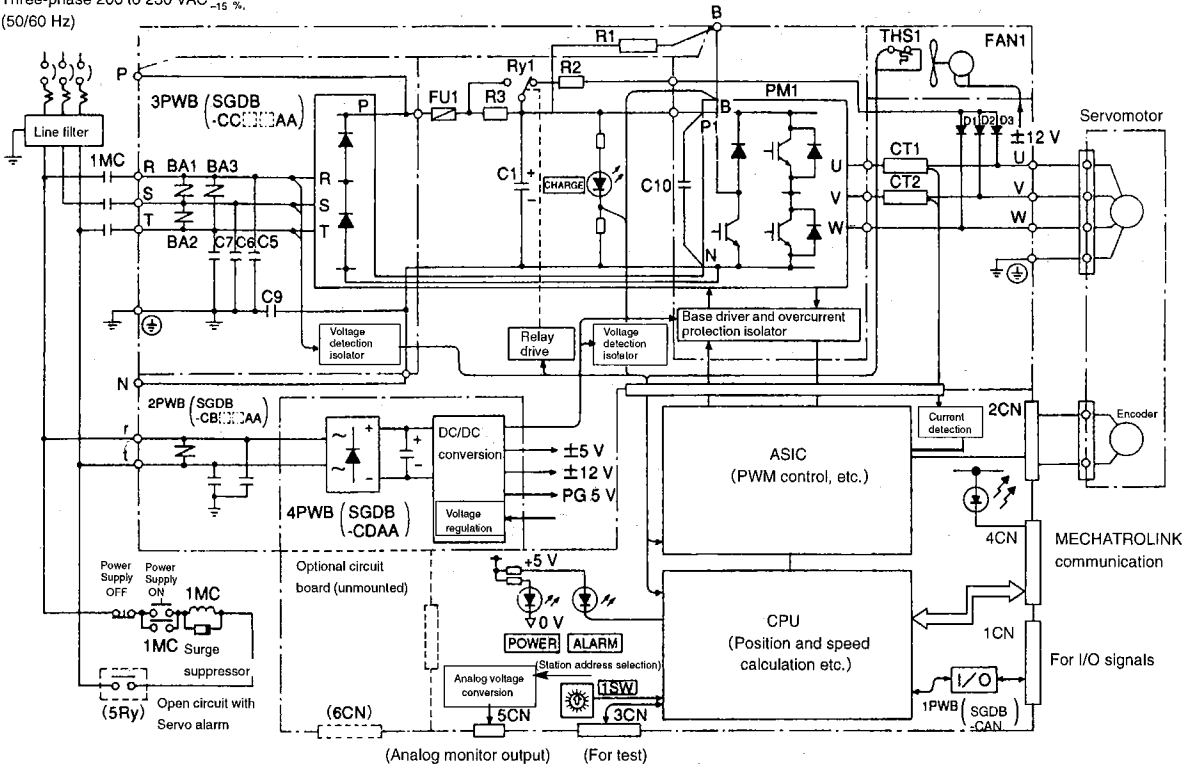
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4.1 Internal Connection Diagram

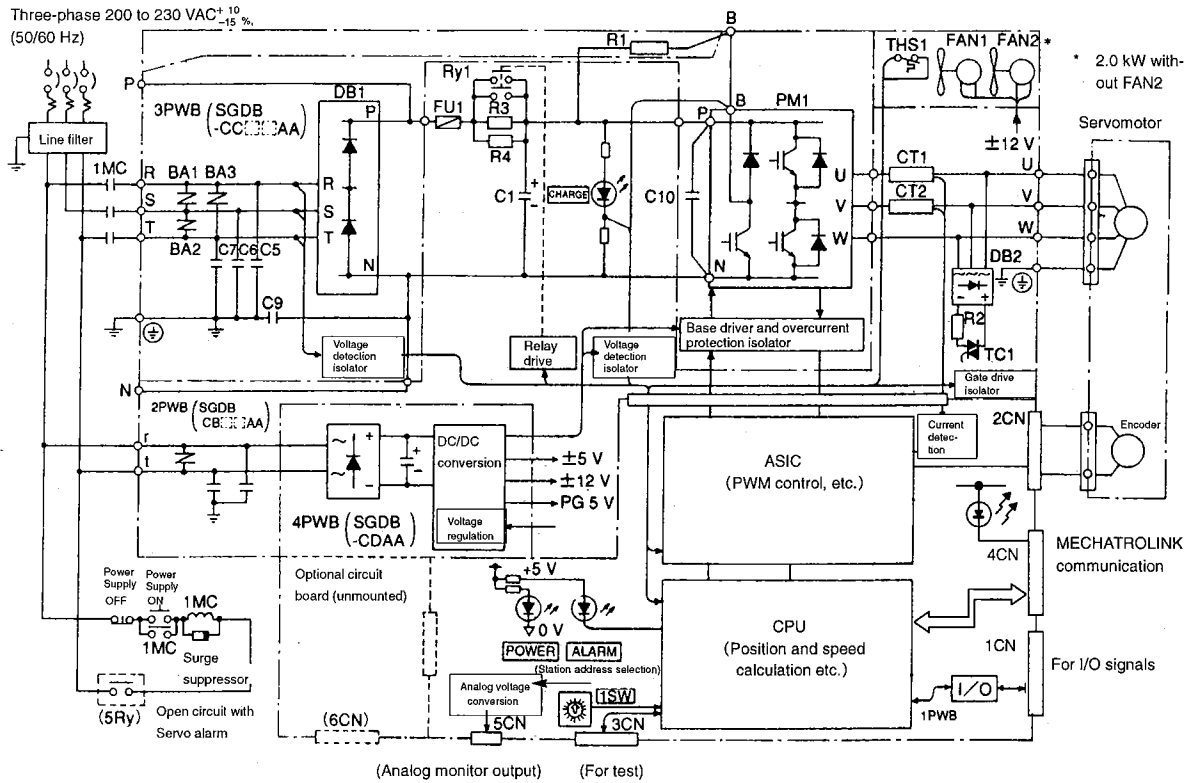
4.1.1 0.5 kW to 1.5 kW Servodrives

Three-phase 200 to 230 VAC^{+10%}
^{-15%}
 (50/60 Hz)



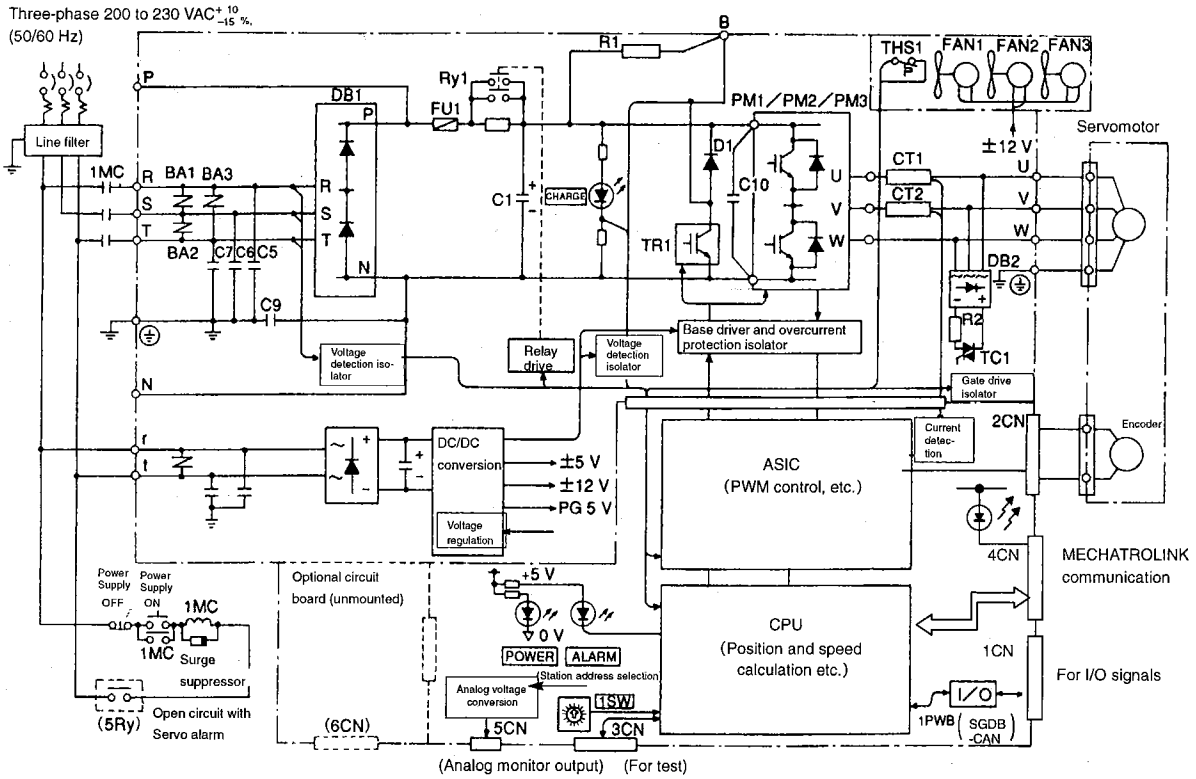
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4.1.2 2.0 kW to 3.0 kW Servodrives

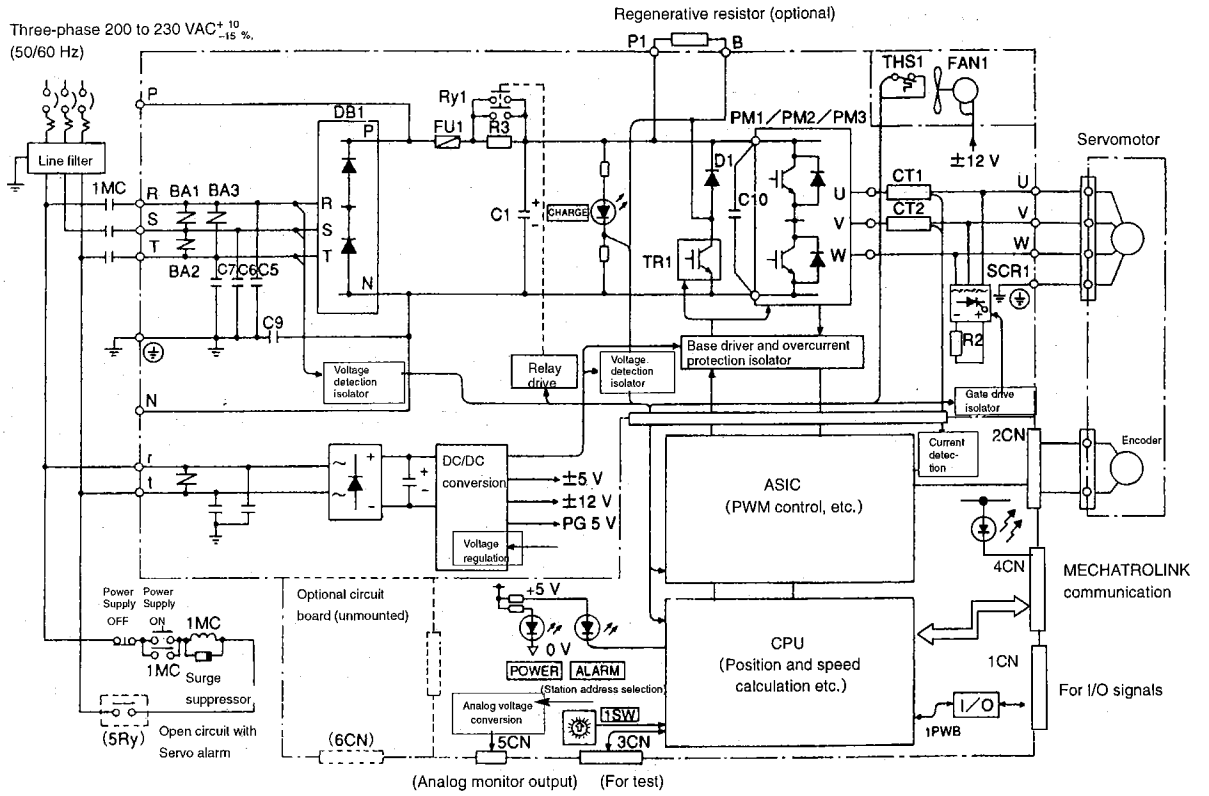


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4.1.3 5.0 kW Servodrive



4.1.4 6.0 kW to 15.0 kW Servodrives



4

4.2 Name and Description of Main Circuit Terminals

Table 4.1 Name and Description of Main Circuit Terminals

Terminal Signal	Name	Description
R, S, T	Main circuit power supply input terminal	Three-phase 200 to 230 VAC $\begin{matrix} +10 \\ -15 \end{matrix}$ %, 50/60 Hz
U, V, W	Motor terminal	Connects to the Servomotor.
r, t	Control power supply input terminal	Single-phase 200 to 230 VAC $\begin{matrix} +10 \\ -15 \end{matrix}$ %, 50/60 Hz
$\oplus \times 2$	Ground terminal	Connects to ground (for grounding the power supply and Servomotor).
P, B	Regenerative resistor unit terminal	SERVOPACK with 5 kW or less capacity (external connection is usually not needed.)
P1, B	Regenerative resistor unit terminal	SERVOPACKS with 6 kW or higher capacity
N	Main circuit negative terminal	External connection is usually not needed.

Note SERVOPACKS with 5 kW or less capacity do not have a P1 terminal.

4

4.3 Applicable Receptacles

4.3.1 1CN Connector for I/O Signals

Table 4.2 Specifications for Applicable SERVOPACK I/O Signal Receptacles

Specifications for SERVOPACK Connector	Applicable Receptacle Model		
	Solder	Case	Manufacturer
10226-52A2JL (Product of SUMITOMO 3M Co., Ltd.), 26 pin right angle	10126-3000VE	10326-52A0-008	SUMITOMO 3M Co., Ltd.

4.3.2 2CN Connector for Encoder

Table 4.3 Applicable Receptacle and Cable Specifications

Specifications for SERVOPACK Connector	Applicable Receptacle Model			Cable Specifications (see note)
	Solder	Case	Manufacturer	
10220-52A2JL (Product of SUMITOMO 3M Co.,Ltd.), 20 pin right angle	10120-3000VE	10320-52A0-008	SUMITOMO 3M Co., Ltd.	See 9.3 "Cables".

Note This cable is available from Yaskawa. Refer to 9.3 "Cables" for more details on cables.

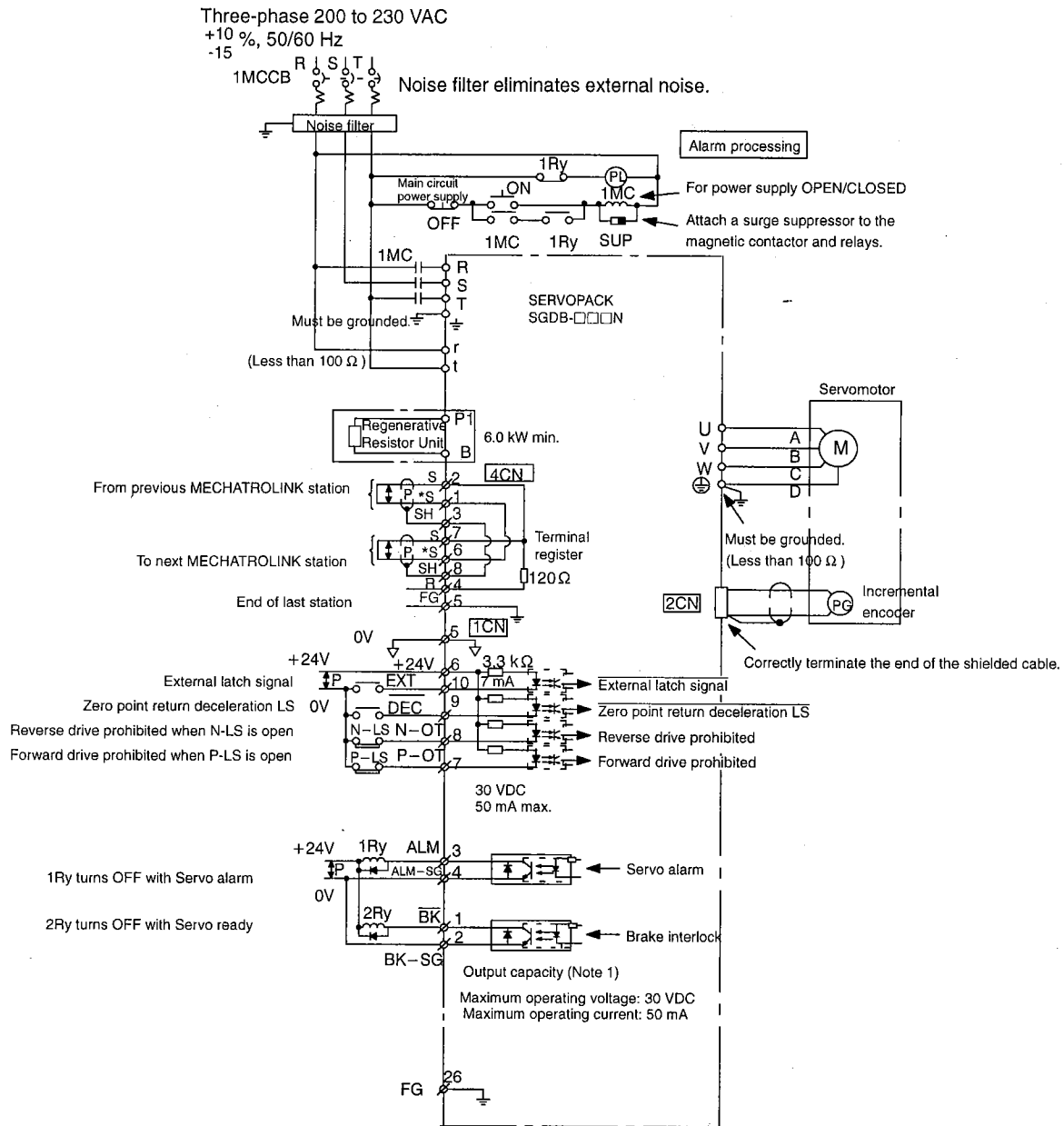
4.3.3 4CN Connector for MECHATROLINK Communication

Table 4.4 Applicable Receptacle

Specifications for SERVOPACK Connector	Applicable Receptacle Model		
	Solder	Case	Manufacturer
MR-8RMD2 (Product of Honda Tsushin Industry Co., Ltd.), 8-pin right angle	MR-8F	MR-8L	Honda Tsushin Industry Co., Ltd.

4.4 Connecting an Incremental Encoder

4.4.1 Typical Example



4

Note 1. Maximum capacity of each output circuit is 30 VDC and 50 mA.

2. Signal output line \boxed{P} represents twisted-pair wires.
3. The 24 VDC power supply (I/O power supply) must be supplied by the user.
4. The power supply must be ON while the servo alarm (1Ry) remains OFF till the communication connection (CONNECT command) is completed after the control power is turned ON.
5. SERVOPACK model SGDB-60 to -1E require a regenerative resistor (externally mounted option).

Figure 4.1 Example: SGDB-□□□N SERVOPACK Connection to Motor and Peripheral Device

4.4.2 1CN I/O Connector Terminals

■ Terminal Layout

Table 4.5 1CN Terminal Layout

2	4	6	8	10	12	
SG-BK	SG-ALM	+24 V IN	N-OT	EXT	-	
Signal ground for brake out	Signal ground for servo alarm	I/O power supply input	Reverse drive prohibited input	External latch signal input	-	
1	3	5	7	9	11	13
/BK	ALM	-	P-OT	DEC	-	-
Brake interlock signal output	Servo alarm output	-	Forward drive prohibited input	Zero point return deceleration LS input	-	-
15	17	19	21	23	25	
-	-	-	-	-	-	
-	-	-	-	-	-	
14	16	18	20	22	24	26
-	-	-	-	-	-	FG
-	-	-	-	-	-	Frame ground

Note 1. Do not connect any terminals marked with “-”.

2. Do not use vacant pins for relay or other purposes.