YASKAWA

ACサーボモータ

Linear Σシリーズ

安全上のご注意

形式：SGLGW-□□□，SGLTW-□□□，SGLFW-□□□，SGLCW-□□□
SGLGM-□□□，SGLTM-□□□，SGLFM-□□□，SGLCM-□□□

製品を安全にお使い頂くために，本書を必ずお読みください。
また，本書をお手元に保管していただくとともに，最終的に本製品をご使用になるユーザー様のお手元に確実に届けられるよう，お取り計らい願います。

AC Servomotor

Linear Σ Series

SAFETY PRECAUTIONS

Model: SGLGW-□□□, SGLTW-□□□, SGLFW-□□□, SGLCW-□□□
SGLGM-□□□, SGLTM-□□□, SGLFM-□□□, SGLCM-□□□

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 C230800 00D

1 INTRODUCTION

This safety precautions manual covers Linear Σ series linear servomotor. To properly use the Linear Σ series linear servomotor, read this safety precautions manual and user's manuals (see the table below) thoroughly, and retain for easy reference for inspections and maintenance etc. Make sure that these manuals reach the end user.

Description of Technical Terms

Moving coil: The motor unit that moves the machine table for one linear servomotor. (It requires mostly electrical wiring.)

Magnet track: The motor unit that is relatively fixed in reference to the moving coil for one linear servomotor. (It mainly contains the permanent magnet.)

Linear servomotor: Both the moving coil and the magnet track together.

2 GENERAL PRECAUTIONS

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.

3 SAFETY INFORMATION

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

⚠ WARNING

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

⚠ CAUTION

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

In some situations, the precautions indicated could have series 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:  .

4 NOTES FOR SAFE OPERATION

Read this manual thoroughly before usage, storage, transportation, installation, wiring, operation, and maintenance and inspection.

■ USAGE

⚠ WARNING

- Any person having electronic medical devices such as a pacemaker must not approach the magnet track of the linear servomotor.

  Failure to observe this warning may result in malfunction of the electronic medical device.
- Be sure to use nonmagnetic tools when installing or working close to the linear servomotor.
  (Example: a beryllium-copper alloy hexagonal wrench set, made by NGK Insulators, Ltd.)
- If starting an operation with the linear servomotor in a machine, set the linear servomotor to always allow emergency stops.

  Failure to observe this warning may result in injury.
- Perform wiring after installing the linear servomotor.

  Failure to observe this warning may result in electric shock.
- While wiring, be certain to wire the linear servomotor main circuit cables correctly.

  Failure to observe this warning may result in malfunction or product failure.
- Ground the grounding terminals of the linear sevomotor according to local electrical codes.

  Incorrect grounding may result in electric shock.
- Use ground wires of the sizes specified for internal wiring.
- Keep the wiring distance as short as possible and wire high-voltage lines separately from low-voltage lines.

  If noise enters signal lines, oscillation or faulty operation may result.
- Always turn off the power supply and wait at least five minutes before performing wiring or inspection work.

  Failure to observe this warning may result in electric shock.
- Do not damage, press, exert excessive force or place heavy objects on the cables.

  Failure to observe this warning may result in electric shock, stopping operation of the product, or burning.
- Do not remove the cables, connectors, or optional items while the power is ON.

  Failure to observe this warning may result in electric shock.
- Never touch the moving coil of the linear servomotor during operation and never approach the moving range during operation.

  Failure to observe this warning may result in injury.
- Do not modify the linear servomotor.

  Failure to observe this warning may result in injury or damage to the product.

⚠ CAUTION

- Pay attention to the magnetic attraction when unpacking the magnet track.

  Failure to observe this caution may result in injury or damage to the magnet track.
- Do not place any magnetic objects such as iron particles close to the magnet track.

  Failure to observe this caution may result in injury.
- Do not place any electronic devices such as clocks, magnetic cards, storage media, or measuring devices close to the magnet track.

  Failure to observe this caution may result in malfunction or mechanical failure of the electronic devices.
- Pay attention to the magnetic attraction and confirm that there are not any magnetic objects such as iron particles attached before mounting the magnet track.

  Failure to observe this caution may result in injury or damage to the magnet track.
- When handling the magnet track with the protective cover, do not grab the cover.

  Failure to observe this caution may result in injury caused by the end of the cover or deformation of the cover.
- Always use the linear servomotor and SERVOPACK in one of the specified combinations.

  Failure to observe this caution may result in fire or product failure.
- Never use the linear servomotor in a location where it will be subjected to liquids, such as water or oil, corrosive or inflammable gases, or near inflammable materials.

  Failure to observe this caution may result in fire or product failure.
- Do not touch the linear servomotor and peripheral devices while power is ON or soon after the power is OFF.

  Failure to observe this caution may result in electric shock or burns due to high temperatures.

■ STORAGE

⚠ CAUTION

- Be sure to store the magnetic way of the linear servomotor in the same way as it was originally packaged.
- Do not stand or sit on the linear servomotor, place heavy objects on it, or lean heavy objects against it.
- Install the linear servomotor in the following location.
  - Away from direct sunlight.
  - Away from corrosive or flammable gases.
  - Well-ventilated and free from dust, moisture, salts, and iron dust.
  - Ambient temperature of -20°C to 60°C.
  - Relative humidity of 20% to 80% (non-condensing)
  - Free from shock or vibration.
  - Free from exposure to water, oil, or chemicals.

⃠ PROHIBITED

- Do not store the magnet track in a location when it would be approached by magnetic objects, such as iron particles or electronic devices.

  Failure to observe this caution may result in malfunction of the electronic devices.

❗ MANDATORY

- Contact your Yaskawa representative if the linear servomotors have been stored for an extended period of time.

■ TRANSPORTATION

⚠ CAUTION

- Do not hold the linear servomotor by the cables or connectors while transporting it.

  Failure to observe this caution may result in product failure or injury.
- Do not apply any strong force.

  Failure to observe this caution may result in damage to the linear servomotor.
- When transporting the moving coil, pay attention to the magnetic attraction and do not take it close to magnetic objects such as iron particles, or electronic devices.

  Failure to observe this caution may result in injury or the malfunction of the electronic devices.
- When handling the magnet track with the protective cover, do not grab the cover.

  Failure to observe this caution may result in injury caused by the end of the cover or deformation of the cover.
- Do not place any load exceeding the limit specified on the packing box.

  Failure to observe this caution may result in injury or malfunction.

❗ MANDATORY

- Use the lifting bolts on the linear servomotor to transport only the linear servomotor. Do not use them to transport the machine.

■ INSTALLATION

⚠ CAUTION

- When unpacking and installing magnetic way, chek that no medtal fragments or magnetized objects near the stator because they may be affected by the magnetic attraction of the magnetic way.

  Failure to observe this caution may result in injury or damage to the magnedic way's magnets.
- Do not use the magnetic way near metal or other magnetized objects.

  Failure to observe this caution may result in injury.
- Do not place any electronic devices such as clocks, magnetic cards, storage media, or measuring devices close to the magnet track.

  Failure to observe this caution may result in malfunction or mechanical failure of the electronic devices.
- Do not stand or sit on the linear servomotor, place heavy objects on it, or lean heavy objects against it.

  Failure to observe this caution may result in injury.
- Securely mount the linear servomotor on to the machine.

  If the linear servomotor is not mounted securely, it may loosen during operation.
- Install the linear servomotor in the following location.
  - Away from direct sunlight.
  - Away from corrosive or flammable gases.
  - Well-ventilated and free from dust, moisture, salts, and iron dust.
  - Ambient temperature of 0°C to 40°C.
  - Relative humidity of 20% to 80% (non-condensing)
  - Inspection and cleaning can be performed easily.
  - Free from shock or vibration.

  If the location is subject to the splashing of water or oil. attach a cover to protect the linear servomotor.
- Do not apply any strong force.

  Failure to observe this caution may result in product failure.
- Be sure to install the product in the correct direction.

  Failure to observe this caution may result in malfunction.
- Adjust the gap between the moving coil and the magnet track to within the limits specified in the technical documents fro each model.
- Do not allow foreign matter to enter the gap between the moving coil and the magnet track.

  Failure to observe this caution may result in fire or product failure.
- Securely tighten the linear servomotor mounting bolts. Take precautions to ensure the bolts will not become loose.
- Use the accessories for models that are packed together with washers.
  Applicable models: SGLTM-○○○○○□Y
- Only use alcohol when using a solvent to clean the linear servomotor.

  Other solvents may cause product failure.
- Do not modify the linear servomotor.

■ WIRING

⚠ CAUTION

- Use the cables extending out from the linear servomotor only for stabilizing.

  Using them to move the linear servomotor may result in product failure.
- Securely tighten the cable connector screws and securing mechanism.

  If the connector screws and securing mechanism are not secure, they may loosen during operation.
- Securely connect the power supply terminals and output terminals of the linear servomotor.

  Failure to observe this caution may result in fire.
- Be sure to wire correctly and securely.

  Failure to observe this caution may result in the linear servomotor overrun, injury, or malfunction.
- Never connect the linear servomotor directly to a commercial power line.
- Take sufficient grounding and noise measures.
- Keep the wiring distances as short as possible and wire high-voltage lines separately from low-voltage lines. Do not place high-voltage and low-voltage lines in the same duct or bundle them together.

  If noise enters signal lines, oscillation or faulty operation may result.
- Use the cables specified by Yaskawa. If you must use cables from other companies, confirm the rated current for your linear servomotor, consider the application environment, and select cables with a radius, heat resistance, and flexibility suitable for the system.

  When using non-Yaskawa cables for the encoder, be sure to use a twisted pair shielded cable.
- Connectors and connector pin arrangements depend on the model. Always check the technical documents for each model before wiring.
- Always use the specified power supply voltage.

  An incorrect voltage may result in burning.

■ OPERATION

⚠ CAUTION

- Perform trial operation while disconnected from the load.

  Failure to observe this caution may result in product failure or injury.
- Do not stand within the machine's range of motion during operation.

  Failure to observe this caution may result in injury.
- Provide a stop mechanism on the machine such as limit switches, to ensure safety if the linear servomotor malfunctions. Design the machine to ensure personal safety. The linear servomotor does not have a holding or emergency brake.

  Failure to observe this caution may result in injury.
- Do not come close to the machine immediately and touch the linear servomotor after resetting momentary power loss to avoid an unexpected restart. Take appropriate measures to ensure safety against an unexpected restart.

  Failure to observe this caution may result in injury.
- When an alarm occurs, remove the cause, reset the alarm after confirming safety, and then resume operation.

  Failure to observe this caution may result in injury.
- If using the linear servomotor on a vetical axis, install a safety device such as a counterbalance so that the workpiece does not fall if an alarm or overtravel occurs. Set the linear servomotor so that it will stop in the zero clamp state at occurrence of overtravel.

  The workpiece may fall during overtraveling.
- Do not touch the linear servomotor or machines connected to it while power is ON or soon after the power is turened OFF.

  Failure to observe this caution may result in burns due to high temperatures.
- Do not allow any metallic or other foreign matter to attach to the magnet track.

  Foreign matter in the gap between the moving coil and the magnet track may result in equipment failure or burning.

■ DISPOSAL

⚠ CAUTION

- Heat the magnetic way for one hour at a minimum of 300°C to degauss before disposal.

  The force of the magnetic attraction may cause injuries.
- When disposing of the products, treat them as ordinary industrial waste.

■ MAINTENANCE AND INSPECTION

⚠ CAUTION

- Do not attempt to disassemble or repair the linear servomotor.

  Failure to observe this caution may result in electric shock or injury.
- Do not attempt to change wiring while the power is ON.

  Failure to observe this caution may result in electric shock or injury.

Perform the following regular inspections to maintain the linear servomotor.

Linear servomotors generally require only daily inspection. The periods given in the following table are given as guidelines only. Adjust the periods according to the application conditions and environment.

If the motor fails, contact your Yaskawa representative.

Item	Frequency	Procedure	Remarks
Vibration and noise	Daily	Inspect by feeling and listening from a safe location.	Confirm that the level of vibration or noise has not increased from normal levels.
Appearance	According to degree of contamination	Clean with a cloth or compressed air.	Do not use any solvents other than alcohol.
Insulation resistance measurement	At least once a year	Disconnect the SERVOPACK and test insulation resistance at 500 V. * Must exceed 10 MΩ .	Contact your YASKAWA representative if the insulation resistance is below 10 MΩ . Do not perform insulation resistance or withstand voltage tests on the sensor.
Gap between moving coil and magnet track	At least once a year	Disconnect the SERVOPACK and check the gap.	Confirm that the gap has not changed.
Overhaul	At least once every 5 years	Contact your Yaskawa representative.	The customer should not disassemble and clean the linear servomotor.

* Measure across the linear servomotor FG and the phase-U, phase-V, or phase-W power lead.

AC Servomotor

Linear Σ Series

SAFETY PRECAUTIONS

IRUMA BUSINESS CENTER (SOLUTION CENTER)
480, Kamifujisawa, Iruma, Saitama, 358-8555, Japan
Phone: +81-4-2962-5151 Fax: +81-4-2962-6138
http://www.yaskawa.co.jp

YASKAWA AMERICA, INC.
2121, Norman Drive South, Waukegan, IL 60085, U.S.A.
Phone: +1-800-YASKAWA (927-5292) or +1-847-887-7000 Fax: +1-847-887-7310
http://www.yaskawa.com

YASKAWA ELÉTRICO DO BRASIL LTDA.
777, Avenida Piraporinha, Diadema, São Paulo, 09950-000, Brasil
Phone: +55-11-3585-1100 Fax: +55-11-3585-1187
http://www.yaskawa.com.br

YASKAWA EUROPE GmbH
Hauptstraβe 185, 65760 Eschborn, Germany
Phone: +49-6196-569-300 Fax: +49-6196-569-398
http://www.yaskawa.eu.com E-mail: info@yaskawa.eu.com

YASKAWA ELECTRIC KOREA CORPORATION
35F, Three IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, 07326, Korea
Phone: +82-2-784-7844 Fax: +82-2-784-8495
http://www.yaskawa.co.kr

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
151, Lorong Chuan, #04-02A, New Tech Park, 556741, Singapore
Phone: +65-6282-3003 Fax: +65-6289-3003
http://www.yaskawa.com.sg

YASKAWA ELECTRIC (THAILAND) CO., LTD.
59, 1st-5th Floor, Flourish Building, Soi Ratchadapisek 18, Ratchadapisek Road, Huaykwang, Bangkok, 10310, Thailand
Phone: +66-2-017-0099 Fax: +66-2-017-0799
http://www.yaskawa.co.th

YASKAWA ELECTRIC (CHINA) CO., LTD.
22F, One Corporate Avenue, No.222, Hubin Road, Shanghai, 200021, China
Phone: +86-21-5385-2200 Fax: +86-21-5385-3299
http://www.yaskawa.com.cn

YASKAWA ELECTRIC (CHINA) CO., LTD. BEIJING OFFICE
Room 1011, Tower W3 Oriental Plaza, No.1, East Chang An Ave.,
Dong Cheng District, Beijing, 100738, China
Phone: +86-10-8518-4086 Fax: +86-10-8518-4082

YASKAWA ELECTRIC TAIWAN CORPORATION
12F, No. 207, Sec. 3, Beishin Rd., Shindian Dist., New Taipei City 23143, Taiwan
Phone: +886-2-8913-1333 Fax: +886-2-8913-1513 or +886-2-8913-1519
http://www.yaskawa.com.tw

YASKAWA

YASKAWA ELECTRIC CORPORATION

MANUAL NO. TOBP C230800 00D <21>-0
Published in Japan May 2017
17-4-13