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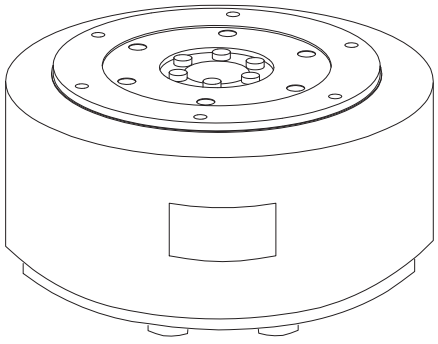
Σ-7-Series AC Servo Drive

Direct Drive Servomotor

Product Manual

Model: SGM7D/SGM7E/SGM7F/SGMCV/SGMCS



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MANUAL NO. SIEP S800001 38K

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About this Manual

This manual provides information required to select, install, connect, and maintain Direct Drive 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

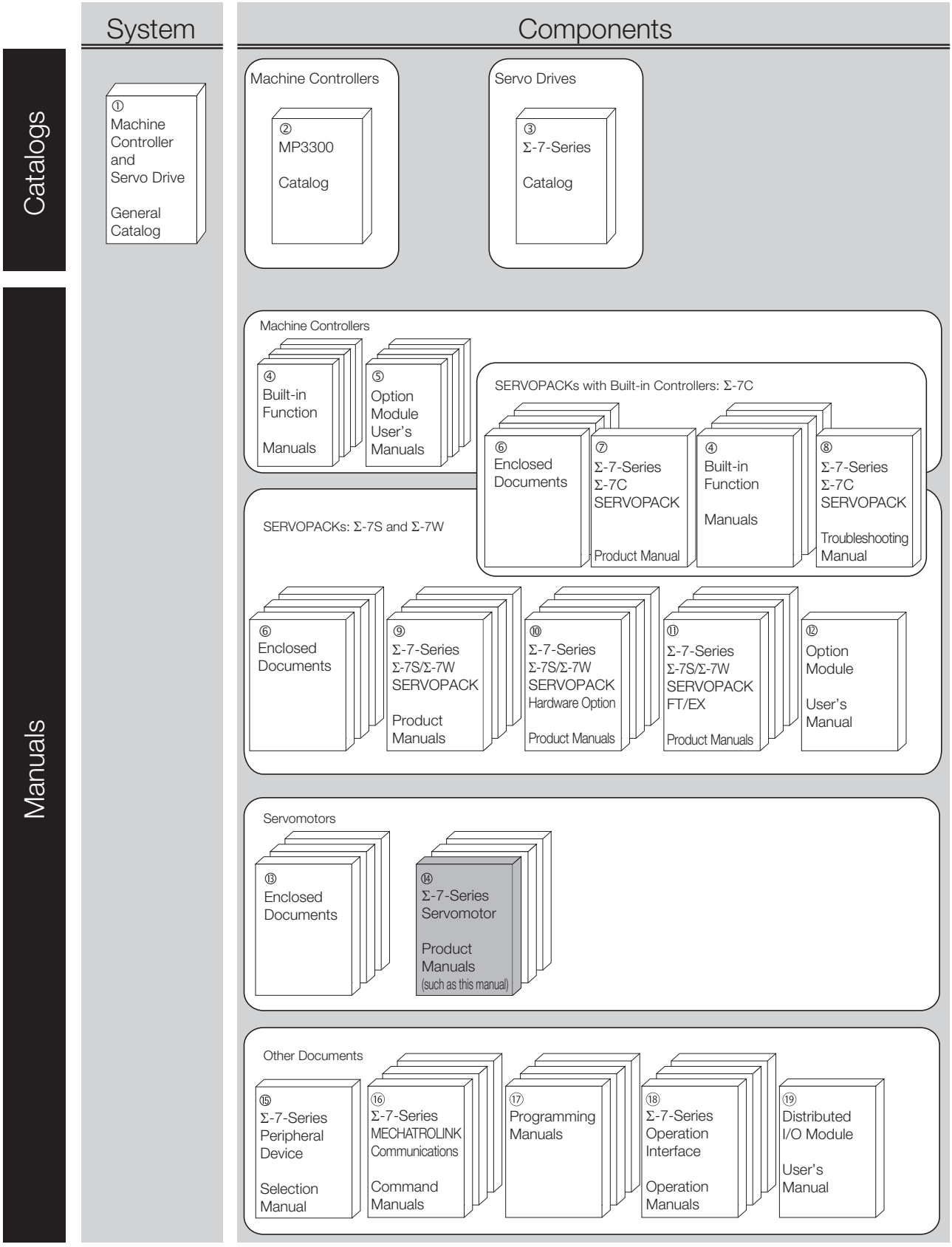
The contents of the chapters of this manual are described in the following table.

Refer to these chapters as required.

Chapter	Chapter Title	Contents
1	Basic Information on Servomotors	Provides basic information on Direct Drive 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 SGM7D Servomotors	Describes how to interpret the model numbers of SGM7D Servomotors and gives their specifications, ratings, and external dimensions.
4	Specifications, Ratings, and External Dimensions of SGM7E Servomotors	Describes how to interpret the model numbers of SGM7E Servomotors and gives their specifications, ratings, and external dimensions.
5	Specifications, Ratings, and External Dimensions of SGM7F Servomotors	Describes how to interpret the model numbers of SGM7F Servomotors and gives their specifications, ratings, and external dimensions.
6	Specifications, Ratings, and External Dimensions of SGMCV Servomotors	Describes how to interpret the model numbers of SGMCV Servomotors and gives their specifications, ratings, and external dimensions.
7	Specifications, Ratings, and External Dimensions of SGMCS Servomotors	Describes how to interpret the model numbers of SGMCS Servomotors and gives their specifications, ratings, and external dimensions.
8	Servomotor Installation	Describes the installation conditions and precautions for Servomotors.
9	Wiring Servomotors and SERVOPACKs	This chapter provides precautions for wiring Servomotors and SERVOPACKs.
10	Maintenance and Inspection	Describes the maintenance, inspection, and disposal of a Servomotor.
11	Appendix	Provides information to use when selecting Servomotor capacities.

Related Documents

The relationships between the documents that are related to the Servo Drives are shown in the following figure. The numbers in the figure correspond to the numbers in the table on the following pages. Refer to these documents as required.



Classification	Document Name	Document No.	Description
① Machine Controller and Servo Drive General Catalog	Machine Controller and AC Servo Drive Solutions Catalog	KAEP S800001 22	Describes the features and application examples for combinations of MP3000-Series Machine Controllers and Σ-7-Series AC Servo Drives.
② MP3300 Catalog	Machine Controller MP3300	KAEP C880725 03	Provides detailed information on MP3300 Machine Controllers, including features and specifications.
③ Σ-7-Series Catalog	AC Servo Drives Σ-7 Series	KAEP S800001 23	Provides detailed information on Σ-7-Series AC Servo Drives, including features and specifications.
④ Built-in Function Manuals	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Motion Control User's Manual	SIEP S800002 03	Provides detailed information on the specifications, system configuration, and application methods of the Motion Control Function Modules (SVD, SVC4, and SVR4) for Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP3000 Series Communications User's Manual	SIEP C880725 12	Provides detailed information on the specifications, system configuration, and communications connection methods for the Ethernet communications that are used with MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
⑤ Option Module User's Manuals	Machine Controller MP2000 Series Communication Module User's Manual	SIEP C880700 04	Provide detailed information on the specifications and communications methods for the Communications Modules that can be mounted to MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP2000 Series 262IF-01 FL-net Communication Module User's Manual	SIEP C880700 36	
	Machine Controller MP2000 Series 263IF-01 EtherNet/IP Communication Module User's Manual	SIEP C880700 39	
	Machine Controller MP2000 Series I/O Module User's Manual	SIEP C880700 34	Provide detailed information on the specifications and communications methods for the I/O Modules that can be mounted to MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP2000 Series Analog Input/Analog Output Module AI-01/AO-01 User's Manual	SIEP C880700 26	
	Machine Controller MP2000 Series Counter Module CNTR-01 User's Manual	SIEP C880700 27	

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Classification	Document Name	Document No.	Description
⑥ Enclosed Documents	Σ-7-Series AC Servo Drive Σ-7S and Σ-7W SERVOPACK Safety Precautions	TOMP C710828 00	Provides detailed information for the safe usage of Σ-7-Series SERVOPACKs.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Safety Precautions Option Module	TOBP C720829 00	Provides detailed information for the safe usage of Option Modules.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Command Option Module	TOBP C720829 01	Provides detailed procedures for installing the Command Option Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Fully-closed Module	TOBP C720829 03	Provides detailed procedures for installing the Fully-closed Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide Safety Module	TOBP C720829 06	Provides detailed procedures for installing the Safety Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide INDEXER Module	TOBP C720829 02	Provides detailed procedures for installing the INDEXER Module in a SERVOPACK.
	Σ-V-Series/Σ-V-Series for Large-Capacity Models/ Σ-7-Series Installation Guide DeviceNet Module	TOBP C720829 07	Provides detailed procedures for installing the DeviceNet Module in a SERVOPACK.
⑦ Σ-7-Series Σ-7C SERVOPACK Product Manual	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Product Manual	SIEP S800002 04	Provides detailed information on selecting Σ-7-Series Σ-7C SERVOPACKs; installing, connecting, setting, testing in trial operation, and tuning Servo Drives; writing, monitoring, and maintaining programs; and other information.
⑧ Σ-7-Series Σ-7C SERVOPACK Troubleshooting Manual	Σ-7-Series AC Servo Drive Σ-7C SERVOPACK Troubleshooting Manual	SIEP S800002 07	Provides detailed troubleshooting information for Σ-7-Series Σ-7C SERVOPACKs.

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Classification	Document Name	Document No.	Description
⑨ Σ-7-Series Σ-7S/Σ-7W SERVOPACK Product Manuals	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-III Communications References Product Manual	SIEP S800001 28	Provide detailed information on selecting Σ-7-Series SERVOPACKs and information on installing, connecting, setting, performing trial operation for, tuning, and monitoring the Servo Drives.
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with MECHATROLINK-II Communications References Product Manual	SIEP S800001 27	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with Analog Voltage/Pulse Train References Product Manual	SIEP S800001 26	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with INDEXER Module Product Manual	SIEP S800001 64	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with DeviceNet Module Product Manual	SIEP S800001 70	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with EtherCAT Communications References Product Manual	SIEP S800001 55	
	Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with MECHATROLINK-III Communications References Product Manual	SIEP S800001 29	
⑩ Σ-7-Series Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Product Manuals	Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual	SIEP S800001 73	Provide detailed information on Hardware Options for Σ-7-Series SERVOPACKs.
	Σ-7-Series AC Servo Drive Σ-7W/Σ-7C SERVOPACK with Hardware Option Specifications HWBB Function Product Manual	SIEP S800001 72	

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Classification	Document Name	Document No.	Description
⑪ Σ-7-Series Σ-7S/Σ-7W SERVOPACK FT/EX Product Manuals	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Indexing Application Product Manual	SIEP S800001 84	Provide detailed information on the FT/EX Option for Σ-7-Series SERVOPACKs.
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Tracking Application Product Manual	SIEP S800001 89	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Application with Special Motor, SGM7D Motor Product Manual	SIEP S800001 91	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Press and Injection Molding Application Product Manual	SIEP S800001 94	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Transfer and Alignment Application Product Manual	SIEP S800001 95	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Torque/Force Assistance for Conveyance Application Product Manual	SIEP S800002 09	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Cutting Application Feed Shaft Motor Product Manual	SIEP S800002 10	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Three-Point Latching for Conveyance Application Product Manual	SIEP S800002 17	
	Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for Semi-/Fully-Closed Loop Control Online Switching for Conveyance Application Product Manual	SIEP S800002 27	
	Σ-7-Series AC Servo Drive Σ-7W SERVOPACK with FT/EX Specification for Gantry Applications Product Manual	SIEP S800002 29	

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Classification	Document Name	Document No.	Description
⑫ Option Module User's Manual	AC Servo Drives Σ-V Series/Σ-V Series for Large-Capacity Models/ Σ-7 Series User's Manual Safety Module	SIEP C720829 06	Provides details information required for the design and maintenance of a Safety Module.
⑬ Enclosed Documents	AC Servo Drive Rotary Servomotor Safety Precautions	TOBP C230260 00	Provides detailed information for the safe usage of Rotary Servomotors and Direct Drive Servomotors.
	AC Servomotor Linear Σ Series Safety Precautions	TOBP C230800 00	Provides detailed information for the safe usage of Linear Servomotors.
⑭ Σ-7-Series Servomotor Product Manuals	Σ-7-Series AC Servo Drive Rotary Servomotor Product Manual	SIEP S800001 36	Provide detailed information on selecting, installing, and connecting the Σ-7-Series Servomotors.
	Σ-7-Series AC Servo Drive Linear Servomotor Product Manual	SIEP S800001 37	
	Σ-7-Series AC Servo Drive Direct Drive Servomotor Product Manual	This manual (SIEP S800001 38)	
⑮ Σ-7-Series Peripheral Device Selection Manual	Σ-7-Series AC Servo Drive Peripheral Device Selection Manual	SIEP S800001 32	Provides the following information in detail for Σ-7-Series Servo Systems. • Cables: Models, dimensions, wiring materials, connector models, and connection specifications • Peripheral devices: Models, specifications, diagrams, and selection (calculation) methods
⑯ Σ-7-Series MECHATROLINK Communications Command Manuals	Σ-7-Series AC Servo Drive MECHATROLINK-II Communications Command Manual	SIEP S800001 30	Provides detailed information on the MECHATROLINK-II communications commands that are used for a Σ-7-Series Servo System.
	Σ-7-Series AC Servo Drive MECHATROLINK-III Communications Standard Servo Profile Command Manual	SIEP S800001 31	Provides detailed information on the MECHATROLINK-III communications standard servo profile commands that are used for a Σ-7-Series Servo System.

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Classification	Document Name	Document No.	Description
⑰ Programming Manuals	Machine Controller MP3000 Series Ladder Programming Manual	SIEP C880725 13	Provides detailed information on the ladder programming specifications and instructions for MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
	Machine Controller MP3000 Series Motion Programming Manual	SIEP C880725 14	Provides detailed information on the motion programming and sequence programming specifications and instructions for MP3000-Series Machine Controllers and Σ-7-Series Σ-7C SERVOPACKs.
⑱ Σ-7-Series Operation Interface Operating Manuals	Machine Controller MP2000/MP3000 Series Engineering Tool MPE720 Version 7 User's Manual	SIEP C880761 03	Describes in detail how to operate MPE720 version 7.
	Σ-7-Series AC Servo Drive Digital Operator Operating Manual	SIEP S800001 33	Describes the operating procedures for a Digital Operator for a Σ-7-Series Servo System.
	AC Servo Drive Engineering Tool SigmaWin+ Operation Manual	SIET S800001 34	Provides detailed operating procedures for the SigmaWin+ Engineering Tool for a Σ-7-Series Servo System.
⑲ Distributed I/O Module User's Manuals	MECHATROLINK-III Compatible I/O Module User's Manual	SIEP C880781 04	Describes the functions, specifications, operating methods, and MECHATROLINK-III communications for the Remote I/O Modules for MP2000/MP3000-Series Machine Controllers.

Using This Manual

◆ Technical Terms Used in This Manual

The following terms are used in this manual.

Term	Meaning
Servomotor	A Σ-7-Series Direct Drive Servomotor.
SERVOPACK	A Σ-7-Series Servo Amplifier.
Servo Drive	The combination of a Servomotor and SERVOPACK.
Main Circuit Cable	One of the cables that connect to the main circuit terminals of a SERVOPACK, including the Main Circuit Power Supply Cable, Control Power Supply Cable, and Servomotor Main Circuit Cable.

◆ Trademarks

- MECHATROLINK is a trademark of the MECHATROLINK Members Association.
- QR code is a trademark of Denso Wave Inc.
- Other product names and company names are the trademarks or registered trademarks of the respective company. “TM” and the ® mark do not appear with product or company names in this manual.

◆ Visual Aids

The following aids are used to indicate certain types of information for easier reference.

Indicates precautions or restrictions that must be observed.
Also indicates alarm displays and other precautions that will not result in machine damage.

Indicates definitions of difficult terms or terms that have not been previously explained in this manual.

Example Indicates operating or setting examples.

Information Indicates supplemental information to deepen understanding or useful information.

Safety Precautions

◆ Safety Information

To prevent personal injury and equipment damage in advance, the following signal words are used to indicate safety precautions in this document. The signal words are used to classify the hazards and the degree of damage or injury that may occur if a product is used incorrectly. Information marked as shown below is important for safety. Always read this information and heed the precautions that are provided.

⚠ DANGER

- Indicates precautions that, if not heeded, are likely to result in loss of life, serious injury, or fire.

⚠ WARNING

- Indicates precautions that, if not heeded, could result in loss of life, serious injury, or fire.

⚠ CAUTION

- Indicates precautions that, if not heeded, could result in relatively serious or minor injury, or in fire.

NOTICE

- Indicates precautions that, if not heeded, could result in property damage.

◆ Safety Precautions That Must Always Be Observed

■ General Precautions

⚠ DANGER

- Read and understand this manual to ensure the safe usage of the product.
- Keep this manual in a safe, convenient place so that it can be referred to whenever necessary. Make sure that it is delivered to the final user of the product.
- Do not remove covers, cables, connectors, or optional devices while power is being supplied to the SERVOPACK.
  There is a risk of electric shock, operational failure of the product, or burning.

⚠ WARNING

- Connect the ground terminals on the SERVOPACK and Servomotor to ground poles according to local electrical codes (100 Ω or less for a SERVOPACK with a 100-VAC or 200-VAC power supply, and 10 Ω or less for a SERVOPACK with a 400-VAC power supply).
  There is a risk of electric shock or fire.
- Do not attempt to disassemble, repair, or modify the product.
  There is a risk of fire or failure.
  The warranty is void for the product if you disassemble, repair, or modify it.

⚠ CAUTION

- The SERVOPACK heat sinks, regenerative resistors, External Dynamic Brake Resistors, Servomotors, and other components can be very hot while power is ON or soon after the power is turned OFF. Implement safety measures, such as installing covers, so that hands and parts such as cables do not come into contact with hot components.
  There is a risk of burn injury.
- Do not damage, pull on, apply excessive force to, place heavy objects on, or pinch cables.
  There is a risk of failure, damage, or electric shock.
- Do not use the product in an environment that is subject to water, corrosive gases, or flammable gases, or near flammable materials.
  There is a risk of electric shock or fire.

NOTICE

- Do not attempt to use a SERVOPACK or Servomotor that is damaged or that has missing parts.
- Install external emergency stop circuits that shut OFF the power supply and stops operation immediately when an error occurs.
- Always use a Servomotor and SERVOPACK in one of the specified combinations.
- Do not touch a SERVOPACK or Servomotor with wet hands.
  There is a risk of product failure.

■ Storage Precautions

⚠ CAUTION

- Do not place an excessive load on the product during storage. (Follow all instructions on the packages.)
  There is a risk of injury or damage.

NOTICE

- Do not install or store the product in any of the following locations.
  - Locations that are subject to direct sunlight
  - Locations that are subject to ambient temperatures that exceed product specifications
  - Locations that are subject to relative humidities that exceed product specifications
  - Locations that are subject to condensation as the result of extreme changes in temperature
  - Locations that are subject to corrosive or flammable gases
  - Locations that are near flammable materials
  - Locations that are subject to dust, salts, or iron powder
  - Locations that are subject to water, oil, or chemicals
  - Locations that are subject to vibration or shock that exceeds product specifications
  - Locations that are subject to radiation

  If you store or install the product in any of the above locations, the product may fail or be damaged.
- Consult with your Yaskawa representative if you have stored products for an extended period of time.

■ Transportation Precautions

⚠ CAUTION

- Transport the product in a way that is suitable to the mass of the product.
- Do not hold onto the cables, rotating part, or connectors when you move a Servomotor.
  There is a risk of disconnection, damage, or injury.
- Do not use the eyebolts on a SERVOPACK or Servomotor to move the machine.
  There is a risk of damage or injury.
- When you handle a SERVOPACK or Servomotor, be careful of sharp parts, such as the corners.
  There is a risk of injury.
- Do not place an excessive load on the product during transportation. (Follow all instructions on the packages.)
  There is a risk of injury or damage.

NOTICE

- A SERVOPACK or Servomotor is a precision device. Do not drop it or subject it to strong shock.
  There is a risk of failure or damage.
- Do not subject connectors to shock.
  There is a risk of faulty connections or damage.
- If disinfectants or insecticides must be used to treat packing materials such as wooden frames, plywood, or pallets, the packing materials must be treated before the product is packaged, and methods other than fumigation must be used.
  Example: Heat treatment, where materials are kiln-dried to a core temperature of 56°C for 30 minutes or more.
  If the electronic products, which include stand-alone products and products installed in machines, are packed with fumigated wooden materials, the electrical components may be greatly damaged by the gases or fumes resulting from the fumigation process. In particular, disinfectants containing halogen, which includes chlorine, fluorine, bromine, or iodine can contribute to the erosion of the capacitors.
- Do not overtighten the eyebolts on a SERVOPACK or Servomotor.
  If you use a tool to overtighten the eyebolts, the tapped holes may be damaged.

■ Installation Precautions

⚠ CAUTION

- Securely mount the Servomotor to the machine.
  If the Servomotor is not mounted securely, it may come off the machine during operation.
- Install the Servomotor or SERVOPACK in a way that will support the mass given in technical documents.
- Install SERVOPACKs, Servomotors, regenerative resistors, and External Dynamic Brake Resistors on nonflammable materials.
  Installation directly onto or near flammable materials may result in fire.
- Do not step on or place a heavy object on the product.
  There is a risk of failure, damage, or injury.
- Do not allow any foreign matter to enter the SERVOPACK or Servomotor.
  There is a risk of failure or fire.
- Implement safety measures, such as installing a cover so that the rotating part of the Servomotor cannot be touched accidentally during operation.

NOTICE

- Do not install or store the product in any of the following locations.
  - Locations that are subject to direct sunlight
  - Locations that are subject to ambient temperatures that exceed product specifications
  - Locations that are subject to relative humidities that exceed product specifications
  - Locations that are subject to condensation as the result of extreme changes in temperature
  - Locations that are subject to corrosive or flammable gases
  - Locations that are near flammable materials
  - Locations that are subject to dust, salts, or iron powder
  - Locations that are subject to water, oil, or chemicals
  - Locations that are subject to vibration or shock that exceeds product specifications
  - Locations that are subject to radiation

  If you store or install the product in any of the above locations, the product may fail or be damaged.
- Use the product in an environment that is appropriate for the product specifications.
  If you use the product in an environment that exceeds product specifications, the product may fail or be damaged.
- A SERVOPACK or Servomotor is a precision device. Do not drop it or subject it to strong shock.
  There is a risk of failure or damage.
- A Servomotor is a precision device. Do not subject the output shaft or the main body of the Servomotor to strong shock.
- Design the machine so that the thrust and radial loads on the motor shaft during operation do not exceed the allowable values given in the catalog.
- The shaft opening of a Servomotor is not waterproof or oilproof. Implement measures in the machine to prevent water or cutting oil from entering the Servomotor.
  There is a risk of failure.
- In an application where the Servomotor would be subjected to large quantities of water or oil, implement measures to protect the Servomotor from large quantities of liquid, such as installing covers to protect against water and oil.
- In an environment with high humidity or oil mist, face Servomotor lead wires and connectors downward and provide cable traps.
  There is a risk of failure or fire due to insulation failure or accidents from short circuits.

■ Wiring Precautions

⚠ DANGER

- Do not change any wiring while power is being supplied.
  There is a risk of electric shock or injury.

⚠ WARNING

- Wiring and inspections must be performed only by qualified engineers.
  There is a risk of electric shock or product failure.

⚠ CAUTION

- Observe the precautions and instructions for wiring and trial operation precisely as described in this document.
  Failures caused by incorrect wiring or incorrect voltage application in the brake circuit may cause the SERVOPACK to fail, damage the equipment, or cause an accident resulting in death or injury.
- Check the wiring to be sure it has been performed correctly.
  Connectors and pin layouts are sometimes different for different models. Always confirm the pin layouts in technical documents for your model before operation.
  There is a risk of failure or malfunction.
- Connect wires to power supply terminals and motor connection terminals securely with the specified methods and tightening torque.
  Insufficient tightening may cause wires and terminal blocks to generate heat due to faulty contact, possibly resulting in fire.
- Use shielded twisted-pair cables or screened unshielded multi-twisted-pair cables for I/O Signal Cables and Encoder Cables.
- The maximum wiring length is 3 m for I/O Signal Cables, and 50 m for Encoder Cables or Servomotor Main Circuit Cables.
- Observe the following precautions when wiring the SERVOPACK's main circuit terminals.
  - Turn ON the power supply to the SERVOPACK only after all wiring, including the main circuit terminals, has been completed.
  - If a connector is used for the main circuit terminals, remove the main circuit connector from the SERVOPACK before you wire it.
  - Insert only one wire per insertion hole in the main circuit terminals.
  - When you insert a wire, make sure that the conductor wire (e.g., whiskers) does not come into contact with adjacent wires.

NOTICE

- Whenever possible, use the Cables specified by Yaskawa.
  If you use any other cables, confirm the rated current and application environment of your model and use the wiring materials specified by Yaskawa or equivalent materials.
- Securely tighten cable connector screws and lock mechanisms.
  Insufficient tightening may result in cable connectors falling off during operation.
- Do not bundle power lines (e.g., the Main Circuit Cable) and low-current lines (e.g., the I/O Signal Cables or Encoder Cables) together or run them through the same duct. If you do not place power lines and low-current lines in separate ducts, separate them by at least 30 cm.
  If the cables are too close to each other, malfunctions may occur due to noise affecting the low-current lines.
- Install a battery at either the host controller or on the Encoder Cable.
  If you install batteries both at the host controller and on the Encoder Cable at the same time, you will create a loop circuit between the batteries, resulting in a risk of damage or burning.
- When connecting a battery, connect the polarity correctly.
  There is a risk of battery rupture or encoder failure.

■ Operation Precautions

⚠ WARNING

- Before starting operation with a machine connected, change the settings of the switches and parameters to match the machine.
  Unexpected machine operation, failure, or personal injury may occur if operation is started before appropriate settings are made.
- Do not radically change the settings of the parameters.
  There is a risk of unstable operation, machine damage, or injury.
- Install limit switches or stoppers at the ends of the moving parts of the machine to prevent unexpected accidents.
  There is a risk of machine damage or injury.
- For trial operation, securely mount the Servomotor and disconnect it from the machine.
  There is a risk of injury.
- Forcing the motor to stop for overtravel is disabled when the Jog, Origin Search, or Easy FFT utility function is executed. Take necessary precautions.
  There is a risk of machine damage or injury.
- When an alarm occurs, the Servomotor will coast to a stop or stop with the dynamic brake according to the SERVOPACK Option and settings. The coasting distance will change with the moment of inertia of the load and the resistance of the External Dynamic Brake Resistor. Check the coasting distance during trial operation and implement suitable safety measures on the machine.
- Do not enter the machine's range of motion during operation.
  There is a risk of injury.
- Do not touch the moving parts of the Servomotor or machine during operation.
  There is a risk of injury.

⚠ CAUTION

- Always turn OFF the servo before you turn OFF the power supply. If you turn OFF the main circuit power supply or control power supply during operation before you turn OFF the servo, the Servomotor will stop as follows:
  - If you turn OFF the main circuit power supply during operation without turning OFF the servo, the Servomotor will stop abruptly with the dynamic brake.
  - If you turn OFF the control power supply without turning OFF the servo, the stopping method that is used by the Servomotor depends on the model of the SERVOPACK. For details, refer to the manual for the SERVOPACK.

NOTICE

- Always measure the vibration of the Servomotor with the Servomotor mounted to the machine and confirm that the vibration is within the allowable value.
  If the vibration is too large, the Servomotor will be damage quickly and bolts may become loose.
- When you adjust the gain during system commissioning, use a measuring instrument to monitor the torque waveform and speed waveform and confirm that there is no vibration.
  If a high gain causes vibration, the Servomotor will be damaged quickly.
- An alarm or warning may occur if communications are performed with the host controller while the SigmaWin+ or Digital Operator is operating.
  If an alarm or warning occurs, it may interrupt the current process and stop the system.

■ Maintenance and Inspection Precautions

⚠ DANGER

- Do not change any wiring while power is being supplied.
  There is a risk of electric shock or injury.

⚠ WARNING

- Wiring and inspections must be performed only by qualified engineers.
  There is a risk of electric shock or product failure.

⚠ CAUTION

- Wait for at least six minutes after turning OFF the power supply (with a SERVOPACK for a 100-VAC power supply input, wait for at least nine minutes) and then make sure that the CHARGE indicator is not lit before starting wiring or inspection work. Do not touch the power supply terminals while the CHARGE lamp is lit after turning OFF the power supply because high voltage may still remain in the SERVOPACK.
  There is a risk of electric shock.

■ Troubleshooting Precautions

⚠ WARNING

- The product may suddenly start to operate when the power supply is recovered after a momentary power interruption. Design the machine to ensure human safety when operation restarts.
  There is a risk of injury.

⚠ CAUTION

- When an alarm occurs, remove the cause of the alarm and ensure safety. Then reset the alarm or turn the power supply OFF and ON again to restart operation.
  There is a risk of injury or machine damage.
- If the Servo ON signal is input to the SERVOPACK and an alarm is reset, the Servomotor may suddenly restart operation. Confirm that the servo is OFF and ensure safety before you reset an alarm.
  There is a risk of injury or machine damage.
- If there is the possibility that an external force (including gravity) may move the current position and create a hazardous situation when power is interrupted or an error occurs, install an external braking mechanism that ensures safety.

■ Disposal Precautions

- Correctly discard the product as stipulated by regional, local, and municipal laws and regulations. Be sure to include these contents in all labelling and warning notifications on the final product as necessary.

■ General Precautions

- Figures provided in this document are typical examples or conceptual representations. There may be differences between them and actual wiring, circuits, and products.
- The products shown in illustrations in this document are sometimes shown without covers or protective guards. Always replace all covers and protective guards before you use the product.
- If you need a new copy of this document because it has been lost or damaged, contact your nearest Yaskawa representative or one of the offices listed on the back of this document.
- This document is subject to change without notice for product improvements, specifications changes, and improvements to the manual itself.
  We will update the document number of the document and issue revisions when changes are made.
- Any and all quality guarantees provided by Yaskawa are null and void if the customer modifies the product in any way. Yaskawa disavows any responsibility for damages or losses that are caused by modified products.

Warranty

◆ Details of Warranty

■ Warranty Period

The warranty period for a product that was purchased (hereinafter called the “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 above warranty period.
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.

- 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
- Causes not attributable to the delivered product itself
- Modifications or repairs not performed by Yaskawa
- Use of the delivered product in a manner in which it was not originally intended
- Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
- Events for which Yaskawa is not responsible, such as natural or human-made disasters

◆ Limitations of Liability

- 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.
- 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.
- 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.
- 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.

◆ Suitability for Use

- 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.
- The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
- 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
- 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.
- 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.
- Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

◆ 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.

Compliance with UL Standards, EU Directives, UK Regulations, and Korean Radio Waves Act

Certification marks for the standards for which the product has been certified by certification bodies are shown on nameplate. Products that do not have the marks are not certified for the standards.

Refer to the SERVOPACK manual for compliant standards of SERVOPACKs.

◆ North American Safety Standards (UL)

Product	Model	North American Safety Standards (UL File No.)
Direct Drive Servomotors	• SGM7E • SGM7F-□□A, -□□B, -□□C, and -□□D (Small-Capacity Servomotors with Cores) • SGMCV	UL 1004-1 UL 1004-6 (E165827) CSA C22.2 No.100

◆ European Directives

Product	Model	EU Directive	Harmonized Standards
Direct Drive Servomotors	• SGM7D • SGM7E • SGM7F • SGMCV	EMC Directive 2014/30/EU	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3 (Category C2, Second environment)
		Low Voltage Directive 2014/35/EU	EN 60034-1 EN 60034-5
		RoHS Directive 2011/65/EU as amended by(EU)2015/863	EN IEC 63000

Note: 1. We declared the CE Marking based on the harmonized standards in the above table.

2. These products are for industrial use. In home environments, these products may cause electromagnetic interference and additional noise reduction measures may be necessary.

◆ UK Conformity Assessed (UKCA)

Product	Model	UK Regulations	Designated Standards
Direct Drive Servomotors	• SGM7D • SGM7E • SGM7F • SGMCV	Electromagnetic Compatibility Regulations S.I. 2016/1091	EN 55011 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3 (Category C2, Second environment)
		Electrical Equipment (Safety) Regulations S.I. 2016/1101	EN 60034-1 EN 60034-5
		Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations S.I. 2012/3032	EN IEC 63000

Note: 1. We declared the UKCA Marking based on the harmonized standards in the above table.
2. These products are for industrial use. In home environments, these products may cause electromagnetic interference and additional noise reduction measures may be necessary.

◆ Korean Radio Waves Act (KC)

Product	Models
Rotary Servomotors	SGM7D

■ Precautions for Korean Radio Waves Act (한국 전파법에 관한 주의사항)

Products with the KC Mark conform to broadcast and communications equipment for business use (Class A) and are designed for use in locations other than in ordinary houses.

KC 마크가 부착되어 있는 제품은 한국 전파법에 적합한 제품입니다 . 한국에서 사용할 경우에는 아래 사항에주의하여 주십시오 .

사용자 안내문
이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다 .

(주)사용자 안내문은 " 업무용 방송통신기자재 " 에만 적용한다 .

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Revision History

Basic Information on Servomotors

1

This chapter provides basic information on Direct Drive Servomotors, including Servomotor part names and combinations with SERVOPACKs.

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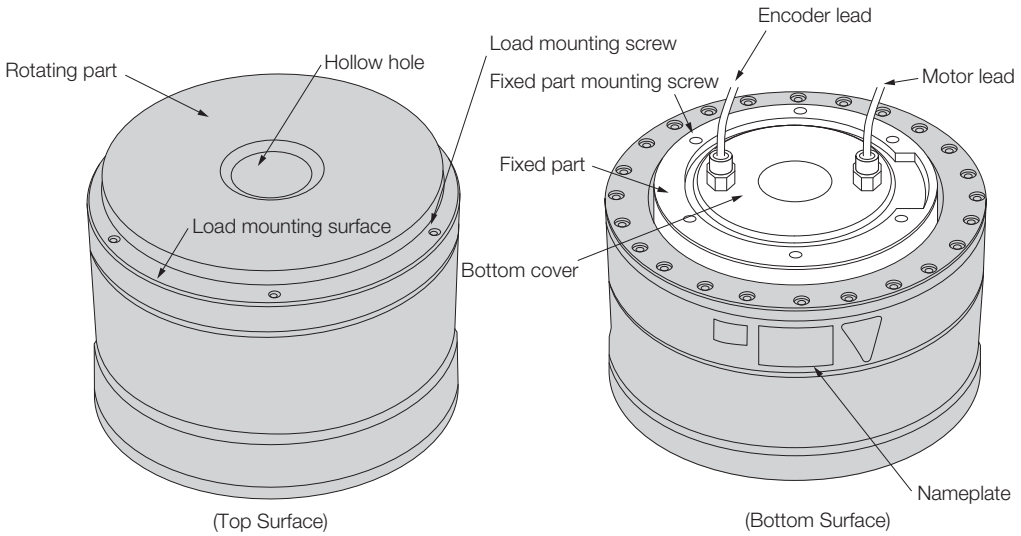
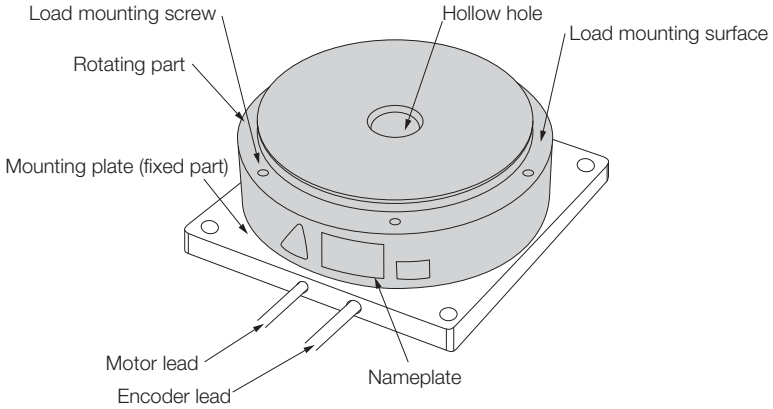
1.1 Servomotor Part Names

1.1.1 SGM7D

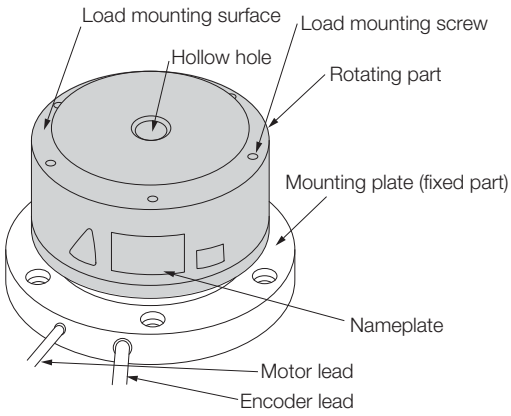
SGM7D-□□F and -08G to -45G



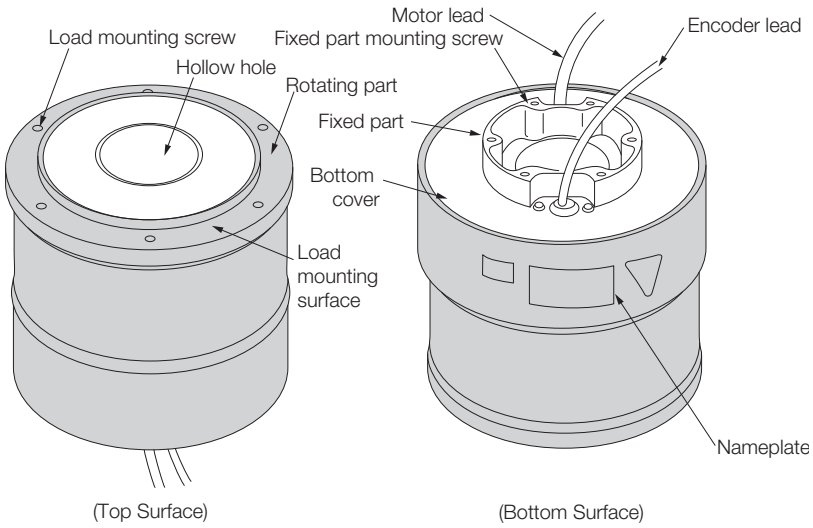
SGM7D-01G and -05G



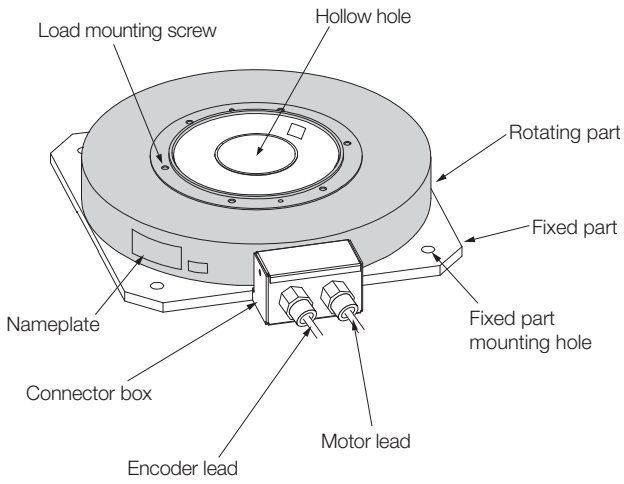
SGM7D-03H



SGM7D-□□I, -□□J, and -□□K

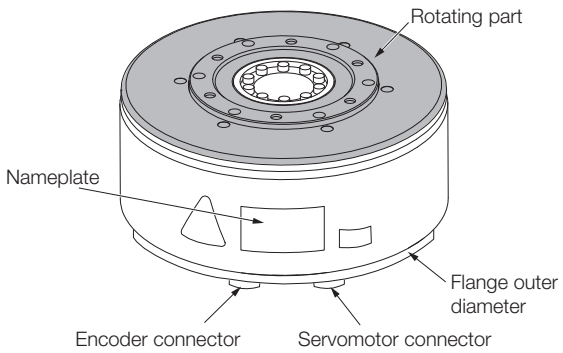


SGM7D-□□L

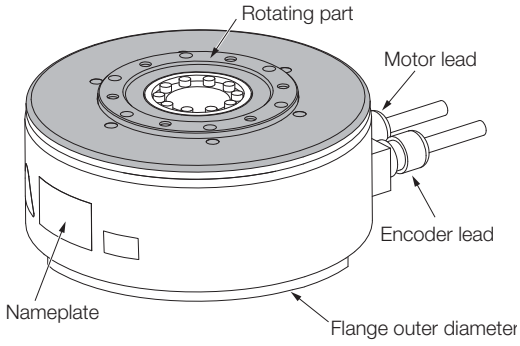


1.1.2 SGM7E

- Flange Specification 1



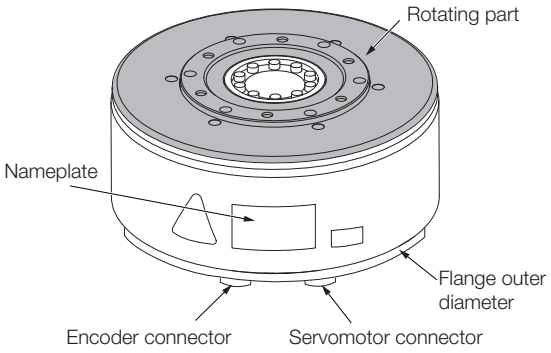
- Flange Specification 4



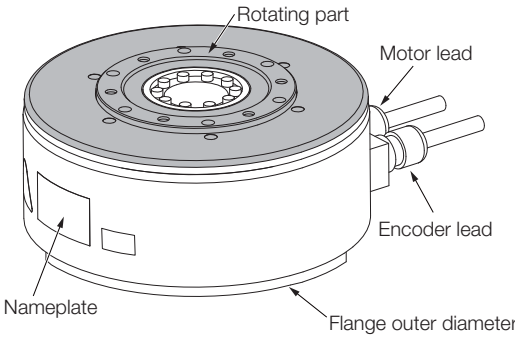
1.1.3 SGM7F

Small-Capacity Servomotors with Cores

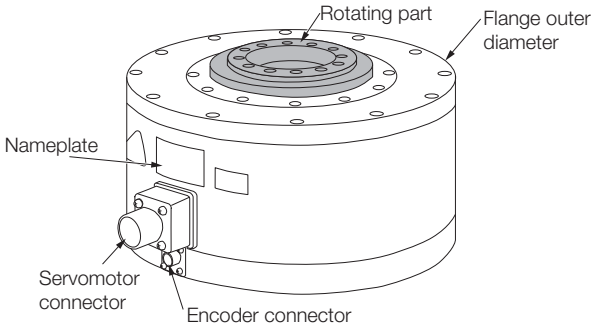
- Flange Specification 1



- Flange Specification 4

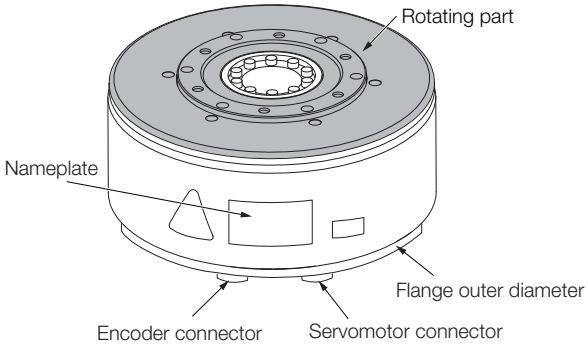


Medium-Capacity Servomotors with Cores

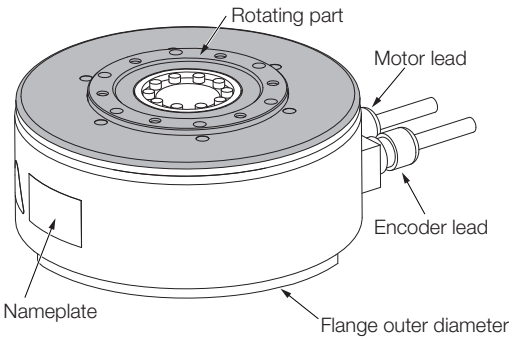


1.1.4 SGMCV

- Flange Specification 1



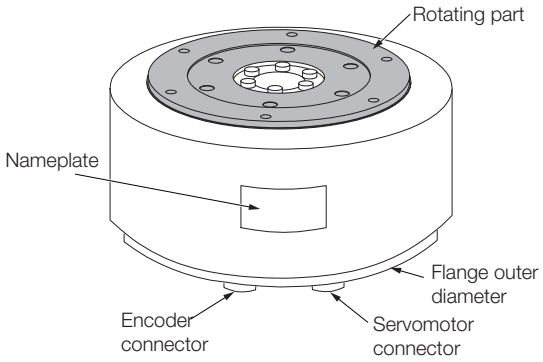
- Flange Specification 4



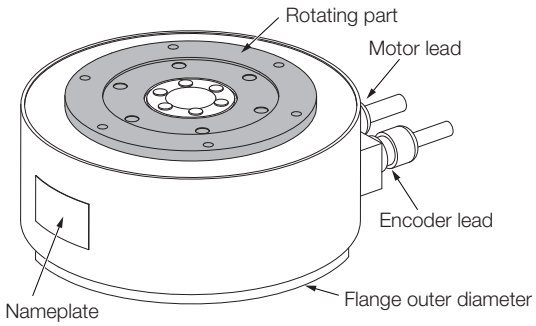
1.1.5 SGMCS

Small-Capacity, Coreless Servomotors

- Flange Specification 1

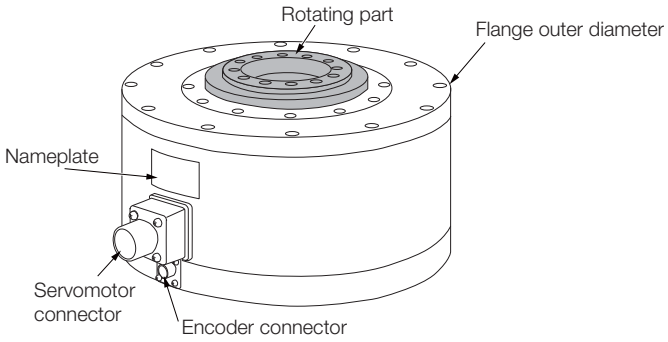


- Flange Specification 4



Medium-Capacity Servomotors with Cores

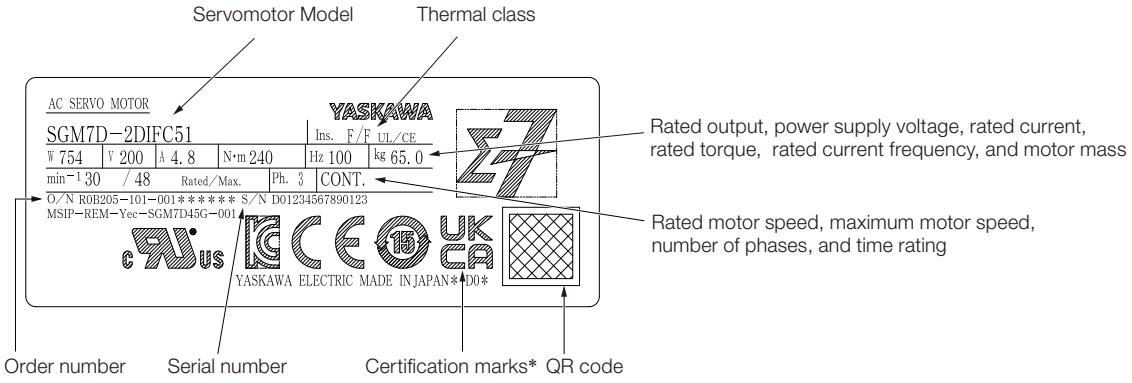
- Connectors



1.2 Nameplate

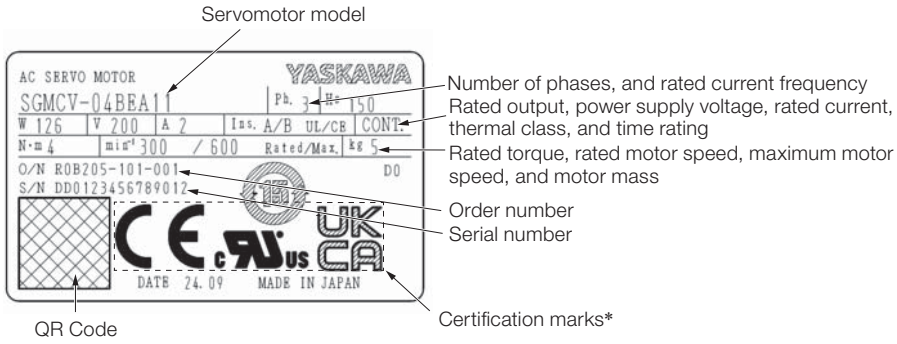
The nameplate provides the basic information that is given below.

1.2.1 SGM7D, SGM7E, and SGM7F



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

1.2.2 SGMCV

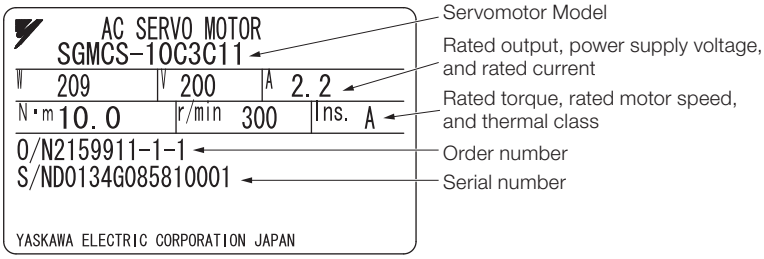


* Certification marks for the standards for which the Servomotor has been certified by certification bodies are shown on the product.

1.2.3 SGMCS

Information Refer to the following section when using a Servomotor that is compliant with European directives (model number ending with -E). The nameplate will be the same as for SGMCV Servomotors.

☞ *1.2.2 SGMCV* on page 1-6



1.3 Outline of Model Designations

1.3.1 Servomotors

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

SGM□□- 02 B 3 C 1 1 - E*

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

Series Σ-7-Series Servomotors

Code	Specifications	Reference
SGM7D	Outer rotor with core	Chapter 3
SGM7E	Coreless inner rotor	Chapter 4
SGM7F	Small capacity, inner rotor with core	Chapter 5
	Medium capacity, inner rotor with core	
SGMCV	Small capacity, inner rotor with core	Chapter 6
SGMCS	Small capacity, coreless inner rotor	Chapter 7
	Medium capacity, inner rotor with core	

1st+2nd digits Rated Output

3rd digit Servomotor Outer Diameter

4th digit Serial Encoder Specification

5th digit Design Revision Order

6th digit Flange Specifications

- Non-load side installation
- Load side installation

7th digit Options

- High mechanical precision

8th digit EU Directive Certification*

Code	Specification
E	Certified
None	Not certified

* The distinction for models compliant with European directives (model number ending with -E) is only made for SGMCS Servomotors.

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 000 000 B

Series | 1st+2nd+3rd digits | 4th digit | 5th+6th digits | 7th digit | 8th+9th+10th digits | 11th+12th+13th digits | 14th digit

Series Σ-7-Series SERVOPACKs

Code	Specification
SGD7S	Single-axis SERVOPACKs
SGD7W	Two-axis SERVOPACKs
SGD7C	Two-axis SERVOPACKs with Built-in Controllers

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
- Command Option attachable type

7th digit Design Revision Order

8th+9th+10th digits Hardware Options Specification

11th+12th+13th digits FT/EX Specification

14th digit BTO Specification

1.4 Combinations of Servomotors and SERVOPACKs

Direct Drive Servomotor Model		Rated Torque N·m	Instantaneous Maximum Torque N·m	SERVOPACK Model	
				SGD7S-□□□□	SGD7W-□□□□
SGM7D (Outer Rotor with Core)	SGM7D-30F	30.0	50.0	120A*1	–
	SGM7D-58F	58.0	100		
	SGM7D-90F	90.0	150		
	SGM7D-1AF	110	200		
	SGM7D-01G	1.30	4.00	2R8A*1, 2R8F*1	
	SGM7D-05G	5.00	6.00		
	SGM7D-08G	8.00	15.0	120A*1	
	SGM7D-18G	18.0	30.0		
	SGM7D-24G	24.0	45.0		
	SGM7D-34G	34.0	60.0		
	SGM7D-45G	45.0	75.0		
	SGM7D-03H	3.00	4.00	2R8A*1, 2R8F*1	
	SGM7D-28I	28.0	50.0	120A*1	
	SGM7D-70I	70.0	100		
	SGM7D-1ZI	100	150		
	SGM7D-1CI	130	200		
	SGM7D-2BI	220	300		
	SGM7D-2DI	240	400		
	SGM7D-06J	6.00	8.00		
	SGM7D-09J	9.00	15.0		
	SGM7D-18J	18.0	30.0		
	SGM7D-20J	20.0	45.0		
	SGM7D-38J	38.0	60.0		
	SGM7D-02K	2.06	5.00	2R8A*1, 2R8F*1	
	SGM7D-06K	6.00	10.0		
	SGM7D-08K	8.00	15.0		
	SGM7D-06L	6.00	10.0		
	SGM7D-12L	12.0	20.0		
	SGM7D-30L	30.0	40.0	120A*1	
SGM7E (Small Capacity, Coreless, Inner Rotor)	SGM7E-02B	2.00	6.00	2R8A, 2R1F	2R8A
	SGM7E-05B	5.00	15.0		
	SGM7E-07B	7.00	21.0		
	SGM7E-04C	4.00	12.0	2R8A, 2R8F	
	SGM7E-10C	10.0	30.0		
	SGM7E-14C	14.0	42.0		
	SGM7E-08D	8.00	24.0		
	SGM7E-17D	17.0	51.0		
	SGM7E-25D	25.0	75.0		
	SGM7E-16E	16.0	48.0	5R5A	
	SGM7E-35E	35.0	105		

Continued on next page.

Continued from previous page.

Direct Drive Servomotor Model		Rated Torque N·m	Instantaneous Maximum Torque N·m	SERVOPACK Model	
				SGD7S-□□□□	SGD7W-□□□□
SGM7F (Small Capacity, with Core, Inner Rotor)	SGM7F-02A	2.00	6.00	2R8A, 2R8F	2R8A
	SGM7F-05A	5.00	15.0		
	SGM7F-07A	7.00	21.0		
	SGM7F-04B	4.00	12.0		
	SGM7F-10B	10.0	30.0		
	SGM7F-14B	14.0	42.0	5R5A	
	SGM7F-08C	8.00	24.0	2R8A, 2R8F	2R8A
	SGM7F-17C	17.0	51.0	5R5A	
	SGM7F-25C	25.0	75.0	7R6A	
	SGM7F-16D	16.0	48.0	5R5A	
	SGM7F-35D	35.0	105	7R6A*2, 120A	7R6A*2
SGM7F (Medium Capacity, Inner Rotor with Core)	SGM7F-45M	45.0	135	7R6A	
	SGM7F-80M	80.0	240	120A	–
	SGM7F-80N	80.0	240		
	SGM7F-1AM	110	330	180A	
	SGM7F-1EN	150	450	200A	
	SGM7F-2ZN	200	600		
SGMCV (Small Capacity, Inner Rotor with Core)	SGMCV-04B	4.00	12.0	2R8A, 2R8F	2R8A
	SGMCV-10B	10.0	30.0		
	SGMCV-14B	14.0	42.0	5R5A	
	SGMCV-08C	8.00	24.0	2R8A, 2R8F	2R8A
	SGMCV-17C	17.0	51.0	5R5A	
	SGMCV-25C	25.0	75.0	7R6A	
	SGMCV-16D	16.0	48.0	5R5A	
	SGMCV-35D	35.0	105	7R6A*3, 120A	7R6A*3
SGMCS (Small Capacity, Coreless Inner Rotor)	SGMCS-02B	2.00	6.00	2R8A, 2R1F	2R8A
	SGMCS-05B	5.00	15.0		
	SGMCS-07B	7.00	21.0		
	SGMCS-04C	4.00	12.0	2R8A, 2R8F	
	SGMCS-10C	10.0	30.0		
	SGMCS-14C	14.0	42.0		
	SGMCS-08D	8.00	24.0		
	SGMCS-17D	17.0	51.0		
	SGMCS-25D	25.0	75.0		
	SGMCS-16E	16.0	48.0	5R5A	
	SGMCS-35E	35.0	105		
SGMCS (Medium Capacity, Inner Rotor with Core)	SGMCS-45M	45.0	135	7R6A	
	SGMCS-80M	80.0	240	120A	–
	SGMCS-80N	80.0	240		
	SGMCS-1AM	110	330	180A	
	SGMCS-1EN	150	450	200A	
	SGMCS-2ZN	200	600		

*1. An SGM7D Servomotor is used together with an FT-specification SERVOPACK. The following SERVOPACK models can be used.
- SGD7S-□□□□□□A□□□F82□
- SGD7S-□□□□00A□□□F83□

*2. Use derated values for this combination. Refer to the following section for information on derating values.
☞ *5.2.2 Ratings* on page 5-5

*3. Use derated values for this combination. Refer to the following section for information on derating values.
☞ *6.2.2 Ratings* on page 6-5

Capacity Selection

2

This chapter describes calculation methods to use when selecting Servomotor capacities.

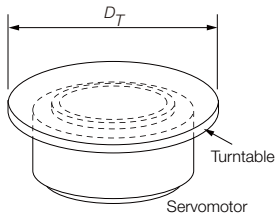
2.1 Selecting the Servomotor Capacity 2-2

2.1 Selecting the Servomotor Capacity

Contact your Yaskawa representative for information on the Servomotor capacity selection software.

Refer to the following selection examples to select Servomotor capacities with manual calculations.

1. Mechanical Specifications



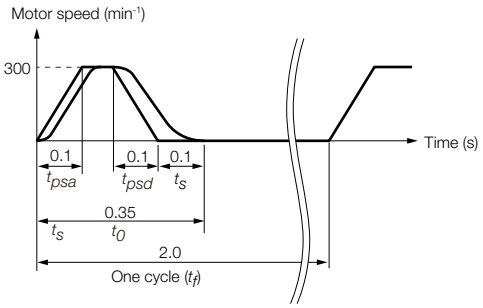
Item	Code	Value
Turntable Mass	W	12 kg
Turntable Diameter	D_T	300 mm
Rotational Angle per Cycle	θ	270 deg
Positioning Time	t_0	0.35 s

Item	Code	Value
Acceleration/ Deceleration Time	t_p = t_{psa} = t_{psd}	0.1 s
Operating Cycle	t_f	2 s
Load Torque	T_L	0 N·m
Settling time	t_s	0.1 s

2. Motor Speed of Direct Drive Servomotor

$$N_O = \frac{\theta}{360} \times \frac{60}{(t_0 - t_p - t_s)} = \frac{270}{360} \times \frac{60}{(0.35 - 0.1 - 0.1)} = 300 \text{ (min}^{-1}\text{)}$$

3. Operation Pattern



4. Load Moment of Inertia

$$J_L = \frac{1}{8} \times D_T^2 \times W = \frac{1}{8} \times (300 \times 10^{-3})^2 \times 12 = 0.135 \text{ (kg·m}^2\text{)}$$

5. Load Acceleration/Deceleration Torque

$$T_a = J_L \times 2\pi \times \frac{N_O/60}{t_p} = 0.135 \times 2\pi \times \frac{300/60}{0.1} = 42.4 \text{ (N·m)}$$

6. Provisional Selection of Direct Drive Servomotor

① Selection Conditions

- Load acceleration/deceleration torque < Instantaneous maximum torque of Direct Drive Servomotor
- Load moment of inertia < Allowable load moment of inertia ratio (J_R) × Moment of inertia of Direct Drive Servomotor (J_M)

The following Servomotor meets the selection conditions.

- SGM7F-17C7A11

② Specifications of the Provisionally Selected Servomotor

Item	Value
Rated Torque	17 (N·m)
Instantaneous Maximum Torque	51 (N·m)
Moment of Inertia (J_M)	0.00785 (kg·m^2)
Allowable Load Moment of Inertia Ratio (J_R)	25

7. Verification of the Provisionally Selected Servomotor

- Verification of required acceleration torque:

$$T_{Ma} = \frac{(J_L + J_M) \times N_O}{9.55 \times t_{psa}} = \frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$\approx$ 44.9 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of required deceleration torque:

$$T_{Md} = -\frac{(J_L + J_M) \times N_O}{9.55 \times t_{psd}} = -\frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$\approx$ -44.9 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of effective torque value:

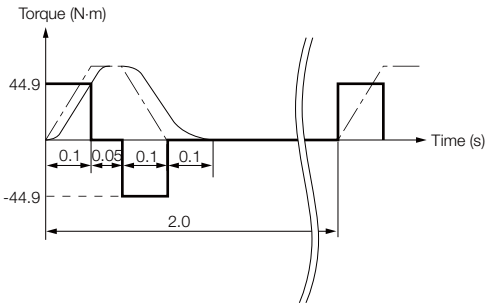
$$Trms = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{tf}} = \sqrt{\frac{44.9^2 \times 0.1 + 0^2 \times 0.05 + (-44.9)^2 \times 0.1}{2}}$$

$\approx$ 14.2 (N·m) < Rated torque...Satisfactory

t_c =Time of constant motor speed = $t_0 - t_s - t_{psa} - t_{psd}$

8. Result

It has been verified that the provisionally selected Servomotor is applicable.
The torque diagram is shown below.



Specifications, Ratings, and External Dimensions of SGM7D Servomotors

3

This chapter describes how to interpret the model numbers of SGM7D Servomotors and gives their specifications, ratings, and external dimensions.

3.1 Model Designations 3-2

3.2 Specifications and Ratings 3-3

3.2.1 Specifications 3-3
3.2.2 Ratings 3-7
3.2.3 Torque-Motor Speed Characteristics 3-13
3.2.4 Servomotor Overload Protection Characteristics 3-15
3.2.5 Allowable Load Moment of Inertia 3-20

3.3 External Dimensions 3-21

3.4 Selecting Cables 3-30

3.4.1 Cable Configurations 3-30
3.4.2 Servomotor Main Circuit Cables 3-30
3.4.3 Encoder Cables of 20 m or Less 3-31
3.4.4 Relay Encoder Cables of 30 m to 50 m 3-31

3.1 Model Designations

SGM7D - 30 F 7 C 4 1

Direct Drive Servomotors: SGM7D

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

1st+2nd digits Rated Torque

Code	Specification	Code	Specification	Code	Specification
01	1.30 N·m	18	18.0 N·m	58	58.0 N·m
02	2.06 N·m	20	20.0 N·m	70	70.0 N·m
03	3.00 N·m	24	24.0 N·m	90	90.0 N·m
05	5.00 N·m	28	28.0 N·m	1Z	100 N·m
06	6.00 N·m	30	30.0 N·m	1A	110 N·m
08	8.00 N·m	34	34.0 N·m	1C	130 N·m
09	9.00 N·m	38	38.0 N·m	2B	220 N·m
12	12.0 N·m	45	45.0 N·m	2D	240 N·m

3rd digit Servomotor Outer Diameter

Code	Specification	Code	Specification
F	264-mm dia.	J	150-mm dia.
G	160-mm dia.	K	107-mm dia.
H	116-mm dia.	L	224 mm × 224 mm
I	264-mm dia.		

Note: 1. Direct Drive Servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

4th digit Serial Encoder

Code	Specification
7	24-bit multiturn absolute encoder*
F	24-bit incremental encoder*

* The encoder can be used as a single-turn absolute encoder by setting a parameter.

5th digit Design Revision Order

C

6th digit Flange

Code	Mounting		Servomotor Outer Diameter Code (3rd Digit)						
			F	G	H	I	J	K	L
4	Non-load side	With cable on side	✓	✓	✓	-	-	-	✓
5	Non-load side	With cable on bottom	✓	✓*	-	✓	✓	✓	-

✓: Applicable models.
* SGM7D-01G and -05G are not available with a cable extending from the bottom.

7th digit Options

Code	Specification
1	Standard mechanical precision
2	High mechanical precision*

* The SGM7D-01G, -05G, and -03H are available only with high mechanical precision.

◆ Manufactured Models

Rated Torque N·m	Servomotor Outer Diameter						
	F (264-mm dia.)	G (160-mm dia.)	H (116-mm dia.)	I (264-mm dia.)	J (150-mm dia.)	K (107-mm dia.)	L (224 mm × 224 mm)
1.30	–	SGM7D-01G	–	–	–	–	–
2.06	–	–	–	–	–	SGM7D-02K	–
3.00	–	–	SGM7D-03H	–	–	–	–
5.00	–	SGM7D-05G	–	–	–	–	–
6.00	–	–	–	–	SGM7D-06J	SGM7D-06K	SGM7D-06L
8.00	–	SGM7D-08G	–	–	–	SGM7D-08K	–
9.00	–	–	–	–	SGM7D-09J	–	–
12.0	–	–	–	–	–	–	SGM7D-12L
18.0	–	SGM7D-18G	–	–	SGM7D-18J	–	–
20.0	–	–	–	–	SGM7D-20J	–	–
24.0	–	SGM7D-24G	–	–	–	–	–
28.0	–	–	–	SGM7D-28I	–	–	–
30.0	SGM7D-30F	–	–	–	–	–	SGM7D-30L
34.0	–	SGM7D-34G	–	–	–	–	–
38.0	–	–	–	–	SGM7D-38J	–	–
45.0	–	SGM7D-45G	–	–	–	–	–
58.0	SGM7D-58F	–	–	–	–	–	–
70.0	–	–	–	SGM7D-70I	–	–	–
90.0	SGM7D-90F	–	–	–	–	–	–
100	–	–	–	SGM7D-1ZI	–	–	–
110	SGM7D-1AF	–	–	–	–	–	–
130	–	–	–	SGM7D-1CI	–	–	–
220	–	–	–	SGM7D-2BI	–	–	–
240	–	–	–	SGM7D-2DI	–	–	–

Note: The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

3.2 Specifications and Ratings

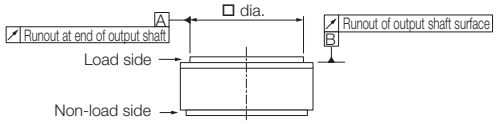
3.2.1 Specifications

SGM7D-□□F, -□□G, and -□□H

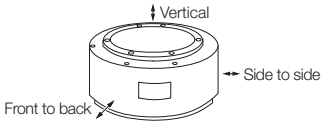
Voltage				200 V										
SGM7D-				30F	58F	90F	1AF	01G	05G	08G	18G	24G	34G	45G	03H
Time Rating				Continuous											
Thermal Class				F											
Insulation Resistance				500 VDC, 10 MΩ min.											
Withstand Voltage				1,500 VAC for 1 minute											
Excitation				Three-phase											
Mounting				Flange-mounted											
Drive Method				Direct drive											
Rotation Direction				Counterclockwise (CCW) for forward reference when viewed from the load side											
Absolute Accuracy[*1]				±15 s											
Repeatability				±1.3 s											
Protective Structure[*2]				Totally enclosed, self-cooled, IP20				Totally enclosed, self-cooled, IP30		Totally enclosed, self-cooled, IP20					Totally enclosed, self-cooled, IP30
Environmental Conditions	Surrounding Air Temperature			0°C to 40°C (with no freezing)											
	Surrounding Air Humidity			20% to 80% relative humidity (with no condensation)											
	Installation Site			• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.											
	Storage Environment			Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)											
Mechanical Tolerances[*3]	Runout of Output Shaft Surface/ Runout at End of Output Shaft	Standard Mechanical Precision	mm	0.1				–		0.1		0.1			–
		High Mechanical Precision	mm	0.005				0.01		0.005		0.01			
Shock Resistance[*4]	Impact Acceleration Rate at Flange			490 m/s^2											
	Number of Impacts			2 times											
Vibration Resistance[*4]	Vibration Acceleration Rate at Flange			49 m/s^2											
Applicable SERVOPACKs	SGD7S-			120A[*5]				2R8A[*5], 2R8F[*5]		120A[*5]					2R8A[*5], 2R8F[*5]
	SGD7W- SGD7C-			–											

*1. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.

*2. Protective structure specifications apply only when the special cable is used.
*3. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*4. The given values are for when the Servomotor shaft is mounted vertically and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



*5. An SGM7D Servomotor is used together with an FT-specification SERVOPACK. The following SERVOPACK models can be used.
- SGD7S-□□□□□□A□□□F82□
- SGD7S-□□□□00A□□□F83□

SGM7D-□□I and -□□J

Voltage				200 V								
SGM7D-				28I	70I	1ZI	1CI	2BI	2DI	06J	09J	18J	20J	38J
Time Rating				Continuous										
Thermal Class				F										
Insulation Resistance				500 VDC, 10 MΩ min.										
Withstand Voltage				1,500 VAC for 1 minute										
Excitation				Three-phase										
Mounting				Flange-mounted										
Drive Method				Direct drive										
Rotation Direction				Counterclockwise (CCW) for forward reference when viewed from the load side										
Absolute Accuracy*1				±15 s										
Repeatability				±1.3 s										
Protective Structure*2				Totally enclosed, self-cooled, IP30										
Environmental Conditions	Surrounding Air Temperature			0°C to 40°C (with no freezing)										
	Surrounding Air Humidity			20% to 80% relative humidity (with no condensation)										
	Installation Site			• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.										
	Storage Environment			Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)										
Mechanical Tolerances*3	Runout of Output Shaft Surface/ Runout at End of Output Shaft	Standard Mechanical Precision	mm	0.1										
		High Mechanical Precision	mm	0.005			0.02			0.005				0.01

Continued on next page.

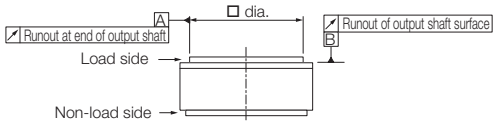
Continued from previous page.

Voltage			200 V									
SGM7D-			28I	70I	1ZI	1CI	2BI	2DI	06J	09J	18J	20J	38J
Shock Resistance *4	Impact Acceleration Rate at Flange		490 m/s^2										
	Number of Impacts		2 times										
Vibration Resistance *4	Vibration Acceleration Rate at Flange		49 m/s^2										
Applicable SERVOPACKs		SGD7S-	120A*5										
		SGD7W- SGD7C-	–										

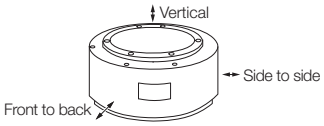
*1. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.

*2. Protective structure specifications apply only when the special cable is used.

*3. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*4. The given values are for when the Servomotor shaft is mounted vertically and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



*5. An SGM7D Servomotor is used together with an FT-specification SERVOPACK. The following SERVOPACK models can be used.
- SGD7S-□□□□□□A□□□F82□
- SGD7S-□□□□00A□□□F83□

SGM7D-□□K and -□□L

Voltage	200 V					
SGM7D-	02K	06K	08K	06L	12L	30L
Time Rating	Continuous					
Thermal Class	F					
Insulation Resistance	500 VDC, 10 MΩ min.					
Withstand Voltage	1,500 VAC for 1 minute					
Excitation	Three-phase					
Mounting	Flange-mounted					
Drive Method	Direct drive					
Rotation Direction	Counterclockwise (CCW) for forward reference when viewed from the load side					
Absolute Accuracy*1	±15 s					
Repeatability	±1.3 s					
Protective Structure*2	Totally enclosed, self-cooled, IP30					

Continued on next page.

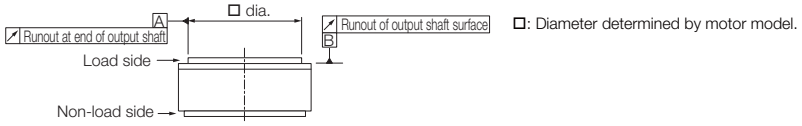
Continued from previous page.

Voltage				200 V					
SGM7D-				02K	06K	08K	06L	12L	30L
Environmental Conditions	Surrounding Air Temperature			0°C to 40°C (with no freezing)					
	Surrounding Air Humidity			20% to 80% relative humidity (with no condensation)					
	Installation Site			• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.					
	Storage Environment			Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)					
Mechanical Tolerances *3	Runout of Output Shaft Surface/ Runout at End of Output Shaft	Standard Mechanical Precision	mm	0.1			0.05		
		High Mechanical Precision	mm	0.01			0.005		
Shock Resistance *4	Impact Acceleration Rate at Flange			490 m/s^2					
	Number of Impacts			2 times					
Vibration Resistance *4	Vibration Acceleration Rate at Flange			24.5m/s^2					
Applicable SERVOPACKs		SGD7S-		2R8A*5, 2R8F*5					120A*5
		SGD7W- SGD7C-		–					

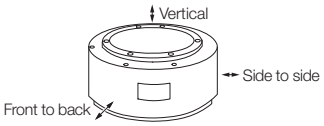
*1. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.

*2. Protective structure specifications apply only when the special cable is used.

*3. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*4. The given values are for when the Servomotor shaft is mounted vertically and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



*5. An SGM7D Servomotor is used together with an FT-specification SERVOPACK. The following SERVOPACK models can be used.
- SGD7S-□□□□□□A□□□F82□
- SGD7S-□□□□00A□□□F83□

3.2.2 Ratings

SGM7D-□□F, -□□G, and -□□H

Voltage				200 V										
SGM7D-				30F	58F	90F	1AF	01G	05G	08G	18G	24G	34G	45G	03H
Rated Output			W	188	364	565	691	16	63	101	226	302	320	565	38
Rated Torque*1			N·m	30.0	58.0	90.0	110	1.30	5.00	8.00	18.0	24.0	34.0	45.0	3.00
Repetitive Rated Torque*2			N·m	–	–	–	–	–	–	–	–	27.0	40.0	52.0	–
Instantaneous Maximum Torque			N·m	50.0	100	150	200	4.00	6.00	15.0	30.0	45.0	60.0	75.0	4.00
Stall Torque			N·m	30.0	58.0	90.0	110	1.30	5.00	8.00	18.0	24.0	34.0	45.0	3.00
Rated Current			Arms	5.7	6.4	5.9	5.0	1.7	1.6	3.4	3.4	3.1	3.3	4.8	1.1
Instantaneous Maximum Current			Arms	14.1				4.2	3.5	10.6					3.5
Rated Motor Speed			min^{-1}	60				120					90	120	120
Maximum Motor Speed			min^{-1}	72				150		144					150
Torque Constant			N·m/ Arms	6.25	12.5	17.8	24.5	1.09	3.84	2.82	5.76	8.57	11.2	10.2	3.01
Motor Moment of Inertia			$\times 10^{-4}$ $kg \cdot m^2$	960	1190	1420	1670	55.0	75.0	120	150	190	230	270	25.0
Rated Power Rate			kW/s	9.38	28.3	57.0	72.5	0.307	3.33	5.33	21.6	30.3	50.3	75.0	3.60
Rated Angular Acceleration Rate			rad/s^2	313	487	634	659	236	667	667	1200	1260	1480	1670	1200
Heat Sink Size			mm	550 x 550 x 30 (aluminum)											350 × 350 × 20 (steel)
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)				200 times 500 times*4	150 times 400 times*4	150 times 350 times*4	130 times 300 times*4	130 times	300 times	400 times 1000 times*4	350 times 900 times*4	300 times 750 times*4	250 times 650 times*4	200 times 450 times*4	600 times
	With External Regenerative Resistor and Dynamic Brake Resistor*3			2,500 times	3,500 times	4,000 times	5,000 times	130 times	300 times	2,000 times	3,000 times	4,000 times			600 times
Allowable Loads *5	Allowable Thrust Load	Forward	N	4×10^4				50	200	3×10^4					50
		Reverse	N	2×10^4				50	200	1×10^4					50
	Allowable Moment Load		N·m	400				–	50	200					–
Rigidities	Thrust Displacement Rigidity	Forward	mm/N	2×10^{-6}				–		2.5×10^{-6}					–
		Reverse	mm/N	3×10^{-6}				–		3×10^{-6}					–
	Moment Displacement Rigidity		rad/ N·m	4×10^{-7}				–		1×10^{-6}					–

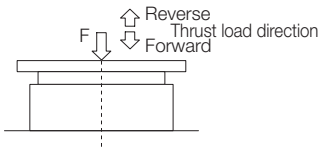
*1. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a heat sink of the dimensions given in the table.

*2. The repetitive rated torque is the value for 60% ED.

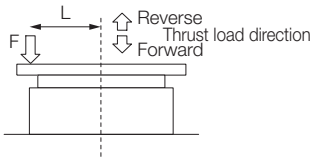
*3. To externally connect dynamic brake resistance, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect dynamic brake resistance if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).
- SGD7S-2R8□□□A020F82□
- SGD7S-2R8□00A020F83□

*4. If you use an SGD7S-120A008 SERVOPACK and SGM7D Servomotor together, use the ratios given on the bottom line.

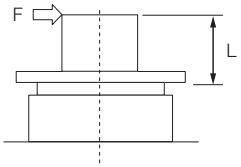
*5. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.
The allowable load is for a static load in one direction.
When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



Where F is the external force,
Thrust load = Load mass
Moment load = F × L

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

SGM7D-□□I and -□□J

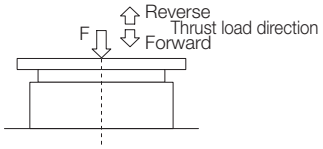
Voltage				200 V									
SGM7D-				28I	70I	1ZI	1CI	2BI	2DI	06J	09J	18J	20J	38J
Rated Output			W	264	440	628	817	691	754	75	113	226	251	358
Rated Torque*1			N·m	28.0	70.0	100	130	220	240	6.00	9.00	18.0	20.0	38.0
Instantaneous Maximum Torque			N·m	50.0	100	150	200	300	400	8.00	15.0	30.0	45.0	60.0
Stall Torque			N·m	28.0	70.0	100	130	220	240	6.00	9.00	18.0	20.0	38.0
Rated Current			Arms	5.2	5.6	5.5	5.0	5.6	4.8	4.0	3.4	3.0	2.2	3.1
Instantaneous Maximum Current			Arms	14.1						10.6				
Rated Motor Speed			min^{-1}	90	60			30		120				90
Maximum Motor Speed			min^{-1}	108	72			60	48	144				
Torque Constant			N·m/ Arms	6.90	13.9	20.8	27.8	41.5	54.4	1.71	3.29	6.62	9.88	13.3
Motor Moment of Inertia			$\times 10^{-4}$ $kg \cdot m^2$	1800	2000	2300	2850	3400	4000	150	210	240	260	330
Rated Power Rate			kW/s	4.36	24.5	43.5	59.3	142	144	2.40	3.86	13.5	15.4	43.8
Rated Angular Acceleration Rate			rad/s^2	156	350	435	456	647	600	400	429	750	769	1150
Heat Sink Size			mm	550 × 550 × 30										
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)				50 times 125 times*2	100 times 250 times*2	90 times 230 times*2	80 times 200 times*2	100 times	150 times	350 times 700 times*2	250 times 600 times*2	240 times 550 times*2	220 times 550 times*2	180 times 450 times*2
	With External Regenerative Resistor and Dynamic Brake Resistor			800 times	2,000 times	2,500 times	3,000 times	100 times	150 times	700 times	900 times	2,500 times	2,000 times	
Allowable Loads *3	Allowable Thrust Load	Forward	N	4×10^4						3×10^4				
		Reverse	N	2×10^4						1×10^4				
	Allowable Moment Load		N·m	400						200				
Rigidities	Thrust Displacement Rigidity	Forward	mm/N	2×10^{-6}						3×10^{-6}				
		Reverse	mm/N	3×10^{-6}						4×10^{-6}				
	Moment Displacement Rigidity		rad/N·m	4×10^{-7}						2×10^{-6}				

*1. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

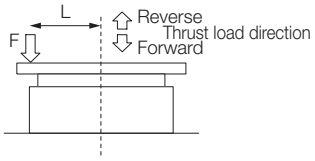
*2. If you use an SGD7S-120A008 SERVOPACK and SGM7D Servomotor together, use the ratios given on the bottom line.

*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.
The allowable load is for a static load in one direction.
When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10

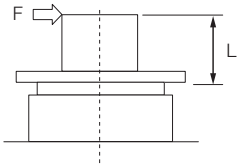
3.2.2 Ratings



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



Where F is the external force,
Thrust load = Load mass
Moment load = F × L

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

SGM7D-□□K and -□□L

Voltage				200 V					
SGM7D-				02K	06K	08K	06L	12L	30L
Rated Output			W	52	151	201	113	226	565
Rated Torque*1			N·m	2.06	6.00	8.00	6.00	12.0	30.0
Repetitive Rated Torque*2			N·m	–	6.90	–	–	–	–
Instantaneous Maximum Torque			N·m	5.00	10.0	15.0	10.0	20.0	40.0
Stall Torque			N·m	2.06	6.00	8.00	6.00	12.0	30.0
Rated Current			Arms	1.6	1.8	1.6	1.7	2.1	8.1
Instantaneous Maximum Current			Arms	4.2			4.2	4.2	14.1
Rated Motor Speed			min^{-1}	240			180		
Maximum Motor Speed			min^{-1}	360			216		
Torque Constant			N·m/Arms	1.83	3.67	5.50	4.13	6.59	3.95
Motor Moment of Inertia			$\times 10^{-4}$ kg·m^2	60.0	70.0	80.0	220	220	370
Rated Power Rate			kW/s	0.707	5.14	8.00	1.64	6.55	24.3
Rated Angular Acceleration Rate			rad/s^2	343	857	1000	273	545	811
Heat Sink Size			mm	550 × 550 × 30			650 × 650 × 30		
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)				200 times	350 times	25 times	450 times	20 times	60 times 130 times*4
	With External Regenerative Resistor and Dynamic Brake Resistor*3			200 times	350 times	25 times	450 times	20 times	3,500 times
Allowable Loads *5	Allowable Thrust Load	Forward	N	5×10^3			2000		
		Reverse	N	3×10^3			1000		
	Allowable Moment Load		N·m	20			100		
Rigidities	Thrust Displacement Rigidity	Forward	mm/N	4×10^{-6}			–		
		Reverse	mm/N	8×10^{-6}			–		
	Moment Displacement Rigidity		rad/N·m	8×10^{-6}			–		

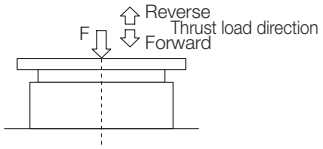
*1. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

*2. The repetitive rated torque is the value for 60% ED.

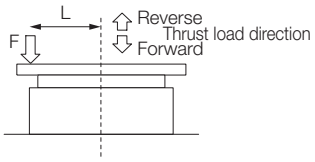
*3. To externally connect dynamic brake resistance, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect dynamic brake resistance if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).
- SGD7S-2R8□□□A020F82□
- SGD7S-2R8□00A020F83□

*4. If you use an SGD7S-120A008 SERVOPACK and SGM7D Servomotor together, use the ratios given on the bottom line.

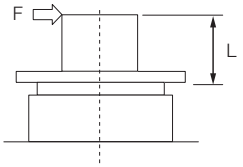
*5. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.
The allowable load is for a static load in one direction.
When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L

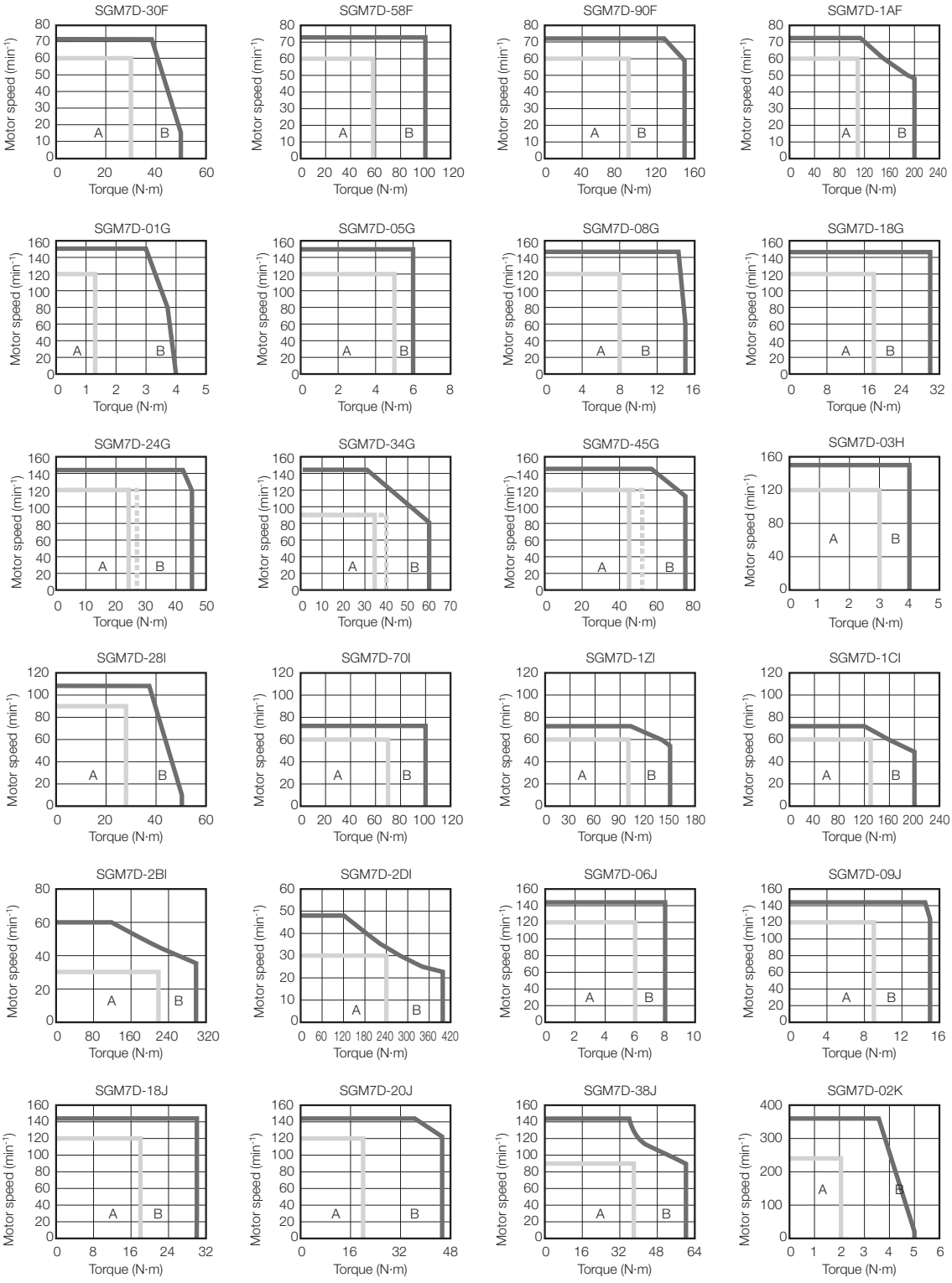


Where F is the external force,
Thrust load = Load mass
Moment load = F × L

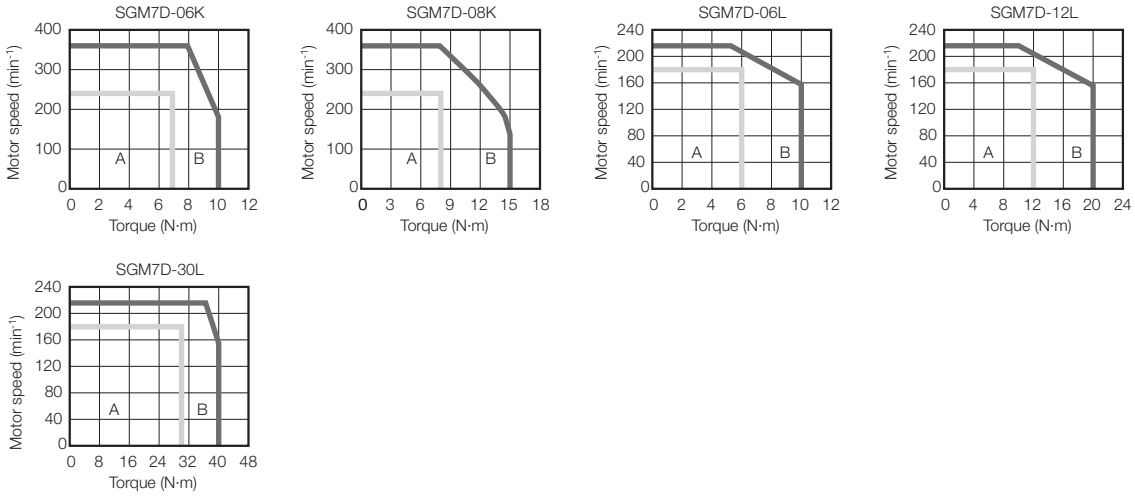
Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

3.2.3 Torque-Motor Speed Characteristics

A : Continuous duty zone -------- (dotted lines): With duty factor of 60% ED and 10-min rating
B : Intermittent duty zone* ——— (solid lines): With three-phase 200-V input or single-phase 200-V input



3.2.3 Torque-Motor Speed Characteristics



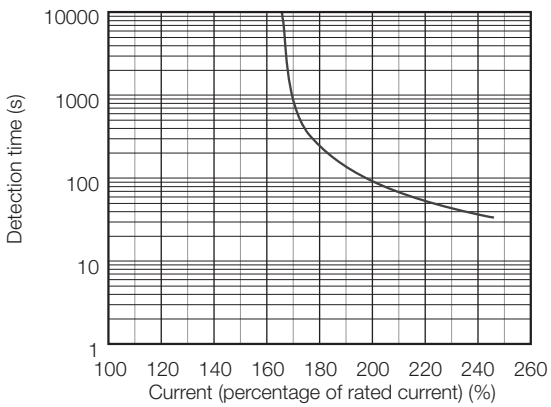
* The characteristics are the same for a three-phase 200-VAC input and single-phase 200-VAC input.
  Contact your Yaskawa representative for information on the characteristics for a single-phase 100-V input.

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
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.

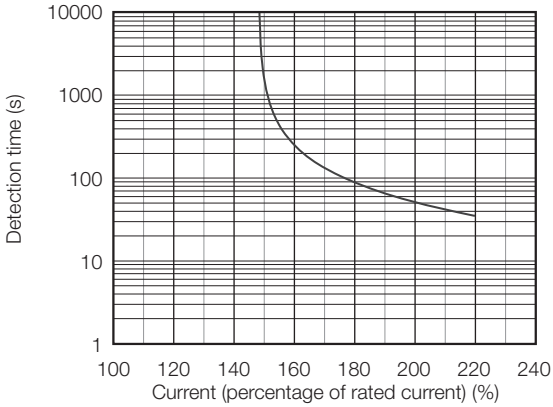
3.2.4 Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40ºC.

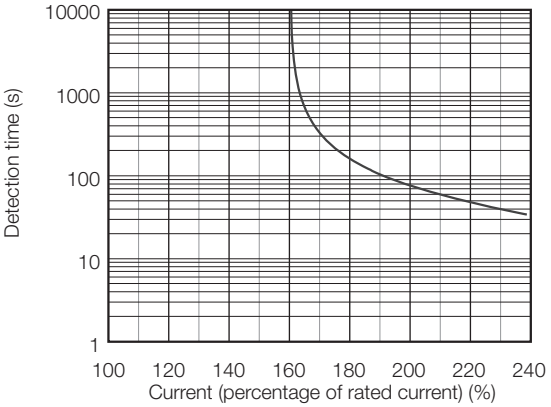
SGM7D-30F



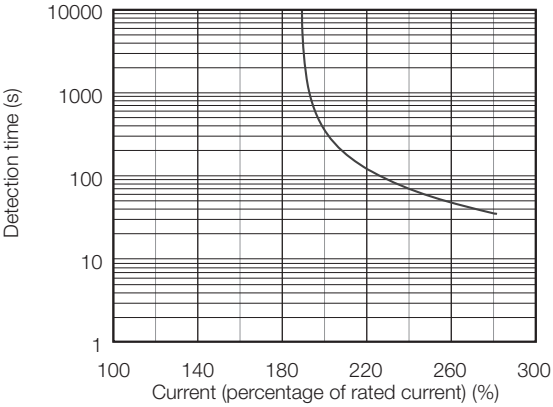
SGM7D-58F



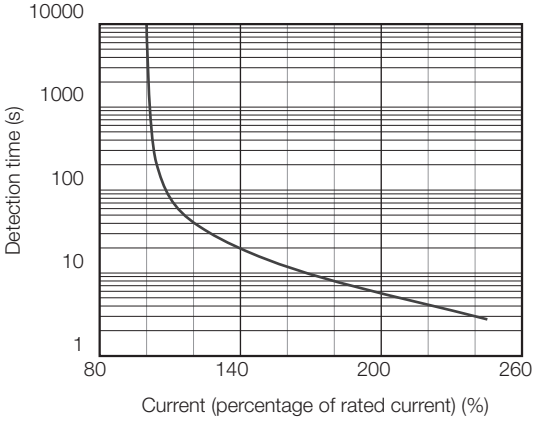
SGM7D-90F



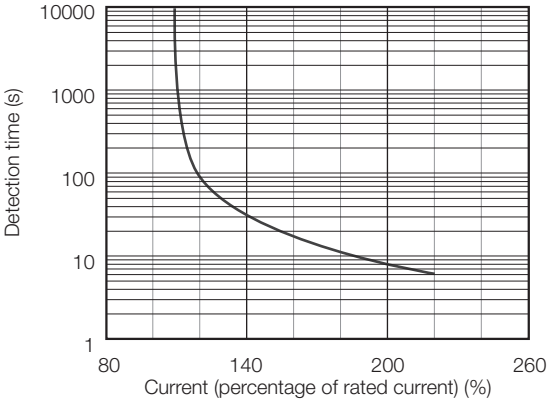
SGM7D-1AF



SGM7D-01G

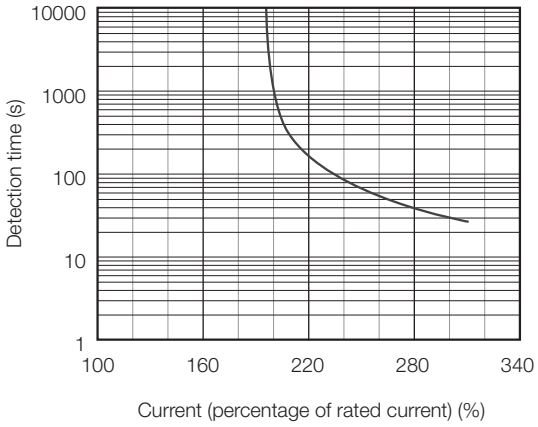


SGM7D-05G

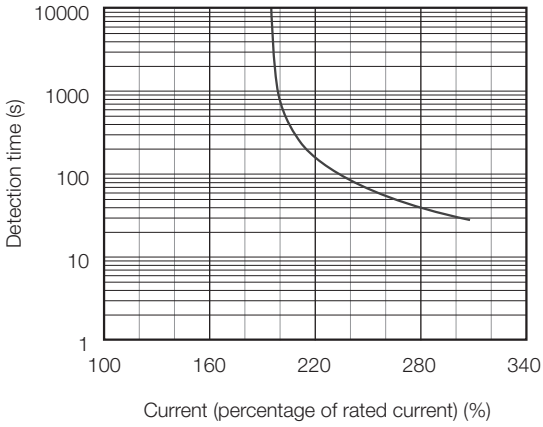


3.2.4 Servomotor Overload Protection Characteristics

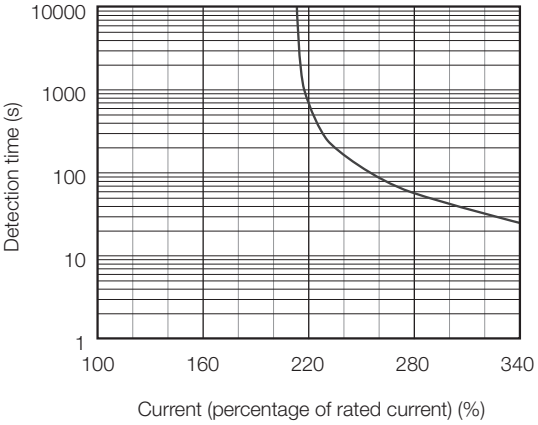
SGM7D-08G



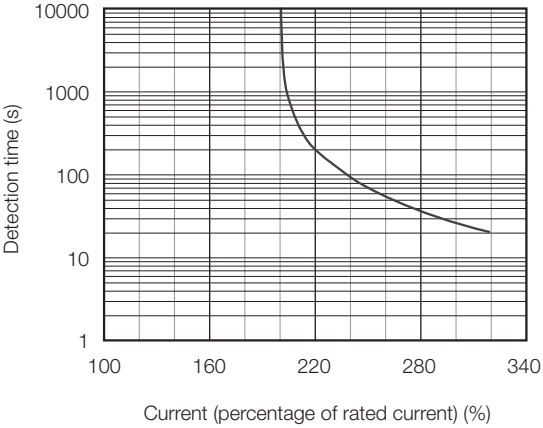
SGM7D-18G



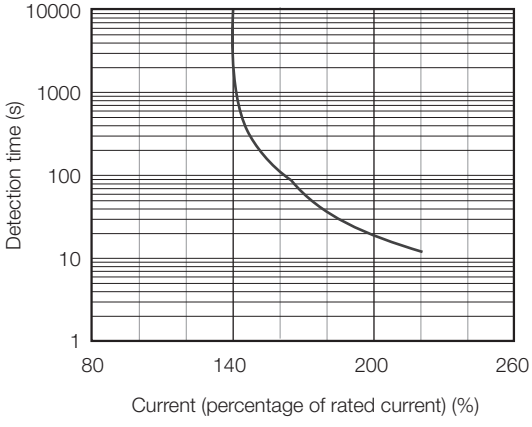
SGM7D-24G



SGM7D-34G



SGM7D-45G



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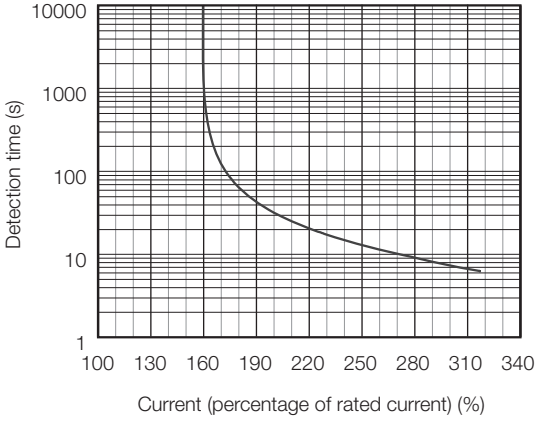
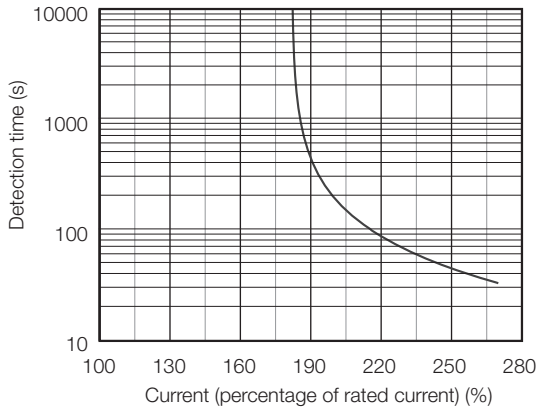


SGM7D-28I



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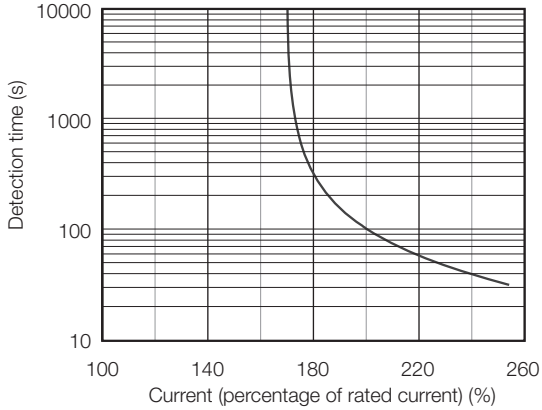

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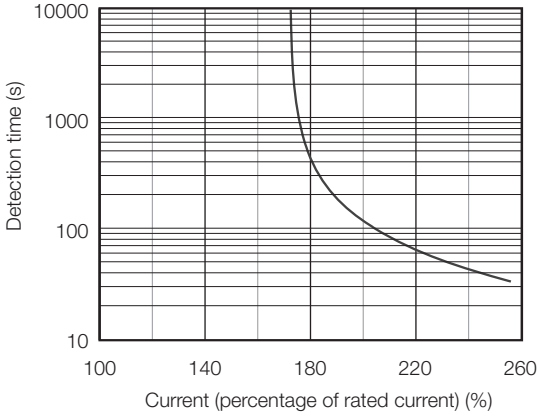

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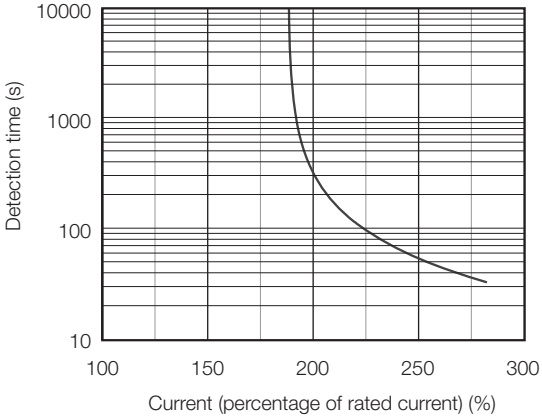

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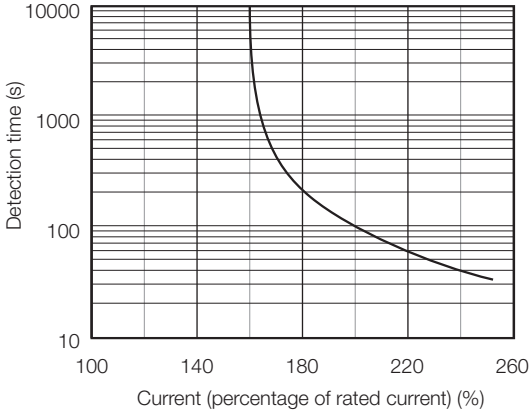

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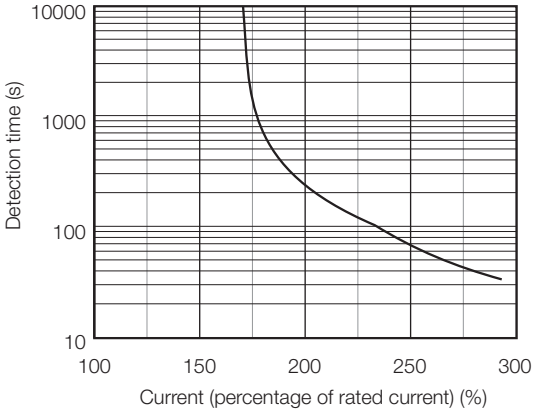
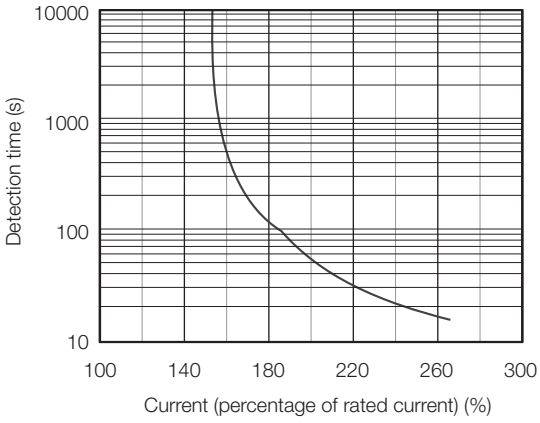


3.2.4 Servomotor Overload Protection Characteristics

SGM7D-06J



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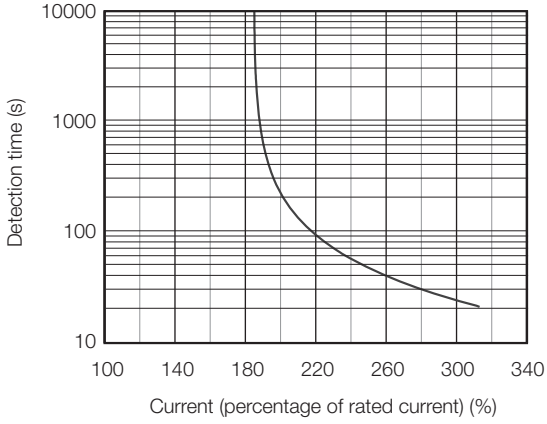
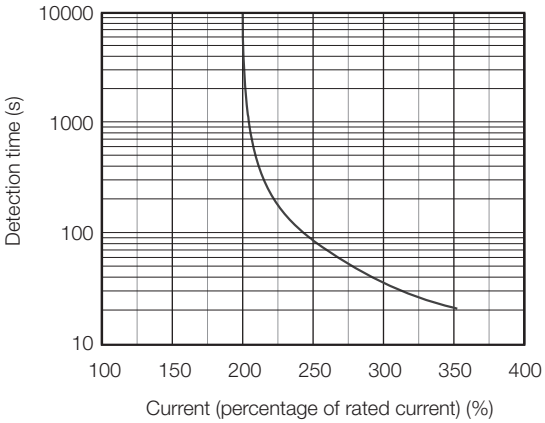


SGM7D-18J



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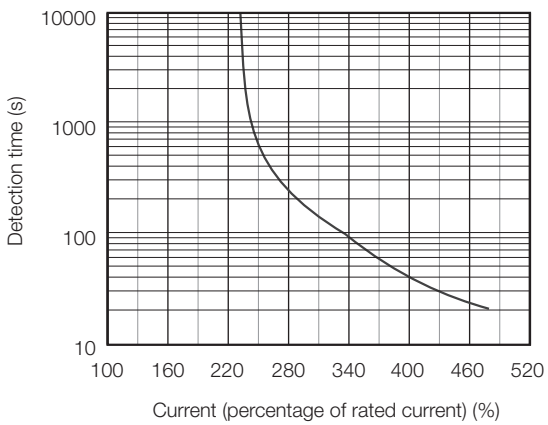
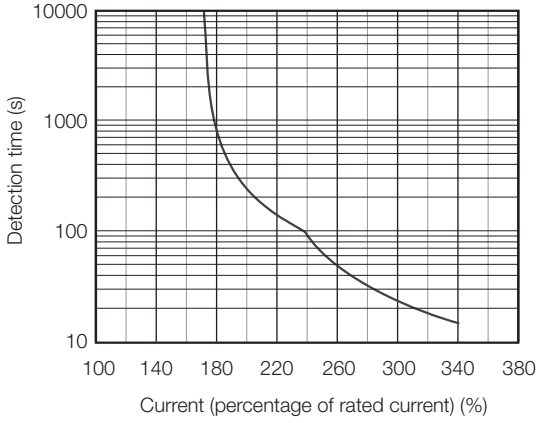
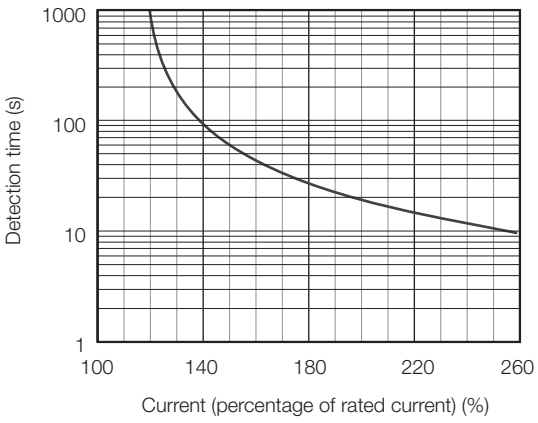


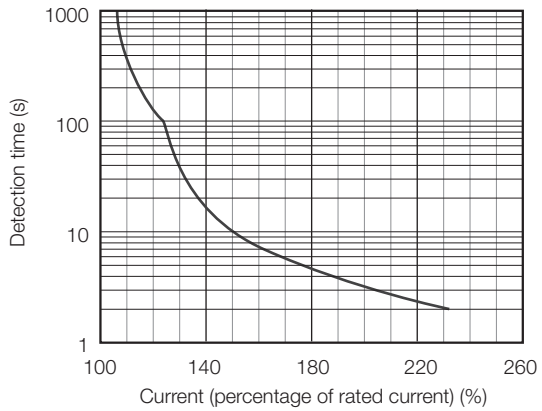
SGM7D-38J



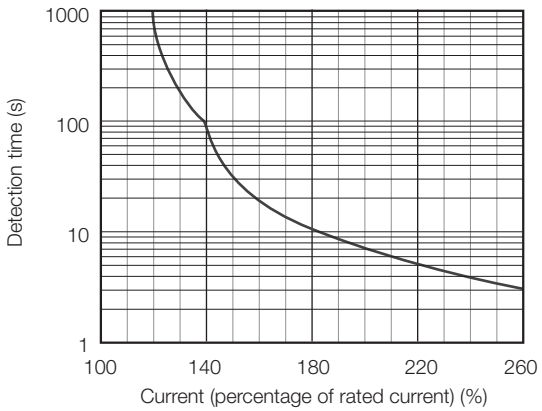
SGM7D-02K



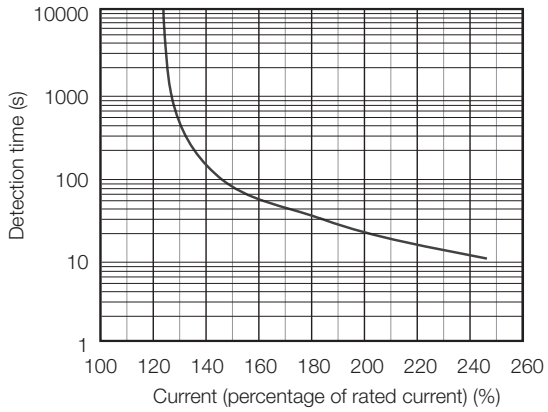
SGM7D-06K



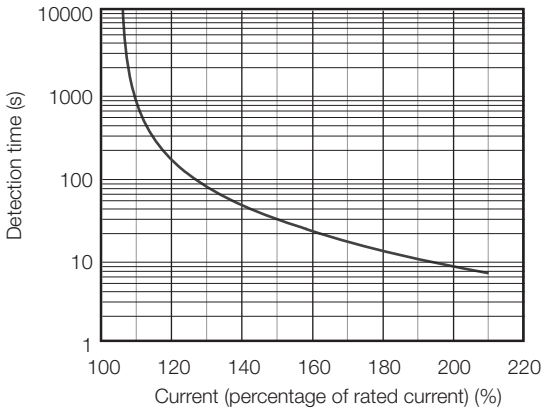
SGM7D-08K



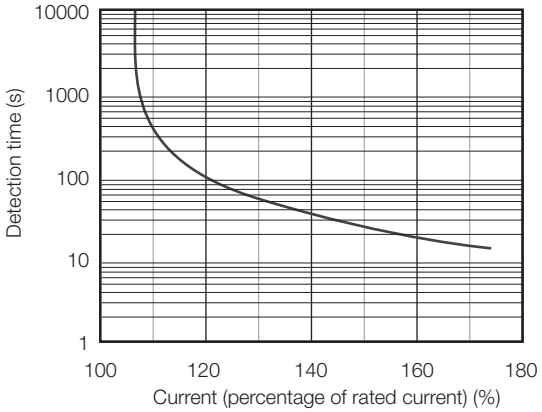
SGM7D-06L



SGM7D-12L



SGM7D-30L



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
Use the Servomotor so that the effective force remains within the continuous duty zone. Refer to the following section for details on the effective torque.
☞ *3.2.3 Torque-Motor Speed Characteristics* on page 3-13

3.2.5 Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the *3.2.2 Ratings* on page 3-7. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

Information

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).
Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.
Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

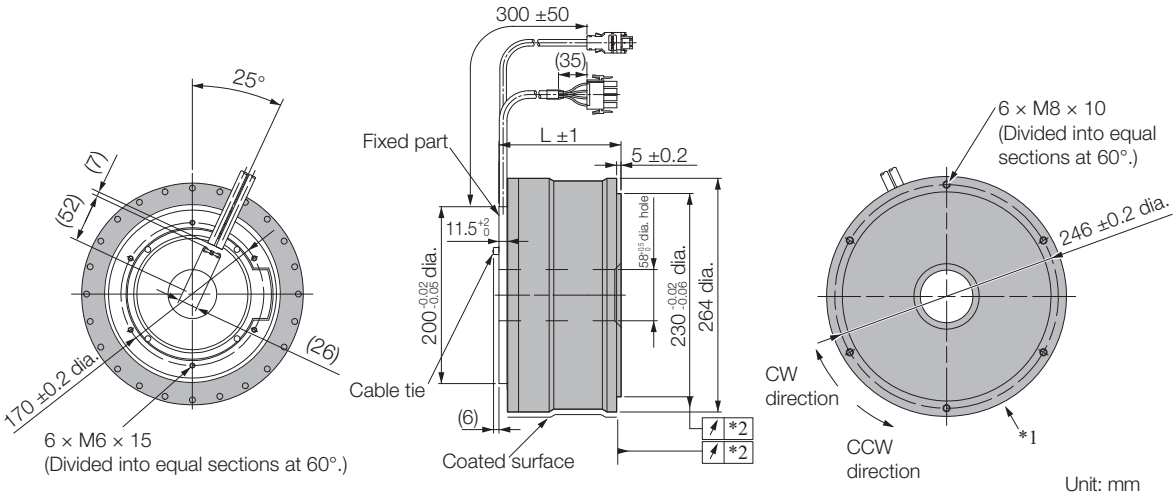
When an External Regenerative Resistor Is Required

Install the External Regenerative Resistor. Refer to the following section for the recommended products.
Refer to the following catalog for information on External Regenerative Resistors.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

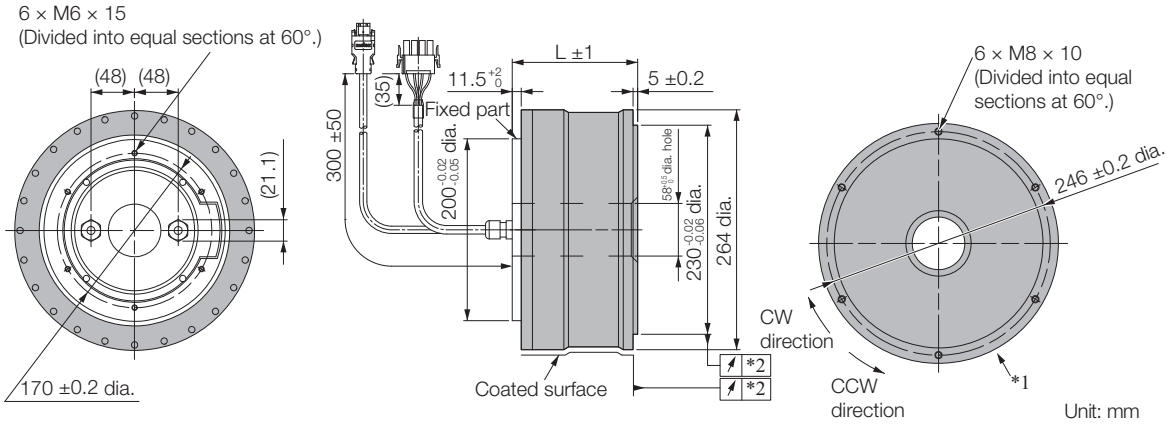
3.3 External Dimensions

◆ SGM7D-□□F

• Servomotors with the Cable on the Side



• Servomotors with the Cable on the Bottom



*1. The shaded section indicates the rotating parts.

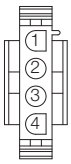
*2. The precision depends on the option specification. Refer to the following section for details.
☞ *3.2.1 Specifications* on page 3-3

Note: Values in parentheses are reference dimensions.

Model SGM7D-	L	Approx. Mass [kg]
30F□C□□	113 ±1	14.5
58F□C□□	138 ±1	19
90F□C□□	163 ±1	24
1AF□C□□	188 ±1	29

◆ Connector Specifications

• Servomotor Connector



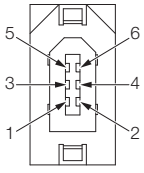
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350536-3 or 350550-3

• Encoder Connector



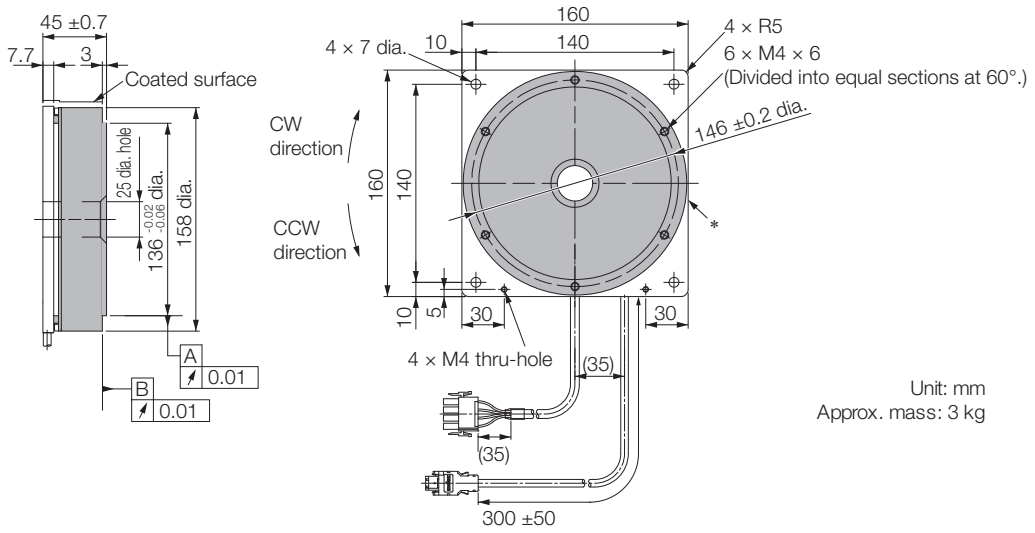
1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

Model: 55102-0600
Manufacturer: Molex Japan LLC
Mating connector: 54280-0609

◆ SGM7D-01G

• Servomotors with the Cable on the Side



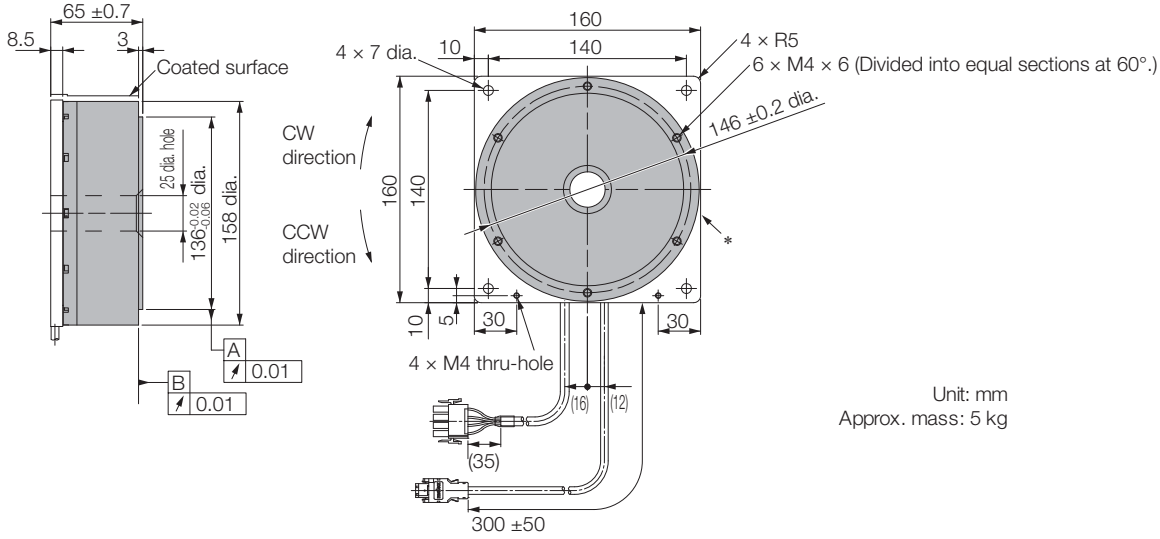
Unit: mm
Approx. mass: 3 kg

* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

◆ SGM7D-05G

• Servomotors with the Cable on the Side



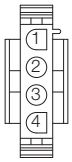
Unit: mm
Approx. mass: 5 kg

* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

◆ Connector Specifications

• Servomotor Connector



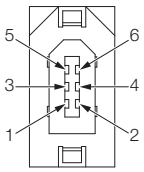
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green

Models
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350570-3 or 350689-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

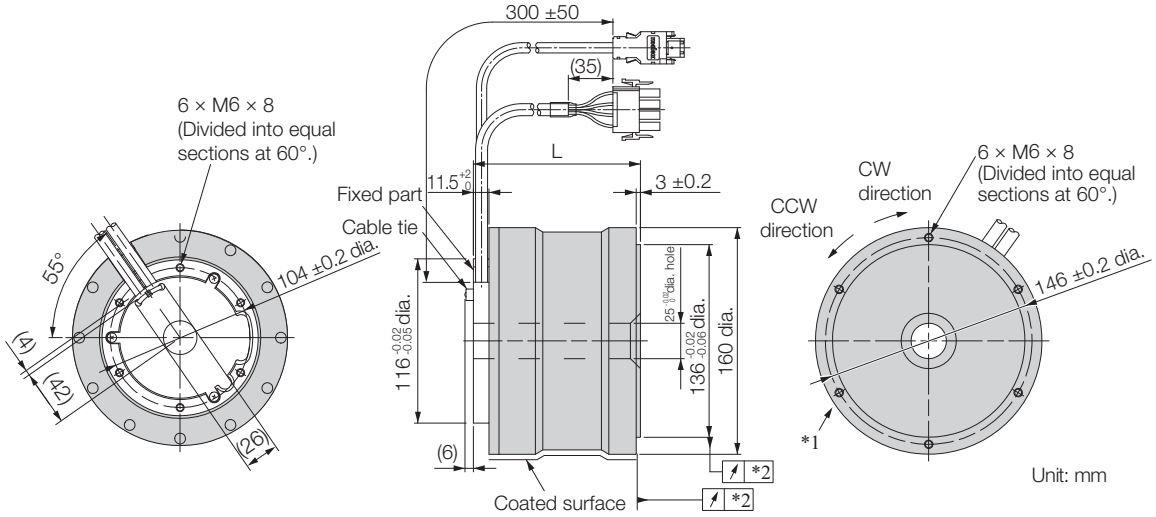
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

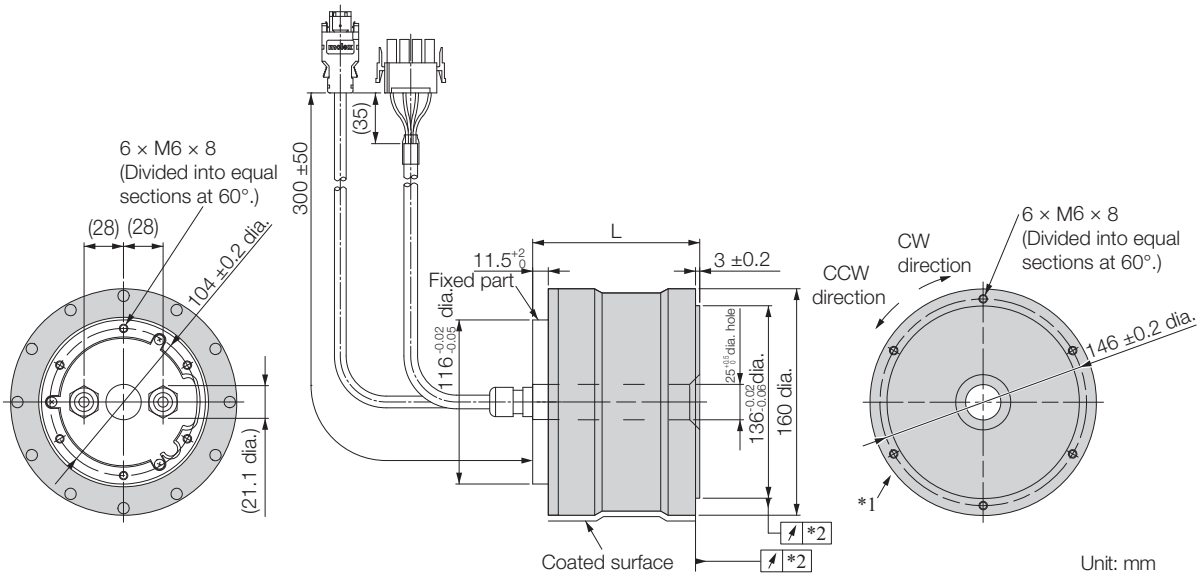
◆ SGM7D-08G, -18G, -24G, -34G, and -45G

• Servomotors with the Cable on the Bottom



Unit: mm

• Servomotors with the Cable on the Bottom



Unit: mm

*1. The shaded section indicates the rotating parts.

*2. The precision depends on the option specification. Refer to the following section for details.

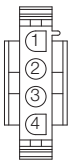
☞ *3.2.1 Specifications* on page 3-3

Note: Values in parentheses are reference dimensions.

Model SGM7D-	L	Approx. Mass [kg]
08G□C□□	92.5 ±1	5.5
18G□C□□	118 ±1	7.5
24G□C□□	143 ±1	9.5
34G□C□□	168 ±1	12
45G□C□□	194 ±1	14

◆ Connector Specifications

• Servomotor Connector



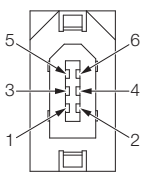
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350536-3 or 350550-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

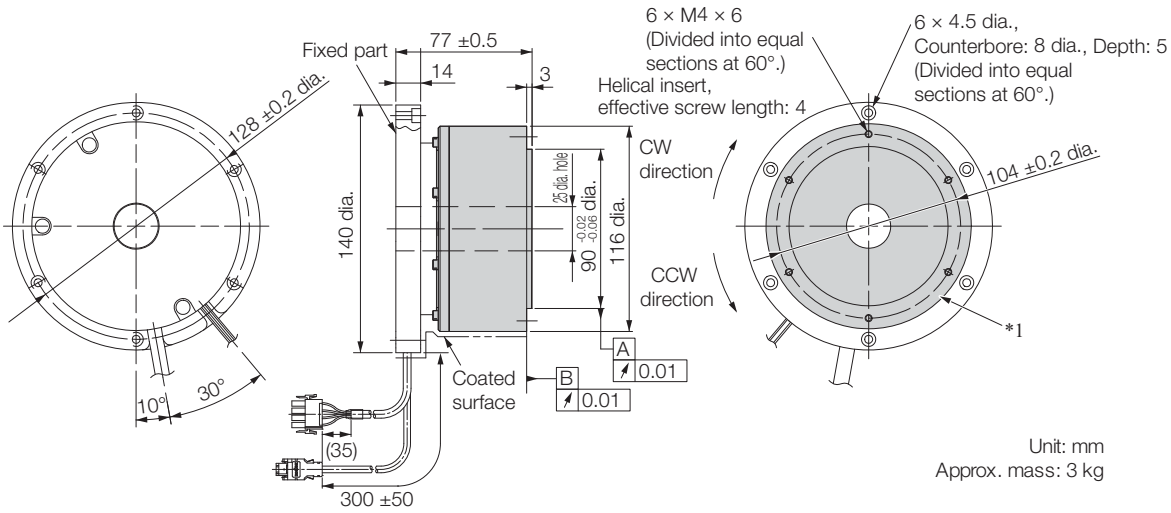
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

◆ SGM7D-03H

• Servomotors with the Cable on the Side



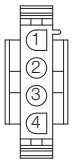
Unit: mm
Approx. mass: 3 kg

* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

◆ Connector Specifications

• Servomotor Connector



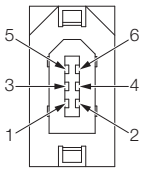
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green

Models
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350570-3 or 350689-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

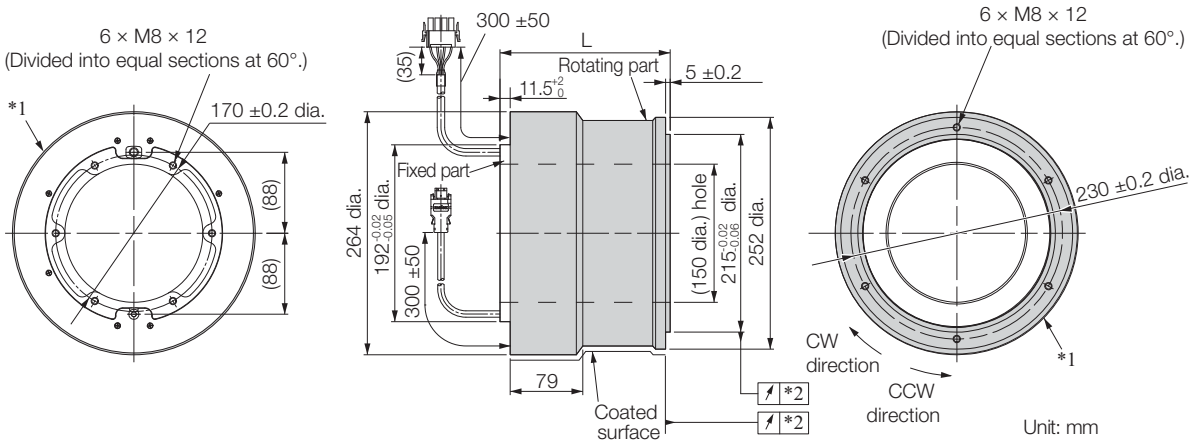
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

◆ SGM7D-□□I

• Servomotors with the Cable on the Bottom



*1. The shaded section indicates the rotating parts.

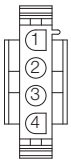
*2. The precision depends on the option specification. Refer to the following section for details.
☞ *3.2.1 Specifications* on page 3-3

Note: Values in parentheses are reference dimensions.

Model SGM7D-	L	Approx. Mass [kg]
28I□C5□	158 ±1	23
70I□C5□	185 ±1	28
1ZI□C5□	212 ±1	33
1CI□C5□	250 ±1	45
2BI□C5□	304 ±1	55
2DI□C5□	358 ±1	65

◆ Connector Specifications

• Servomotor Connector



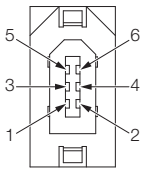
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350536-3 or 350550-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

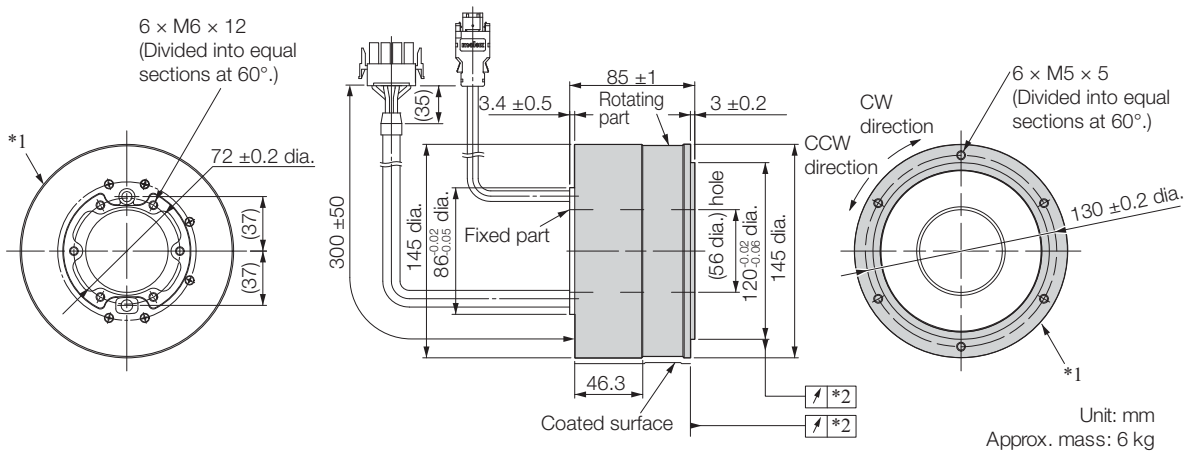
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

◆ SGM7D-06J

• Servomotors with the Cable on the Bottom



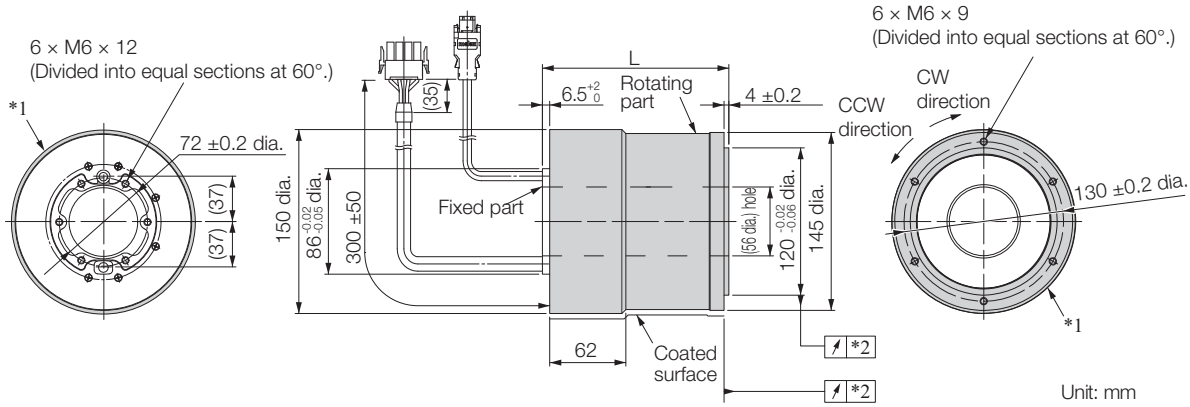
*1. The shaded section indicates the rotating parts.

*2. The precision depends on the option specification. Refer to the following section for details.
☞ *3.2.1 Specifications* on page 3-3

Note: Values in parentheses are reference dimensions.

◆ SGM7D-09J, -18J, -20J, and -38J

• Servomotors with the Cable on the Bottom



*1. The shaded section indicates the rotating parts.

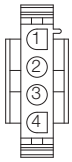
*2. The precision depends on the option specification. Refer to the following section for details.
☞ *3.2.1 Specifications* on page 3-3

Note: Values in parentheses are reference dimensions.

Model SGM7D-	L	Approx. Mass [kg]
09J□C5□	123 ±1	8.0
18J□C5□	151 ±1	11.0
20J□C5□	179 ±1	13.0
38J□C5□	207 ±1	15.5

◆ Connector Specifications

• Servomotor Connector



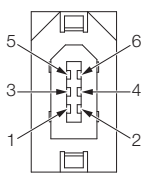
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350536-3 or 350550-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

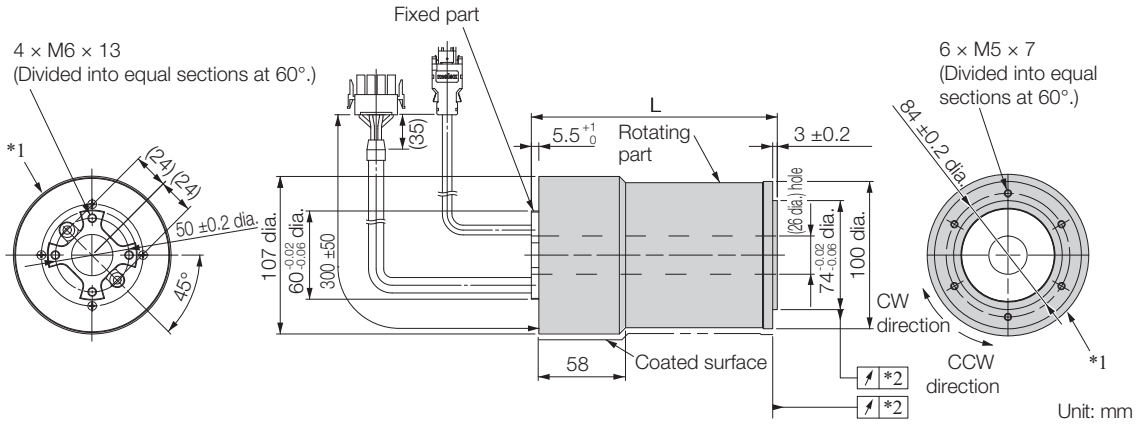
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

◆ SGM7D-□□K

• Servomotors with the Cable on the Bottom



*1. The shaded section indicates the rotating parts.

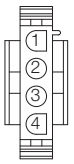
*2. The precision depends on the option specification. Refer to the following section for details.
☞ *3.2.1 Specifications* on page 3-3

Note: Values in parentheses are reference dimensions.

Model SGM7D-	L	Approx. Mass [kg]
02K□C5□	113 ±1	4.0
06K□C5□	140 ±1	5.0
08K□C5□	167 ±1	6.5

◆ Connector Specifications

• Servomotor Connector



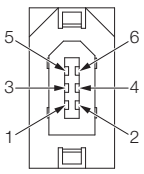
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green

Models
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350570-3 or 350689-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

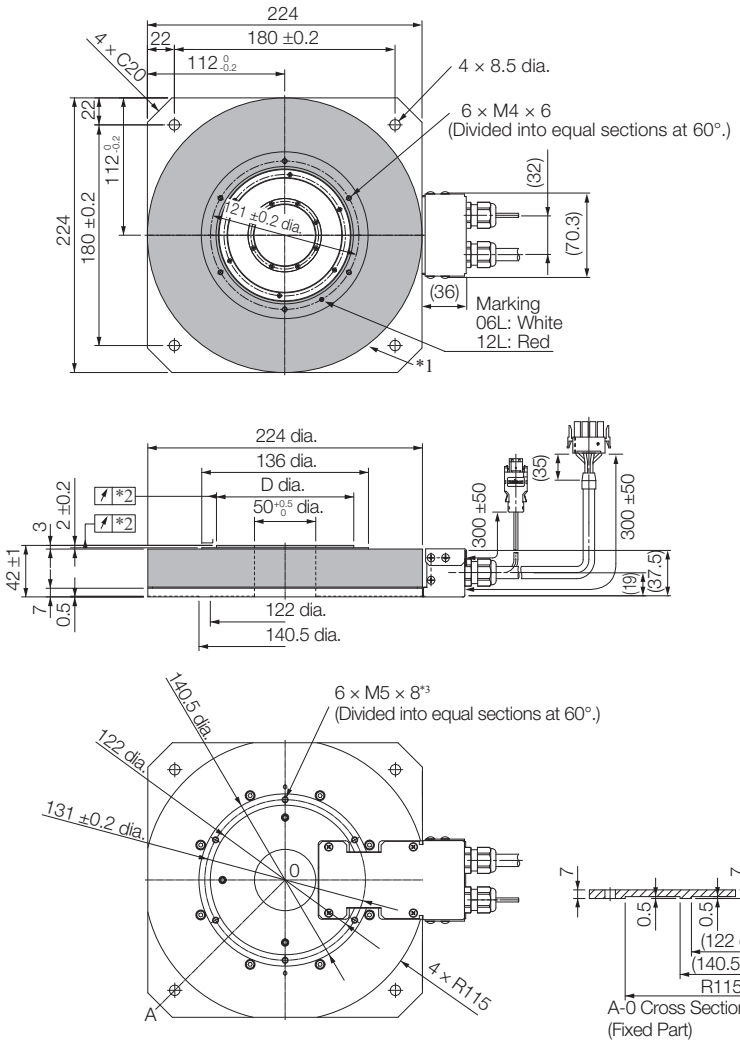
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

◆ SGM7D-06L and -12L

• Servomotors with the Cable on the Side



Unit: mm
Approx. mass: 8.1 kg

*1. The shaded section indicates the rotating parts.

*2. The precision depends on the option specification. Refer to the following section for details.
☞ *3.2.1 Specifications* on page 3-3

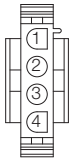
*3. In the following cases, rigidity is required in the Servomotor. Therefore, secure the Servomotor with these holes.
- There is a fluctuating vertical load on the Servomotor.
- There is a moment load on the Servomotor.
- The Servomotor is used hanging upside down.

Note: Values in parentheses are reference dimensions.

Model SGM7D-	D
□□L□C41 (Standard mechanical precision)	112 -0.02 -0.06
□□L□C42 (High mechanical precision)	111.9 -0.02 -0.06

◆ Connector Specifications

• Servomotor Connector



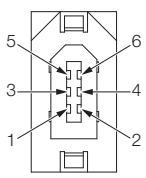
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350536-3 or 350550-3

• Encoder Connector

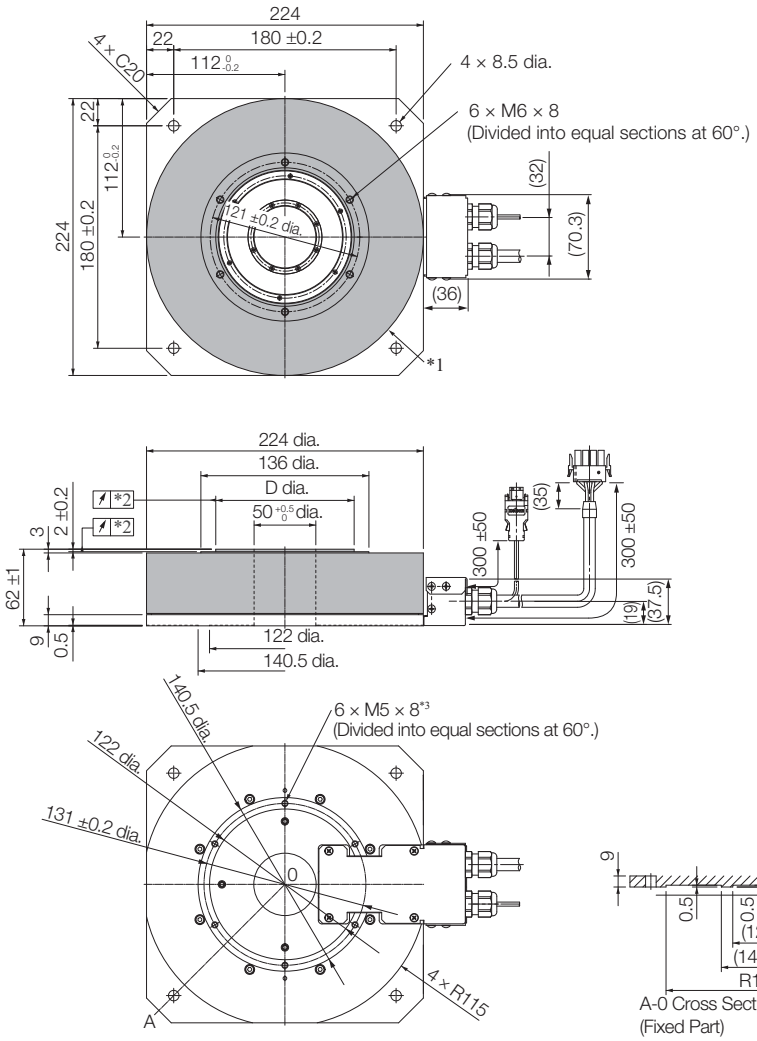


1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.
Model: 55102-0600
Manufacturer: Molex Japan LLC
Mating connector: 54280-0609

◆ SGM7D-30L

• Servomotors with the Cable on the Side



Unit: mm
Approx. mass: 11.8 kg

*1. The shaded section indicates the rotating parts.

*2. The precision depends on the option specification. Refer to the following section for details.
☞ *3.2.1 Specifications* on page 3-3

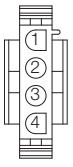
*3. In the following cases, rigidity is required in the Servomotor. Therefore, secure the Servomotor with these holes.
- There is a fluctuating vertical load on the Servomotor.
- There is a moment load on the Servomotor.
- The Servomotor is used hanging upside down.

Note: Values in parentheses are reference dimensions.

Model SGM7D-	D
30L□C41 (Standard mechanical precision)	$112^{-0.02}_{-0.06}$
30L□C42 (High mechanical precision)	$111.9^{-0.02}_{-0.06}$

◆ Connector Specifications

• Servomotor Connector



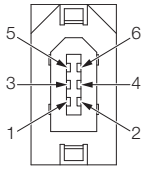
1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350536-3 or 350550-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

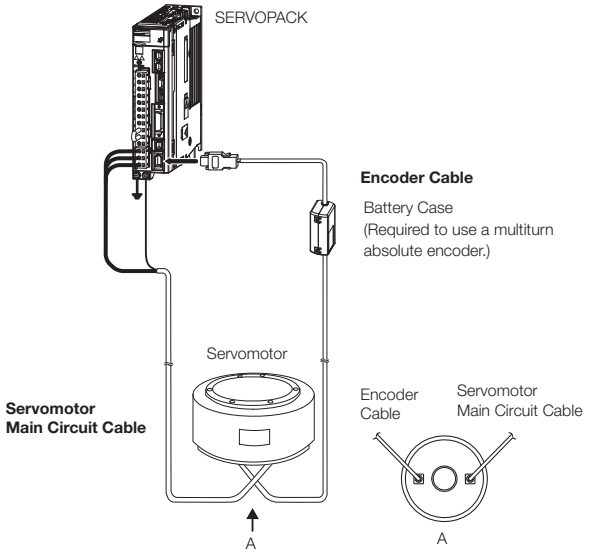
Model: 55102-0600
Manufacturer: Molex Japan LLC
Mating connector: 54280-0609

3.4 Selecting Cables

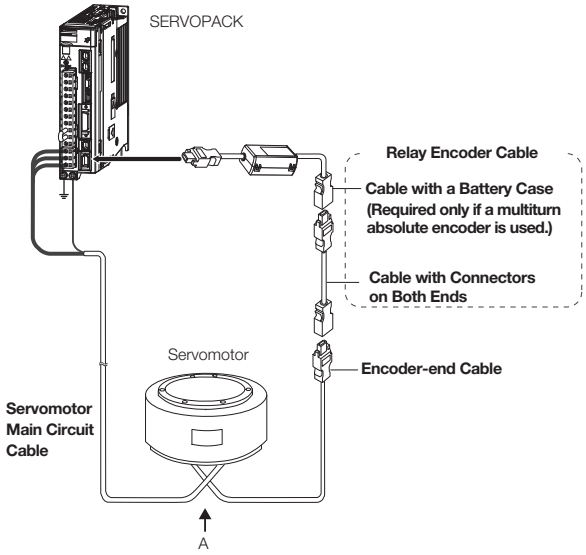
3.4.1 Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

Encoder Cable of 20 m or Less

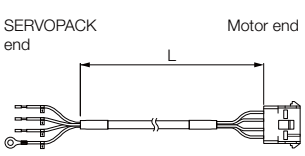
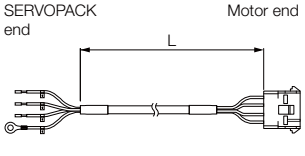


Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2. 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.
3. Refer to the following manual for the following information.
• Cable dimensional drawings and cable connection specifications
• Order numbers and specifications of individual connectors for cables
• Order numbers and specifications for wiring materials
📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

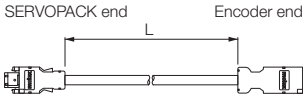
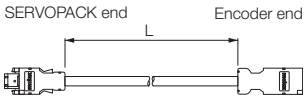
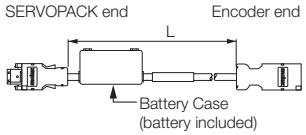
3.4.2 Servomotor Main Circuit Cables

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable*	
SGM7D-□□F SGM7D-08G to -45G SGM7D-□□I SGM7D-□□J SGM7D-□□L	3 m	JZSP-CMM00-03-E	JZSP-C7DM21-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-C7DM21-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-C7DM21-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-C7DM21-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-C7DM21-20-E	
SGM7D-01G or -05G SGM7D-□□H SGM7D-□□K	3 m	JZSP-CMM00-03-E	JZSP-CMM01-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-CMM01-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-CMM01-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-CMM01-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-CMM01-20-E	

* Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.

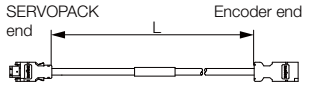
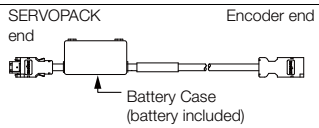
Note: Direct Drive Servomotors are not available with holding brakes.

3.4.3 Encoder Cables of 20 m or Less

Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable*1	
All SGM7D models	For incremental encoder: Without Battery Case	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
	For multiturn absolute encoder: Without Battery Case*2	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
	For multiturn absolute encoder: With Battery Case	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
		5 m	JZSP-CSP19-05-E	JZSP-CSP29-05-E	
		10 m	JZSP-CSP19-10-E	JZSP-CSP29-10-E	
		15 m	JZSP-CSP19-15-E	JZSP-CSP29-15-E	
		20 m	JZSP-CSP19-20-E	JZSP-CSP29-20-E	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 46 mm or larger.
*2. Use one of these Cables if a battery is connected to the host controller.

3.4.4 Relay Encoder Cables of 30 m to 50 m

Servomotor Model	Name	Length (L)	Order Number*1	Appearance
All SGM7D models	Cables with Connectors on Both Ends (for incremental or multiturn absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
	Cable with a Battery Case (for multiturn absolute encoder)*2	0.3 m	JZSP-CSP12-E	

*1. Flexible Cables are not available.
*2. This Cable is not required if a battery is connected to the host controller.

3.4.4 Relay Encoder Cables of 30 m to 50 m

Specifications, Ratings, and External Dimensions of SGM7E Servomotors

4

This chapter describes how to interpret the model numbers of SGM7E Servomotors and gives their specifications, ratings, and external dimensions.

4.1 Model Designations 4-2

4.2 Specifications and Ratings 4-3

4.2.1 Specifications 4-3
4.2.2 Ratings 4-4
4.2.3 Torque-Motor Speed Characteristics 4-5
4.2.4 Servomotor Overload Protection Characteristics 4-6
4.2.5 Allowable Load Moment of Inertia 4-7

4.3 External Dimensions 4-9

4.3.1 Connector Specifications 4-13

4.4 Selecting Cables 4-14

4.4.1 Cable Configurations 4-14
4.4.2 Servomotor Main Circuit Cables 4-14
4.4.3 Encoder Cables of 20 m or Less 4-15
4.4.4 Relay Encoder Cables of 30 m to 50 m 4-16

4.1 Model Designations

SGM7E - 02 B 7 A 1 1

Direct Drive Servomotors: SGM7E

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

1st+2nd digits Rated Output

Code	Specification
02	2.00 N·m
04	4.00 N·m
05	5.00 N·m
07	7.00 N·m
08	8.00 N·m
10	10.0 N·m
14	14.0 N·m
16	16.0 N·m
17	17.0 N·m
25	25.0 N·m
35	35.0 N·m

3rd digit Servomotor Outer Diameter

Code	Specification
B	135-mm dia.
C	175-mm dia.
D	230-mm dia.
E	290-mm dia.

4th digit Serial Encoder

Code	Specification
7	24-bit multiturn absolute encoder*
F	24-bit incremental encoder*

5th digit Design Revision Order

A

6th digit Flange

Code	Mounting
1	Non-load side
4	Non-load side (with cable on side)

7th digit Options

Code	Specification
1	Without options
2	High machine precision (runout at end of shaft and runout of shaft surface: 0.01 mm)

* The encoder can be used as a single-turn absolute encoder by setting a parameter.

Note: 1. Direct Drive Servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

◆ Manufactured Models

Rated Torque N·m	Servomotor Outer Diameter			
	B (135-mm dia.)	C (175-mm dia.)	D (230-mm dia.)	E (290-mm dia.)
2.00	SGM7E-02B	–	–	–
4.00	–	SGM7E-04C	–	–
5.00	SGM7E-05B	–	–	–
7.00	SGM7E-07B	–	–	–
8.00	–	–	SGM7E-08D	–
10.0	–	SGM7E-10C	–	–
14.0	–	SGM7E-14C	–	–
16.0	–	–	–	SGM7E-16E
17.0	–	–	SGM7E-17D	–
25.0	–	–	SGM7E-25D	–
35.0	–	–	–	SGM7E-35E

Note: The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

4.2 Specifications and Ratings

4.2.1 Specifications

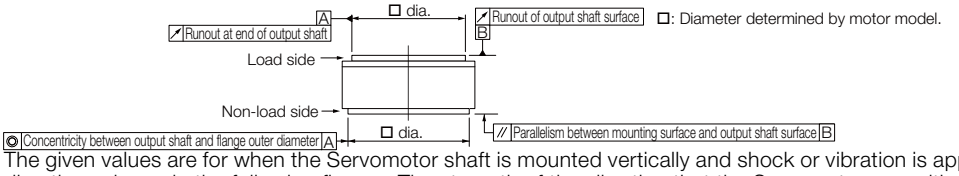
Voltage			200 V									
Model SGM7E-			02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E
Time Rating			Continuous										
Thermal Class			A										
Insulation Resistance			500 VDC, 10 MΩ min.										
Withstand Voltage			1,500 VAC for 1 minute										
Excitation			Permanent magnet										
Mounting			Flange-mounted										
Drive Method			Direct drive										
Rotation Direction			Counterclockwise (CCW) for forward reference when viewed from the load side										
Vibration Class*1			V15										
Absolute Accuracy*2			±15 s										
Repeatability			±1.3 s										
Protective Structure*3			Totally enclosed, self-cooled, IP42 (The protective structure is IP40 for CE Marking.)										
Environmental Conditions	Surrounding Air Temperature		0°C to 40°C (with no freezing)										
	Surrounding Air Humidity		20% to 80% relative humidity (with no condensation)										
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.										
	Storage Environment		Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)										
Mechanical Tolerances*4	Runout of Output Shaft Surface	mm	0.02 (0.01 for high machine precision option)										
	Runout at End of Output Shaft	mm	0.04 (0.01 for high machine precision option)										
	Parallelism between Mounting Surface and Output Shaft Surface	mm	0.07						0.08				
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.07						0.08				
Shock Resistance*5	Impact Acceleration Rate at Flange		490 m/s^2										
	Number of Impacts		2 times										
Vibration Resistance*5	Vibration Acceleration Rate at Flange		49 m/s^2										
Applicable SERVOPACKs	SGD7S-		2R8A, 2R1F					2R8A, 2R8F					5R5A
	SGD7W- SGD7C-		2R8A										

*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

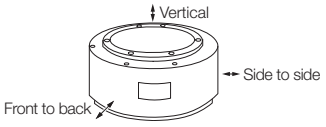
*2. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.

*3. The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used. The protective structure is IP40 for CE Marking.

*4. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*5. The given values are for when the Servomotor shaft is mounted vertically and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



4.2.2 Ratings

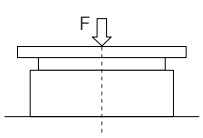
Voltage			200 V									
Model SGM7E-			02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E
Rated Output*1		W	42	105	147	84	209	293	168	356	393	335	550
Rated Torque*1, *2		N·m	2.00	5.00	7.00	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Instantaneous Maximum Torque*1		N·m	6.00	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque*1		N·m	2.05	5.15	7.32	4.09	10.1	14.2	8.23	17.4	25.4	16.5	35.6
Rated Current*1		Arms	1.8	1.7	1.4	2.2		2.8	1.9	2.5	2.6	3.3	3.5
Instantaneous Maximum Current*1		Arms	5.4	5.1	4.1	7.0		8.3	5.6	7.5	8.0	9.4	10.0
Rated Motor Speed*1		min^{-1}	200			200			200		150	200	150
Maximum Motor Speed*1		min^{-1}	500			500	400	300	500	350	250	500	250
Torque Constant		N·m/Arms	1.18	3.17	5.44	2.04	5.05	5.39	5.10	7.79	10.8	5.58	11.1
Motor Moment of Inertia		$\times 10^{-4}$ $kg \cdot m^2$	28.0	51.0	77.0	77.0	140	220	285	510	750	930	1430
Rated Power Rate*1		kW/s	1.43	4.90	6.36	2.08	7.14	8.91	2.25	5.67	8.33	2.75	8.57
Rated Angular Acceleration Rate*1		rad/s^2	710	980	910	520	710	640	280	330		170	240
Heat Sink Size		mm	350 × 350 × 12			450 × 450 × 12			550 × 550 × 12			650 × 650 × 12	
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			10 times				5 times	3 times					
	With External Regenerative Resistor and External Dynamic Brake Resistor*3		10 times				5 times	3 times					
Allowable Load*4	Allowable Thrust Load	N	1500			3300			4000			11000	
	Allowable Moment Load	N·m	40	50	64	70	75	90	93	103	135	250	320

*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

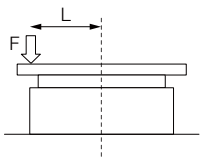
*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

*3. To externally connect dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect 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-1R6AMAA020 to -2R8AMAA020

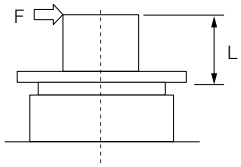
*4. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L

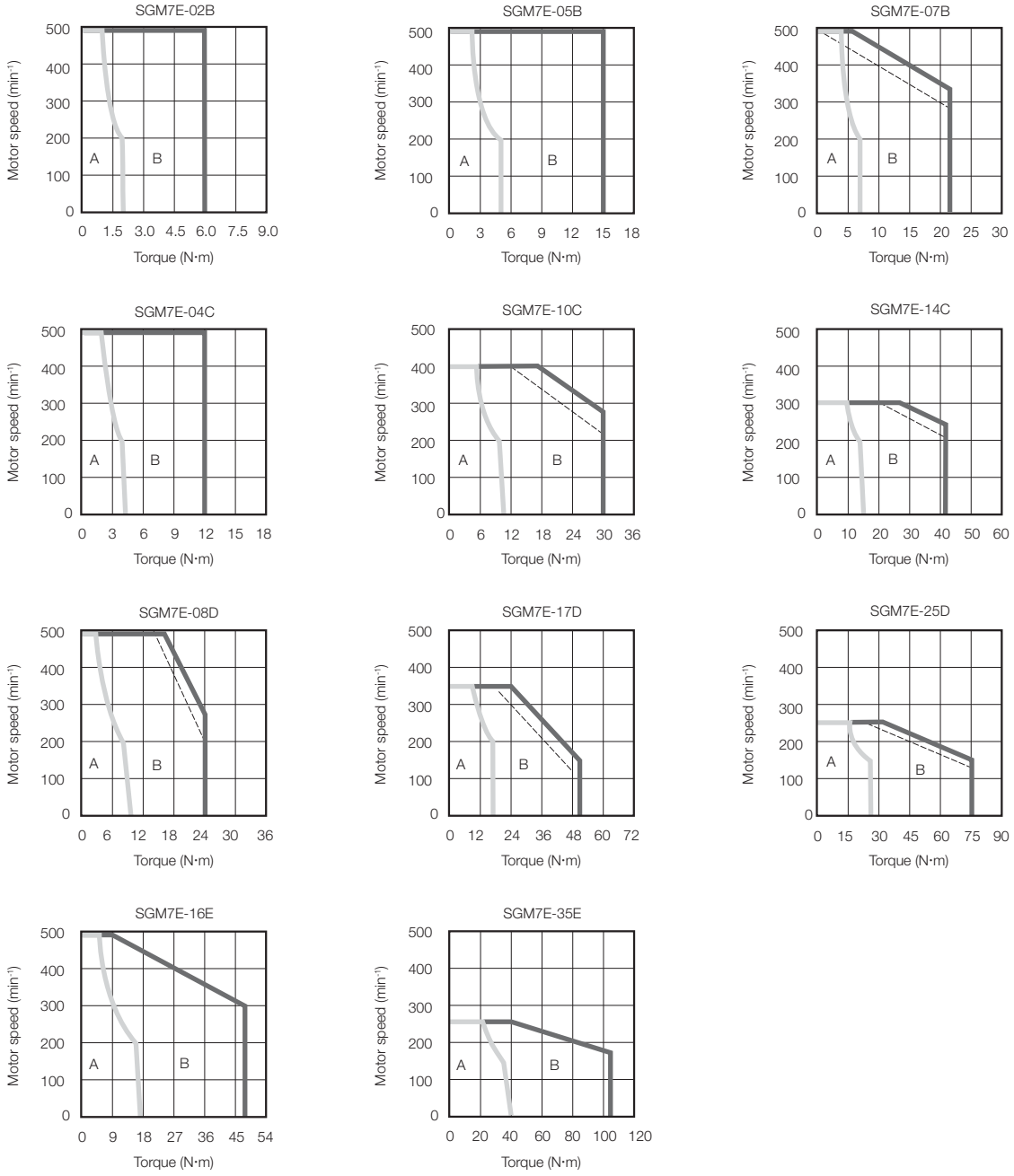


Where F is the external force,
Thrust load = Load mass
Moment load = F × L

Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

4.2.3 Torque-Motor Speed Characteristics

A : Continuous duty zone ——— (solid lines): With three-phase 200-V input
B : Intermittent duty zone - - - - - - - - (dotted lines): With single-phase 100-V input

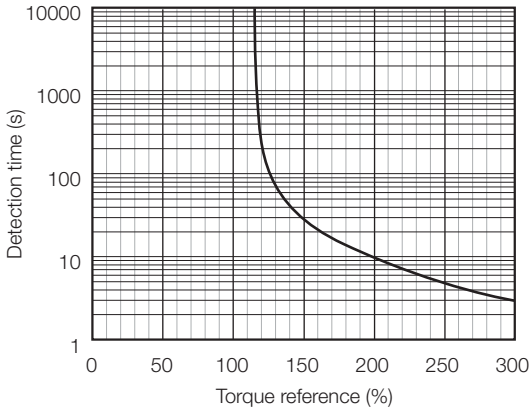


Note: 1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable 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.

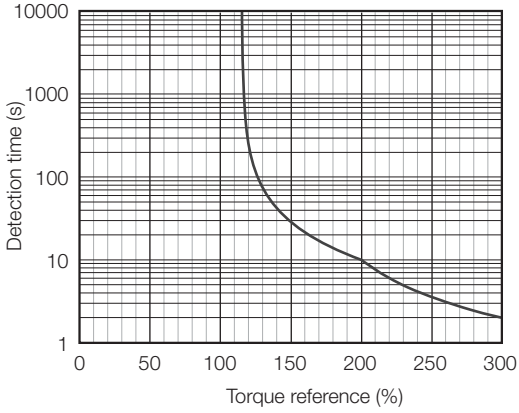
4.2.4 Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.

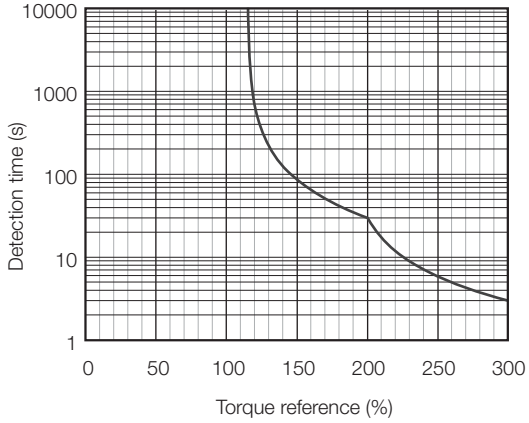
SGM7E-02B, -05B, -07B, -10C, -17D, and -35E



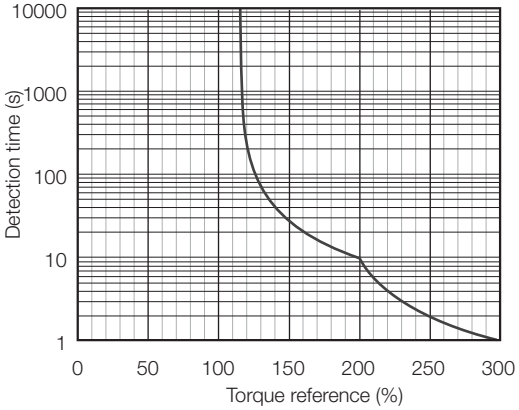
SGM7E-04C



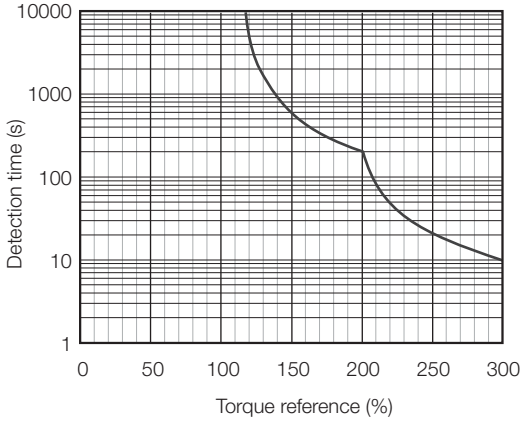
SGM7E-14C



SGM7E-08D and -16E



SGM7E-25D



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
Use the Servomotor so that the effective force remains within the continuous duty zone. Refer to the following section for the effective torque.
☞ *4.2.3 Torque-Motor Speed Characteristics* on page 4-5

4.2.5 Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the *4.2.2 Ratings* on page 4-4. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

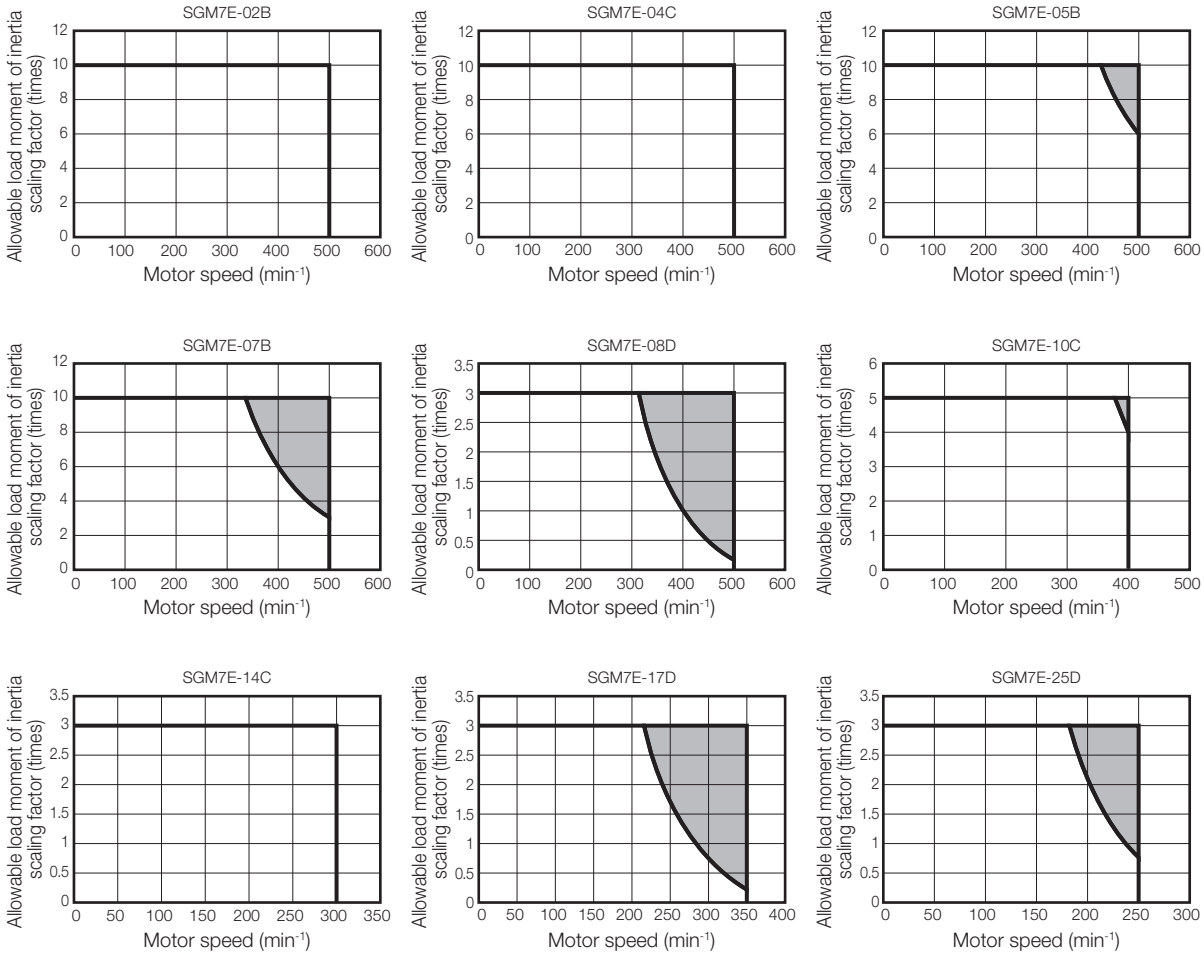
- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

Information 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).
Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.
Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



Note: Applicable SERVOPACK models: SGD7S-2R8A and -2R8F

When an External Regenerative Resistor Is Required

Install the External Regenerative Resistor.

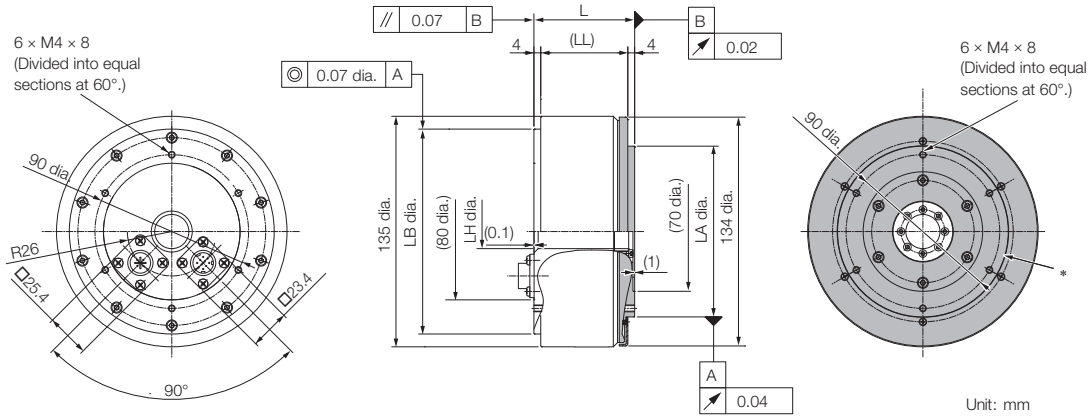
Refer to the following catalog for information on External Regenerative Resistors.

📖 AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

4.3 External Dimensions

◆ SGM7E-□□B

• Flange Specification 1

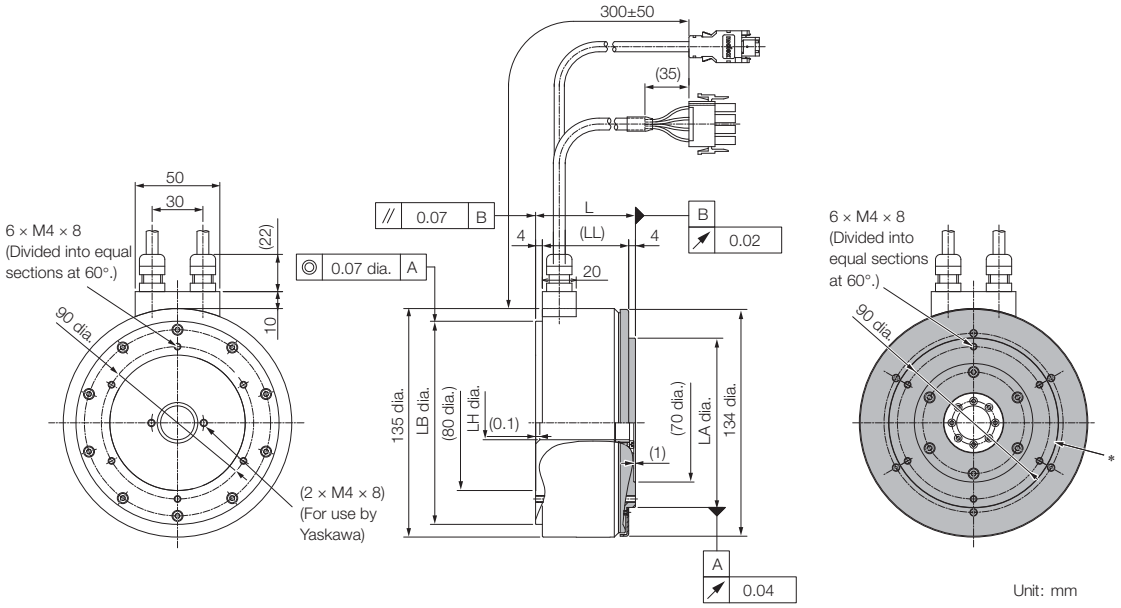


* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7E-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02B□A11	59	51	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	4.8
05B□A11	88	80	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	5.8
07B□A11	128	120	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	8.2

• Flange Specification 4



* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

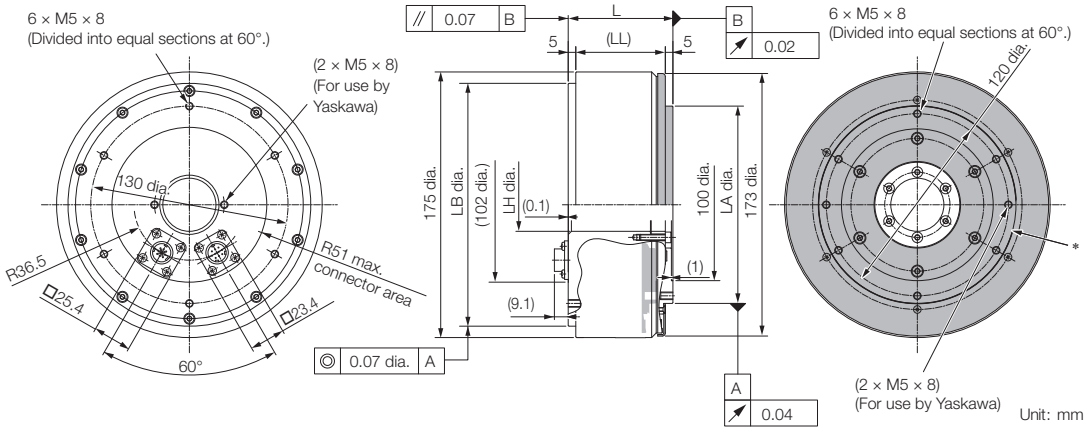
Model SGM7E-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02B□A41	59	51	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	4.8
05B□A41	88	80	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	5.8
07B□A41	128	120	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	8.2

Refer to the following section for information on connectors.

☞ *4.3.1 Connector Specifications* on page 4-13

◆ SGM7E-□□C

• Flange Specification 1

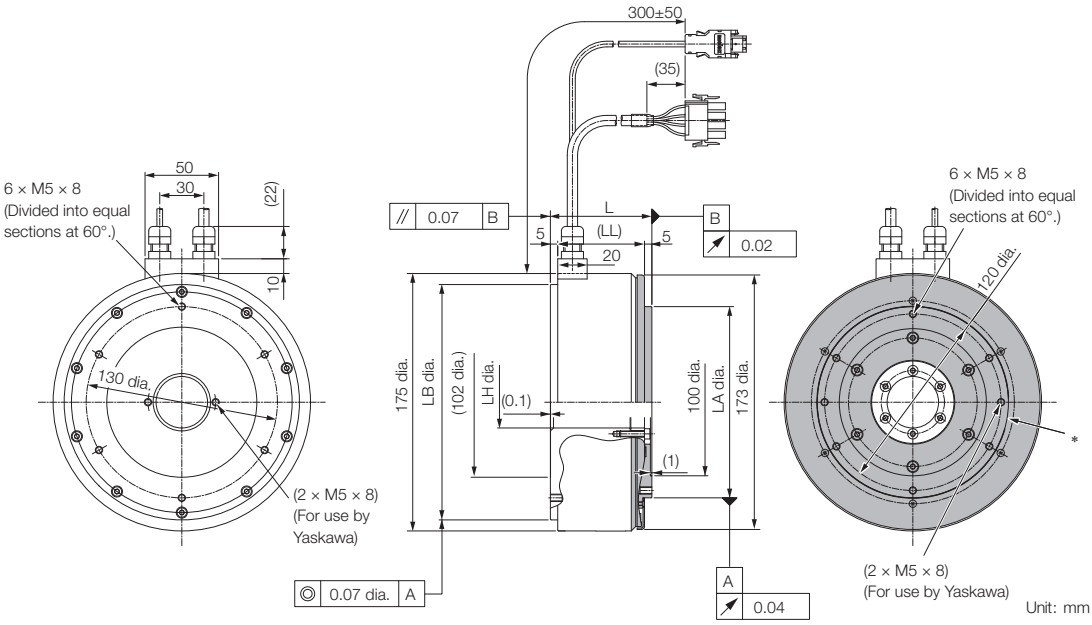


* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7E-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04C□A11	69	59	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	7.2
10C□A11	90	80	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	10.2
14C□A11	130	120	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	14.2

• Flange Specification 4



* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

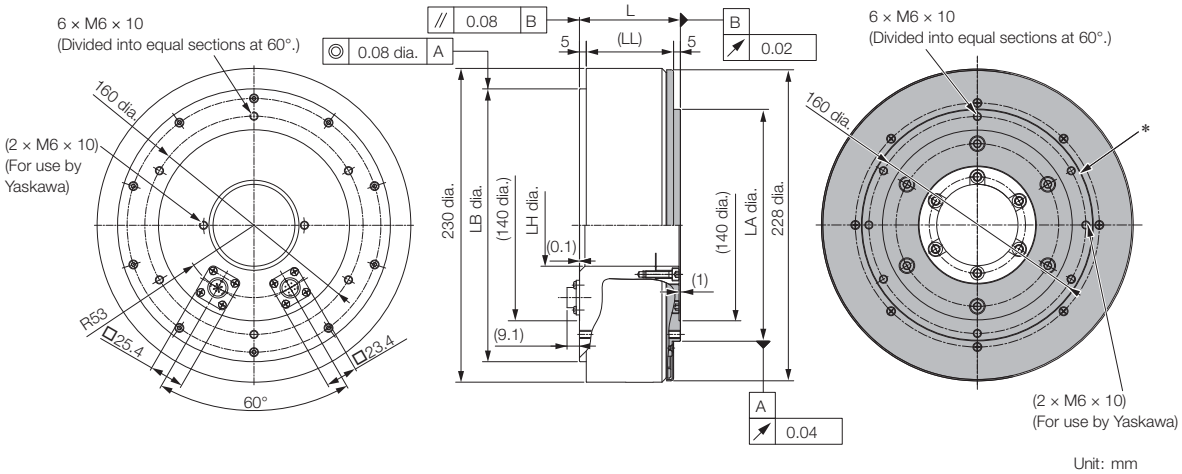
Model SGM7E-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04C□A41	69	59	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	7.2
10C□A41	90	80	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	10.2
14C□A41	130	120	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	14.2

Refer to the following section for information on connectors.

☞ *4.3.1 Connector Specifications* on page 4-13

◆ SGM7E-□□D

• Flange Specification 1



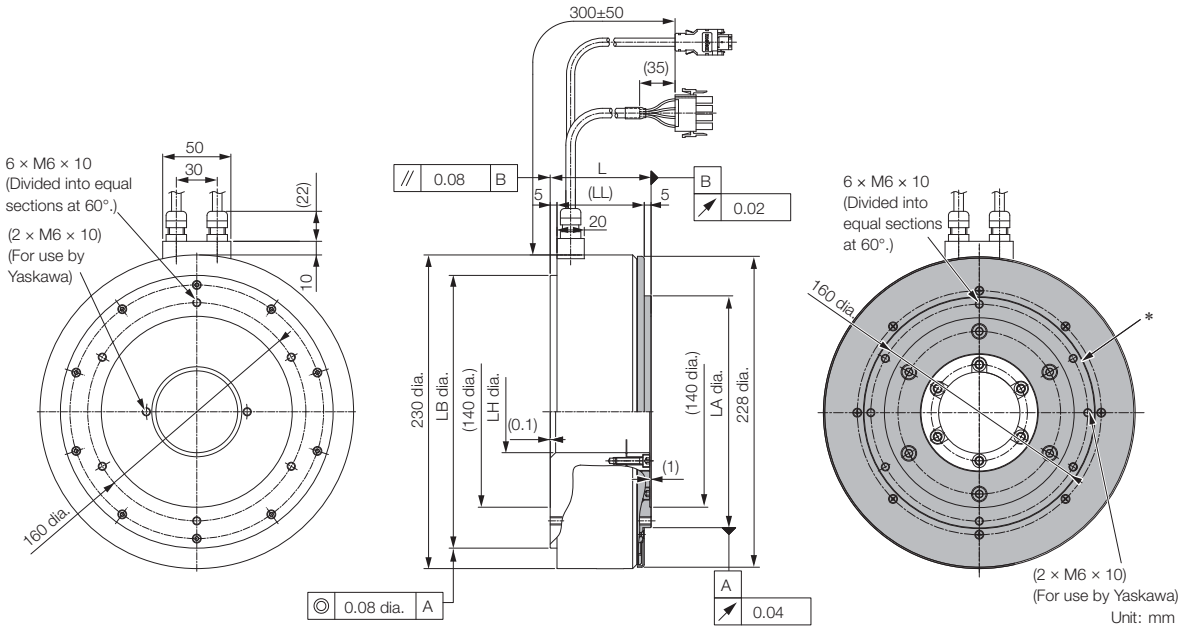
Unit: mm

* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7E-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08D□A11	74	64	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	14.0
17D□A11	110	100	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	22.0
25D□A11	160	150	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	29.7

• Flange Specification 4



Unit: mm

* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

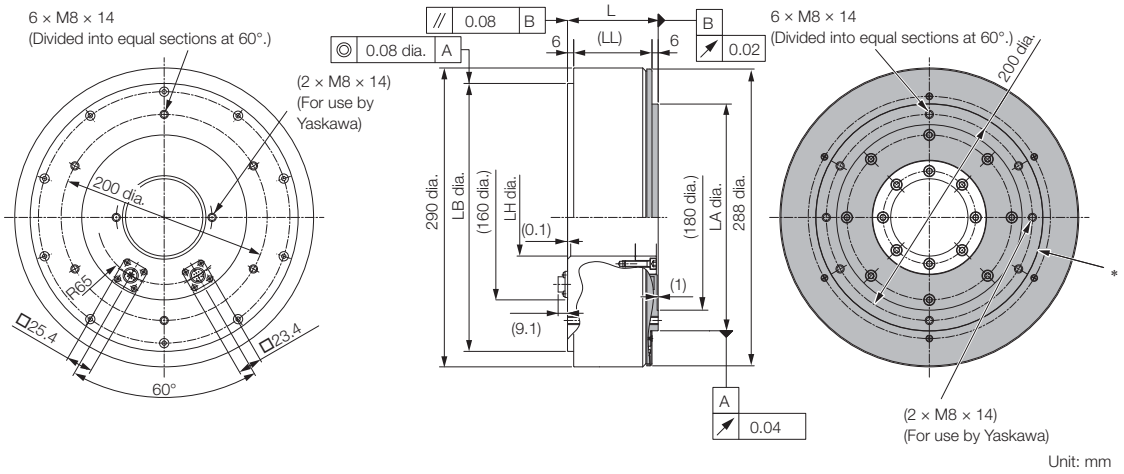
Model SGM7E-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08D□A41	74	64	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	14.0
17D□A41	110	100	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	22.0
25D□A41	160	150	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	29.7

Refer to the following section for information on connectors.

☞ *4.3.1 Connector Specifications* on page 4-13

◆ SGM7E-□□E

• Flange Specification 1



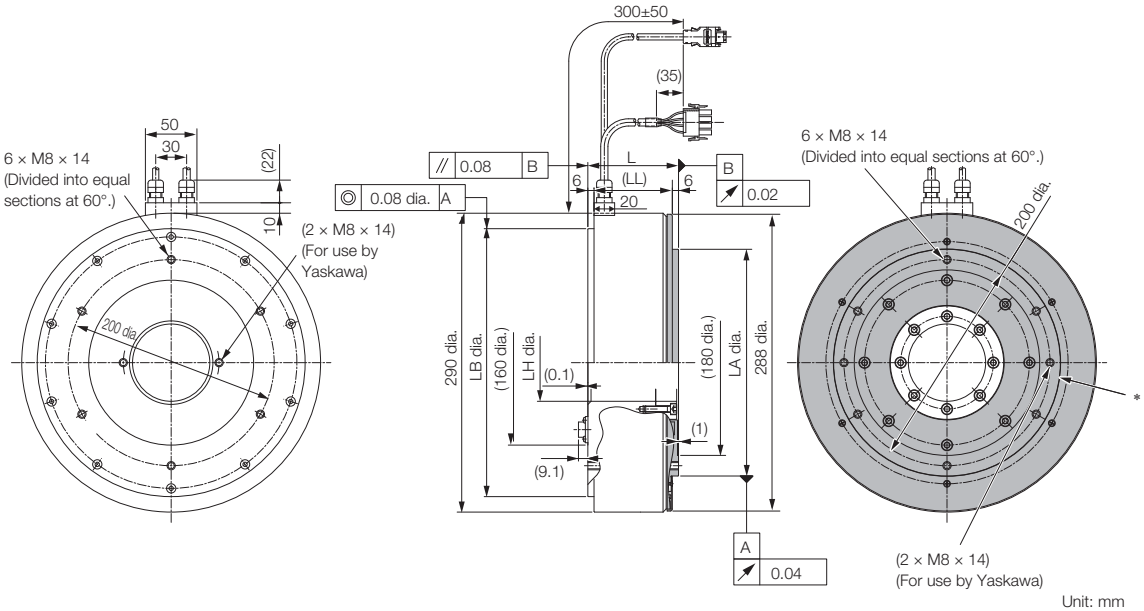
Unit: mm

* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7E-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16E□A11	88	76	$260^{\ 0}_{-0.052}$	$75^{+0.4}_{\ 0}$	$220^{\ 0}_{-0.046}$	26.0
35E□A11	112	100	$260^{\ 0}_{-0.052}$	$75^{+0.4}_{\ 0}$	$220^{\ 0}_{-0.046}$	34.0

• Flange Specification 4



Unit: mm

* The shaded section indicates the rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7E-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16E□A41	88	76	$260^{\ 0}_{-0.052}$	$75^{+0.4}_{\ 0}$	$220^{\ 0}_{-0.046}$	26.0
35E□A41	112	100	$260^{\ 0}_{-0.052}$	$75^{+0.4}_{\ 0}$	$220^{\ 0}_{-0.046}$	34.0

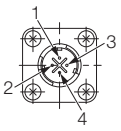
Refer to the following section for information on connectors.

☞ *4.3.1 Connector Specifications* on page 4-13

4.3.1 Connector Specifications

◆ Flange Specification 1

• Servomotor Connector

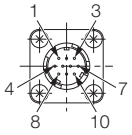


1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Model: JN1AS04MK2R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1
(Not provided by Yaskawa.)

• Encoder Connector



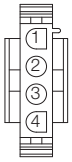
1	PS
2	/PS
3	–
4	PG5V
5*	BAT0
6	–
7	FG (frame ground)
8*	BAT
9	PG0V
10	–

* Only absolute-value models with multiturn data.
Model: JN1AS10ML1-R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1
(Not provided by Yaskawa.)

◆ Flange Specification 4

• Servomotor Connector

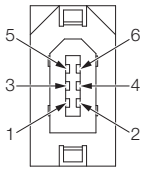


1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
• Plug: 350779-1
• Pins: 350561-3 or 350690-3 (No.1 to 3)
• Ground pin: 350654-1 or 350669-1 (No. 4)
Manufacturer: TE Connectivity Japan G.K.

Mating Connector
• Cap: 350780-1
• Socket: 350570-3 or 350689-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.
Model: 55102-0600
Manufacturer: Molex Japan LLC

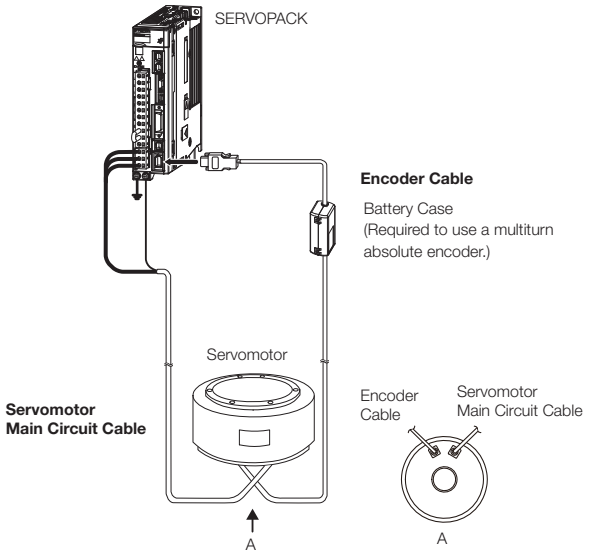
Mating connector: 54280-0609

4.4 Selecting Cables

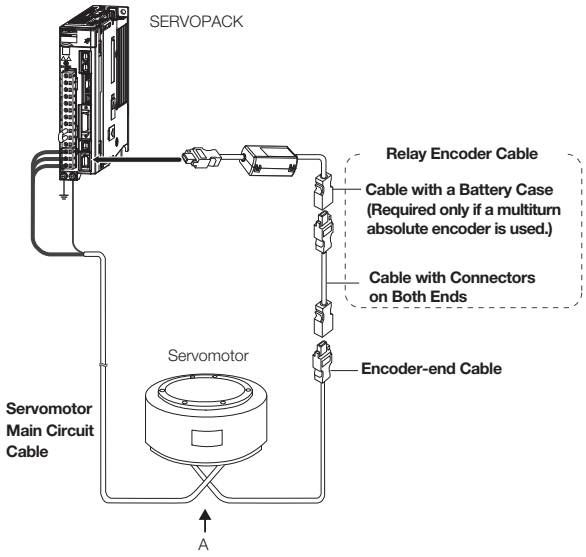
4.4.1 Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

Encoder Cable of 20 m or Less

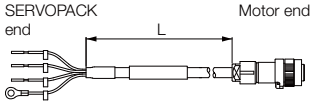
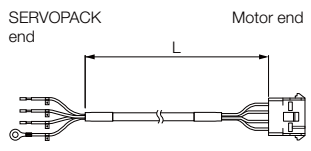


Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2. 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.
3. Refer to the following manual for the following information.
• Cable dimensional drawings and cable connection specifications
• Order numbers and specifications of individual connectors for cables
• Order numbers and specifications for wiring materials
Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

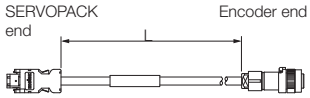
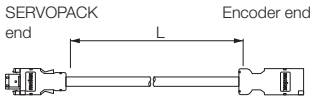
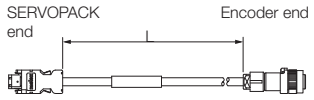
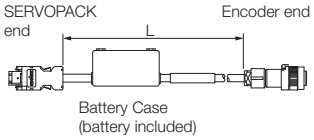
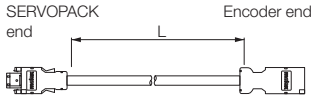
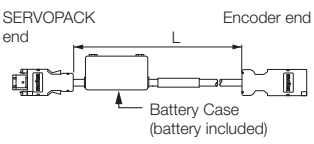
4.4.2 Servomotor Main Circuit Cables

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable*1	
SGM7E-□□□□ Flange specification*2: 1	3 m	JZSP-CMM60-03-E	JZSP-C7MDN23-03-E	
	5 m	JZSP-CMM60-05-E	JZSP-C7MDN23-05-E	
	10 m	JZSP-CMM60-10-E	JZSP-C7MDN23-10-E	
	15 m	JZSP-CMM60-15-E	JZSP-C7MDN23-15-E	
	20 m	JZSP-CMM60-20-E	JZSP-C7MDN23-20-E	
SGM7E-□□□□ Flange specification*2: 4	3 m	JZSP-CMM00-03-E	JZSP-C7MDS23-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-C7MDS23-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-C7MDS23-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-C7MDS23-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-C7MDS23-20-E	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
*2. Refer to the following section for the flange specifications.
4.1 Model Designations on page 4-2

Note: Direct Drive Servomotors are not available with holding brakes.

4.4.3 Encoder Cables of 20 m or Less

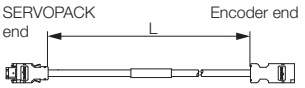
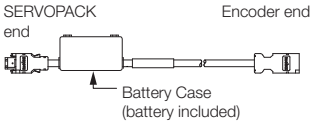
Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable*1	
SGM7E-□□□F Flange specification*2: 1	For incremental encoder	3 m	JZSP-CMP60-03-E	JZSP-CSP60-03-E	
		5 m	JZSP-CMP60-05-E	JZSP-CSP60-05-E	
		10 m	JZSP-CMP60-10-E	JZSP-CSP60-10-E	
		15 m	JZSP-CMP60-15-E	JZSP-CSP60-15-E	
		20 m	JZSP-CMP60-20-E	JZSP-CSP60-20-E	
SGM7E-□□□F Flange specification*2: 4		3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
SGM7E-□□□7 Flange specification*2: 1	For multiturn absolute encoder (without Battery Case*3)	3 m	JZSP-C7PI00-03-E	JZSP-C7PI20-03-E	
		5 m	JZSP-C7PI00-05-E	JZSP-C7PI20-05-E	
		10 m	JZSP-C7PI00-10-E	JZSP-C7PI20-10-E	
		15 m	JZSP-C7PI00-15-E	JZSP-C7PI20-15-E	
		20 m	JZSP-C7PI00-20-E	JZSP-C7PI20-20-E	
	For multiturn absolute encoder (with Battery Case)	3 m	JZSP-C7PA00-03-E	JZSP-C7PA20-03-E	
		5 m	JZSP-C7PA00-05-E	JZSP-C7PA20-05-E	
		10 m	JZSP-C7PA00-10-E	JZSP-C7PA20-10-E	
		15 m	JZSP-C7PA00-15-E	JZSP-C7PA20-15-E	
		20 m	JZSP-C7PA00-20-E	JZSP-C7PA20-20-E	
SGM7E-□□□7 Flange specification*2: 4	For multiturn absolute encoder (without Battery Case*3)	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
	For multiturn absolute encoder (with Battery Case)	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
		5 m	JZSP-CSP19-05-E	JZSP-CSP29-05-E	
		10 m	JZSP-CSP19-10-E	JZSP-CSP29-10-E	
		15 m	JZSP-CSP19-15-E	JZSP-CSP29-15-E	
		20 m	JZSP-CSP19-20-E	JZSP-CSP29-20-E	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 46 mm or larger.

*2. Refer to the following section for the flange specifications.
☞ *4.1 Model Designations* on page 4-2

*3. Use one of these Cables if a battery is connected to the host controller.

4.4.4 Relay Encoder Cables of 30 m to 50 m

Servomotor Model	Name	Length (L)	Order Number*1	Appearance
SGM7E-□□□F SGM7E-□□□7 Flange specification*2: 1	Encoder-end Cable (for single-turn/multiturn absolute encoder)	0.3 m	JZSP-C7PRC0-E	
SGM7E-□□□F SGM7E-□□□7 Flange specification*2: 1 or 4	Cables with Connectors on Both Ends (for single-turn/multiturn absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
SGM7E-□□□7 Flange specification*2: 1 or 4	Cable with a Battery Case (for multiturn absolute encoder)*3	0.3 m	JZSP-CSP12-E	

*1. Flexible Cables are not available.

*2. Refer to the following section for the flange specifications.
☞ *4.1 Model Designations* on page 4-2

*3. Use one of these Cables if a battery is connected to the host controller.

Specifications, Ratings, and External Dimensions of SGM7F Servomotors

5

This chapter describes how to interpret the model numbers of SGM7F Servomotors and gives their specifications, ratings, and external dimensions.

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5.1 Model Designations

SGM7F - 02 A 7 A 1 1

SGM7F	02	A	7	A	1	1
Direct Drive Servomotors: SGM7F	1st+2nd digits	3rd digit	4th digit	5th digit	6th digit	7th digit

1st+2nd digits Rated Output

● Small Capacity

Code	Specification
02	2.00 N·m
04	4.00 N·m
05	5.00 N·m
07	7.00 N·m
08	8.00 N·m
10	10.0 N·m
14	14.0 N·m
16	16.0 N·m
17	17.0 N·m
25	25.0 N·m
35	35.0 N·m

● Medium Capacity

Code	Specification
45	45.0 N·m
80	80.0 N·m
1A	110 N·m
1E	150 N·m
2Z	200 N·m

3rd digit Servomotor Outer Diameter

Code	Specification
A	100-mm dia.
B	135-mm dia.
C	175-mm dia.
D	230-mm dia.
M	280-mm dia.
N	360-mm dia.

4th digit Serial Encoder

Code	Specification
7	24-bit multiturn absolute encoder*
F	24-bit incremental encoder*

5th digit Design Revision Order

A

6th digit Flange

Code	Mounting	Servomotor Outer Diameter Code (3rd Digit)					
		A	B	C	D	M	N
1	Non-load side	✓	✓	✓	✓	–	–
	Load side	–	–	–	–	✓	✓
3	Non-load side	–	–	–	–	✓	✓
4	Non-load side (with cable on side)	✓	✓	✓	✓	–	–

✓ : Applicable models.

7th digit Options

Code	Specification
1	Without options
2	High machine precision (runout at end of shaft and runout of shaft surface: 0.01 mm)

* The encoder can be used as a single-turn absolute encoder by setting a parameter.

Note: 1. Direct Drive Servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

◆ Manufactured Models

Rated Torque N·m	Servomotor Outer Diameter					
	A (100-mm dia.)	B (135-mm dia.)	C (175-mm dia.)	D (230-mm dia.)	M (280-mm dia.)	N (360-mm dia.)
2.00	SGM7F-02A	–	–	–	–	–
4.00	–	SGM7F-04B	–	–	–	–
5.00	SGM7F-05A	–	–	–	–	–
7.00	SGM7F-07A	–	–	–	–	–
8.00	–	–	SGM7F-08C	–	–	–
10.0	–	SGM7F-10B	–	–	–	–
14.0	–	SGM7F-14B	–	–	–	–
16.0	–	–	–	SGM7F-16D	–	–
17.0	–	–	SGM7F-17C	–	–	–
25.0	–	–	SGM7F-25C	–	–	–
35.0	–	–	–	SGM7F-35D	–	–
45.0	–	–	–	–	SGM7F-45M	–
80.0	–	–	–	–	SGM7F-80M	SGM7F-80N
110	–	–	–	–	SGM7F-1AM	–
150	–	–	–	–	–	SGM7F-1EN
200	–	–	–	–	–	SGM7F-2ZN

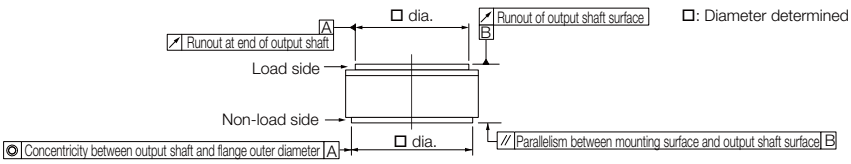
Note: The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

5.2 Specifications and Ratings: Small Capacity

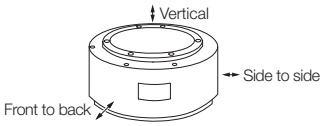
5.2.1 Specifications

Voltage			200 V									
Model SGM7F-			02A	05A	07A	04B	10B	14B	08C	17C	25C	16D	35D
Time Rating			Continuous										
Thermal Class			A										
Insulation Resistance			500 VDC, 10 MΩ min.										
Withstand Voltage			1,500 VAC for 1 minute										
Excitation			Permanent magnet										
Mounting			Flange-mounted										
Drive Method			Direct drive										
Rotation Direction			Counterclockwise (CCW) for forward reference when viewed from the load side										
Vibration Class*1			V15										
Absolute Accuracy*2			±15 s										
Repeatability			±1.3 s										
Protective Structure*3			Totally enclosed, self-cooled, IP42 (The protective structure is IP40 for CE Marking.)										
Environmental Conditions	Surrounding Air Temperature		0°C to 40°C (with no freezing)										
	Surrounding Air Humidity		20% to 80% relative humidity (with no condensation)										
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.										
	Storage Environment		Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)										
Mechanical Tolerances*4	Runout of Output Shaft Surface	mm	0.02 (0.01 for high machine precision option)										
	Runout at End of Output Shaft	mm	0.04 (0.01 for high machine precision option)										
	Parallelism between Mounting Surface and Output Shaft Surface	mm	0.07										
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.07										
Shock Resistance*5	Impact Acceleration Rate at Flange		490 m/s^2										
	Number of Impacts		2 times										
Vibration Resistance*5	Vibration Acceleration Rate at Flange		49 m/s^2										
Applicable SERVOPACKs		SGD7S-	2R8A, 2R1F		2R8A, 2R8F			5R5A	2R8A, 2R8F	5R5A	7R6A	5R5A	7R6A*6, 120A
		SGD7W- SGD7C-	2R8A						2R8A				7R6A*6

*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.
*2. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.
*3. The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used.
*4. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*5. The given values are for when the Servomotor shaft is mounted vertically and shock or vibration is applied in the directions shown in the following figures.
The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



*6. Use derated values for this combination. Refer to the following section for information on derating values.
☞ *5.2.2 Ratings* on page 5-5

5.2.2 Ratings

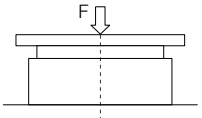
Voltage			200 V										
Model SGM7F-			02A	05A	07A	04B	10B	14B	08C	17C	25C	16D	35D
Rated Output*1		W	63	157	220	126	314	440	251	534	785	503	1100 1000 *5
Rated Torque*1, *2		N·m	2.00	5.00	7.00	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Instantaneous Maximum Torque*1		N·m	6.00	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque*1		N·m	2.00	5.00	7.00	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Rated Current*1		Arms	1.7	1.8	2.1	2.0	2.8	4.6	2.4	4.5		5.0	
Instantaneous Maximum Current*1		Arms	5.1	5.4	6.3	6.4	8.9	14.1	8.6	14.7	13.9	16.9	16.0
Rated Motor Speed*1		min^{-1}	300			300			300				300 270*5
Maximum Motor Speed*1		min^{-1}	600			600			600		500	600	400
Torque Constant		N·m/Arms	1.28	3.01	3.64	2.21	3.81	3.27	3.52	4.04	6.04	3.35	7.33
Motor Moment of Inertia		$\times 10^{-4}$ kg·m^2	8.04	14.5	19.3	16.2	25.2	36.9	56.5	78.5	111	178	276
Rated Power Rate*1		kW/s	4.98	17.2	25.4	9.88	39.7	53.1	11.3	36.8	56.3	14.4	44.4
Rated Angular Acceleration Rate*1		rad/s^2	2490	3450	3630	2470	3970	3790	1420	2170	2250	899	1270
Heat Sink Size		mm	300 x 300 x 12		350 × 350 × 12				450 × 450 × 12			550 × 550 × 12	
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			25 times	35 times	35 times	25 times	40 times	45 times	15 times	25 times	25 times	10 times	15 times
	With External Regenerative Resistor and External Dynamic Brake Resistor*3		25 times	35 times	35 times	25 times	40 times	45 times	15 times	25 times	25 times	10 times	15 times
Allowable Load*4	Allowable Thrust Load	N	1100			1500			3300			4000	
	Allowable Moment Load	N·m	22	24	26	45	55	65	92	98	110	210	225

*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

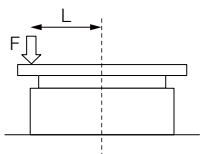
*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

*3. To externally connect dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect 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-1R6AMAA020 to -2R8AMAA020

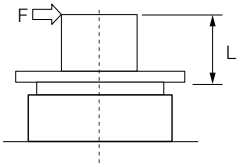
*4. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



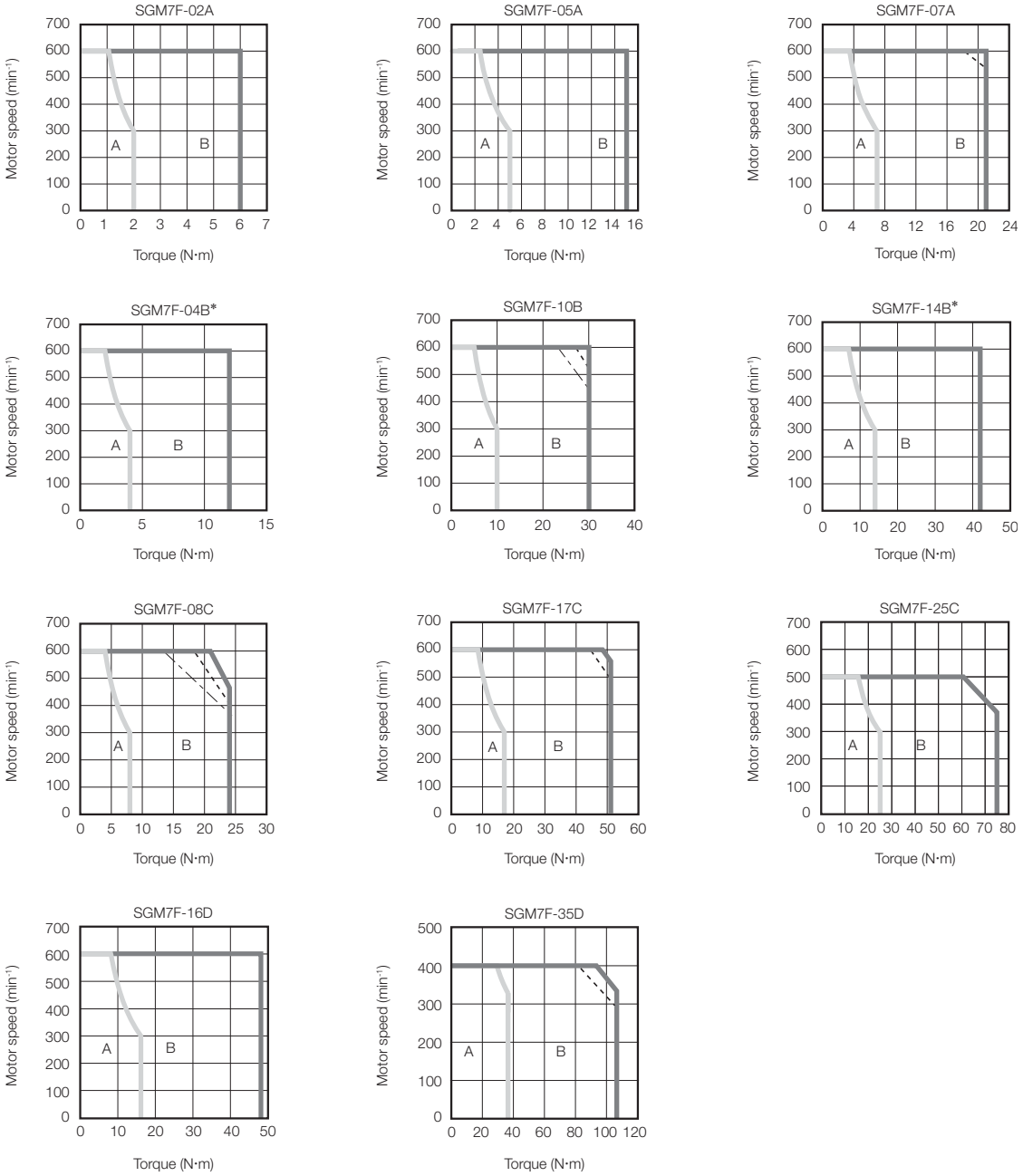
Where F is the external force,
Thrust load = Load mass
Moment load = F × L

*5. If you use an SGD7□-7R6A SERVOPACK and SGM7F-35D Servomotor together, use this value (a derated value).

Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

5.2.3 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



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

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

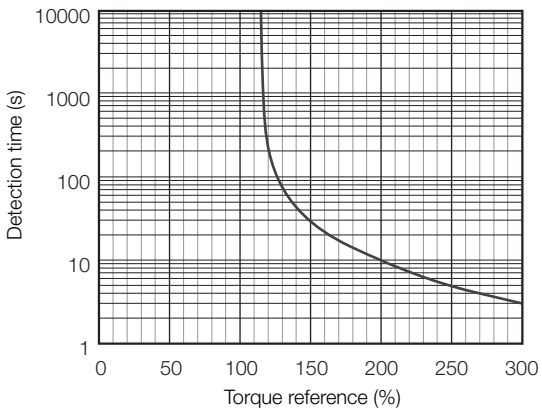
2. The characteristics in the intermittent duty zone depend on the power supply voltage.

3. 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.

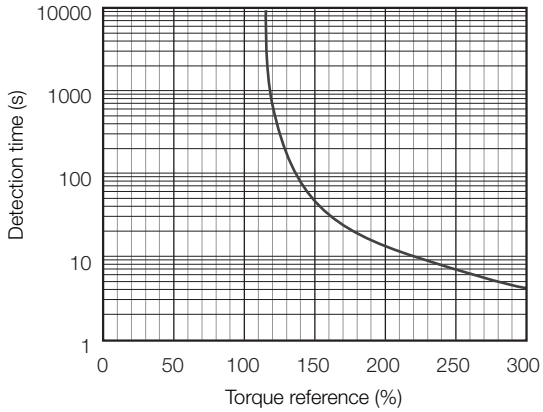
5.2.4 Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.

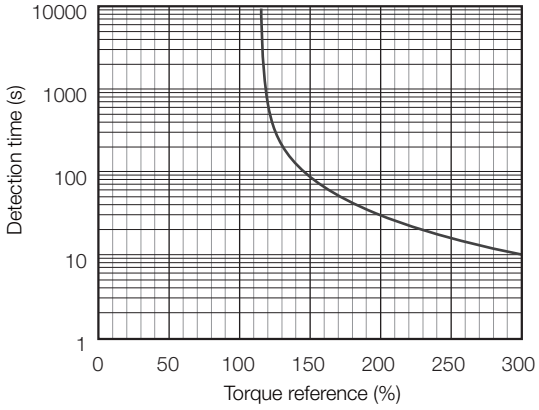
SGM7F-□□A and -□□B



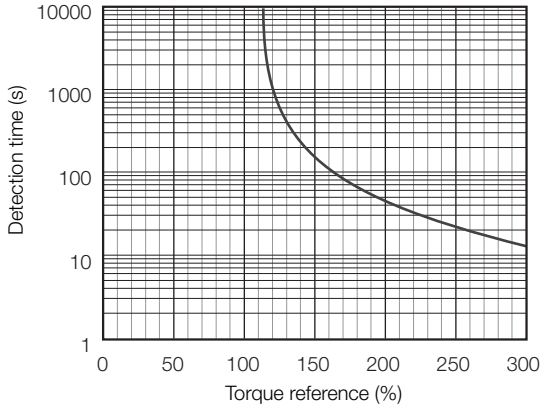
SGM7F-08C



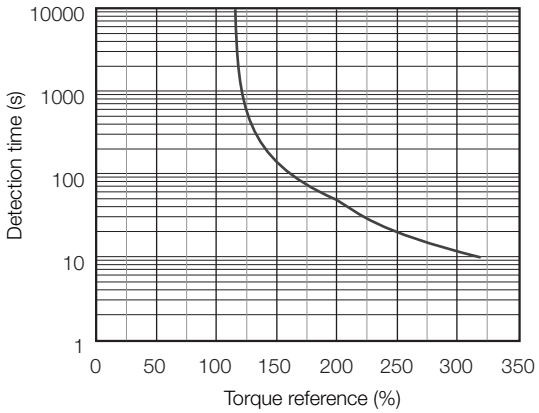
SGM7F-17C and -25C



SGM7F-16D



SGM7F-35D



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
Use the Servomotor so that the effective force remains within the continuous duty zone. Refer to the following section for the effective torque.
☞ *5.2.3 Torque-Motor Speed Characteristics* on page 5-6

5.2.5 Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the *5.2.2 Ratings*. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

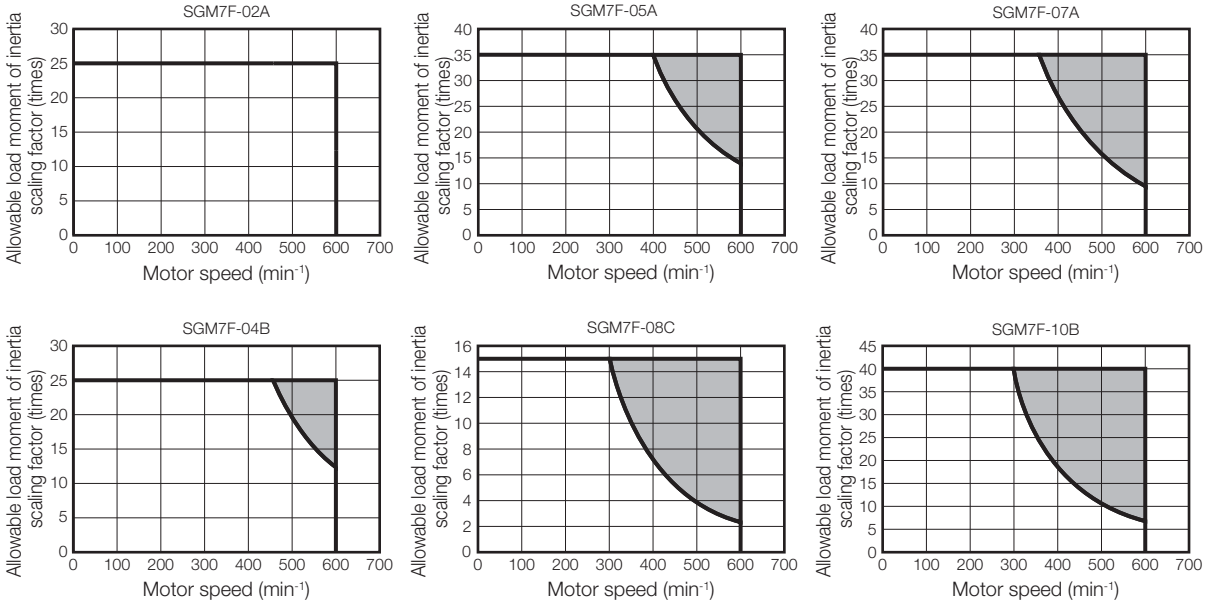
- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

Information 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).
Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.
Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



Note: Applicable SERVOPACK models: SGD7S-2R8A and -2R8F

When an External Regenerative Resistor Is Required

Install the External Regenerative Resistor.

Refer to the following catalog for information on External Regenerative Resistors.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

5.3 Specifications and Ratings: Medium Capacity

5.3.1 Specifications

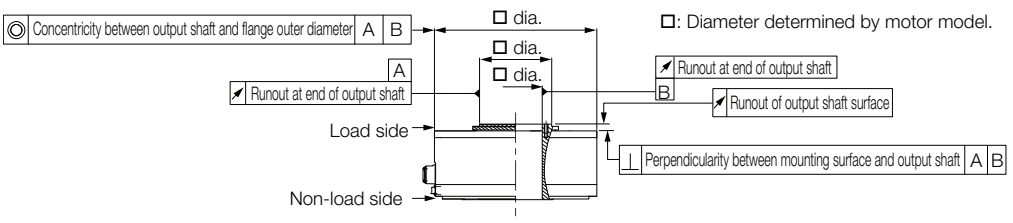
Voltage				200 V					
Model SGM7F-				45M	80M	1AM	80N	1EN	2ZN
Time Rating				Continuous					
Thermal Class				F					
Insulation Resistance				500 VDC, 10 MΩ min.					
Withstand Voltage				1,500 VAC for 1 minute					
Excitation				Permanent magnet					
Mounting				Flange-mounted					
Drive Method				Direct drive					
Rotation Direction				Counterclockwise (CCW) for forward reference when viewed from the load side					
Vibration Class*1				V15					
Absolute Accuracy*2				±15 s					
Repeatability				±1.3 s					
Protective Structure*3				Totally enclosed, self-cooled, IP44 (IP40 for CE Marking)					
Environmental Conditions	Surrounding Air Temperature			0°C to 40°C (with no freezing)					
	Surrounding Air Humidity			20% to 80% relative humidity (with no condensation)					
	Installation Site			• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.					
	Storage Environment			Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)					
Mechanical Tolerances*4	Runout of Output Shaft Surface		mm	0.02 (0.01 for high machine precision option)					
	Runout at End of Output Shaft		mm	0.04 (0.01 for high machine precision option)					
	Parallelism between Mounting Surface and Output Shaft Surface		mm	–					
	Concentricity between Output Shaft and Flange Outer Diameter		mm	0.08					
	Perpendicularity between Mounting Surface and Output Shaft		mm	0.08					
Shock Resistance*5	Impact Acceleration Rate at Flange			490 m/s^2					
	Number of Impacts			2 times					
Vibration Resistance*5	Vibration Acceleration Rate at Flange			24.5 m/s^2					
Applicable SERVOPACKs		SGD7S-		7R6A	120A	180A	120A	200 A	
		SGD7W- SGD7C-		7R6A	–				

*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

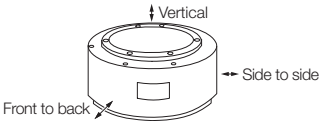
*2. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.

*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

*4. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*5. The given values are for when the Servomotor shaft is mounted vertically and shock or vibration is applied in the directions shown in the following figures.
The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



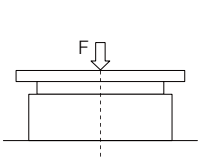
5.3.2 Ratings

Voltage			200 V					
Model SGM7F-			45M	80M	1AM	80N	1EN	2ZN
Rated Output*1		W	707	1260	1730	1260	2360	3140
Rated Torque*1, *2		N·m	45.0	80.0	110	80.0	150	200
Instantaneous Maximum Torque*1		N·m	135	240	330	240	450	600
Stall Torque*1		N·m	45.0	80.0	110	80.0	150	200
Rated Current*1		Arms	5.8	9.7	13.4	9.4	17.4	18.9
Instantaneous Maximum Current*1		Arms	17.0	28.0	42.0	28.0	56.0	56.0
Rated Motor Speed*1		min^{-1}	150			150		
Maximum Motor Speed*1		min^{-1}	300			300	250	
Torque Constant		N·m/Arms	8.39	8.91	8.45	9.08	9.05	11.5
Motor Moment of Inertia		$\times 10^{-4}$ kg·m^2	388	627	865	1360	2470	3060
Rated Power Rate*1		kW/s	52.2	102	140	47.1	91.1	131
Rated Angular Acceleration Rate*1		rad/s^2	1160	1280	1270	588	607	654
Heat Sink Size		mm	750 × 750 × 45					
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			3 times					
	With External Regenerative Resistor and External Dynamic Brake Resistor		3 times					
Allowable Load*3	A	mm	33			37.5		
	Allowable Thrust Load	N	9000			16000		
	Allowable Moment Load	N·m	180			350		

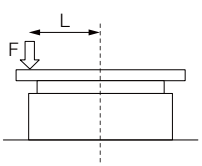
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

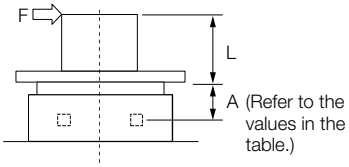
*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L

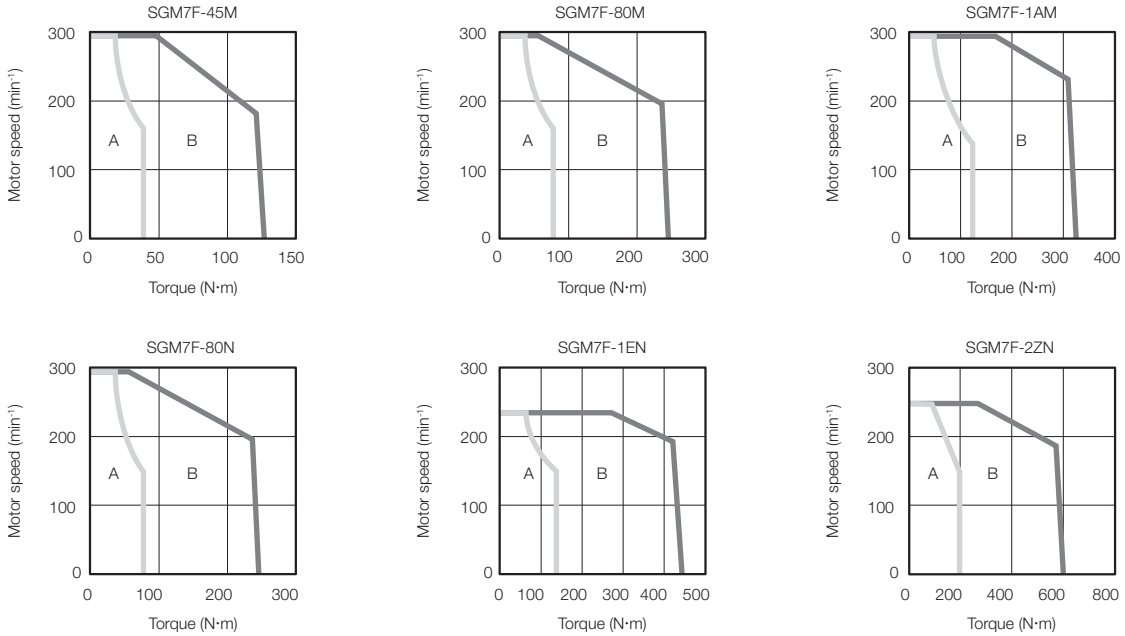


Where F is the external force,
Thrust load = Load mass
Moment load = F × (L + A)

Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

5.3.3 Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

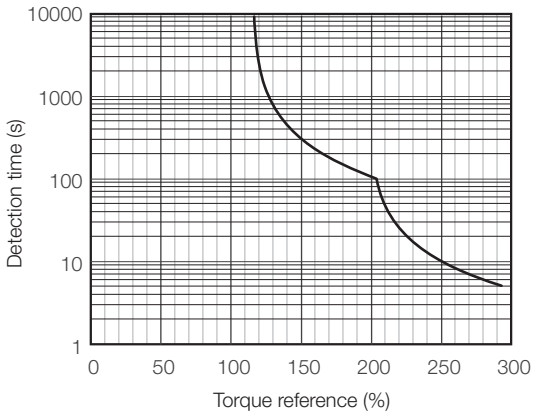


Note: 1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
2. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
3. If you use a Servomotor 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.

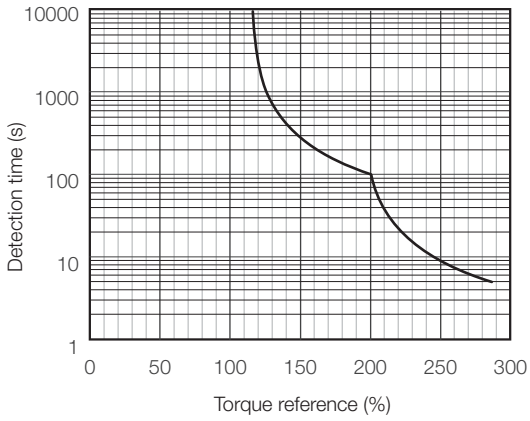
5.3.4 Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.

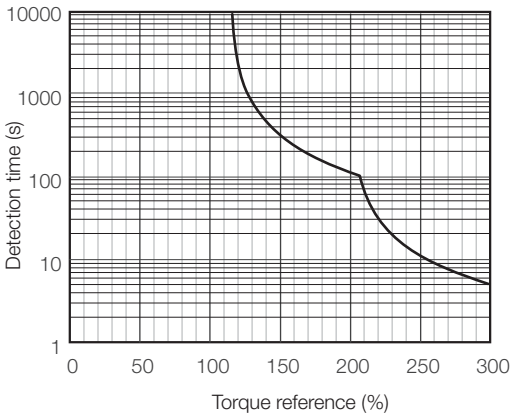
SGM7F-45M



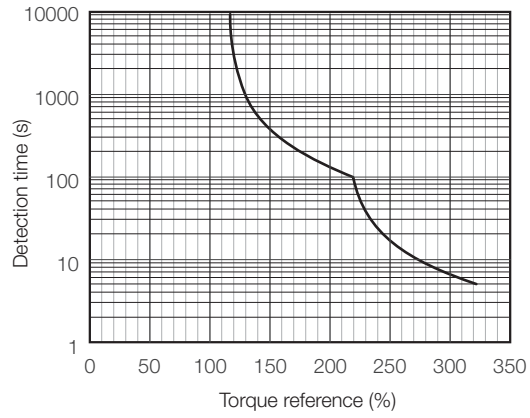
SGM7F-80M



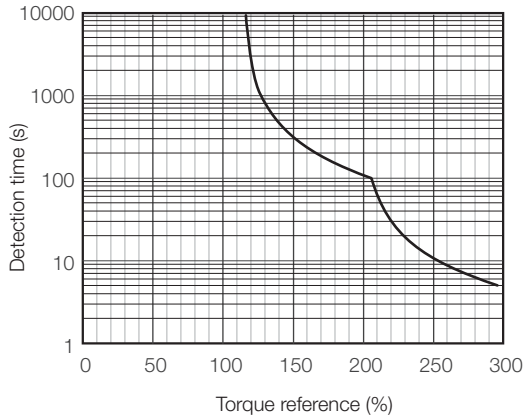
SGM7F-1AM and -80N



SGM7F-1EN



SGM7F-2ZN



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in *5.3.3 Torque-Motor Speed Characteristics* on page 5-11.

5.3.5 Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the *5.3.2 Ratings* on page 5-10. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

Information

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).
Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.
Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

When an External Regenerative Resistor Is Required

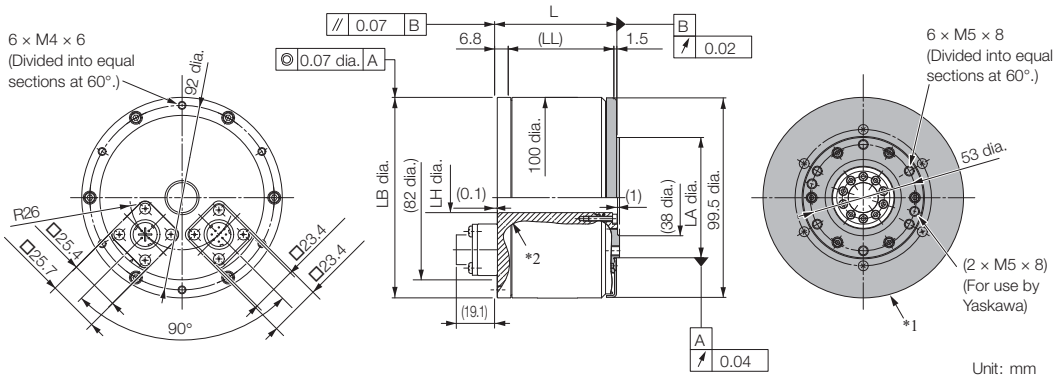
Install the External Regenerative Resistor.

Refer to the following catalog for information on External Regenerative Resistors.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

5.4 External Dimensions

◆ SGM7F-□□A

• Flange Specification 1

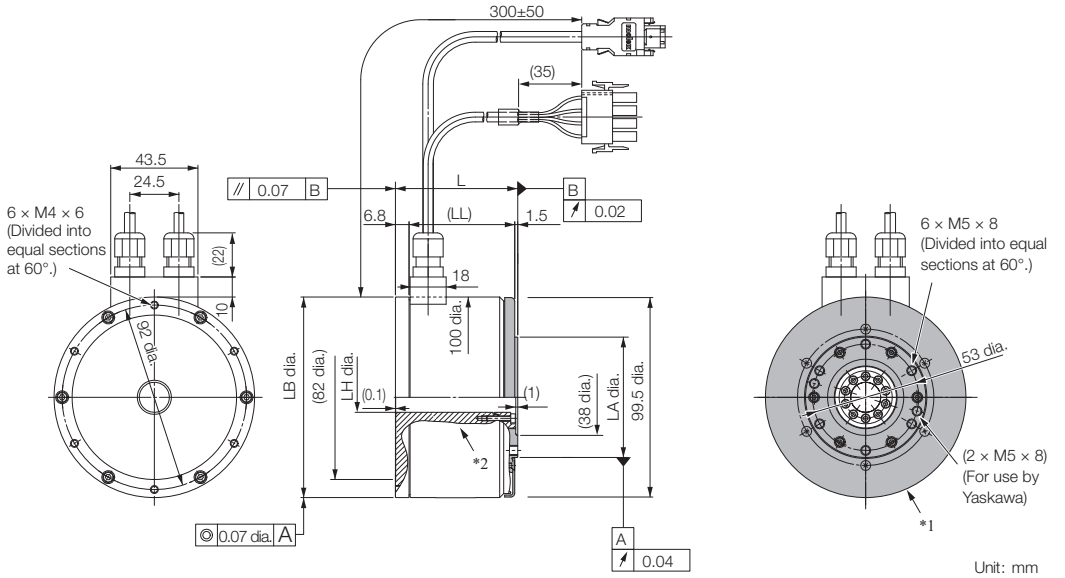


*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7F-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02A□A11	61	(52.7)	$100\ ^{0}_{-0.035}$	$15\ ^{+0.4}_{0}$	$60\ ^{0}_{-0.030}$	2.5
05A□A11	96	(87.7)	$100\ ^{0}_{-0.035}$	$15\ ^{+0.4}_{0}$	$60\ ^{0}_{-0.030}$	4.5
07A□A11	122	(113.7)	$100\ ^{0}_{-0.035}$	$15\ ^{+0.4}_{0}$	$60\ ^{0}_{-0.030}$	5.5

• Flange Specification 4



*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

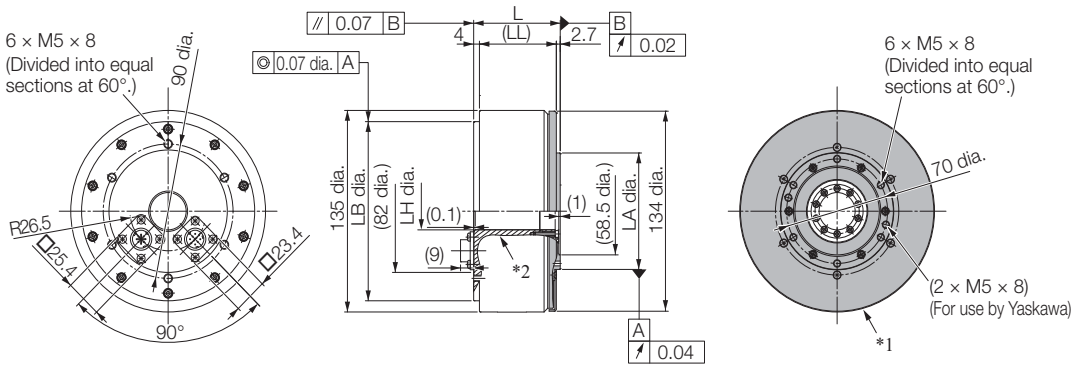
Model SGM7F-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02A□A41	61	(52.7)	$100\ ^{0}_{-0.035}$	$15\ ^{+0.4}_{0}$	$60\ ^{0}_{-0.030}$	2.5
05A□A41	96	(87.7)	$100\ ^{0}_{-0.035}$	$15\ ^{+0.4}_{0}$	$60\ ^{0}_{-0.030}$	4.5
07A□A41	122	(113.7)	$100\ ^{0}_{-0.035}$	$15\ ^{+0.4}_{0}$	$60\ ^{0}_{-0.030}$	5.5

Refer to the following section for information on connectors.

☞ *5.4.1 Connector Specifications* on page 5-20

◆ SGM7F-□□B

• Flange Specification 1



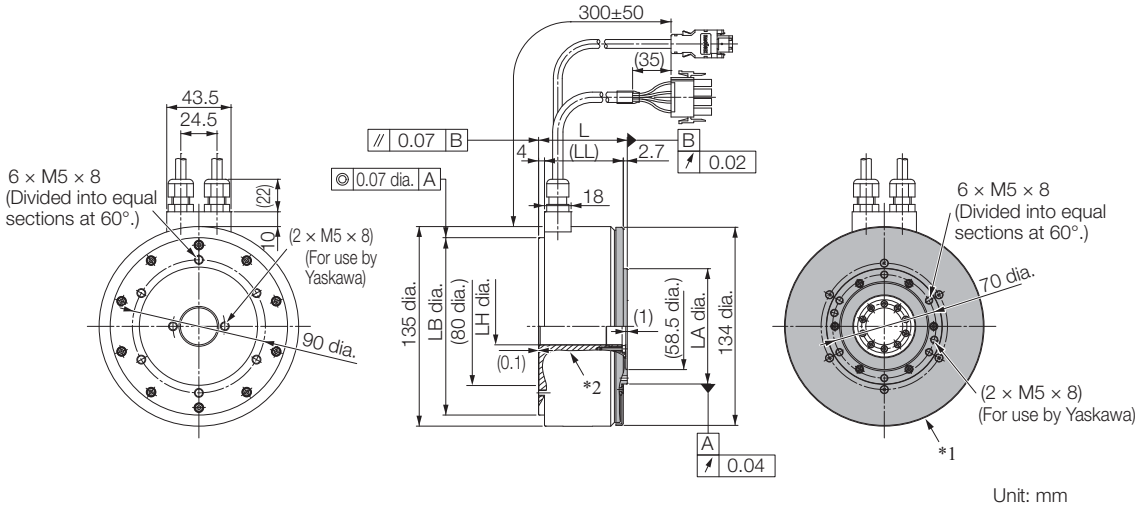
Unit: mm

*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7F-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04B□A11	60	53.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	5.0
10B□A11	85	78.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	6.5
14B□A11	115	108.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	9.0

• Flange Specification 4



Unit: mm

*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

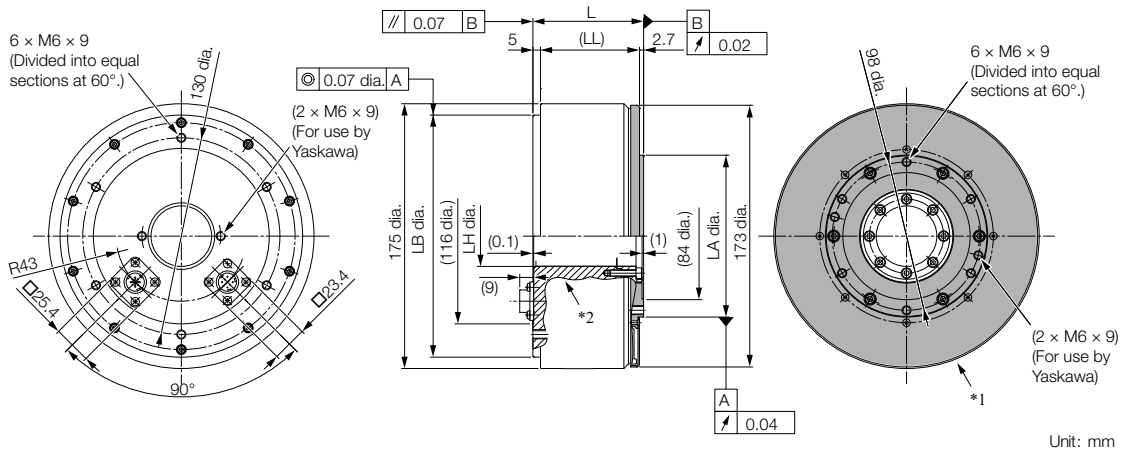
Model SGM7F-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04B□A41	60	53.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	5.0
10B□A41	85	78.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	6.5
14B□A41	115	108.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	9.0

Refer to the following section for information on connectors.

☞ *5.4.1 Connector Specifications* on page 5-20

◆ SGM7F-□□C

• Flange Specification 1

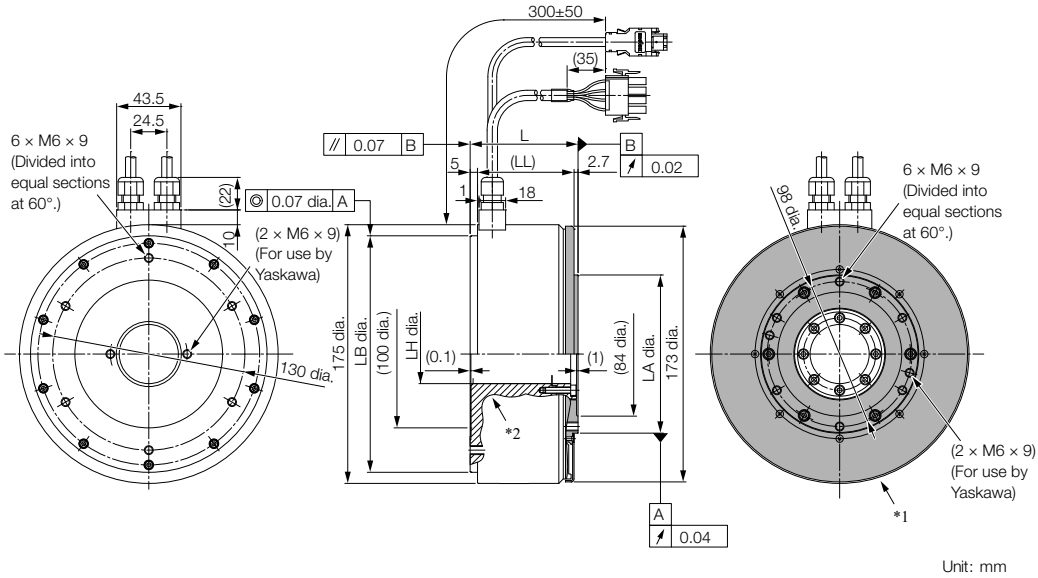


*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7F-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08C□A11	73	65.3	$160\ ^{0}_{-0.040}$	$40\ ^{+0.3}_{+0.1}$	$107\ ^{0}_{-0.035}$	9.0
17C□A11	87	79.3	$160\ ^{0}_{-0.040}$	$40\ ^{+0.3}_{+0.1}$	$107\ ^{0}_{-0.035}$	11.0
25C□A11	117	109.3	$160\ ^{0}_{-0.040}$	$40\ ^{+0.3}_{+0.1}$	$107\ ^{0}_{-0.035}$	15.0

• Flange Specification 4



*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

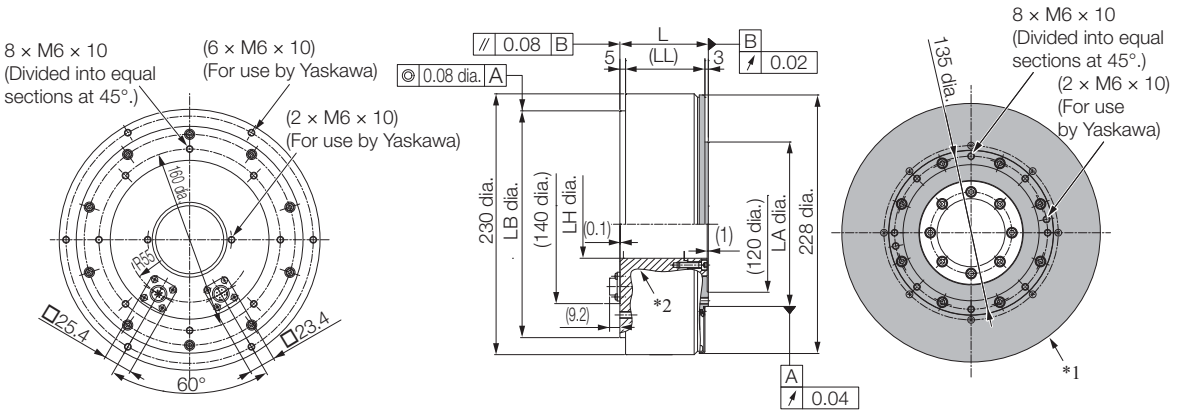
Model SGM7F-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08C□A41	73	65.3	$160\ ^{0}_{-0.040}$	$40\ ^{+0.3}_{+0.1}$	$107\ ^{0}_{-0.035}$	9.0
17C□A41	87	79.3	$160\ ^{0}_{-0.040}$	$40\ ^{+0.3}_{+0.1}$	$107\ ^{0}_{-0.035}$	11.0
25C□A41	117	109.3	$160\ ^{0}_{-0.040}$	$40\ ^{+0.3}_{+0.1}$	$107\ ^{0}_{-0.035}$	15.0

Refer to the following section for information on connectors.

☞ *5.4.1 Connector Specifications* on page 5-20

◆ SGM7F-□□D

• Flange Specification 1



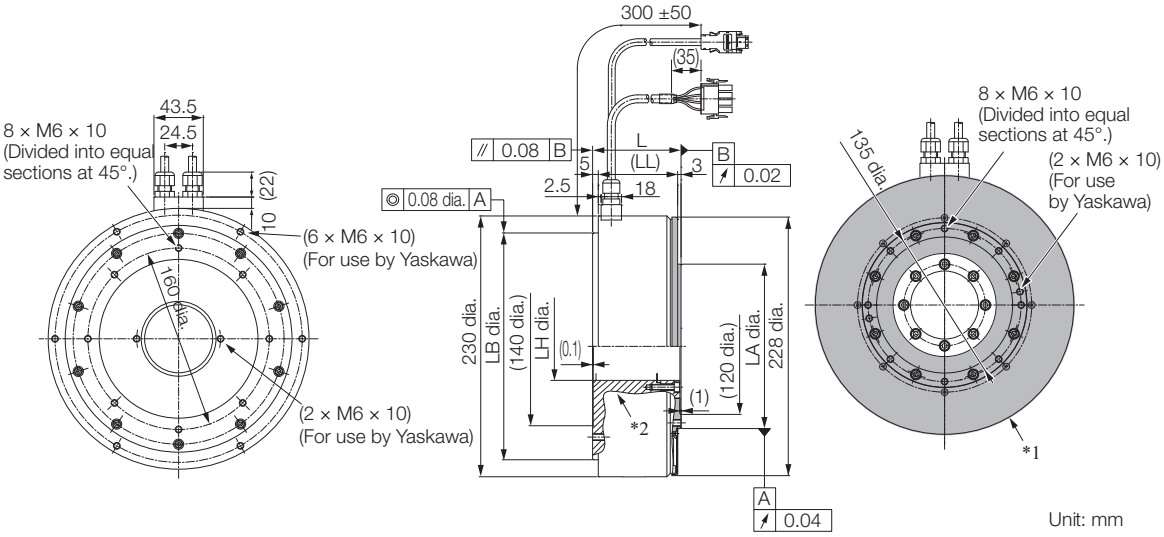
Unit: mm

*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGM7F-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16D□A11	78	70	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$145^{\ 0}_{-0.040}$	16.0
35D□A11	107	99	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$145^{\ 0}_{-0.040}$	25.0

• Flange Specification 4



Unit: mm

*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

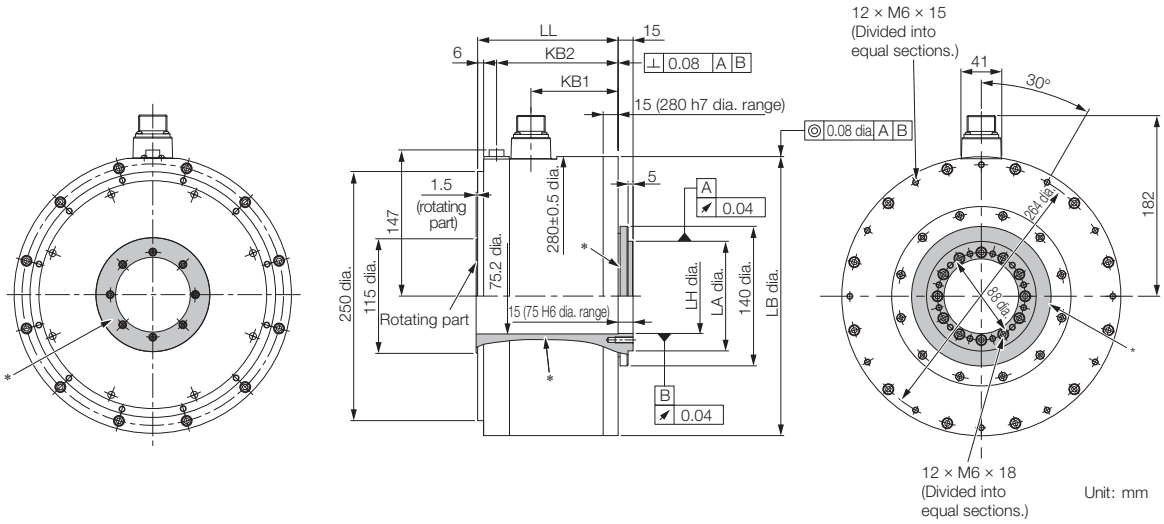
Model SGM7F-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16D□A41	78	70	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$145^{\ 0}_{-0.040}$	16.0
35D□A41	107	99	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$145^{\ 0}_{-0.040}$	25.0

Refer to the following section for information on connectors.

☞ *5.4.1 Connector Specifications* on page 5-20

■ SGM7F-□□M

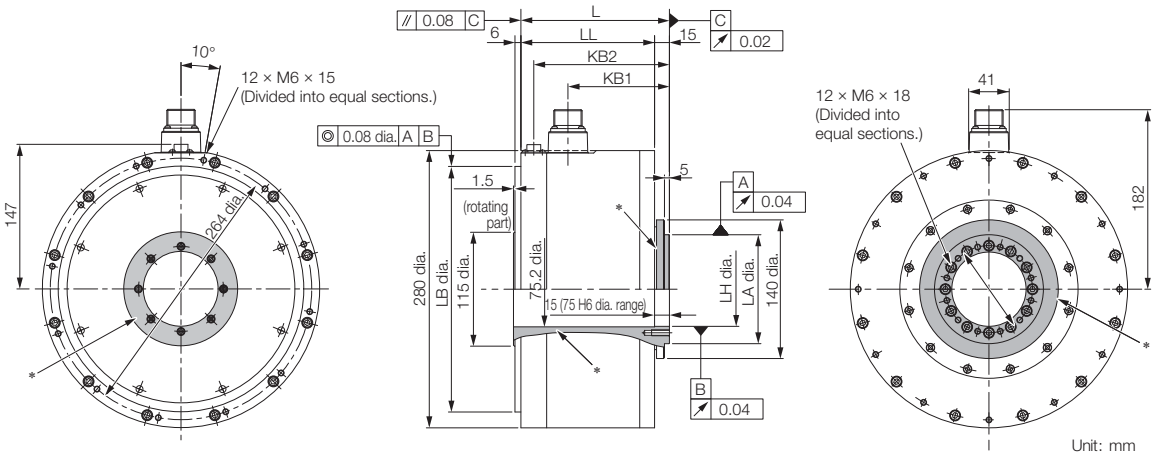
• Flange Specification 1



* The shaded section indicates the rotating parts.

Model SGM7F-	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
45M□A11	141	87.5	122	$280^{\ 0}_{-0.052}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	38
80M□A11	191	137.5	172	$280^{\ 0}_{-0.052}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	45
1AM□A11	241	187.5	222	$280^{\ 0}_{-0.052}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	51

• Flange Specification 3



* The shaded section indicates the rotating parts.

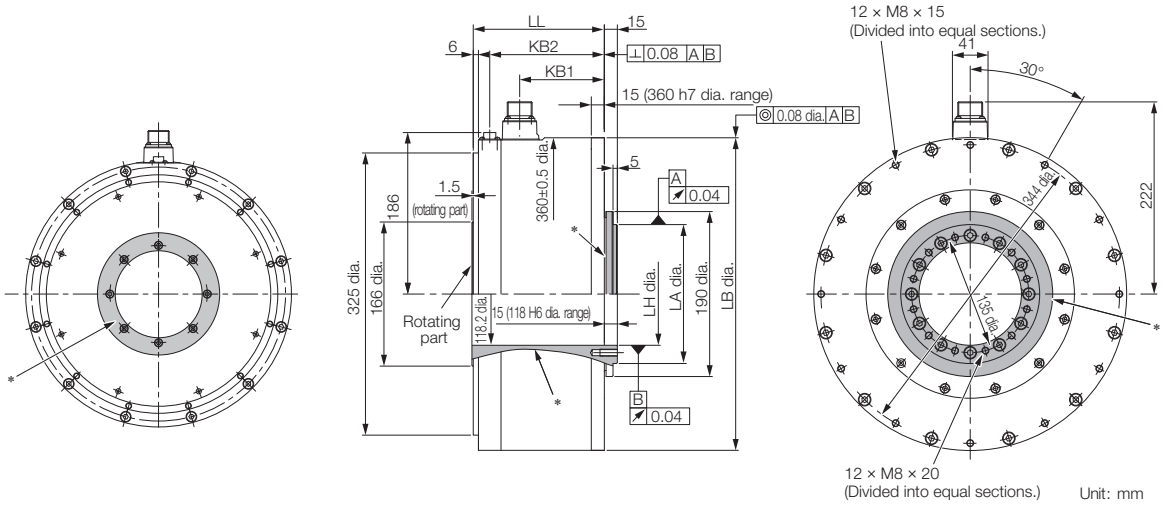
Model SGM7F-	L	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
45M□A31	150	135	102.5	137	$248^{\ 0}_{-0.046}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	38
80M□A31	200	185	152.5	187	$248^{\ 0}_{-0.046}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	45
1AM□A31	250	235	202.5	237	$248^{\ 0}_{-0.046}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	51

Refer to the following section for information on connectors.

☞ *5.4.1 Connector Specifications* on page 5-20

◆ SGM7F-□□N

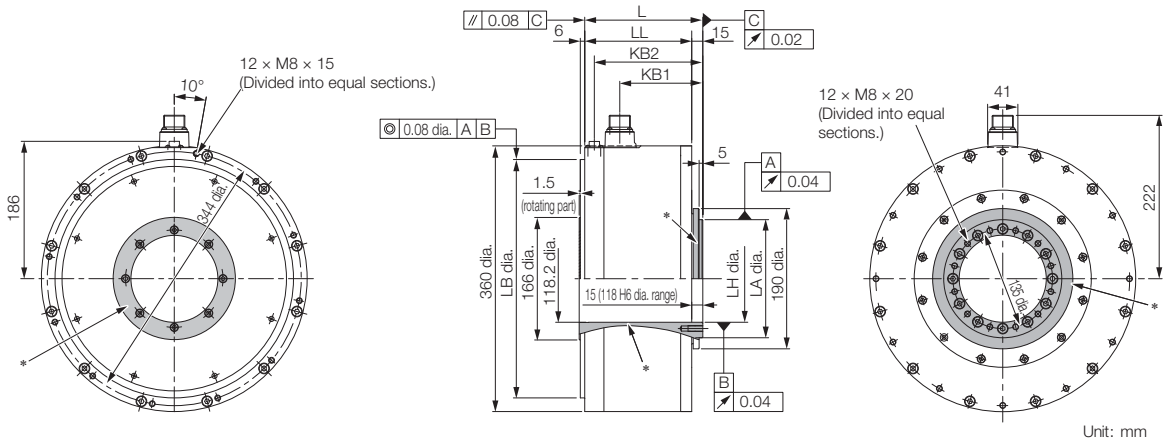
• Flange Specification 1



* The shaded section indicates the rotating parts.

Model SGM7F-	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
80N□A11	151	98	132	$360^{\ 0}_{-0.057}$	$118^{+0.022}_{\ 0}$	$160^{\ 0}_{-0.040}$	50
1EN□A11	201	148	182	$360^{\ 0}_{-0.057}$	$118^{+0.022}_{\ 0}$	$160^{\ 0}_{-0.040}$	68
2ZN□A11	251	198	232	$360^{\ 0}_{-0.057}$	$118^{+0.022}_{\ 0}$	$160^{\ 0}_{-0.040}$	86

• Flange Specification 3



* The shaded section indicates the rotating parts.

Model SGM7F-	L	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
80N□A31	160	145	113	147	$323^{\ 0}_{-0.057}$	$118^{+0.022}_{\ 0}$	$160^{\ 0}_{-0.040}$	50
1EN□A31	210	195	163	197	$323^{\ 0}_{-0.057}$	$118^{+0.022}_{\ 0}$	$160^{\ 0}_{-0.040}$	68
2ZN□A31	260	245	213	247	$323^{\ 0}_{-0.057}$	$118^{+0.022}_{\ 0}$	$160^{\ 0}_{-0.040}$	86

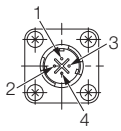
Refer to the following section for information on connectors.

☞ *5.4.1 Connector Specifications* on page 5-20

5.4.1 Connector Specifications

◆ SGM7F-□□A, -□□B, -□□C, or -□□D: Flange Specification 1

• Servomotor Connector

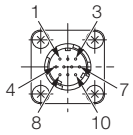


1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Model: JN1AS04MK2R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1
(Not provided by Yaskawa.)

• Encoder Connector



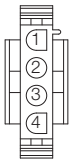
1	PS
2	/PS
3	–
4	PG5V
5*	BAT0
6	–
7	FG (frame ground)
8*	BAT
9	PG0V
10	–

* Only absolute-value models with multiturn data.
Model: JN1AS10ML1-R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1
(Not provided by Yaskawa.)

◆ SGM7F-□□A, -□□B, -□□C, or -□□D: Flange Specification 4

• Servomotor Connector

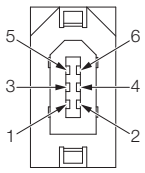


1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
• Plug: 350779-1
• Pins: 350561-3 or 350690-3 (No.1 to 3)
• Ground pin: 350654-1 or 350669-1 (No. 4)
Manufacturer: TE Connectivity Japan G.K.

Mating Connector
• Cap: 350780-1
• Socket: 350570-3 or 350689-3

• Encoder Connector



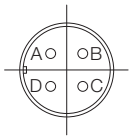
1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.
Model: 55102-0600
Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

◆ SGM7F-□□M or -□□N: Flange Specification 1 or 3

• Servomotor Connector

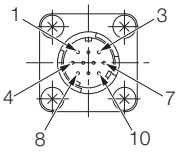


A	Phase U
B	Phase V
C	Phase W
D	FG (frame ground)

Model: CE05-2A18-10PD-D
Manufacturer: Fujikura Ltd.

Mating Connector
Plug: CE05-6A18-10SD-D-BSS (R1)
Cable clamp: CE3057-10A-□-D (R1)

• Encoder Connector



1	PS
2	/PS
3	–
4	PG5V
5*	BAT0
6	–
7	FG (frame ground)
8*	BAT
9	PG0V
10	–

* Only absolute-value models with multiturn data.
Model: JN1AS10ML1
Manufacturer: Japan Aviation Electronics Industry, Ltd.

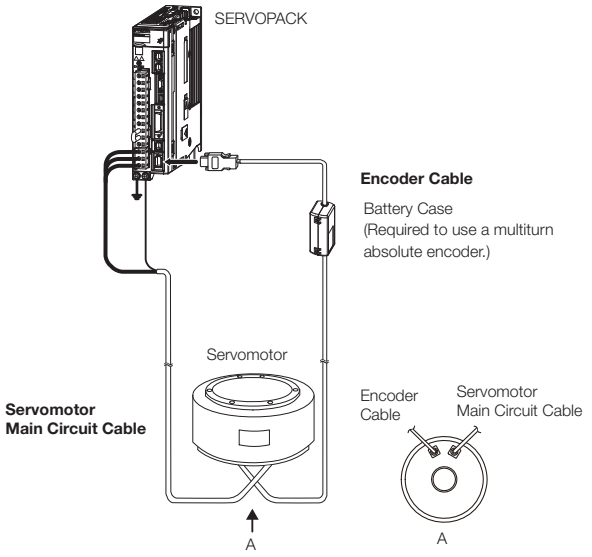
Mating connector:
JN1DS10SL1

5.5 Selecting Cables

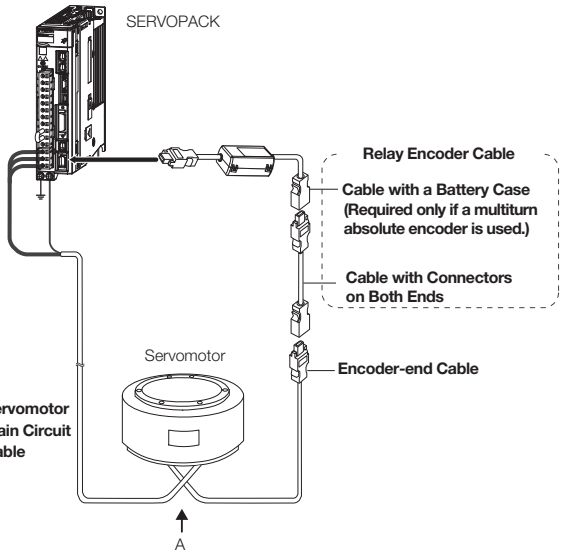
5.5.1 Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

Encoder Cable of 20 m or Less

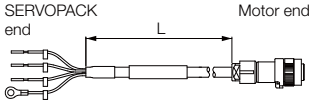
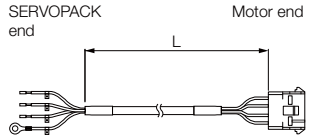


Encoder Cable of 30 m to 50 m (Relay Cable)



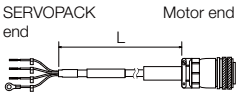
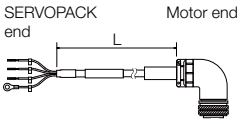
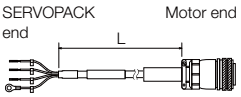
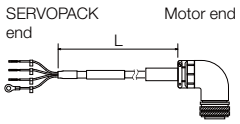
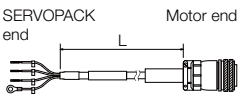
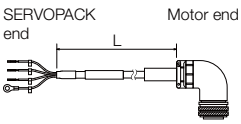
Note: 1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.
3. Refer to the following manual for the following information.
• Cable dimensional drawings and cable connection specifications
• Order numbers and specifications of individual connectors for cables
• Order numbers and specifications for wiring materials
📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

5.5.2 Servomotor Main Circuit Cables

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable*1	
SGM7F-□□A SGM7F-□□B SGM7F-□□C SGM7F-□□D Flange specification*2: 1	3 m	JZSP-CMM60-03-E	JZSP-C7MDN23-03-E	
	5 m	JZSP-CMM60-05-E	JZSP-C7MDN23-05-E	
	10 m	JZSP-CMM60-10-E	JZSP-C7MDN23-10-E	
	15 m	JZSP-CMM60-15-E	JZSP-C7MDN23-15-E	
	20 m	JZSP-CMM60-20-E	JZSP-C7MDN23-20-E	
SGM7F-□□A SGM7F-□□B SGM7F-□□C SGM7F-□□D Flange specification*2: 4	3 m	JZSP-CMM00-03-E	JZSP-C7MDS23-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-C7MDS23-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-C7MDS23-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-C7MDS23-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-C7MDS23-20-E	

Continued on next page.

Continued from previous page.

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable*1	
SGM7F-□□M SGM7F-□□N □□: 45 □□: 80	3 m	JZSP-USA101-03-E	JZSP-USA121-03-E	
	5 m	JZSP-USA101-05-E	JZSP-USA121-05-E	
	10 m	JZSP-USA101-10-E	JZSP-USA121-10-E	
	15 m	JZSP-USA101-15-E	JZSP-USA121-15-E	
	20 m	JZSP-USA101-20-E	JZSP-USA121-20-E	
	3 m	JZSP-USA102-03-E	JZSP-USA122-03-E	
	5 m	JZSP-USA102-05-E	JZSP-USA122-05-E	
	10 m	JZSP-USA102-10-E	JZSP-USA122-10-E	
	15 m	JZSP-USA102-15-E	JZSP-USA122-15-E	
	20 m	JZSP-USA102-20-E	JZSP-USA122-20-E	
SGM7F-□□M SGM7F-□□N □□: 1A	3 m	JZSP-USA301-03-E	JZSP-USA321-03-E	
	5 m	JZSP-USA301-05-E	JZSP-USA321-05-E	
	10 m	JZSP-USA301-10-E	JZSP-USA321-10-E	
	15 m	JZSP-USA301-15-E	JZSP-USA321-15-E	
	20 m	JZSP-USA301-20-E	JZSP-USA321-20-E	
	3 m	JZSP-USA302-03-E	JZSP-USA322-03-E	
	5 m	JZSP-USA302-05-E	JZSP-USA322-05-E	
	10 m	JZSP-USA302-10-E	JZSP-USA322-10-E	
	15 m	JZSP-USA302-15-E	JZSP-USA322-15-E	
	20 m	JZSP-USA302-20-E	JZSP-USA322-20-E	
SGM7F-□□M SGM7F-□□N □□: 1E □□: 2Z	3 m	JZSP-USA501-03-E	JZSP-USA521-03-E	
	5 m	JZSP-USA501-05-E	JZSP-USA521-05-E	
	10 m	JZSP-USA501-10-E	JZSP-USA521-10-E	
	15 m	JZSP-USA501-15-E	JZSP-USA521-15-E	
	20 m	JZSP-USA501-20-E	JZSP-USA521-20-E	
	3 m	JZSP-USA502-03-E	JZSP-USA522-03-E	
	5 m	JZSP-USA502-05-E	JZSP-USA522-05-E	
	10 m	JZSP-USA502-10-E	JZSP-USA522-10-E	
	15 m	JZSP-USA502-15-E	JZSP-USA522-15-E	
	20 m	JZSP-USA502-20-E	JZSP-USA522-20-E	

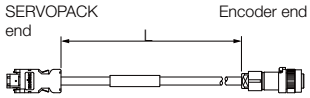
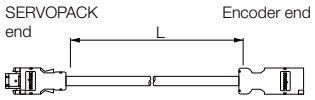
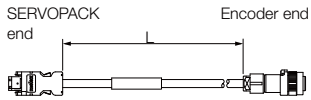
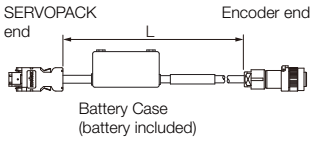
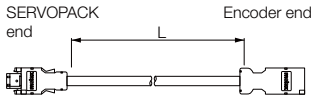
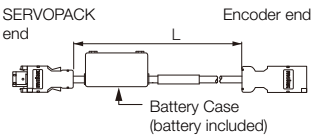
*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius of the Flexible Cables are given in the following table.

Order Number	Recommended Bending Radius (R)	Order Number	Recommended Bending Radius (R)
JZSP-C7MDN23-□□-E	90 mm min.	JZSP-USA321-□□-E	113 mm min.
JZSP-C7MDS23-□□-E		JZSP-USA322-□□-E	
JZSP-USA121-□□-E	96 mm min.	JZSP-USA521-□□-E	150 mm min.
JZSP-USA122-□□-E		JZSP-USA522-□□-E	

*2. Refer to the following section for the flange specifications.
☞ *5.1 Model Designations* on page 5-2

Note: Direct Drive Servomotors are not available with holding brakes.

5.5.3 Encoder Cables of 20 m or Less

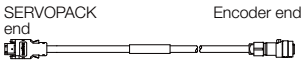
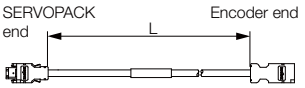
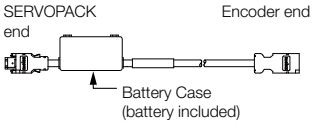
Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable*1	
SGM7F-□□□F Flange specification*2: 1 or 3	For incremental encoder	3 m	JZSP-CMP60-03-E	JZSP-CSP60-03-E	
		5 m	JZSP-CMP60-05-E	JZSP-CSP60-05-E	
		10 m	JZSP-CMP60-10-E	JZSP-CSP60-10-E	
		15 m	JZSP-CMP60-15-E	JZSP-CSP60-15-E	
		20 m	JZSP-CMP60-20-E	JZSP-CSP60-20-E	
SGM7F-□□AF SGM7F-□□BF SGM7F-□□CF SGM7F-□□DF Flange specification*2: 4		3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
SGM7F-□□□7 Flange specification*2: 1 or 3	For multiturn absolute encoder (without Battery Case*3)	3 m	JZSP-C7PI00-03-E	JZSP-C7PI20-03-E	
		5 m	JZSP-C7PI00-05-E	JZSP-C7PI20-05-E	
		10 m	JZSP-C7PI00-10-E	JZSP-C7PI20-10-E	
		15 m	JZSP-C7PI00-15-E	JZSP-C7PI20-15-E	
		20 m	JZSP-C7PI00-20-E	JZSP-C7PI20-20-E	
	For multiturn absolute encoder (with Battery Case)	3 m	JZSP-C7PA00-03-E	JZSP-C7PA20-03-E	
		5 m	JZSP-C7PA00-05-E	JZSP-C7PA20-05-E	
		10 m	JZSP-C7PA00-10-E	JZSP-C7PA20-10-E	
		15 m	JZSP-C7PA00-15-E	JZSP-C7PA20-15-E	
		20 m	JZSP-C7PA00-20-E	JZSP-C7PA20-20-E	
SGM7F-□□A7 SGM7F-□□B7 SGM7F-□□C7 SGM7F-□□D7 Flange specification*2: 4	For multiturn absolute encoder (without Battery Case*3)	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
	For multiturn absolute encoder (with Battery Case)	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
		5 m	JZSP-CSP19-05-E	JZSP-CSP29-05-E	
		10 m	JZSP-CSP19-10-E	JZSP-CSP29-10-E	
		15 m	JZSP-CSP19-15-E	JZSP-CSP29-15-E	
		20 m	JZSP-CSP19-20-E	JZSP-CSP29-20-E	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 46 mm or larger.

*2. Refer to the following section for the flange specifications.
☞ *5.1 Model Designations* on page 5-2

*3. Use one of these Cables if a battery is connected to the host controller.

5.5.4 Relay Encoder Cables of 30 m to 50 m

Servomotor Model	Name	Length (L)	Order Number*1	Appearance
SGM7F-□□□F SGM7F-□□□7 Flange specification*2: 1 or 3	Encoder-end Cable (for single-turn/multiturn absolute encoder)	0.3 m	JZSP-C7PRC0-E	
SGM7F-□□□F SGM7F-□□□7 Flange specification*2: 1, 3 or 4	Cables with Connectors on Both Ends (for single-turn/multiturn absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
SGM7F-□□□7 Flange specification*2: 1, 3 or 4	Cable with a Battery Case (for multiturn absolute encoder)*3	0.3 m	JZSP-CSP12-E	

*1. Flexible Cables are not available.

*2. Refer to the following section for the flange specifications.
☞ *5.1 Model Designations* on page 5-2

*3. Use one of these Cables if a battery is connected to the host controller.

Specifications, Ratings, and External Dimensions of SGMCV Servomotors

6

This chapter describes how to interpret the model numbers of SGMCV Servomotors and gives their specifications, ratings, and external dimensions.

6.1 Model Designations 6-2

6.2 Specifications and Ratings 6-3

6.2.1 Specifications 6-3
6.2.2 Ratings 6-5
6.2.3 Torque-Motor Speed Characteristics 6-6
6.2.4 Servomotor Overload Protection Characteristics 6-7
6.2.5 Allowable Load Moment of Inertia 6-8

6.3 External Dimensions 6-9

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6.4 Selecting Cables 6-13

6.4.1 Cable Configurations 6-13
6.4.2 Servomotor Main Circuit Cables 6-13
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6.1 Model Designations

SGMCV - 04 B E A 1 1

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

Direct Drive Servomotors: SGMCV

1st+2nd digits Rated Output

Code	Specification
04	4.00 N·m
08	8.00 N·m
10	10.0 N·m
14	14.0 N·m
16	16.0 N·m
17	17.0 N·m
25	25.0 N·m
35	35.0 N·m

3rd digit Servomotor Outer Diameter

Code	Specification
B	135-mm dia.
C	175-mm dia.
D	230-mm dia.

4th digit Serial Encoder

Code	Specification
E	22-bit single-turn absolute encoder
I	22-bit multiturn absolute encoder

5th digit Design Revision Order

A

6th digit Flange

Code	Mounting
1	Non-load side
4	Non-load side (with cable on side)

7th digit Options

Code	Specification
1	Without options
5	High mechanical precision (runout at end of shaft and runout of shaft surface: 0.01 mm)

Note: 1. Direct Drive Servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

◆ Manufactured Models

Rated Torque N·m	Servomotor Outer Diameter		
	B (135-mm dia.)	C (175-mm dia.)	D (230-mm dia.)
4.00	SGMCV-04B	–	–
8.00	–	SGMCV-08C	–
10.0	SGMCV-10B	–	–
14.0	SGMCV-14B	–	–
16.0	–	–	SGMCV-16D
17.0	–	SGMCV-17C	–
25.0	–	SGMCV-25C	–
35.0	–	–	SGMCV-35D

Note: The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

6.2 Specifications and Ratings

6.2.1 Specifications

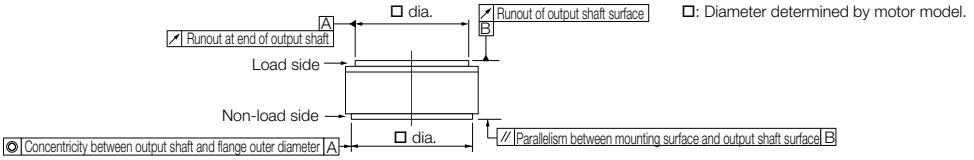
Voltage			200 V							
Model SGMCV-			04B	10B	14B	08C	17C	25C	16D	35D
Time Rating			Continuous							
Thermal Class			A							
Insulation Resistance			500 VDC, 10 MΩ min.							
Withstand Voltage			1,500 VAC for 1 minute							
Excitation			Permanent magnet							
Mounting			Flange-mounted							
Drive Method			Direct drive							
Rotation Direction			Counterclockwise (CCW) for forward reference when viewed from the load side							
Vibration Class*1			V15							
Absolute Accuracy*2			±15 s							
Repeatability			±1.3 s							
Protective Structure*3			Totally enclosed, self-cooled, IP42							
Environmental Conditions	Surrounding Air Temperature		0°C to 40°C (with no freezing)							
	Surrounding Air Humidity		20% to 80% relative humidity (with no condensation)							
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.							
	Storage Environment		Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)							
Mechanical Tolerances*4	Runout of Output Shaft Surface	mm	0.02 (0.01 for high mechanical precision option)							
	Runout at End of Output Shaft	mm	0.04 (0.01 for high mechanical precision option)							
	Parallelism between Mounting Surface and Output Shaft Surface	mm	0.07							
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.07							
Shock Resistance*5	Impact Acceleration Rate at Flange		490 m/s^2							
	Number of Impacts		2 times							
Vibration Resistance*5	Vibration Acceleration Rate at Flange		49 m/s^2							
Applicable SERVOPACKs		SGD7S-	2R8A, 2R8F		5R5A	2R8A, 2R8F	5R5A	7R6A	5R5A	7R6A*6, 120A
		SGD7W- SGD7C-	2R8A			2R8A				7R6A*6

*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*2. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.

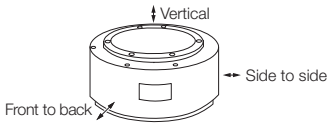
*3. The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used.

*4. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*5. The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures.
The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.

Shock Applied to the Servomotor



Vibration Applied to the Servomotor

*6. Use derated values for this combination. Refer to the following section for information on derating values.
☞ *6.2.2 Ratings* on page 6-5

6.2.2 Ratings

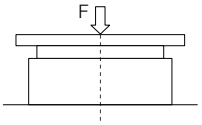
Voltage			200 V							
Model SGMCV-			04B	10B	14B	08C	17C	25C	16D	35D
Rated Output*1		W	126	314	440	251	534	785	503	1100 1000*5
Rated Torque*1, *2		N·m	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Instantaneous Maximum Torque*1		N·m	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque*1		N·m	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Rated Current*1		Arms	2.0	2.8	4.6	2.4	4.5		5.0	
Instantaneous Maximum Current*1		Arms	6.4	8.9	14.1	8.6	14.7	13.9	16.9	16.0
Rated Motor Speed*1		min^{-1}	300			300				300 270*5
Maximum Motor Speed*1		min^{-1}	600			600		500	600	400
Torque Constant		N·m/Arms	2.21	3.81	3.27	3.52	4.04	6.04	3.35	7.33
Motor Moment of Inertia		$\times 10^{-4}$ kg·m^2	16.2	25.2	36.9	56.5	78.5	111	178	276
Rated Power Rate*1		kW/s	9.88	39.7	53.1	11.3	36.8	56.3	14.4	44.4
Rated Angular Acceleration Rate*1		rad/s^2	2470	3970	3790	1420	2170	2250	899	1270
Heat Sink Size		mm	350 × 350 × 12			450 × 450 × 12			550 × 550 × 12	
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			25 times	40 times	45 times	15 times	25 times	25 times	10 times	15 times
	With External Regenerative Resistor and Dynamic Brake Resistor*3		25 times	40 times	45 times	15 times	25 times	25 times	10 times	15 times
Allowable Load*4	Allowable Thrust Load	N	1500			3300			4000	
	Allowable Moment Load	N·m	45	55	65	92	98	110	210	225

*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

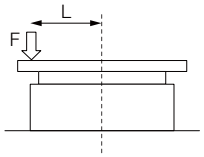
*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

*3. To externally connect dynamic brake resistance, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect dynamic brake resistance if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).
- SGD7S-R70□□□A020 to -2R8□□□A020
- SGD7W-1R6A20A020 to -2R8A20A020
- SGD7C-1R6AMAA020 to -2R8MAA020

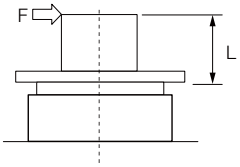
*4. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



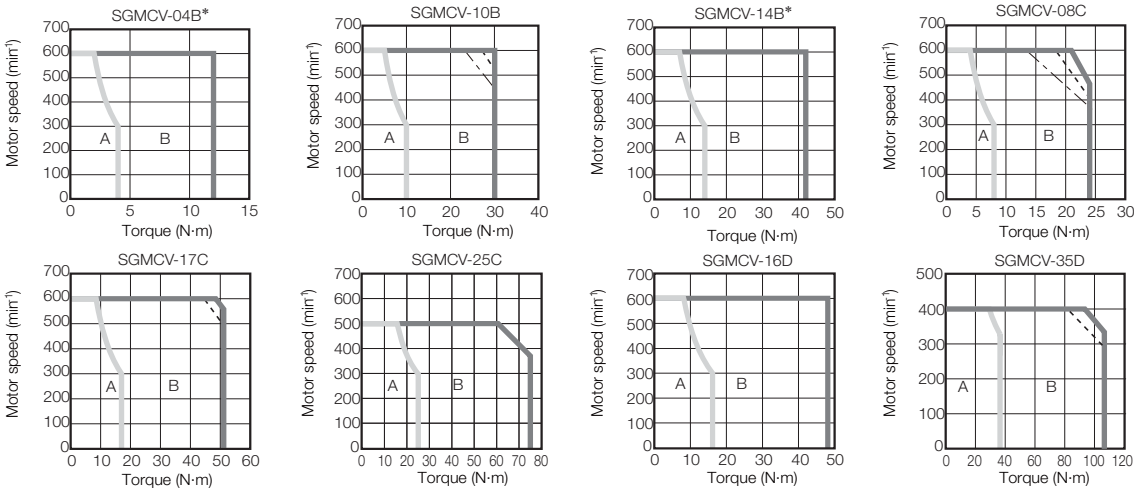
Where F is the external force,
Thrust load = Load mass
Moment load = F × L

*5. If you use an SGD7□-7R6A SERVOPACK and SGMCV-35D Servomotor together, use this value (a derated value).

Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

6.2.3 Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone
——— (solid lines): With three-phase 200-V input or single-phase 230-V input
- - - - - - - (dotted lines): With single-phase 200-V input
— - — - - (dash-dot lines): With single-phase 100-V input



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

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

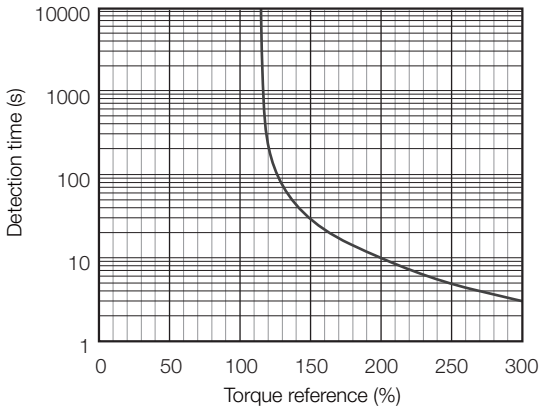
2. The characteristics in the intermittent duty zone depend on the power supply voltage.

3. 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.

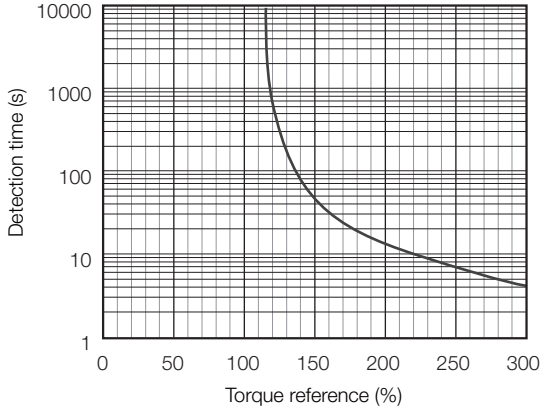
6.2.4 Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.

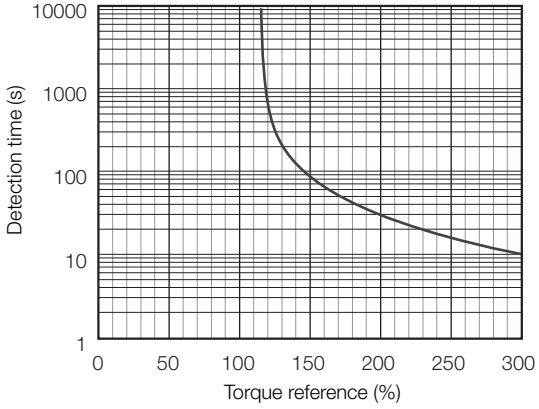
SGMCV-□□B



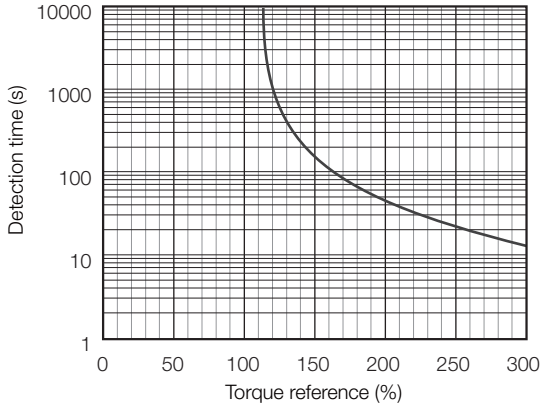
SGMCV-08C



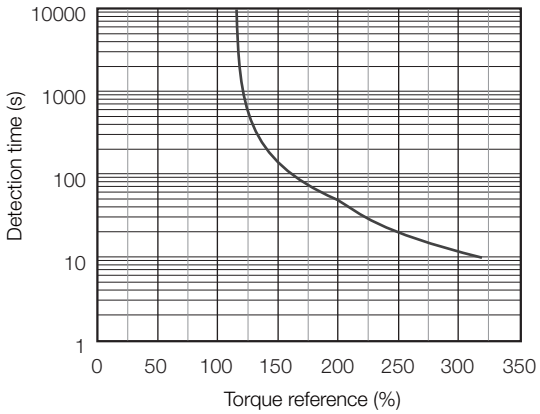
SGMCV-17C and -25C



SGMCV-16D



SGMCV-35D



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
Use the Servomotor so that the effective force remains within the continuous duty zone. Refer to the following section for the effective torque.
☞ *6.2.3 Torque-Motor Speed Characteristics* on page 6-6

6.2.5 Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the *6.2.2 Ratings*. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

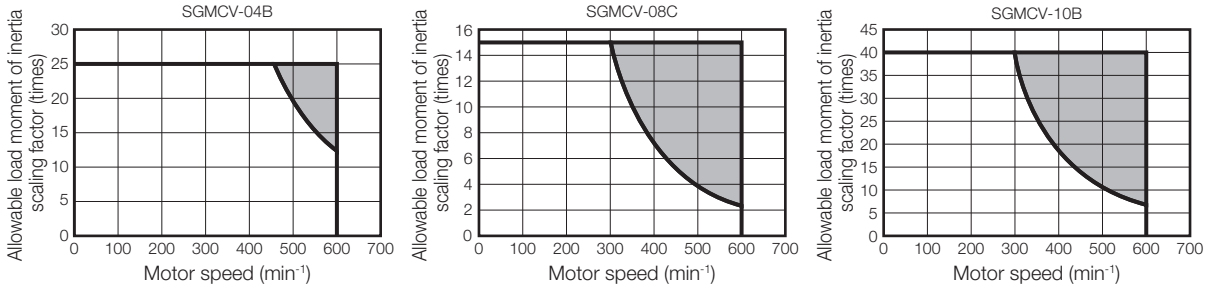
- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

Information 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).
Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.
Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



Note: Applicable SERVOPACK models: SGD7S-2R8A and -2R8F

When an External Regenerative Resistor Is Required

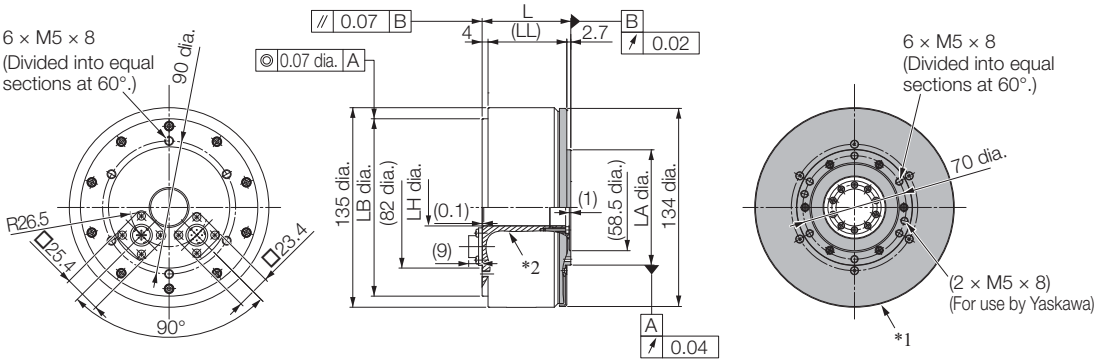
Install the External Regenerative Resistor.

Refer to the following catalog for information on External Regenerative Resistors.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

6.3 External Dimensions

◆ SGMCV-□□B

• Flange Specification 1



Unit: mm

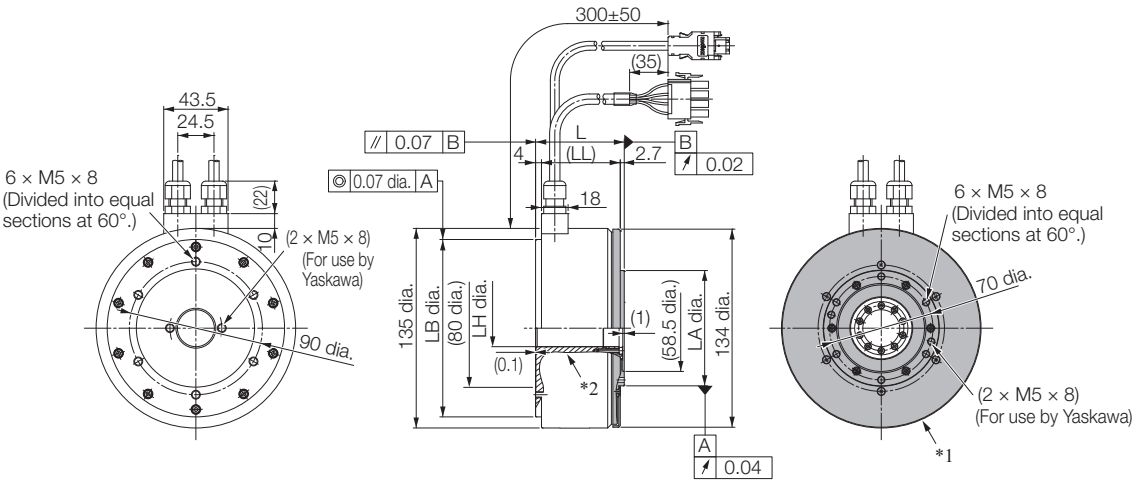
*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCV-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04B□A11	60	53.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	5.0
10B□A11	85	78.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	6.5
14B□A11	115	108.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	9.0

• Flange Specification 4



Unit: mm

*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

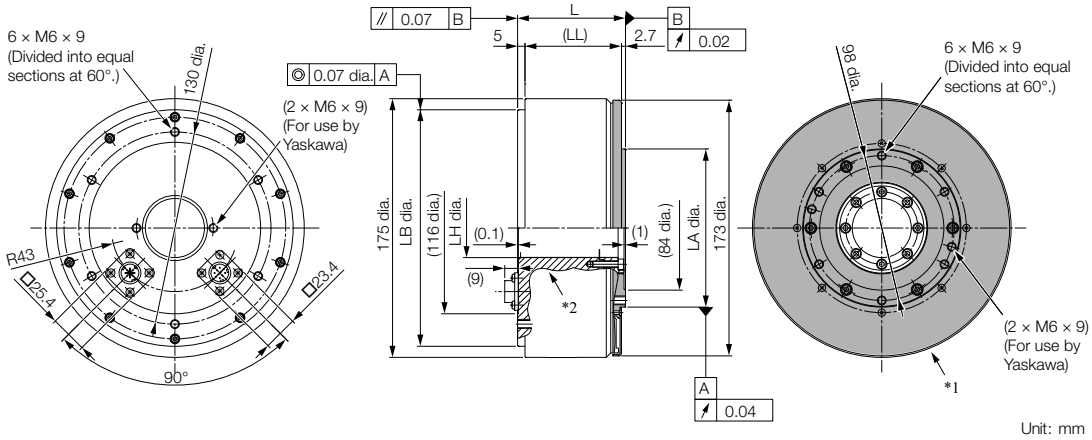
Model SGMCV-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04B□A41	60	53.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	5.0
10B□A41	85	78.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	6.5
14B□A41	115	108.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	9.0

Refer to the following section for information on connectors.

☞ *6.3.1 Connector Specifications* on page 6-12

◆ SGMCV-□□C

• Flange Specification 1



Unit: mm

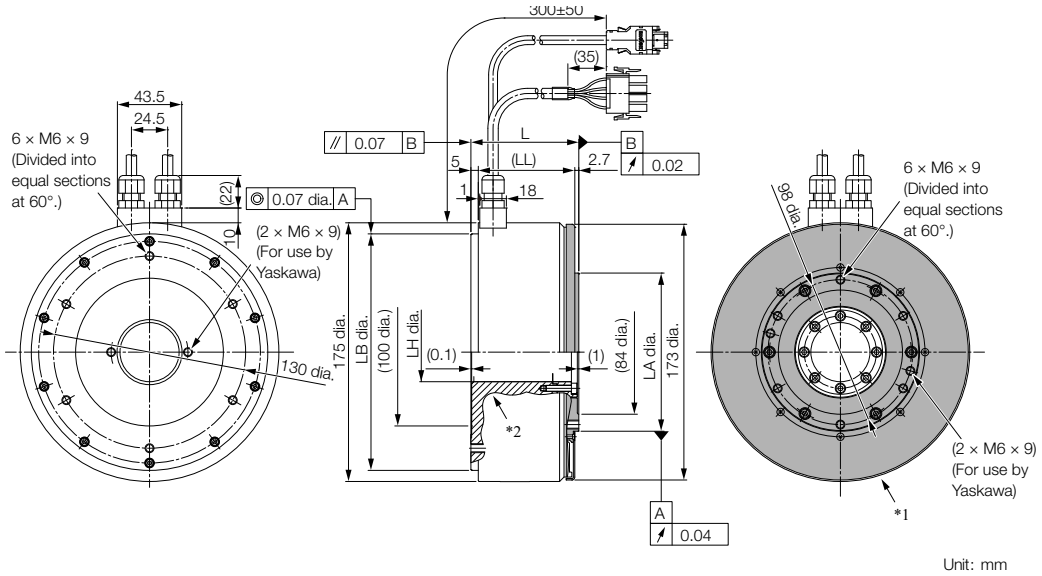
*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCV-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08C□A11	73	65.3	$160^{\ 0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{\ 0}_{-0.035}$	9.0
17C□A11	87	79.3	$160^{\ 0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{\ 0}_{-0.035}$	11.0
25C□A11	117	109.3	$160^{\ 0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{\ 0}_{-0.035}$	15.0

• Flange Specification 4



Unit: mm

*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

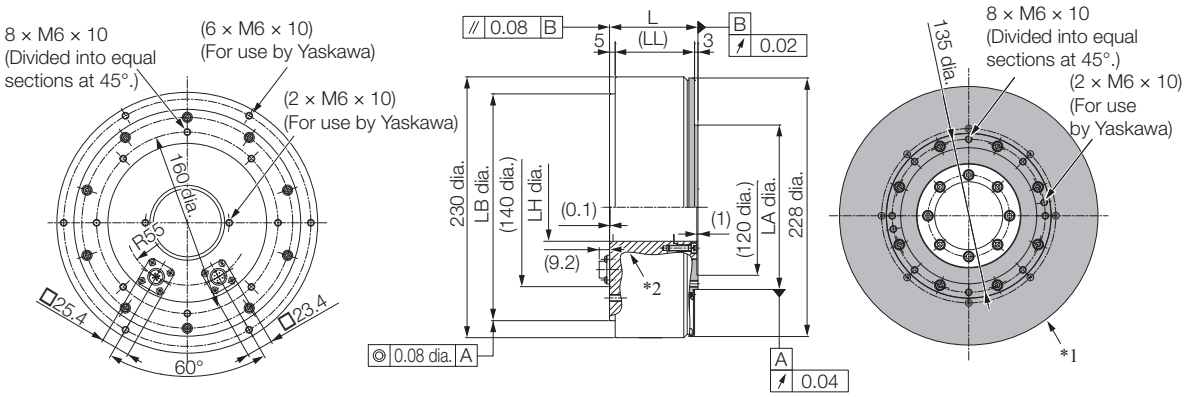
Model SGMCV-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08C□A41	73	65.3	$160^{\ 0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{\ 0}_{-0.035}$	9.0
17C□A41	87	79.3	$160^{\ 0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{\ 0}_{-0.035}$	11.0
25C□A41	117	109.3	$160^{\ 0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{\ 0}_{-0.035}$	15.0

Refer to the following section for information on connectors.

☞ *6.3.1 Connector Specifications* on page 6-12

◆ SGMCV-□□D

• Flange Specification 1



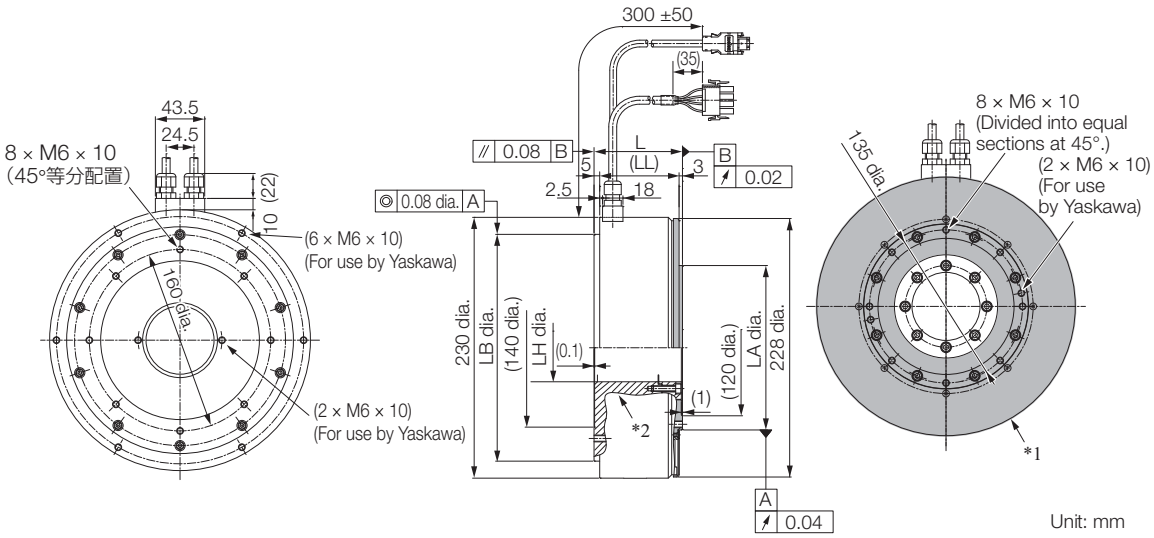
Unit: mm

*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCV-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16D□A11	78	70	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$145^{\ 0}_{-0.040}$	16.0
35D□A11	107	99	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$145^{\ 0}_{-0.040}$	25.0

• Flange Specification 4



Unit: mm

*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCV-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16D□A41	78	70	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$145^{\ 0}_{-0.040}$	16.0
35D□A41	107	99	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$145^{\ 0}_{-0.040}$	25.0

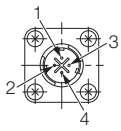
Refer to the following section for information on connectors

☞ *6.3.1 Connector Specifications* on page 6-12

6.3.1 Connector Specifications

◆ Flange Specification 1

• Servomotor Connector

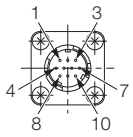


1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Model: JN1AS04MK2R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1
(Not provided by Yaskawa.)

• Encoder Connector



1	PS	6	–
2	/PS	7	FG (frame ground)
3	–	8*	BAT
4	PG5V	9	PG0V
5*	BAT0	10	–

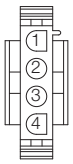
* Only absolute-value models with multiturn data.

Model: JN1AS10ML1-R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1
(Not provided by Yaskawa.)

◆ Flange Specification 4

• Servomotor Connector



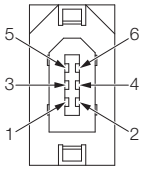
1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: TE Connectivity Japan G.K.

Mating Connector
- Cap: 350780-1
- Socket: 350570-3 or 350689-3

• Encoder Connector



1	PG5V
2	PG0V
3*	BAT
4*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

* Only absolute-value models with multiturn data.

Model: 55102-0600
Manufacturer: Molex Japan LLC

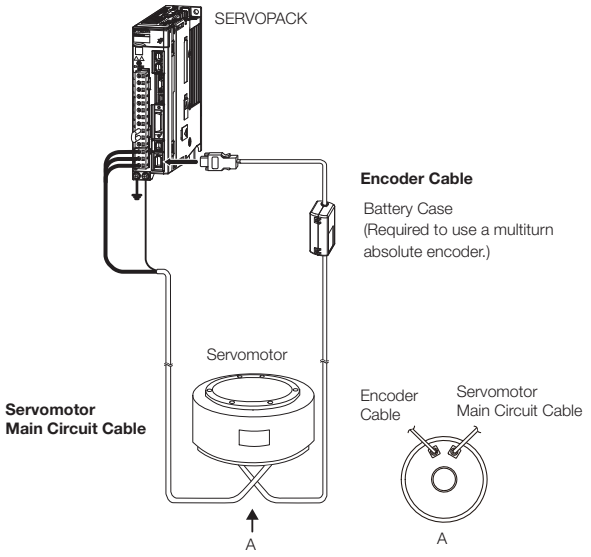
Mating connector: 54280-0609

6.4 Selecting Cables

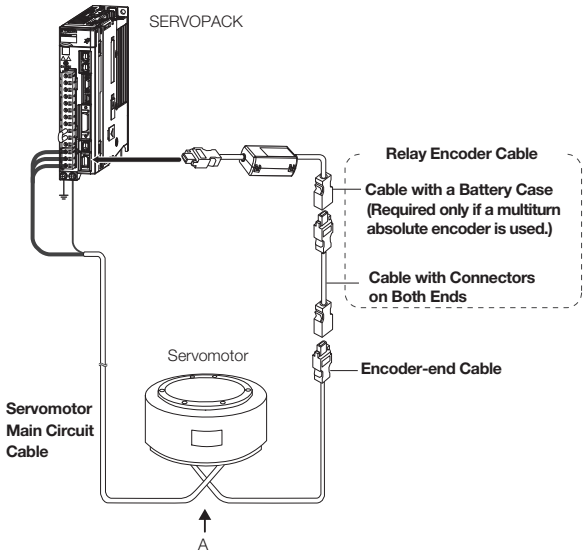
6.4.1 Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

Encoder Cable of 20 m or Less

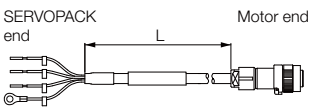
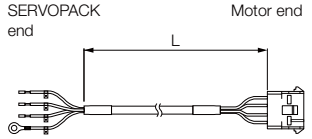


Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2. 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.
3. Refer to the following manual for the following information.
• Cable dimensional drawings and cable connection specifications
• Order numbers and specifications of individual connectors for cables
• Order numbers and specifications for wiring materials
Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

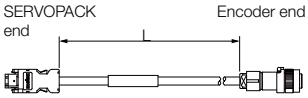
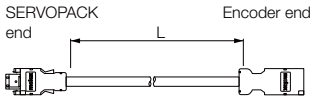
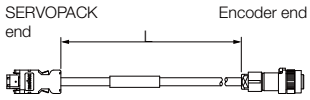
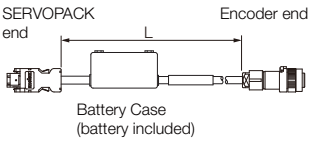
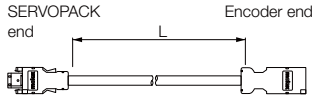
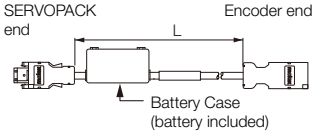
6.4.2 Servomotor Main Circuit Cables

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable*1	
SGMCV-□□□□ Flange specification*2: 1	3 m	JZSP-CMM60-03-E	JZSP-C7MDN23-03-E	
	5 m	JZSP-CMM60-05-E	JZSP-C7MDN23-05-E	
	10 m	JZSP-CMM60-10-E	JZSP-C7MDN23-10-E	
	15 m	JZSP-CMM60-15-E	JZSP-C7MDN23-15-E	
	20 m	JZSP-CMM60-20-E	JZSP-C7MDN23-20-E	
SGMCV-□□□□ Flange specification*2: 4	3 m	JZSP-CMM00-03-E	JZSP-C7MDS23-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-C7MDS23-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-C7MDS23-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-C7MDS23-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-C7MDS23-20-E	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
*2. Refer to the following section for the flange specifications.
6.1 Model Designations on page 6-2

Note: Direct Drive Servomotors are not available with holding brakes.

6.4.3 Encoder Cables of 20 m or Less

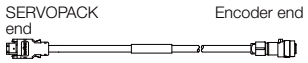
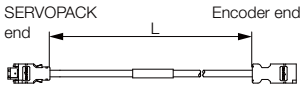
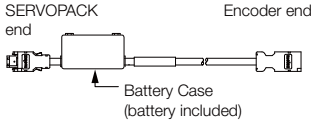
Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable*1	
SGMCV-□□□E Flange specification*2: 1	For single-turn absolute encoder (without Battery Case)	3 m	JZSP-CMP60-03-E	JZSP-CSP60-03-E	
		5 m	JZSP-CMP60-05-E	JZSP-CSP60-05-E	
		10 m	JZSP-CMP60-10-E	JZSP-CSP60-10-E	
		15 m	JZSP-CMP60-15-E	JZSP-CSP60-15-E	
		20 m	JZSP-CMP60-20-E	JZSP-CSP60-20-E	
SGMCV-□□□E Flange specification*2: 4		3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
SGMCV-□□□I Flange specification*2: 1	For multiturn absolute encoder (without Battery Case*3)	3 m	JZSP-C7PI00-03-E	JZSP-C7PI20-03-E	
		5 m	JZSP-C7PI00-05-E	JZSP-C7PI20-05-E	
		10 m	JZSP-C7PI00-10-E	JZSP-C7PI20-10-E	
		15 m	JZSP-C7PI00-15-E	JZSP-C7PI20-15-E	
		20 m	JZSP-C7PI00-20-E	JZSP-C7PI20-20-E	
	For multiturn absolute encoder (with Battery Case)	3 m	JZSP-C7PA00-03-E	JZSP-C7PA20-03-E	
		5 m	JZSP-C7PA00-05-E	JZSP-C7PA20-05-E	
		10 m	JZSP-C7PA00-10-E	JZSP-C7PA20-10-E	
		15 m	JZSP-C7PA00-15-E	JZSP-C7PA20-15-E	
		20 m	JZSP-C7PA00-20-E	JZSP-C7PA20-20-E	
SGMCV-□□□I Flange specification*2: 4	For multiturn absolute encoder (without Battery Case*3)	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
	For multiturn absolute encoder (with Battery Case)	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
		5 m	JZSP-CSP19-05-E	JZSP-CSP29-05-E	
		10 m	JZSP-CSP19-10-E	JZSP-CSP29-10-E	
		15 m	JZSP-CSP19-15-E	JZSP-CSP29-15-E	
		20 m	JZSP-CSP19-20-E	JZSP-CSP29-20-E	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 46 mm or larger.

*2. Refer to the following section for the flange specifications.
☞ *6.1 Model Designations* on page 6-2

*3. Use one of these Cables if a battery is connected to the host controller.

6.4.4 Relay Encoder Cables of 30 m to 50 m

Servomotor Model	Name	Length (L)	Order Number*1	Appearance
SGMCV-□□□□ Flange specification*2: 1	Encoder-end Cable (for single-turn/multiturn absolute encoder)	0.3 m	JZSP-C7PRC0-E	
SGMCV-□□□□ Flange specification*2: 1 or 4	Cables with Connectors on Both Ends (for single-turn/multiturn absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
SGMCV-□□□I Flange specification*2: 1 or 4	Cable with a Battery Case (for multiturn absolute encoder)*3	0.3 m	JZSP-CSP12-E	

*1. Flexible Cables are not available.

*2. Refer to the following section for the flange specifications.
☞ *6.1 Model Designations* on page 6-2

*3. Use one of these Cables if a battery is connected to the host controller.

6.4.4 Relay Encoder Cables of 30 m to 50 m

Specifications, Ratings, and External Dimensions of SGMCS Servomotors

7

This chapter describes how to interpret the model numbers of SGMCS Servomotors and gives their specifications, ratings, and external dimensions.

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7.1 Model Designations

SGMCS - 02 B 3 C 1 1 - E

Direct Drive Servomotors: SGMCS

1st+2nd digits | 3rd digit | 4th digit | 5th digit | 6th digit | 7th digit | 8th digit

1st+2nd digits Rated Output

- Small-Capacity, Coreless Servomotors

Code	Specification
02	2.00 N·m
04	4.00 N·m
05	5.00 N·m
07	7.00 N·m
08	8.00 N·m
10	10.0 N·m
14	14.0 N·m
16	16.0 N·m
17	17.0 N·m
25	25.0 N·m
35	35.0 N·m

- Medium-Capacity Servomotors with Cores

Code	Specification
45	45.0 N·m
80	80.0 N·m
1A	110 N·m
1E	150 N·m
2Z	200 N·m

3rd digit Servomotor Outer Diameter

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

4th digit Serial Encoder

Code	Specification
3	20-bit single-turn absolute encoder
D	20-bit incremental encoder

5th digit Design Revision Order

Code	Specification
A	Model with servomotor outer diameter code M or N
B	Model with servomotor outer diameter code E
C	Model with servomotor outer diameter code B, C, or D

6th digit Flange

Code	Mounting	Servomotor Outer Diameter Code (3rd Digit)					
		B	C	D	E	M	N
1	Non-load side	✓	✓	✓	✓	–	–
	Load side	–	–	–	–	✓	✓
3	Non-load side	–	–	–	–	✓	✓
4	Non-load side (with cable on side)	✓	✓	✓	✓	–	–

✓ : Applicable models.

7th digit Options

Code	Specification
1	Without options

8th digit EU Directive Certification

Code	Specification
E	Certified
None	Not certified

Note: 1. Direct Drive Servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

◆ Manufactured Models

Rated Torque N·m	Servomotor Outer Diameter					
	B (135-mm dia.)	C (175-mm dia.)	D (230-mm dia.)	E (290-mm dia.)	M (280-mm dia.)	N (360-mm dia.)
2.00	SGMCS-02B	–	–	–	–	–
4.00	–	SGMCS-04C	–	–	–	–
5.00	SGMCS-05B	–	–	–	–	–
7.00	SGMCS-07B	–	–	–	–	–
8.00	–	–	SGMCS-08D	–	–	–
10.0	–	SGMCS-10C	–	–	–	–
14.0	–	SGMCS-14C	–	–	–	–
16.0	–	–	–	SGMCS-16E	–	–
17.0	–	–	SGMCS-17D	–	–	–
25.0	–	–	SGMCS-25D	–	–	–
35.0	–	–	–	SGMCS-35E	–	–
45.0	–	–	–	–	SGMCS-45M	–
80.0	–	–	–	–	SGMCS-80M	SGMCS-80N
110	–	–	–	–	SGMCS-1AM	–
150	–	–	–	–	–	SGMCS-1EN
200	–	–	–	–	–	SGMCS-2ZN

Note: The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

7.2 Specifications and Ratings

7.2.1 Small-Capacity, Coreless Servomotors: Specifications

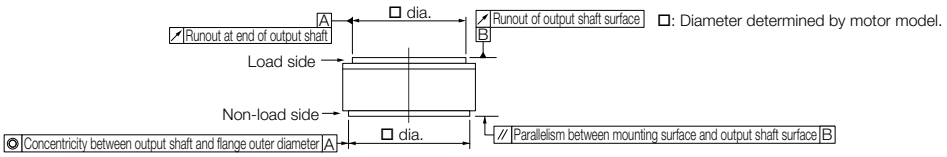
Voltage			200 V									
Model SGMCS-			02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E
Time Rating			Continuous									
Thermal Class			A									
Insulation Resistance			500 VDC, 10 MΩ min.									
Withstand Voltage			1,500 VAC for 1 minute									
Excitation			Permanent magnet									
Mounting			Flange-mounted									
Drive Method			Direct drive									
Rotation Direction			Counterclockwise (CCW) for forward reference when viewed from the load side									
Vibration Class*1			V15									
Absolute Accuracy*2			±15 s									
Repeatability			±1.3 s									
Protective Structure*3			Totally enclosed, self-cooled, IP42									
Environmental Conditions	Surrounding Air Temperature		0°C to 40°C (with no freezing)									
	Surrounding Air Humidity		20% to 80% relative humidity (with no condensation)									
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.									
	Storage Environment		Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)									
Mechanical Tolerances*4	Runout of Output Shaft Surface	mm	0.02									
	Runout at End of Output Shaft	mm	0.04									
	Parallelism between Mounting Surface and Output Shaft Surface	mm	0.07						0.08			
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.07						0.08			
Shock Resistance*5	Impact Acceleration Rate at Flange		490 m/s^2									
	Number of Impacts		2 times									
Vibration Resistance*5	Vibration Acceleration Rate at Flange		49 m/s^2									
Applicable SERVOPACKs	SGD7S-		2R8A, 2R1F			2R8A, 2R8F						5R5A
	SGD7W- SGD7C-		2R8A									

*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*2. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.

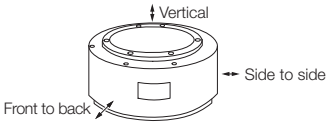
*3. The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used.

*4. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*5. The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures.
The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.

Shock Applied to the Servomotor



Vibration Applied to the Servomotor

7.2.2 Small-Capacity, Coreless Servomotors: Ratings

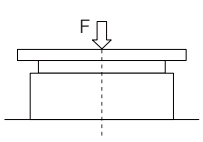
Voltage			200 V									
Model SGMCS-			02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E
Rated Output*1		W	42	105	147	84	209	293	168	356	393	335	550
Rated Torque*1, *2		N·m	2.00	5.00	7.00	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Instantaneous Maximum Torque*1		N·m	6.00	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque*1		N·m	2.05	5.15	7.32	4.09	10.1	14.2	8.23	17.4	25.4	16.5	35.6
Rated Current*1		Arms	1.8	1.7	1.4	2.2		2.8	1.9	2.5	2.6	3.3	3.5
Instantaneous Maximum Current*1		Arms	5.4	5.1	4.1	7.0		8.3	5.6	7.5	8.0	9.4	10.0
Rated Motor Speed*1		min^{-1}	200			200			200		150	200	150
Maximum Motor Speed*1		min^{-1}	500			500	400	300	500	350	250	500	250
Torque Constant		N·m/Arms	1.18	3.17	5.44	2.04	5.05	5.39	5.10	7.79	10.8	5.58	11.1
Motor Moment of Inertia		$\times 10^{-4}$ kg·m^2	28.0	51.0	77.0	77.0	140	220	285	510	750	930	1430
Rated Power Rate*1		kW/s	1.43	4.90	6.36	2.08	7.14	8.91	2.25	5.67	8.33	2.75	8.57
Rated Angular Acceleration Rate*1		rad/s^2	710	980	910	520	710	640	280	330		170	240
Heat Sink Size		mm	350 × 350 × 12			450 × 450 × 12			550 × 550 × 12			650 × 650 × 12	
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			10 times				5 times	3 times					
	With External Regenerative Resistor and Dynamic Brake Resistor		10 times				5 times	3 times					
Allowable Load*4	Allowable Thrust Load	N	1500			3300			4000			11000	
	Allowable Moment Load	N·m	40	50	64	70	75	90	93	103	135	250	320

*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

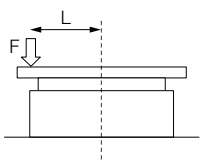
*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

*3. To externally connect dynamic brake resistance, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect dynamic brake resistance if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).
- SGD7S-R70□□□A020 to -2R8□□□A020
- SGD7W-1R6A20A020 to -2R8A20A020
- SGD7C-1R6AMAA020 to -2R8MAA020

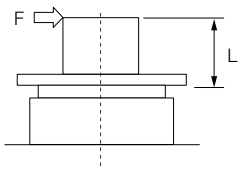
*4. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L

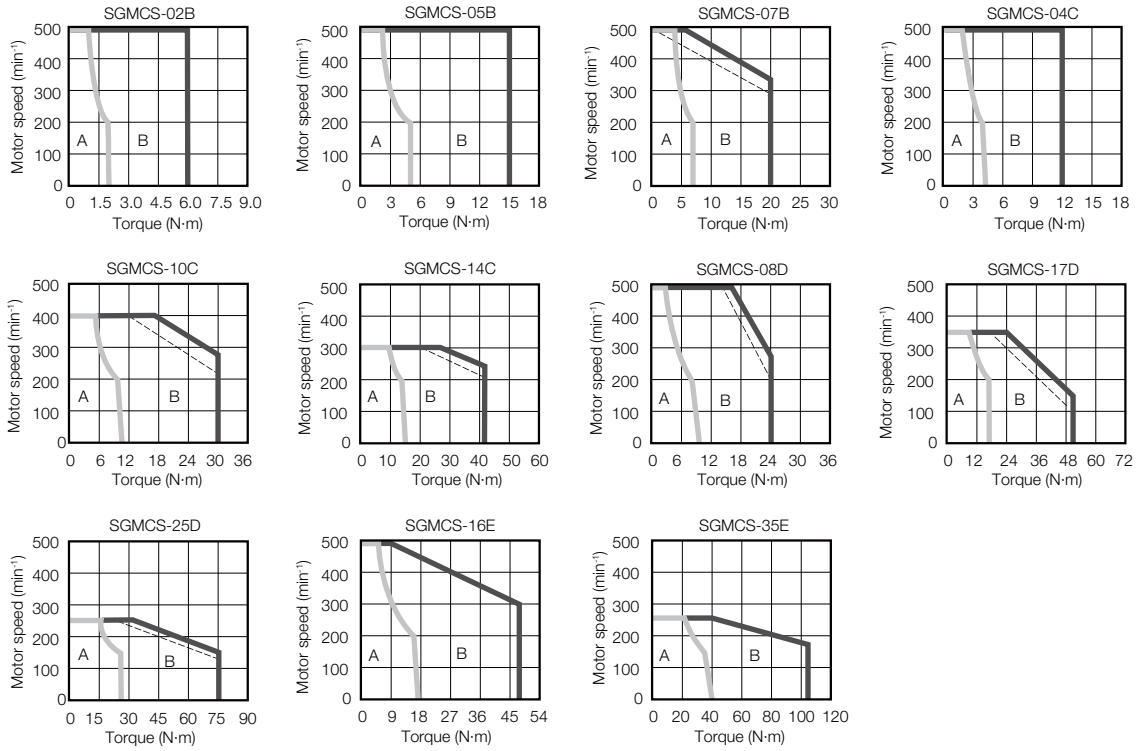


Where F is the external force
Thrust load = Load mass
Moment load = F × L

Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

7.2.3 Small-Capacity, Coreless Servomotors: Torque-Motor Speed Characteristics

A : Continuous duty zone ——— (solid lines): With three-phase 200-V input
B : Intermittent duty zone - - - - - - - (dotted lines): With single-phase 100-V input

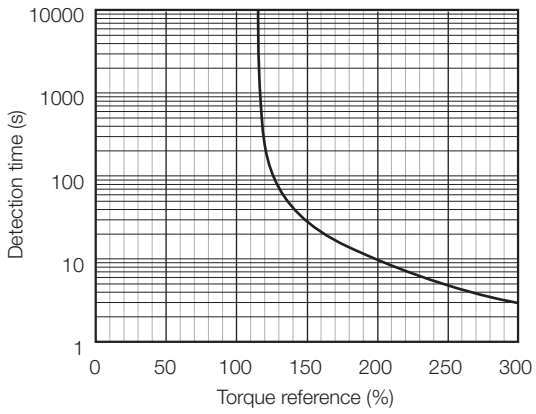


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for 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.

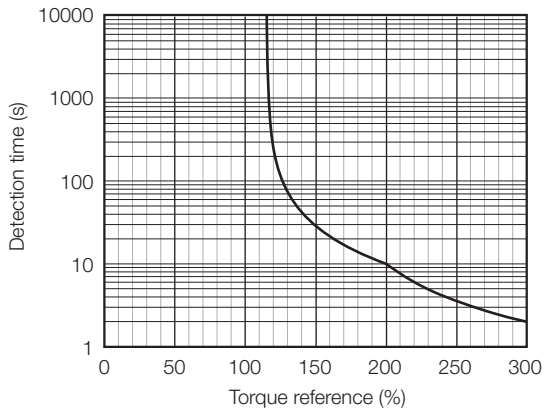
7.2.4 Small-Capacity, Coreless Servomotors: Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.

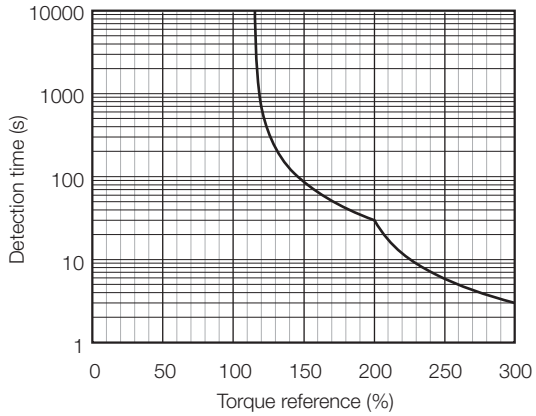
SGMCS-02B, -05B, -07B, -10C, -17D, and -35E



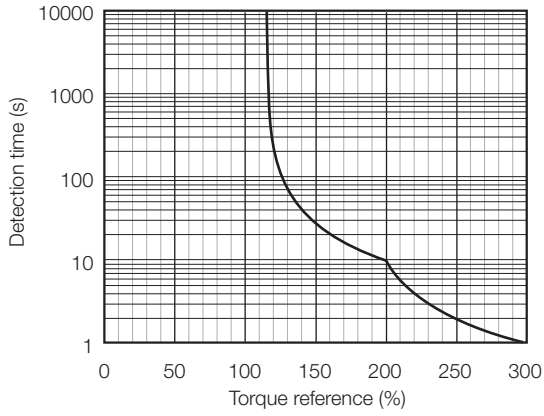
SGMCS-04C



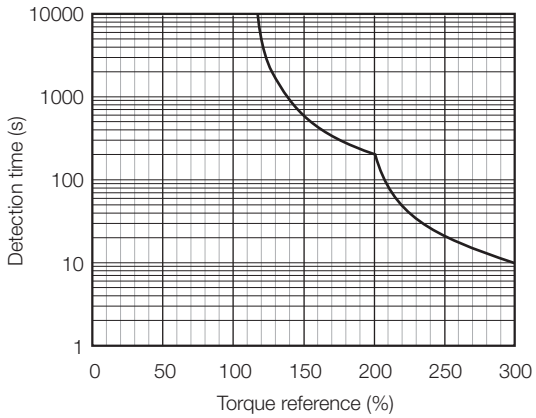
SGMCS-14C



SGMCS-08D and -16E



SGMCS-25D



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
Use the Servomotor so that the effective force remains within the continuous duty zone. Refer to the following section for the effective torque.
☞ *7.2.3 Small-Capacity, Coreless Servomotors: Torque-Motor Speed Characteristics* on page 7-7

7.2.5 Medium-Capacity Servomotors, with Cores: Specifications

Voltage			200 V					
Model SGMCS-			45M	80M	1AM	80N	1EN	2ZN
Time Rating			Continuous					
Thermal Class			F					
Insulation Resistance			500 VDC, 10 MΩ min.					
Withstand Voltage			1,500 VAC for 1 minute					
Excitation			Permanent magnet					
Mounting			Flange-mounted					
Drive Method			Direct drive					
Rotation Direction			Counterclockwise (CCW) for forward reference when viewed from the load side					
Vibration Class*1			V15					
Absolute Accuracy*2			±15 s					
Repeatability			±1.3 s					
Protective Structure*3			Totally enclosed, self-cooled, IP44					
Environmental Conditions	Surrounding Air Temperature		0°C to 40°C (with no freezing)					
	Surrounding Air Humidity		20% to 80% relative humidity (with no condensation)					
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.					
	Storage Environment		Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)					
Mechanical Tolerances*4	Runout of Output Shaft Surface	mm	0.02					
	Runout at End of Output Shaft	mm	0.04					
	Parallelism between Mounting Surface and Output Shaft Surface	mm	–					
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.08					
	Perpendicularity between Mounting Surface and Output Shaft	mm	0.08					
Shock Resistance*5	Impact Acceleration Rate at Flange		490 m/s^2					
	Number of Impacts		2 times					
Vibration Resistance*5	Vibration Acceleration Rate at Flange		24.5 m/s^2					
Applicable SERVOPACKs		SGD7S-	7R6A	120A	180A	120A	200A	
		SGD7W- SGD7C-	7R6A	–				

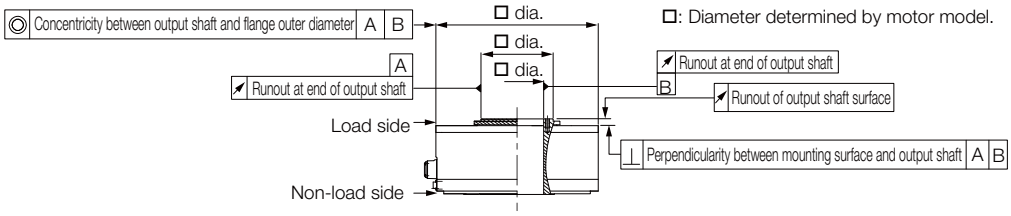
*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*2. Typical value based on YASKAWA measurements when the product is shipped. The value will vary depending on factors such as the application environment and temperature.

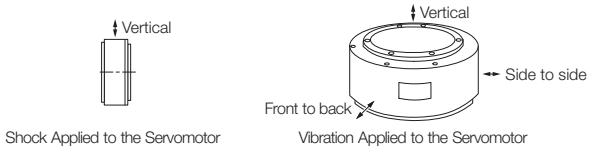
*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

7.2.5 Medium-Capacity Servomotors, with Cores: Specifications

*4. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



*5. The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures.
The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



Shock Applied to the Servomotor

Vibration Applied to the Servomotor

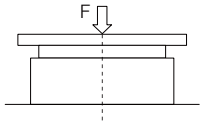
7.2.6 Medium-Capacity Servomotors, with Cores: Ratings

Voltage			200 V					
Model SGMCS-			45M	80M	1AM	80N	1EN	2ZN
Rated Output*1		W	707	1260	1730	1260	2360	3140
Rated Torque*1, *2		N·m	45.0	80.0	110	80.0	150	200
Instantaneous Maximum Torque*1		N·m	135	240	330	240	450	600
Stall Torque*1		N·m	45.0	80.0	110	80.0	150	200
Rated Current*1		Arms	5.8	9.7	13.4	9.4	17.4	18.9
Instantaneous Maximum Current*1		Arms	17.0	28.0	42.0	28.0	56.0	56.0
Rated Motor Speed*1		min^{-1}	150			150		
Maximum Motor Speed*1		min^{-1}	300			300	250	
Torque Constant		N·m/Arms	8.39	8.91	8.45	9.08	9.05	11.5
Motor Moment of Inertia		$\times 10^{-4}$ kg·m^2	388	627	865	1360	2470	3060
Rated Power Rate*1		kW/s	52.2	102	140	47.1	91.1	131
Rated Angular Acceleration Rate*1		rad/s^2	1160	1280	1270	588	607	654
Heat Sink Size		mm	750 × 750 × 45					
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			3 times					
	With External Regenerative Resistor and Dynamic Brake Resistor		3 times					
Allowable Load*3	A	mm	33			37.5		
	Allowable Thrust Load	N	9000			16000		
	Allowable Moment Load	N·m	180			350		

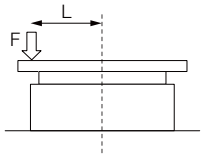
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

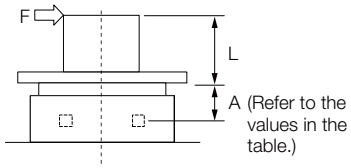
*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L

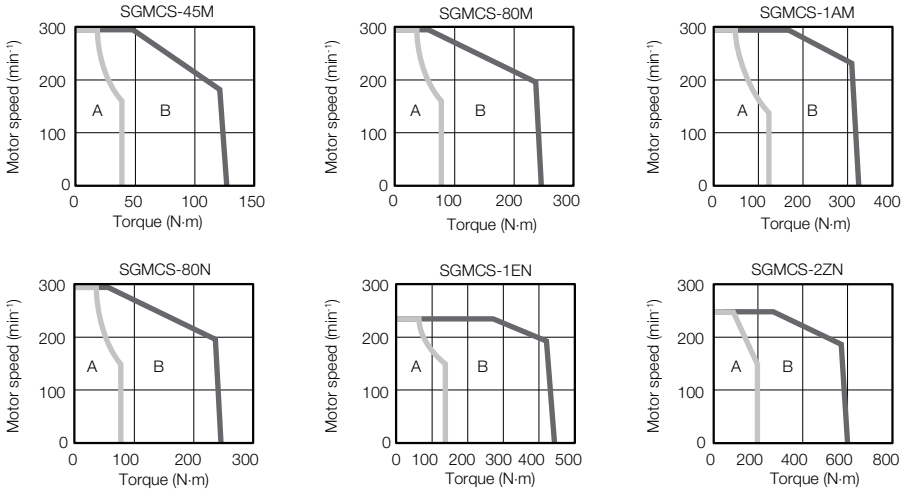


Where F is the external force,
Thrust load = Load mass
Moment load = F × (L + A)

Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

7.2.7 Medium-Capacity Servomotors, with Cores: Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

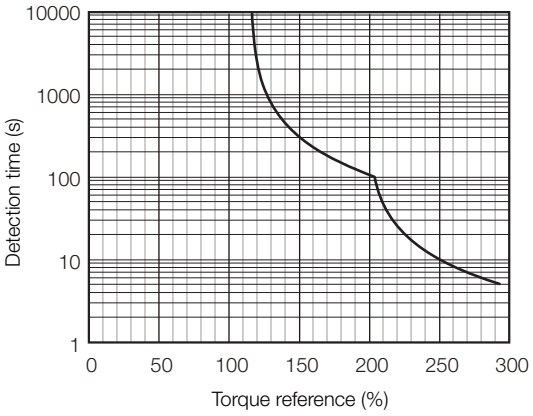


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
3. If you 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.

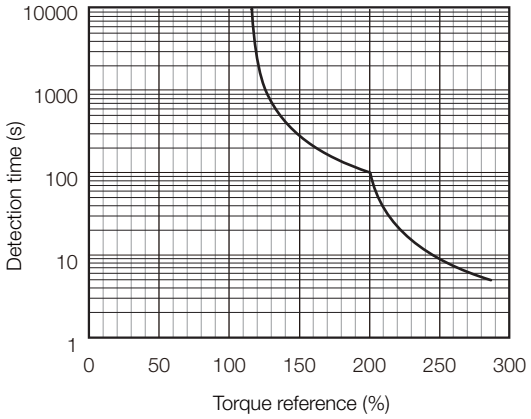
7.2.8 Medium-Capacity Servomotors, with Cores: Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.

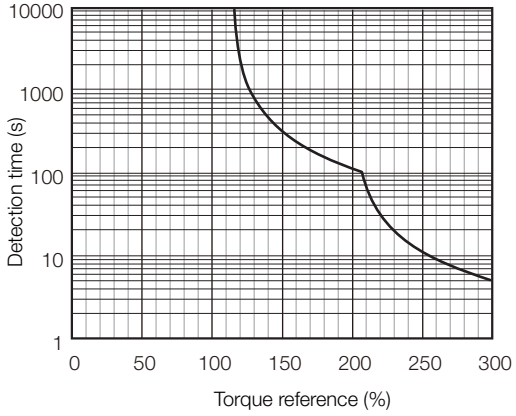
SGMCS-45M



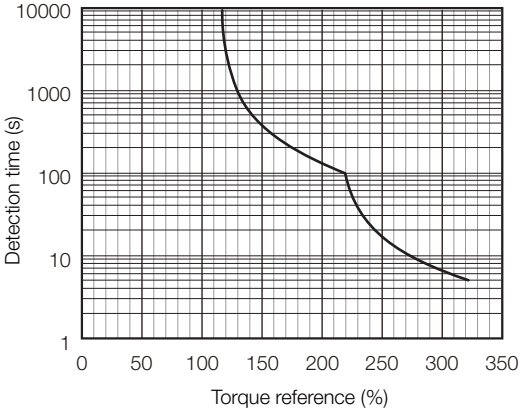
SGMCS-80M



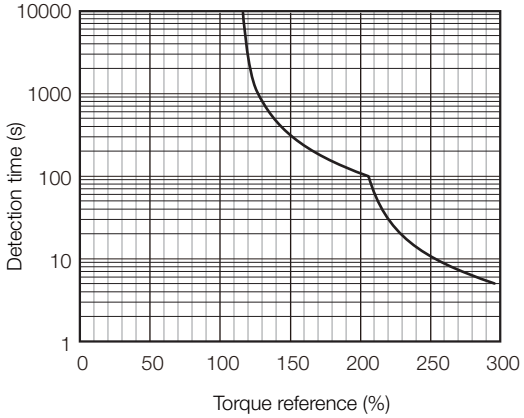
SGMCS-1AM and -80N



SGMCS-1EN



SGMCS-2ZN



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
Use the Servomotor so that the effective force remains within the continuous duty zone. Refer to the following section for the effective torque.
☞ *7.2.7 Medium-Capacity Servomotors, with Cores: Torque-Motor Speed Characteristics* on page 7-12

7.2.9 Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the *7.2.2 Small-Capacity, Coreless Servomotors: Ratings* on page 7-6 and *7.2.6 Medium-Capacity Servomotors, with Cores: Ratings* on page 7-11. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

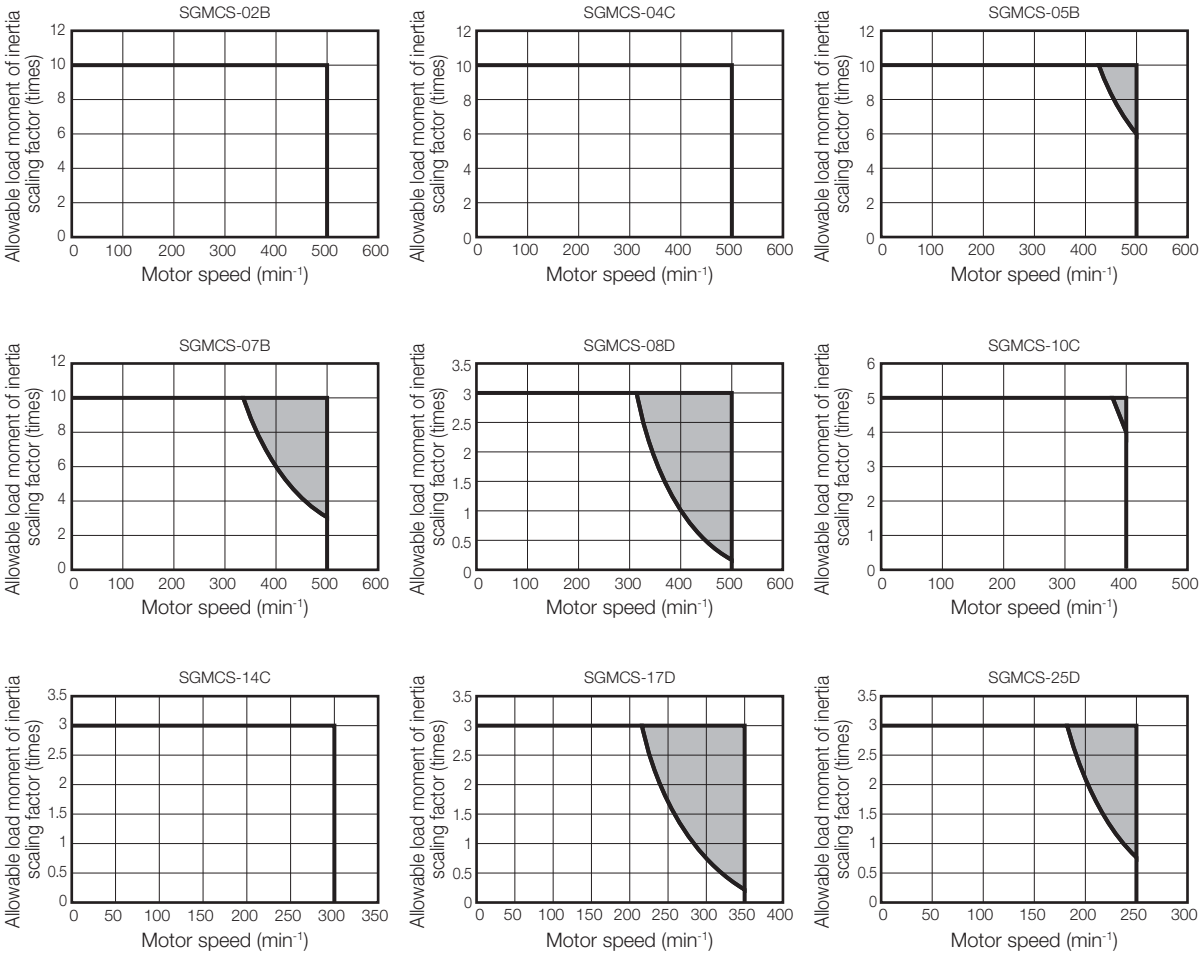
If the above steps is not possible, install an external regenerative resistor.

Information

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).
Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.
Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



Note: Applicable SERVOPACK models: SGD7S-2R8A and -2R8F

When an External Regenerative Resistor Is Required

Install the External Regenerative Resistor.

Refer to the following catalog for information on External Regenerative Resistors.

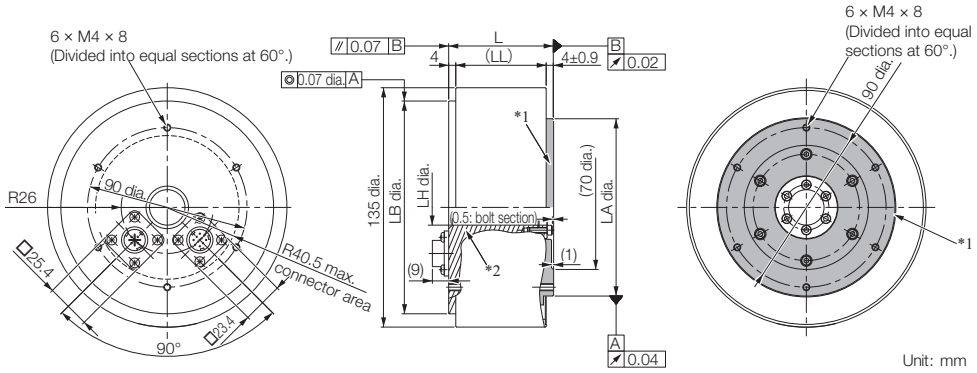
AC Servo Drives Σ-7 Series (Manual No.: KAEP S800001 23)

7.3 External Dimensions

7.3.1 Small-Capacity, Coreless Servomotors

◆ SGMCS-□□B

• Flange Specification 1



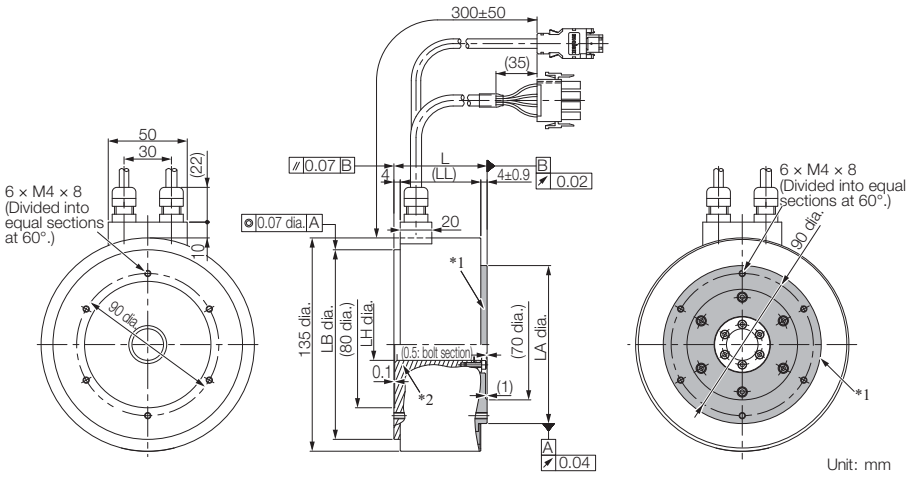
*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02B□C11	59	51	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	4.8
05B□C11	88	80	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	5.8
07B□C11	128	120	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	8.2

• Flange Specification 4



*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

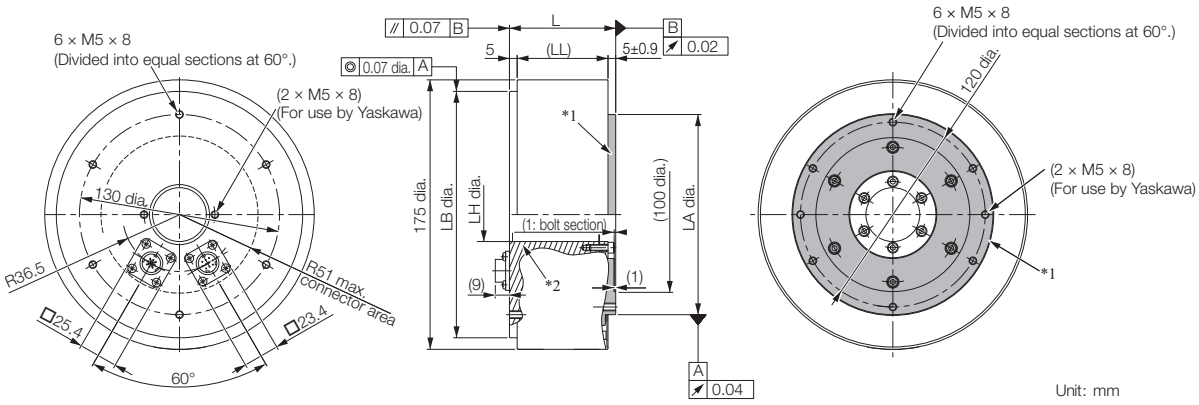
Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02B□C41	59	51	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	4.8
05B□C41	88	80	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	5.8
07B□C41	128	120	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	8.2

Refer to the following section for information on connectors.

☞ *7.3.3 Connector Specifications* on page 7-22

◆ SGMCS-□□C

• Flange Specification 1



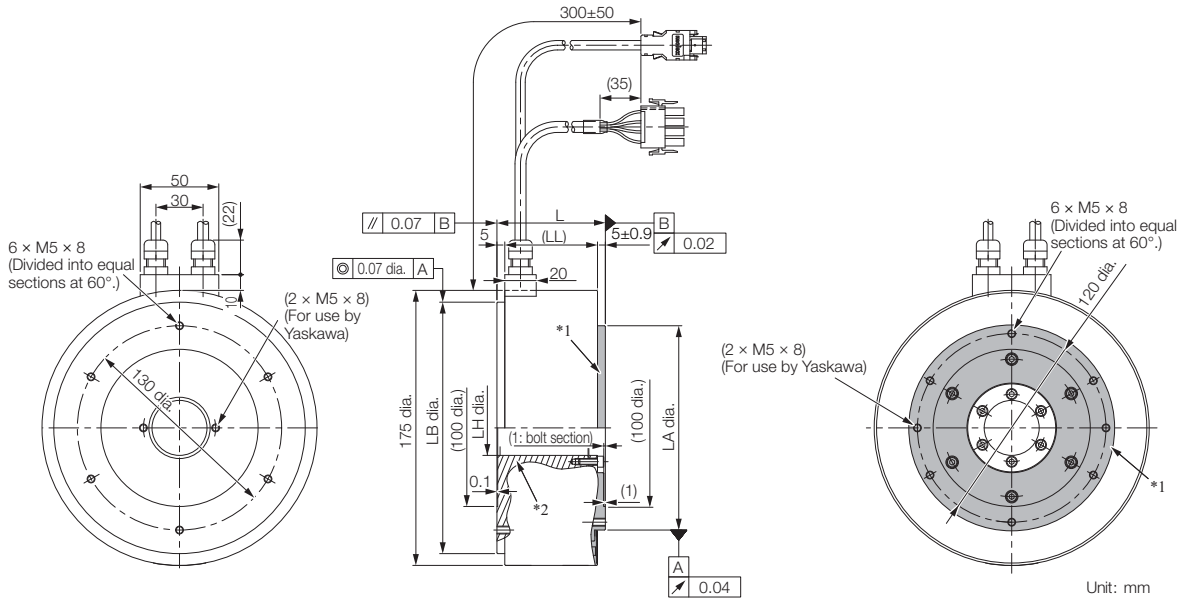
*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04C□C11	69	59	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	7.2
10C□C11	90	80	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	10.2
14C□C11	130	120	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	14.2

• Flange Specification 4



*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

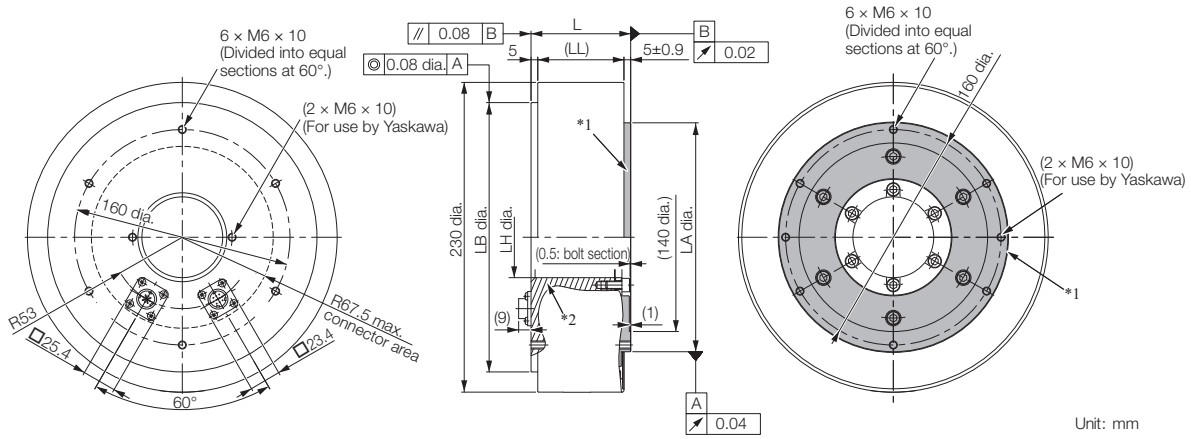
Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04C□C41	69	59	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	7.2
10C□C41	90	80	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	10.2
14C□C41	130	120	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	14.2

Refer to the following section for information on connectors.

☞ *7.3.3 Connector Specifications* on page 7-22

◆ SGMCS-□□D

• Flange Specification 1



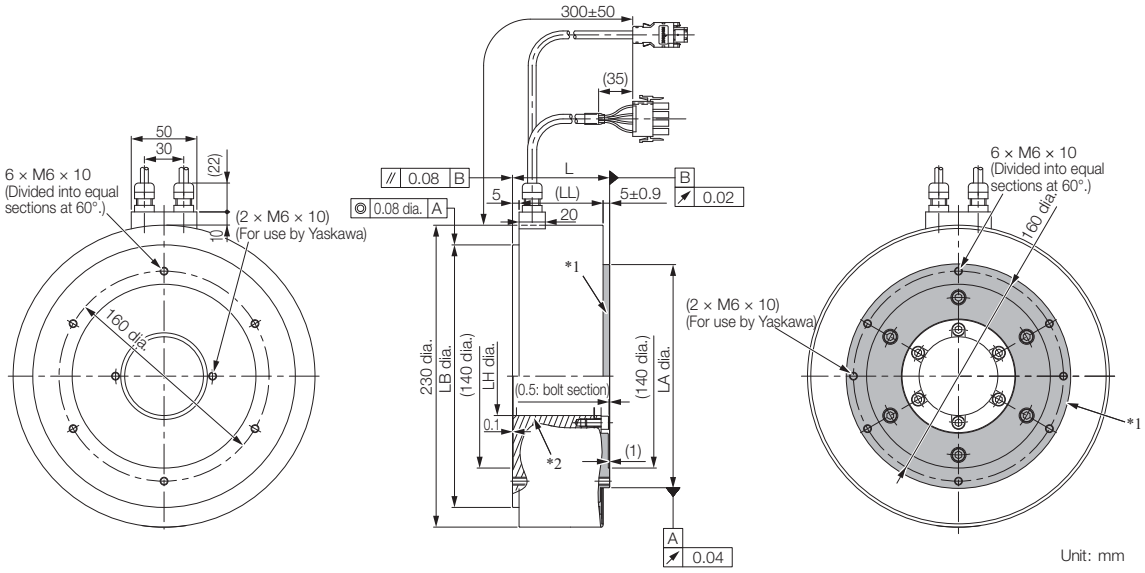
*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08D□C11	74	64	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	14.0
17D□C11	110	100	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	22.0
25D□C11	160	150	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	29.7

• Flange Specification 4



*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

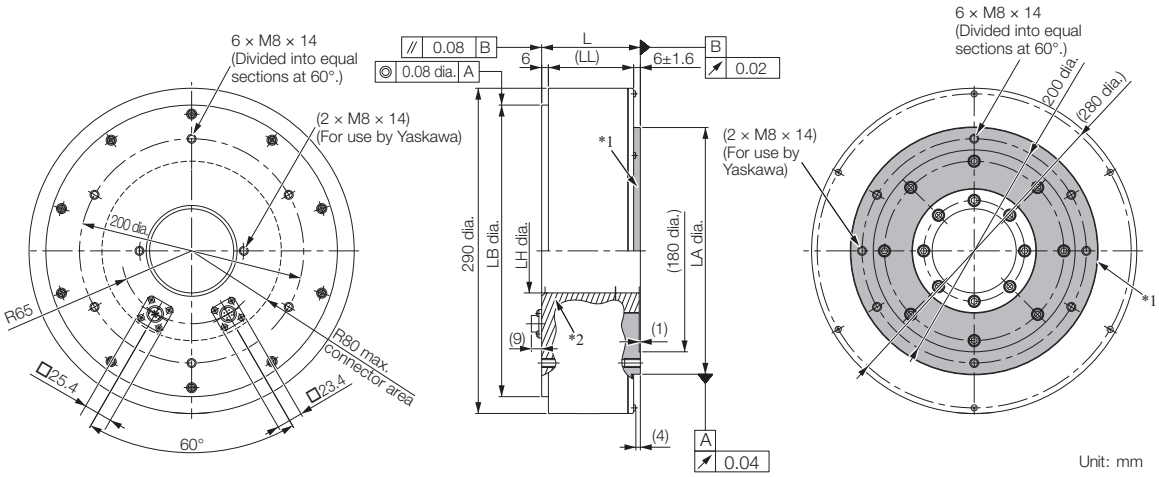
Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08D□C41	74	64	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	14.0
17D□C41	110	100	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	22.0
25D□C41	160	150	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	29.7

Refer to the following section for information on connectors.

☞ *7.3.3 Connector Specifications* on page 7-22

◆ SGMCS-□□E

• Flange Specification 1



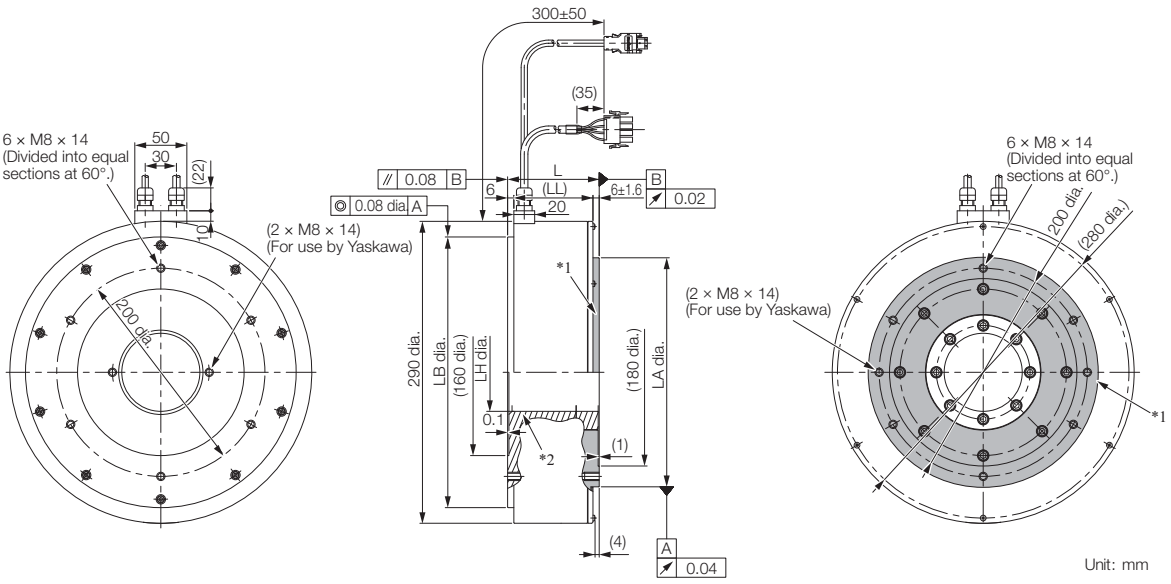
*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16E□B11	88	76	$260^{\ 0}_{-0.052}$	$75^{+0.4}_{\ 0}$	$220^{\ 0}_{-0.046}$	26.0
35E□B11	112	100	$260^{\ 0}_{-0.052}$	$75^{+0.4}_{\ 0}$	$220^{\ 0}_{-0.046}$	34.0

• Flange Specification 4



*1. The shaded section indicates the rotating parts.

*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16E□B41	88	76	$260^{\ 0}_{-0.052}$	$75^{+0.4}_{\ 0}$	$220^{\ 0}_{-0.046}$	26.0
35E□B41	112	100	$260^{\ 0}_{-0.052}$	$75^{+0.4}_{\ 0}$	$220^{\ 0}_{-0.046}$	34.0

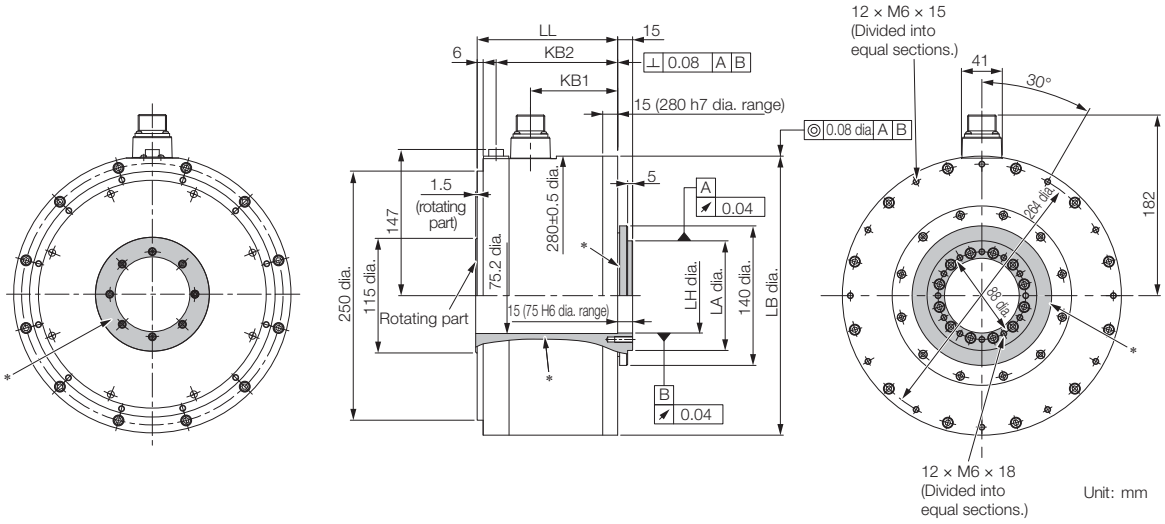
Refer to the following section for information on connectors.

☞ *7.3.3 Connector Specifications* on page 7-22

7.3.2 Medium-Capacity Servomotors with Cores

◆ SGMCS-□□M

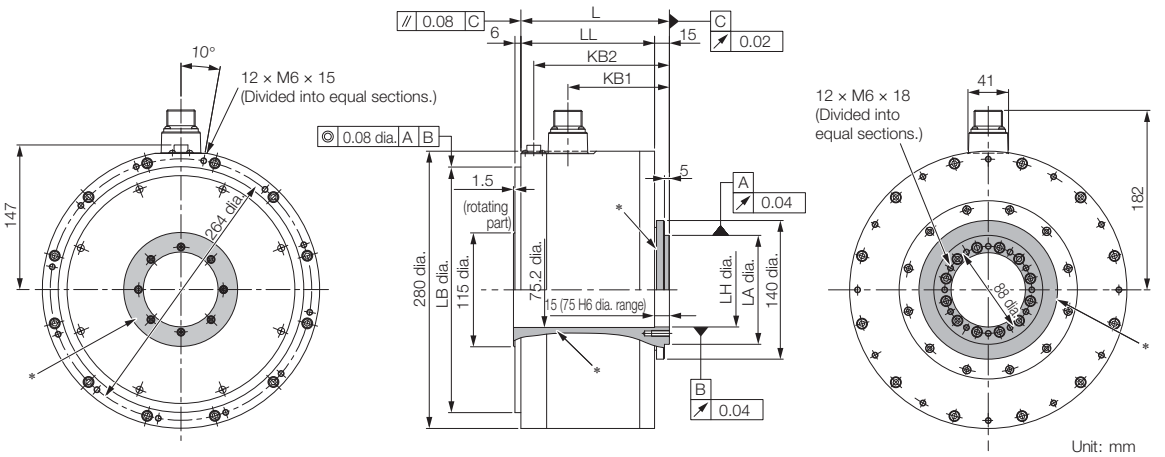
• Flange Specification 1



* The shaded section indicates the rotating parts.

Model SGMCS-	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
45M□A11	141	87.5	122	$280^{\ 0}_{-0.052}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	38
80M□A11	191	137.5	172	$280^{\ 0}_{-0.052}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	45
1AM□A11	241	187.5	222	$280^{\ 0}_{-0.052}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	51

• Flange Specification 3



* The shaded section indicates the rotating parts.

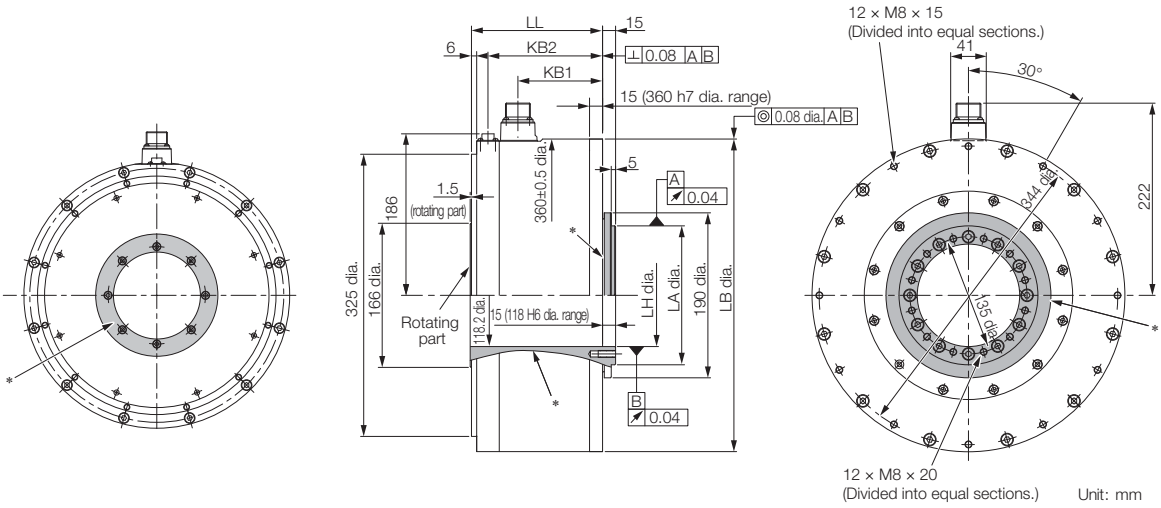
Model SGMCS-	L	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
45M□A31	150	135	102.5	137	$248^{\ 0}_{-0.046}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	38
80M□A31	200	185	152.5	187	$248^{\ 0}_{-0.046}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	45
1AM□A31	250	235	202.5	237	$248^{\ 0}_{-0.046}$	$75^{+0.019}_{\ 0}$	$110^{\ 0}_{-0.035}$	51

Refer to the following section for information on connectors.

☞ *7.3.3 Connector Specifications* on page 7-22

◆ SGMCS-□□N

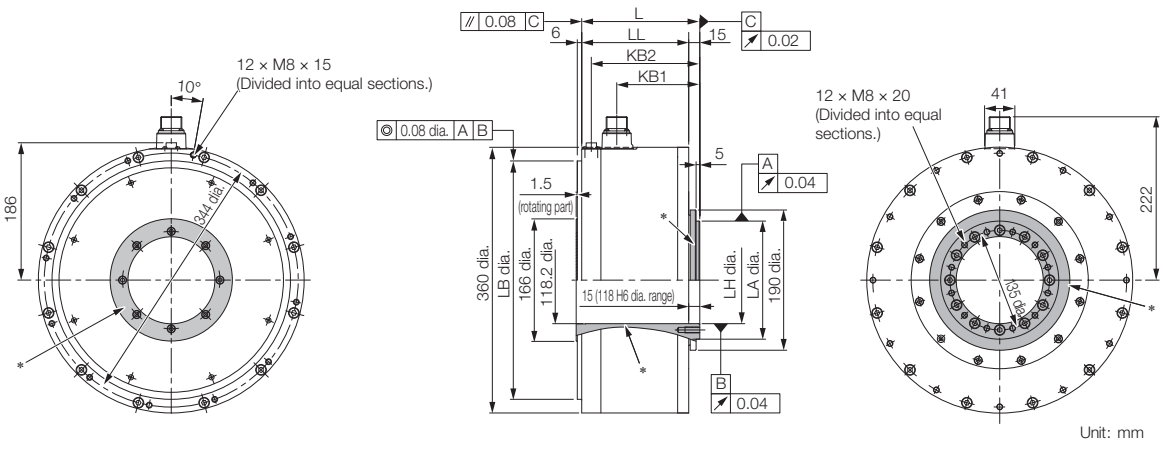
• Flange Specification 1



* The shaded section indicates the rotating parts.

Model SGMCS-	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
80N□A11	151	98	132	$360\ ^{0}_{-0.057}$	$118\ ^{+0.022}_{0}$	$160\ ^{0}_{-0.040}$	50
1EN□A11	201	148	182	$360\ ^{0}_{-0.057}$	$118\ ^{+0.022}_{0}$	$160\ ^{0}_{-0.040}$	68
2ZN□A11	251	198	232	$360\ ^{0}_{-0.057}$	$118\ ^{+0.022}_{0}$	$160\ ^{0}_{-0.040}$	86

• Flange Specification 3



* The shaded section indicates the rotating parts.

Model SGMCS-	L	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
80N□A31	160	145	113	147	$323\ ^{0}_{-0.057}$	$118\ ^{+0.022}_{0}$	$160\ ^{0}_{-0.040}$	50
1EN□A31	210	195	163	197	$323\ ^{0}_{-0.057}$	$118\ ^{+0.022}_{0}$	$160\ ^{0}_{-0.040}$	68
2ZN□A31	260	245	213	247	$323\ ^{0}_{-0.057}$	$118\ ^{+0.022}_{0}$	$160\ ^{0}_{-0.040}$	86

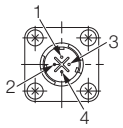
Refer to the following section for information on connectors.

☞ *7.3.3 Connector Specifications* on page 7-22

7.3.3 Connector Specifications

◆ SGMCS-□□B, -□□C, -□□D, or -□□E with Flange Specification 1

• Servomotor Connector

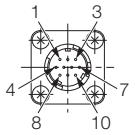


1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Model: JN1AS04MK2R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1
(Not provided by Yaskawa.)

• Encoder Connector



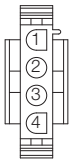
1	PS	6	–
2	/PS	7	FG (frame ground)
3	–	8	–
4	PG5V	9	PG0V
5	–	10	–

Model: JN1AS10ML1-R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1
(Not provided by Yaskawa.)

◆ SGMCS-□□B, -□□C, -□□D, or -□□E with Flange Specification 4

• Servomotor Connector

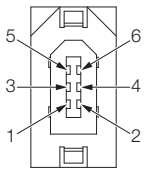


1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Models
• Plug: 350779-1
• Pins: 350561-3 or 350690-3 (No.1 to 3)
• Ground pin: 350654-1 or 350669-1 (No. 4)
Manufacturer: TE Connectivity Japan G.K.

Mating Connector
• Cap: 350780-1
• Socket: 350570-3 or 350689-3

• Encoder Connector



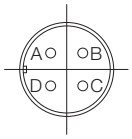
1	PG5V
2	PG0V
3	–
4	–
5	PS
6	/PS
Connector case	FG (frame ground)

Model: 55102-0600
Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

◆ SGMCS-□□M or -□□N with Flange Specification 1 or 3

• Servomotor Connector

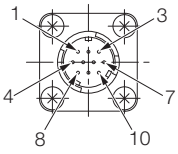


A	Phase U
B	Phase V
C	Phase W
D	FG (frame ground)

Model: CE05-2A18-10PD
Manufacturer: Fujikura Ltd.

Mating Connector
Plug: CE05-6A18-10SD-D-BSS
Cable clamp: CE3057-10A-□(D265)

• Encoder Connector



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

Model: JN1AS10ML1
Manufacturer: Japan Aviation Electronics Industry, Ltd.

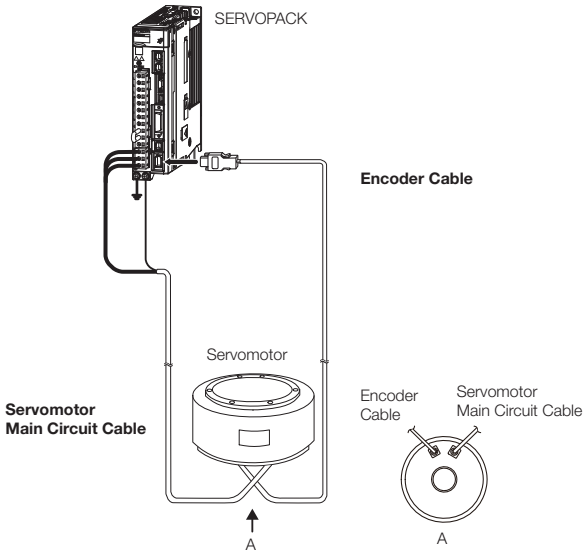
Mating connector:
JN1DS10SL1

7.4 Selecting Cables

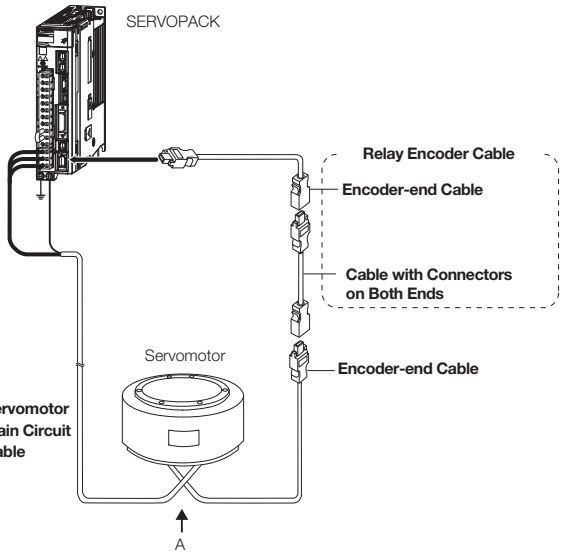
7.4.1 Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

Encoder Cable of 20 m or Less

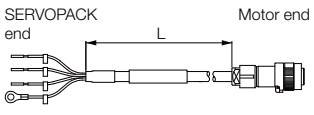
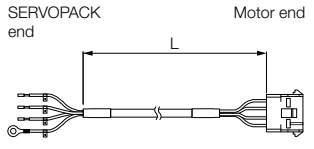


Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2. 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.
3. Refer to the following manual for the following information.
• Cable dimensional drawings and cable connection specifications
• Order numbers and specifications of individual connectors for cables
• Order numbers and specifications for wiring materials
📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

7.4.2 Servomotor Main Circuit Cables

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable*1	
SGMCS-□□B SGMCS-□□C SGMCS-□□D SGMCS-□□E Flange specification*2: 1 Non-load side installation	3 m	JZSP-CMM60-03-E	JZSP-CSM60-03-E	
	5 m	JZSP-CMM60-05-E	JZSP-CSM60-05-E	
	10 m	JZSP-CMM60-10-E	JZSP-CSM60-10-E	
	15 m	JZSP-CMM60-15-E	JZSP-CSM60-15-E	
	20 m	JZSP-CMM60-20-E	JZSP-CSM60-20-E	
SGMCS-□□B SGMCS-□□C SGMCS-□□D SGMCS-□□E Flange specification*2: 4 Non-load side installation (with cable on side)	3 m	JZSP-CMM00-03-E	JZSP-CMM01-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-CMM01-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-CMM01-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-CMM01-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-CMM01-20-E	

Continued on next page.

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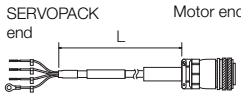
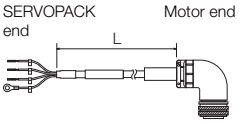
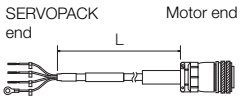
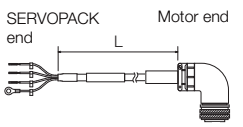
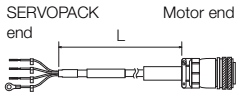
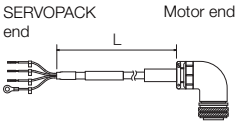
Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable*1	
SGMCS-□□M SGMCS-□□N □□: 45 □□: 80	3 m	JZSP-USA101-03-E	JZSP-USA121-03-E	
	5 m	JZSP-USA101-05-E	JZSP-USA121-05-E	
	10 m	JZSP-USA101-10-E	JZSP-USA121-10-E	
	15 m	JZSP-USA101-15-E	JZSP-USA121-15-E	
	20 m	JZSP-USA101-20-E	JZSP-USA121-20-E	
	3 m	JZSP-USA102-03-E	JZSP-USA122-03-E	
	5 m	JZSP-USA102-05-E	JZSP-USA122-05-E	
	10 m	JZSP-USA102-10-E	JZSP-USA122-10-E	
	15 m	JZSP-USA102-15-E	JZSP-USA122-15-E	
	20 m	JZSP-USA102-20-E	JZSP-USA122-20-E	
SGMCS-□□M SGMCS-□□N □□: 1A	3 m	JZSP-USA301-03-E	JZSP-USA321-03-E	
	5 m	JZSP-USA301-05-E	JZSP-USA321-05-E	
	10 m	JZSP-USA301-10-E	JZSP-USA321-10-E	
	15 m	JZSP-USA301-15-E	JZSP-USA321-15-E	
	20 m	JZSP-USA301-20-E	JZSP-USA321-20-E	
	3 m	JZSP-USA302-03-E	JZSP-USA322-03-E	
	5 m	JZSP-USA302-05-E	JZSP-USA322-05-E	
	10 m	JZSP-USA302-10-E	JZSP-USA322-10-E	
	15 m	JZSP-USA302-15-E	JZSP-USA322-15-E	
	20 m	JZSP-USA302-20-E	JZSP-USA322-20-E	
SGMCS-□□M SGMCS-□□N □□: 1E □□: 2Z	3 m	JZSP-USA501-03-E	JZSP-USA521-03-E	
	5 m	JZSP-USA501-05-E	JZSP-USA521-05-E	
	10 m	JZSP-USA501-10-E	JZSP-USA521-10-E	
	15 m	JZSP-USA501-15-E	JZSP-USA521-15-E	
	20 m	JZSP-USA501-20-E	JZSP-USA521-20-E	
	3 m	JZSP-USA502-03-E	JZSP-USA522-03-E	
	5 m	JZSP-USA502-05-E	JZSP-USA522-05-E	
	10 m	JZSP-USA502-10-E	JZSP-USA522-10-E	
	15 m	JZSP-USA502-15-E	JZSP-USA522-15-E	
	20 m	JZSP-USA502-20-E	JZSP-USA522-20-E	

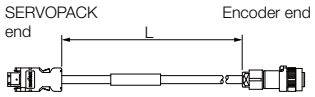
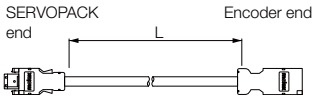
*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius of the Flexible Cables are given in the following table.

Order Number	Recommended Bending Radius (R)	Order Number	Recommended Bending Radius (R)
JZSP-CSM60-□□-E	55 mm min.	JZSP-USA321-□□-E	113 mm min.
JZSP-CMN01-□□-E		JZSP-USA322-□□-E	
JZSP-USA121-□□-E	96 mm min.	JZSP-USA521-□□-E	150 mm min.
JZSP-USA122-□□-E		JZSP-USA522-□□-E	

*2. Refer to the following section for the flange specifications.
☞ *7.1 Model Designations* on page 7-3

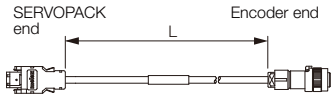
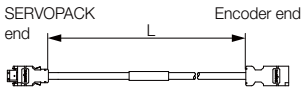
Note: Direct Drive Servomotors are not available with holding brakes.

7.4.3 Encoder Cables of 20 m or Less

Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable*1	
SGMCS-□□ Flange specification*2: 1 or 3	For incremental/ absolute encoder	3 m	JZSP-CMP60-03-E	JZSP-CSP60-03-E	
		5 m	JZSP-CMP60-05-E	JZSP-CSP60-05-E	
		10 m	JZSP-CMP60-10-E	JZSP-CSP60-10-E	
		15 m	JZSP-CMP60-15-E	JZSP-CSP60-15-E	
		20 m	JZSP-CMP60-20-E	JZSP-CSP60-20-E	
SGMCS-□□ Flange Specification*2: 4		3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		5 m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
		10 m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
		15 m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
		20 m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 46 mm or larger.
*2. Refer to the following section for the flange specifications.
☞ *7.1 Model Designations* on page 7-3

7.4.4 Relay Encoder Cables of 30 m to 50 m

Servomotor Model	Name	Length (L)	Order Number*1	Appearance
SGMCS-□□ Flange specification*2: 1 or 3	Encoder-end Cable (for incremental or absolute encoder)	0.3 m	JZSP-CSP15-E	
SGMCS-□□ Flange specification*2: 1, 3, or 4	Cables with Connectors on Both Ends (for incremental or absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	

*1. Flexible Cables are not available.
*2. Refer to the following section for the flange specifications.
☞ *7.1 Model Designations* on page 7-3

7.4.4 Relay Encoder Cables of 30 m to 50 m

Servomotor Installation

8

This chapter describes the installation conditions and precautions for Servomotors.

8.1 Installation Conditions 8-2
8.1.1 Installation Precautions 8-2
8.1.2 Installation Environment 8-3
8.1.3 Installation Orientation 8-3

8.2 Mounting to the Machine 8-4

8.3 Oil and Water Countermeasures 8-7

8.4 Equipment Structure 8-8
8.4.1 Minimum Angle of Oscillation 8-8
8.4.2 Precautions on Passing the Origin 8-8

8.5 Servomotor Temperature Increase 8-9

8.1 Installation Conditions

The service life of a 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.

8.1.1 Installation Precautions

⚠ CAUTION

- Implement safety measures, such as installing a cover so that the rotating part of the Direct Drive Servomotor cannot be touched accidentally during operation.
- Never use the Servomotor in an environment that is subject to water, corrosive gases, or flammable gases, or near flammable objects. Failure to observe this caution may result in electric shock or fire.

Important

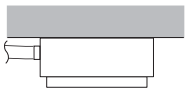
- Mount the Servomotor to a nonflammable material. Installation directly onto or near flammable objects may result in fire.
- Mount the SERVOPACK and Direct Drive Servomotor on a structure that will support the masses that are given in the user's manuals.
- Do not step on or place a heavy object on the Servomotor. Failure to observe this caution may result in injury.
- Install the Servomotor within the specified ambient conditions. Refer to the specifications for each type of Servomotor for the ambient conditions.
- Direct Drive Servomotors are precision devices. Never drop a Servomotor or subject it to strong shock.
- Do not place a Direct Drive Servomotor with the connector side facing down. Doing so will damage the connectors.
- Do not place any load on the cover on the rotating part of a SGM7E, SGM7F, or SGMCV Direct Drive Servomotor. Doing so will deform or damage the cover.
- Do not attempt to install or operate a Direct Drive Servomotor that is damaged or missing parts.
- When you transport a Direct Drive Servomotor, do not hold onto the cables, rotating part, or connectors. Failure to observe this caution may result in damage or injury.
- Securely mount the Direct Drive Servomotor onto the machine. If the Servomotor is not mounted securely, it may come off during operation, possibly causing injury.
- When you couple the load to the Direct Drive Servomotor, do not strike the Servomotor with a hammer or otherwise subject it to shock. Failure to observe this caution may result in damage to the encoder.
- Do not place more than the allowable load on the rotating part of the Direct Drive Servomotor. Failure to observe this caution may result in damage to the rotating part.
- Consult your Yaskawa representative if you plan to use a Direct Drive Servomotor that has been stored for an extended period of time.
- Check the level of vibration while the Direct Drive Servomotor is mounted to the machine. If the vibration is too strong, the bearings and encoder will be damaged faster, faulty connector contacts may occur, and bolts may become loose.
- When you adjust the gain during equipment commissioning, use a measuring instrument to monitor the torque waveform and speed waveform and confirm that there is no vibration. If a high gain causes vibration, the Direct Drive Servomotor will be damaged faster.

8.1.2 Installation Environment

Refer to the specifications for each type of Servomotor for the mechanical specifications, protective structure, and environmental conditions related to Servomotor installation.

8.1.3 Installation Orientation

You can install the Servomotor either vertically or horizontally.

Installation Orientation		Figure	Precautions
Vertical direction	Shaft end up		–
	Shaft end down		• Securely attach the Servomotor to the machine. • Confirm in advance that large loads (a payload that exceeds the allowable payload or an excessive shock load) will not be applied to the Servomotor. • Install a mechanism on the machine to provide protection in case the Direct Drive Servomotor falls off.
Horizontal direction			–

8.2 Mounting to the Machine

⚠ WARNING

- Confirm that the rotating part and fixed part of the Servomotor have not been reversed when you mount the Servomotor to the machine.

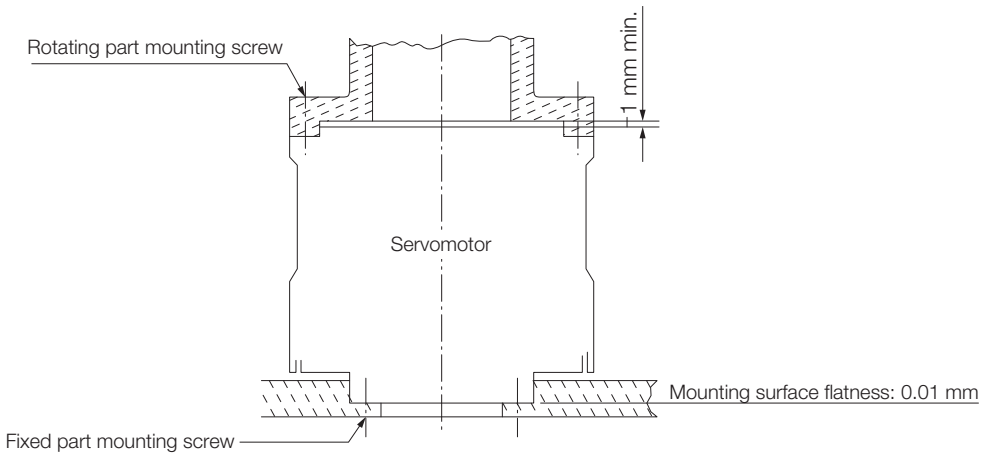
Important

Important Precautions for All Servomotors

- When you mount the Servomotor to the machine, use the flange outer diameter to center the Servomotor and the machine.
- When you couple the Servomotor to the load, sufficiently center the output shaft with the load. Consult your Yaskawa representative if you plan to use a rigid coupling with the machine shaft.

Important Precautions for SGM7D Servomotors

- Attach the load securely with screws to the load mounting surface on the top surface of the Servomotor. Provide a gap of 1 mm or greater between the top of the Servomotor and the load and make sure that the load does not come into contact or interfere with any parts other than the load mounting surface. If there is any such contact or interference, mechanical accuracy will be reduced. Also, make sure that the Servomotor mounting surface has a flatness of 0.01 mm min. Otherwise, the accuracy or performance of the Servomotor may be affected.



- Do not exceed the tightening torques given in the following table for the mounting screws of the rotating part and fixed part of the Servomotor. If you tighten the screws to an excessive torque, the screw threads may be damaged and the Servomotor may fail.

Model SGM7D-	Maximum Tightening Torque		Model SGM7D-	Maximum Tightening Torque	
	Rotating Part	Fixed Part		Rotating Part	Fixed Part
□□F	21 N·m	16 N·m	□□I	21 N·m	21 N·m
01G	2 N·m	2 N·m	□□J	11 N·m	11 N·m
05G			□□K	6 N·m	11 N·m
08G to 45G	11 N·m	11 N·m	06L, 12L	2.7 N·m	21 N·m
□□H	2 N·m	2 N·m	30L	9 N·m	5.4 N·m

- Use Loctite 601 or the equivalent for the mounting screws to prevent loosening.
- If you place anything through the hollow hole, allow a clearance of at least 1 mm on all sides and make sure that nothing comes into contact with the inside surface of the hollow hole. Do not press anything into the hollow hole or apply pressure. Accuracy and functionality may be lost and failure may occur.

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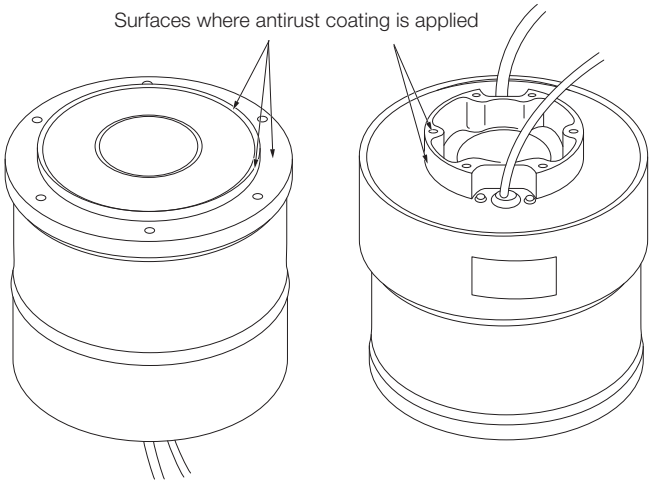
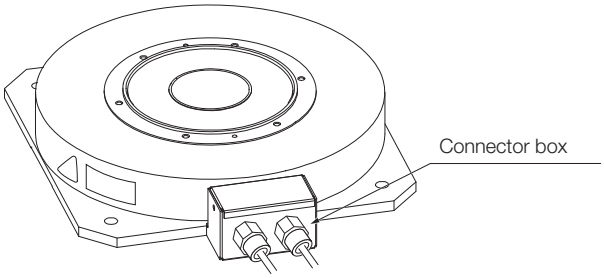
Important

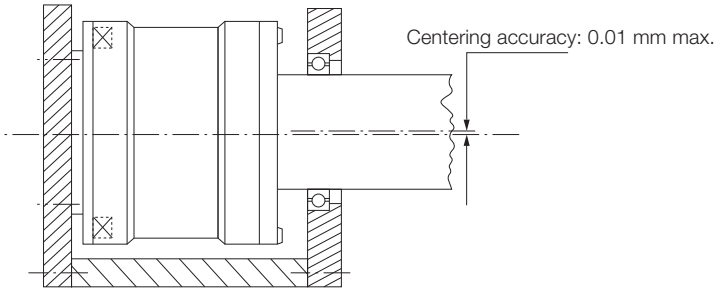
- The load mounting surface on the top and the fixed part on the bottom of a SGM7D-□□I, -□□J, or -□□K Servomotor are coated with an antirust coating. Before you mount the Servomotor or load, use a hydrocarbon-based detergent and wipe off the coating completely. If the coating is not removed completely, accuracy or functionality may be lost. When you wipe off the coating, make sure that the coating or detergent do not come into contact with the cables, interior of the Servomotor, or anything other than the load mounting surface and fixed part.



- SGM7D-□□L Servomotors have a connector box. Do not apply external force to the connector box. Cables may become disconnected or the Servomotor may run out of control.



- Make sure that the mounting screws do not penetrate any farther than the effective thread length in the Servomotor. If the screws penetrate farther than the effective thread length, failure or reduced functionality may occur.
- When you couple the Servomotor to the load, ensure a centering accuracy of 0.01 mm or less. If the centering accuracy is not sufficient, noise or vibration may occur and the bearings inside the Servomotor may be damaged.



• Allowable Loads

When you connect a load to the Servomotor, do not place a load on the rotating part that exceeds the allowable limits. If you exceed the allowable limits, the service life of the bearings will be reduced and the rotating part will be damaged.

Refer to the specifications for each type of Servomotor for the allowable loads on the rotating part of the Servomotor.

Note

- The allowable loads that are given in the specifications include the static load in one direction and the dynamic load that occurs during rotation. Consider the dynamic load when you select a Servomotor or design the equipment.
- When designing a system for a SGM7D Servomotor, multiply the allowable load by the following safety coefficient depending on the type of load.

Type of Load	Safety Coefficient
Smooth load with no shock	1/3
Light repetitive load	1/5
Shock load	1/10

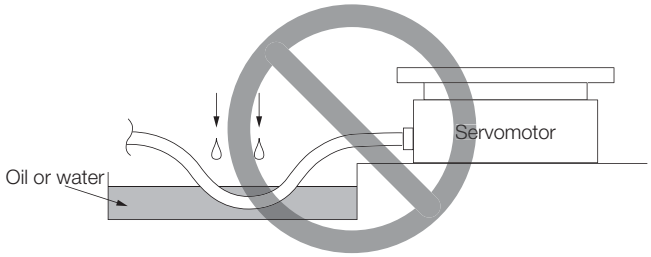
8.3 Oil and Water Countermeasures

Important

- When you mount the Direct Drive Servomotor to the machine, use the flange outer diameter to center the Servomotor and the machine.
- When you couple the Direct Drive Servomotor to the load, sufficiently center the output shaft with the load. Consult your Yaskawa representative if you plan to use a rigid coupling with the machine shaft.

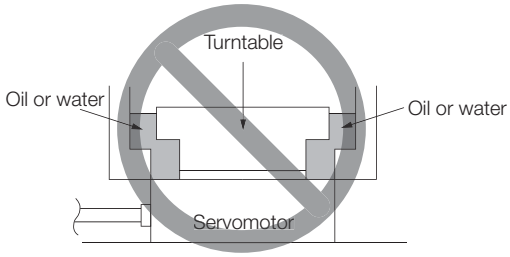
Observe the following instructions so that water, oil, or other foreign matter will not enter the Servomotor.

- Do not allow the cables to be in oil or water.



If contact with oil or water is unavoidable, use oil-resistant cables. Oil-resistant cables are not provided by Yaskawa.

- Do not use the Servomotor where oil or water from the machine, a turntable, or other source would come into contact with the Servomotor.



If contact with oil or water is unavoidable, implement countermeasures in the machine so that oil or water does not enter the Servomotor.

- Do not use the Servomotor where it would come into contact with cutting fluids.
  Depending on the type of cutting fluid, the cables or other part may be adversely affected.
- Do not use the Servomotor where it would be continuously in contact with oil mist, water vapor, oil, water, or grease.
  If usage under the above conditions is unavoidable, implement countermeasures in the machine to protect against dirt and water.

8.4 Equipment Structure

8.4.1 Minimum Angle of Oscillation

- If you use a SGM7D Servomotor for oscillating rotation, rotate the Servomotor 90° or more at least once every 10,000 round-trip operations to ensure sufficient bearing lubrication. Consult your Yaskawa representative if you cannot perform this operation.
- If you use a SGM7E, SGM7F, SGMCV, or SGMCS Servomotor for oscillating rotation, rotate the Servomotor 90° or more at least once a day to ensure sufficient bearing lubrication. Consult your Yaskawa representative if you cannot perform this operation.

8.4.2 Precautions on Passing the Origin

- If you use a Servomotor with an Incremental Encoder, you must perform an origin return operation after you turn ON the power supply.
  If you use the SERVOPACK's origin pulse (phase C) output, rotate the Direct Drive Servomotor at least two turns before you start the origin return operation.
  If the Direct Drive Servomotor cannot be rotated two or more times, perform an origin return operation at a motor speed of 6 min^{-1} or lower.
- If the equipment structure prevents the Direct Drive Servomotor from rotating a complete turn, install the Servomotor so that the origin within one encoder rotation is passed.

8.5 Servomotor Temperature Increase

This section describes measures to suppress temperature increases in the Servomotor.

- When you install the Servomotor, observe the cooling conditions (heat sink sizes) that are given in the specifications for each type of Servomotor.
  The Servomotor generates heat when it operates. The heat generated by the Servomotor radiates to the heat sink through the motor mounting surface. Therefore, if the surface area of the heat sink is too small, the temperature of the Servomotor may increase abnormally.
- If the operating environment makes it difficult to use a large heat sink, or if the ambient operating temperature or altitude given in the specifications is exceeded, implement the following measures.
  - Derate the Servomotor.
    Contact your Yaskawa representative for information on derating.
  - Use external forced-air cooling for the Servomotor with a cooling fan or other means.

Important

Do not place packing or any other insulating material between the Servomotor and heat sink. Doing so will cause the motor temperature to increase, affect resistance to noise, and may cause motor failure.

Wiring Servomotors and SERVOPACKs

9

This chapter provides precautions for wiring Servomotors and SERVOPACKs.

9.1 Wiring Precautions 9-2
9.1.1 General Precautions 9-2
9.1.2 Grounding Precautions 9-3
9.1.3 Precautions for Standard Cables 9-3
9.1.4 Precautions for Flexible Cables 9-4

9.2 Wiring Procedure 9-5

9.1 Wiring Precautions

⚠ CAUTION

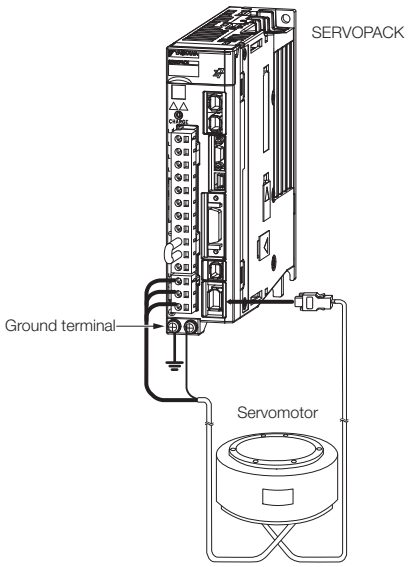
- Do not connect the Servomotor directly to an industrial power supply. Doing so will destroy the Servomotor. You cannot operate a Servomotor without a SERVOPACK that is designed for it

9.1.1 General Precautions

- Never perform any wiring work while the power supply is ON.
- Always connect the Servomotor Main Circuit Cable before you connect the Encoder Cable. If you connect the Encoder Cable first, the encoder may be damaged due to the difference in electrical potential from the FG.
- Never touch the connector pins on the Servomotor directly with your hands. Particularly the encoder may be damaged by static electricity.
- For a Medium-Capacity Servomotor with a Core, use the joint nuts to secure the cable connectors to the Servomotor. Make sure that they are securely attached.
  If they are not securely attached, the protective structure specifications may not be satisfied.
- Separate the Servomotor Main Circuit Cable from the I/O Signal Cables and Encoder Cable by at least 30 cm.
- Do not connect magnetic contactors, reactors, or other devices on the cables that connect the SERVOPACK and Servomotor. Failure to observe this caution may result in malfunction or damage.
- Do not subject the cables to excessive bending stress or tension. The conductors in the Encoder Cable and Servomotor Main Circuit Cable are as thin as 0.2 mm^2 or 0.3 mm^2. Wire them so that they are not subjected to excessive stress.
- If you secure the cables with cable ties, protect the cables with cushioning material.
- If the cable will be bent repeatedly, e.g., if the Servomotor will move in the machine, use Flexible Cables. If you do not use Flexible Cables, the cables may break.
- Before you connect the wires, make sure that there are no mistakes in the wiring.
- Always use the connectors specified by Yaskawa and insert them correctly.
- When you connect a connector, check it to make sure there is no foreign matter, such as metal clippings, inside.
- The connectors for Small-Capacity Servomotors are made from resin. To prevent damage, do not apply any strong impact.
- Perform all wiring so that stress is not applied to the connectors. The connectors may break if they are subjected to stress.
- If you move the Servomotor while the cables are connected, always hold onto the main body of the Servomotor. If you lift the Servomotor by the cables when you move it, the connectors may be damaged or the cables may be broken.

9.1.2 Grounding Precautions

The ground terminal on the SERVOPACK is used to ground the Servomotor.



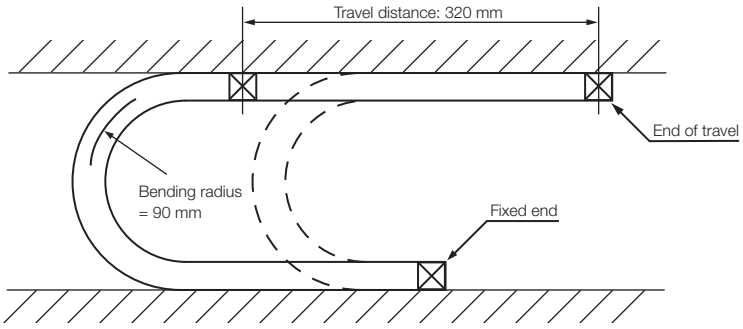
9.1.3 Precautions for Standard Cables

Do not use standard cables in applications that require a high degree of flexibility, such as twisting and turning, or in which the cables themselves must move. When you use Standard Cables, observe the recommended bending radius given in the following table and perform all wiring so that stress is not applied to the cables. Use the cables so that they are not repeatedly bent.

Cable Diameter	Recommended Bending Radius [R]
Less than 8 mm	15 mm min.
8 mm	20 mm min.
Over 8 mm	Cable diameter × 3 mm min.

9.1.4 Precautions for Flexible Cables

- The Flexible Cables have a service life of 10,000,000 operations minimum when used at the recommended bending radius of 90 mm or larger under the following test conditions. The service life of a Flexible Cable is reference data under special test conditions. The service life of a Flexible Cable greatly depends on the amount of mechanical shock, how the cable is attached, and how the cable is secured.
  Test Conditions
  - One end of the cable is repeatedly moved forward and backward for 320 mm using the test equipment shown in the following figure.
  - The lead wires are connected in series, and the number of cable return operations until a lead wire breaks are counted. One round trip is counted as one bend.



Note: The service life of a Flexible Cable indicates the number of bends while the lead wires are electrically charged for which no cracks or damage that affects the performance of the cable sheathing occur. Breaking of the shield wire is not considered.

- Straighten out the Flexible Cable when you connect it. If the cable is connected while it is twisted, it will break faster. Check the indication on the cable surface to make sure that the cable is not twisted.
- Do not secure the portions of the Flexible Cable that move. Stress will accumulate at the point that is secured, and the cable will break faster. Secure the cable in as few locations as possible.
- If a Flexible Cable is too long, looseness will cause it to break faster. It the Flexible Cable is too short, stress at the points where it is secured will cause it to break faster. Adjust the cable length to the optimum value.
- Do not allow Flexible Cables to interfere with each other. Interference will restrict the motion of the cables, causing them to break faster. Separate the cables sufficiently, or provide partitions between them when wiring.

9.2 Wiring Procedure

Wire according to the system configuration diagrams in the relevant chapters.

Refer to the SERVOPACK manual for information on wiring the SERVOPACKs.

Maintenance and Inspection

10

This chapter describes the maintenance, inspection, and disposal of a Servomotor.

10.1 Periodic Inspections 10-2

10.2 Service Lives of Parts 10-3

10.3 Disposing of Servomotors 10-4

10.1 Periodic Inspections

The following table gives the periodic inspection items for a Servomotor. The inspection periods given in the table are guidelines. Determine the optimum inspection periods based on the application conditions and environment.

⚠ CAUTION

- Before you perform any maintenance or inspection work, turn OFF the power supply, confirm that the CHARGE indicator on the front of the SERVOPACK has gone out, and then use a tester to check the voltage between the positive and negative terminals on the SERVOPACK. Start inspection work only after you have confirmed that the main circuit voltage has dropped.
  If there is any main circuit voltage left, the risk of electric shock still exists. Do not touch the Servomotor or any wiring.
- All inspection and maintenance work must be performed only by qualified engineers.
  There is a risk of electric shock or injury.
- Contact your Yaskawa representative for help with failures, repairs, or part replacement.

Item	Inspection Period	Basic Inspection and Maintenance Procedure	Remarks
Check the coupling between the Servomotor and the machine.	Before starting operation	• Make sure that there are no loose mounting screws between the Servomotor and machine. • Make sure that there is no looseness in the coupling between the Servomotor and machine. • Make sure that there is no misalignment.	–
Check for vibration and noise.	Daily	Inspect by touching and by listening.	There should be no more vibration or noise than normal.
Exterior	Check for dirt and grime.	Clean off the dirt and grime with a cloth or pressurized air.	–
Measure the insulation resistance.	At least once a year	Disconnect the Servomotor from the SERVOPACK and measure the insulation resistance at 500 V with an insulation resistance meter. (Measurement method: Measure the resistance between phase U, V, or W on the Servomotor's power line and FG.) The insulation is normal if the resistance is 10 MΩ or higher.	If the resistance is less than 10 MΩ, contact your Yaskawa representative.
Overhaul	At least once every 5 years or every 20,000 hours	Contact your Yaskawa representative.	–

10.2 Service Lives of Parts

The following table gives the standard service lives of the parts of the Servomotor. Contact your Yaskawa representative using the following table as a guide. After an examination of the part in question, we will determine whether the part should be replaced. Even if the service life of a part has not expired, replacement may be required if abnormalities occur. The standard service lives in the table are only for reference. The actual service lives will depend on the application conditions and environment.

Part	Standard Service Life	Remarks
Bearings	20,000 hours	The service life is affected by operating conditions. Check for abnormal sounds and vibration during inspections.

10.3 Disposing of Servomotors

When disposing of a Servomotor, treat it as ordinary industrial waste.

However, local ordinances and national laws must be observed. Implement all labeling and warnings as a final product as required.

Appendix

11

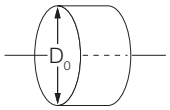
The appendix provides information to use when selecting Servomotor capacities.

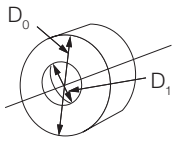
11.1 Reference Information for Servomotor Capacity Selection . . 11-2

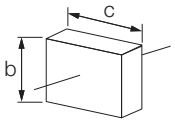
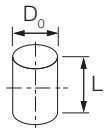
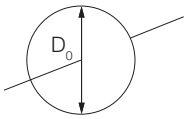
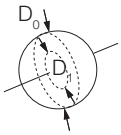
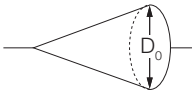
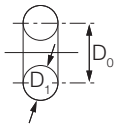
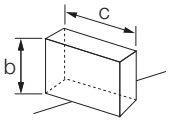
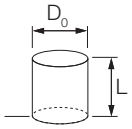
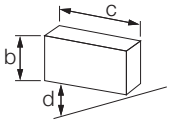
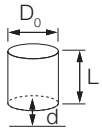
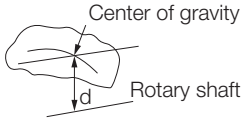
11.1.1 GD^2 for Simple Diagrams 11-2
11.1.2 Conversions between Traditional Units and SI Units 11-3

11.1 Reference Information for Servomotor Capacity Selection

11.1.1 GD² for Simple Diagrams

<table>
<tr><td>When Rotary Shaft Is Aligned with Center Line of Cylinder</td><td>Solid cylinder
$(D^2 = D_0^{\,2}/2)$
 

OR
$GD^2 = 125\pi\,\rho LD^4$
ρ: Density (g/cm^3)...Copper: 7.866
L : Length (m)
D: Diameter (m)</td><td>Hollow cylinder
$D^2 = (D_0^{\,2} + D_1^{\,2})/2$
 

OR
$GD^2 = 125\pi\,\rho L\,(D_0^{\,4} + D_1^{\,4})$
ρ:Density (g/cm^3)
L : Length (m)
D_0 , D_1 :Diameter (m)</td></tr>
<tr><td rowspan="3">When Rotary Shaft Runs Through Gravitational Center</td><td>Rectangular solid
$D^2 = (b^2 + c^2)/3$
 
</td><td>Cylindrical body
$D^2 = L^2/3 + D_0^{\,2}/4$
 
</td></tr>
<tr><td>Sphere
$D^2 = \frac{2}{5}D_0^{\,2}$
 
</td><td>Hollow sphere
$D^2 = \frac{2}{5} \cdot \frac{D_0^{\,5} - D_1^{\,3}}{D_0^{\,3} - D_1^{\,3}}$
 
</td></tr>
<tr><td>Cone
$D^2 = \frac{3}{10}D_0^{\,2}$
 
</td><td>Wheel
$D^2 = D_0^{\,2} + \frac{3}{4}D_1^{\,2}$
 
</td></tr>
<tr><td>When Rotary Shaft Is on One End</td><td>Rectangular solid
$D^2 = (4b^2 + C^2)/3$
 
</td><td>Cylindrical body
$D^2 = \frac{4}{3}L^2 + \frac{D_0^{\,2}}{4}$
 
</td></tr>
<tr><td>When Rotary Shaft Is Outside Rotating Body</td><td>Rectangular solid
$D^2 = \frac{4b^2 + C^2}{3} + 4(bd + d^2)$
 
</td><td>Cylindrical body
$D^2 = \frac{4}{3}L^2 + \frac{D_0^{\,2}}{4} + 4(dL + d^2)$
 
</td></tr>
<tr><td>General Formula When Rotary Shaft Is outside Rotating Body</td><td colspan="2">General Formula for Diameter of Rotation When Rotary Shaft Is Outside Rotating Body
$D_2^{\,2} = D_1^{\,2} + 4d^2$
D_1 : Diameter of rotation when shaft that is parallel to rotary shaft and runs through center of gravity virtually operates as a rotary shaft
 
</td></tr>
</table>

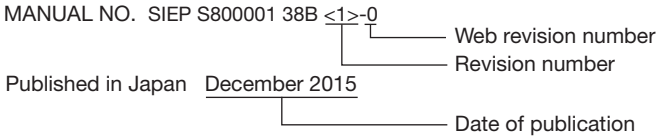
Information GD^2 = Weight × (Diameter of rotation)^2

11.1.2 Conversions between Traditional Units and SI Units

Quantity	Traditional Unit	SI Unit	Conversion Factor
Force or load	kgf	N	1 kgf = 9.80665 N
Weight	kgf	–	The numerical values are the same for mass in the traditional unit and the SI unit. (The mass SI unit Wkg is used for objects in the Wkgf traditional unit.)
Mass	$kgf \cdot s^2/m$	kg	
Torque	kgf·m	N·m	1 kgf·m = 9.80665 N·m
Inertia (moment of inertia)	$gf \cdot cm \cdot s^2$	$kg \cdot m^2$	$1\ gf \cdot cm \cdot s^2 = 0.980665 \times 10^{-4}\ kg \cdot m^2$
GD^2	$kgf \cdot m^2$	$kg \cdot m^2$	Relationship between GD^2 ($kgf \cdot m^2$) and moment of inertia J ($kg \cdot m^2$) $J = \frac{GD^4}{4}$

Revision History

The date of publication, revision number, and web revision number of the manual are given on the bottom right of the back cover. Refer to the following example.



Date of Publication	Rev. No.	Web Rev. No.	Section	Revised Content
August 2025	<11>	0	All chapters	Partly revised.
April 2025	<10>	0	4.2.3	Revision: Torque-motor speed characteristics for SGM7E-07B
			4.3, 5.4, 6.3, 7.3	Revision: Positioning of leader lines in the external dimensions drawings.
			All chapters	Partly revised
			Back cover	Revision: Address
August 2023	<9>	0	All chapters	Partly revised.
			Back cover	Revision: Address
September 2021	<8>	0	–	Printed version of the manual that is available on the web (web version: SIEP S800001 38G<7>-1)
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December 2019		0	All chapters	Partly revised.
			Back cover	Revision: Address
January 2019	<6>	0	–	Printed version of the manual that is available on the web (web version: SIEP S800001 38E<5>-3)
			Back cover	Revision: Address
July 2018	<5>	3	3.3	Revision: External Dimensions of SGM7D-□□F, SGM7D-08G, -18G, -24G, -34G, -45G
March 2018		2	Preface	Revision: Information on certification for standards
November 2017		1	4.3	Revision: Figure of flange specification 4 for SGM7E-□□B
September 2017		0	Preface	Revision: UL standards and European directives
			4.3	Revision: Dimensions of SGM7E-□□D
			5.2.2	Revision: Description on allowable loads for SGM7F-02A, -05A, -07A
				Revision: Information on heat sink size of SGM7F-07A
			Back cover	Revision: Address
April 2017	<4>	0	Preface	Revision: Information on certification and description of Precautions for Korean Radio Waves Act
			1.2.1	Revision: Description on nameplate
			3.1, 4.1, 5.1	Revision: Information on serial encoder
			3.2.1	Partly revised.
			5.2.2	Revision: The values of allowable thrust load and allowable moment load of SGM7F-02A, 05A, and 07A
			5.4	Revision: Approximate mass of SGM7F-05A and -07A
			Back cover	Revision: Address
November 2016	<3>	0	Chapter 4	Newly added.
			Chapter 5	Addition: SGM7F-02, -05, -07, -45, -80, -1A, -1E, and -2Z
July 2016	<2>	0	Preface	Addition: Information on Korean Radio Waves Act
			Chapter 1	Addition: Information on SGM7F Servomotors
			Chapter 3	Revision: Servomotor Model SGM7D-07K changed to SGM7D-06K.
				Revision: Specifications and ratings of SGM7D Servomotors
				Addition: Allowable load moment of inertia ratios for SGM7D Servomotors
			3.3	Addition: D diameters for the SGM7D-06L, -12L, and -30L
			Chapter 4	Newly added.
			Chapter 8	Addition: Information on cables for SGM7F Servomotors
			Back cover	Revision: Format

Date of Publication	Rev. No.	Web Rev. No.	Section	Revised Content
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			–	Based on Japanese user's manual, SIJP S800001 38B <1>-1, published in November 2015.
			Back cover	Revision: Address and format
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Σ-7-Series AC Servo Drive

Direct Drive Servomotor

Product Manual

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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 Act. 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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