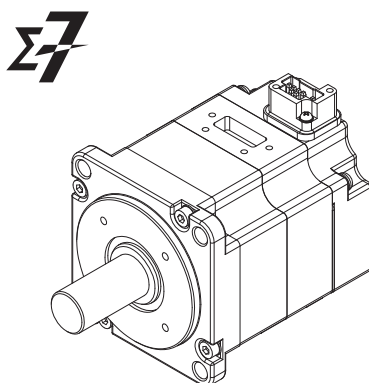


YASKAWA

Σ-7-Series AC Servo Drive Rotary Servomotor Product Manual

Model: SGM7M/SGM7J/SGM7A/SGM7P/SGM7G/SGMMV



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MANUAL NO. SIEP S800001 36J

About this Manual

This manual provides information required to select, install, connect, and maintain Rotary Servomotors for Σ -7-Series AC Servo Drives.

Read and understand this manual to ensure correct usage of the Σ -7-Series AC Servo Drives.

Keep this manual in a safe place so that it can be referred to whenever necessary.

Outline of Manual

The contents of the chapters of this manual are described in the following table.

Refer to these chapters as required.

Chapter	Chapter Title	Contents
1	Basic Information on Servomotors	Provides basic information on Rotary Servomotors, including Servomotor part names and combinations with SERVOPACKs.
2	Capacity Selection	Describes calculation methods to use when selecting Servomotor capacities.
3	Specifications, Ratings, and External Dimensions of SGM7M Servomotors	Describes how to interpret the model numbers of SGM7M Servomotors and gives their specifications, ratings, and external dimensions.
4	Specifications, Ratings, and External Dimensions of SGM7J Servomotors	Describes how to interpret the model numbers of SGM7J Servomotors and gives their specifications, ratings, and external dimensions.
5	Specifications, Ratings, and External Dimensions of SGM7A Servomotors	Describes how to interpret the model numbers of SGM7A Servomotors and gives their specifications, ratings, and external dimensions.
6	Specifications, Ratings, and External Dimensions of SGM7P Servomotors	Describes how to interpret the model numbers of SGM7P Servomotors and gives their specifications, ratings, and external dimensions.
7	Specifications, Ratings, and External Dimensions of SGM7G Servomotors	Describes how to interpret the model numbers of SGM7G Servomotors and gives their specifications, ratings, and external dimensions.
8	Specifications, Ratings, and External Dimensions of SGMMV Servomotors	Describes how to interpret the model numbers of SGMMV Servomotors and gives their specifications, ratings, and external dimensions.
9	Servomotor Installation	Describes the installation conditions, procedures, and precautions for Servomotors.
10	Connections between Servomotors and SERVOPACKs	Describes the cables that are used to connect the Servomotors and SERVOPACKs and provides related precautions.
11	Maintenance and Inspection	Describes the maintenance, inspection, and disposal of a Servomotor.
12	Appendices	Provide additional information on Servomotors with Gears and reference information on selecting Servomotor capacity.

1.2 Interpreting the Nameplates

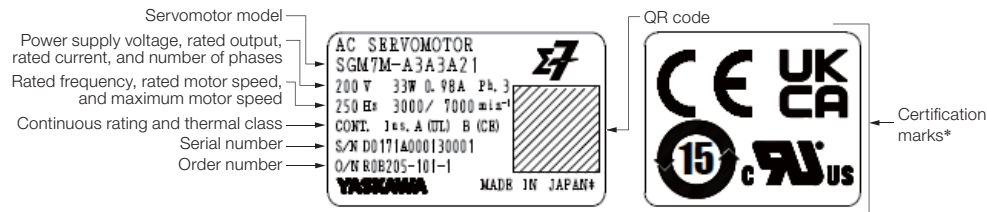
1.2.1 SGM7M Servomotors

1.2 Interpreting the Nameplates

The following basic information is provided on the nameplate.

1.2.1 SGM7M Servomotors

A nameplate containing the following information is attached to the Servomotor.

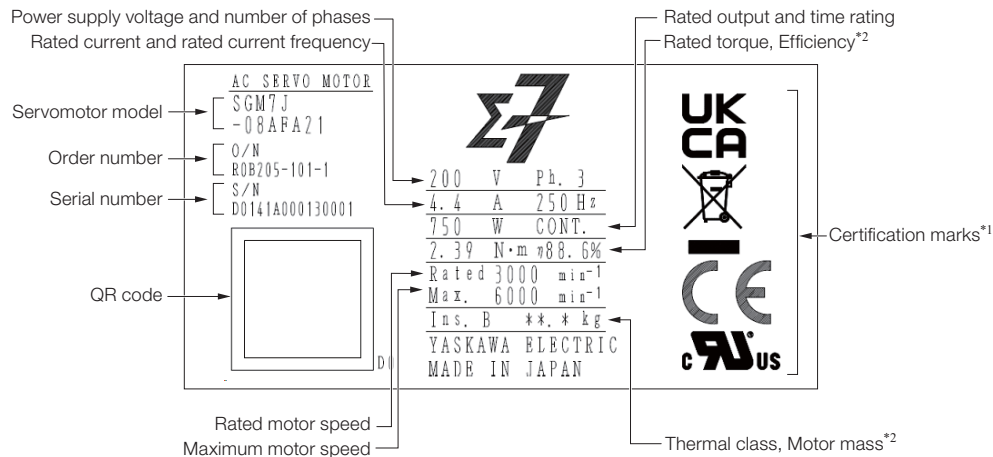


* Certification marks for the standards for which the Servomotor has been certified by certification bodies are shown on the product.

1.2.2 SGM7J, SGM7A, SGM7P, and SGM7G Servomotors

The nameplate is printed on the Servomotor.

The layout of the nameplate depends somewhat on the model of the Servomotor.



*1. Certification marks for the standards for which the Servomotor has been certified by certification bodies are shown on the product.

*2. These values are displayed only when required by the standards.

1.3 Outline of Model Designations

1.3.1 Servomotor

1.3 Outline of Model Designations

1.3.1 Servomotor

This section outlines the model numbers of Σ -7-Series Servomotors. For details, refer to the chapter for your type of Servomotor.

SGM□□- 01 A F A 2 1

Series 1st+2nd digits 3rd digit 4th digit 5th digit 6th digit 7th digit

Series	Specifications	Reference
SGM7M	Low inertia, ultra-small capacity	Chapter 3
SGM7J	Medium inertia, high speed	Chapter 4
SGM7A	Low inertia, high speed	Chapter 5
SGM7P	Medium inertia, flat	Chapter 6
SGM7G	Medium inertia, low speed, high torque	Chapter 7
SGMMV	Low inertia, ultra-small capacity	Chapter 8

1st+2nd digits Rated Output

3rd digit Power Supply Voltage

- 200 VAC
- 24 VDC/48 VDC*

4th digit Serial Encoder Specification

- 17-bit absolute encoder
- 20-bit absolute encoder
- 24-bit batteryless absolute encoder
- 24-bit absolute encoder
- 24-bit incremental encoder

5th digit Design Revision Order

6th digit Shaft End Specification

- Straight without key
- Straight with key and tap
- With flat seat
- With two flat seats

7th digit Options

- With 24-V holding brake
- With oil seal

* This specification must be used with SGD V SERVOPACKs (Σ -V Series).

1.3.2 SERVOPACKs

This section outlines the model numbers of Σ -7-Series SERVOPACKs. For details, refer to the manual for your SERVOPACK.

- Σ-7-Series Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual (Manual No.: SIEP S800001 26)
- Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-II Communications References Product Manual (Manual No.: SIEP S800001 27)
- Σ-7-Series Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 28)
- Σ-7-Series Σ-7W SERVOPACK with MECHATROLINK-III Communications References Product Manual (Manual No.: SIEP S800001 29)

SGD7□ - R70 A 00 A 000

Series 1st+2nd+3rd digits 4th digit 5th+6th digits 7th digit 8th+9th+10th digits

Series	Specification
SGD7S	Single-axis SERVOPACKs
SGD7W	Two-axis SERVOPACKs

1st+2nd+3rd digits Maximum Applicable Motor Capacity

0.05 kW to 15 kW

4th digit Power Supply Voltage

- 200 VAC

5th+6th digits Interface

- Analog voltage/pulse train reference
- MECHATROLINK-II communications reference
- MECHATROLINK-III communications reference

7th digit Design Revision Order

8th+9th+10th digits Options

- Rack-mounted installation
- Varnished

SGM7M Servomotors with DC power supply input must be used with SGD V SERVOPACKs (Σ -V Series). For details, refer to the manual for your SERVOPACK.

- DC Power Input Σ -V Series User's Manual, Design and Maintenance, Rotational Motor, Analog Voltage Reference and Pulse Train Reference (Manual No.: SIEP S800000 81)
- DC Power Input Σ -V Series User's Manual, Design and Maintenance, Rotational Motor, MECHATROLINK-II Communications Reference (Manual No.: SIEP S800000 82)
- DC Power Input Σ -V Series User's Manual, Design and Maintenance, Rotational Motor, MECHATROLINK-III Communications Reference (Manual No.: SIEP S800000 83)
- Σ -V-MD Series User's Manual, Type A01/A02, Rotational Motor, MECHATROLINK-III Communications References (Manual No.: SIEP S800001 02)

1.4 Combinations of Servomotors and SERVOPACKs

1.4.1 Combination of Servomotors and SERVOPACKs for AC Power Input

1.4 Combinations of Servomotors and SERVOPACKs

1.4.1 Combination of Servomotors and SERVOPACKs for AC Power Input

Rotary Servomotor Model		Capacity	SERVOPACK Model			
			SGD7S-□□□□	SGD7W-□□□□	SGD7C-□□□□	
SGM7M (Low inertia, ultra-small capacity) 3000 min ⁻¹	SGM7M-A1A	11 W	R90A, R90F	1R6A* ¹ , 2R8A* ¹	—	
	SGM7M-A2A	22 W				
	SGM7M-A3A	33 W	1R6A, 2R1F	1R6A, 2R8A* ¹		
SGM7J (Medium inertia, high speed) 3000 min ⁻¹	SGM7J-A5A	50 W	R70A, R70F	1R6A* ¹ , 2R8A* ¹		
	SGM7J-01A	100 W	R90A, R90F			
	SGM7J-C2A	150 W	1R6A, 2R1F	1R6A, 2R8A* ¹		
	SGM7J-02A	200 W				
	SGM7J-04A	400 W	2R8A, 2R8F	2R8A, 5R5A* ¹ , 7R6A* ¹		
	SGM7J-06A	600 W	5R5A	5R5A, 7R6A		
	SGM7J-08A	750 W				
SGM7A (Low inertia, high speed) 3000 min ⁻¹	SGM7A-A5A	50 W	R70A, R70F	1R6A* ¹ , 2R8A* ¹		
	SGM7A-01A	100 W	R90A, R90F			
	SGM7A-C2A	150 W	1R6A, 2R1F	1R6A, 2R8A* ¹		
	SGM7A-02A	200 W				
	SGM7A-04A	400 W	2R8A, 2R8F	2R8A, 5R5A* ¹ , 7R6A* ¹		
	SGM7A-06A	600 W	5R5A	5R5A, 7R6A		
	SGM7A-08A	750 W				
	SGM7A-10A	1.0 kW	120A	—		
	SGM7A-15A	1.5 kW				
	SGM7A-20A	2.0 kW	180A			
	SGM7A-25A	2.5 kW				
	SGM7A-30A	3.0 kW	200A			
	SGM7A-40A	4.0 kW				
	SGM7A-50A	5.0 kW	330A			
	SGM7A-70A	7.0 kW				
SGM7P (Medium inertia, flat type) 3000min ⁻¹	SGM7P-01A	100 W	R90A, R90F	1R6A* ¹ , 2R8A* ¹		
	SGM7P-02A	200 W	2R8A, 2R1F	2R8A, 5R5A* ¹ , 7R6A* ¹		
	SGM7P-04A	400 W	2R8A, 2R8F			
	SGM7P-08A	750 W	5R5A	5R5A, 7R6A		
	SGM7P-15A	1.5 kW	120A	—		
SGM7G (Medium inertia, low speed, large torque) 1500 min ⁻¹	SGM7G-03A	300 W	3R8A	5R5A* ¹ , 7R6A* ¹		
	SGM7G-05A	450 W				
	SGM7G-09A	850 W	7R6A			
	SGM7G-13A	1.3 kW	120A	—		
	SGM7G-20A	1.8 kW	180A			
	SGM7G-30A	2.9 kW* ²	330A			
	SGM7G-44A	4.4 kW				
	SGM7G-55A	5.5 kW	470A			
	SGM7G-75A	7.5 kW	550A			
	SGM7G-1AA	11 kW	590A			
SGM7G-1EA	15 kW	780A				

Continued on next page.

Basic Information on Servomotors

1

4.1 Model Designations

4.1.1 Without Gears

4.1 Model Designations

4.1.1 Without Gears

SGM7J - 01 A 7 A 2 1

Σ-7 Series
Servomotors:
SGM7J

1st+2nd digits Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC

4th digit Serial Encoder

Code	Specification
6	24-bit batteryless absolute
7	24-bit absolute
F	24-bit incremental

5th digit Design Revision Order

A

6th digit Shaft End

Code	Specification
2	Straight without key
6	Straight with key and tap
B	With two flat seats

7th digit Options

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

4.1.2 With Gears

SGM7J - 01 A 7 A H 1 2 1

Σ-7 Series
Servomotors:
SGM7J

1st+2nd digits Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC

4th digit Serial Encoder

Code	Specification
6	24-bit batteryless absolute
7	24-bit absolute
F	24-bit incremental

5th digit Design Revision Order

A

6th digit Gear Type

Code	Specification
H	HDS planetary low-backlash gear

7th digit Gear Ratio

Code	Specification
B	1/11 ^{*1}
C	1/21
1	1/5
2	1/9 ^{*2}
7	1/33

*1. This specification is not supported for models with a rated output of 50 W.

*2. This specification is supported only for models with a rated output of 50 W.

8th digit Shaft End

Code	Specification
0	Flange output
2	Straight without key
6	Straight with key and tap

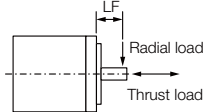
9th digit Options

Code	Specification
1	Without options
C	With holding brake (24 VDC)

4.2 Specifications and Ratings

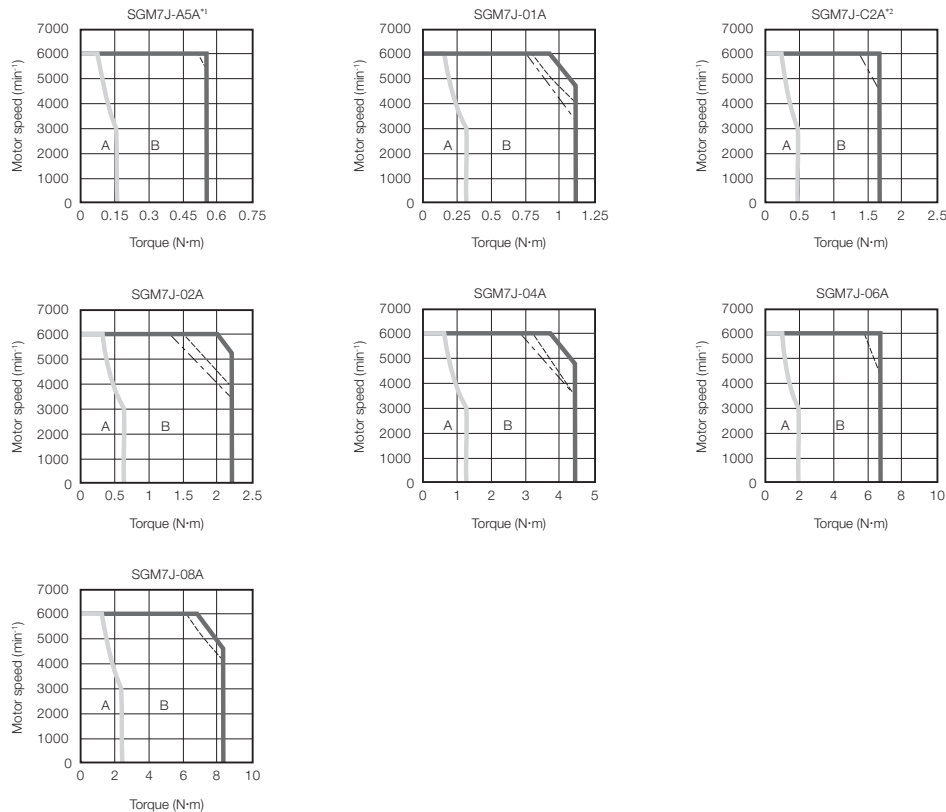
4.2.3 Torque-Motor Speed Characteristics

- *5. Observe the following precautions if you use a Servomotor with a Holding Brake.
 - The holding brake cannot be used to stop the Servomotor.
 - The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
 - The 24-VDC power supply is not provided by Yaskawa.
- *6. The motor moment of inertia scaling factor is the value for a standard Servomotor without a Holding Brake.
- *7. To externally connect a dynamic brake resistor, select hardware option specification Q20 for the SERVOPACK. However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).
 - SGD7S-R70□□□A020 to -2R8□□□A020
 - SGD7W-1R6A20A020 to -2R8A20A020
 - SGD7C-1R6MAA020 to -2R8MAA020
- *8. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table.



4.2.3 Torque-Motor Speed Characteristics

- [A] : Continuous duty zone (solid lines): With three-phase 200-V or single-phase 230-V input
 [B] : Intermittent duty zone (dotted lines): With single-phase 200-V input
 (dashed-dotted lines): With single-phase 100-V input



*1. The characteristics are the same for a single-phase 200-V and single-phase 100-V input.

*2. The characteristics are the same for three-phase 200-V and single-phase 200-V input.

Note: 1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.

2. The characteristics in the intermittent duty zone depend on the power supply voltage.

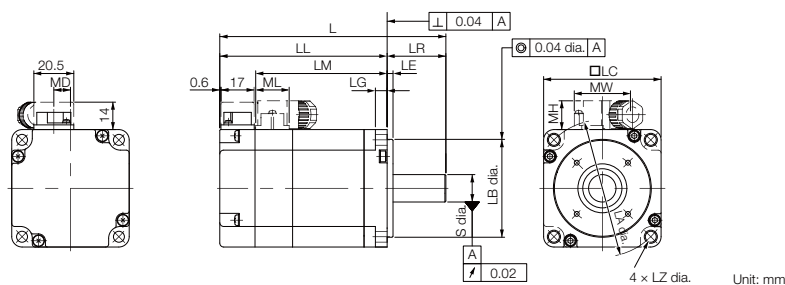
3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.

4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

4.3 External Dimensions

4.3.1 Servomotors without Gears

SGM7J-02, -04, and -06



Model SGM7J-	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
02A□A2□	99.5 (140)	69.5 (110)	51.2	30	3	6	60	70	50 ⁰ _{-0.025}	5.5	14 ⁰ _{-0.011}	8.5	28.7	14.7	17.1	0.8 (1.4)
04A□A2□	115.5 (156)	85.5 (126)	67.2	30	3	6	60	70	50 ⁰ _{-0.025}	5.5	14 ⁰ _{-0.011}	8.5	28.7	14.7	17.1	1.1 (1.7)
06A□A2□	137.5 (191.5)	107.5 (161.5)	89.2	30	3	6	60	70	50 ⁰ _{-0.025}	5.5	14 ⁰ _{-0.011}	8.5	28.7	14.7	17.1	1.6 (2.2)

* For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the following section for the values for individual models.

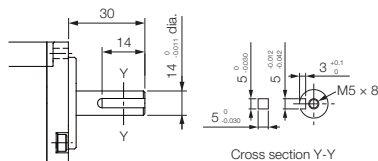
 *Dimensions of Servomotors with Batteryless Absolute Encoders on page 4-20*

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

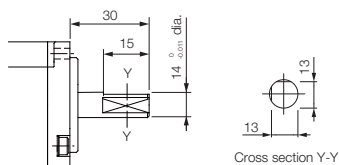
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

◆ Shaft End Specifications

- Straight with Key and Tap

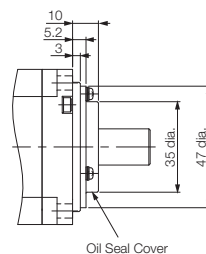


- With Two Flat Seats



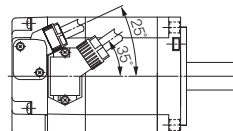
◆ Specifications of Options

- Oil Seal

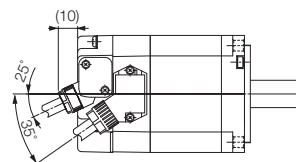


◆ Connector Mounting Dimensions

- Cable Installed on Load Side



- Cable Installed on Non-load Side





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