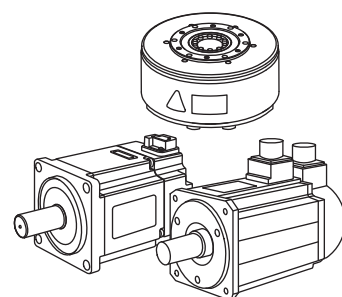


AC SERVO MOTOR
SAFETY PRECAUTIONS

Type USAG000-000000
SGMD-000000
SGM00-000000

To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.

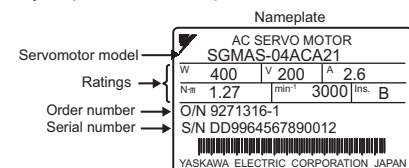


MANUAL NO. TOBP C230200 00C

Before use

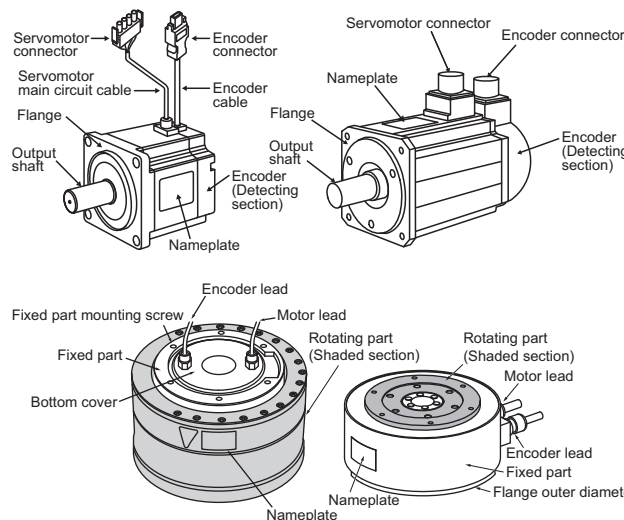
Checking Product

Verify that the ordered product as received by the model number marked on the nameplate on the servomotor. If any motor is incorrect or faulty, contact your Yaskawa representative or the dealer from whom you purchased the products.



Note: Contents of the nameplate may differ in accordance with the series or type of the motor.

Part Names



Note: Actual motor may vary in accordance with the series or type of the motor.

General Precautions

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

Safety Information

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

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

CAUTION Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation. In some situations, the precautions indicated could have serious consequences if not heeded.

PROHIBITED Indicates prohibited actions that must not be performed. For example, this symbol would be used to indicate that fire is prohibited as follows:

MANDATORY Indicates compulsory actions that must be performed. For example, this symbol would be used as follows to indicate that grounding is compulsory:

Notes for Safe Operation

- WARNING** Ground the ground terminals of the SERVOPACK and the motor (or ground the metallic part such as frame in case of no ground terminal) according to local and/or national electrical codes (ground resistance: 100 Ω or less). Use grounding wires of a size complying with relevant international or local standards. Failure to observe this warning can result in electric shock.
- Disconnect all power and wait 5 minutes before wiring or inspection. Failure to observe this warning may result in electric shock by the residual voltage.
- Do not damage the cables or subject them to excessive stress such as bending or stretching. Do not place heavy objects on the cables or the cables between other objects where they might be pinched. Failure to observe this warning may result in electric shock, stopping operation of the product, or burning.
- The motor will become extremely hot during operation, so do not touch the motor with bare hands. Failure to observe this caution may result in burns.
- Never touch the motor rotary parts during operation. Failure to observe this warning may result in personal injury.
- Installation, wiring, operation, maintenance and inspection must be performed only by authorized personnel. Failure to observe this warning may result in electric shock or injury.
- If using the motor with the shaft key slot, do not touch the key slot with bare hands. Failure to observe this caution may result in injury.
- Do not disassemble or modify the product. Failure to observe this warning may result in injury or damage to the product.
- Do not come close to the machine immediately after resetting momentary power loss to avoid an unexpected restart. Take appropriate measures to ensure safety against an unexpected restart. Failure to observe this warning may result in injury.

MANDATORY

- If connecting the motor to the machine, build an external emergency stop circuit that immediately stops operation and shuts down power in an emergency.

Checking on Delivery

CAUTION

- Always use the servomotor and SERVOPACK in one of the specified combinations. Failure to observe this caution may result in fire or malfunction.

Storage and Transportation

CAUTION

- Do not hold the product by the cables or motor shaft while transporting it. Failure to observe this caution may result in injury or malfunction.
- Do not place any load exceeding the limit specified on the packing box. Failure to observe this caution may result in injury or malfunction.
- If disinfectants or insecticides must be used to treat packing materials such as wooden frames, pallets, or plywood, 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.

MANDATORY

- If the motor has been in storage for a long time, contact your Yaskawa representative.
- Use the eyebolt of the motor only to transport the motor. Do not use it to transport other machines.
- For more information on storage environments, refer to *Installation*.

Installation

CAUTION

- Do not store or install the product in the following places. Failure to observe this caution may result in fire, electric shock, or damage to the product.
 - Outdoor locations or locations subject to direct sunlight.
 - Locations subject to ambient temperatures outside the allowable temperature range.
 - Locations subject to humidity levels outside the allowable humidity range.
 - Locations at an altitude of 1000 m or more.
 - Locations subject to condensation as the result of extreme changes in temperature.
 - Locations subject to corrosive or flammable gases and near combustible substances.
 - Locations subject to dust, salts, or iron dust.
 - Locations subject to oil or chemicals.
 - Locations subject to shock or vibration.
 - Locations that are difficult to check, clean, and maintain.
- Install the servomotor only in environments that meet the requirements for its protection class. Failure to observe this caution may result in malfunction.
- For applications where the motor may be splashed with large amounts of water or oil, use a cover or take other protective action. Also, the connectors should face downwards.
- Do not step on or place a heavy object on the motor. Failure to observe this caution may result in injury.
- Be sure to prevent any foreign objects from entering the product. Failure to observe this caution may result in malfunction or fire.
- The motor shaft extension is coated with anticorrosive paint. Before installation, wipe off the paint with a cloth soaked in liquid detergent. If the extension is not wiped, the motor can not be connected with the machine.
- For coupling with the load machine, use a flexible coupling for the servomotor being used. A flexible coupling with the high rigidity of the metallic-plate spring type is recommended.
- Lubricant agent differs in accordance with the frame numbers of the gear. If using oil as a lubricant, always lubricate before operation.
- The motor can be installed in either horizontal or vertical direction. However, when using the models with an oil seal, installing the motor with the output shaft up may cause oil to enter the motor depending on the operating conditions. Check the operating conditions. Mounting direction is limited for some motors with reduction gears. For details, refer to the manual for each model. If you install a Direct Drive Servomotor vertically (i.e., with the shaft end down), observe the following precautions.
 - Securely attach the Servomotor to the machine.
 - Confirm in advance that a large load (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.
- The cable connector is secured on the top of the motor with screw (s) for some models. Refer to the procedure for connecting the cable to the motor in the manual for each model of motor.
- If using a motor with a cooling fan, provide a space of 200 mm or more on the intake side of the fan.

PROHIBITED

- The motor system is precision equipment. Do not apply shock to the motor or the motor output shaft. Design machines so that the thrust load and radial load applied to the motor shaft extension during operation should be within the allowable range described in the catalogue.
- Do not block the air inlet and outlet, and do not let foreign materials enter. Failure to observe this caution may result in fire.
- Do not alter the motor in any way.

Wiring

CAUTION

- Be sure to wire correctly and securely. Failure to observe this caution may result in motor overrun and injury.
- Securely connect the power supply terminal screws and motor output terminal screws. Failure to observe this caution may result in fire.
- Always use the specified power supply voltage. Failure to observe this caution may result in fire.
- Make wiring length as short as possible. Separate power cables from signal lines at least 30 cm (11.81 in.). Noise on signal lines may cause vibration or malfunctions.
- Use YASKAWA-specified cables. To use other cables, check the rated current of your equipment, and consider operating environment to select correct cables. If cables not specified by YASKAWA are to be used for the encoder, select twisted-pair shielded wires or multi-core, twisted-pair shielded wires.
- The cable connector is secured on the top of the motor with one or more screws for some models. For more details, refer to the manuals for the individual models.
- If using a motor with a built-in thermostat, be sure to use the thermostat to help prevent the motor from overheating.
- If using a motor with a cooling fan, be sure to check the rotation of the fan after wiring the cooling fan and before use.

PROHIBITED

- Do not connect the commercial power supply with the motor. Failure to observe this caution may result in fire or malfunction.

Operation

CAUTION

- Perform test run as follows. Secure the motor and disconnect from load machine system, check operations, then connect the motor to the load machine. Failure to observe this caution may result in personal injury.
- If an alarm is issued, correct the cause, verify safety, and reset the alarm. Then, turn ON the power supply again and restart the servomotor. Failure to observe this caution may result in personal injury.
- Do not touch the SERVOPACK heatsinks, regenerative resistor, servomotor, or peripheral devices while power is ON or soon after the power is turned OFF. Failure to observe this caution may result in burns due to high temperatures.
- Adjust the setting switches and the parameters of the servomotor before operation. For setting details, refer to the related manual.
- The holding brake is not a stopping device, and does not secure the load. Install a stopping device on the load side to ensure load safety. Failure to observe this caution may result in injury.
- Keep away from the motor after momentary power loss, as it may unexpectedly restart. Design a machine system to ensure the safety of the operators after restart of the motor.

PROHIBITED

- Do not use the holding brake of the servomotor for ordinary braking. Failure to observe this caution may result in malfunction.

Disposal

- When disposing of the products, treat them as general industrial waste.

Inspection and Maintenance

Regular Inspections

Daily inspection is sufficient for the maintenance of the motor. The inspection and maintenance frequencies in the table are only guidelines. Increase or decrease the frequency to suit the operating conditions and environment.

| Item | Frequency | Procedure | Comments |
|-----------------------------------|---|--|---|
| Vibration and Noise | Daily | Touch and listen. | Vibration and noise must not be greater than normal levels. |
| Exterior | According to degree of contamination | Clean with cloth or compressed air. | - |
| Insulation Resistance Measurement | At least once a year | Disconnect the motor from the SERVOPACK and test insulation resistance at 500 V megger. Must exceed 10 MΩ. Measure across the servomotor FG and the phase-U, phase-V, or phase-W power line. | Contact your Yaskawa representative if the insulation resistance is below 10 MΩ. Do not measure insulation resistance or perform withstand voltage test of the encoder. |
| Replacing Oil Seal | At least once every 5000 hours | Contact your Yaskawa representative. | Applies only to servomotors with oil seals. |
| Overhaul | At least once every 20,000 hours or 5 years | Contact your Yaskawa representative. | - |

Part's Life Expectancy

The parts of the servomotors are subject to mechanical wear or deterioration over time. The life expectancy listed in the table is a reference period that may be affected by the environmental and operating conditions. If an unusual noise or vibration occurs, refer to the life expectancy table and contact your Yaskawa representative. After examining the part in question, we will determine whether the parts should be replaced or not. When the part has expired before the expected time, further inspection will be required.

| Part | Life Expectancy | Comments |
|---------|-----------------|--|
| Bearing | 20,000 hours | Life depends on operation conditions. Check that there is no unusual noise or vibration. |

Warranty Information

Free Warranty Period

This product is warranted for twelve months after being delivered to Yaskawa's customer or if applicable eighteen months from the date of shipment from Yaskawa's factory whichever comes first.

Scope of Warranty

If a Yaskawa product is found to be defective due to Yaskawa workmanship or materials and the defect occurs during the warranty period, Yaskawa will provide a replacement, repair the defective product, and provide shipping to and from the site free of charge.

However, if the Yaskawa Authorized Service Center determines that the problem with a Yaskawa product is not due to defects in Yaskawa's workmanship or materials, then the customer will be responsible for the cost of any necessary repairs.

AC SERVO MOTOR
SAFETY PRECAUTIONS

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply. Specifications are subject to change without notice for ongoing product modifications and improvements.
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