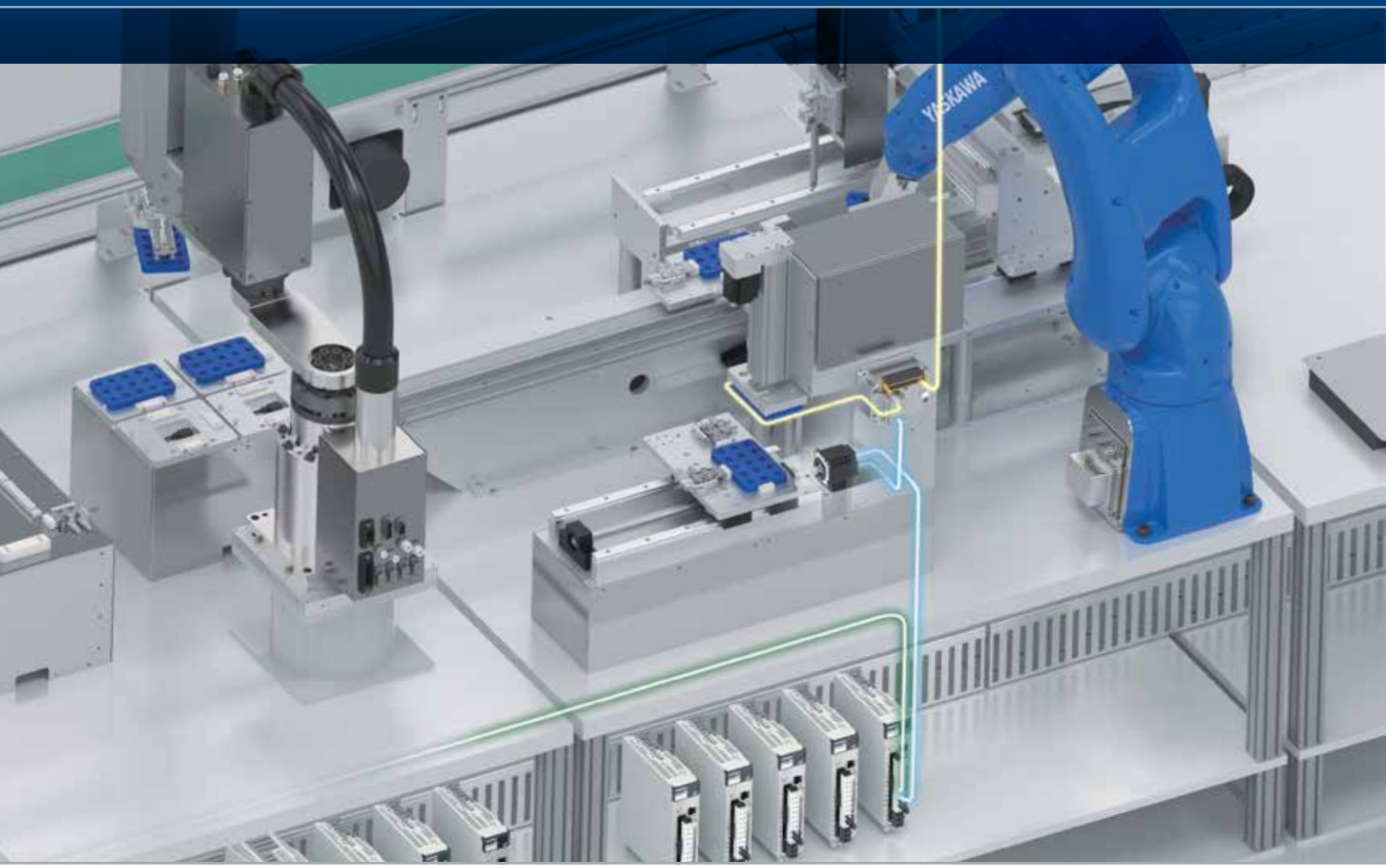
YASKAWA

SIGMA-X

AC SERVO DRIVES AND MOTORS
TECHNICAL SUPPLEMENT





Motion × Digital data solution to accelerate evolution

Digital data solutions by the Σ-X series will transport you to the next step in production with the high precision collection and analysis of data.

Σ-X -Series AC Servo Drive





A digital data solution that begins with the servo, made possible by Yaskawa

Customer Value

Enables immediate data collection, without device or equipment design changes
Predict trends from data such as vibration, disturbance, and torque reference to prevent sudden stops or failure

Best motion performance in the industry for maximizing equipment performance and contributing to resolving our customers' issues

Customer Value

Upgrade to the Σ-X series for improved equipment performance and production efficiency
Faster development with smart servos

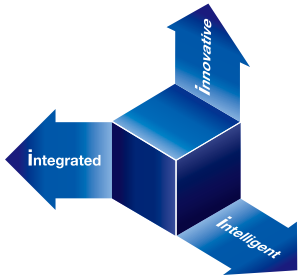
A digital data solution that begins with the servo, made possible by Yaskawa

Inevitably, future manufacturing will involve a transformation into factories without downtime, capable of efficient, consistent, and high-quality production while responding to on-site changes. Toward this vision, Yaskawa Electric has introduced the i3-Mechatronics concept, and as the first step, we have developed Σ-X AC servo drives that collect data to help users visualize and analyze production. Σ-X products can collect valuable data on the same time axis, as needed for insight on how the state of each device may be linked to changes in equipment motion that represent problems.

i3-Mechatronics concept

Building on proven factory automation solutions centered on mechatronics technologies and products by tapping the potential of digital data management, Yaskawa helps solve enterprise challenges from production sites.

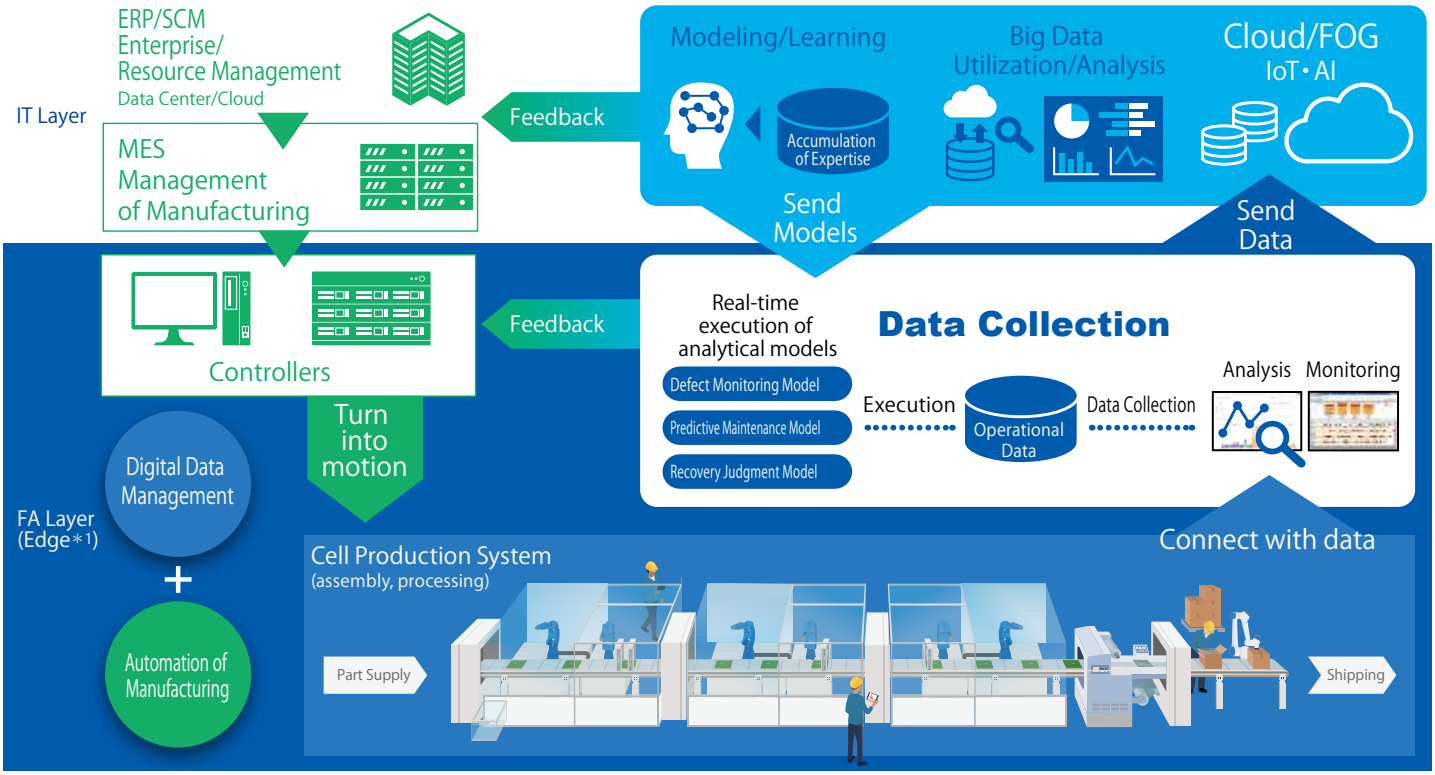
Integrated ▸▸▸	Intelligent ▸▸▸	Innovative
System development	Smart development	Evolution through technological innovations



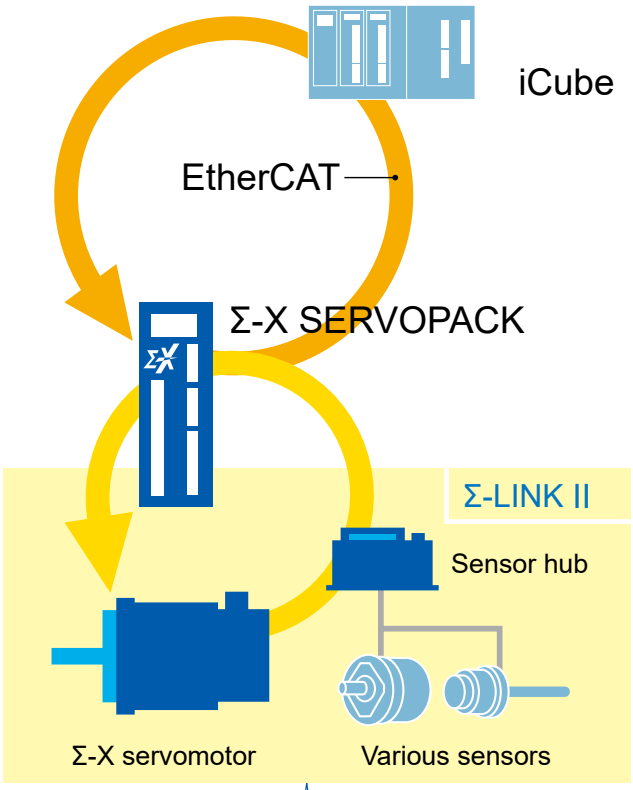
i³-Mechatronics

New value with “i cube”, digital data solution

Smart factory with i3-Mechatronics solutions



Components that bring i3-Mechatronics to life



Feedback in ms or sec.

High-speed data collection and analysis
Real-time feedback of analysis results to controllers

Feedback in µs or ms

Supports periodic motion control, data collection, and analysis

Feedback in µs

Production site data (sensor data) synchronized with the servo period (µs) is collected by the Σ-LINK II sensor network

Equipment: Process

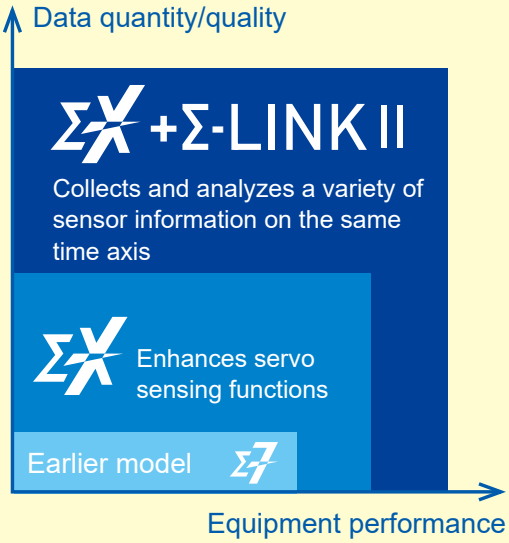
Drive System: Axis

Σ-X: Becoming a key factor in collection of real-time data

Σ-X features enhanced servo sensing functions. What's more, Σ-LINK II sensor networks can be used to collect sensor information at the same time, for equipment offering higher performance and functionality than ever.

What is Σ-LINK II?

A network providing integrated collection of servo and sensor information. Maintains advanced, highly reliable communication between SERVOPACKs and servomotor encoders while enabling cascaded connections of sensors and I/O devices.

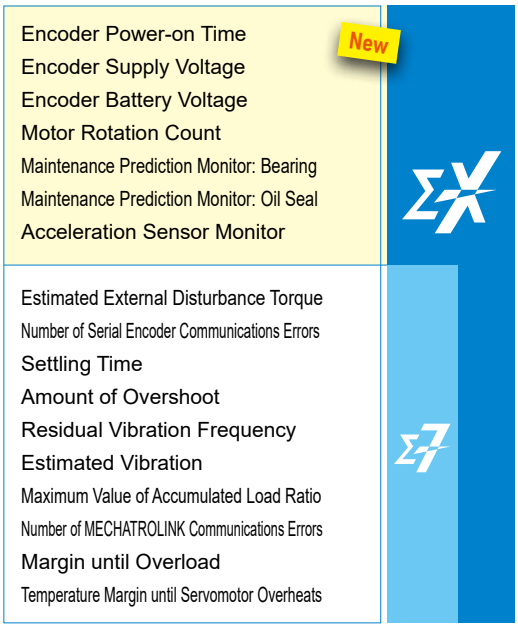


Integrated “Data Collection and Visualization”

The servomotor acts as a sensor and collects various data. It can be used for preventive maintenance of equipment.

Σ-X uses the servomotor as a sensor to sense and monitor the parts used by the servo and the servo’s installation environment. This can be useful for accurately determining maintenance periods and for preventing sudden failures.

Sensing Items

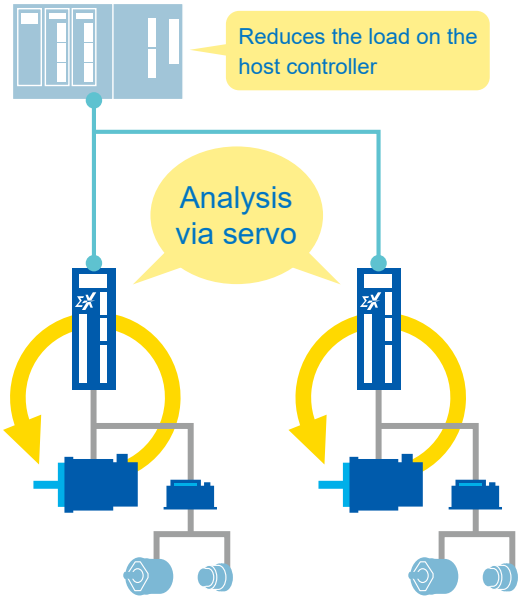




Both installation environment information and the service life of parts used by the servo can be monitored.

Intelligent “Utilization of Sensing Data”

Data utilization can be completed by the servo alone, from digitizing operation data to detecting errors. It is able to provide feedback to the host system in real time.

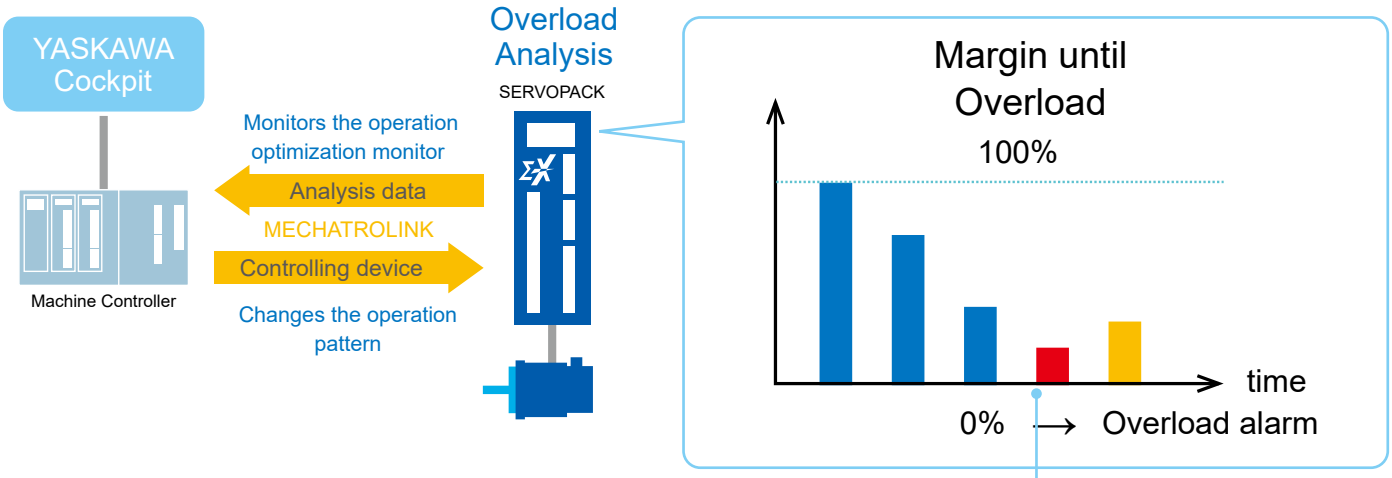


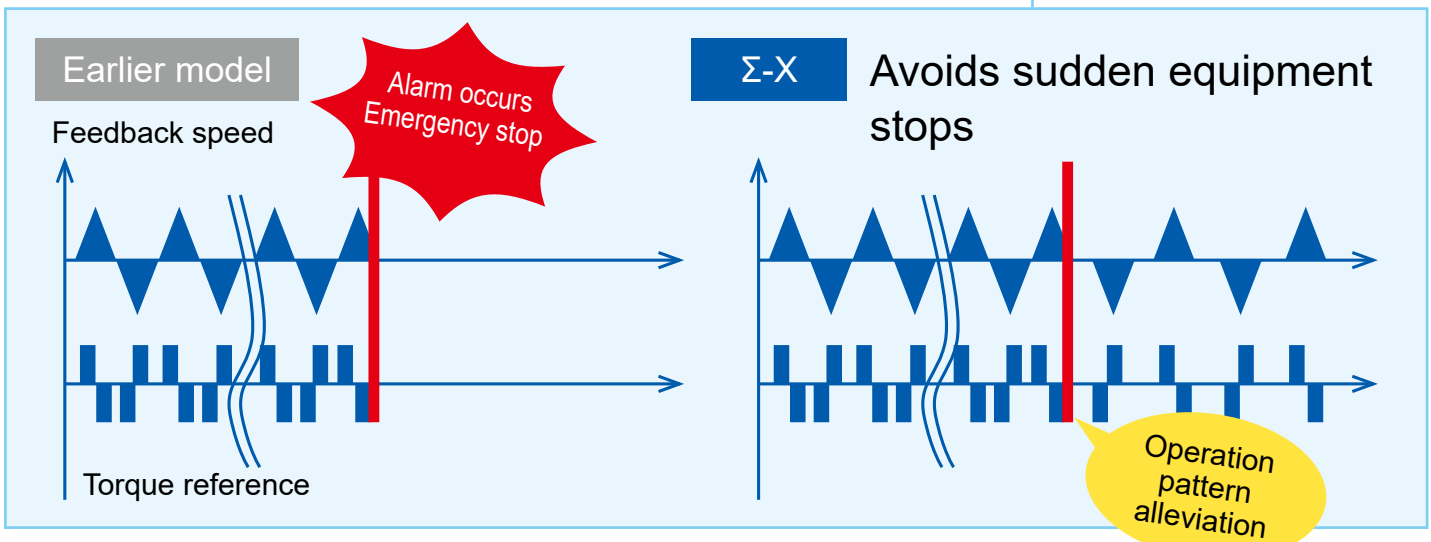
Items to monitor	Solutions with Σ-X	
Equipment status	Sensing function	
Changes in mechanical vibrations	Error detection	New Function
Load status Torque reference Changes in external disturbance	Vibration information monitor	New Function
	External disturbance torque estimation	
	Moment of inertia ratio estimation	
Servo status	Operation optimization monitor	
Operation margin	Margin until overload	
	Margin until regenerative overload	New Function
	Temperature margin until SERVOPACK overheats	New Function
	Temperature margin until servomotor overheats	
	Main circuit power supply voltage margin	New Function
Servo operating status	Environment/Service life monitor	
Surrounding environment	Operating status monitor	Improved Function
Operating status	Service life estimation	Improved Function

Intelligent “Utilization of Sensing Data”

Utilizes the operation optimization monitor to ensure that equipment does not stop working.

Sudden equipment stops can be prevented by monitoring the operation optimization monitor and changing the operation pattern with the controller according to the equipment status.





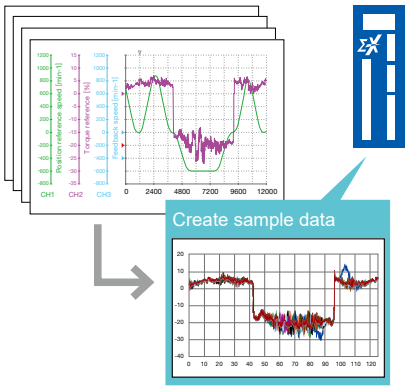
The Σ-X raises the intelligence of the SERVOPACK. Its error detection function detects when equipment is operating in a way that may be “different than normal”.

The Σ-□ detects equipment errors by comparing sample data stored in the SERVOPACK with operation data. It is useful for detecting equipment errors caused by deterioration over time, judging the quality of products and confirming assembly accuracy.

Advance Preparation

Acquire multiple sets of trace data with a fixed pattern of operation

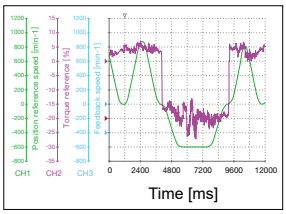
Save the sample data in the SERVOPACK



Operation

Operate with the same operation pattern, and the servo compares it with the sample data to detect errors

Measurement data

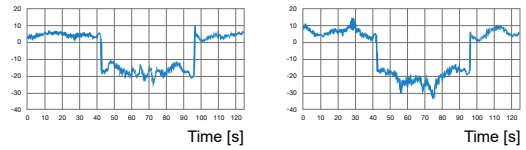


Error Detection

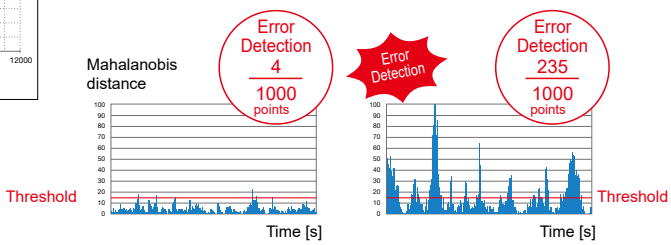
When Normal

When Abnormal

Torque reference



Mahalanobis distance



Error Detection Settings and Monitoring Methods for Judgement Results

Settings and monitoring can be done with the engineering tool SigmaWin+.

Step 1 Creating Sample Data

Read multiple sets of trace data (std files), create sample data and register it in the SERVOPACK.

Step 3 Executing the Error Detection Function

The function is enabled by pressing the [Execute Error Detection] button. The equipment starts running, and A.905 (Error Detection Warning) occurs when an error is detected according to the set conditions and description.

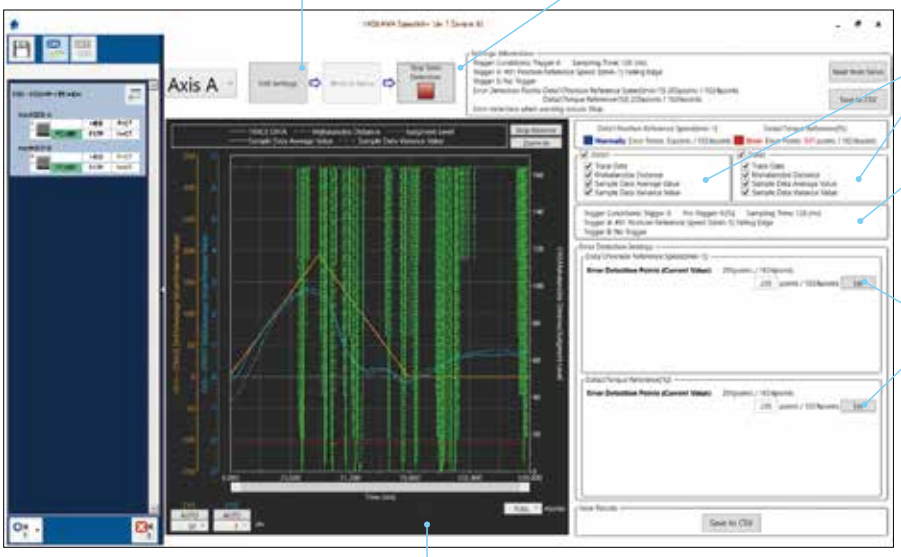


Image of the SigmaWin+ Error Detection Function Screen

Errors can be detected with two sets of trace targets.

Trigger conditions and the conditions for the sampling period are the set values for the sample data.

Step2 Setting the Error Detection Warning Level

Set the level at which an Error Detection Warning (A.905) will be issued based on the degree of difference from the sample data when a difference is detected (error detection points).

Step 4 Displaying the Error Detection Results

The error detection results can be monitored.

Best motion performance in the industry

for maximizing equipment performance and contributing to resolving our customers' issues

1 Improved equipment performance

Shortens takt time

Upgrade to Σ-X for improved production efficiency and further added value from equipment. Also enables faster development and lower production costs.

UP!

- ☑ Throughput
- ☑ Equipment speed performance during development and design

Improved basic performance, essential in accelerated operation

Maximum motor rotation speed

The maximum rotation speed of the motor has increased from the earlier value of 6,000 min^{-1} to 7,000 min^{-1}.

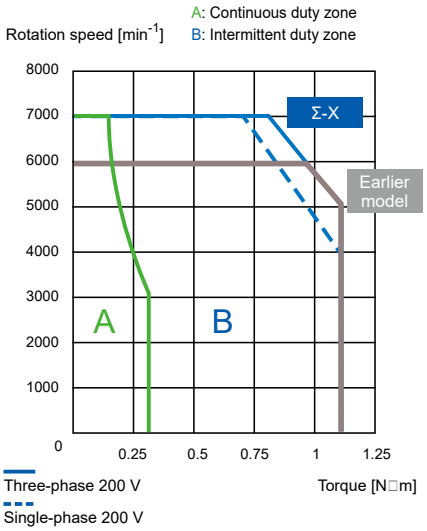


Applicable models: All SGMXJ and SGMXA models

Σ-X 7000 min^{-1}

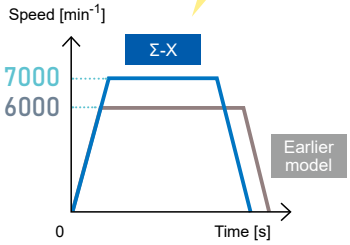
Earlier model 6000 min^{-1}

Torque-rotation speed characteristics (for SGMXJ-01A)



Positioning time

Improving maximum servomotor rotation speed can reduce positioning time, which can contribute to higher productivity.



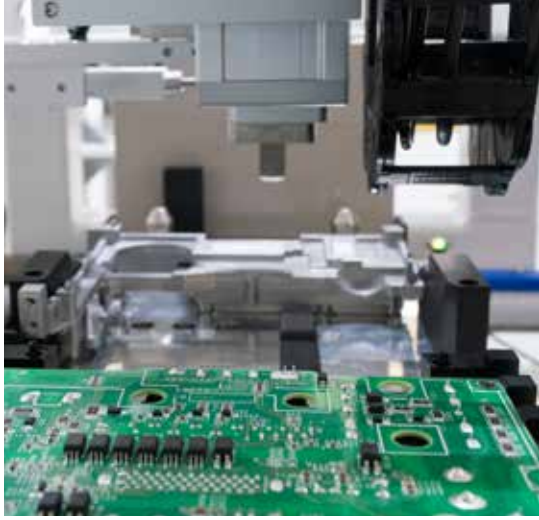
Speed frequency response

Speed frequency response has changed from 3.1 kHz for the earlier model to 3.5 kHz. Maximizing the following performance for the speed reference improves equipment productivity.

Σ-X 3.5 kHz

Earlier model 3.1 kHz





Improves control precision and smoothness

Upgrading to Σ-X reduces inconsistent speed and improves control accuracy.
Refinements in smooth movement can enhance machining precision and quality.

UP!

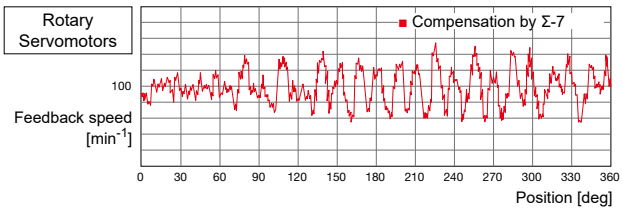
- ☑ Manufacturing quality
- ☑ Equipment precision
- ☑ Machining precision in operation

Expanded functions for improved machining precision and quality

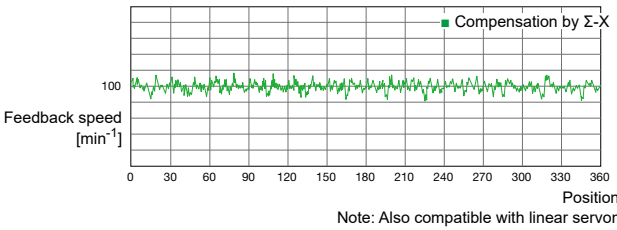
Speed ripple compensation

Smoother drive is possible from a more effective speed ripple compensation algorithm for cogging compensation. This helps reduce inconsistency in equipment machining precision and quality.

Earlier model — Uneven speed causes some inconsistency in machining precision and quality



Σ-X — Eliminates uneven speed, for smooth movement that improves the quality of final products

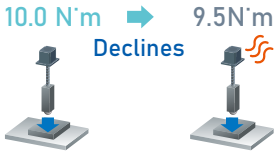


Note: Also compatible with linear servomotors.

Output torque compensation

Previously, output torque may have become offset from reference values due to motor temperature or load status. Output torque compensation is used to compensate the offset from the torque reference for output torque. Reducing the offset can improve equipment machining quality.

Earlier model — Output torque with the same torque reference varies significantly.



Factors
- Changes in motor temperature
  Changes in ambient temperature or motor load status
- Variation in individual motors
  Variation in torque constant

Σ-X — Output torque with the same torque reference is uniform, contributing to improved machining quality.

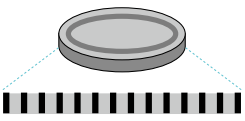


Compensation
- Compensation according to motor temperature
- Compensation for variation in individual motors

Equipped with a high-resolution 26-bit encoder

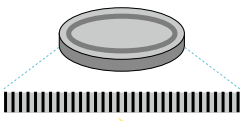
The resolution of the encoder has been increased to 26 bits, four times that of the earlier model.

Earlier model
Encoder resolution 24 bits ≈ 16 million pulses/rev



Σ-X
Encoder resolution 26 bits ≈ 67 million pulses/rev

Four times that of the earlier model



- Increased positioning resolution/stop precision → Precise stops
- Decrease in speed ripples → Smooth movement and improved machining precision

2 Faster servo tuning

Zero man-hours for tuning even in equipment with severe load fluctuations

Σ-X is free of problems affecting other servos, such as time lost in ineffective tuning to position or transfer workpieces of different weights, or servo performance not improving takt time.

OK!

- Unprecedented compatibility
- Accelerated development

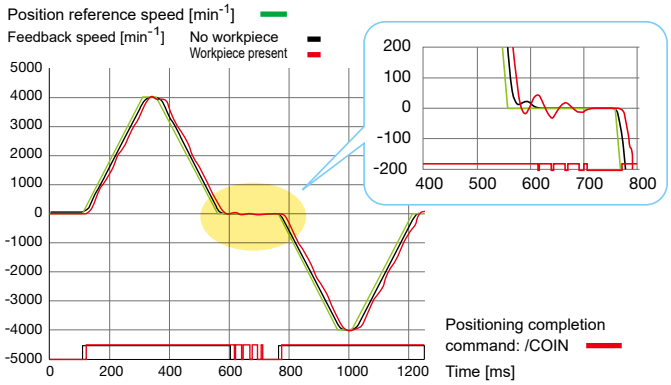


Toward effortless tuning, with expanded functions for load fluctuation

Load fluctuation compensation control

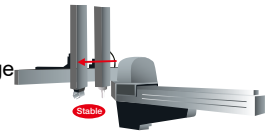
Yaskawa's original "Load fluctuation compensation control" function suppresses variations in settling time and achieves stable drive even if the load fluctuates according to the presence or absence of workpieces on the transfer shaft. Unlike with the earlier model, multiple tuning operations are not required.

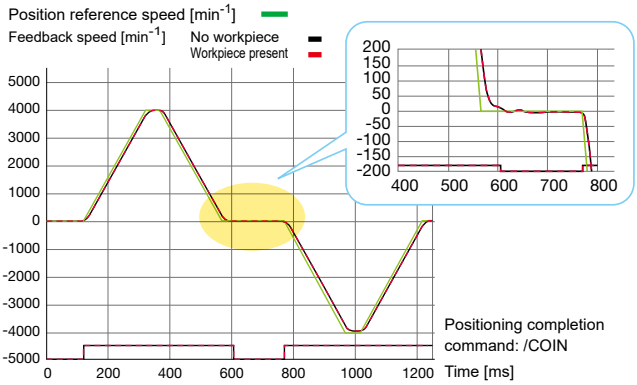
Earlier model — After servo tuning, changes in load may cause overshoot or longer settling time.



Workpiece (moment of inertia ratio)	Settling time
None (324%): Black line	Approx. 40 ms
Present (947%): Red line	Approx. 125 ms

Σ-X — Settling time does not change even if the load changes.





Workpiece (moment of inertia ratio)	Settling time
None (324%): Black line	Approx. 40 ms
Present (947%): Red line	Approx. 40 ms

Enhanced servo tuning functions

The range of the tuning-less function has been expanded to a maximum of 100 times the load. Also applies to mechanisms that have posed tuning challenges, greatly reducing tuning time.

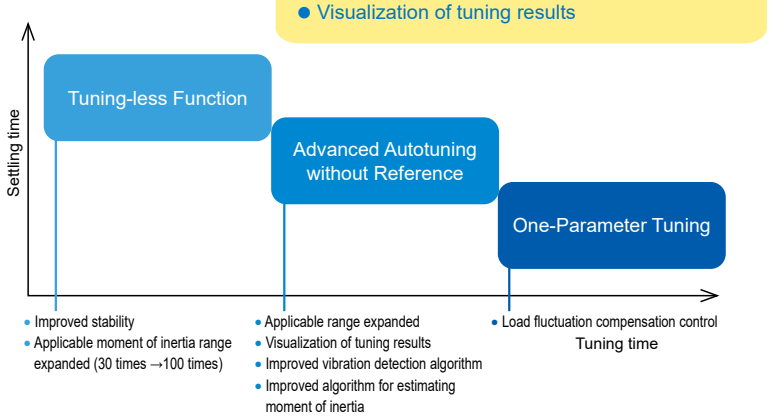
Note: The allowable moment of inertia ratio varies depending on the combination of SERVOPACK and servomotor.

- Broad motion and rigidity support
- More optimal tuning
- Consistent operation even with load fluctuation
- Visualization of tuning results

Earlier model

- Autotuning is not available for some mechanisms
- Difficult to interpret tuning results
- Difficult to tune for axes with load fluctuation
- Autotuning results may not be suitable for some mechanisms

Σ-X





Zero man-hours for setup even for equipment with limited ranges of motion

Σ-X eliminates the hassle of servo tuning and checking operation for mechanisms that do not support autotuning, which otherwise makes development more time-consuming.

OK!

- ☑ Tuning is possible by all equipment operators
- ☑ Reduces tuning time during development

Enhanced functionality to enable autotuning, toward effortless setup

Increased performance for estimating moment of inertia (arbitrary commands, real-time estimation)

The estimation algorithm has evolved. Estimates can be made with an arbitrary command, and the results can be monitored in real time. The moment of inertia can be estimated automatically for mechanisms that cannot perform round-trip operation and for those with load fluctuations. This eliminates the need for actions exclusive to estimation and reduces the time and effort for confirming and adjusting the range of motion.

Earlier model

Estimating moment of inertia has required actions specifically for estimation.



Moment of inertia estimation function in SigmaWin+

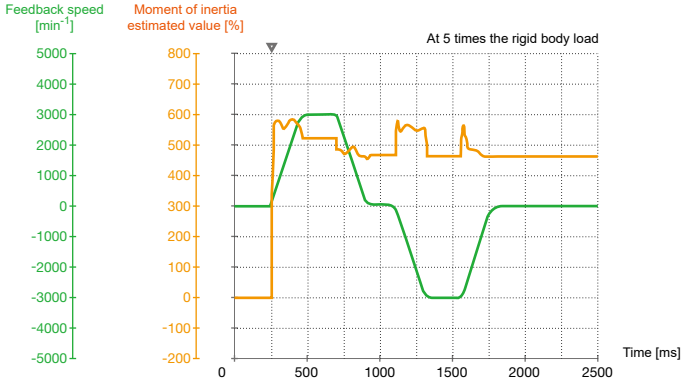
Σ-X

1 Moment of inertia ratio estimated with arbitrary commands

Estimated in conjunction with user commands or program jogging.

2 Constantly estimated in real time

Constant estimation is possible while the servo is ON, enabling monitoring of the results in real time.



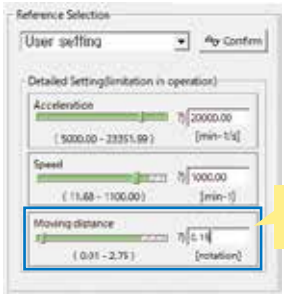
Note: Certain conditions apply to operation where estimation is available. In particular, estimation is not available during low-speed operation.

Moment of inertia estimation function for micro-movement

This estimation function is used for mechanisms with travel distances of less than 0.25 rotations. Previously, these mechanisms were calculated manually because the range of motion was too small for this estimation function to work.

Earlier model

The existing function for estimating the moment of inertia could not be completed for some mechanisms because they cannot travel a certain distance.



Moment of inertia estimation conditions screen in SigmaWin+

Travel distance setting

Σ-X

Moment of inertia estimated even when range of motion is not fully acquired



Capable of estimating the moment of inertia ratio even at rotations of less than 0.25

Note: Inaccuracies in estimations increase at a machine resonance of 70 to 300 Hz, which may cause errors to occur.

2 Faster servo tuning

Zero man-hours for re-tuning the servo during mass production

Σ-X eliminates stressful servo re-tuning for each servo-equipped unit at the stage of mass production.



OK!

- ☑ No need for re-tuning to address individual variation in equipment
- ☑ Prevents vibration due to differences in environments of use

Expanded anti-vibration option settings and tuning modes, accounting for equipment variation

Expansion of the applicable range for autotuning

It can be used to set the ideal options to match the equipment for mechanisms where autotuning cannot be applied, or when the investigation results do not match the machine.

Item	Description
Maximum Search Gain Setting	Enables optimal search gain configuration for the equipment.
Gain Ratio (margin)	Can be set with a margin accounting for equipment variation.
Allowable Amount of Overshoot	Configurable for equipment that allows overshoot.
Control Mode Expansion	Compatible with I-P control mode.



Advanced Setting Screen for Tuning in SigmaWin+

Earlier model — Man-hours and rework from individual variation in equipment

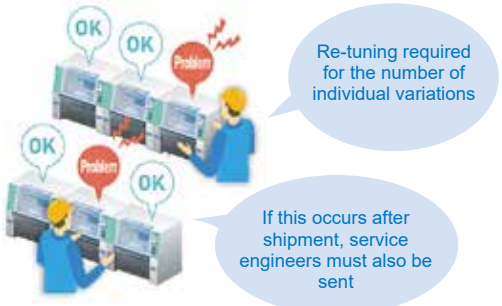
Servo tuning on the prototype machine

▼

Machines are mass-produced (individual variation occurs)

▼

Occurrence of individual variations in equipment



Σ-X — Enables tuning that is not easily affected by individual variation

Servo tuning with a margin, as set on the prototype machine

▼

Machines are mass-produced (individual variation occurs)

▼

Prototype machine tuning results are applied to mass-produced machines

However...



No vibration, so these machines are acceptable

No need for re-tuning or on-site service by engineers

3 Compatible functions

Convenient compatibility, easy upgrading

Eliminates hassles associated with replacement, such as the need to redesign equipment and reconfigure host controllers. This simplifies development and maintenance.

Reduced

- Development lead time
- Tuning time after replacement

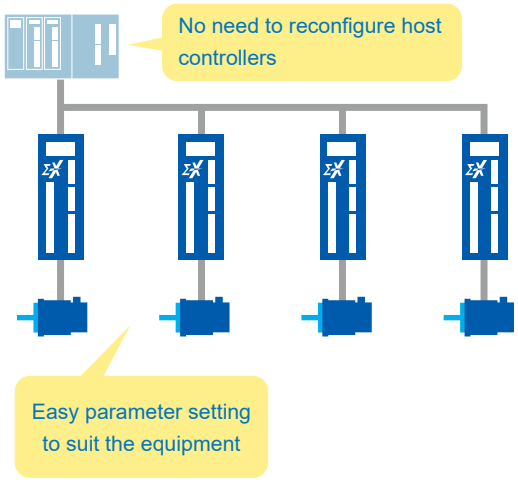


No need to reconfigure host controllers

Σ-X/7 compatible functions

Compatible functions are available to facilitate replacement of the earlier model with Σ-X. There is no need for complicated settings to reconfigure the host controller.

Σ-X Three easy steps to update settings for Σ-X



Step 1

Parameter conversion in SigmaWin+ enables migration of Σ-V/7 parameter settings as-is.

Step 2

Communications interface compatibility settings enable host controllers to communicate with Σ-X as if they were Σ-V/7.

Set Value	0	1	2
Function	Communicate as Σ-X	Communicate as Σ-V	Communicate as Σ-7

Step 3

Encoder resolution compatibility settings enable servomotors to operate with an encoder resolution different from the servomotor specifications.

Encoder resolution/operation

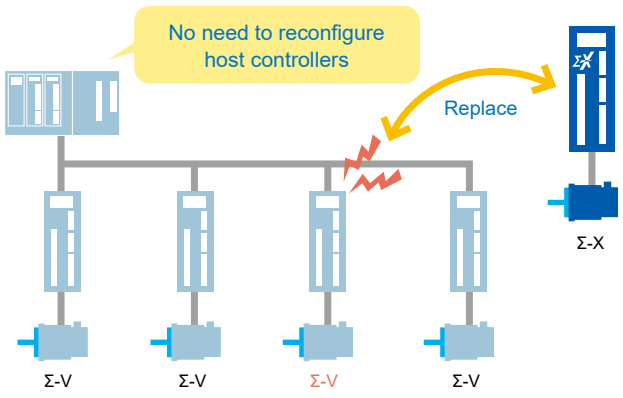
Set Value	4	6	8	A
Function	20-bit	22-bit	24-bit	26-bit

Installation compatibility of SERVOPACKs and servomotors

Servomotors compatible with Σ-7 are available, ensuring compatibility of installation. Σ-7 series cables can also be used.

Example of after-sales service

In case of servo failure, users can isolate affected axes for replacement with Σ-X models, following the 3 steps above. This enables prompt recovery.



3 Compatible functions



Compatible standards with FT specifications

In the Σ-7 series, functions that were available separately in a lineup of models with optimized applications (FT specifications) have been enhanced and integrated into the standard Σ-X SERVOPACK.

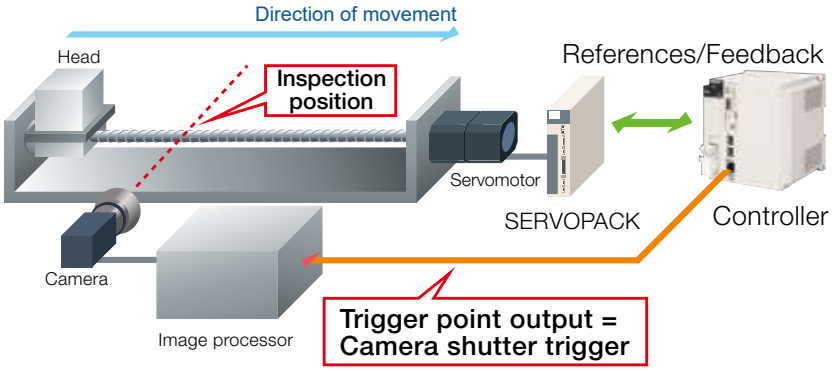


✓Inventory control workload

Triggers at preset positions function with integrated Σ-7 FT62 specification

When a moving part of a machine passes the preset reference positions, the servo outputs signals at preset positions, which speeds up the equipment.

System for outputting triggers at preset positions using a controller

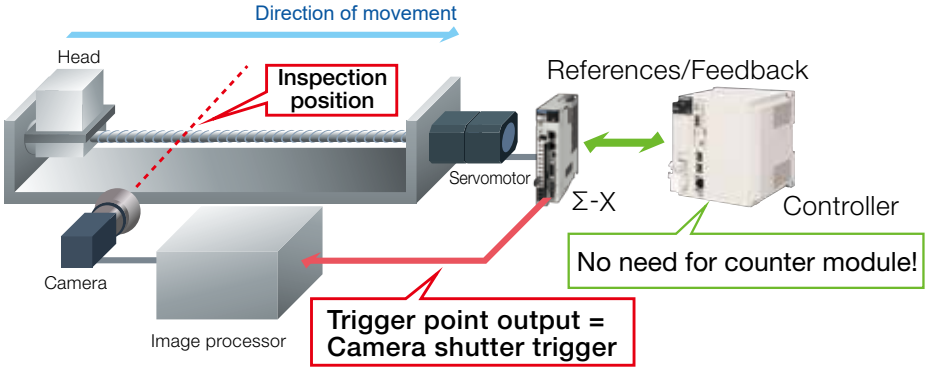


In a conventional system for outputting triggers at preset positions, the controller's counter module receives the divided pulse output from the servo, detects the preset reference positions that have been passed, and outputs a trigger signal.

Problem

The trigger output signal is dependent on the processing cycle of the controller application.

System for outputting triggers at preset positions using the Σ-X standard SERVOPACK



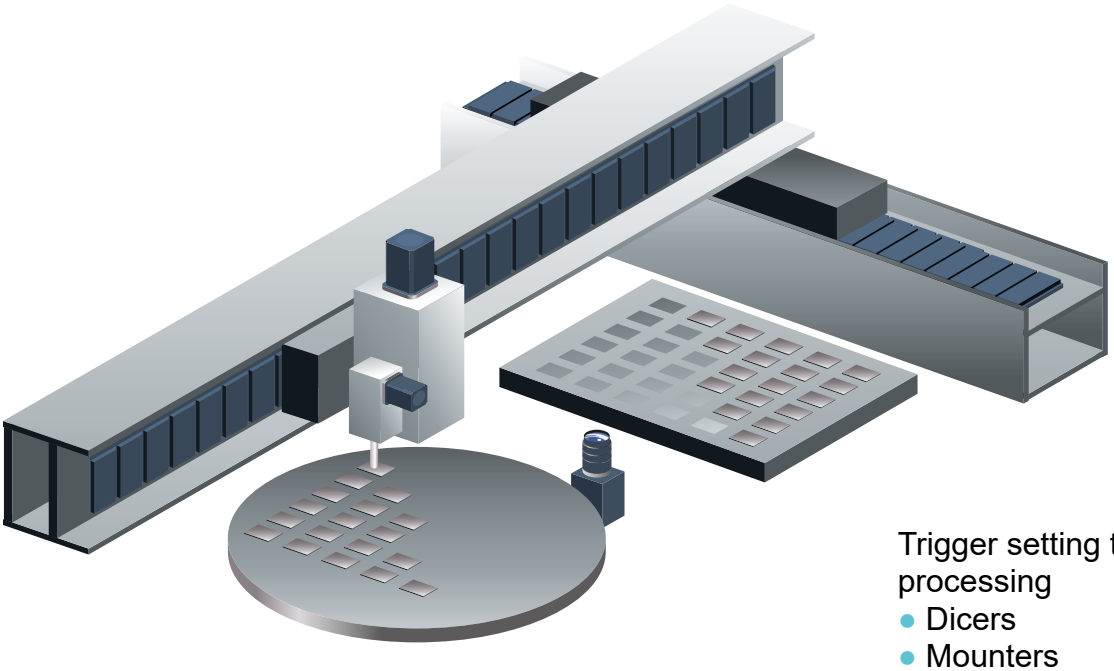
In the system for outputting triggers at preset positions using the Σ-X standard SERVOPACK, the servo outputs a trigger signal when it detects that the preset reference positions have been passed.

Improvement

A trigger signal is output with the high-speed processing cycles of the servo drive, which reduces delays in output times.

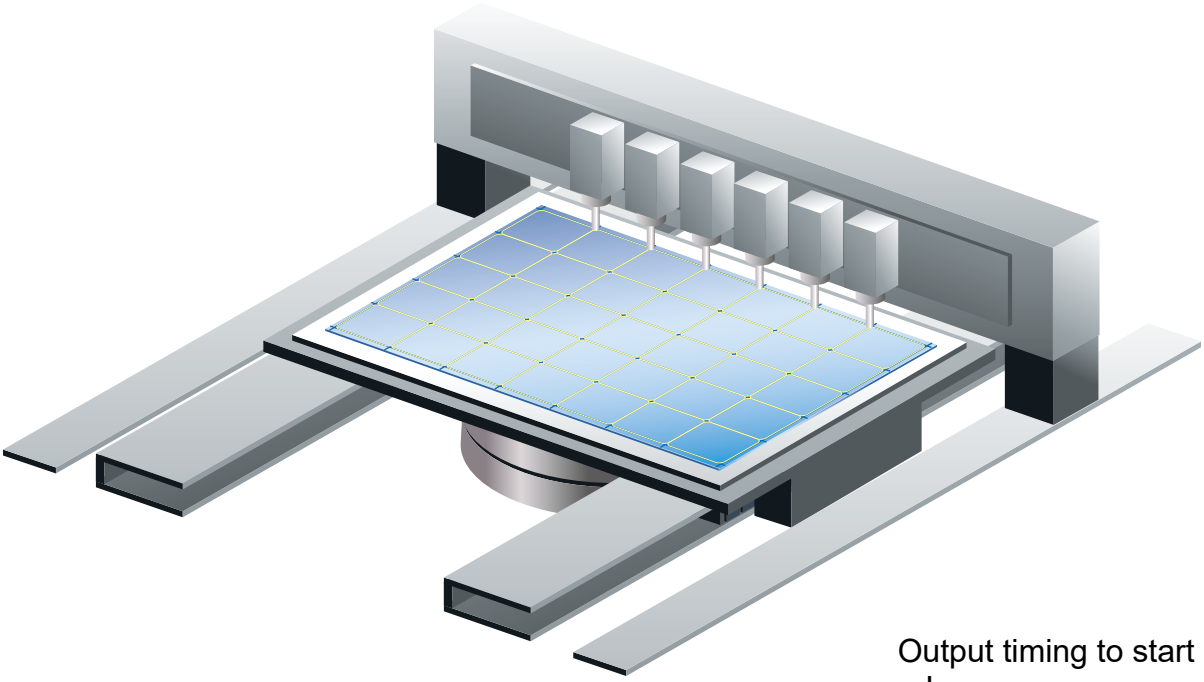
Applications

All devices that require an output process linked to a point through which a servo mechanism passes.



Trigger setting to start image processing

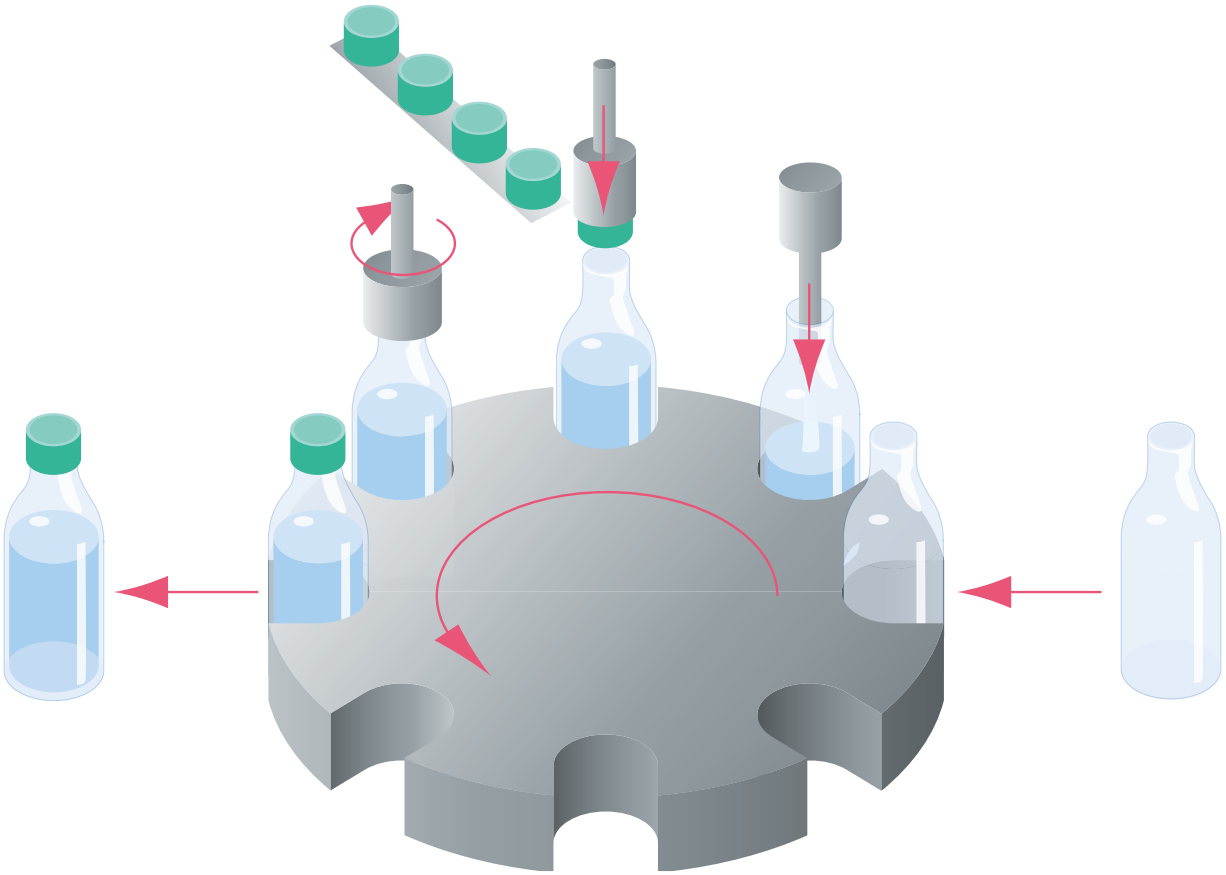
- Dicers
- Mounters



Output timing to start processing

- Laser processors
- Dispensers

● Applications (cont.)



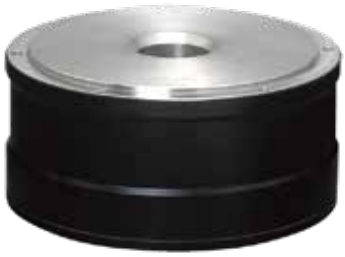
Use of triggers at preset positions for rotary tables
- Parts conveyance (transfer)
- Board inspection equipment, etc.

SGM7D motor drive with integrated Σ-7 FT82 specification

Ideal for applications that require high torque, high precision, and high rigidity

Previously with the Σ-7 series, a separate FT specification SERVOPACK was required to drive the SGM7D, but this can now be performed with the standard Σ-X SERVOPACK.

With core, outer rotor
Small and medium capacity: SGM7D



Features of application-optimized SERVOPACK (FT specification)

We use the know-how accumulated in different markets to develop SERVOPACKs (FT specifications) equipped with functions that are optimized for different applications. Helps increase added value of equipment.

- ☑Press and injection molding application (FT40)
  - ☑Pressure control function
- ☑Gantry application function (FT70)
  - ☑Optimized function for driving a gantry (gantry application function)
  - ☑Torque/force assistance



Features

FT Specifications	Applications	Function	Features
FT40	Press and Injection Molding	Pressure control function	Pressure sensor signals sent to the SERVOPACK enable high-precision pressure control.
FT70	Gantry drive applications	Gantry application function	Enables optimal control of difficult-to-control gantry mechanisms.
		Torque/force assist function	Multiple SERVOPACKs can be coordinated and operated to construct high-thrust (torque) systems.

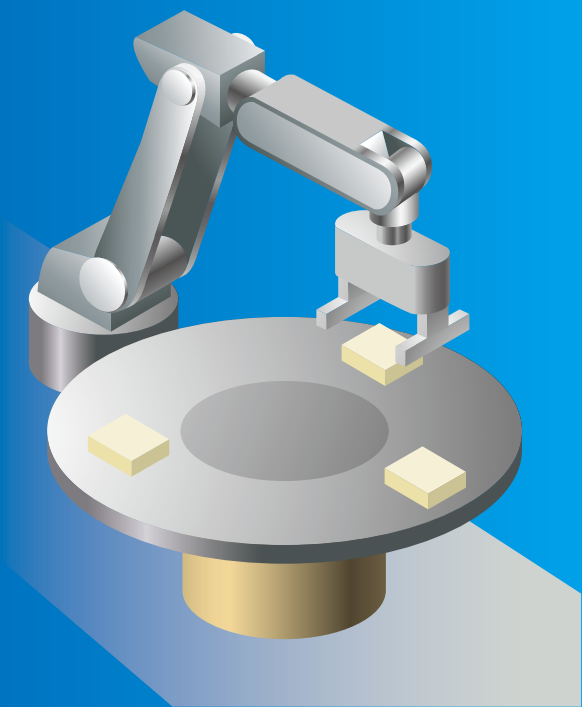
Product system

FT Specifications	SERVOPACKs	Communications References	Applicable Motors		
			Rotary Servomotor	Direct drive Servomotor	Linear Servomotor
FT40	Σ-XS	EtherCAT	□	□	□
FT70	Σ-XS□Σ-XW	EtherCAT	□	×	□

Features of Direct Drive Servomotors

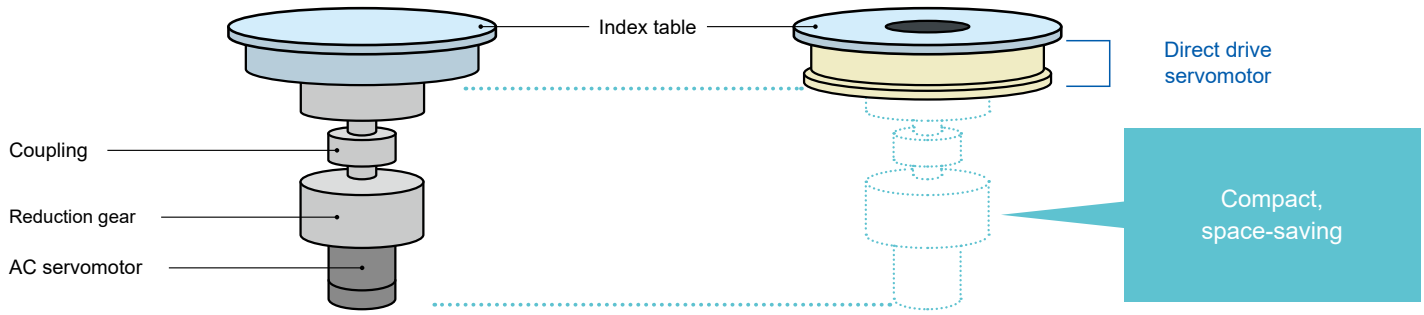
- ☑ Compact, space-saving design
- ☑ Energy-efficient
- ☑ High accuracy
- ☑ Can accelerate design processes
- ☑ No looseness or backlash

Direct drive servomotors drive loads directly without a reduction gear, supplying high torque at low speeds and offering fast, accurate positioning without looseness or backlash.



Example in an index table

With conventional AC servomotors	With direct drive servomotors



Current Limitations

- Reduced positioning accuracy due to looseness and backlash
- Noise
- Maintenance required for wear and lubrication

Technical Improvements

- Improved positioning accuracy, as a result of direct connection to load
- Low noise
- Hollow design simplifies wiring/piping
- Fewer parts, for faster design and more economical maintenance
- No loss of efficiency from a reduction gear; enables energy-saving equipment
- Clean operation, without gears or need for lubrication
- Easy to set operation angle and number of divisions via command values

With core, outer rotor

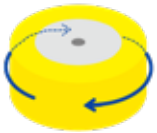
Small and medium capacity: SGM7D

Ideal for applications that require high torque, high precision, and high rigidity



Outer rotor*

The outside of the motor rotates.

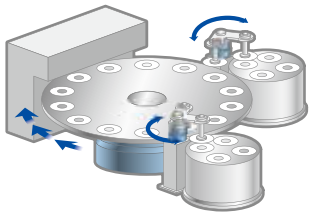


- Built-in 24-bit encoder
- Application to large loads possible with a high allowable load moment of inertia ratio
- Large center aperture design provides more space available for wiring connections
- High rigidity

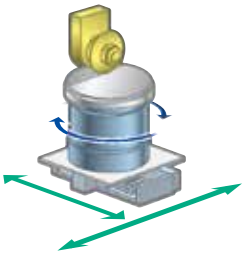
*A magnetic bias is used that places a strong permanent magnet between the stator and core.

Applications

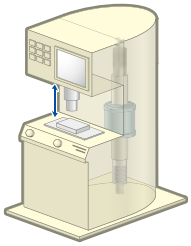
Rotary tables (Can handle large loads)



Semiconductor manufacturing equipment



Machine tools



Coreless, inner rotor

Small capacity: SGM7E

Ideal for applications that require smooth movement without speed fluctuations



Inner rotor

The inside of the motor rotates.



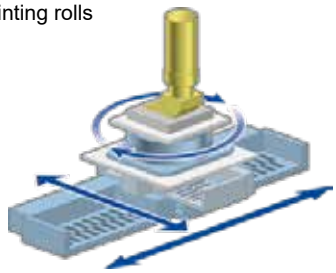
- Built-in 24-bit encoder
- Low cogging with a core-less system provides smooth operation free from speed variations

Applications

Spinning (CMP equipment, washing machines)



Printing rolls



With core, inner rotor

Small and medium capacity: SGM7F

Ideal for applications that require downsizing and a shorter takt time



Inner rotor

The inside of the motor rotates.



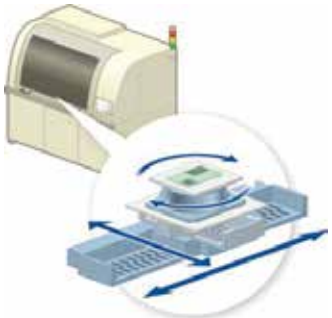
- Built-in 24-bit encoder
- Compact design with small rotor diameter
- High-speed, high-frequency positioning
- Low inertia
- Low heat generation

Applications

Indexers



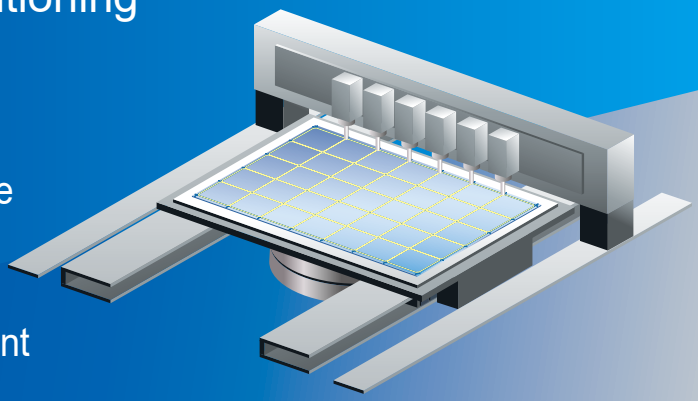
Sorters and bonders



Features of Linear Servomotors

☑High-speed, high-accuracy positioning

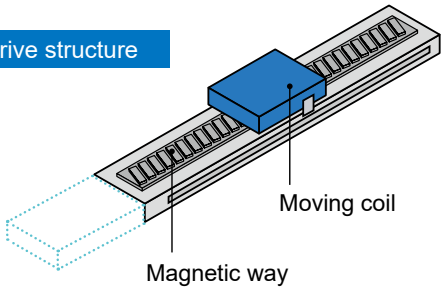
- ☑Fast acceleration
- ☑Easily enables long strokes, high force
- ☑Low heat generation
- ☑Maintenance-free, from the standpoint of part wear and lubrication



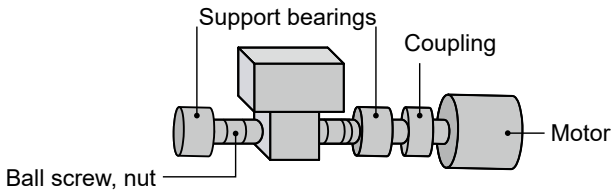
Linear servomotors contribute to improved machine functionality and performance with exceptional features such as high speed, fast acceleration/deceleration, long-stroke compatibility, constant speed, safety, clean and quiet operation, and low maintenance.

Differences between linear drive and ball screw drive

Linear drive structure

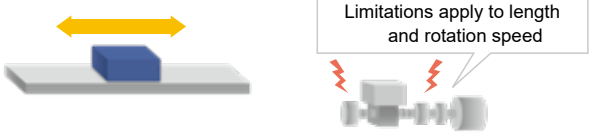


Ball screw drive structure



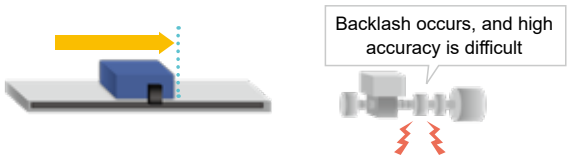
● High speed

High-speed operation without inherent mechanical speed limitations.
Maximum speed: 5.0 m/s



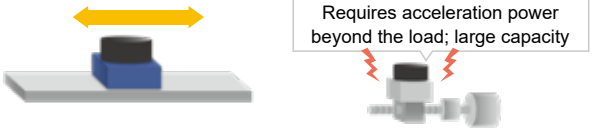
● High positioning accuracy

Accurate positioning at the submicron level.



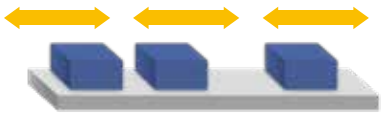
● Fast acceleration/deceleration

Acceleration is determined solely by the motor and load.
Reducing loads greatly increases acceleration.



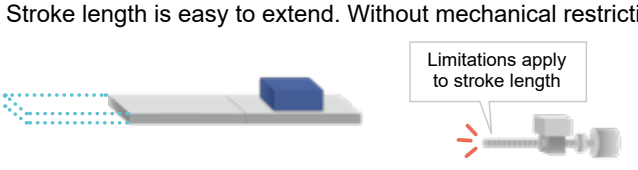
● Multi-head

Independent control of multiple moving parts, small installation area. Higher productivity, from a simple structure.



● Long stroke

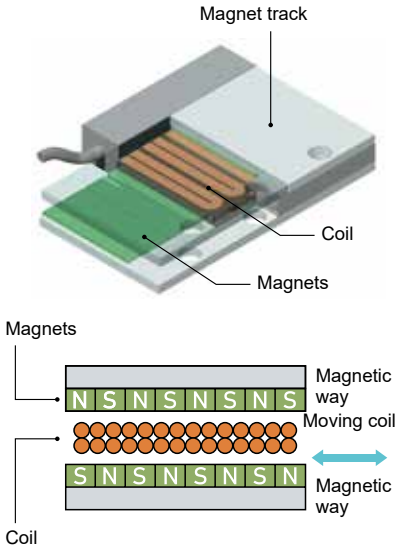
Stroke length is easy to extend. Without mechanical restrictions, servo performance is not affected.



Coreless
SGLG

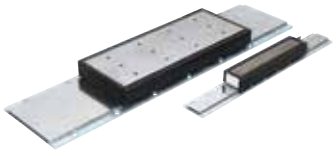


Low-noise and longer guide service life without magnetic attraction. Zero cogging, for minimal force ripple.

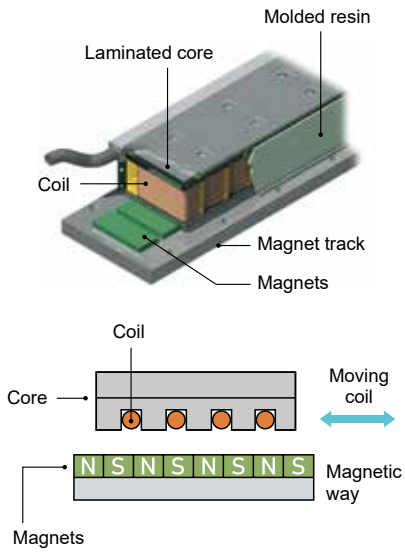


- The moving coil has no iron core and consists of an accurately resin-molded coil.
- The magnetic way consists of two opposing plates holding accurately positioned magnets.

With Core
SGLFW2



Large magnetic attraction between moving/fixed parts can be used to create a preload on the bearings. Frictional force from the magnetic attraction can reduce deceleration force.

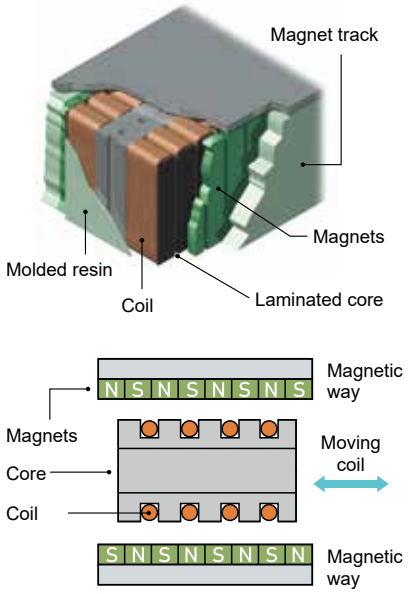


- The moving coil consists of a slotted, laminated core holding the pre-wound coil, with the entire unit encapsulated in resin.
- The magnetic way consists of a row of accurately positioned magnets on a plate facing the core.

With Core
SGLT



Original structure negates magnetic attraction to minimize noise and extend guide life. Negligible cogging force.



- The moving coil consists of a slotted, laminated core holding the pre-wound coil, with the entire unit encapsulated in resin.
- The magnetic way consists of rows of accurately positioned magnets on plates facing the core.

Applications

Multiple heads

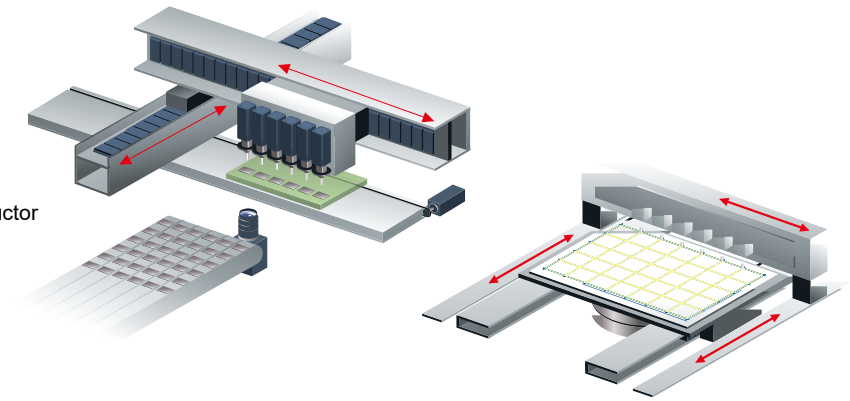
LCD and OLED manufacturing equipment such as dispensers or inspection or repair equipment

Linear stages (X, Y)

LCD and OLED manufacturing equipment (for G 5.5 or larger glass substrates, or for long strokes), semiconductor manufacturing equipment such as probers

Gantries

Electronic component manufacturing equipment such as high-speed mounters



Product Lineup

Servomotor

Rotary Servomotors



Model: SGMXJ

Rated Output: 50 W - 750 W

- Medium inertia, high speed
- 26-bit encoder
- Maximum rotation speed: 7000 min^{-1}



Model: SGMXA

Rated Output: 50 W - 7.0 kW

- Low inertia, high speed
- 26-bit encoder
- Maximum rotation speed: 7000 min^{-1}



Model: SGMXP

Rated Output: 100 W - 1.5 kW

- Medium inertia, flat type
- 26-bit encoder
- Maximum rotation speed: 7000 min^{-1}



Model: SGMXG

Rated Output: 300 W - 15 kW

- Medium inertia, high torque
- 26-bit encoder
- For feed shaft driving (high-speed feed)



Model: SGM7M

Rated Output: 11 - 33W

- Low inertia, Super-compact
- 20-bit encoder
- Maximum rotation speed: 7000 min^{-1}

Linear Servomotors



Model: SGLG

Rated Force: 12.5 N – 750 N

- Low-noise and longer guide service life without magnetic attraction
- Zero cogging, for minimal force ripple



Model: SGLFW2

Rated Force: 45 N – 2520 N

- Large magnetic attraction can be used to create a preload on the bearings
- Frictional force from the magnetic attraction can reduce deceleration force



Model: SGLT

Rated Force: 130 N – 2000 N

- Original structure negates magnetic attraction to minimize noise and help extend guide life
- Negligible cogging force

Linear Stages



Model: ST2F Sigma Trac II

Rated Force: 45 N to 1680 N

- Turnkey linear stages, built-to-order and fully tested
- Based on SGLFW2 series servomotor

Direct Drive Servomotors









Model	SGM7D	SGM7E	SGM7F (small capacity)	SGM7F (medium capacity)
Rated Torque	1.30 N·m – 240 N·m	2.00 N·m – 35.0 N·m	2.00 N·m – 35.0 N·m	45.0 N·m – 200 N·m

- Ideal for applications that require high torque, high accuracy, and high rigidity
- Supports large loads, with a high allowable load moment of inertia ratio
- Large center aperture design provides wiring space

- Ideal for applications that require smooth movement without speed fluctuations
- Low cogging with a core-less system provides smooth operation free from speed variations
- High mechanical precision for runout at end of shaft and runout of shaft surface (0.01 mm)

- Ideal for applications that require downsizing and high-speed, high-frequency positioning
- Low heat generation
- High mechanical precision for runout at end of shaft and runout of shaft surface (0.01 mm)

SERVOPACKs

Σ-XS (Single-axis)





Interface	EtherCAT	Analog Voltage/Pulse Train
Model	SGDXS-□□□AA0A	SGDXS-□□□A00A

- Implements the CiA 402 CANopen drive profile for EtherCAT communications (real-time Ethernet communications)
- Provides an EtherCAT interface for the Σ-X series' high-level servo control performance, advanced tuning functions, and full-featured actuator control

- Select and use analog voltage speed/torque reference and pulse train position reference by configuring parameter settings

Σ-XW (Two-axis)



Interface	EtherCAT
Model	SGDXW-□□□AA0A

- Implements the CiA 402 CANopen drive profile for EtherCAT communications (real-time Ethernet communications)
- Provides an EtherCAT interface for the Σ-X series' high-level servo control performance, advanced tuning functions, and full-featured actuator control
- Use regenerative energy from multiple axes as drive energy

Σ-XT (Three axis)

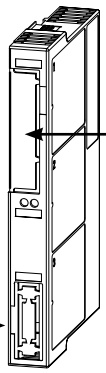


	EtherCAT
Model	SGDXT-□□□AA0A

- Implements the CiA 402 CANopen drive prole for EtherCAT communications (real-time Ethernet communications)
- Provides an EtherCAT interface for the Σ-X series' high-level servo control performance, advanced tuning functions, and full-featured actuator control
- Less Wiring/Smaller Footprint

Product Lineup (Continued)

SERVOPACKs



Option Module

Interface	Fully-Closed Module
Model	SGDV-OFA01A

- High-accuracy, high-response positioning by using feedback signals from a detector installed on the machine
- Compatible with high-resolution external encoders

Safety Module

Name	Advanced Safety Module
Model	SGDXS-OSA□□A

- Equipped with safety functions that monitor the position, speed, and acceleration of the servomotor
- Multiple safety functions can be executed at the same time, such as executing different types of safety functions or switching the monitoring threshold between safety functions of the same type.

Support Tools

AC servo capacity selection software

Sigma Select



AC servo drive engineering tool

SigmaWin+ Ver.7

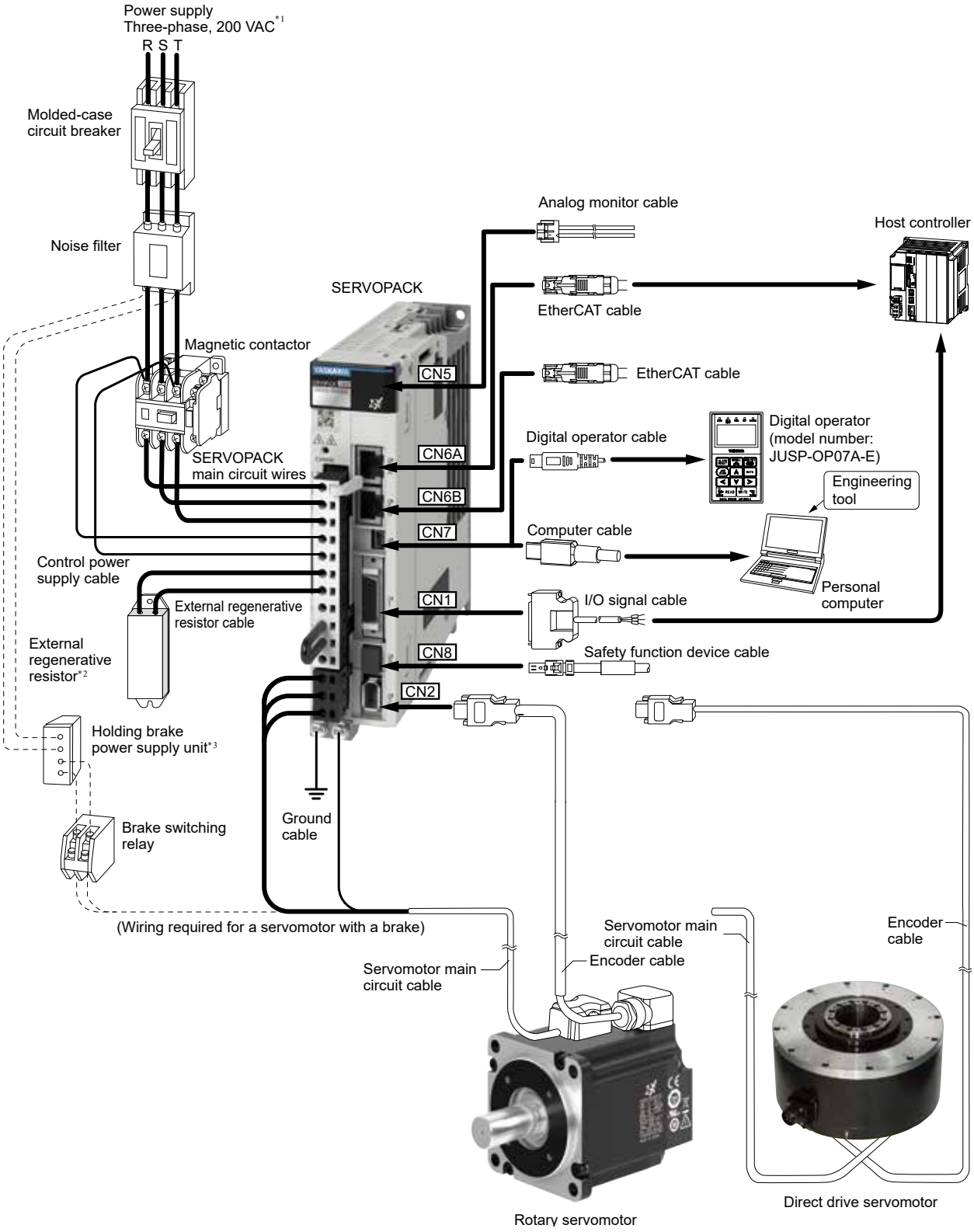


- Supports operations from setup to tuning and maintenance.

System Configuration Examples

Combination of Σ-X SERVOPACK and Rotary Servomotor/Direct Drive Servomotor

●For EtherCAT Communications/Three-phase 200 VAC

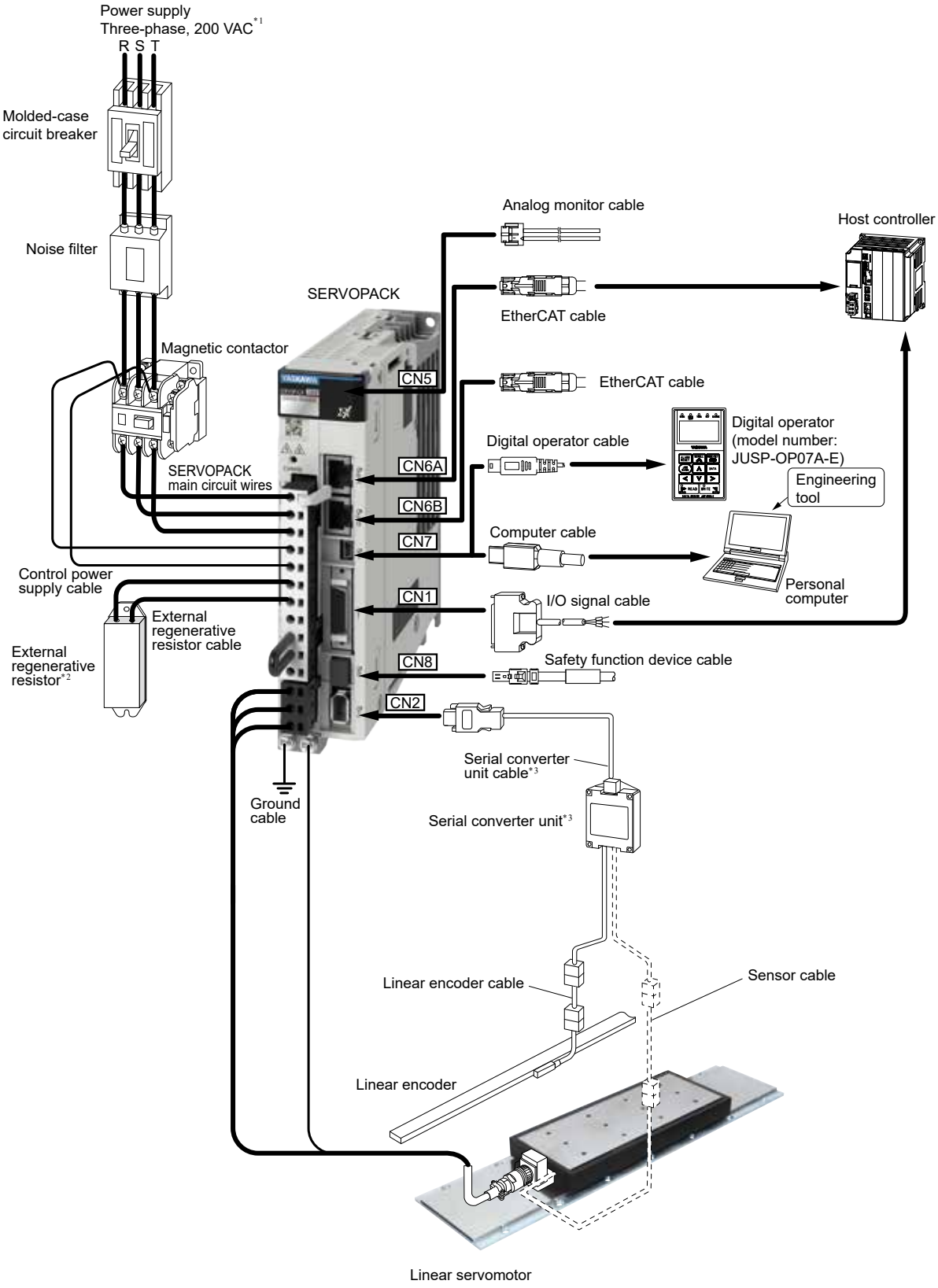


*1 This example is for a SERVOPACK with a three-phase, 200-VAC power supply input. The pin layout of the main circuit connector depends on the voltage.
*2 External regenerative resistors are not provided by Yaskawa.
*3 The power supply unit for the holding brake is not provided by Yaskawa. Select a power supply unit based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.
*4 No battery unit is required when using a servomotor equipped with a batteryless absolute encoder.

System Configuration Examples (Continued)

Combination of Σ-XS SERVOPACK and Linear Servomotor

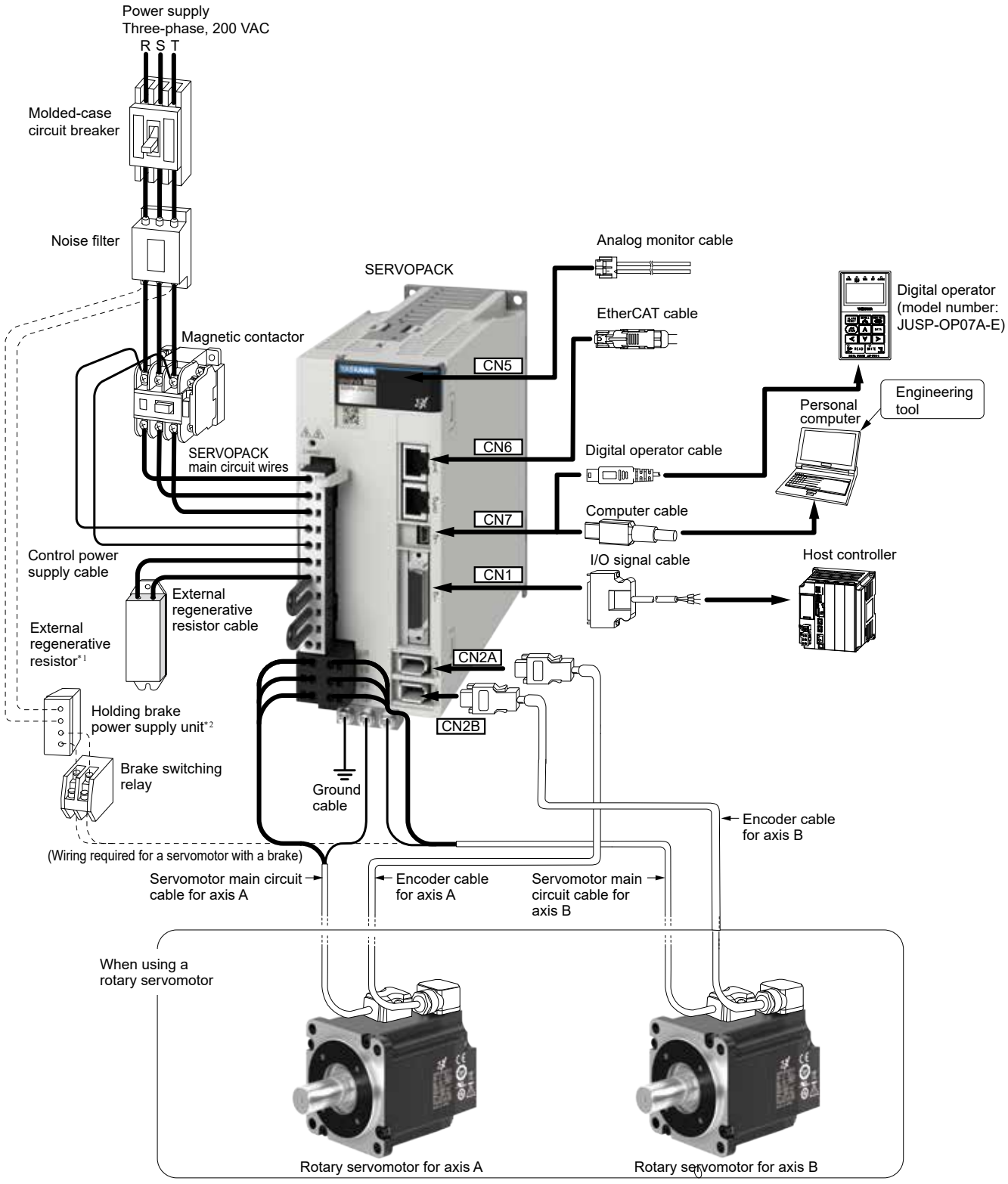
●For EtherCAT Communications/Three-phase 200 VAC



*1 This example is for a SERVOPACK with a three-phase, 200-VAC power supply input. The pin layout of the main circuit connector depends on the voltage.
*2 External regenerative resistors are not provided by Yaskawa.
*3 Only required when using an incremental linear encoder (manufactured by Dr. JOHANNES HEIDENHAIN GmbH or Renishaw PLC).

Combination of Σ-XW SERVOPACK and Rotary Servomotor

●For EtherCAT Communications/Three-phase 200 VAC



*1 External regenerative resistors are not provided by Yaskawa.

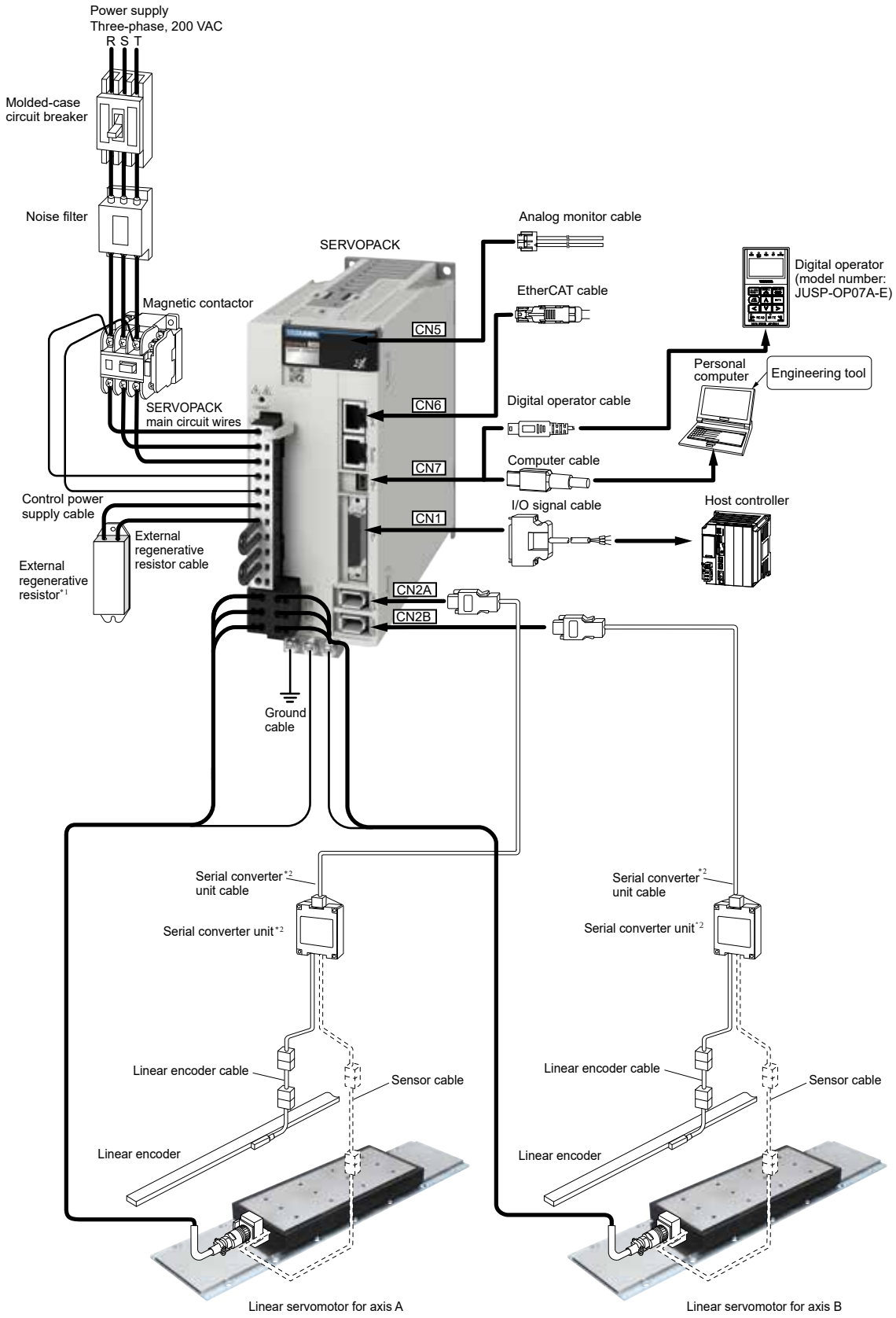
*2 The power supply unit for the holding brake is not provided by Yaskawa. Select a power supply unit based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.

*3 No battery unit is required when using a servomotor equipped with a batteryless absolute encoder.

System Configuration Examples (Continued)

Combination of Σ-XW SERVOPACK and Linear Servomotor

●For EtherCAT Communications/Three-phase 200 VAC

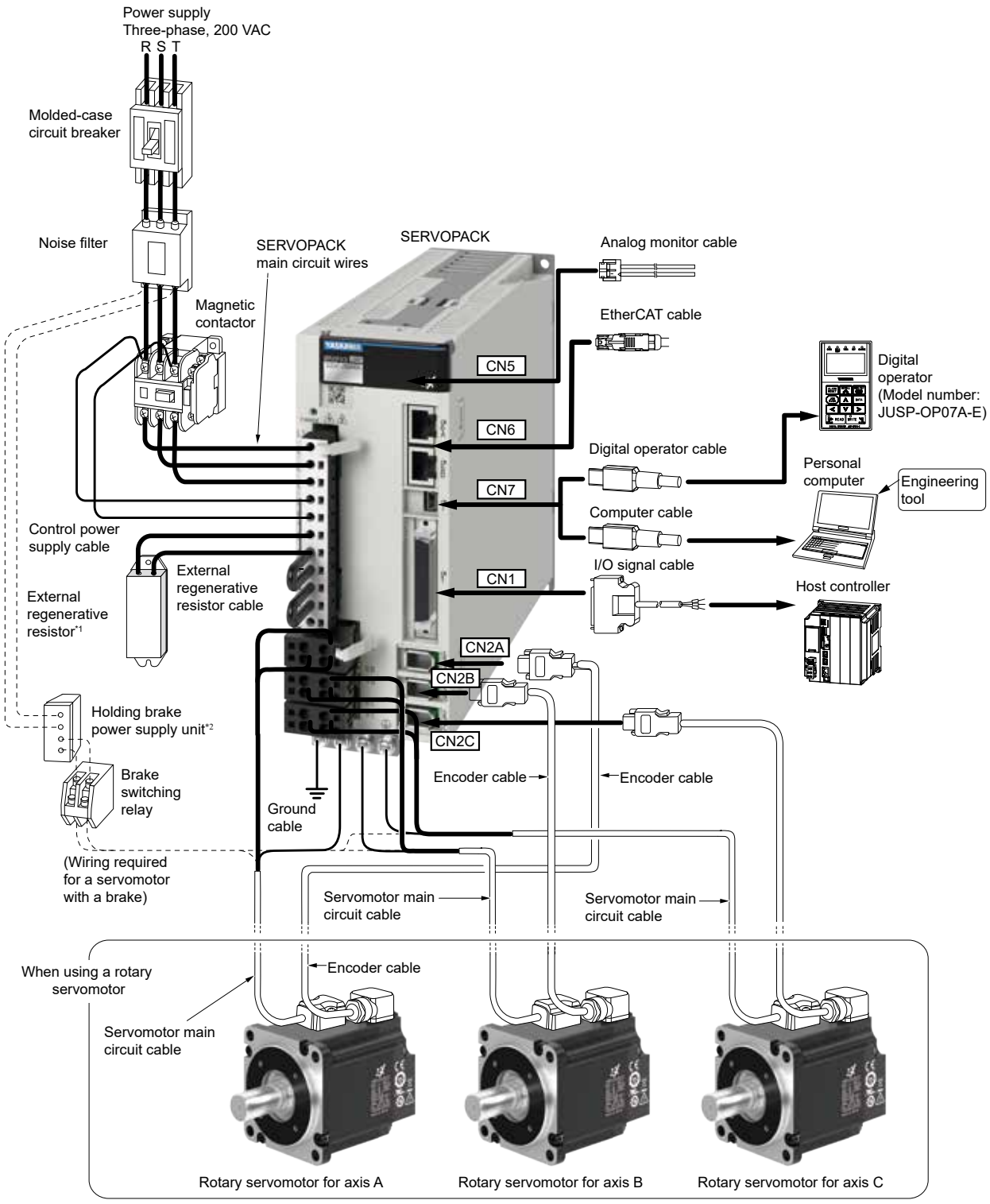


*1 External regenerative resistors are not provided by Yaskawa.

*2 Only required when using an incremental linear encoder (manufactured by Dr. JOHANNES HEIDENHAIN GmbH or Renishaw PLC).

Combination of Σ-XT SERVOPACK and Rotary Servomotor

●For EtherCAT Communications/Three-phase 200 VAC



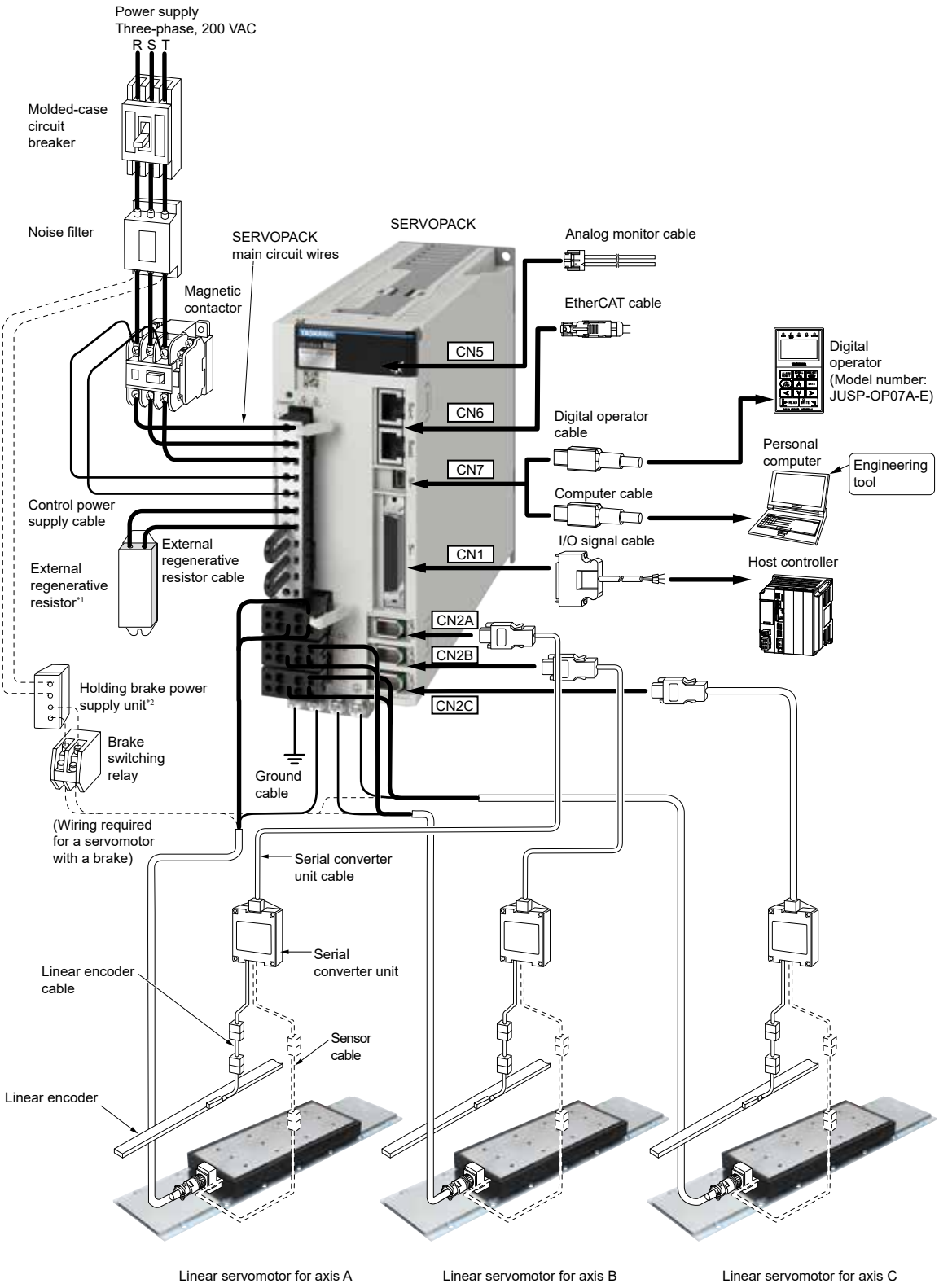
*1 External regenerative resistors are not provided by Yaskawa.

*2 The power supply unit for the holding brake is not provided by Yaskawa. Select a power supply unit based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.

System Configuration Examples (Continued)

Combination of Σ-XT SERVOPACK and Linear Servomotor

●For EtherCAT Communications/Three-phase 200 VAC



*1 External regenerative resistors are not provided by Yaskawa.

*2 The power supply unit for the holding brake is not provided by Yaskawa. Select a power supply unit based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.

Series Combination

● Combinations of Rotary Servomotors and SERVOPACKs

Rotary Servomotor Model			Capacity	SERVOPACK Model		
				SGDXS - □□□□	SGDXW - □□□□	SGDXT - □□□□
SGMXJ (Medium inertia, small capacity), 3000 min^{-1}	Three-phase, 200 VAC	SGMXJ-A5A	50 W	R70A	1R6A[*1], 2R8A[*1]	1R6A[*1], 2R8A[*1]
		SGMXJ-01A	100 W	R90A		
		SGMXJ-C2A	150 W	1R6A	1R6A, 2R8A[*1]	1R6A, 2R8A[*1]
		SGMXJ-02A	200 W			
		SGMXJ-04A	400 W	2R8A	2R8A, 5R5A[*1], 7R6A[*1]	2R8A
		SGMXJ-06A	600 W	5R5A	5R5A, 7R6A	–
		SGMXJ-08A	750 W			
SGMXA (Low inertia, small capacity), 3000 min^{-1}	Three-phase, 200 VAC	SGMXA-A5A	50 W	R70A	1R6A[*1], 2R8A[*1]	1R6A[*1], 2R8A[*1]
		SGMXA-01A	100 W	R90A		
		SGMXA-C2A	150 W	1R6A	1R6A, 2R8A[*1]	1R6A, 2R8A[*1]
		SGMXA-02A	200 W			
		SGMXA-04A	400 W	2R8A	2R8A, 5R5A[*1], 7R6A[*1]	2R8A
		SGMXA-06A	600 W	5R5A	5R5A, 7R6A	–
		SGMXA-08A	750 W			
		SGMXA-10A	1.0 kW	120A	–	
		SGMXA-15A	1.5 kW	120A		
		SGMXA-20A	2.0 kW	180A		
		SGMXA-25A	2.5 kW	200A		
		SGMXA-30A	3.0 kW			
		SGMXA-40A	4.0 kW	330A		
		SGMXA-50A	5.0 kW			
		SGMXA-70A	7.0 kW	550A		
	Three-phase, 400 VAC	SGMXA-15D	1.5 kW	5R4D	–	–
		SGMXA-20D	2.0 kW	8R4D		
		SGMXA-25D	2.5 kW	120D		
		SGMXA-30D	3.0 kW	120D		
		SGMXA-40D	4.0 kW	170D		
		SGMXA-50D	5.0 kW	170D		
SGMXP (Medium inertia, flat type), 3000 min^{-1}	Three-phase, 200 VAC	SGMXP-01A	100 W	R90A	1R6A[*1], 2R8A[*1]	1R6A[*1], 2R8A[*1]
		SGMXP-02A	200 W	2R8A	2R8A, 5R5A[*1], 7R6A[*1]	2R8A
		SGMXP-04A	400 W			
		SGMXP-08A	750 W	5R5A	5R5A, 7R6A	–
		SGMXP-15A	1.5 kW	120A	–	
	Three-phase, 400 VAC	SGMXP-02D	200 W	1R9D	–	–
		SGMXP-04D	400 W	1R9D		
		SGMXP-08D	750 W	3R5D		
		SGMXP-15D	1.5 kW	5R4D		

*1: If you use this combination, performance may not be as good as with Σ-XS SERVOPACKs. For example, gain control may not improve.
*2: 2.4 kW when using the servomotor with a SGDXS-200A SERVOPACK.
*3: If you want to increase instantaneous maximum torque, use the SERVOPACK model number shown in the brackets. Refer to the following manual for details for each SERVOPACK's instantaneous maximum torque. Σ-X-Series AC Servo Drive Rotary Servomotor Product Manual (Manual No.: SIEP C230210 00

● Combinations of Rotary Servomotors and SERVOPACKs (Continued)

Rotary Servomotor Model			Capacity	SERVOPACK Model		
				SGDXS - □□□□	SGDXW - □□□□	SGDXT - □□□□
SGMXG (Medium inertia, medium capacity), 1500 min^{-1}	Three-phase, 200 VAC	SGMXG-03A	300 W	3R8A	5R5A[*1], 7R6A[*1]	–
		SGMXG-05A	450 W			
		SGMXG-09A	850 W	7R6A (120A)[*3]	7R6A	
		SGMXG-13A	1.3 kW	120A (180A)[*3]	–	
		SGMXG-20A	1.8 kW	180A (200A)[*3]		
		SGMXG-30A	2.9 kW [*2]	330A (470A)[*3]		
		SGMXG-44A	4.4 kW	330A (550A)[*3]		
		SGMXG-55A	5.5 kW	470A (780A)[*3]		
		SGMXG-75A	7.5 kW	550A		
		SGMXG-1AA	11 kW	590A	–	
		SGMXG-1EA	15 kW	780A		
	Three-phase, 400 VAC	SGMXG-05D	450 W	1R9D	–	–
		SGMXG-09D	850 W	3R5D (5R4D) [*3]		
		SGMXG-13D	1.3 kW	5R4D (8R4D) [*3]		
		SGMXG-20D	1.8 kW	8R4D 120D) [*3]		
		SGMXG-30D	2.9 kW [*2]	120D (210D) [*3]		
		SGMXG-44D	4.4 kW	170D (260D) [*3]		
		SGMXG-55D	5.5 kW	210D (370D) [*3]		
		SGMXG-75D	7.5 kW	260D		
		SGMXG-1AD	11 kW	280D		
		SGMXG-1ED	15 kW	370D		
SGM7M (Low inertia, ultra-small capacity), 3000 min^{-1}	Three-phase, 200 VAC	SGM7M-A1A	11 W	R90A	1R6A, 2R8A[*1]	1R6A, 2R8A[*1]
		SGM7M-A2A	22 W			
		SGM7M-A3A	33 W	1R6A		

*1: If you use this combination, performance may not be as good as with Σ-XS SERVOPACKs. For example, gain control may not improve.
*2: 2.4 kW when using the servomotor with a SGDXS-200A SERVOPACK.
*3: If you want to increase instantaneous maximum torque, use the SERVOPACK model number shown in the brackets. Refer to the following manual for details for each SERVOPACK's instantaneous maximum torque. Σ-X-Series AC Servo Drive Rotary Servomotor Product Manual (Manual No.: SIEP C230210 00

● Combinations of Direct Drive Servomotors and SERVOPACKs

Direct Drive Servomotor Model		Rated Torque Nm	Instantaneous Maximum Torque Nm	SERVOPACK Model		
				SGDXS - □□□□	SGDXW - □□□□	SGDXT - □□□□
SGM7D (With core, outer rotor)	SGM7D-30F	30	50	120A	–	–
	SGM7D-58F	58	100			
	SGM7D-90F	90	150			
	SGM7D-1AF	110	200			
	SGM7D-01G	1.30	4	2R8A		
	SGM7D-05G	5	6			
	SGM7D-08G	8	15	120A		
	SGM7D-18G	18	30			
	SGM7D-24G	24	45			
	SGM7D-34G	34	60			
	SGM7D-45G	45	75			
	SGM7D-03H	3	4	2R8A		
	SGM7D-28I	28	50	120A		
	SGM7D-70I	70	100			
	SGM7D-1ZI	100	150			
	SGM7D-1CI	130	200			
	SGM7D-2BI	220	300			
	SGM7D-2DI	240	400			
	SGM7D-06J	6	8			
	SGM7D-09J	9	15			
	SGM7D-18J	18	30			
	SGM7D-20J	20	45			
	SGM7D-38J	38	60			
	SGM7D-02K	2.06	5	2R8A		
	SGM7D-06K	6	10			
	SGM7D-08K	8	15			
	SGM7D-06L	6	10			
	SGM7D-12L	12	20			
	SGM7D-30L	30	40	120A		
SGM7E (Small capacity, coreless, inner rotor)	SGM7E-02B	2	6	2R8A	2R8A	2R8A
	SGM7E-05B	5	15			
	SGM7E-07B	7	21			
	SGM7E-04C	4	12			
	SGM7E-10C	10	30			
	SGM7E-14C	14	42			
	SGM7E-08D	8	24			
	SGM7E-17D	17	51			
	SGM7E-25D	25	75			
	SGM7E-16E	16	48	5R5A	5R5A	–
	SGM7E-35E	35	105			

*1 For this combination, use the following derated values for the rated output and rated rotation speed.
- Rated output: 1000 W
- Rated rotation speed: 270 min^{-1}

● Combinations of Direct Drive Servomotors and SERVOPACKs (Continued)

Direct Drive Servomotor Model		Rated Torque Nm	Instantaneous Maximum Torque Nm	SERVOPACK Model		
				SGDXS - □□□□	SGDXW - □□□□	SGDXT - □□□□
SGM7F (Small capacity, with core, inner rotor)	SGM7F-02A	2	6	2R8A	2R8A	2R8A
	SGM7F-05A	5	15			
	SGM7F-07A	7	21			
	SGM7F-04B	4	12			
	SGM7F-10B	10	30			
	SGM7F-14B	14	42	5R5A	5R5A	–
	SGM7F-08C	8	24	2R8A	2R8A	2R8A
	SGM7F-17C	17	51	5R5A	5R5A	–
	SGM7F-25C	25	75	7R6A	7R6A	
	SGM7F-16D	16	48	5R5A	5R5A	
	SGM7F-35D	35	105	7R6A*1, 120A	7R6A*1	
SGM7F (Medium capacity, with core, inner rotor)	SGM7F-45M	45	135	7R6A	7R6A	–
	SGM7F-80M	80	240	120A	–	
	SGM7F-80N	80	240			
	SGM7F-1□□	110	330	180A		
	SGM7F-1EN	150	450	200A		
	SGM7F-2ZN	200	600			

*1 For this combination, use the following derated values for the rated output and rated rotation speed.
- Rated output: 1000 W
- Rated rotation speed: 270 min^{-1}

● Combinations of Linear Servomotors/Stages and SERVOPACKs

Linear Servomotor Model			Rated Force N	Maximum Force N	SERVOPACK Model		
					SGDXS -□□□□	SGDXW -□□□□	SGDXT -□□□□
SGLG (Coreless model, with standard magnetic way)	Three-phase, 200 VAC	SGLGW-30A050C	12.5	40	R70A	1R6A*2	1R6A
		SGLGW-30A080C	25	80	R90A		
		SGLGW-40A140C	47	140			
		SGLGW-40A253C	93	280	1R6A		
		SGLGW-40A365C	140	420	2R8A	2R8A	2R8A
		SGLGW-60A140C	70	220	1R6A	1R6A	1R6A
		SGLGW-60A253C	140	440	2R8A	2R8A	2R8A
		SGLGW-60A365C	210	660	5R5A	5R5A	–
		SGLGW-90A200C	325	1300	120A	–	
		SGLGW-90A370C	550	2200	180A		
		SGLGW-90A535C	750	3000	200A		
SGLG (Coreless model, with high-force magnetic way)		SGLGW-40A140C	57	230	1R6A	1R6A	1R6A
		SGLGW-40A253C	114	460	2R8A	2R8A	2R8A
		SGLGW-40A365C	171	690	3R8A	5R5A*2	–
		SGLGW-60A140C	85	360	1R6A	1R6A	1R6A
		SGLGW-60A253C	170	720	3R8A	5R5A*2	–
		SGLGW-60A365C	255	1080	7R6A	7R6A	
SGLFW2 (With F-type iron core)	Three-phase, 200 VAC	SGLFW2-30A070A	45	135	1R6A	1R6A	1R6A
		SGLFW2-30A120A	90	270			
		SGLFW2-30A230A*1	180	540	3R8A	–	–
			170	500	2R8A	2R8A	2R8A
		SGLFW2-45A200A	280	840	5R5A	5R5A	–
		SGLFW2-45A380A*1	560	1680	180A	–	
				1500	120A		
		SGLFW2-90A200A*1	560	1680			
		SGLFW2-90A200A*1	896	1680			
		SGLFW2-90A380A	1120	3360	200A		
		SGLFW2-90A560A	1680	5040	330A		
		SGLFW2-1DA380A	1680	5040	200A		
		SGLFW2-1DA560A	2520	7560	330A		
	Three-phase, 400 VAC	SGLFW2-30D070A	45	135	1R9D	–	–
		SGLFW2-30D120A	90	270			
		SGLFW2-30D230A	180	540			
		SGLFW2-45D200A	280	840	3R5D		
		SGLFW2-45D380A	560	1680	5R4D, 8R4D		
		SGLFW2-90D200A	560	1680	5R4D		
		SGLFW2-90D380A	1120	3360	120D		
		SGLFW2-90D560A	1680	5040	170D		
		SGLFW2-1DD380A	1680	5040			
		SGLFW2-1DD560A	2520	7560	260D		

*1 The force depends on the SERVOPACK that is used with the servomotor.

*2 Performance may be lower with Σ-XW SERVOPACKs than with Σ-XS SERVOPACKs. For example, gain control may not improve.

● Combinations of Linear Servomotors/Stages and SERVOPACKs (Continued)

Linear Servomotor Model			Rated Force N	Maximum Force N	SERVOPACK Model		
					SGDXS -□□□□	SGDXW -□□□□	SGDXT -□□□□
SGLT (With T-type iron core)	Three-phase, 200 VAC	SGLTW-20A170A	130	380	3R8A	5R5A*2	–
		SGLTW-20A320A	250	760	7R6A	7R6A	
		SGLTW-20A460A	380	1140	120A	–	
		SGLTW-35A170A	220	660	5R5A	5R5A	
		SGLTW-35A170H	300	600			
		SGLTW-35A320A	440	1320	120A	–	
		SGLTW-35A320H	600	1200			
		SGLTW-35A460A	670	2000	180A		
		SGLTW-40A400B	670	2600			
		SGLTW-40A600B	1000	4000	330A		
		SGLTW-50A170H	450	900	5R5A	5R5A	
		SGLTW-50A320H	900	1800	120A	–	
		SGLTW-80A400B	1300	5000	330A		
		SGLTW-80A600B	2000	7500	550A		
ST2F (Sigma Trac II Linear Stages)	Three-phase, 200 VAC	ST2F-A1A	45	135	1R6A	1R6A	1R6A
		ST2F-A2A	90	270			
		ST2F-A3A	180	540	3R8A	–	–
			170	500	2R8A	2R8A	2R8A
		ST2F-C1A	560	1680	120A	–	–
		ST2F-C2A	1120	3360	200A	–	–
		ST2F-C3A	1680	5040	330A	–	–
	Three-phase, 400 VAC	ST2F-A1D	45	135	1R9D	–	–
		ST2F-A2D	90	270			
		ST2F-A3D	180	540			
		ST2F-C1D	560	1680	5R4D		
		ST2F-C2D	1120	3360	120D		
		ST2F-C3D	1680	5040			

*1 The force depends on the SERVOPACK that is used with the servomotor.

*2 Performance may be lower with Σ-XW SERVOPACKs than with Σ-XS SERVOPACKs. For example, gain control may not improve.

Recommended External Encoders

● Incremental Linear Encoders

□: Possible

Output Signal	Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch μm	Resolution nm	Maximum Speed*3 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
			Scale	Sensor Head	Interpolator (Serial Converter Unit)						
1 Vp-p Analog Voltage*1	Dr. JOHANNES HEIDENHAIN GmbH	Exposed	LIDA48□		JZDP-H003/-H006*4	20	78.1	5	□	□	□
					JZDP-J003/-J006*4		4.9	2	□	□	*7
			LIF48□		JZDP-H003/-H006*4	4	15.6	1	□	□	□
					JZDP-J003/-J006*4		1.0	0.4	□	*7	*7
	Renishaw PLC	Exposed	TONiC Series (Only Ti0000A00V)		JZDP-H005/-H008*4	20	78.1	5	□	□	□
					JZDP-J005/-J008*4		4.9	2			
Encoder for Yaskawa's Serial Interface*2 (Σ-LINK)	Magnescale Co., Ltd.	Exposed	SL7□0	PL101-RY*5		800	97.7	10	–	□	□
				PL101	MJ620-T13*6				□	□	*7
			SQ10	PQ10	MQ10-FLA	400	48.83	3	–	□	□
					MQ10-GLA				□	□	–

*1 You must also use a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the serial converter unit.
*2 The multiplier (number of divisions) depends on the linear encoder. Also, you must write the motor constant file to the linear encoder in advance.
*3 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the linear servomotor or the maximum speed of the linear encoder (given above).
*4 Use this model number to purchase the serial converter unit.
*5 Use this model number to purchase the sensor head with interpolator.
*6 Use this model number to purchase the interpolator.
*7 Contact your Yaskawa representative.
Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the encoder before you use it.

● Absolute Linear Encoders

□: Possible

Output Signal	Manufacturer	Linear Encoder Type	Model		Linear Encoder Pitch*2 μm	Resolution nm	Maximum Speed*3 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
			Scale	Sensor Head	Interpolator (Serial Converter Unit)					
Encoder for Yaskawa's Serial Interface*1 (Σ-LINK)	Magnescale Co., Ltd.	Exposed	SQ47-□□□□□ SF□□□		–	20.48	5	3.33	–	□	□
			SQ47-□□□□□TF□□□								
			SQ47-□□□□□AF□□□		–	40.96	10	3.33	–	□	□
			SQ47-□□□□□FF□□□								
			SQ57-□□□□□SF□□□		–	20.48	5	3.33	–	□	□
			SQ57-□□□□□TF□□□								
			SQ57-□□□□□AF□□□		–	40.96	10	3.33	–	□	□
			SQ57-□□□□□FF□□□								
		Shield	SR77-□□□□□LF		–	80	9.8	3.33	–	□	□
			SR77-□□□□□MF		–	80	78.1	3.33	–	□	□
			SR87-□□□□□LF		–	80	9.8	3.33	–	□	□
			SR87-□□□□□MF		–	80	78.1	3.33	–	□	□
	Mitutoyo Corporation	Exposed	ST781A		–	256	500	5	–	□	□
			ST782A		–	256	500	5	–	□	□
			ST783A		–	51.2	100	5	–	□	□
			ST784A		–	51.2	100	5	–	□	□
			ST788A		–	51.2	100	5	–	□	□
			ST789A*4		–	25.6	50	5	–	□	□
			ST1381		–	5.12	10	8	–	□	□
			ST1382		–	0.512	1	3.6*6	–	□	□
		Shield	AT1383A		–	25.6	50	3	–	□	□
			AT1384A		–	5.12	10	3	–	□	□
			AT1387A		–	0.512	1	3	–	□	□

● Absolute Linear Encoders (continued)

□: Possible

Output Signal	Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch*2 μm	Resolution nm	Maximum Speed*3 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
			Scale	Sensor Head	Interpolator (Serial Converter Unit)						
Encoder for Yaskawa's Serial Interface*1	Dr. JOHANNES HEIDENHAIN GmbH	Exposed	LIC4100 series*5		EIB3391Y	20.48	5	10	–	□	□
			(Σ-LINK)			204.8	50	10	–	□	□
						409.6	100	10	–	□	□
			LIC4190 series		–	40.96	10	10	□	□	□
					–	20.48	5	10	□	□	□
					–	4.096	1	10	□	□	□
			LIC3190 Series		–	409.6	100	10	□	□	□
					–	40.96	10	10	□	□	□
			LIC2190 series		–	409.6	100	10	□	□	□
					–	204.8	50	10	□	□	□
		Shield	LC115		EIB3391Y	40.96	10	3	–	□	□
			LC415			40.96	10	3	–	□	□
	RSF Elektronik GmbH	Exposed	MC15Y series		□	409.6	100	10	□	□	□
					□	204.8	50	10	□	□	□
	Renishaw PLC	Exposed	EL36Y□□050F□□□		–	12.8	50	100	–	□	□
			EL36Y□□100F□□□		–	25.6	100	100	–	□	□
			EL36Y□□500F□□□		–	128	500	100	–	□	□
			RL36Y□□050□□□		–	12.8	50	100	–	□	□
			RL36Y□□001□□□		–	0.256	1	3.6	–	□	□
		Enclosed	FORTiS Series		–	12.8	50	4	–	□	□
					–	2.56	10	4	–	□	□
					–	0.256	1	3.6	–	□	□
	Fagor Automation S. Coop.	Exposed	L2AK208		–	20	78.1	8.0	–	□	□
			L2AK211		–	20	9.8	8.0	–	□	□
		Shield	LAK209		–	40	78.1	3.0	–	□	□
			LAK212		–	40	9.8	3.0	–	□	□
			S2AK208		–	20	78.1	3.0	–	□	□
			SV2AK208		–	20	78.1	3.0	–	□	□
			G2AK208		–	20	78.1	3.0	–	□	□
			S2AK211		–	20	9.8	3.0	–	□	□
			SV2AK211		–	20	9.8	3.0	–	□	□
			G2AK211		–	20	9.8	3.0	–	□	□

*1 The multiplier (number of divisions) depends on the linear encoder. Also, you must write the motor constant file to the linear encoder in advance.
*2 These are reference values for setting SERVOPACK parameters. Contact the manufacturer for actual linear encoder scale pitches.
*3 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the linear servomotor or the maximum speed of the linear encoder (given above).
*4 Contact Mitutoyo Corporation for details on this encoder.
*5 Sales of the interface unit EIB3391Y combination LIC4100 and LIC2100 series have ended due to the release of the LIC4190 and LIC2190 series.
*6 The speed is restricted for some SERVOPACKs.
Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the encoder before you use it.

● Absolute Rotary Encoders The following absolute rotary encoders are for fully-closed control. Can not use it to control the motor.

Output Signal	Manufacturer	Rotary Encoder Type	Model		Relay Device between Fully-Closed Module and Rotary Encoder	Resolution bits	Maximum Speed*1 min^{-1}
			Scale	Sensor Head			
Encoder for Yaskawa's Serial Interface (Σ-LINK)	Magnescale Co., Ltd.	Shield	RU77-4096ADF*2		–	20	2000
			RU77-4096AFFT01*2		–	22	2000
	Dr. JOHANNES HEIDENHAIN GmbH	Exposed	ECA4412*2		EIB3391Y	27	1600
						28	800
						29	400
		Shield	RCN2□10*2			26	3000
			RCN5□10*2			28	800
			RCN8□10*2			29	400
			ROC2310*2			26	3000
			ROC7310*2			28	800
	Renishaw PLC	Exposed	RA23Y-□□□□□□□□□*2		–	23	14600
			RA26Y-□□□□□□□□□*2		–	26	3250
			RA30Y-□□□□□□□□□*2		–	30	200

*1 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the rotary servomotor or the maximum speed of the rotary encoder (given above).
*2 This is a single-turn absolute encoder.
Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the encoder before you use it.

Model Designations

● Rotary Servomotors

SGMXJ

SGMXJ - 01 A U A 2 1 A 1 (200 VAC)

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

Σ-X-Series Servomotor SGMXJ model

1st+2nd digits Rated Output

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

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC

4th digit Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

5th digit Design Revision Order

A

6th digit Shaft End

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

7th digit Options

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

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ-7 compatible
3	Standard Safety
4	Σ-7 compatible Safety

SGMXA

SGMXA - 01 A U A 2 1 A 1

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

SGMXA model

1st+2nd digits Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W
10	1.0 kW
15	1.5 kW
20	2.0 kW
25	2.5 kW
30	3.0 kW
40	4.0 kW
50	5.0 kW
70	7.0 kW

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

4th digit Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

5th digit Design Revision Order

A

6th digit Shaft End

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

7th digit Options

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

Note: The SGMXA-70A does not support models with a holding brake.

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ-7 compatible
3	Standard Safety
4	Σ-7 compatible Safety

SGMXP

SGMXP - 01 A U A 2 1 A 1

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

Σ -X-Series Servomotor SGMXP model

1st+2nd digits Rated Output

Code	Specification
01	100 W
02	200 W
04	400 W
08	750 W
15	1.5 kW

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

4th digit Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

5th digit Design Revision Order

A

6th digit Shaft End

Code	Specification
2	Straight without key
6	Straight with key and tap

7th digit Options

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

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ-7 compatible
3	Standard Safety
4	Σ-7 compatible Safety

SGMXG

SGMXG - 09 A U A 2 1 A 1

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

Σ-X-Series Servomotor SGMXG model

1st+2nd digits Rated Output

Code	Specification
03	300 W
05	450 W
09	850 W
13	1.3 kW
20	1.8 kW
30	2.9 kW
44	4.4 kW
55	5.5 kW
75	7.5 kW
1A	11 kW
1E	15 kW

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

4th digit Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

5th digit Design Revision Order

A

6th digit Shaft End

Code	Specification
2	Straight without key (SGMXG-03 to -20 only)
6	Straight with key and tap
8	Straight without key, with tap (SGMXG-30 to -1E only)

7th digit Options

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

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ-7 compatible
3	Standard Safety
4	Σ-7 compatible Safety

Note: 2.4 kW when using SGMXG-30A with SGDXS-200A.

● Direct Drive Servomotors

Note: Direct drive servomotors are not available with holding brakes.

SGM7D

SGM7D - 30 F 7 C 4 1

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

Direct drive servomotor SGM7D model

1st+2nd digits Rated Torque

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

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
I	264-mm dia.		

4th digit Serial Encoder

Code	Specification
7	24-bit (multi-turn absolute encoder)*1
F	24-bit (incremental encoder)*1

*1 Can be used as a single-turn absolute encoder by setting parameters.

5th digit Design Revision Order

C

6th digit Flange □: Applicable models

Code	Mounting		Servomotor Outer Diameter						
			F	G	H	I	J	K	L
4	Non-load side	With cable on side	□	□	□	–	–	–	□
5		With cable on bottom	□	□*1	–	□	□	□	–

*1 SGM7D-01G and -05G are not available with a cable on bottom.

7th digit Options

Code	Specification
1	Standard mechanical precision
2	High mechanical precision*1

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

SGM7E

SGM7E - 02 B 7 A 1 1

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

Direct drive servomotor SGM7E model

1st+2nd digits Rated torque

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

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 (multi-turn absolute encoder)*1
F	24-bit (incremental encoder)*1

*1 Can be used as a single-turn absolute encoder by setting parameters.

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 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.

SGM7F

SGM7F - 02 A 7 A 1 1

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

Direct drive servomotor SGM7F model

1st+2nd digits Rated Torque

Small-capacity

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

Medium-capacity

Code	Specification
45	45.0 Nm
80	80.0 Nm
1A	110 Nm
1E	150 Nm
2Z	200 Nm

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 (multi-turn absolute encoder)*1
F	24-bit (incremental encoder)*1

*1 Can be used as a single-turn absolute encoder by setting parameters.

5th digit Design Revision Order

M	Small Capacity
A	Medium Capacity

6th digit Flange □: Applicable models

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)	□	□	□	□	–	–

7th digit Options

Code	Specification
1	Without options
2	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.codes.

● Linear Servomotors

SGLG (Coreless)

● Moving coil

S G L G W - 30 A 050 C P □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th 6th+7th+8th 9th 10th 11th digit

1st digit Servomotor Type

Code	Specification
G	Coreless model

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving coil

3rd+4th digits Magnet Height

Code	Specification
30	30 mm
40	40 mm
60	60 mm
90	86 mm

5th digit Power Supply Voltage

Code	Specification
A	200 VAC

6th+7th+8th digits Length of Moving Coil

Code	Specification
050	50 mm
080	80 mm
140	140 mm
200	199 mm
253	252.5 mm
365	365 mm
370	367 mm
535	535 mm

9th digit Design Revision Order
A, B□□□

10th digit Sensor Specification and Cooling Method

Code	Specification		Applicable Models
	Polarity Sensor	Cooling Method	
None	None	Self-cooled	All models
C	None	Air-cooled	SGLGW-40A, 60A, 90A
H	Yes	Air-cooled	
P	Yes	Self-cooled	All models

11th digit Connector for Servomotor Main Circuit Cable

Code	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	All models
D	Connector from Interconnectron GmbH	SGLGW-30A, 40A, 60A

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

● Magnetic way

S G L G M - 30 108 A □

Linear Σ Series Linear Servomotors

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

1st digit Servomotor Type

Code	Specification
G	Coreless model

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic way

3rd+4th digits Magnet Height

Code	Specification
30	30 mm
40	40 mm
60	60 mm
90	86 mm

5th+6th+7th digits Length of Magnetic Way

Code	Specification
090	90 mm
108	108 mm
216	216 mm
225	225 mm
252	252 mm
360	360 mm
405	405 mm
432	432 mm
450	450 mm
504	504 mm

8th digit Design Revision Order
A, B, C *1 □ □ □

9th digit Options

Code	Specification	Applicable Models
None	Standard-force	All models
-M	High-force	SGLGM-40, -60

*1 SGLGM-40 and -60 also have a CT code.
· C: Without mounting holes on bottom
· CT: With mounting holes on bottom

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

SGLFW2 (with F-type iron cores)

● Moving coil

S G L F W2 - 30 A 070 A T 1 H

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th 6th+7th+8th 9th 10th 11th 12th digit

1st digit Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W2	Moving coil

3rd+4th digits Magnet Height

Code	Specification
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

5th digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

6th+7th+8th digits Length of Moving Coil

Code	Specification
070	70 mm
120	125 mm
200	205 mm
230	230 mm
380	384 mm
560	563 mm

9th digit Design Revision Order
A

10th digit Sensor Specification

Code	Specification
S	With polarity sensor and thermal protector
T	Without polarity sensor, with thermal protector

11th digit Cooling Method

Code	Specification
1	Self-cooled
L	Water-cooled *1

12th digit Connector for Servomotor Main Circuit Cable/Cable Length

Code	Specification
None	Connector from Tyco Electronics Japan G.K./300 mm
F	Loose lead wires with no connector/300 mm
G	Loose lead wires with no connector/500 mm
H	Connector from Tyco Electronics Japan G.K./500 mm

*1 Contact your Yaskawa representative for details on water-cooled models.
Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

● Magnetic way

S G L F M2 - 30 270 A

Linear Σ Series Linear Servomotors

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

1st digit Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
M2	Magnetic way

3rd+4th digits Magnet Height

Code	Specification
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

5th+6th+7th digits Length of Magnetic Way

Code	Specification
270	270 mm
306	306 mm
450	450 mm
510	510 mm
630	630 mm
714	714 mm

8th digit Design Revision Order
A

SGLT (with T-type iron cores)

● Moving coil

S G L T W - 20 A 170 A P □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th 6th+7th+8th 9th 10th 11th digit

1st digit Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving coil

3rd+4th digits Magnet Height

Code	Specification
20	20 mm
35	36 mm
40	40 mm
50	51 mm
80	76.5 mm

5th digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

6th+7th+8th digits Length of Moving Coil

Code	Specification
170	170 mm
320	315 mm
400	394.2 mm
460	460 mm
600	574.2 mm

9th digit Design Revision Order
A, B□□□
H: High-efficiency model

10th digit Sensor Specification and Cooling Method

Code	Specification		Applicable Models
	Polarity Sensor	Cooling Method	
None	None	Self-cooled	All models
C*1	None	Water-cooled	SGLTW-40, -80
H*1	Yes	Water-cooled	
P	Yes	Self-cooled	All models

11th digit Connector for Servomotor Main Circuit Cable

Code	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	SGLTW-20A□□□□□, -35A□□□□
	MS connector	SGLTW-40A□□□B□, -80A□□□B□
	Loose lead wires with no connector	SGLTW-35A□□□H□, -50A□□H□

*1 Contact your Yaskawa representative for the characteristics, dimensions, and other details on servomotors with these specifications.
Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

● Magnetic way

S G L T M - 20 324 A □

Linear Σ Series Linear Servomotors

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

1st digit Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic way

3rd+4th digits Magnet Height

Code	Specification
20	20 mm
35	36 mm
40	40 mm
50	51 mm
80	76.5 mm

5th+6th+7th digits Length of Magnetic Way

Code	Specification
324	324 mm
405	405 mm
540	540 mm
675	675 mm
756	756 mm
945	945 mm

8th digit Design Revision Order
A, B□□□
H: High-efficiency model

9th digit Options

Code	Specification	Applicable Models
None	Without options	–
C	With magnet cover	All models
Y	With base and magnet cover	SGLTM-20, 35*1, -40, -80

*1 SGLTM-35□□□H(high-efficiency models) do not support this specification.
Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

ST2F (Sigma Trac II Linear Stages)

S T 2 F A1 - A 1375 - A 1 L B

Sigma Trac II Linear Stage

1st 2nd+3rd 4th 5th+6th+7th+8th 9th 10th 11th 12th digit

1st digit Servomotor Type

Code	Specification
F	SGLFW2 Iron Core

2nd+3rd digits Motor Size

Code	Specification
A1	SGLFW2-30A070
A2	SGLFW2-30A120
A3	SGLFW2-30A230
C1	SGLFW2-90A200
C2	SGLFW2-90A380
C3	SGLFW2-90A560

4th digit Voltage

Code	Specification
A	200 V
D	400 V

5th+6th+7th+8th digits Base Length

SGLFW2-30 Models		SGLFW2-90 Models	
Code	Specification	Code	Specification
0390	390 mm	0800	800 mm
0565	565 mm	0900	900 mm
0655	655 mm	1000	1000 mm
0745	745 mm	1105	1105 mm
0835	835 mm	1205	1205 mm
0925	925 mm	1310	1310 mm
1015	1015 mm	1410	1410 mm
1105	1105 mm	1510	1510 mm
1195	1195 mm	1615	1615 mm
1285	1285 mm	1715	1715 mm
1375	1375 mm	1815	1815 mm
1465	1465 mm	1920	1920 mm
1555	1555 mm		

9th digit Base Plate

Code	Specification
A	Standard Base Plate
B	Thick Base Plate

10th digit Feedback Device

Code	Specification
1	Fagor Optical Absolute (9.765 nm)
2	Heidenhain Optical Absolute (5 nm)
9	Heidenhain EnDat 2.2 Optical Absolute (5 nm)

11th digit Cable Carrier

Code	Specification
L	Left Side
R	Right Side

12th digit Brake and Bellows

Code	Specification
B	Without Brake, With Bellows
N	Without Brake, Without Bellows
K	With Brake, With Bellows
Q	With Brake, Without Bellows

●SERVOPACKs

Σ-XS

SGDXS - R70 A A0 A 0001 00 B

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

Σ-XS model

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

Voltage	Code	Specification
Three-Phase, 200 VAC	R70[*1]	0.05 kW
	R90[*1]	0.1 kW
	1R6[*1]	0.2 kW
	2R8[*1]	0.4 kW
	3R8	0.5 kW
	5R5[*1]	0.75 kW
	7R6	1.0 kW
	120[*2]	1.5 kW
	180	2.0 kW
	200	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
	590	11 kW
	780	15 kW

4th digit Voltage

Code	Specification
A	200 VAC
D	400 VAC

5th+6th digits Interface[*3]

Code	Specification
00	Analog voltage/pulse train reference
A0	EtherCAT communications reference

7th digit Design Revision Order

A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	SGDXS-R70A to -330A
	Duct-ventilated	SGDXS-470A to -780A
0002	Varnished	All models
0008	Single-phase, 200-VAC power supply input	SGDXS-120A
0020[*4]	No dynamic brake	SGDXS-R70A to -2R8A
	External dynamic brake resistor	SGDXS-3R8A to -780A

12th+13th digits FT Specification

Code	Specification
None	None
00	

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.
*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification (model: SGDXS-120A00A0008).
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.
📖 Σ-X-Series Σ-XS/Σ-XW SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP C71081214)

Σ-XW

SGDXW - 1R6 A A0 A 0001 00 B

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

Σ-XW models

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

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6[*1]	0.2 kW
	2R8[*1]	0.4 kW
	5R5[*1, *2]	0.75 kW
	7R6	1.0 kW

4th digit Voltage

Code	Specification
A	200 VAC

5th+6th digits Interface[*3]

Code	Specification
A0	EtherCAT communications reference

7th digit Design Revision Order

A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	
0002	Varnished	
0020[*4]	No dynamic brake	SGDXW-1R6A to -2R8A
	External dynamic brake resistor	SGDXW-5R5A to -7R6A
1000[*5]	HWBB function	All models

12th+13th digits FT Specification

Code	Specification
None	None
00	

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.
*2 If you use the SERVOPACK with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.
📖 Σ-X-Series Σ-XS/Σ-XW SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP C71081214)
*5 Refer to the following manual for details.
📖 Σ-X-Series AC Servo Drive Σ-XW SERVOPACK with Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

Σ-XT

SGDXT - 1R6 A A0 A 0001 00 B

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

Σ-X-Series
Σ-XT model

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

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6*1	0.2 kW
	2R8*1, *2	0.4 kW

4th digit Voltage

Code	Specification
A	AC200 V

5th+6th digits Interface*3

Code	Specification
A0	EtherCAT communications reference

7th digit Design Revision Order
A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification
None	Without options
0000	
0001	Rack-mounted
0002	Varnished
0020*4	No dynamic brake
1000*5	HWBB Function

12th+13th digits FT Specification

Code	Specification
None	None
00	

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.
*2 If you use the servomotor with a single-phase power supply input, derate the total continuous output of the motors to 65% of maximum applicable motor capacity × number of axes. Example: For the SGDXT-2R8A, make the output 0.4 kW × 3 axes × 65% = 0.78 kW or less. To perform operation at an output of 0.4 kW for the first axis and 0.2 kW for the second axis, you must limit the output for the third axis to 0.18 kW or less.
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.
Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)
*5 Refer to the following manual for details.
Σ-X-Series Σ-XW/Σ-XT SERVOPACK Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

Related Documents

The documents that are related to the Σ-X series AC servo drives are shown in the following table. Refer to these documents as required.

Catalog (Catalog No.)	Manual (Manual No.)	Description of Document
AC Servo Drives Σ-X Series (KAEP C710812 03)	SERVOPACK	
	Σ-XS SERVOPACK with Analog Voltage/Pulse Train References (SIEP C710812 03)	Provide detailed information on selecting Σ-X-series SERVOPACKs; installing, connecting, setting, testing in trial operation, tuning, and monitoring servo drives; and other information.
	Σ-XS SERVOPACK with EtherCAT Communications References (SIEP C710812 02)	
	Σ-XW SERVOPACK with EtherCAT Communications References (SIEP C710812 05)	
	Σ-XT SERVOPACK with EtherCAT Communications References □SIEP C710812 17□	
	Σ-XW/Σ-XT SERVOPACK with Hardware Option Specifications HWBB Function (SIEP C710812 13)	Provides detailed information on hardware options for Σ-X-series SERVOPACKs.
	Σ-XW/Σ-XT SERVOPACK with Hardware Option Specifications Dynamic Brake (SIEP C710812 14)	
	Servomotor	
	Rotary Servomotor (SIEP C230210 00)	Provide detailed information on selecting, installing, and connecting the servomotors.
	Σ-7-Series AC Servo Drive Rotary Servomotor (SIEP S800001 36)	
	Linear Servomotor (SIEP S800001 37)	
	Direct Drive Servomotor (SIEP S800001 38)	
	Others	
	Peripheral Device Selection Manual (SIEP C710812 12)	Describes the cables and peripheral devices for a Σ-X-series servo system.
	Digital Operator Operating Manual (SIEP S800001 33)	Describes the operating procedures for a digital operator for a servo system.
	Engineering Tool SigmaWin+ Operation Manual (SIET S800001 34)	Provides detailed operating procedures for the SigmaWin+ engineering tool for a servo system.
	Σ-X Series Replacement Guide (SIEP C710812 11)	Provides information required to replace Σ-7 or Σ-V series products with the Σ-X series.

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SGMXJ

Model Designations

SGMXJ - 01 A U A 2 1 A 1

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

Σ-X-Series Servomotor SGMXJ model

1st+2nd digits Rated Output

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

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC

Limited Stock

Non-Stock

4th digit Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

5th digit Design Revision Order

A

6th digit Shaft End

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

7th digit Options

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

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ-7 compatible
3	Standard Safety
4	Σ-7 compatible Safety

The SGMXJ gear motor product family pairs SGMXJ servo motors with high precision, low backlash inline planetary gear heads resulting in a portfolio of rotary actuators fit for a wide range of applications. The family of gear motors has been thoroughly tested and adheres to the high levels of quality and performance expected from Yaskawa.

Gear Motor Model Designation

SXJ 01 A W C - VL 050 - 05

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

Σ-X Series Gear Motors: SGMXJ

1st+2nd digits Rated Output

Code	Specification
01	100 W
02	200 W
04	400 W
08	750 W

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC battery type

4th digit Encoder Option

Code	Specification
W	Standard encoder
H	Small encoder

5th digit Brake Option

Code	Specification
Blank	No brake
C	24 V Brake

6th digit Gear box backlash

Code	Specification
VL	5 arc-min backlash

7th digit Gear head frame size

Code	Specification
050	50 mm
070	70 mm
090	90 mm
120	120 mm

8th digit Gear Ratio

Code	Specification
03	3:1 Ratio
05	5:1 Ratio
10	10:1 Ratio
25	25:1 Ratio
50	50:1 Ratio

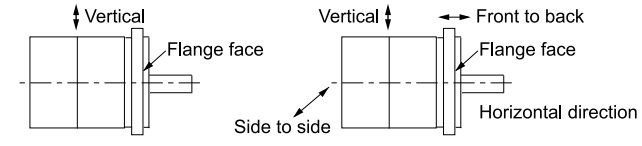
Specifications and Ratings

Specifications

Voltage		200 V						
Model SGMXJ-		A5A	01A	C2A	02A	04A	06A	08A
Time Rating		Continuous						
Thermal Class		UL: B, CE: B						
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						
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (With derating, usage is possible between 40°C and 60°C.) *3						
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 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)						
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²						
	Number of Impacts	2 times						
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s²						
Applicable SERVOPACKs	SGDXS-	R70A	R90A	1R6A	1R6A	2R8A	5R5A	5R5A
	SGDXW-	1R6A *4, 2R8A *4	1R6A *4, 2R8A *4	1R6A, 2R8A *4	1R6A, 2R8A *4	2R8A, 5R5A *4, 7R6A *4	5R5A, 7R6A	5R5A, 7R6A
	SGDXT-	1R6A *4, 2R8A *4	1R6A *4, 2R8A *4	1R6A, 2R8A *4	1R6A, 2R8A *4	2R8A	-	-

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 64*

*4 If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Σ-XS SERVOPACK.

Servomotor Ratings

Voltage			200 V						
Model SGMXJ-			A5A	01A	C2A	02A	04A	06A	08A
Rated Output *1		W	50	100	150	200	400	600	750
Rated Torque *1, *2		N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39
Instantaneous Max Torque *1		N·m	0.557	1.11	1.67	2.23	4.46	6.69	8.36
Rated Current *1		Arms	0.55	0.85	1.6	1.6	2.5	4.2	4.4
Instantaneous Max Current *1		Arms	2.0	3.1	5.7	5.8	9.3	15.3	16.9
Rated Rotation Speed *1		min^{-1}	3000						
Continuous Allowable Rotation Speed		min^{-1}	7000				6000		
Maximum Rotation Speed *1		min^{-1}	7000						
Torque Constant		N·m/Arms	0.316	0.413	0.321	0.444	0.544	0.493	0.584
Rotor Moment of Inertia	Without Holding Brakes	$\times 10^{-4}$ kg·m^2	0.0421	0.0669	0.0946	0.263	0.486	0.800	1.59
	With Holding Brakes		0.0501	0.0749	0.103	0.323	0.546	0.860	1.76
	Without Holding Brake and with Batteryless Absolute Encoder		0.0458	0.0706	0.0983	0.267	0.490	0.804	1.59
	With Holding Brake and Batteryless Encoder		0.0538	0.0786	0.107	0.327	0.550	0.864	1.76
Rated Power Rate *1	Without Holding Brakes	kW/s	6.00	15.1	24.0	15.4	33.1	45.6	35.9
	With Holding Brakes		5.04	13.5	22.1	12.5	29.5	42.4	32.4
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	37700	47500	50400	24200	26100	23800	15000
	With Holding Brakes		31700	42400	46400	19700	23200	22200	13500
Derating Rate for Servomotor with Oil Seal		%	80	90			95		
Heat Sink Size (aluminum) *3		mm	200 ×200 ×6		250 ×250 × 6				
Protective Structure *4			Totally enclosed, self-cooled, IP67						
Holding Brake Specifications *5	Rated Voltage	V	24 VDC ±10%						
	Capacity	W	5.5			6		6.5	
	Holding Torque	N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39
	Coil Resistance	Ω (at 20°C)	104.8 ±10%			96 ±10%		88.6 ±10%	
	Rated Current	A (at 20°C)	0.23			0.25		0.27	
	Time Required to Release Brake	ms	60					80	
	Time Required to Brake	ms	100						
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *6	At 6000 min^{-1}		35 times	35 times	35 times	15 times	10 times	20 times	12 times
	At 7000 min^{-1}					10 times	5 times	15 times	8 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *7	At 6000 min^{-1}	35 times	35 times	35 times	25 times	25 times	20 times	15 times
		At 7000 min^{-1}							

Continued on next page.

Continued from previous page.

Voltage			200 V						
Model SGMXJ-			A5A	01A	C2A	02A	04A	06A	08A
Allowable Shaft Loads *8	LF	mm	20			25			35
	Allowable Radial Load	N	78			245			392
	Allowable Thrust Load	N	54			74			147

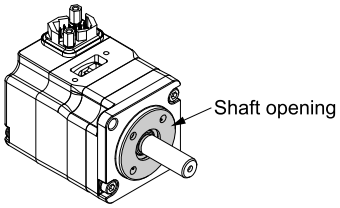
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

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

*3 Refer to the following section for the relation between the heat sinks and derating rate.

☞ *Servomotor Heat Dissipation Conditions on page 64*

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



*5 Observe the following precautions if you use a servomotor with a holding brake.

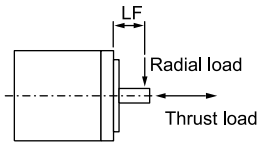
- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*6 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*7 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

- SGDXS-R70A□□A0020 to -2R8A□□A0020
- SGDXW-1R6A□□A0020, -2R8A□□A0020
- SGDXT-1R6A□□A0020, -2R8A□□A0020

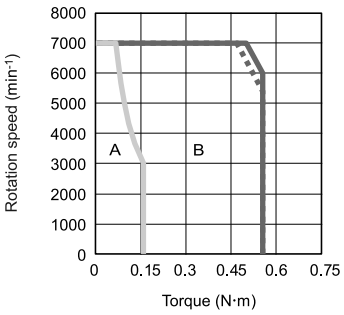
*8 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



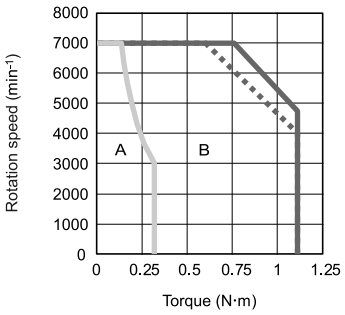
Torque-Rotation Speed Characteristics

A : Continuous duty zone — (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V

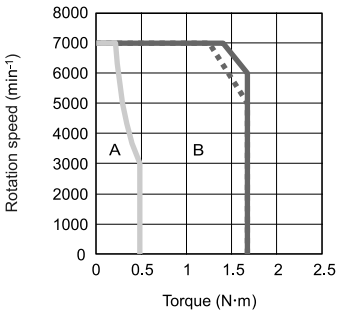
SGMXJ-A5A



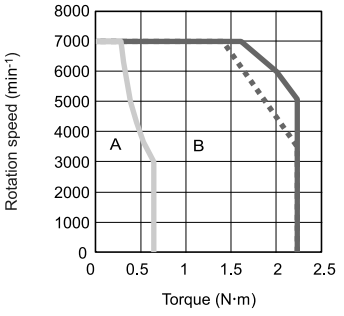
SGMXJ-01A



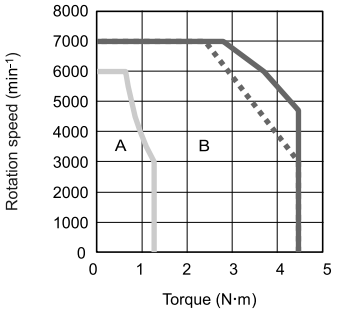
SGMXJ-C2A



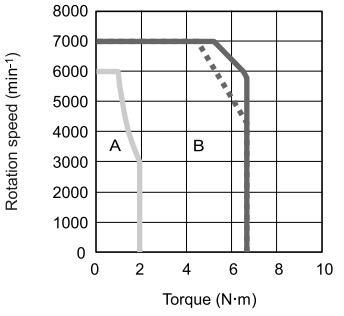
SGMXJ-02A



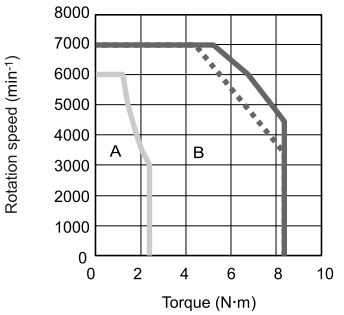
SGMXJ-04A



SGMXJ-06A



SGMXJ-08A



Note:

1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
4. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.

Gear Motor Ratings

Gear Motor Model Number SXJ___	Base Servo Motor Model SGMXJ-	Gear Ratio	Gearing Efficiency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10^{-4} kg.m^2)	Gearhead Inertia (x 10^{-4} kg.m^2)	Allowable Radial Load (N)	Allowable Axial Load (N)	Backlash (arc-min)	Class
01AW☐ -VL050-03	01AW-A6☐	3:1	95	1000	2333	0.91	3.16	0.0706 (0.0786)	0.053	240	270	5	IP65
01AW☐ -VL050-05		5:1		600	1400	1.51	5.27		0.036	290	330		
01AW☐ -VL050-10		10:1		300	700	3.02	10.5		0.030	360	450		
01AW☐ -VL050-25		25:1	90	120	280	7.16	21.0 *3		0.034	490	640	7	
01AW☐ -VL070-50		50:1		60	140	14.3	50.0		0.051	1100	1100	5	
02AW☐ -VL050-03	02AW-A6☐	3:1	95	1000	2333	1.82	6.36	0.267 (0.327)	0.170	240	270	5	IP65
02AW☐ -VL050-05		5:1		600	1400	3.03	10.6		0.150	290	330		
02AW☐ -VL070-10		10:1		300	700	6.05	21.2		0.170	640	530		
02AW☐ -VL070-25		25:1	90	120	280	14.3	50.2		0.170	870	790		
02AW☐ -VL070-50		50:1		60	140	28.7	66.0 *3		0.160	1100	1100		
04AW☐ -VL050-03	04AW-A6☐	3:1	95	1000	2333	3.62	12.7	0.490 (0.550)	0.170	240	270	5	IP65
04AW☐ -VL050-05		5:1		600	1400	6.03	21.2		0.150	290	330		
04AW☐ -VL070-10		10:1		300	700	12.1	42.4		0.170	640	530		
04AW☐ -VL070-25		25:1	90	120	280	28.6	66.0 *3		0.170	870	790		
04AW☐ -VL090-50		50:1		60	140	57.2	165 *3		0.270	2100	2200		
08AW☐ -VL070-03	08AW-A6☐	3:1	95	1000	2333	6.81	23.8	1.59 (1.76)	0.530	430	310	5	IP65
08AW☐ -VL070-05		5:1		600	1400	11.4	39.7		0.460	510	390		
08AW☐ -VL090-10		10:1		300	700	22.7	79.4		0.700	1200	1600		
08AW☐ -VL090-25		25:1	90	120	280	53.8	165 *3		0.740	1600	2200		
08AW☐ -VL120-50		50:1		60	130	108	376		0.760	3400	3900		

Note:

The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of ☐ in model numbers).

*1 The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

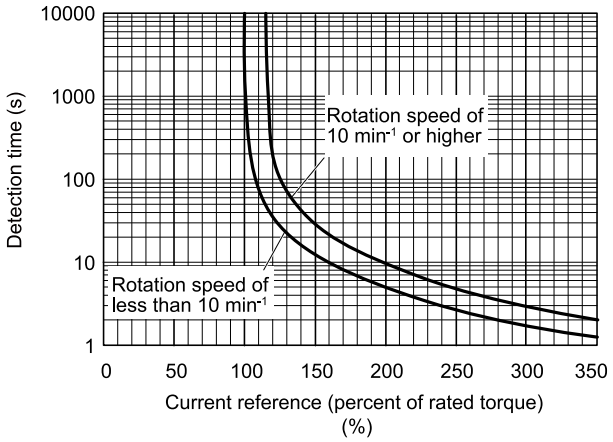
*2 The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25 °C. They are reference values only.

*3 The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.

Servomotor Overload Protection Characteristics

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

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.



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 "*Torque-Rotation Speed Characteristics on page 60*".

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 58*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program *1 to check the driving conditions. Perform the required steps for each of the following cases.

*1 Contact your Yaskawa representative for information on this program.

■ 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 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).

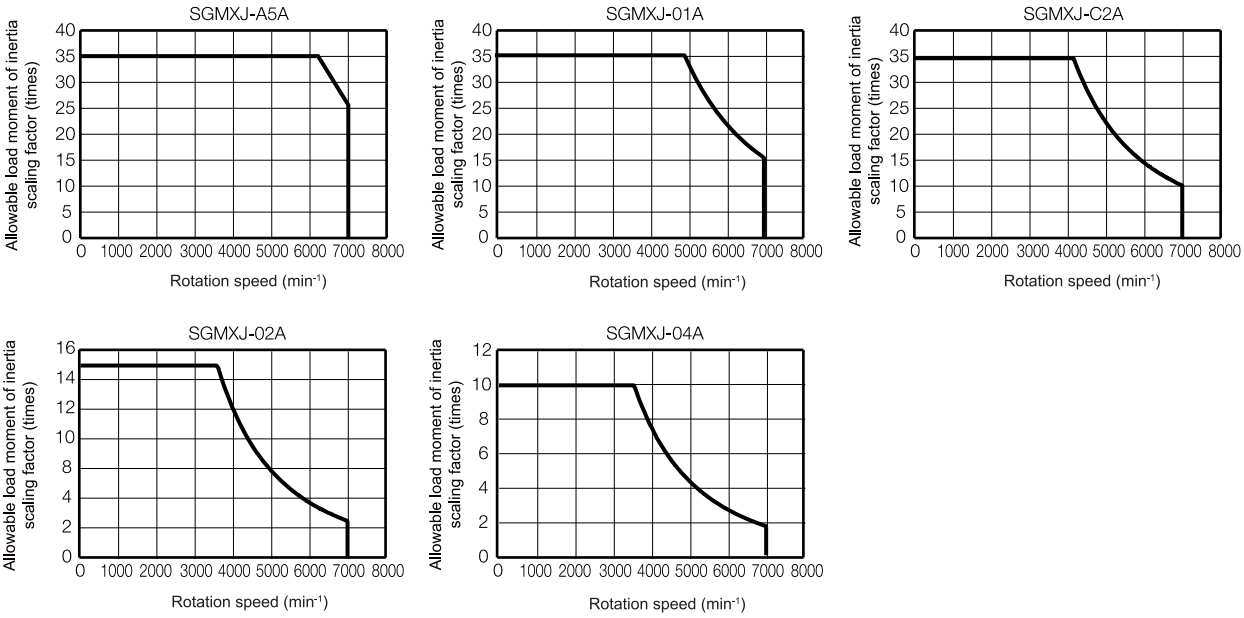
Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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, for the shaded areas of the graphs, use Yaskawa's SigmaSize+, an AC servo drive capacity selection program, to select an external regenerative resistor.



Note:

Applicable SERVOPACK Model: SGDXS-R70A, -90A, -1R6A, -2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

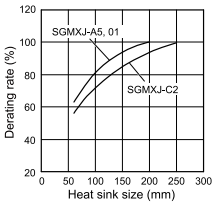
Refer to the following section for details on the external regenerative resistors.

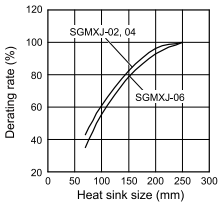
☞ *Specifications and Dimensions of External Regenerative Resistors on page 728*

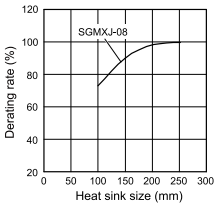
Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.







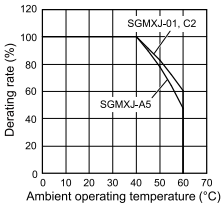
Important

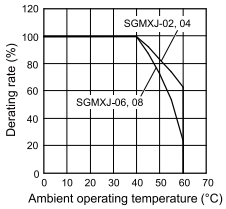
The actual temperature rise depends on these conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

■ Applications Where the Surrounding Air Temperature Exceeds 40°C

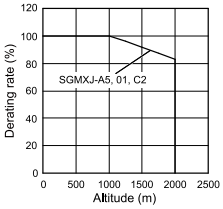
The servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

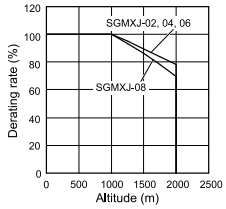




■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.





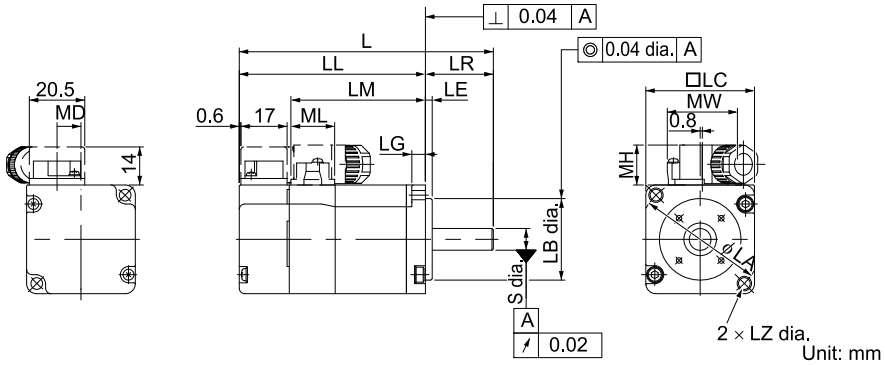
Note:

- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 62*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

External Dimensions

SGMXJ-A5 to -C2

■ Σ-7 Compatible Specification



Model SGMXJ-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
A5A□A2□A1	80.5 (121.0)	55.5 (96.0)	37.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3
01A□A2□A1	92.5 (133.0)	67.5 (108.0)	49.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3
C2A□A2□A1	104.5 (153.0)	79.5 (128.0)	61.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3

Model SGMXJ-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
A5A□A2□A1	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.3 (0.6)
01A□A2□A1	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.4 (0.7)
C2A□A2□A1	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.5 (0.8)

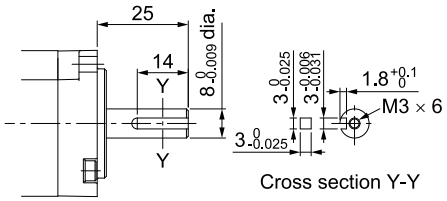
*1 For models that have a batteryless absolute encoder, L and LL are 7.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 72*

Note:

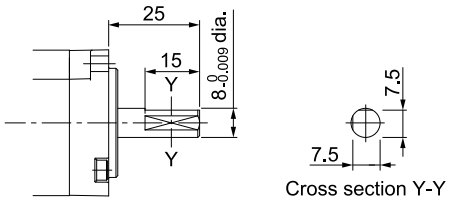
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 65*
☞ *Option Specification on page 66*

■ Shaft End Specification

- Straight with Key and Tap

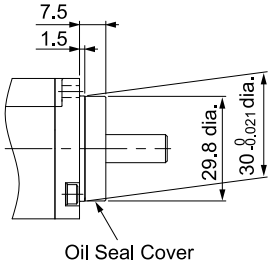


- With Two Flat Seats



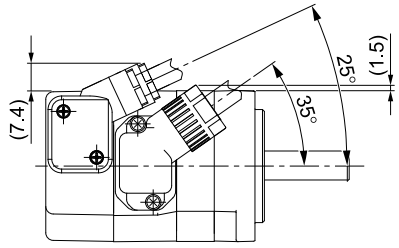
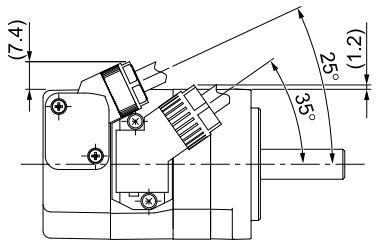
■ Option Specification

- With Oil Seal

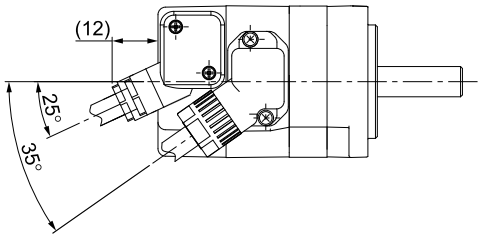
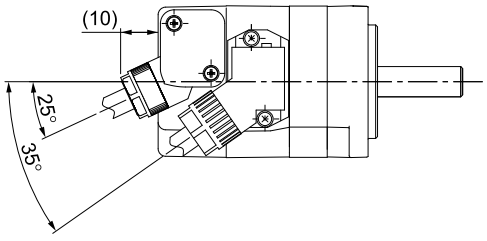


■ Connector Mounting Dimensions

- Cable Installed on Load Side

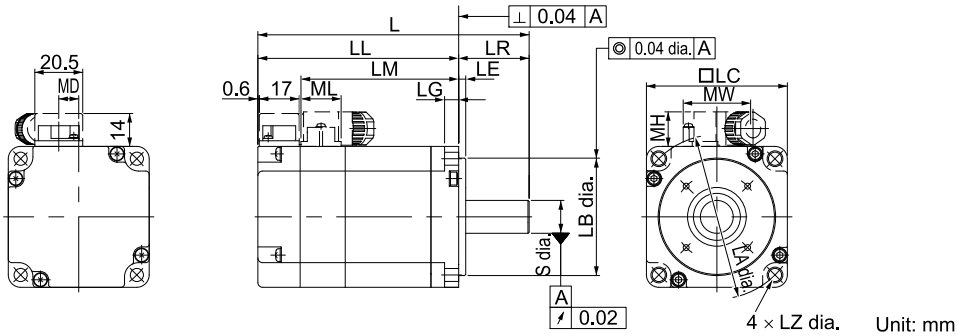
Standard Specification	Σ-7 Compatible Specification
	

- Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXJ-02 to -06

■ Σ-7 Compatible Specification



Unit: mm

Model SGMXJ-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
02A□A2□A1	98.5 (139.0)	68.5 (109.0)	50.5	30	3	6	60	70	$50^{0}_{-0.025}$	5.5
04A□A2□A1	115 (155.5)	85 (125.5)	67	30	3	6	60	70	$50^{0}_{-0.025}$	5.5
06A□A2□A1	137 (191.0)	107 (161.0)	89	30	3	6	60	70	$50^{0}_{-0.025}$	5.5

Model SGMXJ-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
02A□A2□A1	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	0.8 (1.4)
04A□A2□A1	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	1.1 (1.7)
06A□A2□A1	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	1.6 (2.2)

*1 For models that have a batteryless absolute encoder, L and LL are 7.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.

☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 72*

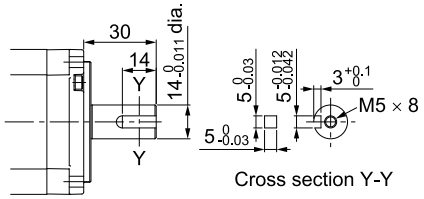
Note:

1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

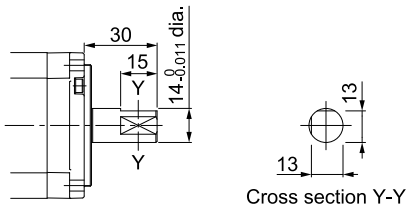
☞ *Shaft End Specification on page 68*
☞ *Option Specification on page 68*

■ Shaft End Specification

- Straight with Key and Tap

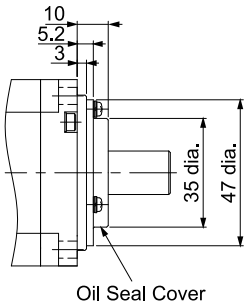


- With Two Flat Seats



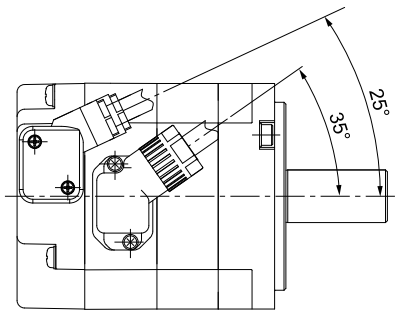
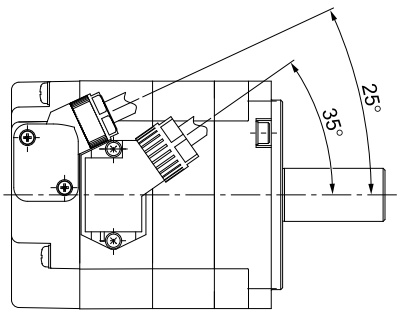
■ Option Specification

- With Oil Seal

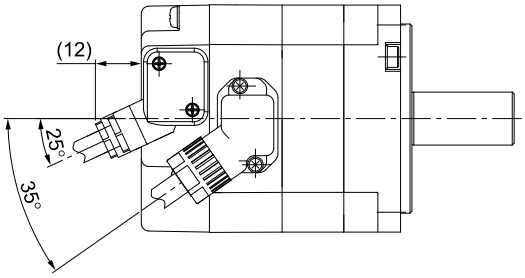
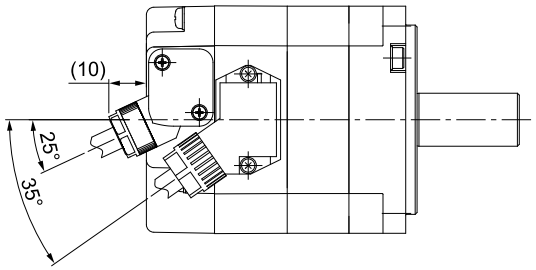


■ Connector Mounting Dimensions

- Cable Installed on Load Side

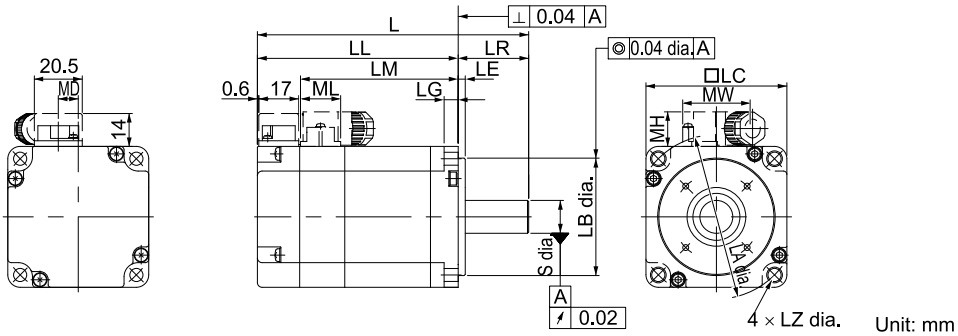
Standard Specification	Σ-7 Compatible Specification
	

- Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXJ-08

■ Σ-7 Compatible Specification



Unit: mm

Model SGMXJ-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
08A□A2□A1	136 (183.0)	96 (143.0)	78	40	3	8	80	90	$70^{0}_{-0.030}$	7

Model SGMXJ-	S	MD	MW	MH	ML	Approx. Mass *1 [kg]
08A□A2□A1	$19^{0}_{-0.013}$	14	38	17	19.3	2.2 (2.8)

*1 For models that have a batteryless absolute encoder, L and LL are +6.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.

☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 72*

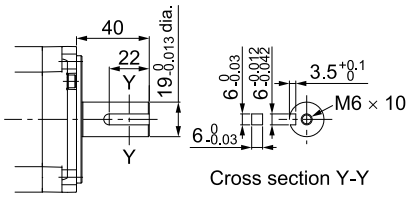
Note:

1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

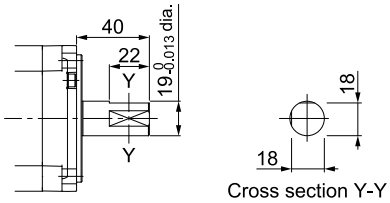
☞ *Shaft End Specification on page 71*
☞ *Option Specification on page 71*

■ Shaft End Specification

• Straight with Key and Tap

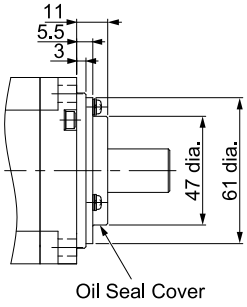


• With Two Flat Seats



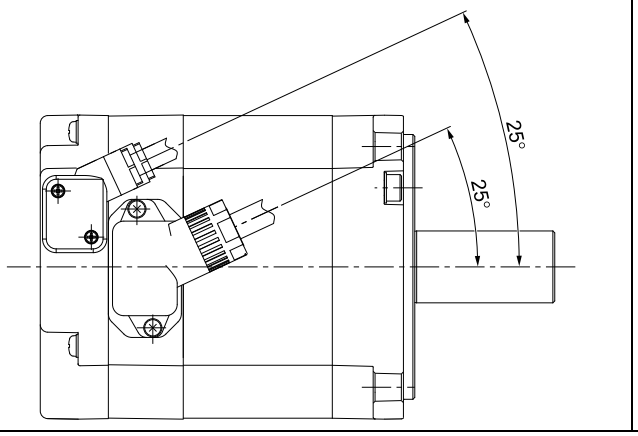
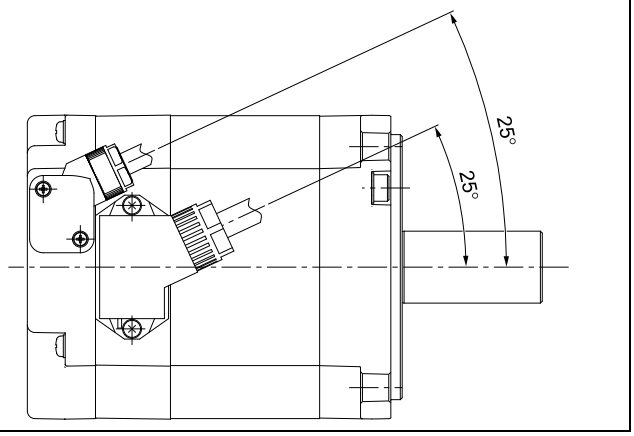
■ Option Specification

• With Oil Seal

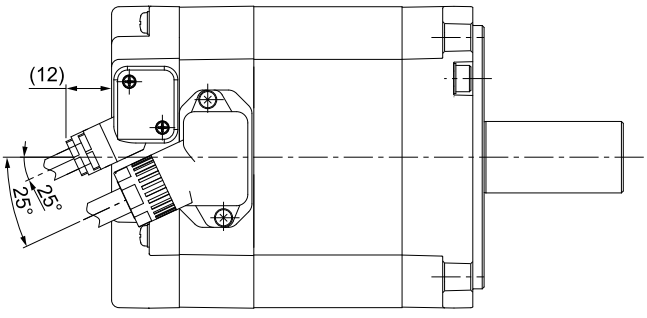
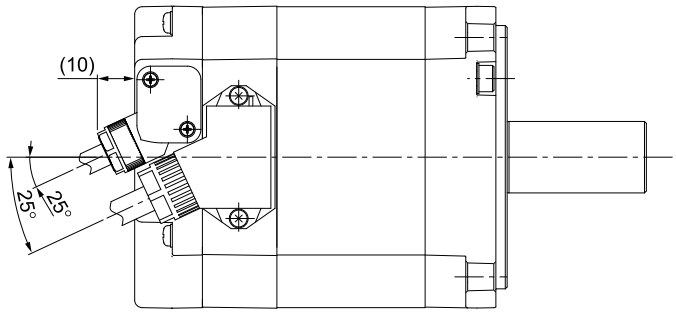


■ Connector Mounting Dimensions

• Cable Installed on Load Side

Standard Specification	Σ-7 Compatible Specification
	

• Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

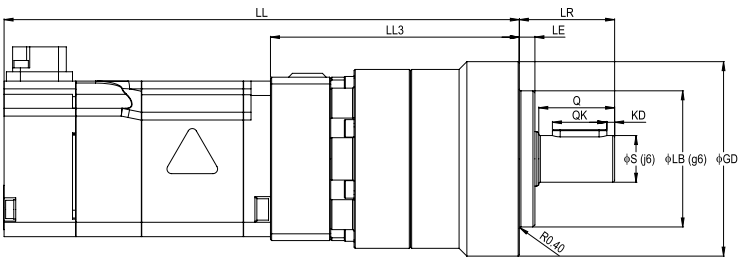
Dimensions of Servomotors with Batteryless Absolute Encoders

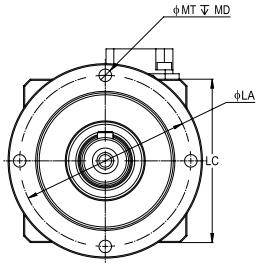
Model SGMXJ-	L	LL	Approx. Mass [kg]
A5AWA2☐A1	88 (128.5)	63 (103.5)	0.4 (0.7)
01AWA2☐A1	100 (140.5)	75 (115.5)	0.5 (0.8)
C2AWA2☐A1	112 (160.5)	87 (135.5)	0.6 (0.9)
02AWA2☐A1	106 (146.5)	76 (116.5)	0.9 (1.5)
04AWA2☐A1	122.5 (163.0)	92.5 (133.0)	1.2 (1.8)
06AWA2☐A1	144.5 (198.5)	114.5 (168.5)	1.7 (2.3)
08AWA2☐A1	142.5 (189.5)	102.5 (149.5)	2.3 (2.9)

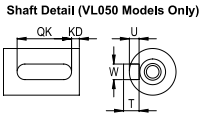
Note:

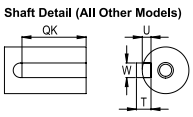
The values in parentheses are for servomotors with holding brakes.

SGMXJ Gear Motor External Dimensions









100 W Models

Model S7J		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	01A□ -VL050-03	133.5 (174)	65	24.5	4	12	35	50	42	44	M4	8	19.5	14	2	4	2.5	4
	01A□ -VL050-05																	
	01A□ -VL050-10																	
	01A□ -VL050-25	150 (190.5)	81.5															
	01A□ -VL070-50	163.5 (204)	95	36	5	16	52	70	52	62	M5	10	28	22	0	5	3	5

200 W Models

Model S7J		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	02A□ -VL050-03	137.5 (178	68	24.5	4	12	35	50	65	44	M4	8	19.5	14	2	4	2.5	4
	02A□ -VL050-05																	
	02A□ -VL050-10																	
	02A□ -VL070-25	170.5 (211)	101	36	5	16	52	70		62	M5	10	28	22	0	5	3	5
	02A□ -VL070-50																	

400 W Models

Model S7J		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	04A□ -VL050-03	153.5 (194)	68	24.5	4	12	35	50	65	44	M4	8	19.5	14	2	4	2.5	4
	04A□ -VL050-05																	
	04A□ -VL070-10	165.5 (206)	80	36	5	16	52	70		62	M5	10	28	22	0	5	3	5
	04A□ -VL070-25	186.5 (227)	101															
	04A□ -VL090-50	204.5 (245)	119	46	7	22	68	90		80	M6	12	36	28		6	3.5	6

750 W Models

Model S7J		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	08A□ -VL070-03	191 (238)	94	36	5	16	52	70	80	62	M5	10	28	22	0	5	3	5
	08A□ -VL070-05																	
	08A□ -VL090-10	204 (251)	107	46	7	22	68	90		80	M6	12	36	28		6	3.5	6
	08A□ -VL090-25	226 (273)	129															
	08A□ -VL120-50	241.5 (288.5)	144.5	70	9	32	90	120		108	M8	16	58	45		10	5	8

Model Designations

SGMXA - 01 A U A 2 1 A 1

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

Σ-X-Series Servomotor SGMXA model

1st+2nd digits Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W
10	1.0 kW
15	1.5 kW
20	2.0 kW
25	2.5 kW
30	3.0 kW
40	4.0 kW
50	5.0 kW
70	7.0 kW

Limited Stock

Non-Stock

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

4th digit Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

5th digit Design Revision Order

A

6th digit Shaft End

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

* Code B does not support models above 1.5 kW.

7th digit Options

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

Note: The SGMXA-70A does not support models with a holding brake.

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ-7 compatible
3	Standard Safety
4	Σ-7 compatible Safety

The SGMXA gear motor product family pairs SGMXA servo motors with high precision, low backlash inline planetary gear heads resulting in a portfolio of rotary actuators fit for a wide range of applications. The family of gear motors has been thoroughly tested and adheres to the high levels of quality and performance expected from Yaskawa.

Gear Motor Model Designation

SXA 01 A W C - VL 050 - 05

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

Σ-X Series Gear Motors: SGMXA

1st+2nd digits Rated Output

Code	Specification
01	100 W
02	200 W
04	400 W
08	750 W
10	1.0 kW
15	1.5 kW
20	2.0 kW
25	2.5 kW
30	3.0 kW
40	4.0 kW
50	5.0 kW
70	7.0 kW

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

4th digit Encoder Option

Code	Specification
W	Standard encoder
H	Small encoder

5th digit Brake Option

Code	Specification
Blank	No brake
C	24 V Brake

6th digit Gear box backlash

Code	Specification
VL	5 arc-min backlash

7th digit Gear head frame size

Code	Specification
050	50 mm
070	70 mm
090	90 mm
120	120 mm
155	155 mm
205	205mm
235	235mm

8th digit Gear Ratio

Code	Specification
03	3:1 Ratio
05	5:1 Ratio
10	10:1 Ratio
25	25:1 Ratio
50	50:1 Ratio

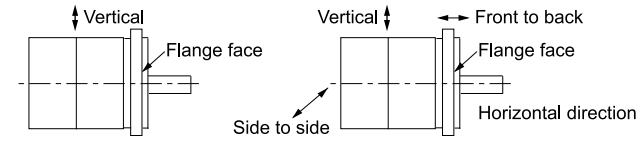
Specifications and Ratings (200 V Specification)

Specifications and Ratings (200 V Specification)

Voltage		200 V										
Model SGMXA-		A5A	01A	C2A, 02A	04A	06A, 08A	10A	15A	20A	25A, 30A	40A, 50A	70A
Time Rating		Continuous										
Thermal Class		UL: B, CE: B						UL: F, CE: F				
Insulation Resistance		500 VDC, 10 MΩ min.										
Withstand Voltage		1500 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										
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (With derating, usage is possible between 40°C and 60°C.) *3										
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 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)										
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²										
	Number of Impacts	2 times										
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s²						49 m/s² (24.5 m/s² front to back)				14.7 m/s²
Applicable SERVOPACKs	SGDXS	R70A	R90A	1R6A	2R8A	5R5A	120A	120A	180A	200A	330A	550A
	SGDXW	1R6A *4, 2R8A *4	1R6A *4, 2R8A *4	1R6A, 2R8A *4	2R8A, 5R5A *4, 7R6A *4	5R5A, 7R6A	–	–	–	–	–	–
	SGDXT-	1R6A *4, 2R8A *4	1R6A *4, 2R8A *4	1R6A, 2R8A *4	2R8A	–	–	–	–	–	–	–

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 88*

*4 If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Σ-XS SERVOPACK.

Servomotor Ratings

■ SGMXA-A5 to -10

Voltage			200 V							
Model SGMXA-			A5A	01A	C2A	02A	04A	06A	08A	10A
Rated Output *1		W	50	100	150	200	400	600	750	1000
Rated Torque *1, *2		N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
Instantaneous Maximum Torque *1		N·m	0.557	1.11	1.67	2.23	4.46	6.69	8.36	11.1
Rated Current *1		Arms	0.57	0.89	1.5	1.5	2.4	4.5	4.4	6.4
Instantaneous Maximum Current *1		Arms	2.1	3.2	5.6	5.9	9.3	16.9	16.8	23.2
Rated Rotation Speed *1		min^{-1}	3000							
Continuous Allowable Rotation Speed		min^{-1}	7000				6000			
Maximum Rotation Speed *1		min^{-1}	7000							
Torque Constant		N·m/Arms	0.304	0.384	0.332	0.458	0.576	0.456	0.584	0.541
Rotor Moment of Inertia	Without Holding Brakes	× 10^{-4} $kg·m^2$	0.0220	0.0340	0.0461	0.139	0.216	0.315	0.773	0.969
	With Holding Brakes		0.0300	0.0420	0.0541	0.199	0.276	0.375	0.943	1.14
	Without Holding Brake and with Batteryless Absolute Encoder		0.0257	0.0377	0.0498	0.143	0.220	0.319	0.777	0.973
	With Holding Brake and Batteryless Encoder		0.0337	0.0457	0.0578	0.203	0.280	0.379	0.947	1.14
Rated Power Rate *1	Without Holding Brakes	kW/s	11.5	29.7	49.4	29.1	74.7	116	73.7	104
	With Holding Brakes		8.42	24.1	42.1	20.4	58.5	97.3	60.4	88.8
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	72200	93500	103500	45700	58800	60600	30800	32800
	With Holding Brakes		53000	75700	88200	31900	46000	50900	25300	27900
Derating Rate for Servomotor with Oil Seal		%	80	90			95			
Heat Sink Size (aluminum) *3		mm	200 × 200 × 6		250 × 250 × 6			300 × 300 × 12 *9	250 × 250 × 6	300 × 300 × 12
Protective Structure *4			Totally enclosed, self-cooled, IP67							
Holding Brake Specifications *5	Rated Voltage	V	24 VDC ±10%							
	Capacity	W	5.5			6		6.5		
	Holding Torque	N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
	Coil Resistance	Ω (at 20°C)	104.8 ±10%			96 ±10%		88.6 ±10%		
	Rated Current	A (at 20°C)	0.23			0.25		0.27		
	Time Required to Release Brake	ms	60					80		
	Time Required to Brake	ms	100							

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Continued from previous page.

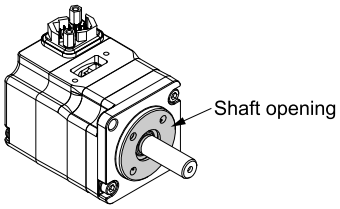
Voltage			200 V							
Model SGMXA-			A5A	01A	C2A	02A	04A	06A	08A	10A
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *6	At 6000 min-1		40 times	40 times	40 times	30 times	20 times	20 times	20 times	20 times
	At 7000 min-1					25 times	15 times	20 times	15 times	20 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *7	At 6000 min-1	40 times	40 times	40 times	30 times	20 times	20 times	20 times	30 times
		At 7000 min-1								
Allowable Shaft Loads *8	LF	mm	20			25			35	
	Allowable Radial Load	N	78			245			392	
	Allowable Thrust Load	N	54			74			147	

*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 an aluminum heat sink of the dimensions given in the table.

*3 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 88*

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



*5 Observe the following precautions if you use a servomotor with a holding brake.

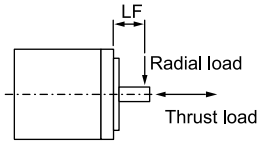
- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*6 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*7 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

- SGDXS-R70A□□A0020 to -2R8A□□A0020
- SGDXW-1R6A□□A0020, -2R8A□□A0020
- SGDXT-1R6A□□A0020, -2R8A□□A0020

*8 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



*9 If the heat sink is 250 mm × 250 mm × 6 mm, the rated output is 550 W and the rated torque is 1.75 N·m. Refer to the following section for details.
☞ *Servomotor Heat Dissipation Conditions on page 88*

■ SGMXA-15 to -70

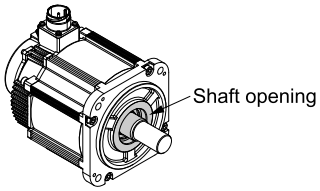
Voltage			200 V						
Model SGMXA-			15A	20A	25A	30A	40A	50A	70A
Rated Output *1		kW	1.5	2.0	2.5	3.0	4.0	5.0	7.0
Rated Torque *1, *2		N·m	4.90	6.36	7.96	9.80	12.6	15.8	22.3
Instantaneous Maximum Torque *1		N·m	14.7	19.1	23.9	29.4	37.8	47.6	54.0
Rated Current *1		Arms	9.3	12.1	15.6	17.9	25.4	27.6	38.3
Instantaneous Maximum Current *1		Arms	28	42	51	56	77	84	105
Rated Rotation Speed *1		min^{-1}	3000						
Continuous Allowable Rotation Speed		min^{-1}	6000		5000	6000		5000	6000
Maximum Rotation Speed *1		min^{-1}	6000 *3						
Torque Constant *1		N·m/Arms	0.590	0.561	0.538	0.582	0.519	0.604	0.604
Rotor Moment of Inertia *4	Without Holding Brakes	$\times 10^{-4}$ $kg \cdot m^2$	2.00	2.47	3.19	7.00	9.60	12.3	12.3
	With Holding Brakes		2.25	2.72	3.44	9.20	11.8	14.5	–
Rated Power Rate *1	Without Holding Brakes	kW/s	120	164	199	137	165	203	404
	With Holding Brakes		107	149	184	104	134	172	–
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	24500	25700	24900	14000	13100	12800	18100
	With Holding Brakes		21700	23300	23100	10600	10600	10800	–
Heat Sink Size (aluminum) *5		mm	300 × 300 × 12			400 × 400 × 20			
Protective Structure *6			Totally enclosed, self-cooled, IP67						Totally enclosed, forced ventilation (with fan), IP22
Holding Brake Specifications *7	Rated Voltage	V	24 VDC±10%						–
	Capacity	W	12			10			
	Holding Torque	N·m	7.84		10	20			
	Coil Resistance	Ω (at 20°C)	48			59			
	Rated Current	A (at 20°C)	0.5			0.41			
	Time Required to Release Brake	ms	170			100			
	Time Required to Brake	ms	80						
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *8	Without External Devices		10 times			5 times			
	With External Regenerative Resistor and External Dynamic Brake Resistor *9		20 times			15 times			
Allowable Shaft Loads *10	LF	mm	45			63			
	Allowable Radial Load	N	686			980	1176		
	Allowable Thrust Load	N	196			392			

*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 an aluminum heat sink of the dimensions given in the table.
*3 For SGMXA-25A and -50A servomotors, the maximum rotation speed in the continuous duty zone is 5000 min^{-1}. Use the servomotor in a range where the average motor speed and effective torque stay in the continuous zone.

*4 The values for SGMXA-15A to -70A servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.

*5 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 88*

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



*7 Observe the following precautions if you use a servomotor with a holding brake.

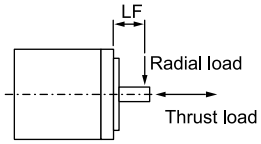
- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*8 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*9 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

- SGDXS-R70A□□A0020 to -2R8A□□A0020
- SGDXW-1R6A□□A0020 to -2R8A□□A0020

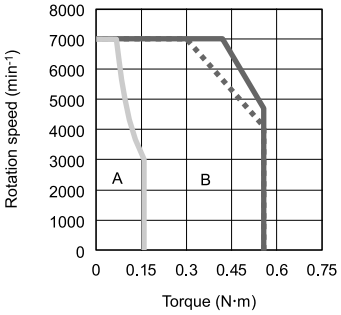
*10 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



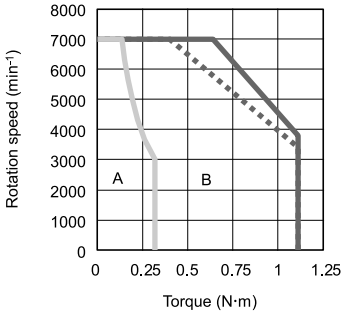
Torque-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V

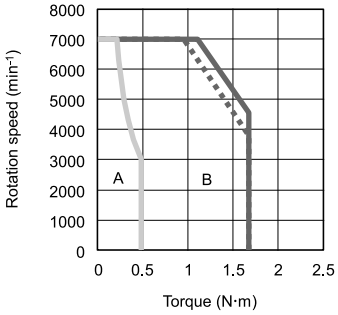
SGMXA-A5A



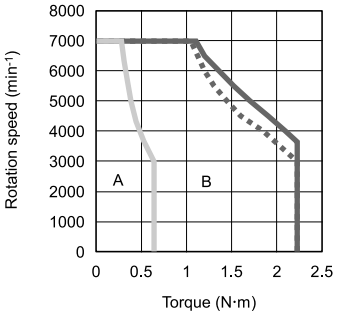
SGMXA-01A



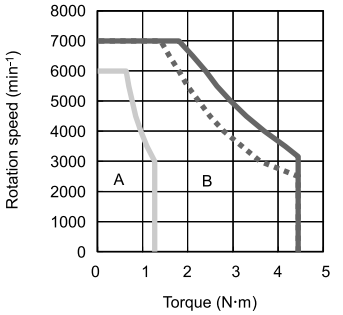
SGMXA-C2A



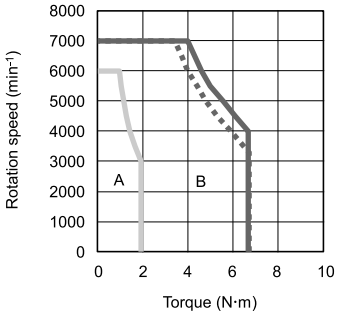
SGMXA-02A



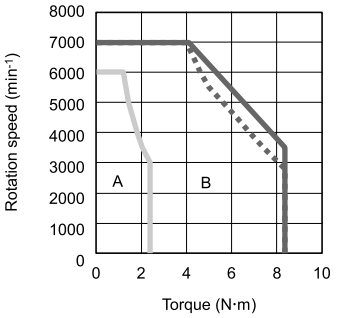
SGMXA-04A



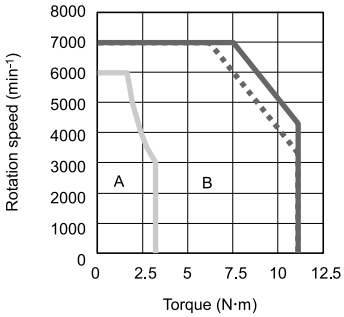
SGMXA-06A



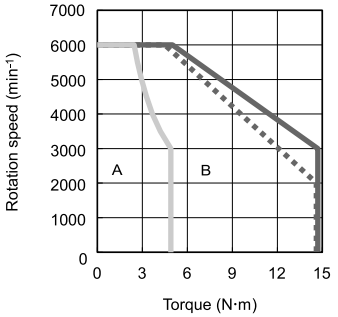
SGMXA-08A



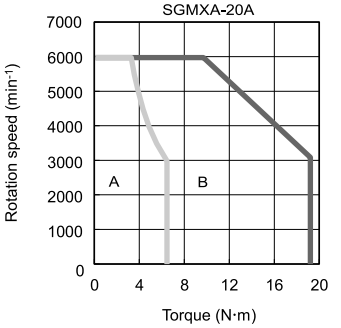
SGMXA-10A



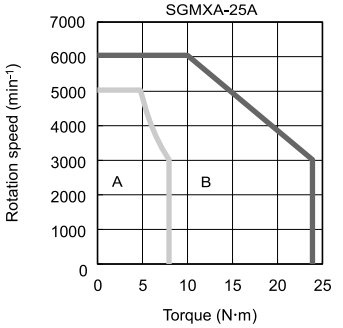
SGMXA-15A



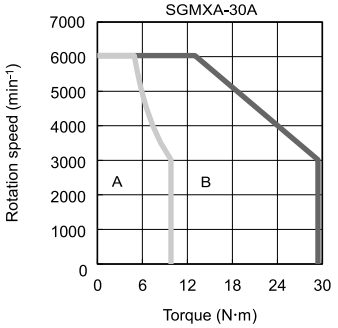
SGMXA-20A

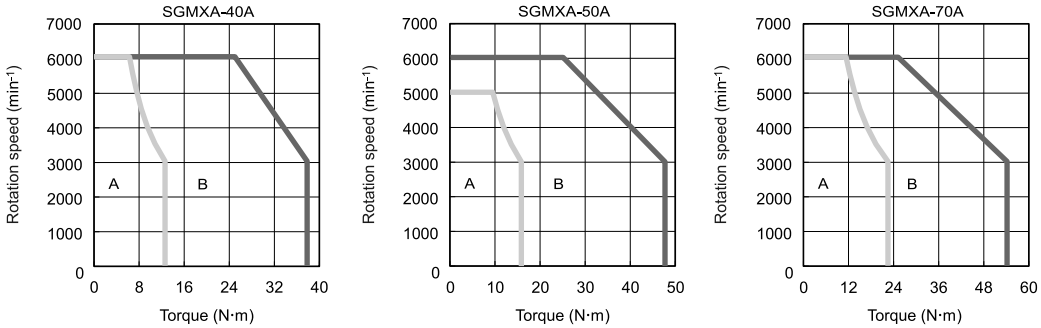


SGMXA-25A



SGMXA-30A





Note:

1. SGMXA-A5A to -10: These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
   SGMXA-15A to -70: These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
4. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
5. The SGMXA-10A and -15A can use a single-phase power input in combination with the SGDXS-120A□□A0008.

Gear Motor Ratings (200V Models)

Gear Motor Model Number SXA___	Base Servo Motor Model SGMXA-	Gear Ratio	Gear-ing Effi-ciency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10^{-4} kg.m^2)	Gear-head Inertia (x 10^{-4} kg.m^2)	Allowa-ble Radial Load (N)	Allowa-ble Axial Load (N)	Back-lash (arc-min)	Class
01AW☐ -VL050-03	01AW-A6☐	3:1	95	1000	2333	0.906	3.16	0.0377 (0.0457)	0.053	240	270	5	IP65
01AW☐ -VL050-05		5:1		600	1400	1.51	5.27		0.036	290	330		
01AW☐ -VL050-10		10:1		300	700	3.02	10.5		0.030	360	450		
01AW☐ -VL050-25		25:1	90	120	280	7.16	18.0		0.034	490	640	7	
01AW☐ -VL070-50		50:1		60	140	14.3	50.0		0.051	1100	1100	5	
02AW☐ -VL050-03	02AW-A6☐	3:1	95	1000	2333	1.82	6.36	0.143 (0.203)	0.17	240	270	5	IP65
02AW☐ -VL050-05		5:1		600	1400	3.03	10.6		0.15	290	330		
02AW☐ -VL070-10		10:1		300	700	6.05	21.2		0.17	640	530		
02AW☐ -VL070-25		25:1	90	120	280	14.3	50.2		0.17	870	790		
02AW☐ -VL070-50		50:1		60	140	28.7	66.0 *3		0.16	1100	1100		
04AW☐ -VL050-03	04AW-A6☐	3:1	95	1000	2333	3.62	12.7	0.220 (0.280)	0.17	240	270	5	IP65
04AW☐ -VL050-05		5:1		600	1400	6.03	21.2		0.15	290	330		
04AW☐ -VL070-10		10:1		300	700	12.1	42.4		0.17	640	530		
04AW☐ -VL070-25		25:1	90	120	280	28.6	66.0 *3		0.17	870	790		
04AW☐ -VL090-50		50:1		60	140	57.2	165 *3		0.27	2100	2200		
08AW☐ -VL070-03	08AW-A6☐	3:1	95	1000	2333	6.81	23.8	0.777 (0.947)	0.53	430	310	5	IP65
08AW☐ -VL070-05		5:1		600	1400	11.4	39.7		0.46	510	390		
08AW☐ -VL090-10		10:1		300	700	22.7	79.4		0.70	1200	1600		
08AW☐ -VL090-25		25:1	90	120	280	53.8	165 *3		0.74	1600	2200		
08AW☐ -VL120-50		50:1		60	130	108	376		0.76	3400	3900		
10AW☐ -VL070-03	10AW-A6☐	3:1	95	1000	2333	9.06	31.6	0.973 (1.14)	0.53	430	310	5	IP65
10AW☐ -VL070-05		5:1		600	1400	15.1	52.7		0.46	510	390		
10AW☐ -VL090-10		10:1		300	700	30.2	105		0.70	1200	1600		
10AW☐ -VL090-25		25:1	90	120	280	71.6	165 *3		0.74	1600	2200		
10AW☐ -VL120-50		50:1		60	130	143	390 *3		0.76	3400	3900		
15AW☐ -VL090-03	15AW-A6☐	3:1	95	1000	2000	14.0	41.9	2.00 (2.25)	2.90	810	930	5	IP65
15AW☐ -VL090-05		5:1		600	1200	23.3	69.8		2.60	960	1200		
15AW☐ -VL090-10		10:1		300	600	46.6	140		2.50	1200	1600		
15AW☐ -VL120-25		25:1	90	120	240	110	331		2.80	2700	3700		
15AW☐ -VL120-50		50:1		60	120	221	390 *3		2.50	3400	3900		
20AW☐ -VL090-03	20AW-A6☐	3:1	95	1000	2000	18.1	54.4	2.47 (2.72)	2.90	810	930	5	IP65
20AW☐ -VL090-05		5:1		600	1200	30.2	90.7		2.60	960	1200		
20AW☐ -VL120-10		10:1		300	600	60.4	181		2.60	2000	2500		
20AW☐ -VL120-25		25:1	90	120	240	143	390 *3		2.80	2700	3700		
20AW☐ -VL155-50		50:1		60	120	286	840 *3		2.80	8100	8200		

Continued on next page.

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Gear Motor Model Number SXA___	Base Servo Motor Model SGMXA-	Gear Ratio	Gearing Efficiency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10^{-4} kg.m^2)	Gear-head Inertia (x 10^{-4} kg.m^2)	Allowable Radial Load (N)	Allowable Axial Load (N)	Backlash (arc-min)	Class
25AW☐ -VL090-03	25AW-A6☐	3:1	95	1000	2000	22.7	68.1	3.19 (3.44)	2.90	810	930	5	IP65
25AW☐ -VL090-05		5:1		600	1200	37.8	114		2.60	960	1200		
25AW☐ -VL120-10		10:1		300	600	75.6	227		2.60	2000	2500		
25AW☐ -VL120-25		25:1	90	120	240	179	390 *3		2.80	2700	3700		
25AW☐ -VL155-50		50:1		60	120	358	840 *3		2.80	8100	8200		
30AW☐ -VL090-03	30AW-A6☐	3:1	95	1000	2000	27.9	83.8	7.00 (9.20)	2.90	810	930	5	IP65
30AW☐ -VL090-05		5:1		600	1200	46.6	140		2.60	960	1200		
30AW☐ -VL120-10		10:1		300	600	93.1	279		2.60	2000	2500		
30AW☐ -VL120-25		25:1	90	120	240	221	390 *3		2.80	2700	3700		
30AW☐ -VL155-50		50:1		60	120	441	840 *3		2.80	8100	8200		
40AW☐ -VL090-03	40AW-A6☐	3:1	95	1000	2000	35.9	108	9.60 (11.8)	2.90	810	930	5	IP65
40AW☐ -VL090-05		5:1		600	1200	59.9	180		2.60	960	1200		
40AW☐ -VL120-10		10:1		300	600	120	359		2.60	2000	2500		
40AW☐ -VL155-25		25:1	90	116	240	284	840 *3		4.10	6400	6100		
40AW☐ -VL205-50		50:1		58	100	567	1701		3.80	14000	14000		
50AW☐ -VL090-03	50AW-A6☐	3:1	95	1000	2000	45.0	135 *3	12.3 (14.5)	2.90	810	930	5	IP65
50AW☐ -VL090-05		5:1		600	1200	75.1	200 *3		2.60	960	1200		
50AW☐ -VL120-10		10:1		300	600	150	370 *3		2.60	2000	2500		
50AW☐ -VL155-25		25:1	90	116	240	356	840 *3		4.10	6400	6100		
50AW☐ -VL205-50		50:1		58	100	711	1850 *3		3.80	14000	14000		
70AW-VL120-03	70AWA61	3:1	95	1000	2000	63.6	154	12.3	5.10	1300	1500	5	IP65
70AW-VL120-05		5:1		600	1200	106	257		3.10	1600	1900		
70AW-VL155-10		10:1		300	500	212	513		3.20	4700	4100		
70AW-VL205-25		25:1	90	108	200	502	1215		7.90	11000	11000		
70AW-VL235-50		50:1		50	90	1004	2430		4.70	15000	14000		

Note:

The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of ☐ in model numbers).

*1 The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

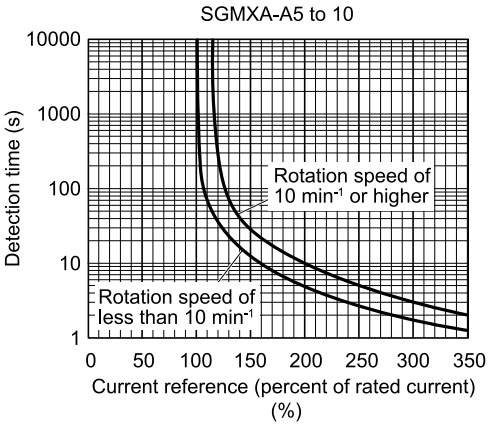
*2 The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25 °C. They are reference values only.

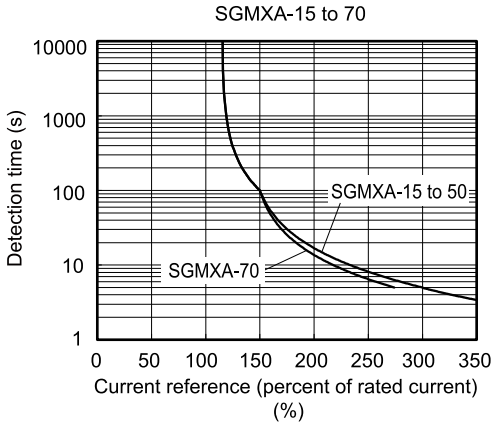
*3 The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.

Servomotor Overload Protection Characteristics

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

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.





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 "*Torque-Rotation Speed Characteristics on page 82*".

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 78*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program *1 to check the driving conditions. Perform the required steps for each of the following cases.

*1 Contact your Yaskawa representative for information on this program.

■ 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).

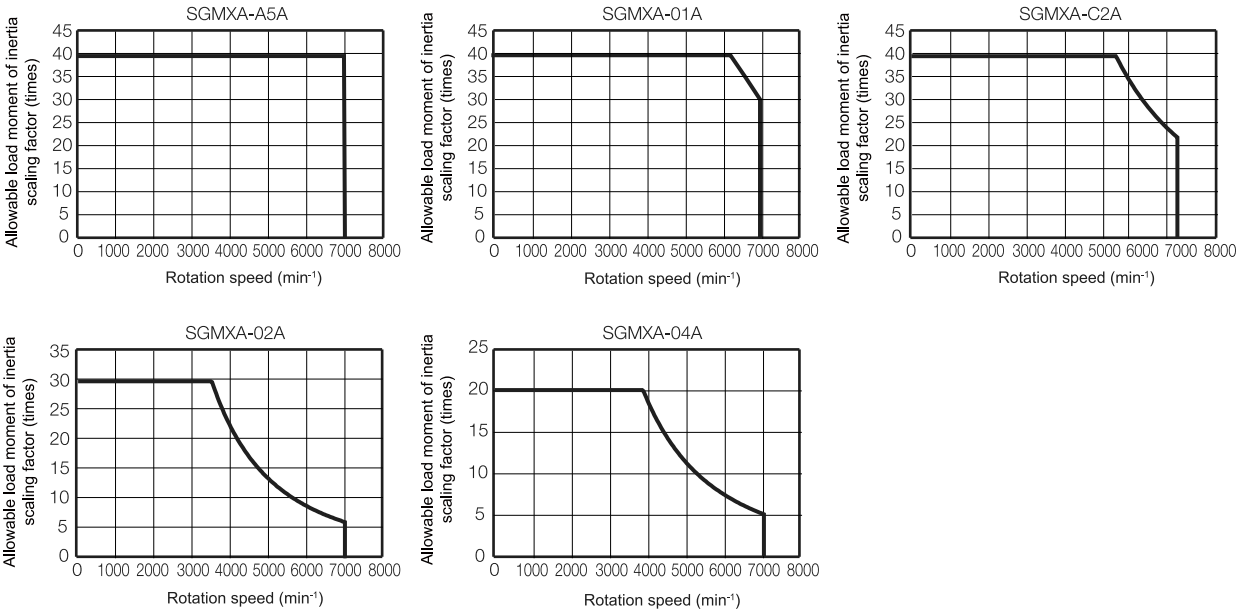
Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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, for the shaded areas of the graphs, use Yaskawa's SigmaSize+, an AC servo capacity selection program, to select an external regenerative resistor.



Note:

Applicable SERVOPACK Model: SGDXS-R70A, -90A, -1R6A, -2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

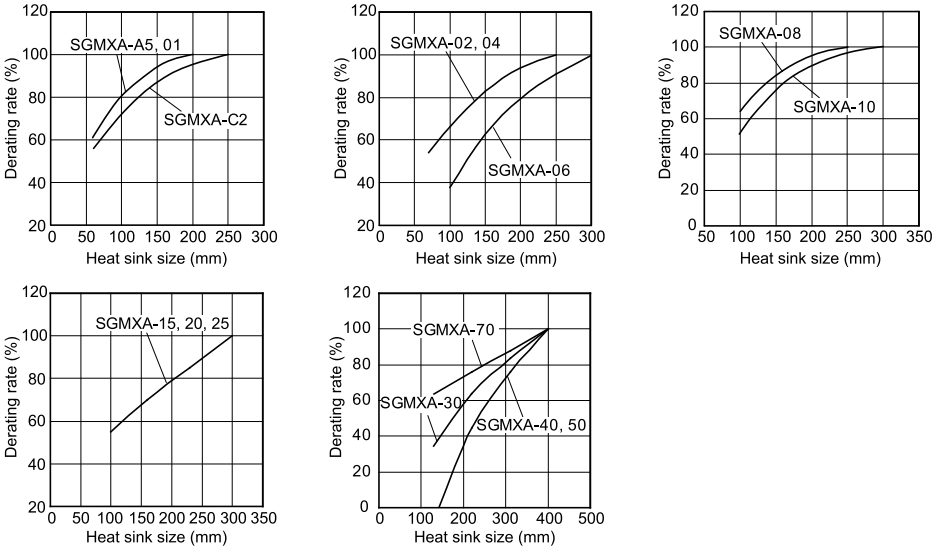
Refer to the following section for details on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 728*

Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.



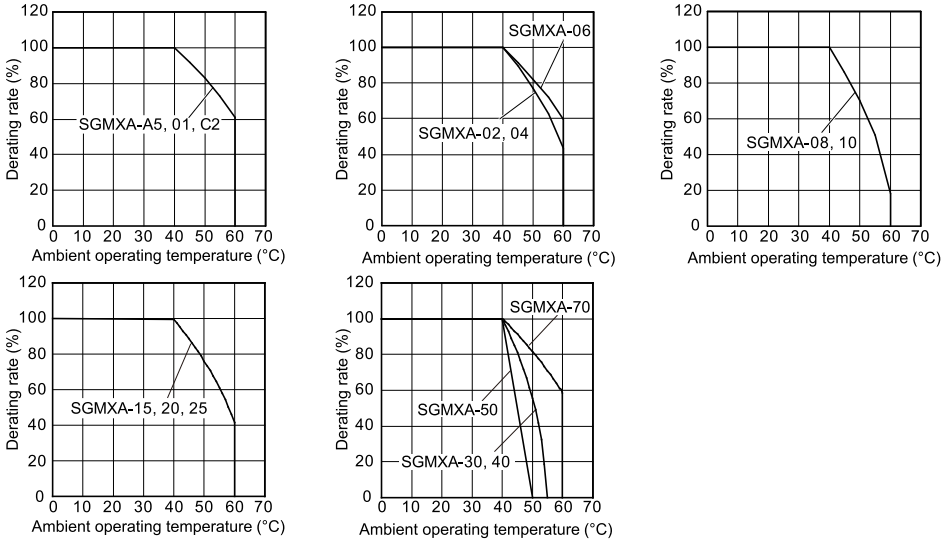
Important

The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

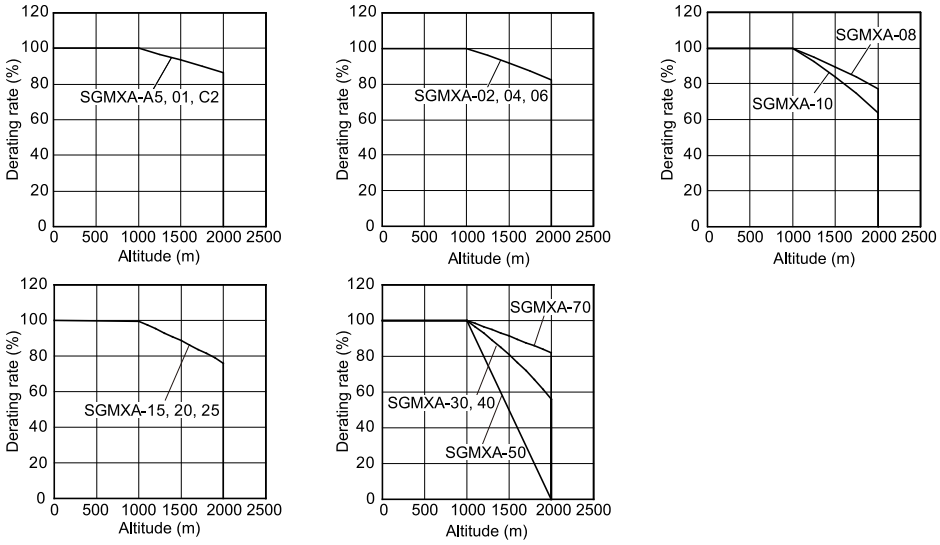
■ Applications Where the Surrounding Air Temperature Exceeds 40°C

The servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.



■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.



Note:

- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 86*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

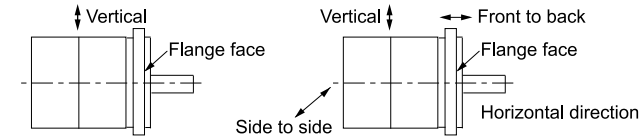
Specifications and Ratings (400 V Specification)

Specification

Voltage		400 V					
Model SGMXA-		15D	20D	25D	30D	40D	50D
Time Rating		Continuous					
Thermal Class		UL: F, CE: F					
Insulation Resistance		500 VDC, 10 MΩ min.					
Withstand Voltage		1,800 VAC for 1 minute, or 2,200 VAC for 1 second					
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					
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (With derating, usage is possible between 40°C and 60°C.) *3					
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 • 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)					
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²					
	Number of Impacts	2 times					
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s²					
Applicable SERVOPACKs	SGDXS	5R4D	8R4D	120D	120D	170D	170D

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 96*

Servomotor Ratings

Voltage			400 V					
Model SGMXA-			15D	20D	25D	30D	40D	50D
Rated Output *1		W	1.5	2.0	2.5	3.0	4.0	5.0
Rated Torque *1, *2		N·m	4.90	6.36	7.96	9.80	12.6	15.8
Instantaneous Maximum Torque *1		N·m	14.7	19.1	23.9	29.4	37.8	47.6
Rated Current *1		Arms	4.5	5.9	7.4	8.9	12.5	13.8
Instantaneous Maximum Current *1		Arms	14	20	25	28	39	42
Rated Rotation Speed *1		min^{-1}	3000					
Continuous Allowable Rotation Speed		min^{-1}	6000		5000	6000		5000
Maximum Rotation Speed *1		min^{-1}	6000					
Torque Constant		N·m/Arms	1.23	1.18	1.15	1.16	1.06	1.21
Rotor Moment of Inertia *3	Without Holding Brakes	× 10^{-4} kg·m^2	2.00	2.47	3.19	7.00	9.60	12.3
	With Holding Brakes		2.25	2.72	3.44	9.20	11.8	14.5
Rated Power Rate *1	Without Holding Brakes	kW/s	120	164	199	137	165	203
	With Holding Brakes		107	149	184	104	135	172
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	24500	25700	24900	14000	13100	12800
	With Holding Brakes		21700	23300	23100	10600	10600	10800
Heat Sink Size (aluminum) *4		mm	300 × 300 × 12			400 ×400 × 20		
Protective Structure *5			Totally enclosed, self-cooled, IP67					
Holding Brake Specifications *6	Rated Voltage	V	24 VDC±10%					
	Capacity	W	12			10		
	Holding Torque	N·m	7.84		10	20		
	Coil Resistance	Ω (at 20°C)	48			59		
	Rated Current	A (at 20°C)	0.5			0.41		
	Time Required to Release Brake	ms	170			100		
	Time Required to Brake	ms	80					
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *7	Without External Devices		10 times			5 times		
	With External Regenerative Resistor and External Dynamic Brake Resistor *8		20 times			15 times		

Continued on next page.

Continued from previous page.

Voltage			400 V					
Model SGMXA-			15D	20D	25D	30D	40D	50D
Allowable Shaft Loads *9	LF	mm	45			63		
	Allowable Radial Load	N	686			980	1176	
	Allowable Thrust Load	N	196			392		

*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.

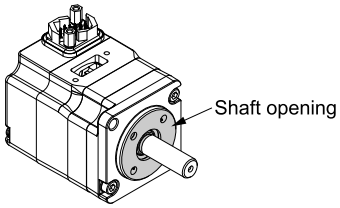
*2 The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

*3 The values for SGMXA-15D to -50D servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.

*4 Refer to the following section for the relation between the heat sinks and derating rate.

☞ *Servomotor Heat Dissipation Conditions on page 96*

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



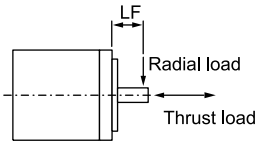
*6 Observe the following precautions if you use a servomotor with a holding brake.

- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*7 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*8 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.

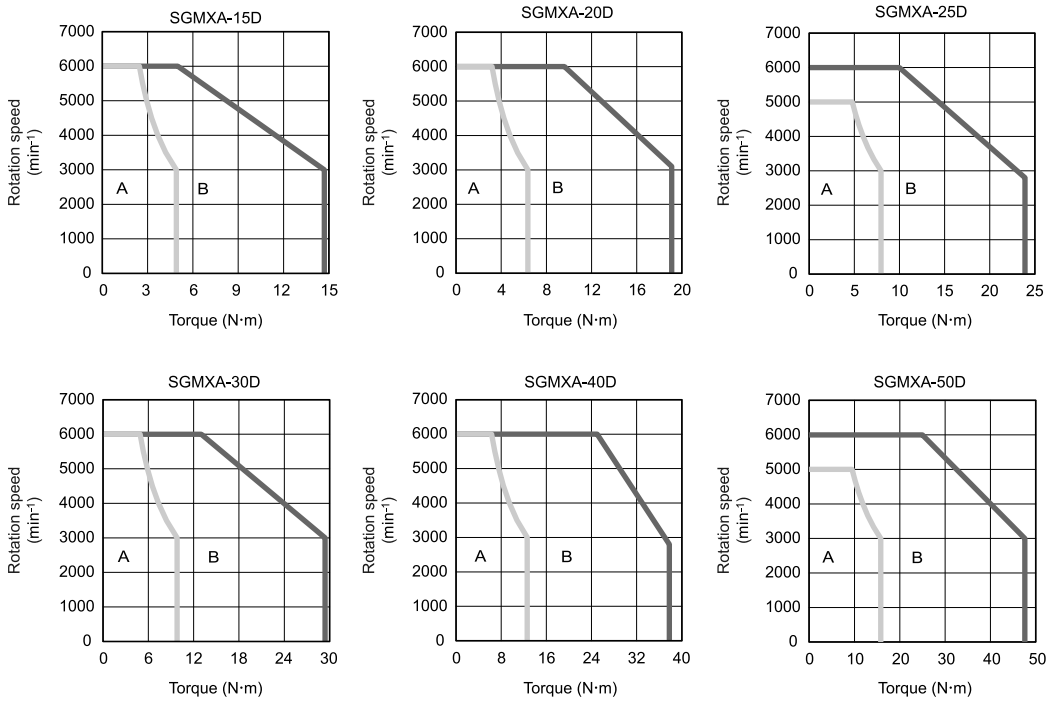
*9 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



Torque-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 400 V

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. 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-rotation speed characteristics will become smaller because the voltage drop increases.

Gear Motor Ratings (400V Models)

Gear Motor Model Number SXA___	Base Servo Motor Model SGMXA-	Gear Ratio	Gearing Efficiency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10^{-4} kg.m^2)	Gear-head Inertia (x 10^{-4} kg. m^2)	Allowable Radial Load (N)	Allowable Axial Load (N)	Backlash (arc-min)	Class
15DW☐ -VL090-03	15DWA6☐	3:1	95	1000	2333	14.0	41.9	2.00 (2.25)	2.90	810	930	5	IP65
15DW☐ -VL090-05		5:1		600	1400	23.3	69.8		2.60	960	1200		
15DW☐ -VL090-10		10:1		300	700	46.6	140		2.50	1200	1600		
15DW☐ -VL120-25		25:1	90	120	280	110	331		2.80	2700	3700		
15DW☐ -VL120-50		50:1		60	140	221	390 *3		2.50	3400	3900		
20DW☐ -VL090-03	20DWA6☐	3:1	95	1000	2333	18.1	54.4	2.47 (2.72)	2.90	810	930	5	IP65
20DW☐ -VL090-05		5:1		600	1400	30.2	90.7		2.60	960	1200		
20DW☐ -VL120-10		10:1		300	700	60.4	181		2.60	2000	2500		
20DW☐ -VL120-25		25:1	90	120	280	143	390 *3		2.80	2700	3700		
20DW☐ -VL155-50		50:1		60	140	286	840 *3		2.80	8100	8200		
25DW☐ -VL090-03	25DWA6☐	3:1	95	1000	2333	22.7	68.1	3.19 (3.44)	2.90	810	930	5	IP65
25DW☐ -VL090-05		5:1		600	1400	37.8	114		2.60	960	1200		
25DW☐ -VL120-10		10:1		300	700	75.6	227		2.60	2000	2500		
25DW☐ -VL120-25		25:1	90	120	280	179	390 *3		2.80	2700	3700		
25DW☐ -VL155-50		50:1		60	140	358	840 *3		2.80	8100	8200		
30DW☐ -VL090-03	30DWA6☐	3:1	95	1000	2333	27.9	83.8	7.00 (9.20)	2.90	810	930	5	IP65
30DW☐ -VL090-05		5:1		600	1400	46.6	140		2.60	960	1200		
30DW☐ -VL120-10		10:1		300	700	93.1	279		2.60	2000	2500		
30DW☐ -VL120-25		25:1	90	120	280	221	390 *3		2.80	2700	3700		
30DW☐ -VL155-50		50:1		60	130	441	840 *3		2.80	8100	8200		
40DW☐ -VL090-03	40DWA6☐	3:1	95	1000	2333	35.9	108	9.60 (11.8)	2.90	810	930	5	IP65
40DW☐ -VL090-05		5:1		600	1400	59.9	180		2.60	960	1200		
40DW☐ -VL120-10		10:1		300	700	120	359		2.60	2000	2500		
40DW☐ -VL155-25		25:1	90	116	280	284	840 *3		4.10	6400	6100		
40DW☐ -VL205-50		50:1		58	130	567	1701		3.80	14000	14000		
50DW☐ -VL090-03	50DWA6☐	3:1	95	1000	2333	45.0	135 *3	12.3 (14.5)	2.90	810	930	5	IP65
50DW☐ -VL090-05		5:1		600	1400	75.1	200 *3		2.60	960	1200		
50DW☐ -VL155-10		10:1		300	500	150	452		3.20	4700	4100		
50DW☐ -VL155-25		25:1	90	120	280	356	840 *3		4.10	6400	6100		
50DW☐ -VL205-50		50:1		60	140	711	1850 *3		3.80	14000	14000		

Note:

The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of ☐ in model numbers).

*1 The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

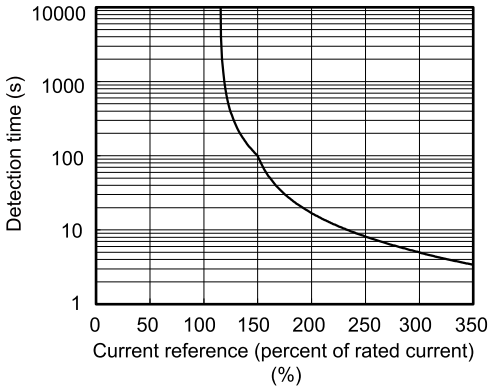
*2 The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25 °C. They are reference values only.

*3 The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.

Servomotor Overload Protection Characteristics

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

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.



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 "*Torque-Rotation Speed Characteristics on page 93*".

Allowable Load Moment of Inertia

The allowable load moments of inertia (rotor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 91*". 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 rotation speed.

If the above steps are 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).

Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ SERVOPACKs without Built-in Regenerative Resistors

The allowable load moments of inertia (rotor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 91*". Application is possible without an external regenerative resistor if the multiplier for “Without External Devices” is within the allowable value. An external regenerative resistor is required if the multiplier is not within the allowable value.

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor.

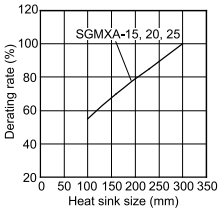
Refer to the following catalog for details on external regenerative resistors.

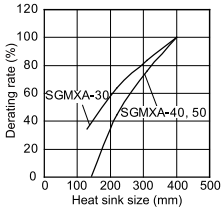
AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.





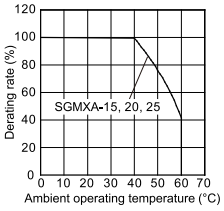
Important

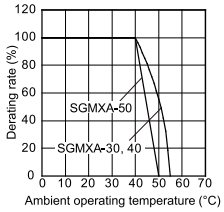
The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

■ Applications Where the Surrounding Air Temperature Exceeds 40°C

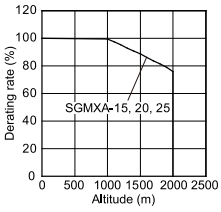
The servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

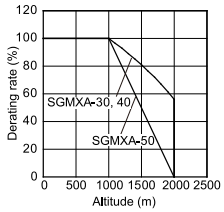




■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.





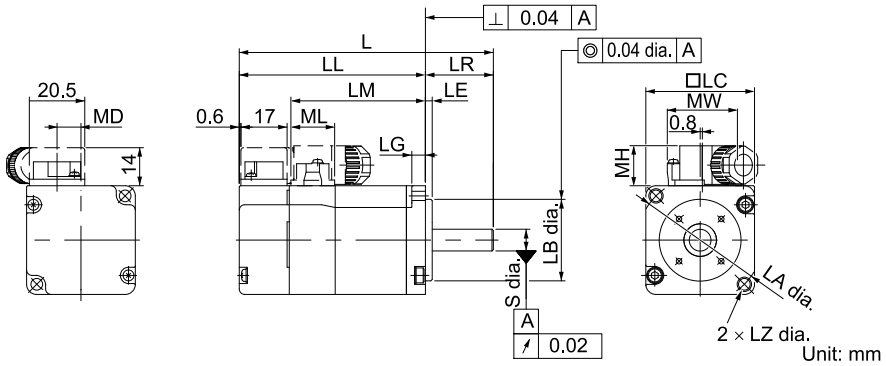
Note:

- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 95*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

External Dimensions (200 V Specification)

SGMXA-A5 to -C2

■ Σ-7 Compatible Specification



Model SGMXA-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
A5A□A2□A1	80.5 (121.0)	55.5 (96.0)	37.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3
01A□A2□A1	92.5 (133.0)	67.5 (108.0)	49.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3
C2A□A2□A1	104.5 (153.0)	79.5 (128.0)	61.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3

Model SGMXA-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
A5A□A2□A1	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.3 (0.6)
01A□A2□A1	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.4 (0.7)
C2A□A2□A1	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.5 (0.8)

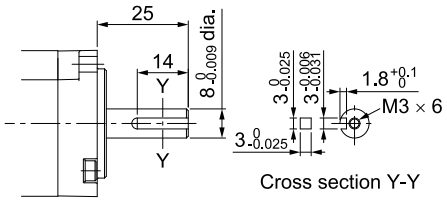
*1 For models that have a batteryless absolute encoder, L and LL are 7.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 120*

Note:

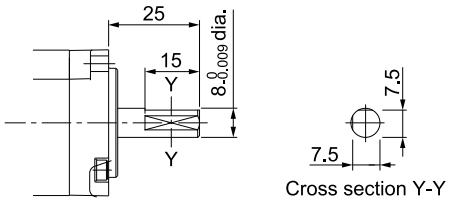
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 97*
☞ *Option Specification on page 98*

■ Shaft End Specification

- Straight with Key and Tap

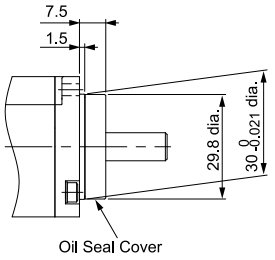


- With Two Flat Seats



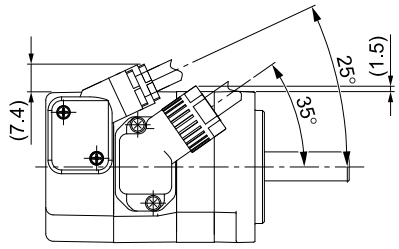
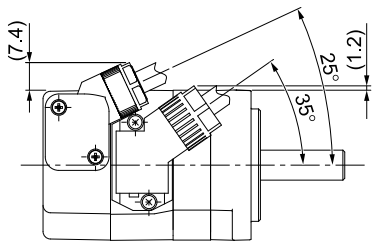
■ Option Specification

- With Oil Seal

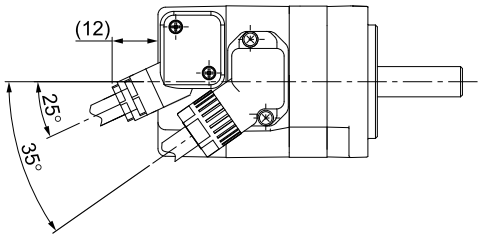
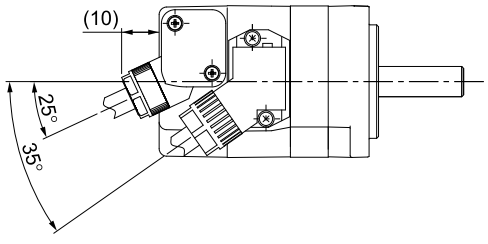


■ Connector Mounting Dimensions

- Cable Installed on Load Side

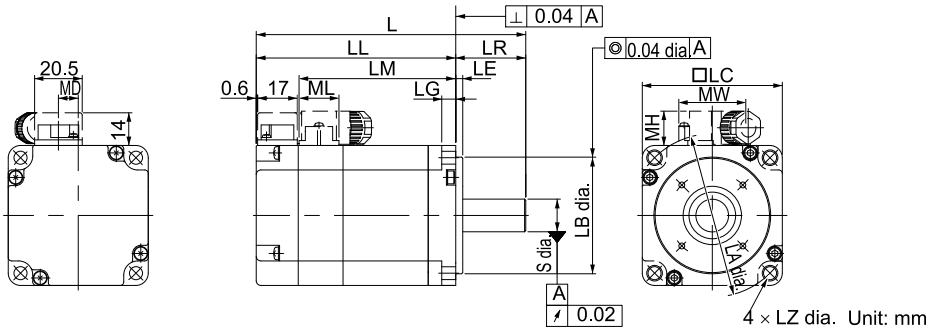
Standard Specification	Σ-7 Compatible Specification
	

- Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXA-02 to -06

■ Σ-7 Compatible Specification



Model SGMXA-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
02A□A2□A1	98.5 (139.0)	68.5 (109.0)	50.5	30	3	6	60	70	$50^{0}_{-0.025}$	5.5
04A□A2□A1	115 (155.5)	85 (125.5)	67	30	3	6	60	70	$50^{0}_{-0.025}$	5.5
06A□A2□A1	137 (191.0)	107 (161.0)	89	30	3	6	60	70	$50^{0}_{-0.025}$	5.5

Model SGMXA-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
02A□A2□A1	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	0.8 (1.4)
04A□A2□A1	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	1.2 (1.8)
06A□A2□A1	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	1.6 (2.2)

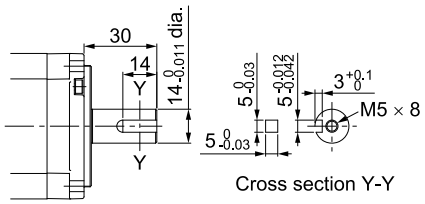
*1 For models that have a batteryless absolute encoder, L and LL are 7.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 120*

Note:

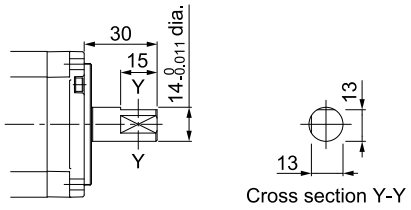
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 100*
☞ *Option Specification on page 100*

■ Shaft End Specification

- Straight with Key and Tap

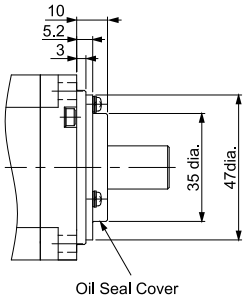


- With Two Flat Seats



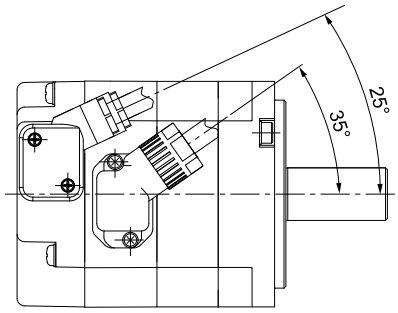
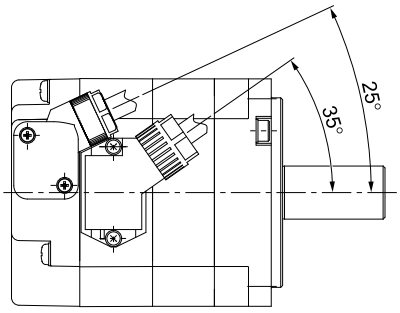
■ Option Specification

- With Oil Seal

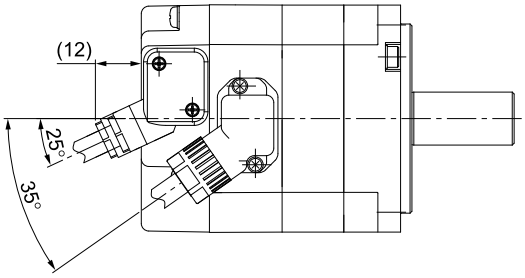
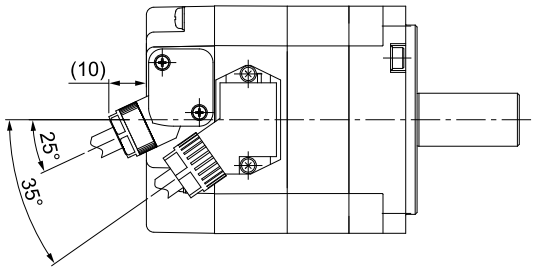


■ Connector Mounting Dimensions

- Cable Installed on Load Side

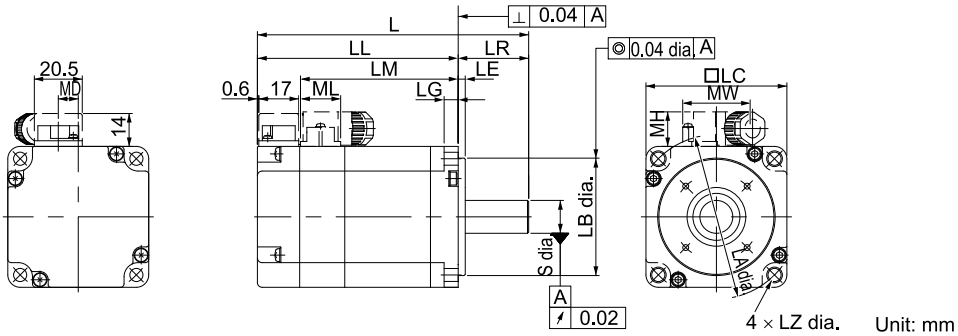
Standard Specification	Σ-7 Compatible Specification
	

- Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXA-08 and -10

■ Σ-7 Compatible Specification



Unit: mm

Model SGMXA-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
08A□A2□A1	136 (183.0)	96 (143.0)	78	40	3	8	80	90	$70^{0}_{-0.030}$	7
10A□A2□A1	161 (208.0)	121 (168.0)	103	40	3	8	80	90	$70^{0}_{-0.030}$	7

Model SGMXA-	S	MD	MW	MH	ML	Approx. Mass *1 [kg]
08A□A2□A1	$19^{0}_{-0.013}$	14	38	17	19.3	2.3 (2.9)
10A□A2□A1	$19^{0}_{-0.013}$	14	38	17	19.3	3.1 (3.7)

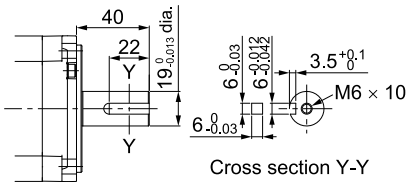
*1 For models that have a batteryless absolute encoder, L and LL are +6.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 120*

Note:

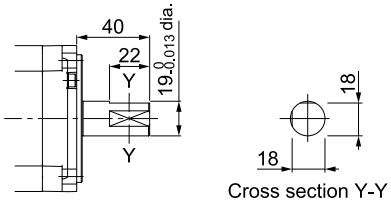
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 103*
☞ *Option Specification on page 103*

■ Shaft End Specification

• Straight with Key and Tap

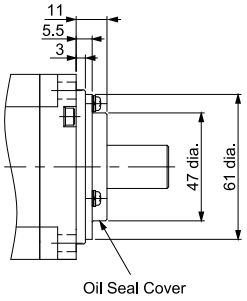


• With Two Flat Seats



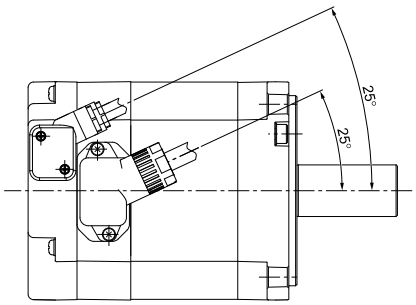
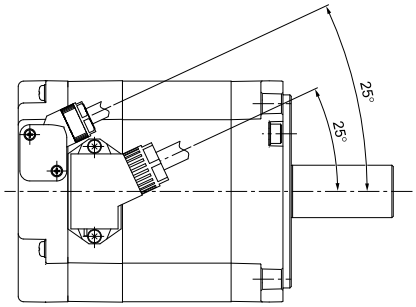
■ Option Specification

• With Oil Seal

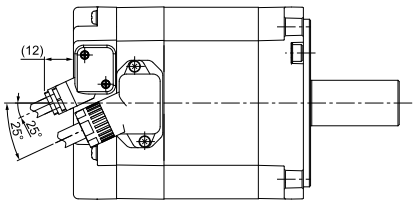
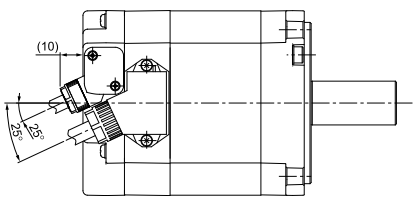


■ Connector Mounting Dimensions

- Cable Installed on Load Side

Standard Specification	Σ-7 Compatible Specification
	

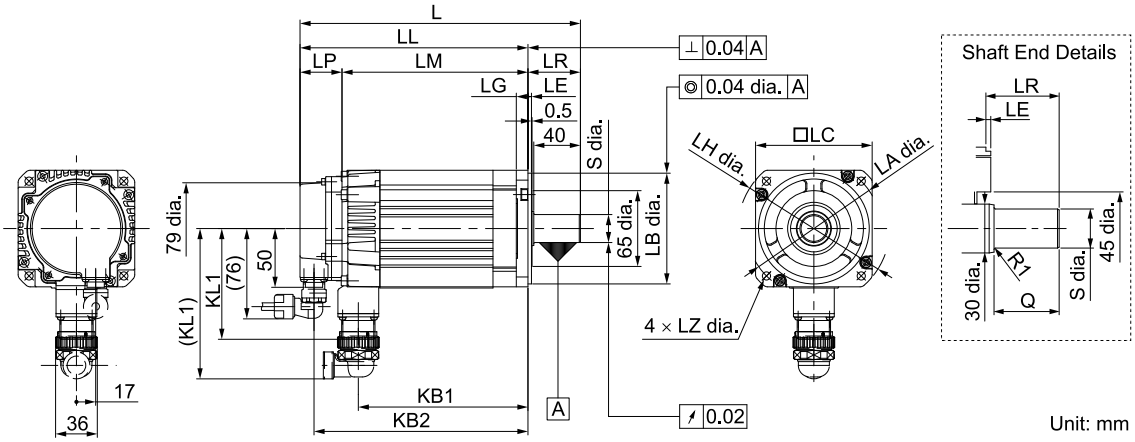
- Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXA-15 to -25

■ Servomotors without Holding Brakes

◆ Σ-7 Compatible Specification



Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1 *2)
15A□A21A1	200	155	121	34	45	107	143	95 (129)
20A□A21A1	216	171	137	34	45	123	159	95 (129)
25A□A21A1	239	194	160	34	45	146	182	95 (129)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
15A□A21A1	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	4.6
20A□A21A1	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	5.4
25A□A21A1	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 120*

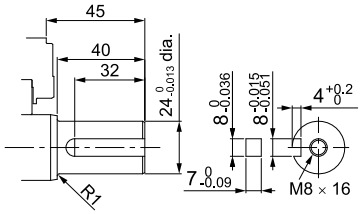
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 106*

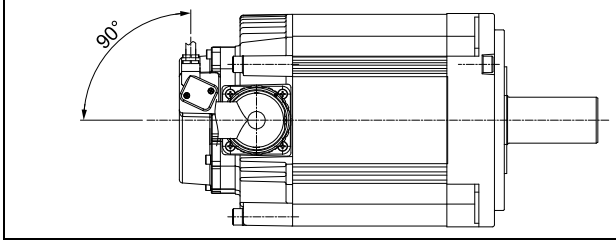
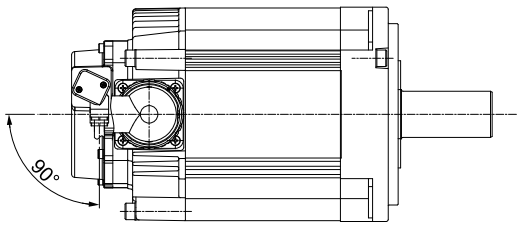
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

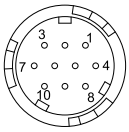
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

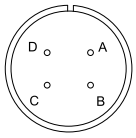
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications

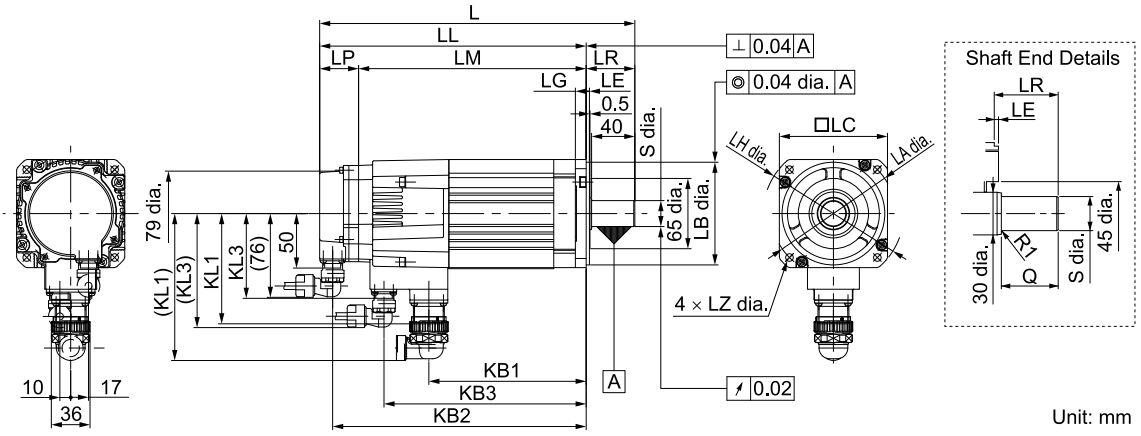


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-7 Compatible Specification



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1 *2)	KL3 (KL3 *2)
15A□A2CA1	241	196	162	34	45	107	184	139	102 (136)	80 (105)
20A□A2CA1	257	212	178	34	45	123	200	155	102 (136)	80 (105)
25A□A2CA1	290	245	211	34	45	156	233	188	102 (136)	80 (105)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
15A□A2CA1	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.0
20A□A2CA1	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8
25A□A2CA1	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	8.7

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 120*

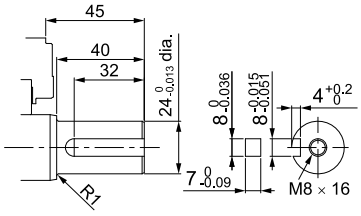
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 109*

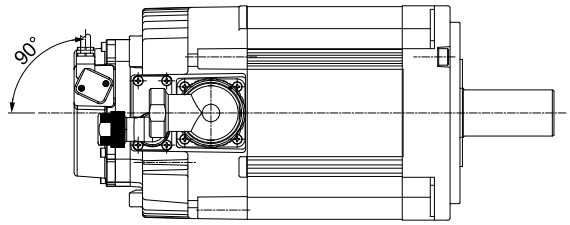
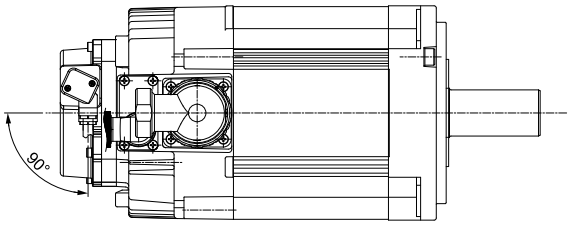
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

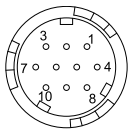
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

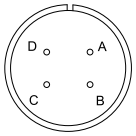
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

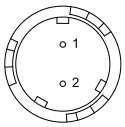
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1-R2P-D

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (right-angle type), CM10-SP2S-□-D (straight), CMV1-AP2S-□-D (right-angle type), CMV1-SP2S-□-D (straight), CMV1S-AP2S-□-D (right-angle type), CMV1S-SP2S-□-D (straight)

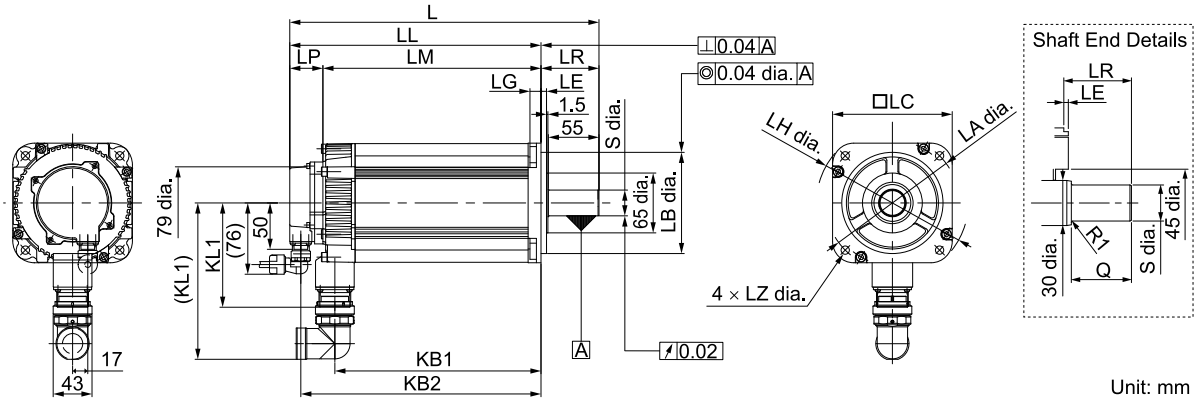
(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

SGMXA-30 to -50

■ Servomotors without Holding Brakes

◆ Σ-7 Compatible Specification



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1 *2)
30A□A21A1	255	192	158	34	63	145	180	114 (170)
40A□A21A1	294	231	197	34	63	184	219	114 (170)
50A□A21A1	334	271	237	34	63	224	259	114 (170)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
30A□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	10.5
40A□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13.5
50A□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16.5

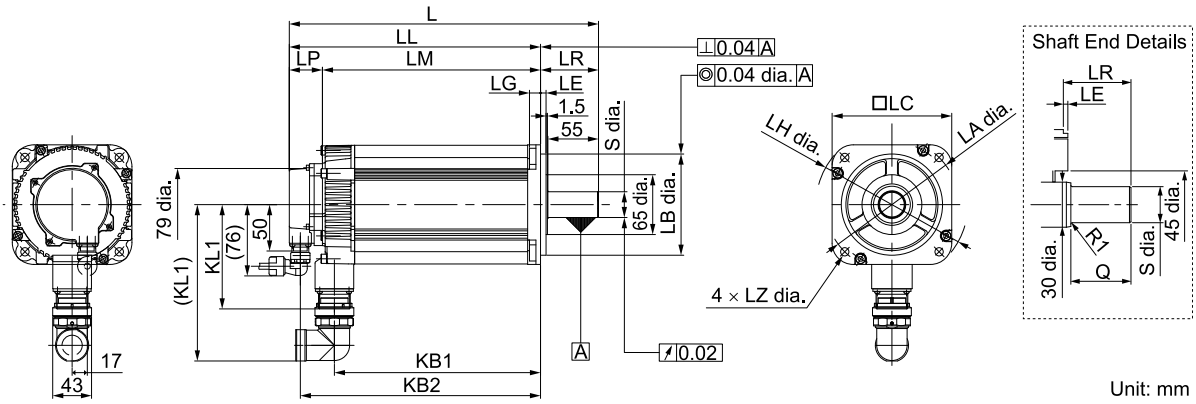
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are +8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 120*

*2 These are reference dimensions when the JL10 connector (flexible type) is connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 112*

◆ Σ-7 Compatible Specification



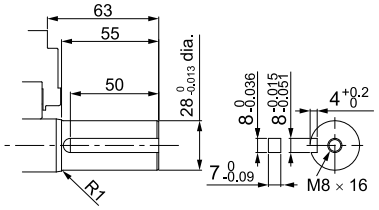
Note:

The difference from the model with standard specifications is the shape of the encoder cable connector.

The dimensions for non-connector parts are identical to those for models with standard specifications.

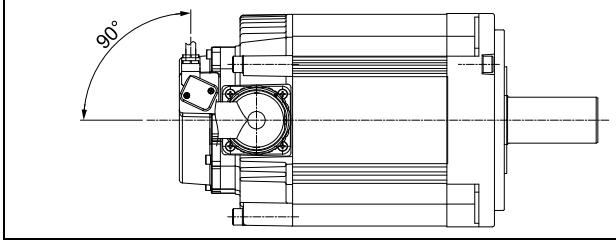
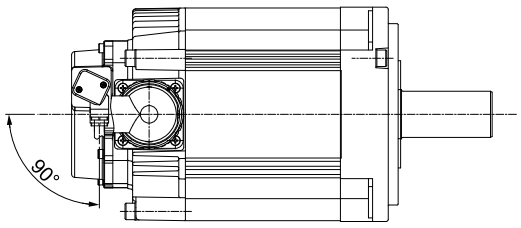
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

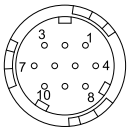
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

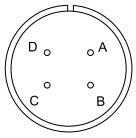
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications

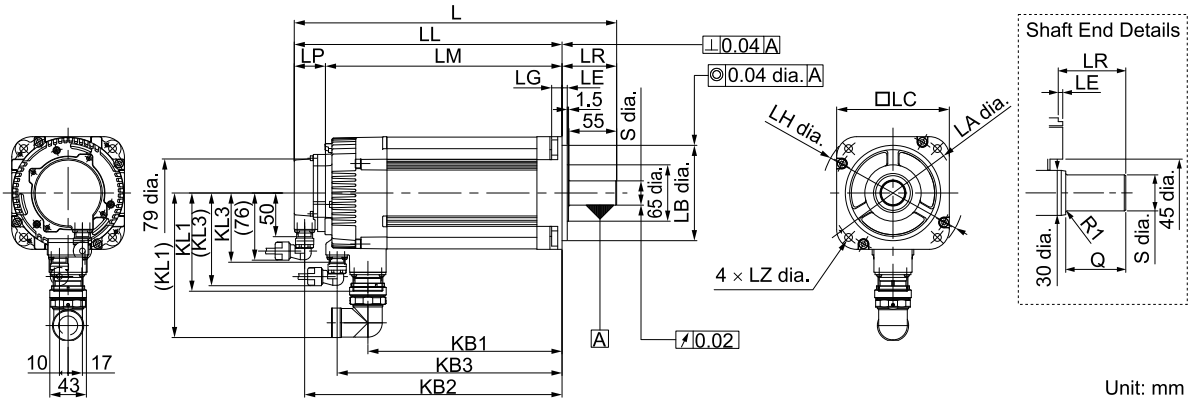


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-7 Compatible Specification



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1 *2)	KL3 (KL3 *2)
30A□A2CA1	291	228	194	34	63	145	216	181	114 (170)	81 (106)
40A□A2CA1	330	267	233	34	63	184	255	220	114 (170)	81 (106)
50A□A2CA1	370	307	273	34	63	224	295	260	114 (170)	81 (106)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
30A□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13
40A□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16
50A□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	19

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are +8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 120*

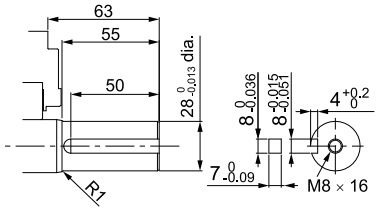
*2 These are reference dimensions when the JL10 connector (flexible type) is connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 115*

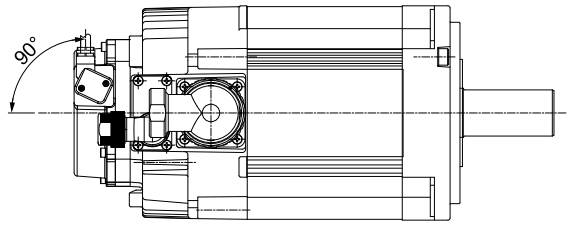
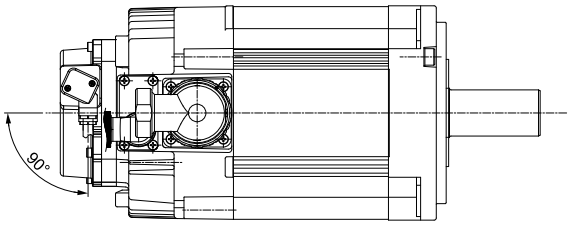
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

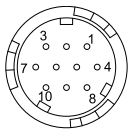
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

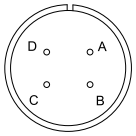
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

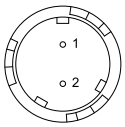
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1-R2P-D

Applicable plug (not provided by Yaskawa)

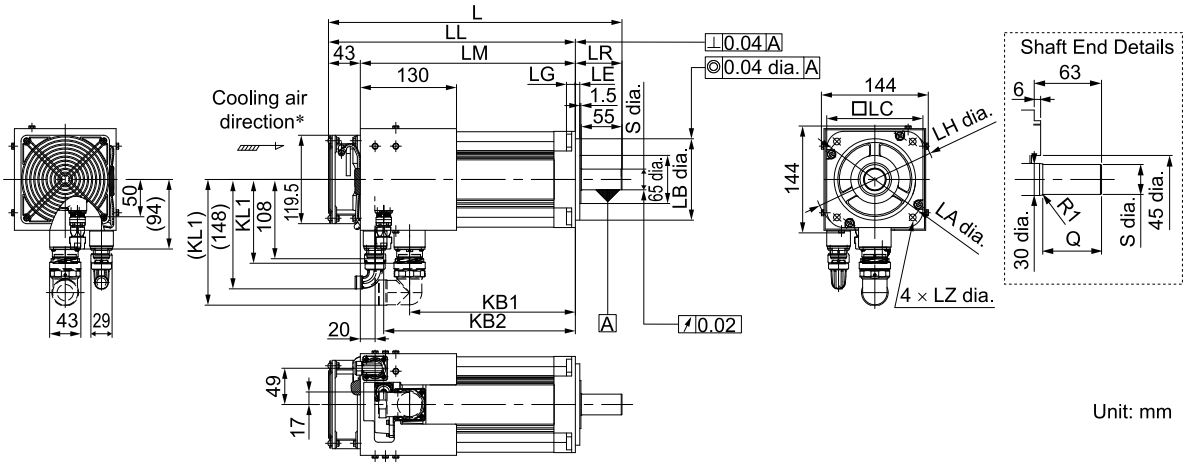
Plug: CM10-AP2S-□-D (right-angle type), CM10-SP2S-□-D (straight), CMV1-AP2S-□-D (right-angle type), CMV1-SP2S-□-D (straight), CMV1S-AP2S-□-D (right-angle type), CMV1S-SP2S-□-D (straight)

(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

SGMXA-70 (Without Holding Brakes)

■ Σ-7 Compatible Specification



Note:

Mount the servomotor 70 mm or more from walls, machines, and other objects to ensure sufficient cooling air.

Model SGMXA-	L	LL	LM	LR	KB1	KB2 *1	KL1 (KL1)
70A□A21A1	397	334	291	63	224	259	114 (170)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
70A□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	18.5

*1 For models that have a batteryless absolute encoder, KB2 is +8 mm greater than the given value. Refer to the following section for the values for individual models.

☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 120*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.

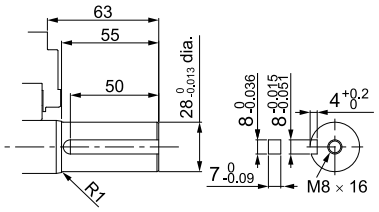
☞ *Shaft End Specification on page 118*

■ Cooling Fan Specifications

- Single-phase 220 VAC
- 50/60 Hz
- 17/15 W
- 0.11/0.09 A

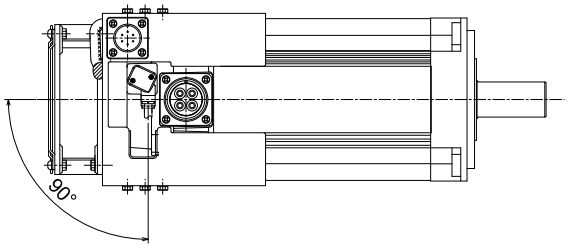
■ Shaft End Specification

- Straight with Key and Tap



■ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

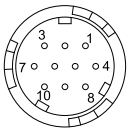


For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

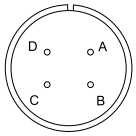
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

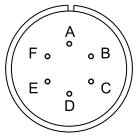
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Fan Connector



A	Fan motor	D	–
B	Fan motor	E	–
C	–	F	FG (frame ground)

Receptacle: MS3102A14S-6P
Applicable plug (not provided by Yaskawa)
Plug: MS3108B14S-6S
Cable clamp: MS3057-6A
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Note:

The motor connector (receptacle) complies with RoHS Directives.

Contact each connector manufacturer for customer-prepared cable connectors that comply with RoHS Directives.

Dimensions of Servomotors with Batteryless Absolute Encoders

Model SGMXA-	L	LL	LP	KB2	Approx. Mass [kg]
A5AWA□□□□	88 (128.5)	63 (103.5)	–	–	0.4 (0.7)
01AWA□□□□	100 (140.5)	75 (115.5)	–	–	0.5 (0.8)
C2AWA□□□□	112 (160.5)	87 (135.5)	–	–	0.6 (0.9)
02AWA□□□□	106 (146.5)	76 (116.5)	–	–	0.9 (1.5)
04AWA□□□□	122.5 (163.0)	92.5 (133.0)	–	–	1.3 (1.9)
06AWA□□□□	144.5 (198.5)	114.5 (168.5)	–	–	1.7 (2.3)
08AWA□□□□	142.5 (189.5)	102.5 (149.5)	–	–	2.4 (3.0)
10AWA□□□□	167.5 (214.5)	127.5 (174.5)	–	–	3.2 (3.8)
15AWA□□□□	208 (249)	163 (204)	42 (42)	151 (192)	4.6 (6.0)
20AWA□□□□	224 (265)	179 (220)	42 (42)	167 (208)	5.4 (6.8)
25AWA□□□□	247 (298)	202 (253)	42 (42)	190 (241)	6.8 (8.7)
30AWA□□□□	263 (299)	200 (236)	42 (42)	188 (224)	10.5 (13)
40AWA□□□□	302 (338)	239 (275)	42 (42)	227 (263)	13.5 (16)
50AWA□□□□	342 (378)	279 (315)	42 (42)	267 (303)	16.5 (19)
70AWA□□□□	397	334	–	269	18.5

Note:

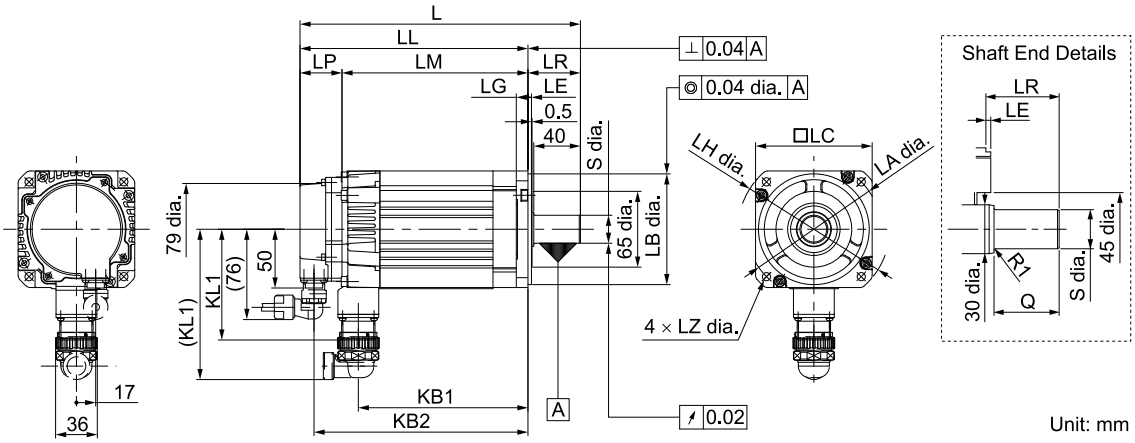
The values in parentheses are for servomotors with holding brakes.

External Dimensions (400 V Specification)

SGMXA-15 to -25

■ Servomotors without Holding Brakes

◆ Σ-V Compatible Specification



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1 *2)
15D□A□1□□	200	155	121	34	45	107	143	95 (129)
20D□A□1□□	216	171	137	34	45	123	159	95 (129)
25D□A□1□□	239	194	160	34	45	146	182	95 (129)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
15D□A□1□□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	4.6
20D□A□1□□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	5.4
25D□A□1□□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are +8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 133*

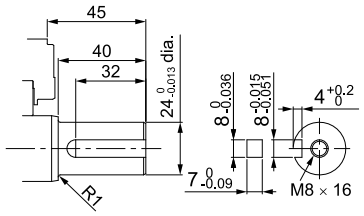
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 121*

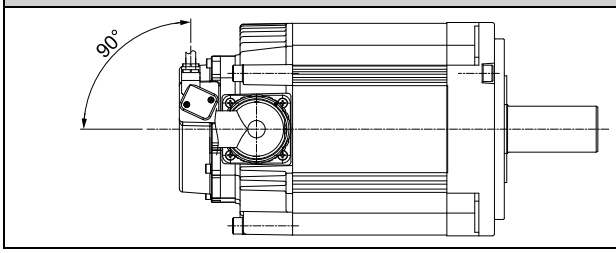
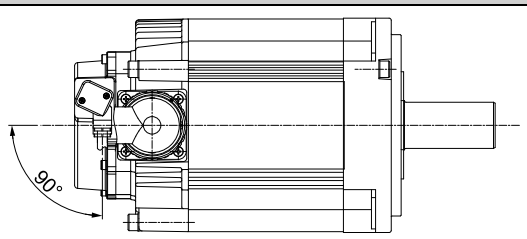
◆ Shaft End Specification

- Straight with Key and Tap


45
40
32
24 0 -0.013 dia.
8 0 -0.036
8 -0.015 -0.051
4 +0.2 0
7 0 -0.09
R1
M8 × 16

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

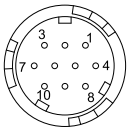
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

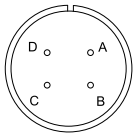
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications

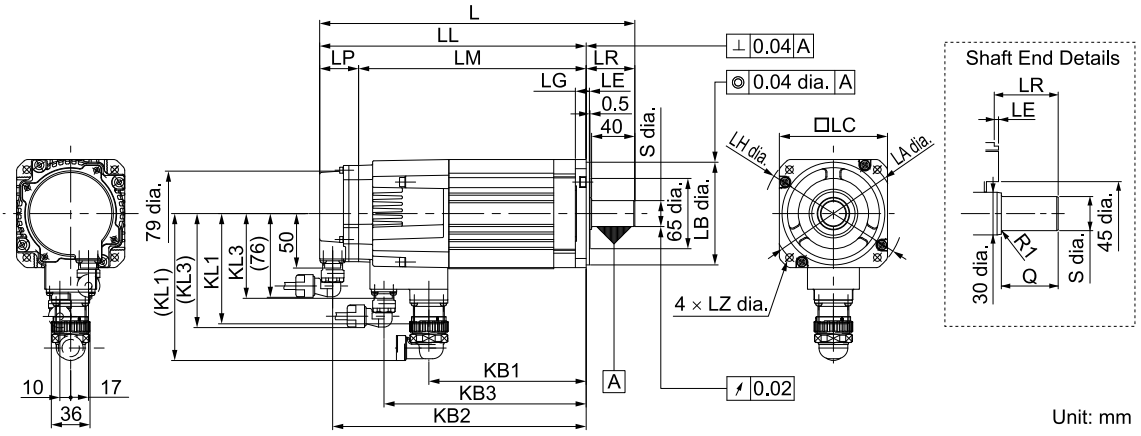


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-V Compatible Specification



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1 *2)	KL3 (KL3 *2)
15D□A□1□□	241	196	162	34	45	107	184	139	102 (136)	80 (105)
20D□A□1□□	257	212	178	34	45	123	200	155	102 (136)	80 (105)
25D□A□1□□	290	245	211	34	45	156	233	188	102 (136)	80 (105)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
15D□A□1□□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.0
20D□A□1□□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8
25D□A□1□□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	8.7

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are +8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 133*

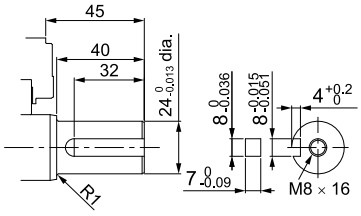
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 125*

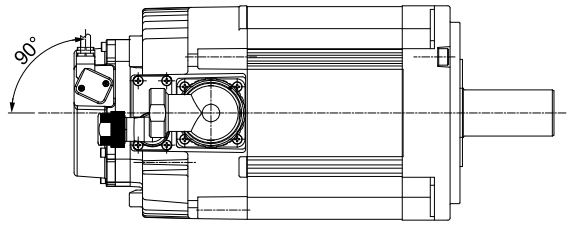
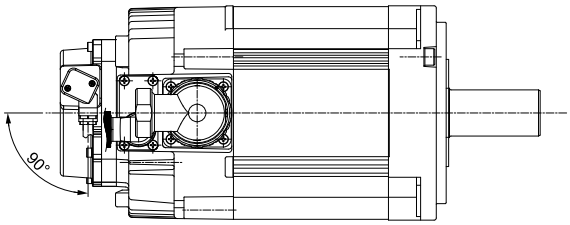
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

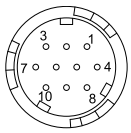
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

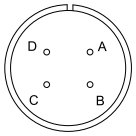
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

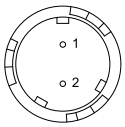
- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1-R2P-D

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (right-angle type), CM10-SP2S-□-D (straight), CMV1-AP2S-□-D (right-angle type), CMV1-SP2S-□-D (straight), CMV1S-AP2S-□-D (right-angle type), CMV1S-SP2S-□-D (straight)

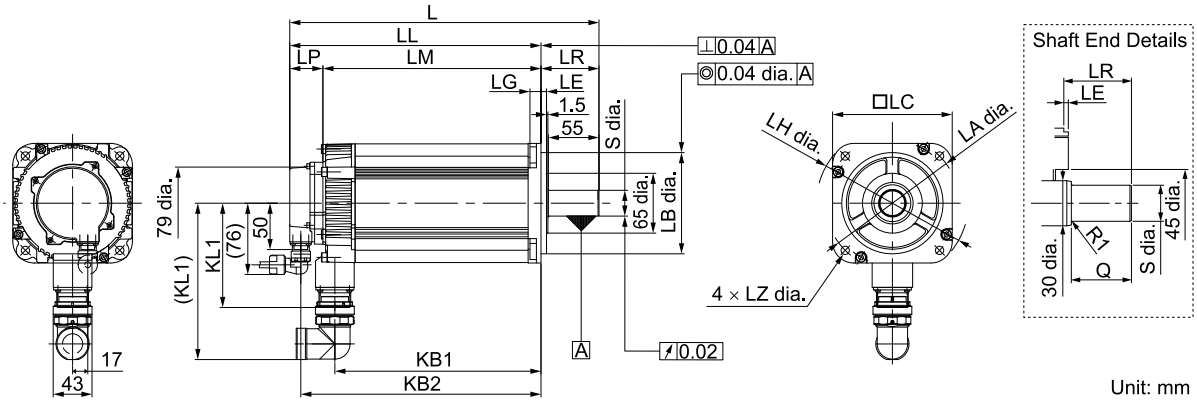
(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

SGMXA-30 to -50

■ Servomotors without Holding Brakes

◆ Σ-V Compatible Specification



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1 *2)
30D□A□1□□	255	192	158	34	63	145	180	114 (170)
40D□A□1□□	294	231	197	34	63	184	219	114 (170)
50D□A□1□□	334	271	237	34	63	224	259	114 (170)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
30D□A□1□□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	10.5
40D□A□1□□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13.5
50D□A□1□□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16.5

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are +8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 133*

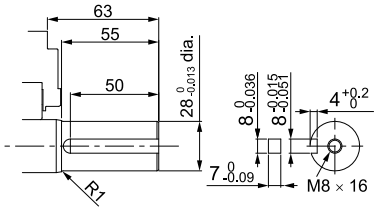
*2 These are reference dimensions when the JL10 connector (flexible type) is connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 128*

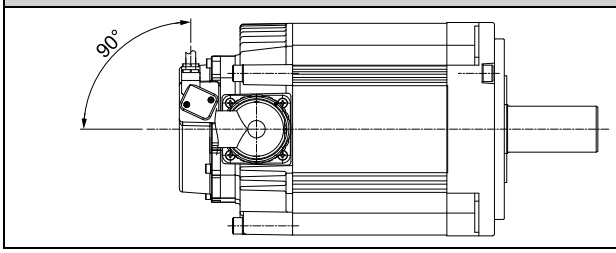
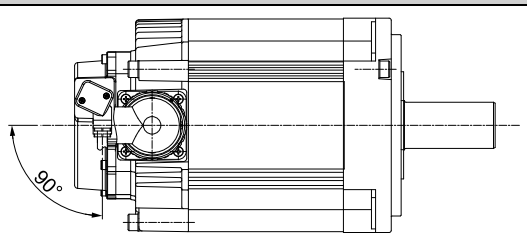
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

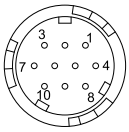
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

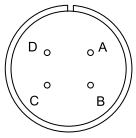
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications

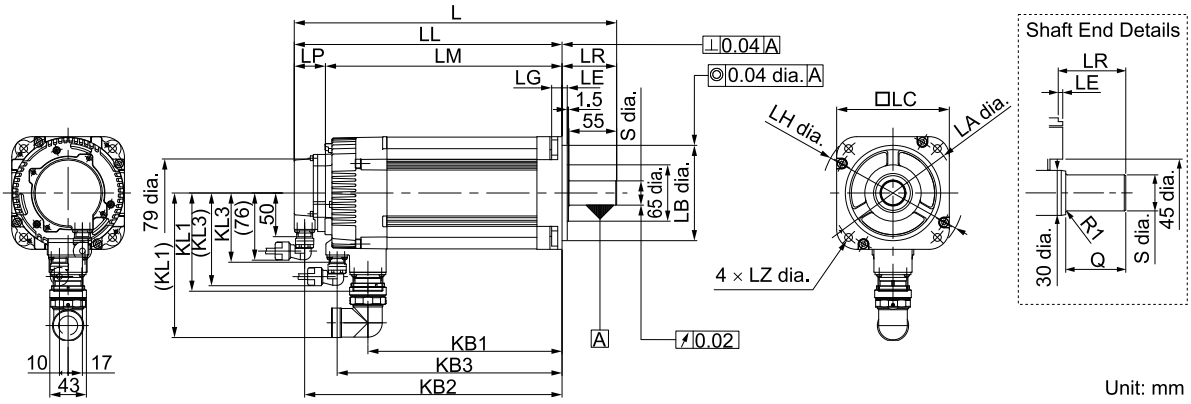


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-V Compatible Specification



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1 *2)	KL3 (KL3 *2)
30D□A□C□□	291	228	194	34	63	145	216	181	114 (170)	81 (106)
40D□A□C□□	330	267	233	34	63	184	255	220	114 (170)	81 (106)
50D□A□C□□	370	307	273	34	63	224	295	260	114 (170)	81 (106)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
30D□A□C□□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13
40D□A□C□□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16
50D□A□C□□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	19

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are +8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 133*

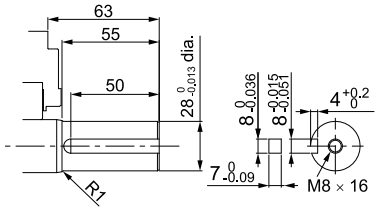
*2 These are reference dimensions when the JL10 connector (flexible type) is connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 131*

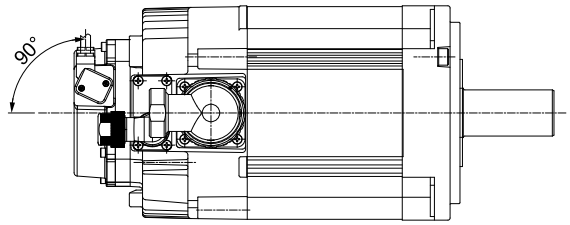
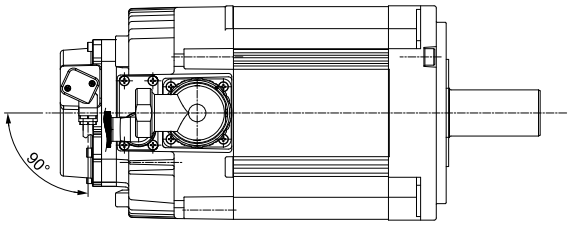
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

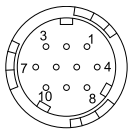
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 273*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

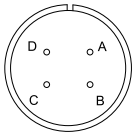
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

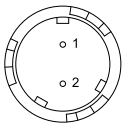
- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1-R2P-D

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (right-angle type), CM10-SP2S-□-D (straight), CMV1-AP2S-□-D (right-angle type), CMV1-SP2S-□-D (straight), CMV1S-AP2S-□-D (right-angle type), CMV1S-SP2S-□-D (straight)

(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

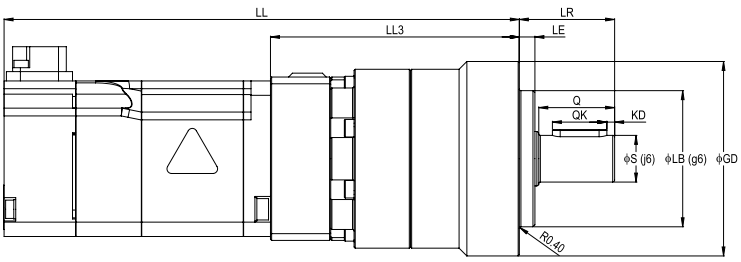
Dimensions of Servomotors with Batteryless Absolute Encoders

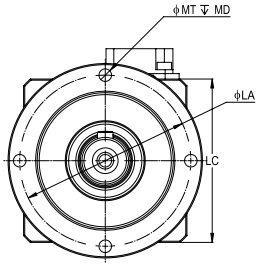
Model SGMXA-	L	LL	LP	KB2	Approx. Mass [kg]
15DWA□□□□	208 (249)	163 (204)	42 (42)	151 (192)	4.6 (6.0)
20DWA□□□□	224 (265)	179 (220)	42 (42)	167 (208)	5.4 (6.8)
25DWA□□□□	247 (298)	202 (253)	42 (42)	190 (241)	6.8 (8.7)
30DWA□□□□	263 (299)	200 (236)	42 (42)	188 (224)	10.5 (13)
40DWA□□□□	302 (338)	239 (275)	42 (42)	227 (263)	13.5 (16)
50DWA□□□□	342 (378)	279 (315)	42 (42)	267 (303)	16.5 (19)

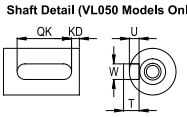
Note:

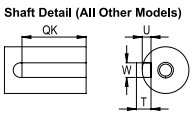
The values in parentheses are for servomotors with holding brakes.

SGMXA Gear Motor External Dimensions









100 W Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	01A□ -VL050-03	133.5 (174)	65	24.5	4	12	35	50	42	44	M4	8	19.5	14	2	4	2.5	4
	01A□ -VL050-05																	
	01A□ -VL050-10																	
	01A□ -VL050-25	150 (190.5)	81.5															
	01A□ -VL070-50	163.5 (204)	95	36	5	16	52	70	52	62	M5	10	28	22	0	5	3	5

200 W Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	02A□ -VL050-03	137.5 (178)	68	24.5	4	12	35	50	65	44	M4	8	19.5	14	2	4	2.5	4
	02A□ -VL050-05																	
	02A□ -VL050-10																	
	02A□ -VL070-25	170.5 (211)	101	36	5	16	52	70		62	M5	10	28	22	0	5	3	5
	02A□ -VL070-50																	

400 W Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	04A□ -VL050-03	153.5 (194)	68	24.5	4	12	35	50	65	44	M4	8	19.5	14	2	4	2.5	4
	04A□ -VL050-05																	
	04A□ -VL070-10	165.5 (206)	80	36	5	16	52	70		62	M5	10	28	22	0	5	3	5
	04A□ -VL070-25	186.5 (227)	101															
	04A□ -VL090-50	204.5 (245)	119	46	7	22	68	90		80	M6	12	36	28		6	3.5	6

750 W Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	08A□ -VL070-03	191 (238)	94	36	5	16	52	70	80	62	M5	10	28	22	0	5	3	5
	08A□ -VL070-05																	
	08A□ -VL090-10	204 (251)	107	46	7	22	68	90		80	M6	12	36	28		6	3.5	6
	08A□ -VL090-25	226 (273)	129															
	08A□ -VL120-50	241.5 (288.5)	144.5	70	9	32	90	120		108	M8	16	58	45		10	5	8

1.5 kW Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
400 V	15D□ -VL090-03	230.5 (263.50	107	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	15D□ -VL090-05																	
	15D□ -VL090-10																	
	15D□ -VL120-25	268 (301)	144.5	70	9	32	90	120		108	M8	16	58	45		10	5	8
	15D□ -VL155-50	293 93260	169.5	97	12	40	120	155		140	M10	20	82	65		12	5	8

2.0 kW Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	20A□-VL090-03	292 (333)	119	46	7	22	68	90	100	80	M6	12	36	28	0	6	3.5	6
	20A□-VL090-05																	
	20A□-VL120-10	302 (343)	129	70	9	32	90	120		108	M8	16	58	45		10	5	8
	20A□-VL120-25	329 (370.5)	156.5															
	20A□-VL155-50	354.5 (395.5)	181.5	97	12	40	120	155		140	M10	20	82	65		12	5	8
400 V	20D□-VL090-03	294 (3350	119	46	7	22	68	90	100	80	M6	12	36	28	0	6	4	6
	20D□-VL090-05																	
	20D□-VL120-10	304 (345)	129	70	9	32	90	120		108	M8	16	58	45		10	5	8
	20D□-VL120-25	331.5 (372.5)	156.5															
	20D□-VL155-50	356.5 (397.5)	181.5	97	12	40	120	155		140	M10	20	82	65		12	5	8

2.5 kW Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	25A□-VL090-03	315 (366)	119	46	7	22	68	90	100	80	M6	12	36	28	0	6	3.5	6
	25A□-VL090-05																	
	25A□-VL120-10	325 (376)	129	70	9	32	90	120		108	M8	16	58	45		10	5	8
	25A□-VL120-25	352.5 (403.5)	156.5															
	25A□-VL155-50	377.5 (428.5)	181.5	97	12	40	120	155		140	M10	20	82	65		12		
400 V	25D□-VL090-03	317 (368)	119	46	7	22	68	90	100	80	M6	12	36	28	0	6	3.5	6
	25D□-VL090-05																	
	25D□-VL120-10	327 (378)	129	70	9	32	90	120		108	M8	16	58	45		10	5	8
	25D□-VL120-25	354.5 (405.5)	156.5															
	25D□-VL155-50	377.5 (430.5)	181.5	97	12	40	120	155		140	M10	20	82	65		12		

3.0 kW Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	30A□-VL090-03	318 (356)	124	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	30A□-VL090-05																	
	30A□-VL120-10	328 (366)	134	70	9	32	90	120		108	M8	16	58	45		10	5	8
	30A□-VL120-25	355.5 (393.5)	161.5															
	30A□-VL155-50	380.5 (418.5)	186.5	97	12	40	120	155		140	M10	20	82	65		12		
400 V	30D□-VL090-03	320 (356	124	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	30D□-VL090-05																	
	30D□-VL120-10	330 (366)	134	70	9	32	90	120		108	M8	16	58	45		10	5	8
	30D□-VL120-25	357.5 (393.5)	161.5															
	30D□-VL155-50	382.5 (418.5)	186.5	97	12	40	120	155		140	M10	20	82	65		12		

4.0 kW Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	40A□-VL090-03	357 (393)	124	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	40A□-VL090-05																	
	40A□-VL120-10	367 (403)	134	70	9	32	90	120		108	M8	16	58	45		10	5	8
	40A□-VL155-25	419.5 (455.5)	186.5	97	12	40	120	155		140	M10	20	82	65		12		
	40A□-VL205-50	449 (485)	216	100	15	55	160	205		184	M12	22				16	6	10
400 V	40D□-VL090-03	359 (395)	124	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	40D□-VL090-05																	
	40D□-VL120-10	369 (405)	134	70	9	32	90	120		108	M8	16	58	45		10	5	8
	40D□-VL155-25	421.5 (457.5)	186.5	97	12	40	120	155		140	M10	20	82	65		12		
	40D□-VL205-50	451 (487)	216	100	15	55	160	205		184	M12	22				16	6	10

5.0 kW Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	50A□-VL090-03	397 (433)	124	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	50A□-VL090-05																	
	50A□-VL155-10	425 (461)	152	97	12	40	120	155		140	M10	20	82	65		12	5	8
	50A□-VL155-25	459.5 (495.5)	186.5															
	50A□-VL205-50	489 (525)	216	100	15	55	160	205		184	M12	22				16	6	10
400 V	50D□-VL090-03	399 (435)	124	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	50D□-VL090-05																	
	50D□-VL155-10	427 (463)	152	97	12	40	120	155		140	M10	20	82	65		12	5	8
	50D□-VL155-25	461.5 (497.5)	186.5															
	50D□-VL205-50	491 (527)	216	100	15	55	160	205		184	M12	22				16	6	10

7.0 kW Models

Model SXA		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	70A□-VL120-03	468	134	70	9	32	90	120	130	108	M8	16	58	45	0	10	5	8
	70A□-VL120-05																	
	70A□-VL155-10	486	152	97	12	40	120	155		140	M10	20	82	65		12		
	70A□-VL205-25	550	216	100	15	55	160	205		184	M12	22				16	6	10
	70A□-VL235-50	559.5	225.5	126	18	75	180	235		210	M16	28	105	85		20	7.5	12
400 V	70D□-VL120-03	468	134	70	9	32	90	120	130	108	M8	16	58	45	0	10	5	8
	70D□-VL120-05																	
	70D□-VL155-10	486	152	97	12	40	120	155		140	M10	20	82	65		12		
	70D□-VL205-25	550	216	100	15	55	160	205		184	M12	22				16	6	10
	70D□-VL235-50	559.5	225.5	126	18	75	180	235		210	M16	28	105	85		20	7.5	12

SGMXP

Model Designations

SGMXP - 01 A W A 2 1 A 1

Σ-X-Series Servomotor SGMXP model

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

1st+2nd digits Rated Output

Code	Specification
01	100 W
02	200 W
04	400 W
08*	750 W
15*	1.5 kW

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

4th digit Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

5th digit Design Revision Order

A

6th digit Shaft End

Code	Specification
2	Straight without key
6	Straight with key and tap

7th digit Options

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

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ-7 compatible
3	Standard Safety
4	Σ-7 compatible Safety

Limited Stock

Non-Stock

* 750 W and 1.5 kW models only available with 400 V power supply

The SGMXP gear motor product family pairs SGMXP servo motors with high precision, low backlash inline planetary gear heads resulting in a portfolio of rotary actuators fit for a wide range of applications. The family of gear motors has been thoroughly tested and adheres to the high levels of quality and performance expected from Yaskawa.

Gear Motor Model Designation

SXP 01 A W C - VL 050 - 05

Σ-X Series Gear Motors: SGMXP

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

1st+2nd digits Rated Output

Code	Specification
01	100 W
02	200 W
04	400 W
08*	750 W
15*	1.5 kW

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

* 750 W and 1.5 kW models only available with 400 V power supply

4th digit Encoder Option

Code	Specification
W	Standard encoder
H	Small encoder

5th digit Brake Option

Code	Specification
Blank	No brake
C	24 V Brake

6th digit Gear box backlash

Code	Specification
VL	5 arc-min backlash

7th digit Gear head frame size

Code	Specification
050	50 mm
070	70 mm
090	90 mm
120	120 mm

8th digit Gear Ratio

Code	Specification
03	3:1 Ratio
05	5:1 Ratio
10	10:1 Ratio
25	25:1 Ratio
50	50:1 Ratio

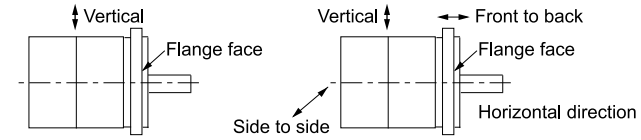
Specifications and Ratings (200 V Specification)

Specifications

Voltage		200 V				
Model SGMXP-		01A	02A	04A	08A	15A
Time Rating		Continuous				
Thermal Class		UL: B, CE: B				
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				
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (60°C max.) *3				
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 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)				
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²				
	Number of Impacts	2 times				
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s²				
Applicable SERVOPACKs	SGDXS	R90A	2R8A	2R8A	5R5A	120A
	SGDXW	1R6A *4, 2R8A *4	2R8A, 5R5A *4, 7R6A *4	2R8A, 5R5A *4, 7R6A *4	5R5A, 7R6A	–
	SGDXT-	1R6A *4, 2R8A *4	2R8A	2R8A	–	–

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 145*

*4 If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Σ-XS SERVOPACK.

Servomotor Ratings

Voltage			200 V				
Model SGMXP-			01A	02A	04A	08A	15A
Rated Output *1		W	100	200	400	750	1500
Rated Torque *1, *2		N·m	0.318	0.637	1.27	2.39	4.77
Instantaneous Maximum Torque *1		N·m	1.11	2.23	4.46	7.16	14.3
Rated Current *1		Arms	0.76	1.5	2.4	5.4	9.2
Instantaneous Maximum Current *1		Arms	3.2	5.9	9.3	16.5	28.0
Rated Rotation Speed *1		min^{-1}	3000				
Continuous Allowable Rotation Speed		min^{-1}	7000		6000		
Maximum Rotation Speed *1		min^{-1}	7000				
Torque Constant		N·m/Arms	0.453	0.467	0.587	0.476	0.559
Rotor Moment of Inertia	Without Holding Brakes	$\times 10^{-4}$ $kg·m^2$	0.0594	0.263	0.409	2.10	4.02
	With Holding Brakes		0.0922	0.423	0.569	2.98	4.90
	Without Holding Brake and with Batteryless Absolute Encoder		0.0631	0.267	0.413	2.10	4.02
	With Holding Brake and Batteryless Encoder		0.0959	0.427	0.573	2.98	4.90
Rated Power Rate *1	Without Holding Brakes	kW/s	17.0	15.4	39.4	27.1	56.5
	With Holding Brakes		8.5	9.6	28.3	19.2	46.5
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	53500	24200	31000	11300	11800
	With Holding Brakes		26600	15000	22300	8000	9700
Derating Rate for Servomotor with Oil Seal		%	90		95		
Heat Sink Size (aluminum) *3		mm	250 × 250 × 6			300 × 300 × 12	
Protective Structure *4			Totally enclosed, self-cooled, IP67				
Holding Brake Specifications *5	Rated Voltage	V	24 VDC ±10%				
	Capacity	W	6	7.4		7.5	
	Holding Torque	N·m	0.318	0.637	1.27	2.39	4.77
	Coil Resistance	Ω (at 20°C)	96	77.8		76.8	
	Rated Current	A (at 20°C)	0.25	0.31			
	Time Required to Release Brake	ms	80				
	Time Required to Brake	ms	100				
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *6	At 6000 min^{-1}		25 times	15 times	10 times	5 times	
	At 7000 min^{-1}		25 times	10 times	6 times	5 times	
	With External Regenerative Resistor and External Dynamic Brake Resistor *7	At 6000 min^{-1}	25 times	15 times	10 times	5 times	
		At 7000 min^{-1}					

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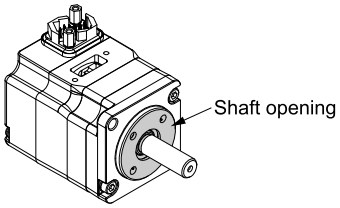
Voltage			200 V				
Model SGMXP-			01A	02A	04A	08A	15A
Allowable Shaft Loads *8	LF	mm	20	25		35	
	Allowable Radial Load	N	78	245		392	490
	Allowable Thrust Load	N	49	68		74	147

*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 an aluminum heat sink of the dimensions given in the table.

*3 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 145*

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



*5 Observe the following precautions if you use a servomotor with a holding brake.

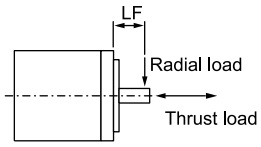
- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*6 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*7 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

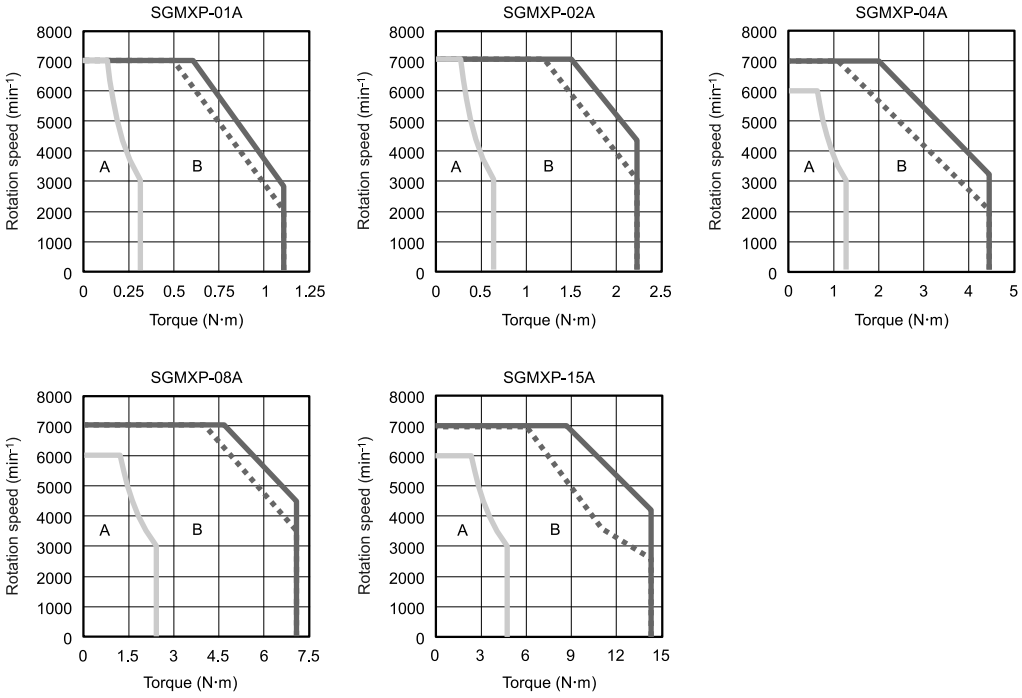
- SGDXS-R70A□□A0020 to -2R8A□□A0020
- SGDXW-1R6A□□A0020, -2R8A□□A0020
- SGDXT-1R6A□□A0020, -2R8A□□A0020

*8 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



Torque-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V



Note:

- These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
- The characteristics in the intermittent duty zone depend on the power supply voltage.
- If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
- If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
- The SGMXP-15A can use a single-phase power input in combination with the SGDXS-120A□□A0008.

Gear Motor Ratings (200V Models)

Gear Motor Model Number SXP___	Base Servo Motor Model SGMXP-	Gear Ratio	Gearing Efficiency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10 -4 kg.m2)	Gearhead Inertia (x 10 -4 kg.m2)	Allowable Radial Load (N)	Allowable Axial Load (N)	Backlash (arc-min)	Class
01AW☐ -VL050-03	01AW-A6☐	3:1	95	1000	2333	0.91	3.16	0.0706 (0.0786)	0.053	240	270	5	IP65
01AW☐ -VL050-05		5:1		600	1400	1.51	5.27		0.036	290	330	5	
01AW☐ -VL050-10		10:1		300	700	3.02	10.5		0.030	360	450	5	
01AW☐ -VL050-25		25:1	90	120	280	7.16	21.0 *3		0.034	490	640	7	
01AW☐ -VL070-50		50:1		60	140	14.3	50.0		0.051	1100	1100	5	
02AW☐ -VL050-03	02AW-A6☐	3:1	95	1000	2333	1.82	6.36	0.267 (0.327)	0.170	240	270	5	IP65
02AW☐ -VL050-05		5:1		600	1400	3.03	10.6		0.150	290	330		
02AW☐ -VL070-10		10:1		300	700	6.05	21.2		0.170	640	530		
02AW☐ -VL070-25		25:1	90	120	280	14.3	50.2		0.170	870	790		
02AW☐ -VL070-50		50:1		60	140	28.7	66.0 *3		0.160	1100	1100		
04AW☐ -VL050-03	04AW-A6☐	3:1	95	1000	2333	3.62	12.7	0.490 (0.550)	0.170	240	270	5	IP65
04AW☐ -VL050-05		5:1		600	1400	6.03	21.2		0.150	290	330		
04AW☐ -VL070-10		10:1		300	700	12.1	66.0 *3		0.170	640	530		
04AW☐ -VL070-25		25:1	90	120	280	28.6	165 *3		0.170	870	790		

Note:

The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of ☐ in model numbers).

*1 The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

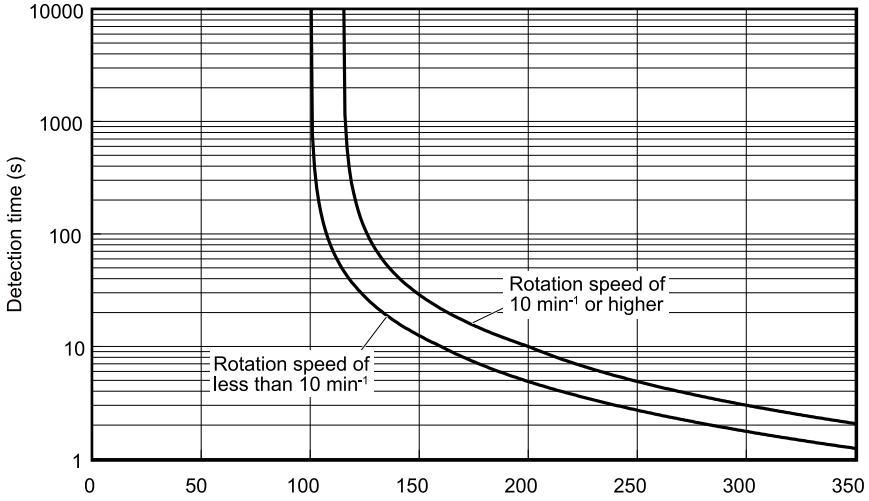
*2 The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25 °C. They are reference values only.

*3 The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.

Servomotor Overload Protection Characteristics

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

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.



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 "*Torque-Rotation Speed Characteristics on page 142*".

Allowable Load Moment of Inertia

The allowable load moments of inertia (rotor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 140*". 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 rotation speed.

If the above steps are 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).

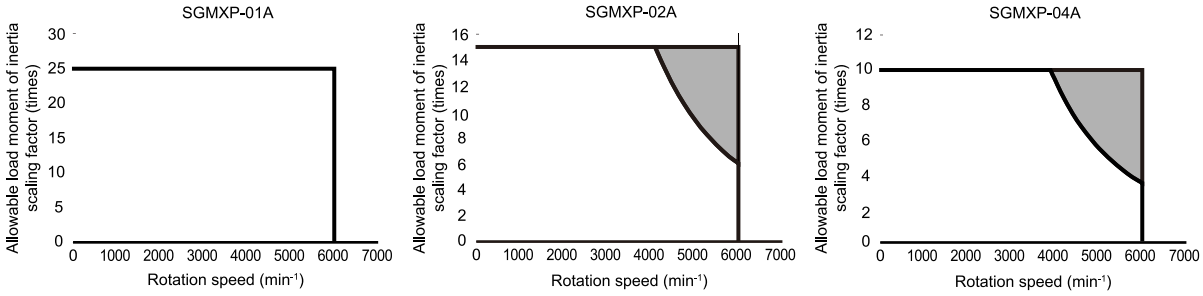
Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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: SGDXS-R70A, SGDXS-R90A, SGDXS-1R6A, and SGDXS-2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor.

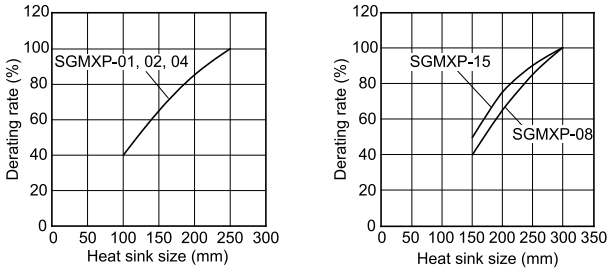
Refer to the following catalog for details on external regenerative resistors.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.



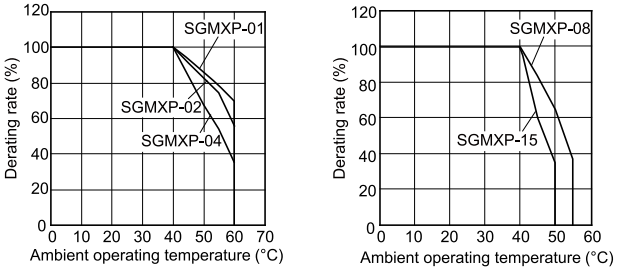
Important

The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

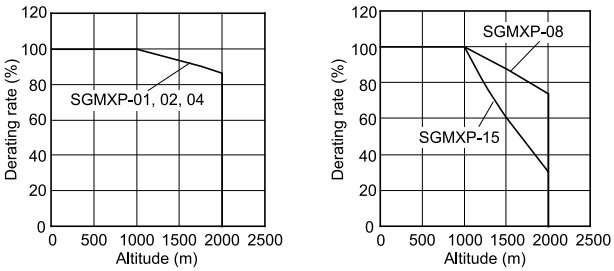
■ Servomotor Derating Rates for Surrounding Air Temperature

Apply a suitable derating rate from the following graphs according to the surrounding air temperature of the servomotor (60°C max.).



■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.



Note:

- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 144*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

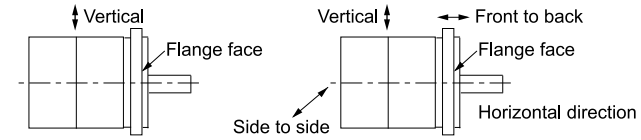
Specifications and Ratings (400 V Specification)

Specification

Voltage		400 V			
Model SGMXP-		02D	04D	08D	15D
Time Rating		Continuous			
Thermal Class		UL: B, CE: B			
Insulation Resistance		500 VDC, 10 MΩ min.			
Withstand Voltage		1,800 VAC for 1 minute, or 2,200 VAC for 1 second			
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			
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (60°C max.) *3			
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 • 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)			
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²			
	Number of Impacts	2 times			
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s²			
Applicable SERVOPACKs	SGDXS	1R9D	1R9D	3R5D	5R4D

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 153*

Servomotor Ratings

Voltage			400 V			
Model SGMXP-			02D	04D	08D	15D
Rated Output *1		W	200	400	750	1500
Rated Torque *1, *2		N·m	0.637	1.27	2.39	4.77
Instantaneous Maximum Torque *1		N·m	2.23	4.46	7.16	14.3
Rated Current *1		Arms	1.07	1.20	2.6	4.5
Instantaneous Maximum Current *1		Arms	4.17	4.67	7.8	14.0
Rated Rotation Speed *1		min^{-1}	3000			
Continuous Allowable Rotation Speed		min^{-1}	7000	6000		
Maximum Rotation Speed *1		min^{-1}	7000			
Torque Constant		N·m/Arms	0.656	1.18	0.99	1.13
Rotor Moment of Inertia	Without Holding Brakes	× 10^{-4} kg·m^2	0.263	0.409	2.10	4.02
	With Holding Brakes		0.403	0.548	2.98	4.90
	Without Holding Brake and with Batteryless Absolute Encoder		0.267	0.413	2.10	4.02
	With Holding Brake and Batteryless Encoder		0.407	0.552	2.98	4.90
Rated Power Rate *1	Without Holding Brakes	kW/s	15.4	39.4	27.1	56.5
	With Holding Brakes		9.6	28.3	19.2	46.5
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	24200	31000	11300	11800
	With Holding Brakes		15000	22300	8000	9700
Derating Rate for Servomotor with Oil Seal		%	90	95		
Heat Sink Size (aluminum) *3		mm	250 × 250 × 6		300 × 300 × 12	
Protective Structure *4			Totally enclosed, self-cooled, IP67			
Holding Brake Specifications *5	Rated Voltage	V	24 VDC±10%			
	Capacity	W	7.4		7.5	
	Holding Torque	N·m	0.637	1.27	2.39	4.77
	Coil Resistance	Ω (at 20°C)	77.8		76.8	
	Rated Current	A (at 20°C)	0.31			
	Time Required to Release Brake	ms	80			
	Time Required to Brake	ms	100			
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *6	At 6000 min^{-1}		15 times	10 times	5 times	
	At 7000 min^{-1}		10 times	6 times	5 times	
	With External Regenerative Resistor and External Dynamic Brake Resistor *7	At 6000 min^{-1}	15 times	10 times	5 times	
		At 7000 min^{-1}				

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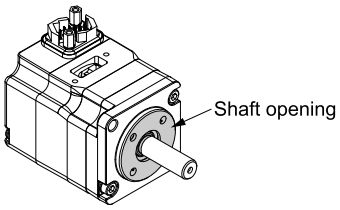
Voltage			400 V			
Model SGMXP-			02D	04D	08D	15D
Allowable Shaft Loads *8	LF	mm	25		35	
	Allowable Radial Load	N	245		392	490
	Allowable Thrust Load	N	68		74	147

*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 an aluminum heat sink of the dimensions given in the table.

*3 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 153*

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



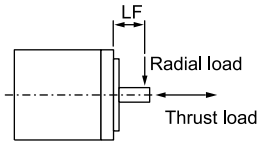
*5 Observe the following precautions if you use a servomotor with a holding brake.

- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*6 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

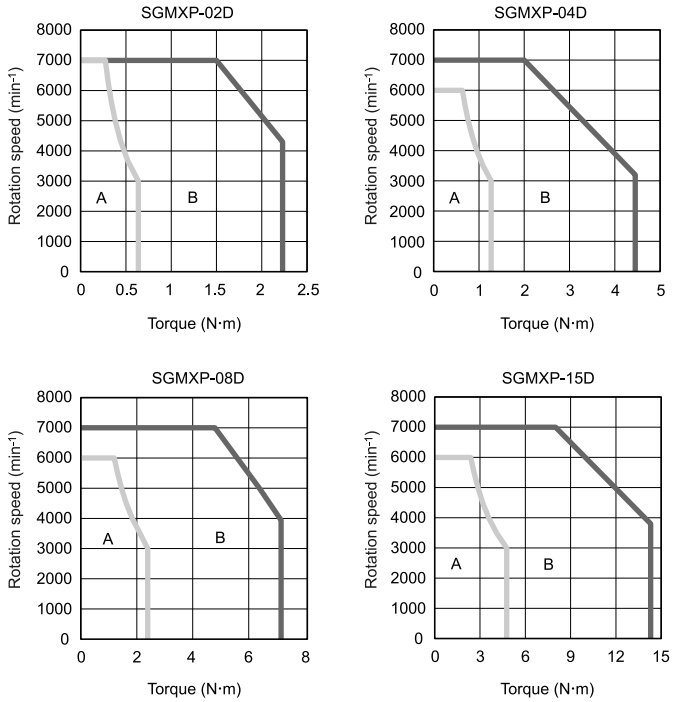
*7 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
However, you cannot externally connect a dynamic brake resistor if you use SERVOPACK SGDXS-1R9D.

*8 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



Torque-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 400 V
B : Intermittent duty zone



Note:

- These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
- The characteristics in the intermittent duty zone depend on the power supply voltage.
- If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
- If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.

Gear Motor Ratings (400V Models)

Gear Motor Model Number SXP___	Base Servo Motor Model SGMX-P-	Gear Ratio	Gear-ing Effi-ciency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10^{-4} $kg.m^2$)	Gear-head Inertia (x 10^{-4} $kg.m^2$	Allowa-ble Radial Load (N)	Allowa-ble Axial Load (N)	Back-lash (arc-min)	Class
02DW☐ -VL070-03	02DW-A6☐	3:1	95	1000	2333	1.82	6.36	0.267 (0.427)	0.250	430	310	5	IP65
02DW☐ -VL070-05		5:1		600	1400	3.03	10.6		0.190	510	390		
02DW☐ -VL070-10		10:1		300	700	6.05	21.2		0.170	640	530		
02DW☐ -VL070-25		25:1	90	120	280	14.3	50.2		0.170	870	790		
02DW☐ -VL070-50		50:1		60	140	28.7	66.0 *3		0.160	1100	1100		
04DW☐ -VL070-03	04DW-A6☐	3:1	95	1000	2333	3.62	12.7	0.413 (0.573)	0.250	430	310	5	IP65
04DW☐ -VL070-05		5:1		600	1400	6.03	21.2		0.190	510	390		
04DW☐ -VL070-10		10:1		300	700	12.1	42.4		0.170	640	530		
04DW☐ -VL070-25		25:1	90	120	280	28.6	66.0 *3		0.170	870	790		
04DW☐ -VL090-50		50:1		60	140	57.2	165 *3		0.270	2100	2200		
08DW☐ -VL090-03	08DW-A6☐	3:1	95	1000	2333	6.81	20.4	2.10 (2.98)	1.10	810	930	5	IP65
08DW☐ -VL090-05		5:1		600	1400	11.4	34.0		0.80	960	1200		
08DW☐ -VL090-10		10:1		300	700	22.7	68.0		0.70	1200	1600		
08DW☐ -VL090-25		25:1	90	120	280	53.8	161		0.74	1600	2200		
08DW☐ -VL120-50		50:1		60	130	108	322		0.76	3400	3900		
15DW☐ -VL090-03	15DW-A6☐	3:1	95	1000	2333	13.6	40.8	4.02 (4.90)	1.10	810	930	5	IP65
15DW☐ -VL090-05		5:1		600	1400	22.7	67.9		0.80	960	1200		
15DW☐ -VL090-10		10:1		300	700	45.3	136		0.70	1200	1600		
15DW☐ -VL120-25		25:1	90	120	260	107	322		1.10	2700	3700		
15DW☐ -VL120-50		50:1		60	130	215	390 *3		0.76	3400	3900		

Note:

The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of ☐ in model numbers).

*1 The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

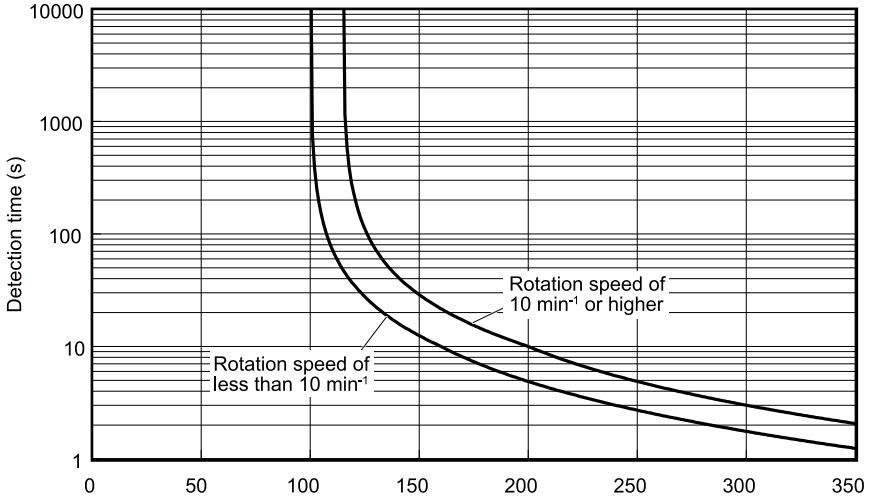
*2 The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25 °C. They are reference values only.

*3 The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.

Servomotor Overload Protection Characteristics

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

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.



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 "*Torque-Rotation Speed Characteristics on page 150*".

Allowable Load Moment of Inertia

The allowable load moments of inertia (rotor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 148*". 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 rotation speed.

If the above steps are 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).

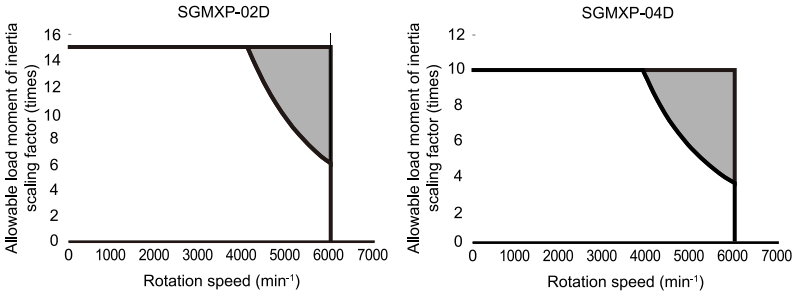
Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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 model: SGDXS-1R9D

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor.

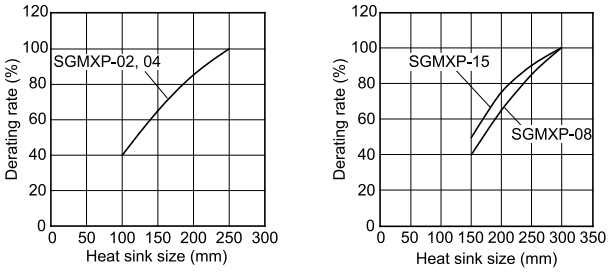
Refer to the following catalog for details on external regenerative resistors.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.



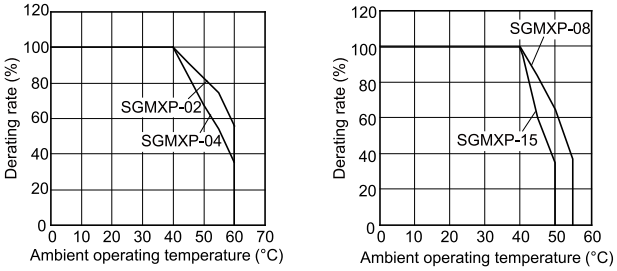
Important

The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

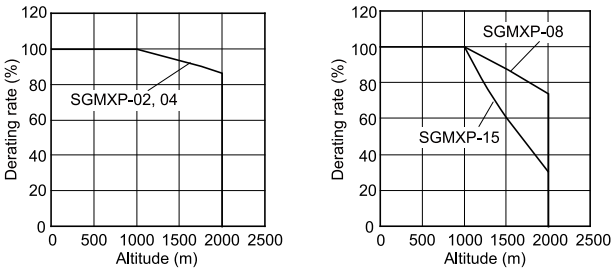
■ Servomotor Derating Rates for Surrounding Air Temperature

Apply a suitable derating rate from the following graphs according to the surrounding air temperature of the servomotor (60°C max.).



■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.



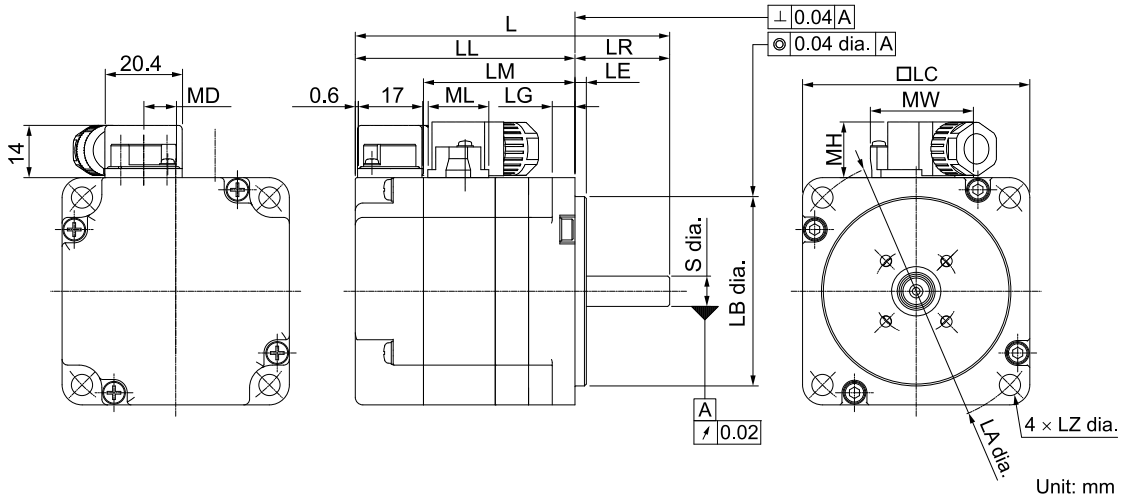
Note:

- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 152*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

External Dimensions (200 V Specification)

SGMXP-01 to -04

■ Σ-7 Compatible Specification



Model SGMXP-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
01A□A2□A1	83 (113.0)	58 (88.0)	40	25	3	6	60	70	$50^{0}_{-0.025}$	5.5
02A□A2□A1	95 (126.5)	65 (96.5)	47	30	3	8	80	90	$70^{0}_{-0.030}$	7
04A□A2□A1	105 (136.5)	75 (106.5)	57	30	3	8	80	90	$70^{0}_{-0.030}$	7

Model SGMXP-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
01A□A2□A1	$8^{0}_{-0.009}$	8.5	25.8	14.7	16.1	0.4 (0.7)
02A□A2□A1	$14^{0}_{-0.011}$	14	28.7	14.7	17.1	1.1 (1.8)
04A□A2□A1	$14^{0}_{-0.011}$	14	28.7	14.7	17.1	1.4 (2.1)

*1 For models that have a batteryless absolute encoder, L and LL for the SGMXP-01A are 7.5 mm greater, L and LL for the SGMXP-02A and -04A are 6.5 mm greater, and the approximate mass of the SGMXP-01A, -02A, and -04A is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.

☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 159*

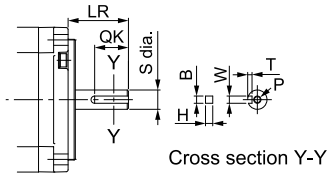
Note:

1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

☞ *Shaft End Specification on page 156*
☞ *Option Specification on page 157*

■ Shaft End Specification

- Straight with Key and Tap

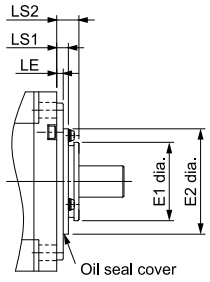


Cross section Y-Y

Model SGMXP-	LR	QK	S	B	H	W	T	P
01A□A61□□	25	14	$8^{0}_{-0.009}$	$3^{0}_{-0.025}$	$3^{0}_{-0.025}$	$3^{-0.006}_{-0.031}$	$1.8^{+0.1}_{0}$	M3 × 6
02A□A61□□	30	14	$14^{0}_{-0.011}$	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$5^{-0.012}_{-0.042}$	$3^{+0.1}_{0}$	M5 × 8
04A□A61□□	30	14	$14^{0}_{-0.011}$	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$5^{-0.012}_{-0.042}$	$3^{+0.1}_{0}$	M5 × 8

■ Option Specification

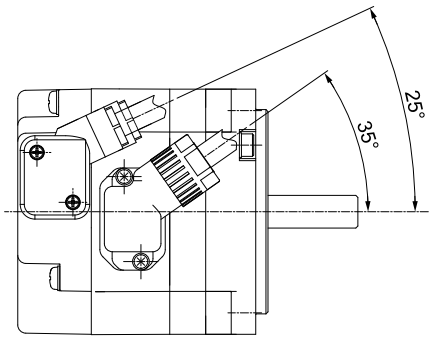
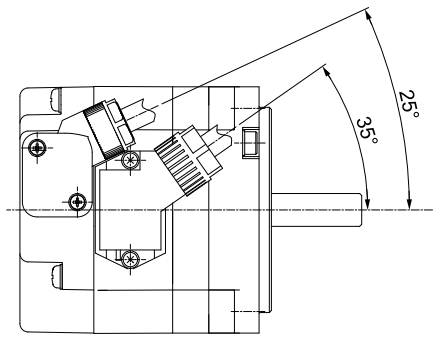
• With Oil Seal



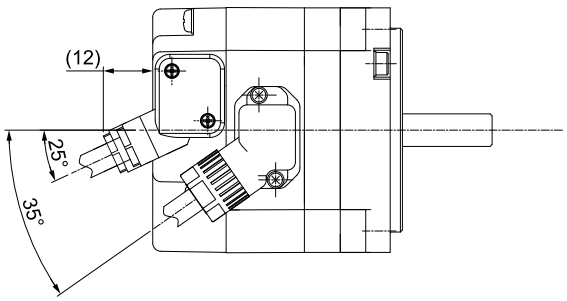
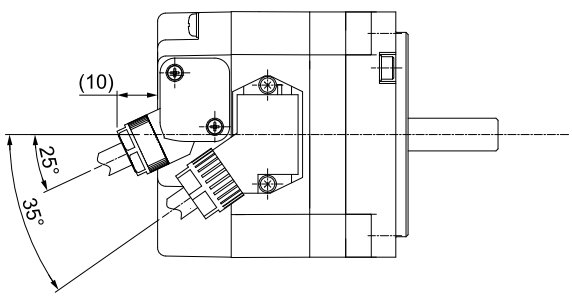
Model SGMXP-	E1	E2	LS1	LS2	LE
01A□A□S□□	22	38	3.5	7	3
02A□A□S□□	35	47	5.2	10	3
04A□A□S□□					

■ Connector Mounting Dimensions

• Cable Installed on Load Side

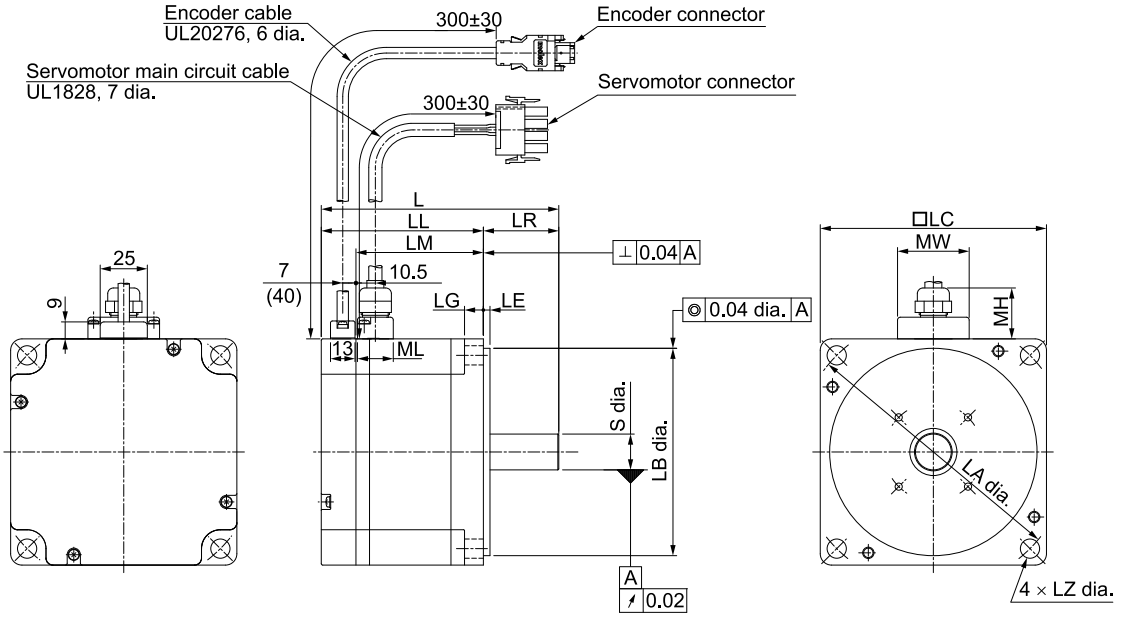
Standard Specification	Σ-7 Compatible Specification
	

• Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXP-08, -15

■ Σ-7 Compatible Specification



Unit: mm

Model SGMXP-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
08A□A2□A1	126.5 (160.0)	86.5 (120.0)	67.6	40	3.5	10	120	145	$110^{0}_{-0.035}$	10.2
15A□A2□A1	154.5 (188.0)	114.5 (148.0)	95.6	40	3.5	10	120	145	$110^{0}_{-0.035}$	10.2

Model SGMXP-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
08A□A2□A1	$19^{0}_{-0.013}$	17	38	28	19 (25.5)	4.2 (5.9)
15A□A2□A1	$19^{0}_{-0.013}$	17	38	28	19 (25.5)	6.6 (8.2)

*1 For models that have a batteryless absolute encoder, L and LL are +8 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 159*

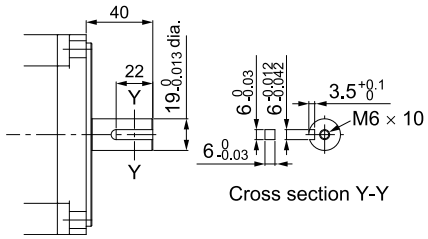
*2 These are the values when the flexible connectors are connected.

Note:

1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 156*
☞ *Option Specification on page 159*

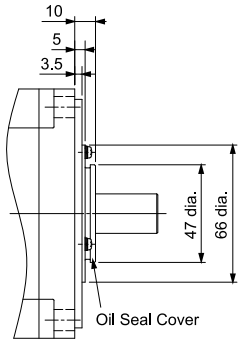
■ Shaft End Specification

- Straight with Key and Tap

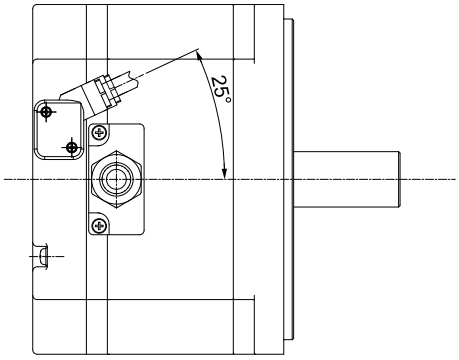
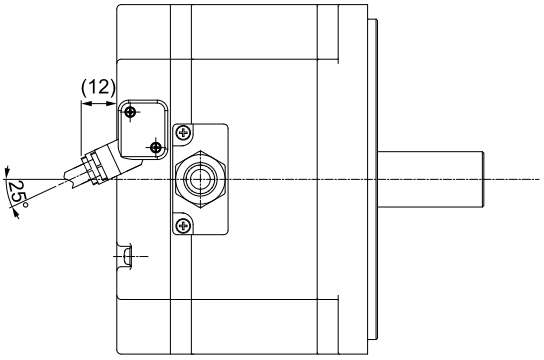


■ Option Specification

• With Oil Seal



■ Connector Mounting Dimensions

Cable Installed on Load Side	Cable Installed on Non-load Side
	

Dimensions of Servomotors with Batteryless Absolute Encoders

Model SGMXP-	L	LL	Approx. Mass [kg]
01AWA2☐A☐	90.5 (120.5)	65.5 (95.5)	0.5 (0.8)
02AWA2☐A☐	101.5 (133)	71.5 (103)	1.2 (1.9)
04AWA2☐A☐	111.5 (143)	81.5 (113)	1.5 (2.2)
08AWA2☐A☐	134.5 (168)	94.5 (128)	4.3 (6)
15AWA2☐A☐	162.5 (196)	122.5 (156)	6.7 (8.3)

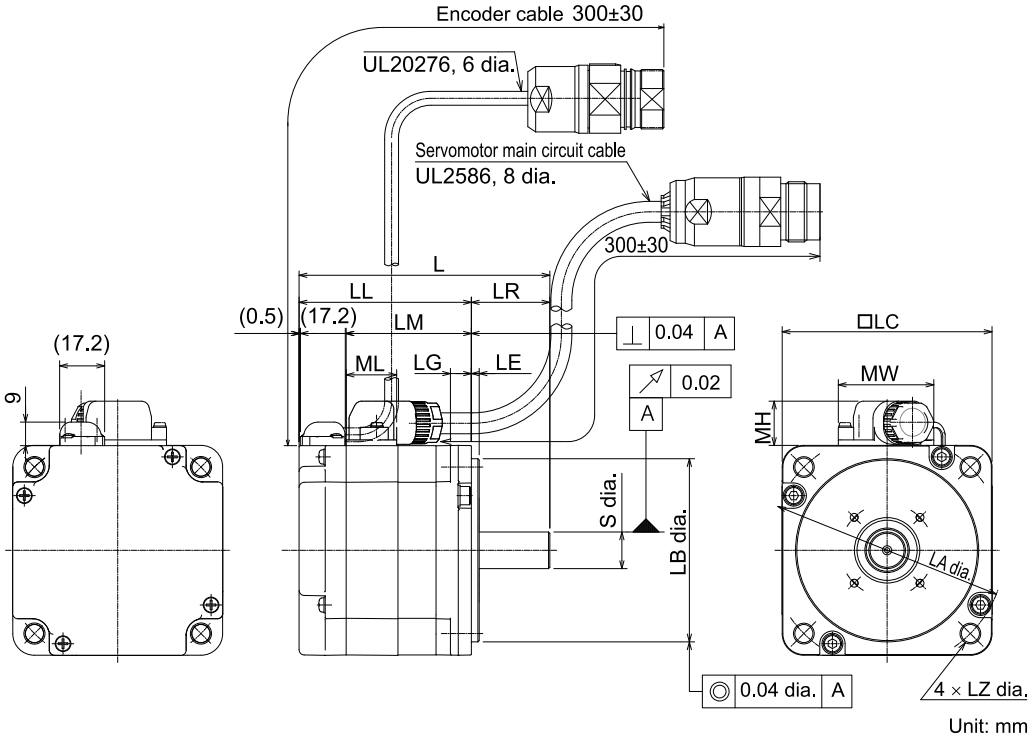
Note:

The values in parentheses are for servomotors with holding brakes.

External Dimensions (400 V Specification)

SGMXP-02, -04

■ Σ-V Compatible Specification



Unit: mm

Model SGMXP-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
02D□A2□A1	96 (126.5)	66 (96.5)	48	30	3	8	80	90	$70^{0}_{-0.030}$	7
04D□A2□A1	106 (136.5)	76 (106.5)	58	30	3	8	80	90	$70^{0}_{-0.030}$	7

Model SGMXP-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
02D□A2□A1	$14^{0}_{-0.011}$	14	36.5	17	19.3	1.4 (2.0)
04D□A2□A1	$14^{0}_{-0.011}$	14	36.5	17	19.3	1.7 (2.3)

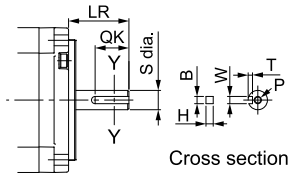
*1 For models that have a batteryless absolute encoder, L and LL are +6.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 167*

Note:

1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 161*
☞ *Option Specification on page 162*

■ Shaft End Specification

- Straight with Key and Tap

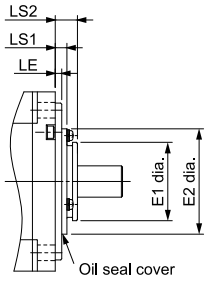


Cross section Y-Y

Model SGMXP-	LR	QK	S	B	H	W	T	P
02D□A61□□	30	14	$14^{0}_{-0.011}$	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$5^{-0.012}_{-0.042}$	$3^{+0.1}_{0}$	M5 × 8
04D□A61□□	30	14	$14^{0}_{-0.011}$	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$5^{-0.012}_{-0.042}$	$3^{+0.1}_{0}$	M5 × 8

■ Option Specification

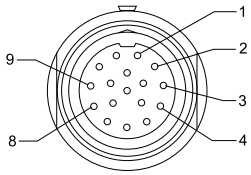
- With Oil Seal



Model SGMXP-	E1	E2	LS1	LS2	LE
02D□A□S□□	35	47	5.2	10	3
04D□A□S□□					

■ Connector Specifications

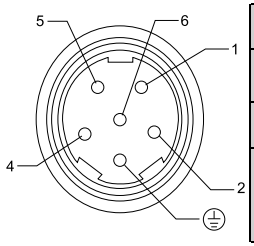
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



1 *1*	0BAT	8	PG5V
2 *1*	BAT	9	PG0V
3	PS	10 to 17	–
4	/PS	Connector Case	FG (frame ground)
5 to 7	–		

*1 A battery is required only for a 26-bit absolute encoder.
Applicable plug (not provided by Yaskawa)
Plug: SPNA17HFRBN□□□
Manufacturer: Smith Interconnect

- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications

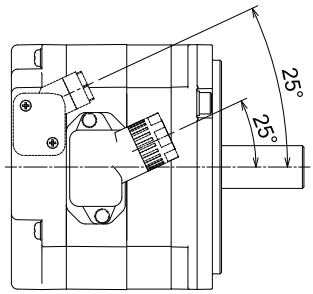
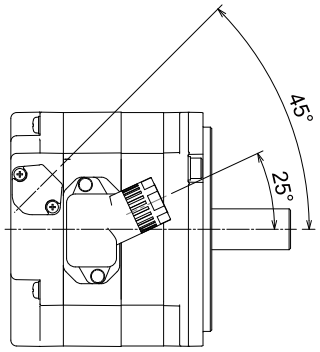


1	Phase U	6 *1*	Brake terminal
2	Phase V	⏚	FG (frame ground)
4	Phase W	Connector Case	FG (frame ground)
5 *1*	Brake terminal		

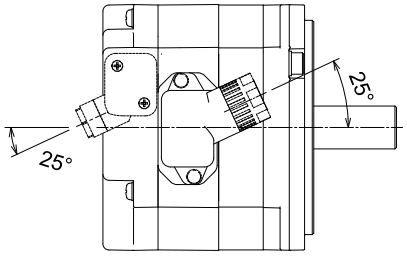
*1 Only for servomotors with holding brakes. There is no voltage polarity for the brake terminals.
Applicable plug (not provided by Yaskawa)
Plug: LPNA06BFRDN□□□
Manufacturer: Smith Interconnect

■ Connector Mounting Dimensions

• Cable Installed on Load Side

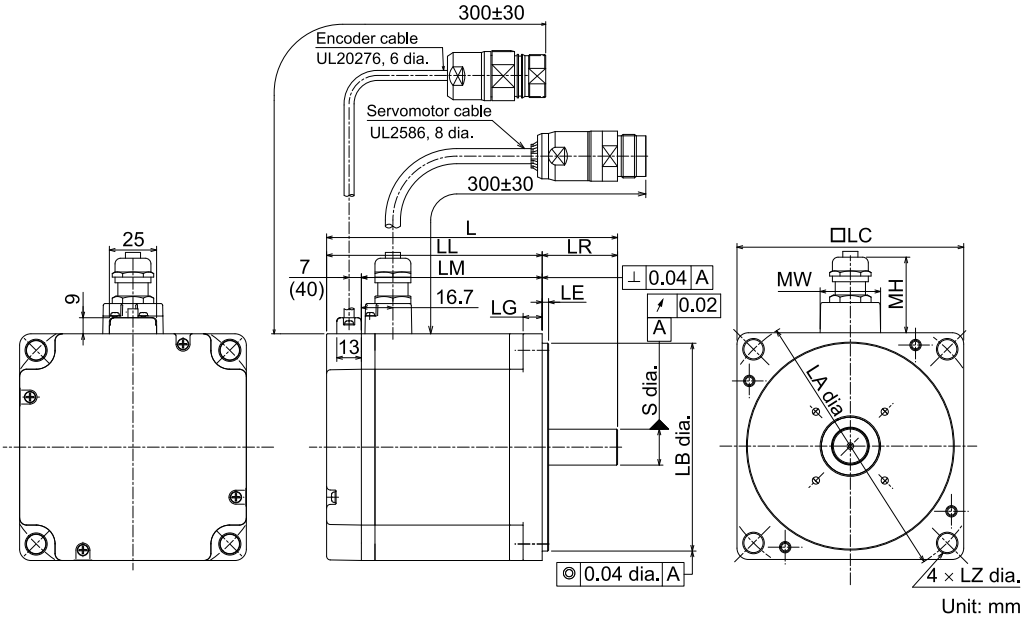
Standard Specification	Σ-V Compatible Specification
	

• Cable Installed on Non-load Side

Standard Specification	Σ-V Compatible Specification
	None

SGMXP-08, -15

■ Σ-V Compatible Specification



Unit: mm

Model SGMXP-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
08D□A2□A1	126.5 (160.0)	86.5 (120.0)	67.6	40	3.5	10	120	145	$110^{0}_{-0.035}$	10.2
15D□A2□A1	154.5 (188.0)	114.5 (148.0)	95.6	40	3.5	10	120	145	$110^{0}_{-0.035}$	10.2

Model SGMXP-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
08D□A2□A1	$19^{0}_{-0.013}$	17	38	28	25 (40)	4.3 (6.0)
15D□A2□A1	$19^{0}_{-0.013}$	17	38	28	25 (40)	6.7 (8.3)

*1 For models that have a batteryless absolute encoder, L and LL are +8 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 167*

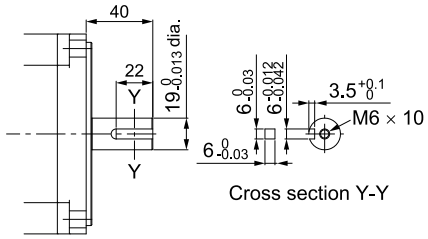
*2 These are the values when the flexible connectors are connected.

Note:

1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 165*
☞ *Option Specification on page 165*

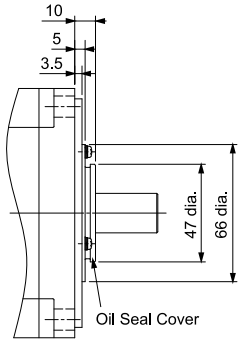
■ Shaft End Specification

• Straight with Key and Tap



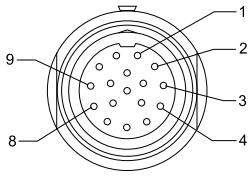
■ Option Specification

• With Oil Seal



■ Connector Specifications

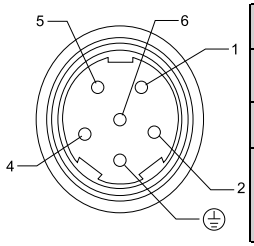
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



1 *1*	0BAT	8	PG5V
2 *1*	BAT	9	PG0V
3	PS	10 to 17	–
4	/PS	Connector Case	FG (frame ground)
5 to 7	–		

*1 A battery is required only for a 26-bit absolute encoder.
Applicable plug (not provided by Yaskawa)
Plug: SPNA17HFRBN□□□
Manufacturer: Smith Interconnect

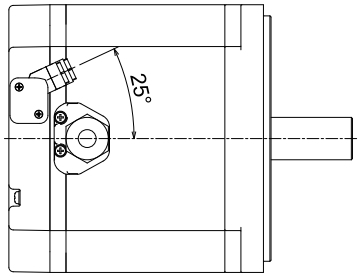
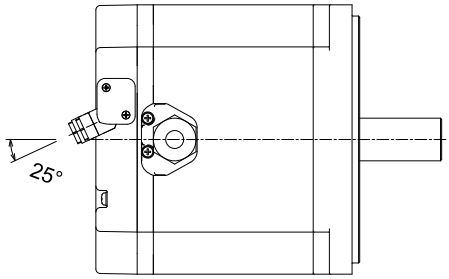
- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



1	Phase U	6 *1*	Brake terminal
2	Phase V	⏚	FG (frame ground)
4	Phase W	Connector Case	FG (frame ground)
5 *1*	Brake terminal		

*1 Only for servomotors with holding brakes. There is no voltage polarity for the brake terminals.
Applicable plug (not provided by Yaskawa)
Plug: LPNA06BFRDN□□□
Manufacturer: Smith Interconnect

■ Connector Mounting Dimensions

Cable Installed on Load Side	Cable Installed on Non-load Side
	

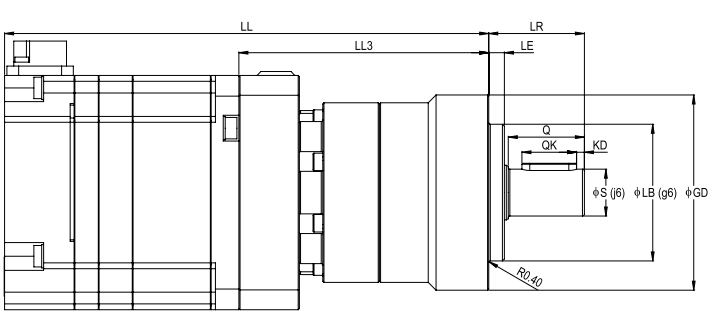
Dimensions of Servomotors with Batteryless Absolute Encoders

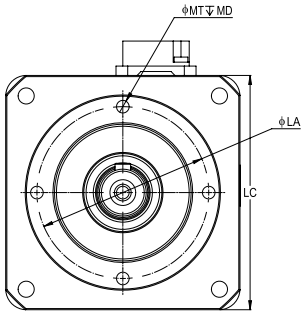
Model SGMXP-	L	LL	Approx. Mass [kg]
02DWA2☐A☐	102.5 (133)	72.5 (103)	1.4 (2.0)
04DWA2☐A☐	112.5 (143)	82.5 (113)	1.7 (2.3)
08DWA2☐A☐	134.5 (168)	94.5 (128)	4.3 (6.0)
15DWA2☐A☐	162.5 (196)	122.5 (156)	6.7 (8.3)

Note:

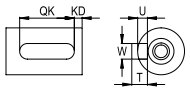
The values in parentheses are for servomotors with holding brakes.

SGMXP Gear Motor External Dimensions

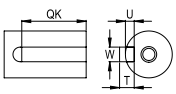




Shaft Detail (VL050 Models Only)



Shaft Detail (All Other Models)



100 W Models

Model S7P		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	01A□ -VL050-03	124 (154)	64	24.5	4	12	35	50	60	44	M4	8	19.5	14	2	4	2.5	4
	01A□ -VL050-05																	
	01A□ -VL050-10																	
	01A□ -VL050-25	140.5 (170.5)	80.5															
	01A□ -VL070-50	155 (185)	95	36	5	16	52	70		62	M5	10	28	22	0	5	3	5

200 W Models

Model S7P		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	02A□ -VL070-03	146 (177.5)	79	36	5	16	52	70	80	62	M5	10	28	22	0	5	3	5
	02A□ -VL070-05																	
	02A□ -VL070-10																	
	02A□ -VL070-25	167 (198.5)	100															
	02A□ -VL070-50																	
400 V	02D□ -VL070-03	146 (177.5)	79	36	5	16	52	70	80	62	M5	10	28	22	0	5	3	5
	02D□ -VL070-05																	
	02D□ -VL070-10																	
	02D□ -VL070-25	167 (198.5)	100															
	02D□ -VL070-50																	

400 W Models

Model S7P		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	04A□ -VL070-03	156 (187.5)	79	36	5	16	52	70	80	62	M5	10	28	22	0	5	3	5
	04A□ -VL070-05																	
	04A□ -VL070-10																	
	04A□ -VL070-25	177 (208.5)	100															
	04A□ -VL090-50	196 (227.5)	119	46	7	22	68	90		80	M6	12	36	28		6	3.5	6
400 V	04D□ -VL070-03	156 (187.5)	79	36	5	16	52	70	80	62	M5	10	28	22	0	5	3	5
	04D□ -VL070-05																	
	04D□ -VL070-10																	
	04D□ -VL070-25	177 (208.5)	100															
	04D□ -VL090-50	196 (227.5)	119	46	7	22	68	90		80	M6	12	36	28		6	3.5	6

750 W Models

Model S7P		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
400 V	08D□ -VL090-03	193.5 (227)	107	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	08D□ -VL090-05																	
	08D□ -VL090-10																	
	08D□ -VL090-25	215.5 (249)	129															
	08D□ -VL120-50	231 (264.5)	144.-5	70	9	32	90	120		108	M8	16	58	45		10	5	8

1.5 kW Models

Model S7P		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
400 V	15D□ -VL090-03	230.5 (263.50	107	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	15D□ -VL090-05																	
	15D□ -VL090-10																	
	15D□ -VL120-25	268 (301)	144.-5	70	9	32	90	120		108	M8	16	58	45		10	5	8
	15D□ -VL155-50	293 (326)	169.-5	97	12	40	120	155		140	M10	20	82	65		12	5	8

SGMXG

Model Designations

SGMXG - 09 A U A 2 1 A 1

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

Σ-X-Series Servomotor SGMXG model

1st+2nd digits Rated Output

Code	1500-min^{-1} Specification	Code	1000-min^{-1} Specification
03	300 W	03	300 W
05	450 W	06	600 W
09	850 W	09	900 W
13	1.3 kW	12	1.2 kW
20	1.8 kW	20	2.0 kW
30	2.9 kW	30	3.0 kW
44	4.4 kW	40	4.0 kW
55	5.5 kW	55	5.5 kW
75	7.5 kW		
1A	11 kW		
1E	15 kW		

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

4th digit Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

5th digit Design Revision Order

Code	Specification
A	1500-min^{-1} specification
B	1000-min^{-1} specification

6th digit Shaft End

Code	Specification
2	Straight without key (SGMXG-03A□A to 20A□A) (SGMXG-03A□B to 12A□B)
6	Straight with key and tap
8	Straight without key, with tap (SGMXG-30A□A to 1EA□A) (SGMXG-20A□B to 55A□B)

7th digit Options

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

8th digit Destination

A

9th digit Ancillary Specification

Code	Specification
1	Standard
2	Σ-7 compatible
3	Standard Safety
4	Σ-7 compatible Safety

Limited Stock Non-Stock

Note:

The rated output is 2.4 kW if you combine the SGMXG-30A□A with the SGDXS-200A.

The SGMXG gear motor product family pairs SGMXG servo motors with high precision, low backlash inline planetary gear heads resulting in a portfolio of rotary actuators fit for a wide range of applications. The family of gear motors has been thoroughly tested and adheres to the high levels of quality and performance expected from Yaskawa.

Gear Motor Model Designation

SXG 01 A W C - VL 070 - 05

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

Σ-X Series Gear Motors: SGMXG

1st+2nd digits Rated Output

Code	Specification
05	450 W
09	850 W
13	1.3 kW
20	1.8 kW
30	2.9 kW
44	4.4 kW
55	5.5 kW
75	7.5 kW

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC
D	400 VAC

4th digit Encoder Option

Code	Specification
W	Standard encoder
H	Small encoder

5th digit Brake Option

Code	Specification
Blank	No brake
C	24 V Brake

6th digit Gear box backlash

Code	Specification
VL	5 arc-min backlash

7th digit Gear head frame size

Code	Specification
070	70 mm
090	90 mm
120	120 mm
155	155 mm
205	205mm
235	235mm

8th digit Gear Ratio

Code	Specification
03	3:1 Ratio
05	5:1 Ratio
10	10:1 Ratio
25	25:1 Ratio
50	50:1 Ratio

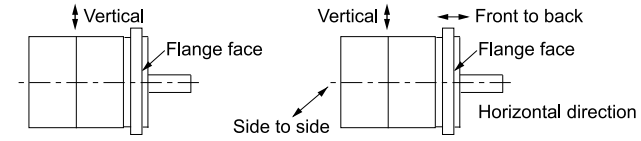
Specifications and Ratings (200 V, 1500-min^{-1} Specification)

Specification

Voltage		200 V									
Model SGMXG-		03A□A, 05A□A	09A□A	13A□A	20A□A	30A□A	44A□A	55A□A	75A□A	1AA□A	1EA□A
Time Rating		Continuous									
Thermal Class		UL: F, CE: 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									
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (60°C max.) *3									
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 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)									
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s^2									
	Number of Impacts	2 times									
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s^2 (24.5 m/s^2 front to back)						24.5 m/s^2			
Applicable SERVOPACKs *4	SGDXS	3R8A	7R6A (120A) *4	120A (180A) *4	180A (200A) *4	330A (470A) *4	330A (550A) *4	470A (780A) *4	550A	590A	780A
	SGDXW	5R5A *5, 7R6A *5	7R6A	–							

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 182*

*4 To increase the instantaneous maximum torque, use the SERVOPACK model in parentheses ( ).
Refer to the following section for the instantaneous maximum torque for individual SERVOPACK models.
☞ *Servomotor Ratings (SGMXG-03A□A to -20A□A) on page 172*
☞ *Servomotor Ratings (SGMXG-30A□A to -1EA□A) on page 174*
☞ *Torque-Rotation Speed Characteristics on page 176*

*5 If you use a servomotor together with a Σ-XW SERVOPACK, the control gain may not increase as much as with a Σ-XS SERVOPACK and other performances may be lower than those achieved with a Σ-XS SERVOPACK.

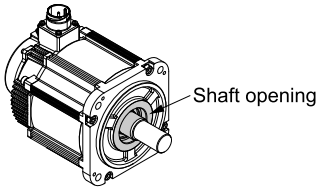
Servomotor Ratings (SGMXG-03A□A to -20A□A)

Voltage			200 V				
Model SGMXG-			03A□A	05A□A	09A□A	13A□A	20A□A
Rated Output *1		kW	0.3	0.45	0.85	1.3	1.8
Rated Torque *1, *2		N·m	1.96	2.86	5.39	8.34	11.5
Instantaneous Maximum Torque *1		N·m	5.88	8.92	14.2 20.0 *3	23.3 30.0 *4	28.7 35.4 *5
Rated Current *1		Arms	2.8	3.8	6.9	10.7	16.7
Instantaneous Maximum Current *1		Arms	8.0	11	17 28 *3	28 40 *4	42 56 *5
Rated Rotation Speed *1		min^{-1}	1500				
Continuous Allowable Rotation Speed		min^{-1}	4000				3000
Maximum Rotation Speed *1		min^{-1}	4000				
Torque Constant *1		N·m/Arms	0.776	0.854	0.859	0.891	0.748
Rotor Moment of Inertia *6	Without Holding Brakes	$\times 10^{-4}$ kg·m^2	2.48	3.33	13.9	19.9	26.0
	With Holding Brakes		2.73	3.58	16.0	22.0	28.1
Rated Power Rate *1	Without Holding Brakes	kW/s	15.5	24.6	20.9	35.0	50.9
	With holding brakes		14.1	22.9	18.2	31.6	47.1
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	7900	8590	3880	4190	4420
	With Holding Brakes		7180	7990	3370	3790	4090
Heat Sink Size *7		mm	250 ×250 × 6 (aluminum)		400 × 400 × 20 (steel)		
Protective Structure *8			Totally enclosed, self-cooled, IP67				
Holding Brake Specification *9	Rated Voltage	V	24 $VDC^{+10\%}_{0}$				
	Capacity	W	10				
	Holding Torque	N·m	4.5		12.7	19.6	
	Coil Resistance	Ω (at 20°C)	56		59		
	Rated Current	A (at 20°C)	0.43		0.41		
	Time Required to Release Brake	ms	100				
	Time Required to Brake	ms	80				
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *10	At 3000 min^{-1}		15 times		5 times		
	At 4000 min^{-1}		8.4 times		2 times		5 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *11	At 3000 min^{-1}	15 times		10 times		
		At 4000 min^{-1}	8.4 times		8 times	9 times	7 times
Allowable Shaft Loads *12	LF	mm	40		58		
	Allowable Radial Load	N	490			686	980
	Allowable Thrust Load	N	98			343	392

*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 with an aluminum or steel heat sink of the dimensions given in the table.
*3 This is the value if you combine with the SERVOPACK SGDXS-120A.
*4 This is the value if you combine with the SERVOPACK SGDXS-180A.
*5 This is the value if you combine with the SERVOPACK SGDXS-200A.
*6 The values for the servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.

*7 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 182*

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



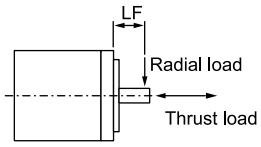
*9 Observe the following precautions if you use a servomotor with a holding brake.

- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*10 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*11 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.

*12 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



Servomotor Ratings (SGMXG-30A□A to -1EA□A)

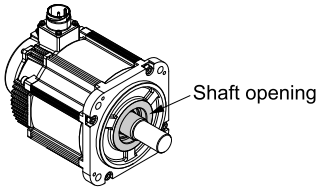
Voltage			200 V						
Model SGMXG-			30A□A	30A□A *3	44A□A	55A□A	75A□A	1AA□A	1EA□A
Rated Output *1		kW	2.9	(2.4)	4.4	5.5	7.5	11	15
Rated Torque *1, *2		N·m	18.6	(15.1)	28.4	35.0	48.0	70.0	95.4
Instantaneous Maximum Torque *1		N·m	54.0 66.8 *4	(45.1)	71.6 95.6 *5	102 134 *6	119	175	224
Rated Current *1		Arms	24.5	(19.6)	32.9	37.2	54.7	58.6	74.0
Instantaneous Maximum Current *1		Arms	71 92 *4	(56)	84 115 *5	110 149 *6	130	140	170
Rated Rotation Speed *1		min^{-1}	1500						
Continuous Allowable Rotation Speed		min^{-1}	3000					2000	
Maximum Rotation Speed *1		min^{-1}	4000					3000	
Torque Constant *1		N·m/Arms	0.826		0.932	1.02	0.957	1.38	1.44
Rotor Moment of Inertia *7	Without Holding Brakes	$\times10^{-4}$ kg·m^2	46.0		67.5	89.0	125	242	303
	With Holding Brakes		53.9		75.4	96.9	133	261	341
Rated Power Rate *1	Without Holding Brakes	kW/s	75.2	(49.6)	119	138	184	202	300
	With Holding Brakes		64.2	(42.3)	107	126	173	188	267
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	4040	(3280)	4210	3930	3840	2890	3150
	With Holding Brakes		3450	(2800)	3770	3610	3610	2680	2800
Heat Sink Size *8		mm	550 × 550 × 30 (steel)					650 ×650 × 35 (steel)	
Protective Structure *9			Totally enclosed, self-cooled, IP67						
Holding Brake Specification *10	Rated Voltage	V	24 $VDC^{+10\%}_{0}$						
	Capacity	W	18.5			25		32	35
	Holding Torque	N·m	43.1			72.6		84.3	114.6
	Coil Resistance	Ω (at 20°C)	31			23		18	17
	Rated Current	A (at 20°C)	0.77			1.05		1.33	1.46
	Time Required to Release Brake	ms	170						250
	Time Required to Brake	ms	100			80			

Continued on next page.

Continued from previous page.

Voltage			200 V						
Model SGMXG-			30A□A	30A□A *3	44A□A	55A□A	75A□A	1AA□A	1EA□A
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *11	At 2000 min-1		–					5 times	
	At 3000 min-1		5 times	3 times	5 times	5 times	5 times	2.2 times	1.5 times
	At 4000 min-1		4 times	2.2 times	2.4 times	3.5 times	2.2 times	–	
	With External Regenerative Resistor and External Dynamic Brake Resistor *12	At 2000 min-1	–					10 times	
		At 3000 min-1	10 times	7 times	10 times	10 times	10 times	4 times	2 times
		At 4000 min-1	5 times	4 times	5 times	5 times	4 times	–	
Allowable Shaft Loads *13	LF	mm	79			113		116	
	Allowable Radial Load	N	1470			1764			4998
	Allowable Thrust Load	N	490			588			2156

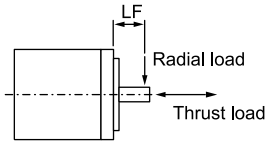
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
*2 The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.
*3 This is the value if you combine with the SERVOPACK SGDXS-200A.
The output of the servomotor will be limited by the rated current and maximum current of the SERVOPACK that is used. The load ratio is calculated based on the servomotor's rated current of 24.5 Arms. Use the servomotor with a load ratio of 80% or less.
*4 This is the value if you combine with the SERVOPACK SGDXS-470A.
*5 This is the value if you combine with the SERVOPACK SGDXS-550A.
*6 This is the value if you combine with the SERVOPACK SGDXS-780A.
*7 The values for the servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.
*8 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 182*
*9 This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.



*10 Observe the following precautions if you use a servomotor with a holding brake.

- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

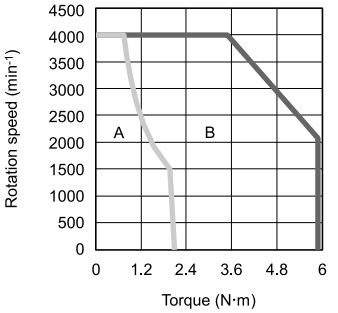
*11 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.
*12 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
*13 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



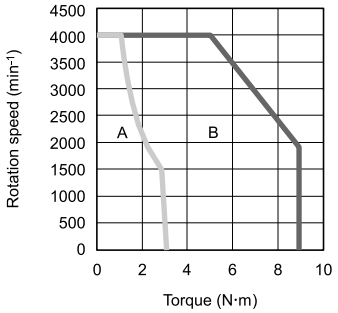
Torque-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V

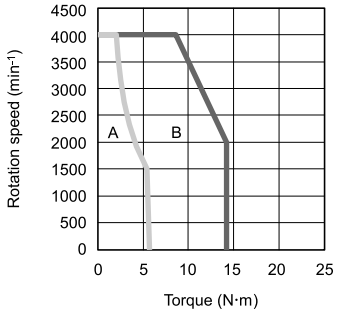
SGMXG-03A□A



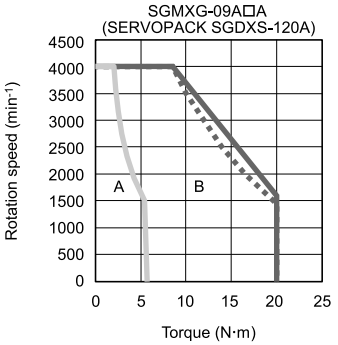
SGMXG-05A□A



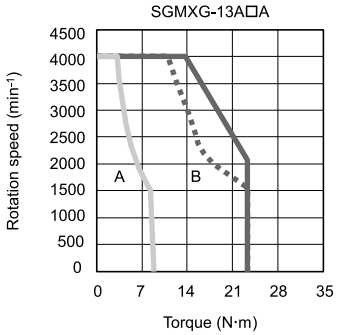
SGMXG-09A□A



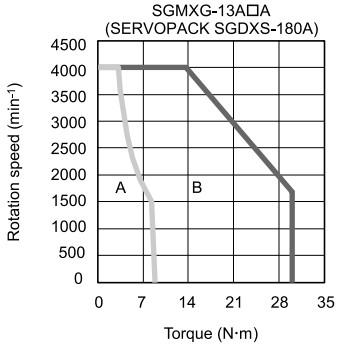
SGMXG-09A□A
(SERVOPACK SGDXS-120A)



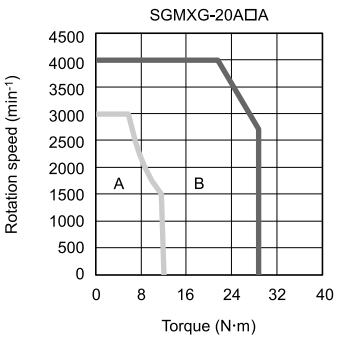
SGMXG-13A□A



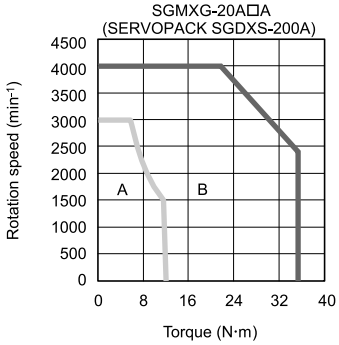
SGMXG-13A□A
(SERVOPACK SGDXS-180A)



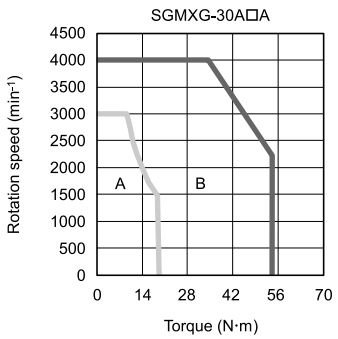
SGMXG-20A□A



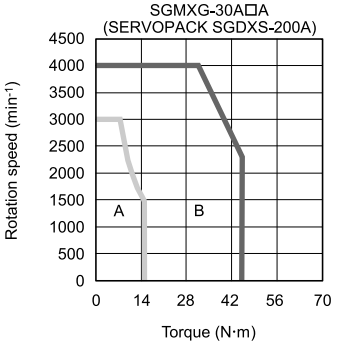
SGMXG-20A□A
(SERVOPACK SGDXS-200A)



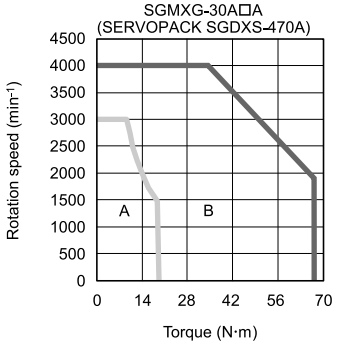
SGMXG-30A□A



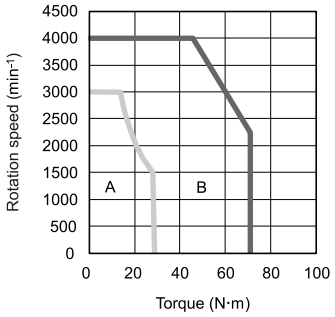
SGMXG-30A□A
(SERVOPACK SGDXS-200A)



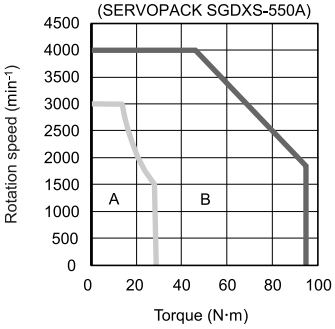
SGMXG-30A□A
(SERVOPACK SGDXS-470A)



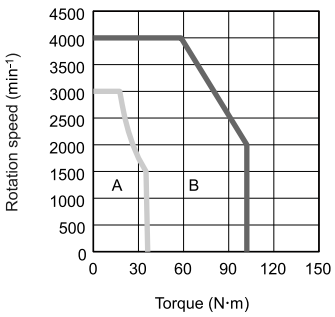
SGMXG-44A□A



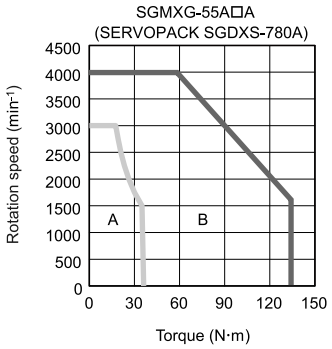
SGMXG-44A□A
(SERVOPACK SGDXS-550A)



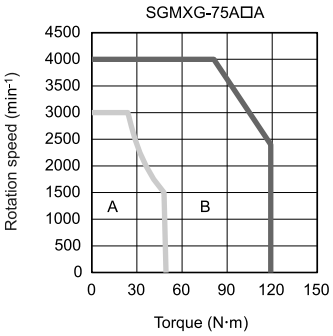
SGMXG-55A□A



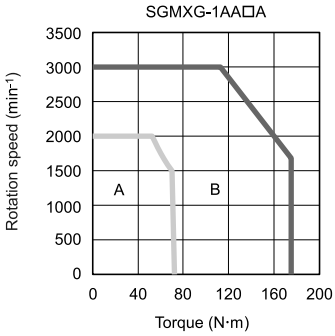
SGMXG-55A□A
(SERVOPACK SGDXS-780A)



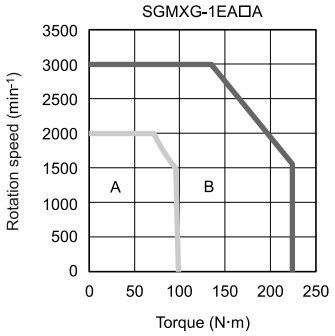
SGMXG-75A□A



SGMXG-1AA□A



SGMXG-1EA□A



Note:

- These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
- The characteristics in the intermittent duty zone depend on the power supply voltage.
- If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
- If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
- The SGMXG-09A□A and -13A□A can use a single-phase power input in combination with the SGDXS-120A□□A0008.

Gear Motor Ratings (200 V Models)

Gear Motor Model Number SXG___	Base Servo Motor Model SGMX-G-	Gear Ratio	Gearing Efficiency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10^{-4} kg.m^2)	Gearhead Inertia (x 10^{-4} kg.m^2	Allowable Radial Load (N)	Allowable Axial Load (N)	Backlash (arc-min)	Class
05AW☐ -VL070-03	05AW-A6☐	3:1	95	500	1333	8.15	25.4	3.33 (3.58)	0.53	430	310	5	IP65
05AW☐ -VL070-05		5:1		300	800	13.6	42.4		0.46	510	390		
05AW☐ -VL090-10		10:1		150	400	27.2	84.7		0.70	1200	1600		
05AW☐-VL090-25		25:1	90	60	160	64.4	165 *3		0.74	1600	2200	7	
05AW☐ -VL120-50		50:1		30	80	129	390 *3		0.76	3400	3900	5	
09AW☐ -VL090-03	09AW-A6☐	3:1	95	500	1333	15.4	40.5	13.9 (16.0)	2.90	810	930	5	IP65
09AW☐ -VL090-05		5:1		300	800	25.6	67.5		2.60	960	1200		
09AW☐ -VL090-10		10:1		150	400	51.2	135		2.50	1200	1600		
09AW☐ -VL120-25		25:1	90	60	160	121	320		2.80	2700	3700		
09AW☐ -VL155-50		50:1		30	80	243	639		2.80	8100	8200		
13AW☐ -VL090-03	13AW-A6☐	3:1	95	500	1333	23.8	66.4	19.9 (22.0)	2.90	810	930	5	IP65
13AW☐ -VL090-05		5:1		300	800	39.6	111		2.60	960	1200		
13AW☐ -VL120-10		10:1		150	400	79.2	221		2.50	2000	2500		
13AW☐ -VL120-25		25:1	90	60	160	188	390 *3		2.80	2700	3700		
13AW☐ -VL155-50		50:1		30	80	375	840 *3		2.80	8100	8200		
20AW☐ -VL090-03	20AW-A6☐	3:1	95	500	1333	32.8	81.8	26.0 (28.1)	2.90	810	930	5	IP65
20AW☐ -VL090-05		5:1		300	800	54.6	136		2.60	960	1200		
20AW☐ -VL120-10		10:1		150	400	109	273		2.60	2000	2500		
20AW☐ -VL155-25		25:1	90	60	160	259	646		4.10	6400	6100		
20AW☐ -VL205-50		50:1		30	80	518	1292		3.80	14000	14000		
30AW☐ -VL120-03	30AW-A6☐	3:1	95	500	1333	53.0	154	46.0 (53.9)	12.0	1300	1500	5	IP65
30AW☐ -VL120-05		5:1		300	800	88.4	257		9.50	1600	1900		
30AW☐ -VL155-10		10:1		150	400	177	513		9.60	4700	4100		
30AW☐ -VL155-25		25:1	90	60	160	419	840 *3		10.0	6400	6100		
30AW☐ -VL205-50		50:1		30	80	837	1850 *3		10.0	14000	14000		
44AW☐ -VL120-03	44AW-A6☐	3:1	95	500	1333	80.9	204	67.5 (75.4)	12.0	1300	1500	5	IP65
44AW☐ -VL120-05		5:1		300	800	135	340		9.50	1600	1900		
44AW☐ -VL205-10		10:1		150	400	270	680		12.0	8400	7300		
44AW☐ -VL205-25		25:1	90	60	160	639	1611		14.0	11000	11000		
44AW☐ -VL235-50		50:1		30	80	1278	2900 *3		12.0	15000	14000		
55AW☐ -VL155-03	55AW-A6☐	3:1	95	500	1333	100	291	89.0 (96.9)	35.0	3200	2400	5	IP65
55AW☐ -VL155-05		5:1		300	800	166	485		27.0	3800	3000		
55AW☐ -VL205-10		10:1		150	400	333	969		27.0	8400	7300		
55AW☐ -VL205-25		25:1	90	60	160	788	1850 *3		29.0	11000	11000		
55AW☐ -VL235-50		50:1		30	80	1575	2900 *3		26.0	15000	14000		

Continued on next page.

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Gear Motor Model Number SXG___	Base Servo Motor Model SGMX-G-	Gear Ratio	Gearing Efficiency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10^{-4} $kg.m^2$)	Gear-head Inertia (x 10^{-4} $kg.m^2$	Allowable Radial Load (N)	Allowable Axial Load (N)	Backlash (arc-min)	Class
75AW☐ -VL155-03	75AW-A6☐	3:1	95	500	1333	137	339	125 (133)	35.0	3200	2400	5	IP65
75AW☐ -VL155-05		5:1		300	800	228	565		27.0	3800	3000		
75AW☐ -VL205-10		10:1		150	400	456	1131		27.0	8400	7300		
75AW☐ -VL235-25		25:1	90	60	160	1080	2678		33.0	12000	14000		
75AW☐ -VL235-50		50:1		30	80	2000 *3	2900 *3		26.0	15000	14000		

Note:

The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of ☐ in model numbers).

*1 The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

*2 The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25 °C. They are reference values only.

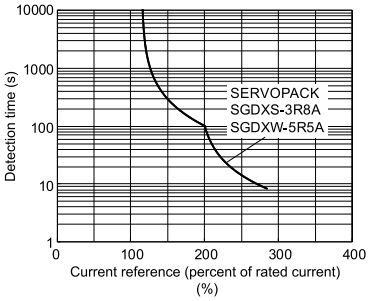
*3 The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.

Servomotor Overload Protection Characteristics

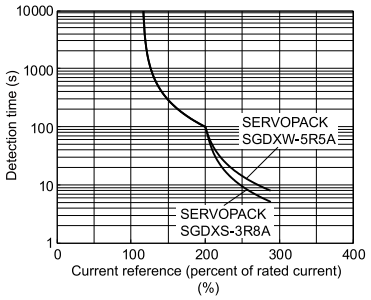
The overload detection level is set for hot start conditions with a servomotor surrounding air temperature of 40°C.

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.

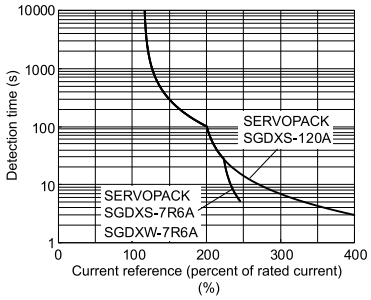
SGMXG-03A□A



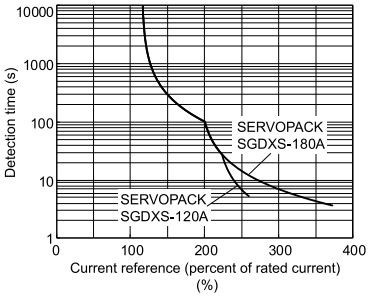
SGMXG-05□A



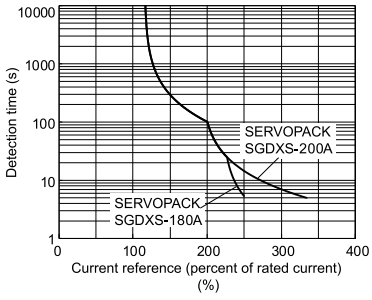
SGMXG-09□A



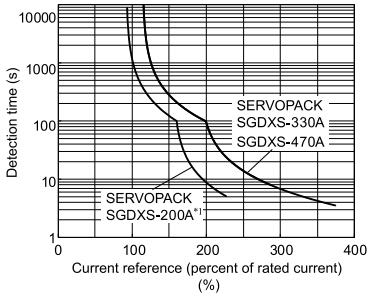
SGMXG-13A□A



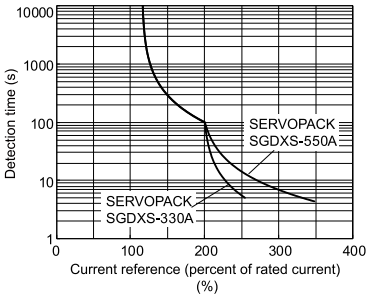
SGMXG-20A□A



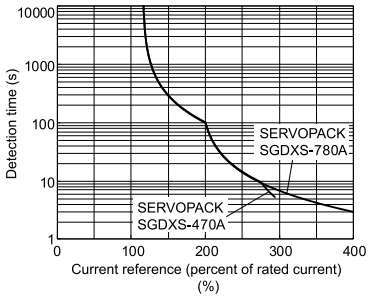
SGMXG-30A□A



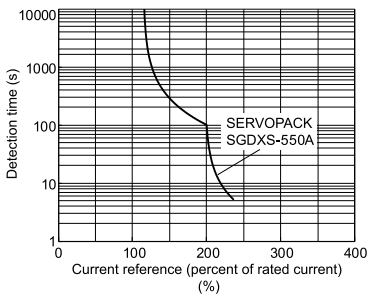
SGMXG-44A□A



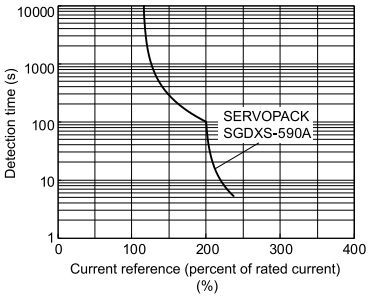
SGMXG-55A□A



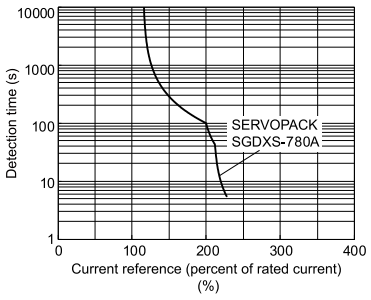
SGMXG-75A□A



SGMXG-1AA□A



SGMXG-1EA□A



*1 The current reference is calculated based on the servomotor's rated current of 24.5 Arms.

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 "*Torque-Rotation Speed Characteristics on page 176*".
- The value for the instantaneous maximum current / rated current (%) for each servomotor is taken as the current reference maximum value.

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings (SGMXG-30A□A to -1EA□A) on page 174*" and "*Servomotor Ratings (SGMXG-30A□A to -1EA□A) on page 174*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program *1 to check the driving conditions. Perform the required steps for each of the following cases.

*1 Contact your Yaskawa representative for information on this program.

■ 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).

Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

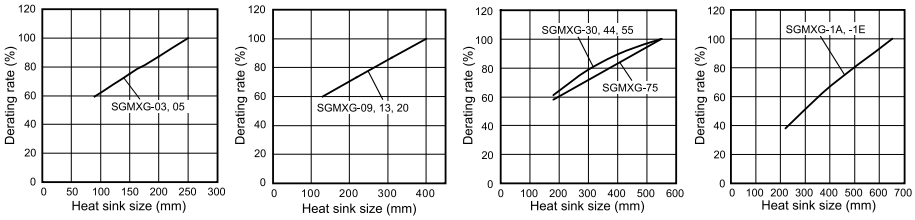
Refer to the following section for details on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 728*

Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.



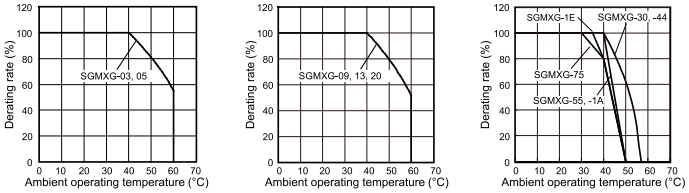
Important

The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

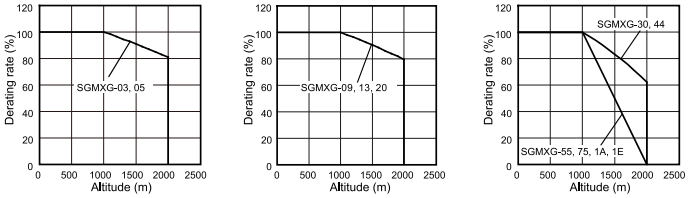
■ Servomotor Derating Rates for Surrounding Air Temperature

Apply a suitable derating rate from the following graphs according to the surrounding air temperature of the servomotor (60°C max.).



■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.



Note:

- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 180*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

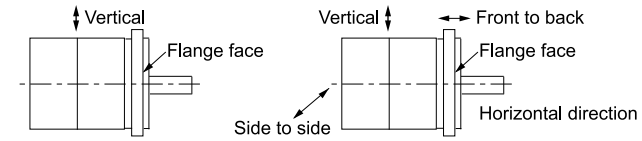
Specifications and Ratings (200 V, 1000-min^{-1} Specification)

Specification

Voltage		200 V							
Model SGMXG-		03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	40A□B	55A□B
Time Rating		Continuous							
Thermal Class		UL: F, CE: 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							
Environmental Conditions	Surrounding Air Temp.	0°C to 40°C (60°C max.) *3							
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 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)							
Impact Resistance *2	Impact Accel. (at Flange)	490 m/s^2							
	Number of Impacts	2 times							
Vibration Resistance *2	Vibration Accel. (at Flange)	49 m/s^2 (24.5 m/s^2 front to back)						24.5 m/s^2	
Applicable SERVOPACKs	SGDXS	3R8A	5R5A	7R6A	120A	180A (200A) *4	200A	330A	470A
	SGDXW	5R5A *5	5R5A	7R6A	–				

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 182*

*4 To increase the instantaneous maximum torque, use the SERVOPACK model in parentheses ( ).
Refer to the following section for the instantaneous maximum torque for individual SERVOPACK models.
☞ *Servomotor Ratings on page 185*
☞ *Torque-Rotation Speed Characteristics on page 187*

*5 If you use a servomotor together with a Σ-XW SERVOPACK, the control gain may not increase as much as with a Σ-XS SERVOPACK and other performances may be lower than those achieved with a Σ-XS SERVOPACK.

Servomotor Ratings

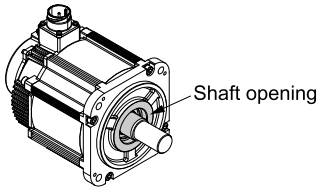
Voltage			200 V							
Model SGMXG-			03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	40A□B	55A□B
Rated Output *1		kW	0.3	0.6	0.9	1.2	2.0	3.0	4.0	5.5
Rated Torque *1, *2		N·m	2.86	5.68	8.62	11.5	19.1	28.4	38.2	52.6
Instantaneous Maximum Torque *1		N·m	7.17	20.2	24.5	33.5	58 67 *3	86	121	169
Rated Current *1		Arms	3.0	4.4	5.7	9.2	12.7	17.7	24.9	32.2
Instantaneous Maximum Current *1		Arms	7.3	16.9	17	28	42 50.6 *3	56	82	110
Rated Rotation Speed *1		min^{-1}	1000							
Continuous Allowable Rotation Speed *1		min^{-1}	2000							
Maximum Rotation Speed *1		min^{-1}	2000							
Torque Constant *1		N·m/Arms	1.05	1.41	1.64	1.36	1.57	1.7	1.65	1.71
Rotor Moment of Inertia *4	Without Holding Brakes	$\times 10^{-4}$ $kg \cdot m^2$	3.33	13.9	19.9	26	46	67.5	89	125
	With Holding Brakes		3.58	16	22	28.1	53.9	75.4	96.9	133
Rated Power Rate *1	Without Holding Brakes	kW/s	24.6	23.2	37.3	50.9	79.3	119	164	221
	With Holding Brakes		22.9	20.2	33.8	47.1	67.7	107	150.6	208
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	8590	4090	4330	4420	4150	4210	4290	4210
	With Holding Brakes		7990	3550	3920	4090	3540	3770	3940	3950
Heat Sink Size *5		mm	250 ×250 × 6 (aluminum)	400 × 400 × 20 (steel)			550 × 550 × 30 (steel)			
Protective Structure *6			Totally enclosed, self-cooled, IP67							
Holding Brake Specification *7	Rated Voltage	V	24 VDC $^{+10\%}_{0}$							
	Capacity	W	10				18.5		25	
	Holding Torque	N·m	4.5	12.7	19.6		43.1		72.6	
	Coil Resistance	Ω (at 20°C)	56	59			31		23	
	Rated Current	A (at 20°C)	0.43	0.41			0.77		1.05	
	Time Required to Release Brake	ms	100				170			
	Time Required to Brake	ms	80				100		80	
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *8	Without External Devices		18 times	11 times	7.5 times	8.3 times	11 times	7.3 times	8.3 times	10 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *9		18 times	11 times	18 times	18 times	13 times	12 times	16 times	14 times

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Voltage			200 V							
Model SGMXG-			03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	40A□B	55A□B
Allowable Shaft Loads *10	LF		40	58			79		113	
	Allowable Radial Load	N	490		686	980	1470		1764	
	Allowable Thrust Load	N	98		343	392	490		588	

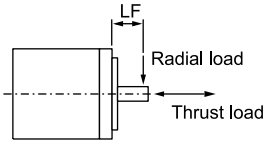
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
*2 The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.
*3 This is the value if you combine with the SERVOPACK SGDXS-200A.
*4 The values for the servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.
*5 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 182*
*6 This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.



*7 Observe the following precautions if you use a servomotor with a holding brake.

- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

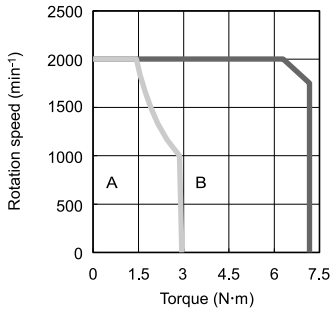
*8 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.
*9 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
*10 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



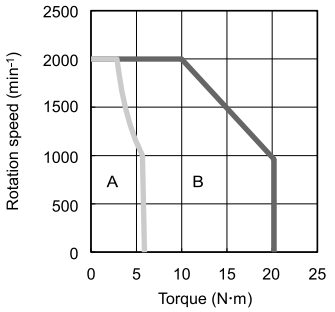
Torque-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V

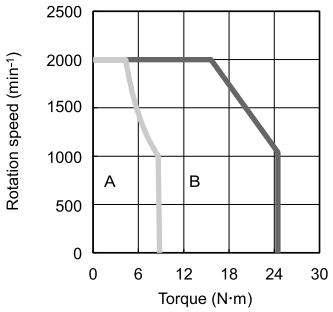
SGMXG-03A□B



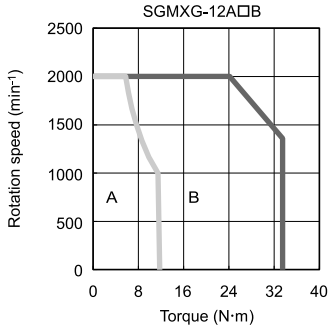
SGMXG-06A□B



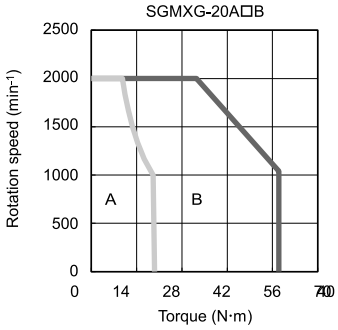
SGMXG-09A□B



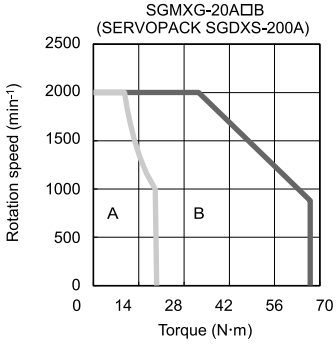
SGMXG-12A□B



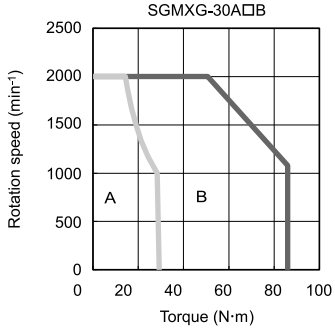
SGMXG-20A□B



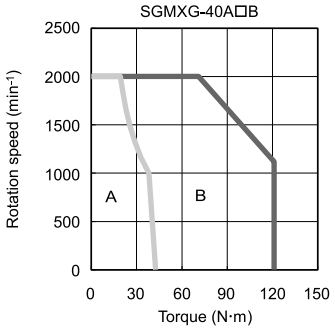
SGMXG-20A□B
(SERVOPACK SGDXS-200A)



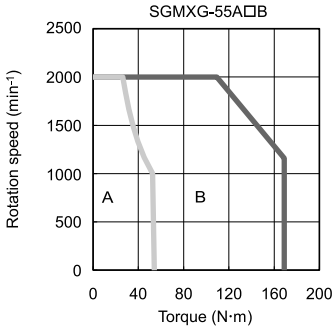
SGMXG-30A□B



SGMXG-40A□B



SGMXG-55A□B



Note:

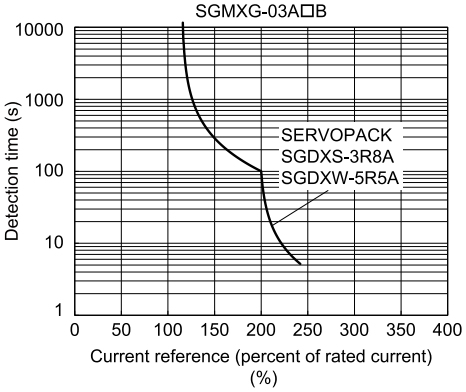
- These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
- The characteristics in the intermittent duty zone depend on the power supply voltage.
- If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
- If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.

Servomotor Overload Protection Characteristics

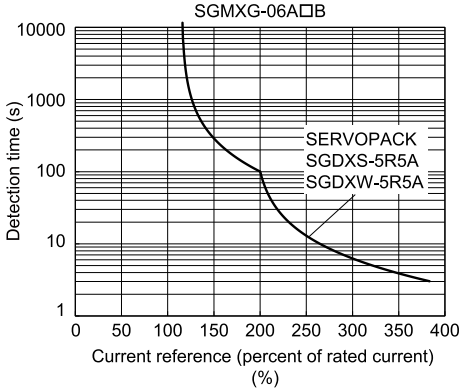
The overload detection level is set for hot start conditions with a servomotor surrounding air temperature of 40°C.

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.

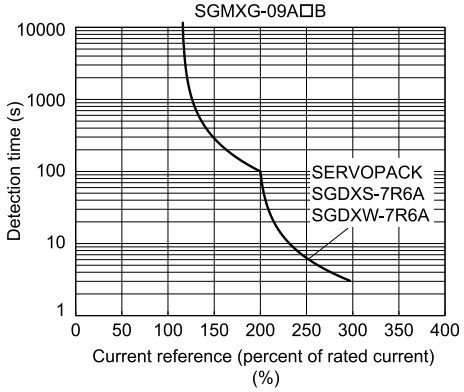
SGMXG-03A□B



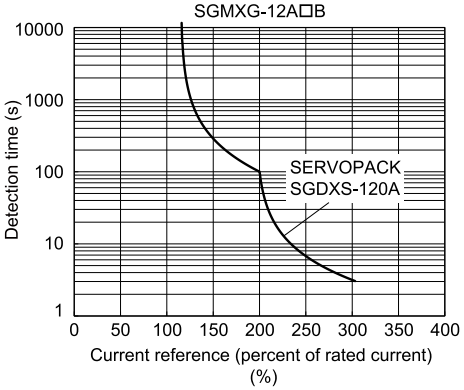
SGMXG-06A□B



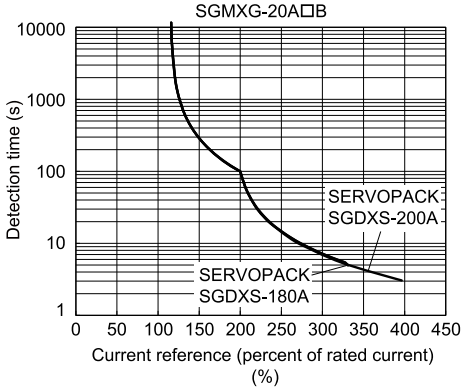
SGMXG-09A□B



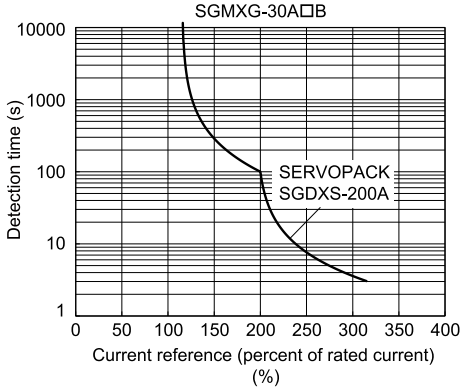
SGMXG-12A□B



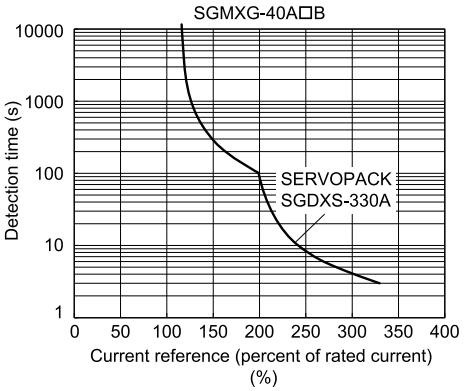
SGMXG-20A□B



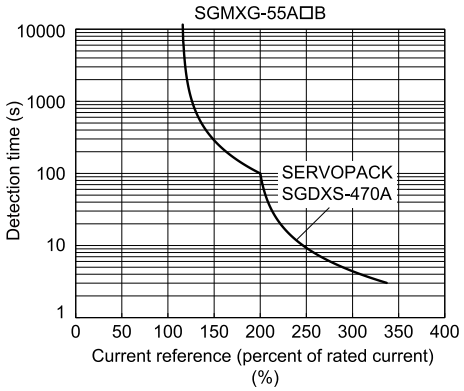
SGMXG-30A□B



SGMXG-40A□B



SGMXG-55A□B



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 "*Torque-Rotation Speed Characteristics on page 187*".
- The value for the instantaneous maximum current / rated current (%) for each servomotor is taken as the current reference maximum value.

Allowable Load Moment of Inertia

The allowable load moments of inertia (rotor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 185*". 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 rotation speed.

If the above steps are 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).

Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor.

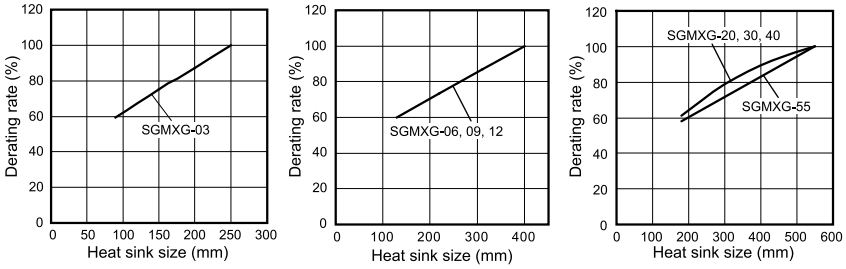
Refer to the following catalog for details on external regenerative resistors.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.



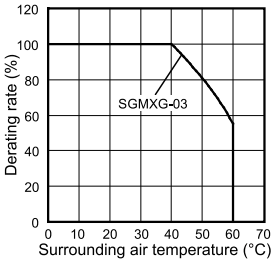
Important

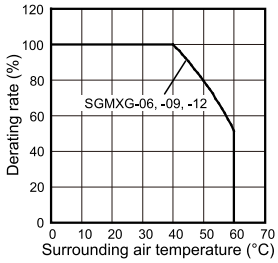
The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

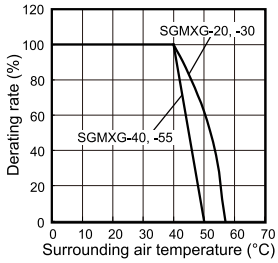
- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

■ Servomotor Derating Rates for Surrounding Air Temperature

Apply a suitable derating rate from the following graphs according to the surrounding air temperature of the servomotor (60°C max.).

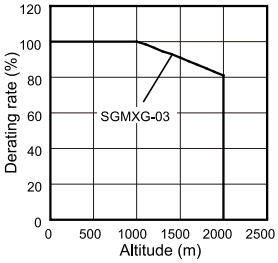


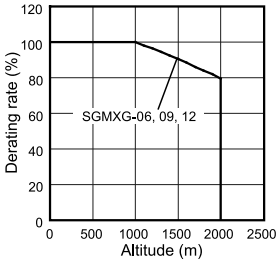


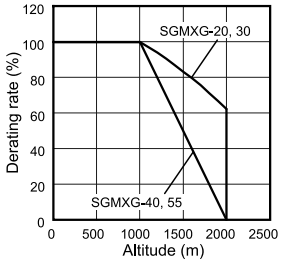


■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.







Note:

- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 188*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

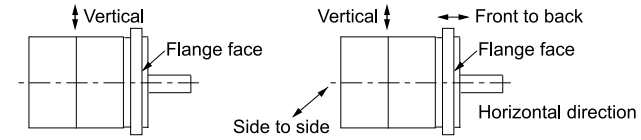
Specifications and Ratings (400 V, 1500-min^{-1} Specification)

Specification

Voltage		400 V									
Model SGMXG-		05D□A	09D□A	13D□A	20D□A	30D□A	44D□A	55D□A	75D□A	1AD□A	1ED□A
Time Rating		Continuous									
Thermal Class		UL: F, CE: F									
Insulation Resistance		500 VDC, 10 MΩ min.									
Withstand Voltage		1,800 VAC for 1 minute, or 2,200 VAC for 1 second									
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									
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (60°C max.) *3									
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 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)									
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s^2									
	Number of Impacts	2 times									
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s^2 (24.5 m/s^2 front to back)						24.5 m/s^2			
Applicable SERVOPACKs *4	SGDXS	1R9D	3R5D (5R4D) *4	5R4D (8R4D) *4	8R4D (120D) *4	120D (210A) *4	170D (260D) *4	210D (370D) *4	260D	280D	370D

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 200*

*4 To increase the instantaneous maximum torque, use the SERVOPACK model in parentheses ( ).
Refer to the following section for the instantaneous maximum torque for individual SERVOPACK models.
☞ *Servomotor Ratings (SGMXG-05D□A to -30D□A) on page 192*
☞ *Servomotor Ratings (SGMXG-44D□A to -1ED□A) on page 194*
☞ *Torque-Rotation Speed Characteristics on page 196*

Servomotor Ratings (SGMXG-05D□A to -30D□A)

Voltage			400 V				
Model SGMXG-			05D□A	09D□A	13D□A	20D□A	30D□A
Rated Output *1		kW	0.45	0.85	1.3	1.8	2.9
Rated Torque *1, *2		N·m	2.86	5.39	8.34	11.5	18.6
Instantaneous Maximum Torque *1		N·m	8.92	14.2 20.0 *3	23.3 30.0 *4	28.7 35.4 *5	45.1 66.8 *6
Rated Current *1		Arms	1.9	3.5	5.4	8.4	11.9
Instantaneous Maximum Current *1		Arms	5.5	8.5 14 *3	14 20 *4	21 28 *5	28 45 *6
Rated Rotation Speed *1		min^{-1}	1500				
Continuous Allowable Rotation Speed		min^{-1}	4000			3000	
Maximum Rotation Speed *1		min^{-1}	4000				
Torque Constant *1		N·m/Arms	1.71	1.72	1.78	1.50	1.69
Rotor Moment of Inertia *7	Without Holding Brakes	$\times 10^{-4}$ kg·m^2	3.33	13.9	19.9	26.0	46.0
	With Holding Brakes		3.58	16.0	22.0	28.1	53.9
Rated Power Rate *1	Without Holding Brakes	kW/s	24.6	20.9	35.0	50.9	75.2
	With Holding Brakes		22.9	18.2	31.6	47.1	64.2
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	8590	3880	4190	4420	4040
	With Holding Brakes		7990	3370	3790	4090	3450
Heat Sink Size *8		mm	250 ×250 × 6 (aluminum)	400 × 400 × 20 (steel)			550 ×550 × 30 (steel)
Protective Structure *9			Totally enclosed, self-cooled, IP67				
Holding Brake Specification *10	Rated Voltage	V	24 VDC $^{+10\%}_{0}$				
	Capacity	W	10				18.5
	Holding Torque	N·m	4.5	12.7	19.6		43.1
	Coil Resistance	Ω (at 20°C)	56	59			31
	Rated Current	A (at 20°C)	0.43	0.41			0.77
	Time Required to Release Brake	ms	100				170
	Time Required to Brake	ms	80				100
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *11	At 3000 min^{-1}		15 times	5 times			
	At 4000 min^{-1}		8.4 times	2 times		5 times	2.2 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *12	At 3000 min^{-1}	15 times	10 times			
		At 4000 min^{-1}	8.4 times	8 times	9 times	7 times	5 times
Allowable Shaft Loads *13	LF	mm	40	58			79
	Allowable Radial Load	N	490		686	980	1470
	Allowable Thrust Load	N	98		343	392	490

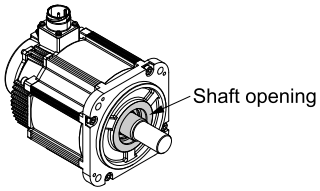
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
*2 The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.
*3 This is the value if you combine with the SERVOPACK SGDXS-5R4D.
*4 This is the value if you combine with the SERVOPACK SGDXS-8R4D.
*5 This is the value if you combine with the SERVOPACK SGDXS-120D.
*6 This is the value if you combine with the SERVOPACK SGDXS-210D.

*7 The values for the servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.

*8 Refer to the following section for the relation between the heat sinks and derating rate.

☞ *Servomotor Heat Dissipation Conditions on page 200*

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



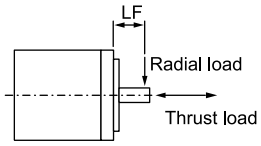
*10 Observe the following precautions if you use a servomotor with a holding brake.

- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*11 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*12 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.

*13 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



Servomotor Ratings (SGMXG-44D□A to -1ED□A)

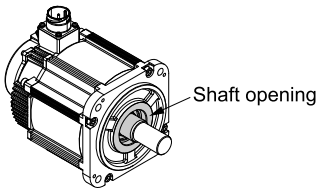
Voltage			400 V				
Model SGMXG-			44D□A	55D□A	75D□A	1AD□A	1ED□A
Rated Output *1		kW	4.4	5.5	7.5	11	15
Rated Torque *1, *2		N·m	28.4	35.0	48.0	70.0	95.4
Instantaneous Maximum Torque *1		N·m	71.6 95.6 *3	102 134 *4	119	175	224
Rated Current *1		Arms	16.0	18.6	25.7	28.1	37.0
Instantaneous Maximum Current *1		Arms	41 56 *3	55 75 *4	63	70	85
Rated Rotation Speed *1		min^{-1}	1500				
Continuous Allowable Rotation Speed		min^{-1}	3000			2000	
Maximum Rotation Speed *1		min^{-1}	4000			3000	
Torque Constant *1		N·m/Arms	1.92	2.05	1.97	2.76	2.86
Rotor Moment of Inertia *5	Without Holding Brakes	$\times 10^{-4}$ kg·m^2	67.5	89.0	125	242	303
	With Holding Brakes		75.4	96.9	133	261	341
Rated Power Rate *1	Without Holding Brakes	kW/s	119	138	184	202	300
	With Holding Brakes		107	126	173	188	267
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	4210	3930	3840	2890	3150
	With Holding Brakes		3770	3610	3610	2680	2800
Heat Sink Size *6		mm	550 × 550 × 30 (steel)			650 ×650 × 35 (steel)	
Protective Structure *7			Totally enclosed, self-cooled, IP67				
Holding Brake Specification *8	Rated Voltage	V	24 VDC $^{+10\%}_{0}$				
	Capacity	W	18.5	25		32	35
	Holding Torque	N·m	43.1	72.6		84.3	114.6
	Coil Resistance	Ω (at 20°C)	31	23		18	17
	Rated Current	A (at 20°C)	0.77	1.05		1.33	1.46
	Time Required to Release Brake	ms	170				250
	Time Required to Brake	ms	100	80			
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *9	At 2000 min^{-1}		–			5 times	
	At 3000 min^{-1}		5 times			2.2 times	1.5 times
	At 4000 min^{-1}		2.4 times	3.5 times	2.2 times	–	
	With External Regenerative Resistor and External Dynamic Brake Resistor *10	At 2000 min^{-1}	–			10 times	
		At 3000 min^{-1}	10 times			4 times	2 times
		At 4000 min^{-1}	5 times		4 times	–	

Continued on next page.

Continued from previous page.

Voltage			400 V				
Model SGMXG-			44D□A	55D□A	75D□A	1AD□A	1ED□A
Allowable Shaft Loads *11	LF	mm	79	113		116	
	Allowable Radial Load	N	1470	1764			4998
	Allowable Thrust Load	N	490	588			2156

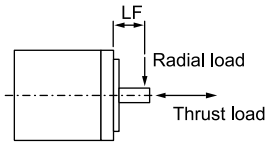
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
*2 The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.
*3 This is the value if you combine with the SERVOPACK SGDXS-260D.
*4 This is the value if you combine with the SERVOPACK SGDXS-370D.
*5 The values for the servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.
*6 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 200*
*7 This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.



*8 Observe the following precautions if you use a servomotor with a holding brake.

- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*9 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.
*10 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
*11 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.

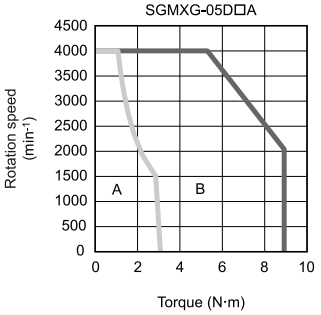


Torque-Rotation Speed Characteristics

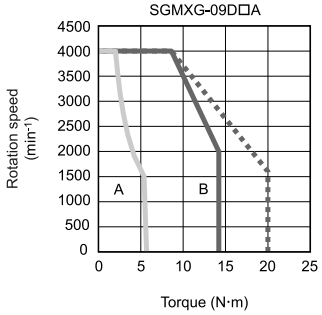
A : Continuous duty zone
B : Intermittent duty zone

(solid lines): Three-phase, 400 V
(dotted lines): Three-phase 400 V (with changed SERVOPACK combination (refer to chapters 6.2.2 and 6.2.3))

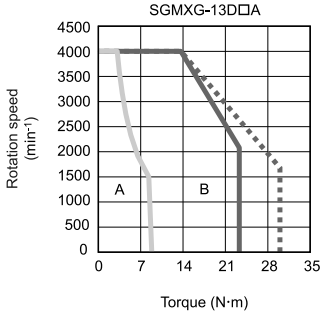
SGMXG-05D□A



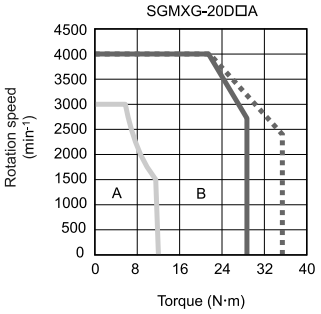
SGMXG-09D□A



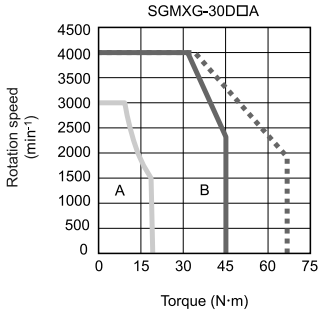
SGMXG-13D□A



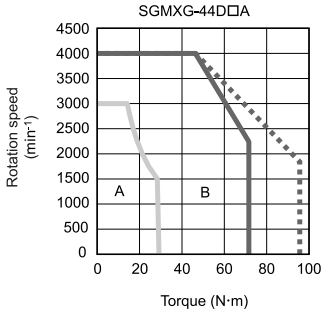
SGMXG-20D□A



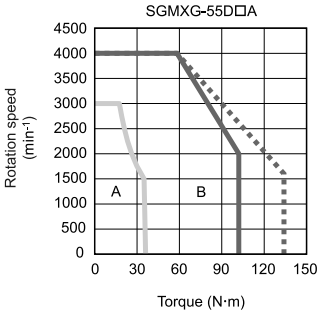
SGMXG-30D□A



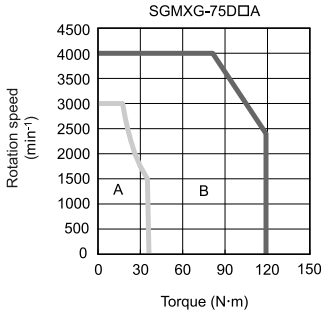
SGMXG-44D□A



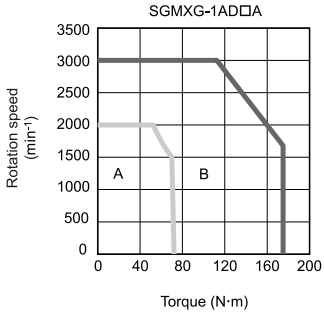
SGMXG-55D□A



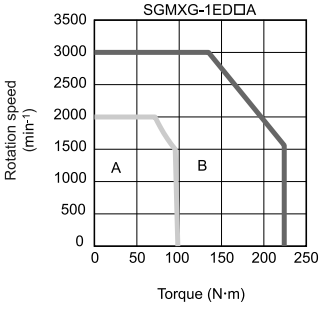
SGMXG-75D□A



SGMXG-1AD□A



SGMXG-1ED□A



Note:

- These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
- The characteristics in the intermittent duty zone depend on the power supply voltage.
- If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
- If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.

Gear Motor Ratings (400 V Models)

Gear Motor Model Number SXG___	Base Servo Motor Model SGMX-G-	Gear Ratio	Gear-ing Effi-ciency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10-4 kg.m2)	Gear-head Inertia (x 10-4 kg.m2	Allowa-ble Radial Load (N)	Allowa-ble Axial Load (N)	Back-lash (arc-min)	Class
05DW☐ -VL070-03	05DW-A6☐	3:1	95	500	1333	8.15	25.4	3.33 (3.58)	0.53	430	310	5	IP65
05DW☐ -VL070-05		5:1		300	800	13.6	42.4		0.46	510	390		
05DW☐ -VL090-10		10:1		150	400	27.2	84.7		0.70	1200	1600		
05DW☐ -VL090-25		25:1	90	60	160	64.4	165 *3		0.74	1600	2200		
05DW☐ -VL120-50		50:1		30	80	129	390 *3		0.76	3400	3900		
09DW☐ -VL090-03	09DW-A6☐	3:1	95	500	1333	15.4	40.5	13.9 (16.0)	2.90	810	930	5	IP65
09DW☐ -VL090-05		5:1		300	800	25.6	67.5		2.60	960	1200		
09DW☐ -VL090-10		10:1		150	400	51.2	135		2.50	1200	1600		
09DW☐ -VL120-25		25:1	90	60	160	121	320		2.80	2700	3700		
09DW☐ -VL155-50		50:1		30	80	243	639		2.80	8100	8200		
13DW☐ -VL090-03	13DW-A6☐	3:1	95	500	1333	23.8	66.4	19.9 (22.0)	2.90	810	930	5	IP65
13DW☐ -VL090-05		5:1		300	800	39.6	111		2.60	960	1200		
13DW☐ -VL120-10		10:1		150	400	79.2	221		2.50	2000	2500		
13DW☐ -VL120-25		25:1	90	60	160	188	390 *3		2.80	2700	3700		
13DW☐ -VL155-50		50:1		30	80	375	840 *3		2.80	8100	8200		
20DW☐ -VL090-03	20DW-A6☐	3:1	95	500	1333	32.8	81.8	26.0 (28.1)	2.90	810	930	5	IP65
20DW☐ -VL090-05		5:1		300	800	54.6	136		2.60	960	1200		
20DW☐ -VL120-10		10:1		150	400	109	273		2.60	2000	2500		
20DW☐ -VL155-25		25:1	90	60	160	259	646		4.10	6400	6100		
20DW☐ -VL205-50		50:1		30	80	518	1292		3.80	14000	14000		
30DW☐ -VL120-03	30DW-A6☐	3:1	95	500	1333	53.0	154	46.0 (53.9)	12.0	1300	1500	5	IP65
30DW☐ -VL120-05		5:1		300	800	88.4	257		9.50	1600	1900		
30DW☐ -VL155-10		10:1		150	400	177	513		9.60	4700	4100		
30DW☐ -VL155-25		25:1	90	60	160	419	840 *3		10.0	6400	6100		
30DW☐ -VL205-50		50:1		30	80	837	1850 *3		10.0	14000	14000		
44DW☐ -VL120-03	44DW-A6☐	3:1	95	500	1333	80.9	204	67.5 (75.4)	12.0	1300	1500	5	IP65
44DW☐ -VL120-05		5:1		300	800	135	340		9.50	1600	1900		
44DW☐ -VL205-10		10:1		150	400	270	680		12.0	8400	7300		
44DW☐ -VL205-25		25:1	90	60	160	639	1611		14.0	11000	11000		
44DW☐ -VL235-50		50:1		30	80	1278	2900 *3		12.0	15000	14000		

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Gear Motor Model Number SXG___	Base Servo Motor Model SGMX-G-	Gear Ratio	Gearing Efficiency *1	Rated Speed (RPM)	Max Speed (RPM)	Rated Torque (Nm) *2 *3	Peak Torque (Nm) *2 *3	Motor Inertia (x 10^{-4} kg.m^2)	Gear-head Inertia (x 10^{-4} kg.m^2	Allowable Radial Load (N)	Allowable Axial Load (N)	Backlash (arc-min)	Class
55DW☐ -VL155-03	55DW-A6☐	3:1	95	500	1333	100	291	89.0 (96.9)	35.0	3200	2400	5	IP65
55DW☐ -VL155-05		5:1		300	800	166	485		27.0	3800	3000		
55DW☐ -VL205-10		10:1		150	400	333	969		27.0	8400	7300		
55DW☐ -VL205-25		25:1	90	60	160	788	1850 *3		29.0	11000	11000		
55DW☐ -VL235-50		50:1		30	80	1575	2900 *3		26.0	15000	14000		
75DW☐ -VL155-03	75DW-A6☐	3:1	95	500	1333	137	339	125 (133)	35.0	3200	2400	5	IP65
75DW☐ -VL155-05		5:1		300	800	228	565		27.0	3800	3000		
75DW☐ -VL205-10		10:1		150	400	456	1131		27.0	8400	7300		
75DW☐ -VL235-25		25:1	90	60	160	1080	2678		33.0	12000	14000		
75DW☐ -VL235-50		50:1		30	80	2000 *3	2900 *3		26.0	15000	14000		

Note:

The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of ☐ in model numbers).

*1 The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

*2 The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25 °C. They are reference values only.

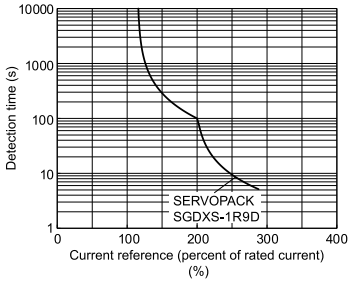
*3 The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.

Servomotor Overload Protection Characteristics

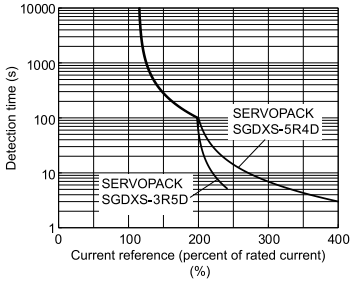
The overload detection level is set for hot start conditions with a servomotor surrounding air temperature of 40°C.

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.

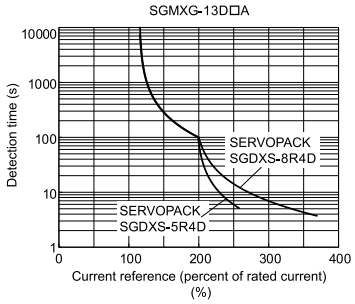
SGMXG-05D□A



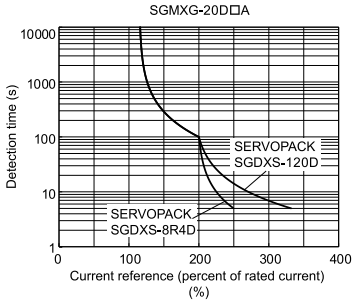
SGMXG-09D□A



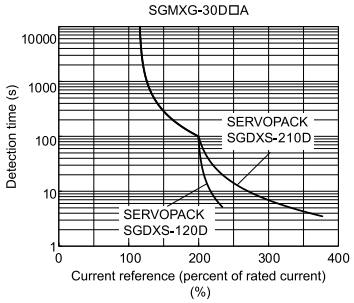
SGMXG-13D□A



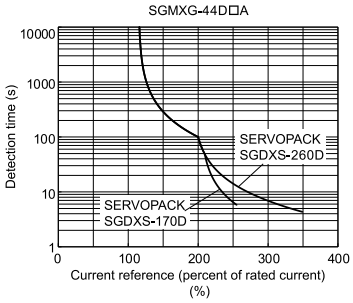
SGMXG-20D□A



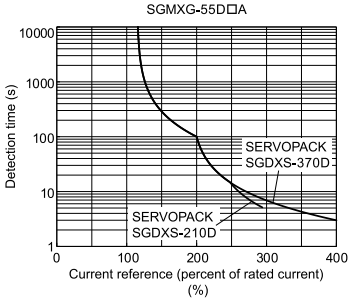
SGMXG-30D□A



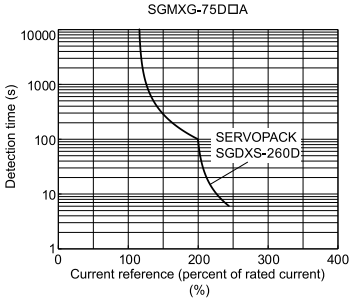
SGMXG-44D□A



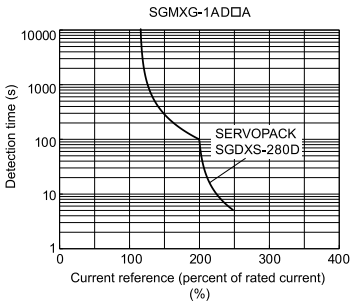
SGMXG-55D□A



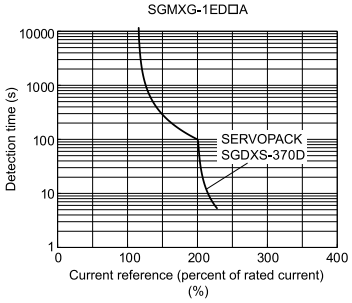
SGMXG-75D□A



SGMXG-1AD□A



SGMXG-1ED□A



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 "*Torque-Rotation Speed Characteristics on page 196*".
- The value for the instantaneous maximum current / rated current (%) for each servomotor is taken as the current reference maximum value.

Allowable Load Moment of Inertia

The allowable load moments of inertia (rotor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings (SGMXG-05D□A to -30D□A) on page 192*, *Servomotor Ratings (SGMXG-44D□A to -1ED□A) on page 194*". 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 rotation speed.

If the above steps are 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).

Refer to the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor.

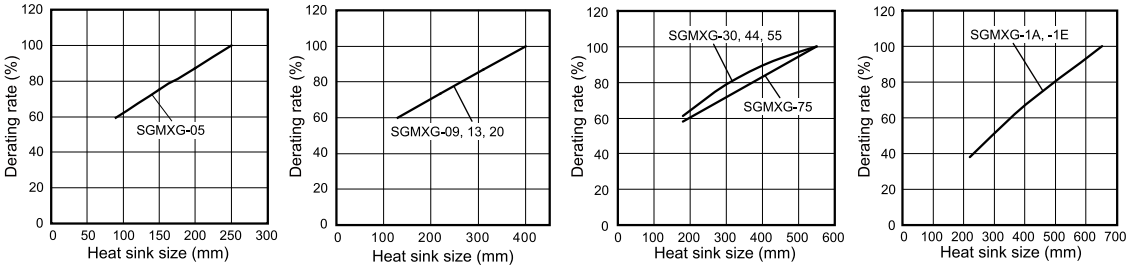
Refer to the following catalog for details on external regenerative resistors.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.



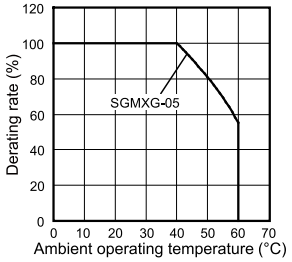
Important

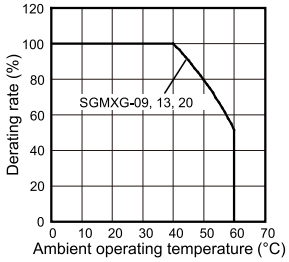
The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

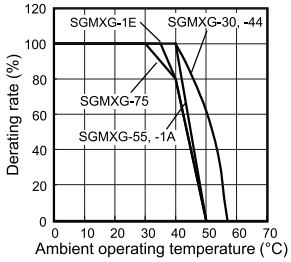
- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

■ Servomotor Derating Rates for Surrounding Air Temperature

Apply a suitable derating rate from the following graphs according to the surrounding air temperature of the servomotor (60°C max.).

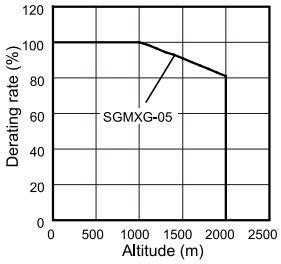


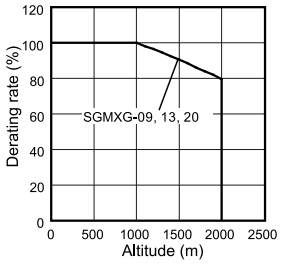


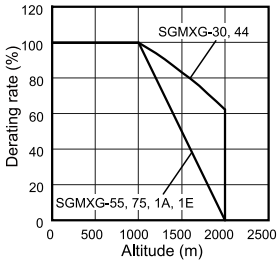


■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.







Note:

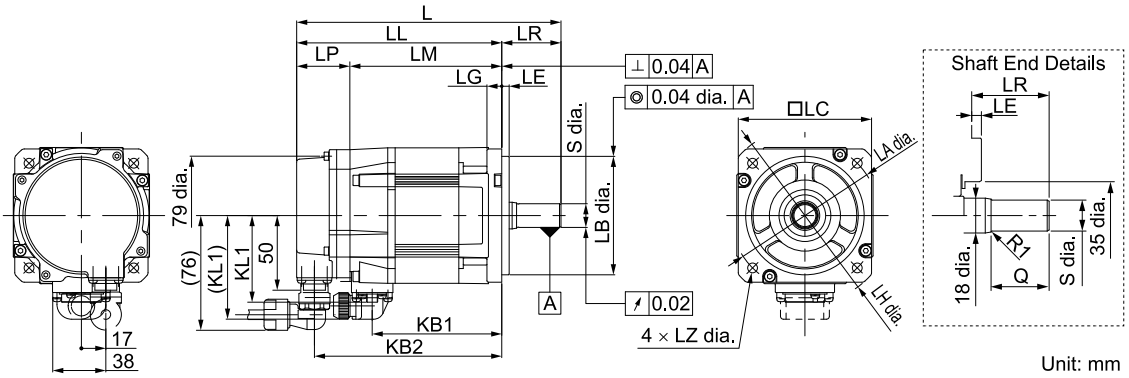
- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 199*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

External Dimensions (200 V Specification)

SGMXG-03A□A, -05A□A, -03A□B

■ Servomotors without Holding Brakes

◆ Σ-7 Compatible Specification



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1)
03A□A21A1	164	124	90	34	40	75	112	59 (70)
05A□A21A1	177	137	103	34	40	88	125	59 (70)
03A□B21A1	177	137	103	34	40	88	125	59 (70)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
03A□A21A1	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	2.6
05A□A21A1	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	3.2
03A□B21A1	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	3.2

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 226*

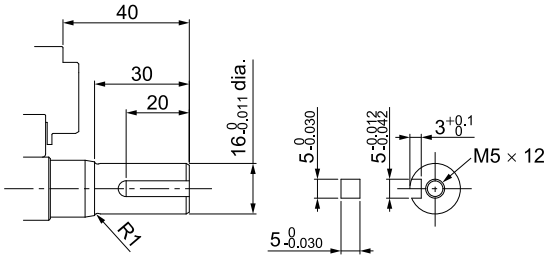
Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.

☞ *Shaft End Specification on page 203*

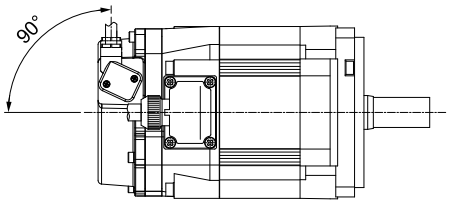
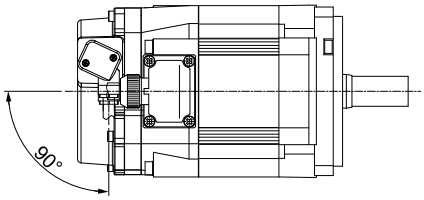
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

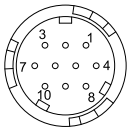
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

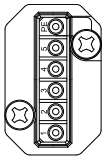
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications

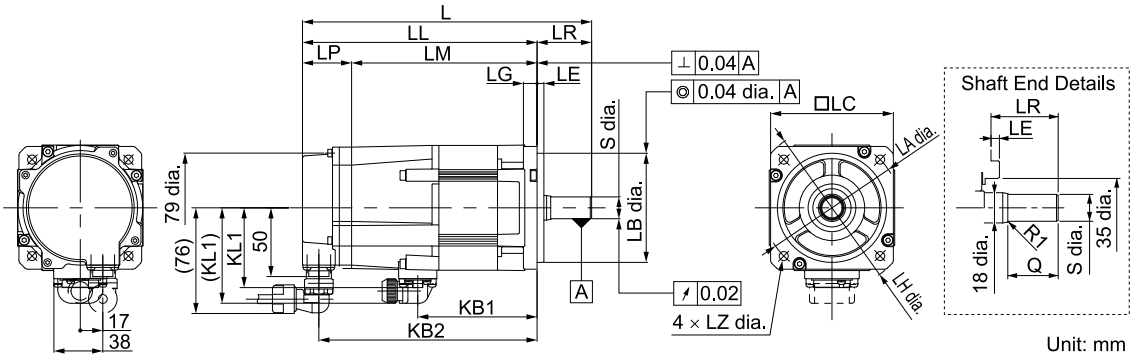


PE	FG (frame ground)	3	Phase U
5	–	2	Phase V
4	–	1	Phase W

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-7 Compatible Specification



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1)
03A□A2CA1	197	157	123	34	40	75	145	59 (70)
05A□A2CA1	210	170	136	34	40	88	158	59 (70)
03A□B2CA1	210	170	136	34	40	88	158	59 (70)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
03A□A2CA1	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	3.6
05A□A2CA1	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	4.2
03A□B2CA1	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	4.2

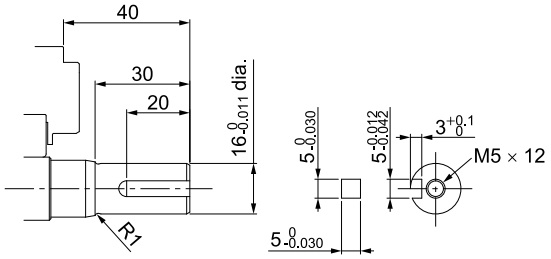
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 226*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 206*

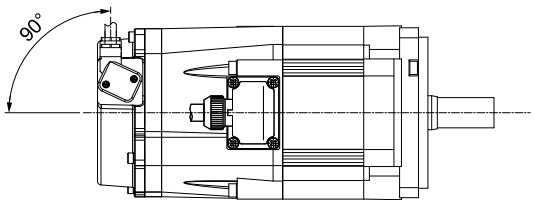
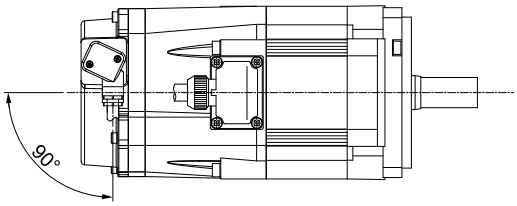
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

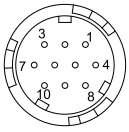
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

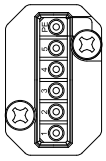
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



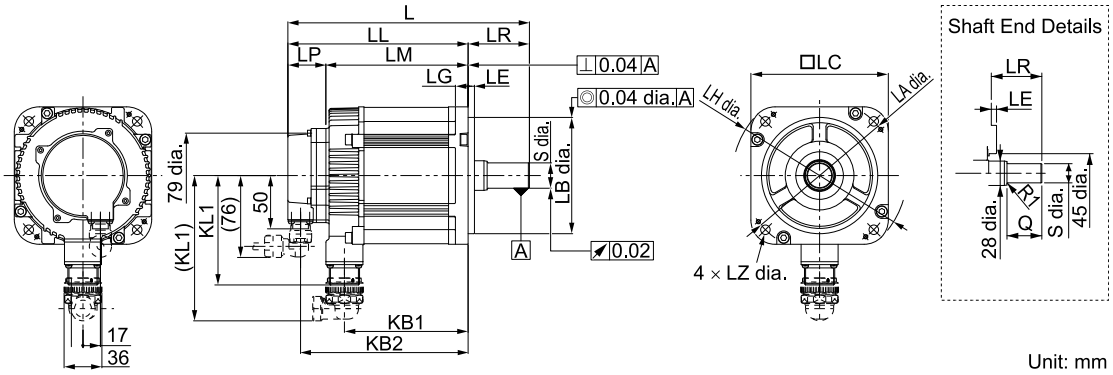
PE	FG (frame ground)	3	Phase U
5	Brake terminal	2	Phase V
4	Brake terminal	1	Phase W

Manufacturer: Japan Aviation Electronics Industry, Ltd.

SGMXG-09A□A to -20A□A, -06A□B to -12A□B

■ Servomotors without Holding Brakes

◆ Σ-7 Compatible Specification



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1 *2)
09A□A21A1	193	135	101	34	58	83	123	104 (138)
13A□A21A1	209	151	117	34	58	99	139	104 (138)
20A□A21A1	227	169	135	34	58	117	157	104 (138)
06A□B21A1	193	135	101	34	58	83	123	104 (138)
09A□B21A1	209	151	117	34	58	99	139	104 (138)
12A□B21A1	227	169	135	34	58	117	157	104 (138)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
09A□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	5.5
13A□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.1
20A□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	8.6
06A□B21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	5.5
09A□B21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.1
12A□B21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	8.6

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 226*

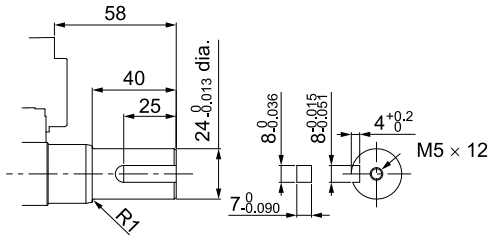
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 208*

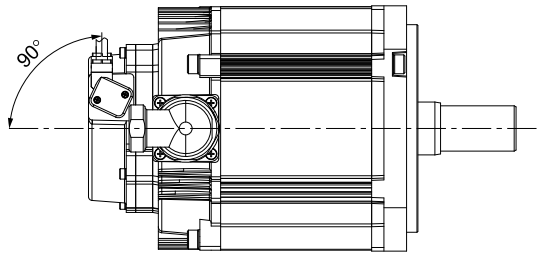
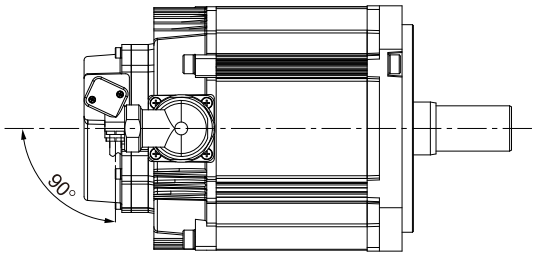
◆ Shaft End Specification

- Straight with Key and Tap


58
40
25
24 0 -0.013 dia.
8 0 -0.036
8 -0.015 -0.051
4 +0.2 0
M5 × 12
7 0 -0.090
R1

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

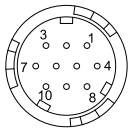
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

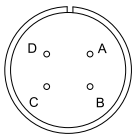
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications

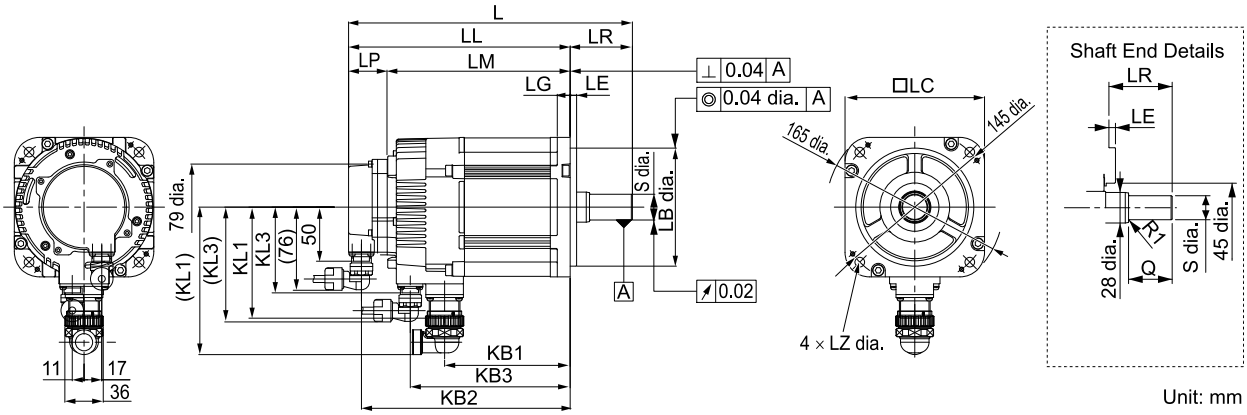


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-7 Compatible Specification



Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1) *2	KL3 (KL3) *2
09A□A2CA1	229	171	137	34	58	83	159	115	104 (138)	81 (106)
13A□A2CA1	245	187	153	34	58	99	175	131	104 (138)	81 (106)
20A□A2CA1	263	205	171	34	58	117	193	149	104 (138)	81 (106)
06A□B2CA1	229	171	137	34	58	83	159	115	104 (138)	81 (106)
09A□B2CA1	245	187	153	34	58	99	175	131	104 (138)	81 (106)
12A□B2CA1	263	205	171	34	58	117	193	149	104 (138)	81 (106)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
09A□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.5
13A□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	9.0
20A□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	11.0
06A□B2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.5
09A□B2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	9.0
12A□B2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	11.0

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 226*

*2 These are the values when the flexible connectors are connected.

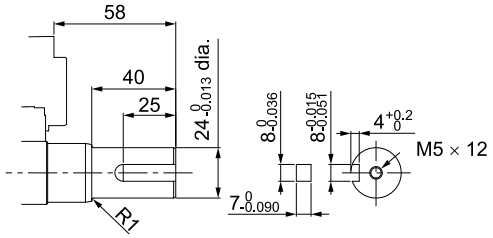
Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.

☞ *Shaft End Specification on page 212*

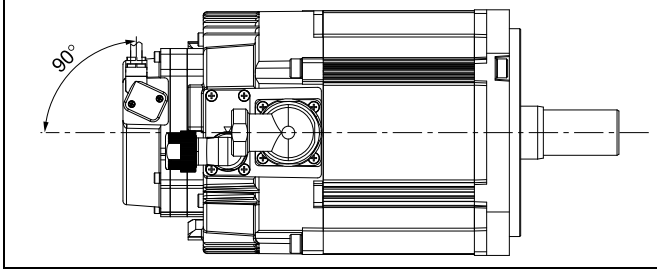
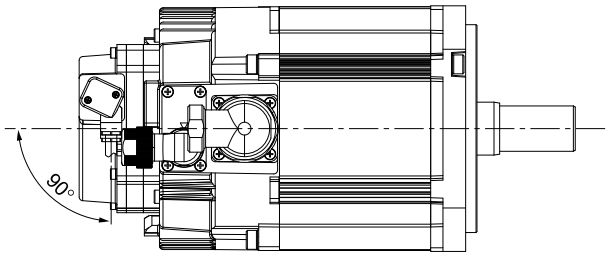
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

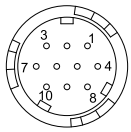
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

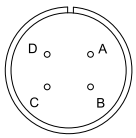
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

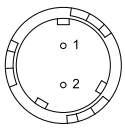
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

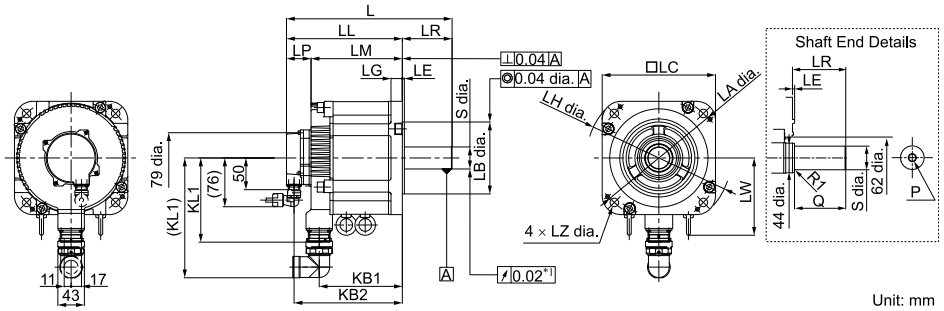
(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

SGMXG-30A□A to -75A□A, -20A□B to -55A□B

■ Servomotors without Holding Brakes

◆ Σ-7 Compatible Specification



*1 This is 0.04 for the SGMXG-55A□A, -75A□A, -40A□B, and -55A□B.

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	LW	KL1 (KL1) *2	MW
30A□A81A1	237	158	124	34	79	108	146	–	134 (190)	43
44A□A81A1	261	182	148	34	79	132	170	–	134 (190)	
55A□A81A1	332	219	185	34	113	163	207	123	145 (221)	59
75A□A81A1	378	265	231	34	113	209	253	123	145 (221)	
20A□B81A1	237	158	124	34	79	108	146	–	134 (190)	43
30A□B81A1	261	182	148	34	79	132	170	–	134 (190)	
40A□B81A1	332	219	185	34	113	163	207	123	145 (221)	59
55A□B81A1	378	265	231	34	113	209	253	123	145 (221)	

Model SGMXG-	Flange Dimensions							Shaft End Dimensions			Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	P	
30A□A81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25	13.5
44A□A81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		17.5
55A□A81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32	21.5
75A□A81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		29.5
20A□B81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25	13.5
30A□B81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		17.5
40A□B81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32	21.5
55A□B81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		29.5

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 226*

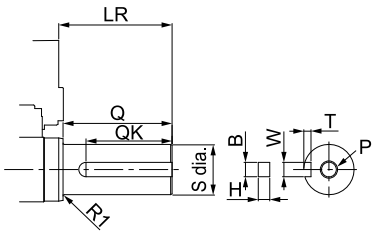
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for the shaft end are for a straight shaft without key and with tap. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 215*

◆ Shaft End Specification

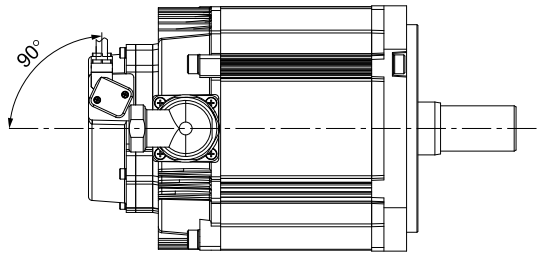
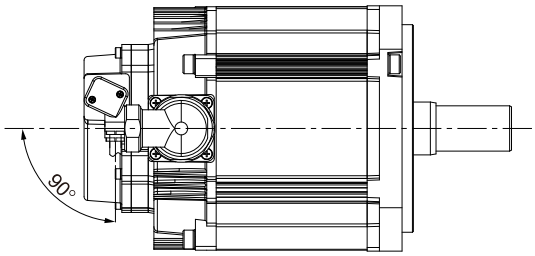
• Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
30A□A61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
44A□A61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
55A□A61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
75A□A61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	
20A□B61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
30A□B61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
40A□B61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
55A□B61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

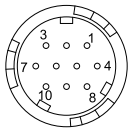
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

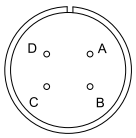
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications

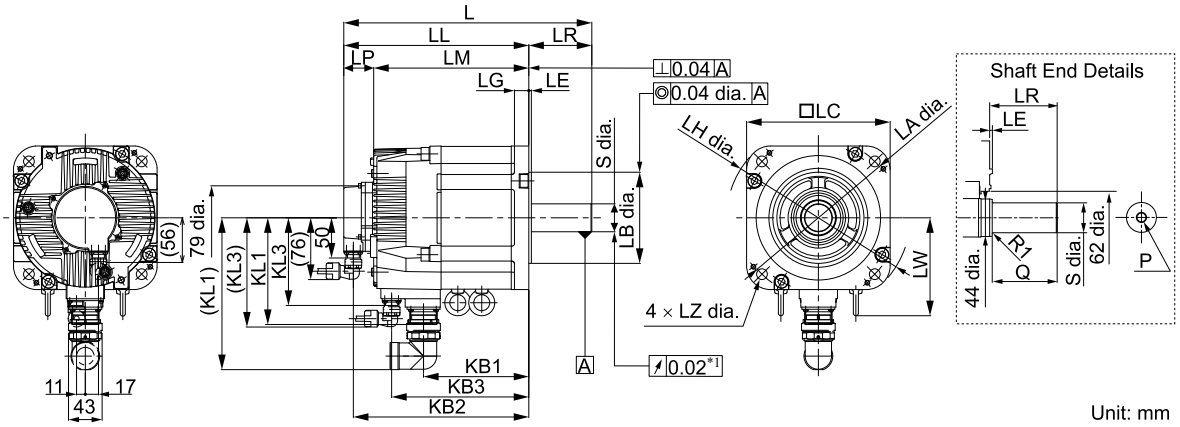


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-7 Compatible Specification



*1 This is 0.04 for the SGMXG-55A□A, -75A□A, -40A□B, and -55A□B.

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	LW	KL1 (KL1 *2)	KL3 (KL3 *2)	MW
30A□A8CA1	287	208	174	34	79	108	196	150	–	134 (190)	111 (136)	43
44A□A8CA1	311	232	198	34	79	132	220	174	–	134 (190)	111 (136)	
55A□A8CA1	376	263	229	34	113	163	251	205	123	145 (221)	111 (136)	59
75A□A8CA1	422	309	275	34	113	209	297	251	123	145 (221)	111 (136)	
20A□B8CA1	287	208	174	34	79	108	196	150	–	134 (190)	111 (136)	43
30A□B8CA1	311	232	198	34	79	132	220	174	–	134 (190)	111 (136)	
40A□B8CA1	376	263	229	34	113	163	251	205	123	145 (221)	111 (136)	59
55A□B8CA1	422	309	275	34	113	209	297	251	123	145 (221)	111 (136)	

Model SGMXG-	Flange Dimensions							Shaft End Dimensions			Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	P	
30A□A8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25	19.5
44A□A8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		23.5
55A□A8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32	27.5
75A□A8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		35.0
20A□B8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25	19.5
30A□B8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		23.5
40A□B8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32	27.5
55A□B8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		35.0

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 226*

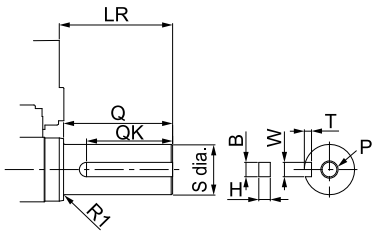
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for the shaft end are for a straight shaft without key and with tap. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 218*

◆ Shaft End Specification

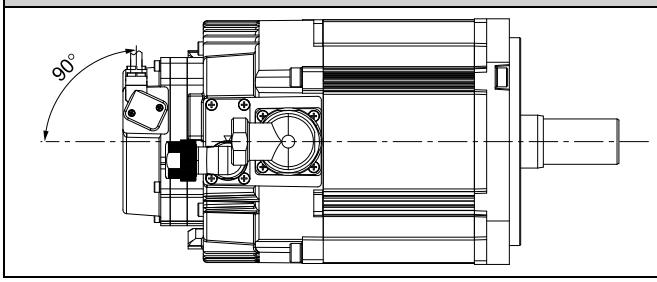
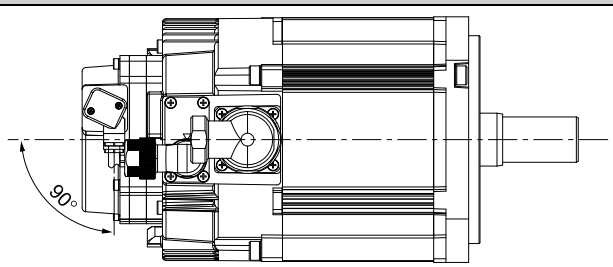
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
30A□A6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
44A□A6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
55A□A6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
75A□A6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	
20A□B6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
30A□B6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
40A□B6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
55A□B6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

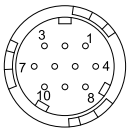
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

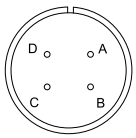
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

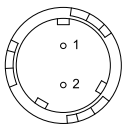
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

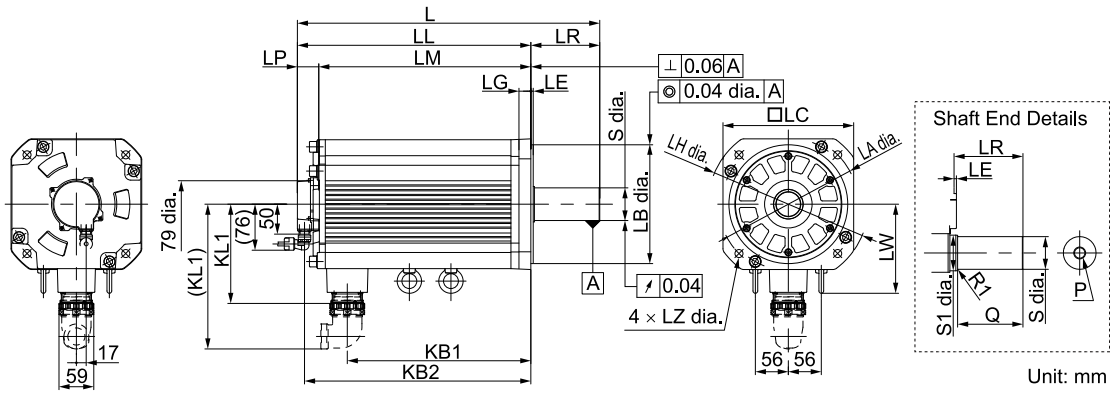
(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

SGMXG-1A, -1E

■ Servomotors without Holding Brakes

◆ Σ-7 Compatible Specification



Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	LW	KL1 (KL1 *2)
1AA□A81A1	445	329	295	34	116	247	317	150	168 (245)
1EA□A81A1	507	391	357	34	116	309	379	150	168 (245)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions				Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	S1	Q	P	
1AA□A81A1	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	110	M16 × 32	57
1EA□A81A1	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	110	M20 × 40	67

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 226*

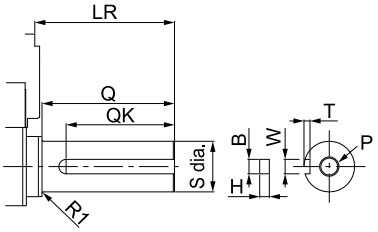
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 221*

◆ Shaft End Specification

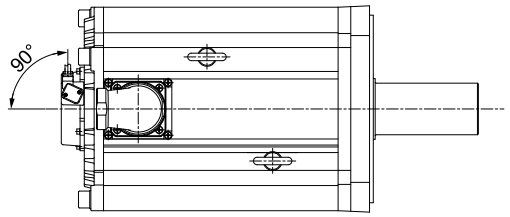
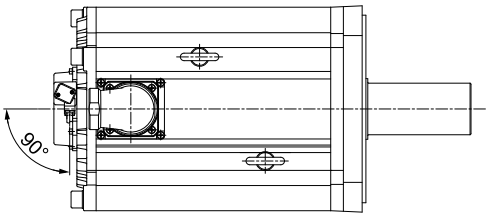
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
1AA□A61□□	116	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
1EA□A61□□	116	110	90	$55^{+0.030}_{+0.011}$	$16^{0}_{-0.043}$	$10^{0}_{-0.090}$	$16^{-0.018}_{-0.061}$	$6^{+0.2}_{0}$	M20 × 40

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

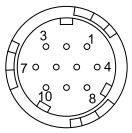
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

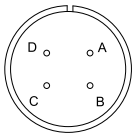
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications

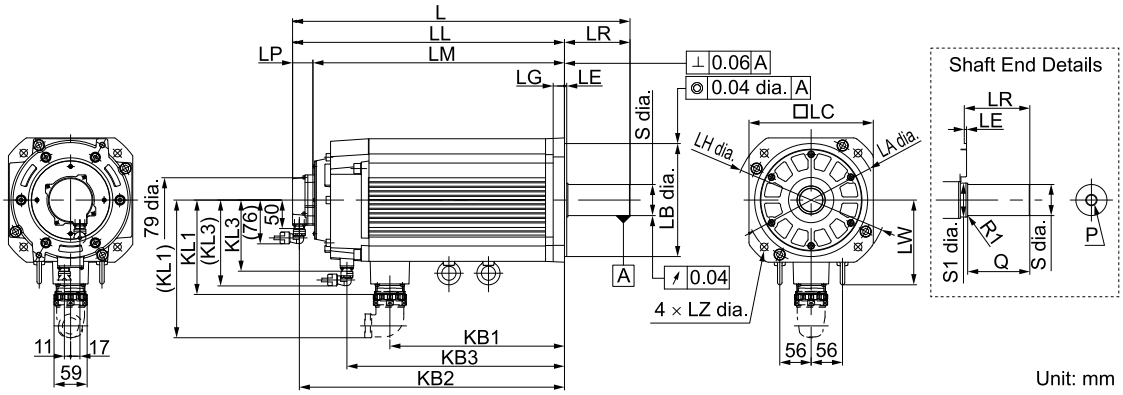


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-7 Compatible Specification



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	LW	KL1 (KL1 *2)	KL3 (KL3 *2)
1AA□A8CA1	496	380	346	34	116	247	368	315	150	168 (245)	126 (151)
1EA□A8CA1	596	480	446	34	116	309	468	385	150	168 (245)	126 (151)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions				Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	S1	Q	P	
1AA□A8CA1	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	110	M16 × 32	65
1EA□A8CA1	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	110	M20 × 40	85

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 226*

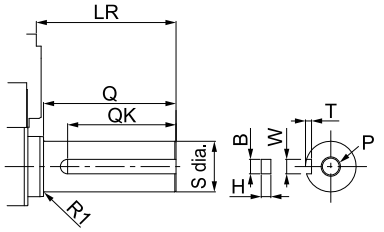
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 224*

◆ Shaft End Specification

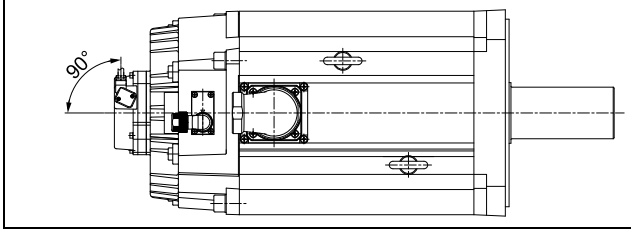
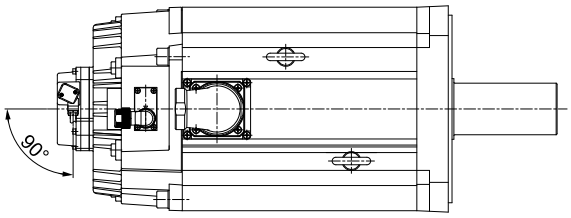
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
1AA□A6C□□	116	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
1EA□A6C□□	116	110	90	$55^{+0.030}_{+0.011}$	$16^{0}_{-0.043}$	$10^{0}_{-0.090}$	$16^{-0.018}_{-0.061}$	$6^{+0.2}_{0}$	M20 × 40

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

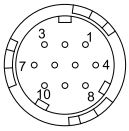
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

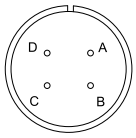
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

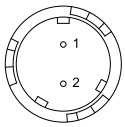
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

Dimensions of Servomotors with Batteryless Absolute Encoders

■ 1500-min-1 Specification

Model SGMXG-	L	LL	LP	KB2
03AWA□□A□	172 (205)	132 (165)	42 (42)	120 (153)
05AWA□□A□	185 (218)	145 (178)	42 (42)	133 (166)
09AWA□□A□	201 (237)	143 (179)	42 (42)	131 (167)
13AWA□□A□	217 (253)	159 (195)	42 (42)	147 (183)
20AWA□□A□	235 (271)	177 (213)	42 (42)	165 (201)
30AWA□□A□	245 (295)	166 (216)	42 (42)	154 (204)
44AWA□□A□	269 (319)	190 (240)	42 (42)	178 (228)
55AWA□□A□	340 (384)	227 (271)	42 (42)	215 (259)
75AWA□□A□	386 (430)	273 (317)	42 (42)	261 (305)
1AAWA□□A□	453 (504)	337 (388)	42 (42)	325 (376)
1EAWA□□A□	515 (604)	399 (488)	42 (42)	387 (476)

Note:

The values in parentheses are for servomotors with holding brakes.

■ 1000-min-1 Specification

Model SGMXG-	L	LL	LP	KB2
03AWB□□A□	185 (218)	145 (178)	42 (42)	133 (166)
06AWB□□A□	201 (237)	143 (179)	42 (42)	131 (167)
09AWB□□A□	217 (253)	159 (195)	42 (42)	147 (183)
12AWB□□A□	235 (271)	177 (213)	42 (42)	165 (201)
20AWB□□A□	245 (295)	166 (216)	42 (42)	154 (204)
30AWB□□A□	269 (319)	190 (240)	42 (42)	178 (228)
40AWB□□A□	340 (384)	227 (271)	42 (42)	215 (259)
55AWB□□A□	386 (430)	273 (317)	42 (42)	261 (305)

Note:

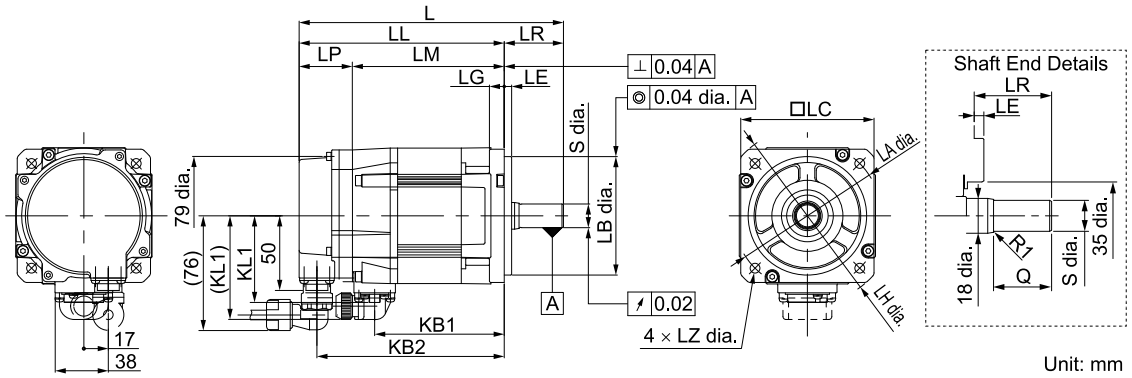
The values in parentheses are for servomotors with holding brakes.

External Dimensions (400 V Specification)

SGMXG-05D□A

■ Servomotors without Holding Brakes

◆ Σ-V Compatible Specification



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1
05D□A21A1	177	137	103	34	40	88	125	70

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
05D□A21A1	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	3.2

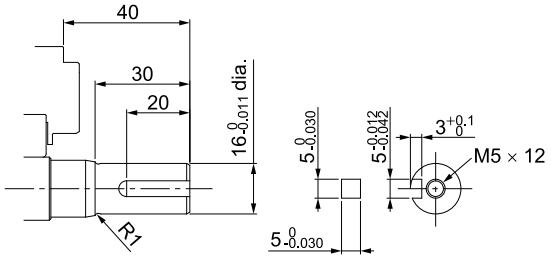
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 249*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 228*

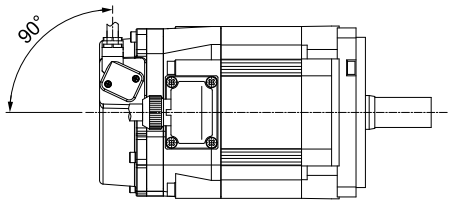
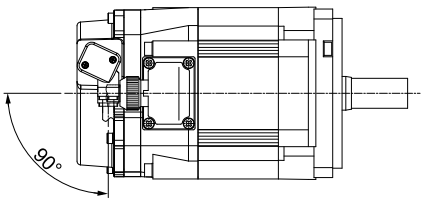
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

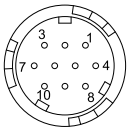
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

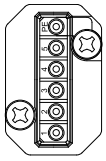
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications

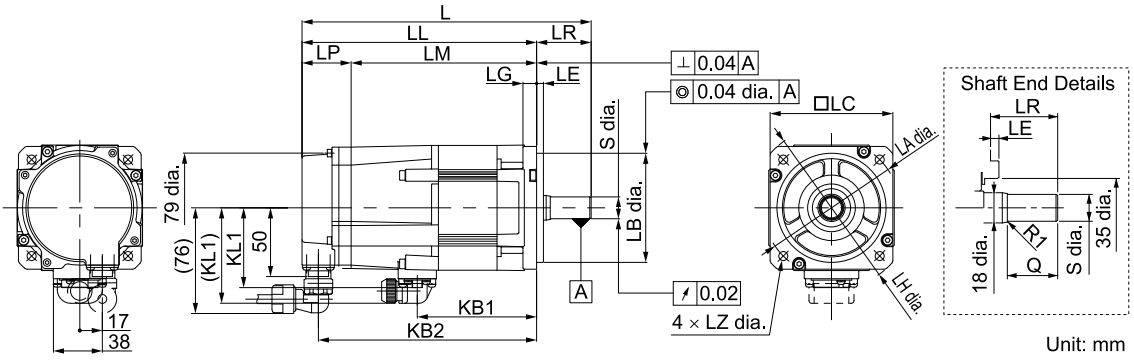


PE	FG (frame ground)	3	Phase U
5	–	2	Phase V
4	–	1	Phase W

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-V Compatible Specification



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1
05D□A2CA1	210	170	136	34	40	88	158	70

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
05D□A2CA1	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	4.2

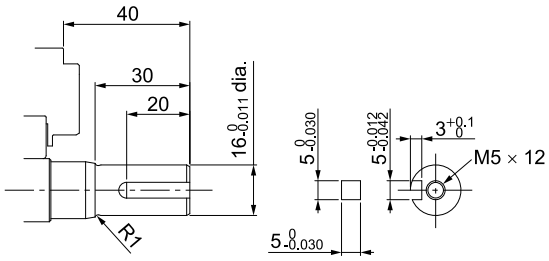
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 249*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 230*

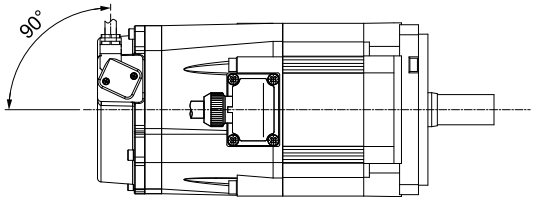
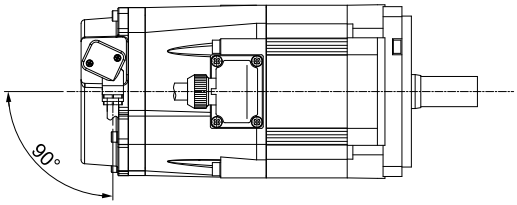
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

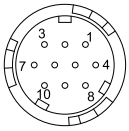
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

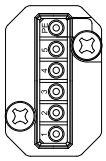
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



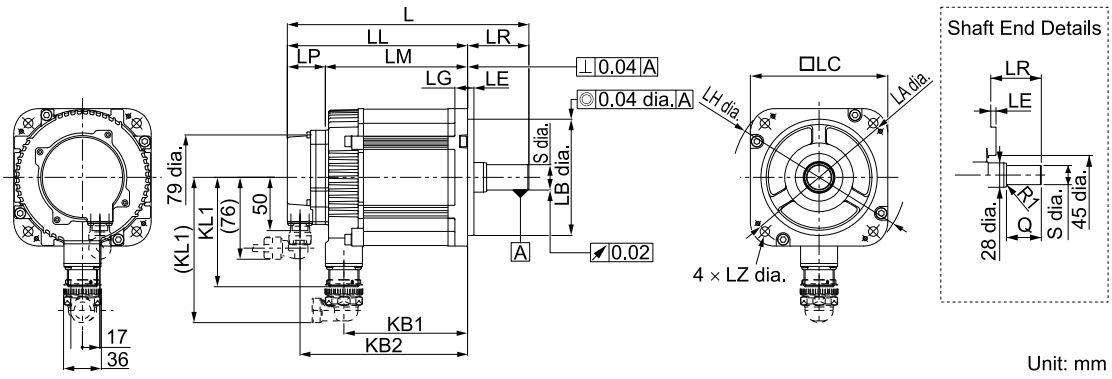
PE	FG (frame ground)	3	Phase U
5	Brake terminal	2	Phase V
4	Brake terminal	1	Phase W

Manufacturer: Japan Aviation Electronics Industry, Ltd.

SGMXG-09D□A to -20D□A

■ Servomotors without Holding Brakes

◆ Σ-V Compatible Specification



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1
09D□A21A1	193	135	101	34	58	83	123	138
13D□A21A1	209	151	117	34	58	99	139	138
20D□A21A1	227	169	135	34	58	117	157	138

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
09D□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	5.5
13D□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.1
20D□A21A1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	8.6

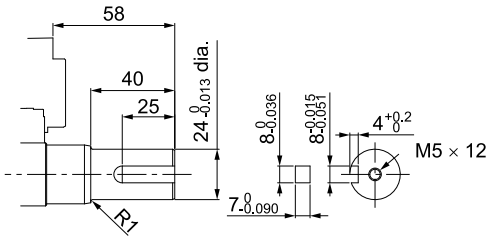
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 249*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 232*

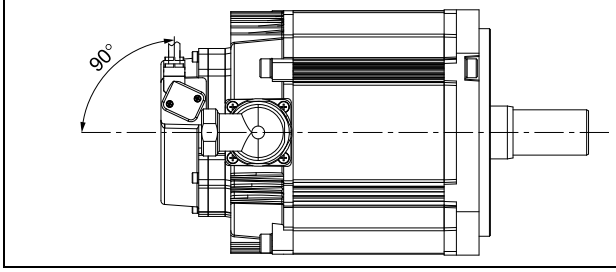
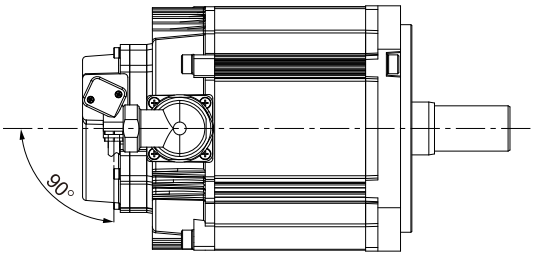
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

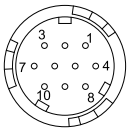
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

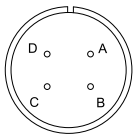
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications

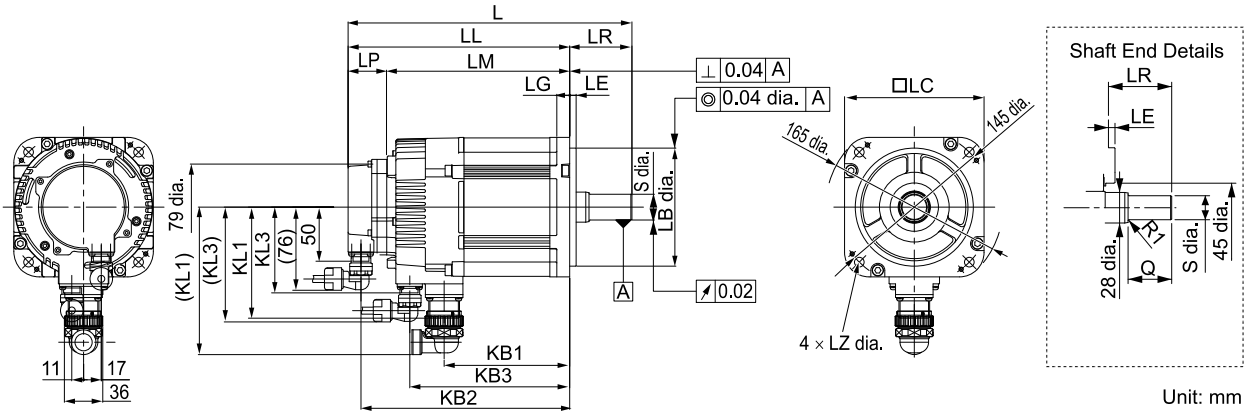


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-V Compatible Specification



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1	KL3
09D□A2CA1	229	171	137	34	58	83	159	115	138	106
13D□A2CA1	245	187	153	34	58	99	175	131	138	106
20D□A2CA1	263	205	171	34	58	117	193	149	138	106

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
09D□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.5
13D□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	9.0
20D□A2CA1	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	11.0

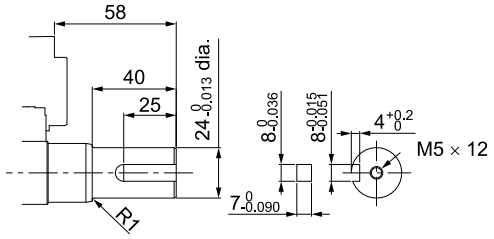
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 249*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 235*

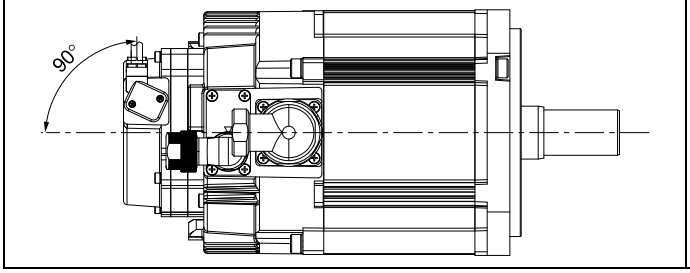
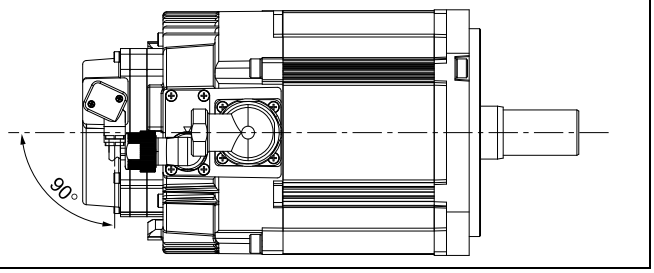
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

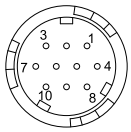
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

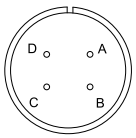
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

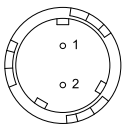
- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

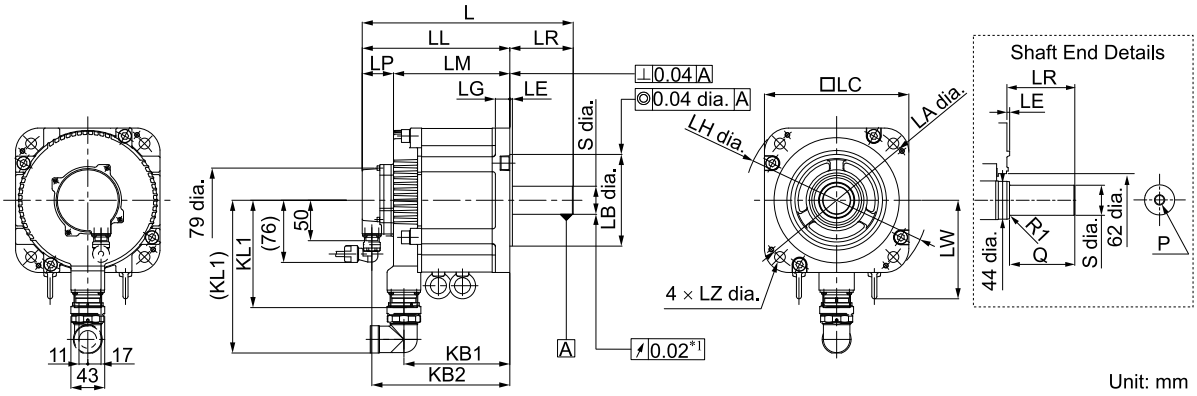
(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

SGMXG-30D□A to -75D□A

■ Servomotors without Holding Brakes

◆ Σ-V compatible specification



*1 This is 0.04 for the SGMXG-55D, -75D.

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	LW	KL1	MW
30D□A81A1	237	158	124	34	79	108	146	–	190	43
44D□A81A1	261	182	148	34	79	132	170	–	190	
55D□A81A1	332	219	185	34	113	163	207	123	221	59
75D□A81A1	378	265	231	34	113	209	253	123	221	

Model SGMXG-	Flange Dimensions							Shaft End Dimensions			Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	P	
30D□A81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25L	13.5
44D□A81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		17.5
55D□A81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32L	21.5
75D□A81A1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		29.5

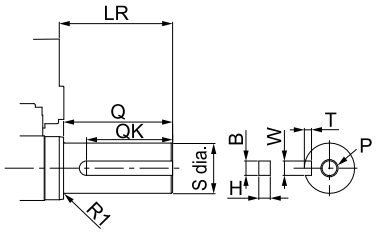
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 249*

Note:

1. The dimensions are same for models with oil seals.
2. The values for the shaft end are for a straight shaft without key and with tap. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 237*

◆ Shaft End Specification

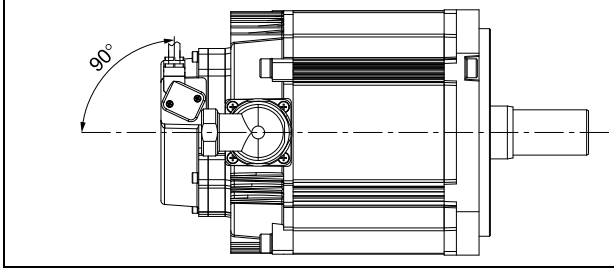
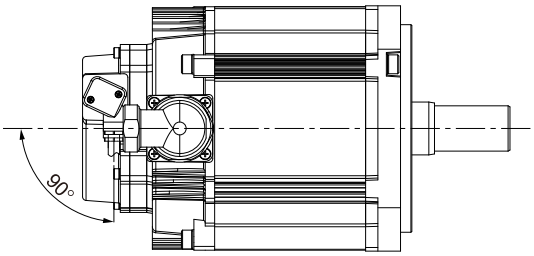
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
30D□A61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
44D□A61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
55D□A61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
75D□A61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

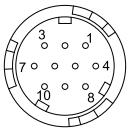
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

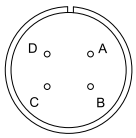
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications

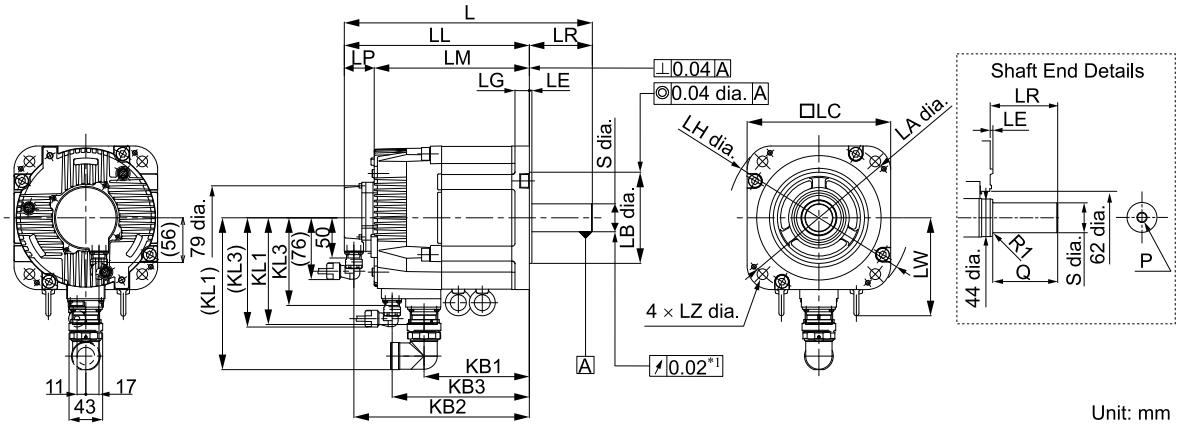


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-V compatible specification



*1 This is 0.04 for the SGMXG-55D, -75D.

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	LW	KL1	KL3	MW
30D□A8CA1	287	208	174	34	79	108	196	150	–	190	136	43
44D□A8CA1	311	232	198	34	79	132	220	174	–	190	136	
55D□A8CA1	376	263	229	34	113	163	251	205	123	221	136	59
75D□A8CA1	422	309	275	34	113	209	297	251	123	221	136	

Model SGMXG-	Flange Dimensions							Shaft End Dimensions			Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	P	
30D□A8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25L	19.5
44D□A8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		23.5
55D□A8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32L	27.5
75D□A8CA1	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		35.0

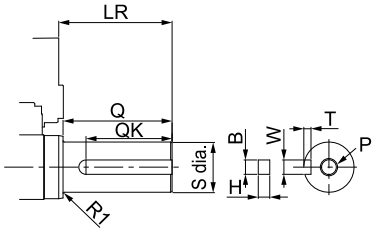
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 249*

Note:

1. The dimensions are same for models with oil seals.
2. The values for the shaft end are for a straight shaft without key and with tap. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 241*

◆ Shaft End Specification

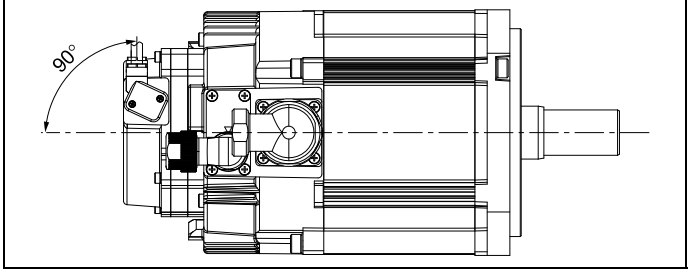
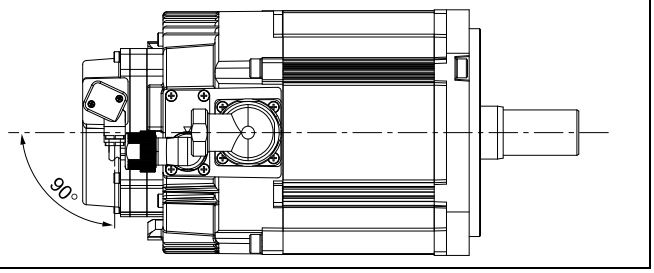
• Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
30D□A6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
44D□A6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
55D□A6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
75D□A6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

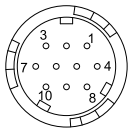
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

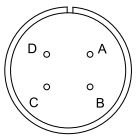
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

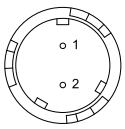
- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

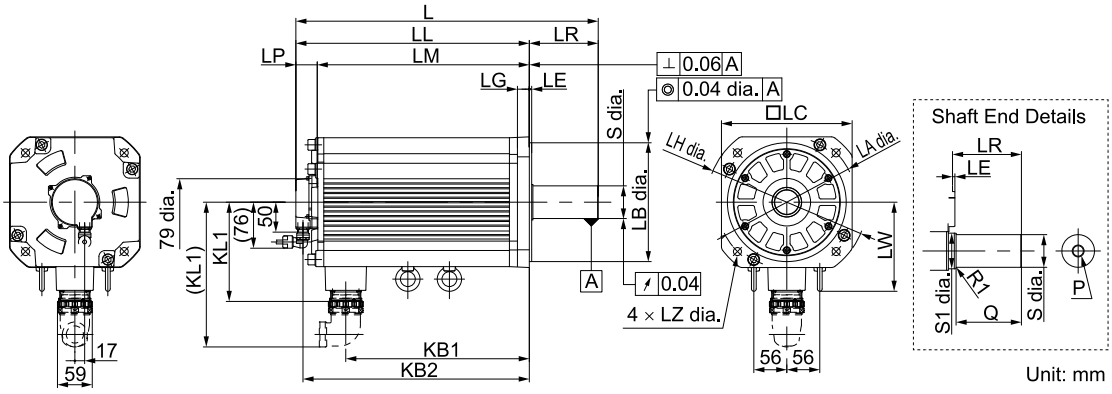
(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

SGMXG-1A, -1E

■ Servomotors without Holding Brakes

◆ Σ-V Compatible Specification



Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	LW	KL1
1AD☐A81A1	445	329	295	34	116	247	317	150	245
1ED☐A81A1	507	391	357	34	116	309	379	150	245

Model SGMXG-	Flange Dimensions							Shaft End Dimensions				Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	S1	Q	P	
1AD☐A81A1	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	110	M16 × 32	57
1ED☐A81A1	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	110	M20 × 40	67

*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 249*

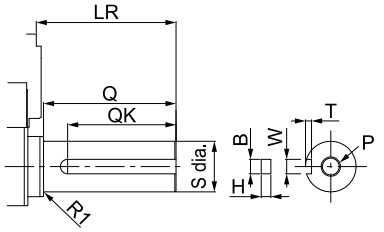
Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.

☞ *Shaft End Specification on page 244*

◆ Shaft End Specification

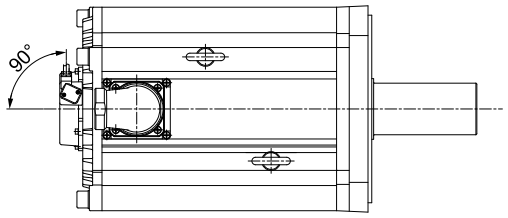
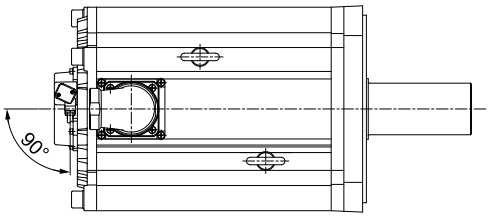
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
1AD□A61□□	116	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
1ED□A61□□	116	110	90	$55^{+0.030}_{+0.011}$	$16^{0}_{-0.043}$	$10^{0}_{-0.090}$	$16^{-0.018}_{-0.061}$	$6^{+0.2}_{0}$	M20 × 40

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

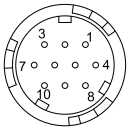
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

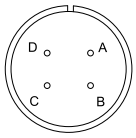
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications

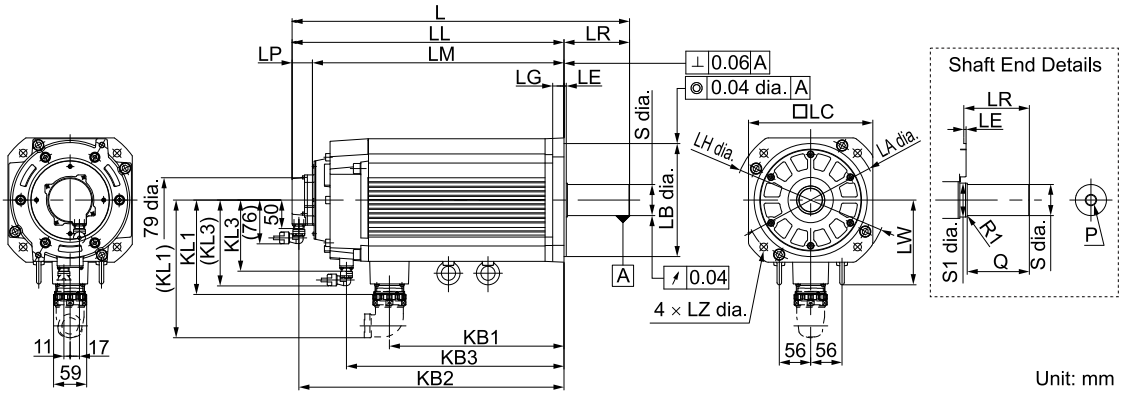


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Σ-V Compatible Specification



Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	LW	KL1	KL3
1AD□A8CA1	496	380	346	34	116	247	368	315	150	245	151
1ED□A8CA1	596	480	446	34	116	309	468	385	150	245	151

Model SGMXG-	Flange Dimensions							Shaft End Dimensions				Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	S1	Q	P	
1AD□A8CA1	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	110	M16 × 32	65
1ED□A8CA1	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	110	M20 × 40	79

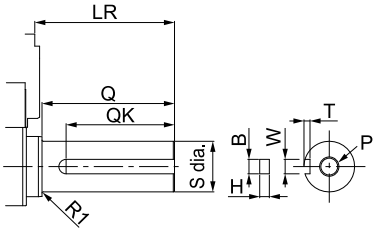
*1 For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders on page 249*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 247*

◆ Shaft End Specification

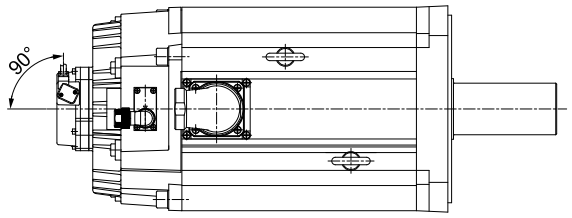
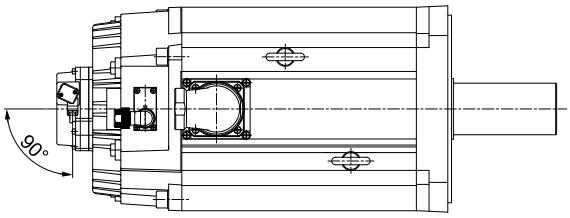
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
1AD□A6C□□	116	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
1ED□A6C□□	116	110	90	$55^{+0.030}_{+0.011}$	$16^{0}_{-0.043}$	$10^{0}_{-0.090}$	$16^{-0.018}_{-0.061}$	$6^{+0.2}_{0}$	M20 × 40

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

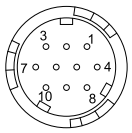
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 295*

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

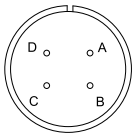
- Encoder Connector (26-bit Encoder): Σ-V Compatible Specification



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

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: DDK Ltd.

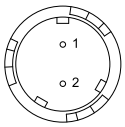
- Servomotor Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-V Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

(□ varies depending on the applicable cable size.)

Manufacturer: DDK Ltd.

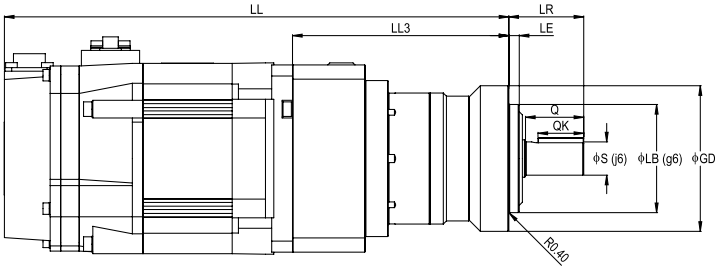
Dimensions of Servomotors with Batteryless Absolute Encoders

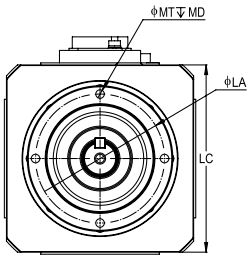
Model SGMXG-	L	LL	LP	KB2
05DWA□□A□	185 (218)	145 (178)	42 (42)	133 (166)
09DWA□□A□	201 (237)	143 (179)	42 (42)	131 (167)
13DWA□□A□	217 (253)	159 (195)	42 (42)	147 (183)
20DWA□□A□	235 (271)	177 (213)	42 (42)	165 (201)
30DWA□□A□	245 (295)	166 (216)	42 (42)	154 (204)
44DWA□□A□	269 (319)	190 (240)	42 (42)	178 (228)
55DWA□□A□	340 (384)	227 (271)	42 (42)	215 (259)
75DWA□□A□	386 (430)	273 (317)	42 (42)	261 (305)
1ADWA□□A□	453 (504)	337 (388)	42 (42)	325 (376)
1EDWA□□A□	515 (604)	399 (488)	42 (42)	387 (476)

Note:

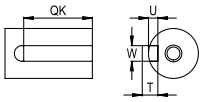
The values in parentheses are for servomotors with holding brakes.

SGMXG Gear Motor External Dimensions





Shaft Detail



450 W Models

Model S7G		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	05A□ -VL070-03	243 (276)	104	36	5	16	52	70	90	62	M5	10	28	22	0	5	3	5
	05A□ -VL070-05																	
	05A□ -VL090-10	256 (289)	117	46	7	22	68	90		80	M6	12	36	28		6	3.5	6
	05A□ -VL090-25	278 (311)	139															
	05A□ -VL120-50	293.5 (326.-5)	154.-5	70	9	32	90	120		108	M8	16	58	45		10	5	8
400 V	05D□ -VL070-03	243 (276)	104	36	5	16	52	70	90	62	M5	10	28	22	0	5	3	5
	05D□ -VL070-05																	
	05D□ -VL090-10	256 (289)	117	46	7	22	68	90		80	M6	12	36	28		6	3.5	6
	05D□ -VL090-25	278 (311)	139															
	05D□-VL120-50	293.5 (326.-5)		70	9	32	90	120		108	M8	16	58	45		10	5	8

850 W Models

Model S7G		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	09A□ -VL090-03	259 (295)	122	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	09A□ -VL090-05																	
	09A□-VL090-10																	
	09A□ -VL120-25	296.5 (332.-5)	159.-5	70	9	32	90	120		108	M8	16	58	45		10	5	8
	09A□-VL155-50	321.5 (357.-5)	184.-5	97	12	40	120	155		140	M10	20	82	65		12		
400 V	09D□ -VL090-03	259 (295)	122	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	09D□-VL090-05																	
	09D□ -VL090-10																	
	09D□ -VL120-25	296.5 (332.-5)	159.-5	70	9	32	90	120		108	M8	16	58	45		10	5	8
	09D□ -VL155-50	321.5 (357.-5)	184.-5	97	12	40	120	155		140	M10	20	82	65		12		

1.3 kW Models

Model S7G		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	13A□ -VL090-03	287 (323)	134	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	13A□ -VL090-05																	
	13A□ -VL120-10	297 (333)	144	70	9	32	90	120		108	M8	16	58	45		10	5	8
	13A□ -VL120-25	324.5 (360.-5)	171.-5															
	13A□ -VL155-50	349.5 (385.-5)	196.-5	97	12	40	120	155		140	M10	20	82	65		12		
400 V	13D□ -VL090-03	287 (323)	134	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	13D□ -VL090-05																	
	13D□ -VL120-10	297 (333)	144	70	9	32	90	120		108	M8	16	58	45		10	5	8
	13D□ -VL120-25	324.5 (360.-5)	171.-5															
	13D□ -VL155-50	349.5 (385.-5)	196.-5	97	12	40	120	155		140	M10	20	82	65		12		

1.8 kW Models

Model S7G		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	20A□ -VL090-03	305 (341)	134	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	20A□ -VL090-05																	
	20A□ -VL120-10	315 (351)	144	70	9	32	90	120		108	M8	16	58	45		10	5	8
	20A□ -VL155-25	367.5 (403.-5)	196.-5	97	12	40	120	155		140	M10	20	82	65		12		
	20A□ -VL205-50	397 (433)	226	100	15	55	160	205		184	M12	22				16	6	10
400 V	20D□ -VL090-03	305 (341)	134	46	7	22	68	90	130	80	M6	12	36	28	0	6	3.5	6
	20D□ -VL090-05																	
	20D□ -VL120-10	315 (351)	144	70	9	32	90	120		108	M8	16	58	45		10	5	8
	20D□ -VL155-25	367.5 (403.-5)	196.-5	97	12	40	120	155		140	M10	20	82	65		12		
	20D□ -VL205-50	397 (433)	226	100	15	55	160	205		184	M12	22				16	6	10

2.9 kW Models

Model S7G		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	30A□ -VL120-03	285 (363)	155	70	9	32	90	120	180	108	M8	16	58	45	0	10	5	8
	30A□ -VL120-05																	
	30A□ -VL155-10	297 (375)	167	97	12	40	120	155		140	M10	20	82	65		12		
	30A□ -VL155-25	331.5 (409.-5)	201.-5															
	30A□ -VL205-50	361 (439)	231	100	15	55	160	205		184	M12	22				16	6	10
400 V	30D□ -VL120-03	285 (363)	155	70	9	32	90	120	180	108	M8	16	58	45	0	10	5	8
	30D□ -VL120-05																	
	30D□ -VL155-10	297 (375)	167	97	12	40	120	155		140	M10	20	82	65		12		
	30D□ -VL155-25	331.5 (409.-5)	201.-5															
	30D□ -VL205-50	361 (439)	231	100	15	55	160	205		184	M12	22				16	6	10

4.4 kW Models

Model S7G		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	44A□ -VL120-03	339 (387)	155	70	9	32	90	120	180	108	M8	16	58	45	0	10	5	8
	44A□ -VL120-05																	
	44A□ -VL205-10	370.5 (418.-5)	186.-5	100	15	55	160	205		184	M12	22	82	65		16	6	10
	44A□ -VL205-25	415 (463)	231															
	44A□ -VL235-50	424.5 (472.-5)	240.-5	126	18	75	180	235		210	M16	28	105	85		20	7.5	12
400 V	44D□ -VL120-03	339 (387)	155	70	9	32	90	120	180	108	M8	16	58	45	0	10	5	8
	44D□ -VL120-05																	
	44D□ -VL205-10	370.5 (418.-5)	186.-5	100	15	55	160	205		184	M12	22	82	65		16	6	10
	44D□ -VL205-25	415 (463)	231															
	44D□ -VL235-50	424.5 (472.-5)	240.-5	126	18	75	180	235		210	M16	28	105	85		20	7.5	12

5.5 kW Models

Model S7G		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	55A□ -VL155-03	429 (473)	208	97	12	40	120	155	180	140	M10	20	82	65	0	12	5	8
	55A□ -VL155-05																	
	55A□ -VL205-10	443.5 (487.-5)	222.-5	100	15	55	160	205		184	M12	22				16	6	10
	55A□ -VL205-25	488 (532)	267															
	55A□ -VL235-50	497.5 (541.-5)	277	126	18	75	180	235		210	M16	28	105	85		20	7.5	12
400 V	55D□ -VL155-03	429 (473)	208	97	12	40	120	155	180	140	M10	20	82	65	0	12	5	8
	55D□ -VL155-05																	
	55D□ -VL205-10	443.5 (487.-5)	222.-5	100	15	55	160	205		184	M12	22				16	6	10
	55D□ -VL205-25	488 (532)	267															
	55D□ -VL235-50	497.5 (541.-5)		126	18	75	180	235		210	M16	28	105	85		20	7.5	12

7.5 kW Models

Model S7G		LL	LL3	LR	LE	□S	□LB	□GD	LC	□LA	□MT	MD	Q	QK	KD	W	U	T
200 V	75A□ -VL155-03	475 (519)	208	97	12	40	120	155	180	140	M10	20	82	65	0	12	5	8
	75A□ -VL155-05																	
	75A□ -VL205-10	489.5 (533.-5)	222.-5	100	15	55	160	205		184	M12	22				16	6	10
	75A□ -VL235-25	544 (588)	277	126	18	75	180	235		210	M16	28	105	85		20	7.5	12
	75A□-VL235-50																	
400 V	75D□o -VL155-03	475 (519)	208	97	12	40	120	155	180	140	M10	20	82	65	0	12	5	8
	75D□ -VL155-05																	
	75D□ -VL205-10	489.5 (533.-5)	222.-5	100	15	55	160	205		184	M12	22				16	6	10
	75D□ -VL235-25	544 (588)	277	126	18	75	180	235		210	M16	28	105	85		20	7.5	12
	75D□ -VL235-50																	

SGM7M

Model Designations

SGM7M - A1 A 3 A 2 1

- SGM7M - : Σ-7 mini series servomotor SGM7M model
- A1 : 1st+2nd digits
- A : 3rd digit
- 3 : 4th digit
- A : 5th digit
- 2 : 6th digit
- 1 : 7th digit

1st+2nd digits Rated Output

Code	Specification
A1	11 W
A2	22 W
A3	33 W

3rd digit Power Supply Voltage

Code	Specification
A	200 VAC

4th digit Serial Encoder

Code	Specification
3	20-bit absolute

5th digit Design Revision Order

A

6th digit Shaft End

Code	Specification
2	Straight (standard)
A	Straight with flat seats (optional)

7th digit Options

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

Specifications and Ratings

Specification

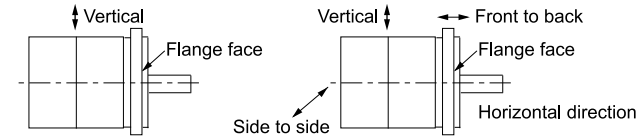
Voltage	AC 200 V		
Model SGM7M-	**A1A**	**A2A**	**A3A**
Time Rating	Continuous		
Thermal Class	B		
Insulation Resistance	500 VDC, 10 MΩ min.		
Withstand Voltage	1,500 VAC for 1 minute		
Excitation	Permanent magnet		
Mounting	Flange-mounted		
Drive Method	Direct drive		
Rotation Direction	Counterclockwise (CCW) for forward reference when viewed from the load side		
Vibration Class *1	V15		

Continued on next page.

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Voltage		AC 200 V		
Model SGM7M-		A1A	A2A	A3A
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C		
	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 1000 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)		
Shock Resistance *2	Impact Acceleration (at Flange)	490 m/s²		
	Number of Impacts	2 times		
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s²		
Applicable SERVOPACKs	SGDXS-	R90A		1R6A
	SGDXW-	1R6A *3, 2R8A *3		
	SGDXT-	1R6A *3, 2R8A *3		

*1 A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the servomotor without a load at the rated rotation speed.
*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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. Always check the vibration acceleration that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Σ-XS SERVOPACK.

Servomotor Ratings

Voltage		AC 200 V		
Model SGM7M-		A1A	A2A	A3A
Rated Output *1	W	11	22	33
Rated Torque *1 *2	N·m	0.0350	0.0700	0.105
Instantaneous Maximum Torque *1	N·m	0.105	0.210	0.315
Rated Current *1	Arms	0.83	0.82	0.90
Instantaneous Maximum Current *1	Arms	2.6	2.5	2.8

Continued on next page.

Continued from previous page.

Voltage			AC 200 V		
Model SGM7M-			A1A	A2A	A3A
Rated Rotation Speed *1		min^{-1}	3000		
Maximum Rotation Speed *1		min^{-1}	7000		
Torque Constant		N·m/Arms	0.0458	0.0928	0.126
Rotor Moment of Inertia		$\times 10^{-7}$ kg·m^2	2.54 (3.99)	4.49 (5.96)	6.81 (8.31)
Rated Power Rate *1		kW/s	4.82	10.9	16.2
Rated Angular Acceleration *1		rad/s^2	138000	156000	154000
Motor Constant		$N·m/\sqrt{W}$	0.0149	0.0245	0.0309
Heat Sink Size (aluminum) *3		mm	150 × 150 × 3		250 × 250 × 6
Protective Structure *4			Totally enclosed, self-cooled, IP55 (except for shaft opening)		
Holding Brake Specifications *5	Rated Voltage	V	24 VDC±10%		
	Capacity	W	2.1	2.8	3.2
	Holding Torque	N·m	0.044	0.077	0.116
	Coil Resistance	Ω (at 20°C)	274.3	205.7	180
	Rated Current	A (at 20°C)	0.087	0.117	0.133
	Time Required to Release Brake	ms	60	60	60
	Time Required to Brake	ms	100	100	100
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *6			30 times		
	With External Regenerative Resistor		30 times		
Allowable Shaft Loads *7	LF	mm	16		
	Allowable Radial Load	N	34	44	
	Allowable Thrust Load	N	14.5		

Note:

The values in parentheses are for servomotors with holding brakes.

*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 an aluminum or steel heat sink of the dimensions given in the table.

*3 Refer to the following section for the relation between the heat sinks and derating rate.

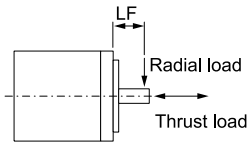
*4 This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

*5 Observe the following precautions if you use a servomotor with a holding brake.

- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

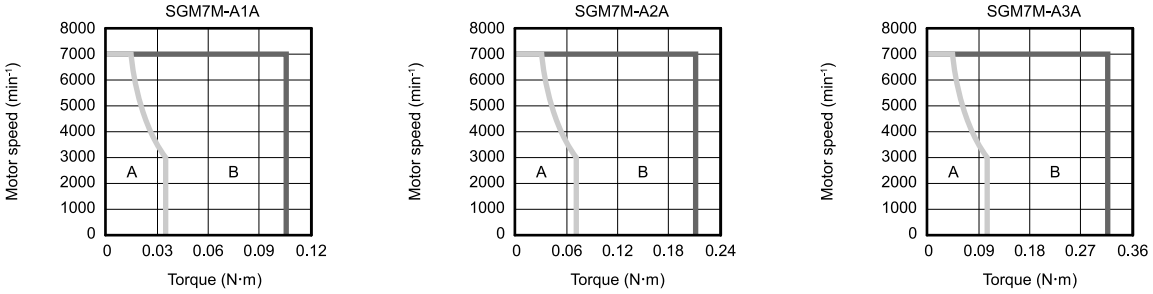
*6 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*7 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



Torque-Rotation Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone*



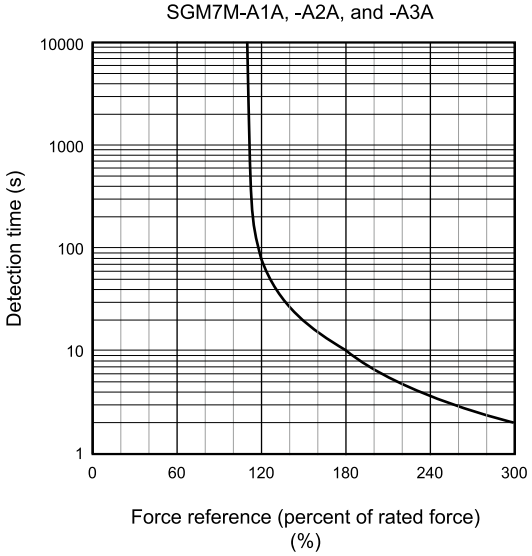
*1 The characteristics are the same for three-phase 200 V, single-phase 200 V, and single-phase 100 V input.

Note:

1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
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-rotation speed characteristics will become smaller because the voltage drop increases.

Servomotor Overload Protection Characteristics

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



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 "*Torque-Rotation Speed Characteristics on page 259*".

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Servomotor 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. Use the SigmaSize+*1 AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 Contact your Yaskawa representative for information on this program.

■ 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 are 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).

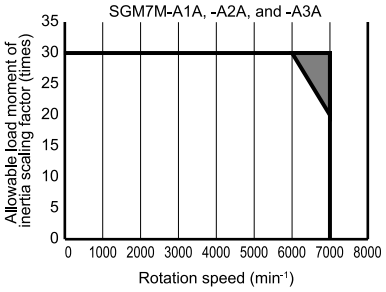
Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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, for the shaded areas of the graphs, use Yaskawa's SigmaSize+, an AC servo capacity selection program, to select an external regenerative resistor.



Note:

Applicable SERVOPACK Model: SGDXS-R90A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

Refer to the following section for details on the external regenerative resistors.

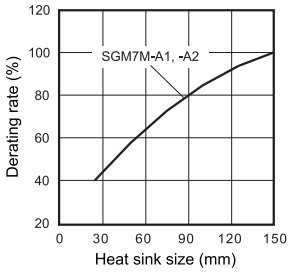
☞ *Specifications and Dimensions of External Regenerative Resistors on page 728*

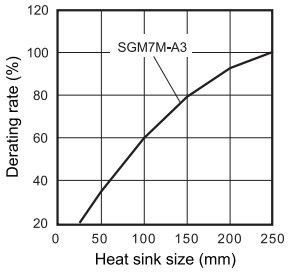
Derating Rates

■ Servomotor Heat Dissipation Conditions

The servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the servomotor. If the servomotor is mounted on a small device component, the servomotor temperature may rise considerably

because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.





Important

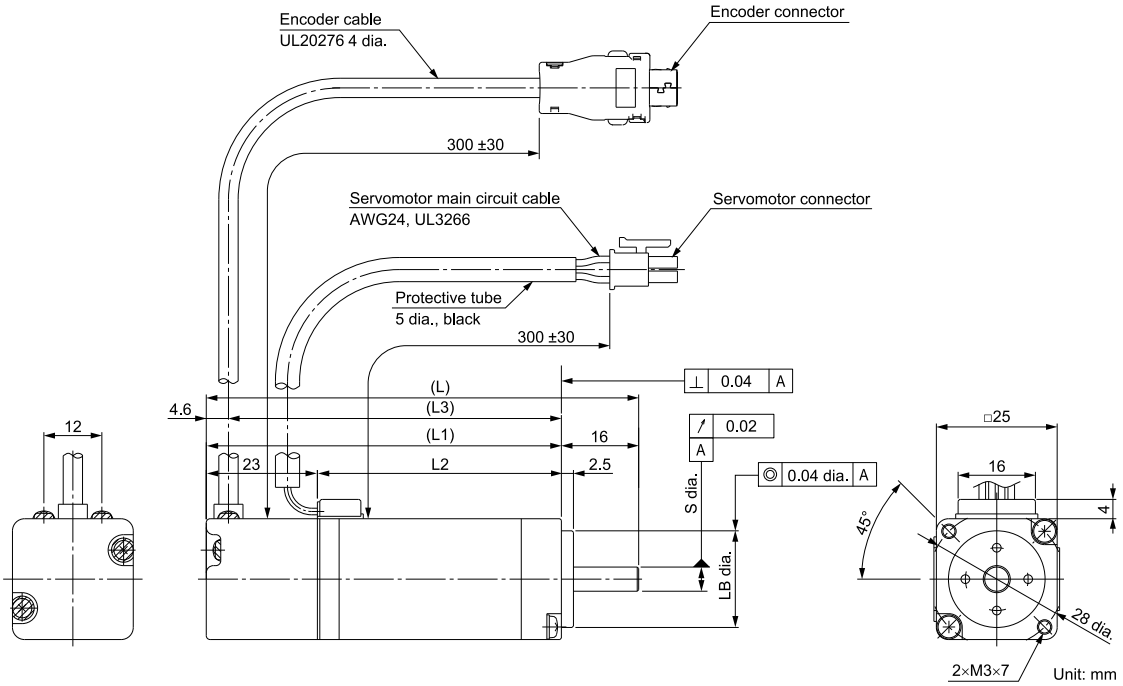
The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

External Dimensions

Servomotors without Holding Brakes

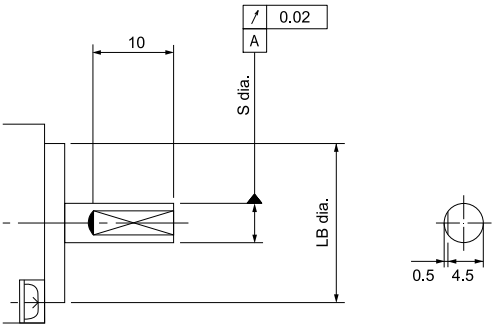
■ SGM7M-A1, - A2, - A3



Model SGM7M-	L	L1	L2	L3	Shaft End Dimensions		Approx. Mass g
					S	LB	
A1□3A□1	68	52	29	47.4	$5^{0}_{-0.008}$	$20^{0}_{-0.021}$	120
A2□3A□1	78	62	39	57.4	$5^{0}_{-0.008}$	$20^{0}_{-0.021}$	160
A3□3A□1	89.5	73.5	50.5	68.9	$5^{0}_{-0.008}$	$20^{0}_{-0.021}$	210

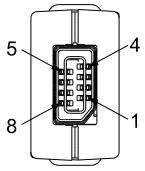
◆ Shaft End Specifications

- Straight with Flat Seats



◆ Connector Specifications

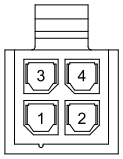
- Encoder Connector



1	PG5V	5	PS
2	PG0V	6	/PS
3	BAT(+)	7	-
4	BAT(-)	8	-
Connector case			FG

Model: IX40-A-8S-CV (6.4)
Manufacturer: Hirose Electric Co., Ltd.
Mating connector: IX40-A-8P-JC (7.1)

- Servomotor Connector

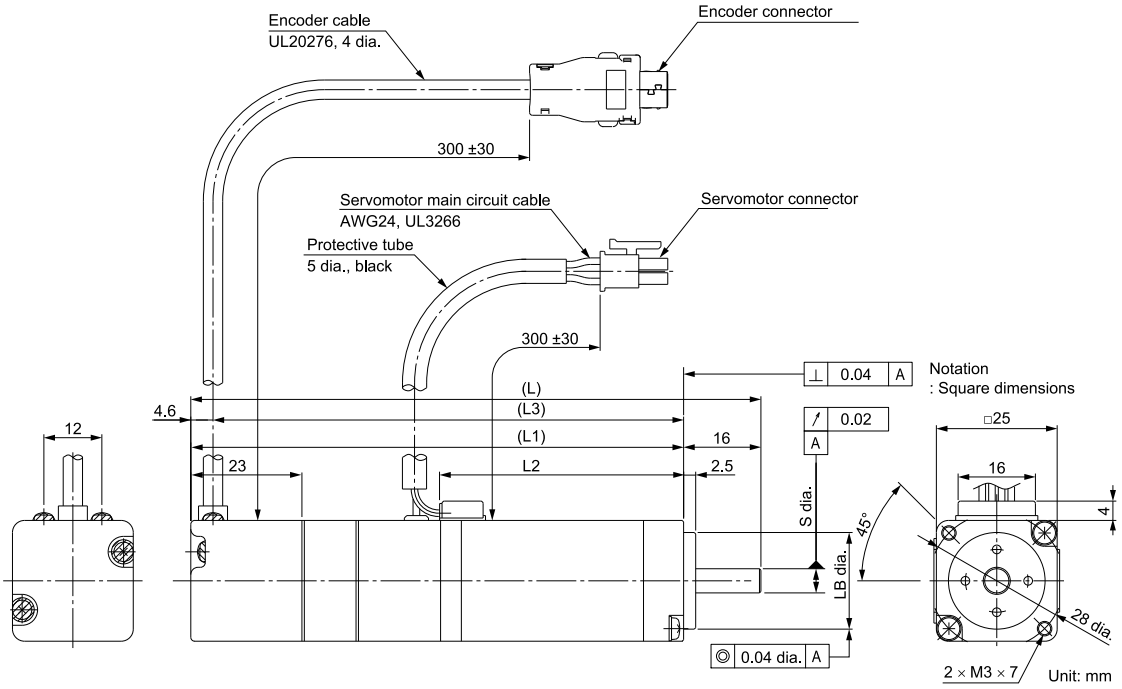


1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Receptacle: 43025-0400
Manufacturer: Molex Japan Co., Ltd.

Servomotors with Holding Brakes

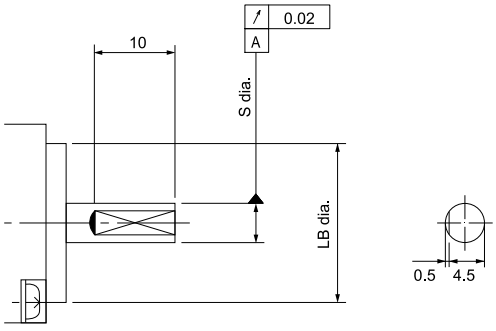
■ SGM7M-A1, - A2, - A3



Model SGM7M-	L	L1	L2	L3	Shaft End Dimensions		Approx. Mass
					S	LB	g
A1□3A□C	90.5	74.5	29	69.9	$5^{0}_{-0.008}$	$20^{0}_{-0.021}$	180
A2□3A□C	104	88	39	83.4	$5^{0}_{-0.008}$	$20^{0}_{-0.021}$	220
A3□3A□C	118	102	50.5	97.4	$5^{0}_{-0.008}$	$20^{0}_{-0.021}$	310

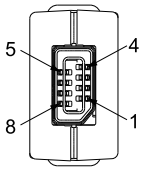
◆ Shaft End Specifications

- Straight with Flat Seats



◆ Connector Specifications

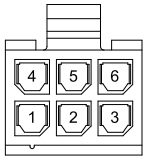
- Encoder Connector



1	PG5V	5	PS
2	PG0V	6	/PS
3	BAT(+)	7	-
4	BAT(-)	8	-
Connector case			FG

Model: IX40-A-8S-CV (6.4)
Manufacturer: Hirose Electric Co., Ltd.
Mating connector: IX40-A-8P-JC (7.1)

- Servomotor Connector



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

Receptacle: 43025-0600
Manufacturer: Molex Japan Co., Ltd.

Connections between Servomotors and SERVOPACKs

Cables for the SGMXJ Servomotors

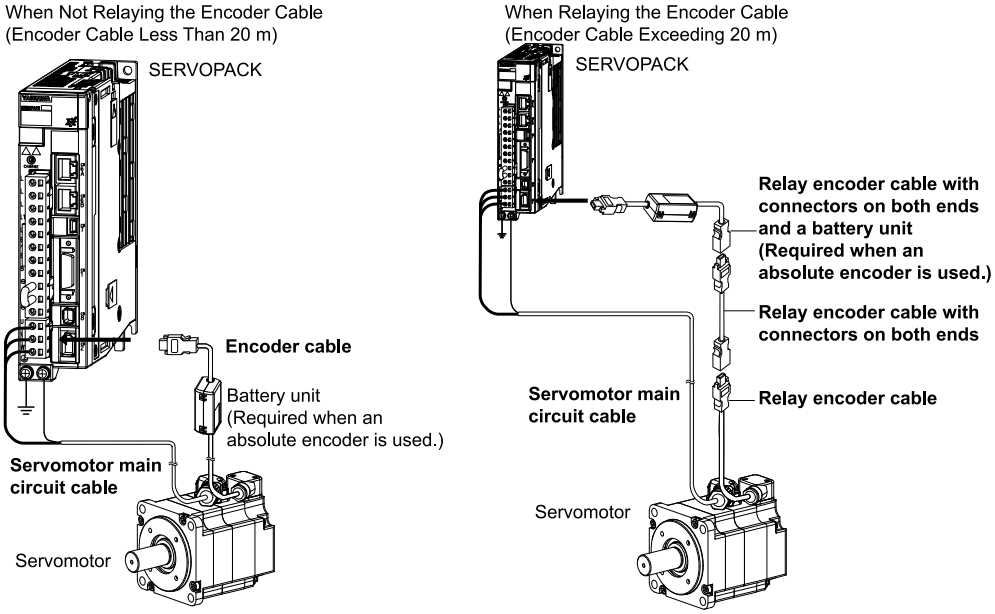
Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

System Configurations

■ Servomotors with Σ-7 Compatible Specifications

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



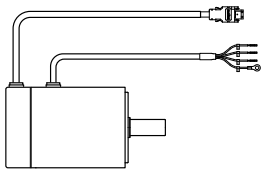
Note:

1. The encoder cable to use depends on whether the encoder cable will be relayed. Be sure to use the relay encoder cable with connectors at both ends in combination with the relay encoder cable as shown in the illustration at the upper right.
2. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
   Refer to the following section for the intermittent duty zone.
   ☞ *Torque-Rotation Speed Characteristics on page 60*
3. Refer to the following manual for the following information.
   - Cable dimensional drawings and wiring specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

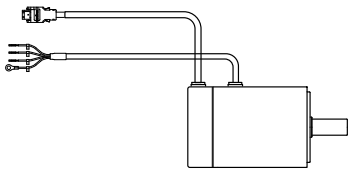
   Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Important There are different order numbers for the servomotor main circuit cables and encoder cables depending on the cable installation direction. Confirm the order numbers before you order.

Cable Installed toward Load



Cable Installed away from Load



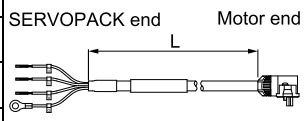
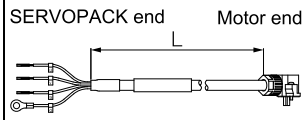
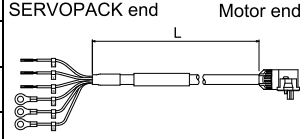
Servomotor Main Circuit Cables

This section provides information on selecting a servomotor main circuit cable. Refer to the following manual for detailed information on cables and for the wiring materials to make your own cables.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

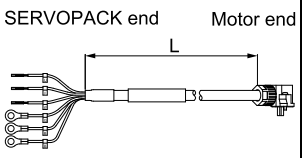
■ Servomotors with Σ-7 Compatible Specifications

◆ SGMXJ-A5 to -C2 (50 to 150 W)

Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1	Shielded/Flexible	
For servomotors without holding brakes. Cable installed toward load. 200 V models.	3 m	JZSP-C7M10F-03-E	JZSP-C7M12F-03-E	YAI-CSM21-03-P-E	
	5 m	JZSP-C7M10F-05-E	JZSP-C7M12F-05-E	YAI-CSM21-05-P-E	
	10 m	JZSP-C7M10F-10-E	JZSP-C7M12F-10-E	YAI-CSM21-10-P-E	
	15 m	JZSP-C7M10F-15-E	JZSP-C7M12F-15-E	YAI-CSM21-15-P-E	
	20 m	JZSP-C7M10F-20-E	JZSP-C7M12F-20-E	YAI-CSM21-20-P-E	
	30 m	JZSP-C7M10F-30-E	JZSP-C7M12F-30-E	YAI-CSM21-20-P-E	
	40 m	JZSP-C7M10F-40-E	JZSP-C7M12F-40-E	YAI-CSM21-40-P-E	
	50 m	JZSP-C7M10F-50-E	JZSP-C7M12F-50-E	YAI-CSM21-50-P-E	
For servomotors without holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M10G-03-E	JZSP-C7M12G-03-E	N/A	
	5 m	JZSP-C7M10G-05-E	JZSP-C7M12G-05-E		
	10 m	JZSP-C7M10G-10-E	JZSP-C7M12G-10-E		
	15 m	JZSP-C7M10G-15-E	JZSP-C7M12G-15-E		
	20 m	JZSP-C7M10G-20-E	JZSP-C7M12G-20-E		
	30 m	JZSP-C7M10G-30-E	JZSP-C7M12G-30-E		
	40 m	JZSP-C7M10G-40-E	JZSP-C7M12G-40-E		
	50 m	JZSP-C7M10G-50-E	JZSP-C7M12G-50-E		
For servomotors with holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M13F-03-E	JZSP-C7M14F-03-E	YAI-CSM31-03-P-E	
	5 m	JZSP-C7M13F-05-E	JZSP-C7M14F-05-E	YAI-CSM31-05-P-E	
	10 m	JZSP-C7M13F-10-E	JZSP-C7M14F-10-E	YAI-CSM31-10-P-E	
	15 m	JZSP-C7M13F-15-E	JZSP-C7M14F-15-E	YAI-CSM31-15-P-E	
	20 m	JZSP-C7M13F-20-E	JZSP-C7M14F-20-E	YAI-CSM31-20-P-E	
	30 m	JZSP-C7M13F-30-E	JZSP-C7M14F-30-E	YAI-CSM31-30-P-E	
	40 m	JZSP-C7M13F-40-E	JZSP-C7M14F-40-E	YAI-CSM31-40-P-E	
	50 m	JZSP-C7M13F-50-E	JZSP-C7M14F-50-E	YAI-CSM31-50-P-E	

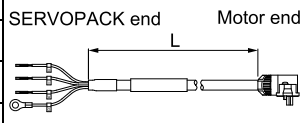
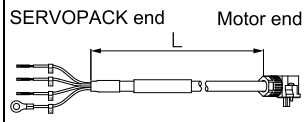
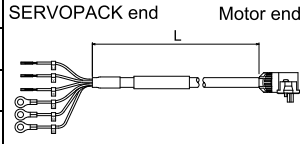
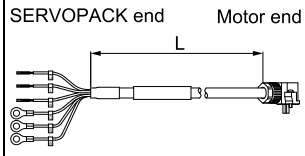
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Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1	Shielded/Flexible	
For servomotors with holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M13G-03-E	JZSP-C7M14G-03-E	N/A	
	5 m	JZSP-C7M13G-05-E	JZSP-C7M14G-05-E		
	10 m	JZSP-C7M13G-10-E	JZSP-C7M14G-10-E		
	15 m	JZSP-C7M13G-15-E	JZSP-C7M14G-15-E		
	20 m	JZSP-C7M13G-20-E	JZSP-C7M14G-20-E		
	30 m	JZSP-C7M13G-30-E	JZSP-C7M14G-30-E		
	40 m	JZSP-C7M13G-40-E	JZSP-C7M14G-40-E		
	50 m	JZSP-C7M13G-50-E	JZSP-C7M14G-50-E		

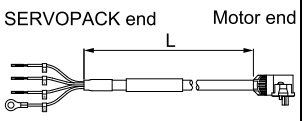
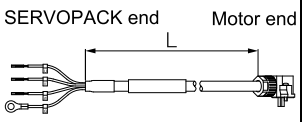
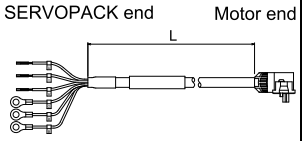
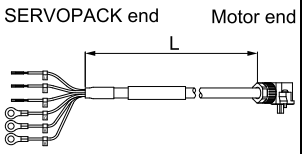
*1 Use flexible cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.

◆ SGMXJ-02 to -06 (200 to 600 W)

Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
For servomotors without holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M20F-03-E	JZSP-C7M22F-03-E	YAI-CSM22-03-P-E	
	5 m	JZSP-C7M20F-05-E	JZSP-C7M22F-05-E	YAI-CSM22-05-P-E	
	10 m	JZSP-C7M20F-10-E	JZSP-C7M22F-10-E	YAI-CSM22-10-P-E	
	15 m	JZSP-C7M20F-15-E	JZSP-C7M22F-15-E	YAI-CSM22-15-P-E	
	20 m	JZSP-C7M20F-20-E	JZSP-C7M22F-20-E	YAI-CSM22-20-P-E	
	30 m	JZSP-C7M20F-30-E	JZSP-C7M22F-30-E	YAI-CSM22-30-P-E	
	40 m	JZSP-C7M20F-40-E	JZSP-C7M22F-40-E	YAI-CSM22-40-P-E	
	50 m	JZSP-C7M20F-50-E	JZSP-C7M22F-50-E	YAI-CSM22-50-P-E	
For servomotors without holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M20G-03-E	JZSP-C7M22G-03-E	N/A	
	5 m	JZSP-C7M20G-05-E	JZSP-C7M22G-05-E		
	10 m	JZSP-C7M20G-10-E	JZSP-C7M22G-10-E		
	15 m	JZSP-C7M20G-15-E	JZSP-C7M22G-15-E		
	20 m	JZSP-C7M20G-20-E	JZSP-C7M22G-20-E		
	30 m	JZSP-C7M20G-30-E	JZSP-C7M22G-30-E		
	40 m	JZSP-C7M20G-40-E	JZSP-C7M22G-40-E		
	50 m	JZSP-C7M20G-50-E	JZSP-C7M22G-50-E		
For servomotors with holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M23F-03-E	JZSP-C7M24F-03-E	YAI-CSM32-03-P-E	
	5 m	JZSP-C7M23F-05-E	JZSP-C7M24F-05-E	YAI-CSM32-05-P-E	
	10 m	JZSP-C7M23F-10-E	JZSP-C7M24F-10-E	YAI-CSM32-10-P-E	
	15 m	JZSP-C7M23F-15-E	JZSP-C7M24F-15-E	YAI-CSM32-15-P-E	
	20 m	JZSP-C7M23F-20-E	JZSP-C7M24F-20-E	YAI-CSM32-20-P-E	
	30 m	JZSP-C7M23F-30-E	JZSP-C7M24F-30-E	YAI-CSM32-30-P-E	
	40 m	JZSP-C7M23F-40-E	JZSP-C7M24F-40-E	YAI-CSM32-40-P-E	
	50 m	JZSP-C7M23F-50-E	JZSP-C7M24F-50-E	YAI-CSM32-50-P-E	
For servomotors with holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M23G-03-E	JZSP-C7M24G-03-E	N/A	
	5 m	JZSP-C7M23G-05-E	JZSP-C7M24G-05-E		
	10 m	JZSP-C7M23G-10-E	JZSP-C7M24G-10-E		
	15 m	JZSP-C7M23G-15-E	JZSP-C7M24G-15-E		
	20 m	JZSP-C7M23G-20-E	JZSP-C7M24G-20-E		
	30 m	JZSP-C7M23G-30-E	JZSP-C7M24G-30-E		
	40 m	JZSP-C7M23G-40-E	JZSP-C7M24G-40-E		
	50 m	JZSP-C7M23G-50-E	JZSP-C7M24G-50-E		

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

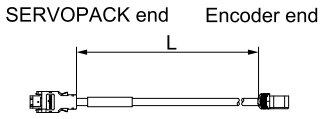
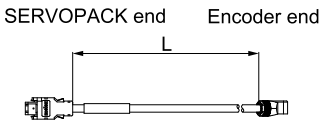
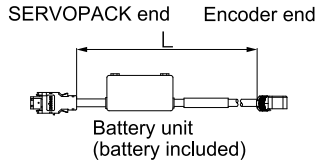
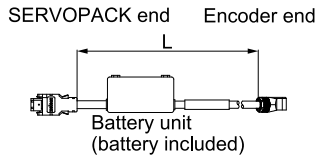
◆ SGMXJ-08 (750 W)

Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1	Shielded/Flexible	
For servomotors without holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M30F-03-E	JZSP-C7M32F-03-E	YAI-CSM23-03-P-E	
	5 m	JZSP-C7M30F-05-E	JZSP-C7M32F-05-E	YAI-CSM23-05-P-E	
	10 m	JZSP-C7M30F-10-E	JZSP-C7M32F-10-E	YAI-CSM23-10-P-E	
	15 m	JZSP-C7M30F-15-E	JZSP-C7M32F-15-E	YAI-CSM23-15-P-E	
	20 m	JZSP-C7M30F-20-E	JZSP-C7M32F-20-E	YAI-CSM23-20-P-E	
	30 m	JZSP-C7M30F-30-E	JZSP-C7M32F-30-E	YAI-CSM23-30-P-E	
	40 m	JZSP-C7M30F-40-E	JZSP-C7M32F-40-E	YAI-CSM23-40-P-E	
	50 m	JZSP-C7M30F-50-E	JZSP-C7M32F-50-E	YAI-CSM23-50-P-E	
For servomotors without holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M30G-03-E	JZSP-C7M32G-03-E	N/A	
	5 m	JZSP-C7M30G-05-E	JZSP-C7M32G-05-E		
	10 m	JZSP-C7M30G-10-E	JZSP-C7M32G-10-E		
	15 m	JZSP-C7M30G-15-E	JZSP-C7M32G-15-E		
	20 m	JZSP-C7M30G-20-E	JZSP-C7M32G-20-E		
	30 m	JZSP-C7M30G-30-E	JZSP-C7M32G-30-E		
	40 m	JZSP-C7M30G-40-E	JZSP-C7M32G-40-E		
	50 m	JZSP-C7M30G-50-E	JZSP-C7M32G-50-E		
For servomotors with holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M33F-03-E	JZSP-C7M34F-03-E	YAI-CSM33-03-P-E	
	5 m	JZSP-C7M33F-05-E	JZSP-C7M34F-05-E	YAI-CSM33-05-P-E	
	10 m	JZSP-C7M33F-10-E	JZSP-C7M34F-10-E	YAI-CSM33-10-P-E	
	15 m	JZSP-C7M33F-15-E	JZSP-C7M34F-15-E	YAI-CSM33-15-P-E	
	20 m	JZSP-C7M33F-20-E	JZSP-C7M34F-20-E	YAI-CSM33-20-P-E	
	30 m	JZSP-C7M33F-30-E	JZSP-C7M34F-30-E	YAI-CSM33-30-P-E	
	40 m	JZSP-C7M33F-40-E	JZSP-C7M34F-40-E	YAI-CSM33-40-P-E	
	50 m	JZSP-C7M33F-50-E	JZSP-C7M34F-50-E	YAI-CSM33-50-P-E	
For servomotors with holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M33G-03-E	JZSP-C7M34G-03-E	N/A	
	5 m	JZSP-C7M33G-05-E	JZSP-C7M34G-05-E		
	10 m	JZSP-C7M33G-10-E	JZSP-C7M34G-10-E		
	15 m	JZSP-C7M33G-15-E	JZSP-C7M34G-15-E		
	20 m	JZSP-C7M33G-20-E	JZSP-C7M34G-20-E		
	30 m	JZSP-C7M33G-30-E	JZSP-C7M34G-30-E		
	40 m	JZSP-C7M33G-40-E	JZSP-C7M34G-40-E		
	50 m	JZSP-C7M33G-50-E	JZSP-C7M34G-50-E		

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

Encoder Cables

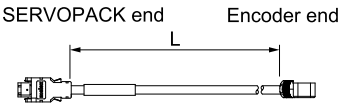
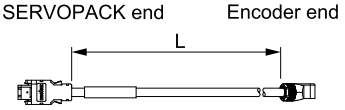
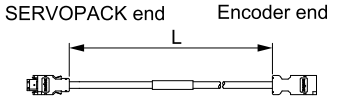
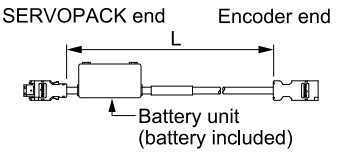
■ Servomotors with Σ-7 Compatible Specifications (20 m or Less)

Name	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1 *2	
For batteryless absolute encoder Cable installed toward load	3 m	JZSP-C7PI0D-03-E	JZSP-C7PI2D-03-E	
	5 m	JZSP-C7PI0D-05-E	JZSP-C7PI2D-05-E	
	10 m	JZSP-C7PI0D-10-E	JZSP-C7PI2D-10-E	
	15 m	JZSP-C7PI0D-15-E	JZSP-C7PI2D-15-E	
	20 m	JZSP-C7PI0D-20-E	JZSP-C7PI2D-20-E	
For batteryless absolute encoder Cable installed away from load	3 m	JZSP-C7PI0E-03-E	JZSP-C7PI2E-03-E	
	5 m	JZSP-C7PI0E-05-E	JZSP-C7PI2E-05-E	
	10 m	JZSP-C7PI0E-10-E	JZSP-C7PI2E-10-E	
	15 m	JZSP-C7PI0E-15-E	JZSP-C7PI2E-15-E	
	20 m	JZSP-C7PI0E-20-E	JZSP-C7PI2E-20-E	
For absolute encoder: With battery unit *3 Cable installed toward load	3 m	JZSP-C7PA0D-03-E	JZSP-C7PA2D-03-E	
	5 m	JZSP-C7PA0D-05-E	JZSP-C7PA2D-05-E	
	10 m	JZSP-C7PA0D-10-E	JZSP-C7PA2D-10-E	
	15 m	JZSP-C7PA0D-15-E	JZSP-C7PA2D-15-E	
	20 m	JZSP-C7PA0D-20-E	JZSP-C7PA2D-20-E	
For absolute encoder: With battery unit *3 Cable installed away from load	3 m	JZSP-C7PA0E-03-E	JZSP-C7PA2E-03-E	
	5 m	JZSP-C7PA0E-05-E	JZSP-C7PA2E-05-E	
	10 m	JZSP-C7PA0E-10-E	JZSP-C7PA2E-10-E	
	15 m	JZSP-C7PA0E-15-E	JZSP-C7PA2E-15-E	
	20 m	JZSP-C7PA0E-20-E	JZSP-C7PA2E-20-E	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 46 mm or larger.
*3 If a battery is connected to the host controller, the battery unit is not required.

Encoder Cables

■ Servomotors with Σ-7 Compatible Specifications (When Exceeding 20 m)

Name	Length (L)	Order Number	Appearance
Relay encoder cable (for all types of encoders) Cable installed toward load	0.3 m	JZSP-C7PRCD-E	
Relay encoder cable (for all types of encoders) Cable installed away from load	0.3 m	JZSP-C7PRCE-E	
Relay encoder cable with connectors on both ends (for all types of encoders)	30 m	JZSP-UCMP00-30-E	
	40 m	JZSP-UCMP00-40-E	
	50 m	JZSP-UCMP00-50-E	
Relay encoder cable with connectors on both ends and battery unit (Required only when an absolute encoder is used. *1)	0.3 m	JZSP-CSP12-E	

*1 This cable is not required if you use a servomotor with a batteryless absolute encoder, and you connect a battery to the host controller.

Cables for the SGMXA Servomotors

Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

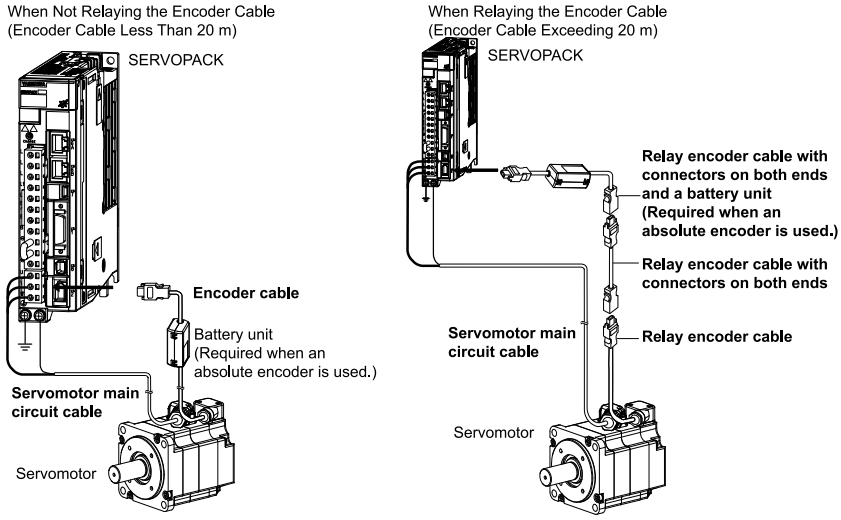
Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

System Configurations

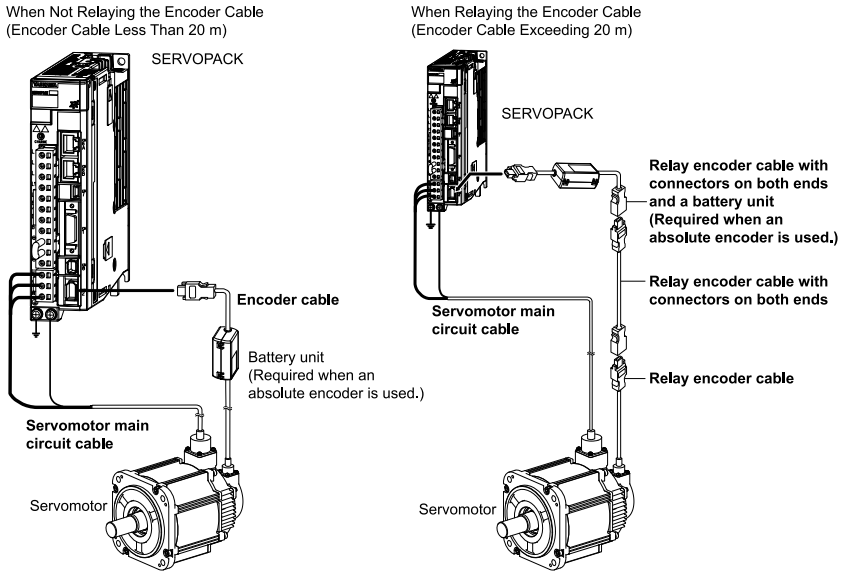
■ Servomotors with Σ-V or Σ-7 Compatible Specifications

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

- SGMXA-A5 to -10



- SGMXA-15 to -70



Note:

1. The encoder cable to use depends on whether the encoder cable will be relayed.
2. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
   Refer to the following section for the intermittent duty zone.
   ☞ *Torque-Rotation Speed Characteristics on page 82*
3. Refer to the following manual for the following information.
   - Cable dimensional drawings and wiring specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

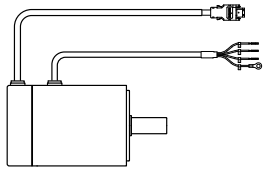
   Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Important

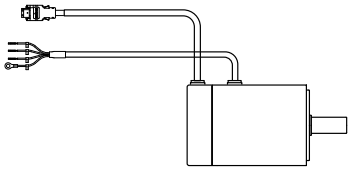
There are different order numbers for the servomotor main circuit cables and encoder cables depending on the cable installation direction. Confirm the order numbers before you order.

- SGMXA-A5 to -10

Cable Installed toward Load

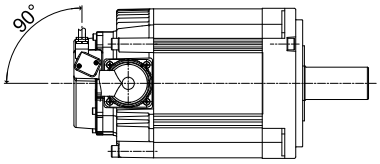


Cable Installed away from Load

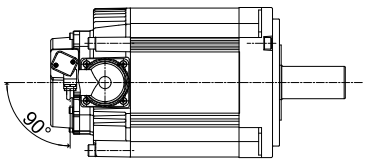


- SGMXA-15 to -70

Cable Installed on Left Side



Cable Installed on Right Side



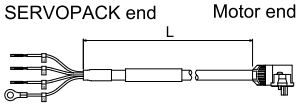
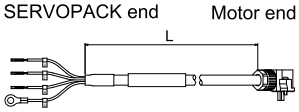
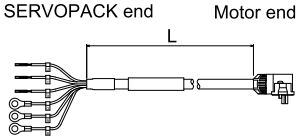
Servomotor Main Circuit Cables

This section provides information on selecting a servomotor main circuit cable. Refer to the following manual for detailed information on cables and for the wiring materials to make your own cables.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

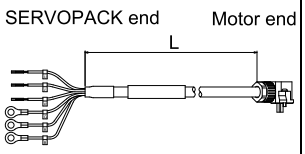
■ Servomotors with Σ-V or Σ-7 Compatible Specifications

◆ SGMXA-A5 to -C2 (50 W to 150 W)

Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
For servomotors without holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M10F-03-E	JZSP-C7M12F-03-E	YAI-CSM21-03-P-E	
	5 m	JZSP-C7M10F-05-E	JZSP-C7M12F-05-E	YAI-CSM21-05-P-E	
	10 m	JZSP-C7M10F-10-E	JZSP-C7M12F-10-E	YAI-CSM21-10-P-E	
	15 m	JZSP-C7M10F-15-E	JZSP-C7M12F-15-E	YAI-CSM21-15-P-E	
	20 m	JZSP-C7M10F-20-E	JZSP-C7M12F-20-E	YAI-CSM21-20-P-E	
	30 m	JZSP-C7M10F-30-E	JZSP-C7M12F-30-E	YAI-CSM21-30-P-E	
	40 m	JZSP-C7M10F-40-E	JZSP-C7M12F-40-E	YAI-CSM21-40-P-E	
	50 m	JZSP-C7M10F-50-E	JZSP-C7M12F-50-E	YAI-CSM21-50-P-E	
For servomotors without holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M10G-03-E	JZSP-C7M12G-03-E	N/A	
	5 m	JZSP-C7M10G-05-E	JZSP-C7M12G-05-E		
	10 m	JZSP-C7M10G-10-E	JZSP-C7M12G-10-E		
	15 m	JZSP-C7M10G-15-E	JZSP-C7M12G-15-E		
	20 m	JZSP-C7M10G-20-E	JZSP-C7M12G-20-E		
	30 m	JZSP-C7M10G-30-E	JZSP-C7M12G-30-E		
	40 m	JZSP-C7M10G-40-E	JZSP-C7M12G-40-E		
	50 m	JZSP-C7M10G-50-E	JZSP-C7M12G-50-E		
For servomotors with holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M13F-03-E	JZSP-C7M14F-03-E	YAI-CSM31-03-P-E	
	5 m	JZSP-C7M13F-05-E	JZSP-C7M14F-05-E	YAI-CSM31-05-P-E	
	10 m	JZSP-C7M13F-10-E	JZSP-C7M14F-10-E	YAI-CSM31-10-P-E	
	15 m	JZSP-C7M13F-15-E	JZSP-C7M14F-15-E	YAI-CSM31-15-P-E	
	20 m	JZSP-C7M13F-20-E	JZSP-C7M14F-20-E	YAI-CSM31-20-P-E	
	30 m	JZSP-C7M13F-30-E	JZSP-C7M14F-30-E	YAI-CSM31-30-P-E	
	40 m	JZSP-C7M13F-40-E	JZSP-C7M14F-40-E	YAI-CSM31-40-P-E	
	50 m	JZSP-C7M13F-50-E	JZSP-C7M14F-50-E	YAI-CSM31-50-P-E	

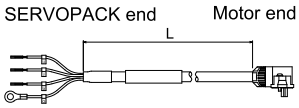
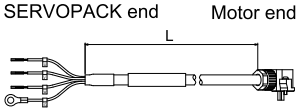
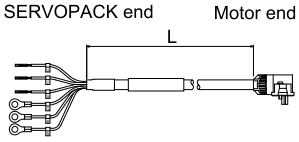
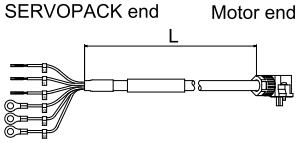
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Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
For servomotors with holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M13G-03-E	JZSP-C7M14G-03-E	N/A	
	5 m	JZSP-C7M13G-05-E	JZSP-C7M14G-05-E		
	10 m	JZSP-C7M13G-10-E	JZSP-C7M14G-10-E		
	15 m	JZSP-C7M13G-15-E	JZSP-C7M14G-15-E		
	20 m	JZSP-C7M13G-20-E	JZSP-C7M14G-20-E		
	30 m	JZSP-C7M13G-30-E	JZSP-C7M14G-30-E		
	40 m	JZSP-C7M13G-40-E	JZSP-C7M14G-40-E		
	50 m	JZSP-C7M13G-50-E	JZSP-C7M14G-50-E		

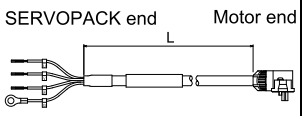
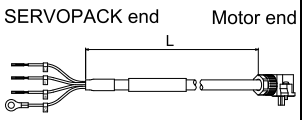
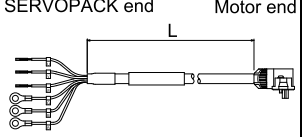
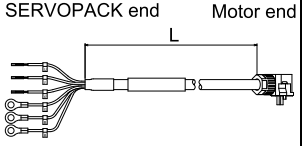
*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

◆ SGMXA-02 to -06 (200 W to 600 W)

Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
For servomotors without holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M20F-03-E	JZSP-C7M22F-03-E	YAI-CSM22-03-P-E	
	5 m	JZSP-C7M20F-05-E	JZSP-C7M22F-05-E	YAI-CSM22-05-P-E	
	10 m	JZSP-C7M20F-10-E	JZSP-C7M22F-10-E	YAI-CSM22-10-P-E	
	15 m	JZSP-C7M20F-15-E	JZSP-C7M22F-15-E	YAI-CSM22-15-P-E	
	20 m	JZSP-C7M20F-20-E	JZSP-C7M22F-20-E	YAI-CSM22-20-P-E	
	30 m	JZSP-C7M20F-30-E	JZSP-C7M22F-30-E	YAI-CSM22-30-P-E	
	40 m	JZSP-C7M20F-40-E	JZSP-C7M22F-40-E	YAI-CSM22-40-P-E	
	50 m	JZSP-C7M20F-50-E	JZSP-C7M22F-50-E	YAI-CSM22-50-P-E	
For servomotors without holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M20G-03-E	JZSP-C7M22G-03-E	N/A	
	5 m	JZSP-C7M20G-05-E	JZSP-C7M22G-05-E		
	10 m	JZSP-C7M20G-10-E	JZSP-C7M22G-10-E		
	15 m	JZSP-C7M20G-15-E	JZSP-C7M22G-15-E		
	20 m	JZSP-C7M20G-20-E	JZSP-C7M22G-20-E		
	30 m	JZSP-C7M20G-30-E	JZSP-C7M22G-30-E		
	40 m	JZSP-C7M20G-40-E	JZSP-C7M22G-40-E		
	50 m	JZSP-C7M20G-50-E	JZSP-C7M22G-50-E		
For servomotors with holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M23F-03-E	JZSP-C7M24F-03-E	YAI-CSM32-03-P-E	
	5 m	JZSP-C7M23F-05-E	JZSP-C7M24F-05-E	YAI-CSM32-05-P-E	
	10 m	JZSP-C7M23F-10-E	JZSP-C7M24F-10-E	YAI-CSM32-10-P-E	
	15 m	JZSP-C7M23F-15-E	JZSP-C7M24F-15-E	YAI-CSM32-15-P-E	
	20 m	JZSP-C7M23F-20-E	JZSP-C7M24F-20-E	YAI-CSM32-20-P-E	
	30 m	JZSP-C7M23F-30-E	JZSP-C7M24F-30-E	YAI-CSM32-30-P-E	
	40 m	JZSP-C7M23F-40-E	JZSP-C7M24F-40-E	YAI-CSM32-40-P-E	
	50 m	JZSP-C7M23F-50-E	JZSP-C7M24F-50-E	YAI-CSM32-50-P-E	
For servomotors with holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M23G-03-E	JZSP-C7M24G-03-E	N/A	
	5 m	JZSP-C7M23G-05-E	JZSP-C7M24G-05-E		
	10 m	JZSP-C7M23G-10-E	JZSP-C7M24G-10-E		
	15 m	JZSP-C7M23G-15-E	JZSP-C7M24G-15-E		
	20 m	JZSP-C7M23G-20-E	JZSP-C7M24G-20-E		
	30 m	JZSP-C7M23G-30-E	JZSP-C7M24G-30-E		
	40 m	JZSP-C7M23G-40-E	JZSP-C7M24G-40-E		
	50 m	JZSP-C7M23G-50-E	JZSP-C7M24G-50-E		

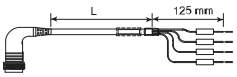
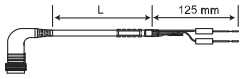
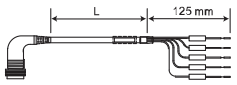
*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

◆ SGMXA-08, -10 (750 W, 1.0 kW)

Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
For servomotors without holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M30F-03-E	JZSP-C7M32F-03-E	YAI-CSM23-03-P-E	
	5 m	JZSP-C7M30F-05-E	JZSP-C7M32F-05-E	YAI-CSM23-05-P-E	
	10 m	JZSP-C7M30F-10-E	JZSP-C7M32F-10-E	YAI-CSM23-10-P-E	
	15 m	JZSP-C7M30F-15-E	JZSP-C7M32F-15-E	YAI-CSM23-15-P-E	
	20 m	JZSP-C7M30F-20-E	JZSP-C7M32F-20-E	YAI-CSM23-20-P-E	
	30 m	JZSP-C7M30F-30-E	JZSP-C7M32F-30-E	YAI-CSM23-30-P-E	
	40 m	JZSP-C7M30F-40-E	JZSP-C7M32F-40-E	YAI-CSM23-40-P-E	
	50 m	JZSP-C7M30F-50-E	JZSP-C7M32F-50-E	YAI-CSM23-50-P-E	
For servomotors without holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M30G-03-E	JZSP-C7M32G-03-E	N/A	
	5 m	JZSP-C7M30G-05-E	JZSP-C7M32G-05-E		
	10 m	JZSP-C7M30G-10-E	JZSP-C7M32G-10-E		
	15 m	JZSP-C7M30G-15-E	JZSP-C7M32G-15-E		
	20 m	JZSP-C7M30G-20-E	JZSP-C7M32G-20-E		
	30 m	JZSP-C7M30G-30-E	JZSP-C7M32G-30-E		
	40 m	JZSP-C7M30G-40-E	JZSP-C7M32G-40-E		
	50 m	JZSP-C7M30G-50-E	JZSP-C7M32G-50-E		
For servomotors with holding brakes Cable installed toward load 200 V models.	3 m	JZSP-C7M33F-03-E	JZSP-C7M34F-03-E	YAI-CSM33-03-P-E	
	5 m	JZSP-C7M33F-05-E	JZSP-C7M34F-05-E	YAI-CSM33-05-P-E	
	10 m	JZSP-C7M33F-10-E	JZSP-C7M34F-10-E	YAI-CSM33-10-P-E	
	15 m	JZSP-C7M33F-15-E	JZSP-C7M34F-15-E	YAI-CSM33-15-P-E	
	20 m	JZSP-C7M33F-20-E	JZSP-C7M34F-20-E	YAI-CSM33-20-P-E	
	30 m	JZSP-C7M33F-30-E	JZSP-C7M34F-30-E	YAI-CSM33-30-P-E	
	40 m	JZSP-C7M33F-40-E	JZSP-C7M34F-40-E	YAI-CSM33-40-P-E	
	50 m	JZSP-C7M33F-50-E	JZSP-C7M34F-50-E	YAI-CSM33-50-P-E	
For servomotors with holding brakes Cable installed away from load 200 V models.	3 m	JZSP-C7M33G-03-E	JZSP-C7M34G-03-E	N/A	
	5 m	JZSP-C7M33G-05-E	JZSP-C7M34G-05-E		
	10 m	JZSP-C7M33G-10-E	JZSP-C7M34G-10-E		
	15 m	JZSP-C7M33G-15-E	JZSP-C7M34G-15-E		
	20 m	JZSP-C7M33G-20-E	JZSP-C7M34G-20-E		
	30 m	JZSP-C7M33G-30-E	JZSP-C7M34G-30-E		
	40 m	JZSP-C7M33G-40-E	JZSP-C7M34G-40-E		
	50 m	JZSP-C7M33G-50-E	JZSP-C7M34G-50-E		

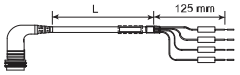
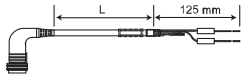
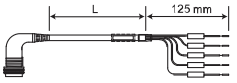
*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

◆ SGMXA-15 to 70 (1.5 kW to 7.0 kW)

Servo Motor Model	Name	Length (L)	Order Number			Appearance
			Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
SGMXA-15 to -25 1.5 to 2.5 kW (200 V)	Power Cable for Servo Motors Cable Installed Toward Load	3 m	B1EV-03(A)-E	N/A	B1EP-03(A)-E	
		5 m	B1EV-05(A)-E		B1EP-05(A)-E	
		10 m	B1EV-10(A)-E		B1EP-10(A)-E	
		15 m	B1EV-15(A)-E		B1EP-15(A)-E	
		20 m	B1EV-20(A)-E		B1EP-20(A)-E	
SGMXA-30 3.0 kW (200 V)		3 m	B3EV-03(A)-E	N/A	B3EP-03(A)-E	
		5 m	B3EV-05(A)-E		B3EP-05(A)-E	
		10 m	B3EV-10(A)-E		B3EP-10(A)-E	
		15 m	B3EV-15(A)-E		B3EP-15(A)-E	
		20 m	B3EV-20(A)-E		B3EP-20(A)-E	
SGMXA-40 to -70 4.0 to 7.0 kW (200 V)		3 m	B4EV-03(A)-E	N/A	B4EP-03(B)-E	
		5 m	B4EV-05(A)-E		B4EP-05(B)-E	
		10 m	B4EV-10(A)-E		B4EP-10(B)-E	
		15 m	B4EV-15(A)-E		B4EP-15(B)-E	
		20 m	B4EV-20(A)-E		B4EP-20(B)-E	
SGMXA-15 to -50 1.5 to 5.0 kW (200 V)	Brake Cable for Servo Motors with Holding Brakes Cable Installed Toward Load	3 m	BBEV-03(A)-E	N/A	BBEP-03(A)-E	
		5 m	BBEV-05(A)-E		BBEP-05(A)-E	
		10 m	BBEV-10(A)-E		BBEP-10(A)-E	
		15 m	BBEV-15(A)-E		BBEP-15(A)-E	
		20 m	BBEV-20(A)-E		BBEP-20(A)-E	
SGMXA-70 7.0 kW (200 V)	Fan Cable (Required)	3 m	BFEV-03(A)-E	N/A	N/A	
		5 m	BFEV-05(A)-E			
		10 m	BFEV-10(A)-E			
		15 m	BFEV-15(A)-E			
		20 m	BFEV-20(A)-E			

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Servo Motor Model	Name	Length (L)	Order Number			Appearance
			Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
SGMXA-15 to SGMXA-25 1.5 to 2.5 kW (400V).	Power Cable for Servomotors with our without brake	3 m	B1EV-03(A)-E	N/A	B1EP-03(A)-E	
		5 m	B1EV-05(A)-E		B1EP-05(A)-E	
		10 m	B1EV-10(A)-E		B1EP-10(A)-E	
		15 m	B1EV-15(A)-E		B1EP-15(A)-E	
		20 m	B1EV-20(A)-E		B1EP-20(A)-E	
SGMXA-30 to SGMXA-50 3.0 to 5.0 kW (400V).		3 m	B3EV-03(A)-E	N/A	B3EP-03(A)-E	
		5 m	B3EV-05(A)-E		B3EP-05(A)-E	
		10 m	B3EV-10(A)-E		B3EP-10(A)-E	
		15 m	B3EV-15(A)-E		B3EP-15(A)-E	
		20 m	B3EV-20(A)-E		B3EP-20(A)-E	
SGMXA-15 to SGMXA-50 1.5 to 5.0 kW (400V).	Holding brake cable	3 m	BBEV-03(A)-E	N/A	N/A	
		5 m	BBEV-05(A)-E			
		10 m	BBEV-10(A)-E			
		15 m	BBEV-15(A)-E			
		20 m	BVEV-20(A)-E			
		3 m	N/A	N/A	BBEP-03(A)-E	
		5 m			BBEP-05(A)-E	
		10 m			BBEP-10(A)-E	
		15 m			BBEP-15(A)-E	
		20 m			BVEP-20(A)-E	

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

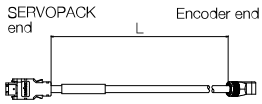
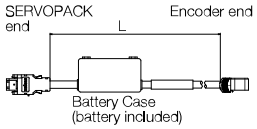
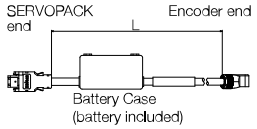
Information Σ-7 compatible specification servomotors can also use the same cables as Σ-7 series rotary servomotors. Refer to the following manual for information on the Σ-7-series for rotary servomotor cables.

Σ-7-Series Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Encoder Cables

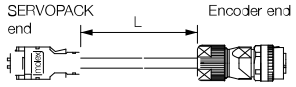
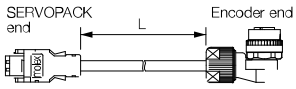
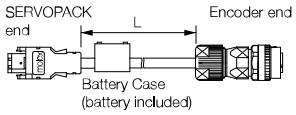
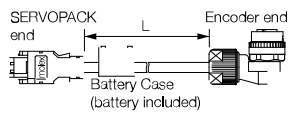
■ Servomotors with Σ-V or Σ-7 Compatible Specifications (20 m or Less)

◆ SGMXA-A5 to -70 (50 W to 7.0 kW)

Servo Motor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable *1 *2	
SGMXA -A5 to -10 50 W to 1.0 kW	For incremental or batteryless absolute encoder. Cable installed toward load	3 m	JZSP-C7PI0D-03-E3	JZSP-C7PI2D-03-E	
		5 m	JZSP-C7PI0D-05-E	JZSP-C7PI2D-05-E	
		10 m	JZSP-C7PI0D-10-E	JZSP-C7PI2D-10-E	
		15 m	JZSP-C7PI0D-15-E	JZSP-C7PI2D-15-E	
		20 m	JZSP-C7PI0D-20-E	JZSP-C7PI2D-20-E20	
	For incremental or batteryless absolute encoder. Cable installed away from load	3 m	JZSP-C7PI0E-03-E3	JZSP-C7PI2E-03-E	
		5 m	JZSP-C7PI0E-05-E	JZSP-C7PI2E-05-E	
		10 m	JZSP-C7PI0E-10-E	JZSP-C7PI2DE-10-E	
		15 m	JZSP-C7PI0E-15-E	JZSP-C7PI2E-15-E	
		20 m	JZSP-C7PI0E-20-E	JZSP-C7PI2E-20-E20	
	For absolute encoder: With Battery Case*2 Cable installed toward load	3 m	JZSP-C7PA0D-03-E3	JZSP-C7PA2D-03-E	
		5 m	JZSP-C7PA0D-05-E	JZSP-C7PA2D-05-E	
		10 m	JZSP-C7PA0D-10-E	JZSP-C7PA2D-10-E	
		15 m	JZSP-C7PA0D-15-E	JZSP-C7PA2D-15-E	
		20 m	JZSP-C7PA0D-20-E	JZSP-C7PA2D-20-E20	
	For absolute encoder: With Battery Case*2 Cable installed away from load	3 m	JZSP-C7PA0E-03-E3	JZSP-C7PA2E-03-E	
		5 m	JZSP-C7PA0E-05-E	JZSP-C7PA2E-05-E	
		10 m	JZSP-C7PA0E-10-E	JZSP-C7PA2DE-10-E	
		15 m	JZSP-C7PA0E-15-E	JZSP-C7PA2E-15-E	
		20 m	JZSP-C7PA0E-20-E	JZSP-C7PA2E-20-E20	

Continued on next page.

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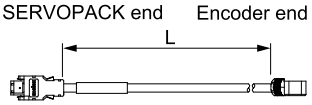
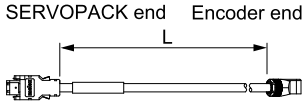
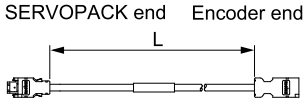
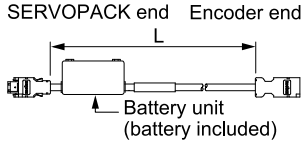
Servo Motor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable *1 *2	
SGMXA -15 to -70 1.5 KW to 7.0 kW	For incremental or batteryless absolute encoder *3	3 m	JZSP-CVP01-03-E	JZSP-CVP11-03-E	
		5 m	JZSP-CVP01-05-E	JZSP-CVP11-05-E	
		10 m	JZSP-CVP01-10-E	JZSP-CVP11-10-E	
		15 m	JZSP-CVP01-15-E	JZSP-CVP11-15-E	
		20 m	JZSP-CVP01-20-E	JZSP-CVP11-20-E	
		3 m	JZSP-CVP02-03-E	JZSP-CVP12-03-E	
		5 m	JZSP-CVP02-05-E	JZSP-CVP12-05-E	
		10 m	JZSP-CVP02-10-E	JZSP-CVP12-10-E	
		15 m	JZSP-CVP02-15-E	JZSP-CVP12-15-E	
		20 m	JZSP-CVP02-20-E	JZSP-CVP12-20-E	
	For absolute encoder: With Battery Case*2 *3	3 m	JZSP-CVP06-03-E	JZSP-CVP26-03-E	
		5 m	JZSP-CVP06-05-E	JZSP-CVP26-05-E	
		10 m	JZSP-CVP06-10-E	JZSP-CVP26-10-E	
		15 m	JZSP-CVP06-15-E	JZSP-CVP26-15-E	
		20 m	JZSP-CVP06-20-E	JZSP-CVP26-20-E	
		3 m	JZSP-CVP07-03-E	JZSP-CVP27-03-E	
		5 m	JZSP-CVP07-05-E	JZSP-CVP27-05-E	
		10 m	JZSP-CVP07-10-E	JZSP-CVP27-10-E	
		15 m	JZSP-CVP07-15-E	JZSP-CVP27-15-E	
		20 m	JZSP-CVP07-20-E	JZSP-CVP27-20-E	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 If a battery is connected to host controller, the Battery Case is not required. If so, use a cable for incremental encoders.
*3 You cannot use a right-angle connector for the encoder of an SGM7A-70 (7.0 kW) servomotor. Use a straight connector

Encoder Cables

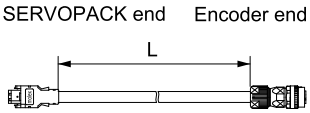
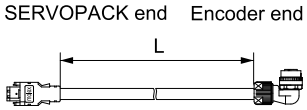
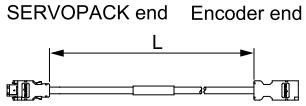
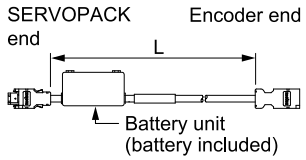
■ Servomotors with Σ-V or Σ-7 Compatible Specifications (When Exceeding 20 m)

◆ SGMXA-A5 to -10 (50 W to 1.0 kW)

Name	Length (L)	Order Number	Appearance
Relay encoder cable (for all types of encoders) Cable installed toward load	0.3 m	JZSP-C7PRCD-E	
Relay encoder cable (for all types of encoders) Cable installed away from load	0.3 m	JZSP-C7PRCE-E	
Relay encoder cable with connectors on both ends (for all types of encoders)	30 m	JZSP-UCMP00-30-E	
	40 m	JZSP-UCMP00-40-E	
	50 m	JZSP-UCMP00-50-E	
Relay encoder cables with connectors on both ends and battery unit (Required only when an absolute encoder is used *1.)	0.3 m	JZSP-CSP12-E	

*1 This cable is not required if you use a servomotor with a batteryless absolute encoder, and you connect a battery to the host controller.

◆ SGMXA-15 to -70 (1.5 kW to 7.0 kW)

Name	Length (L)	Order Number	Appearance
Relay encoder cable (for all types of encoders) *1 *2	0.3 m	JZSP-CVP01-E	
		JZSP-CVP02-E	
Relay encoder cable with connectors on both ends (for all types of encoders)	30 m	JZSP-UCMP00-30-E	
	40 m	JZSP-UCMP00-40-E	
	50 m	JZSP-UCMP00-50-E	
Relay encoder cable with connectors on both ends and battery unit (Required only when an absolute encoder is used. *3)	0.3 m	JZSP-CSP12-E	

*1 The lead installation direction of the right-angle plug connector is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*2 An encoder cable with a right-angle plug cannot be used for the SGMXA-70 (7.0 kW). Use an encoder cable with a straight plug.
*3 This cable is not required if you use a servomotor with a batteryless absolute encoder, and you connect a battery to the host controller.

Cables for the 200 V SGMXP Servomotors

Information Refer to the following manual when making connections between multiple devices and the SERVOPACK.

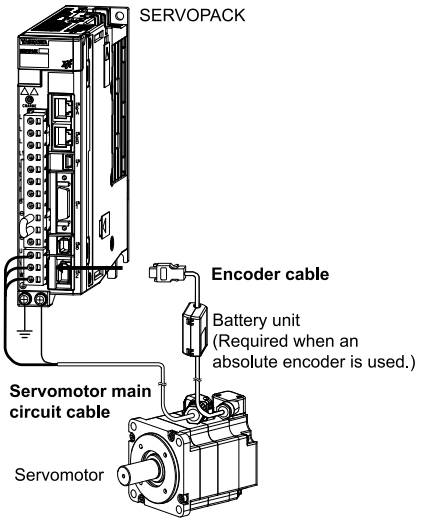
Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

System Configurations

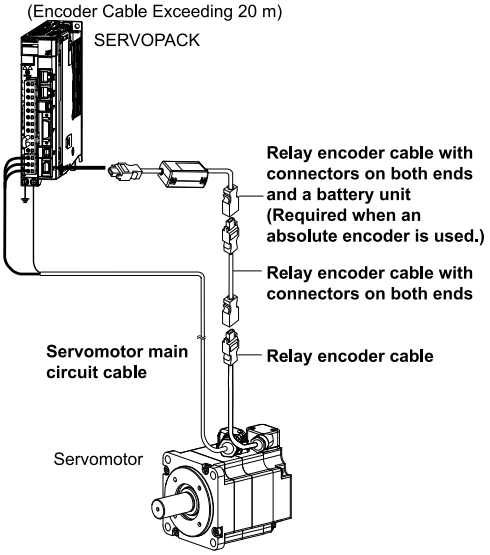
■ Servomotors with Σ-7 Compatible Specifications

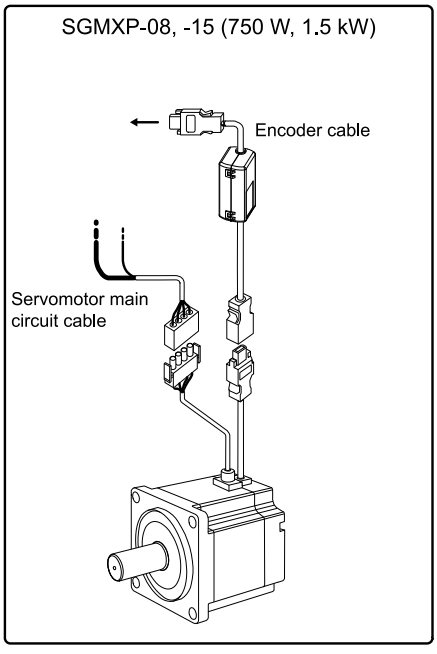
The cables shown below are required to connect a servomotor to a SERVOPACK.

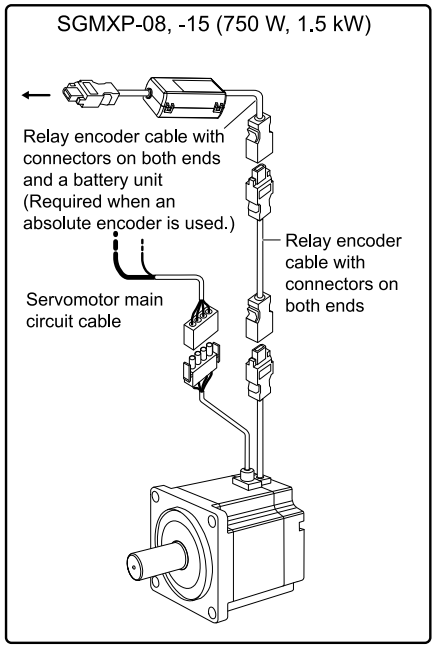
When Not Relaying the Encoder Cable
(Encoder Cable Less Than 20 m)



When Relaying the Encoder Cable
(Encoder Cable Exceeding 20 m)







Note:

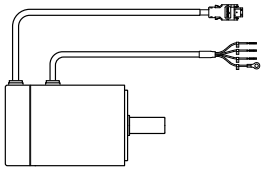
1. The encoder cable to use depends on whether the encoder cable will be relayed.
2. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
   Refer to the following section for the intermittent duty zone.
   ☞ *Torque-Rotation Speed Characteristics on page 142*
3. Refer to the following manual for the following information.
   - Cable dimensional drawings and wiring specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

   🕮 Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

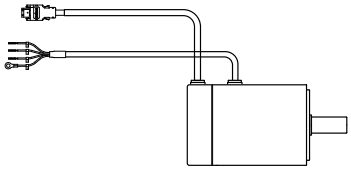
Important

There are different order numbers for the servomotor main circuit cables and encoder cables depending on the cable installation direction. Confirm the order numbers before you order.

Cable Installed toward Load



Cable Installed away from Load



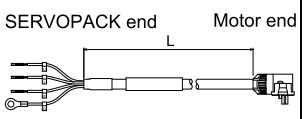
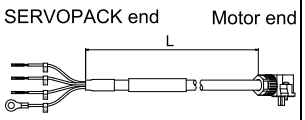
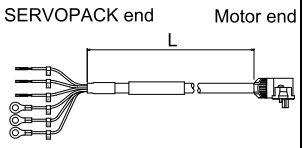
Servomotor Main Circuit Cables

This section provides information on selecting a servomotor main circuit cable. Refer to the following manual for detailed information on cables and for the wiring materials to make your own cables.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

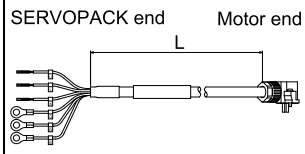
■ Servomotors with Σ-7 Compatible Specifications

◆ SGMXP-01 (100 W)

Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
For servomotors without holding brakes Cable installed toward load	3 m	JZSP-C7M10F-03-E	JZSP-C7M12F-03-E	YAI-CSM21-03-P-E	
	5 m	JZSP-C7M10F-05-E	JZSP-C7M12F-05-E	YAI-CSM21-05-P-E	
	10 m	JZSP-C7M10F-10-E	JZSP-C7M12F-10-E	YAI-CSM21-10-P-E	
	15 m	JZSP-C7M10F-15-E	JZSP-C7M12F-15-E	YAI-CSM21-15-P-E	
	20 m	JZSP-C7M10F-20-E	JZSP-C7M12F-20-E	YAI-CSM21-20-P-E	
	30 m	JZSP-C7M10F-30-E	JZSP-C7M12F-30-E	YAI-CSM21-30-P-E	
	40 m	JZSP-C7M10F-40-E	JZSP-C7M12F-40-E	YAI-CSM21-40-P-E	
	50 m	JZSP-C7M10F-50-E	JZSP-C7M12F-50-E	YAI-CSM21-50-P-E	
For servomotors without holding brakes Cable installed away from load	3 m	JZSP-C7M10G-03-E	JZSP-C7M12G-03-E	N/A	
	5 m	JZSP-C7M10G-05-E	JZSP-C7M12G-05-E		
	10 m	JZSP-C7M10G-10-E	JZSP-C7M12G-10-E		
	15 m	JZSP-C7M10G-15-E	JZSP-C7M12G-15-E		
	20 m	JZSP-C7M10G-20-E	JZSP-C7M12G-20-E		
	30 m	JZSP-C7M10G-30-E	JZSP-C7M12G-30-E		
	40 m	JZSP-C7M10G-40-E	JZSP-C7M12G-40-E		
	50 m	JZSP-C7M10G-50-E	JZSP-C7M12G-50-E		
For servomotors with holding brakes Cable installed toward load	3 m	JZSP-C7M13F-03-E	JZSP-C7M14F-03-E	YAI-CSM31-03-P-E	
	5 m	JZSP-C7M13F-05-E	JZSP-C7M14F-05-E	YAI-CSM31-05-P-E	
	10 m	JZSP-C7M13F-10-E	JZSP-C7M14F-10-E	YAI-CSM31-10-P-E	
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	30 m	JZSP-C7M13F-30-E	JZSP-C7M14F-30-E	YAI-CSM31-30-P-E	
	40 m	JZSP-C7M13F-40-E	JZSP-C7M14F-40-E	YAI-CSM31-40-P-E	
	50 m	JZSP-C7M13F-50-E	JZSP-C7M14F-50-E	YAI-CSM31-50-P-E	

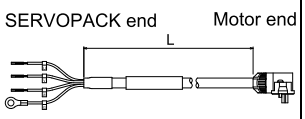
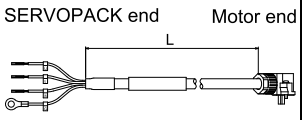
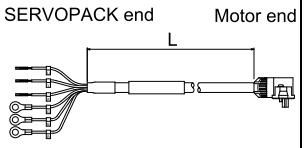
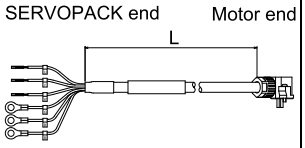
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Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
For servomotors with holding brakes Cable installed away from load	3 m	JZSP-C7M13G-03-E	JZSP-C7M14G-03-E	N/A	
	5 m	JZSP-C7M13G-05-E	JZSP-C7M14G-05-E		
	10 m	JZSP-C7M13G-10-E	JZSP-C7M14G-10-E		
	15 m	JZSP-C7M13G-15-E	JZSP-C7M14G-15-E		
	20 m	JZSP-C7M13G-20-E	JZSP-C7M14G-20-E		
	30 m	JZSP-C7M13G-30-E	JZSP-C7M14G-30-E		
	40 m	JZSP-C7M13G-40-E	JZSP-C7M14G-40-E		
	50 m	JZSP-C7M13G-50-E	JZSP-C7M14G-50-E		

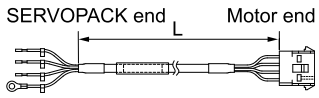
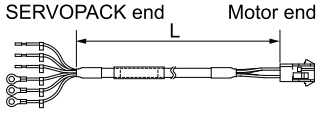
*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

◆ SGMXP-02 to -04 (200 to 400 W)

Name	Length (L)	Order Number			Appearance
		Standard Cable	Flexible Cable *1 *2	Shielded/Flexible	
For servomotors without holding brakes Cable installed toward load	3 m	JZSP-C7M20F-03-E	JZSP-C7M22F-03-E	YAI-CSM22-03-P-E	
	5 m	JZSP-C7M20F-05-E	JZSP-C7M22F-05-E	YAI-CSM22-05-P-E	
	10 m	JZSP-C7M20F-10-E	JZSP-C7M22F-10-E	YAI-CSM22-10-P-E	
	15 m	JZSP-C7M20F-15-E	JZSP-C7M22F-15-E	YAI-CSM22-15-P-E	
	20 m	JZSP-C7M20F-20-E	JZSP-C7M22F-20-E	YAI-CSM22-20-P-E	
	30 m	JZSP-C7M20F-30-E	JZSP-C7M22F-30-E	YAI-CSM22-30-P-E	
	40 m	JZSP-C7M20F-40-E	JZSP-C7M22F-40-E	YAI-CSM22-40-P-E	
	50 m	JZSP-C7M20F-50-E	JZSP-C7M22F-50-E	YAI-CSM22-50-P-E	
For servomotors without holding brakes Cable installed away from load	3 m	JZSP-C7M20G-03-E	JZSP-C7M22G-03-E	N/A	
	5 m	JZSP-C7M20G-05-E	JZSP-C7M22G-05-E		
	10 m	JZSP-C7M20G-10-E	JZSP-C7M22G-10-E		
	15 m	JZSP-C7M20G-15-E	JZSP-C7M22G-15-E		
	20 m	JZSP-C7M20G-20-E	JZSP-C7M22G-20-E		
	30 m	JZSP-C7M20G-30-E	JZSP-C7M22G-30-E		
	40 m	JZSP-C7M20G-40-E	JZSP-C7M22G-40-E		
	50 m	JZSP-C7M20G-50-E	JZSP-C7M22G-50-E		
For servomotors with holding brakes Cable installed toward load	3 m	JZSP-C7M23F-03-E	JZSP-C7M24F-03-E	YAI-CSM32-03-P-E	
	5 m	JZSP-C7M23F-05-E	JZSP-C7M24F-05-E	YAI-CSM32-05-P-E	
	10 m	JZSP-C7M23F-10-E	JZSP-C7M24F-10-E	YAI-CSM32-10-P-E	
	15 m	JZSP-C7M23F-15-E	JZSP-C7M24F-15-E	YAI-CSM32-15-P-E	
	20 m	JZSP-C7M23F-20-E	JZSP-C7M24F-20-E	YAI-CSM32-20-P-E	
	30 m	JZSP-C7M23F-30-E	JZSP-C7M24F-30-E	YAI-CSM32-30-P-E	
	40 m	JZSP-C7M23F-40-E	JZSP-C7M24F-40-E	YAI-CSM32-40-P-E	
	50 m	JZSP-C7M23F-50-E	JZSP-C7M24F-50-E	YAI-CSM32-50-P-E	
For servomotors with holding brakes Cable installed away from load	3 m	JZSP-C7M23G-03-E	JZSP-C7M24G-03-E	N/A	
	5 m	JZSP-C7M23G-05-E	JZSP-C7M24G-05-E		
	10 m	JZSP-C7M23G-10-E	JZSP-C7M24G-10-E		
	15 m	JZSP-C7M23G-15-E	JZSP-C7M24G-15-E		
	20 m	JZSP-C7M23G-20-E	JZSP-C7M24G-20-E		
	30 m	JZSP-C7M23G-30-E	JZSP-C7M24G-30-E		
	40 m	JZSP-C7M23G-40-E	JZSP-C7M24G-40-E		
	50 m	JZSP-C7M23G-50-E	JZSP-C7M24G-50-E		

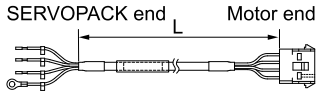
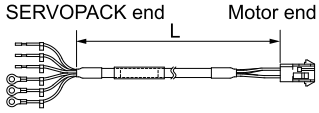
*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

◆ SGMXP-08 (750 W)

Name	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1 *2	
For servomotors without holding brakes	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	
	30 m	JZSP-CMM00-30-E	JZSP-CMM01-30-E	
	40 m	JZSP-CMM00-40-E	JZSP-CMM01-40-E	
	50 m	JZSP-CMM00-50-E	JZSP-CMM01-50-E	
For servomotors with holding brakes	3 m	JZSP-CMM10-03-E	JZSP-CMM11-03-E	
	5 m	JZSP-CMM10-05-E	JZSP-CMM11-05-E	
	10 m	JZSP-CMM10-10-E	JZSP-CMM11-10-E	
	15 m	JZSP-CMM10-15-E	JZSP-CMM11-15-E	
	20 m	JZSP-CMM10-20-E	JZSP-CMM11-20-E	
	30 m	JZSP-CMM10-30-E	JZSP-CMM11-30-E	
	40 m	JZSP-CMM10-40-E	JZSP-CMM11-40-E	
	50 m	JZSP-CMM10-50-E	JZSP-CMM11-50-E	

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

◆ SGMXP-15 (1.5 kW)

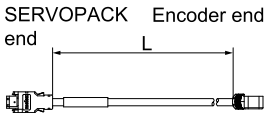
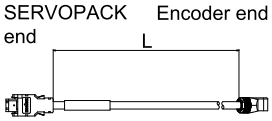
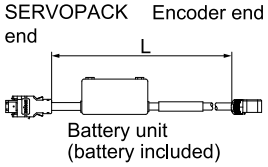
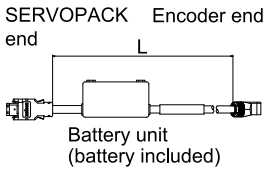
Name	Length (L)	Order Number	Appearance
For servomotors without holding brakes	3 m	JZSP-CMM20-03-E	
	5 m	JZSP-CMM20-05-E	
	10 m	JZSP-CMM20-10-E	
	15 m	JZSP-CMM20-15-E	
	20 m	JZSP-CMM20-20-E	
For servomotors with holding brakes	3 m	JZSP-CMM30-03-E	
	5 m	JZSP-CMM30-05-E	
	10 m	JZSP-CMM30-10-E	
	15 m	JZSP-CMM30-15-E	
	20 m	JZSP-CMM30-20-E	

Note:
Flexible cables are not available.

Encoder Cables (When Not Relaying the Encoder Cable)

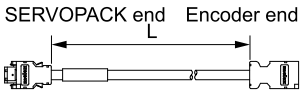
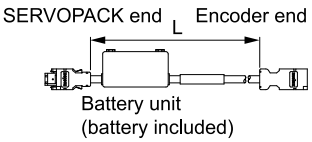
■ Servomotors with Σ-7 Compatible Specifications (20 m or Less)

◆ SGMXP-01 to -04 (100 to 400 W)

Name	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1 *2	
For batteryless absolute encoder Cable installed toward load	3 m	JZSP-C7PI0D-03-E	JZSP-C7PI2D-03-E	
	5 m	JZSP-C7PI0D-05-E	JZSP-C7PI2D-05-E	
	10 m	JZSP-C7PI0D-10-E	JZSP-C7PI2D-10-E	
	15 m	JZSP-C7PI0D-15-E	JZSP-C7PI2D-15-E	
	20 m	JZSP-C7PI0D-20-E	JZSP-C7PI2D-20-E	
For batteryless absolute encoder Cable installed away from load	3 m	JZSP-C7PI0E-03-E	JZSP-C7PI2E-03-E	
	5 m	JZSP-C7PI0E-05-E	JZSP-C7PI2E-05-E	
	10 m	JZSP-C7PI0E-10-E	JZSP-C7PI2E-10-E	
	15 m	JZSP-C7PI0E-15-E	JZSP-C7PI2E-15-E	
	20 m	JZSP-C7PI0E-20-E	JZSP-C7PI2E-20-E	
For absolute encoder: With battery unit *3 Cable installed toward load	3 m	JZSP-C7PA0D-03-E	JZSP-C7PA2D-03-E	
	5 m	JZSP-C7PA0D-05-E	JZSP-C7PA2D-05-E	
	10 m	JZSP-C7PA0D-10-E	JZSP-C7PA2D-10-E	
	15 m	JZSP-C7PA0D-15-E	JZSP-C7PA2D-15-E	
	20 m	JZSP-C7PA0D-20-E	JZSP-C7PA2D-20-E	
For absolute encoder: With battery unit *3 Cable installed away from load	3 m	JZSP-C7PA0E-03-E	JZSP-C7PA2E-03-E	
	5 m	JZSP-C7PA0E-05-E	JZSP-C7PA2E-05-E	
	10 m	JZSP-C7PA0E-10-E	JZSP-C7PA2E-10-E	
	15 m	JZSP-C7PA0E-15-E	JZSP-C7PA2E-15-E	
	20 m	JZSP-C7PA0E-20-E	JZSP-C7PA2E-20-E	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 46 mm or larger.
*3 If a battery is connected to the host controller, the battery unit is not required.

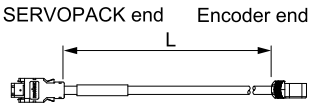
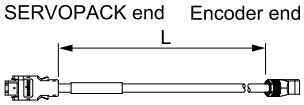
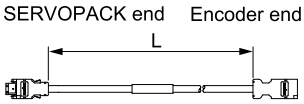
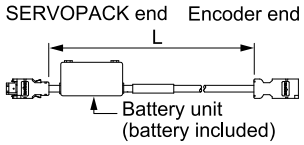
◆ SGMXP-08, -15 (750 W, 1.5 kW)

Name	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1 *2	
For batteryless absolute encoder Cable installed toward load	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 absolute encoder: With battery unit *3 Cable installed toward load	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.
*2 The recommended bending radius (R) is 46 mm or larger.
*3 If a battery is connected to the host controller, the battery unit is not required.

Encoder Cables (When Relaying the Encoder Cable)

■ Servomotors with Σ-7 Compatible Specifications (When Exceeding 20 m)

Name	Length (L)	Order Number	Appearance
Relay encoder cable (for all types of encoders) Cable installed toward load	0.3 m	JZSP-C7PRCD-E	
Relay encoder cable (for all types of encoders) Cable installed away from load	0.3 m	JZSP-C7PRCE-E	
Relay encoder cable with connectors on both ends (for all types of encoders)	30 m	JZSP-UCMP00-30-E	
	40 m	JZSP-UCMP00-40-E	
	50 m	JZSP-UCMP00-50-E	
Relay encoder cables with connectors on both ends and battery unit (Required only when an absolute encoder is used *1.)	0.3 m	JZSP-CSP12-E	

*1 This cable is not required if you use a servomotor with a batteryless absolute encoder, and you connect a battery to the host controller.

Cables for the 400 V SGMXP Servomotors

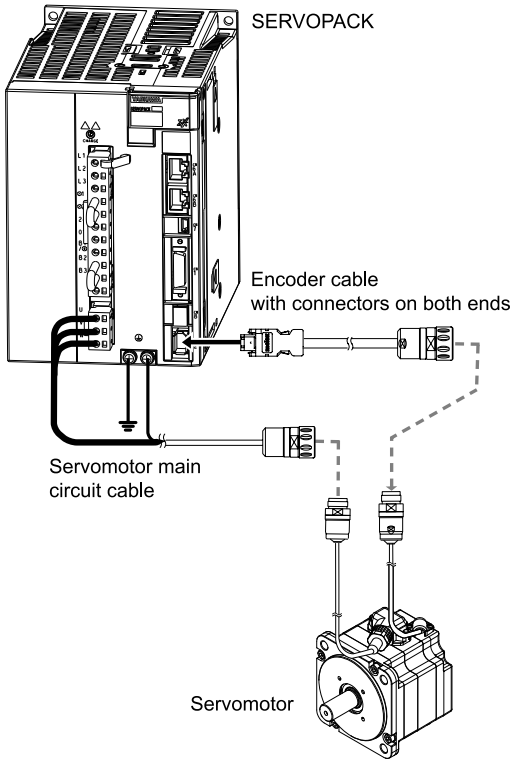
Information Refer to the following manual when making connections between multiple devices and the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

System Configurations

■ Servomotors with Σ-V Compatible Specifications

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



Note:

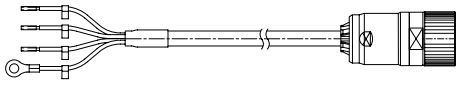
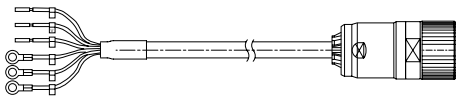
If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.

Refer to the following section for the intermittent duty zone.

☞ *Torque-Rotation Speed Characteristics on page 150*

Servomotor Main Circuit Cables

Main circuit cables for the Σ-V-series SGMEV (400 V) servomotors can be used.

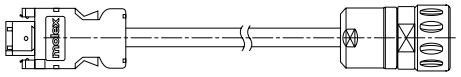
Name	Length (L)	Order Number	Appearance
		Flexible Cable *	
For servomotors without holding brakes	3 m	JZSP-CMM20D15-03G	
	5 m	JZSP-CMM20D15-05G	
	10 m	JZSP-CMM20D15-10G	
	15 m	JZSP-CMM20D15-15G	
	20 m	JZSP-CMM20D15-20G	
For servomotors with holding brakes	3 m	JZSP-CMM30D15-03G	
	5 m	JZSP-CMM30D15-05G	
	10 m	JZSP-CMM30D15-10G	
	15 m	JZSP-CMM30D15-15G	
	20 m	JZSP-CMM30D15-20G	

* These flexible cables are provided as standard equipment.

Encoder Cables

■ Servomotors with Σ-V Compatible Specifications (20 m or Less)

Cables for the Σ-V-series SGMEV (400 V) servomotors can be used.

Name	Length (L)	Order Number	Appearance
		Flexible Cable	
Cables with connectors on both sides	3 m	DP9325256-3G	
	5 m	DP9325256-5G	
	10 m	DP9325256-10G	
	15 m	DP9325256-15G	
	20 m	DP9325256-20G	

Cables for the SGMXG Servomotors

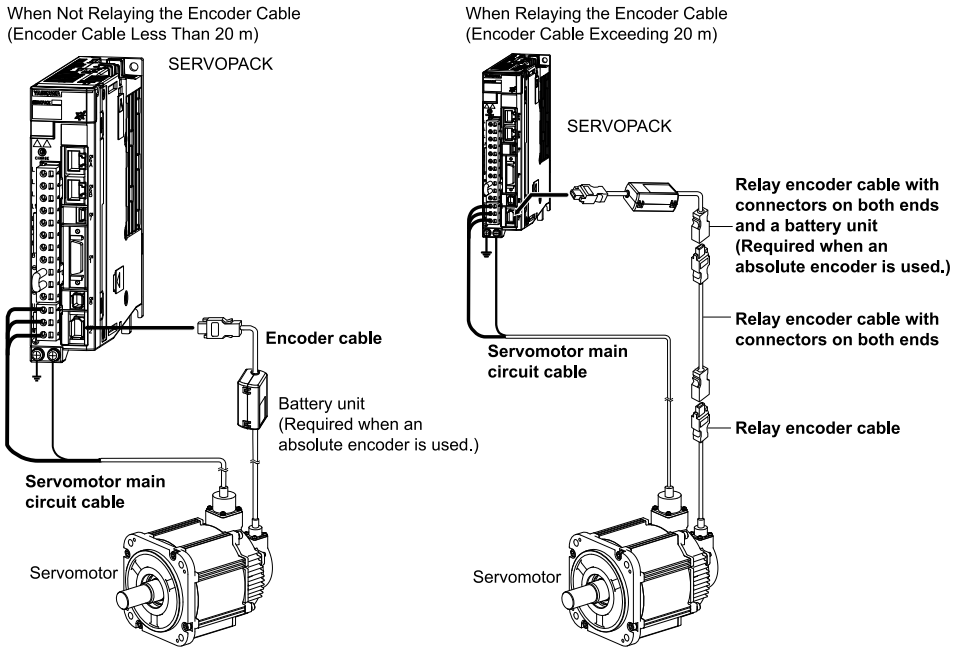
Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

System Configurations

■ Servomotors with Σ-V or Σ-7 Compatible Specifications

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



Note:

1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety Standards are not available from Yaskawa for the SGMXG servomotors. You must make such a cable yourself. Use the connectors specified by Yaskawa for these servomotors. (These connectors are compliant with the standards.) Yaskawa does not specify what wiring materials to use. Use appropriate wiring materials for the current specifications and connectors.
2. The encoder cable to use depends on whether the encoder cable will be relayed.
3. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
   Refer to the following section for the intermittent duty zone.
   ☞ *Torque-Rotation Speed Characteristics on page 176*
   ☞ *Torque-Rotation Speed Characteristics on page 187*
4. Refer to the following manual for the following information.
   • Cable dimensional drawings and wiring specifications
   • Order numbers and specifications of individual connectors for cables
   • Order numbers and specifications for wiring materials

   Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

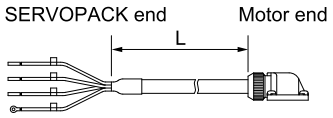
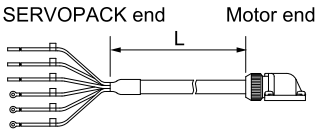
Servomotor Main Circuit Cables

The servomotor main circuit cable for the standard specification servomotor is same as that for the Σ-V or Σ-7 compatible specification servomotor.

This section provides information on selecting a servomotor main circuit cable. Refer to the following manual for detailed information on cables and for the wiring materials to make your own cables.

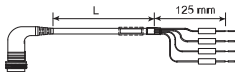
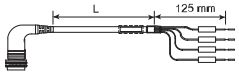
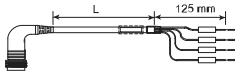
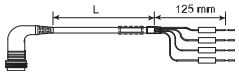
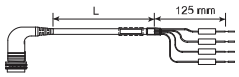
Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

■ SGMXG-03A□A, -05□□A (300 W, 450 W), -03A□B (300 W)

Name	Length (L)	Order Number *1	Appearance
For servomotors without holding brakes	3 m	JZSP-CVM21-03-E	
	5 m	JZSP-CVM21-05-E	
	10 m	JZSP-CVM21-10-E	
	15 m	JZSP-CVM21-15-E	
	20 m	JZSP-CVM21-20-E	
	30 m	JZSP-CVM21-30-E	
	40 m	JZSP-CVM21-40-E	
	50 m	JZSP-CVM21-50-E	
For servomotors with holding brakes	3 m	JZSP-CVM41-03-E	
	5 m	JZSP-CVM41-05-E	
	10 m	JZSP-CVM41-10-E	
	15 m	JZSP-CVM41-15-E	
	20 m	JZSP-CVM41-20-E	
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	40 m	JZSP-CVM41-40-E	
	50 m	JZSP-CVM41-50-E	

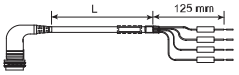
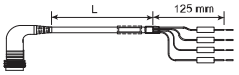
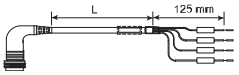
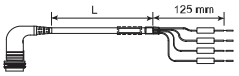
*1 These standard cables are flexible cables. The recommended bending radius (R) is 90 mm or larger.

■ SGMXG-09 to -1E (850 W to 15 kW)

Servo Motor Model	Name	Length (L)	Order Number			Appearance
			Standard Cable	Flexible Cable	Shielded/Flexible	
200 V SGMXG, 850 W, 1.3 kW	Power Cable *1	3 m	B1EV-03(A)-E	N/A	B1EP-03(A)-E	
		5 m	B1EV-05(A)-E		B1EP-05(A)-E	
		10 m	B1EV-10(A)-E		B1EP-10(A)-E	
		15 m	B1EV-15(A)-E		B1EP-15(A)-E	
		20 m	B1EV-20(A)-E		B1EP-20(A)-E	
200 V SGMXG, 2.0 kW	Power Cable *1	3 m	B2EV-03(A)-E	N/A	B2EP-03(A)-E	
		5 m	B2EV-05(A)-E		B2EP-05(A)-E	
		10 m	B2EV-10(A)-E		B2EP-10(A)-E	
		15 m	B2EV-15(A)-E		B2EP-15(A)-E	
		20 m	B2EV-20(A)-E		B2EP-20(A)-E	
200 V SGMXG, 3.0 kW to, 4.4 kW	Power Cable *1	3 m	B4EV-03(A)-E	N/A	B4EP-03(B)-E	
		5 m	B4EV-05(A)-E		B4EP-05(B)-E	
		10 m	B4EV-10(A)-E		B4EP-10(B)-E	
		15 m	B4EV-15(A)-E		B4EP-15(B)-E	
		20 m	B4EV-20(A)-E		B4EP-20(B)-E	
200 V SGMXG, 5.5 kW to, 7.5 kW	Power Cable *1	3 m	B6EV-03(A)-E	N/A	B6EP-03(A)-E	
		5 m	B6EV-05(A)-E		B6EP-05(A)-E	
		10 m	B6EV-10(A)-E		B6EP-10(A)-E	
		15 m	B6EV-15(A)-E		B6EP-15(A)-E	
		20 m	B6EV-20(A)-E		B6EP-20(A)-E	
200 V SGMXG, 11 kW to, 15 kW	Power Cable *1	3 m	B7EV-03(A)-E	N/A	B7EP-03(A)-E	
		5 m	B7EV-05(A)-E		B7EP-05(A)-E	
		10 m	B7EV-10(A)-E		B7EP-10(A)-E	
		15 m	B7EV-15(A)-E		B7EP-15(A)-E	
		20 m	B7EV-20(A)-E		B7EP-20(A)-E	

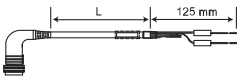
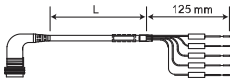
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Servo Motor Model	Name	Length (L)	Order Number			Appearance
			Standard Cable	Flexible Cable	Shielded/Flexible	
400 V 850 W to 2.0 kW	Power Cable *1	3 m	B1EV-03(A)-E	N/A	B1EP-03(A)-E	
		5 m	B1EV-05(A)-E		B1EP-05(A)-E	
		10 m	B1EV-10(A)-E		B1EP-10(A)-E	
		15 m	B1EV-15(A)-E		B1EP-15(A)-E	
		20 m	B1EV-20(A)-E		B1EP-20(A)-E	
400 V 3.0 kW to 4.4 kW	Power Cable *1	3 m	B3EV-03(A)-E	N/A	B3EP-03(A)-E	
		5 m	B3EV-05(A)-E		B3EP-05(A)-E	
		10 m	B3EV-10(A)-E		B3EP-10(A)-E	
		15 m	B3EV-15(A)-E		B3EP-15(A)-E	
		20 m	B3EV-20(A)-E		B3EP-20(A)-E	
400 V 5.5 kW to 7.5 kW	Power Cable *1	3 m	B5EV-03(A)-E	N/A	B5EP-03(A)-E	
		5 m	B5EV-05(A)-E		B5EP-05(A)-E	
		10 m	B5EV-10(A)-E		B5EP-10(A)-E	
		15 m	B5EV-15(A)-E		B5EP-15(A)-E	
		20 m	B5EV-20(A)-E		B5EP-20(A)-E	
400 V 11 kW to 15 kW	Power Cable *1	3 m	B6EV-03(A)-E	N/A	B6EP-03(A)-E	
		5 m	B6EV-05(A)-E		B6EP-05(A)-E	
		10 m	B6EV-10(A)-E		B6EP-10(A)-E	
		15 m	B6EV-15(A)-E		B6EP-15(A)-E	
		20 m	B6EV-20(A)-E		B6EP-20(A)-E	

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Servo Motor Model	Name	Length (L)	Order Number			Appearance
			Standard Cable	Flexible Cable	Shielded/Flexible	
200 V and 400 V SGMXG, 850 W to, 15 kW	Holding Brake Cable	3 m	BBEV-03(A)-E	N/A	N/A	
		5 m	BBEV-05(A)-E			
		10 m	BBEV-10(A)-E			
		15 m	BBEV-15(A)-E			
		20 m	BBEV-20(A)-E			
	Holding Brake Cable	3 m	N/A	N/A	BBEP-03(A)-E	
		5 m			BBEP-05(A)-E	
		10 m			BBEP-10(A)-E	
		15 m			BBEP-15(A)-E	
		20 m			BBEP-20(A)-E	

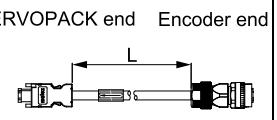
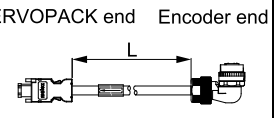
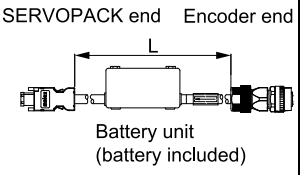
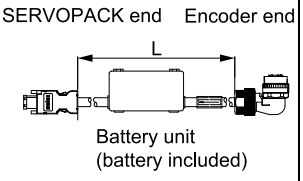
*1 Servo motors with holding brakes require a holding brake cable in addition to a power cable.

Encoder Cables

■ Servomotors with Σ-7 Compatible Specifications (20 m or Less)

Information Σ-V or Σ-7 compatible specification servomotors can also use the same cables as Σ-7 series rotary servomotors. Refer to the following manual for information on the Σ-7-series for rotary servomotor cables.

Σ-7-Series Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

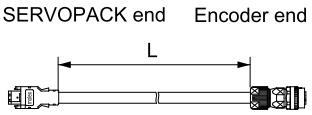
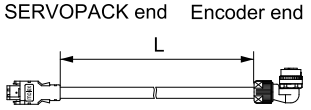
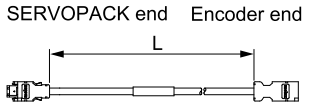
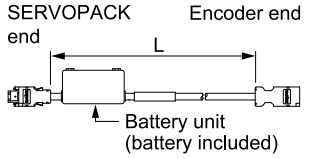
Servo Motor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable *1	
All 200 V and 400 V SGM7G Models	Cables with Connectors on Both Ends (for incremental or batteryless absolute encoder)	3 m	JZSP-CVP01-03-E	JZSP-CVP11-03-E	
		5 m	JZSP-CVP01-05-E	JZSP-CVP11-05-E	
		10 m	JZSP-CVP01-10-E	JZSP-CVP11-10-E	
		15 m	JZSP-CVP01-15-E	JZSP-CVP11-15-E	
		20 m	JZSP-CVP01-20-E	JZSP-CVP11-20-E	
		3 m	JZSP-CVP02-03-E	JZSP-CVP12-03-E	
		5 m	JZSP-CVP02-05-E	JZSP-CVP12-05-E	
		10 m	JZSP-CVP02-10-E	JZSP-CVP12-10-E	
		15 m	JZSP-CVP02-15-E	JZSP-CVP12-15-E	
		20 m	JZSP-CVP02-20-E	JZSP-CVP12-20-E	
	Cables with Connectorson Both Ends (for absolute encoder with battery case)	3 m	JZSP-CVP06-03-E	JZSP-CVP26-03-E	
		5 m	JZSP-CVP06-05-E	JZSP-CVP26-05-E	
		10 m	JZSP-CVP06-10-E	JZSP-CVP26-10-E	
		15 m	JZSP-CVP06-15-E	JZSP-CVP26-15-E	
		20 m	JZSP-CVP06-20-E	JZSP-CVP27-20-E	
		3 m	JZSP-CVP07-03-E	JZSP-CVP27-03-E	
		5 m	JZSP-CVP07-05-E	JZSP-CVP27-05-E	
		10 m	JZSP-CVP07-10-E	JZSP-CVP27-10-E	
		15 m	JZSP-CVP07-15-E	JZSP-CVP27-15-E	
		20 m	JZSP-CVP07-20-E	JZSP-CVP27-20-E	

*1 Use flexible cables for moving parts of machines, such as robots.

Note: Shaded items are non-stock.

Encoder Cables

■ Servomotors with Σ-V or Σ-7 Compatible Specifications (When Exceeding 20 m)

Name	Length (L)	Order Number	Appearance
Relay encoder cable (for all types of encoders) *1	0.3 m	JZSP-CVP01-E	
		JZSP-CVP02-E	
Relay encoder cable with connectors on both ends (for all types of encoders)	30 m	JZSP-UCMP00-30-E	
	40 m	JZSP-UCMP00-40-E	
	50 m	JZSP-UCMP00-50-E	
Relay encoder cable with connectors on both ends and battery unit (Required only when an absolute encoder is used. *2)	0.3 m	JZSP-CSP12-E	

*1 The lead installation direction of the right-angle plug connector is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.

*2 This cable is not required if you use a servomotor with a batteryless absolute encoder, and you connect a battery to the host controller.

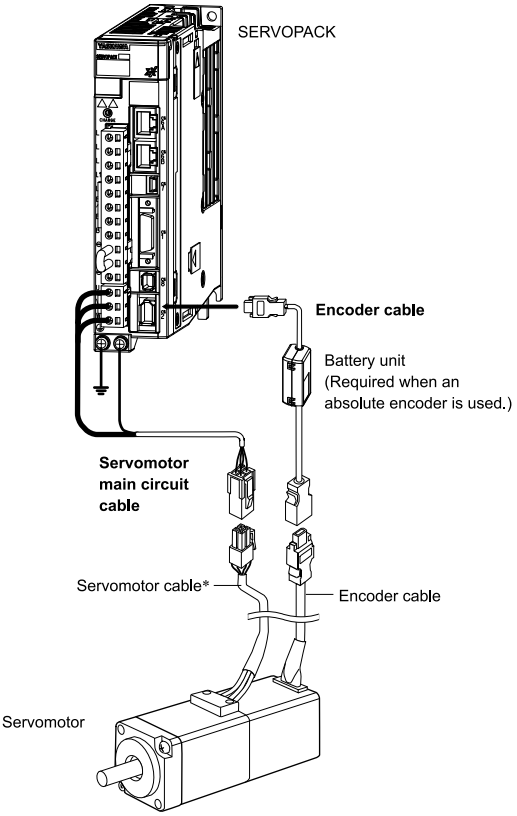
Cables for the SGM7M Servomotors

Information Refer to the following manual when making connections between multiple devices and the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Device Configuration Diagrams

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



- When using a cable tie for servomotor-end cables, make sure that there is enough space between the cable tie and the connector. If the distance between the cable tie and the connector is too close, a connection failure of the connector pins may occur.

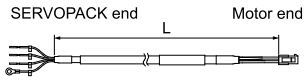
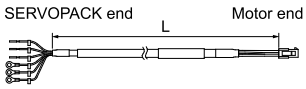
Note:

Refer to the following manual for the following information.

- Cable dimensional drawings and wiring specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

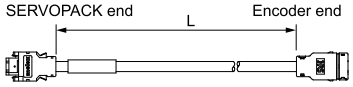
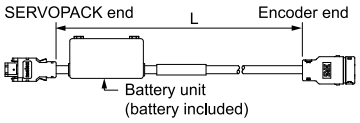
Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Servomotor Main Circuit Cables

Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable *1	
SGM7M-A1A to -A3A 11 W to 33 W	For servomotors without holding brakes	3 m	JZSP-CF2M00-03-E	JZSP-CF2M20-03-E	
		5 m	JZSP-CF2M00-05-E	JZSP-CF2M20-05-E	
		10 m	JZSP-CF2M00-10-E	JZSP-CF2M20-10-E	
		15 m	JZSP-CF2M00-15-E	JZSP-CF2M20-15-E	
		20 m	JZSP-CF2M00-20-E	JZSP-CF2M20-20-E	
	For servomotors with holding brakes	3 m	JZSP-CF2M03-03-E	JZSP-CF2M23-03-E	
		5 m	JZSP-CF2M03-05-E	JZSP-CF2M23-05-E	
		10 m	JZSP-CF2M03-10-E	JZSP-CF2M23-10-E	
		15 m	JZSP-CF2M03-15-E	JZSP-CF2M23-15-E	
		20 m	JZSP-CF2M03-20-E	JZSP-CF2M23-20-E	

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

Encoder Cables

Name	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1	
Cables with connectors on both ends (for incremental encoder)	3 m	JZSP-C7MP01-03-E	JZSP-C7MP21-03-E	
	5 m	JZSP-C7MP01-05-E	JZSP-C7MP21-05-E	
	10 m	JZSP-C7MP01-10-E	JZSP-C7MP21-10-E	
	15 m	JZSP-C7MP01-15-E	JZSP-C7MP21-15-E	
	20 m	JZSP-C7MP01-20-E	JZSP-C7MP21-20-E	
Cables with connectors on both ends (for absolute encoder, with battery unit)	3 m	JZSP-C7MP19-03-E	JZSP-C7MP29-03-E	
	5 m	JZSP-C7MP19-05-E	JZSP-C7MP29-05-E	
	10 m	JZSP-C7MP19-10-E	JZSP-C7MP29-10-E	
	15 m	JZSP-C7MP19-15-E	JZSP-C7MP29-15-E	
	20 m	JZSP-C7MP19-20-E	JZSP-C7MP29-20-E	

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

Direct Drive Servomotors

SGM7D 306
SGM7E 344
SGM7F 364

SGM7D

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*1
F	24-bit incremental encoder*1

*1 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	✓	✓*2	-	✓	✓	✓	-

✓: Applicable models.
*2 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*3

*3 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)
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.

Specifications and Ratings

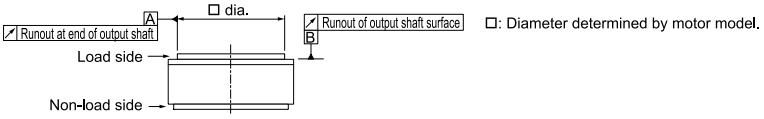
Specifications

■ SGM7D-□□F, -□□G, -□□H

Voltage				200 V									
Model: 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				1500 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				±15 s											
Repeatability				±1.3 s											
Protective Structure *1				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 1000 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 *2	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		
Applicable SERVOPACKs	SGDXS-			120A				2R8A		120A					2R8A
	SGDXW-			-											

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

*2 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.

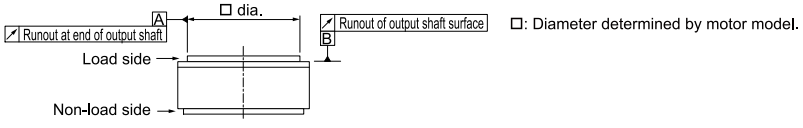


■ SGM7D-□□I, -□□J

Voltage				200 V								
Model: 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				1500 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				±15 s										
Repeatability				±1.3 s										
Protective Structure *1*				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 1000 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 *2*	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
Applicable SERVOPACKs		SGDXS-		120A										
		SGDXW-		-										

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

*2 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.

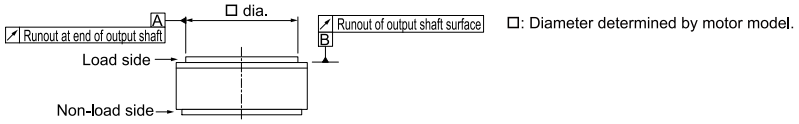


■ SGM7D-□□K, -□□L

Voltage					200 V					
Model: SGM7D-					02K	06K	08K	06L	12L	30L
Time Rating					Continuous					
Thermal Class					F					
Insulation Resistance					500 VDC, 10 MΩ min.					
Withstand Voltage					1500 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					±15 s					
Repeatability					±1.3 s					
Protective Structure *1*					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 1000 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 *2*	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		
Applicable SERVOPACKs		SGDXS-			2R8A					120A
		SGDXW-			-					

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

*2 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.



Ratings

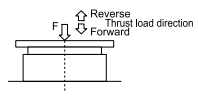
■ SGM7D-□□F, -□□G, -□□H

Voltage				200 V											
Model: 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 Rotation Speed			min^{-1}	60				120					90	120	120
Maximum Rotation 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
Rotor Moment of Inertia			$\times 10^{-4}$ kg·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			rad/s^2	313	487	634	659	236	667	667	1200	1260	1480	1670	1200
Heat Sink Size			mm	550 × 550 × 30 (aluminum)											350 × 350 × 20 (steel)
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)			times	200	150	150	130	130	300	400	350	300	250	200	600
	With external regenerative resistor		times	2500	3500	4000	5000	130	300	2000	3000	4000	4000	4000	600
Allowable Load *3	Thrust Load	Forward	N	4×10^4				50	200	3×10^4					50
		Reverse	N	2×10^4				50	200	1×10^4					50
	Moment Load		N·m	400				-	50	200					-
Rigidity	Thrust Displacement	Forward	mm/N	2×10^{-6}				-		2.5×10^{-6}					-
		Reverse	mm/N	3×10^{-6}				-		3×10^{-6}					-
	Moment Displacement		rad/N·m	4×10^{-7}				-		1×10^{-6}					-

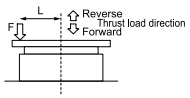
*1 The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a heat sink of the dimensions given in the table.
*2 The repetitive rated torque is the value for 60% ED.

*3 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.

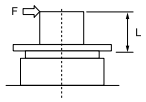
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



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, -□□J

Voltage				200 V									
Model: 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 Rotation Speed			min^{-1}	90	60			30		120				90
Maximum Rotation 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
Rotor Moment of Inertia			$\times 10^{-4}$ kg·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			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 (Rotor Moment of Inertia Ratio)			times	50	100	90	80	100	150	350	250	240	220	180
	With external regenerative resistor and dynamic brake resistor		times	800	2000	2500	3000	100	150	700	900	2500	2000	2000
Allowable Load *2	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				

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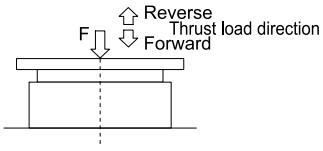
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Voltage				200 V									
Model: SGM7D-				28I	70I	1ZI	1CI	2BI	2DI	06J	09J	18J	20J	38J
Rigidity	Thrust Displacement Rigidity	Forward	mm/N	2×10^{-6}						3×10^{-6}				
		Reverse	mm/N	3×10^{-6}						4×10^{-6}				
	Moment Displacement Rigidity		rad/N·m	4×10^{-7}						2×10^{-6}				

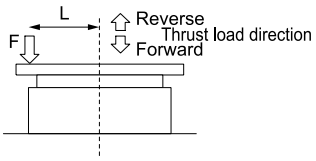
*1 The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

*2 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.

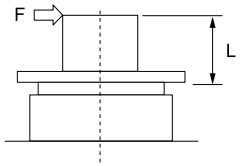
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



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-□□K, -□□L

Voltage		200 V					
Model: 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 Rotation Speed	min^{-1}	240			180		
Maximum Rotation Speed	min^{-1}	360			216		
Torque Constant	N·m/Arms	1.83	3.67	5.50	4.13	6.59	3.95
Rotor 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	rad/s^2	343	857	1000	273	545	811

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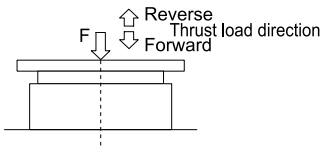
Voltage				200 V					
Model: SGM7D-				02K	06K	08K	06L	12L	30L
Heat Sink Size			mm	550 × 550 × 30			650 × 650 × 30		
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)			times	200	350	25	450	20	60
	With external regenerative resistor		times	200	350	25	450	20	3500
Allowable Load *3	Allowable Thrust Load	Forward	N	5×10^3			2000		
		Reverse	N	3×10^3			1000		
	Allowable Moment Load		N·m	20			100		
Rigidity	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.

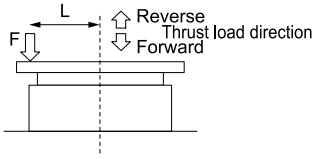
*2 The repetitive rated torque is the value for 60% ED.

*3 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.

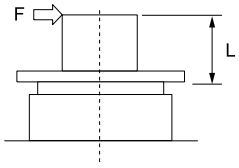
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



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:

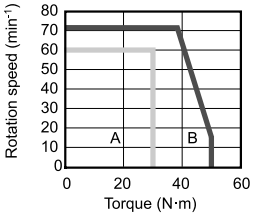
1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. For the bearings used in these servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

Torque-Motor Speed Characteristics

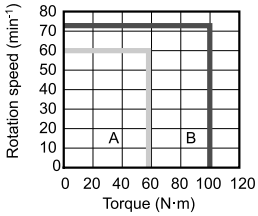
A : Continuous duty zone -------- (dotted lines): With duty factor of 60% ED and 10-min rating

B : Intermittent duty zone*1 ——— (solid lines): With three-phase 200-V input or single-phase 200-V input

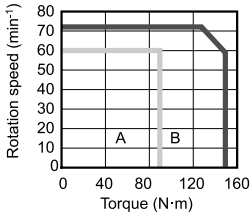
SGM7D-30F



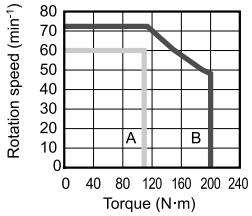
SGM7D-58F



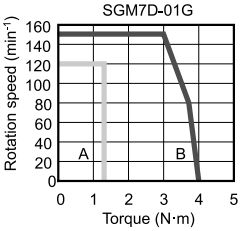
SGM7D-90F



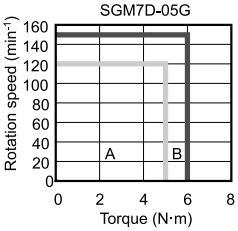
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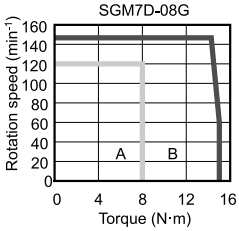
SGM7D-01G



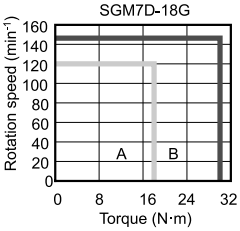
SGM7D-05G



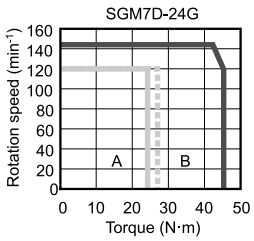
SGM7D-08G



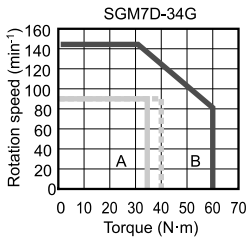
SGM7D-18G



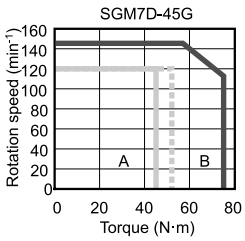
SGM7D-24G



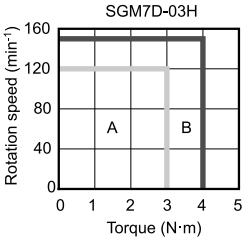
SGM7D-34G



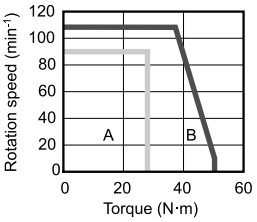
SGM7D-45G



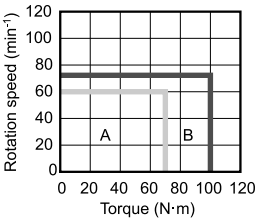
SGM7D-03H



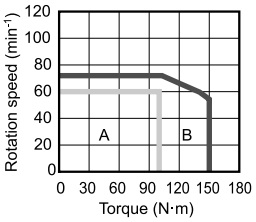
SGM7D-28I



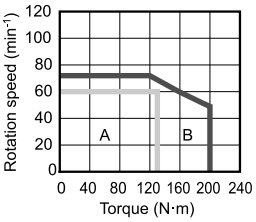
SGM7D-70I



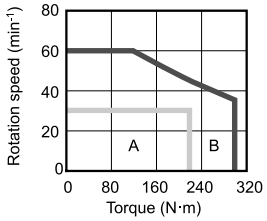
SGM7D-1ZI



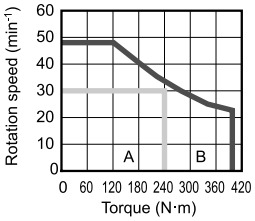
SGM7D-1CI



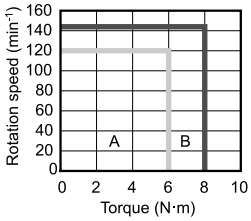
SGM7D-2BI



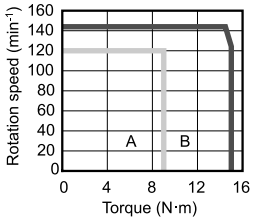
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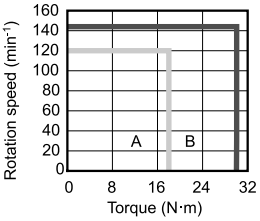
SGM7D-06J



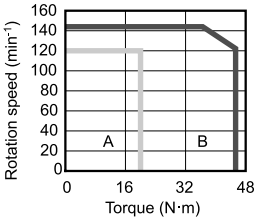
SGM7D-09J



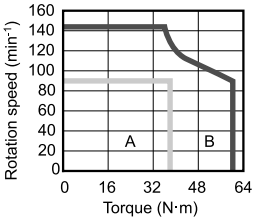
SGM7D-18J



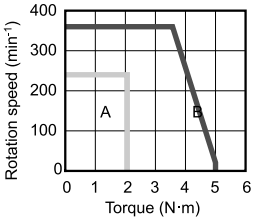
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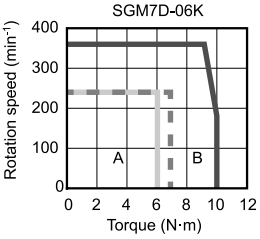
SGM7D-38J



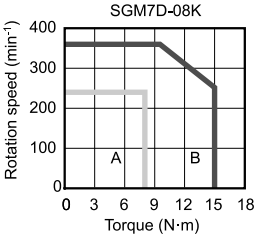
SGM7D-02K



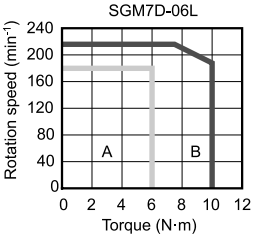
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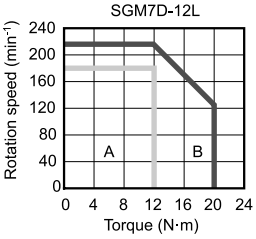
SGM7D-08K



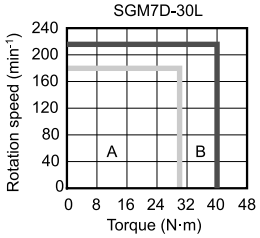
SGM7D-06L



SGM7D-12L



SGM7D-30L



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

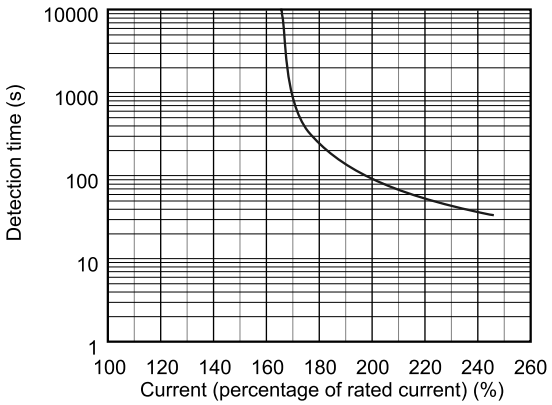
Note:

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.

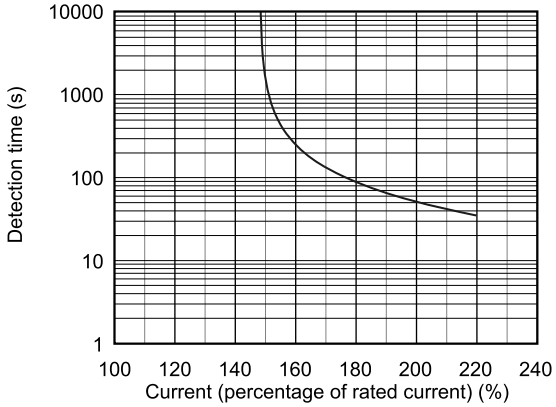
Servomotor Overload Protection Characteristics

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

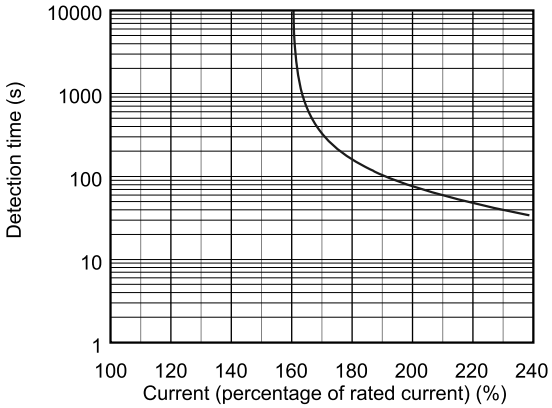
SGM7D-30F



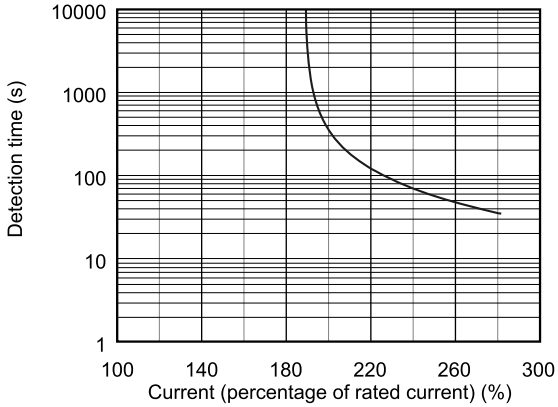
SGM7D-58F



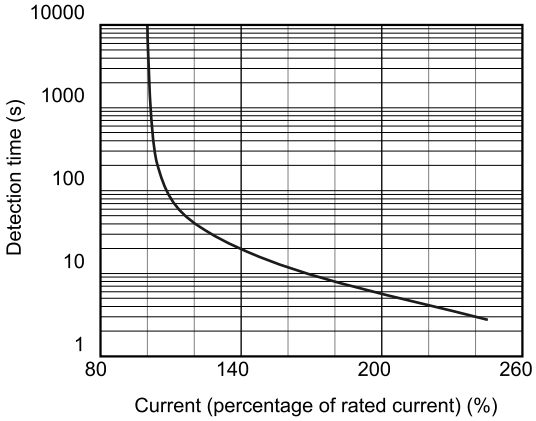
SGM7D-90F



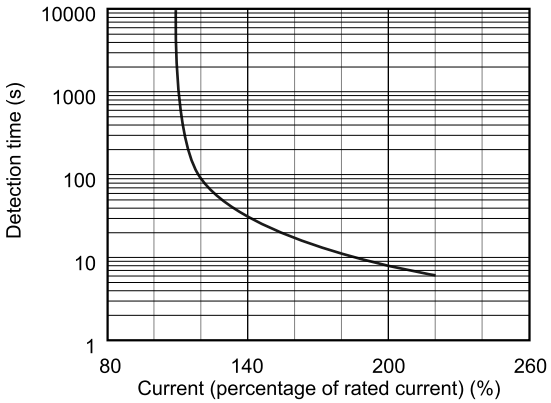
SGM7D-1AF



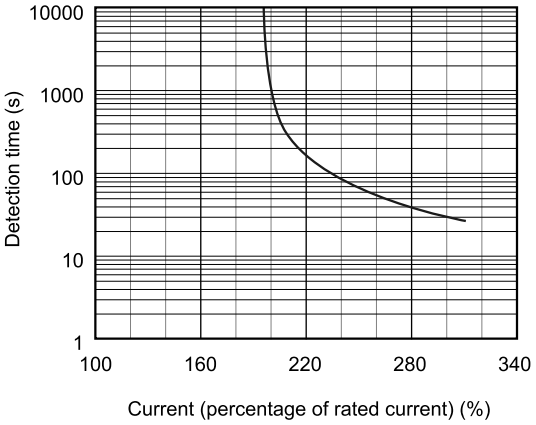
SGM7D-01G



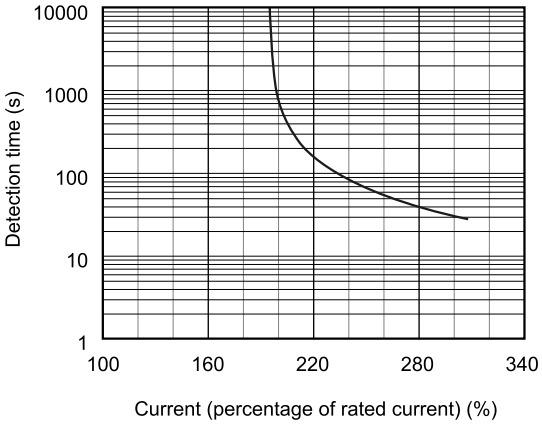
SGM7D-05G



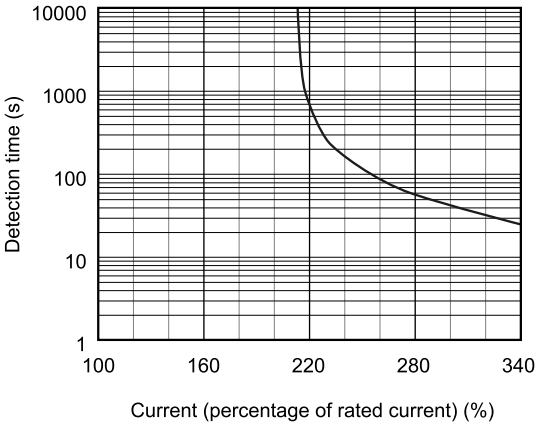
SGM7D-08G



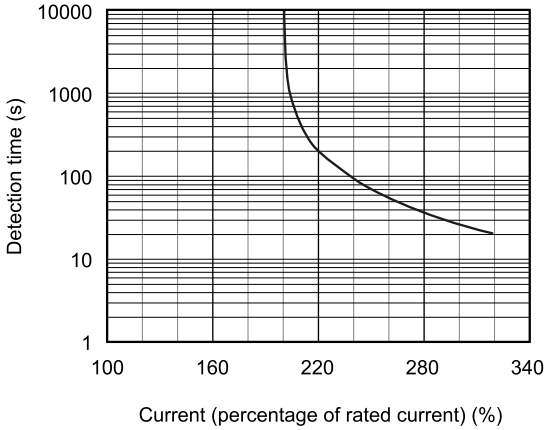
SGM7D-18G



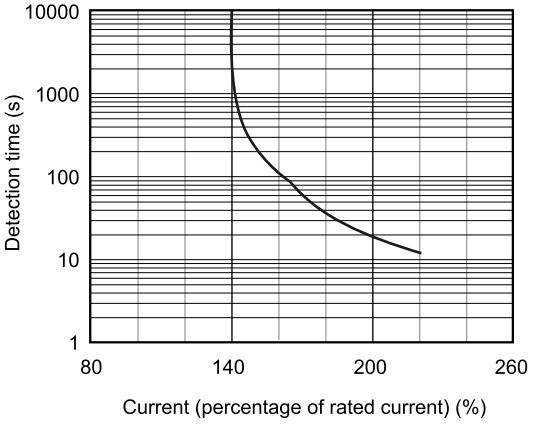
SGM7D-24G



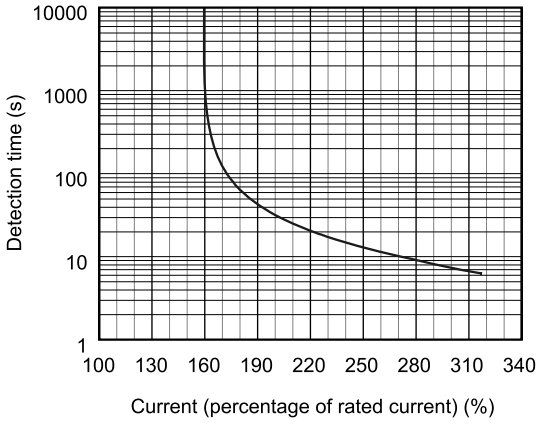
SGM7D-34G



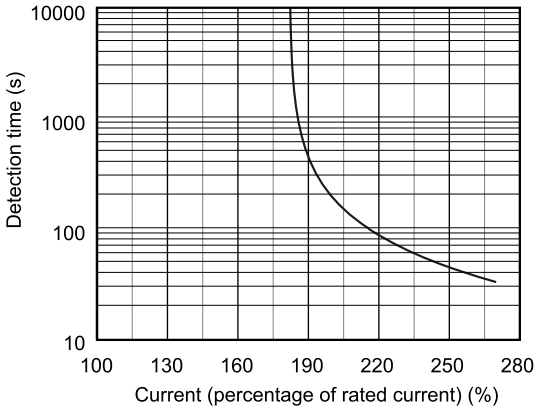
SGM7D-45G



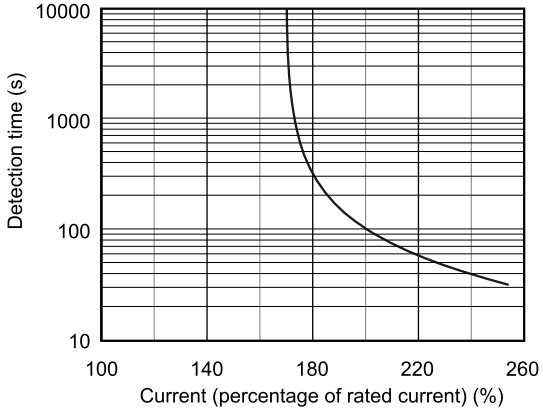
SGM7D-03H



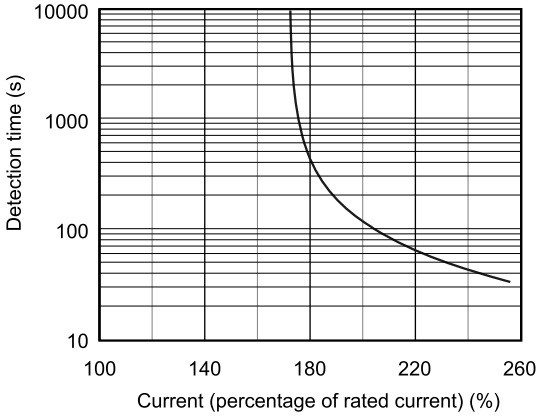
SGM7D-28I



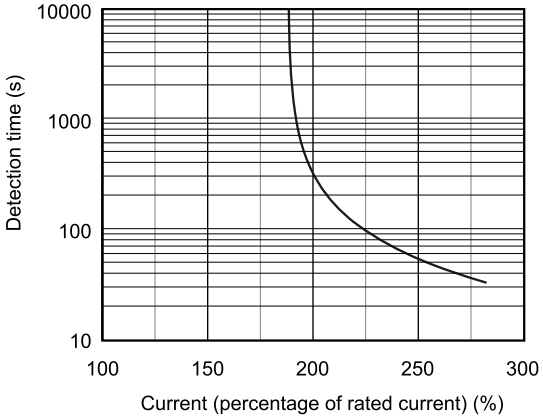
SGM7D-70I



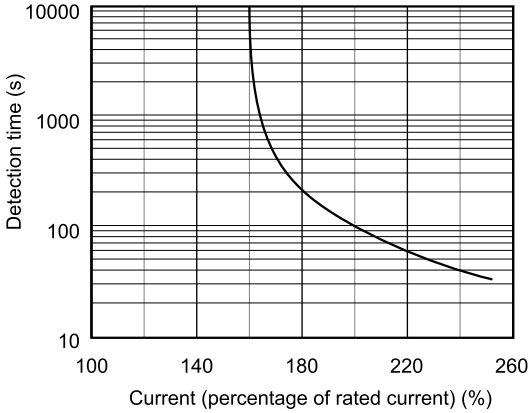
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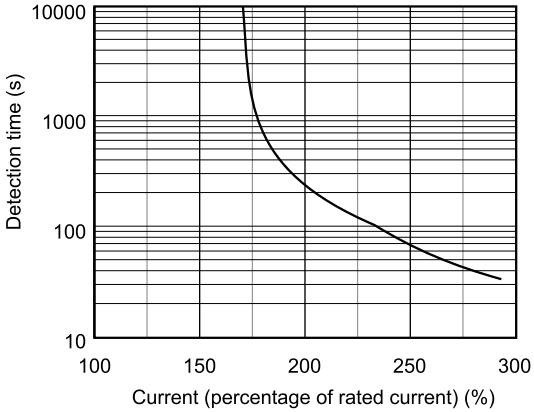
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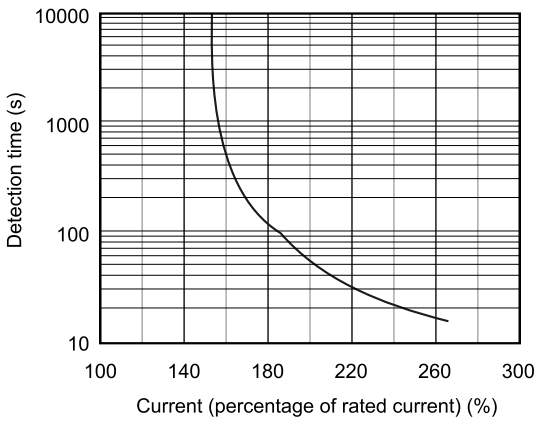
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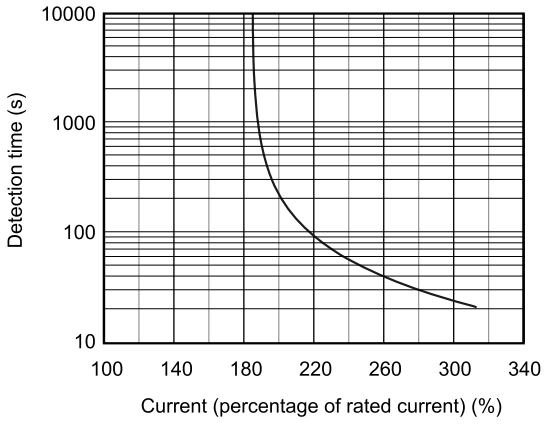
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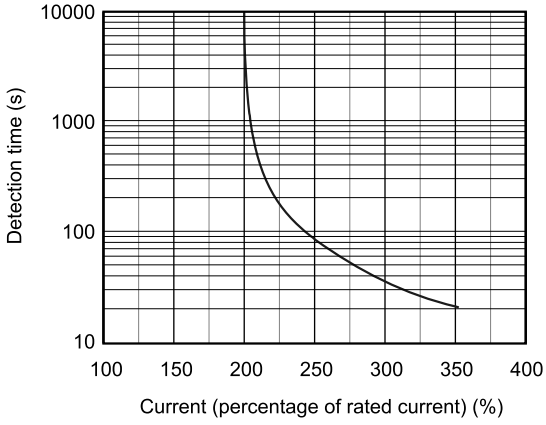
SGM7D-06J



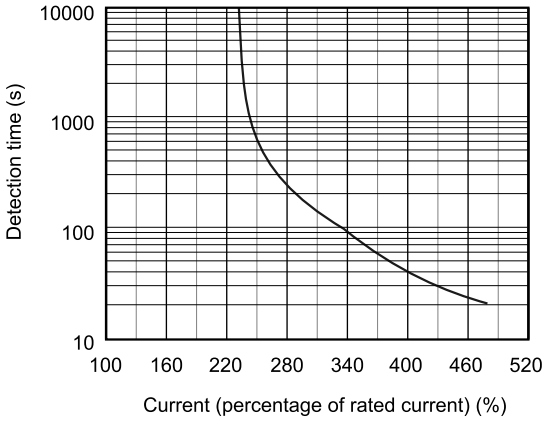
SGM7D-09J



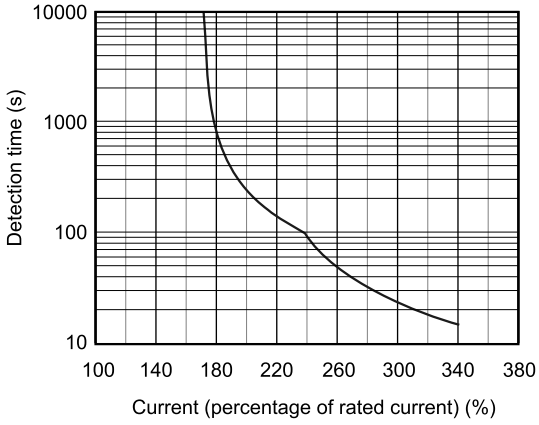
SGM7D-18J



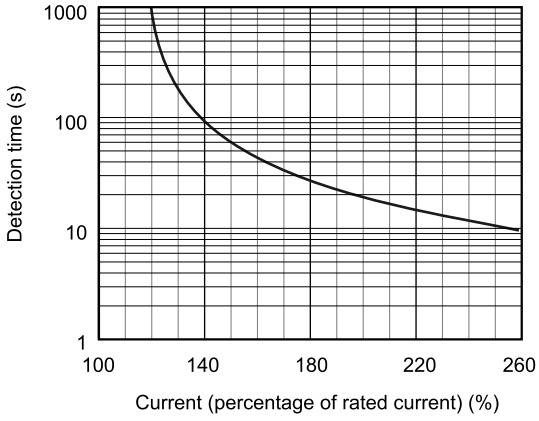
SGM7D-20J



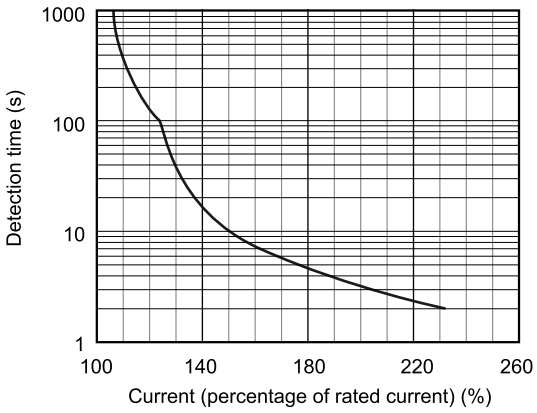
SGM7D-38J



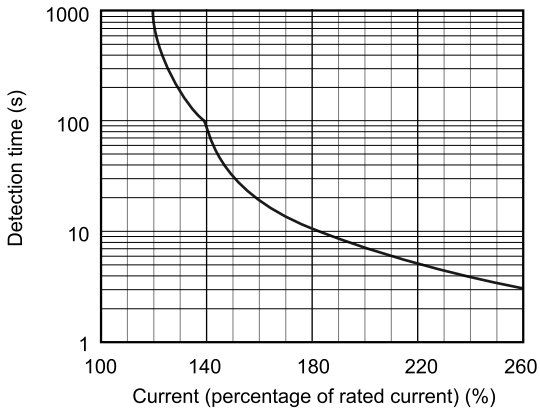
SGM7D-02K



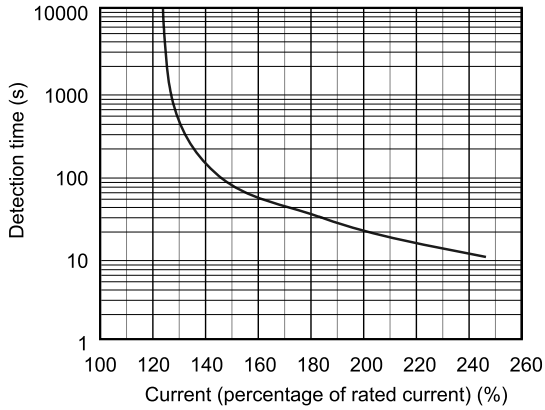
SGM7D-06K



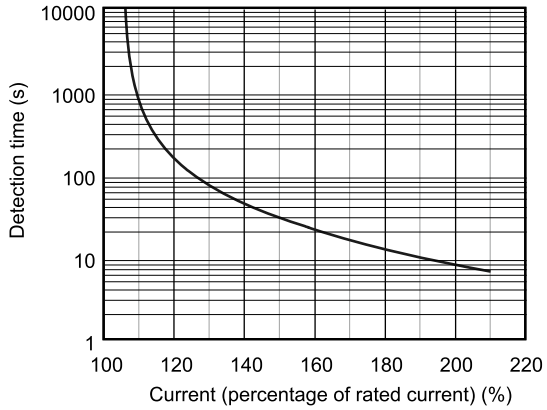
SGM7D-08K



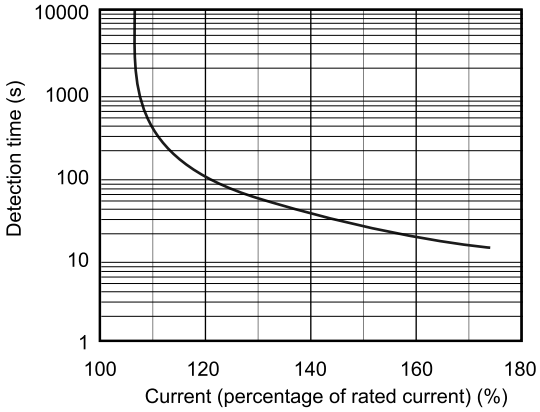
SGM7D-06L



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 torque remains within the continuous duty zone. Refer to the following section for details on the effective torque.

☞ *Torque-Motor Speed Characteristics on page 315*

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Ratings on page 311*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 Contact your Yaskawa representative for information on this program.

■ 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 section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

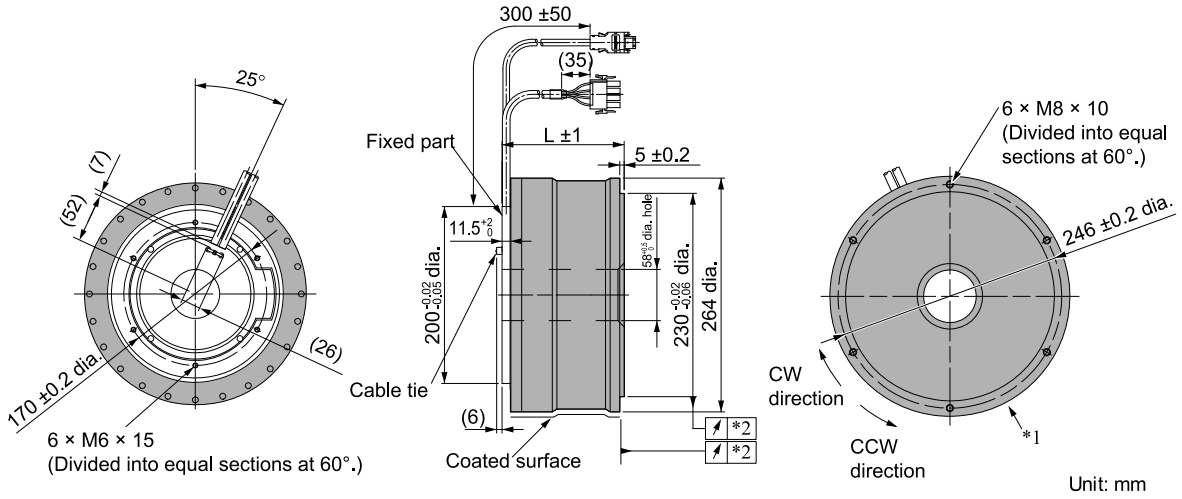
Refer to the following section for information on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 728*

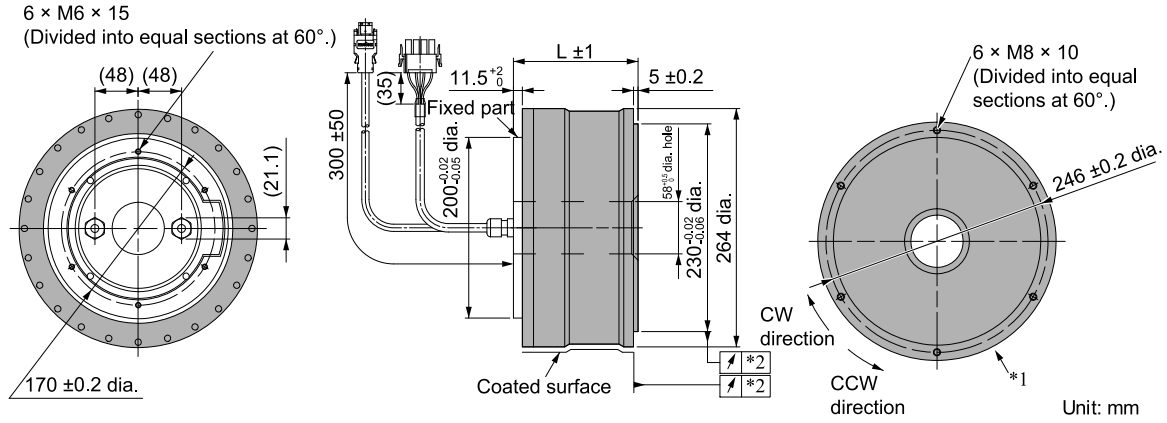
External Dimensions

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. For details, refer to the following section.

☞ *Specifications on page 308*

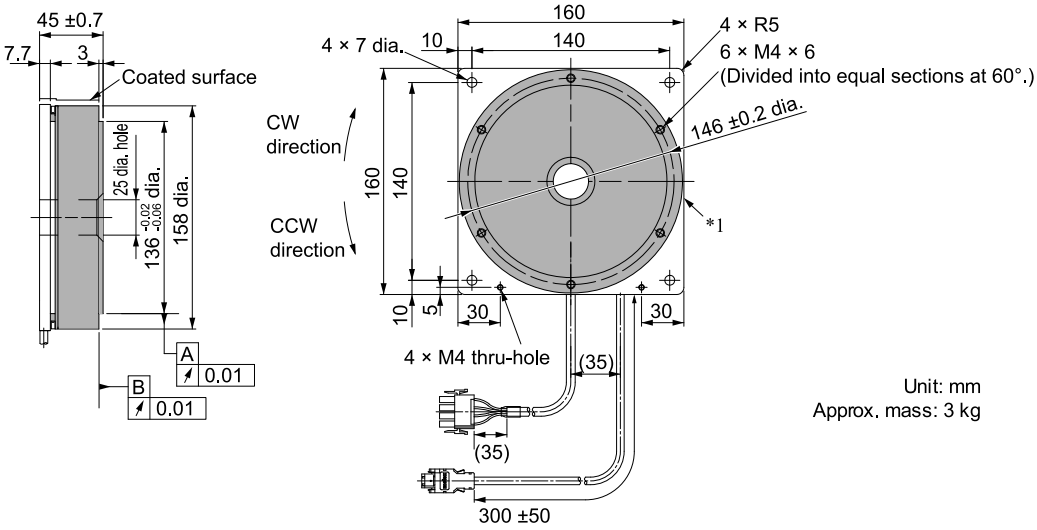
Note:

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

SGM7D-01G

· Servomotors with the Cable on the Side



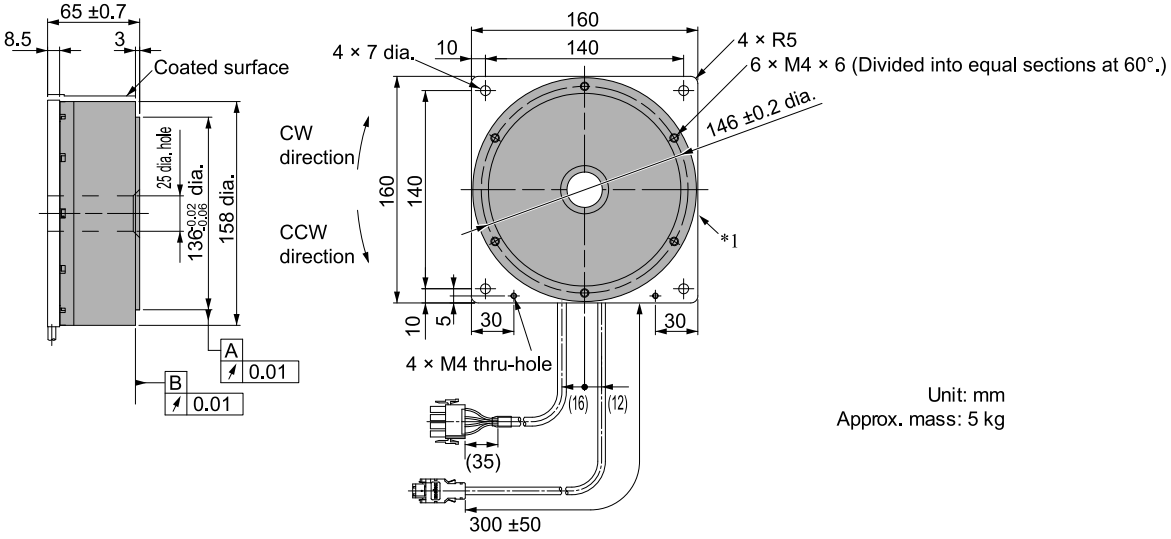
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

SGM7D-05G

· Servomotors with the Cable on the Side



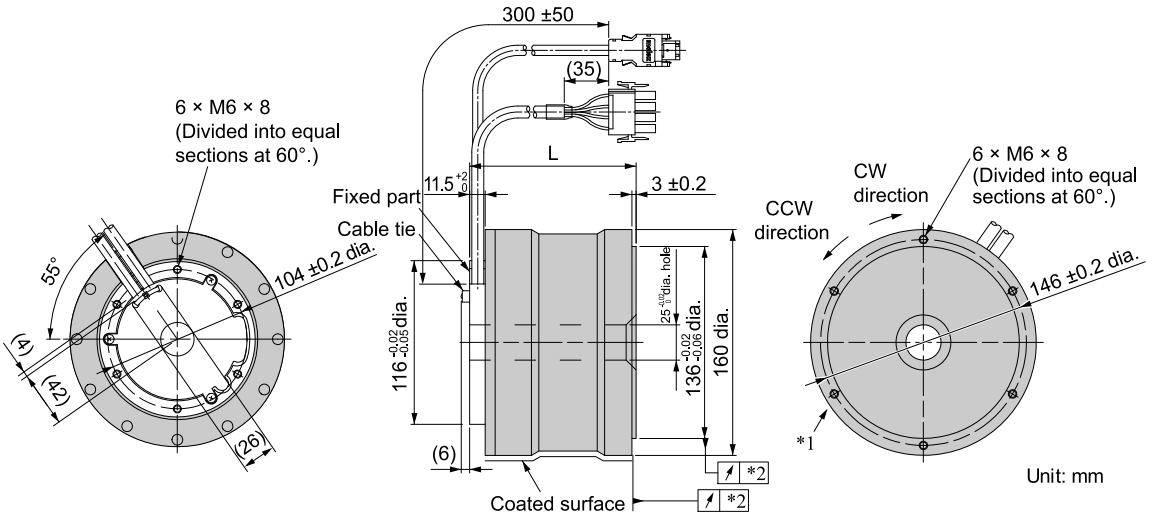
*1 The shaded section indicates the rotating parts.

Note:

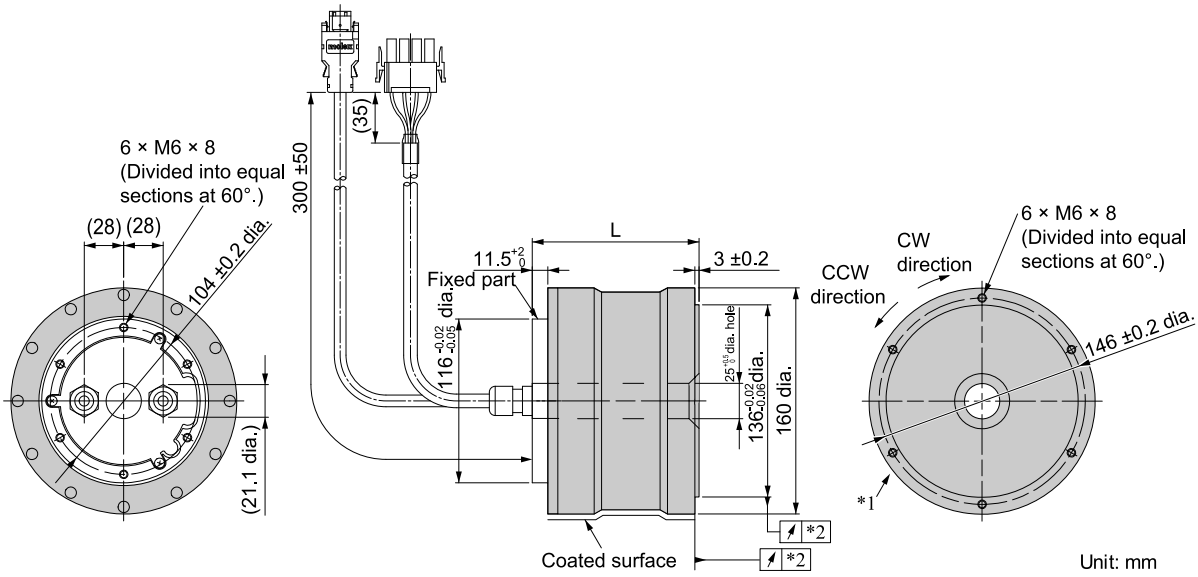
Values in parentheses are reference dimensions.

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

· 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. For details, refer to the following section.

☞ *Specifications on page 308*

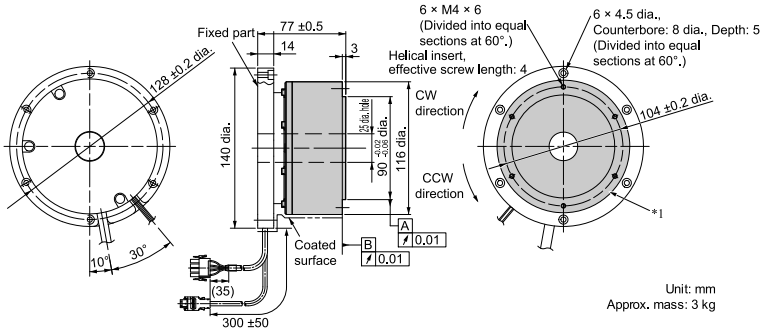
Note:

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

SGM7D-03H

· Servomotors with the Cable on the Side



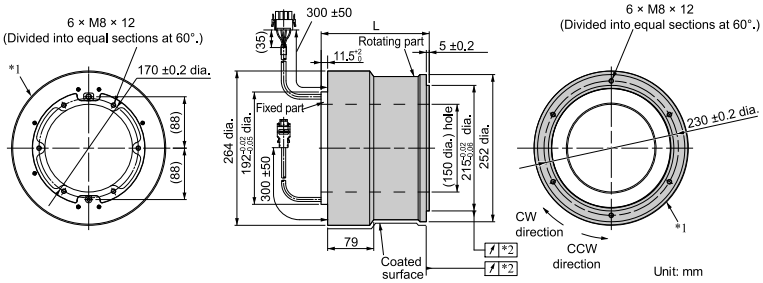
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

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. For details, refer to the following section.

☞ *Specifications on page 308*

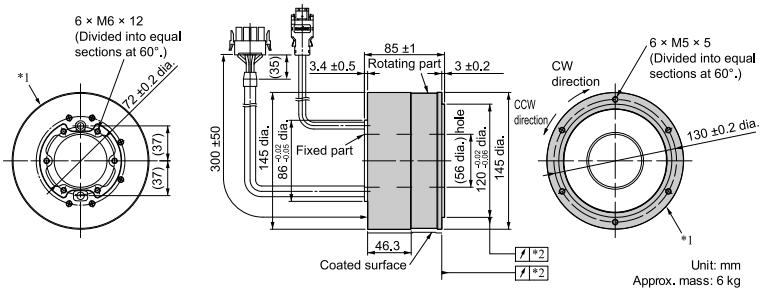
Note:

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

SGM7D-06J

· Servomotors with the Cable on the Bottom



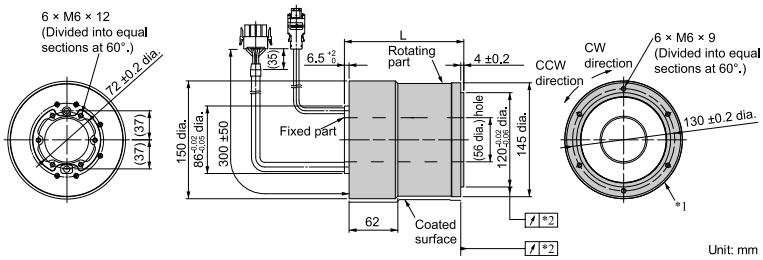
*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.

☞ *Specifications on page 308*

SGM7D-09J, -18J, -20J, -38J

· Servomotors with the Cable on the Bottom



*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.

☞ *Specifications on page 308*

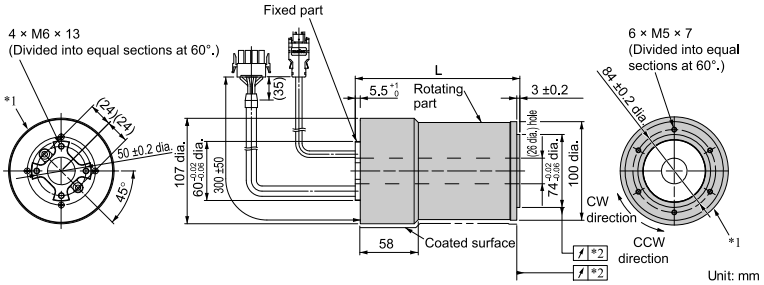
Note:

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

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. For details, refer to the following section.

☞ *Specifications on page 308*

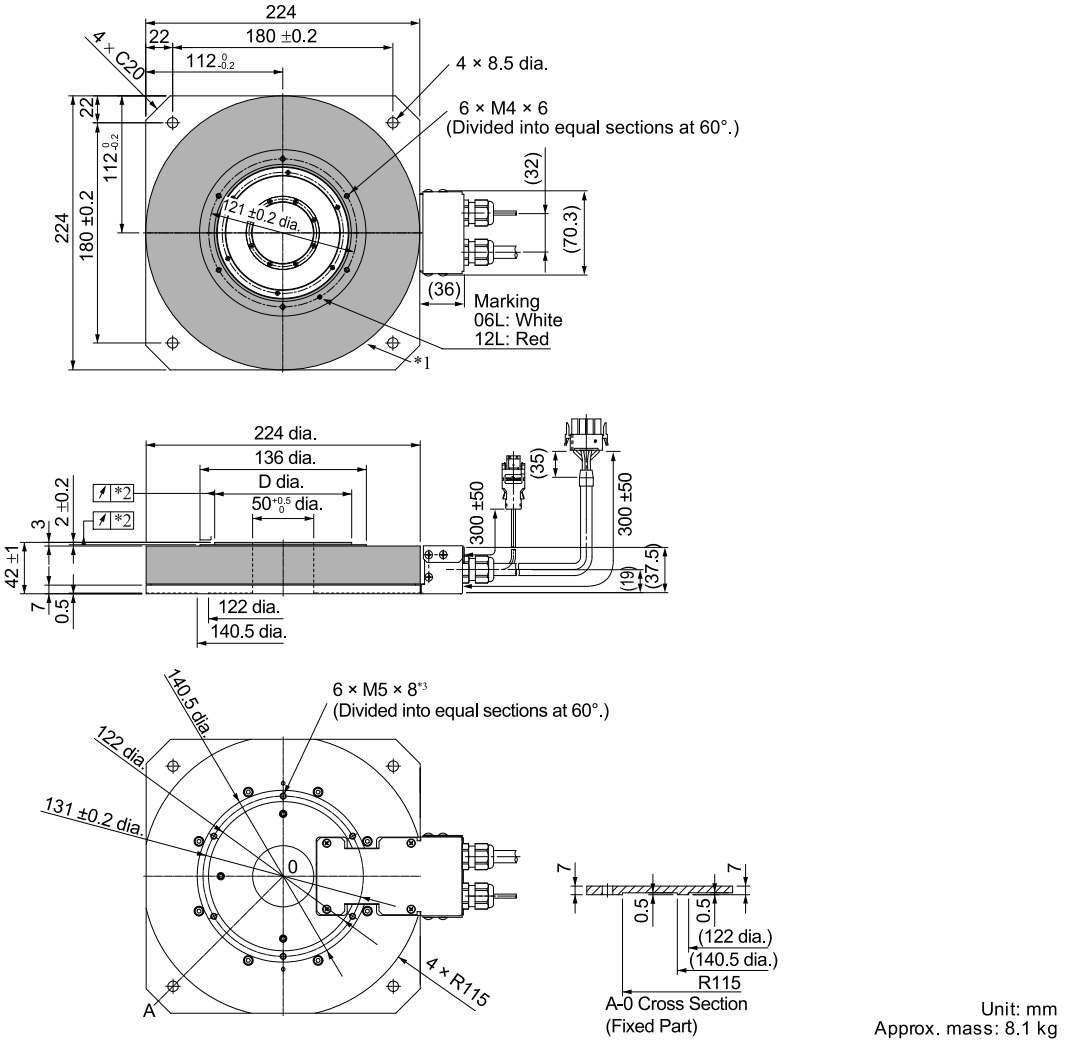
Note:

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

SGM7D-06L, -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. For details, refer to the following section.
☞ *Specifications on page 308*

*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.

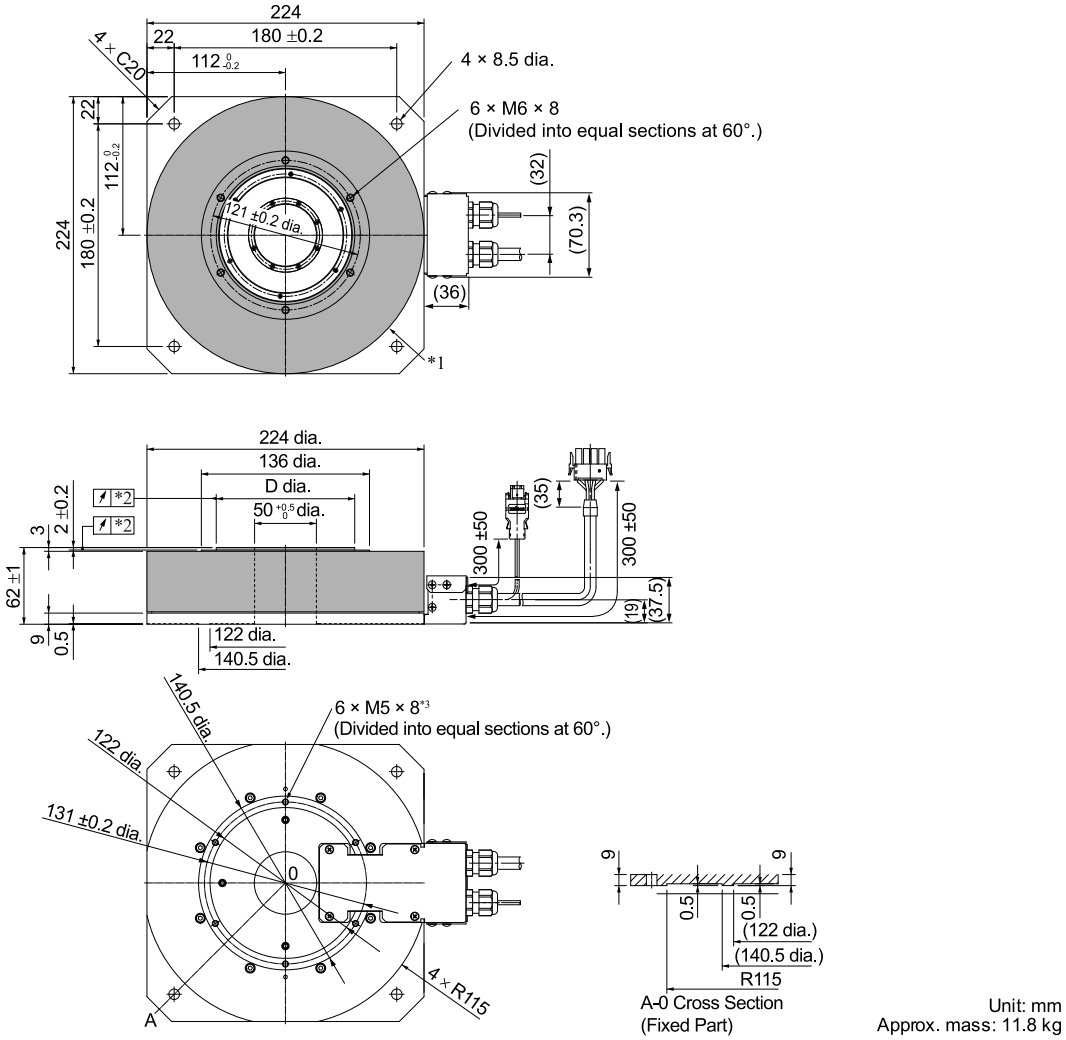
Note:

Values in parentheses are reference dimensions.

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

SGM7D-30L

· Servomotors with the Cable on the Side



*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.
☞ *Specifications on page 308*

*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:

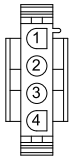
Values in parentheses are reference dimensions.

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

SGM7D-□□F

· Servomotor Connector



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

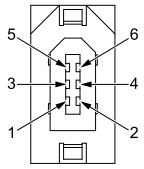
Model

- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
  Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

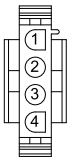
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-05G

· Servomotor Connector



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

Model

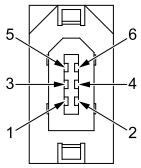
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

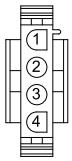
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-08G，-18G，-24G，-34G，-45G

· Servomotor Connector



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

Model

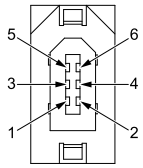
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

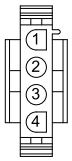
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-03H

· Servomotor Connector



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

Model

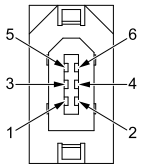
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

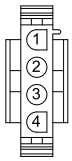
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-□□I

· Servomotor Connector



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

Model

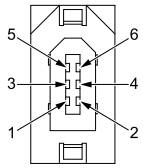
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

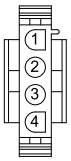
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-09J, -18J, -20J, -38J

· Servomotor Connector



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

Model

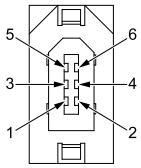
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

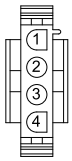
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-□□K

· Servomotor Connector



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

Model

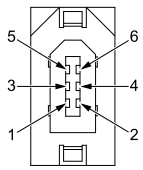
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

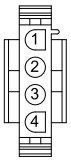
*1 A battery is required only for a multiturn absolute encoder.

Model: 55102-0600 Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-06L, -12L

· Servomotor Connector



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

Model

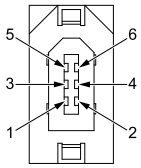
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

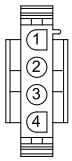
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-30L

· Servomotor Connector



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

Model

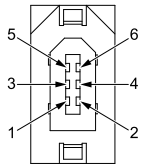
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

Model: 55102-0600

Manufacturer: Molex Japan LLC

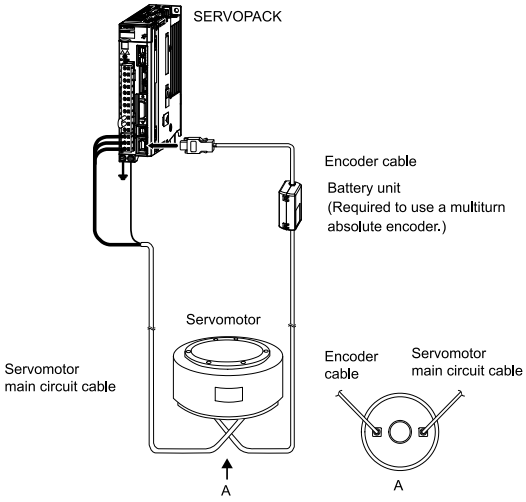
Mating connector: 54280-0609

Selecting Cables

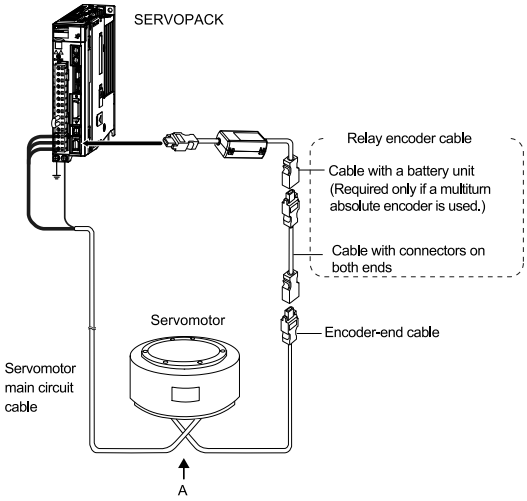
Cable Configurations

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

Encoder Cables of 20 m or Less



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

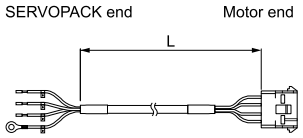
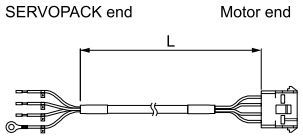


Note:

1. If the encoder cable length exceeds 20 m, 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-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Servomotor Main Circuit Cables

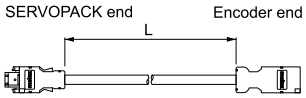
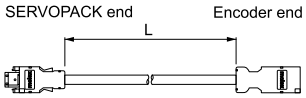
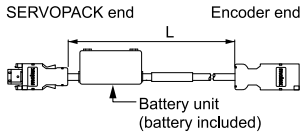
Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1	
SGM7D-□□F SGM7D-08G to -45G SGM7D-□□I SGM7D-□□J SGM7D-□□L	3 m	JZSP-CMM00-03-E	JZSP-C7DM21-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-C7DM21-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-C7DM21-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-C7DM21-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-C7DM21-20-E	
SGM7D-01G and -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	

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

Note:

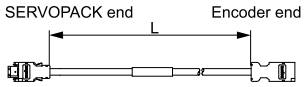
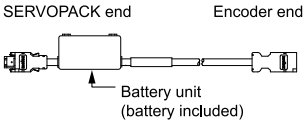
Direct drive servomotors are not available with holding brakes.

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 unit)	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 unit) *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 unit)	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 installed at the host controller.

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 unit (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.

SGM7E

Model Designations

SGM7E - 02 B 7 A 1 1

Direct Drive Servomotors: SGM7E

1st+2nd digits: 1st+2nd digits

3rd digit: 3rd digit

4th digit: 4th digit

5th digit: 5th digit

6th digit: 6th digit

7th 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*

* Both multiturn absolute encoder and incremental encoder can be used as a single-turn absolute encoder by setting parameters.

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)

Non Stock Items

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.

*1 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.

Specifications and Ratings

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			1500 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			±15 s									
Repeatability			±1.3 s									
Protective Structure *2			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 1000 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	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			
Impact Resistance *4	Impact Acceleration at Flange		490 m/s²									
	Number of Impacts		2 times									
Vibration Resistance *4	Vibration Acceleration at Flange		49 m/s²									

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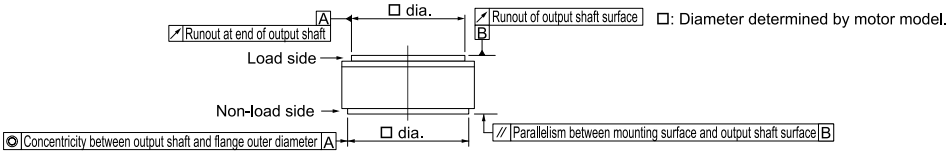
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Voltage		200 V									
Model: SGM7E-		02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E
Applicable SERVOPACKs	SGDXS-	2R8A									5R5A	
	SGDXW-											

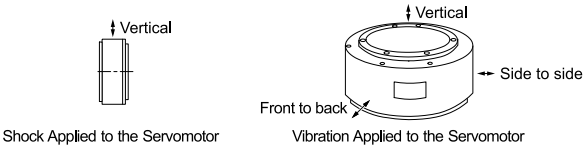
*1 A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the servomotor without a load at the rated rotation speed.

*2 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.

*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 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.



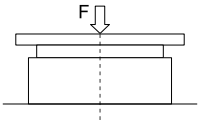
Ratings

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 *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 Rotation Speed *1		min-1	200			200			200		150	200	150
Maximum Rotation 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
Rotor Moment of Inertia		×10-4 kg·m2	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 *1		rad/s2	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)		times	10				5	3					
	With external regenerative resistor	times	10				5	3					
Allowable Load *3	Allowable Thrust Load	N	1500			3300			4000			11000	
	Allowable Moment Load	N·m	40	50	64	70	75	90	93	103	135	250	320

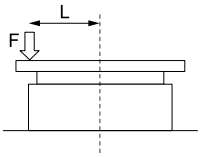
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*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.

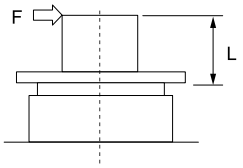
*3 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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

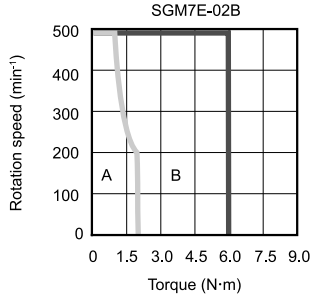
Note:

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

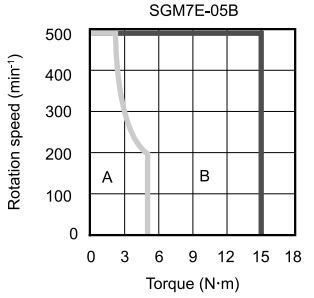
Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

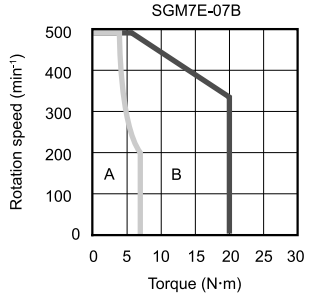
SGM7E-02B



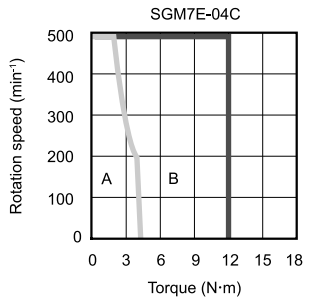
SGM7E-05B



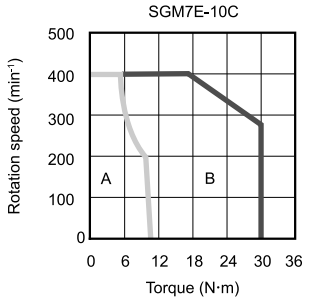
SGM7E-07B



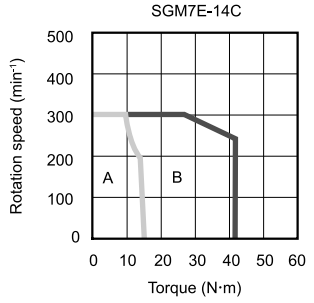
SGM7E-04C



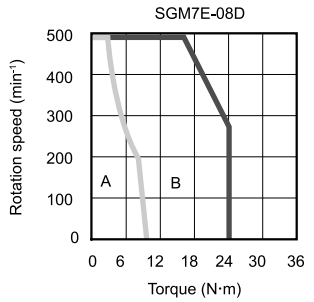
SGM7E-10C



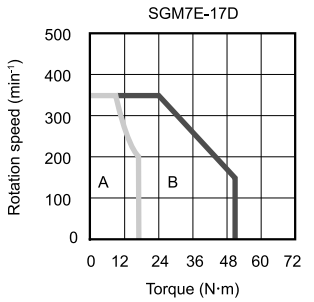
SGM7E-14C



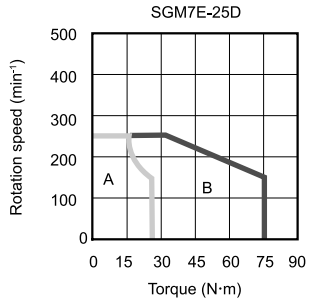
SGM7E-08D



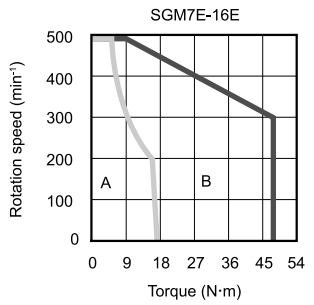
SGM7E-17D



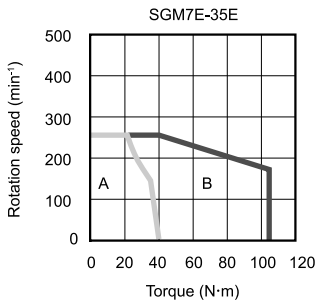
SGM7E-25D



SGM7E-16E



SGM7E-35E



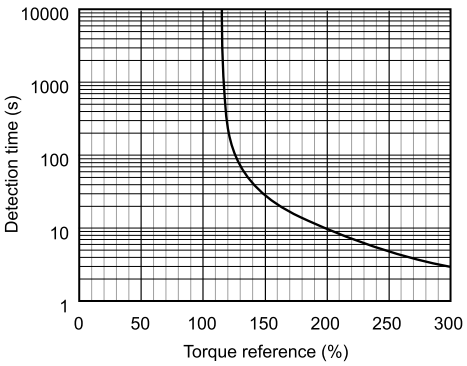
Note:

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.

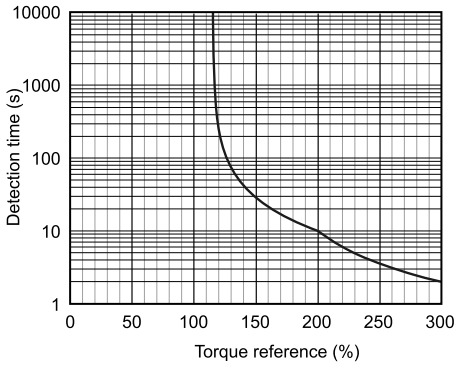
Servomotor Overload Protection Characteristics

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

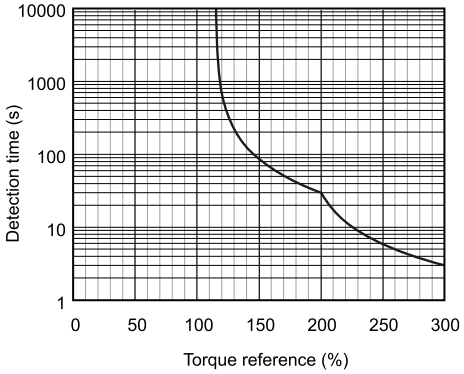
SGM7E-02B, -05B, -07B, -10C, -17D, and -35E



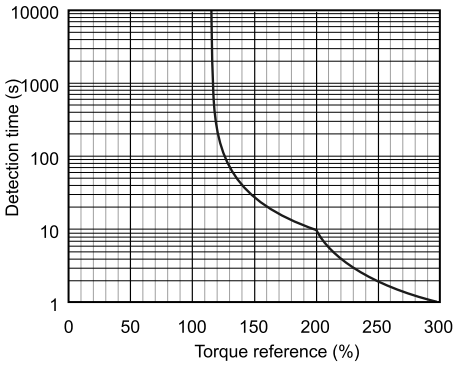
SGM7E-04C



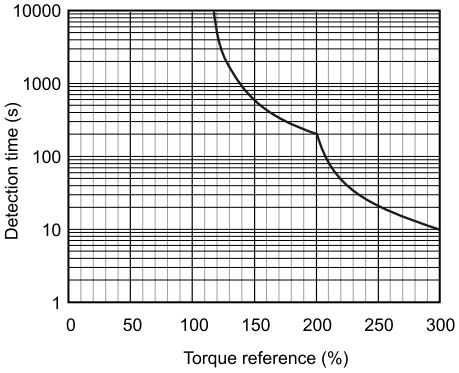
SGM7E-14C



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 torque remains within the continuous duty zone. Refer to the following section for details on the effective torque.

☞ *Torque-Motor Speed Characteristics on page 349*

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Ratings on page 348*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 Contact your Yaskawa representative for information on this program.

■ 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.

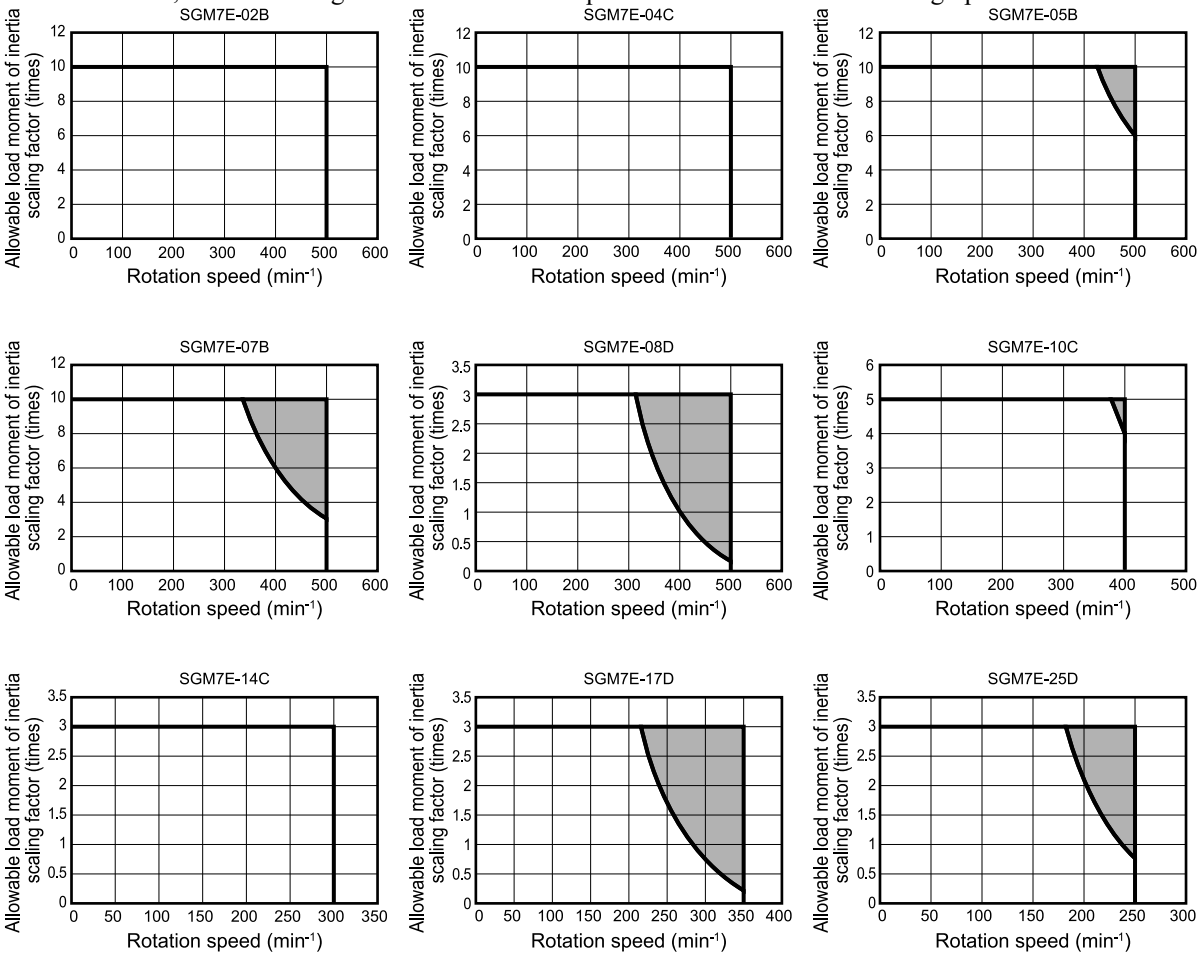
If the above steps is not possible, install an external regenerative resistor.

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 section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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 Model: SGDXS-2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

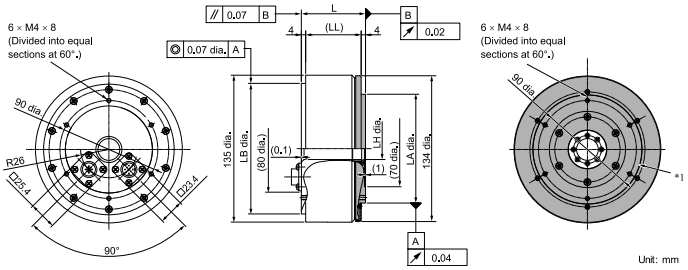
Refer to the following section for information on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 728*

External Dimensions

SGM7E-□□B

· Flange Specification 1



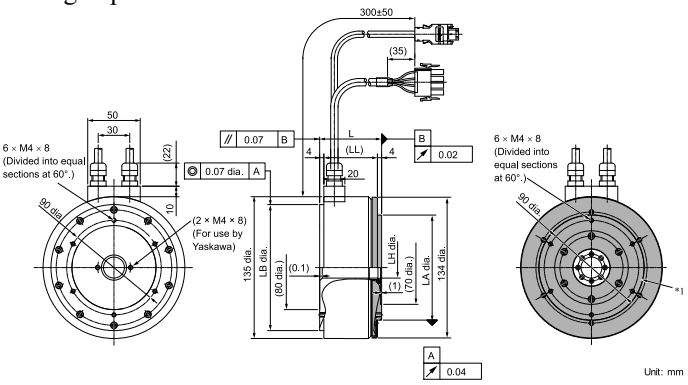
*1 The shaded section indicates the rotating parts.

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



*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

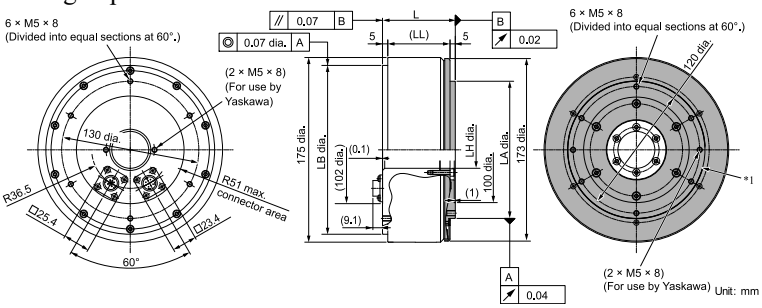
Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
02B□A41	59	51	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	4.8
05B□A41	88	80	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	5.8
07B□A41	128	120	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	8.2

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 357*

SGM7E-□□C

· Flange Specification 1



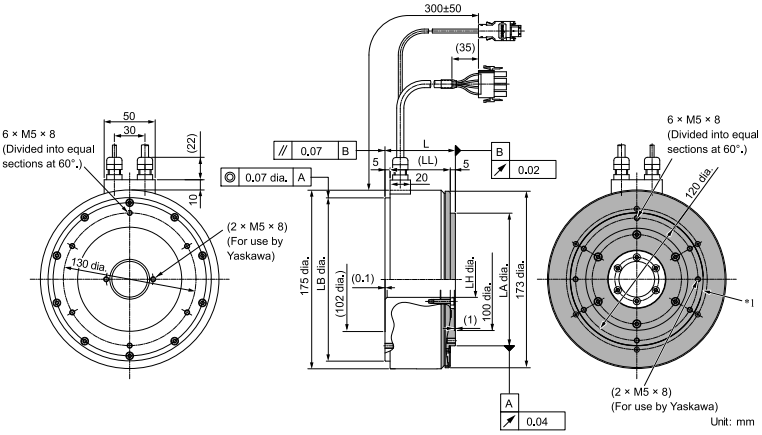
*1 The shaded section indicates the rotating parts.

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



*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

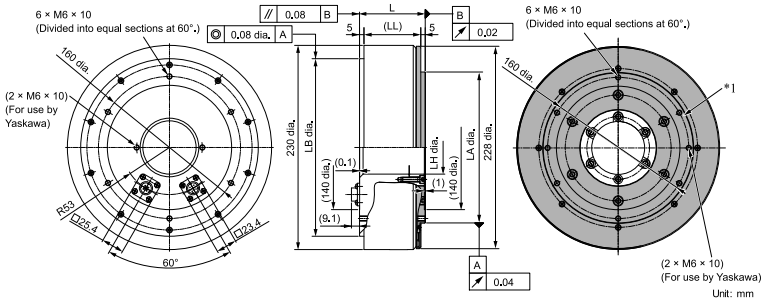
Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
04C□A41	69	59	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	7.2
10C□A41	90	80	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	10.2
14C□A41	130	120	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	14.2

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 357*

SGM7E-□□D

· Flange Specification 1



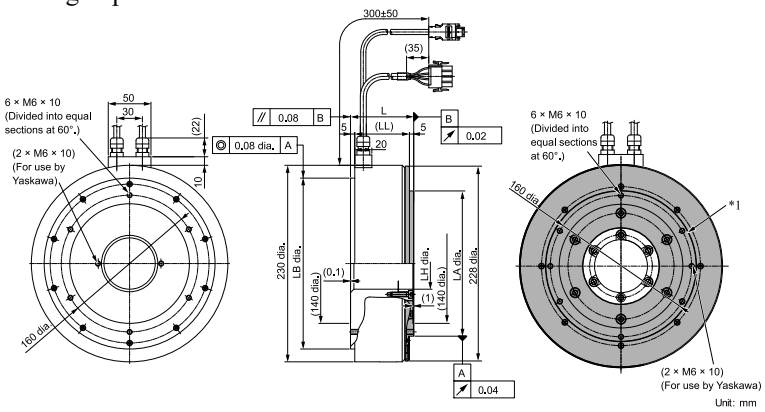
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
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



*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

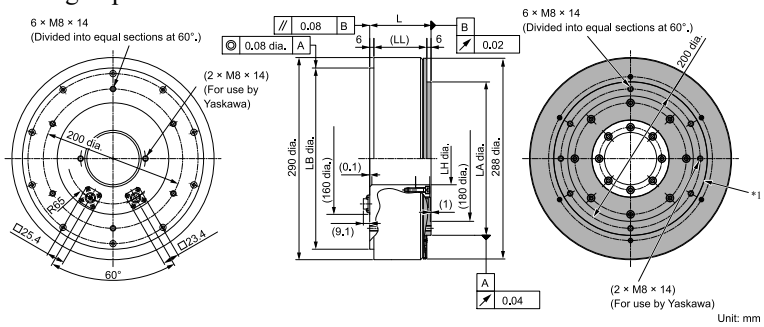
Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
08D□A41	74	64	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	14.0
17D□A41	110	100	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	22.0
25D□A41	160	150	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	29.7

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 357*

SGM7E-□□E

· Flange Specification 1



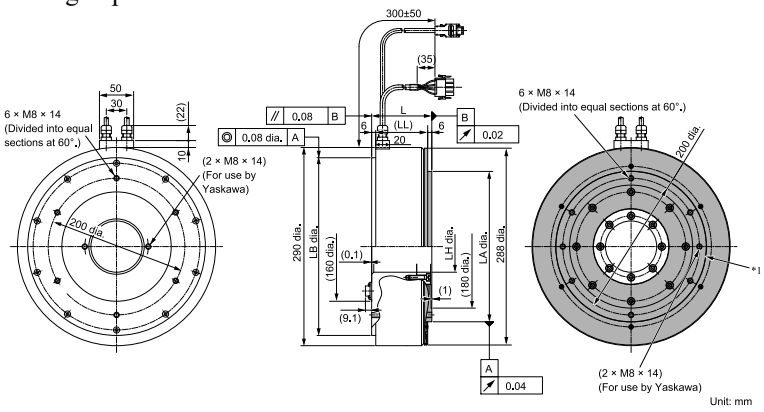
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
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



*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]
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

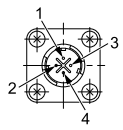
Refer to the following section for information on connector models.

☞ *Connector Specifications on page 357*

Connector Specifications

Flange Specification 1

· Servomotor Connector



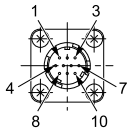
1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

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 **1*	BAT0
6	-
7	FG (frame ground)
8 **1*	BAT
9	PG0V
10	-

*1 A battery is required only for a multiturn absolute encoder.

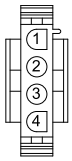
Model: JN1AS10ML1-R

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)

Model

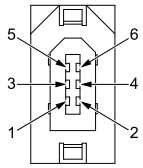
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

Model: 55102-0600

Manufacturer: Molex Japan LLC

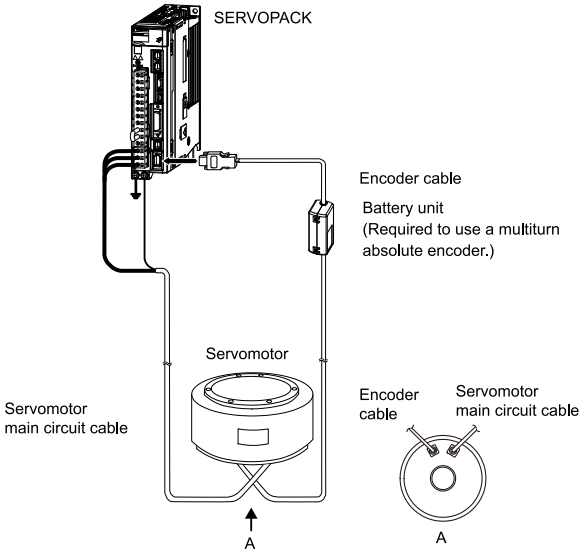
Mating connector: 54280-0609

Selecting Cables

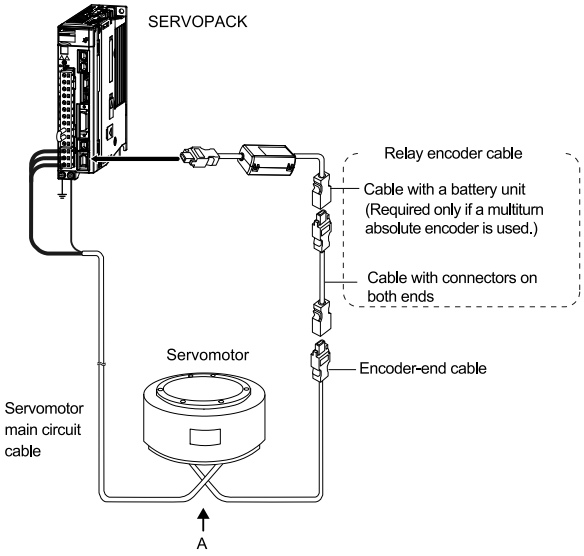
Cable Configurations

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

Encoder Cables of 20 m or Less



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

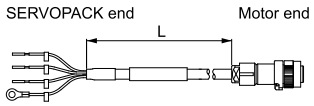
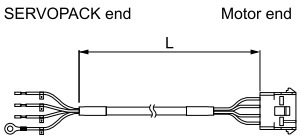


Note:

1. If the encoder cable length exceeds 20 m, 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-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Servomotor Main Circuit Cables

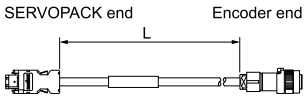
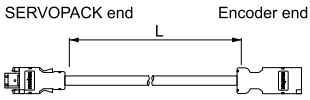
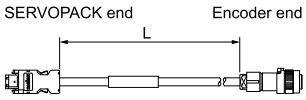
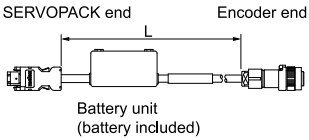
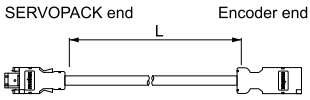
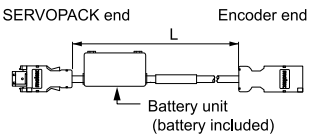
Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1	
SGM7E-□□□□ Flange Specification *2: 1	3 m	JZSP-CMM60-03-E	JZSP-C7MDN23-03-E	
	5 m	JZSP-CMM60-05-E	JZSP-C7MDN23-05-E	
	10 m	JZSP-CMM60-10-E	JZSP-C7MDN23-10-E	
	15 m	JZSP-CMM60-15-E	JZSP-C7MDN23-15-E	
	20 m	JZSP-CMM60-20-E	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 flange specifications.
☞ *Model Designations on page 344*

Note:

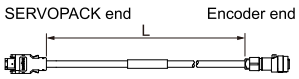
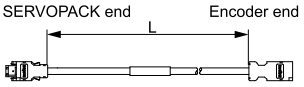
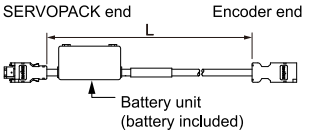
Direct drive servomotors are not available with holding brakes.

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 unit) *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 unit)	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 unit) *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 unit)	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 flange specifications.
☞ *Model Designations on page 344*
*3 Use one of these cables if a battery is installed at the host controller.

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 cable (for incremental or 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 incremental or 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 unit (for multiturn absolute encoder) *3	0.3 m	JZSP-CSP12-E	

*1 Flexible cables are not available.
*2 Refer to the following section for flange specifications.
☞ *Model Designations on page 344*
*3 This cable is not required if a battery is connected to the host controller.

Model Designations

SGM7F - 02 A 7 A 1 1

- 02: 1st+2nd digits
- A: 3rd digit
- 7: 4th digit
- A: 5th digit
- 1: 6th digit
- 1: 7th digit

Direct Drive Servomotors: SGM7F

1st+2nd digits Rated Output

● Small-Capacity

Code	Specification
02	2.00 N·m
04	4.00 N·m
05	5.00 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*

* Both multiturn absolute encoder and incremental encoder can be used as a single-turn absolute encoder by setting parameters.

5th digit Design Revision Order

M: Small Capacity
A: Medium Capacity

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)

■ Non Stock Items

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.

*1 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	–	–	–	–	–
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.

Specifications and Ratings: Small Capacity

Specifications

Voltage			200 V								
Model: SGM7F-			02A	05A	04B	10B	14B	08C	17C	25C	16D	35D
Time Rating			Continuous									
Thermal Class			A									
Insulation Resistance			500 VDC, 10 MΩ min.									
Withstand Voltage			1500 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			±15 s									
Repeatability			±1.3 s									
Protective Structure *2			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 1000 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	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									
Impact Resistance *4	Impact Acceleration at Flange		490 m/s^2									
	Number of Impacts		2 times									

Continued on next page.

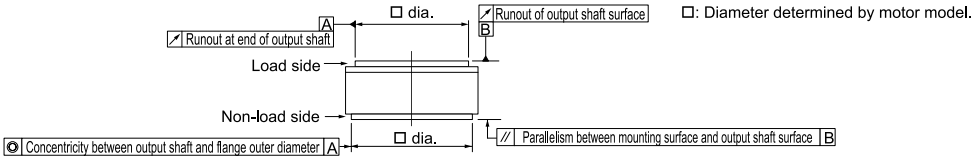
Continued from previous page.

Voltage			200 V								
Model: SGM7F-			02A	05A	04B	10B	14B	08C	17C	25C	16D	35D
Vibration Resistance *4	Vibration Acceleration at Flange		49 m/s²									
Applicable SERVOPACKs		SGDXS-	2R8A				5R5A	2R8A	5R5A	7R6A	5R5A	7R6A *5, 120A
		SGDXW-										7R6A *5

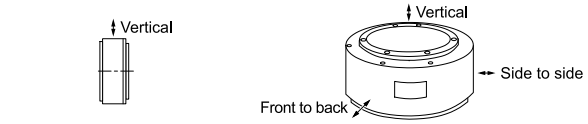
*1 A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the servomotor without a load at the rated rotation speed.

*2 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.

*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 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.



Shock Applied to the Servomotor Vibration Applied to the Servomotor

*5 Use derated values for this combination. Refer to the following section for details on the derated values.
☞ *Ratings on page 368*

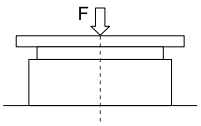
Ratings

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

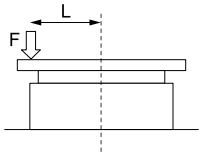
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*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.

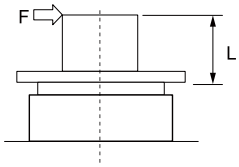
*3 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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

*4 If you use an SGDXS-7R6A SERVOPACK and SGM7E-35D servomotor together, use this value (a derated value).

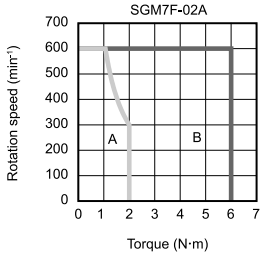
Note:

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

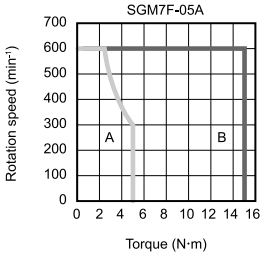
Torque-Motor Speed Characteristics

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

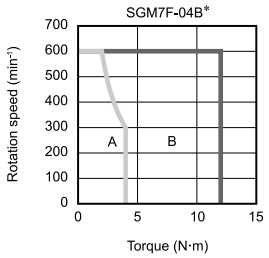
SGM7F-02A



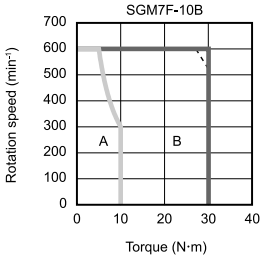
SGM7F-05A



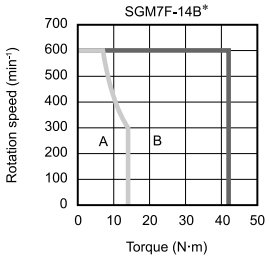
SGM7F-04B*



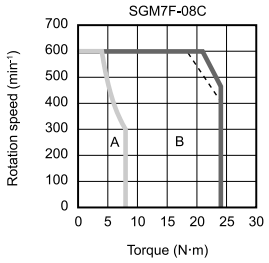
SGM7F-10B



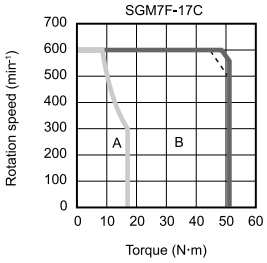
SGM7F-14B*



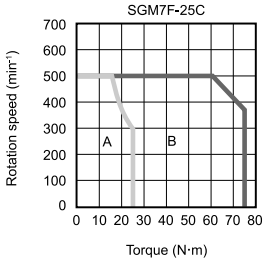
SGM7F-08C



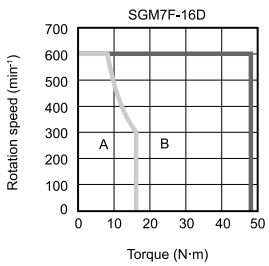
SGM7F-17C



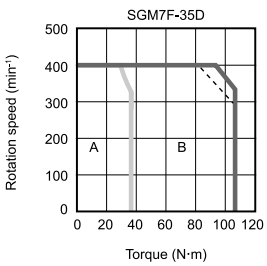
SGM7F-25C



SGM7F-16D



SGM7F-35D



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

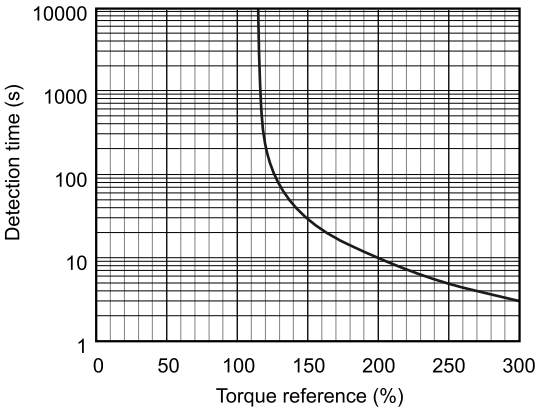
Note:

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.

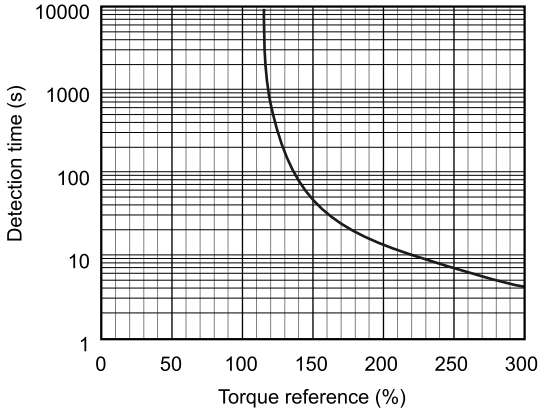
Servomotor Overload Protection Characteristics

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

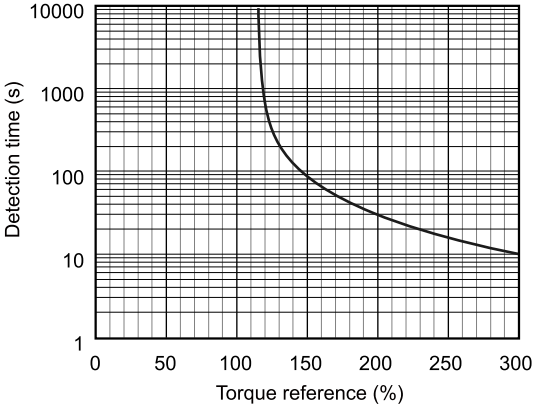
SGM7F-□□A and -□□B



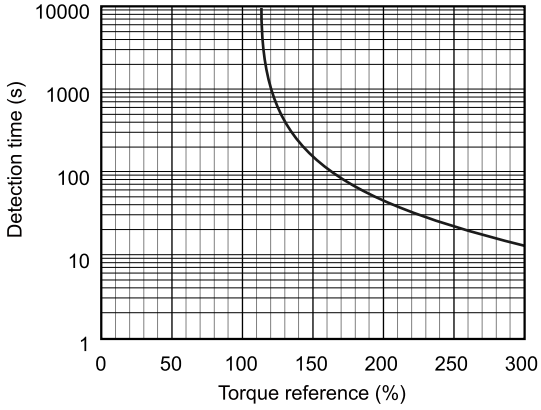
SGM7F-08C



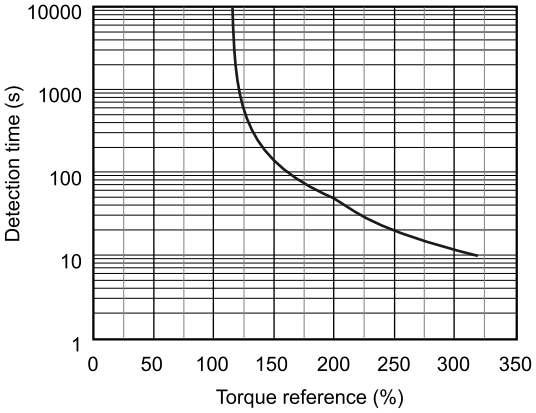
SGM7F-17C and -25C



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 torque remains within the continuous duty zone. Refer to the following section for details on the effective torque.

☞ *Torque-Motor Speed Characteristics on page 369*

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Ratings on page 368*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 Contact your Yaskawa representative for information on this program.

■ 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

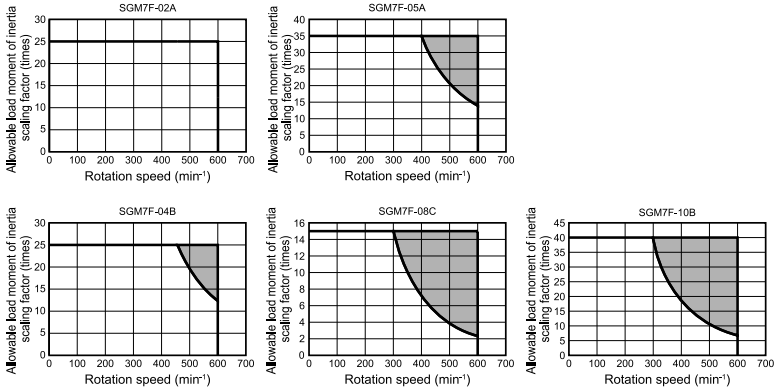
An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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 Model: SGDXS-2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

Refer to the following section for information on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 728*

Specifications and Ratings: Medium Capacity

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			1500 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			±15 s					
Repeatability			±1.3 s					
Protective Structure *2			Totally enclosed, self-cooled, IP44 (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 1000 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	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					
Impact Resistance *4	Impact Acceleration at Flange		490 m/s^2					
	Number of Impacts		2 times					
Vibration Resistance *4	Vibration Acceleration at Flange		24.5 m/s^2					

Continued on next page.

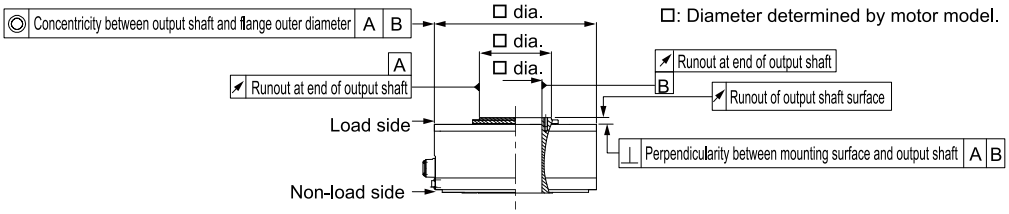
Continued from previous page.

Voltage		200 V					
Model: SGM7F-		45M	80M	1AM	80N	1EN	2ZN
Applicable SERVOPACKs	SGDXS-	7R6A	120A	180A	120A	200A	
	SGDXW-	7R6A	–				

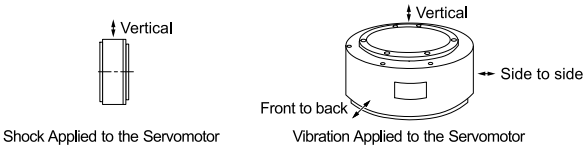
*1 A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the servomotor without a load at the rated rotation speed.

*2 This does not apply to the shaft opening. 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 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.



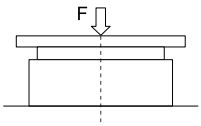
Ratings

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 Rotation Speed *1		min^{-1}	150			150		
Maximum Rotation Speed *1		min^{-1}	300			300	250	
Torque Constant		N·m/Arms	8.39	8.91	8.45	9.08	9.05	11.5
Rotor 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 *1		rad/s^2	1160	1280	1270	588	607	654
Heat Sink Size		mm	750 × 750 × 45					
Allowable Load Moment of Inertia (Rotor 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		

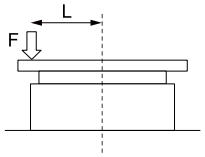
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

*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.

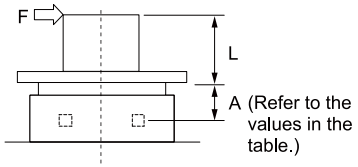
*3 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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



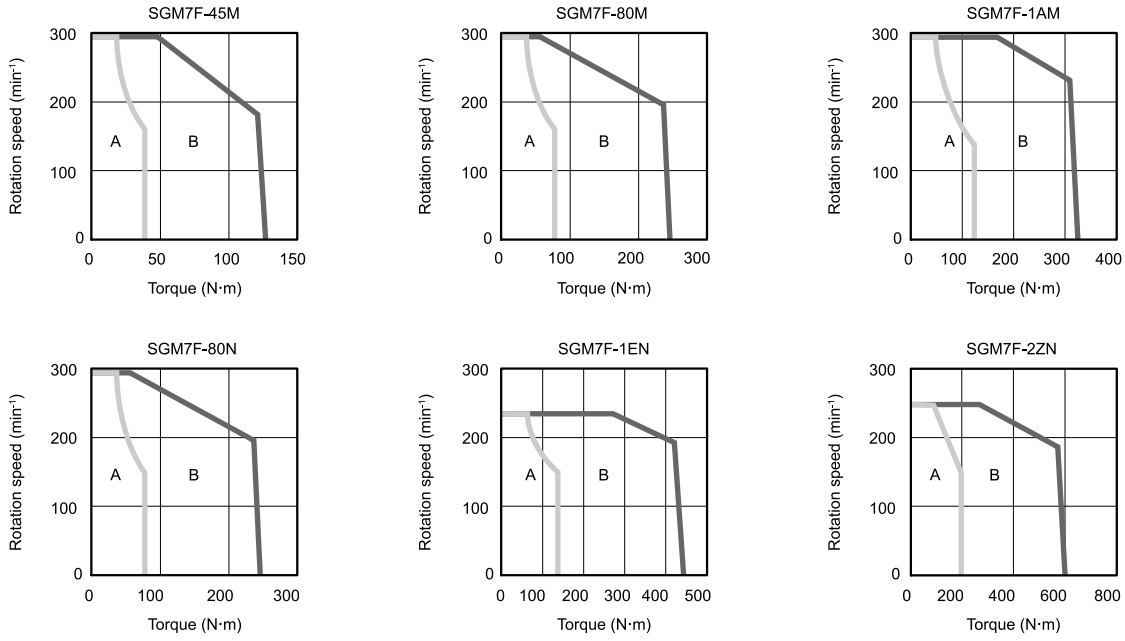
Where F is the external force,
Thrust load = Load mass
Moment load = F × (L + A)

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.

Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone



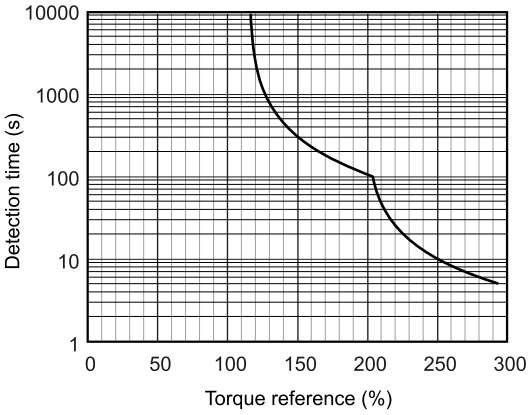
Note:

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.

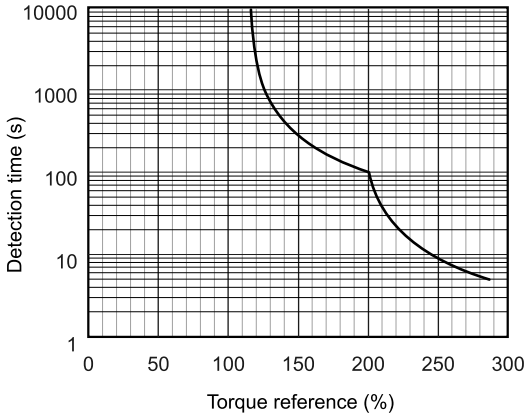
Servomotor Overload Protection Characteristics

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

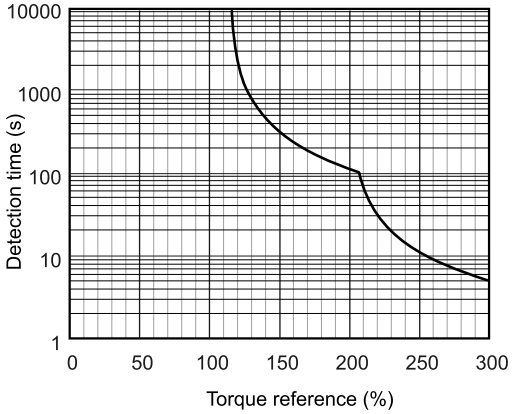
SGM7F-45M



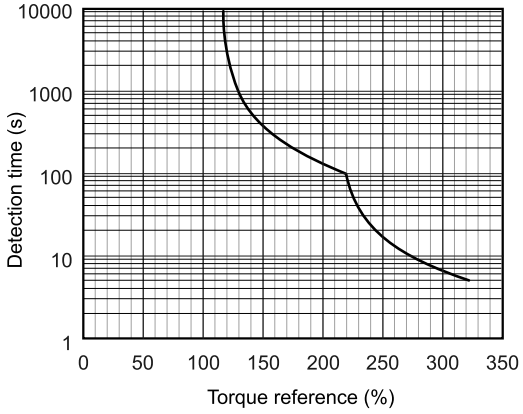
SGM7F-80M



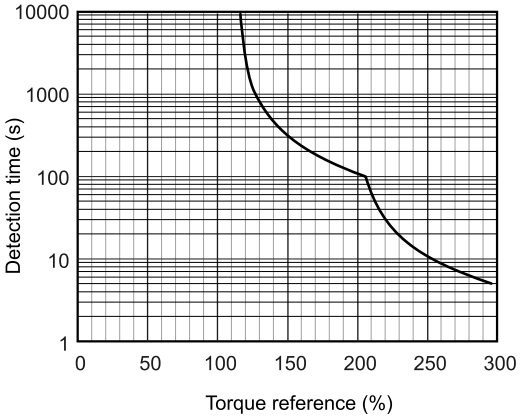
SGM7F-1AM and -80N



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 force remains within the continuous duty zone given in *Torque-Motor Speed Characteristics on page 375*.

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Ratings on page 374*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 Contact your Yaskawa representative for information on this program.

■ 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 section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

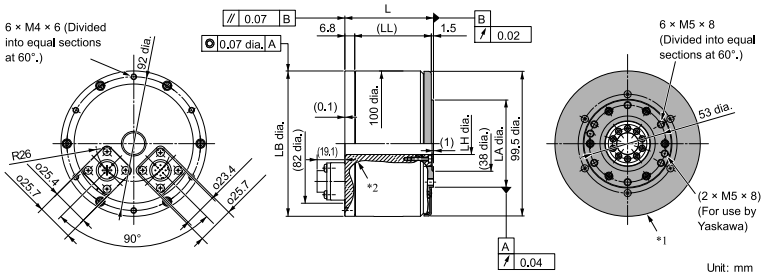
Refer to the following section for information on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 728*

External Dimensions

SGM7F-□□A

· Flange Specification 1



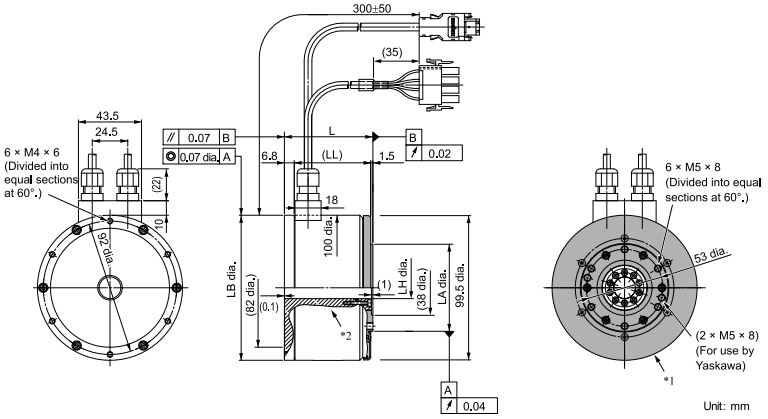
*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

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

· 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.

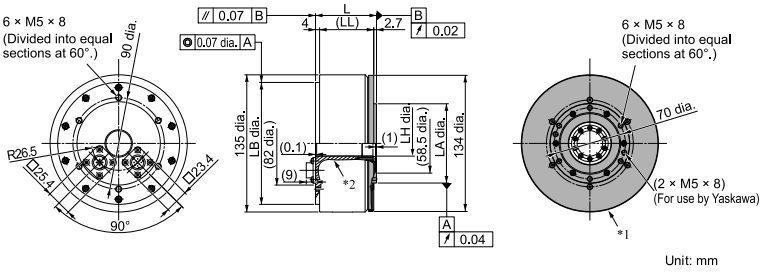
Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
02A□A41	61	(52.7)	$100^{0}_{-0.035}$	$15^{+0.4}_{0}$	$60^{0}_{-0.030}$	2.5
05A□A41	96	(87.7)	$100^{0}_{-0.035}$	$15^{+0.4}_{0}$	$60^{0}_{-0.030}$	4.5

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 384*

SGM7F-□□B

· Flange Specification 1



Unit: mm

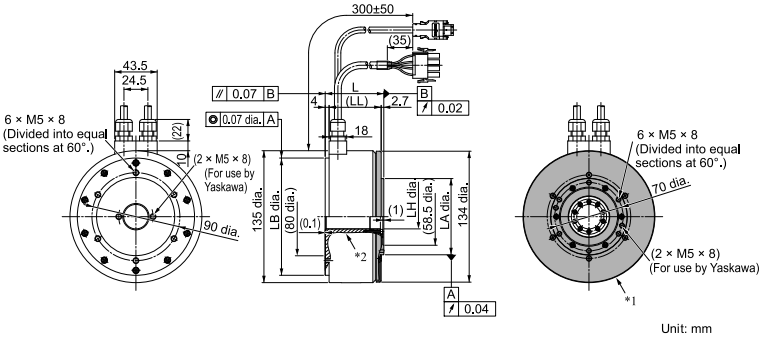
*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

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.

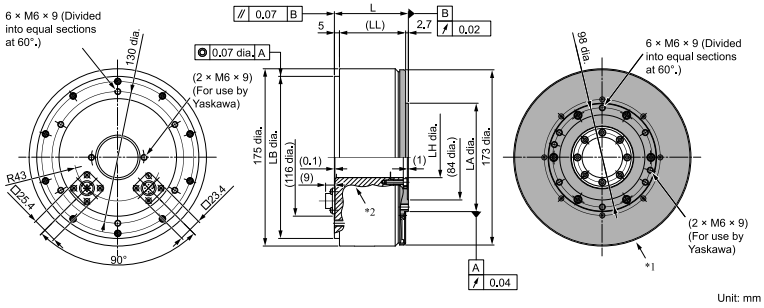
Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
04B□A41	60	53.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	5.0
10B□A41	85	78.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	6.5
14B□A41	115	108.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	9.0

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 384*

SGM7F-□□C

· Flange Specification 1



Unit: mm

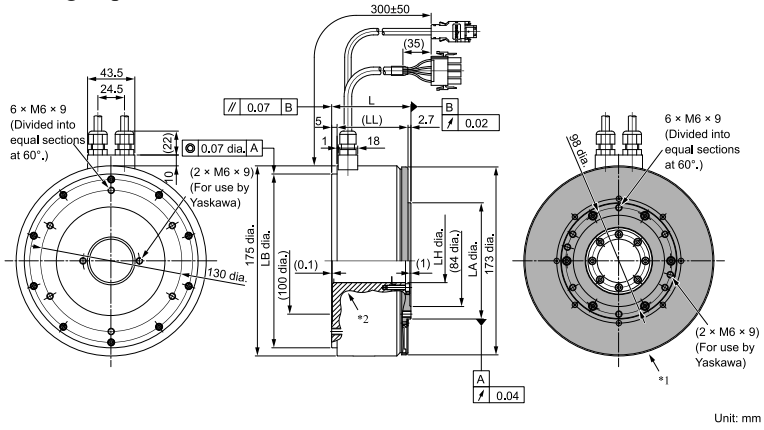
*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: 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



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.

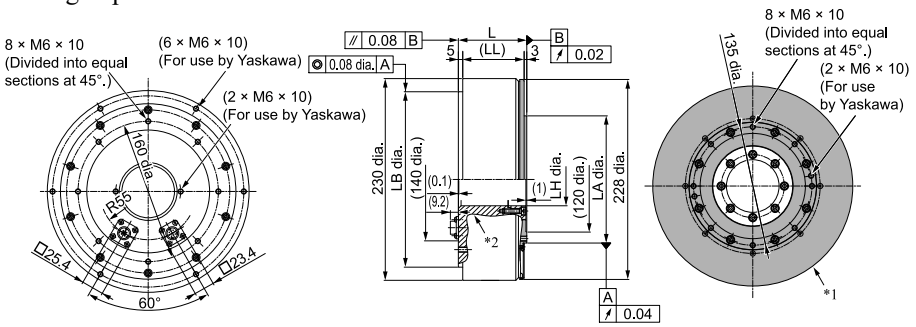
Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
08C□A41	73	65.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	9.0
17C□A41	87	79.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	11.0
25C□A41	117	109.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	15.0

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 384*

SGM7F-□□D

· Flange Specification 1



Unit: mm

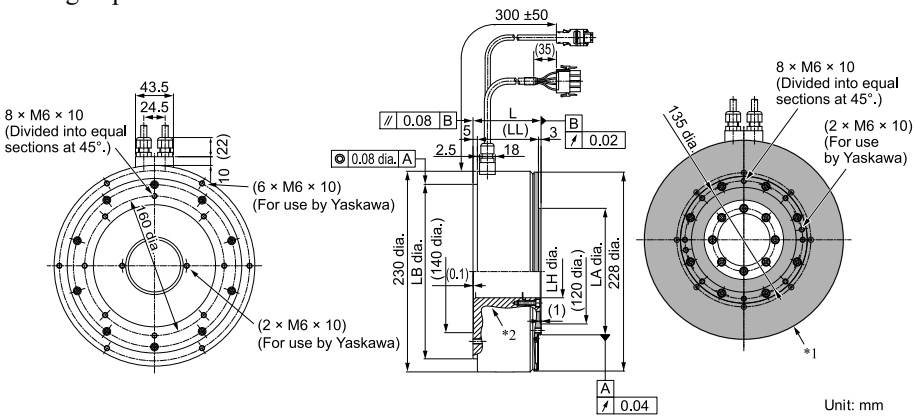
*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

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.

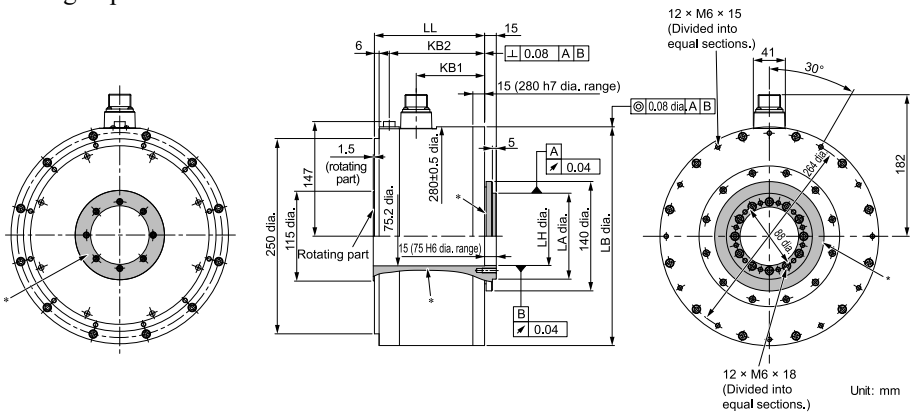
Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
16D□A41	78	70	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$145^{0}_{-0.040}$	16.0
35D□A41	107	99	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$145^{0}_{-0.040}$	25.0

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 384*

SGM7F-□□M

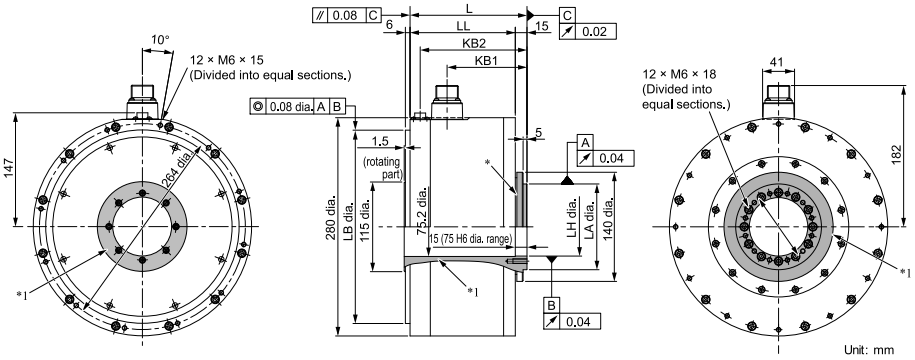
· Flange Specification 1



*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



*1 The shaded section indicates the rotating parts.

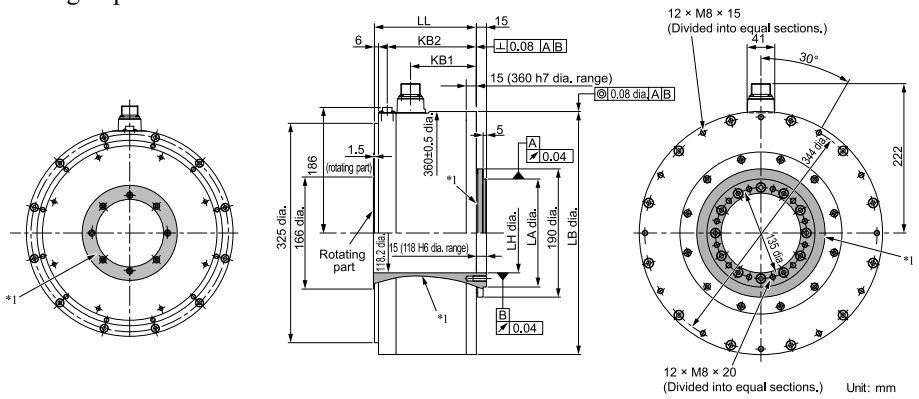
Model: SGM7F-	L	LL	KB1	KB2	LB	LH	LR	Approx. mass [kg]
45M□A31	150	135	102.5	137	$248^{0}_{-0.046}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$	38
80M□A31	200	185	152.5	187	$248^{0}_{-0.046}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$	45
1AM□A31	250	235	202.5	237	$248^{0}_{-0.046}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$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

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 384*

SGM7F-□□N

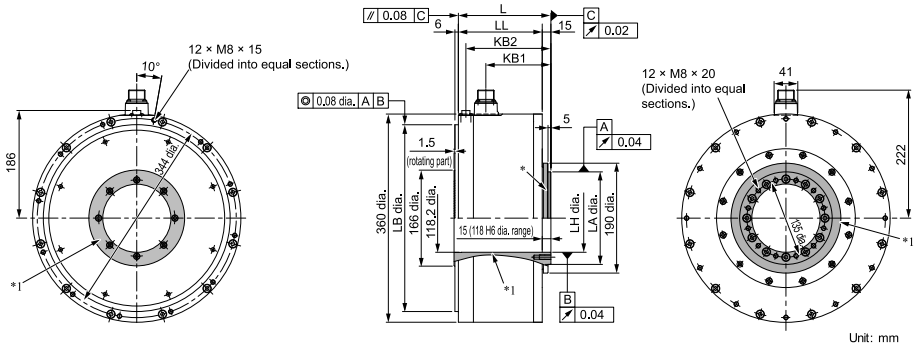
· Flange Specification 1



*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



*1 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

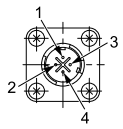
Refer to the following section for information on connector models.

☞ *Connector Specifications on page 384*

Connector Specifications

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

· Servomotor Connector



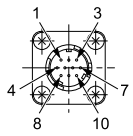
1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

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 *1*	BAT0
6	–
7	FG (frame ground)
8 *1*	BAT
9	PG0V
10	–

*1 A battery is required only for a multiturn absolute encoder.

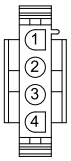
Model: JN1AS10ML1-R

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)

Model

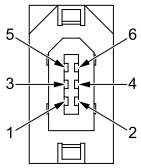
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

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

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

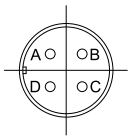
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7F-□□M, -□□N: Flange Specification 1, 3

· Servomotor Connector



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

Model: CE05-2A18-10PD

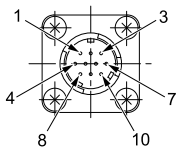
Manufacturer: DDK Ltd.

Mating Connector

Plug: CE05-6A18-10SD-D-BSS

Cable clamp: CE3057-10A-□(D265)

· Encoder Connector



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

*1 A battery is required only for a multiturn absolute encoder.

Model: JN1AS10ML1

Manufacturer: Japan Aviation Electronics Industry, Ltd.

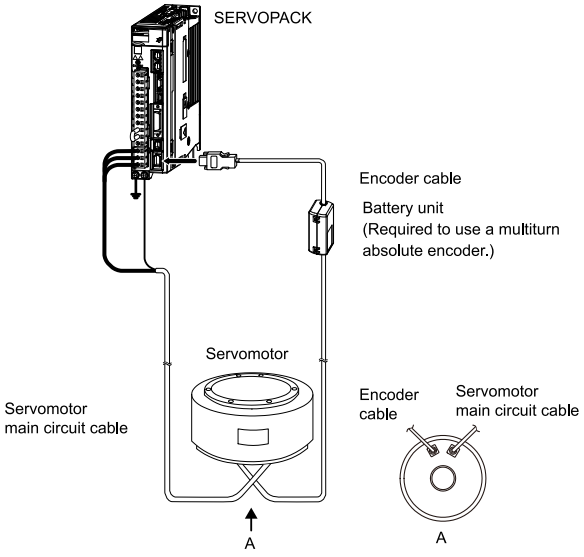
Mating connector: JN1DS10SL1 (Not provided by Yaskawa.)

Selecting Cables

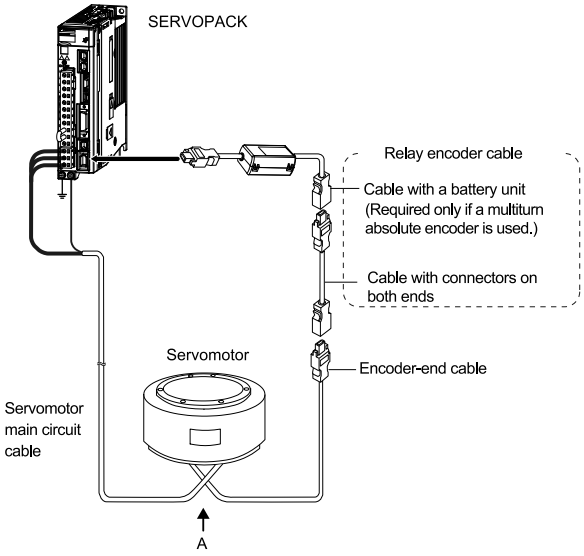
Cable Configurations

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

Encoder Cables of 20 m or Less



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

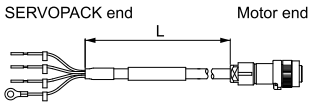
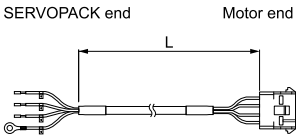
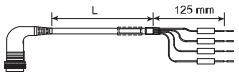
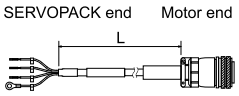
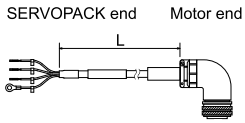


Note:

1. If the encoder cable length exceeds 20 m, 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

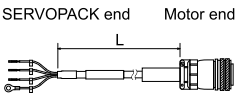
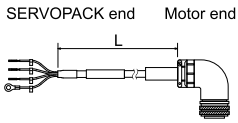
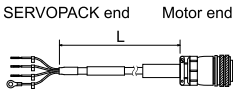
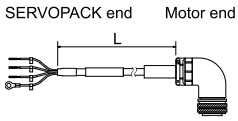
   Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

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	
SGM7F-□□M SGM7F-□□N □□ : 45 □□ : 80 □□ : 1A	3 m	B1EV-03(A)-E	B1EP-03(A)-E	
	5 m	B1EV-05(A)-E	B1EP-05(A)-E	
	10 m	B1EV-10(A)-E	B1EP-10(A)-E	
	15 m	B1EV-15(A)-E	B1EP-15(A)-E	
	20 m	B1EV-20(A)-E	B1EP-20(A)-E	
SGM7F-□□M SGM7F-□□N □□ : 1E □□ : 2Z	3 m	B2EV-03(A)-E	B2EP-03(A)-E	
	5 m	B2EV-05(A)-E	B2EP-05(A)-E	
	10 m	B2EV-10(A)-E	B2EP-10(A)-E	
	15 m	B2EV-15(A)-E	B2EP-15(A)-E	
	20 m	B2EV-20(A)-E	B2EP-20(A)-E	
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	

Continued on next page.

Continued from previous page.

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1	
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.

*2 Refer to the following section for flange specifications.

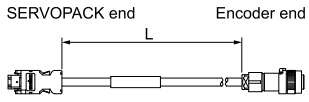
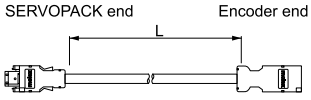
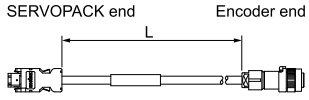
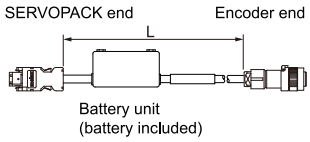
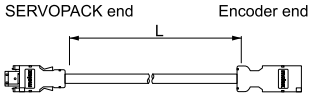
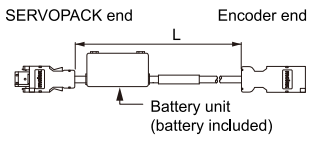
☞ *Model Designations on page 364*

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	

Note:

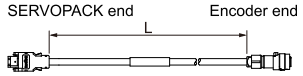
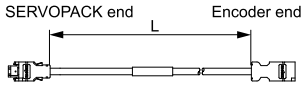
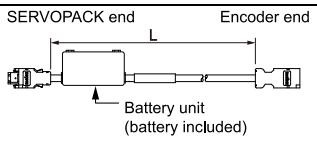
Direct drive servomotors are not available with holding brakes.

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 unit) *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 unit)	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 unit) *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 unit)	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 flange specifications.
☞ *Model Designations on page 364*
*3 Use one of these cables if a battery is installed at the host controller.

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 cable (for incremental or 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 incremental or 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 unit (for multiturn absolute encoder) *3	0.3 m	JZSP-CSP12-E	

*1 Flexible cables are not available.
*2 Refer to the following section for flange specifications.
☞ *Model Designations on page 364*
*3 This cable is not required if a battery is connected to the host controller.

Linear Servomotors

SGLG (Coreless Models) **394**

SGLF2 (Models with F-type Iron Cores - 200 V) **426**

SGLF2 (Models with F-type Iron Cores - 400 V) **460**

SGLT (Models with T-type Iron Cores) **482**

Recommended Linear Encoders and Cables **536**

SGLG (Coreless Models)

Model Designations

Moving Coil

S G L G W - 30 A 050 C P □ - E

Linear Σ series linear servomotors

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

1st digit Servomotor Type

Code	Specification
G	Coreless model

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving coil

3rd+4th digits Magnet Height

Code	Specification
30	30 mm
40	40 mm
60	60 mm
90	86 mm

Non-Stock

5th digit Power Supply Voltage

Code	Specification
A	200 VAC

6th+7th+8th digits Length of Moving Coil

Code	Specification
050	50 mm
080	80 mm
140	140 mm
200	199 mm
253	252.5 mm
365	365 mm
370	367 mm
535	535 mm

9th digit Design Revision Order

A, B...

10th digit Sensor Specification and Cooling Method

Code	Specifications		Applicable Models
	Polarity Sensor (Hall Sensor)	Cooling Method	
None	None	Self-cooled	All models
C	None	Air-cooled	SGLGW -40A, -60A, -90A
H	Yes	Air-cooled	
P	Yes	Self-cooled	All models

11th digit Connector for Servomotor Main Circuit Cable

Code	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	All models
D	Connector from Interconnectron GmbH	SGLGW -30A, -40A, -60A

12th digit EU Directive Certification

Code	Specification
E	Certified
None	Not certified

Note:

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Magnetic Way

S G L G M - 30 108 A □

Linear Σ series linear servomotors | 1st digit | 2nd digit | 3rd+4th digits | 5th+6th+7th digits | 8th digit | 9th digit

1st digit Servomotor Type

(Same as for the moving coil.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic way

3rd+4th digits Magnet Height

(Same as for the moving coil.)

5th+6th+7th digits Length of Magnetic Way

Code	Specification
090	90 mm
108	108 mm
216	216 mm
225	225 mm
252	252 mm
360	360 mm
405	405 mm
432	432 mm
450	450 mm
504	504 mm

8th digit Design Revision Order

A, B, C*...

9th digit Options

Code	Specification	Applicable Models
None	Standard-force	All models
-M	High-force	SGLGM-40, -60

Non-Stock

*1 The SGLGM-40 and SGLGM-60 also have a "CT" code.

- C = Without mounting holes on the bottom
- CT = With mounting holes on the bottom

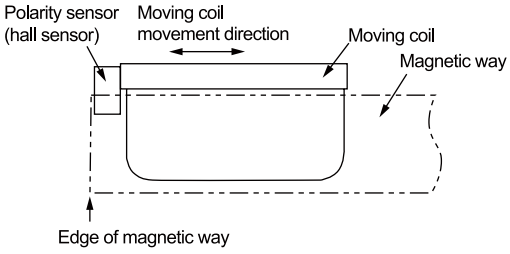
Note:

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

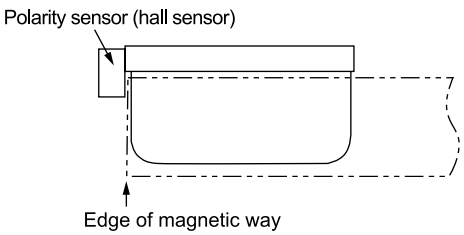
Precautions on Moving Coils with Polarity Sensors (Hall Sensors)

When you use a moving coil with a polarity sensor (hall sensor), the magnetic way must cover the bottom of the polarity sensor (hall sensor). Refer to the example that shows the correct installation. When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length (L) of the moving coil and the polarity sensor (hall sensor). Refer to the following table.

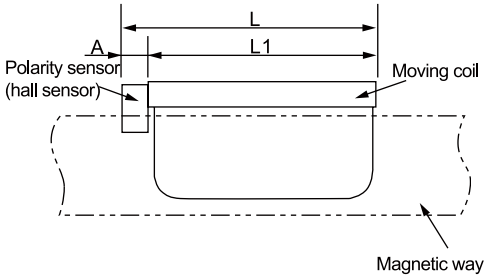
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■ Total Length of Moving Coil with Polarity Sensor (Hall Sensor)



Moving Coil Model SGLGW-	Length of Moving Coil L1 [mm]	Length of Polarity Sensor (Hall Sensor) A [mm]	Total Length L [mm]
30A050□P□	50	0 (Included in the length of moving coil.)	50
30A080□P□	80		80
40A140□H□ 40A140□P□	140	16	156
40A253□H□ 40A253□P□	252.5		268.5
40A365□H□ 40A365□P□	365		381
60A140□H□ 60A140□P□	140	16	156
60A253□H□ 60A253□P□	252.5		268.5
60A365□H□ 60A365□P□	365		381
90A200□H□ 90A200□P□	199	0 (Included in the length of moving coil.)	199
90A370□H□ 90A370□P□	367		367
90A535□H□ 90A535□P□	535		535

Ratings and Specifications

Specifications: With Standard-Force Magnetic Way

Linear Servomotor Moving Coil Model SGLGW-		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
Time Rating		Continuous										
Thermal Class		B										
Insulation Resistance		500 VDC, 10 MΩ min.										
Withstand Voltage		1500 VAC for 1 minute										
Excitation		Permanent magnet										
Cooling Method		Self-cooled or air-cooled (Only self-cooled models are available for the SGLGW-30A.)										
Protective Structure		IP00										
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 1000 m or less. Must be free of strong magnetic fields.										
Shock Resistance	Impact Acceleration Rate	196 m/s^2										
	Number of Impacts	2 times										
Vibration Resistance	Vibration Acceleration Rate	49 m/s^2 (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)										

Ratings: With Standard-Force Magnetic Way

Linear Servomotors Moving Coil Model SGLGW-		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
Rated Motor Speed (Reference Speed during Speed Control) *1	m/s	1.5	1.5	2.0	2.0	2.0	2.3	2.3	2.3	1.8	1.5	1.5
Maximum Speed *1	m/s	5.0	5.0	5.0	5.0	5.0	4.8	4.8	4.8	4.0	4.0	4.0
Rated Force *1, *2	N	12.5	25	47	93	140	70	140	210	325	550	750
Maximum Force *1	N	40	80	140	280	420	220	440	660	1300	2200	3000
Rated Current *1	Arms	0.51	0.79	0.80	1.6	2.4	1.2	2.2	3.3	4.4	7.5	10.2
Maximum Current *1	Arms	1.6	2.5	2.4	4.9	7.3	3.5	7.0	10.5	17.6	30.0	40.8

Continued on next page.

Continued from previous page.

Linear Servomotors Moving Coil Model SGLGW-		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
Moving Coil Mass	kg	0.10	0.15	0.34	0.60	0.87	0.42	0.76	1.1	2.2	3.6	4.9
Force Constant	N/Arms	26.4	33.9	61.5	61.5	61.5	66.6	66.6	66.6	78.0	78.0	78.0
BEMF Constant	Vrms/ (m/s)/phase	8.80	11.3	20.5	20.5	20.5	22.2	22.2	22.2	26.0	26.0	26.0
Motor Constant	N/$\sqrt{W}$	3.66	5.63	7.79	11.0	13.5	11.1	15.7	19.2	26.0	36.8	45.0
Electrical Time Constant	ms	0.19	0.41	0.43	0.43	0.43	0.45	0.45	0.45	1.4	1.4	1.4
Mechanical Time Constant	ms	7.5	4.7	5.6	5.0	4.8	3.4	3.1	3.0	3.3	2.7	2.4
Thermal Resistance (with Heat Sink)	K/W	5.19	3.11	1.67	0.87	0.58	1.56	0.77	0.51	0.39	0.26	0.22
Thermal Resistance (without Heat Sink)	K/W	8.13	6.32	3.02	1.80	1.23	2.59	1.48	1.15	1.09	0.63	0.47
Magnetic Attraction	N	0	0	0	0	0	0	0	0	0	0	0
Maximum Allowable Payload	kg	1.7	3.4	5.9	12	18	9.9	19	48	110	190	260
Maximum Allowable Payload (With External Regenerative Resistor)	kg	1.7	3.4	5.9	12	18	9.9	19	48	110	190	260
Combined Magnetic Way, SGLGM-		30□□□A		40□□□C□			60□□□C□			90□□□A		
Combined Serial Converter Unit, JZDP-□□□□-		250	251	252	253	254	258	259	260	264	265	266
Applicable SERVOPACKs	SGDXS-	R70A	R90A		1R6A	2R8A	1R6A	2R8A	5R5A	120A	180A	200A
	SGDXW-	1R6A				2R8A	1R6A	2R8A	5R5A	-		

*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.

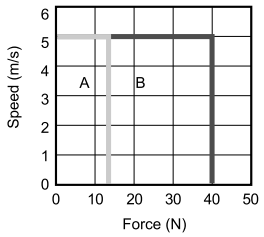
*2 The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
Heat Sink Dimensions

- 200 mm × 300 mm × 12 mm: SGLGW-30A050C, 30A080C, 40A140C, 60A140C
- 300 mm × 400 mm × 12 mm: SGLGW-40A253C, 60A253C
- 400 mm × 500 mm × 12 mm: SGLGW-40A365C, 60A365C
- 800 mm × 900 mm × 12 mm: SGLGW-90A200C, 90A370C, 90A535C

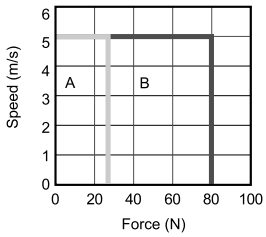
Force-Motor Speed Characteristics

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

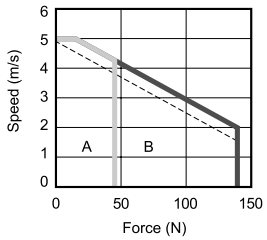
SGLGW-30A050C*



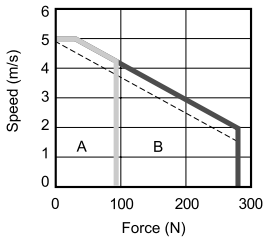
SGLGW-30A080C*



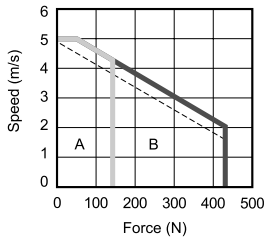
SGLGW-40A140C



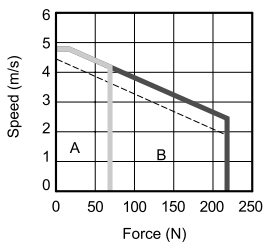
SGLGW-40A253C



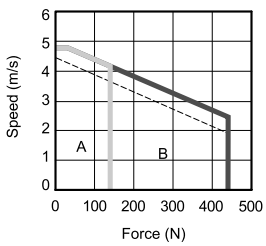
SGLGW-40A365C



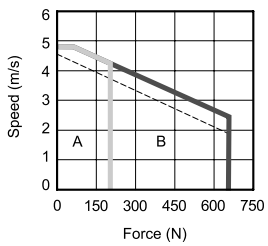
SGLGW-60A140C



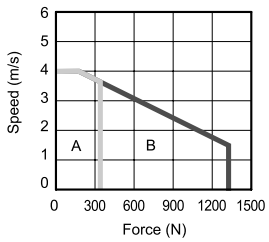
SGLGW-60A253C



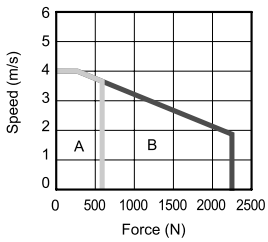
SGLGW-60A365C



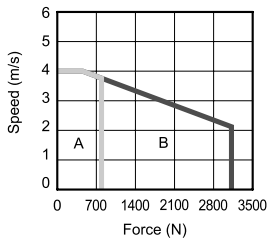
SGLGW-90A200C



SGLGW-90A370C



SGLGW-90A535C



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

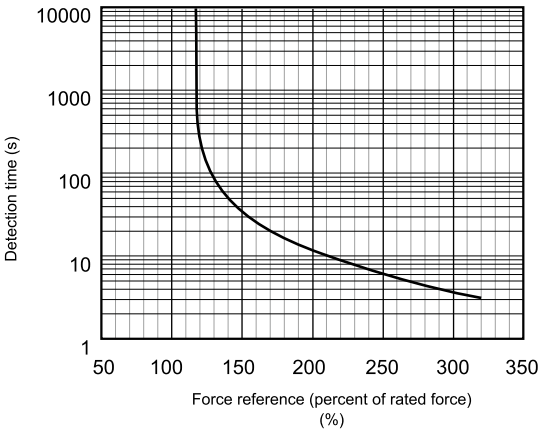
Note:

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 force is within the allowable range for the rated force, 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.

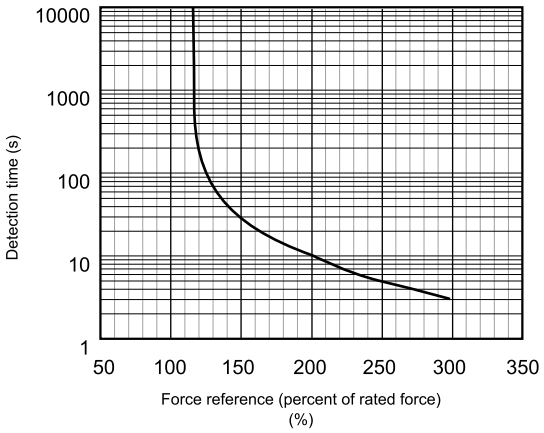
Servomotor Overload Protection Characteristics

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

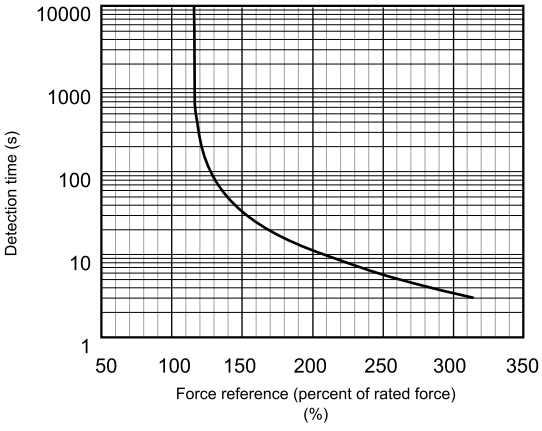
SGLGW-30A



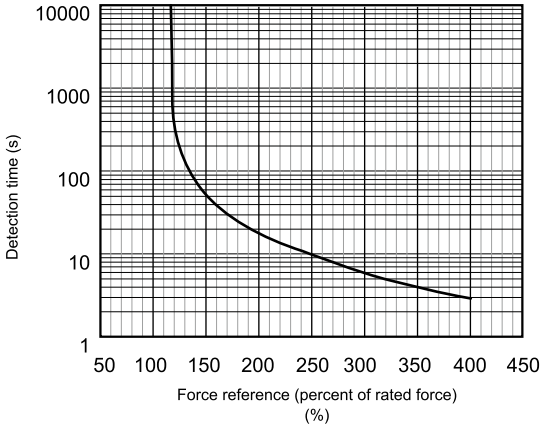
SGLGW-40A



SGLGW-60A



SGLGW-90A



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 given in *Force-Motor Speed Characteristics on page 399*.

Specifications: With High-Force Magnetic Way

Linear Servomotor Moving Coil Model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Time Rating		Continuous					
Thermal Class		B					
Insulation Resistance		500 VDC, 10 MΩ min.					
Withstand Voltage		1,500 VAC for 1 minute					
Excitation		Permanent magnet					
Cooling Method		Self-cooled or air-cooled					
Protective Structure		IP00					
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.					
Shock Resistance	Impact Acceleration Rate	196 m/s^2					
	Number of Impacts	2 times					
Vibration Resistance	Vibration Acceleration Rate	49 m/s^2(the vibration resistance in three directions, vertical, side-to-side, and front-to-back)					

Ratings: With High-Force Magnetic Way

Linear Servomotor Moving Coil Model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Rated Motor Speed (Reference Speed during Speed Control) *1	m/s	1.0	1.0	1.0	1.0	1.0	1.0
Maximum Speed *1	m/s	4.2	4.2	4.2	4.2	4.2	4.2
Rated Force *1, *2	N	57	114	171	85	170	255
Maximum Force *1	N	230	460	690	360	720	1080
Rated Current *1	Arms	0.80	1.6	2.4	1.2	2.2	3.3
Maximum Current *1	Arms	3.2	6.5	9.7	5.0	10.0	14.9
Moving Coil Mass	kg	0.34	0.60	0.87	0.42	0.76	1.1
Force Constant	N/Arms	76.0	76.0	76.0	77.4	77.4	77.4
BEMF Constant	Vrms/(m/s)/phase	25.3	25.3	25.3	25.8	25.8	25.8
Motor Constant	$N/\sqrt{W}$	9.62	13.6	16.7	12.9	18.2	22.3
Electrical Time Constant	ms	0.43	0.43	0.43	0.45	0.45	0.45

Continued on next page.

Continued from previous page.

Linear Servomotor Moving Coil Model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Mechanical Time Constant	ms	3.7	3.2	3.1	2.5	2.3	2.2
Thermal Resistance (with Heat Sink)	K/W	1.67	0.87	0.58	1.56	0.77	0.51
Thermal Resistance (without Heat Sink)	K/W	3.02	1.80	1.23	2.59	1.48	1.15
Magnetic Attraction	N	0	0	0	0	0	0
Maximum Allowable Payload	kg	12	24	58	18	61	91
Maximum Allowable Payload (With External Regenerative Resistor)	kg	12	24	58	18	61	91
Combined Magnetic Way, SGLGM-		40□□□C□-M			60□□□C□-M		
Combined Serial Converter Unit JZDP-□□□□-		255	256	257	261	262	263
Applicable SERVOPACKs	SGDXS-	1R6A	2R8A	3R8A	1R6A	3R8A	7R6A
	SGDXW-	1R6A	2R8A	5R5A	1R6A	5R5A	7R6A

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

<・ Heat Sink Dimensions>

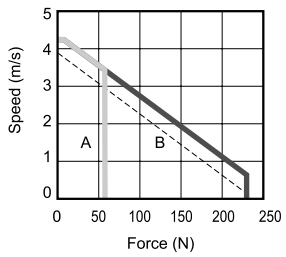
- 200 mm × 300 mm × 12 mm: SGLGW-40A140C, 60A140C
- 300 mm × 400 mm × 12 mm: SGLGW-40A253C, 60A253C
- 400 mm × 500 mm × 12 mm: SGLGW-40A365C, 60A365C

Force-Motor Speed Characteristics

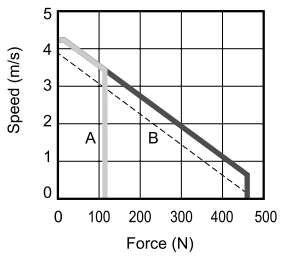
A : Continuous duty zone ———— (solid lines): With three-phase 200-V input

B : Intermittent duty zone - - - - - - - - (dotted lines): With single-phase 200-V input

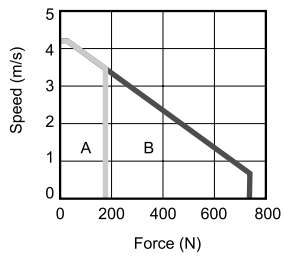
SGLGW-40A140C



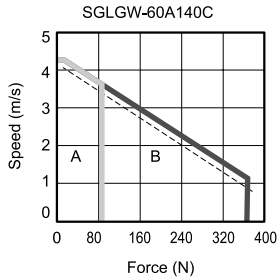
SGLGW-40A253C



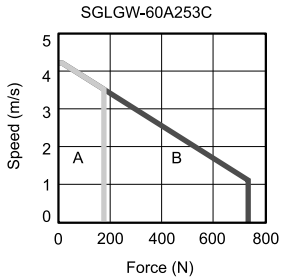
SGLGW-40A365C



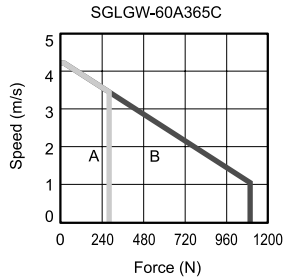
SGLGW-60A140C



SGLGW-60A253C



SGLGW-60A365C



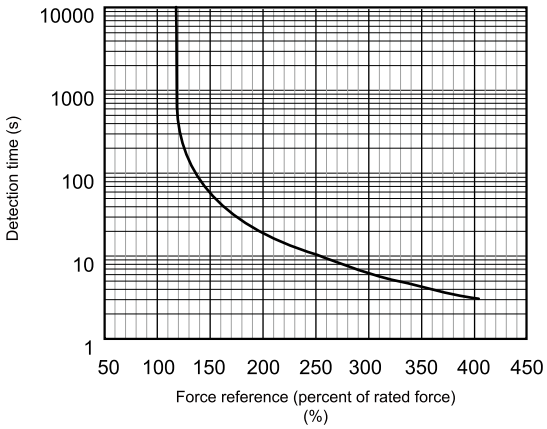
Note:

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 force is within the allowable range for the rated force, 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.

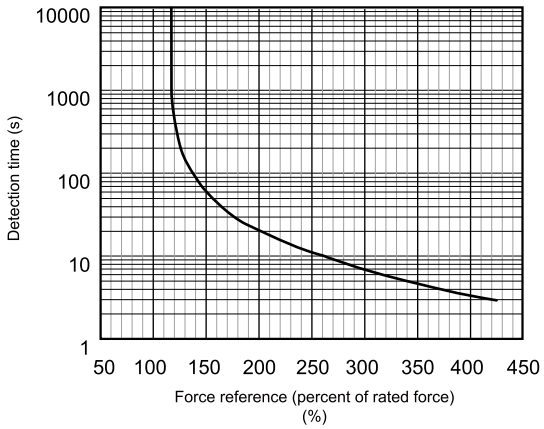
Servomotor Overload Protection Characteristics

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

SGLGW-40A with High-Force Magnetic Way



SGLGW-60A with High-Force Magnetic Way



Note:

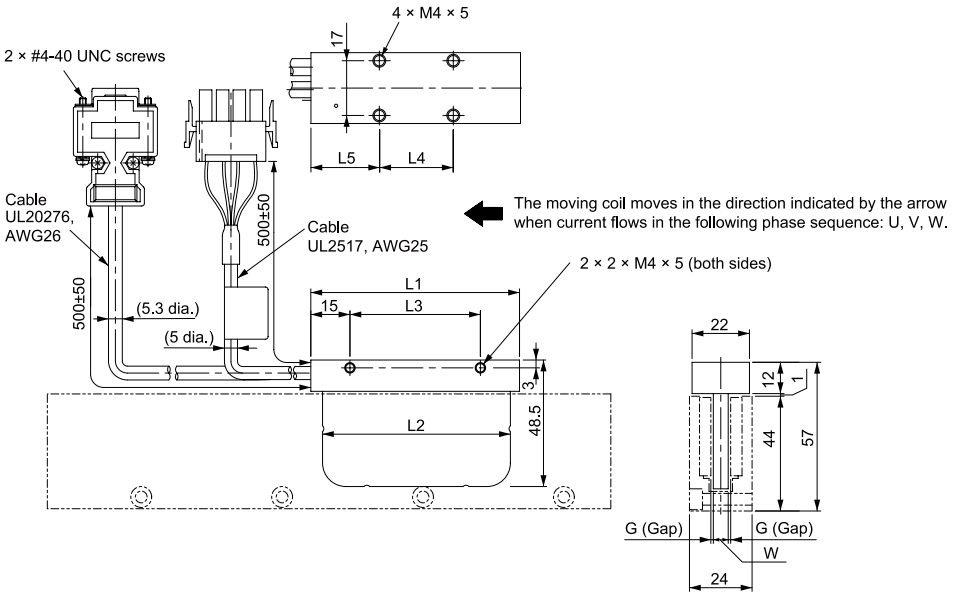
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

Use the servomotor so that the effective force remains within the continuous duty zone given in *Force-Motor Speed Characteristics on page 403*.

External Dimensions

SGLGW-30

■ Moving Coils: SGLGW-30A□□□C□



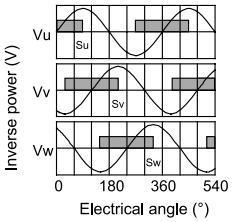
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass *1 [kg]
30A050C□	50	48	30	20	20	5.9	0.85	0.14
30A080C□	80	72	50	30	25	5.7	0.95	0.19

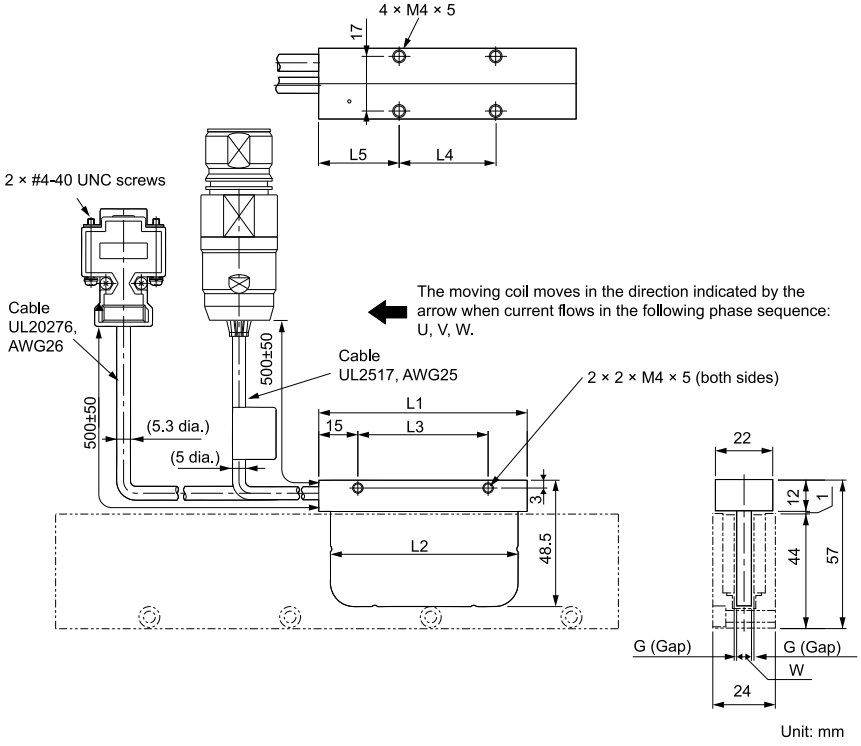
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coils: SGLGW-30A□□□C□D

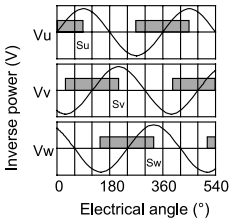


Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass *1 [kg]
30A050C□D	50	48	30	20	20	5.9	0.85	0.14
30A080C□D	80	72	50	30	25	5.7	0.95	0.19

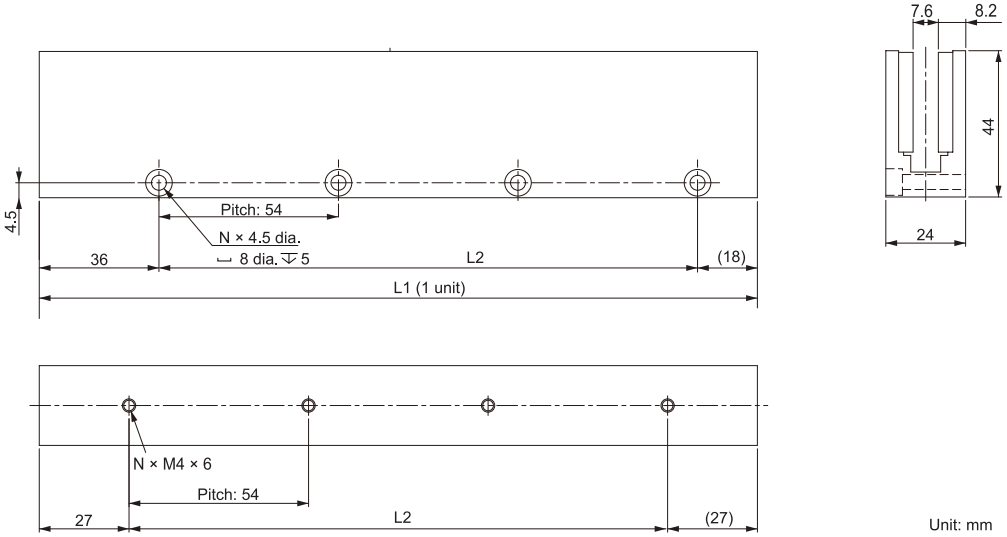
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Standard-Force Magnetic Ways: SGLGM-30□□□A

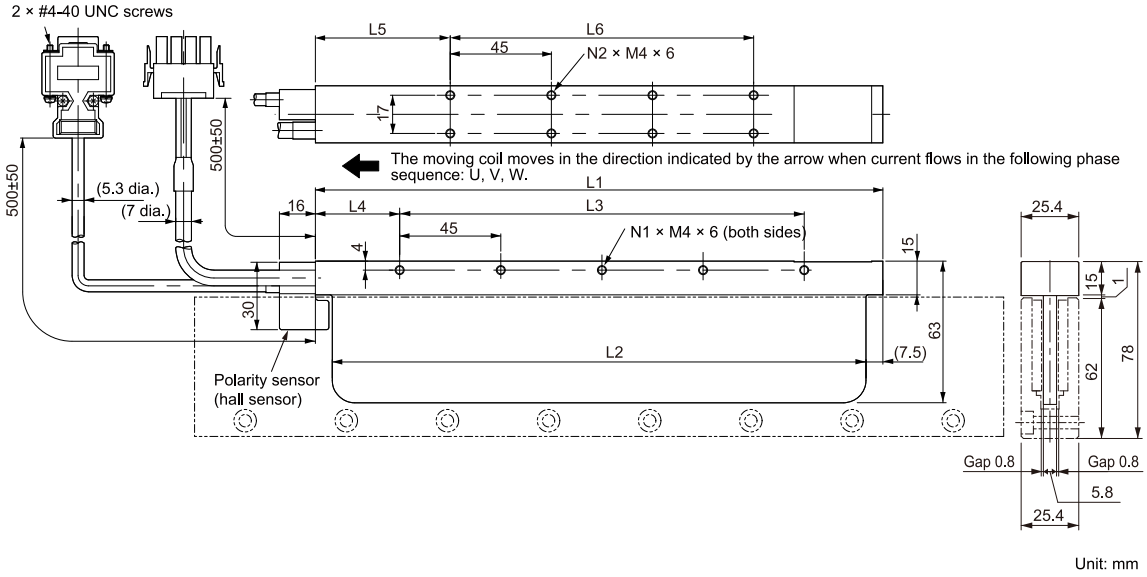


Unit: mm

Magnetic Way Model SGLGM -	L1	L2	N	Approx. Mass [kg]
30108A	$108^{-0.1}_{-0.3}$	54	2	0.6
30216A	$216^{-0.1}_{-0.3}$	162	4	1.1
30432A	$432^{-0.1}_{-0.3}$	378	8	2.3

SGLGW-40

■ Moving Coils: SGLGW-40A□□□C□



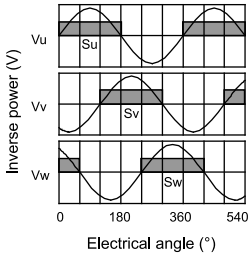
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
40A140C□	140	125	90	30	52.5	45	3	4	0.40
40A253C□	252.5	237.5	180	37.5	60	135	5	8	0.66
40A365C□	365	350	315	30	52.5	270	8	14	0.93

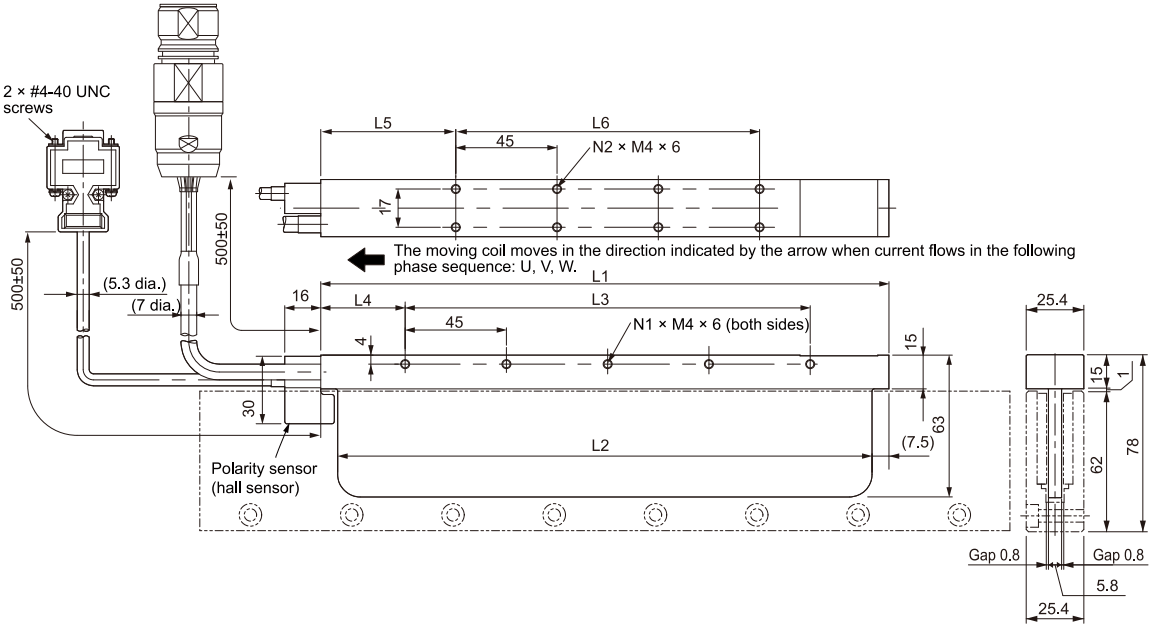
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coils: SGLGW-40A□□□C□D



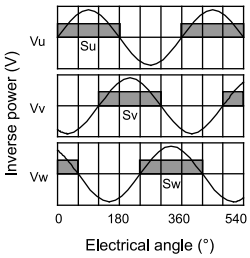
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
40A140C□D	140	125	90	30	52.5	45	3	4	0.40
40A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.66
40A365C□D	365	350	315	30	52.5	270	8	14	0.93

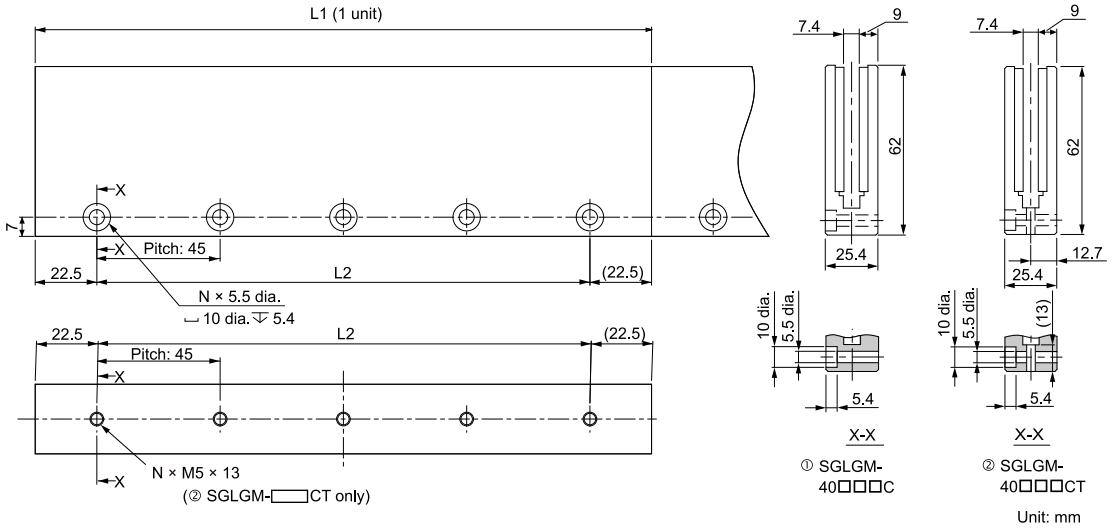
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.

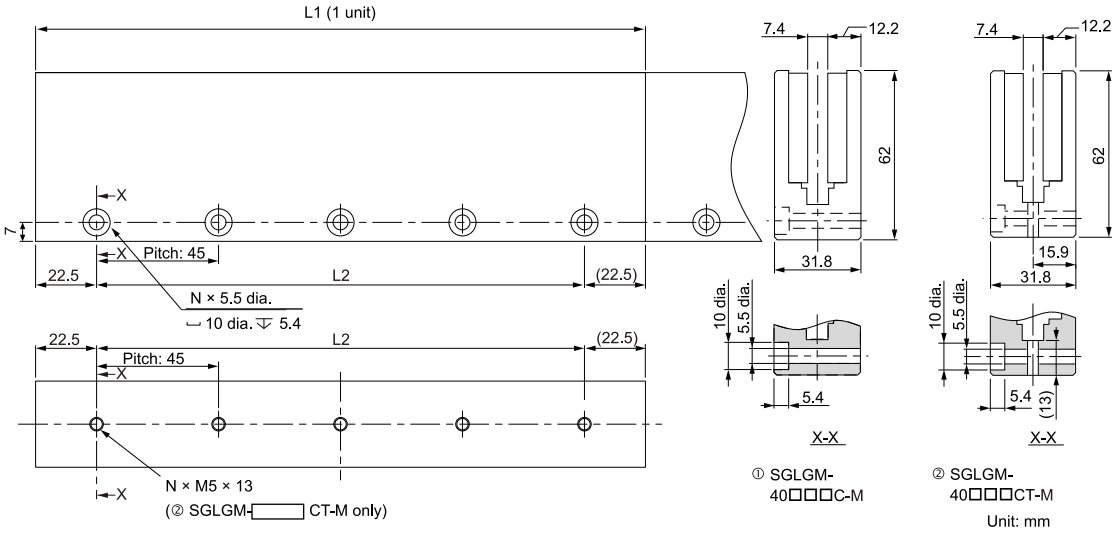


■ Standard-Force Magnetic Ways: SGLGM-40□□□C(without Mounting Holes on the Bottom) SGLGM-40□□□CT(with Mounting Holes on the Bottom)



Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
Standard-Force	40090C or 40090CT	$90^{-0.1}_{-0.3}$	45	2	0.8
	40225C or 40225CT	$225^{-0.1}_{-0.3}$	180	5	2.0
	40360C or 40360CT	$360^{-0.1}_{-0.3}$	315	8	3.1
	40405C or 40405CT	$405^{-0.1}_{-0.3}$	360	9	3.5
	40450C or 40450CT	$450^{-0.1}_{-0.3}$	405	10	3.9

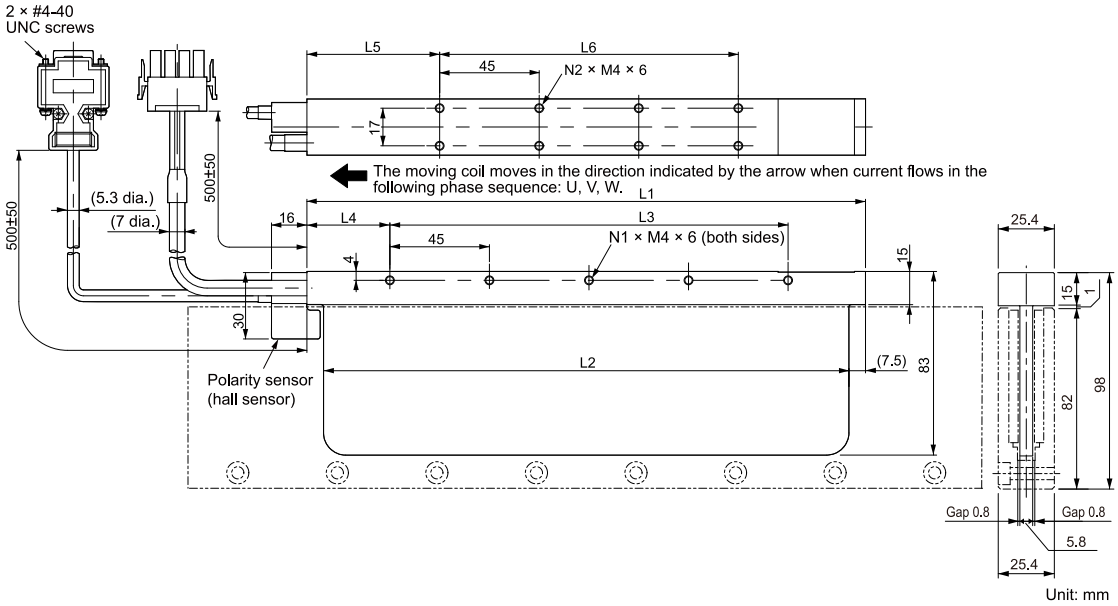
■ High-Force Magnetic Ways: SGLGM-40□□□C-M(without Mounting Holes on the Bottom) SGLGM-40□□□CT-M(with Mounting Holes on the Bottom)



Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
High-Force	40090C-M or 40090CT-M	$90^{-0.1}_{-0.3}$	45	2	1.0
	40225C-M or 40225CT-M	$225^{-0.1}_{-0.3}$	180	5	2.6
	40360C-M or 40360CT-M	$360^{-0.1}_{-0.3}$	315	8	4.1
	40405C-M or 40405CT-M	$405^{-0.1}_{-0.3}$	360	9	4.6
	40450C-M or 40450CT-M	$450^{-0.1}_{-0.3}$	405	10	5.1

SGLGW-60

■ Moving Coils: SGLGW-60A□□□C□

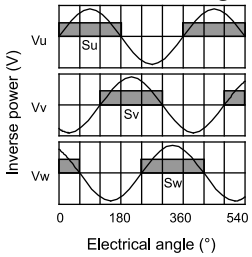


Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
60A140C□	140	125	90	30	52.5	45	3	4	0.48
60A253C□	252.5	237.5	180	37.5	60	135	5	8	0.82
60A365C□	365	350	315	30	52.5	270	8	14	1.16

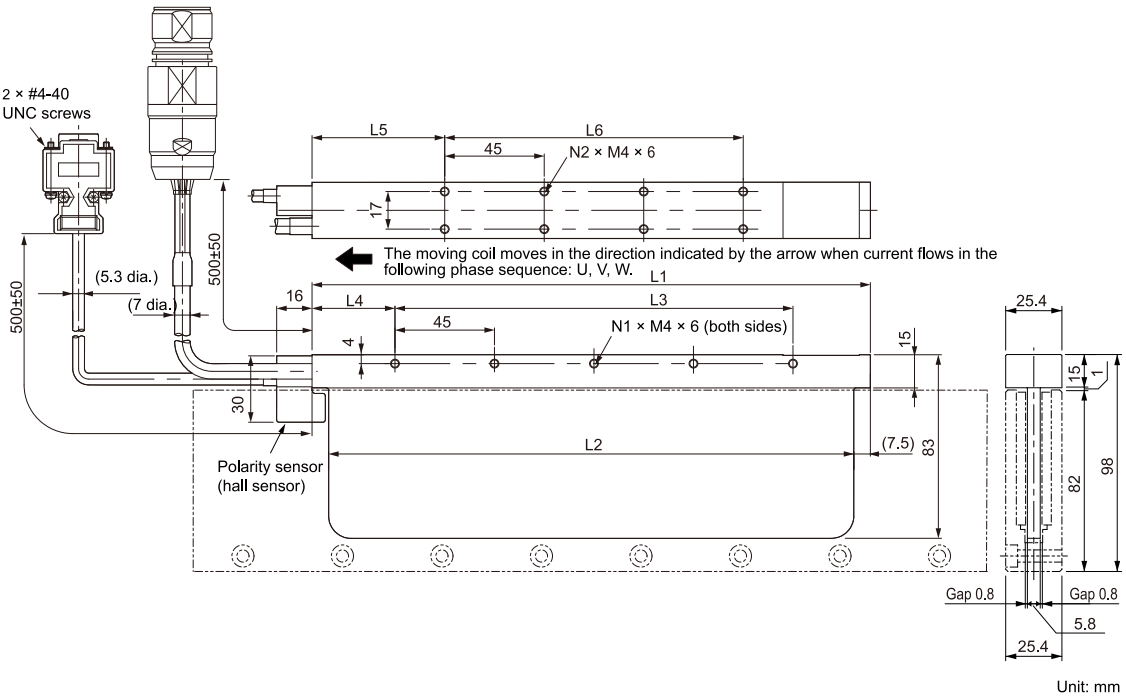
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coils: SGLGW-60A□□□C□D



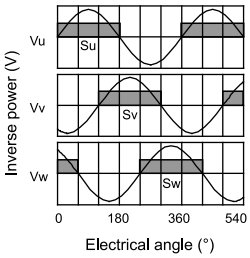
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
60A140C□D	140	125	90	30	52.5	45	3	4	0.48
60A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.82
60A365C□D	365	350	315	30	52.5	270	8	14	1.16

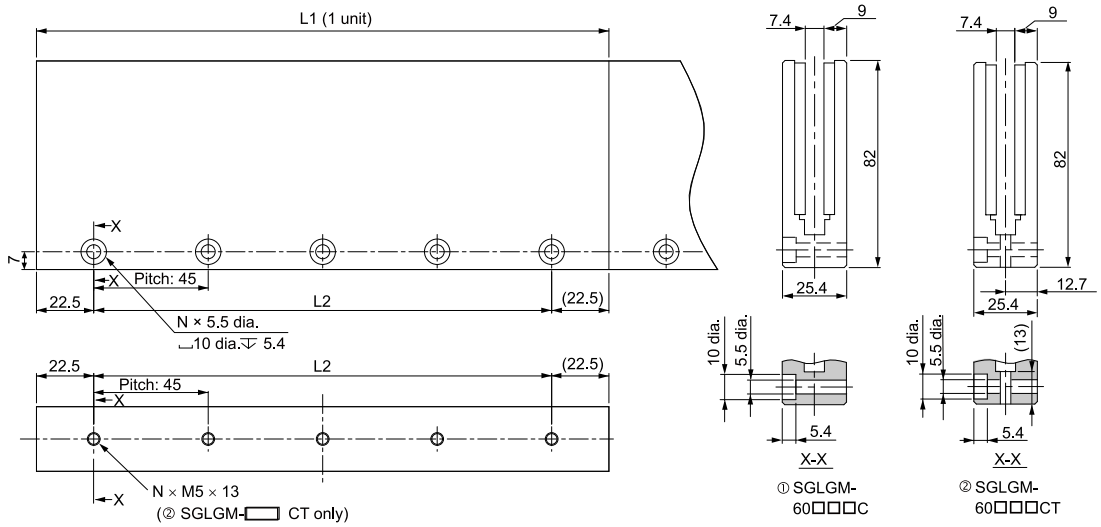
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



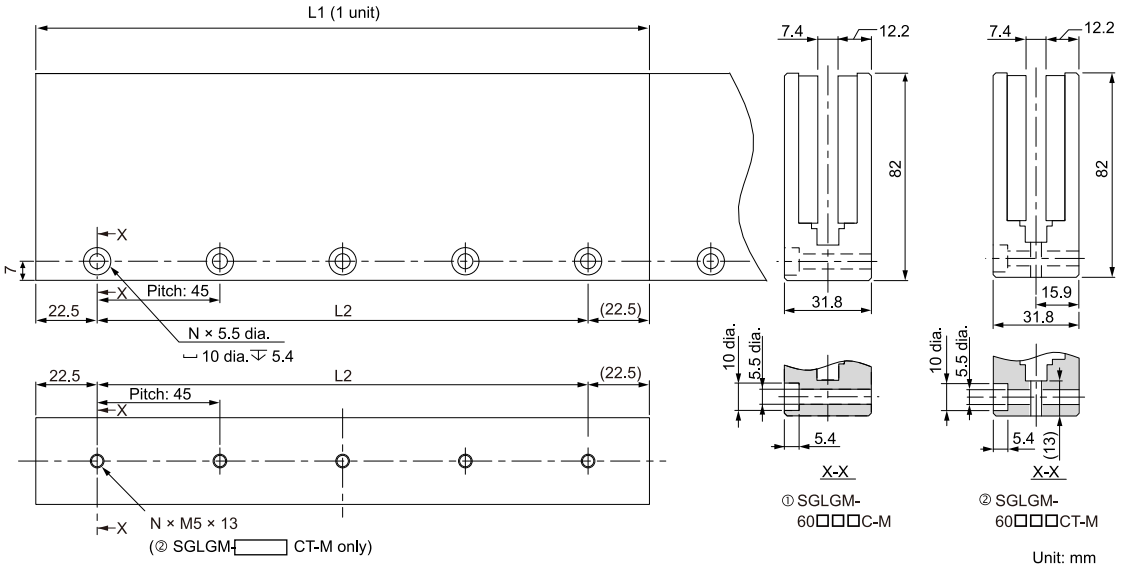
■ Standard-Force Magnetic Ways: SGLGM-60□□□C(without Mounting Holes on the Bottom) SGLGM-60□□□CT(with Mounting Holes on the Bottom)



Unit: mm

Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
Standard-Force	60090C or 60090CT	$90^{-0.1}_{-0.3}$	45	2	1.1
	60225C or 60225CT	$225^{-0.1}_{-0.3}$	180	5	2.6
	60360C or 60360CT	$360^{-0.1}_{-0.3}$	315	8	4.1
	60405C or 60405CT	$405^{-0.1}_{-0.3}$	360	9	4.6
	60450C or 60450CT	$450^{-0.1}_{-0.3}$	405	10	5.1

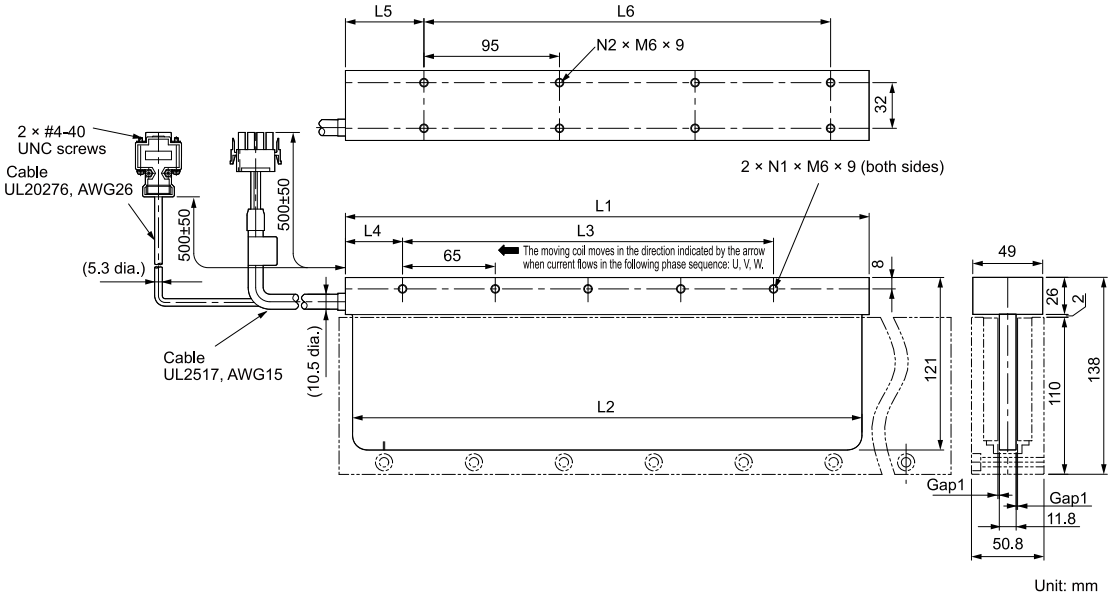
■ High-Force Magnetic Ways: SGLGM-60□□□C-M(without Mounting Holes on the Bottom) SGLGM-60□□□CT-M(with Mounting Holes on the Bottom)



Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
High-Force	60090C-M or 60090CT-M	$90^{-0.1}_{-0.3}$	45	2	1.3
	60225C-M or 60225CT-M	$225^{-0.1}_{-0.3}$	180	5	3.3
	60360C-M or 60360CT-M	$360^{-0.1}_{-0.3}$	315	8	5.2
	60405C-M or 60405CT-M	$405^{-0.1}_{-0.3}$	360	9	5.9
	60450C-M or 60450CT-M	$450^{-0.1}_{-0.3}$	405	10	6.6

SGLGW-90

■ Moving Coils: SGLGW-90A□□□C□

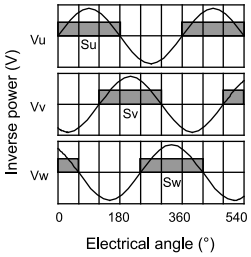


Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
90A200C□	199	189	130	40	60	95	3	4	2.2
90A370C□	367	357	260	40	55	285	5	8	3.65
90A535C□	535	525	455	40	60	380	8	10	4.95

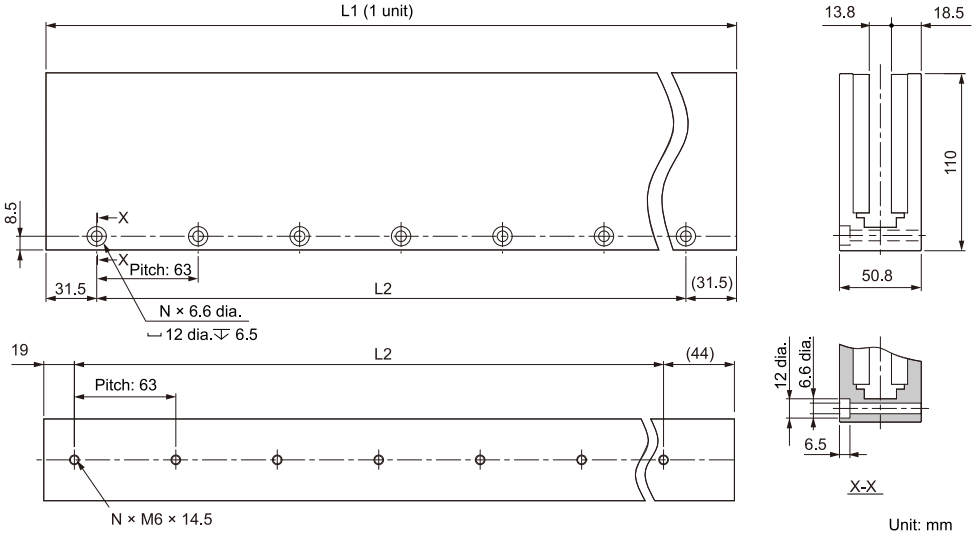
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Standard-Force Magnetic Ways: SGLGM-90□□□A



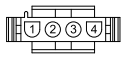
Magnetic Way Model SGLGM -	L1	L2	N	Approx. Mass [kg]
90252A	$252^{-0.1}_{-0.3}$	189	4	7.3
90504A	$504^{-0.1}_{-0.3}$	441	8	14.7

Connector Specifications

SGLGW-30

■ SGLGW-30A□□□C□

· Servomotor Connector

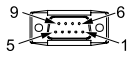


1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350924-1 or 770672-1
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350925-1 or 770673-1

· Polarity Sensor (Hall Sensor) Connector



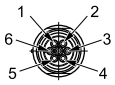
1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

■ SGLGW-30A□□□C□D

· Servomotor Connector

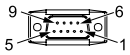


1	Phase U	Red	4	Not used	-
2	Phase V	White	5	Not used	-
3	Phase W	Blue	6	FG	Green

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

· Polarity Sensor (Hall Sensor) Connector



1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

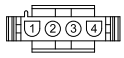
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLGW-40

■ SGLGW-40A□□□C□

· Servomotor Connector



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1

Pins: 350561-3 or 350690-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

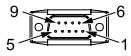
From Tyco Electronics Japan G.K.

Mating Connector

Cap: 350780-1

Socket: 350570-3 or 350689-3

· Polarity Sensor (Hall Sensor) Connector



1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG

From DDK Ltd.

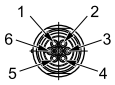
Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

Studs: 17L-002C or 17L-002C1

■ SGLGW-40A□□□C□D

· Servomotor Connector

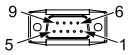


1	Phase U	Red	4	Not used	-
2	Phase V	White	5	Not used	-
3	Phase W	Blue	6	FG	Green

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

· Polarity Sensor (Hall Sensor) Connector



1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

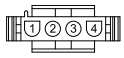
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLGW-60

■ SGLGW-60A□□□C□

· Servomotor Connector

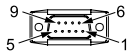


1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350561-3 or 350690-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350689-3

· Polarity Sensor (Hall Sensor) Connector



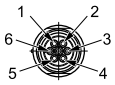
1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

■ SGLGW-60A□□□C□D

· Servomotor Connector

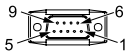


1	Phase U	Red	4	Not used	-
2	Phase V	White	5	Not used	-
3	Phase W	Blue	6	FG	Green

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

· Polarity Sensor (Hall Sensor) Connector



1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

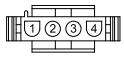
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLGW-90

■ SGLGW-90A□□□C□

· Servomotor Connector

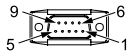


1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350218-3 or 350547-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

· Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

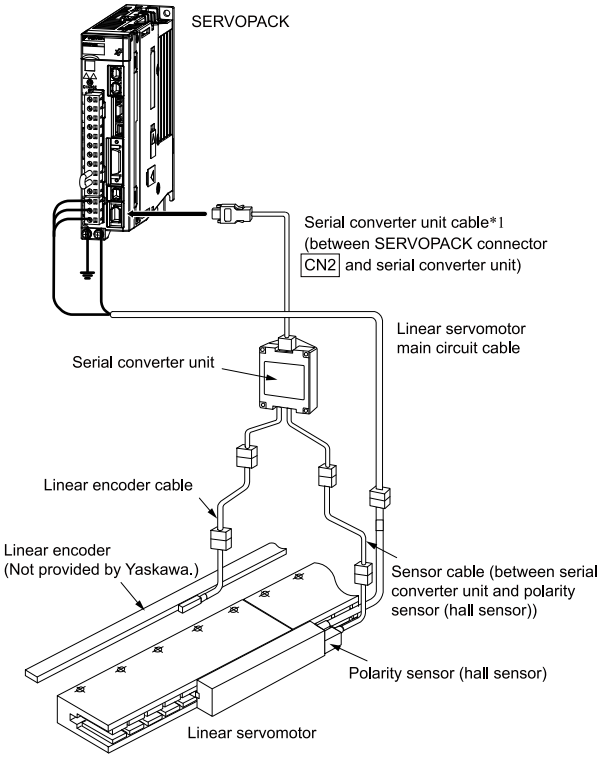
Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

Selecting Cables

Cable Configurations

Refer to *Recommended Linear Encoders on page 536* to select a linear encoder.

Prepare the cable required for the encoder.



*1 You can connect directly to an absolute linear encoder.

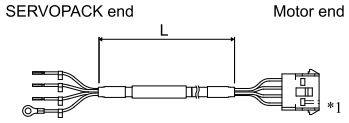
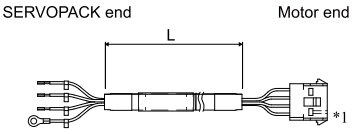
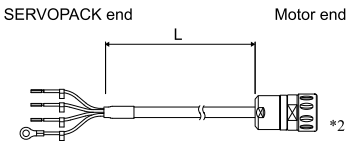
Note:

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-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Linear Servomotor Main Circuit Cables

Linear Servomotor Model	Length (L)	Order Number	Appearance
SGLGW-30A, -40A, -60A	1 m	JZSP-CLN11-01-E	
	3 m	JZSP-CLN11-03-E	
	5 m	JZSP-CLN11-05-E	
	10 m	JZSP-CLN11-10-E	
	15 m	JZSP-CLN11-15-E	
	20 m	JZSP-CLN11-20-E	
SGLGW-90A	1 m	JZSP-CLN21-01-E	
	3 m	JZSP-CLN21-03-E	
	5 m	JZSP-CLN21-05-E	
	10 m	JZSP-CLN21-10-E	
	15 m	JZSP-CLN21-15-E	
	20 m	JZSP-CLN21-20-E	
SGLGW-30A□□□□□D, 40A□□□□□D, 60A□□□□□D	1 m	JZSP-CLN14-01-E	
	3 m	JZSP-CLN14-03-E	
	5 m	JZSP-CLN14-05-E	
	10 m	JZSP-CLN14-10-E	
	15 m	JZSP-CLN14-15-E	
	20 m	JZSP-CLN14-20-E	

*1 Connector from Tyco Electronics Japan G.K.
*2 Connector from Interconnectron GmbH

SGLF2 (Models with F-type Iron Cores - 200 V)

Model Designations

Moving Coil

S G L F W2 - 30 A 070 A T 1 H

Linear Σ series linear servomotors

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

1st digit Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W2	Moving coil

3rd+4th digits Magnet Height

Code	Specification
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

Non-Stock

5th digit Power Supply Voltage

Code	Specification
A	200 VAC

6th+7th+8th digits Length of Moving Coil

Code	Specification
070	70 mm
120	125 mm
200	205 mm
230	230 mm
380	384 mm
560	563 mm

9th digit Design Revision Order

A

10th digit Sensor Specification

Code	Specification
S	With polarity sensor(hall sensor) and thermal protector
T	Without polarity sensor(hall sensor), with thermal protector

11th digit Cooling Method

Code	Specification
1	Self-cooled
L	Water-cooled*1

12th digit Connector for Servomotor Main Circuit Cable and Cable Length

Code	Specification
None	Connector from Tyco Electronics Japan G.K., 300 mm
F	Loose lead wires with no connector, 300 mm
G	Loose lead wires with no connector, 500 mm
H	Connector from Tyco Electronics Japan G.K., 500 mm

*1 Contact your Yaskawa representative for details on water-cooled models.

Note:

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Magnetic Way

S G L F M 2 - 30 270 A

Linear Σ series linear servomotors

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

1st digit Servomotor Type

(Same as for the moving coil.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M2	Magnetic way

3rd+4th digits Magnet Height

(Same as for the moving coil.)

5th+6th+7th digits Length of Magnetic Way

Code	Specification
270	270 mm
306	306 mm
450	450 mm
510	510 mm
630	630 mm
714	714 mm

8th digit Design Revision Order

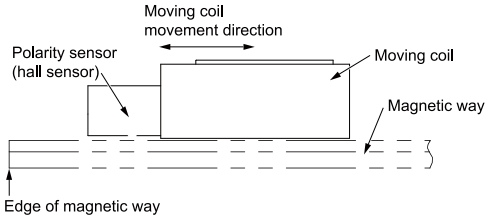
A

Precautions on Moving Coils with Polarity Sensors (Hall Sensors)

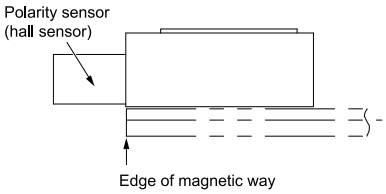
When you use a moving coil with a polarity sensor (hall sensor), the magnetic way must cover the bottom of the polarity sensor (hall sensor). Refer to the example that shows the correct installation.

When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length (L) of the moving coil and the polarity sensor (hall sensor). Refer to the following table.

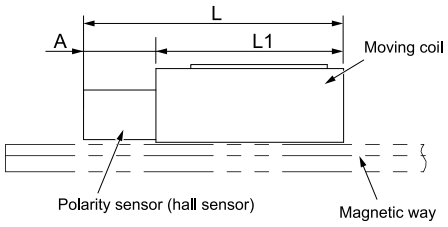
<Correct>



<Incorrect>



■ Total Length of Moving Coil with Polarity Sensor (Hall Sensor)



Moving Coil Model SGLFW2-	Length of Moving Coil L1 [mm]	Length of Polarity Sensor (Hall Sensor) A [mm]	Total Length L [mm]
30A070AS	70	27	97
30A120AS	125		152
30A230AS	230		257
45A200AS	205	32	237
45A380AS	384		416
90A200AS	205	32	237
90A380AS	384		416
90A560AS	563		595
1DA380AS	384	32	416
1DA560AS	563		595

Ratings and Specifications

Specifications

Linear Servomotor Moving Coil Model SGLFW2-		30A			45A		90A			1DA	
		070A□	120A□	230A□	200A□	380A□	200A□	380A□	560A□	380A□	560A□
Time Rating		Continuous									
Thermal Class		B									
Insulation Resistance		500 VDC, 10 MΩ min.									
Withstand Voltage		1,500 VAC for 1 minute									
Excitation		Permanent magnet									
Cooling Method		Self-cooled and water-cooled *1*									
Protective Structure		IP00									
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.									
Shock Resistance	Impact Acceleration	196 m/s^2									
	Number of Impacts	2 times									
Vibration Resistance	Vibration Acceleration	49 m/s^2 (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)									

*1 Contact your Yaskawa representative for details on water-cooled models.

Ratings

Linear Servomotor Moving Coil Model SGLFW2-		30A				45A		
		070A□1	120A□1	230A□1		200A□1	380A□1	
Rated Speed (Reference Speed during Speed Control) *1*	m/s	4.0	4.0	4.0		4.0	4.0	
Maximum speed *1* *2*	m/s	5.0	5.0	5.0		4.5	4.5	
Rated Force *1*	N	45	90	180	170	280	560	
Maximum Force *1*	N	135	270	540	500	840	1680	1500
Rated Current *1*	Arms	1.4	1.5	2.9	2.8	4.4	8.7	
Maximum Current *1*	Arms	5.3	5.2	10.5	9.3	16.4	32.7	27.5
Moving Coil Mass	kg	0.50	0.90	1.7		2.9	5.5	

Continued on next page.

Continued from previous page.

Linear Servomotor Moving Coil Model SGLFW2-		30A				45A		
		070A□1	120A□1	230A□1		200A□1	380A□1	
Force Constant	N/Arms	33.3	64.5	64.5		67.5	67.5	
BEMF Constant	Vrms/(m/s)/phase	11.1	21.5	21.5		22.5	22.5	
Motor Constant	N/√W	11.3	17.3	24.4		36.9	52.2	
Electrical Time Constant	ms	7.6	7.3	7.3		19	19	
Mechanical Time Constant	ms	3.9	3.0	2.9		2.1	2.0	
Thermal Resistance (with Heat Sink)	K/W	2.62	1.17	0.79		0.60	0.44	
Thermal Resistance (without Heat Sink)	K/W	11.3	4.43	2.55		2.64	1.49	
Magnetic Attraction	N	200	630	1260		2120	4240	
Maximum Allowable Payload	kg	5.6	9.4	34	10	58	110	95
Maximum Allowable Payload (With External Regenerative Resistor)	kg	5.6	11	34	20	64	110	110
Combined Magnetic Way, SGLFM2-		30□□□A				45□□□A		
Combined Serial Converter Unit, JZDP-□□□□-		628	629	630		631	632	
Applicable SERVOPACKs	SGDXS-	1R6A		3R8A	2R8A	5R5A	180A	120A
	SGDXW-	1R6A		-	2R8A	5R5A	-	

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

- 150 mm × 100 mm × 10 mm: SGLFW2-30A070A
- 254 mm × 254 mm × 25 mm: SGLFW2-30A120A and 30A230A
- 400 mm × 500 mm × 25 mm: SGLFW2-45A200A and 45A380A

Linear Servomotor Moving Coil Model SGLFW2-		90A			1DA	
		200A□1	380A□1	560A□1	380A□1	560A□1
Rated Speed (Reference Speed during Speed Control) *1	m/s	4.0	4.0	4.0	2.0	2.0
Maximum speed *1	m/s	4.0	4.0	4.0	2.5	2.5
Rated Force *1 *2	N	560	1120	1680	1680	2520
Maximum Force *1	N	1680	3360	5040	5040	7560
Rated Current *1	Arms	7.2	14.4	21.6	14.4	21.6
Maximum Current *1	Arms	26.9	53.9	80.8	53.9	80.8
Moving Coil Mass	kg	5.3	10.1	14.9	14.6	21.5

Continued on next page.

Continued from previous page.

Linear Servomotor Moving Coil Model SGLFW2-		90A			1DA	
		200A□1	380A□1	560A□1	380A□1	560A□1
Force Constant	N/Arms	82.0	82.0	82.0	123	123
BEMF Constant	Vrms/(m/s)/phase	27.3	27.3	27.3	41.0	41.0
Motor Constant	N/√W	58.1	82.2	101	105	129
Electrical Time Constant	ms	24	23	24	25	25
Mechanical Time Constant	ms	1.6	1.5	1.5	1.3	1.3
Thermal Resistance (with Heat Sink)	K/W	0.45	0.21	0.18	0.18	0.12
Thermal Resistance (without Heat Sink)	K/W	1.81	1.03	0.72	0.79	0.55
Magnetic Attraction	N	4240	8480	12700	12700	19100
Maximum Allowable Payload	kg	130	160	360	690	1000
Maximum Allowable Payload (With External Regenerative Resistor)	kg	140	290	440	710	1000
Combined Magnetic Way, SGLFM2-		90□□□A			1D□□□A	
Combined Serial Converter Unit, JZDP-□□□□-		633	634	648	649	650
Applicable SERVOPACKs	SGDXS-	120A	200A	330A	200A	330A
	SGDXW-	-				

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

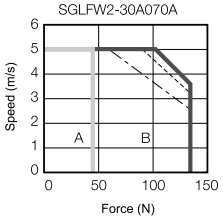
- 400 mm × 500 mm × 25 mm: SGLFW2-90A200A
- 609 mm × 762 mm × 40 mm: SGLFW2-90A380A
- 900 mm × 762 mm × 40 mm: SGLFW2-90A560A and 1DA380A
- 1400 mm × 900 mm × 40 mm: SGLFW2-1DA560A

Force-Motor Speed Characteristics

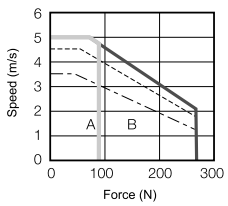
A : Continuous duty zone
B : Continuous duty zone

——— (solid lines): With three-phase 200-V input
- - - - - - - (dotted lines): With single-phase 200-V input
— - — - — (dashed lines): With single-phase 100-V input

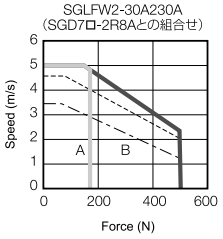
SGLFW2-30A070A



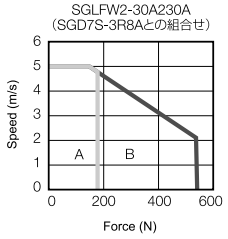
SGLFW2-30A120A



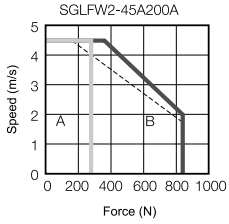
SGLFW2-30A230A (SGD7□-2R8Aとの組合せ)



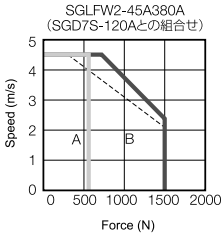
SGLFW2-30A230A (SGD7S-3R8Aとの組合せ)



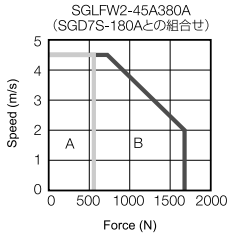
SGLFW2-45A200A



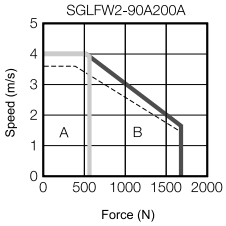
SGLFW2-45A380A (SGD7S-120Aとの組合せ)



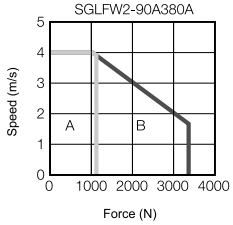
SGLFW2-45A380A (SGD7S-180Aとの組合せ)



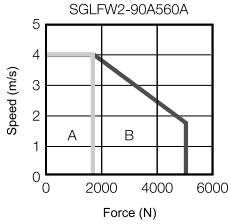
SGLFW2-90A200A



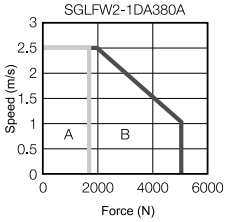
SGLFW2-90A380A



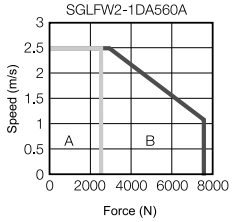
SGLFW2-90A560A



SGLFW2-1DA380A



SGLFW2-1DA560A

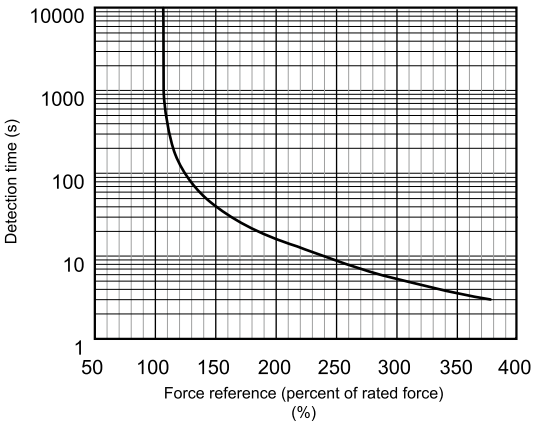


Note:

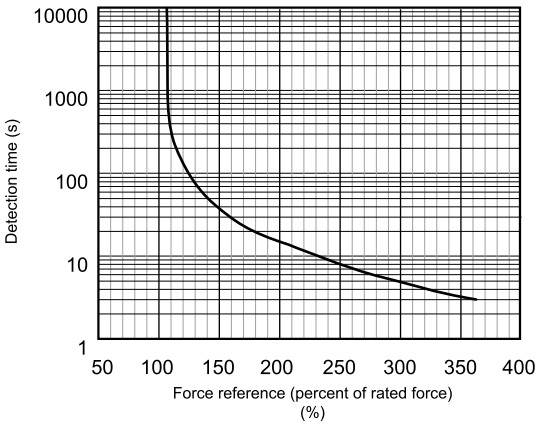
1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated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

Servomotor Overload Protection Characteristics

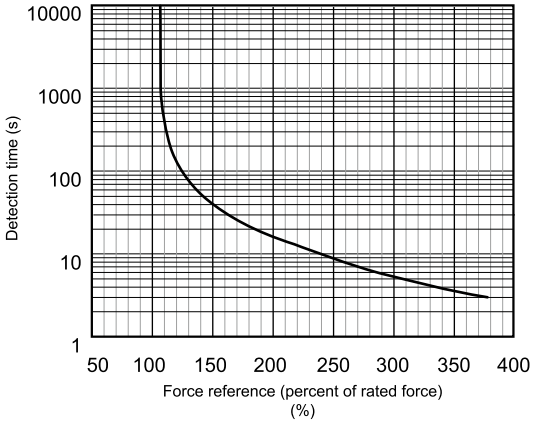
SGLFW2-30A070A



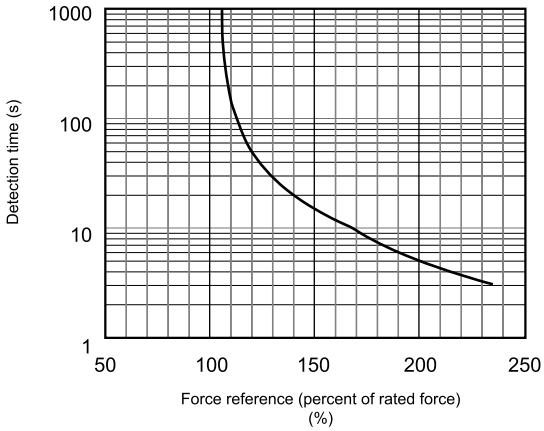
SGLFW2-30A120A and -230A



SGLFW2-45A, -90A□1, and -1DA□1



SGLFW2-90A□L



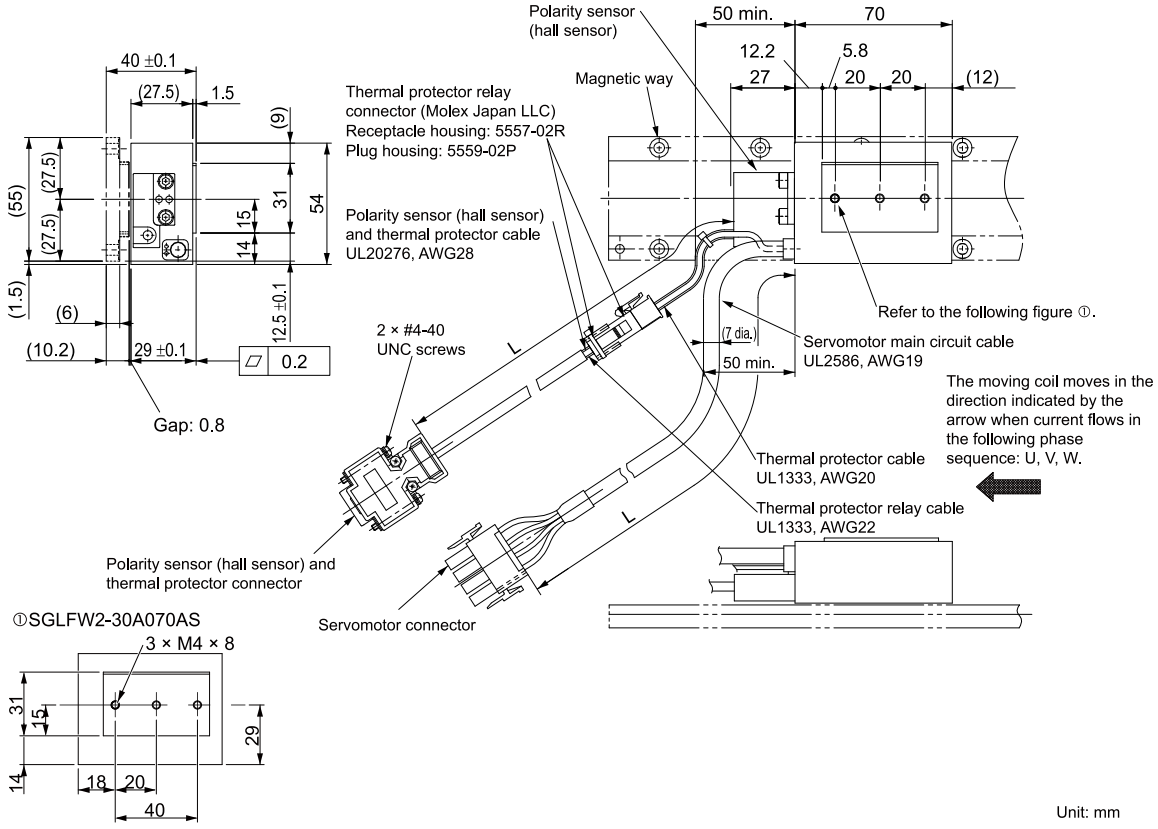
Note:

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 given in *Force-Motor Speed Characteristics on page 431*.

External Dimensions

SGLFW2-30

■ Moving Coils with Polarity Sensors (Hall Sensors): SGLFW2-30A070AS

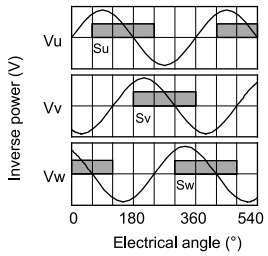


Unit: mm

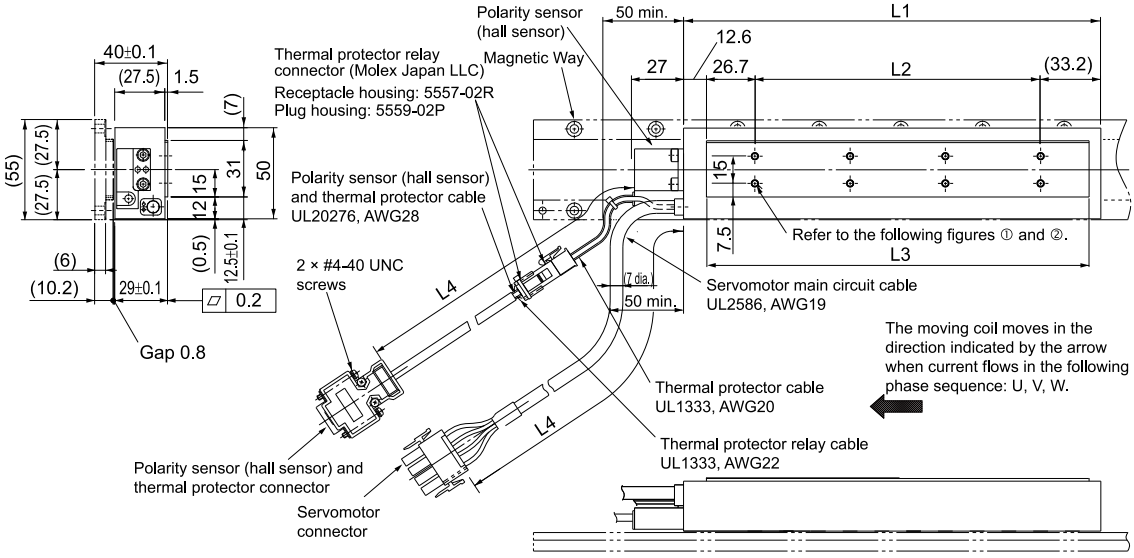
Moving Coil Model SGLFW2-	L	Approx. Mass [kg]
30A070AS1	300 ±30	0.5
30A070AS1H	500 ±50	0.5

◆ Polarity Sensor (Hall Sensor) Output Signal

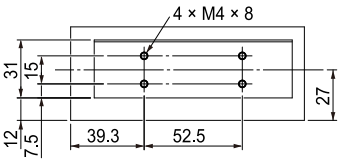
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



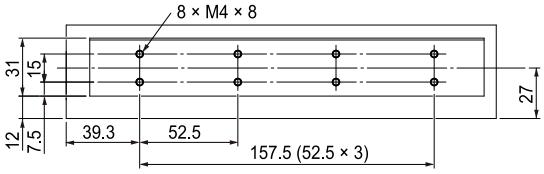
■ Moving Coils with Polarity Sensors (Hall Sensors): SGLFW2-30A□□□AS



①SGLFW2-30A120AS



②SGLFW2-30A230AS

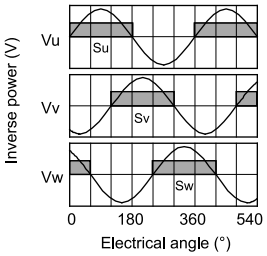


Unit: mm

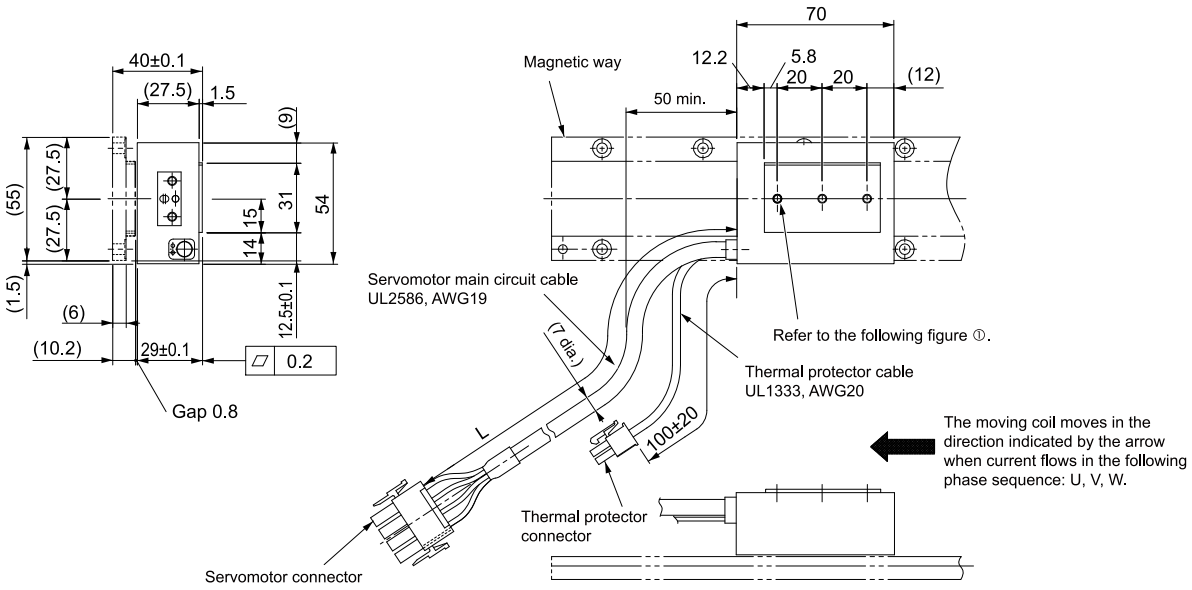
Moving Coil Model SGLFW2-	L1	L2	L3	L4	Approx. Mass [kg]
30A120AS1	125	52.5	105.9	300 ±30	0.9
30A120AS1H				500 ±50	
30A230AS1	230	157.5	210.9	300 ±30	1.7
30A230AS1H				500 ±50	

◆ Polarity Sensor (Hall Sensor) Output Signal

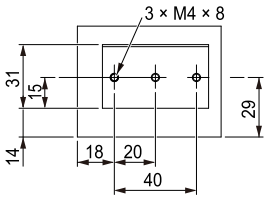
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coil without Polarity Sensor (Hall Sensor): SGLFW2-30A070AT



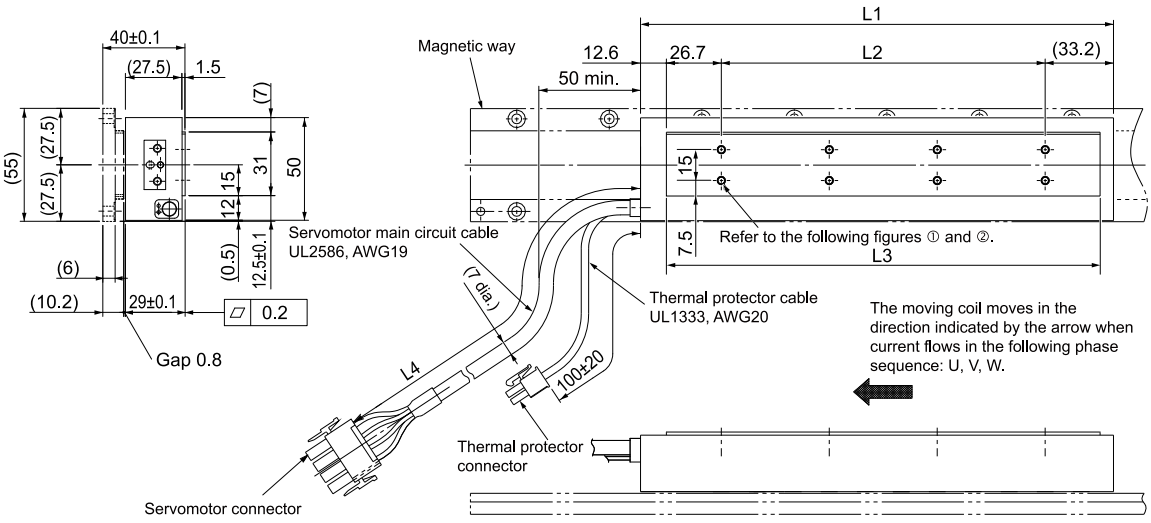
①SGLFW2-30A070AT



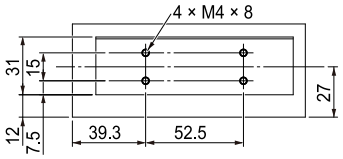
Unit: mm

Moving Coil Model SGLFW2-	L	Approx. Mass [kg]
30A070AT1	300 ±30	0.5
30A070AT1H	500 ±50	0.5

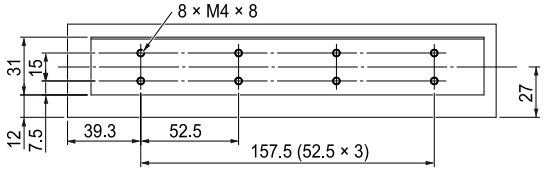
■ Moving Coil without Polarity Sensor (Hall Sensor): SGLFW2-30A□□□AT



①SGLFW2-30A120AT



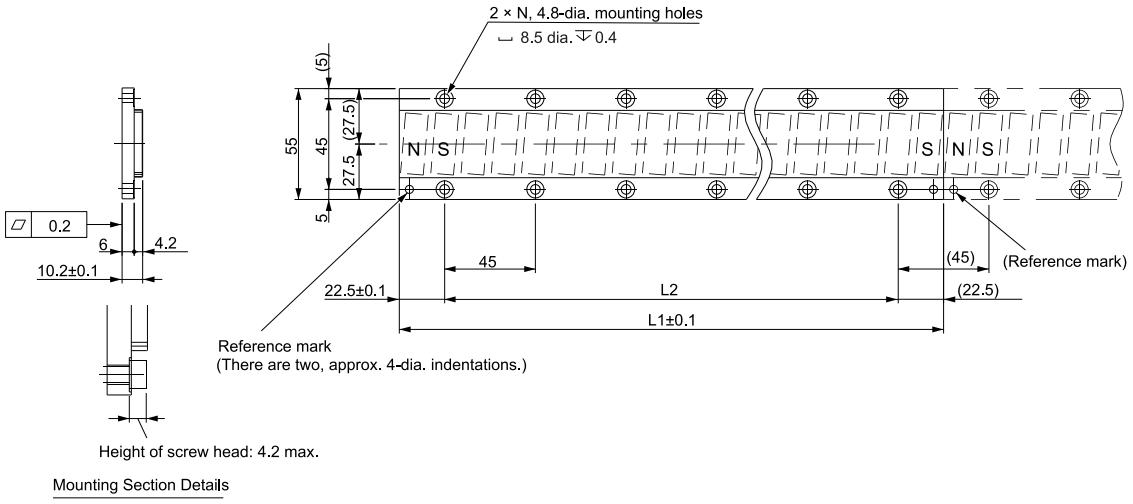
②SGLFW2-30A230AT



Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	L4	Approx. Mass [kg]
30A120AT1	125	52.5	105.9	300 ±30	0.9
30A120AT1H				500 ±50	
30A230AT1	230	157.5	210.9	300 ±30	1.7
30A230AT1H				500 ±50	

■ Magnetic Ways: SGLFM2-30□□□A



Unit: mm

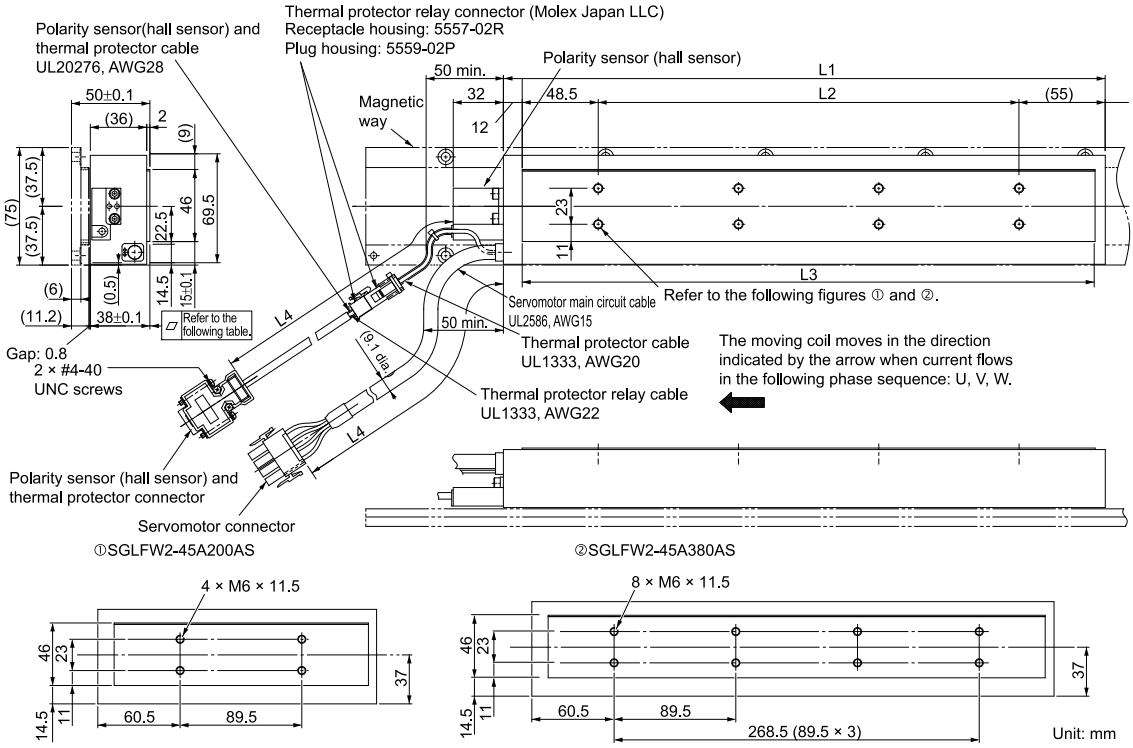
Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
30270A	270	225 (45 × 5)	6	0.9
30450A	450	405 (45 × 9)	10	1.5
30630A	630	585 (45 × 13)	14	2.0

SGLFW2-45

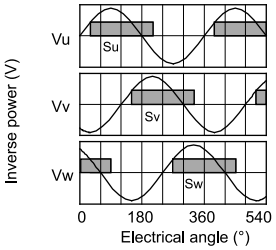
■ Moving Coils with Polarity Sensors (Hall Sensors): SGLFW2-45A□□□AS



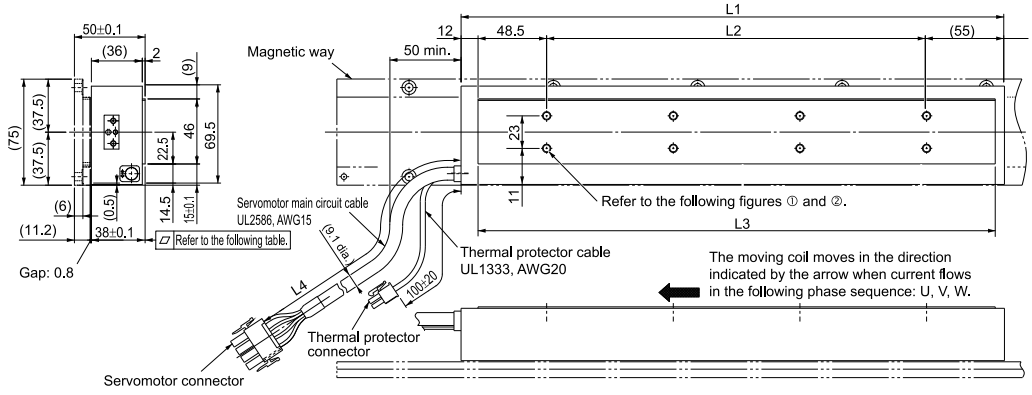
Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
45A200AS1	205	89.5	187	300 ±30	0.2	2.9
45A200AS1H				500 ±50		
45A380AS1	384	268.5	365.5	300 ±30	0.3	5.5
45A380AS1H				500 ±50		

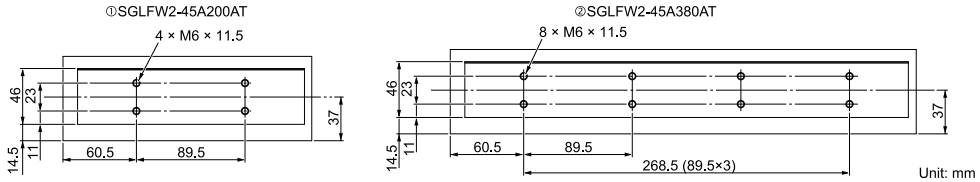
◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



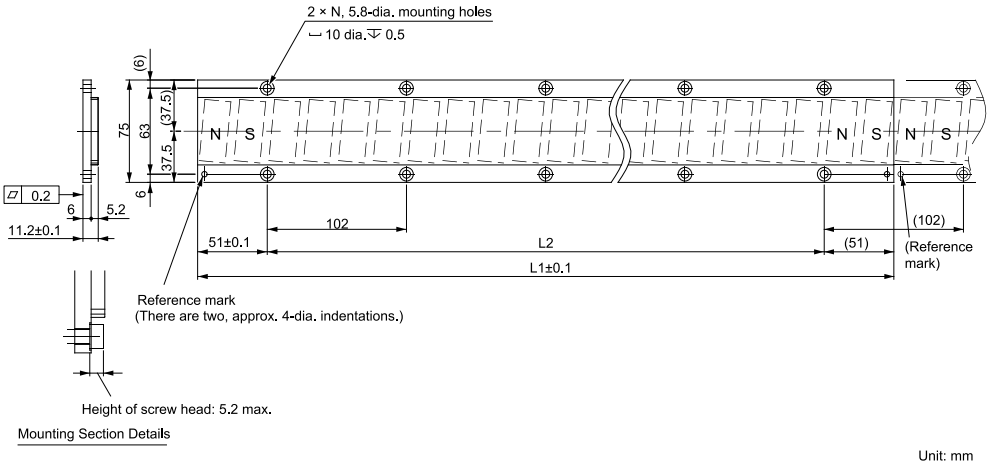
■ Moving Coils without Polarity Sensors (Hall Sensors): SGLFW2-45A□□□AT





Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
45A200AT1	205	89.5	187	300 ±30	0.2	2.9
45A200AT1H				500 ±50		
45A380AT1	384	268.5	365.5	300 ±30	0.3	5.5
45A380AT1H				500 ±50		

■ Magnetic Ways: SGLFM2-45□□□A



Unit: mm

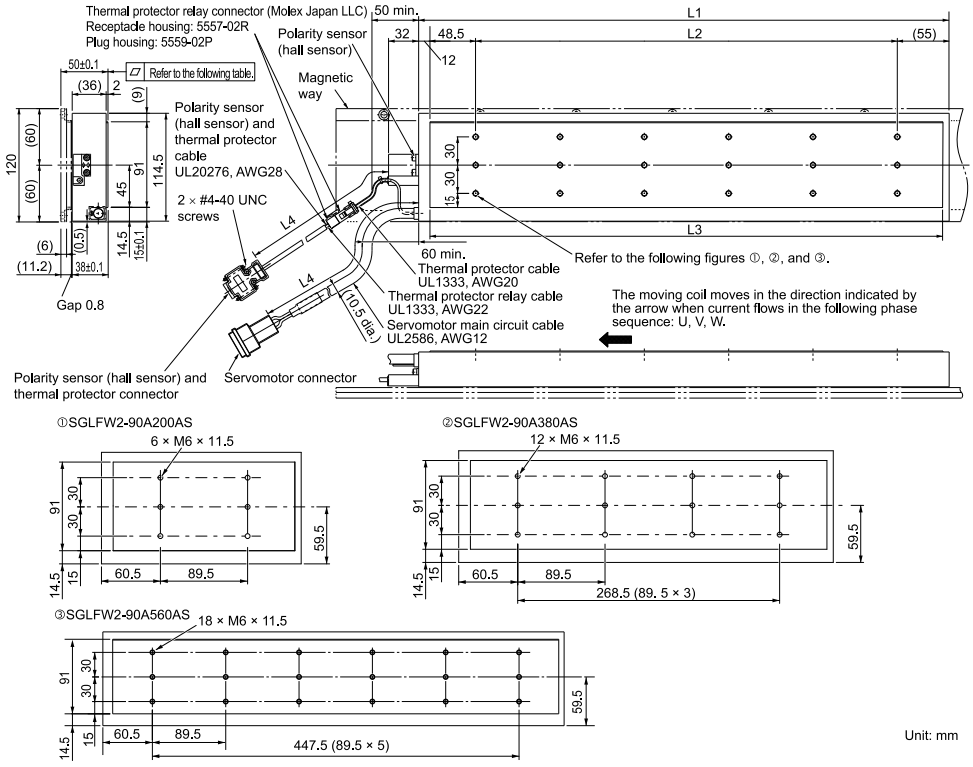
Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
45306A	306	204 (102 × 2)	3	1.5
45510A	510	408 (102 × 4)	5	2.5
45714A	714	612 (102 × 6)	7	3.4

SGLFW2-90

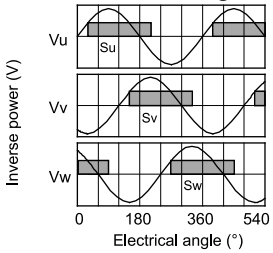
■ Moving Coils with Polarity Sensors (Hall Sensors): SGLFW2-90A□□□AS1



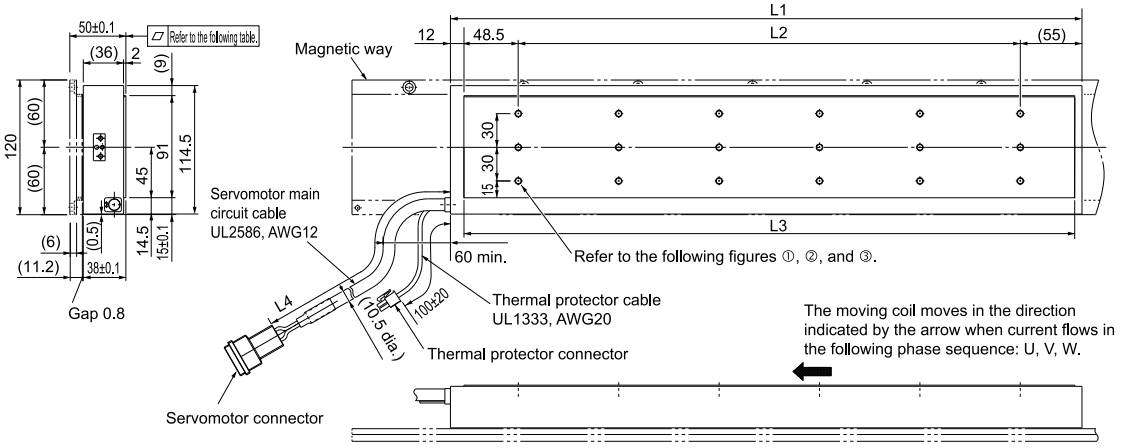
Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass (kg)
90A200AS1	205	89.5	187	300 ±30	0.2	5.3
90A200AS1H				500 ±50		
90A380AS1	384	268.5	365.5	300 ±30	0.3	10.1
90A380AS1H				500 ±50		
90A560AS1	563	447.5	544	300 ±30	0.3	14.9
90A560AS1H				500 ±50		

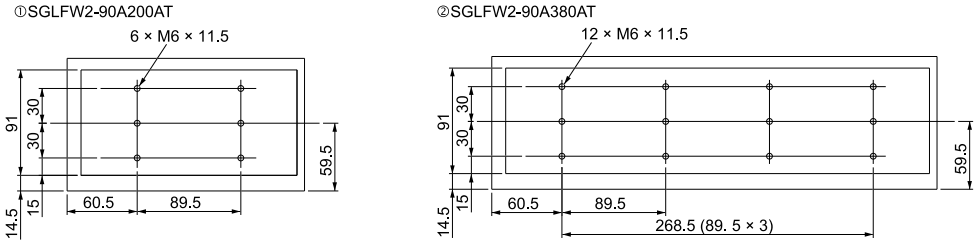
◆ Polarity Sensor (Hall Sensor) Output Signal

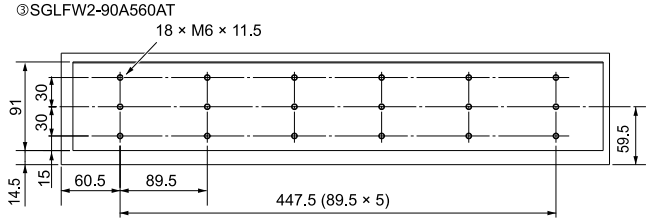
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coils without Polarity Sensors (Hall Sensors): SGLFW2-90A□□□AT1



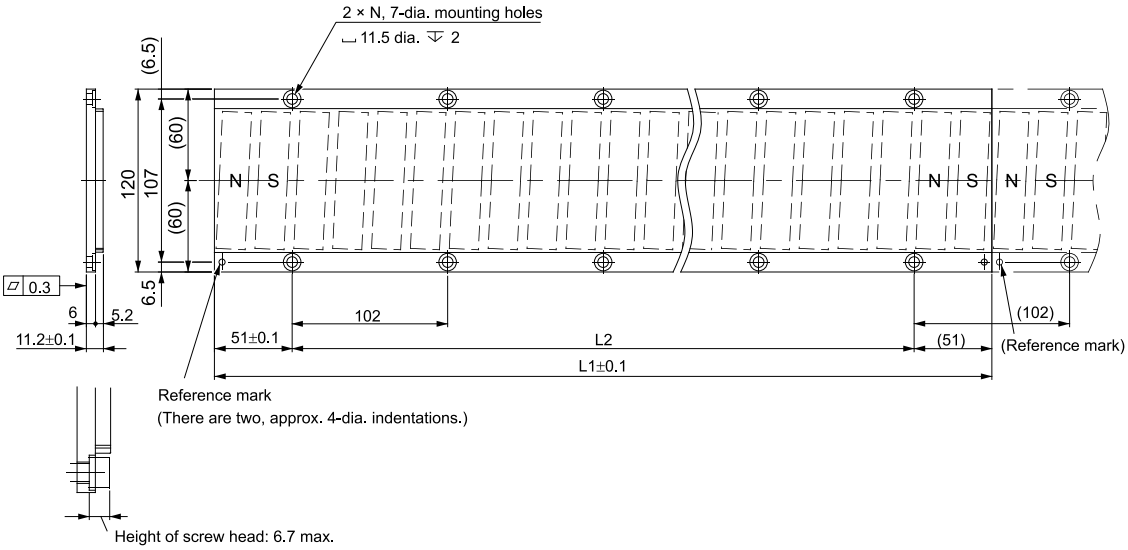




Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
90A200AT1	205	89.5	187	300 ±30	0.2	5.3
90A200AT1H				500 ±50		
90A380AT1	384	268.5	365.5	300 ±30	0.3	10.1
90A380AT1H				500 ±50		
90A560AT1	563	447.5	544	300 ±30	0.3	14.9
90A560AT1H				500 ±50		

■ Magnetic Ways: SGLFM2-90□□□A



Unit: mm

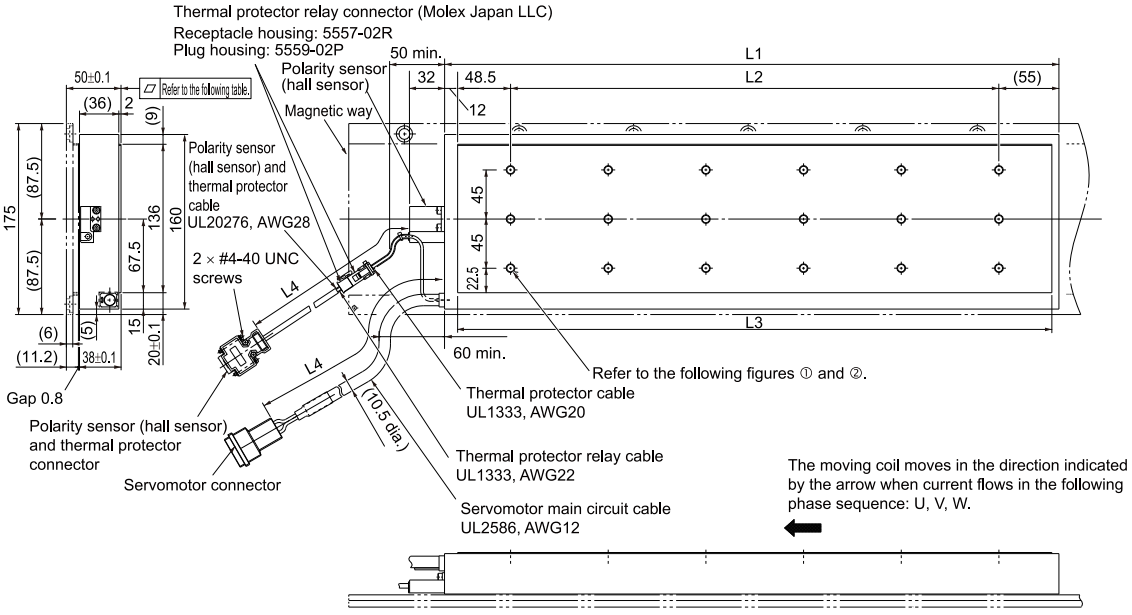
Note:

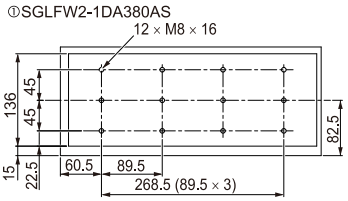
More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
90306A	306	204 (102 × 2)	3	2.6
90510A	510	408 (102 × 4)	5	4.2
90714A	714	612 (102 × 6)	7	5.9

SGLFW2-1D

■ Moving Coil with Polarity Sensor (Hall Sensor): SGLFW2-1DA□□□AS1



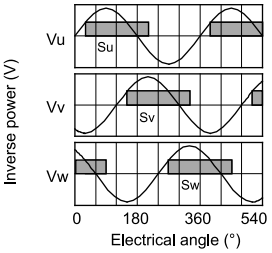


Unit: mm

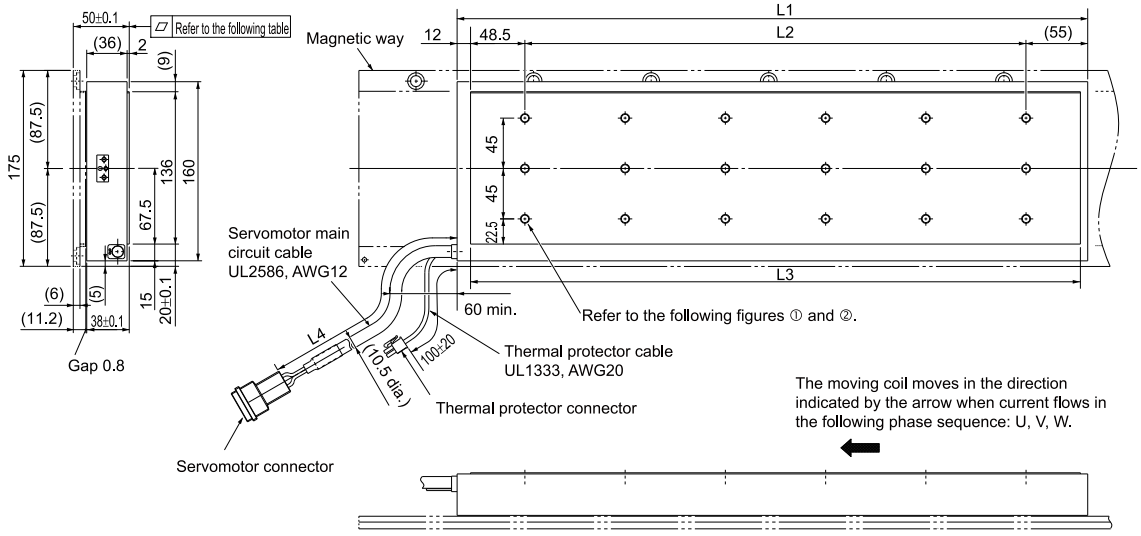
Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
1DA380AS1	384	268.5	365.5	300 ±30	0.3	14.6
1DA380AS1H				500 ±50		
1DA560AS1	563	447.5	544	300 ±30	0.3	21.5
1DA560AS1H				500 ±50		

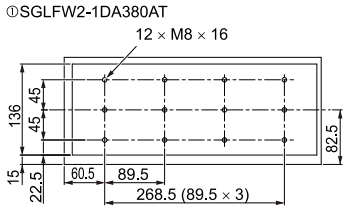
◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coil without Polarity Sensor (Hall Sensor): SGLFW2-1DA□□□AT1

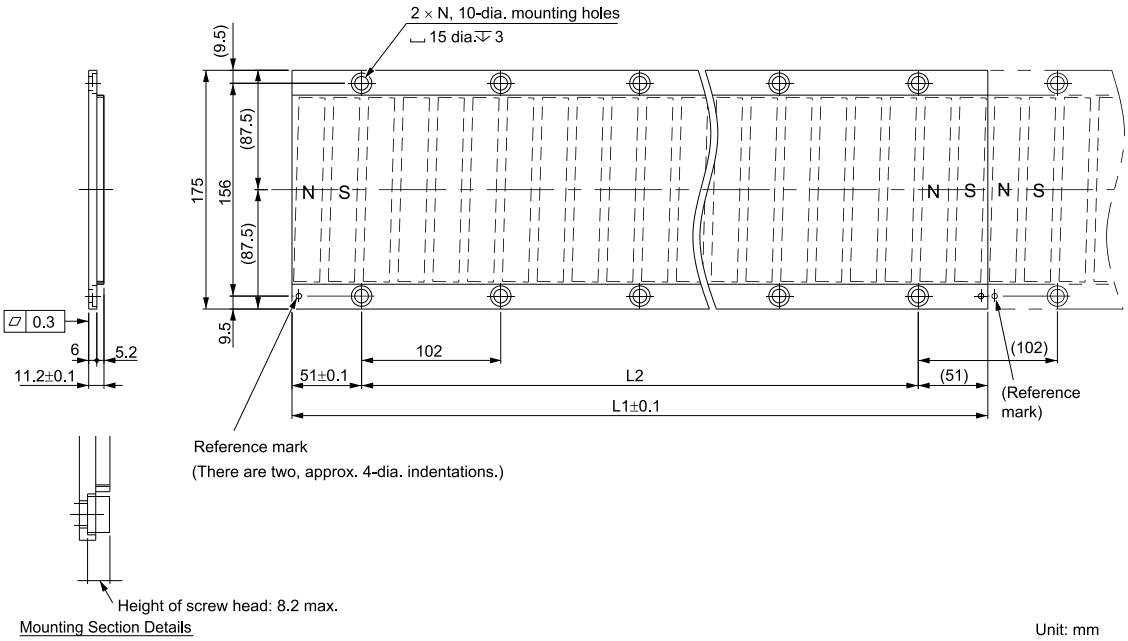




Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
1DA380AT1	384	268.5	365.5	300 ±30	0.3	14.6
1DA380AT1H				500 ±50		
1DA560AT1	563	447.5	544	300 ±30	0.3	21.5
1DA560AT1H				500 ±50		

■ Magnetic Ways: SGLFM2-1D□□□A



Unit: mm

Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

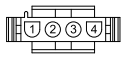
Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
1D306A	306	204 (102 × 2)	3	3.7
1D510A	510	408 (102 × 4)	5	6.2
1D714A	714	612 (102 × 6)	7	8.6

Connector Specifications

SGLFW2-30

■ SGLFW2-30A070AS

· Servomotor Connector



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

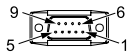
From Tyco Electronics Japan G.K.

Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

· Polarity Sensor (Hall Sensor) and Thermal Protector Connector



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

Pin connector: 17JE-23090-02 (D8C)-CG

From DDK Ltd.

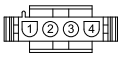
Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

Studs: 17L-002C or 17L-002C1

■ SGLFW2-30A□□□AS

· Servomotor Connector



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

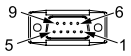
From Tyco Electronics Japan G.K.

Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

· Polarity Sensor (Hall Sensor) and Thermal Protector Connector



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

Pin connector: 17JE-23090-02 (D8C)-CG

From DDK Ltd.

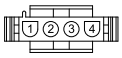
Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

Studs: 17L-002C or 17L-002C1

■ SGLFW2-30A070AT

· Servomotor Connector

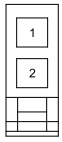


1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350218-3 or 350547-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

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

• Thermal Protector Connector



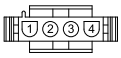
1	Thermal Protector
2	Thermal Protector

Receptacle housing: 5557-02R
Terminals: 5556T or 5556TL
From Molex Japan LLC

Mating Connector
Plug housing: 5559-02P
Terminals: 5558T or 5558TL

■ SGLFW2-30A□□□AT

· Servomotor Connector



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

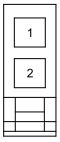
From Tyco Electronics Japan G.K.

Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

• Thermal Protector Connector



1	Thermal Protector
2	Thermal Protector

Receptacle housing: 5557-02R

Terminals: 5556T or 5556TL

From Molex Japan LLC

Mating Connector

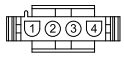
Plug housing: 5559-02P

Terminals: 5558T or 5558TL

SGLFW2-45

■ SGLFW2-45A□□□AS

· Servomotor Connector



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

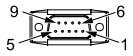
From Tyco Electronics Japan G.K.

Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

• Polarity Sensor (Hall Sensor) and Thermal Protector Connector



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

Pin connector: 17JE-23090-02 (D8C)-CG

From DDK Ltd.

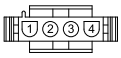
Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

Studs: 17L-002C or 17L-002C1

■ SGLFW2-45A□□□AT

· Servomotor Connector



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

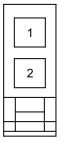
From Tyco Electronics Japan G.K.

Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

• Thermal Protector Connector



1	Thermal Protector
2	Thermal Protector

Receptacle housing: 5557-02R

Terminals: 5556T or 5556TL

From Molex Japan LLC

Mating Connector

Plug housing: 5559-02P

Terminals: 5558T or 5558TL

SGLFW2-90

■ SGLFW2-90A□□□AS1

· Servomotor Connector

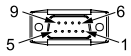


A1	Phase U	Red	B1	Phase W	Black
A2	Phase V	White	B2	FG	Green

Tab housing: 1-917808-2
Contacts: 917803-2 (A1, A2, and B1)
84695-1(B2)
From Tyco Electronics Japan G.K.

Mating Connector
Receptacle housing: 1-917807-2
Contacts: 179956-2

• Polarity Sensor (Hall Sensor) and Thermal Protector Connector



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

■ SGLFW2-90A□□□AT1

· Servomotor Connector

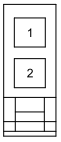


A1	Phase U	Red	B1	Phase W	Black
A2	Phase V	White	B2	FG	Green

Tab housing: 1-917808-2
Contacts: 917803-2 (A1, A2, and B1)
84695-1(B2)
From Tyco Electronics Japan G.K.

Mating Connector
Receptacle housing: 1-917807-2
Contacts: 179956-2

· Thermal Protector Connector



1	Thermal Protector
2	Thermal Protector

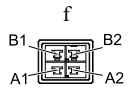
Receptacle housing: 5557-02R
Terminals: 5556T or 5556TL
From Molex Japan LLC

Mating Connector
Plug housing: 5559-02P
Terminals: 5558T or 5558TL

SGLFW2-1D

■ SGLFW2-1DA□□□AS1

· Servomotor Connector

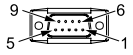


A1	Phase U	Red	B1	Phase W	Black
A2	Phase V	White	B2	FG	Green

Tab housing: 1-917808-2
Contacts: 917803-2 (A1, A2, and B1)
84695-1(B2)
From Tyco Electronics Japan G.K.

Mating Connector
Receptacle housing: 1-917807-2
Contacts: 179956-2

• Polarity Sensor (Hall Sensor) and Thermal Protector Connector



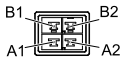
1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

■ SGLFW2-1DA□□□AT1

· Servomotor Connector

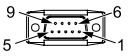


A1	Phase U	Red	B1	Phase W	Black
A2	Phase V	White	B2	FG	Green

Tab housing: 1-917808-2
Contacts: 917803-2 (A1, A2, and B1)
84695-1(B2)
From Tyco Electronics Japan G.K.

Mating Connector
Receptacle housing: 1-917807-2
Contacts: 179956-2

• Polarity Sensor (Hall Sensor) and Thermal Protector Connector



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

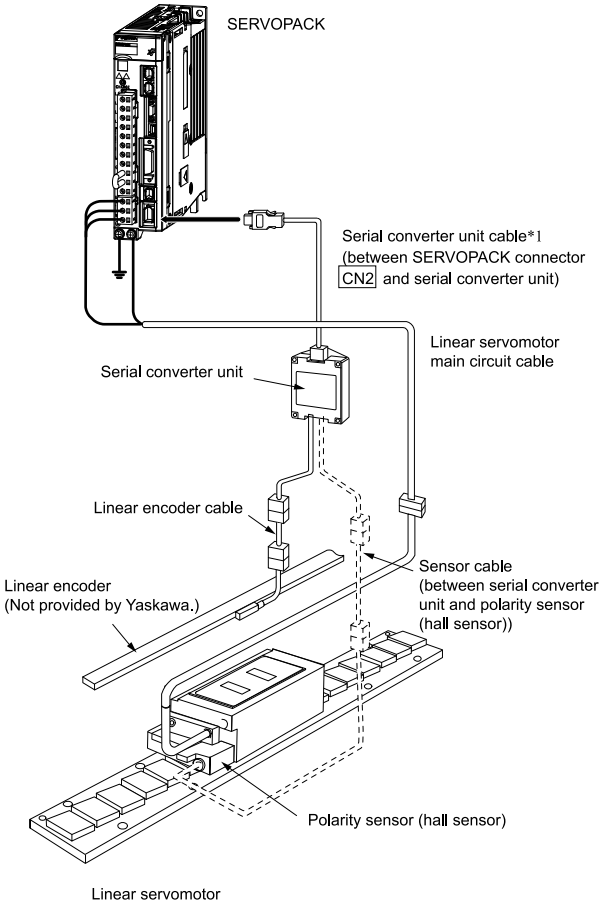
Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

Selecting Cables

Cable Configurations

Refer to *Recommended Linear Encoders on page 536* to select a linear encoder.

Prepare the cable required for the encoder.



*1 You can connect directly to an absolute linear encoder.

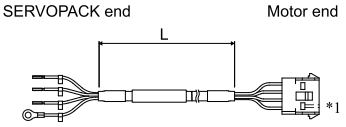
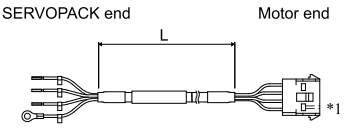
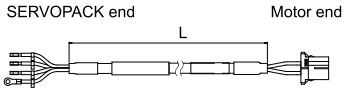
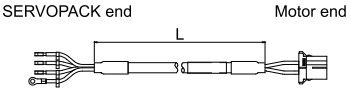
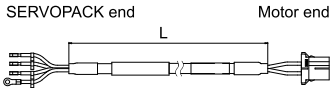
Note:

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-X-Series AC Servo Deive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Linear Servomotor Main Circuit Cables

Linear Servomotor Model	Length (L)	Order Number	Appearance
SGLFW2-30A070A□ SGLFW2-30A120A□ SGLFW2-30A230A□	1 m	JZSP-CL2N703-01-E	
	3 m	JZSP-CL2N703-03-E	
	5 m	JZSP-CL2N703-05-E	
	10 m	JZSP-CL2N703-10-E	
	15 m	JZSP-CL2N703-15-E	
	20 m	JZSP-CL2N703-20-E	
SGLFW2-45A200A□ SGLFW2-45A380A□	1 m	JZSP-CL2N603-01-E	
	3 m	JZSP-CL2N603-03-E	
	5 m	JZSP-CL2N603-05-E	
	10 m	JZSP-CL2N603-10-E	
	15 m	JZSP-CL2N603-15-E	
	20 m	JZSP-CL2N603-20-E	
SGLFW2-90A200A□ SGLFW2-90A380A□	1 m	JZSP-CL2N803-01-E	
	3 m	JZSP-CL2N803-03-E	
	5 m	JZSP-CL2N803-05-E	
	10 m	JZSP-CL2N803-10-E	
	15 m	JZSP-CL2N803-15-E	
	20 m	JZSP-CL2N803-20-E	
SGLFW2-90A560A□ SGLFW2-1DA380A□ SGLFW2-1DA560A□	1 m	JZSP-CL2N503-01-E	
	3 m	JZSP-CL2N503-03-E	
	5 m	JZSP-CL2N503-05-E	
	10 m	JZSP-CL2N503-10-E	
	15 m	JZSP-CL2N503-15-E	
	20 m	JZSP-CL2N503-20-E	
SGLFW2-90A200A□L□	1 m	JZSP-CLN423-01-E	
	3 m	JZSP-CLN423-03-E	
	5 m	JZSP-CLN423-05-E	
	10 m	JZSP-CLN423-10-E	
	15 m	JZSP-CLN423-15-E	
	20 m	JZSP-CLN423-20-E	

Note:

Estimates are available for models other than those listed above (SGLFW2-90A380A□L□, -90A560A□L□, SGLFW2-1DA□□□A□L□).

*1 Connector from Tyco Electronics Japan G.K.

SGLF2 (Models with F-type Iron Cores - 400 V)

Model Designations

Moving Coil

S G L F W 2 - 45 D 070 A S 1 E

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

1st digit Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W2	Moving Coil

3rd+4th digits Magnet Height

Code	Specification
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

5th digit Power Supply Voltage

Code	Specification
D	400 VAC

6th+7th+8th digits Length of Moving Coil

Code	Specification
070	70 mm
120	125 mm
200	205 mm
230	230 mm
380	384 mm
560	563 mm

9th digit Design Revision Order

A

10th digit Sensor Specification

Code	Specification
S	With polarity sensor and Thermal Protector
T	Without polarity sensor, with thermal protector

11th digit Cooling Method

Code	Specification
1	Self-cooled
L	Water-cooled*

11th digit Cooling Method

Code	Specification
E	Metal round connector (Phoenix)

■ Non Stock Items

*1 Contact your Yaskawa representative for details on water-cooled models.

Note:

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Magnetic Way

S G L F M 2 - 30 270 A

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

1st digit Servomotor Type

(Same as for the Moving Coil.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M2	Magnetic Way

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

5th+6th+7th digits Length of Magnetic Way

Code	Specification
270	270 mm
306	306 mm
450	450 mm
510	510 mm
630	630 mm
714	714 mm

8th digit Design Revision Order

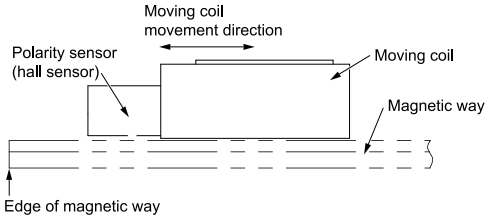
A

Precautions on Moving Coils with Polarity Sensors (Hall Sensors)

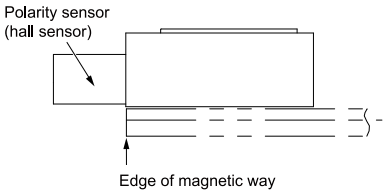
When you use a moving coil with a polarity sensor (hall sensor), the magnetic way must cover the bottom of the polarity sensor (hall sensor). Refer to the example that shows the correct installation.

When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length (L) of the moving coil and the polarity sensor (hall sensor). Refer to the following table.

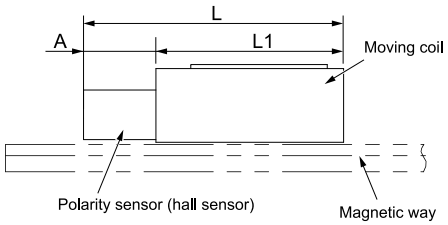
<Correct>



<Incorrect>



■ Total Length of Moving Coil with Polarity Sensor (Hall Sensor)



Moving Coil Model SGLFW2-	Length of Moving Coil L1 [mm]	Length of Polarity Sensor (Hall Sensor) A [mm]	Total Length L [mm]
30D070AS	70	27	97
30D120AS	125		152
30D230AS	230		257
45D200AS	205	32	237
45D380AS	384		416
90D200AS	205		237
90D380AS	384		416

Ratings and Specifications

Specifications

Linear Servomotor Moving Coil Model SGLFW2-		30D			45D		90D			1DD	
		070A□	120A□	230A□	200A□	380A□	200A□	380A□	560A□	380A□	560A□
Time Rating		Continuous									
Thermal Class		B									
Insulation Resistance		500 VDC, 10 MΩ min.									
Withstand Voltage		1,800 VAC for 1 minute									
Excitation		Permanent magnet									
Cooling Method		Self-cooled and water-cooled *1*									
Protective Structure		IP00									
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.									
Shock Resistance	Impact Acceleration	196 m/s^2									
	Number of Impacts	2 times									
Vibration Resistance	Vibration Acceleration	49 m/s^2 (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)									

*1 Contact your Yaskawa representative for details on water-cooled models.

Ratings

Linear Servomotor Moving Coil Model SGLFW2-		30D			45D		
		070A□	120A□	230A□	200A□	380A□	
Rated Speed (Reference Speed during Speed Control) *1	m/s	4.0	4.0	4.0	4.0	4.0	
Maximum speed *1 *2	m/s	5.0	5.0	5.0	4.5	4.5	
Rated Force *1	N	45	90	180	280	560	
Maximum Force *1	N	135	270	540	840	1500	1680
Rated Current *1	Arms	1.4	1.5	1.5	2.2	4.3	
Maximum Current *1	Arms	5.3	5.2	5.1	8.1	13.6	16.2
Moving Coil Mass	kg	0.50	0.90	1.7	2.9	5.4	
Force Constant	N/Arms	33.3	64.5	129.0	137.0	136.7	
BEMF Constant	Vrms/(m/s)/phase	11.1	21.5	43	45.6	45.6	
Motor Constant	$N/\sqrt{W}$	11.3	17.3	24.4	37.9	53.2	
Electrical Time Constant	ms	7.6	7.3	7.3	20	19.6	
Mechanical Time Constant	ms	3.9	3.0	2.9	2.1	1.9	
Thermal Resistance (with Heat Sink)	K/W	2.62	1.17	0.79	0.60	0.44	
Thermal Resistance (without Heat Sink)	K/W	11.3	4.43	2.55	2.64	1.49	
Magnetic Attraction	N	200	630	1260	2120	4240	
Maximum Allowable Payload	kg	5.6	9.4	34	58	110	95
Maximum Allowable Payload (With External Regenerative Resistor)	kg	5.6	11	34	64	110	110
Combined Magnetic Way, SGLFM2-		30□□□A			45□□□A		
Combined Serial Converter Unit, JZDP-□□□□-		651	652	653	654	655	
Applicable SERVOPACKs	SGDXS-	1R9D			3R5D	5R4D	8R4D

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

- 150 mm × 100 mm × 10 mm: SGLFW2-30D070A
- 254 mm × 254 mm × 25 mm: SGLFW2-30D120A and 30D230A
- 400 mm × 500 mm × 25 mm: SGLFW2-45D200A and 45D380A

Linear Servomotor Moving Coil Model SGLFW2-		90D			1DD	
		200A□	380A□	560A□	380A□	560A□
Rated Speed (Reference Speed during Speed Control) *1	m/s	4.0	4.0	4.0	3.5	3.5
Maximum speed *1	m/s	4.0	4.0	4.0	3.5	3.5
Rated Force *1 *2	N	560	1120	1680	1680	2520
Maximum Force *1	N	1680	3360	5040	5040	7560
Rated Current *1	Arms	3.8	7.7	11.5	10.9	16.3
Maximum Current *1	Arms	14.0	28.0	42.0	39.7	59.6
Moving Coil Mass	kg	5.3	10.1	14.9	14.6	21.5
Force Constant	N/Arms	154.0	154.0	154.0	163.0	16.03
BEMF Constant	Vrms/(m/s)/phase	51.3	51.3	51.3	54.3	54.3
Motor Constant	N/$\sqrt{W}$	59.2	83.7	102	103	126
Electrical Time Constant	ms	24	24	24	25	25
Mechanical Time Constant	ms	1.5	1.4	1.4	1.4	1.3
Thermal Resistance (with Heat Sink)	K/W	0.45	0.21	0.18	0.18	0.12
Thermal Resistance (without Heat Sink)	K/W	1.81	1.03	0.72	0.79	0.55
Magnetic Attraction	N	4240	8480	12700	12700	19100
Combined Magnetic Way, SGLFM2-		90□□□A			1D□□□A	
Combined Serial Converter Unit, JZDP-□□□□-		657	658	659	660	661
Applicable SERVOPACKs	SGDXS-	5R4D	120D	170D	170D	260D

*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.

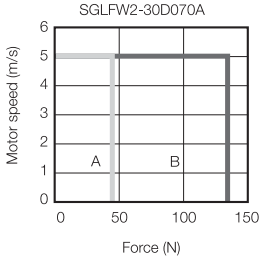
*2 The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

- 400 mm × 500 mm × 25 mm: SGLFW2-90D200A
- 609 mm × 762 mm × 40 mm: SGLFW2-90D380A
- 900 mm × 762 mm × 40 mm: SGLFW2-90D560A and 1DD380A
- 1400 mm × 900 mm × 40 mm: SGLFW2-1DD560A

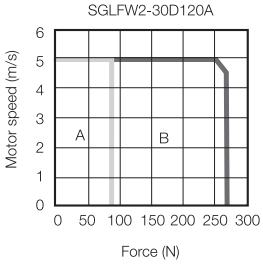
Force-Motor Speed Characteristics

A : Continuous duty zone ——— (solid lines): With three-phase 400-V input
B : Intermittent duty zone - - - - - - - - (dotted lines): With single-phase 400-V input

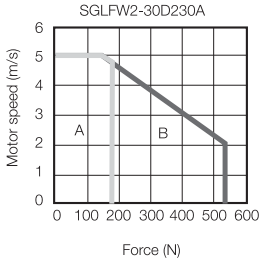
SGLFW2-30D070A



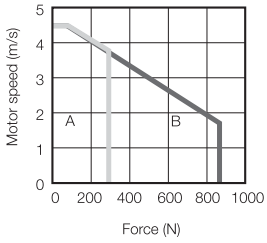
SGLFW2-30D120A



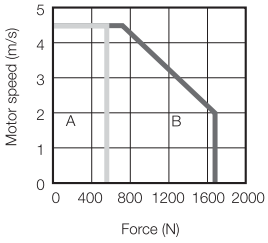
SGLFW2-30D230A



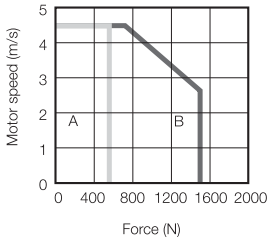
SGLFW2-45D200A



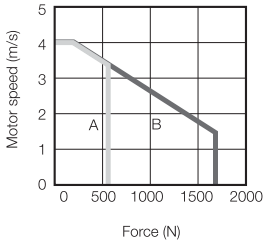
SGLFW2-45D380A
(Combined with SGD7S-8R4D)



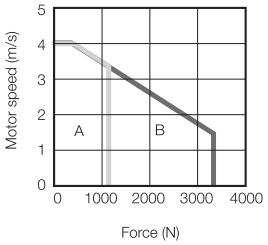
SGLFW2-45D380A
(Combined with SGD7S-5R4D)



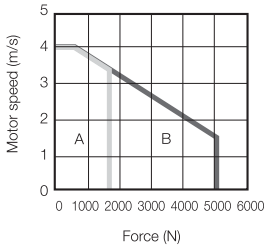
SGLFW2-90D200A



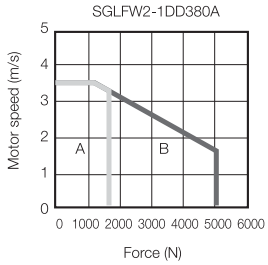
SGLFW2-90D380A



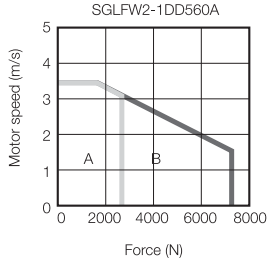
SGLFW2-90D560A



SGLFW2-1DD380A



SGLFW2-1DD560A

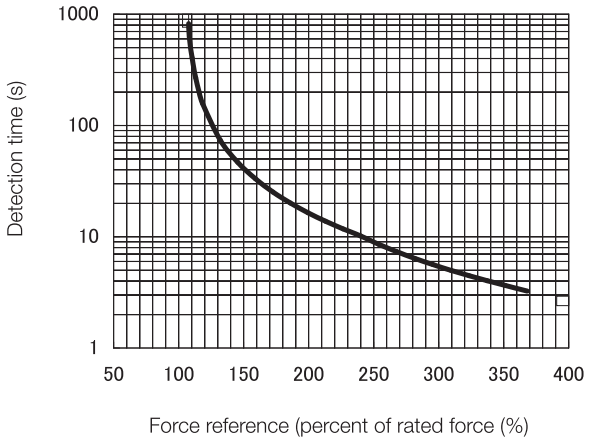


Note:

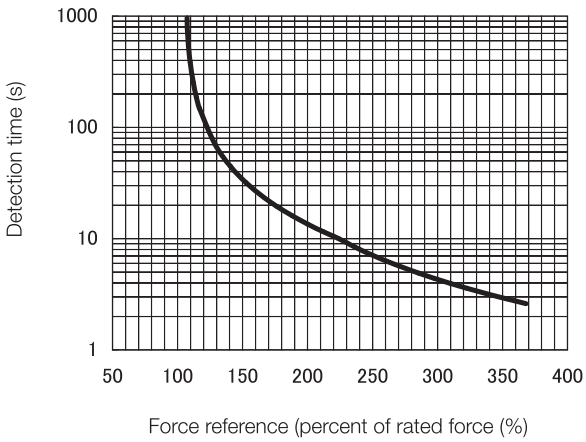
1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated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

Servomotor Overload Protection Characteristics

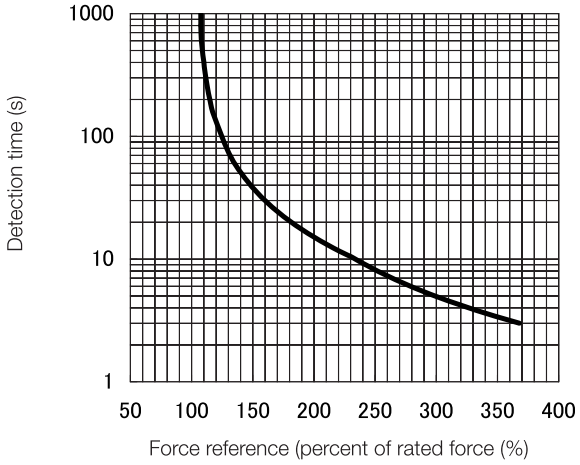
SGLFW2-30D070A



SGLFW2-30D120A and -230A



SGLFW2-45D, -90D, and -1DD



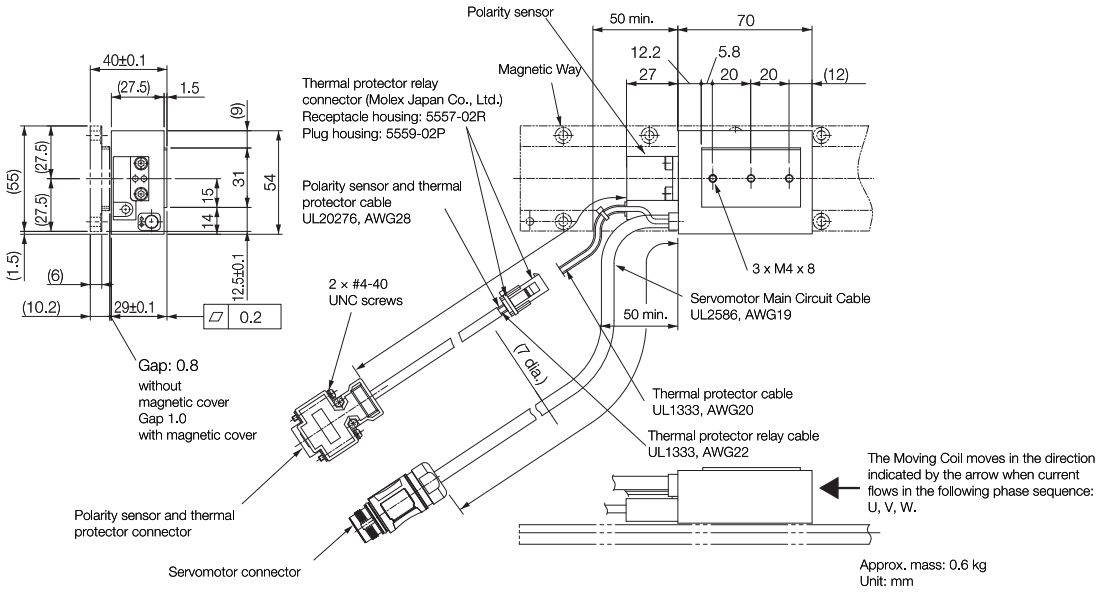
Note:

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 given in *Force-Motor Speed Characteristics on page 465*.

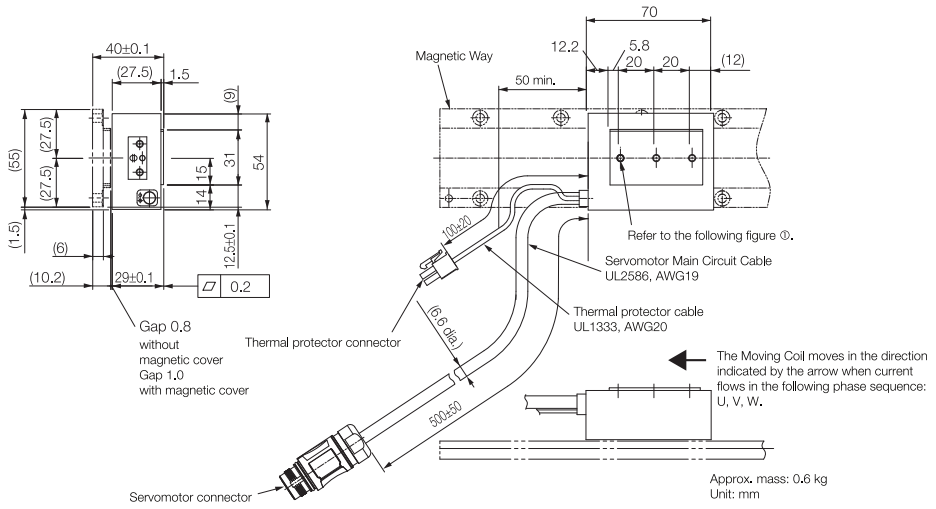
External Dimensions

SGLFW2-30

■ Moving Coil with Polarity Sensor: SGLFW2-30D070AS

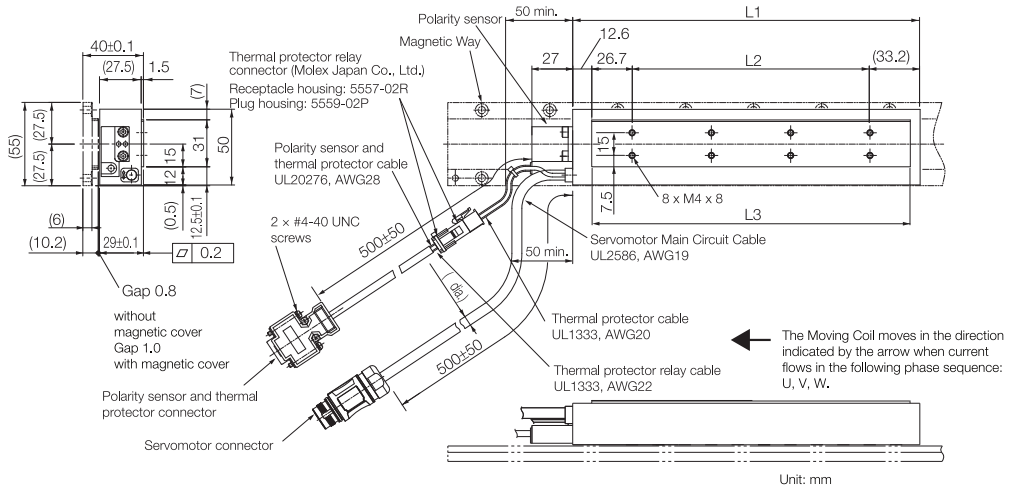


■ Moving Coil without Polarity Sensor: SGLFW2-30D070AT

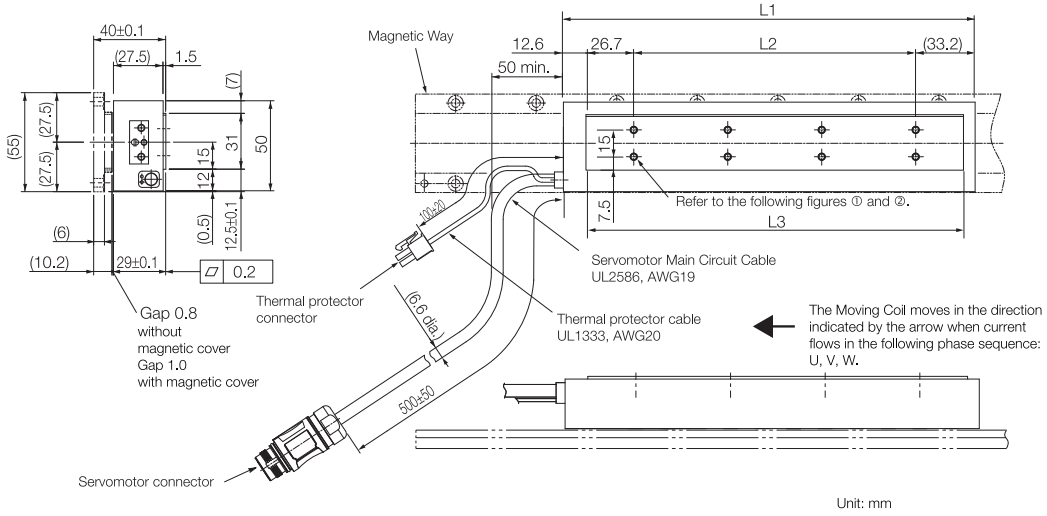


Moving Coil Model SGLFW2-	L1	L2	L3	Approx. Mass [kg]
30D070AS	70	40	54.6	0.6
30D070AT				

■ Moving Coils with Polarity Sensors: SGLFW2-30D□□□AS

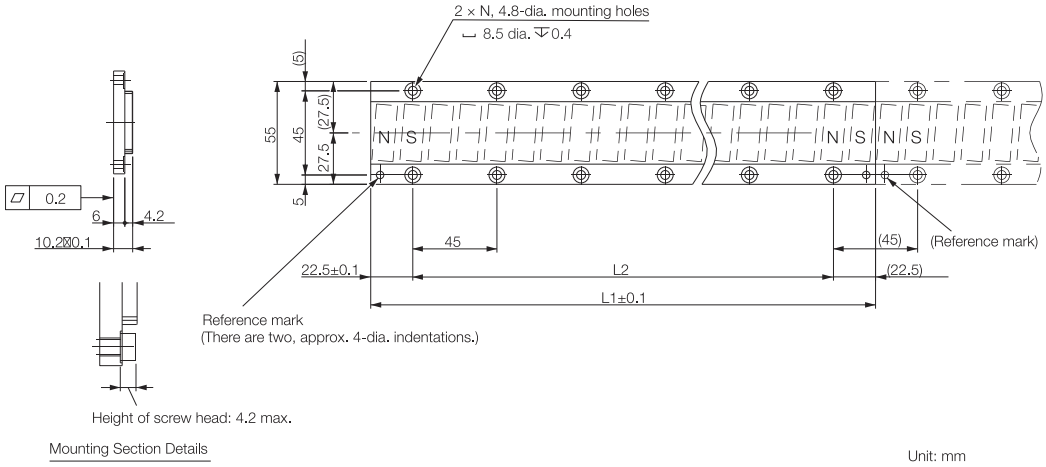


■ Moving Coil without Polarity Sensor: SGLFW2-30D□□□AT



Moving Coil Model SGLFW2-	L1	L2	L3	Approx. Mass [kg]
30D120A□	125	52.5	105.9	1.0
30A230A□	230	157.5	210.9	1.8

■ Magnetic Ways: SGLFM2-30□□□A



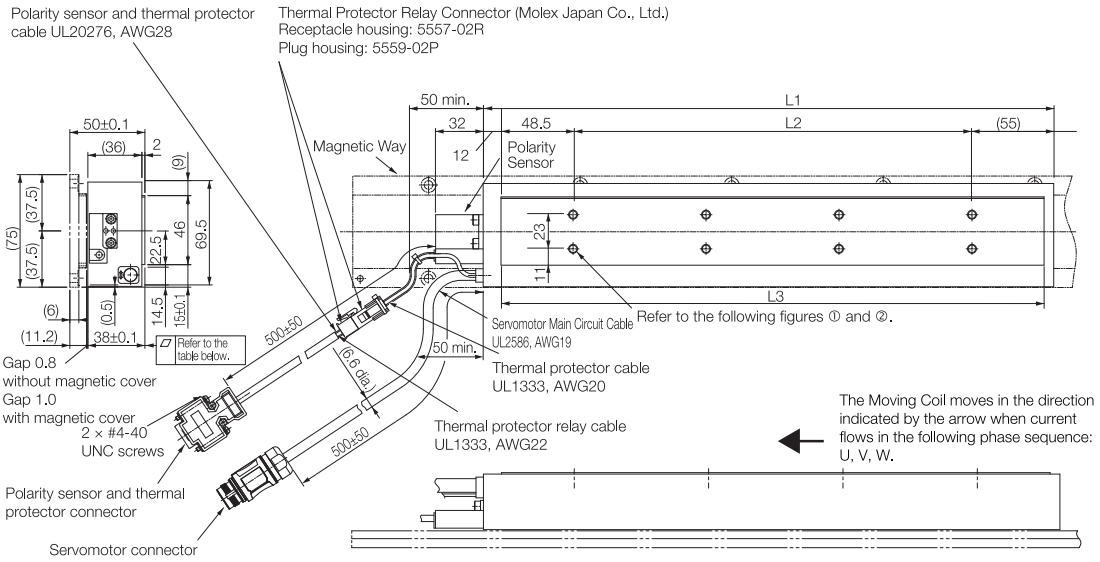
Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1	L2	L3	Approx. Mass [kg]
30270A	270	225 (45 × 5)	6	0.9
30450A	450	405 (45 × 9)	10	1.5
30630A	630	585 (45 × 13)	14	2.0

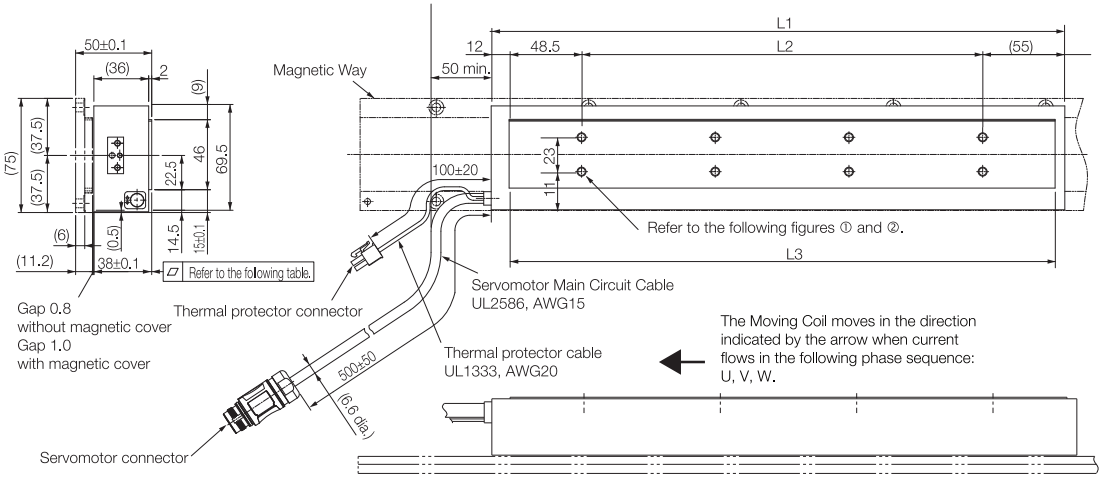
SGLFW2-45

■ Moving Coils with Polarity Sensors: SGLFW2-45D□□□AS



Unit: mm

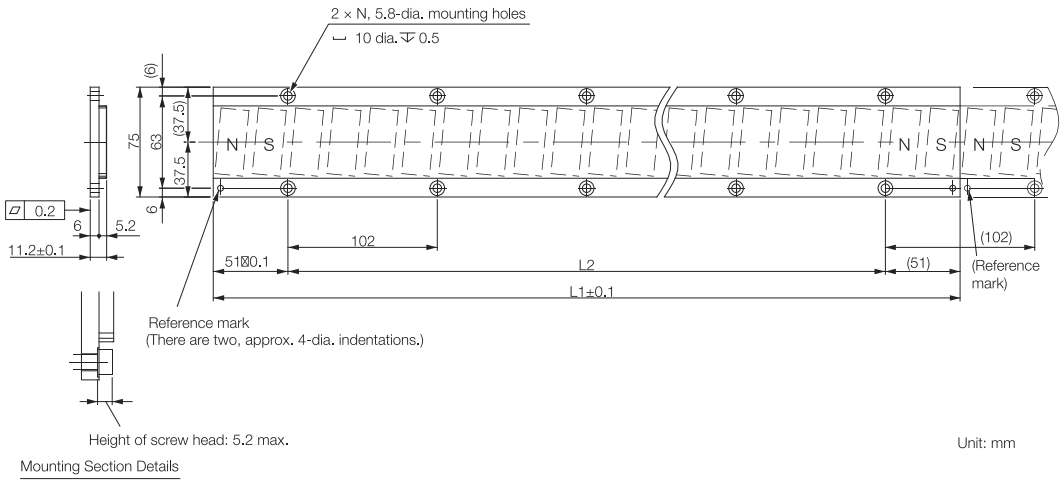
■ Moving Coils without Polarity Sensors: SGLFW2-45D□□□AT



Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
45D200AS	205	89.5	187	0.2	2.9
45D380AS	384	268.5	365.5	0.3	5.5
45D200ATS	205	89.5	187	0.2	2.9
45D380ATS	384	268.5	365.5	0.3	5.5

■ Magnetic Ways: SGLFM2-45□□□A



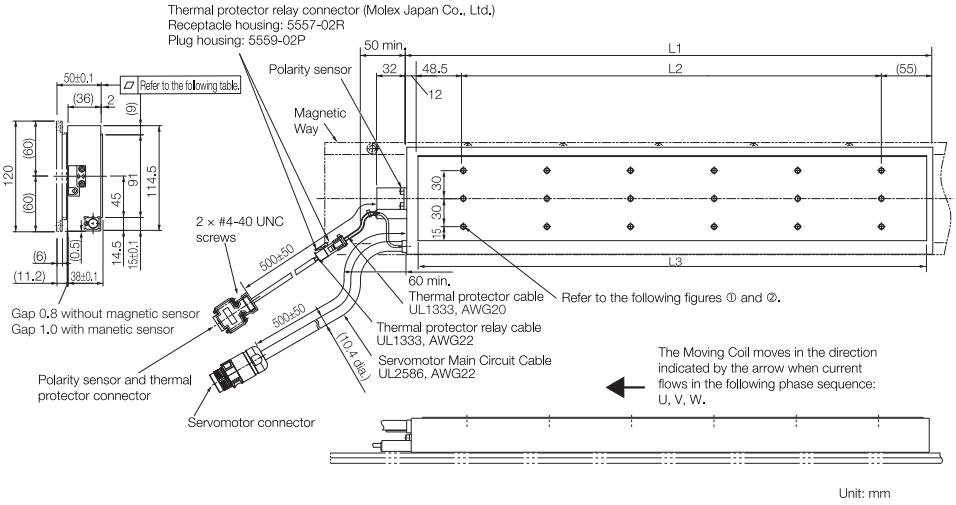
Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
45306A	306	204 (102 × 2)	3	1.5
45510A	510	408 (102 × 4)	5	2.5
45714A	714	612 (102 × 6)	7	3.4

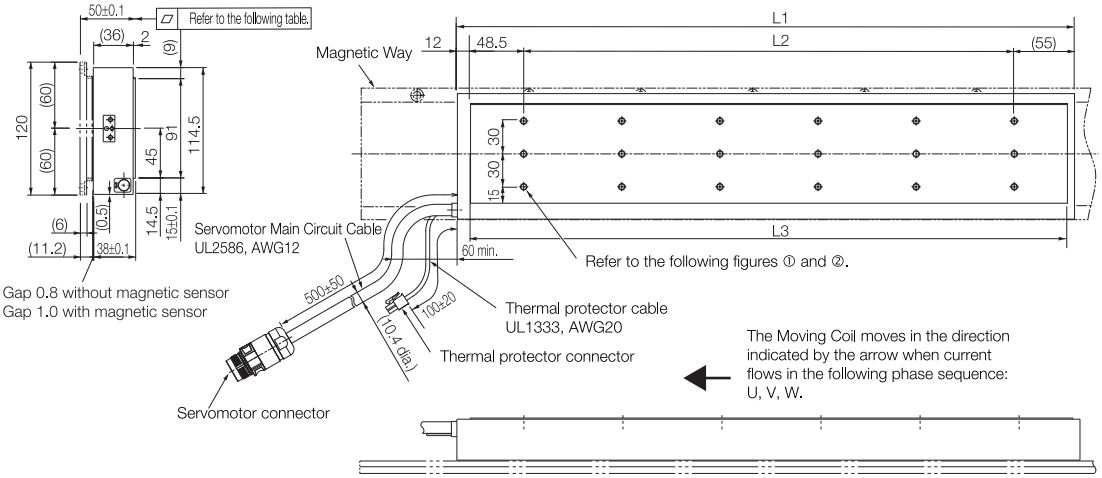
SGLFW2-90

■ Moving Coils with Polarity Sensors: SGLFW2-90D□□□AS



Unit: mm

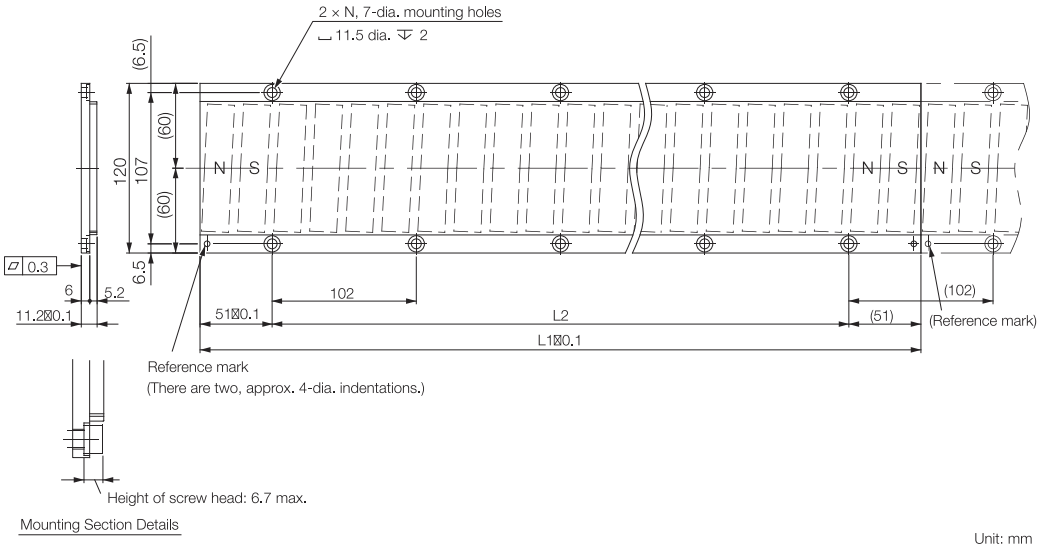
■ Moving Coils without Polarity Sensors: SGLFW2-90D□□□AT



Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
90D200AS	205	89.5	187	0.2	5.3
90D380AS	384	268.5	365.5	0.3	10.1
90D560AS	563	447.5	544	0.3	14.9
90D200AT	205	89.5	187	0.2	5.3
90D380AT	384	268.5	365.5	0.3	10.1

■ Magnetic Ways: SGLFM2-90□□□A



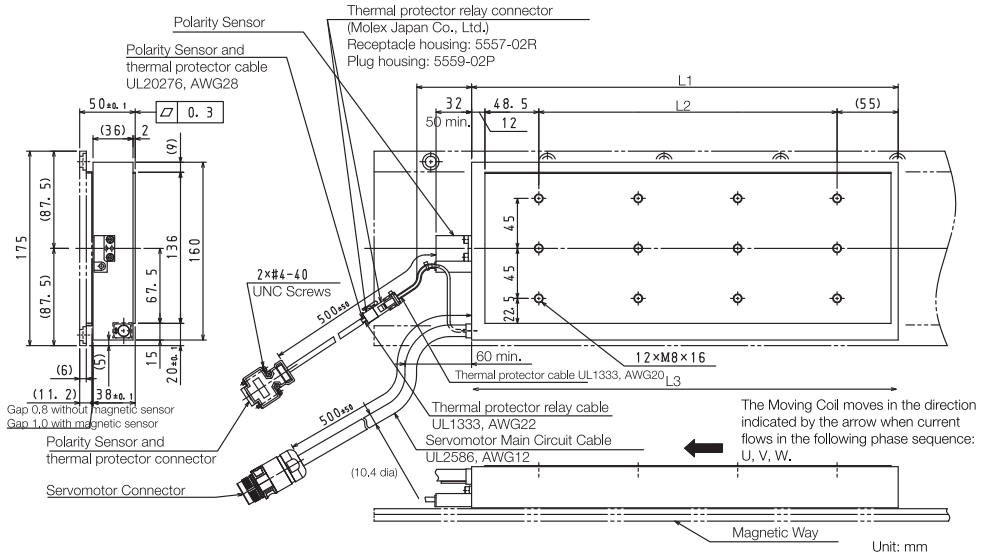
Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

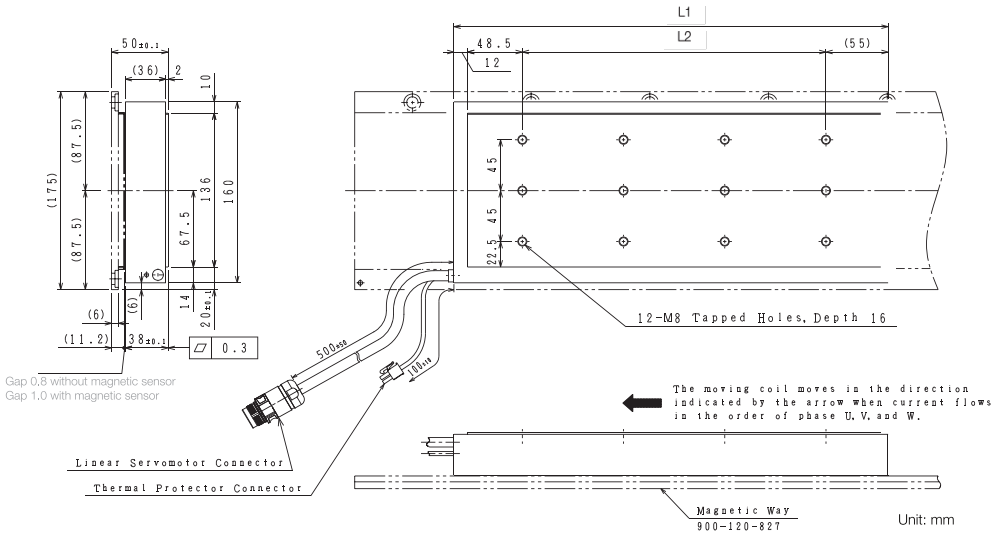
Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
90306A	306	204 (102 × 2)	3	1.5
90510A	510	408 (102 × 4)	5	2.5
90714A	714	612 (102 × 6)	7	3.4

SGLFW2-1D

■ Moving Coil with Polarity Sensor: SGLFW2-1DD□□□AS

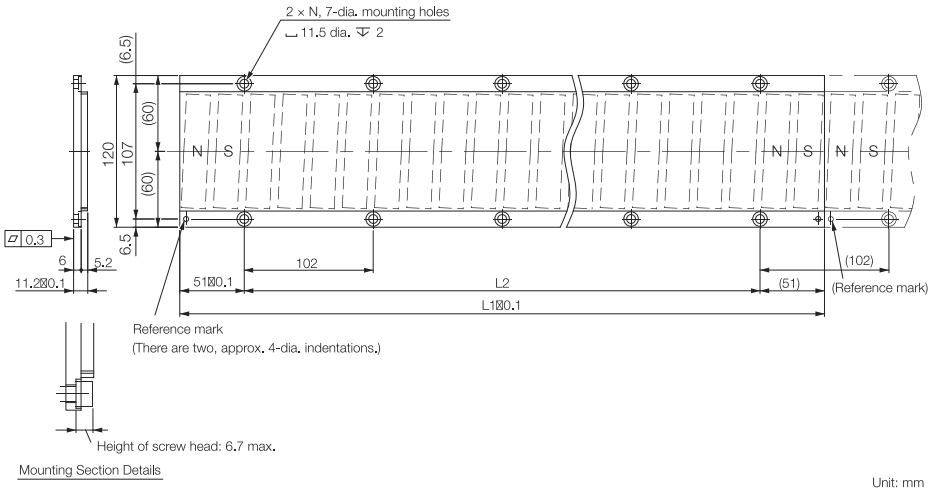


■ Moving Coil without Polarity Sensor: SGLFW2-1DD□□□AT



Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
1DD380A□	384	268.5	365.5	0.3	14.6
1DD560A□	563	447.5	544	0.3	21.5

■ Magnetic Ways: SGLFM2-1D□□□A



Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

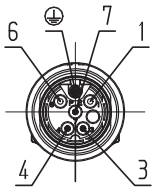
Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
1D306A	306	204 (102 × 2)	3	3.7
1D510A	510	408 (102 × 4)	5	6.2
1D714A	714	612 (102 × 6)	7	8.6

Connector Specifications

Moving Coils with/without Polarity Sensors: SGLFW2-30 and -45

With Polarity Sensors (SGLFW2-30 and -45)

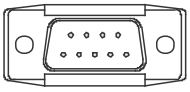
· Servomotor Connector



1	
3	Phase U
4	Phase V
6	
7	Phase W
Ground	FG
Case	Shield

Connector: ST-5EP1N8A9003S (1607706)
Contact: ST-10KP030 (1618261)
From Phoenix Contact GmbH & Co. KG

· Polarity Sensor and Thermal Protector Connector



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

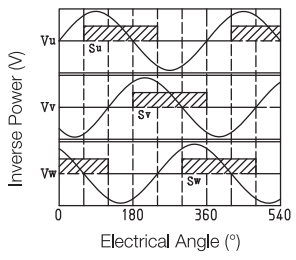
Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

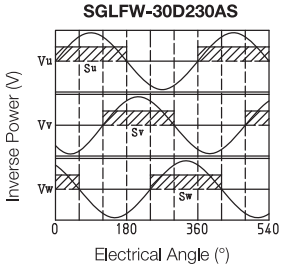
· Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.

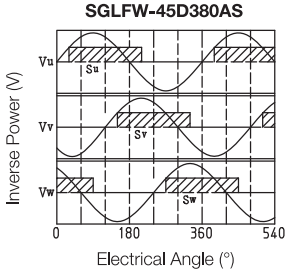
SGLFW-30D070AS



SGLFW-30D120AS
SGLFW-30D230AS

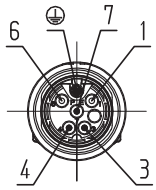


SGLFW-45D200AS
SGLFW-45D380AS



Without Polarity Sensors (SGLFW2-30 and -45)

· Servomotor Connector



1	
3	Phase U
4	Phase V
6	
7	Phase W
Ground	FG
Case	Shield

Connector: ST-5EP1N8A9003S (1607706)
Contact: ST-10KP030 (1618261)
From Phoenix Contact GmbH & Co. KG

· Thermostat Connector

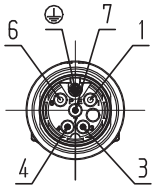


1	Thermal protector
2	Thermal protector

Receptacle housing: 5557-02R
Terminals: 5556T or 5556TL
From Molex Japan Co., Ltd.
Mating Connector
Plug housing: 5559-02P
Terminals: 5558T or 5558TL

Moving Coils with Polarity Sensors: SGLFW2-90 and -1D

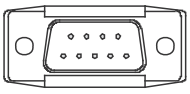
· Servomotor Connector



1	
3	Phase U
4	Phase V
6	
7	Phase W
Ground	FG
Case	Shield

Connector: ST-5EP1N8A9003S (1607706)
Contact: ST-10KP030 (1618261)
From Phoenix Contact GmbH & Co. KG

· Polarity Sensor and Thermal Protector Connector



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

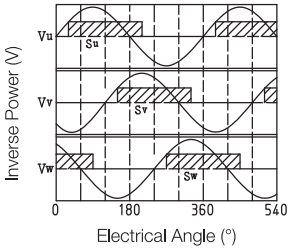
Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

· Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.

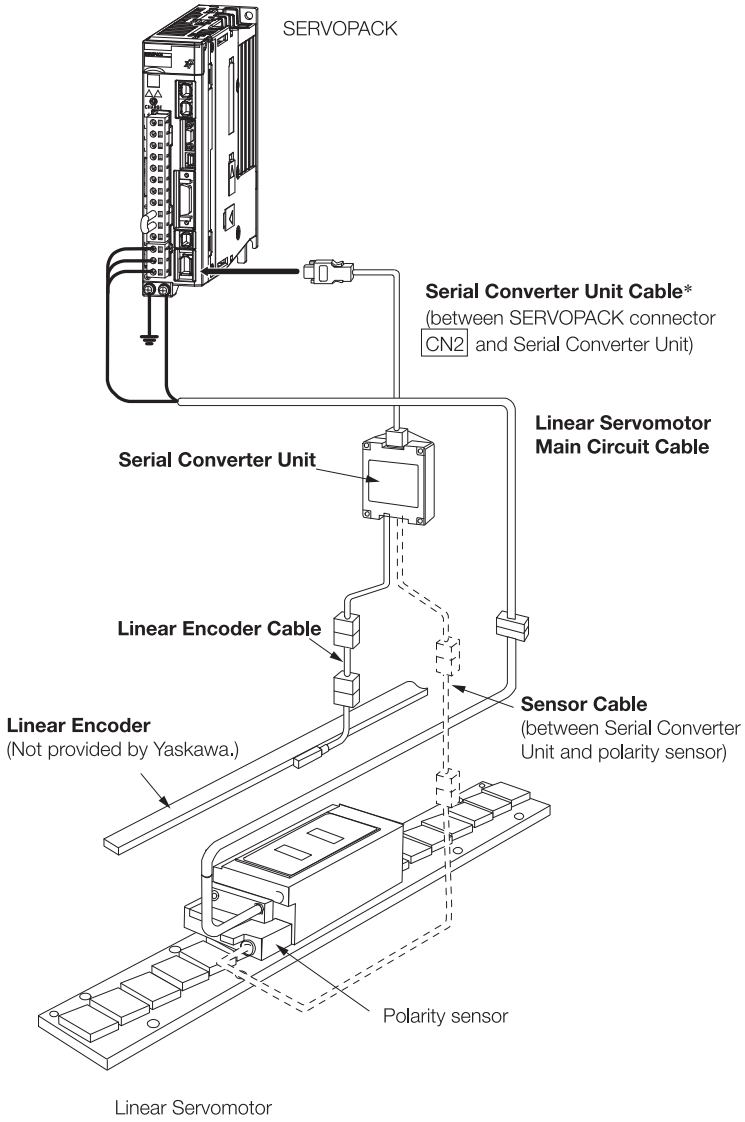


Selecting Cables

Cable Configurations

Refer to *Recommended Linear Encoders on page 536* to select a linear encoder.

Prepare the cable required for the encoder.



*1 You can connect directly to an absolute linear encoder.

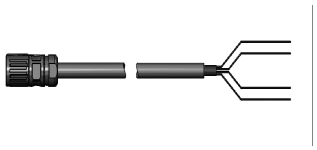
Note:

Refer to the following manual for the following information.

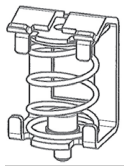
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

Σ-X-Series AC Servo Deive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Linear Servomotor Main Circuit Cables

Linear Servomotor Model	Cable & Connector Type	Length (L)	Order Number	Appearance
SGLFW2-30D070 to SGLFW2-45D380	Flexible Power cable 4 x 1.5mm² with M17 connector	3 m	JZSP-C7M143-03-E-G6	
		5 m	JZSP-C7M143-05-E-G6	
		10 m	JZSP-C7M143-10-E-G6	
		15 m	JZSP-C7M143-15-E-G6	
		20 m	JZSP-C7M143-20-E-G6	
SGLFW2-90D200 to SGLFW2-1DD380	Flexible Power cable 4 x 2.5mm² with M23 connector	3 m	JZSP-C7M154-03-E-G6	
		5 m	JZSP-C7M154-05-E-G6	
		10 m	JZSP-C7M154-10-E-G6	
		15 m	JZSP-C7M154-15-E-G6	
		20 m	JZSP-C7M154-20-E-G6	
SGLFW2-1DD560	Flexible Power cable 4 x 4mm² with M23 connector	3 m	JZSP-C7M164-03-E-G6	
		5 m	JZSP-C7M164-05-E-G6	
		10 m	JZSP-C7M164-10-E-G6	
		15 m	JZSP-C7M164-15-E-G6	
		20 m	JZSP-C7M164-20-E-G6	

· Motor Connection Shielding Clamp

SERVOPACK Model	Order Number	Appearance
Sigma-X 400 V up to 3.0 kW	KLBUE 4-13.5_SC	
Sigma-X 400 V from 5.0 kW to 7.5 kW	KLBUE 10-20_SC	
Sigma-X 400 V from 11 kW to 15kW	KLBUE 15-32_SC	

Reference PN.Sigma-7-03 for the shielding clamp installation and quick start guide.

SGLT (Models with T-type Iron Cores)

Model Designations

Moving Coil

S G L T W - 20 A 170 A P □ - E

Linear Σ series linear servomotors

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

1st digit Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving coil

3rd+4th digits Magnet Height

Code	Specification
20	20 mm
35	36 mm
40	40 mm
50	51 mm
80	76.5 mm

Non-Stock

5th digit Power Supply Voltage

Code	Specification
A	200 VAC

6th+7th+8th digits Length of Moving Coil

Code	Specification
170	170 mm
320	315 mm
400	394.2 mm
460	460 mm
600	574.2 mm

9th digit Design Revision Order

A, B …
H: High-efficiency model

10th digit Sensor Specification and Cooling Method

Code	Specifications		Applicable Models
	Polarity Sensor (Hall Sensor)	Cooling Method	
None	None	Self-cooled	All models
C*1	None	Water-cooled	SGLTW-40, -80
H*1	Yes	Water-cooled	
P	Yes	Self-cooled	All models

11th digit Connector for Servomotor Main Circuit Cable

Code	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	SGLTW-20A□□□□□ -35A□□□□□
	MS connector	SGLTW-40A□□□B□ -80A□□□B□
	Loose lead wires with no connector	SGLTW-35A□□□H□ -50A□□□H□

12th digit EU Directive Certification

Code	Specification
E	Certified
None	Not certified

*1 Contact your Yaskawa representative for the characteristics, dimensions, and other details on servomotors with these specifications.

Note:

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Magnetic Way

S G L T M - 20 324 A □

Linear Σ series linear servomotors

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

1st digit Servomotor Type

(Same as for the moving coil.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic way

3rd+4th digits Magnet Height

(Same as for the moving coil.)

5th+6th+7th digits Length of Magnetic Way

Code	Specification
324	324 mm
405	405 mm
540	540 mm
675	675 mm
756	756 mm
945	945 mm

8th digit Design Revision Order

A, B …
H: High-efficiency model

9th digit Options

Code	Specification	Applicable Models
None	Without options	–
C	With magnet cover	All models
Y	With base and magnet cover	SGLTM-20, -35*1, -40, -80

Non-Stock

*1 The SGLTM-35□□□H (high-efficiency models) do not support this specification.

Note:

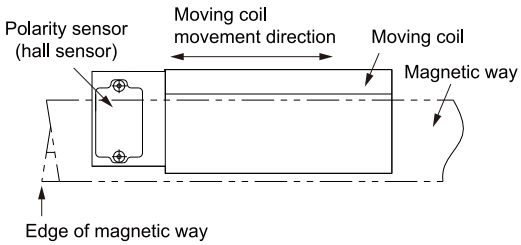
This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Precautions on Moving Coils with Polarity Sensors (Hall Sensor)

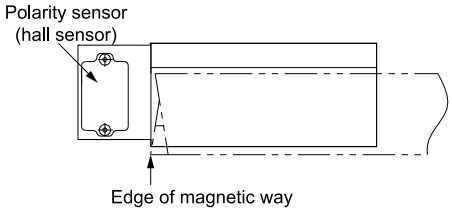
When you use a moving coil with a polarity sensor (hall sensor), the magnetic way must cover the bottom of the polarity sensor (hall sensor). Refer to the example that shows the correct installation.

When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length (L) of the moving coil and the polarity sensor (hall sensor). Refer to the following table.

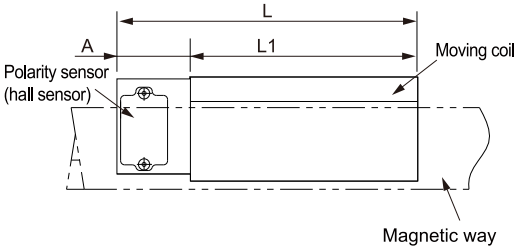
<Correct>



<Incorrect>



■ Total Length of Moving Coil with Polarity Sensor (Hall Sensor)



◆ 200 V Specification

Moving Coil Model SGLTW-	Length of Moving Coil L1 [mm]	Length of Polarity Sensor (Hall Sensor) A [mm]	Total Length L [mm]
20A170AP□	170	34	204
20A320AP□	315		349
20A460AP□	460		494
35A170AP□	170	34	204
35A320AP□	315		349
35A460AP□	460		494
35A170HP□	170	34	204
35A320HP□	315		349
50A170HP□	170	34	204
50A320HP□	315		349
40A400BH□ 40A400BP□	394.2	26	420.2
40A600BH□ 40A600BP□	574.2	26	600.2
80A400BH□ 80A400BP□	394.2	26	420.2
80A600BH□ 80A600BP□	574.2	26	600.2

◆ 400 V Specification

Moving Coil Model SGLTW-	Length of Moving Coil L1 [mm]	Length of Polarity Sensor (Hall Sensor) A [mm]	Total Length L [mm]
35D170HP□	170	34	204
35D320HP□	315		349
50D170HP□	170	34	204
50D320HP□	315		349
40D400B□□	394.2	26	420.2
40D600B□□	574.2		600.2

Continued on next page.

Continued from previous page.

Moving Coil Model SGLTW-	Length of Moving Coil L1 [mm]	Length of Polarity Sensor (Hall Sensor) A [mm]	Total Length L [mm]
80D400B□□	394.2	26	420.2
80D600B□□	574.2		600.2

Ratings and Specifications

Specifications

Linear Servomotor Moving Coil Model SGLTW-		Standard Models										High-efficiency Models			
		20A			35A			40A		80A		35A		50A	
		170A	320A	460A	170A	320A	460A	400B	600B	400B	600B	170H	320H	170H	320H
Time Rating		Continuous													
Thermal Class		B													
Insulation Resistance		500 VDC, 10 MΩ min.													
Withstand Voltage		1,500 VAC for 1 minute													
Excitation		Permanent magnet													
Cooling Method		Self-cooled													
Protective Structure		IP00													
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.													
Shock Resistance	Impact Acceleration	196 m/s²													
	Number of Impacts	2 times													
Vibration Resistance	Vibration Acceleration	49 m/s² (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)													

Ratings

Linear Servomotor Moving Coil Model SGLTW-		Standard Models										High-efficiency Models			
		20A			35A			40A		80A		35A		50A	
		170A	320A	460A	170A	320A	460A	400B	600B	400B	600B	170H	320H	170H	320H
Rated Motor Speed (Reference Speed during Speed Control) *1	m/s	3.0	3.0	3.0	2.5	2.5	2.5	1.5	2.0	2.0	2.0	2.5	2.0	2.0	2.0
Maximum Speed *1	m/s	5.0	5.0	5.0	5.0	5.0	5.0	3.1	3.1	2.5	2.5	4.8	4.8	3.2	3.1
Rated Force *1 *2	N	130	250	380	220	440	670	670	1000	1300	2000	300	600	450	900
Maximum Force *1	N	380	760	1140	660	1320	2000	2600	4000	5000	7500	600	1200	900	1800
Rated Current *1	Arms	2.3	4.4	6.7	3.5	7.0	10.7	7.3	10.9	11.1	17.1	5.1	10.1	5.1	10.2
Maximum Current *1	Arms	7.7	15.4	23.2	12.1	24.2	36.7	39.4	60.6	57.9	86.9	11.9	23.9	11.8	23.6
Moving Coil Mass	kg	2.5	4.6	6.7	3.7	6.8	10	15	23	24	35	4.9	8.8	6.0	11
Force Constant	N/Arms	61.0	61.0	61.0	67.5	67.5	67.5	99.1	99.1	126	126	64.0	64.0	95.2	95.2
BEMF Constant	Vrms/(m/s)/phase	20.3	20.3	20.3	22.5	22.5	22.5	33.0	33.0	42.0	42.0	21.3	21.3	31.7	31.7
Motor Constant	N/$\sqrt{W}$	18.7	26.5	32.3	26.7	37.5	46.4	61.4	75.2	94.7	116	37.4	52.9	48.6	68.7
Electrical Time Constant	ms	5.9	5.9	5.9	6.9	6.8	6.9	15	15	17	17	15	16	16	17
Mechanical Time Constant	ms	7.1	6.6	6.4	5.2	4.8	4.6	4.0	4.1	2.7	2.6	3.5	3.1	2.5	2.4
Thermal Resistance (with Heat Sink)	K/W	1.01	0.49	0.38	0.76	0.44	0.32	0.24	0.20	0.22	0.18	0.76	0.40	0.61	0.30
Thermal Resistance (without Heat Sink)	K/W	1.82	1.11	0.74	1.26	0.95	0.61	0.57	0.40	0.47	0.33	1.26	0.83	0.97	0.80
Magnetic Attraction *3	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magnetic Attraction One Side *4	N	800	1590	2380	1400	2780	4170	3950	5890	7650	11400	1400	2780	2000	3980
Maximum Allowable Payload	kg	25	50	76	44	88	130	280	440	690	1000	33	67	92	190
Maximum Allowable Payload (With External Regenerative Resistor and External Dynamic Brake Resistor)	kg	25	50	76	44	88	130	280	440	690	1000	40	82	95	190
Combined Magnetic Way, SGLTM-		20□□□A□			35□□□A□			40□□□A□		80□□□A□		35□□□H□		50□□□H□	
Combined Serial Converter Unit, JZDP-□□□□-		011	012	013	014	015	016	185	186	187	188	105	106	108	109
Applicable SERVOPACKs	SGDXS-	3R8A	7R6A	120A	5R5A	120A	180A	180A	330A	330A	550A	5R5A	120A	5R5A	120A
	SGDXW-	5R5A	7R6A	-	5R5A	-	-	-	-	-	-	5R5A	-	5R5A	-

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

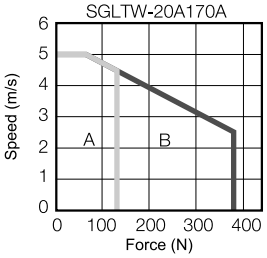
- 254 mm × 254 mm × 25 mm: SGLTW-20A170A, 35A170A
- 400 mm × 500 mm × 40 mm: SGLTW-20A320A, 20A460A, 35A170H, 35A320A, 35A320H, 35A460A, 50A170H
- 609 mm × 762 mm × 50 mm: SGLTW-40A400B, 40A600B, 50A320H, 80A400B, 80A600B

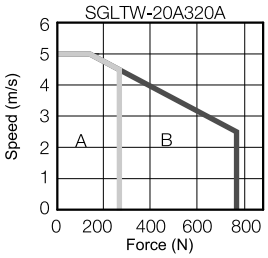
*3 The unbalanced magnetic gap that results from the moving coil installation condition causes a magnetic attraction on the moving coil.
*4 The value that is given is the magnetic attraction that is generated on one side of the magnetic way.

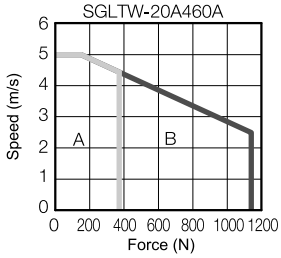
Force-Motor Speed Characteristics

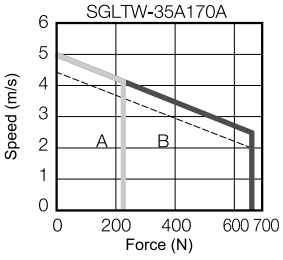
A : Continuous duty zone ———— (solid lines): With three-phase 200-V input
B : Intermittent duty zone - - - - - - - - (dotted lines): With single-phase 200-V input

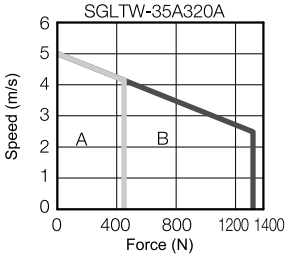
■ Standard Models

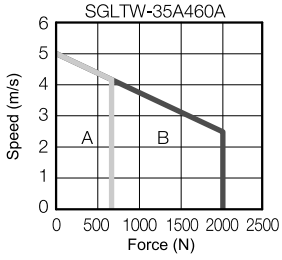


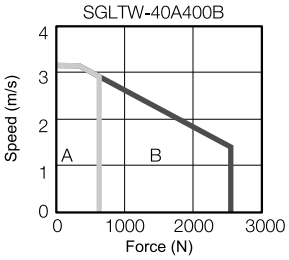


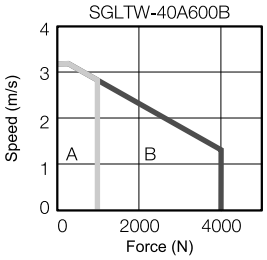


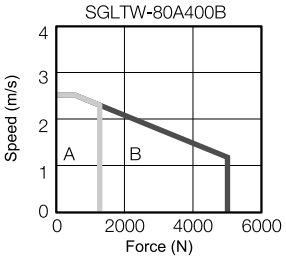


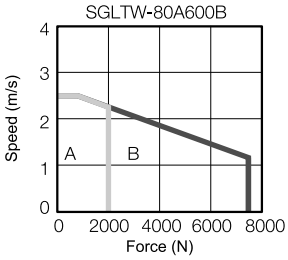








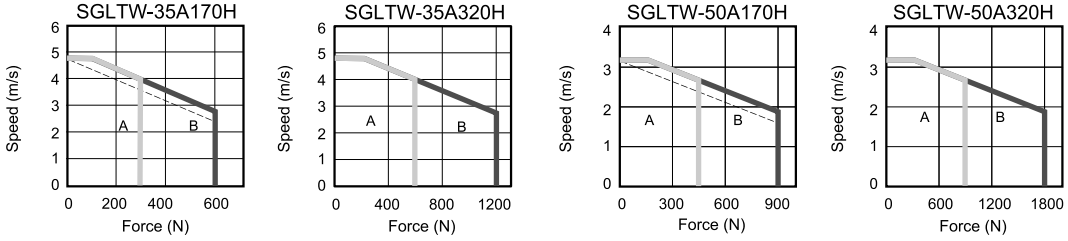




Note:

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 force is within the allowable range for the rated force, 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.

■ High-efficiency Models



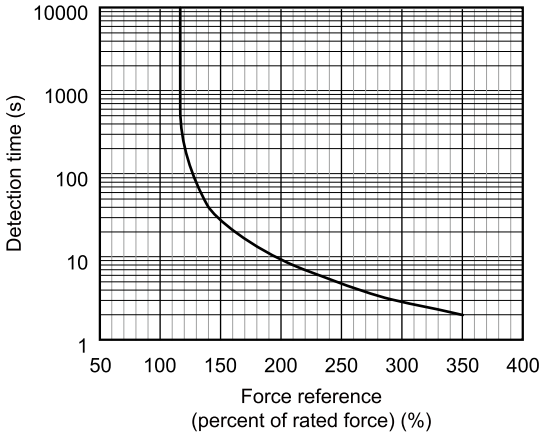
Note:

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 force is within the allowable range for the rated force, 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.

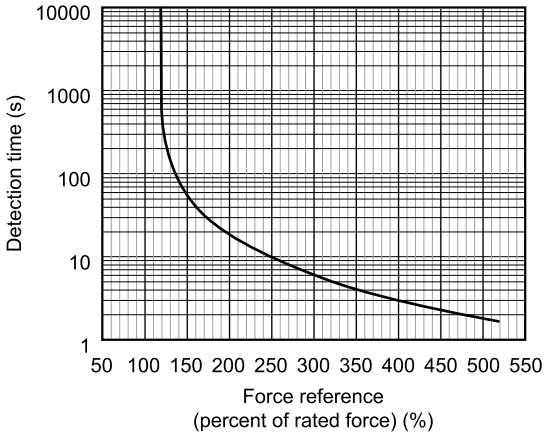
Servomotor Overload Protection Characteristics

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

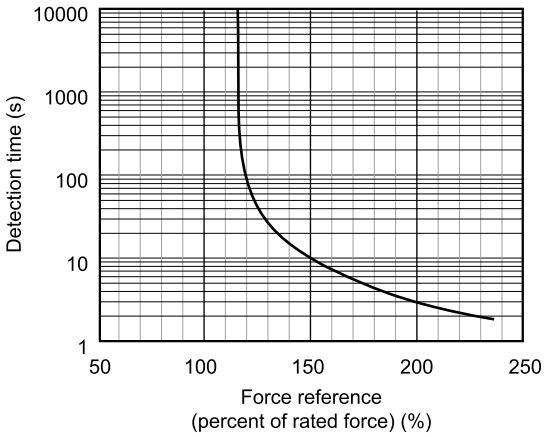
SGLTW-20A□□□A and 35A□□□A



SGLTW-40A□□□B and 80A□□□B



SGLTW-35A□□□H and 50A□□□H



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 given in *Force-Motor Speed Characteristics on page 488*.

Specifications and Ratings (400 V Specification)

Specifications

Linear Servomotor Moving Coil Model SGLTW-		Standard Models				High-efficiency Models			
		40D		80D		35D		50D	
		400B	600B	400B	600B	170H	320H	170H	320H
Time Rating		Continuous							
Thermal Class		B							
Insulation Resistance		500 VDC, 10 MΩ min.							
Withstand Voltage		1,800 VAC for 1 minute							
Excitation		Permanent magnet							
Cooling Method		Self-cooled							
Protective Structure		IP00							
Environ-mental 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.							
Shock Resistance	Impact Acceleration	196 m/s²							
	Number of Impacts	2 times							
Vibration Resistance	Vibration Acceleration	49 m/s² (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)							

Ratings

Linear servomotor Moving Coil Model SGLTW-		Standard Models				High-efficiency Models			
		40D		80D		35D		50D	
		400B	600B	400B	600B	170H	320H	170H	320H
Rated Speed (Reference Speed during Speed Control) *1*		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Maximum Speed *1*	m/s	3.1	3.1	3.1	3.1	5.0	5.0	4.0	4.0
Rated Force *1* *2*	N	670	1000	1300	2000	300	600	450	900
Maximum Force *1*	N	2600	4000	5000	7500	600	1200	900	1800
Rated Current *1*	Arms	3.7	5.5	7.2	11.1	3.2	6.5	3.2	6.3
Maximum Current *1*	Arms	20.7	30.6	37.6	56.4	7.7	15.5	7.4	14.8
Moving Coil Mass	kg	15	22	24	35	4.7	8.8	6.0	11
Force Constant	N/Arms	196	196	194	194	99.6	99.6	153	153

Continued on next page.

Continued from previous page.

Linear servomotor Moving Coil Model SGLTW-		Standard Models				High-efficiency Models			
		40D		80D		35D		50D	
		400B	600B	400B	600B	170H	320H	170H	320H
BEMF Constant	Vrms/(m/s)/phase	65.4	65.4	64.8	64.8	33.2	33.2	51.1	51.1
Motor Constant	N/	59.6	73.0	85.9	105	36.3	51.4	48.9	69.1
Electrical Time Constant	ms	14	14	15	16	14	14	16	16
Mechanical Time Constant	ms	4.2	4.2	3.3	3.2	3.6	3.3	2.5	2.4
Thermal Resistance (with Heat Sink)	K/W	0.24	0.20	0.22	0.18	0.76	0.40	0.61	0.30
Thermal Resistance (without Heat Sink)	K/W	0.57	0.40	0.47	0.33	1.26	0.83	0.97	0.80
Magnetic Attraction *3	N	0	0	0	0	0	0	0	0
Magnetic Attraction (One Side) *4	N	3950	5890	7650	11400	1400	2780	2000	3980
Combined Magnetic Way, SGLTM-		40□□□A□		80□□□A□		35□□□H□		50□□□H□	
Combined Serial Converter Unit, JZDP-□□□□-		197	198	199	200	193	194	195	196
Applicable SERVOPACKs	SGD7S-	120D	170D	170D	260D	3R5D	8R4D	3R5D	8R4D
	SGD7W-	–	–	–	–	–	–	–	–

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

- 400 mm × 500 mm × 40 mm: SGLTW-35D170H, -35D320H, -50D170H
- 609 mm × 762 mm × 50 mm: SGLTW-40D400B, -40D600B, -50D320H, -80D400B, -80D600B

*3 The unbalanced magnetic gap that results from the moving coil installation condition causes a magnetic attraction on the moving coil.

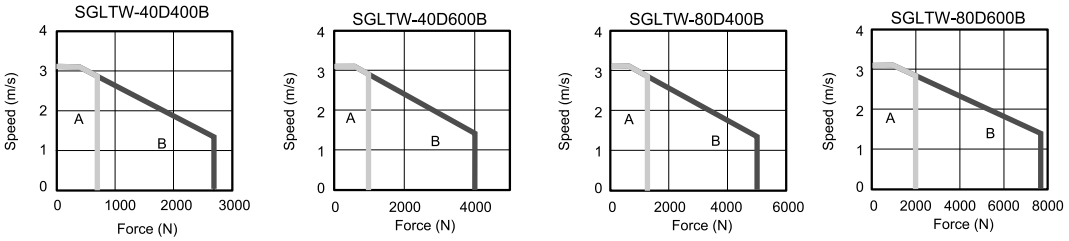
*4 The value that is given is the magnetic attraction that is generated on one side of the magnetic way.

Force-Motor Speed Characteristics

A : Continuous duty zone

B : Intermittent duty zone

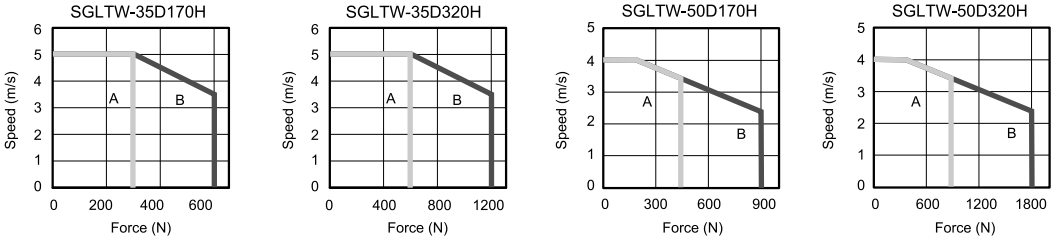
■ Standard Models



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. Replace the serial converter unit when using a three-phase, 200-VAC power supply input. Contact your Yaskawa representative for details.
4. If the effective force is within the allowable range for the rated force, the servomotor can be used within the intermittent duty zone.
5. If the length of the servomotor main circuit cable exceeds 20 m, the intermittent duty zone will become smaller because the voltage drop increases.

■ High-efficiency Models



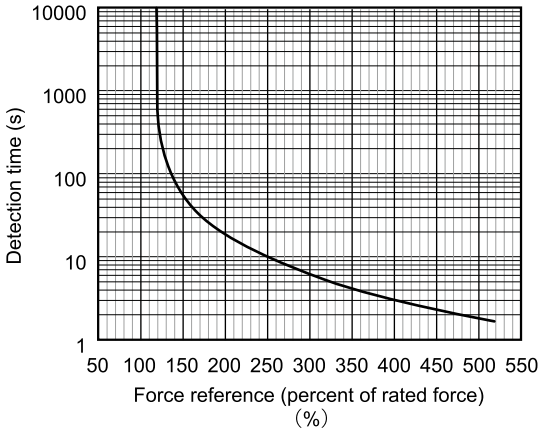
Note:

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. Replace the serial converter unit when using a three-phase, 200-VAC power supply input. Contact your Yaskawa representative for details.
4. If the effective force is within the allowable range for the rated force, the servomotor can be used within the intermittent duty zone.
5. If the length of the servomotor main circuit cable exceeds 20 m, the intermittent duty zone will become smaller because the voltage drop increases.

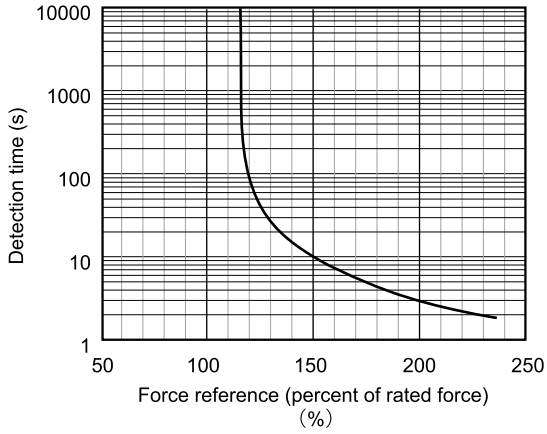
Servomotor Overload Protection Characteristics

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

SGLTW-40D, -80D



SGLTW-35D, -50D



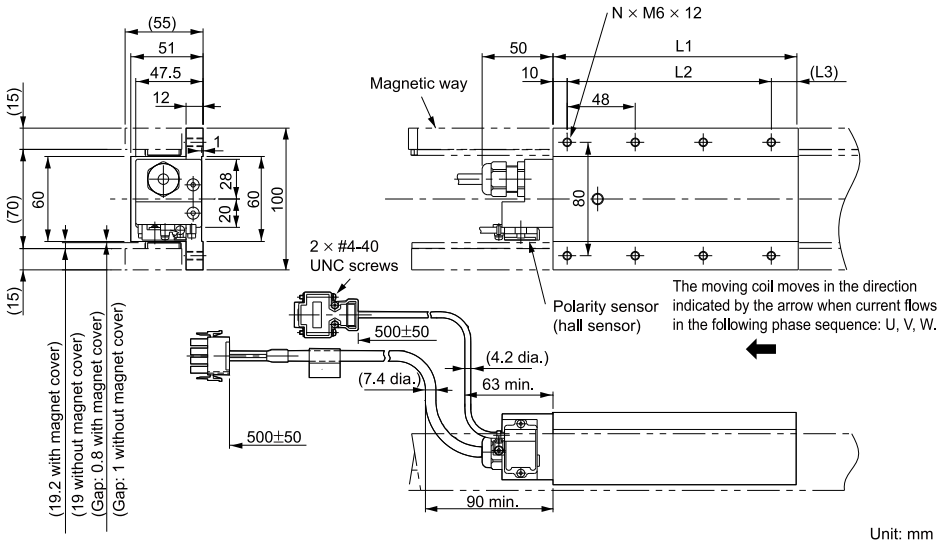
Note:

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 given in "Force-Motor Speed Characteristics on page 426".

External Dimensions

SGLTW-20: Standard Models

■ Moving Coils: SGLTW-20A□□□A□

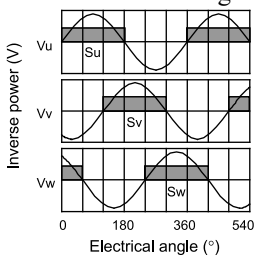


Unit: mm

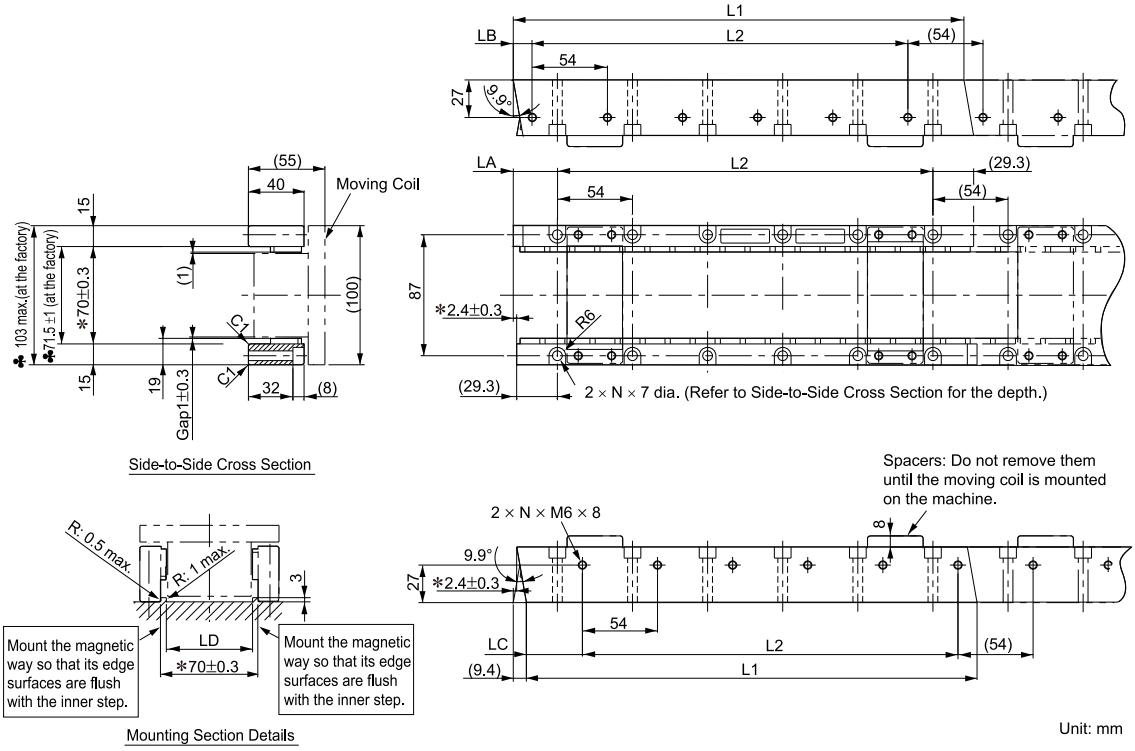
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
20A170A□	170	144 (48 × 3)	(16)	8	2.5
20A320A□	315	288 (48 × 6)	(17)	14	4.6
20A460A□	460	432 (48 × 9)	(18)	20	6.7

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-20□□□A

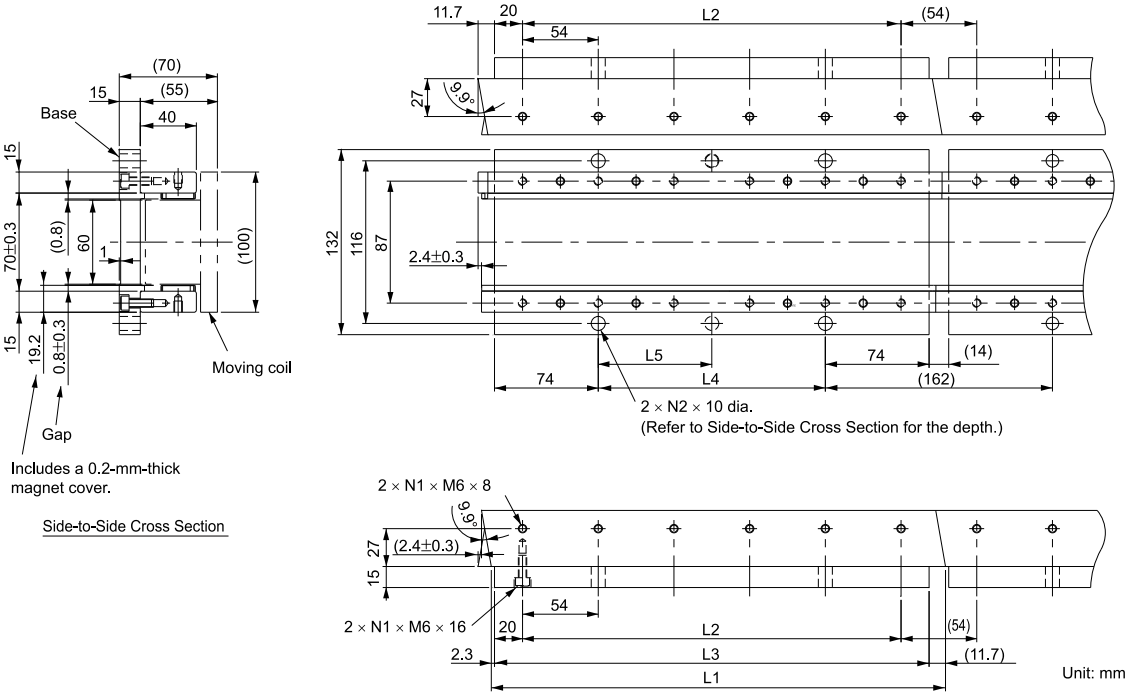


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
20324A□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$31.7^{0}_{-0.2}$	$13.7^{0}_{-0.2}$	$40.3^{0}_{-0.2}$	$62^{+0.6}_{0}$	6	3.4
20540A□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$31.7^{0}_{-0.2}$	$13.7^{0}_{-0.2}$	$40.3^{0}_{-0.2}$	$62^{+0.6}_{0}$	10	5.7
20756A□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$31.7^{0}_{-0.2}$	$13.7^{0}_{-0.2}$	$40.3^{0}_{-0.2}$	$62^{+0.6}_{0}$	14	7.9

■ Magnetic Ways with Bases: SGLTM-20□□□AY



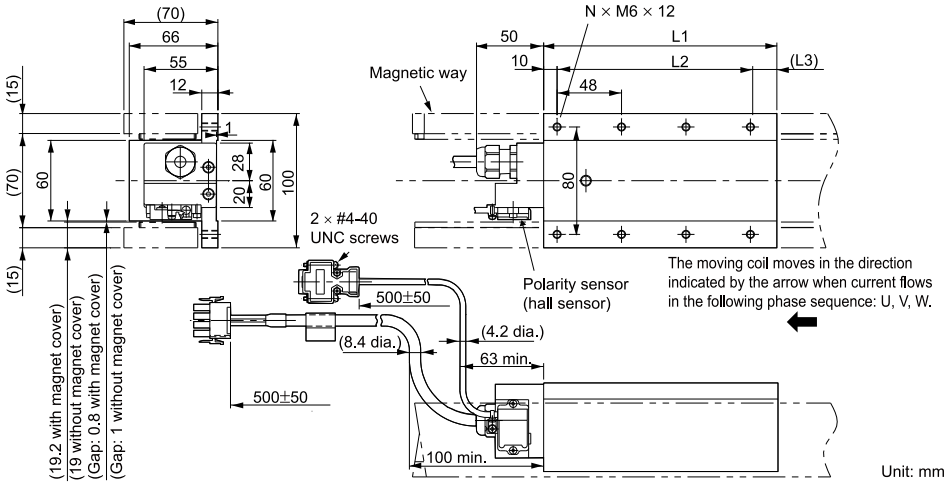
Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
20324AY	$324^{-0.1}_{-0.3}$	270	310	162	162	6	2	5.1
20540AY	$540^{-0.1}_{-0.3}$	486	526	378	189	10	3	8.5
20756AY	$756^{-0.1}_{-0.3}$	702	742	594	198	14	4	12

SGLTW-35: Standard Models

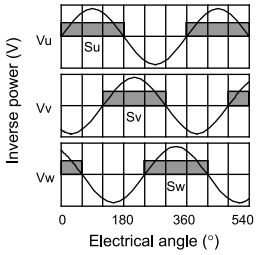
■ Moving Coils: SGLTW-35A□□□A□



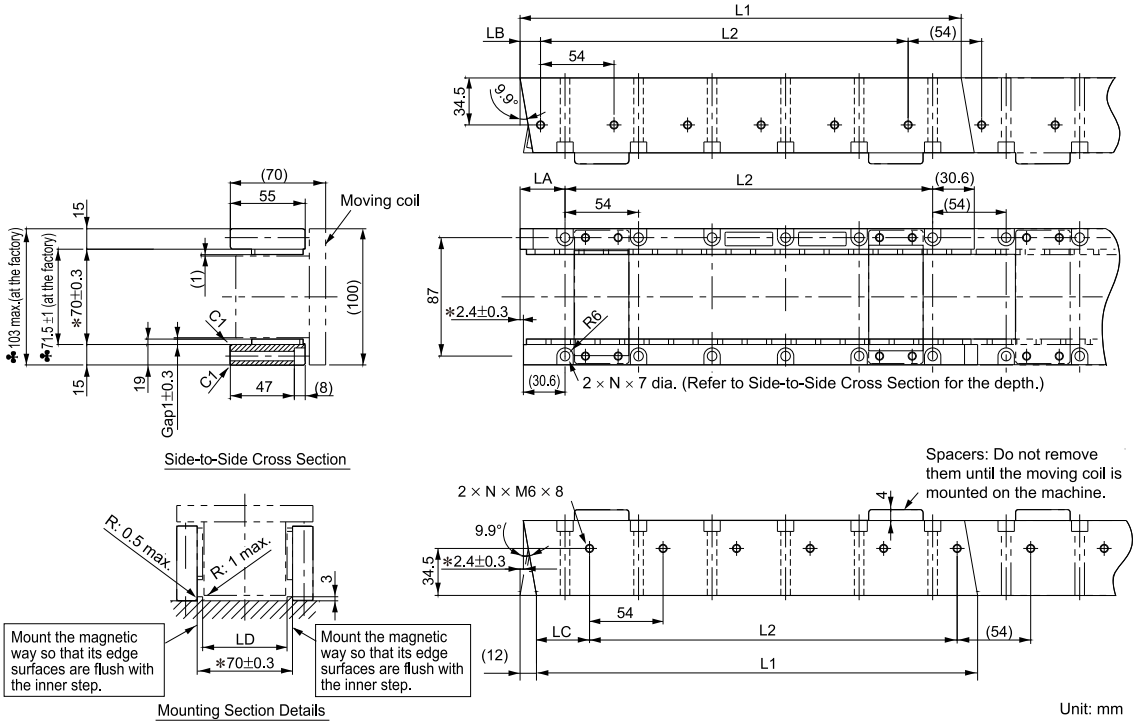
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
35A170A□	170	144 (48 × 3)	(16)	8	3.7
35A320A□	315	288 (48 × 6)	(17)	14	6.8
35A460A□	460	432 (48 × 9)	(18)	20	10

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-35□□□A□

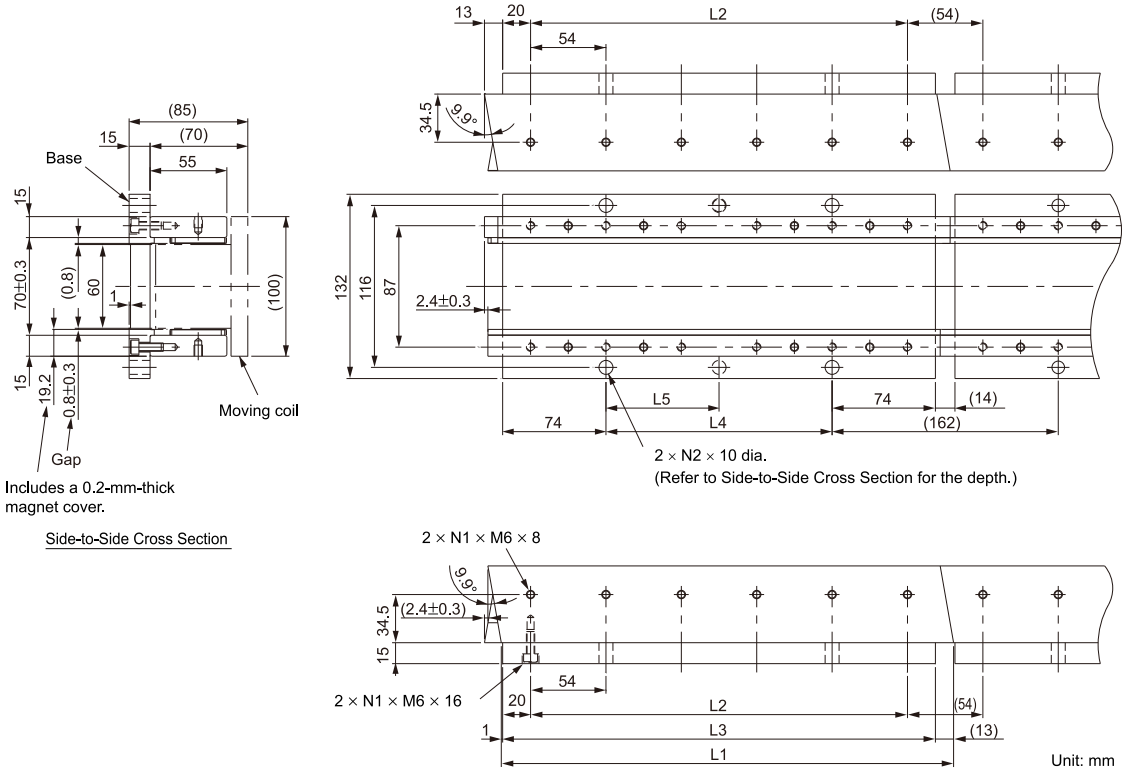


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
35324A□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$62^{+0.6}_{0}$	6	4.8
35540A□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$62^{+0.6}_{0}$	10	8
35756A□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$62^{+0.6}_{0}$	14	11

■ Magnetic Ways with Bases: SGLTM-35□□□AY



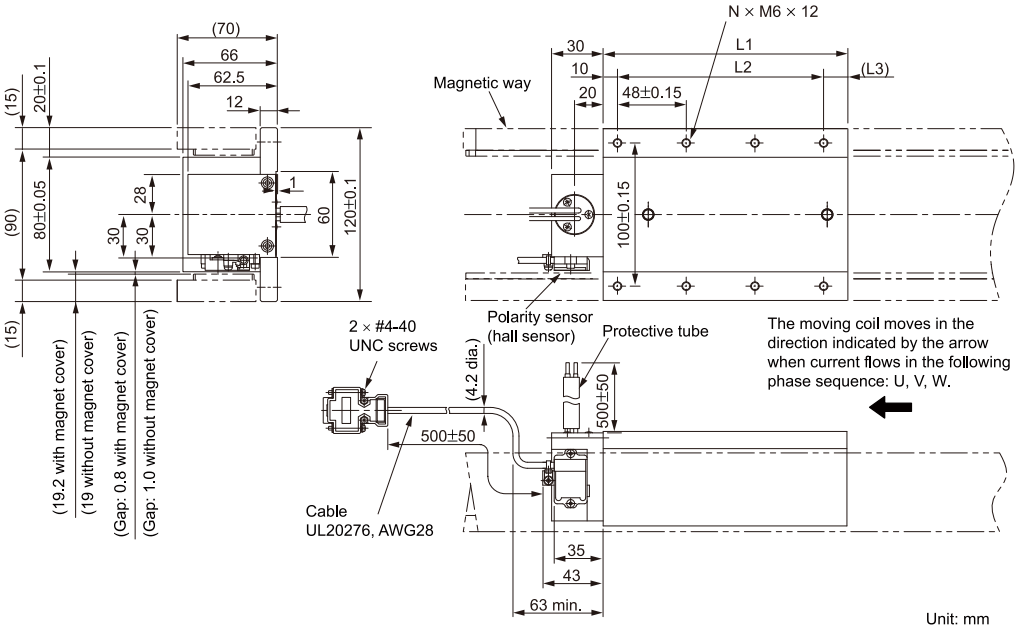
Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
35324AY	$324^{-0.1}_{-0.3}$	270	310	162	162	6	2	6.4
35540AY	$540^{-0.1}_{-0.3}$	486	526	378	189	10	3	11
35756AY	$756^{-0.1}_{-0.3}$	702	742	594	198	14	4	15

SGLTW-35□□□□H□: High-efficiency Models

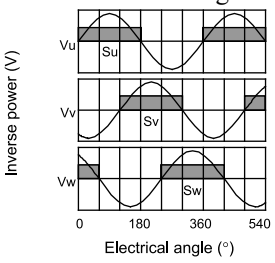
■ Moving Coils: SGLTW-35A□□□H□



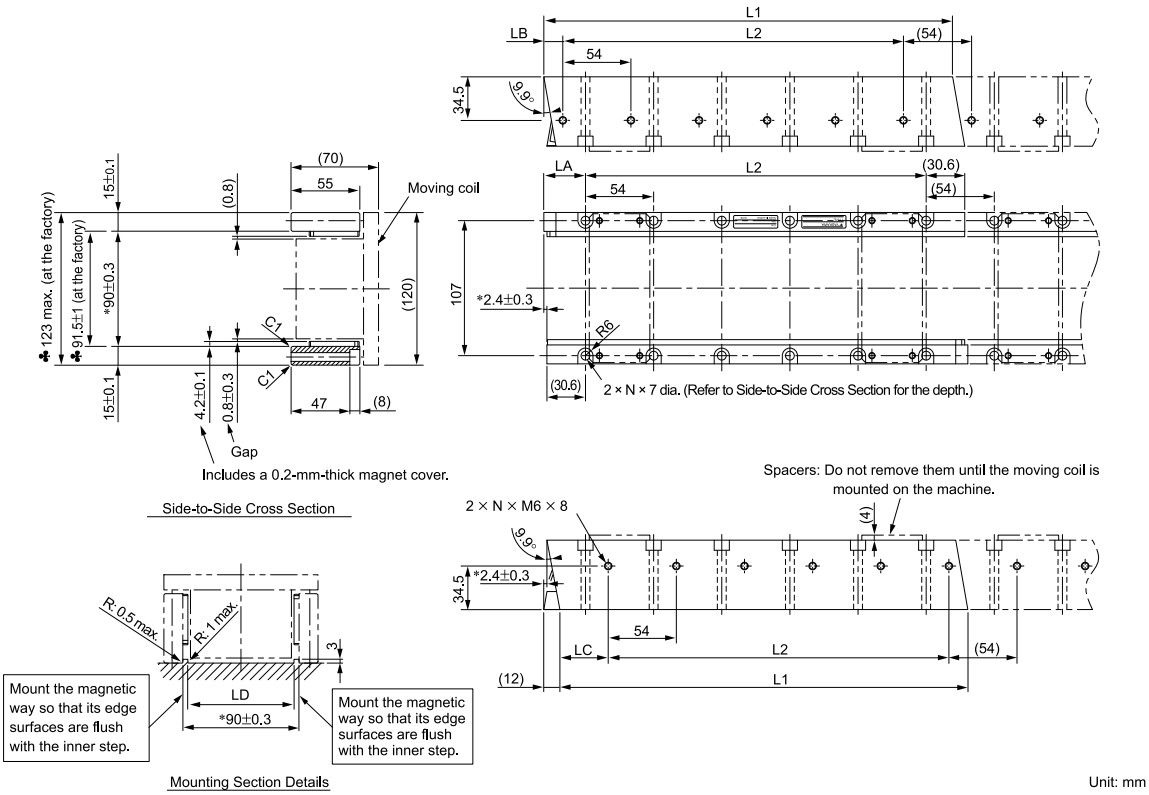
Moving Coil Model SGLTW-	L1	L2	L3	N	Approx. Mass [kg]
35A170H□	170	144 (48 × 3)	(16)	8	4.7
35A320H□	315	288 (48 × 6)	(17)	14	8.8

■ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-35□□□H□



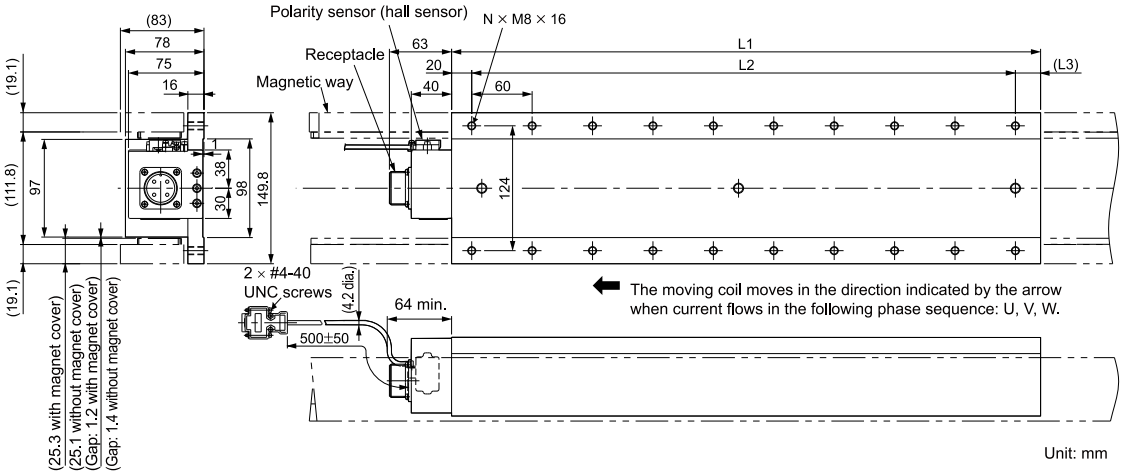
Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
35324H□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	6	4.8
35540H□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	10	8
35756H□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	14	11

SGLTW-40: Standard Models

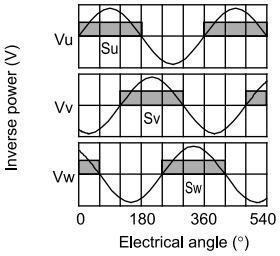
■ Moving Coils: SGLTW-40A□□□B□



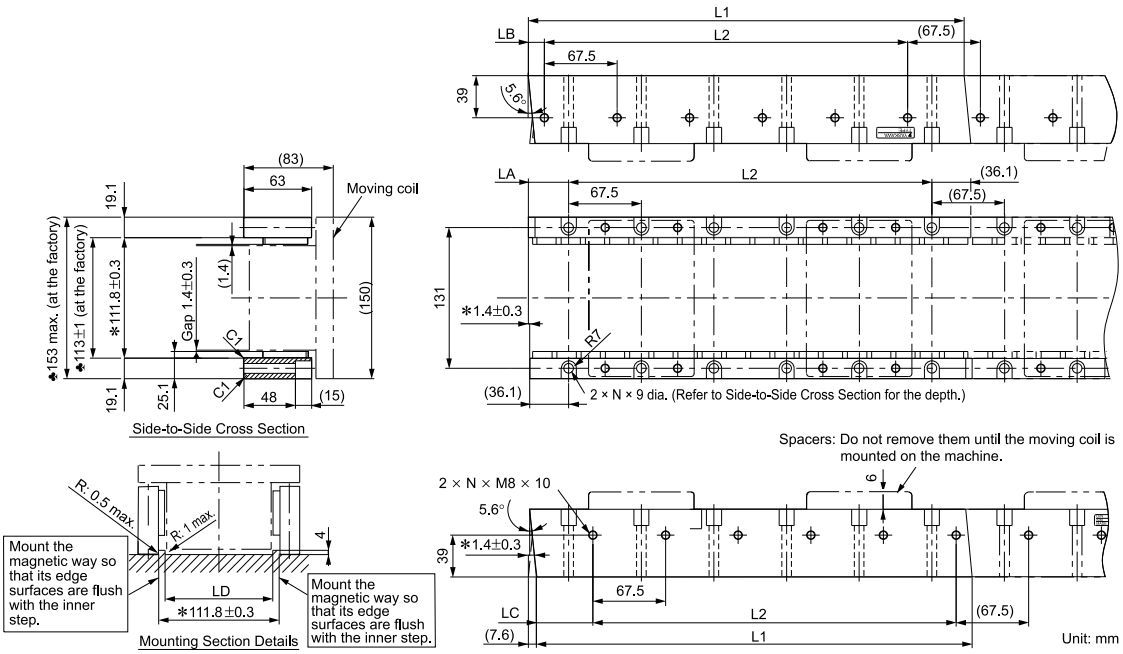
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
40A400B□	394.2	360 (60 × 6)	(15)	14	15
40A600B□	574.2	540 (60 × 9)	(15)	20	22

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-40□□□A□

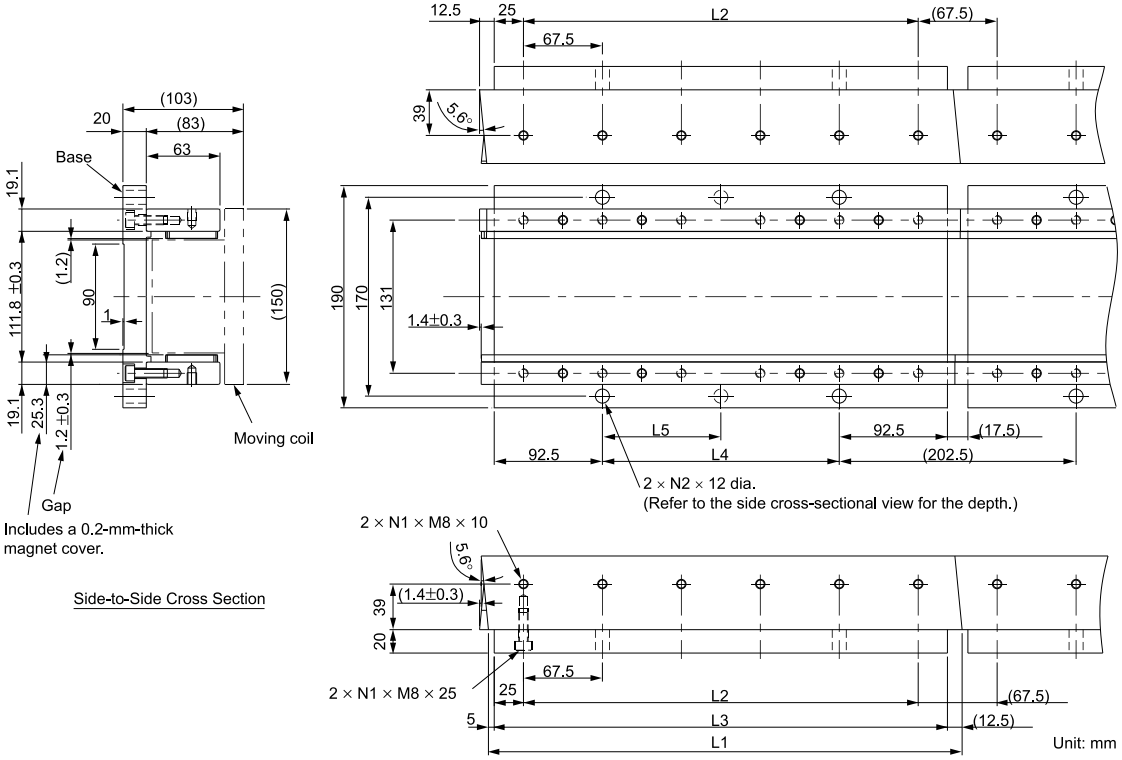


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
40405A□	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	6	9
40675A□	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	10	15
40945A□	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	14	21

■ Magnetic Ways with Bases: SGLTM-40□□□AY



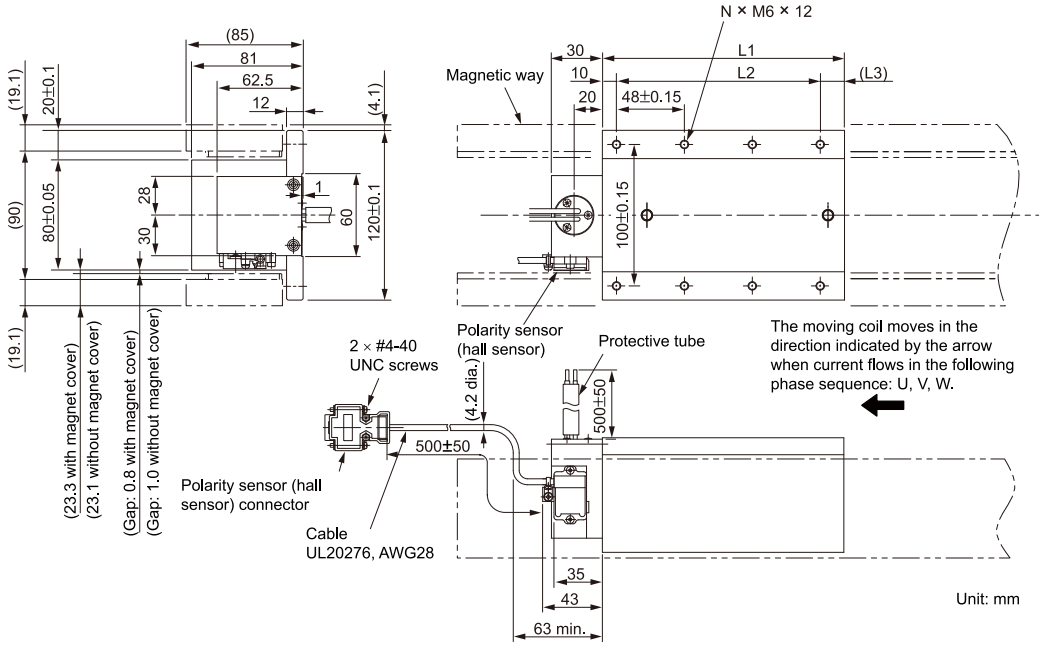
Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
40405AY	$405^{-0.1}_{-0.3}$	337.5	387.5	202.5	202.5	6	2	13
40675AY	$675^{-0.1}_{-0.3}$	607.5	657.5	472.5	236.25	10	3	21
40945AY	$945^{-0.1}_{-0.3}$	877.5	927.5	742.5	247.5	14	4	30

SGLTW-50: High-efficiency Models

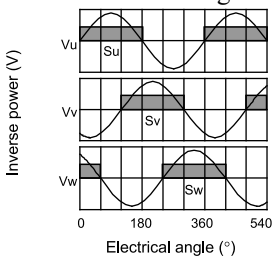
■ Moving Coils: SGLTW-50A□□□H□



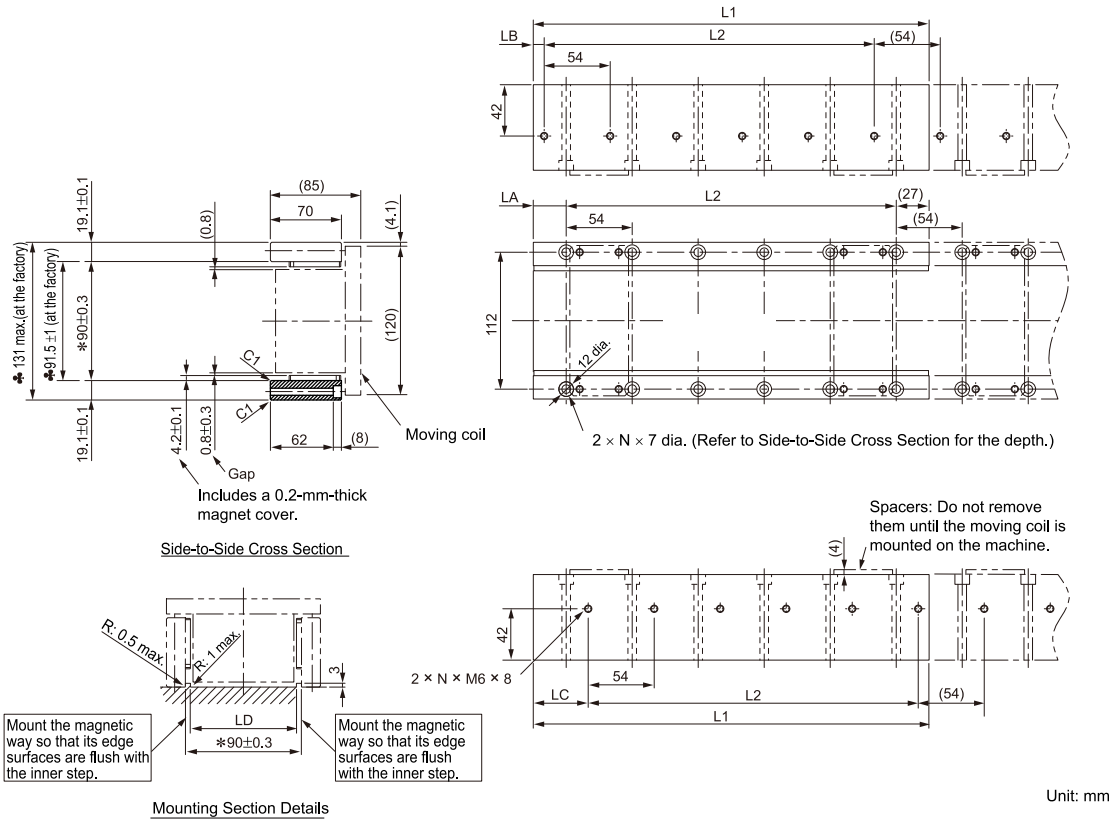
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
50A170H□	170	144 (48 × 3)	(16)	8	6
50A320H□	315	288 (48 × 6)	(17)	14	11

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-50□□□H□



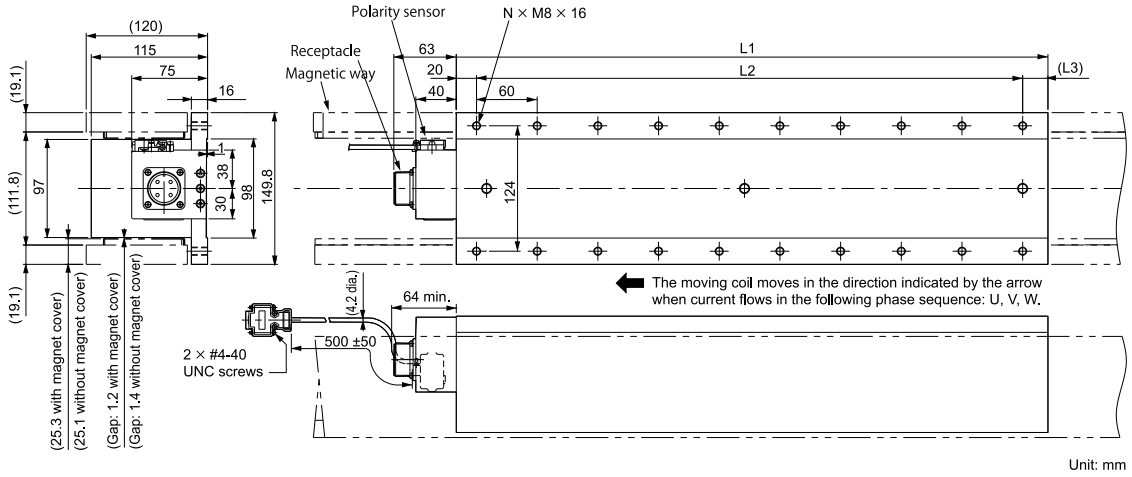
Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
50324H□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	6	8
50540H□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	10	13
50756H□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	14	18

SGLTW-80: Standard Models

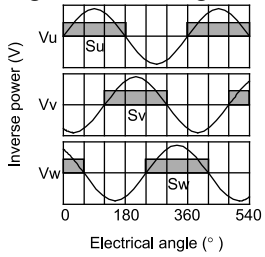
■ Moving Coils: SGLTW-80A□□□B□



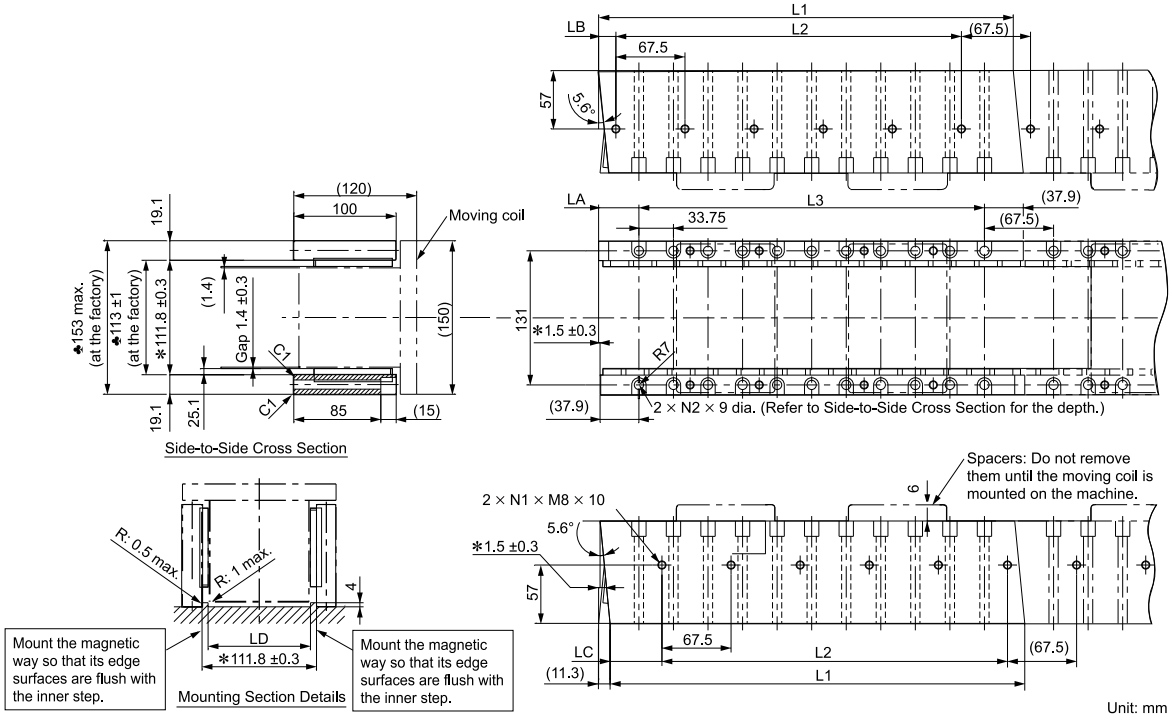
Moving Coil Model SGLTW-	L1	L2	L3	N	Approx. Mass [kg]
80A400Bo	394.2	360 (60 × 6)	(15)	14	24
80A600Bo	574.2	540 (60 × 9)	(15)	20	35

◆ Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-80□□□A□

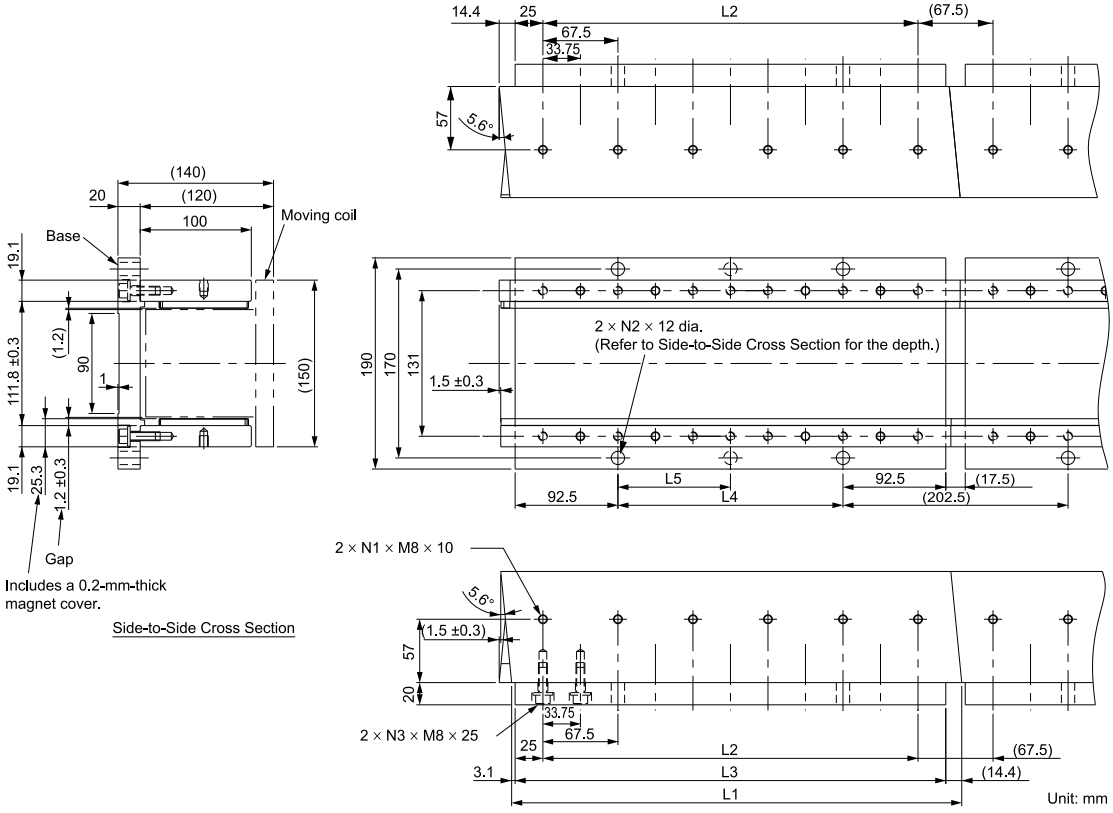


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	L3	LA	LB	LC	LD	N1	N2	Approx. Mass [kg]
80405Ao	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	337.5 (33.75 × 10)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	6	11	14
80675Ao	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	607.5 (33.75 × 18)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	10	19	24
80945Ao	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	887.5 (33.75 × 26)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	14	27	34

■ Magnetic Ways with Bases: SGLTM-80□□□AY



Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

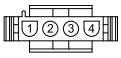
Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	N3	Approx. Mass [kg]
80405AY	$405^{-0.1}_{-0.3}$	337.5	387.5	202.5	202.5	6	2	11	18
80675AY	$675^{-0.1}_{-0.3}$	607.5	657.5	472.5	236.25	10	3	19	31
80945AY	$945^{-0.1}_{-0.3}$	877.5	927.5	742.5	247.5	14	4	27	43

Connector Specifications

SGLTW-20: Standard Models

■ SGLTW-20A□□□A□

• Servomotor Connector

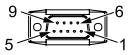


1	Phase U	Red	3	Phase W	Black
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350218-3 or 350547-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

• Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

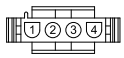
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-35: Standard Models

■ SGLTW-35A□□□A□

• Servomotor Connector

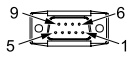


1	Phase U	Red	3	Phase W	Black
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350218-3 or 350547-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

• Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

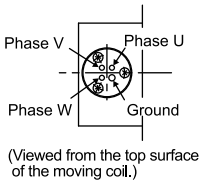
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-35□□□□H□: High-efficiency Models

■ SGLTW-35A□□□H□

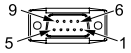
• Servomotor Connector



Phase U	Red	U	2 mm^2
Phase V	White	V	
Phase W	Black	W	
Ground	Green	-	

Secure the lead from the moving coil of the linear servomotor so that it moves together with the moving coil.

• Polarity Sensor



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-40: Standard Models

■ SGLTW-40A□□□B□

• Servomotor Connector

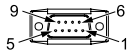


A	Phase U	C	Phase W
B	Phase V	D	Ground

Receptacle: MS3102A-22-22P
From DDK Ltd.

Mating Connector
Right-angle plug: MS3108B22-22S
Straight Plug: MS3106B22-22S
Cable Clamp: MS3057-12A

• Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

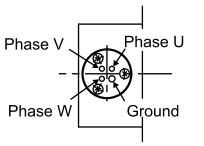
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-50: High-efficiency Models

■ SGLTW-50A□□□H□

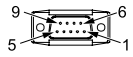
· Servomotor Connector



Phase U	Red	U	2 mm^2
Phase V	White	V	
Phase W	Black	W	
Ground	Green	-	

Secure the lead from the moving coil of the linear servomotor so that it moves together with the moving coil.

• Polarity Sensor



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-80: Standard Models

■ SGLTW-80A□□□B□

• Servomotor Connector

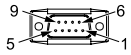


A	Phase U	C	Phase W
B	Phase V	D	Ground

Receptacle: MS3102A-22-22P
From DDK Ltd.

Mating Connector
Right-angle plug: MS3108B22-22S
Straight Plug: MS3106B22-22S
Cable Clamp: MS3057-12A

• Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

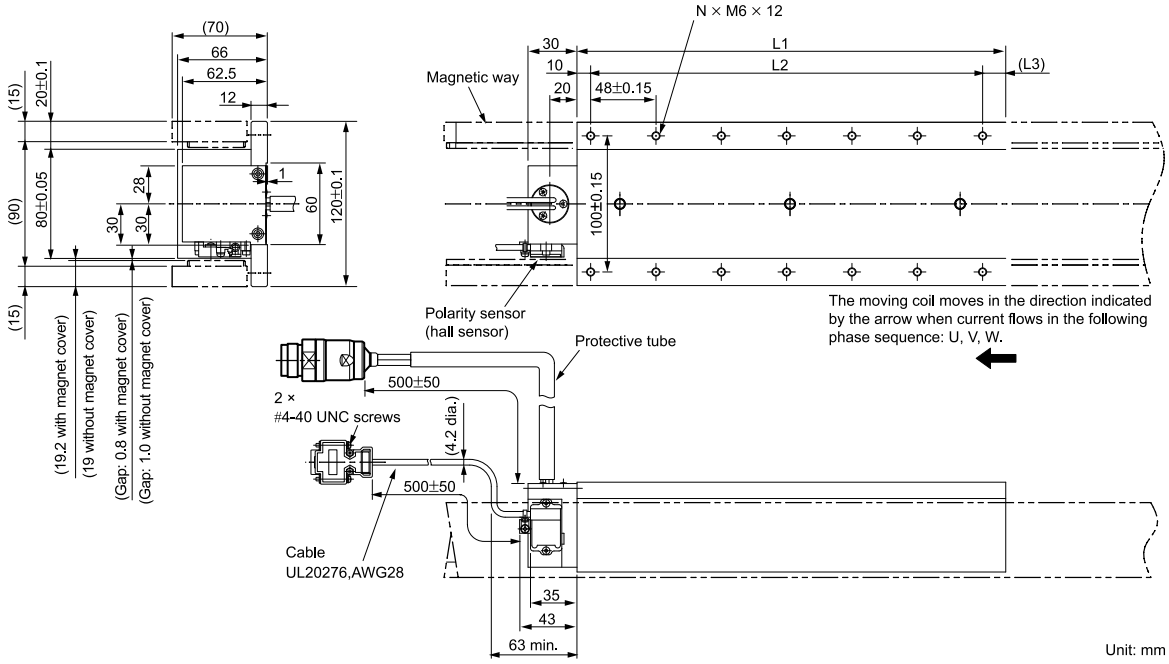
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

External Dimensions (400 V Specification)

SGLTW-35: High-efficiency Models

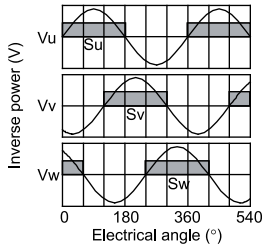
■ Moving Coils: SGLTW-35D□□□H□D



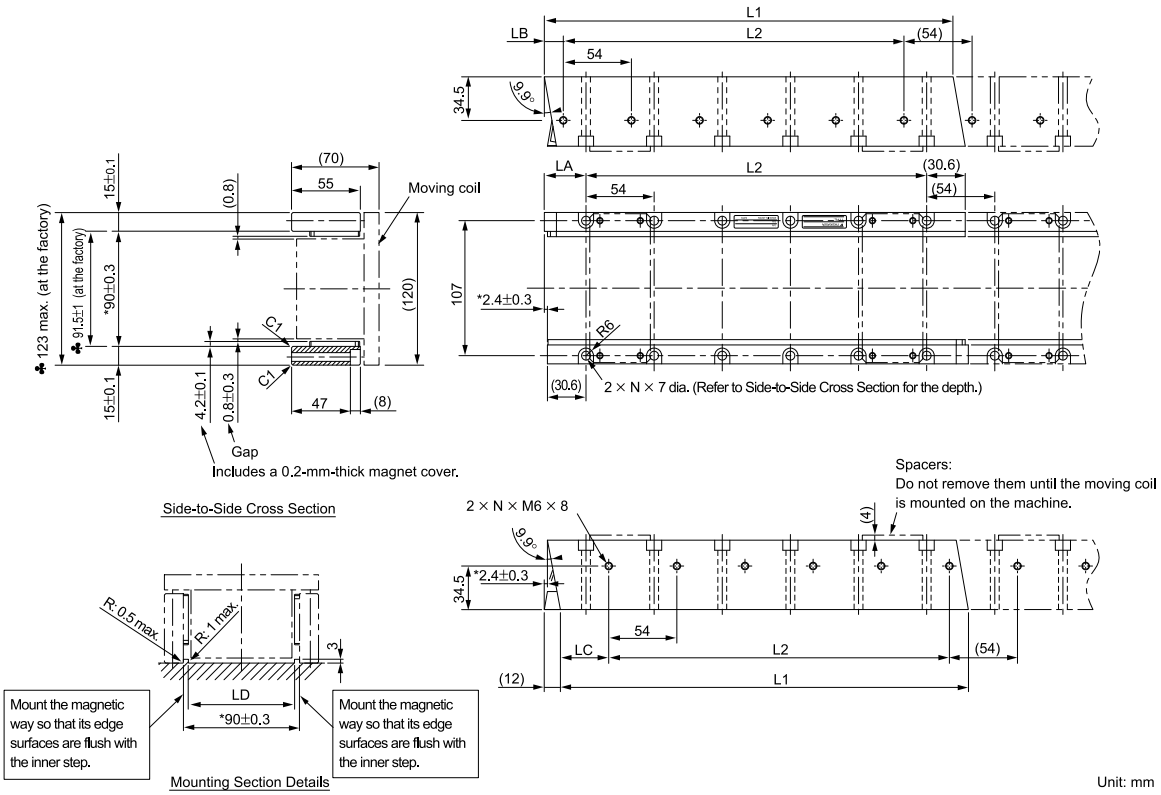
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
35D170H□D	170	144 (48 × 3)	(16)	8	4.7
35D320H□D	315	288 (48 × 6)	(17)	14	8.8

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure below shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-35□□□H□



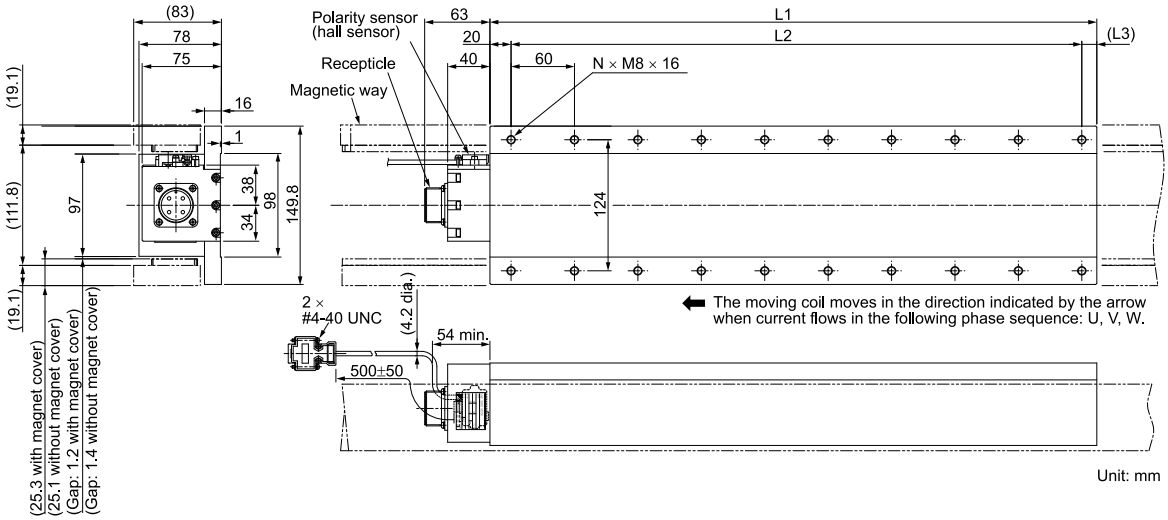
Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
35324H□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	6	4.8
35540H□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	10	8
35756H□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	14	11

SGLTW-40: Standard Models

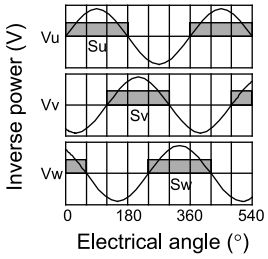
■ Moving Coils: SGLTW-40D□□□B□



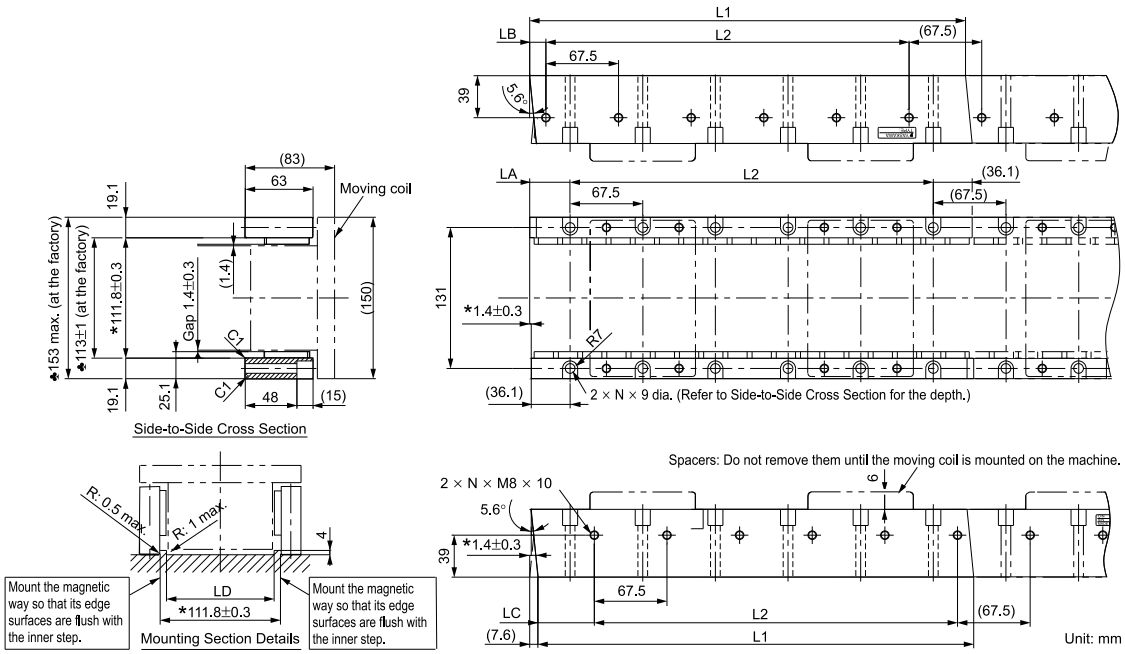
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
40D400B□	394.2	360 (60 × 6)	(15)	14	15
40D600B□	574.2	540 (60 × 9)	(15)	20	22

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-40□□□A□

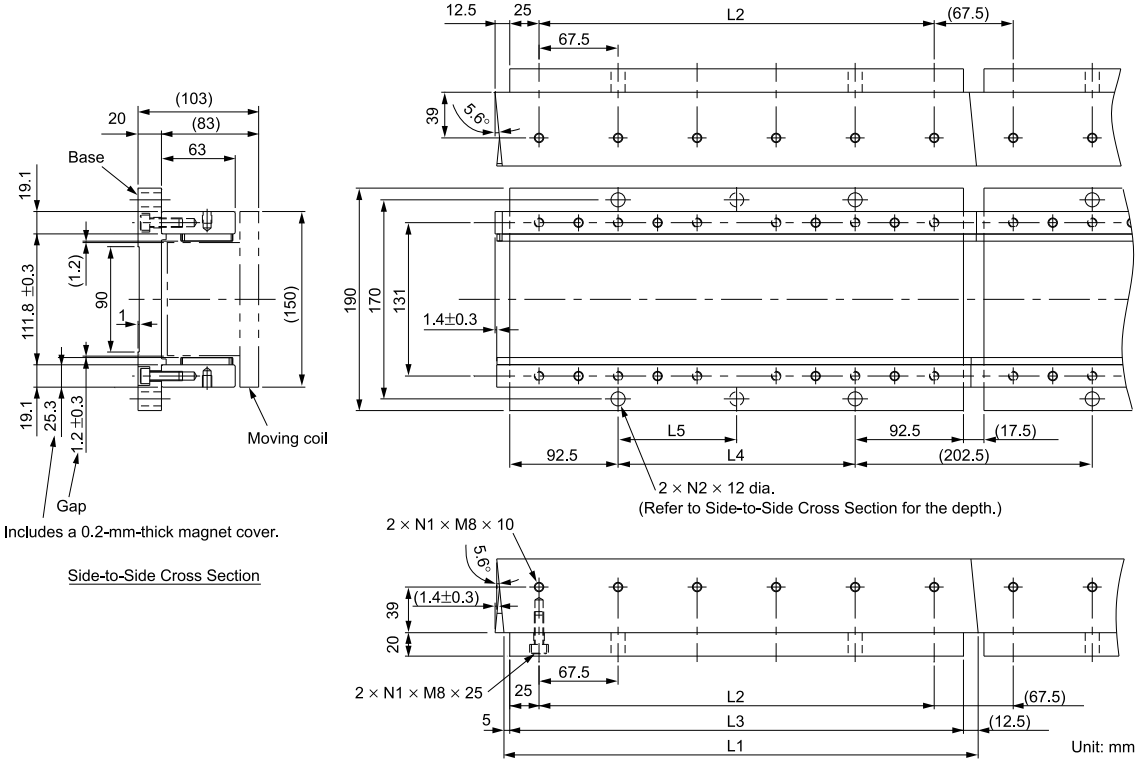


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
40405A□	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	6	9
40675A□	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	10	15
40945A□	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	14	21

■ Magnetic Ways with Bases: SGLTM-40□□□AY



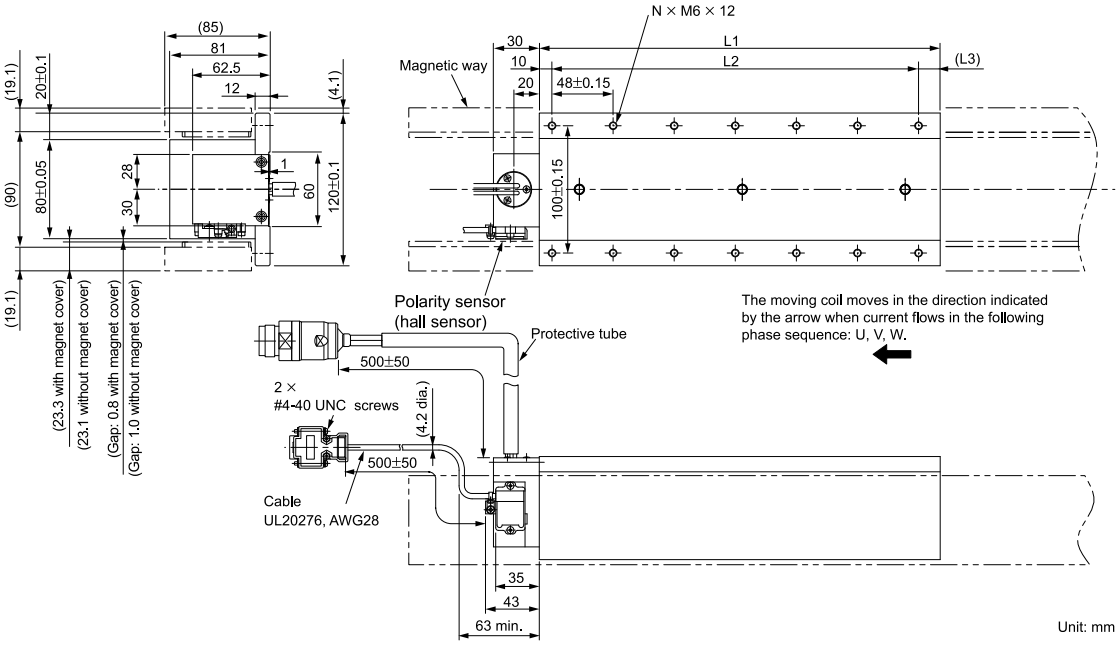
Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
40405AY	$405^{-0.1}_{-0.3}$	337.5	387.5	202.5	202.5	6	2	13
40675AY	$675^{-0.1}_{-0.3}$	607.5	657.5	472.5	236.25	10	3	21
40945AY	$945^{-0.1}_{-0.3}$	877.5	927.5	742.5	247.5	14	4	30

SGLTW-50: High-efficiency Models

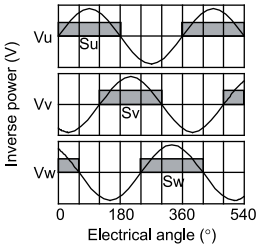
■ Moving Coils: SGLTW-50D□□□H□D



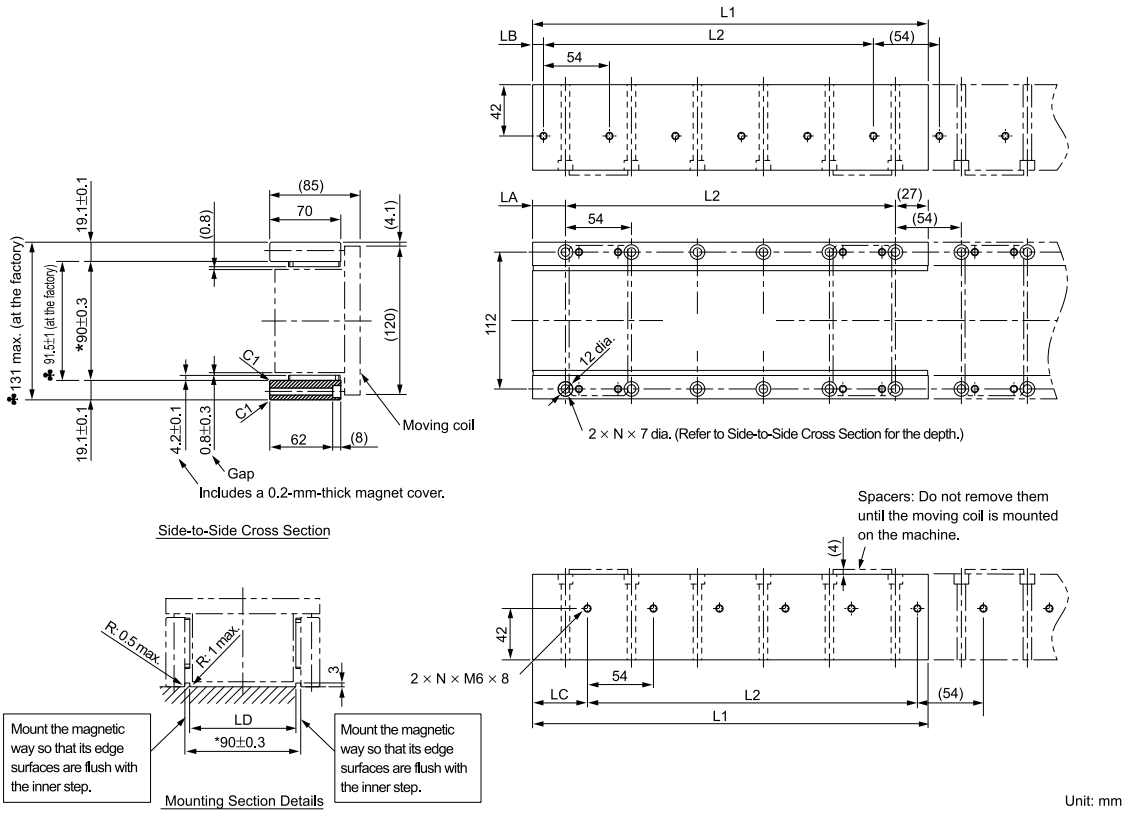
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
50D170H□D	170	144 (48 × 3)	(16)	8	6
50D320H□D	315	288 (48 × 6)	(17)	14	11

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure below shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-50□□□H□



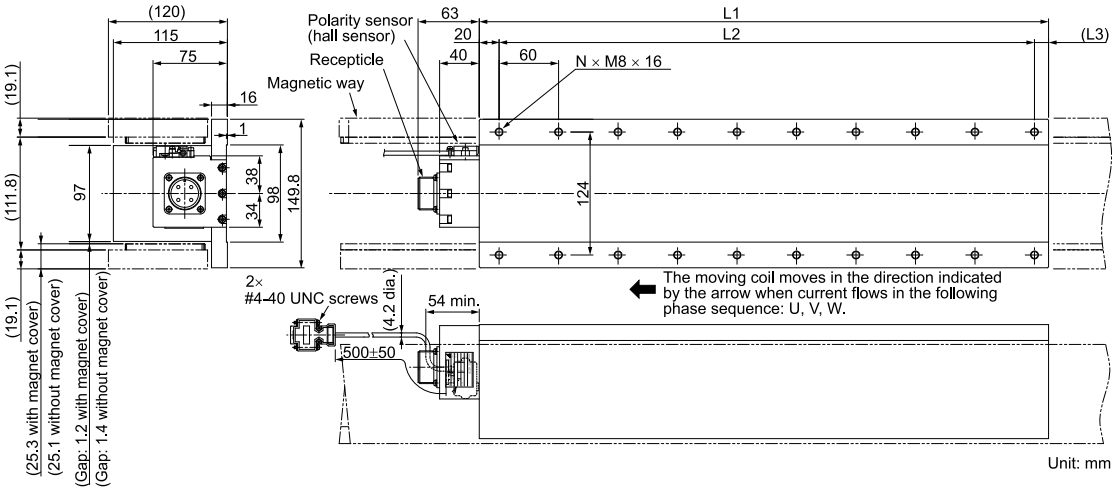
Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
50324H□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	6	8
50540H□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	10	13
50756H□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	14	18

SGLTW-80: Standard Models

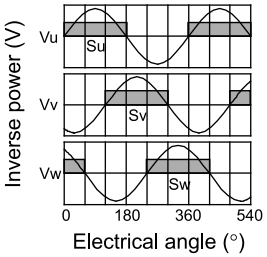
■ Moving Coils: SGLTW-80D□□□B□



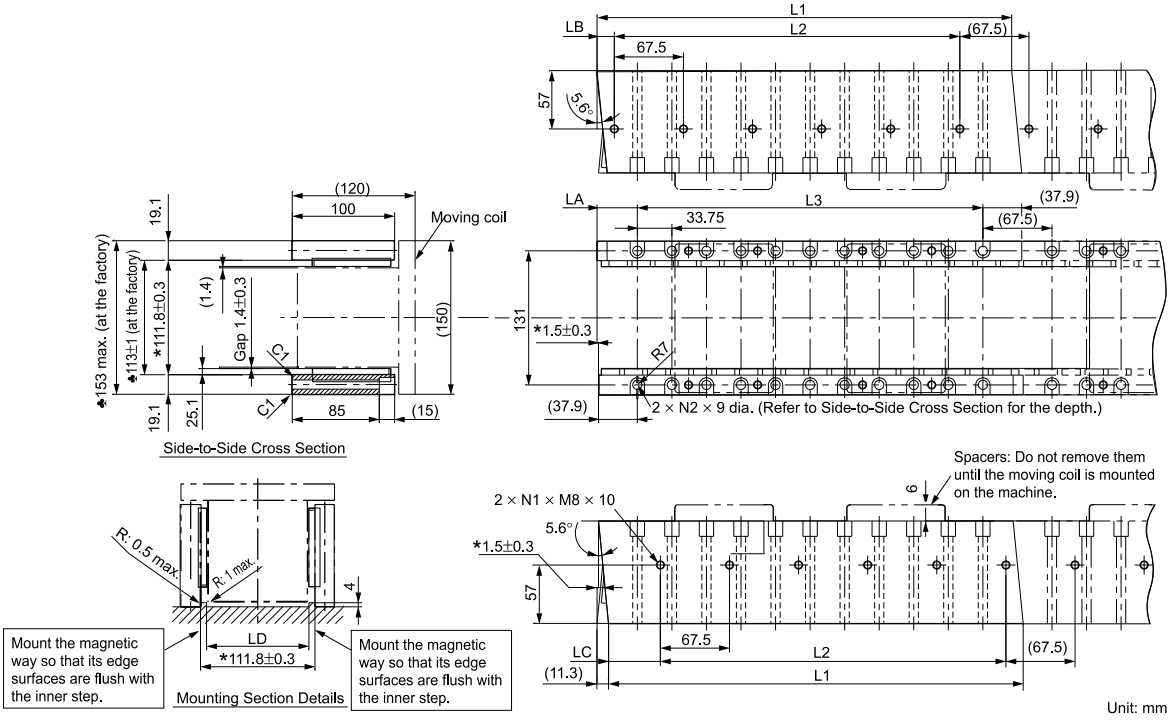
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
80D400B□	394.2	360 (60 × 6)	(15)	14	24
80D600B□	574.2	540 (60 × 9)	(15)	20	35

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure below shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-80□□□A□

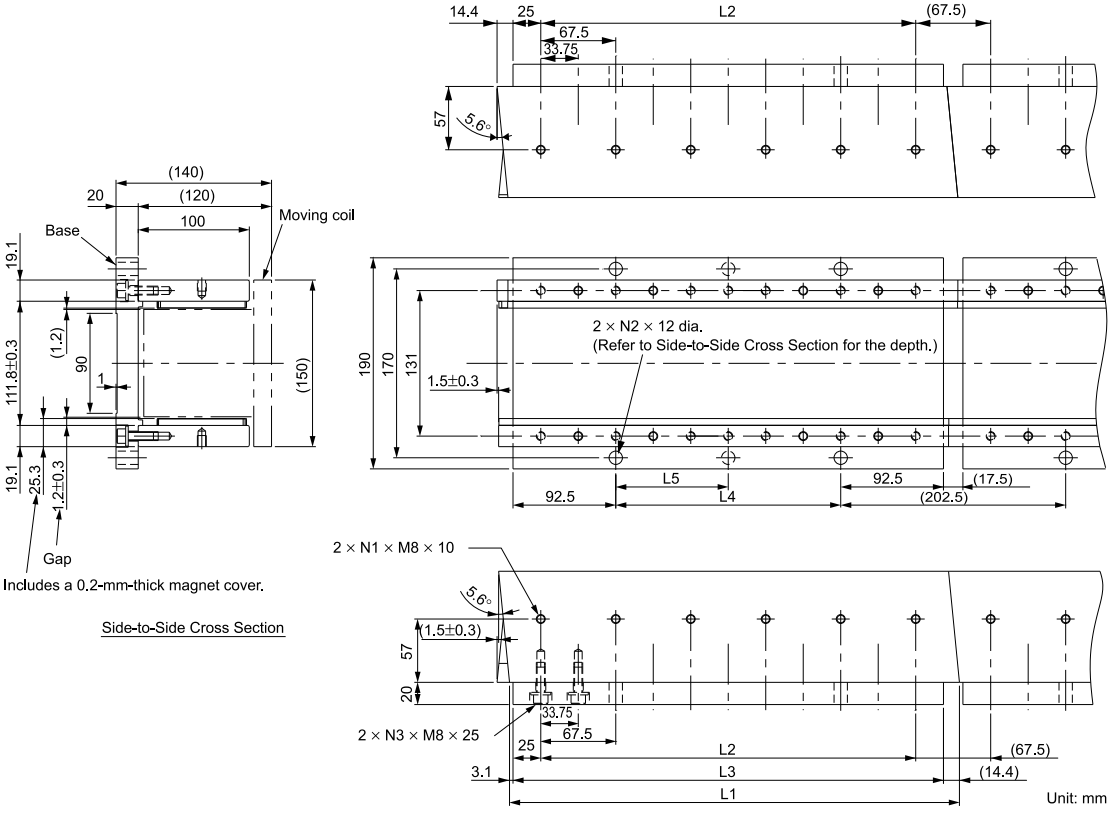


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	L3	LA	LB	LC	LD	N1	N2	Approx. Mass [kg]
80405A□	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	337.5 (33.75 × 10)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	6	11	14
80675A□	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	607.5 (33.75 × 18)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	10	19	24
80945A□	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	887.5 (33.75 × 26)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	14	27	34

■ Magnetic Ways with Bases: SGLTM-80□□□AY



Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

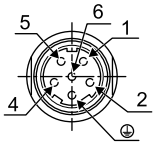
Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	N3	Approx. Mass [kg]
80405AY	$405^{-0.1}_{-0.3}$	337.5	387.5	202.5	202.5	6	2	11	18
80675AY	$675^{-0.1}_{-0.3}$	607.5	657.5	472.5	236.25	10	3	19	31
80945AY	$945^{-0.1}_{-0.3}$	877.5	927.5	742.5	247.5	14	4	27	43

Connector Specifications (400 V Specification)

SGLTW-35: High-efficiency Models

■ SGLTW-30D□□□H□D

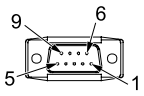
- Servomotor Connector



1	Phase U	5	Not used
2	Phase V	6	
4	Phase W	⏚	Ground

Extension: ARRA06AMRPN182
Pins: 021.279.1020
From Interconnectron GmbH
Mating Connector
Plug: APRA06BFRDN170
Socket: 020.105.1020

- Polarity Sensor (Hall Sensor) Connector

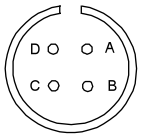
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</td><td>1</td><td>+5 V
(power supply)</td><td>6</td><td rowspan="4">Not used</td></tr>
<tr><td>2</td><td>Phase U</td><td>7</td></tr>
<tr><td>3</td><td>Phase V</td><td>8</td></tr>
<tr><td>4</td><td>Phase W</td><td>9</td></tr>
<tr><td>5</td><td>+0 V
(power supply)</td><td>–</td><td>–</td></tr>
</table>

Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.
Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-40: Standard Models

■ SGLTW-40D□□□B□

• Servomotor Connector

	A	Phase U	C	Phase W
	B	Phase V	D	Ground

Receptacle: MS3102A-22-22P

From DDK Ltd.

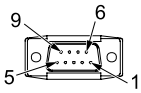
Mating Connector

Right-Angle Plug: MS3108B22-22S

Straight Plug: MS3106B22-22S

Cable Clamp: MS3057-12A

• Polarity Sensor (Hall Sensor) Connector

	1	+5 V (power supply)	6	Not used
	2	Phase U	7	
	3	Phase V	8	
	4	Phase W	9	
	5	+0 V (power supply)	–	–

Pin connector: 17JE-23090-02 (D8C) -CG

From DDK Ltd.

Mating Connector

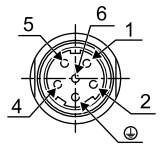
Socket connector: 17JE-13090-02 (D8C) A-CG

Studs: 17L-002C or 17L-002C1

SGLTW-50: High-efficiency Models

■ SGLTW-50D□□□H□D

• Servomotor Connector

	1	Phase U	5	Not used
	2	Phase V	6	
	4	Phase W	⏚	Ground

Extension: ARRA06AMRPN182

Pins: 021.279.1020

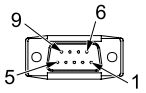
From Interconnectron GmbH

Mating Connector

Plug: APRA06BFRDN170

Socket: 020.105.1020

• Polarity Sensor (Hall Sensor) Connector

	1	+5 V (power supply)	6	Not used
	2	Phase U	7	
	3	Phase V	8	
	4	Phase W	9	
	5	+0 V (power supply)	–	–

Pin connector: 17JE-23090-02 (D8C) -CG

From DDK Ltd.

Mating Connector

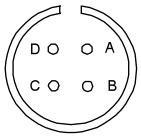
Socket connector: 17JE-13090-02 (D8C) A-CG

Studs: 17L-002C or 17L-002C1

SGLTW-80: Standard Models

■ SGLTW-80D□□□B□

• Servomotor Connector

	A	Phase U	C	Phase W
	B	Phase V	D	Ground

Receptacle: MS3102A-22-22P

From DDK Ltd.

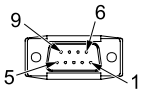
Mating Connector

Right-Angle Plug: MS3108B22-22S

Straight Plug: MS3106B22-22S

Cable Clamp: MS3057-12A

• Polarity Sensor (Hall Sensor) Connector

	1	+5 V (power supply)	6	Not used
	2	Phase U	7	
	3	Phase V	8	
	4	Phase W	9	
	5	+0 V (power supply)	–	–

Pin connector: 17JE-23090-02 (D8C) -CG

From DDK Ltd.

Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

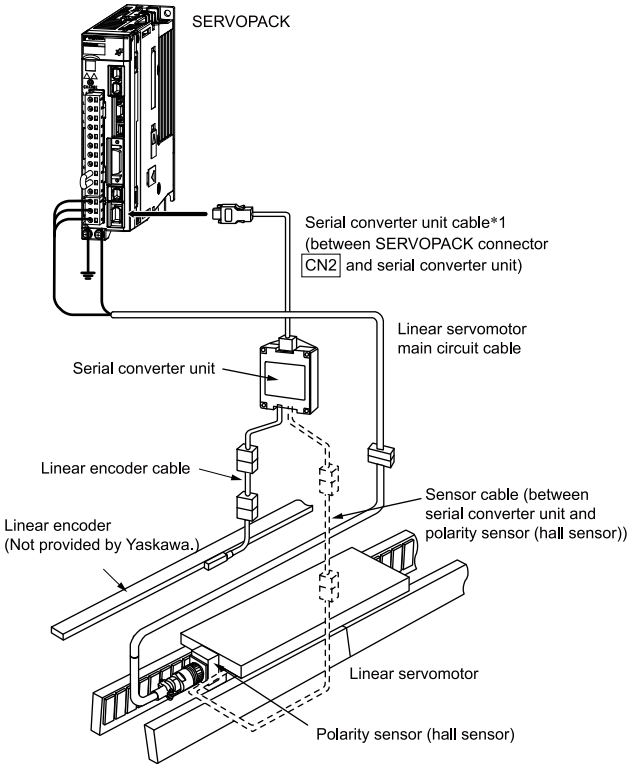
Studs: 17L-002C or 17L-002C1

Selecting Cables

Equipment Configurations

Refer to *Recommended Linear Encoders on page 536* to select a linear encoder.

Prepare the cable required for the encoder.



*1 You can connect directly to an absolute linear encoder.

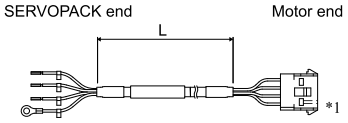
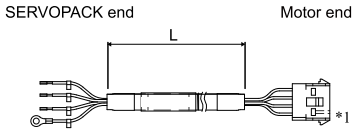
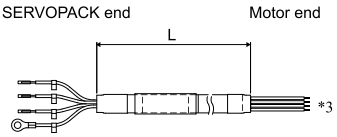
Note:

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

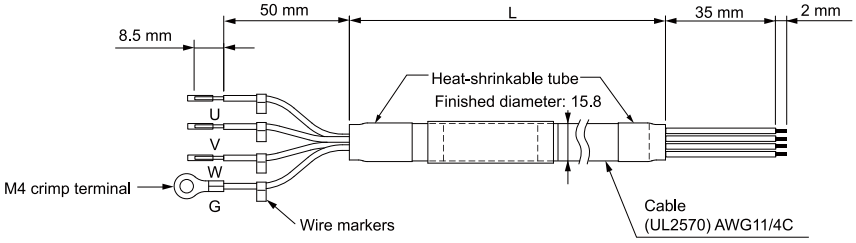
Σ-X-Series AC Servo Deive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Linear Servomotor Main Circuit Cables

Linear Servomotor Model	Length (L)	Order Number	Appearance
SGLTW-20A, 35A	1 m	JZSP-CLN21-01-E	
	3 m	JZSP-CLN21-03-E	
	5 m	JZSP-CLN21-05-E	
	10 m	JZSP-CLN21-10-E	
	15 m	JZSP-CLN21-15-E	
	20 m	JZSP-CLN21-20-E	
SGLTW-□□A□□□□□D	1 m	JZSP-CLN14-01-E	
	3 m	JZSP-CLN14-03-E	
	5 m	JZSP-CLN14-05-E	
	10 m	JZSP-CLN14-10-E	
	15 m	JZSP-CLN14-15-E	
	20 m	JZSP-CLN14-20-E	
SGLTW-40□□□□B□, SGLTW-80□□□□B□	1 m	JZSP-CLN39-01-E	
	3 m	JZSP-CLN39-03-E	
	5 m	JZSP-CLN39-05-E	
	10 m	JZSP-CLN39-10-E	
	15 m	JZSP-CLN39-15-E	
	20 m	JZSP-CLN39-20-E	

*1 Connector from Tyco Electronics Japan G.K.
*2 Connector from Interconnectron GmbH
*3 A connector is not provided on the linear servomotor end. Obtain a connector according to your specifications. Refer to the next page for information on connectors.

■ JZSP-CLN39-□□-E Cables



◆ Wiring Specifications

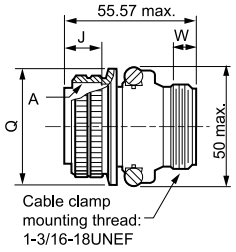
SERVOPACK Leads / Servomotor Connector

Wire Color	Signal	Signal	Pin
Red	Phase U	Phase U	A
White	Phase V	Phase V	B
Blue	Phase W	Phase W	C
Green/yellow	FG	FG	D

◆ JZSP-CLN39 Cable Connectors

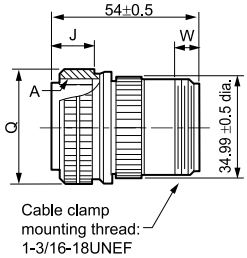
Applicable Linear Servomotor	Connector Provided with Linear Servomotor	Plug		Cable Clamp
		Straight	Right-Angle	
SGLTW-40 or -80	MS3102A22-22P	MS3106B22-22S or MS3106A22-22S	MS3108B22-22S	MS3057-12A

◆ MS3106B22-2S: Straight Plug with Two-Piece Shell



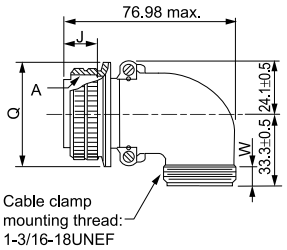
Shell Size	Joint Thread A	Length of Joint J ± 0.12	Joint Nut Outer Diameter Q	Effective Thread Length W min.
22	1-3/8-18UNEF	18.26	40.48	9.53

◆ MS3106A22-2S: Straight Plug with Solid Shell



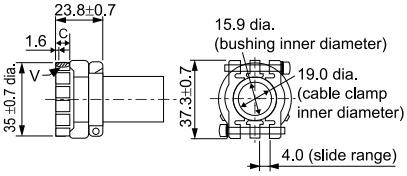
Shell Size	Joint Thread A	Length of Joint J ± 0.12	Joint Nut Outer Diameter Q	Effective Thread Length W min.
22	1-3/8-18UNEF	18.26	40.48	9.53

◆ MS3108B22-2S: Right-angle Plug with Two-piece Shell



Shell Size	Joint Thread A	Length of Joint J ± 0.12	Joint Nut Outer Diameter Q	Effective Thread Length W min.
22	1-3/8-18UNEF	18.26	40.48	9.53

◆ MS3057-12A: Cable Clamp with Rubber Bushing



Applicable Connector Shell Size	Effective Thread Length C	Mounting Screws V	Attached Bushing Name
20.22	10.3	1-3/16-18UNEF	AN3420-12

Recommended Linear Encoders and Cables

Recommended Linear Encoders

Incremental Linear Encoders

Output Signals	Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch µm	Resolution nm	Maximum speed *3 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
			Scale	Sensor Head	Relay Device between SERVOPACK and Linear Encoder						
1Vp-p Analog voltage *1	Dr. JOHANNES HEIDENHAIN GmbH	Exposed	LIDA48□		JZDP-H003/-H006 *4	20	78.1	5	○	○	○
					JZDP-J003/-J006 *4		4.9	2	○	○	*6
			LIF48□		JZDP-H003/-H006 *4	4	15.6	1	○	○	○
					JZDP-J003/-J006 *4		1.0	0.4	○	*6	*6
	Renishaw PLC	Exposed	TONiC Series (Only Ti0000A00V)		JZDP-H005/-H008 *4	20	78.1	5	○	○	○
					JZDP-J005/-J008 *4		4.9	2			
Encoder for Yaskawa's Serial Interface *2	Magnescale Co., Ltd.	Exposed	SL7□0	PL101-RY *5		800	97.7	10	–	○	○
			SQ10	PQ10	MQ10-FLA	400	48.83	3	–	○	○
					MQ10-GLA				○	○	–

*1 You must also use a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the serial converter unit.
*2 The multiplier (number of divisions) depends on the linear encoder. Also, you must write the servomotor constant file to the linear encoder in advance.
*3 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the linear servomotor or the maximum speed of the linear encoder (given above).
*4 This is the model of the serial converter unit.
*5 This is the model of the sensor head with interpolator.
*6 Contact your Yaskawa representative.

Note:

Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the linear encoder before you use it.

Absolute Linear Encoders

The output signal is compatible with the Yaskawa serial interface. The multiplier (number of divisions) depends on the linear encoder. Also, you must write the servomotor constant file to the linear encoder in advance.

Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch *1 µm	Resolution nm	Maximum speed *2 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
		Scale	Sensor Head	Relay Device between SERVOPACK and Linear Encoder						
Magnescale Co., Ltd.	Exposed	SQ47-□□□□S□F□□□		–	20.48	5	3.33	–	○	○
		SQ47-□□□□T□F□□□								
		SQ47-□□□□A□F□□□		–	40.96	10	3.33	–	○	○
		SQ47-□□□□F□F□□□								
		SQ57-□□□□S□F□□□		–	20.48	5	3.33	–	○	○
		SQ57-□□□□T□F□□□								
		SQ57-□□□□A□F□□□		–	40.96	10	3.33	–	○	○
		SQ57-□□□□F□F□□□								
	Sealed	SR27A-□□□SAF□□□		–	40.96	10	3.33	–	○	○
		SR27A-□□□SBF□□□		–	204.8	50	3.33	–	○	○
		SR27A-□□□SLF□□□		–	80	9.8	3.33	–	○	○
		SR27A-□□□SMF□□□		–	80	78.1	3.33	–	○	○
Mitutoyo Corporation	Exposed	ST781A		–	256	500	5	–	○	○
		ST782A		–	256	500	5	–	○	○
		ST783A		–	51.2	100	5	–	○	○
		ST784A		–	51.2	100	5	–	○	○
		ST788A		–	51.2	100	5	–	○	○
		ST789A *3		–	25.6	50	5	–	○	○
		ST1381		–	5.12	10	8	–	○	○
		ST1382		–	0.512	1	3.6 *4	–	○	○
	Sealed	AT1383A		–	25.6	50	3	–	○	○
		AT1384A		–	5.12	10	3	–	○	○
		AT1387A		–	0.512	1	3	–	○	○
Dr. JOHANNES HEIDENHAIN GmbH	Exposed	LIC4190 Series		–	40.96	10	10	–	○	○
				–	20.48	5	10	–	○	○
				–	4.096	1	10	–	○	○
		LIC3190 Series		–	409.6	100	10	–	○	○
				–	40.96	10	10	–	○	○
		LIC2190 Series		–	409.6	100	10	–	○	○
				–	204.8	50	10	–	○	○
	Sealed	LC115		EIB3391Y	40.96	10	3	–	○	○
		LC415		EIB3391Y	40.96	10	3	–	○	○

Continued on next page.

Continued from previous page.

Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch *1 µm	Resolution nm	Maximum speed *2 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
		Scale	Sensor Head	Relay Device between SERVOPACK and Linear Encoder						
RSF Elektronik GmbH	Exposed	MC15Y Series		–	409.6	100	10	–	○	○
				–	204.8	50	10	–	○	○
Renishaw PLC	Exposed	EL36Y□□050F□□□		–	12.8	50	100	–	○	○
		EL36Y□□100F□□□		–	25.6	100	100	–	○	○
		EL36Y□□500F□□□		–	128	500	100	–	○	○
		RL36Y□□050□□□		–	12.8	50	100	–	○	○
		RL36Y□□001□□□		–	0.256	1	3.6	–	○	○
	Enclosed	FORTiS Series		–	12.8	50	4	–	○	○
				–	2.56	10	4	–	○	○
				–	0.256	1	3.6	–	○	○
Fagor Automation S. Coop.	Exposed	L2AK208		–	20	78.1	8.0	–	○	○
		L2AK211		–	20	9.8	8.0	–	○	○
	Sealed	LAK209		–	40	78.1	3.0	–	○	○
		LAK212		–	40	9.8	3.0	–	○	○
		S2AK208		–	20	78.1	3.0	–	○	○
		SV2AK208		–	20	78.1	3.0	–	○	○
		G2AK208		–	20	78.1	3.0	–	○	○
		S2AK211		–	20	9.8	3.0	–	○	○
		SV2AK211		–	20	9.8	3.0	–	○	○
		G2AK211		–	20	9.8	3.0	–	○	○

*1 These are reference values for setting SERVOPACK parameters. Contact the manufacturer for actual linear encoder scale pitches.
*2 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the linear servomotor or the maximum speed of the linear encoder (given above).
*3 Contact Mitutoyo Corporation for details on the linear encoders.
*4 The speed is restricted for some SERVOPACKs.

Note:

Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the linear encoder before you use it.

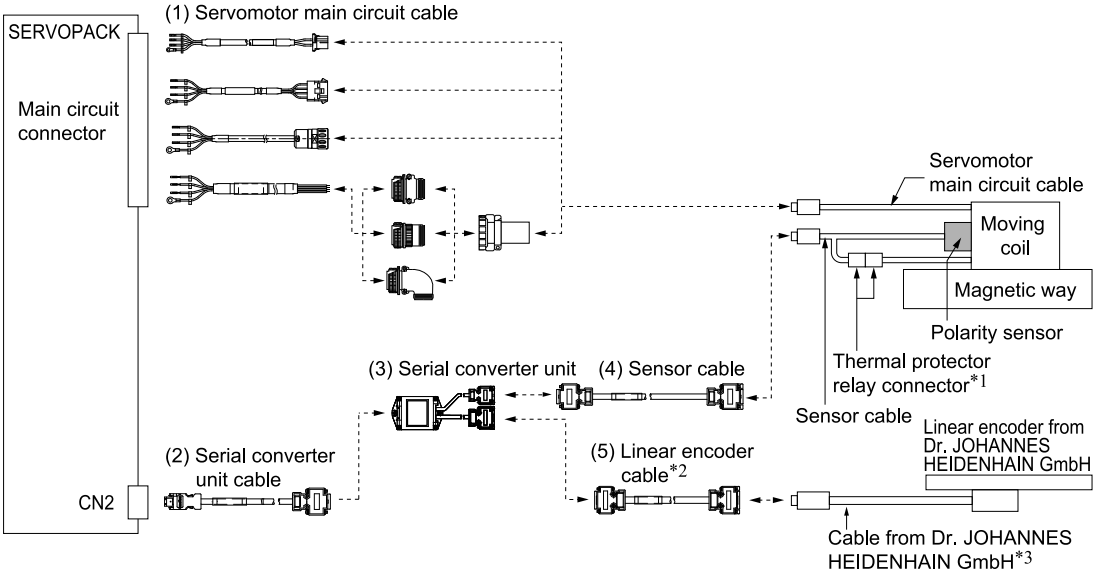
Cable Configurations

Connections to Linear Encoder from Dr. JOHANNES HEIDENHAIN GmbH

■ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the serial converter unit.

◆ Connecting to a Linear Servomotor with a Polarity Sensor

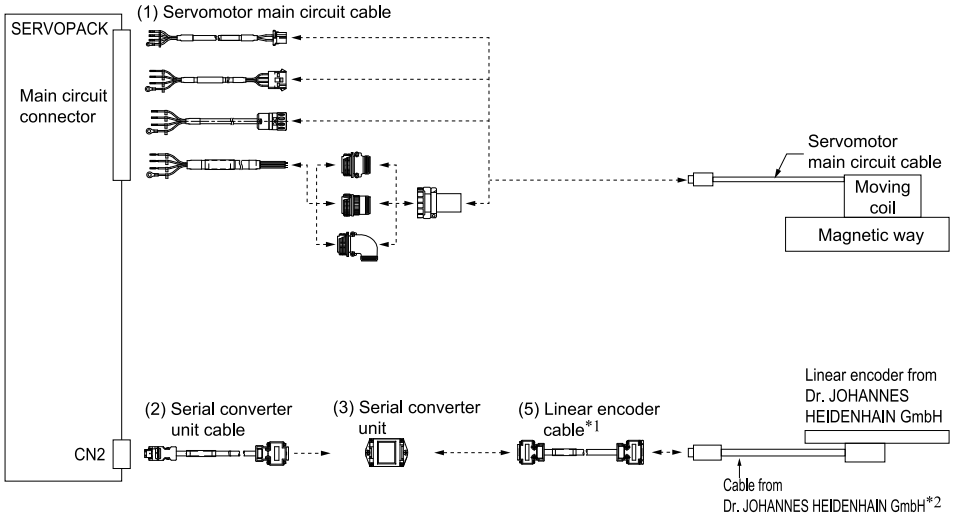


*1 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*2 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.
*3 Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556
(2)	Serial Converter Unit Cables	558
(3)	Serial Converter Unit	571
(4)	Sensor Cables	559
(5)	Linear Encoder Cables	558

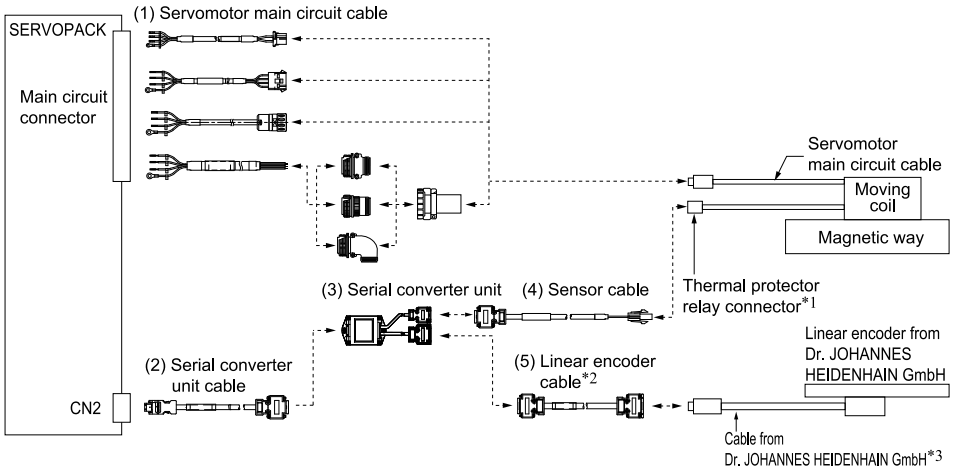
◆ Connecting to a Linear Servomotor without a Polarity Sensor

○ Servomotors Other Than the SGLFW2



*1 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.
*2 Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

○ SGLFW2 Servomotors



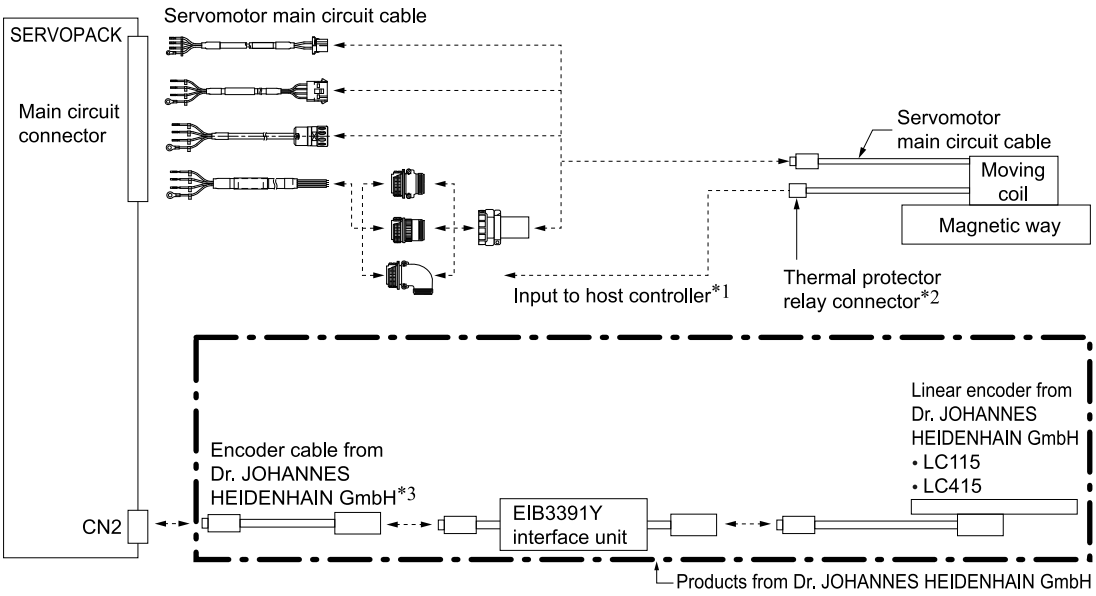
*1 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*2 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.
*3 Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556
(2)	Serial Converter Unit Cables	558
(3)	Serial Converter Unit	571
(4)	Sensor Cables	559
(5)	Linear Encoder Cables	558

■ LC115 or LC415 Linear Encoder with EIB3391Y Interface Unit

Important

1. You cannot use an LC115 or LC415 linear encoder with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

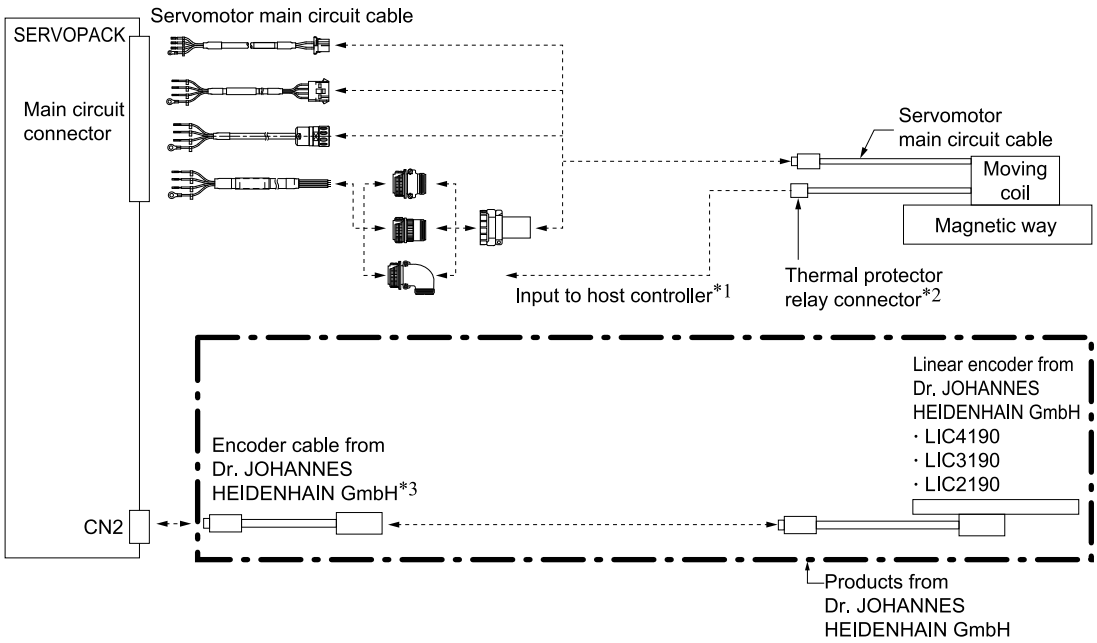
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

*3 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

■ Linear Encoder LIC4190/LIC3190/LIC2190

Important

1. You cannot use an LIC4190, LIC3190, or LIC2190 linear encoder together with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

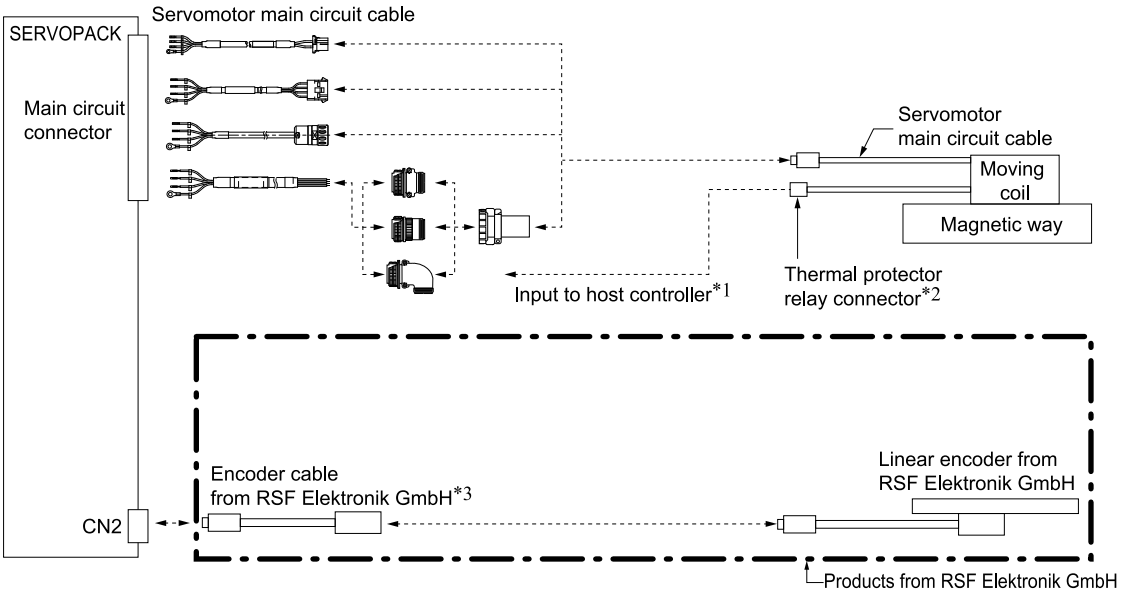
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

*3 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

Connections to Linear Encoder from RSF Elektronik GmbH

Important

1. You cannot use a linear encoder from RSF Elektronik GmbH together with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

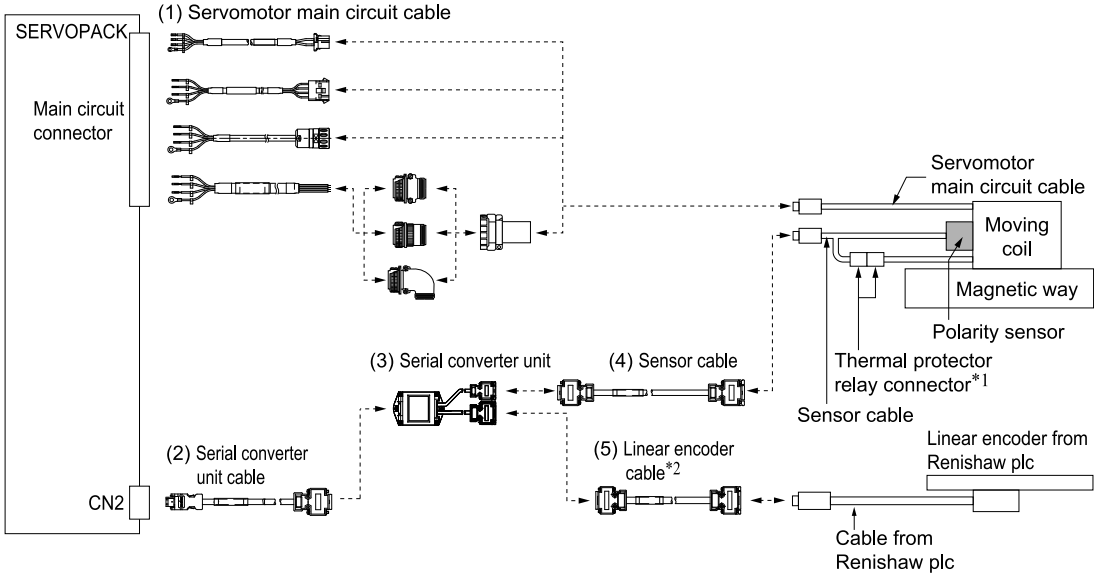
*3 Use an encoder cable from RSF Elektronik GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

Connections to Linear Encoder from Renishaw plc

■ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the serial converter unit.

◆ Connecting to a Linear Servomotor with a Polarity Sensor

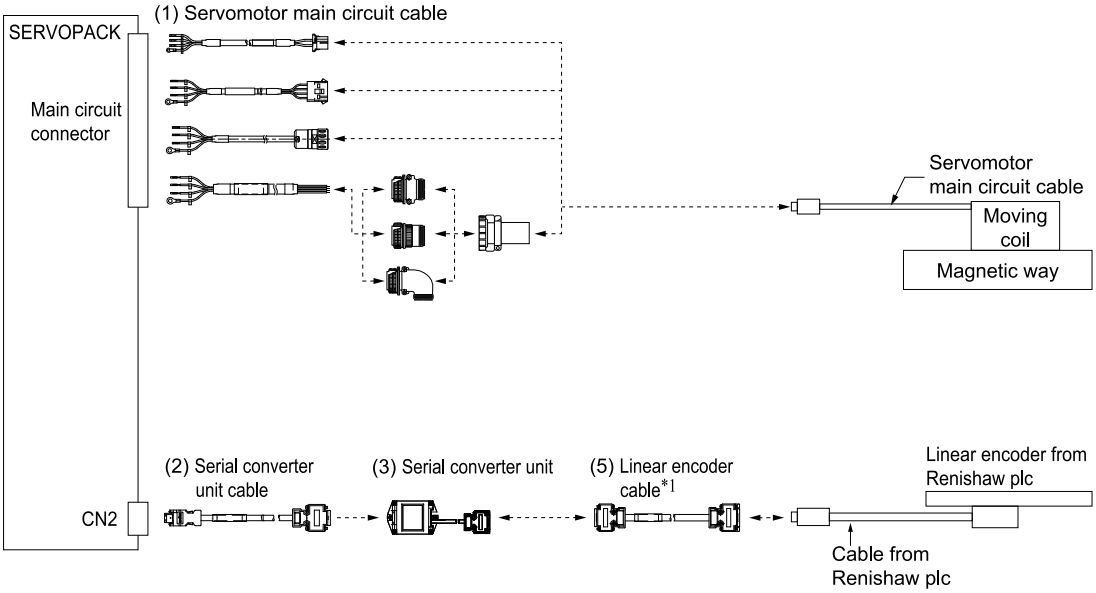


*1 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*2 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556
(2)	Serial Converter Unit Cables	558
(3)	Serial Converter Unit	571
(4)	Sensor cable	559
(5)	Linear Encoder Cables	558

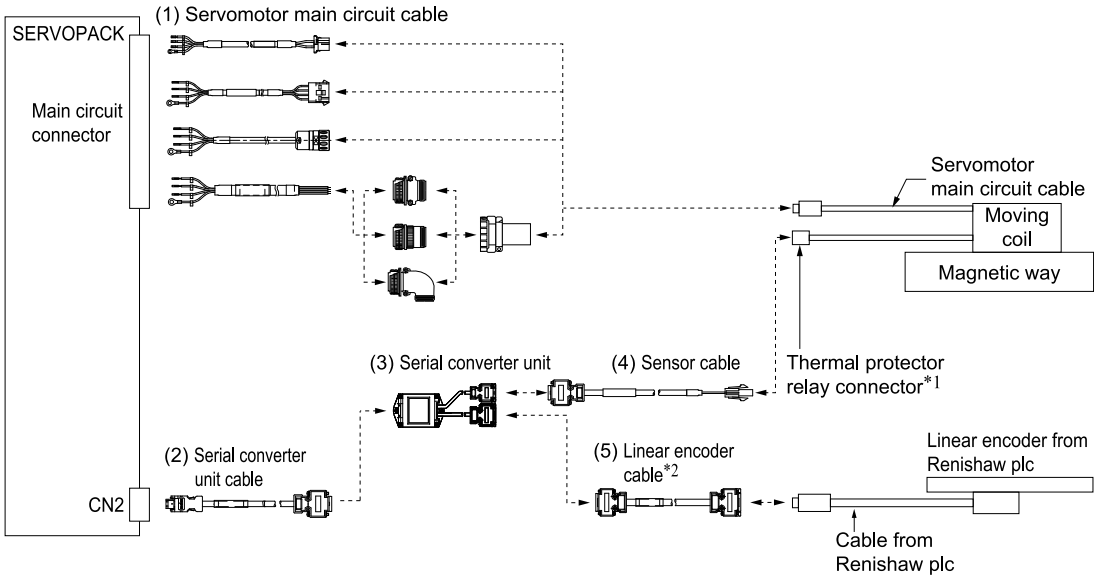
◆ Connecting to a Linear Servomotor without a Polarity Sensor

○ Servomotors Other Than the SGLFW2



*1 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.

○ SGLFW2 Servomotors



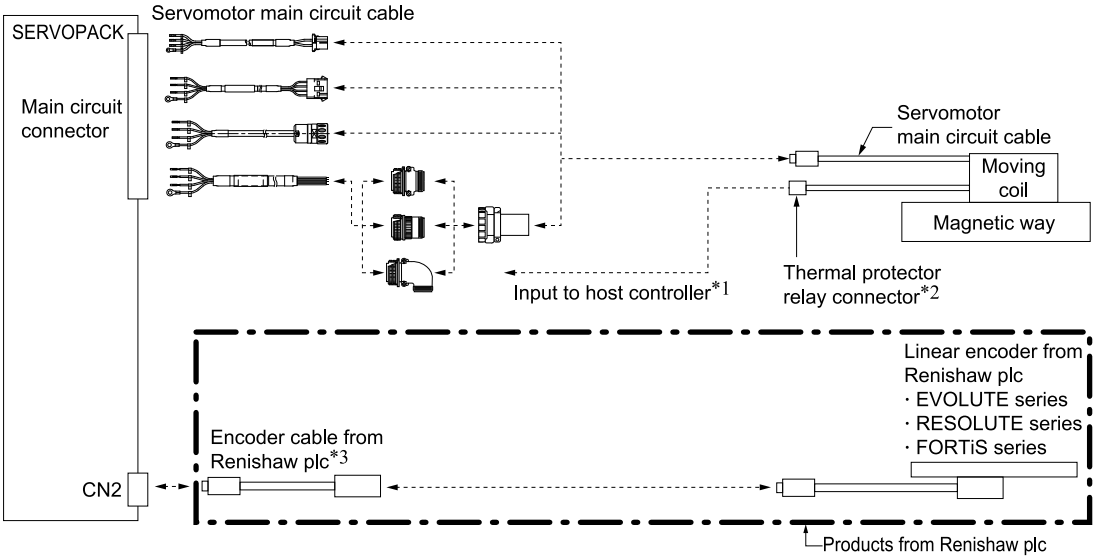
*1 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*2 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556
(2)	Serial Converter Unit Cables	558
(3)	Serial Converter Unit	571
(4)	Sensor cable	559
(5)	Linear Encoder Cables	558

◆ EVOLUTE-Series Linear Encoder (model: EL36Y□□□□□□□□□), RESOLUTE-Series Linear Encoder (model: RL36Y□□□□□□□□), FORTiS-Series Linear Encoder

Important

1. You cannot use an EVOLUTE-series, RESOLUTE-series, or FORTiS-series linear encoder together with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

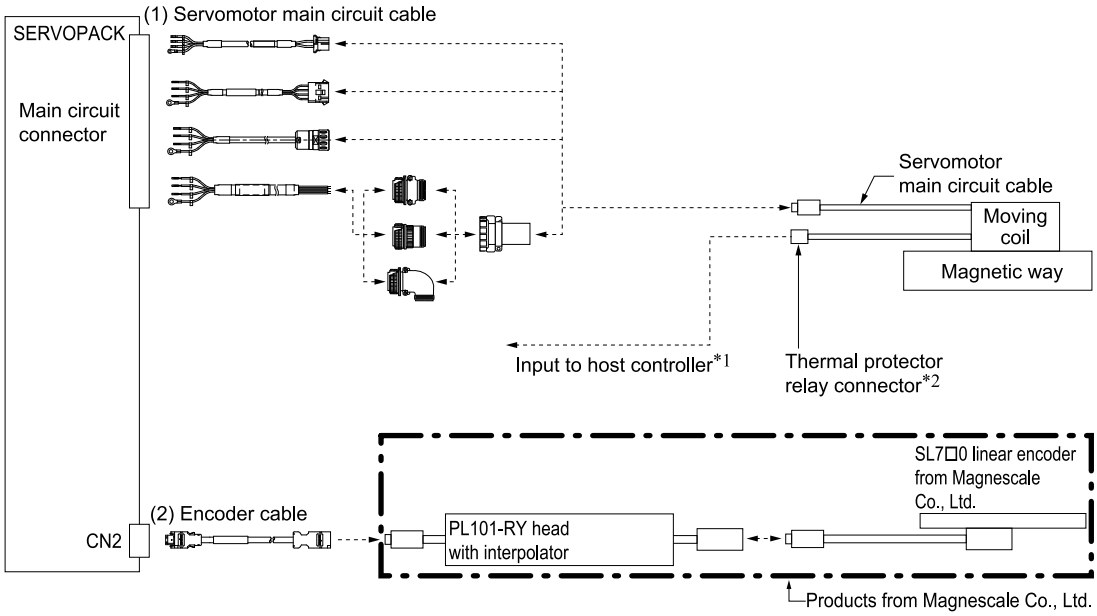
*3 Use an encoder cable from Renishaw plc. Contact Renishaw plc for detailed encoder cable specifications.

Connections to Linear Encoder from Magnescale Co., Ltd.

■ SL7□0 Linear Encoder and PL101-RY Sensor Head with Interpolator

Important

1. You cannot use a PL101-RY sensor head with an interpolator together with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



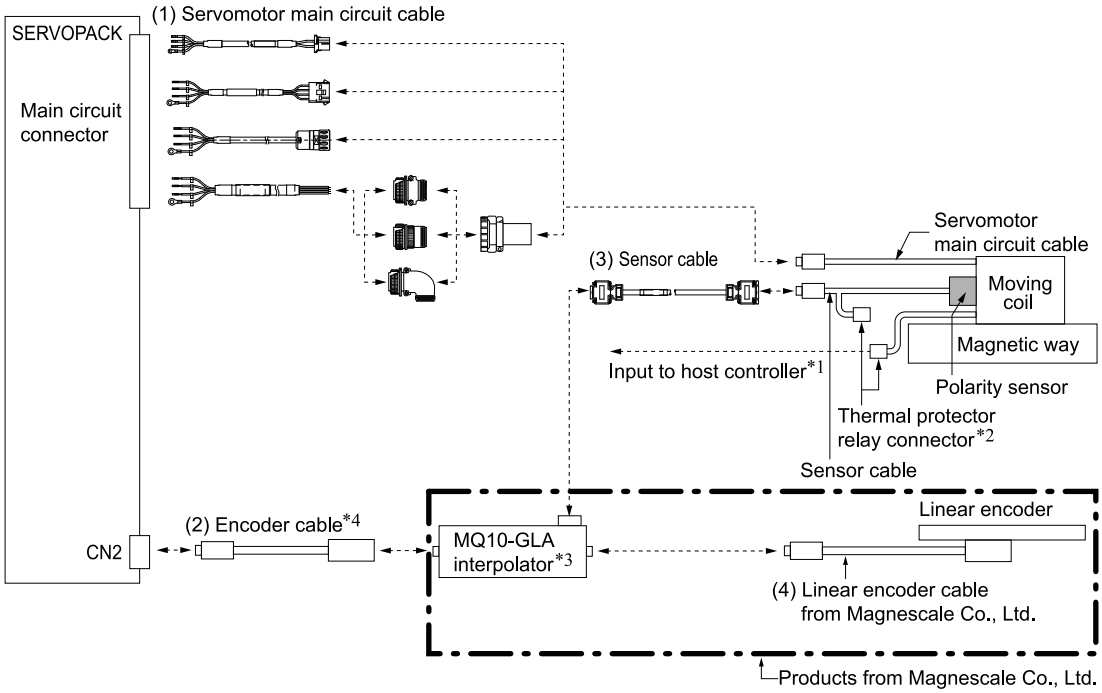
*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556
(2)	Encoder Cables	560

■ SmartSCALE Linear Encoder (SQ10 Scale and MQ10-□LA Interpolator)

> **Important** If you use an SGLFW2 servomotor, remove the thermal protector relay connector and input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*3 The above diagram shows the connections when a MQ10-GLA interpolator (equipped with an electromagnetic sensor input) is used.
*4 The maximum length of the encoder cable is 15 m.

No.	Cable Type		Reference
(1)	Servomotor Main Circuit Cables		556
(2)	Encoder Cables	These cables are not provided by Yaskawa.	551
(3)	Sensor Cables		559
(4)	Linear Encoder Cables	Use the cables that come with the MQ10-□LA interpolator. For details, refer to the specifications for the MQ10-□LA interpolator.	–

◆ Encoder Cables

These cables are not provided by Yaskawa. Use a shielded cable. Refer to the following tables for the pin layouts.

○ SERVOPACK End of Cable (CN2)

- Plug connector: 55100-0670 (Molex Japan Co., Ltd.)
- Connector order number: JZSP-CMP9-1-E (SERVOPACK connector kit)

Pin No.	Signal	Function
1	PG 5 V	Encoder power supply +5 V
2	PG 0 V	Encoder power supply 0 V
3	–	–
4	–	–
5	PS	Serial data
6	/PS	
Shell	Shield	–

○ MQ10-□LA End of Cable

For details, refer to the specifications for the MQ10-□LA from Magnescale Co., Ltd..

○ Cables without Connectors

Name	Length (L)	Order Number	
		Standard Cable	Flexible Cable
Cables without connectors	5 m	JZSP-CMP09-05-E	JZSP-CSP39-05-E
	10 m	JZSP-CMP09-10-E	JZSP-CSP39-10-E
	15 m	JZSP-CMP09-15-E	JZSP-CSP39-15-E

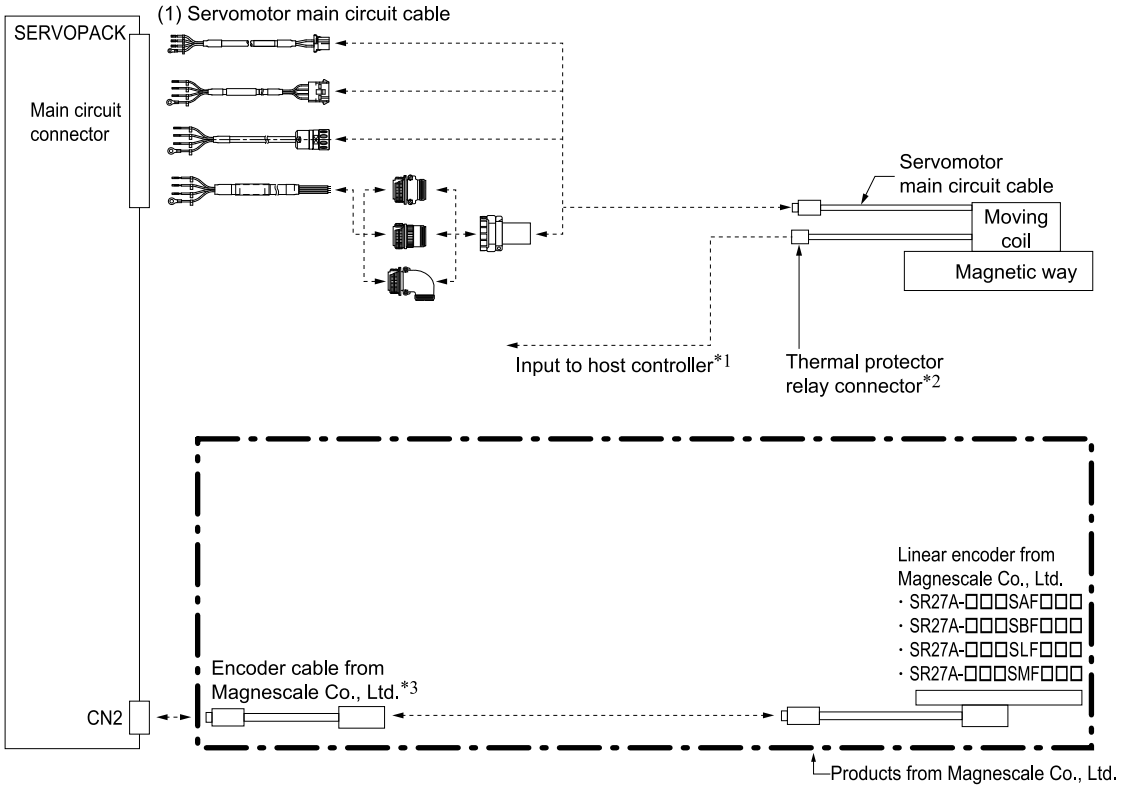
Note:

We recommend that you use flexible cables.

■ Linear Encoder SR27A

Important

1. You cannot use an SR27A linear encoder with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

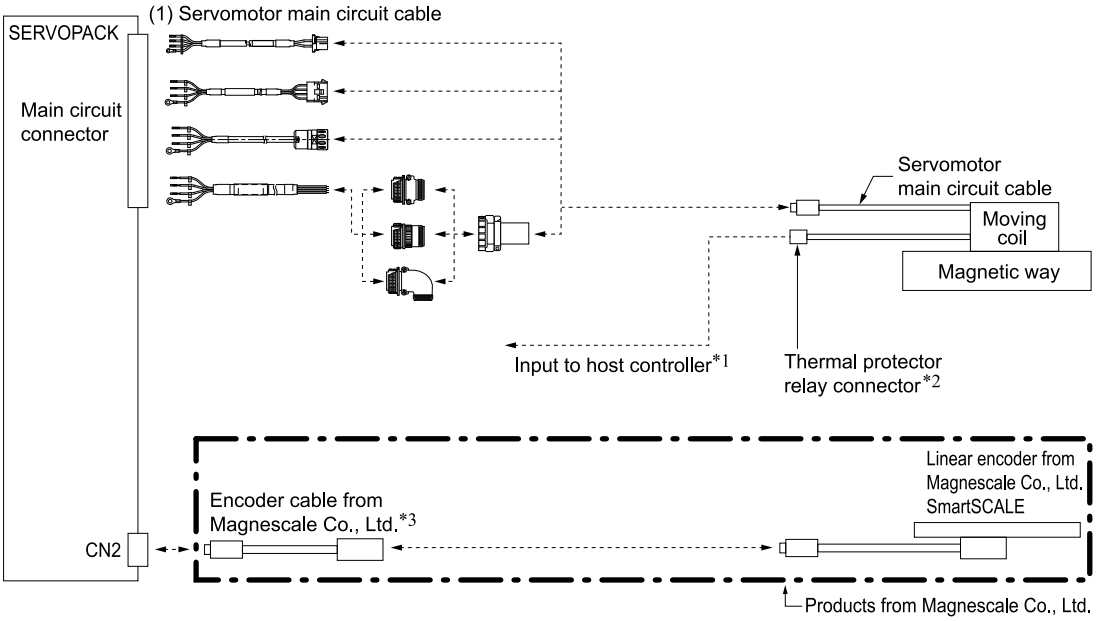
*3 Use an encoder cable from Magnescale Co., Ltd.. Contact Magnescale Co., Ltd. for details on encoder cable specifications.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556

■ SmartSCALE Linear Encoder (SQ47 or SQ57)

Important

1. You cannot use an SQ47 or SQ57 linear encoder with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

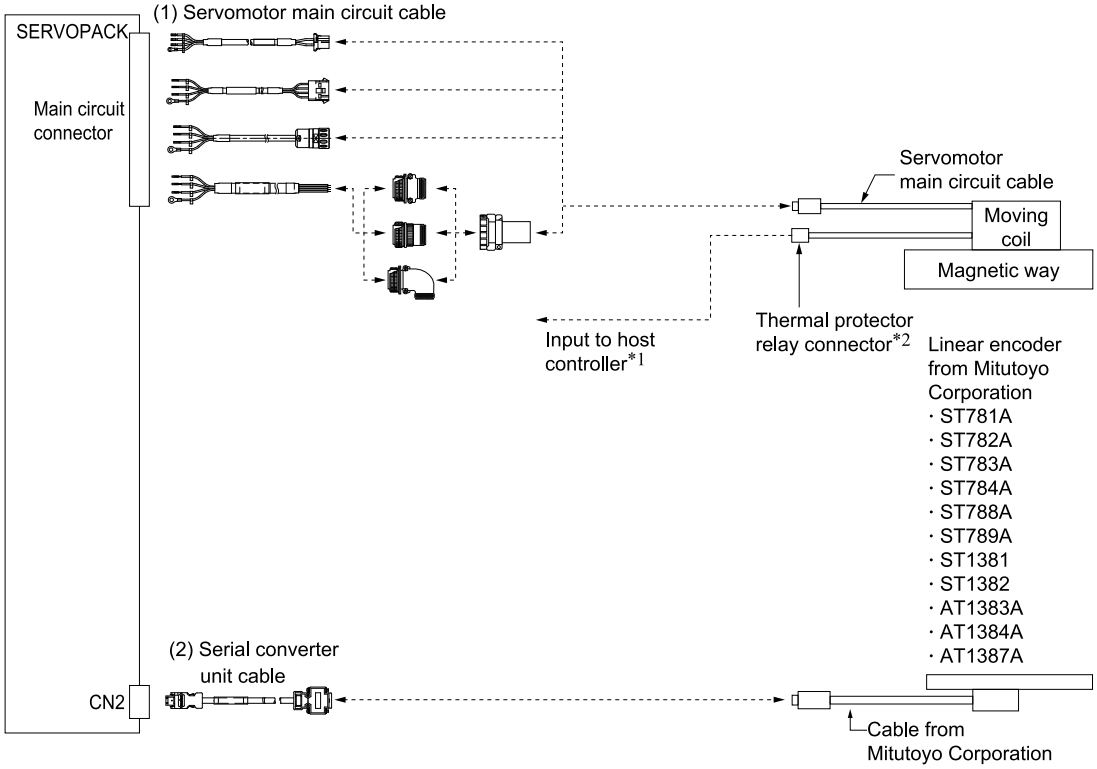
*3 Use an encoder cable from Magnescale Co., Ltd.. Contact Magnescale Co., Ltd. for details on encoder cable specifications.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556

Connections to Linear Encoders from Mitutoyo Corporation

Important

1. You cannot use a Mitutoyo linear encoder with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

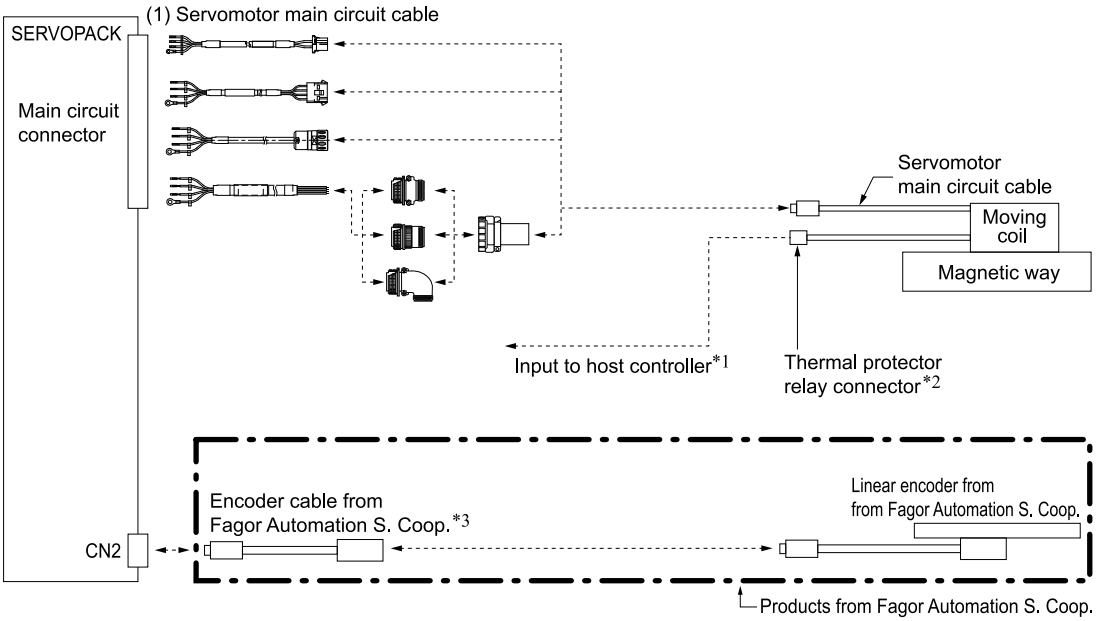
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556
(2)	Serial Converter Unit Cables	558

Connections to Linear Encoder from Fagor Automation S. Coop.

Important

1. You cannot use an linear encoder from Fagor Automation S. Coop. with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 568*

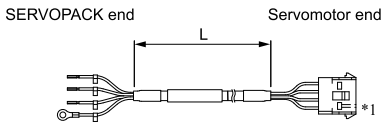
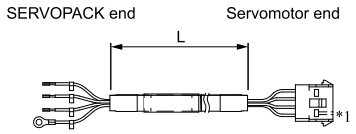
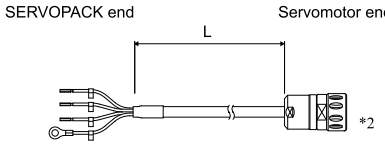
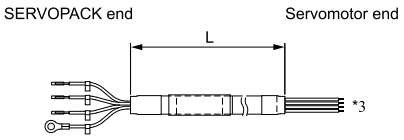
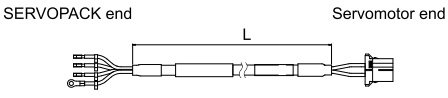
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

*3 Use encoder cables from Fagor Automation S. Coop. For detailed specifications of the encoder cables, consult Fagor Automation S. Coop. or its sales representative.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	556

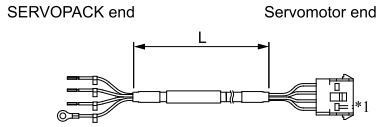
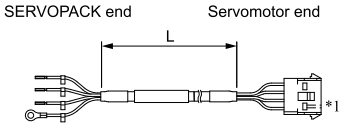
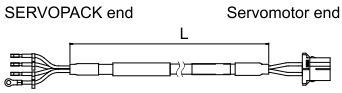
Cable Selection Table

Servomotor Main Circuit Cables

Servomotor Model	Length (L)	Order Number	Appearance	Details
SGLGW-30A, -40A, -60A	1 m	JZSP-CLN11-01-E		560
	3 m	JZSP-CLN11-03-E		
	5 m	JZSP-CLN11-05-E		
	10 m	JZSP-CLN11-10-E		
	15 m	JZSP-CLN11-15-E		
	20 m	JZSP-CLN11-20-E		
SGLGW-90A SGLTW-20A, -35A	1 m	JZSP-CLN21-01-E		560
	3 m	JZSP-CLN21-03-E		
	5 m	JZSP-CLN21-05-E		
	10 m	JZSP-CLN21-10-E		
	15 m	JZSP-CLN21-15-E		
	20 m	JZSP-CLN21-20-E		
SGLGW-30A□□□□□D SGLGW-40A□□□□□D SGLGW-60A□□□□□D SGLTW-□□A□□□□D	1 m	JZSP-CLN14-01-E		561
	3 m	JZSP-CLN14-03-E		
	5 m	JZSP-CLN14-05-E		
	10 m	JZSP-CLN14-10-E		
	15 m	JZSP-CLN14-15-E		
	20 m	JZSP-CLN14-20-E		
SGLTW-40A□□□B□ SGLTW-80A□□□B□	1 m	JZSP-CLN39-01-E		561
	3 m	JZSP-CLN39-03-E		
	5 m	JZSP-CLN39-05-E		
	10 m	JZSP-CLN39-10-E		
	15 m	JZSP-CLN39-15-E		
	20 m	JZSP-CLN39-20-E		
SGLFW2-90A200A□ SGLFW2-90A380A□	1 m	JZSP-CL2N803-01-E		563
	3 m	JZSP-CL2N803-03-E		
	5 m	JZSP-CL2N803-05-E		
	10 m	JZSP-CL2N803-10-E		
	15 m	JZSP-CL2N803-15-E		
	20 m	JZSP-CL2N803-20-E		

Continued on next page.

Continued from previous page.

Servomotor Model	Length (L)	Order Number	Appearance	Details
SGLFW2-30A070A□ SGLFW2-30A120A□ SGLFW2-30A230A□	1 m	JZSP-CL2N703-01-E		563
	3 m	JZSP-CL2N703-03-E		
	5 m	JZSP-CL2N703-05-E		
	10 m	JZSP-CL2N703-10-E		
	15 m	JZSP-CL2N703-15-E		
	20 m	JZSP-CL2N703-20-E		
SGLFW2-45A200A□ SGLFW2-45A380A□	1 m	JZSP-CL2N603-01-E		564
	3 m	JZSP-CL2N603-03-E		
	5 m	JZSP-CL2N603-05-E		
	10 m	JZSP-CL2N603-10-E		
	15 m	JZSP-CL2N603-15-E		
	20 m	JZSP-CL2N603-20-E		
SGLFW2-90A560A□ SGLFW2-1DA380A□ SGLFW2-1DA560A□	1 m	JZSP-CL2N503-01-E		564
	3 m	JZSP-CL2N503-03-E		
	5 m	JZSP-CL2N503-05-E		
	10 m	JZSP-CL2N503-10-E		
	15 m	JZSP-CL2N503-15-E		
	20 m	JZSP-CL2N503-20-E		

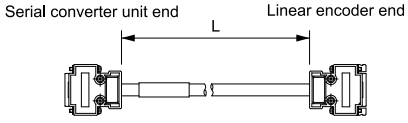
Note:

Estimates are available for models other than those listed above (SGLFW2-90A380A□L, SGLFW2-90A560A□L, and SGLFW2-1D□□□A□L).

*1 Connector from Tyco Electronics Japan G.K.
*2 Connector from Interconnectron GmbH
*3 A connector is not provided on the linear servomotor end. Obtain a connector according to your specifications. Refer to the following section for information on connector models.

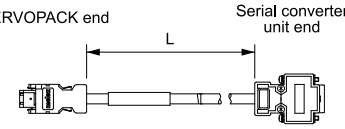
☞ *JZSP-CLN39 Cable Connectors on page 561*

Linear Encoder Cables

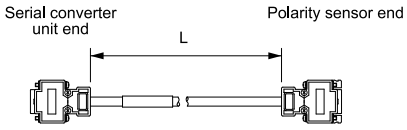
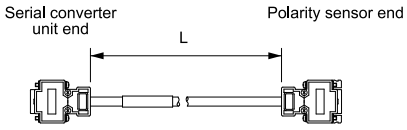
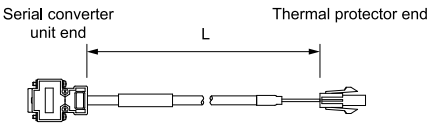
Name	Servomotor Model	Length (L) *1	Order Number	Appearance	Details
For linear encoder from Renishaw plc	All models	1 m	JZSP-CLL00-01-E		565
		3 m	JZSP-CLL00-03-E		
		5 m	JZSP-CLL00-05-E		
		10 m	JZSP-CLL00-10-E		
		15 m	JZSP-CLL00-15-E		
For linear encoder from Dr. JOHANNES HEIDENHAIN GmbH		1 m	JZSP-CLL30-01-E		
		3 m	JZSP-CLL30-03-E		
		5 m	JZSP-CLL30-05-E		
		10 m	JZSP-CLL30-10-E		
		15 m	JZSP-CLL30-15-E		

*1 When using a JZDP-J00□-□□□-E serial converter unit, do not exceed a cable length of 3 m.

Serial Converter Unit Cables

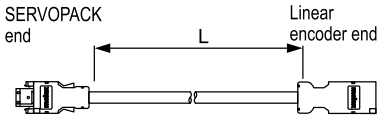
Servomotor Model	Length (L)	Order Number	Appearance	Details
All models	1 m	JZSP-CLP70-01-E		567
	3 m	JZSP-CLP70-03-E		
	5 m	JZSP-CLP70-05-E		
	10 m	JZSP-CLP70-10-E		
	15 m	JZSP-CLP70-15-E		
	20 m	JZSP-CLP70-20-E		

Sensor Cables

Servomotor Model	Length (L)	Order Number	Appearance	Details
SGLGW-□□A SGLTW-□□A	1 m	JZSP-CLL10-01-E		567
	3 m	JZSP-CLL10-03-E		
	5 m	JZSP-CLL10-05-E		
	10 m	JZSP-CLL10-10-E		
	15 m	JZSP-CLL10-15-E		
SGLFW2-□□A□□□AS□ (with polarity sensor)	1 m	JZSP-CL2L100-01-E		568
	3 m	JZSP-CL2L100-03-E		
	5 m	JZSP-CL2L100-05-E		
	10 m	JZSP-CL2L100-10-E		
	15 m	JZSP-CL2L100-15-E		
SGLFW2-□□A□□□AT□ (without polarity sensor)	1 m	JZSP-CL2TH00-01-E		568
	3 m	JZSP-CL2TH00-03-E		
	5 m	JZSP-CL2TH00-05-E		
	10 m	JZSP-CL2TH00-10-E		
	15 m	JZSP-CL2TH00-15-E		

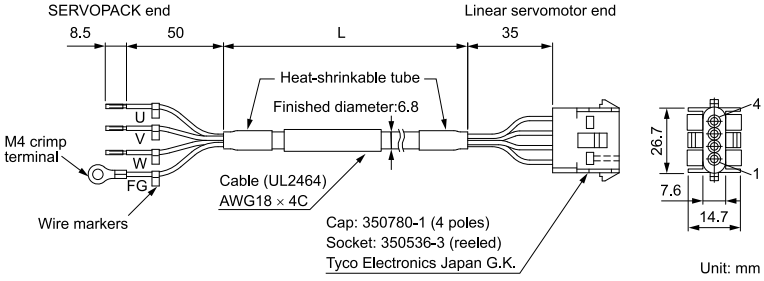
Encoder Cables

The cables in the following table can be used either for absolute linear encoders or incremental linear encoders.

Servomotor Model	Length (L)	Order Number		Appearance	Details
		Standard Cable	Flexible Cable		
All models	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E		569
	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		

Cable Dimensional Drawings and Wiring Specifications

■ JZSP-CLN11-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

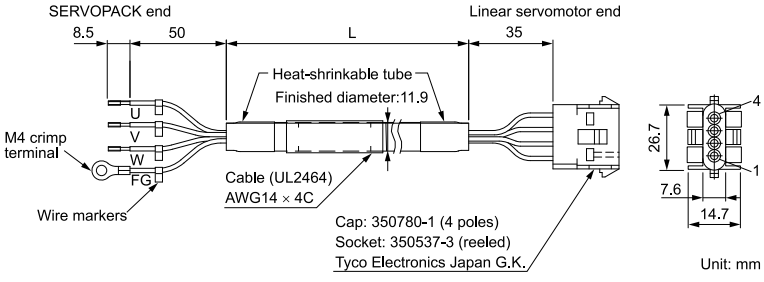
SERVOPACK leads

Wire Color	Signal
Red	Phase U
White	Phase V
Blue	Phase W
Green/yellow	FG

Servomotor connector

Signal	Pin
Phase U	1
Phase V	2
Phase W	3
FG	4

■ JZSP-CLN21-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

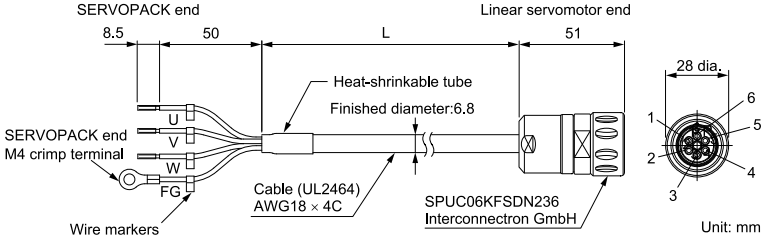
SERVOPACK leads

Wire Color	Signal
Red	Phase U
White	Phase V
Blue	Phase W
Green/yellow	FG

Servomotor connector

Signal	Pin
Phase U	1
Phase V	2
Phase W	3
FG	4

■ JZSP-CLN14-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

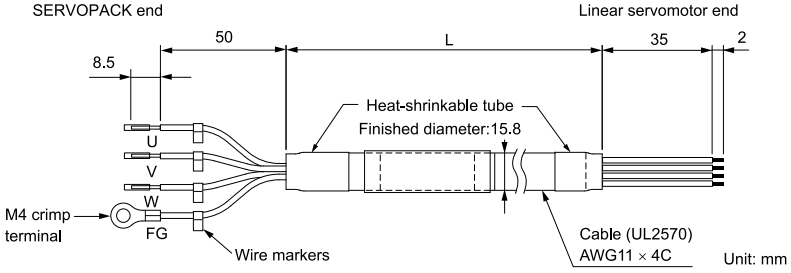
SERVOPACK leads

Wire Color	Pin
Black (white 1)	Phase U
Black (white 2)	Phase V
Black (white 3)	Phase W
Green/yellow	FG

Servomotor connector

Signal	Pin
Phase U	1
Phase V	2
Phase W	3
—	4
—	5
FG	6

■ JZSP-CLN39-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

SERVOPACK leads

Wire Color	Signal
Red	Phase U
White	Phase V
Blue	Phase W
Green/yellow	FG

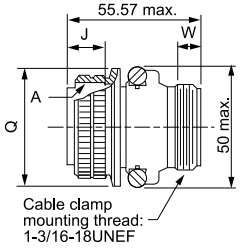
Servomotor connector

Signal	Pin
Phase U	A
Phase V	B
Phase W	C
FG	D

◆ JZSP-CLN39 Cable Connectors

Applicable Servomotor	Connector Provided with Servomotor	Plug		Cable Clamp
		Straight	Right-Angle	
SGLTW-40 or -80	MS3102A22-22P	MS3106B22-22S or MS3106A22-22S	MS3108B22-22S	MS3057-12A

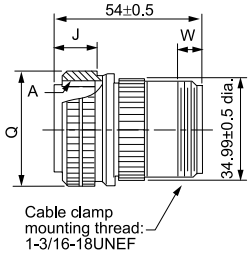
○ MS3106B22-2S: Straight Plug with Two-Piece Shell



Unit: mm

Shell Size	Joint Thread A	Length of Joint J ±0.12	Connecting Nut Outer Diameter $Q^{+0}_{-0.38}$ dia.	Effective Thread Length W Min.
22	1-3/8-18UNEF	18.26	40.48	9.53

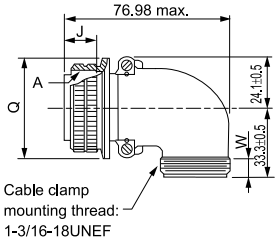
○ MS3106A22-2S: Straight Plug with Solid Shell



Unit: mm

Shell Size	Joint Thread A	Length of Joint J ±0.12	Connecting Nut Outer Diameter $Q^{+0}_{-0.38}$ dia.	Effective Thread Length W Min.
22	1-3/8-18UNEF	18.26	40.48	9.53

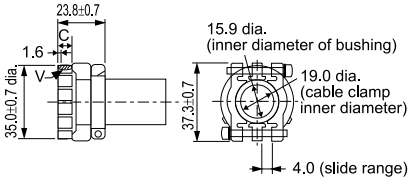
○ MS3108B22-2S: Right-Angle Plug with Two-Piece Shell



Unit: mm

Shell Size	Joint Thread A	Length of Joint J ±0.12	Connecting Nut Outer Diameter $Q^{+0}_{-0.38}$ dia.	Effective Thread Length W Min.
22	1-3/8-18UNEF	18.26	40.48	9.53

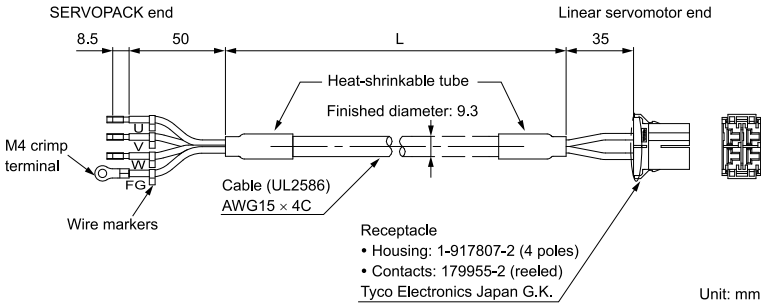
○ MS3057-12A: Cable Clamp with Rubber Bushing



Unit: mm

Applicable Connector Shell Size	Effective Thread Length C	Mounting Screws V	Attached Bushing
20.22	10.3	1-3/16-18UNEF	AN3420-12

■ JZSP-CL2N803-□□-E Servomotor Main Circuit Cables

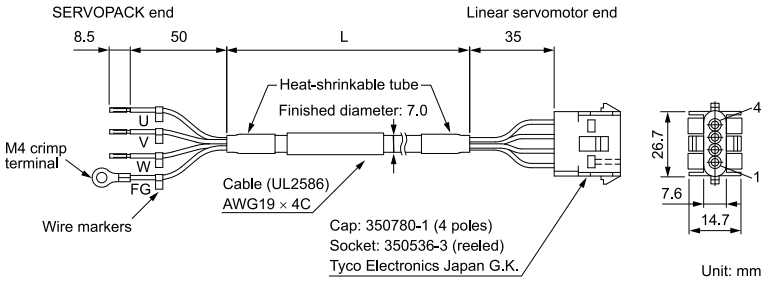


- Wiring Specifications

SERVOPACK leads / Servomotor connector

Wire Color	Signal	Signal	Pin
Red	Phase U	Phase U	A1
White	Phase V	Phase V	A2
Black	Phase W	Phase W	B1
Green	FG	FG	B2

■ JZSP-CL2N703-□□-E Servomotor Main Circuit Cables

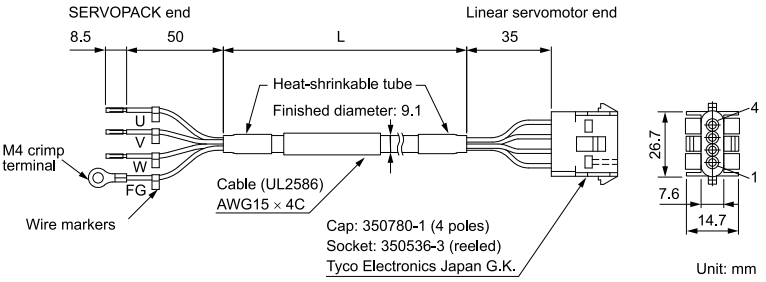


- Wiring Specifications

SERVOPACK leads / Servomotor connector

Wire Color	Signal	Signal	Pin
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Black	Phase W	Phase W	3
Green	FG	FG	4

■ JZSP-CL2N603-□□-E Servomotor Main Circuit Cables

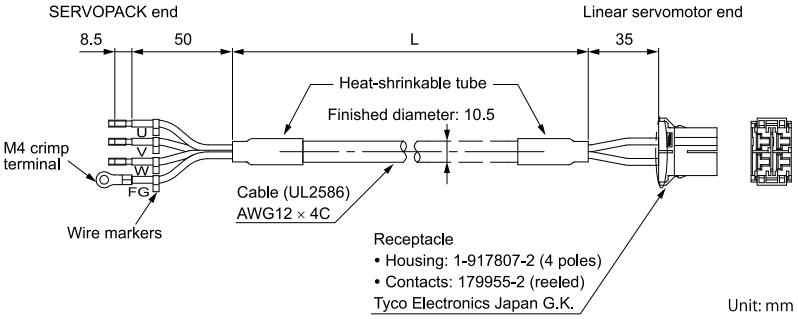


- Wiring Specifications

SERVOPACK leads / Servomotor connector

Wire Color	Signal	Signal	Pin
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Black	Phase W	Phase W	3
Green	FG	FG	4

■ JZSP-CL2N503-□□-E Servomotor Main Circuit Cables

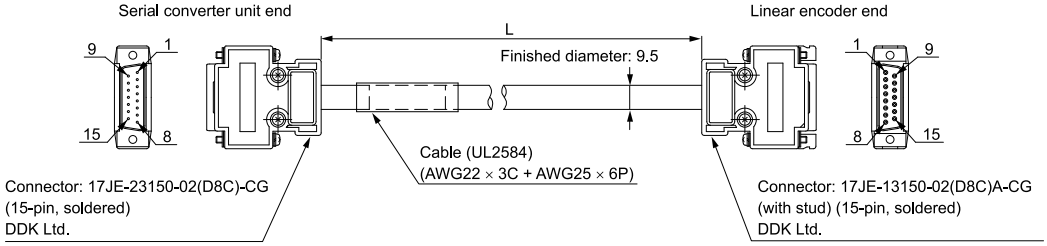


- Wiring Specifications

SERVOPACK leads / Servomotor connector

Wire Color	Signal	Signal	Pin
Red	Phase U	Phase U	A1
White	Phase V	Phase V	A2
Black	Phase W	Phase W	B1
Green	FG	FG	B2

■ JZSP-CLL00-□□-E Linear Encoder Cables



Unit: mm

- Wiring Specifications

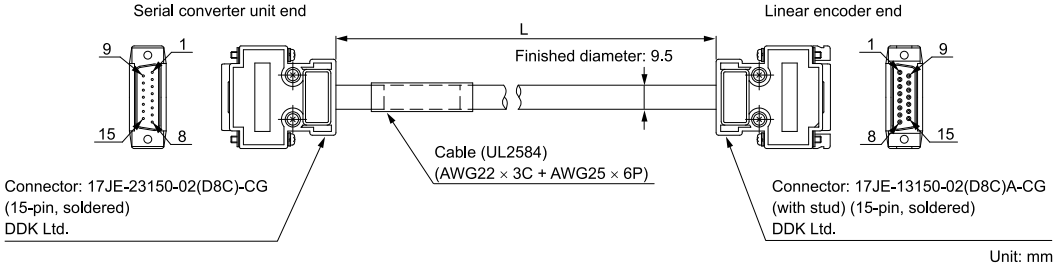
Serial converter unit end

Pin	Signal
1	/cos (V1-)
2	/sin (V2-)
3	Ref (V0+)
4	+5 V
5	5 Vs
6	BID
7	Vx
8	Vq
9	cos (V1+)
10	sin (V2+)
11	/Ref (V0+)
12	0 V
13	0 Vs
14	DIR
15	Inner shield
Case	Shield

Linear encoder end

Pin	Signal
1	/cos (V1-)
2	/sin (V2-)
3	Ref (V0+)
4	+5 V
5	5 Vs
6	BID
7	Vx
8	Vq
9	cos (V1+)
10	sin (V2+)
11	/Ref (V0-)
12	0 V
13	0 Vs
14	DIR
15	Inner shield
Case	Shield

■ JZSP-CLL30-□□-E Linear Encoder Cables



Unit: mm

- Wiring Specifications

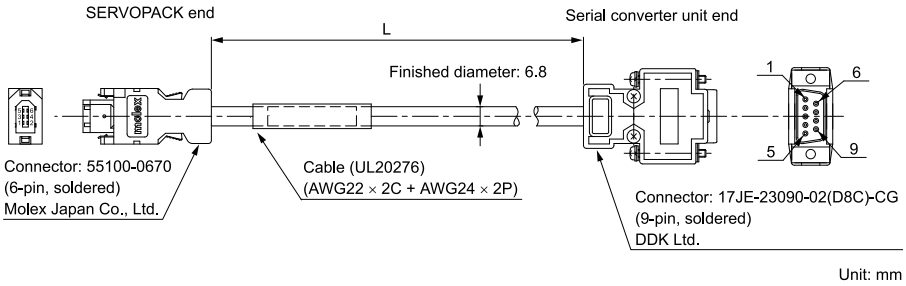
Serial converter unit end

Pin	Signal
1	cos (A+)
2	0 V
3	sin (B+)
4	+5 V
5	–
6	–
7	/Ref (R-)
8	–
9	/cos (A-)
10	0 Vs
11	/sin (B-)
12	5 Vs
13	–
14	Ref (R+)
15	–
Case	Shield

Linear encoder end

Pin	Signal
1	cos (A+)
2	0 V
3	sin (B+)
4	+5 V
5	–
6	–
7	/Ref (R-)
8	–
9	/cos (A-)
10	0 Vs
11	/sin (B-)
12	5 Vs
13	–
14	Ref (R+)
15	–
Case	Shield

■ JZSP-CLP70-□□-E Serial Converter Unit Cables



Unit: mm

- Wiring Specifications

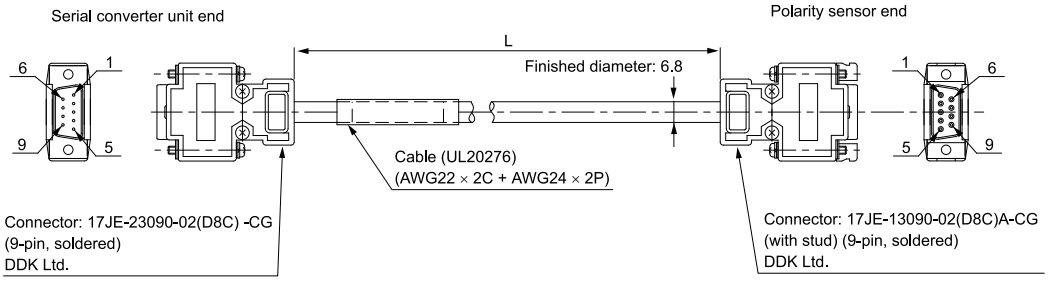
SERVOPACK end

Pin	Signal	Wire Color
1	PG5 V	Orange
2	PG0 V	Green
3	–	–
4	–	–
5	PS	Light blue/red
6	/PS	Light blue/black
Shell	Shield	–

Serial converter unit end

Pin	Signal	Wire Color
1	+5 V	Orange
5	0 V	Green
3	–	–
4	–	–
2	Phase-S output	Light blue/red
6	/Phase-S output	Light blue/black
Case	Shield	–
7	–	–
8	–	–
9	–	–

■ JZSP-CLL10-□□-E Sensor Cables



Unit: mm

- Wiring Specifications

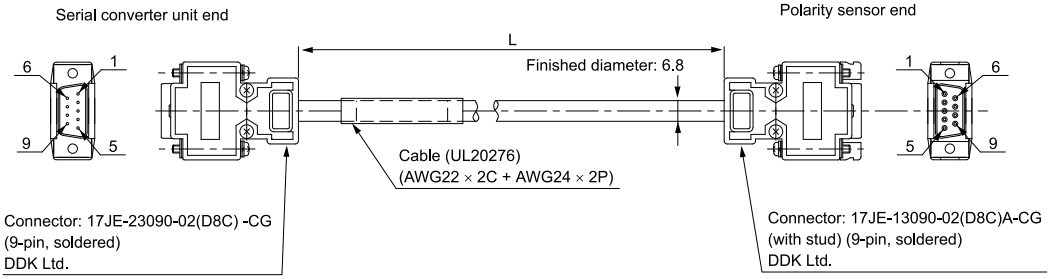
Serial converter unit end

Pin	Signal
1	+5 V
2	Phase-U input
3	Phase-V input
4	Phase-W input
5	0 V
6	–
7	–
8	–
9	–
Case	Shield

Polarity sensor end

Pin	Signal
1	+5 V
2	Phase-U input
3	Phase-V input
4	Phase-W input
5	0 V
6	–
7	–
8	–
9	–
Case	Shield

■ JZSP-CL2L100-□□-E Sensor Cables



Unit: mm

- Wiring Specifications

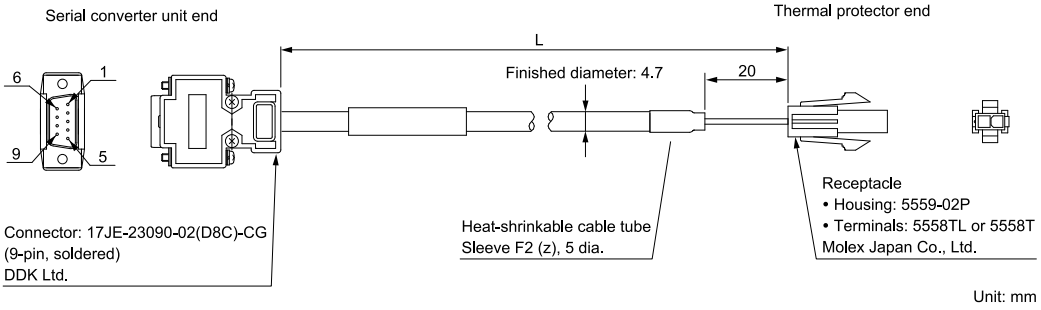
Serial converter unit end

Pin	Signal
1	+5 V, Thermal protector
2	Phase-U input
3	Phase-V input
4	Phase-W input
5	0 V
6	–
7	–
8	–
9	Thermal protector
Case	Shield

Polarity sensor end

Pin	Signal
1	+5 V, Thermal protector
2	Phase-U input
3	Phase-V input
4	Phase-W input
5	0 V
6	–
7	–
8	–
9	Thermal protector
Case	Shield

■ JZSP-CL2TH00-□□-E Sensor Cables



Unit: mm

- Wiring Specifications

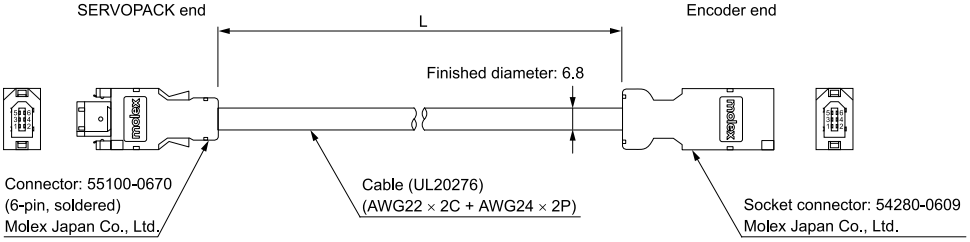
Serial converter unit end

Pin	Signal
1	+5V, Thermal protector
2	–
3	–
4	–
5	–
6	–
7	–
8	–
9	Thermal protector

Thermal protector end

Pin	Signal
1	+5V, Thermal protector
2	Thermal protector

■ Encoder Cables: JZSP-CMP00-□□-E (standard cables) and JZSP-CMP10-□□-E (flexible cables)



- Wiring Specifications

Standard Cable

SERVOPACK end

Pin	Signal
1	PG 5 V
2	PG 0 V
5	PS
6	/PS
Shell	FG

Shield wire

Encoder end

Pin	Wire Color
1	Red
2	Black
5	Light blue
6	Light blue/white
7	FG shield wire

Flexible Cable

SERVOPACK end

Pin	Signal
1	PG 5 V
2	PG 0 V
5	PS
6	/PS
Shell	FG

Shield wire

Encoder end

Pin	Wire Color
1	Orange
2	Light green
5	Red/light blue
6	Black/light blue
7	FG shield wire

Note:

Always connect the shield wire from the encoder cable to the connector case (shell).

Wiring Precautions

■ 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.

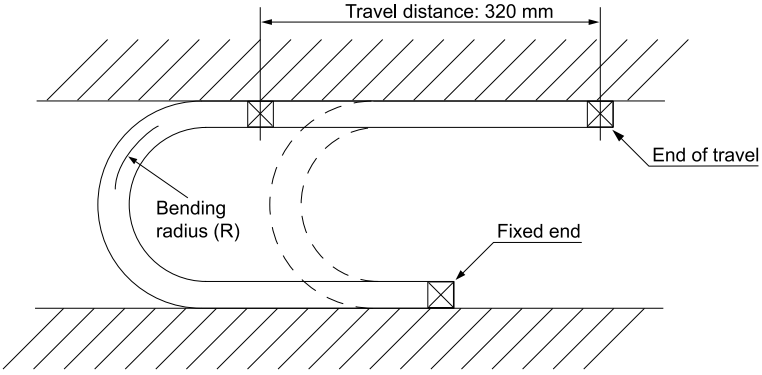
Cable Diameter	Recommended Bending Radius (R)
Less than 8 mm	15 mm min.
8 mm	20 mm min.
Over 8 mm	Cable diameter × 3 mm min.

■ Precautions for Flexible Cables

The flexible cables have a service life of 10,000,000 operations minimum when used at the recommended bending radius (R) or larger under the following test conditions. The service life of a flexible cable is reference data under the following 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 fixed end is connected to a non-moving part, the moving end is connected to the moving part, 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 occurs.

◆ Recommended Cable Bending Radius

Type	Model	Recommended Bending Radius (R) [mm]
Linear Servomotor Main Circuit Cables	JZSP-CLN11-□□-E	35
	JZSP-CLN21-□□-E	75
	JZSP-CLN39-□□-E	100
	JZSP-CLN14-□□-E	35
	JZSP-CL2N803-□□-E	70
	JZSP-CL2N703-□□-E	50
	JZSP-CL2N603-□□-E	60
	JZSP-CL2N503-□□-E	70
Linear Encoder Cables	JZSP-CLL00-□□-E	57
	JZSP-CLL30-□□-E	
Sensor Cables	JZSP-CLL10-□□-E	46
	JZSP-CL2L100-□□-E	
	JZSP-CL2TH00-□□-E	
Serial Converter Unit Cables	JZSP-CLP70-□□-E	
Cables with Connectors on Both Ends (For Incremental or Absolute Encoder)	JZSP-CMP10-□□-E	46
Cables without Connectors	JZSP-CSP39-□□-E	

Serial Converter Unit

Selection Table

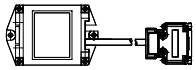
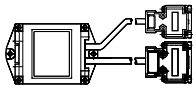
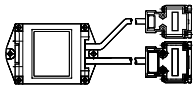
■ Order Number

Use the following tables to select the serial converter unit.

JZDP - □00□ - □□□

Applicable Linear Servomotors

Serial Converter Unit Model

Serial Converter Unit Model				
Symbol	**Appearance**	**Applicable Linear Encoder**	**Polarity Sensor**	**Thermal Protector**
H003 J003		From Dr. JOHANNES HEIDENHAIN GmbH	Not provided.	Not provided.
H005 J005		From Renishaw PLC	Not provided.	Not provided.
H006 J006		From Dr. JOHANNES HEIDENHAIN GmbH	Provided	Provided
H008 J008		From Renishaw PLC	Provided	Provided

Applicable Linear Servomotors		
Servomotor Model		Code
SGLGW- (Coreless models) For Standard-Force Magnetic Way	30A050C	250
	30A080C	251
	40A140C	252
	40A253C	253
	40A365C	254
	60A140C	258
	60A253C	259
	60A365C	260
	90A200C	264
	90A370C	265
	90A535C	266

Continued on next page.

Continued from previous page.

Applicable Linear Servomotors		
SGLGW- + SGLGM- □-M (Coreless models) For High-Force Magnetic Way	40A140C	255
	40A253C	256
	40A365C	257
	60A140C	261
	60A253C	262
	60A365C	263
SGLFW2 (Models with F-type Iron cores) 200V Models	30A070A	628
	30A120A	629
	30A230A	630
	45A200A	631
	45A380A	632
	90A200A□1	633
	90A380A□1	634
	90A560A□1	648
	1DA380A□1	649
	1DA560A□1	650
	90A200A□L	699
	90A380A□L	700
	90A560A□L	701
	1DA380A□L	702
	1DA560A□L	703
SGLFW2 (Models with F-type Iron cores) 200V Models	30D070A□	651
	30D120A□	652
	30D230A□	653
	45D200A□	654
	45D380A□	655
	90D200A□	657
	90D380A□	658
	90D560A□	659
	1DD380A□	660
	1DD560A	661

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Applicable Linear Servomotors		
SGLTW- (Models with T-type Iron cores)	20A170A	011
	20A320A	012
	20A460A	013
	35A170A	014
	35A320A	015
	35A460A	016
	35A170H	105
	35A320H	106
	50A170H	108
	50A320H	109
	40A400B	185
	40A600B	186
	80A400B	187
	80A600B	188

Characteristics and Specifications

Item		JZDP-H00□-□□□	JZDP-J00□-□□□
Electrical Characteristics	Power Supply Voltage	+5.0 V ±5%, ripple content: 5% max.	
	Current Consumption *1	120 mA Typ, 160 mA max.	
	Signal Resolution	1/256 pitch of input two-phase sine wave	1/4096 pitch of input two-phase sine wave
	Maximum Response Frequency	250 kHz	100 kHz
	Analog Input Signals *2 (cos, sin, and Ref)	Differential input amplitude: 0.4 V to 1.2 V Input signal level: 1.5 V to 3.5 V	
	Polarity Sensor Input Signal	CMOS level	
	Thermal Protector Input Signal	Connect the thermal protector built into the linear servomotor *3	
	Output Signals	Position data, polarity sensor information, and alarms	
	Output Method	Serial data transmission	
	Output Circuit	Balanced transceiver (SN75LBC176 or the equivalent), internal terminating resistance: 120 Ω	
Mechanical Characteristics	Approx. Mass	150 g	
	Vibration Resistance	98 m/s max.^{2}(10 Hz to 2,500 Hz) in three directions	
	Impact Resistance	980 m/s^2, (11 ms) two times in three directions	
Environment	Surrounding Air Temperature	0°C to 55°C	
	Storage Temperature	-20°C to 80°C	
	Surrounding Air Humidity/Storage Humidity	20% to 90% relative humidity (with no condensation)	

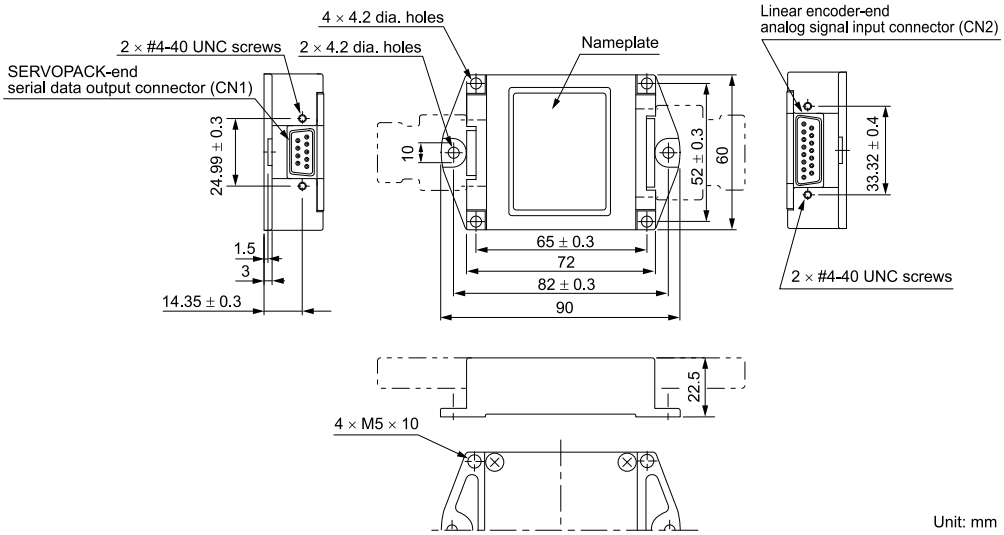
*1 The current consumptions of the linear encoder and the polarity sensor are not included in this value. The current consumption of the polarity sensor is approximately 40 mA. Confirm the current consumption of the linear encoder that you will use and make sure that the current capacity of the SERVOPACK is not exceeded.

*2 If you input an out-of-range value, the correct position information will not be output. Also, the device may be damaged.
*3 Only SGLFW2 servomotors come equipped with thermal protectors.

External Dimensions

■ Serial Converter Unit without Polarity Sensor Cable (for linear encoder from Dr. JOHANNES HEIDENHAIN GmbH)

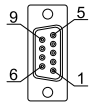
◆ Model: JZDP-□003-□□□



Unit: mm

Pin No.	Signal
1	+ 5 V
2	Phase-S output
3	Not used
4	Not used
5	0 V
6	Phase-/S output
7	Not used
8	Not used
9	Not used
Case	Shield

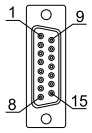
CN1
SERVOPACK-end
serial data outputs



17-series connector:
17LE-13090-27-FA
(socket)
from DDK Ltd.

Pin No.	Signal
1	cos input (A+)
2	0 V
3	sin input (B+)
4	+ 5 V
5	Not used
6	Not used
7	/Ref input (R-)
8	Not used
9	/cos input (A-)
10	0 V sensor
11	/sin input (B-)
12	5 V sensor
13	Not used
14	Ref input (R+)
15	Not used
Case	Shield

CN2
Linear encoder-end
analog signal inputs



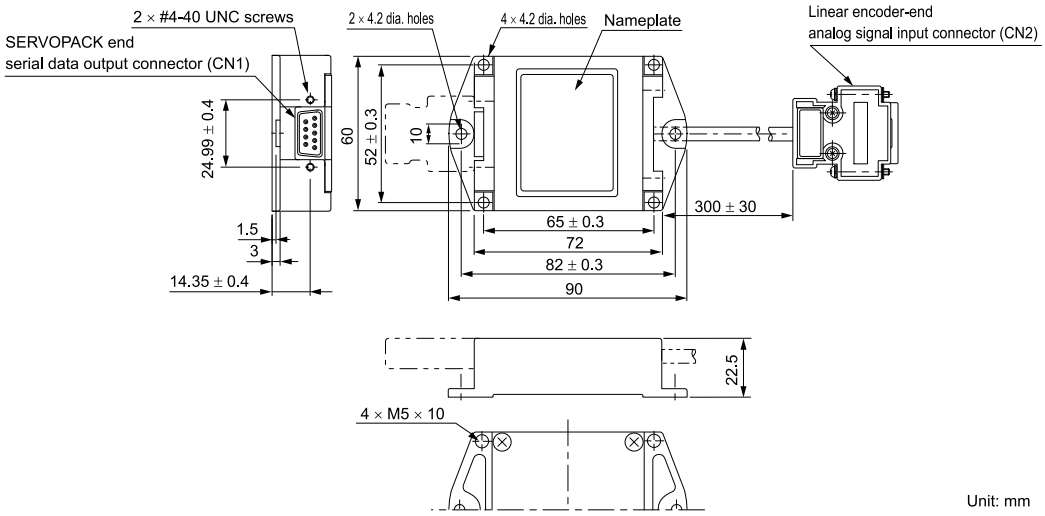
17-series connector:
17LE-13150-27-FA
(socket)
from DDK Ltd.

Note:

1. Do not connect the unused pins.
2. Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

■ Serial Converter Unit without Polarity Sensor Cable (for linear encoder from Renishaw plc)

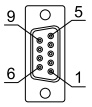
◆ Model: JZDP-□005-□□□



Unit: mm

Pin No.	Signal
1	+ 5 V
2	Phase-S output
3	Not used
4	Not used
5	0 V
6	Phase-/S output
7	Not used
8	Not used
9	Not used
Case	Shield

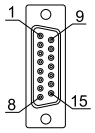
CN1
SERVOPACK-end
serial data outputs



17-series connector:
17LE-13090-27-FA
(socket)
from DDK Ltd.

Pin No.	Signal
1	cos input (V1-)
2	sin input (V2-)
3	Ref input (V0+)
4	+ 5 V
5	5 Vs
6	Not used
7	Not used
8	Not used
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0 V
13	0 Vs
14	Not used
15	Inner shield (0 V)
Case	Shield

CN2
Linear encoder-end
analog signal inputs



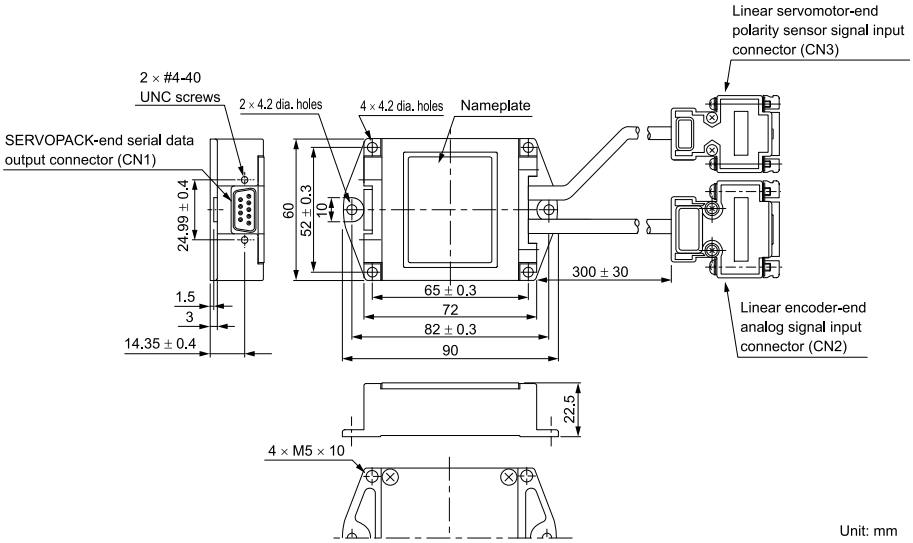
17-series connector:
17JE-13150-02 (D8C) A-CG
(socket)
from DDK Ltd.

Note:

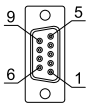
1. Do not connect the unused pins.
2. Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.
3. Use the linear encoder connector to change the origin position specifications of the linear encoder.

■ Serial Converter Unit with Polarity Sensor Cable (for linear encoder from Dr. JOHANNES HEIDENHAIN GmbH)

◆ Model: JZDP-□006-□□□

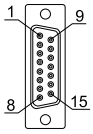


CN1
SERVOPACK-end serial data outputs



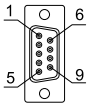
17-series connector:
17LE-13090-27-FA
(socket)
from DDK Ltd.

CN2
Linear encoder-end analog signal inputs



17-series connector:
17JE-13150-02 (D8C) A-CG
(socket)
from DDK Ltd.

CN3
Linear servomotor-end polarity sensor signal input



17-series connector:
17JE-13090-02 (D8C) A-CG
from DDK Ltd.

Pin No.	Signal
1	+5 V
2	Phase-S output
3	Not used
4	Not used
5	0 V
6	Phase-/S output
7	Not used
8	Not used
9	Not used
Case	Shield

Pin No.	Signal	Pin No.	Signal
1	cos input (A+)	9	/cos input (A-)
2	0 V	10	0 V sensor
3	sin input (B+)	11	/sin input (B-)
4	+5 V	12	5 V sensor
5	Not used	13	Not used
6	Not used	14	Ref input (R+)
7	/Ref input (R-)	15	Not used
8	Not used	Case	Shield

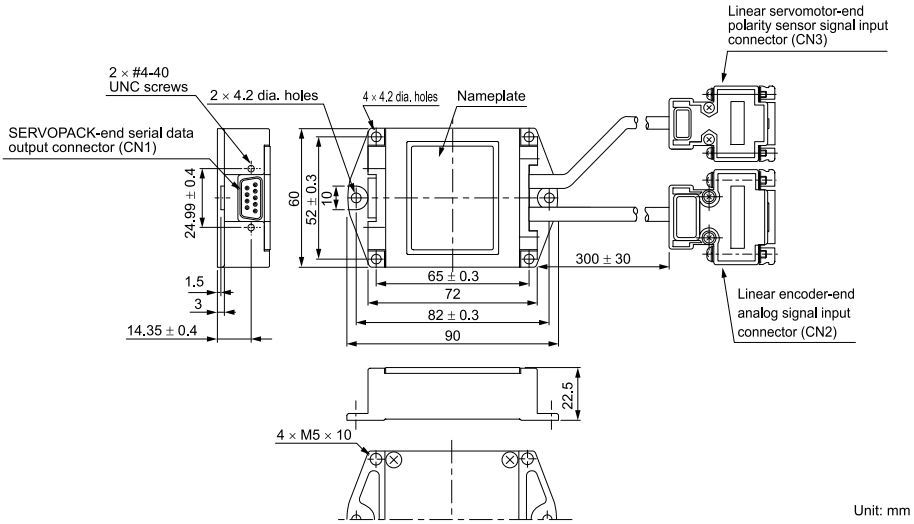
Pin No.	Signal
1	+5 V
2	Phase-U input
3	Phase-V input
4	Phase-W input
5	0 V
6	Not used
7	Not used
8	Not used
9	Thermal protector input
Case	Shield

Note:

1. Do not connect the unused pins.
2. Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.
3. The phase U, V, and W inputs are internally pulled up with 10 kΩ.

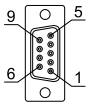
■ Serial Converter Unit with Polarity Sensor Cable (for linear encoder from Renishaw plc)

◆ Model: JZDP-□008-□□□



Unit: mm

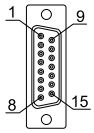
CN1
SERVOPACK-end
serial data outputs



17-series connector:
17LE-13090-27-FA
(socket)
from DDK Ltd.

Pin No.	Signal
1	+5 V
2	Phase-S output
3	Not used
4	Not used
5	0 V
6	Phase-/S output
7	Not used
8	Not used
9	Not used
Case	Shield

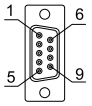
CN2
Linear encoder-end
analog signal inputs



17-series connector:
17JE-13150-02 (D8C) A-CG
(socket)
from DDK Ltd.

Pin No.	Signal	Pin No.	Signal
1	/cos input (V1-)	9	cos input (V1+)
2	/sin input (V2-)	10	sin input (V2+)
3	Ref input (V0+)	11	/Ref input (V0-)
4	+5 V	12	0 V
5	5 Vs	13	0 Vs
6	Not used	14	Not used
7	Not used	15	Inner shield
8	Not used	Case	Shield

CN3
Linear servomotor-end
polarity sensor signal input



17-series connector:
17JE-13090-02 (D8C) A-CG
from DDK Ltd.

Pin No.	Signal
1	+5 V
2	Phase-U input
3	Phase-V input
4	Phase-W input
5	0 V
6	Not used
7	Not used
8	Not used
9	Thermal protector input
Case	Shield

Note:

1. Do not connect the unused pins.
2. Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.
3. Use the linear encoder connector to change the origin position specifications of the linear encoder.
4. The phase U, V, and W inputs are internally pulled up with 10 kΩ.

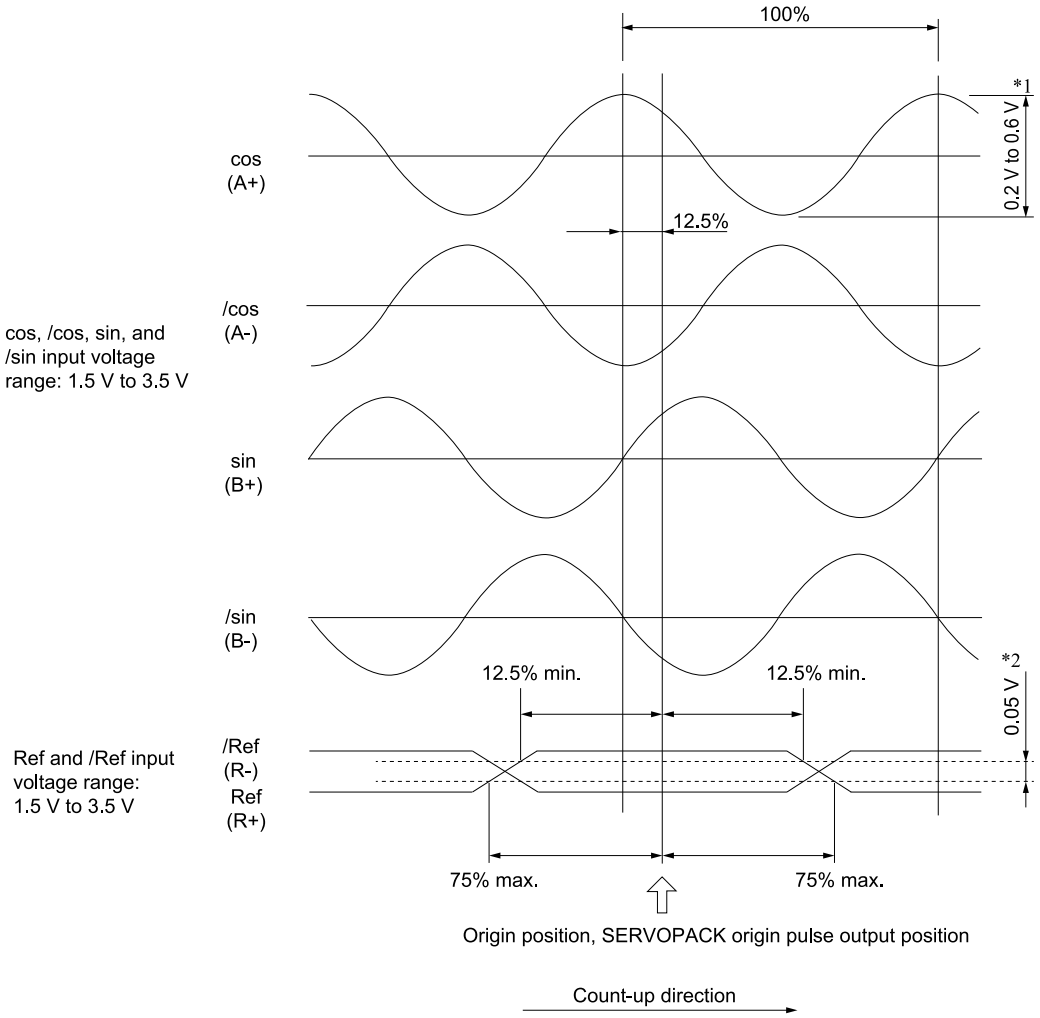
Analog Signal Input Timing

Input the analog signals with the timing shown in the following figure.

The /cos and /sin signals are the differential signals when the cos and sin signals are shifted 180°. The specifications of the cos, /cos, sin, and /sin signals are identical except for the phases.

The Ref and /Ref signals are input to the comparator. Input a signal that will exceed the hysteresis of the comparator (i.e., the broken lines in the following figure).

When they are crossed, the output data will be counted up.



*1 If the analog signal amplitude declines to approximately 0.35 V because of the differential amplitude, the serial converter unit will output an alarm.
*2 This is the hysteresis width.

Important

Application Precautions

1. Never perform insulation resistance or withstand voltage tests.
2. When analog signals are input to the serial converter unit, they are very weak signals, and therefore noise influence on the analog signals affects the unit's ability to output correct position information. Keep the analog signal cable as short as possible and implement proper shielding.
3. Use the serial converter unit in a location without gases such as H_2S.
4. Do not replace the unit while power is being supplied. There is a risk of device damage.
5. If you use more than one axis, use a shielded cable for each axis.
   Do not use one shielded cable for multiple axes.
6. If you use any linear encoder other than a recommended linear encoder, evaluate the system in advance before you use it.

Sigma Trac II Linear Stages

ST2F Sigma Trac II Linear Stages 582

ST2F Sigma Trac II Linear Stages

Model Designations

ST2 F - A1 A 1375 - A 1 L B

1st digit | 2nd+3rd digits | 4th digit | 5th-8th digits | 9th digit | 10th digit | 11th digit | 12th digit

Sigma Trac II
Sigma-7 Series
Linear Stage

1st digit Motor Type

Code	Specification
F	SGLF2 Iron Core

2nd+3rd digits Motor Size

Code	Specification
A1	SGLF2-30□070
A2	SGLF2-30□120
A3	SGLF2-30□230
C1	SGLF2-90□200
C2	SGLF2-90□380
C3	SGLF2-90□560

4th digit Voltage

Code	Specification
A	200 VAC
D	400 VAC

5th-8th digits Base Length

SGLF2-30 Models		SGLF2-90 Models	
Code	Specification	Code	Specification
0390	390 mm	0800	800 mm
0565	565 mm	0900	900 mm
0655	655 mm	1000	1000 mm
0745	745 mm	1105	1105 mm
0835	835 mm	1205	1205 mm
0925	925 mm	1310	1310 mm
1015	1015 mm	1410	1410 mm
1105	1105 mm	1510	1510 mm
1195	1195 mm	1615	1615 mm
1285	1285 mm	1715	1715 mm
1375	1375 mm	1815	1815 mm
1465	1465 mm	1920	1920 mm
1555	1555 mm		

9th digit Base Plate

Code	Specification
A	Standard Base Plate
B	Thick Base Plate

10th digit Feedback Device

Code	Specification
1	Fagor Optical Absolute (9.765 nm)
2	Heidenhain Optical Absolute (5 nm)
9	Heidenhain EnDat 2.2 Optical ABS (5 nm)

11th digit Cable Carrier

Code	Specification
L	Left Side
R	Right Side

12th digit Bellows and Brake

Code	Specification
B	Without Brake, With Bellows
N	Without Brake, Without Bellows
K	With Brake, With Bellows
Q	With Brake, Without Bellows

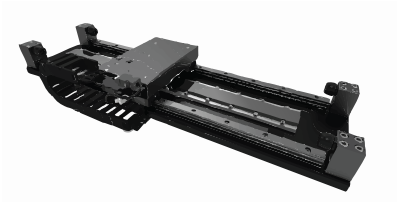
■ Non Stock Items

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes

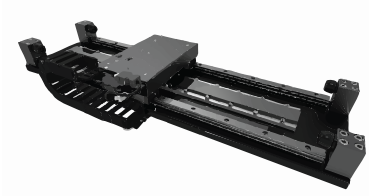
With Bellows



Left Side Cable Carrier



Without Bellows



Right Side Cable Carrier



Specifications and Ratings

Specifications

Linear Stage Model-	STF-2	A1□	A2□	A3□	C1□	C2□	C3□
Mounted Linear Motor	SGLFW2-	30□070	30□120	30□230	90□200	90□380	90□560
Time Rating		Continuous					
Thermal Class		B					
Insulation Resistance		500 VDC, 10 MΩ min.					
Withstand Voltage		1,500 VAC for 1 minute					
Excitation		Permanent magnet					
Cooling Method		Self-cooled					
Protective Structure		IP00					
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.					
Shock Resistance	Impact Acceleration	196 m/s^2					
	Number of Impacts	2 times					
Vibration Resistance	Vibration Acceleration	49 m/s^2 (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)					

Ratings

Linear Stage Model-	ST2F-	A1A	A2A	A3A		A1D	A2D	A3D	C1A	C2A	C3A	C1D	C2D	C3D
Mounted Linear Motor	SGLFW2-	30A0-70	30A1-20	30A230		30D0-70	30D1-20	30D2-30	90A2-00	90A3-80	90A5-60	90D2-00	90D3-80	90D5-60
Power Supply		200 V				400 V			200 V			400 V		
Rated speed *1	m/s	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Maximum Speed *1	m/s	5.0							4.0					
Rated Force *1 *2	N	45	90	180	170	45	90	180	560	1120	1680	560	1120	1680
Maximum Force *1	N	135	270	540	500	135	270	540	1680	3360	5040	1680	3360	5040
Force Constant	N/Arms	33.3	64.5	64.5		33.3	64.5	129.0	82	82	82	154	154	**154**
Motor Constant	N/√W	11.3	17.3	24.4		11.3	17.3	24.4	58.1	82.2	101	59.2	83.7	102
Magnetic Attraction	N	200	630	1260		200	630	1260	4240	8480	12700	4240	8480	12700
Maximum Payload (kg)	w/o Brake	3.8	6.7	30.4	6.4	3.8	6.7	30.4	121.8	147.3	341.9	121.8	147.3	341.9
	with Brake/	3.0	5.9	30.4	6.4	3.0	5.9	30.4	119.8	145.8	339.3	119.8	145.8	339.3
Moving Mass	w/o Brake	2.3	3.6	5.3		2.3	3.6	5.3	13.5	22.8	33.0	13.5	22.8	33.0
	with Brake/	3.1	4.4	5.3		3.1	4.4	5.3	15.5	24.3	35.6	15.5	24.3	35.6
Applicable SERVOPACK	SGDXS-	1R6A	1R6A	3R8A	2R8A	1R9D			120A	200A	330A	5R4D	120D	120D
	SGDXW-	1R6A	1R6A	-	2R8A	-			-			-		
	SGDXT-	1R6A	1R6A	-	2R8A	-			-			-		
Repeatability *3	µm	±2												

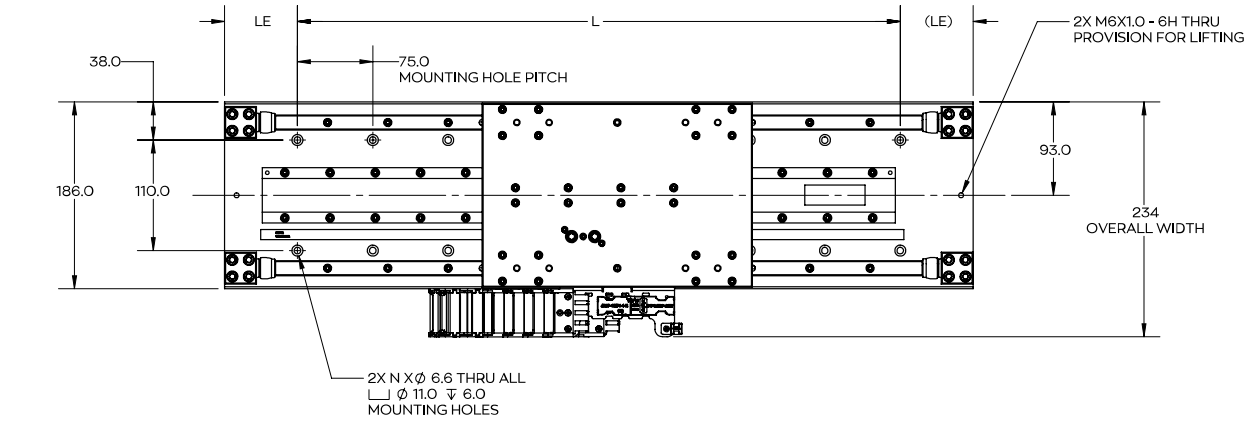
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

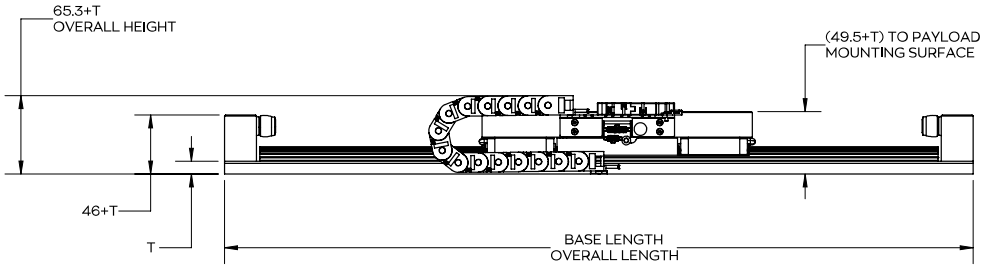
*2 The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

- 150 mm × 100 mm × 10 mm: ST2F-A1A
- 254 mm × 254 mm × 25 mm: ST2F-A2A and ST2F-A3A
- 400 mm × 500 mm × 25 mm: ST2F-C1A
- 609 mm × 762 mm × 40 mm: ST2F-C2A
- 900 mm × 762 mm × 40 mm: ST2F-C3A

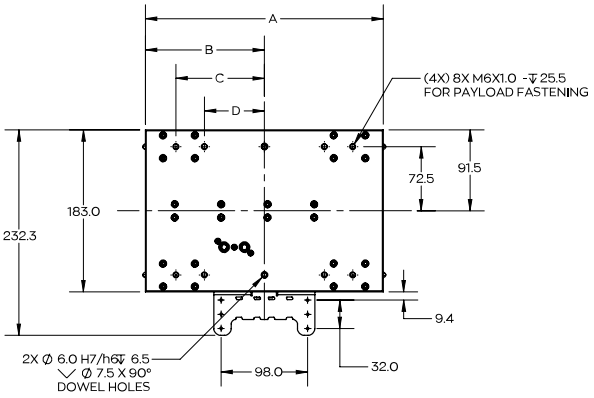
*3 Units are assembled and tested fully restrained on a granite surface with a maximum surface accuracy of 15um at 70'F. Performance of the installed unit may vary with mounting surface quality and temperature

External Dimensions (STF-A1/A2/A3 Models)

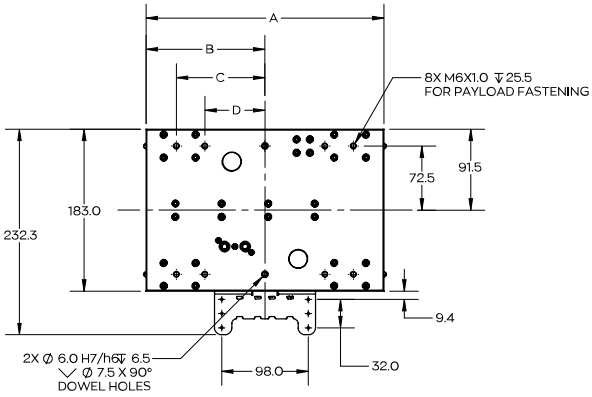




WITHOUT BRAKE



WITH BRAKE



Base Dimensions and Stroke

Base Dimensions						Stroke											
Base Length	L	LE	N	T		S2TF-A1				ST2F-A2				ST2F-A3			
				Std Base (A)	Thick Base (B)	No Opt. (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Opt. (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Opt. (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)
mm	mm	mm	holes	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
390	300	45	5	12.7	38.1	170	150	120	100	110	105	-	-	-	-	-	-
565	450	57.5	7	12.7	38.1	345	295	295	255	285	240	235	200	190	170	190	170
655	525	65	8	12.7	38.1	435	370	385	330	375	320	325	270	280	245	280	245
745	600	72.5	9	12.7	38.1	525	445	475	405	465	390	415	350	370	315	370	320
835	750	42.5	11	12.7	38.1	615	520	565	480	555	470	505	420	460	390	460	395
925	825	50	12	12.7	38.1	705	595	655	555	645	540	595	500	550	465	550	465
1015	900	57.5	13	12.7	38.1	795	670	745	630	735	615	685	570	640	540	640	540
1105	975	65	14	12.7	38.1	885	740	835	690	825	690	775	645	730	615	730	615
1195	1050	72.5	15	12.7	38.1	975	815	925	775	915	760	865	715	820	690	820	690
1285	1200	42.5	17	12.7	38.1	1065	890	1015	850	1005	835	955	790	910	760	910	765
1375	1275	50	18	12.7	38.1	1155	960	1105	920	1095	910	1045	865	1000	835	1000	840
1465	1350	57.5	19	12.7	38.1	1245	1040	1195	1000	1185	985	1135	940	1090	905	1090	905
1555	1425	65	20	12.7	38.1	1335	1110	1285	1070	1275	1060	1225	1015	1180	985	1180	985

Carriage Dimensions and Moving Mass

Without Brake

Linear Stage Model	A	B	C	D	Moving Mass
	mm	mm	mm	mm	kg
STF-A1	114.0	57.0	42.00	-	2.3
STF-A2	176.0	88.0	67.85	-	3.6
STF-A3	269.0	134.5	100.00	67.85	5.3

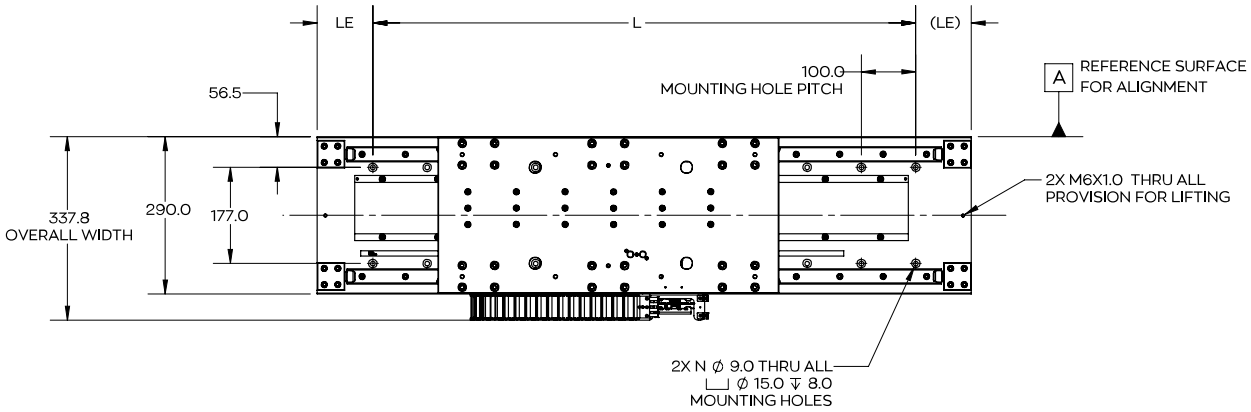
With Brake

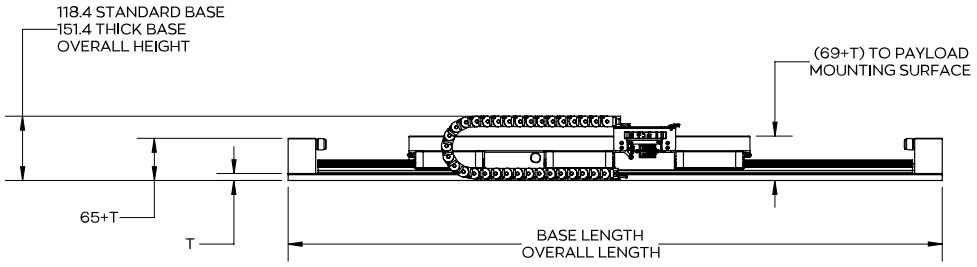
Linear Stage Model	A	B	C	D	Moving Mass
	mm	mm	mm	mm	kg
STF-A1	164.0	82.0	59.70	42.00	3.1
STF-A2	226.0	113.0	92.80	67.85	4.4
STF-A3	269.0	134.5	100.00	67.85	5.3

Note:

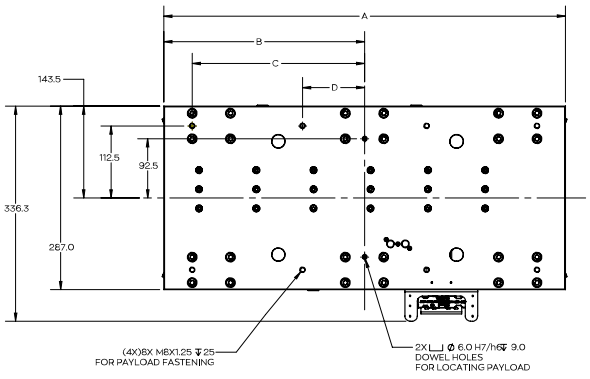
1. Brake is only for holding the Sigma Trac II in static load. Not designed for stopping.
2. Brake air supply should be clean and dry (no oil in the lines). Required pressure is 5.5 bar (79 psi) to 6.5 bar (94 psi). Ø4 mm O.D. air hose supplied without connector.
3. The center pair of mounting holes on the base are inaccessible on the following models. Removal of the carriage to gain access to these holes may cause serious injury and damage to the unit.
   • ST2F-A2-0390- _____
   • ST2F-A3-0565- _____

External Dimensions (STF-C1/C2/C3 Models)

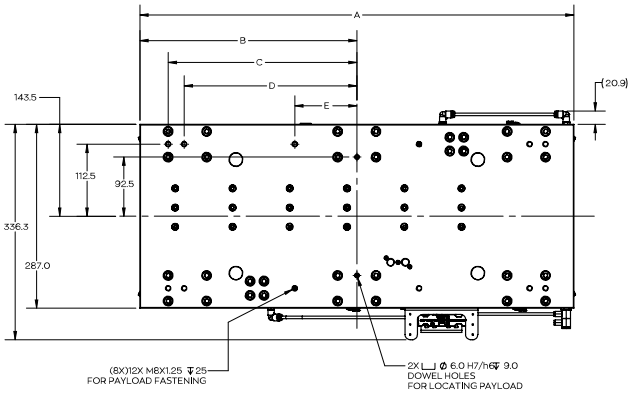




WITHOUT BRAKE



WITH BRAKE



Base Dimensions and Stroke

Base Dimensions						Stroke											
Base Length	L	LE	N	T		S2TF-C1				ST2F-C2				ST2F-C3			
				Std Base (A)	Thick Base (B)	No Opt. (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Opt. (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Opt. (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)
mm	mm	mm	holes	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
800	600	100	7	12.7	38.1	385	335	330	290	210	185	210	185	-	-	-	-
900	700	100	8	12.7	38.1	485	415	430	370	310	265	310	265	-	-	-	-
1000	800	100	9	12.7	38.1	585	505	530	455	410	350	410	350	230	200	-	-
1105	900	102.5	10	12.7	38.1	690	590	635	540	515	435	515	435	335	290	285	245
1205	1000	102.5	11	12.7	38.1	790	675	735	630	615	520	615	520	435	370	385	335
1310	1100	105	12	12.7	38.1	895	760	840	715	720	610	720	610	540	460	490	420
1410	1200	105	13	12.7	38.1	995	850	940	800	820	695	820	695	640	540	590	505
1510	1300	105	14	12.7	38.1	1095	930	1040	880	920	780	920	780	740	630	690	585
1615	1400	107.5	15	12.7	38.1	1200	1020	1145	970	1025	865	1025	865	845	715	795	675
1715	1500	107.5	16	12.7	38.1	1300	1100	1245	1050	1125	950	1125	950	945	800	895	750
1815	1600	107.5	17	12.7	38.1	1400	1185	1345	1140	1225	1035	1225	1035	1045	880	995	845
1920	1700	110	18	12.7	38.1	1505	1270	1450	1215	1330	1120	1330	1120	1150	975	1100	930

Carriage Dimensions and Moving Mass

Without Brake

Linear Stage Model	A	B	C	D	Moving Mass
	mm	mm	mm	mm	kg
STF-C1	270.0	135.0	97.10	-	13.5
STF-C2	449.0	224.5	180.00	97.10	22.8
STF-C3	628.0	314.0	269.75	97.10	33.0

With Brake

Linear Stage Model	A	B	C	D	E	Moving Mass
	mm	mm	mm	mm	mm	kg
STF-C1	325.0	162.5	124.60	97.10	-	15.5
STF-C2	449.0	224.5	180.00	97.10	-	24.3
STF-C3	678.0	339.0	294.75	269.75	97.10	35.6

Note:

1. Brake is only for holding the Sigma Trac II in static load. Not designed for stopping.
2. Brake air supply should be clean and dry (no oil in the lines). Required pressure is 5.5 bar (79 psi) to 6.5 bar (94 psi). Ø4 mm O.D. air hose supplied without connector.

Mass (STF-A1/A2/A3)

Standard Base

	S2TF-A1				ST2F-A2				ST2F-A3			
Base Length	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)
mm	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
390	7.6	8.0	8.4	8.7	8.9	9.2	-	-	-	-	-	-
565	9.9	10.3	10.7	11.1	11.2	11.6	12.0	12.4	12.9	13.3	13.0	13.3
655	11.1	11.5	11.8	12.2	12.4	12.8	13.1	13.5	14.1	14.5	14.1	14.5
745	12.3	12.8	13.1	13.5	13.6	14.1	14.4	14.8	15.3	15.8	15.3	15.8
835	13.5	14.0	14.2	14.7	14.8	15.3	15.5	16.0	16.5	17.0	16.5	17.0
925	14.7	15.2	15.4	15.9	16.0	16.5	16.7	17.2	17.7	18.2	17.7	18.2
1015	15.8	16.4	16.6	17.1	17.1	17.7	17.9	18.4	18.8	19.4	18.8	19.4
1105	17.0	17.6	17.7	18.4	18.3	18.9	19.0	19.6	20.0	20.6	20.0	20.6
1195	18.1	18.8	18.9	19.5	19.4	20.1	20.2	20.8	21.2	21.8	21.2	21.8
1285	19.3	20.0	20.0	20.7	20.6	21.3	21.3	22.0	22.3	22.9	22.3	22.9
1375	20.4	21.2	21.2	21.9	21.7	22.5	22.5	23.2	23.4	24.1	23.5	24.1
1465	21.7	22.5	22.4	23.2	23.0	23.8	23.8	24.6	24.7	25.4	24.7	25.4
1555	22.9	23.7	23.6	24.4	24.2	25.0	24.9	25.7	25.9	26.7	25.9	26.7

Thick Base

	S2TF-A1				ST2F-A2				ST2F-A3			
Base Length	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)
mm	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
390	12.6	13.0	13.4	13.7	13.9	14.2	-	-	-	-	-	-
565	17.1	17.5	17.9	18.3	18.4	18.8	19.2	19.6	20.2	20.5	20.1	20.5
655	19.3	19.8	20.0	20.5	20.6	21.0	21.4	21.8	22.3	22.7	22.3	22.7
745	21.9	22.3	22.6	23.1	23.2	23.6	23.9	24.4	24.9	25.3	24.9	25.3
835	24.2	24.7	24.9	25.4	25.5	26.0	26.2	26.7	27.2	27.6	27.2	27.6
925	26.5	27.1	27.2	27.8	27.8	28.3	28.5	29.1	29.5	30.0	29.5	30.0
1015	28.8	29.4	29.5	30.1	30.1	30.7	30.8	31.4	31.8	32.3	31.8	32.3
1105	31.1	31.7	31.8	32.5	32.4	33.0	33.1	33.7	34.1	34.7	34.1	34.7
1195	33.3	34.0	34.1	34.7	34.6	35.3	35.4	36.0	36.4	37.0	36.3	37.0
1285	35.5	36.3	36.3	37.0	36.9	37.6	37.6	38.3	38.6	39.2	38.5	39.2
1375	37.8	38.6	38.5	39.3	39.1	39.8	39.8	40.6	40.8	41.5	40.3	41.5
1465	40.4	41.2	41.1	41.9	41.7	42.5	42.4	43.3	43.4	44.1	43.4	44.1
1555	42.8	43.6	43.5	44.3	44.1	44.9	44.8	45.6	45.8	46.6	45.8	46.6

Mass (STF-C1/C2/C3)

Standard Base

	S2TF-C1				ST2F-C2				ST2F-C3			
Base Length	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)
mm	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
800	36.7	37.4	38.6	39.3	45.9	46.5	47.4	47.9	-	-	-	-
900	39.5	40.3	41.5	42.3	48.7	49.4	50.2	50.9	-	-	-	-
1000	42.4	43.3	44.4	45.3	51.7	52.4	53.1	53.9	62.0	62.6	-	-
1105	45.4	46.4	47.4	48.4	54.6	55.5	56.1	57.0	65.0	65.7	67.4	68.1
1205	48.3	49.4	50.2	51.3	57.5	57.8	59.0	60.0	67.9	68.7	70.3	71.0
1310	51.3	52.5	53.2	54.4	60.5	61.6	62.0	63.1	70.9	71.8	73.3	74.1
1410	54.2	55.5	56.1	57.4	63.4	64.6	64.9	66.0	73.8	74.8	76.2	77.1
1510	57.1	58.5	59.0	60.4	66.3	67.5	67.8	69.0	76.6	77.7	79.0	80.0
1615	60.0	61.5	62.0	63.5	69.3	70.6	70.8	72.1	79.6	80.8	82.0	83.1
1715	62.9	64.5	64.9	66.5	72.2	73.6	73.6	75.1	82.5	83.8	84.9	86.2
1815	65.9	67.5	67.8	69.5	75.1	76.6	76.6	78.1	85.5	86.8	87.8	89.1
1920	68.8	70.5	70.8	72.4	78.0	79.7	79.5	81.2	88.4	89.8	90.8	92.2

Thick Base

	S2TF-C1				ST2F-C2				ST2F-C3			
Base Length	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)	No Option (N)	Bellows (B)	Brake (Q)	Bellows + Brake (K)
mm	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
800	52.9	53.7	54.9	55.6	62.1	62.6	63.6	64.2	-	-	-	-
900	57.6	58.4	59.6	60.4	66.7	67.4	68.3	69.0	-	-	-	-
1000	62.6	63.6	64.6	65.5	71.8	72.6	73.3	74.1	82.0	82.6	-	-
1105	67.7	68.7	69.6	70.6	76.8	77.7	78.4	79.3	87.1	87.8	89.6	90.3
1205	72.6	73.7	74.6	75.6	81.7	82.7	83.3	84.2	92.0	92.8	94.5	95.3
1310	77.7	78.9	79.7	80.8	86.8	87.9	88.4	89.5	97.1	98.0	99.7	100.5
1410	82.6	83.9	84.6	85.8	91.7	92.9	93.3	94.5	102.0	103.0	104.6	105.5
1510	87.5	88.9	89.4	90.8	96.6	97.9	98.2	99.4	106.9	108.0	109.4	110.4
1615	92.6	94.0	94.5	96.0	101.7	103.1	103.3	104.6	112.0	113.2	114.5	115.6
1715	97.5	99.0	99.4	101.0	106.6	108.1	108.2	109.6	116.9	118.1	119.4	120.7
1815	102.5	104.1	104.4	106.1	111.6	113.1	113.2	114.7	121.9	123.3	124.4	125.7
1920	107.4	109.1	109.4	111.1	116.6	118.3	118.1	119.8	126.8	128.3	129.4	130.8

Selecting Cables

Cable Configurations

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

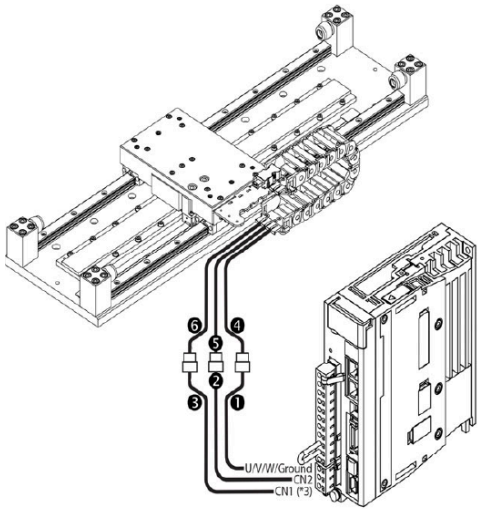


Figure Number	Type	Linear Stage Model	Length	Order Number
1	Power Cable Extension (High Flex)	ST2F-A□A ST2F-A□D	1 m	JZSP-CL2N703-01-E
			3 m	JZSP-CL2N703-03-E
			5 m	JZSP-CL2N703-05-E
			10 m	JZSP-CL2N703-10-E
			15 m	JZSP-CL2N703-15-E
			20 m	JZSP-CL2N703-20-E
		ST2F-C1A ST2F-C2A ST2F-C1D ST2F-C2D	1 m	JZSP-CL2N803-01-E
			3 m	JZSP-CL2N803-03-E
			5 m	JZSP-CL2N803-05-E
			10 m	JZSP-CL2N803-10-E
			15 m	JZSP-CL2N803-15-E
			20 m	JZSP-CL2N803-20-E
		ST2F-C3A ST2F-C3D	1 m	JZSP-CL2N503-01-E
			3 m	JZSP-CL2N503-03-E
			5 m	JZSP-CL2N503-05-E
			10 m	JZSP-CL2N503-10-E
			15 m	JZSP-CL2N503-15-E
			20 m	JZSP-CL2N503-20-E

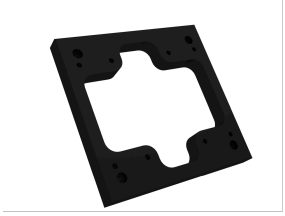
Figure Number	Type	Linear Stage Model	Length	Order Number
2	Encoder Cable Extension (Standard)	ST2F-A☐A ST2F-A☐D ST2F-C☐A ST2F-C☐D	3 m	JZSP-CMP00-03-E
			5 m	JZSP-CMP00-05-E
			10 m	JZSP-CMP00-10-E
			15 m	JZSP-CMP00-15-E
			20 m	JZSP-CMP00-20-E
	Encoder Cable Extension (High Flex)		3 m	JZSP-CMP10-03-E
			5 m	JZSP-CMP10-05-E
			10 m	JZSP-CMP10-10-E
			15 m	JZSP-CMP10-15-E
			20 m	JZSP-CMP10-20-E
3	Thermal Cable Extension (High Flex) *3		3 m	ST2TCBL1-03
			5 m	ST2TCBL1-05
			10 m	ST2TCBL1-10
			15 m	ST2TCBL1-15
			20 m	ST2TCBL1-20
4	Internal Power Cable (High Flex, Small Radius) *1 *2	ST2F-A☐A ST2F-A☐D	2820 mm	ST2IPCBL1
		ST2F-C☐A ST2F-C☐D		ST2IPCBL3
5	Internal Encoder Cable (High Flex, Small Radius) *1 *2	ST2F-A☐A ST2F-A☐D	2750 mm	ST2IECBL1
6	Internal Thermal Cable (High Flex, Small Radius) *1 *2	ST2F-C☐A ST2F-C☐D	2800 mm	ST2ITCBL1

*1 This cable is included with the linear stage and is offered as a replacement part
*2 Cable length is measured from connector to connector. The amount of cable extending beyond the cable carrier depends on stroke length
*3 This cable has flying leads at the SERVOPACK end. Connect to SERVOPACK CN1 via terminal block or I/O cable

Accessories

Optional Accessories

Type	Linear Stage Models	Order Number
X-Y Adapter Kit	Fixed Axis: ST2F-A2, ST2F-A3 Moving Axis: ST2F-A1, ST2F-A2, ST2F-A3	ST2-XYA
	Base Axis: ST2F-C1, ST2F-C2, ST2F-C3 Moving Axis: ST2F-A1, ST2F-A2, ST2F-A3, ST2F-C1, ST2F-C2, ST2F-C3	ST2F-XYC



X-Y Adapter Kit: ST2-XYA

SERVOPACK

Σ-XS Models with Analog Voltage/Pulse Train References **594**

Σ-XS Models with EtherCAT Communications References **620**

Σ-XW Models with EtherCAT Communications References **646**

Σ-XT Models with EtherCAT Communications References **658**

SERVOPACK Cables **668**

Connections between SERVOPACKs and Peripheral **672**

Σ-XS Models with Analog Voltage/Pulse Train References

Interpreting Model Numbers

Interpreting SERVOPACK Model Numbers

SGDXS - R70 A 00 A 0001 00 B

Σ-X-Series
Σ-XS model

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

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

Voltage	Code	Specification
Three-Phase, 200 VAC	R70*1	0.05 kW
	R90*1	0.1 kW
	1R6*1	0.2 kW
	2R8*1	0.4 kW
	3R8	0.5 kW
	5R5*1	0.75 kW
	7R6	1.0 kW
	120*2	1.5 kW
	180	2.0 kW
	200	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
	590	11 kW
	780	15 kW
Three-Phase, 400 VAC	1R9	0.5 kW
	3R5	1.0 kW
	5R4	1.5 kW
	8R4	2.0 kW
	120	3.0 kW
	170	5.0 kW
	210	6.0 kW
	260	7.5 kW
	280	11 kW
	370	15 kW

4th digit Voltage

Code	Specification
A	200 VAC
D	400 VAC

5th+6th digits Interface*3

Code	Specification
00	Analog voltage/pulse train reference

7th digit Design Revision Order

A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	SGDXS-R70A to -330A
	Duct-ventilated	SGDXS-470A to -780A
0002	Varnished	All models
0008	Single-phase, 200-VAC power supply input	SGDXS-120A
0020*4	No dynamic brake	SGDXS-R70A to -2R8A
	External dynamic brake resistor	SGDXS-3R8A to -780A

12th+13th digits FT Specification

Code	Specification
None	None
00	

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

Non-Stock

*1 You can use these models with either a single-phase or three-phase input.
*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification. (Model: SGDXS-120A00A0008)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

*1 You can use these models with either a single-phase or three-phase input.
*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification. (Model: SGDXS-120A00A0008)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-Phase, 200 VAC

Model SGDXS-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA] *1			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Total Power Loss [W]		17.0	19.0	23.9	34.5	42.5	52.9	63.2	87.6	120.2	130.2	245.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	35	35	20	12	10	6
		Capacity [W]	–	–	–	–	60	60	60	60	60	60	180
		Allowable Power Consumption [W]	–	–	–	–	15	15	15	30	30	30	36
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	35	35	20	12	10	6
Overvoltage Category			III										

*1 This is the net value at the rated load.

Model SGDXS-		470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		6.0	7.5	11	15
Continuous Output Current [Arms]		46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		110	130	140	170
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	29	37	54	73
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]	21	21	28	28
	Total Power Loss [W]	292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	Resistance [Ω]	5 *2	3.13 *3	3.13 *3	3.13 *3
	Capacity [W]	880 *2	1760 *3	1760 *3	1760 *3
	Allowable Power Consumption [W]	180 *2	350 *3	350 *3	350 *3
	Minimum Allowable External Resistance [Ω]	5	2.9	2.9	2.9
Overvoltage Category		III			

*1 This is the net value at the rated load.
*2 This value is for the optional JUSP-RA29-E regenerative resistor unit.
*3 This value is for the optional JUSP-RA05-E regenerative resistor unit.

■ Single-Phase, 200 VAC

Model SGDXS-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation		-15% to +10%					
	Input Current [Arms] *1		0.8	1.6	2.4	5.0	8.7	16 *2
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation		-15% to +10%					
	Input Current [Arms] *1		0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	72.6
	Control Circuit Power Loss [W]		12	12	12	12	14	15
	Total Power Loss [W]		17.0	19.1	24.1	35.7	53.2	87.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	20
		Capacity [W]	–	–	–	–	60	60
		Allowable Power Consumption [W]	–	–	–	–	15	30
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	20
Overvoltage Category			III					

*1 This is the net value at the rated load.
*2 Derate to 12 Arms for UL certification.

■ 270 VDC

Model SGDXS-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss *1	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1 This is the net value at the rated load.

Model SGDXS-		180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [Arms]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	0.25	0.25	0.3	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4
	Control Circuit Power Loss [W]	16	16	19	21	21	28	28
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4
Overvoltage Category		III						

*1 This is the net value at the rated load.

■ Three-Phase, 400 VAC

Model SGDXS-			1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Maximum Applicable Motor Capacity [kW]			0.5	1	1.5	2	3	5	6	7.5	11	15
Continuous Output Current [Arms]			1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Instantaneous Maximum Output Current [Arms]			5.5	8.5	14	21	28	42	55	65	70	85
Main Circuit	Power Supply		380 VAC to 480 VAC, 50 Hz/60 Hz									
	Allowable Voltage Fluctuation		-15% to +10%									
	Input Current [Arms] *1		1.4	2.9	4.3	5.8	8.6	14.5	17.4	21.7	31.8	43.4
Control	Power Supply		24 VDC									
	Allowable Voltage Fluctuation		±15%									
	Input Current [Arms] *1		1.2			1.6			1.7			
Power Supply Capacity [kVA] *1			1.1	2.3	3.5	4.5	7.1	11.7	12.4	14.4	21.9	30.6
Power Loss *1	Main Circuit Power Loss [W]		24.6	46.1	71.3	77.9	109	161	173	219	295	404
	Control Circuit Power Loss [W]		21			25		24	27		30	
	Total Power Loss [W]		45.6	67.1	92.3	103	134	185	200	246	325	434
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	56			33		20	12 *2		10 *3	
		Capacity [W]	70			180			880 *2		1760 *3	
		Allowable Power Consumption [W]	14			28		36	180 *2		350 *3	
	Minimum Allowable External Resistance [Ω]		56			33		20	12		10	
Overvoltage Category			III									

*1 This is the net value at the rated load.
*2 This value is for the optional JUSP-RA30-E regenerative resistor unit.
*3 This value is for the optional JUSP-RA31-E regenerative resistor unit.

■ 540 VDC

Model SGDXS-		1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Maximum Applicable Motor Capacity [kW]		0.5	1	1.5	2	3	5	6	7.5	11	15
Continuous Output Current [Arms]		1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Instantaneous Maximum Output Current [Arms]		5.5	8.5	14	21	28	42	55	65	70	85
Main Circuit	Power Supply	540 VDC to 679 VDC									
	Allowable Voltage Fluctuation	-15% to +10%									
	Input Current [Arms] *1	2	3	5.5	6.8	11	18	19.6	26.2	38.3	47.6
Control	Power Supply	24 VDC									
	Allowable Voltage Fluctuation	±15%									
	Input Current [Arms] *1	1.2			1.6			1.7			
Power Supply Capacity [kVA] *1		1.1	2.3	3.5	4.5	7.1	11.7	12.4	14.4	21.9	30.6
Power Loss *1	Main Circuit Power Loss [W]	24.6	46.1	71.3	77.9	109	161	173	219	295	404
	Control Circuit Power Loss [W]	21			25		24	27		30	
	Total Power Loss [W]	45.6	67.1	92.3	103	134	185	200	246	325	434
Overvoltage Category		III									

*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the servomotor.

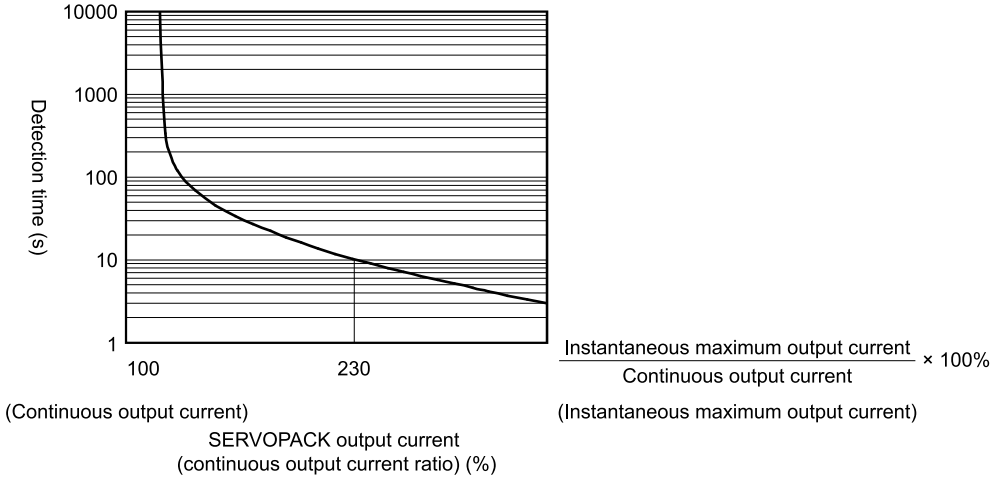


Figure .1 SGDXS-R70A, -R90A, -1R6A, -2R8A

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

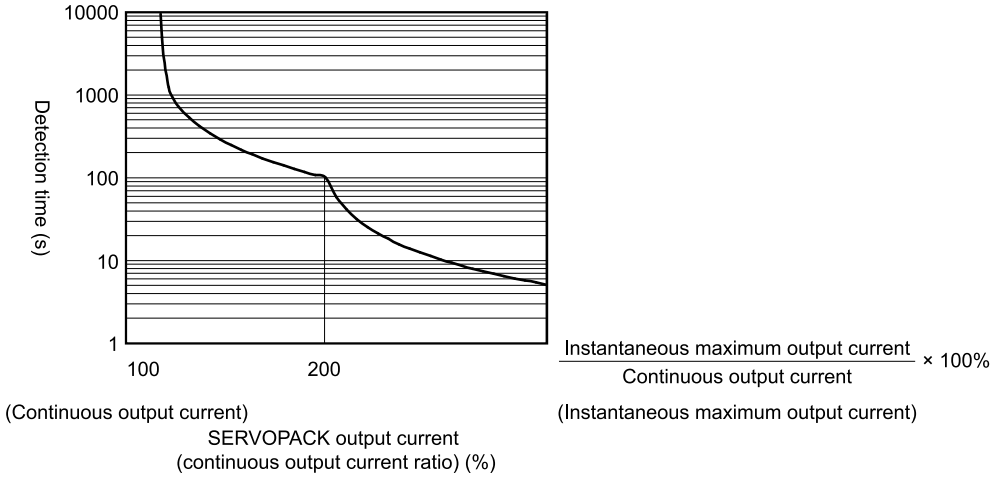


Figure .2 SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 606*
Storage Temperature *1	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20: Models SGDXS-R70A, -R90A, -1R6A, -2R8A, -3R8A, -5R5A, -7R6A, -120A IP10: Models SGDXS-180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude *1	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 606*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

*1 If you combine a Σ-X-series SERVOPACK with a Σ-V-series option module, the following Σ-V-series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1000 m max. Also, the applicable surrounding range cannot be increased by derating.

■ I/O Signals

Item		Specification
Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
Sequence Input Signals	Fixed Input	Allowable voltage range: 5 VDC ±5% Number of input points: 1 (input method: sink inputs or source inputs)
		Input signal: SEN (Absolute Data Request Input) signal
	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 (input method: sink inputs or source inputs)
		Input signals: • /S-ON (Servo ON Input) signal • /P-CON (Proportional Control Input) signal • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /ALM-RST (Alarm Reset Input) signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • /SPD-D (Motor Direction Input) signal • /SPD-A and /SPD-B (Internal Set Speed Selection Input) signals • /C-SEL (Control Selection Input) signal • /ZCLAMP (Zero Clamping Input) signal • /INHIBIT (Reference Pulse Inhibit Input) signal • /G-SEL (Gain Selection Input) signal • /P-DET (Polarity Detection Input) signal • SEN (Absolute Data Request Input) signal • /PSEL (Reference Pulse Input Multiplication Switch Input) Signal • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 (output method: a photocoupler output (isolated))
		Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 6 (3: output method: a photocoupler output (isolated)) (3: output method: an open-collector output (non-isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) signal • /S-RDY (Servo Ready Output) signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /PSELA (Reference Pulse Input Multiplication Switching Output) signal • ALO1, ALO2, and ALO3 (Alarm Code Output) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	RS-422A Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE indicator and five-digit seven-segment display
Panel Operator			Four push switches
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGDXS-470A to -780A and -210D to -370D.)
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions			Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions			Gain tuning, alarm history, program jogging, origin search, etc.
Safety Functions	Inputs		/HWBB1 and /HWBB2: Base block signals for power modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output). *1
	Applicable Standards *2		ISO13849-1 PLe (Category 3) and IEC61508 SIL3

*1 Whether or not you use the EDM1 signal does not affect the performance level of safety parameters.
*2 Always perform risk assessment for the system and confirm that the safety requirements are met.

■ Option

Item	Specification
Applicable Option Modules	Fully-closed module

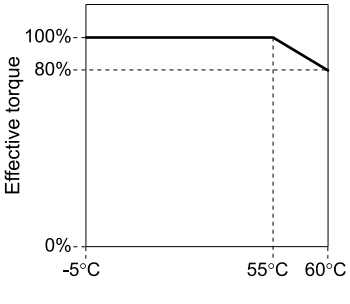
■ Control

Item				Specification
Speed Control	Soft Start Time Setting			0 s to 10 s (Can be set separately for acceleration and deceleration.)
	Input Signal		Reference Voltage	• Maximum input voltage: ±12 V (forward motor rotation for positive reference). • 6 VDC at rated speed (default setting). Input gain setting can be changed.
			Input Impedance	30 kΩ
			Circuit Time Constant	30 μs
	Internal Set Speed Control		Rotation Direction Selection	With /P-CON (Proportional Control Input) signal.
			Speed Selection	With Forward/Reverse External Torque Limit signals (speed 1 to 3 selection). Servomotor stops or another control method is used when both signals are OFF.
Position Control	Feedforward Compensation			0% to 100%
	Output Signal Positioning Completed Width Setting			0 to 1073741824 reference units
	Input Signal	Reference Pulses	Reference Pulse Form	One of the following is selected: Sign + pulse train, CW + CCW pulse trains, and two-phase pulse trains with 90° phase differential
			Input Form	Line driver or open collector
			Maximum Input Frequency	• Line Driver Sign + pulse train or CW + CCW pulse trains: 4 Mpps Two-phase pulse trains with 90° phase differential: 1 Mpps • Open Collector Sign + pulse train or CW + CCW pulse trains: 200 kpps Two-phase pulse trains with 90° phase differential: 200 kpps
			Input Multiplication Switching	1 to 100 times
		Clear Signal		Position deviation clear Line driver or open collector
Torque Control	Input Signal		Reference Voltage	• Maximum input voltage: ±12 V (forward torque output for positive reference). • 3 VDC at rated torque (default setting). Input gain setting can be changed.
			Input Impedance	30 kΩ
			Circuit Time Constant	16 μs

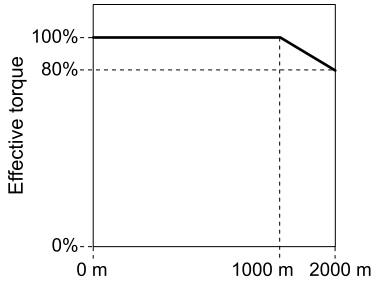
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

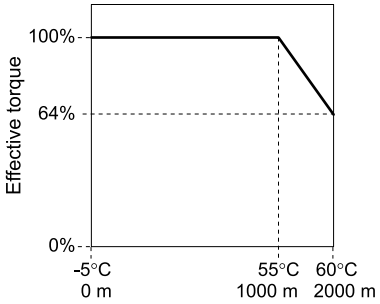
■ SGDXS-R70A, -R90A, -1R6A, -2R8A, -□□□D



Surrounding air temperature

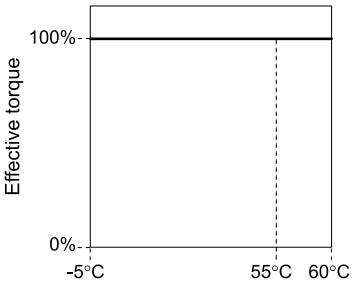


Altitude

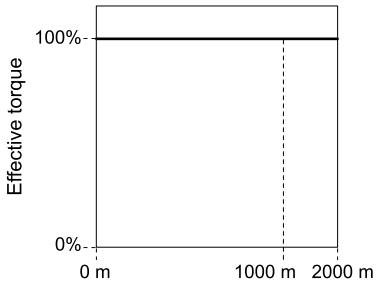


Surrounding air temperature and altitude

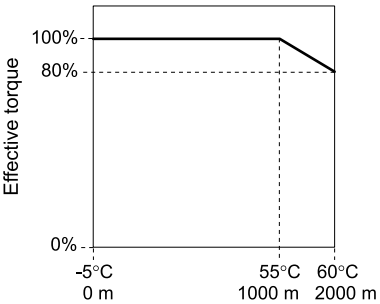
■ SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A



Surrounding air temperature



Altitude



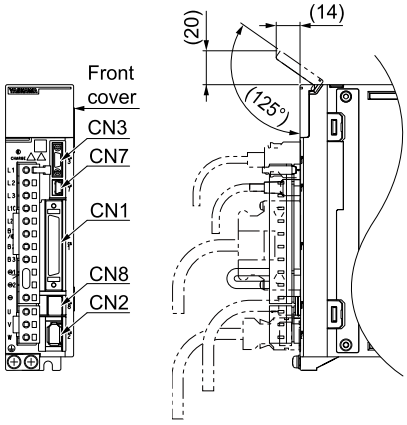
Surrounding air temperature and altitude

External Dimensions

Front Cover Dimensions and Connector Specifications

The connector shapes and pin assignments depend on the interfaces of the SERVOPACK. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10250-52A2PL	50	3M Japan Limited
CN2	53984-0681	6	Molex Japan Co., Ltd.
CN3	HDR-EC14LFDTN-SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
CN7	2342993-1	5	Tyco Electronics Japan G.K.
CN8	2294415-1	8	Tyco Electronics Japan G.K.

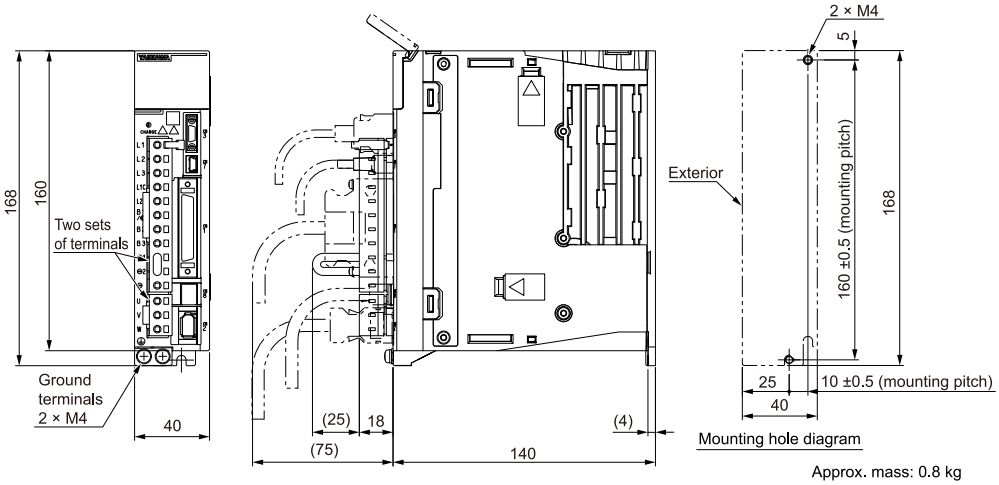
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

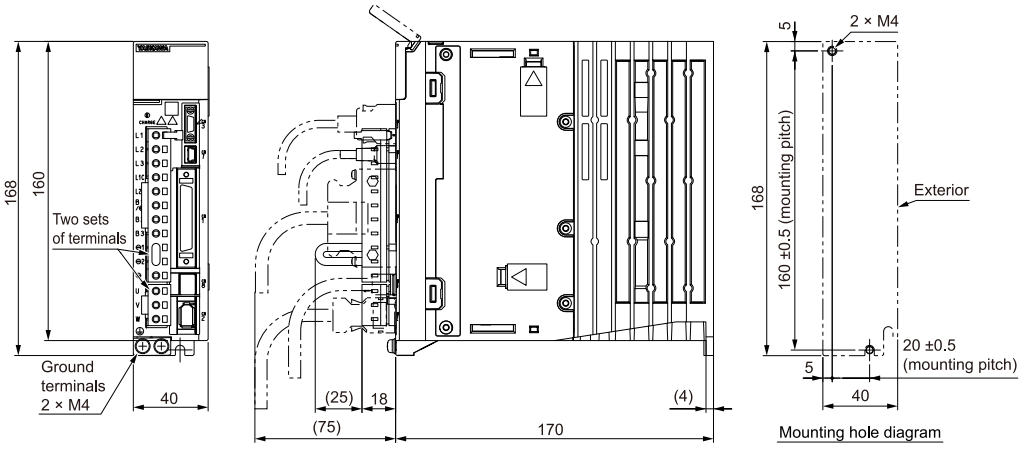
■ Base-mounted SERVOPACKs

◆ SGDXS-R70A, -R90A, -1R6A



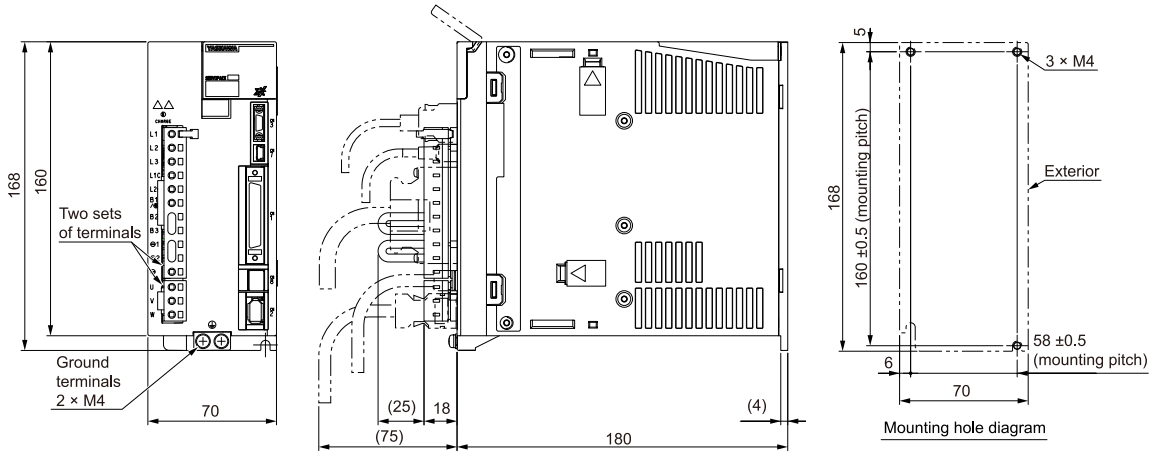
Approx. mass: 0.8 kg
Unit: mm

◆ SGDXS-2R8A



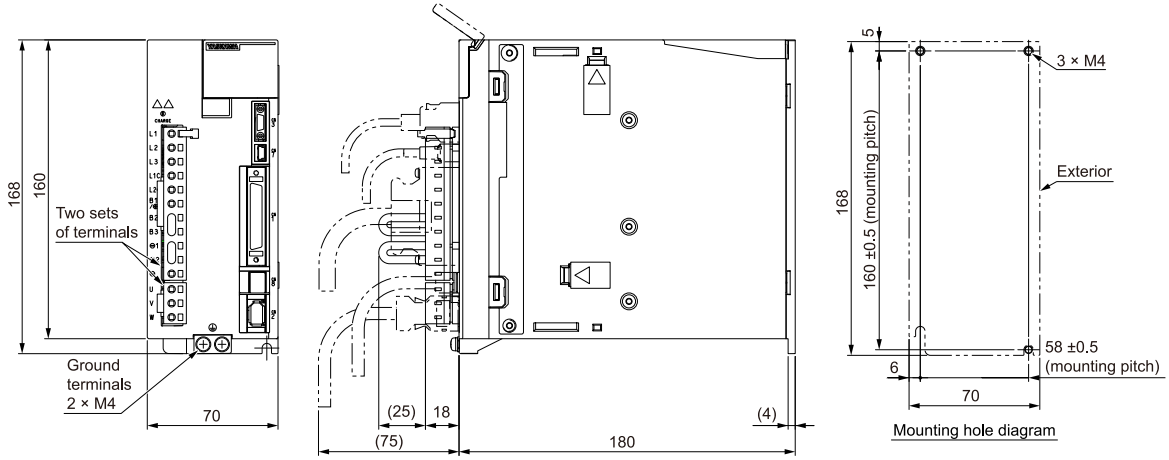
Approx. mass: 1.1 kg
Unit: mm

◆ SGDXS-3R8A



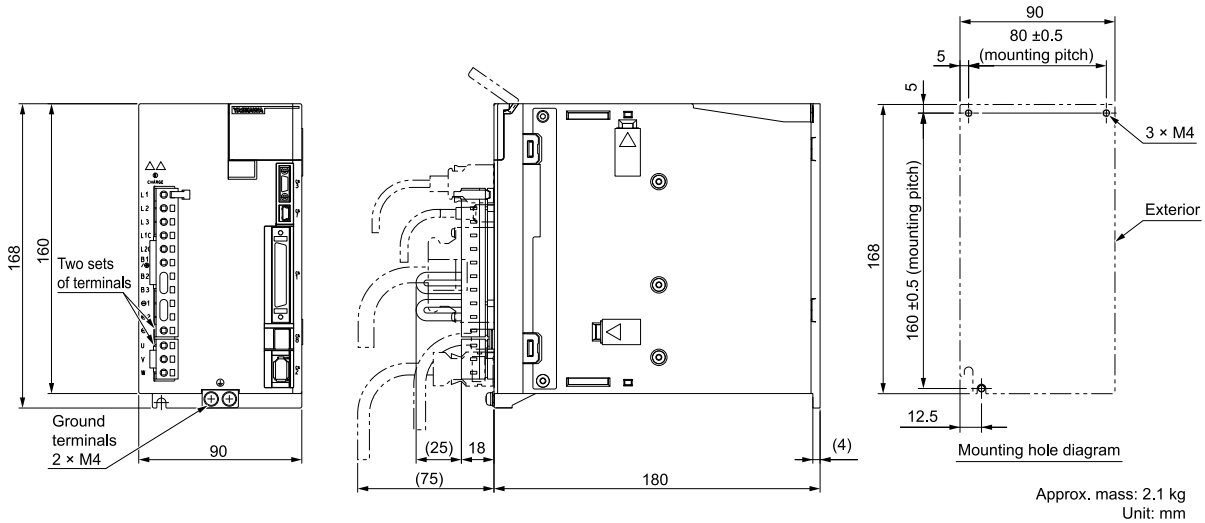
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-5R5A, -7R6A



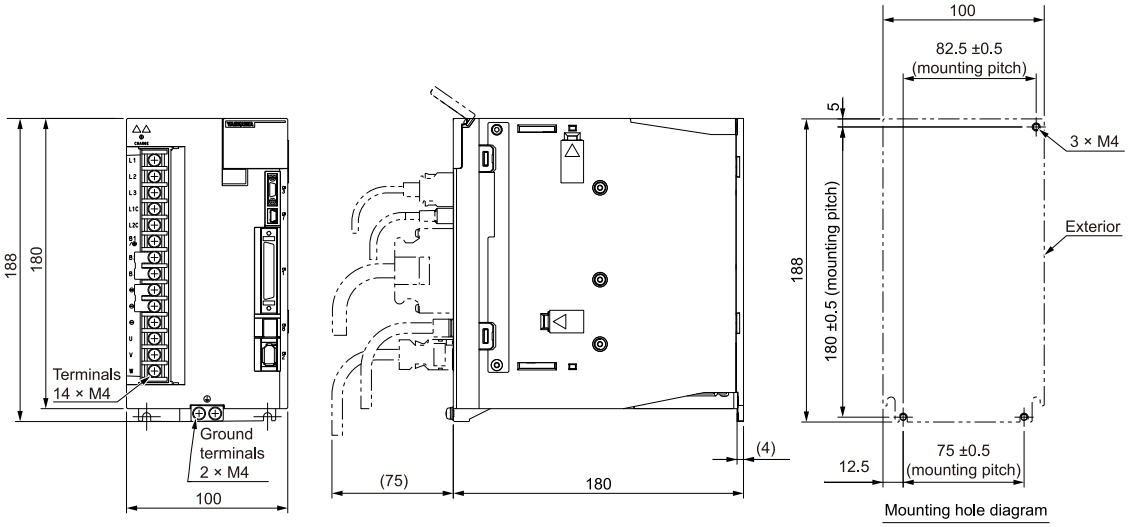
Approx. mass: 1.6 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.1 kg
Unit: mm

◆ SGDXS-180A, -200A

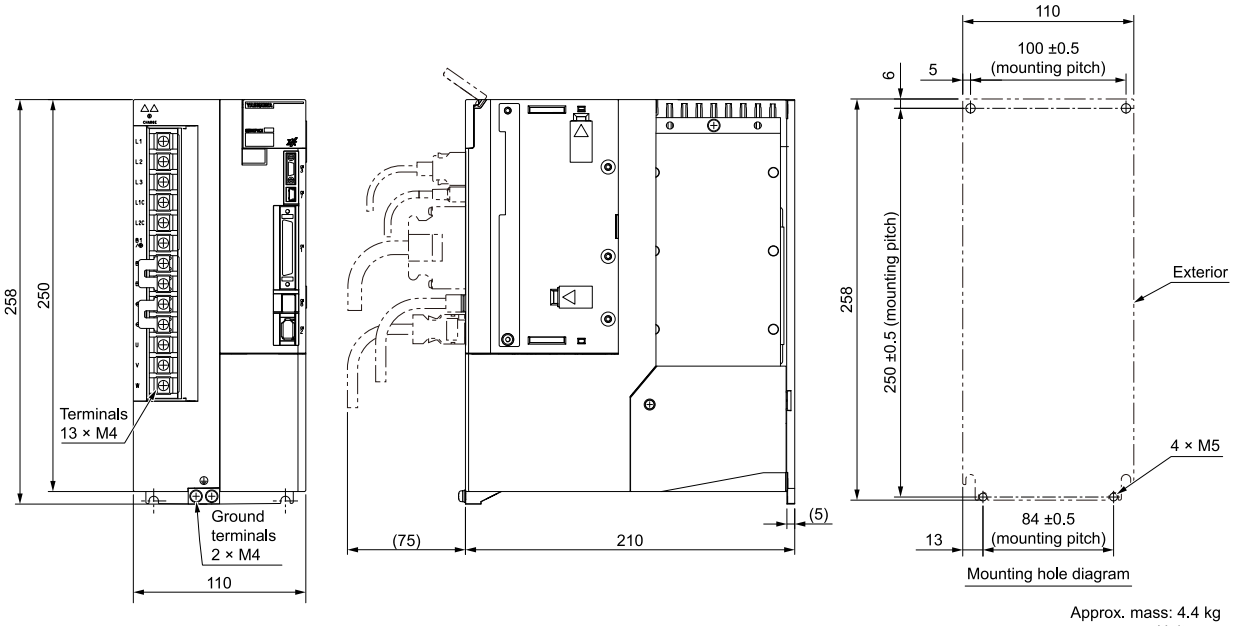


Approx. mass: 2.8 kg
Unit: mm

Note:

These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A

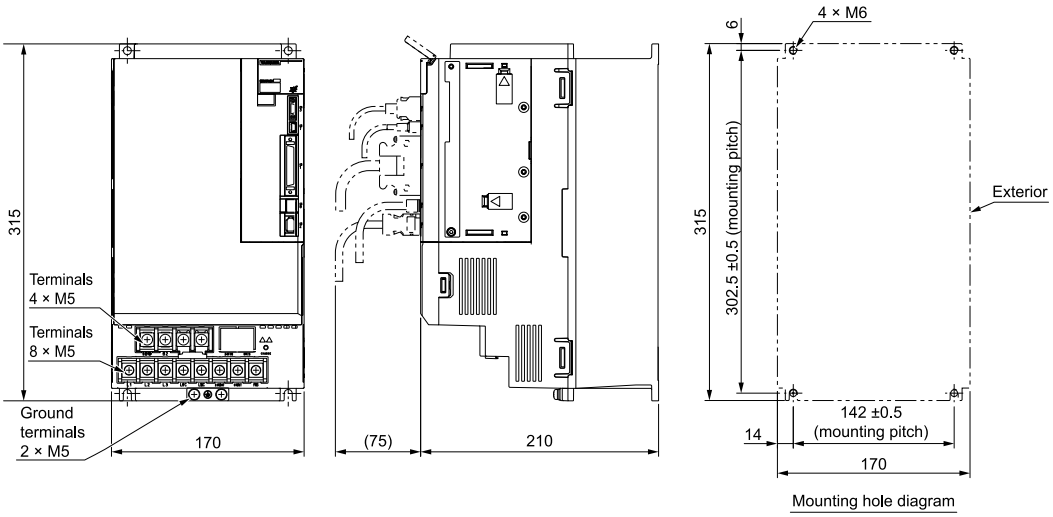


Approx. mass: 4.4 kg
Unit: mm

Note:

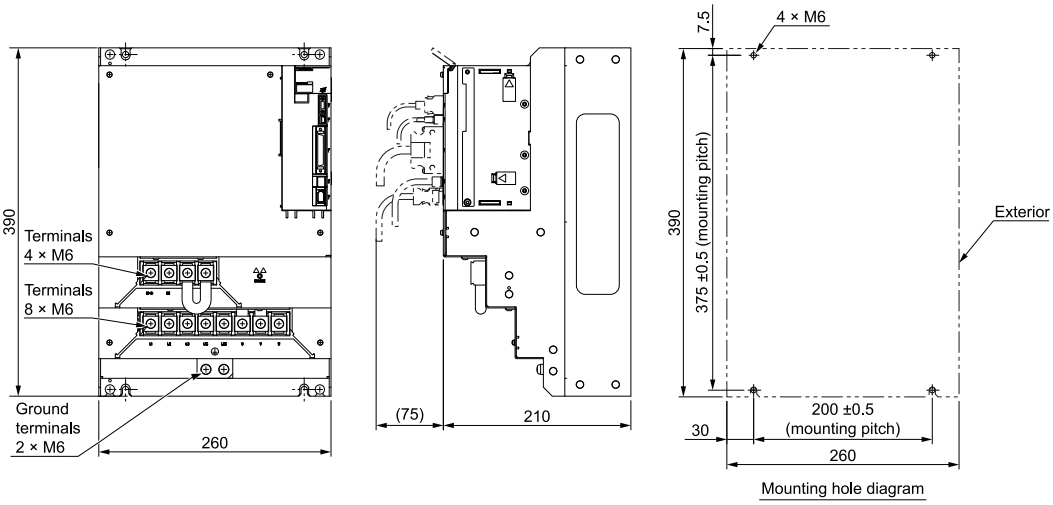
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-470A, -550A



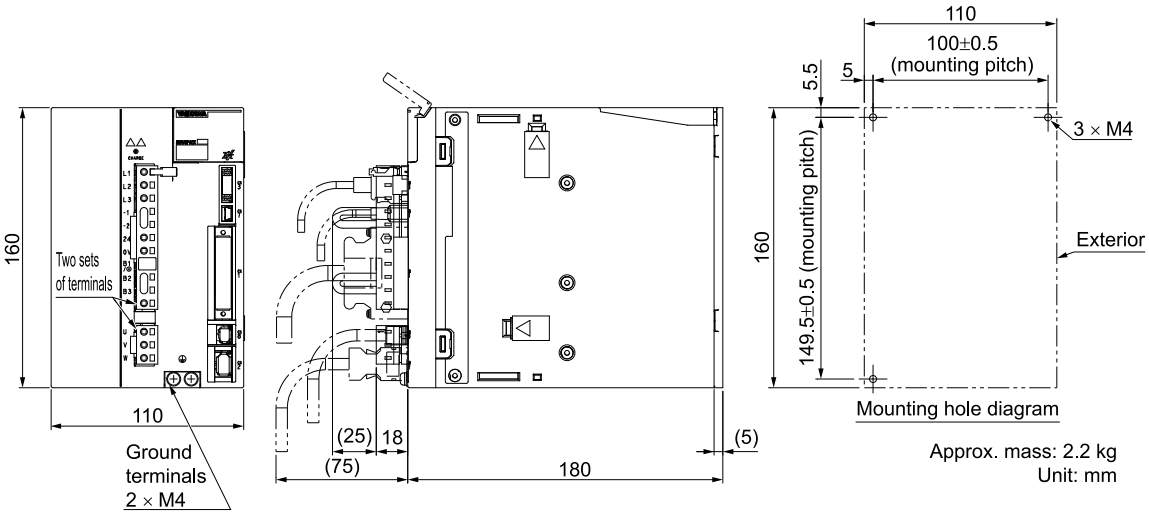
Approx. mass: 9.0 kg
Unit: mm

◆ SGDXS-590A, -780A



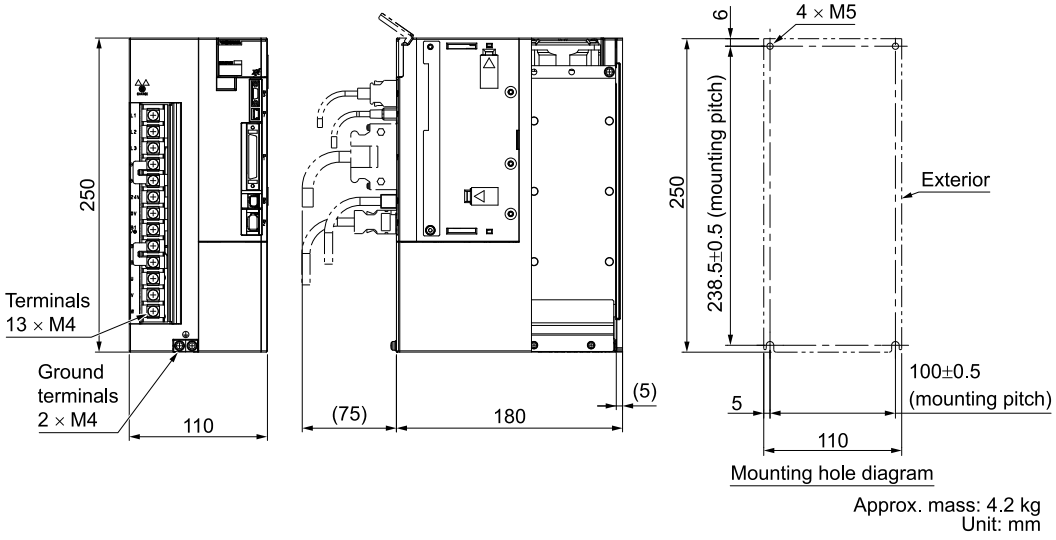
Approx. mass: 16 kg
Unit: mm

◆ SGDXS-1R9D, -3R5D, -5R4D



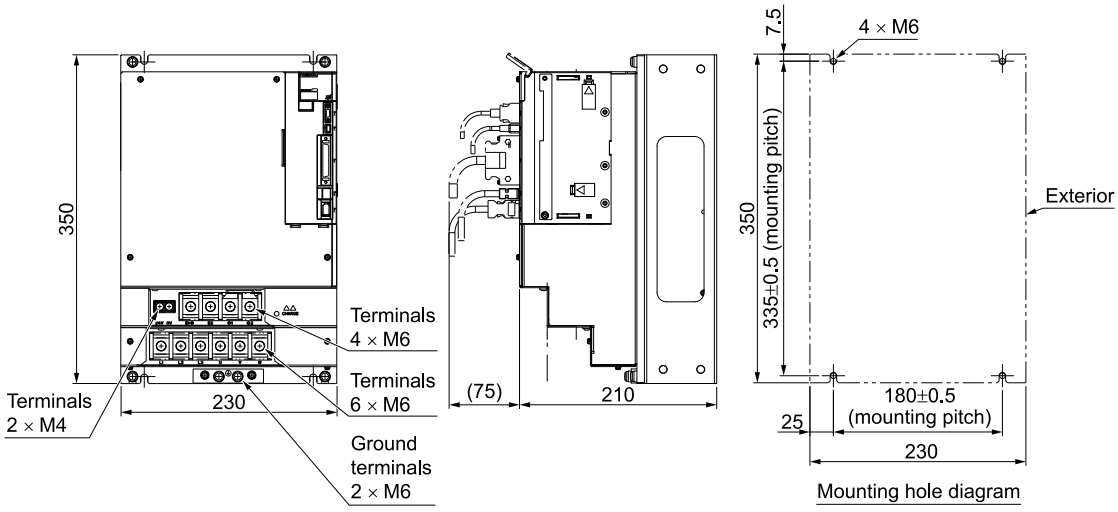
Approx. mass: 2.2 kg
Unit: mm

◆ SGDXS-8R4D, -120D, -170D



Approx. mass: 4.2 kg
Unit: mm

◆ SGDXS-210D, -260D, -280D, -370D

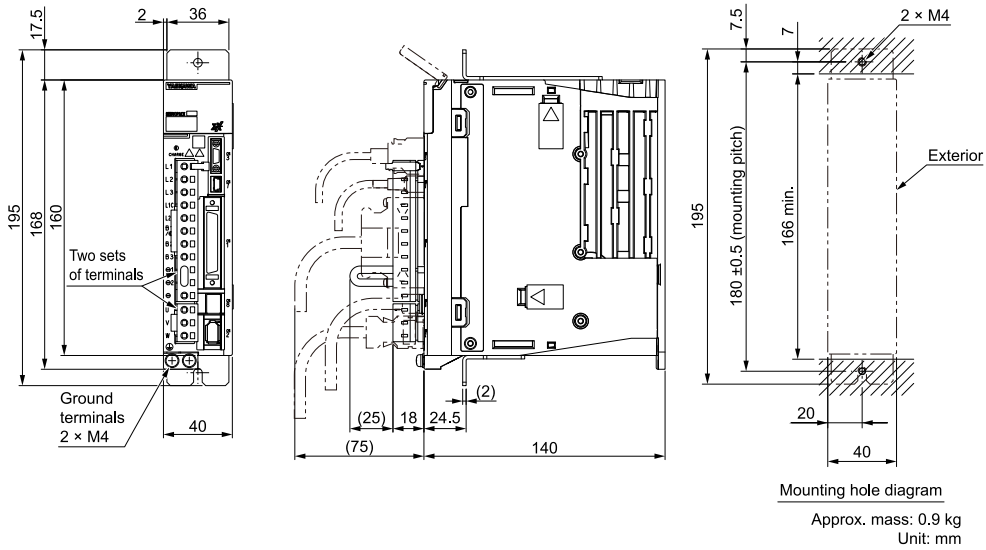


Approx. mass: 12 kg
Unit: mm

■ Rack-mounted SERVOPACKs

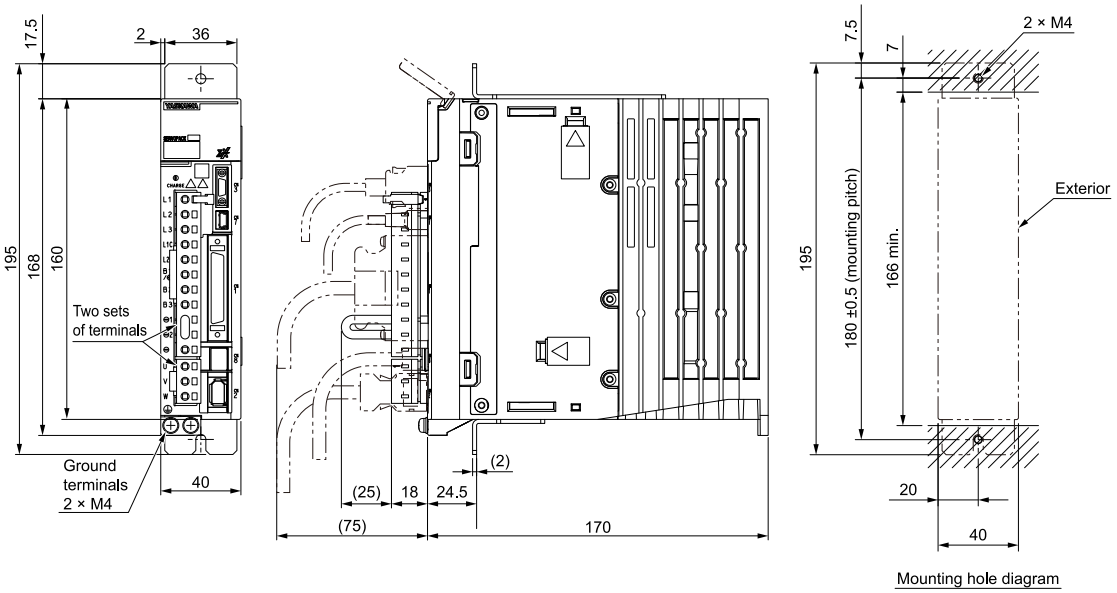
Hardware Option Code: 0001

◆ SGDXS-R70A, -R90A, -1R6A



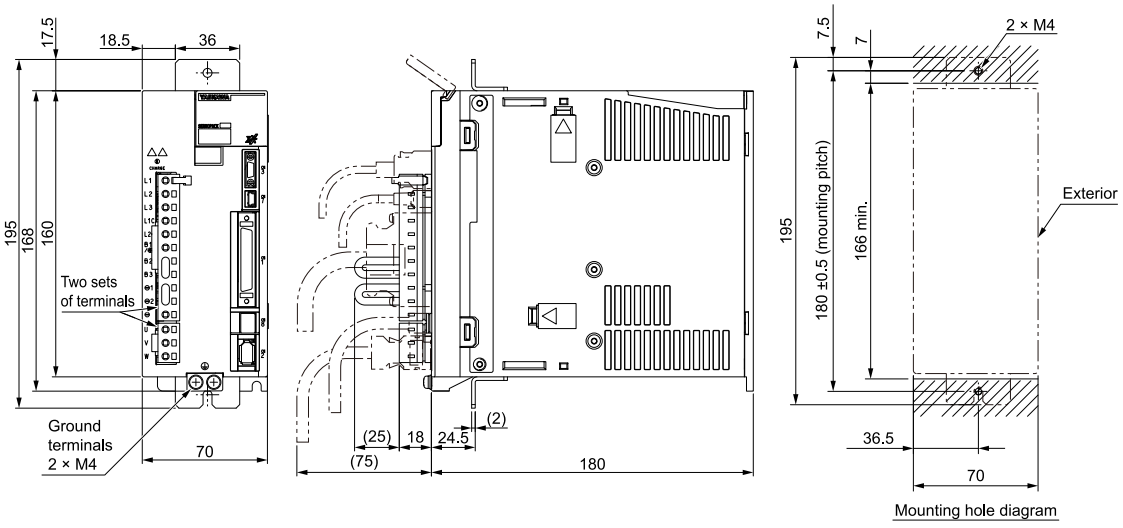
Approx. mass: 0.9 kg
Unit: mm

◆ SGDXS-2R8A



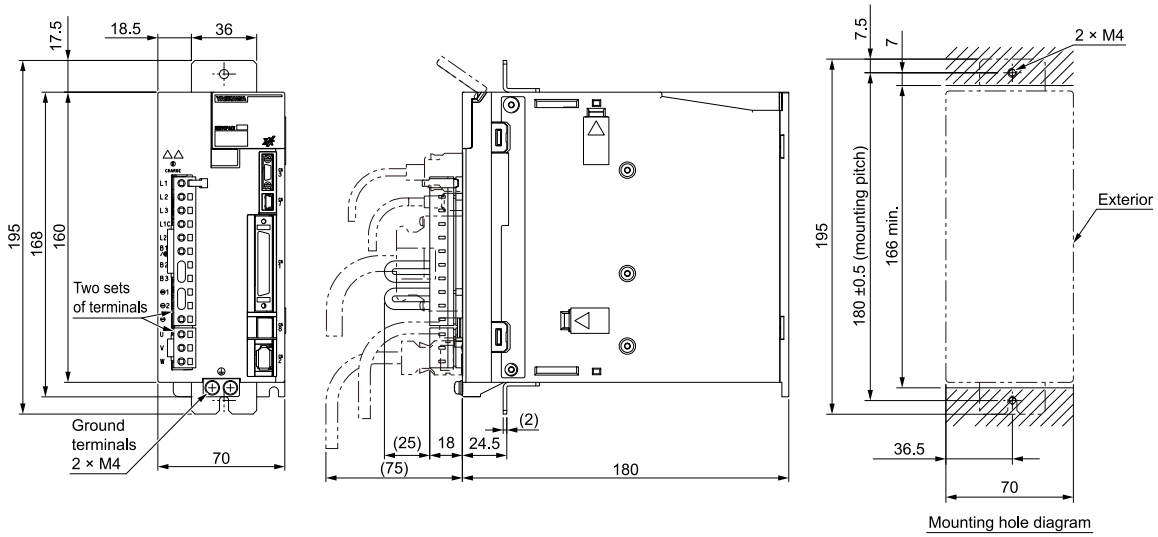
Approx. mass: 1.1 kg
Unit: mm

◆ SGDXS-3R8A



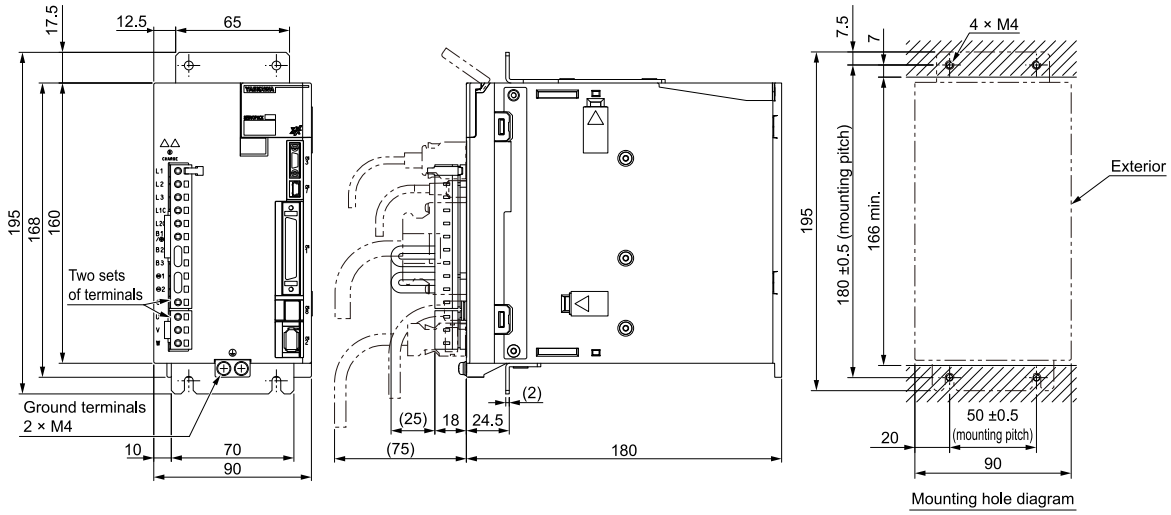
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-5R5A, -7R6A



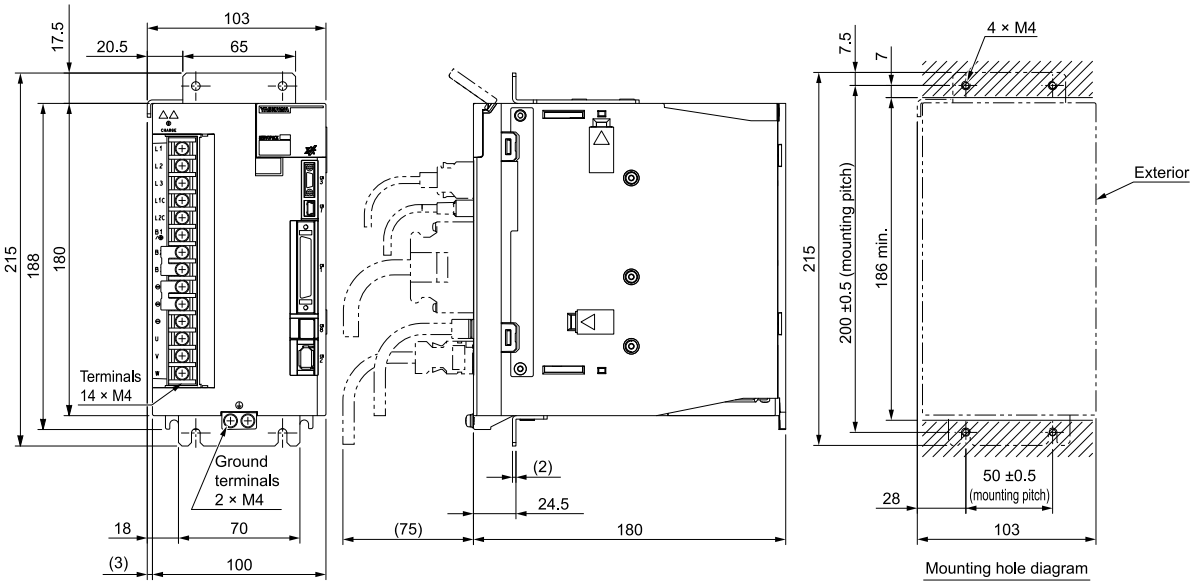
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.2 kg
Unit: mm

◆ SGDXS-180A, -200A

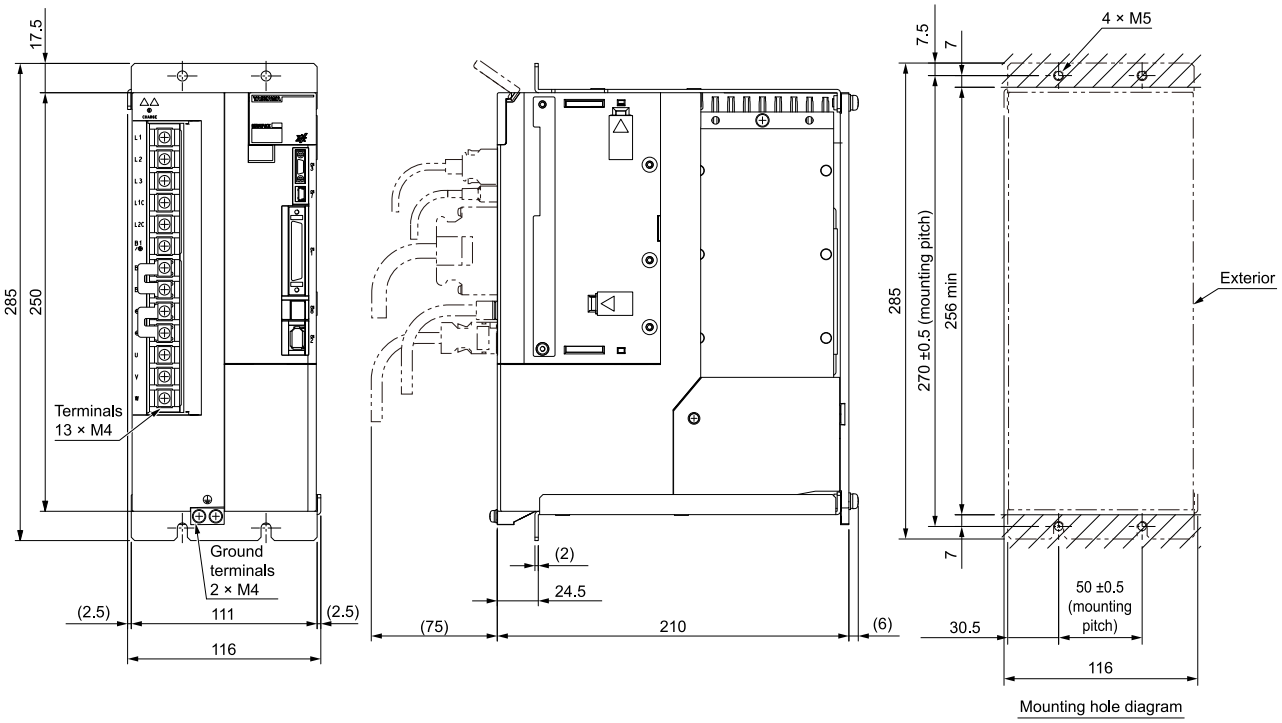


Approx. mass: 2.9 kg
Unit: mm

Note:

These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A

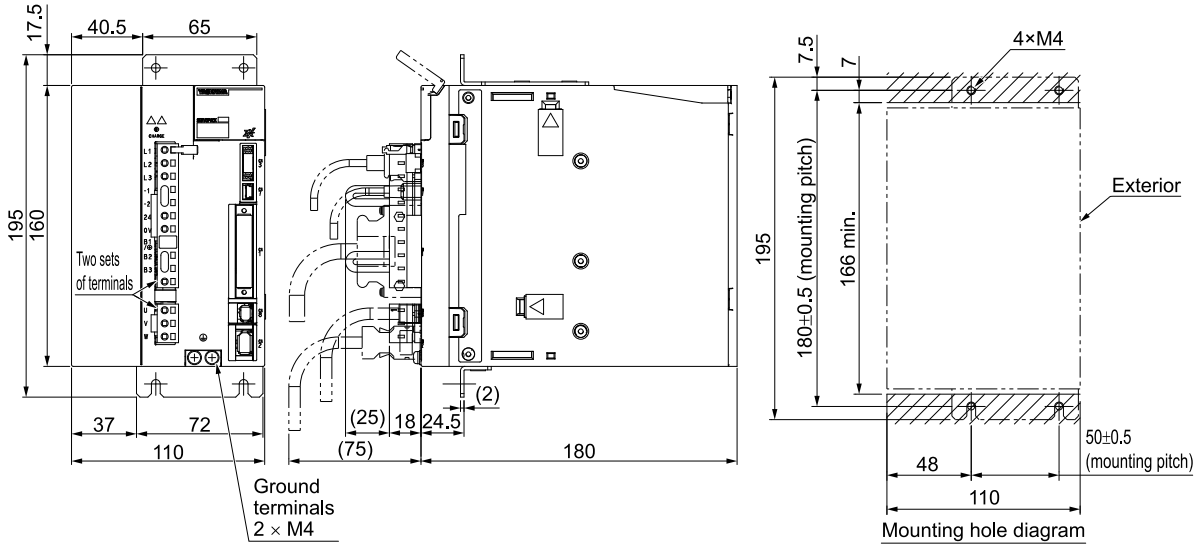


Approx. mass: 4.9 kg
Unit: mm

Note:

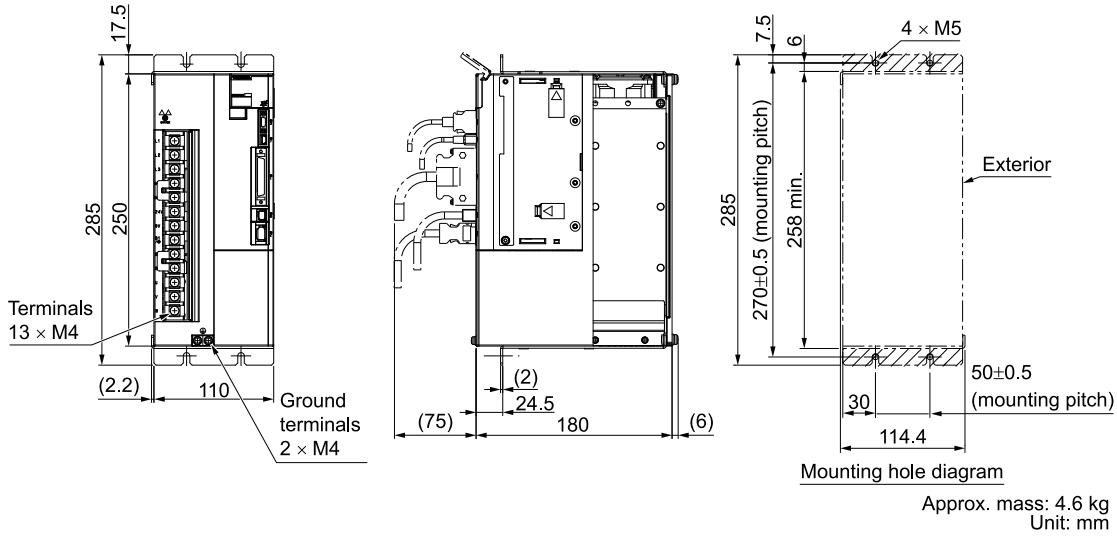
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-1R9D, -3R5D, -5R4D



Approx. mass: 2.3 kg
Unit: mm

◆ SGDXS-8R4D, -120D, -170D

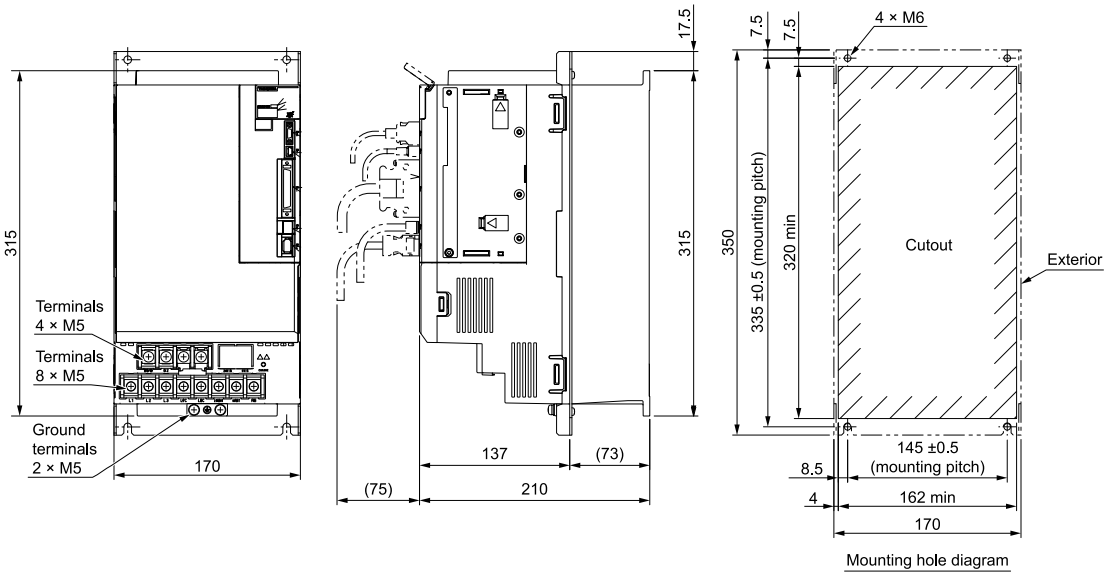


Approx. mass: 4.6 kg
Unit: mm

■ Duct-ventilated SERVOPACKs

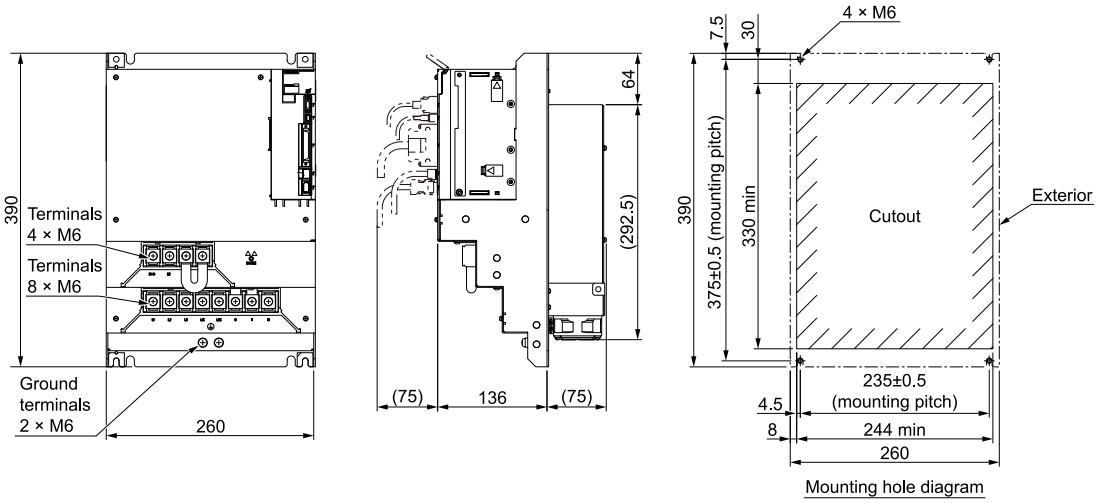
Hardware Option Code: 0001

◆ SGDXS-470A, -550A



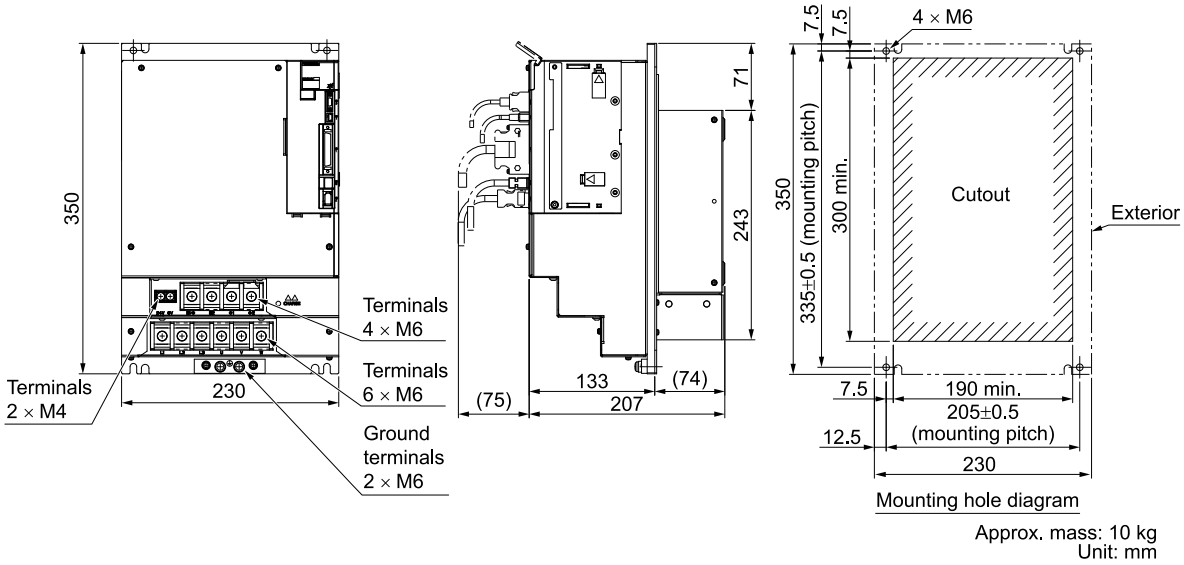
Approx. mass: 9.0 kg
Unit: mm

◆ SGDXS-590A, -780A



Approx. mass: 15 kg
Unit: mm

◆ SGDXS-210D, -260D, -280D, -370D



Approx. mass: 10 kg
Unit: mm

Σ-XS Models with EtherCAT Communications References

Interpreting Model Numbers

Interpreting SERVOPACK Model Numbers

SGDXS - R70 A A0 A 0001 00 B

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

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

Voltage	Code	Specification
Three-Phase, 200 VAC	R70[*1]	0.05 kW
	R90[*1]	0.1 kW
	1R6[*1]	0.2 kW
	2R8[*1]	0.4 kW
	3R8	0.5 kW
	5R5[*1]	0.75 kW
	7R6	1.0 kW
	120[*2]	1.5 kW
	180	2.0 kW
	200	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
	590	11 kW
	780	15 kW
Three-Phase, 400 VAC	1R9	0.5 kW
	3R5	1.0 kW
	5R4	1.5 kW
	8R4	2.0 kW
	120	3.0 kW
	170	5.0 kW
	210	6.0 kW
	260	7.5 kW
	280	11 kW
	370	15 kW

4th digit Voltage

Code	Specification
A	200 VAC
D	400 VAC

5th+6th digits Interface[*3]

Code	Specification
A0	EtherCAT communications reference

7th digit Design Revision Order

A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	SGDXS-R70A to -330A
	Duct-ventilated	SGDXS-470A to -780A
0002	Varnished	All models
0008	Single-phase, 200-VAC power supply input	SGDXS-120A
0020[*4]	No dynamic brake	SGDXS-R70A to -2R8A
	External dynamic brake resistor	SGDXS-3R8A to -780A

12th+13th digits FT Specification

Code	Specification
None	None
00	

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

Non-Stock

*1 You can use these models with either a single-phase or three-phase input.
*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification. (model: SGDXS-120AA0A0008)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

*1 You can use these models with either a single-phase or three-phase input.
*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification. (model: SGDXS-120AA0A0008)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-Phase, 200 VAC

Model SGDXS-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA] *1			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Total Power Loss [W]		17.0	19.0	23.9	34.5	42.5	52.9	63.2	87.6	120.2	130.2	245.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	35	35	20	12	10	6
		Capacity [W]	–	–	–	–	60	60	60	60	60	60	180
		Allowable Power Consumption [W]	–	–	–	–	15	15	15	30	30	30	36
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	35	35	20	12	10	6
Overvoltage Category			III										

*1 This is the net value at the rated load.

Model SGDXS-		470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		6.0	7.5	11	15
Continuous Output Current [Arms]		46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		110	130	140	170
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	29	37	54	73
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]	21	21	28	28
	Total Power Loss [W]	292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	Resistance [Ω]	5 *2	3.13 *3	3.13 *3	3.13 *3
	Capacity [W]	880 *2	1760 *3	1760 *3	1760 *3
	Allowable Power Consumption [W]	180 *2	350 *3	350 *3	350 *3
	Minimum Allowable External Resistance [Ω]	5	2.9	2.9	2.9
Overvoltage Category		III			

*1 This is the net value at the rated load.
*2 This value is for the optional JUSP-RA29-E regenerative resistor unit.
*3 This value is for the optional JUSP-RA05-E regenerative resistor unit.

■ Single-Phase, 200 VAC

Model SGDXS-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation		-15% to +10%					
	Input Current [Arms] *1		0.8	1.6	2.4	5.0	8.7	16 *2
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation		-15% to +10%					
	Input Current [Arms] *1		0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	72.6
	Control Circuit Power Loss [W]		12	12	12	12	14	15
	Total Power Loss [W]		17.0	19.1	24.1	35.7	53.2	87.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	20
		Capacity [W]	–	–	–	–	60	60
		Allowable Power Consumption [W]	–	–	–	–	15	30
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	20
Overvoltage Category			III					

*1 This is the net value at the rated load.
*2 Derate to 12 Arms for UL certification.

■ 270 VDC

Model SGDXS-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss *1	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1 This is the net value at the rated load.

Model SGDXS-		180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [Arms]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	0.25	0.25	0.3	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4
	Control Circuit Power Loss [W]	16	16	19	21	21	28	28
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4
Overvoltage Category		III						

*1 This is the net value at the rated load.

■ Three-Phase, 400 VAC

Model SGDXS-			1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Maximum Applicable Motor Capacity [kW]			0.5	1	1.5	2	3	5	6	7.5	11	15
Continuous Output Current [Arms]			1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Instantaneous Maximum Output Current [Arms]			5.5	8.5	14	21	28	42	55	65	70	85
Main Circuit	Power Supply		380 VAC to 480 VAC, 50 Hz/60 Hz									
	Allowable Voltage Fluctuation		-15% to +10%									
	Input Current [Arms] *1		1.4	2.9	4.3	5.8	8.6	14.5	17.4	21.7	31.8	43.4
Control	Power Supply		24 VDC									
	Allowable Voltage Fluctuation		±15%									
	Input Current [Arms] *1		1.2			1.6			1.7			
Power Supply Capacity [kVA] *1			1.1	2.3	3.5	4.5	7.1	11.7	12.4	14.4	21.9	30.6
Power Loss *1	Main Circuit Power Loss [W]		24.6	46.1	71.3	77.9	109	161	173	219	295	404
	Control Circuit Power Loss [W]		21			25		24	27		30	
	Total Power Loss [W]		45.6	67.1	92.3	103	134	185	200	246	325	434
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	56			33		20	12 *2		10 *3	
		Capacity [W]	70			180			880 *2		1760 *3	
		Allowable Power Consumption [W]	14			28		36	180 *2		350 *3	
	Minimum Allowable External Resistance [Ω]		56			33		20	12		10	
Overvoltage Category			III									

*1 This is the net value at the rated load.
*2 This value is for the optional JUSP-RA30-E regenerative resistor unit.
*3 This value is for the optional JUSP-RA31-E regenerative resistor unit.

■ 540 VDC

Model SGDXS-		1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Maximum Applicable Motor Capacity [kW]		0.5	1	1.5	2	3	5	6	7.5	11	15
Continuous Output Current [Arms]		1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.7	28.1	37.2
Instantaneous Maximum Output Current [Arms]		5.5	8.5	14	21	28	42	55	65	70	85
Main Circuit	Power Supply	540 VDC to 679 VDC									
	Allowable Voltage Fluctuation	-15% to +10%									
	Input Current [Arms] *1	2	3	5.5	6.8	11	18	19.6	26.2	38.3	47.6
Control	Power Supply	24 VDC									
	Allowable Voltage Fluctuation	±15%									
	Input Current [Arms] *1	1.2			1.6			1.7			
Power Supply Capacity [kVA] *1		1.1	2.3	3.5	4.5	7.1	11.7	12.4	14.4	21.9	30.6
Power Loss *1	Main Circuit Power Loss [W]	24.6	46.1	71.3	77.9	109	161	173	219	295	404
	Control Circuit Power Loss [W]	21			25		24	27		30	
	Total Power Loss [W]	45.6	67.1	92.3	103	134	185	200	246	325	434
Overvoltage Category		III									

*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the servomotor.

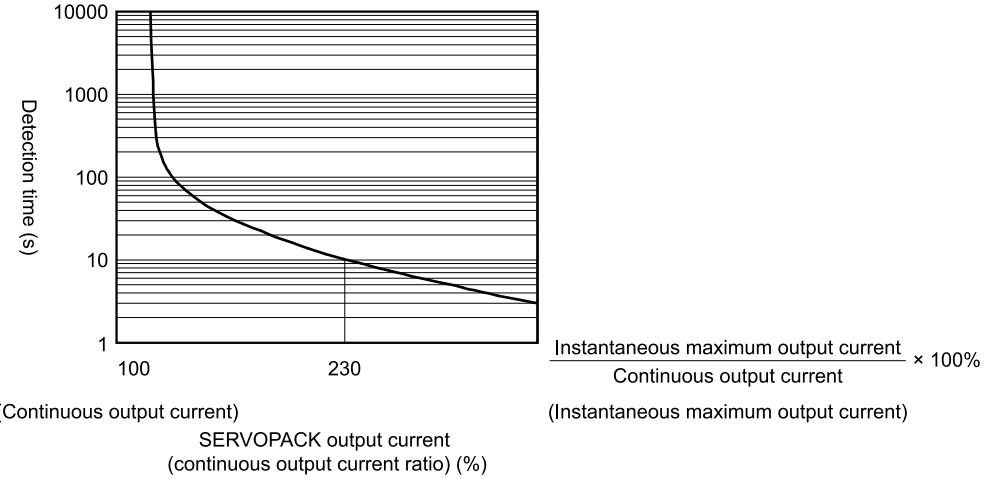


Figure .3 SGDXS-R70A, -R90A, -1R6A, -2R8A

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

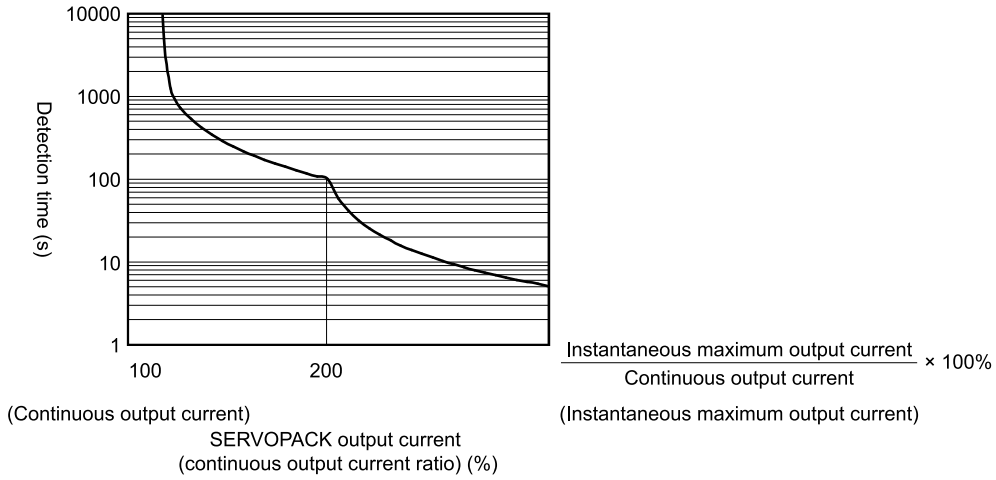


Figure .4 SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 632*
Storage Temperature *1	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20: Models SGDXS-R70A, -R90A, -1R6A, -2R8A, -3R8A, -5R5A, -7R6A, -120A IP10: Models SGDXS-180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.

Continued on next page.

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Item	Specification
Altitude *1	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 632*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

*1 If you combine a Σ-X-series SERVOPACK with a Σ-V-series option module, the following Σ-V-series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1000 m max. Also, the applicable surrounding range cannot be increased by derating.

■ I/O Signals

Item		Specification
Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
Outputs for Triggers at Preset Positions		Number of output points: 3 (output method: a line driver output) Output signals: High-Speed Output Signal for Triggers at Preset Positions 1 to 3 (HSO1 to 3) **Note:** Normal Output Signal for Triggers at Preset Positions 1 to 3 (/NSO1 to 3) are used by allocating the signals to sequence output signals.
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /Probe1 (Probe 1 Latch Input) signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.

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Item		Specification
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 (output method: a photocoupler output (isolated))
		Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) signal • /S-RDY (Servo Ready Output) Signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /NSO1 to 3 (Normal Output for Triggers at Preset Positions 1 to 3) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, RUN, ERR, L/A A, L/A B, and one-digit seven-segment LED
EtherCAT Communications Setting Switches			ID Selector (S1 and S2) positions: 16
EtherCAT Communications	Applicable Communications Standards		IEC 61158 Type 12, IEC 61800-7 CiA402 drive profile
	Physical Layer		100BASE-TX (IEEE802.3)
	Communications Connectors		CN6A (RJ45): ETHERCAT IN (EtherCAT input signal side) CN6B (RJ45): ETHERCAT OUT (EtherCAT output signal side)
	Cable		Category 5, 4 shielded twisted pairs The cable is automatically detected with AUTO MDIX.
	SyncManager		SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU		FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)		APRD, APWR, APRW, FPRD, FPWR, FPRW, BRD, BWR, BRW, LRD, LWR, LRW, ARMW, FRMW
	Process Data		Assignments can be changed with PDO mapping.
	Mailbox		Emergency messages, SDO requests, SDO responses
	Distributed Clocks		Free-run mode and DC mode (can be switched.) Applicable DC cycles: 62.5 µs to 4 ms in 62.5-µs increments
	Slave Information IF		4 KB
	LED Indicator		During EtherCAT communications: L/A x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile			• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA

Continued on next page.

Continued from previous page.

Item		Specification
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGDXS-470A to -780A and -210D to -370D.)
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions		Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions		Gain tuning, alarm history, program jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for power modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output). *1
	Applicable Standards *2	ISO13849-1 PLe (Category 3) and IEC61508 SIL3

*1 Whether or not you use the EDM1 signal does not affect the performance level of safety parameters.
*2 Always perform risk assessment for the system and confirm that the safety requirements are met.

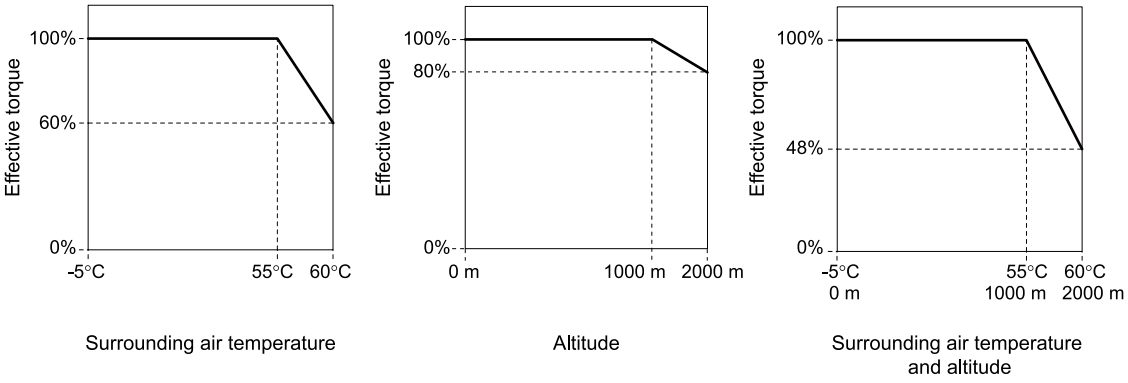
■ Option

Item	Specification
Applicable Option Modules	Fully-closed module

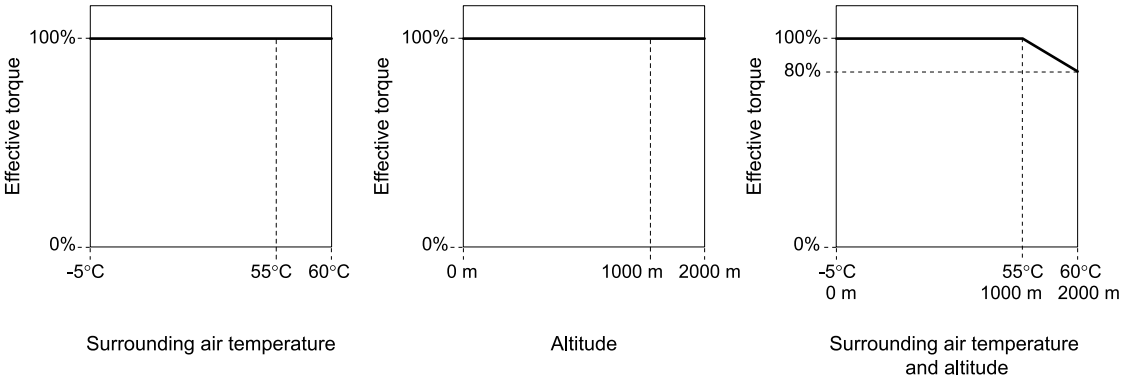
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

■ SGDXS-R70A, -R90A, -1R6A, -2R8A



■ SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A

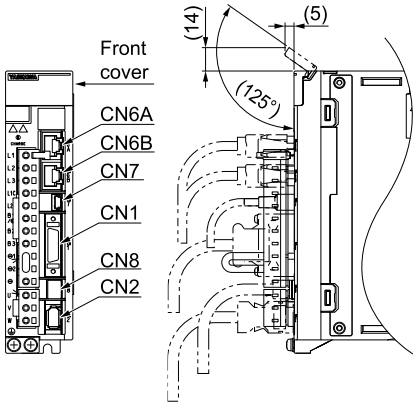


External Dimensions

Front Cover Dimensions and Connector Specifications

The connector shapes and pin assignments depend on the interfaces of the SERVOPACK. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10226-59A3MB	26	3M Japan Limited
CN2	53984-0681	6	Molex Japan Co., Ltd.
CN6A/B	3-1734579-4	8	Tyco Electronics Japan G.K.
CN7	2342993-1	5	Tyco Electronics Japan G.K.
CN8	2294415-1	8	Tyco Electronics Japan G.K.

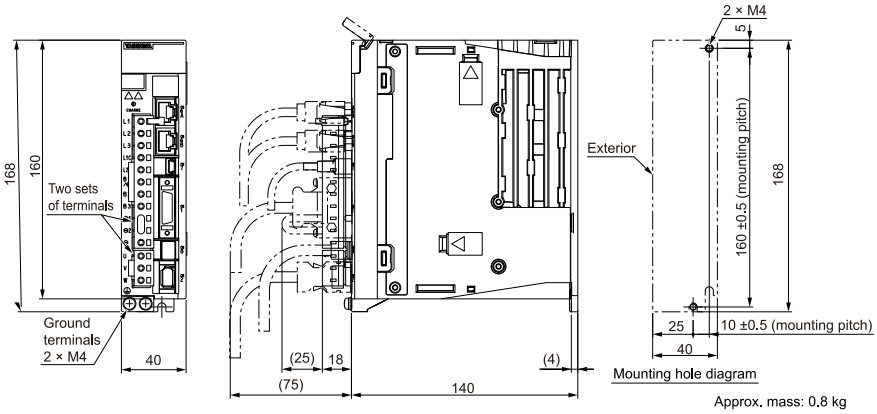
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

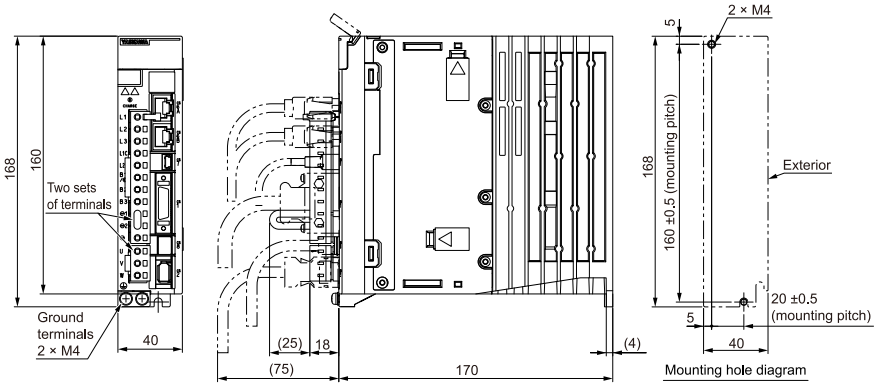
■ Base-mounted SERVOPACKs

◆ SGDXS-R70A, -R90A, -1R6A



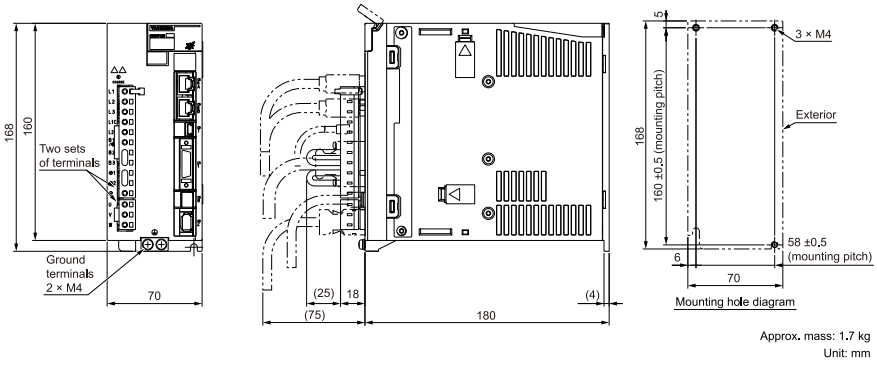
Approx. mass: 0.8 kg
Unit: mm

◆ SGDXS-2R8A



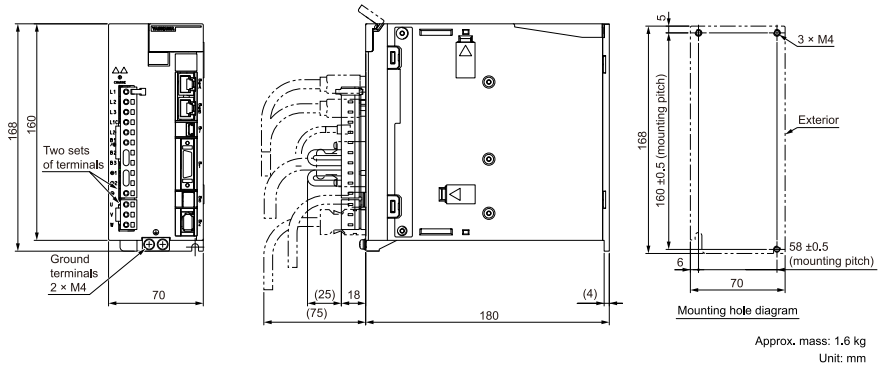
Approx. mass: 1.1 kg
Unit: mm

◆ SGDXS-3R8A



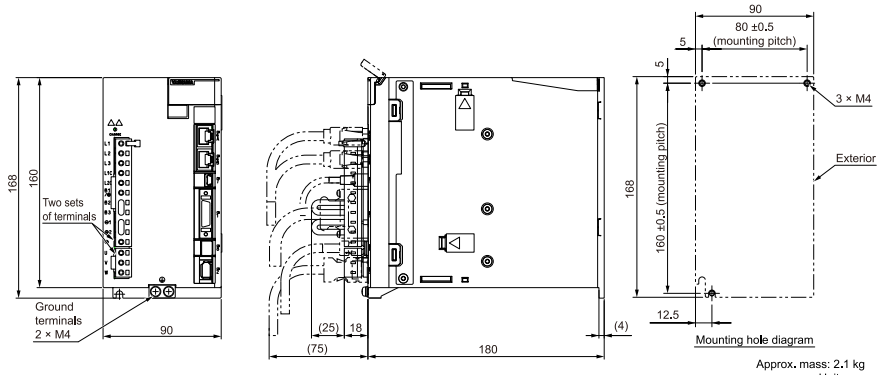
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-5R5A, -7R6A



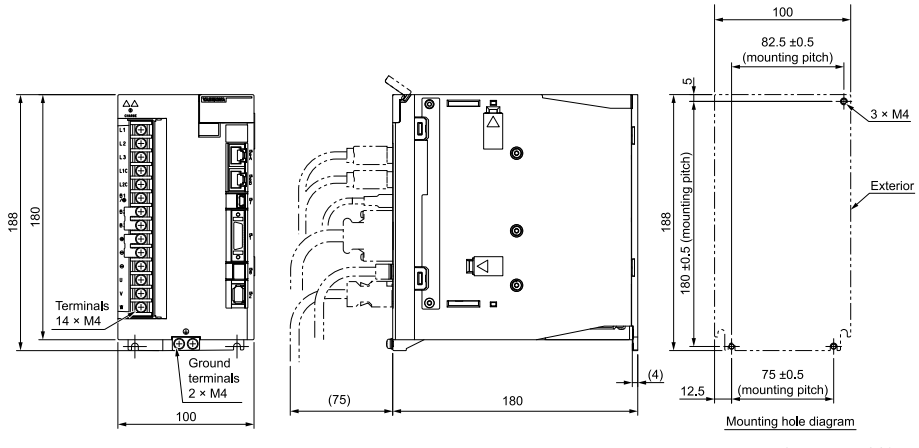
Approx. mass: 1.6 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.1 kg
Unit: mm

◆ SGDXS-180A, -200A

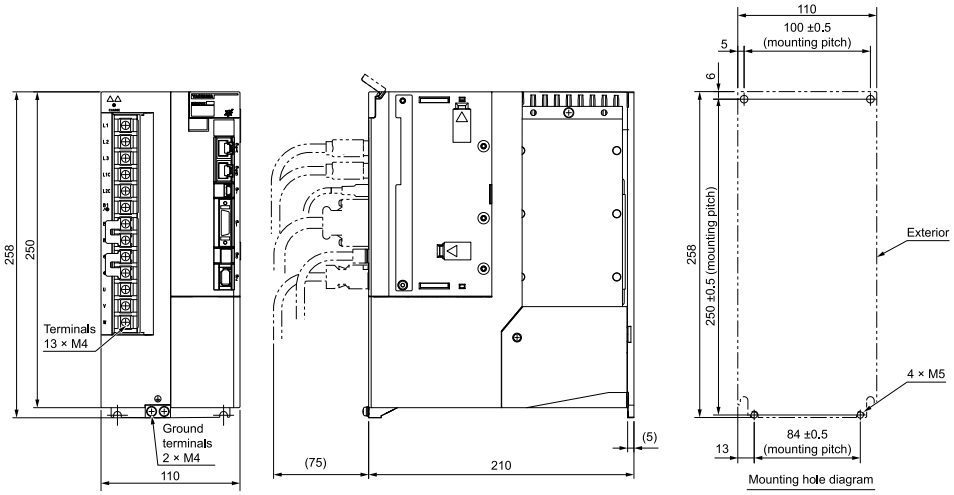


Approx. mass: 2.8 kg
Unit: mm

Note:

These drawings show the SERVOPACK with the terminal cover removed.

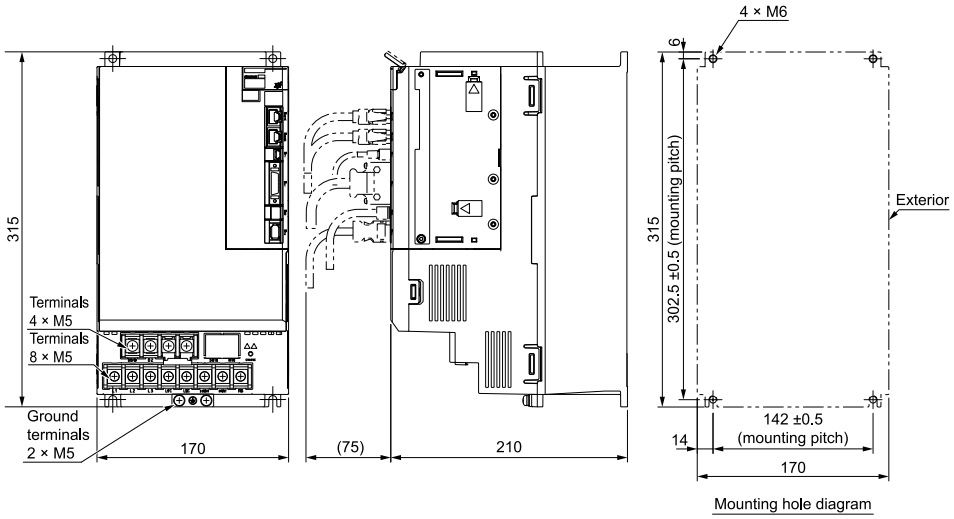
◆ SGDXS-330A



Approx. mass: 4.4 kg
Unit: mm

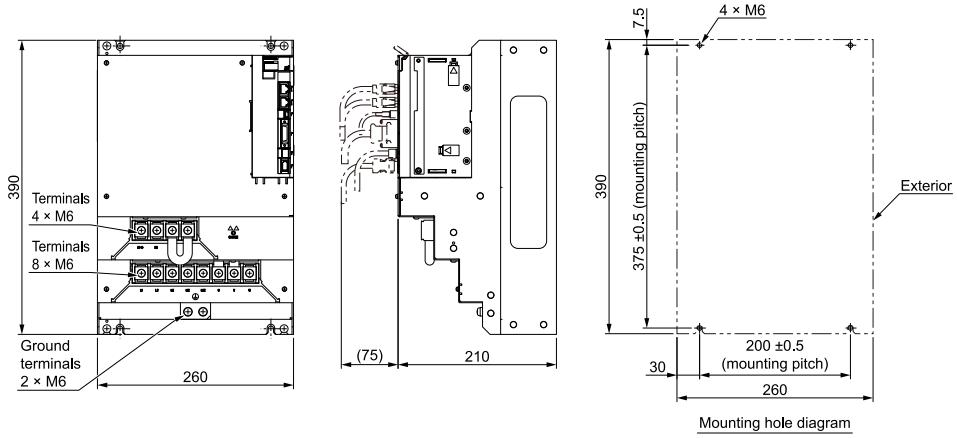
Note:
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-470A, -550A



Approx. mass: 9.0 kg
Unit: mm

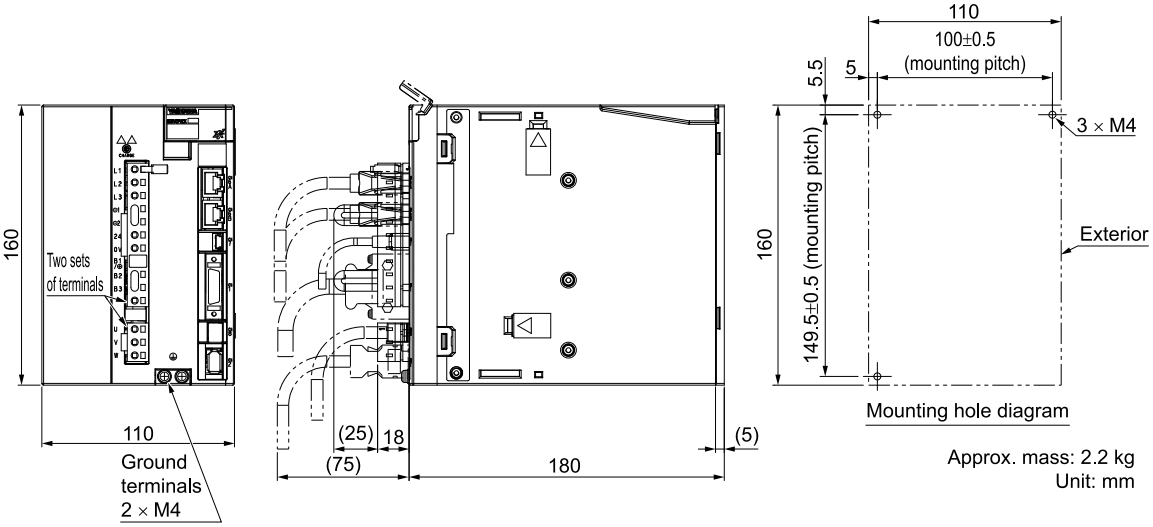
◆ SGDXS-590A, -780A



Mounting hole diagram

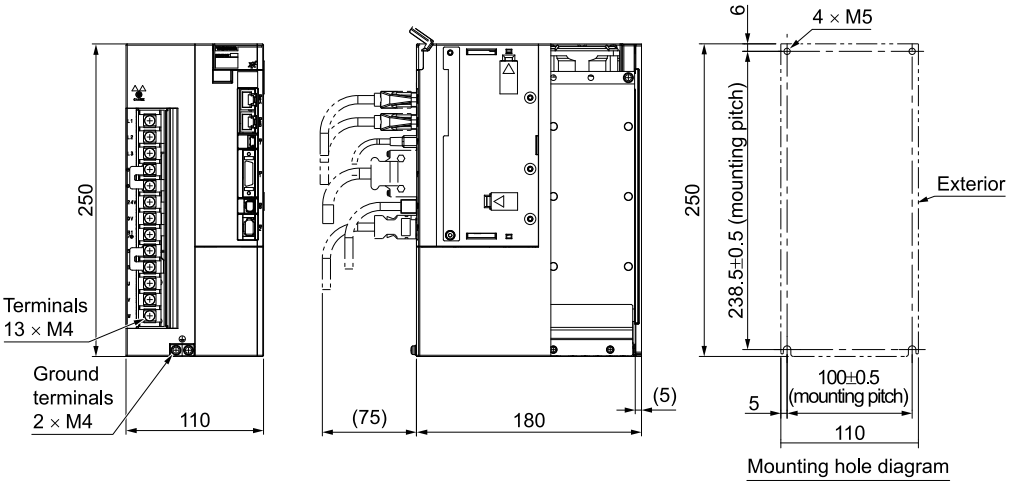
Approx. mass: 16 kg
Unit: mm

◆ SGDXS-1R9D, -3R5D, -5R4D



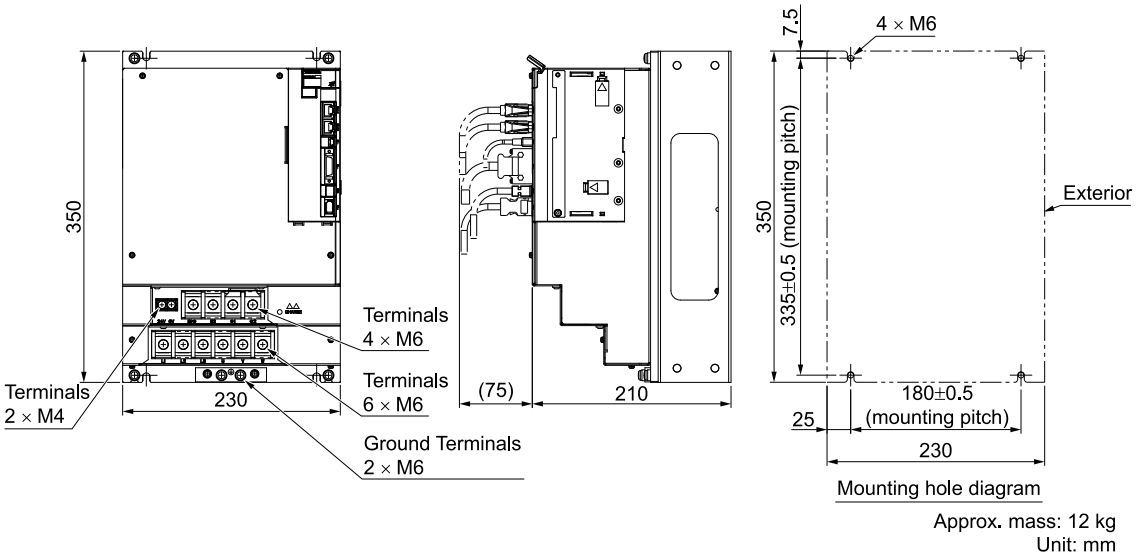
Approx. mass: 2.2 kg
Unit: mm

◆ SGDXS-8R4D, -120D, -170D



Approx. mass: 4.2 kg
Unit: mm

◆ SGDXS-210D, -260D, -280D, -370D

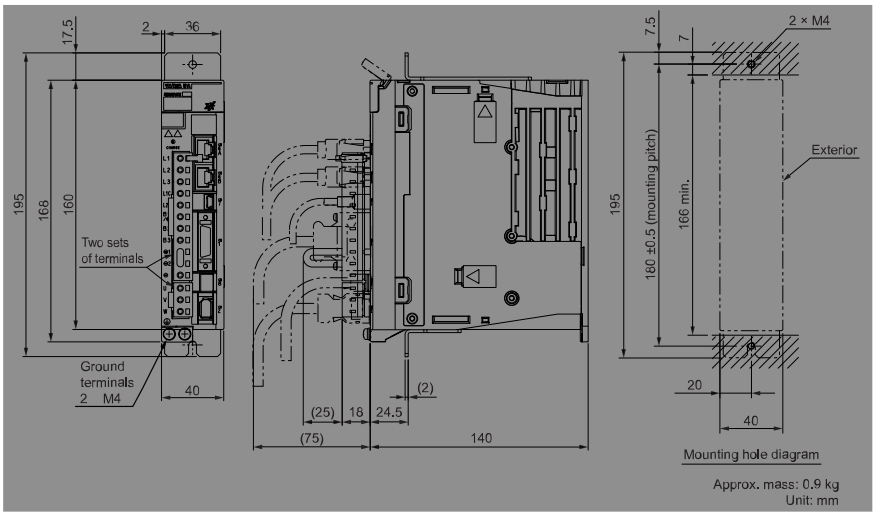


Approx. mass: 12 kg
Unit: mm

■ Rack-mounted SERVOPACKs

Hardware Option Code: 0001

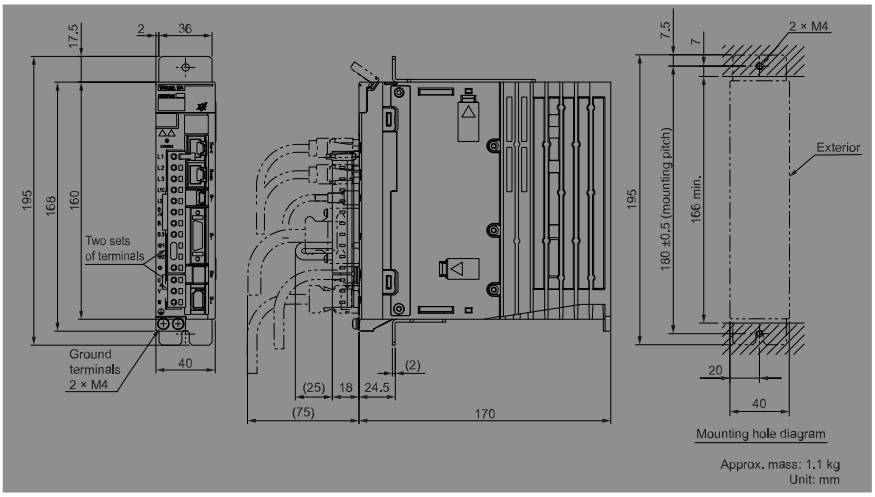
◆ SGDXS-R70A, -R90A, -1R6A



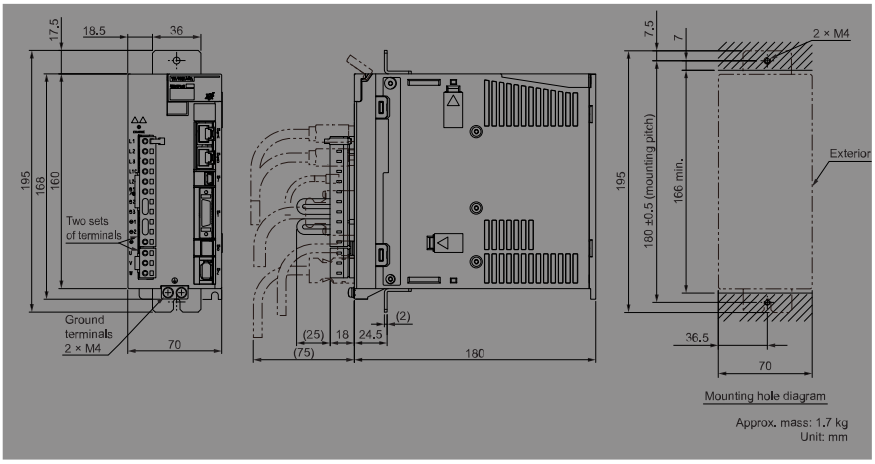
Approx. mass: 0.9 kg
Unit: mm

Non-Stock

◆ SGDXS-2R8A

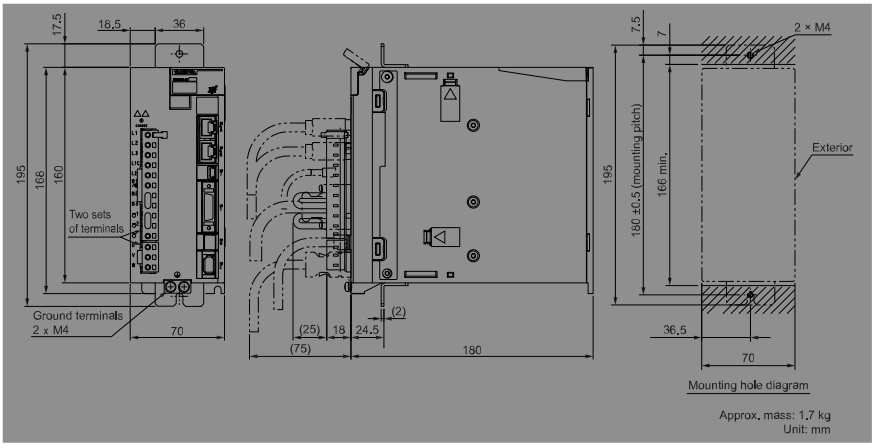


◆ SGDXS-3R8A

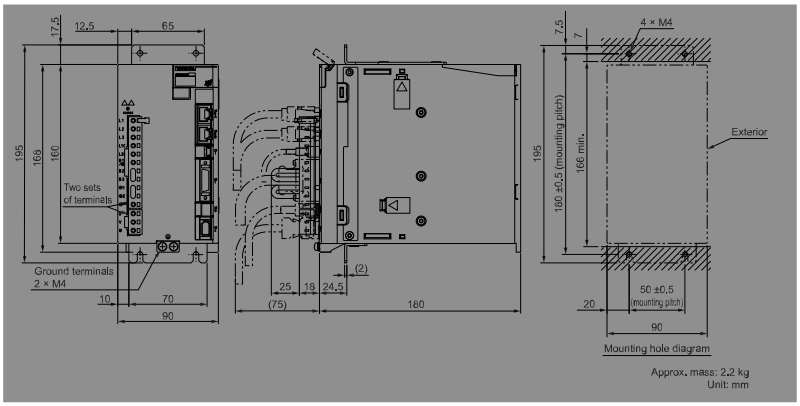


Non-Stock

◆ SGDXS-5R5A, -7R6A

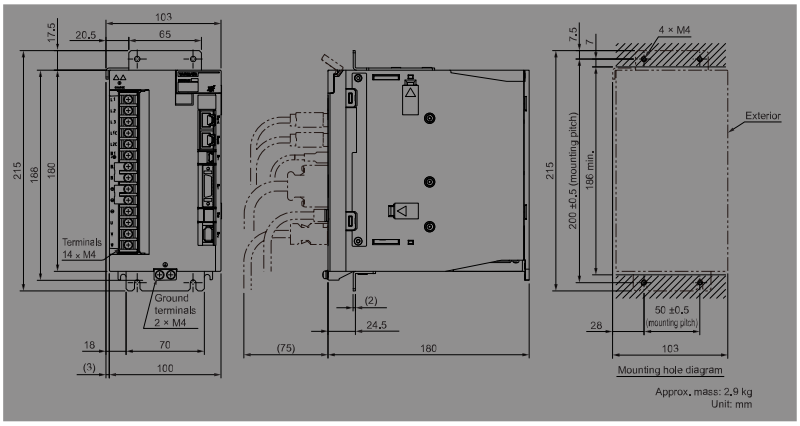


◆ SGDXS-120A



Non-Stock

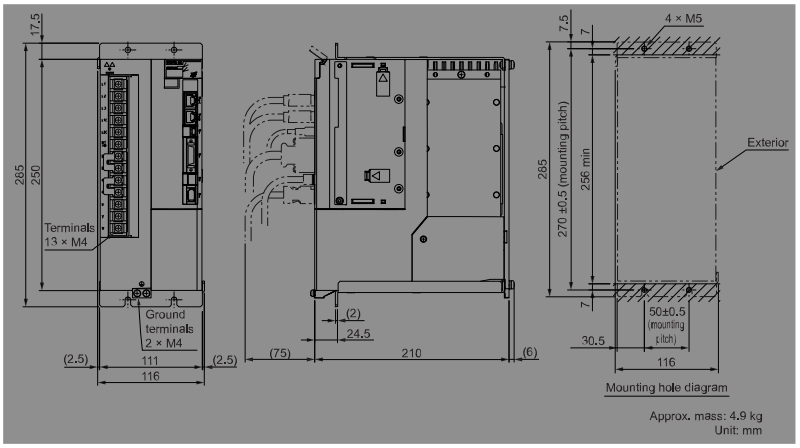
◆ SGDXS-180A, -200A



Note:

These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A

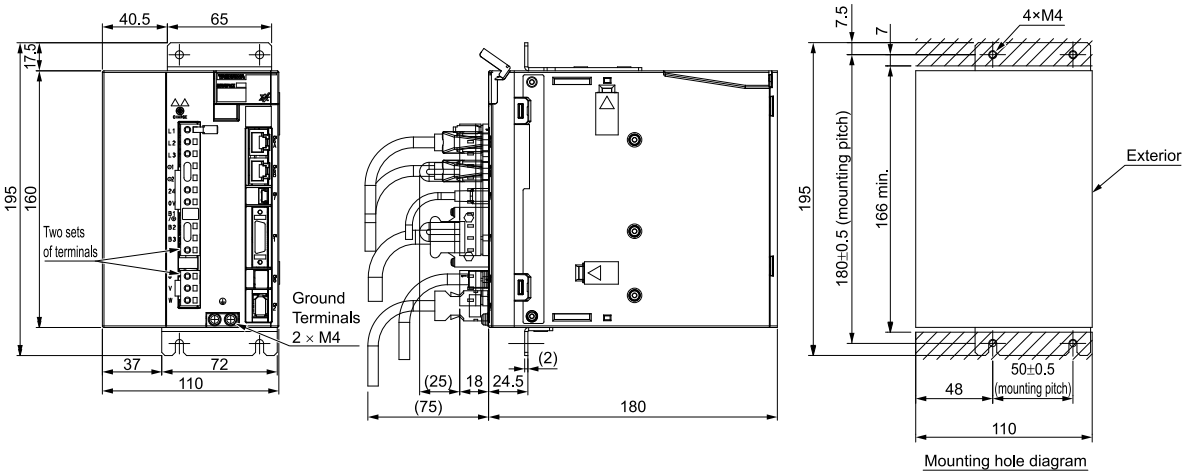


Non-Stock

Note:

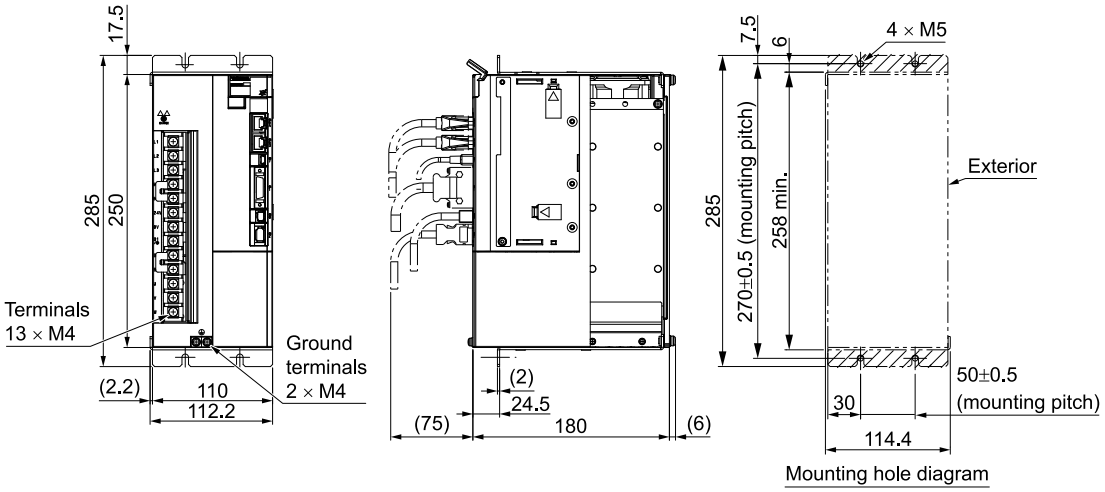
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-1R9D, -3R5D, -5R4D



Approx. mass: 2.3 kg
Unit: mm

◆ SGDXS-8R4D, -120D, -170D

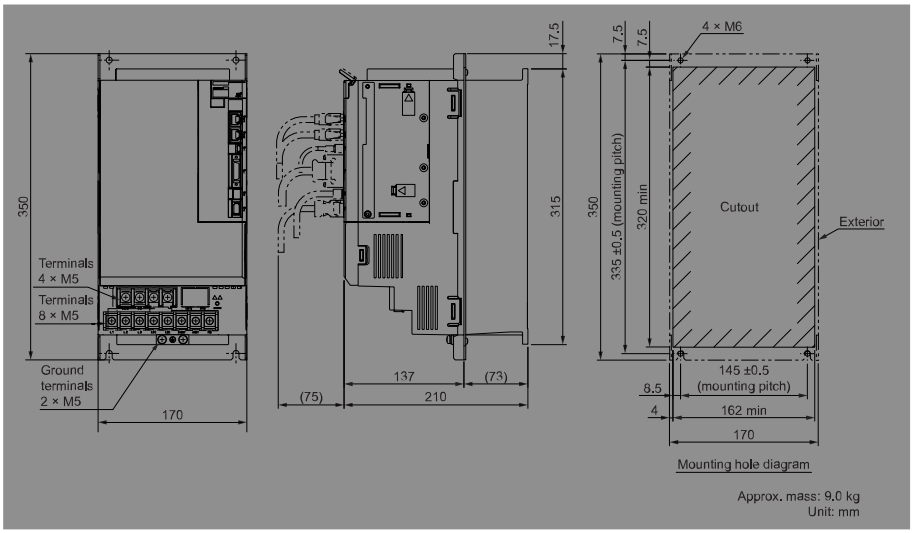


Approx. mass: 4.6 kg
Unit: mm

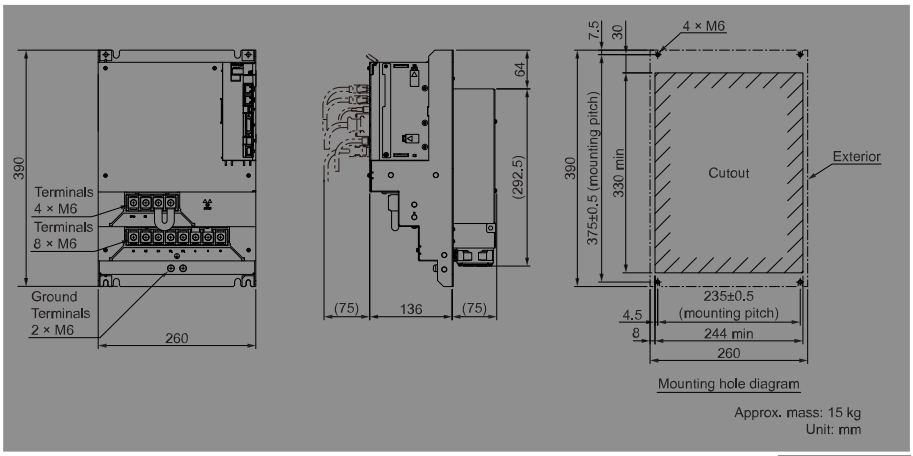
■ Duct-ventilated SERVOPACKs

Hardware Option Code: 0001

◆ SGDXS-470A, -550A

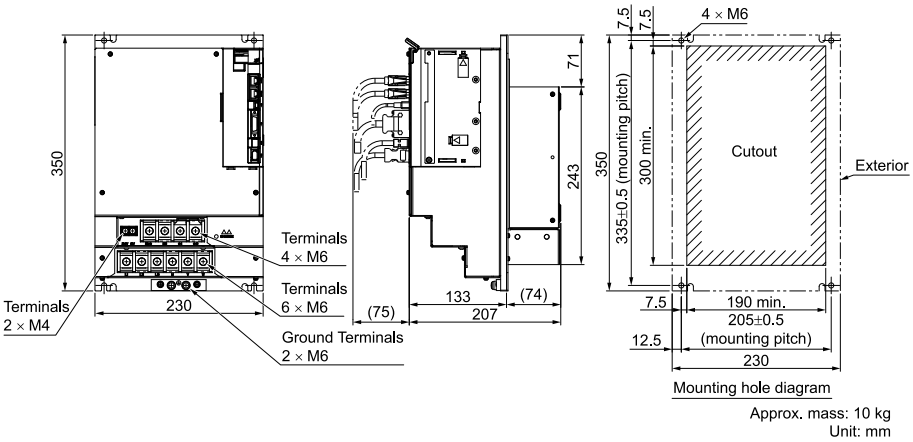


◆ SGDXS-590A, -780A



Non-Stock

◆ SGDXS-210D, -260D, -280D, -370D



Approx. mass: 10 kg
Unit: mm

Σ-XW Models with EtherCAT Communications References

Interpreting Model Numbers

Interpreting SERVOPACK Model Numbers

SGDXW - 1R6 A A0 A 0001 00 B

Σ-X-Series
Σ-XW model

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

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

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6*1	0.2 kW
	2R8*1	0.4 kW
	5R5*1, *2	0.75 kW
	7R6	1.0 kW

4th digit Voltage

Code	Specification
A	200 VAC

Non-Stock

5th+6th digits Interface *3

Code	Specification
A0	EtherCAT communications reference

7th digit Design Revision Order

A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	
0002	Varnished	
0020*4	No dynamic brake	SGDXW-1R6A to -2R8A
	External dynamic brake resistor	SGDXW-5R5A to -7R6A
1000*5	HWBB function	All models

12th+13th digits FT Specification

Code	Specification
None	None
00	

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.

*2 If you use the servomotor with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)

*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.

*4 For details, refer to the following manual.

Σ-X-Series Σ-XS/Σ-XW SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

*5 For details, refer to the following manual.

Σ-X-Series Σ-XW/Σ-XT SERVOPACK Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-Phase, 200 VAC

Model SGDXW-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4	0.75	1.0
Continuous Output Current (each axis) [Arms]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation		-15% to +10%			
	Input Current [Arms] *1		2.5	4.7	7.8	11
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation		-15% to +10%			
	Input Current [Arms] *1		0.25	0.25	0.25	0.25
Power Supply Capacity [kVA] *1			1.0	1.9	3.2	4.5
Power Loss *1	Main Circuit Power Loss [W]		24.0	43.3	78.9	94.2
	Control Circuit Power Loss [W]		17	17	17	17
	Total Power Loss [W]		41.0	60.3	95.9	111.2
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	35	35	12	12
		Capacity [W]	60	60	70	70
		Allowable Power Consumption [W]	20	20	25	25
	Minimum Allowable External Resistance [Ω]		35	35	12	12
Overvoltage Category			III			

*1 This is the net value at the rated load.

■ Single-Phase, 200 VAC

Model SGDXW-			1R6A	2R8A	5R5A *1
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4	0.75
Continuous Output Current (each axis) [Arms]			1.6	2.8	5.5
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3	16.9
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz		
	Allowable Voltage Fluctuation		-15% to +10%		
	Input Current [Arms] *2		5.5	11	12
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz		
	Allowable Voltage Fluctuation		-15% to +10%		
	Input Current [Arms] *2		0.25	0.25	0.25
Power Supply Capacity [kVA] *2			1.3	2.4	2.7
Power Loss *2	Main Circuit Power Loss [W]		24.1	43.6	54.1
	Control Circuit Power Loss [W]		17	17	17
	Total Power Loss [W]		41.1	60.6	71.1
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	35	35	12
		Capacity [W]	60	60	70
		Allowable Power Consumption [W]	20	20	25
	Minimum Allowable External Resistance [Ω]		35	35	12
Overvoltage Category			III		

*1 If you use the SGDXW-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)

*2 This is the net value at the rated load. However, a load ratio of 65% was used for the SGDXW-5R5A.

■ 270 VDC

Model SGDXW-		1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4	0.75	1.0
Continuous Output Current (each axis) [Arms]		1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3	16.9	17.0
Main Circuit	Power Supply	270 VDC to 324 VDC			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	3.0	5.8	9.7	14
Control	Power Supply	270 VDC to 324 VDC			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	0.25	0.25	0.25	0.25
Power Supply Capacity [kVA] *1		1.2	2	3.2	4.6
Power Loss *1	Main Circuit Power Loss [W]	18.7	33.3	58.4	73.7
	Control Circuit Power Loss [W]	17	17	17	17
	Total Power Loss [W]	35.7	50.3	75.4	90.7
Overvoltage Category		III			

*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the servomotor.

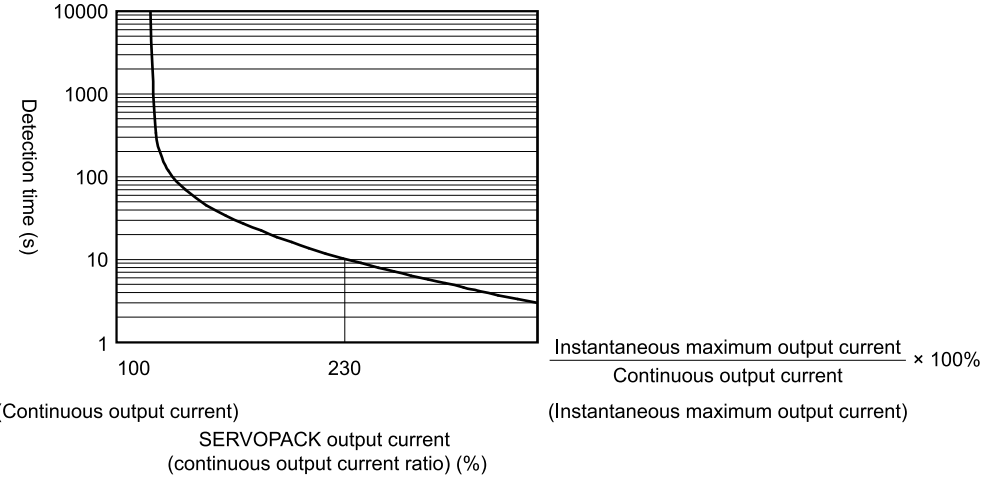


Figure .5 SGDXW-1R6, -2R8

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

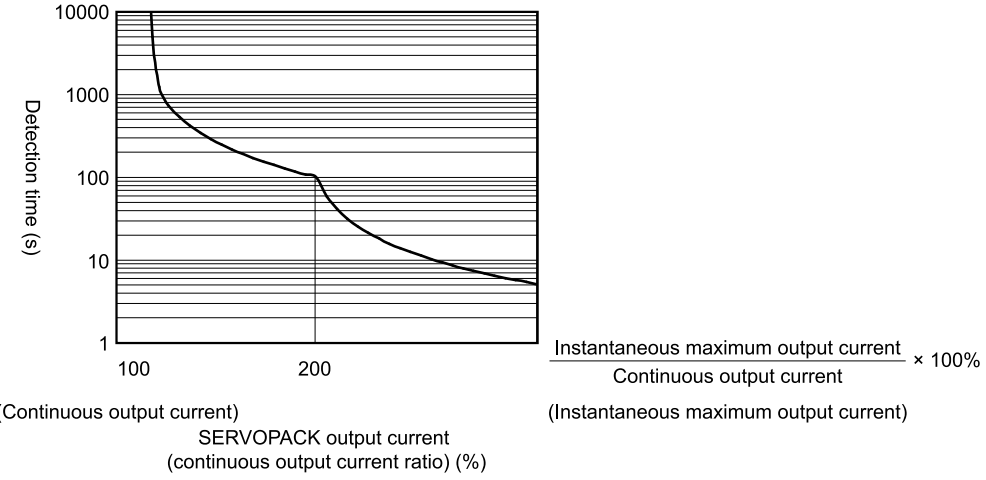


Figure .6 SGDXW-5R5, -7R6

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 654*
Storage Temperature	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 654*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

■ I/O Signals

Item		Specification
Overheat Protection Input		Number of input points: 2 Input voltage range: 0 V to +5 V
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 12 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /Probe1 (Probe 1 Latch Input) signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.

Continued on next page.

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Item		Specification
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 2 (output method: a photocoupler output (isolated))
		Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) signal • /S-RDY (Servo Ready Output) signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /NSO1 to 3 (Normal Output for Triggers at Preset Positions 1 to 3) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, RUN, ERR, L/A A, L/A B, and two one-digit seven-segment LED
EtherCAT Communications Setting Switches			ID Selector (S1 and S2) positions: 16
EtherCAT Communications	Applicable Communications Standards		IEC 61158 Type 12, IEC 61800-7 CiA402 drive profile
	Physical Layer		100BASE-TX (IEEE802.3)
	Communications Connectors		CN6A (RJ45): ETHERCAT IN (EtherCAT input signal side) CN6B (RJ45): ETHERCAT OUT (EtherCAT output signal side)
	Cable		Category 5, 4 shielded twisted pairs The cable is automatically detected with AUTO MDIX.
	SyncManager		SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU		FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)		APRD, APWR, APRW, FPRD, FPWR, FPRW, BRD, BWR, BRW, LRD, LWR, LRW, ARMW, FRMW
	Process Data		Assignments can be changed with PDO mapping.
	Mailbox		Emergency messages, SDO requests, SDO responses
	Distributed Clocks		Free-run mode and DC mode (can be switched.) Applicable DC cycles: 125 µs to 4 ms in 125-µs increments
	Slave Information IF		4 KB
	LED Indicator		During EtherCAT communications: L/A x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile			• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA

Continued on next page.

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Item	Specification
Dynamic Brake (DB)	Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing	Built-in
Overtravel (OT) Prevention	Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions	Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions	Gain tuning, alarm history, jogging operation, origin search, etc.

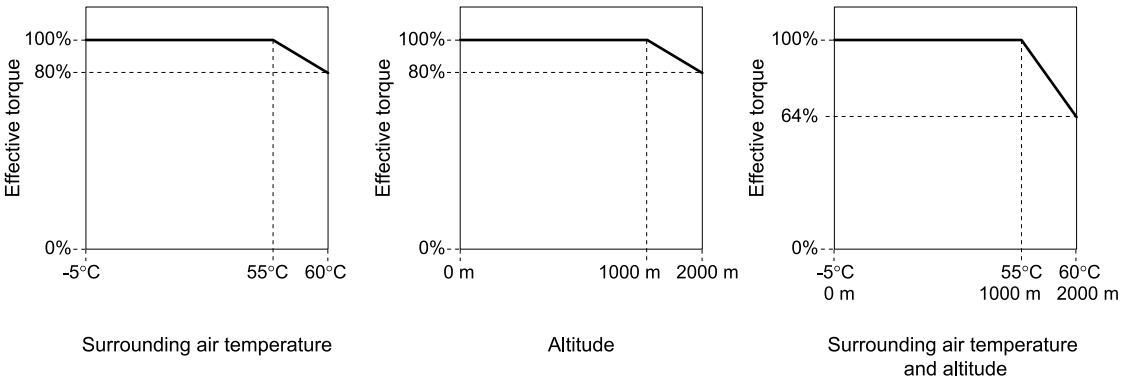
■ Option

Item	Specification
Applicable Option Modules	None

Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

SGDXW-1R6A, -2R8A, -5R5A, -7R6A

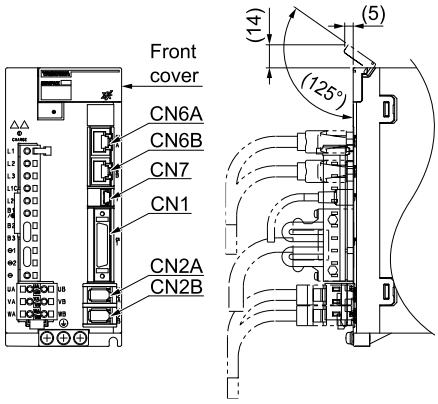


External Dimensions

Front Cover Dimensions and Connector Specifications

The connector shapes and pin assignments depend on the interfaces of the SERVOPACK. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10236-59A3MB	36	3M Japan Limited
CN2A, CN2B	53460-0669	6	Molex Japan Co., Ltd.
CN6A, CN6B	3-1734579-4	8	Tyco Electronics Japan G.K.
CN7	2342993-1	5	Tyco Electronics Japan G.K.

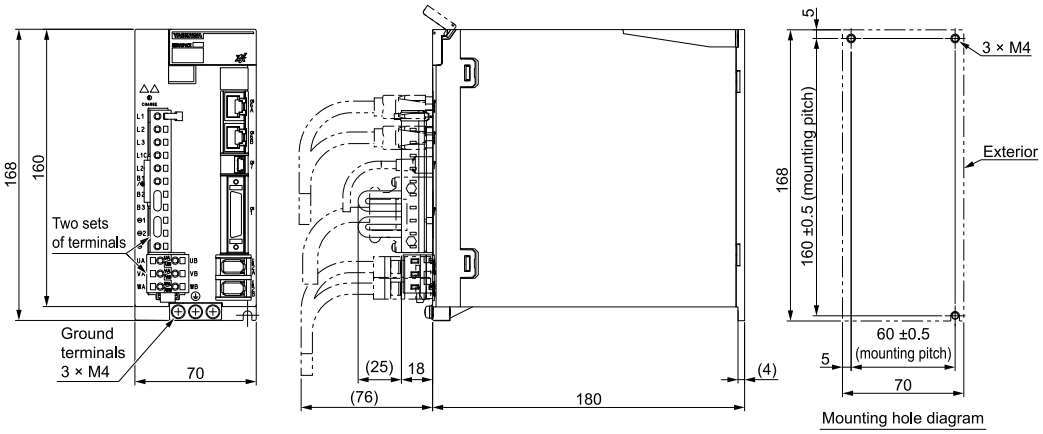
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

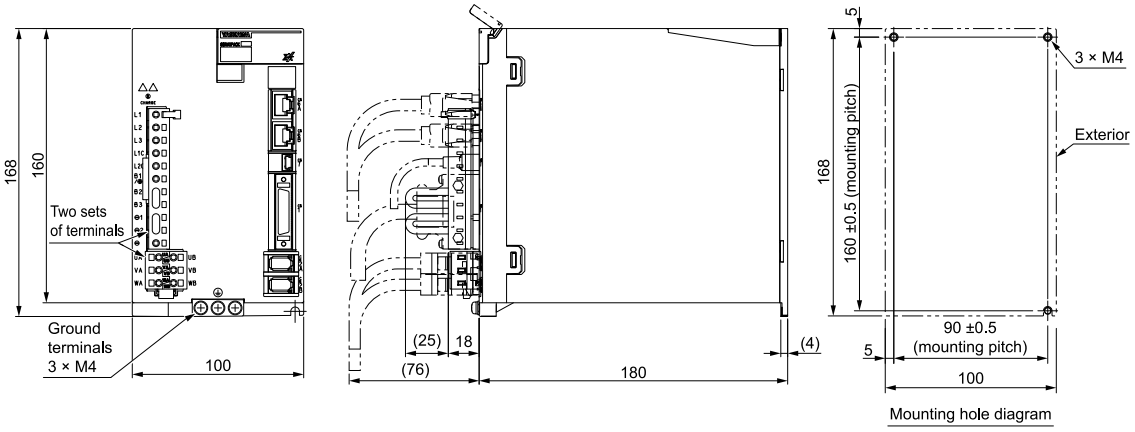
■ Base-mounted SERVOPACKs

◆ SGDXW-1R6A, -2R8A



Approx. mass: 1.7 kg
Unit: mm

◆ SGDXW-5R5A, -7R6A

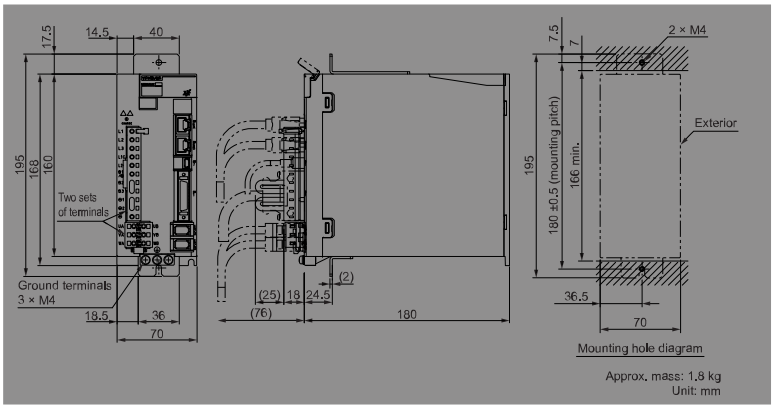


Approx. mass: 2.4 kg
Unit: mm

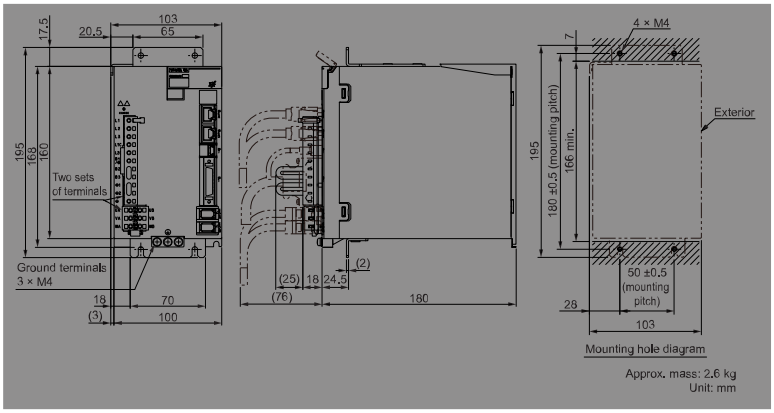
■ Rack-mounted SERVOPACKs

Hardware Option Code: 0001

◆ SGDXW-1R6A, -2R8A



◆ SGDXW-5R5A, -7R6A



Non-Stock

Σ-XT Models with EtherCAT Communications References

Interpreting Model Numbers

Interpreting SERVOPACK Model Numbers

SGDXT - 1R6 A A0 A 0001 00 B

Σ-X-Series
Σ-XT model

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

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

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6*1	0.2 kW
	2R8*1,*2	0.4 kW

4th digit Voltage

Code	Specification
A	200 VAC

Non-Stock

5th+6th digits Interface*3

Code	Specification
A0	EtherCAT communications reference

7th digit Design Revision Order

A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification
None	Without options
0000	
0001	Rack-mounted
0002	Varnished
0020*4	No dynamic brake
1000*5	HWBB function

12th+13th digits FT Specification

Code	Specification
None	None
00	

14th digit BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.

*2 If you use the servomotor with a single-phase power supply input, derate the total continuous output of the motors to 65% of maximum applicable motor capacity × number of axes.
Example: For the SGDXT-2R8A, make the output 0.4 kW × 3 axes × 65% = 0.78 kW or less. To perform operation at an output of 0.4 kW for the first axis and 0.2 kW for the second axis, you must limit the output for the third axis to 0.18 kW or less.

*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.

*4 For details, refer to the following manual.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

*5 For details, refer to the following manual.

Σ-X-Series Σ-XW/Σ-XT SERVOPACK Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-Phase, 200 VAC

Model SGDXT-			1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4
Continuous Output Current (each axis) [Arms]			1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation		-15% to +10%	
	Input Current [Arms] *1		3.9	7.5
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation		-15% to +10%	
	Input Current [Arms] *1		0.3	
Power Supply Capacity [kVA] *1			1.5	3.0
Power Loss *1	Main Circuit Power Loss [W]		33.3	60.4
	Control Circuit Power Loss [W]		17	
	Total Power Loss [W]		50.3	77.4
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	12	
		Capacity [W]	70	
		Allowable Power Consumption [W]	14	
	Minimum Allowable External Resistance [Ω]		12	
Overvoltage Category			III	

*1 This is the net value at the rated load.

■ Single-Phase, 200 VAC

Model SGDXT-		1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4 *1
Continuous Output Current (each axis) [Arms]		1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *2	7.2	12

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Model SGDXT-			1R6A	2R8A
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation		-15% to +10%	
	Input Current [Arms] *2		0.3	
Power Supply Capacity [kVA] *2			1.8	3.6
Power Loss *2	Main Circuit Power Loss [W]		36.2	60.7
	Control Circuit Power Loss [W]		17	
	Total Power Loss [W]		53.2	77.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	12	
		Capacity [W]	70	
		Allowable Power Consumption [W]	14	
	Minimum Allowable External Resistance [Ω]		12	
Overvoltage Category			III	

*1 If you use the servomotor with a single-phase power supply input, derate the total continuous output of the motors to 65% of maximum applicable motor capacity × number of axes.
Example: For the SGDXT-2R8A, make the output 0.4 kW × 3 axes × 65% = 0.78 kW or less. To perform operation at an output of 0.4 kW for the first axis and 0.2 kW for the second axis, you must limit the output for the third axis to 0.18 kW or less.
*2 This is the net value at the rated load (when derated for the SGDXT-2R8A).

■ 270 VDC

Model SGDXT-		1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4
Continuous Output Current (each axis) [Arms]		1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3
Main Circuit	Power Supply	270 VDC to 324 VDC	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *1	4.5	9.0
Control	Power Supply	270 VDC to 324 VDC	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *1	0.3	
Power Supply Capacity [kVA] *1		1.8	3.0
Power Loss *1	Main Circuit Power Loss [W]	28.1	50.4
	Control Circuit Power Loss [W]	17	
	Total Power Loss [W]	45.1	67.4
Overvoltage Category		III	

*1 This is the net value at the rated load.

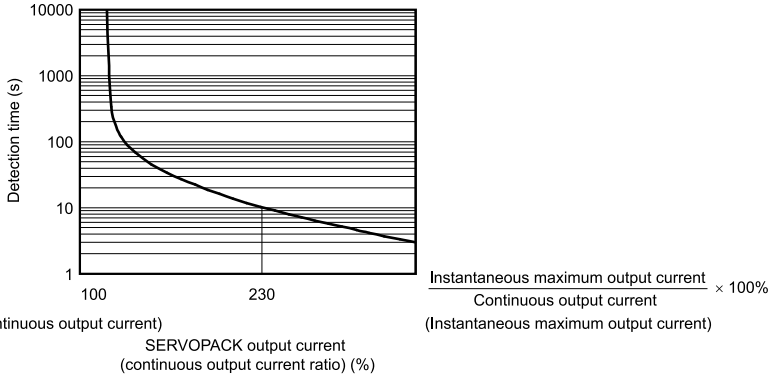
SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the vertical line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the servomotor.



Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

In addition, the model that requires derating when using with single-phase power supply input (applicable model: SGDXT-2R8A) has separate overload protection characteristics (= SERVOPACK overload detection) in addition to the overload protection characteristics listed above. SERVOPACK overload detection will activate A.729 (Overload 2 Alarm) if operation that exceeds the derated value is continuously performed. Use the following values as guidelines for continuous operation that will exceed the derated value.

- Operation for a long period of time at a load of 115% or more of the derated value.
- Operation for 5 s at a load of 200% of the derated value.

Even if the above conditions are satisfied, the above alarm may not be activated when the SERVOPACK is producing a low amount of heat.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 665*
Storage Temperature	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 665*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

■ I/O Signals

Item		Specification
Outputs for Triggers at Preset Positions		Number of output points: 3 (output method: a photocoupler output) Output signals: High-Speed Output Signal for Triggers at Preset Positions 1 to 3 (HSO1 to 3) **Note:** Normal Output Signal for Triggers at Preset Positions 1 to 5 (/NSO1 to 5) are used by allocating the signals to sequence output signals.
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 16 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /Probe1 (Probe 1 Latch Input) signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.

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Item		Specification
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (output method: a photocoupler output (isolated)) Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) signal • /S-RDY (Servo Ready Output) signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • Normal Output Signal for Triggers at Preset Positions 1 to 5 (/NSO1 to 5) A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, RUN, ERR, L/A A, L/A B, and three one-digit seven-segment LED
EtherCAT Communications Setting Switches			ID Selector (S1 and S2) positions: 16
EtherCAT Communications	Applicable Communications Standards		IEC 61158 Type 12, IEC 61800-7 CiA402 drive profile
	Physical Layer		100BASE-TX (IEEE802.3)
	Communications Connectors		CN6A (RJ45): ETHERCAT IN (EtherCAT input signal side) CN6B (RJ45): ETHERCAT OUT (EtherCAT output signal side)
	Cable		Category 5, 4 shielded twisted pairs The cable is automatically detected with AUTO MDIX.
	SyncManager		SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU		FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)		APRD, APWR, APRW, FPRD, FPWR, FPRW, BRD, BWR, BRW, LRD, LWR, LRW, ARMW, FRMW
	Process Data		Assignments can be changed with PDO mapping.
	Mailbox		Emergency messages, SDO requests, SDO responses
	Distributed Clocks		Free-run mode and DC mode (can be switched.) Applicable DC cycles: 125 μs to 4 ms in 125-μs increments
	Slave Information IF		4 KB
	LED Indicator		During EtherCAT communications: L/A x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile			• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA

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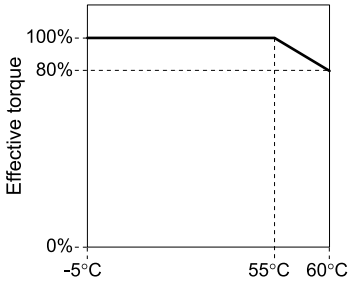
Item	Specification
Dynamic Brake (DB)	Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing	Built-in
Overtravel (OT) Prevention	Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions	Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions	Gain tuning, alarm history, jogging operation, origin search, etc.

■ Option

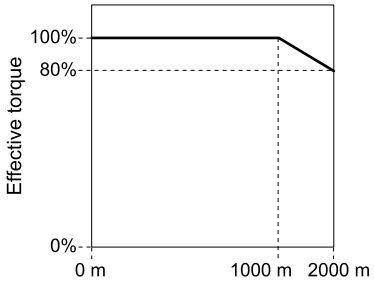
Item	Specification
Applicable Option Modules	None

Derating Specifications

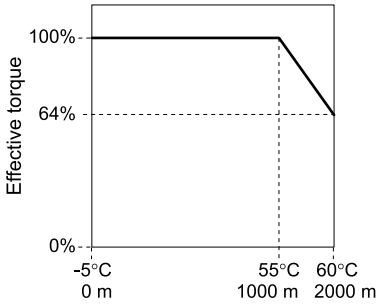
If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.



Surrounding air temperature



Altitude



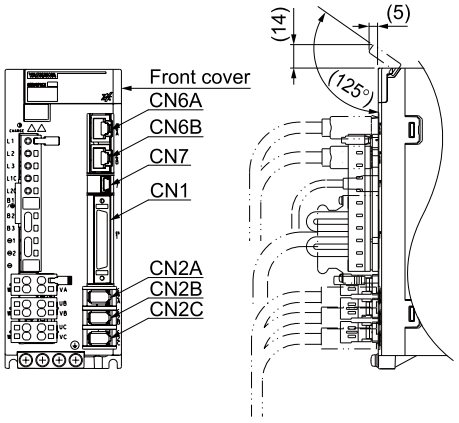
Surrounding air temperature and altitude

External Dimensions

Front Cover Dimensions and Connector Specifications

The front cover dimensions and panel connector section are the same for all capacities. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10250-52A2PL	50	3M Japan Limited
CN2A, CN2B, CN2C	53460-0669	6	Molex Japan Co., Ltd.
CN6A, CN6B	3-1734579-4	8	Tyco Electronics Japan G.K.
CN7	2342993-1	5	Tyco Electronics Japan G.K.

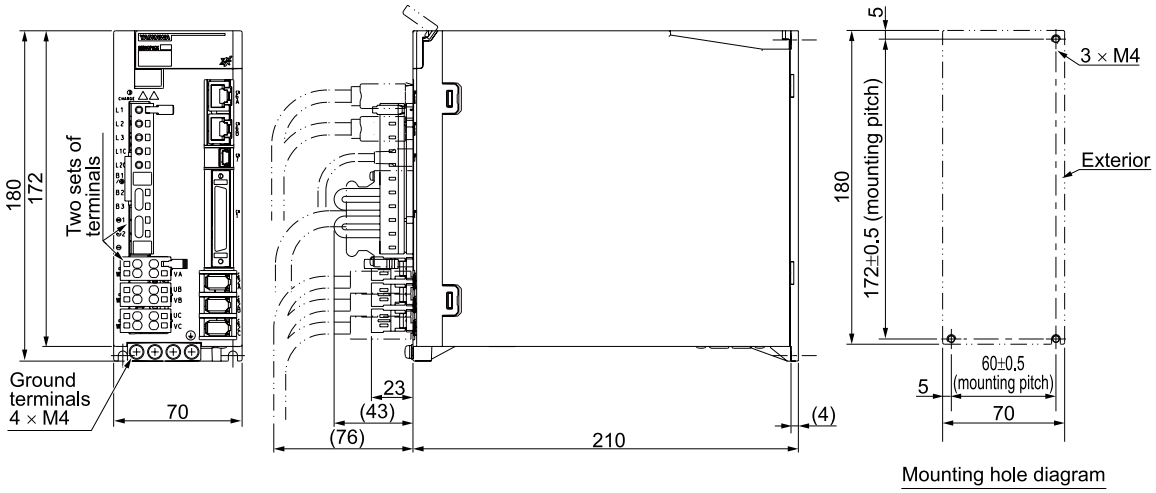
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

■ Base-mounted SERVOPACKs

◆ SGDXT-1R6A, -2R8A

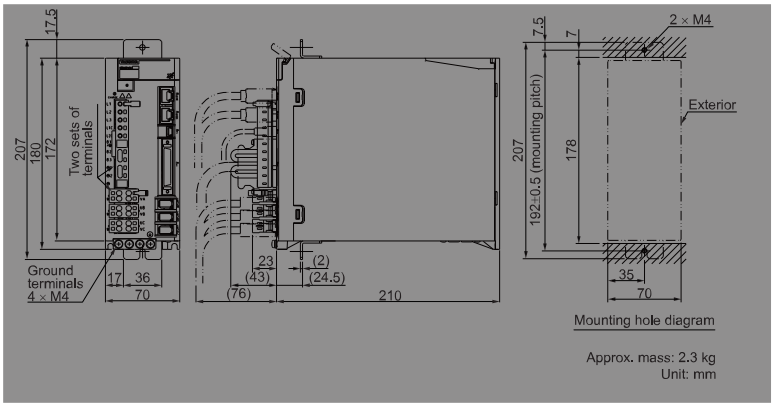


Approx. mass: 2.3 kg
Unit: mm

■ Rack-mounted SERVOPACKs

Hardware Option Code: 0001

◆ SGDXT-1R6A, -2R8A



Approx. mass: 2.3 kg
Unit: mm

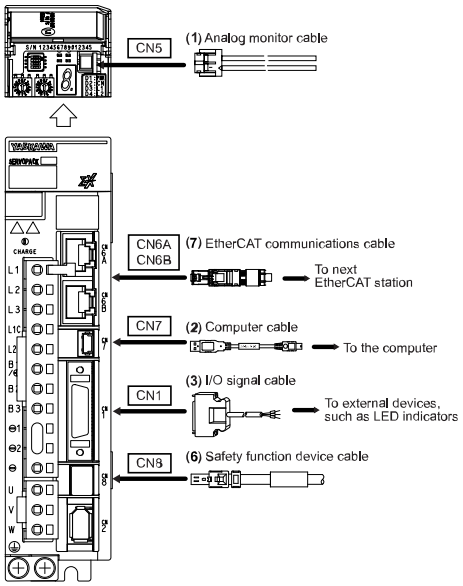
Non-Stock

SERVOPACK Cables

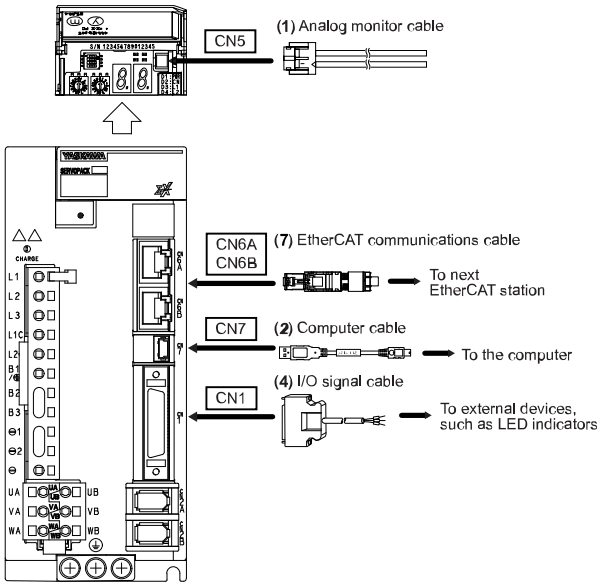
System Configuration Diagrams and Selection Tables

Device Configuration Diagrams

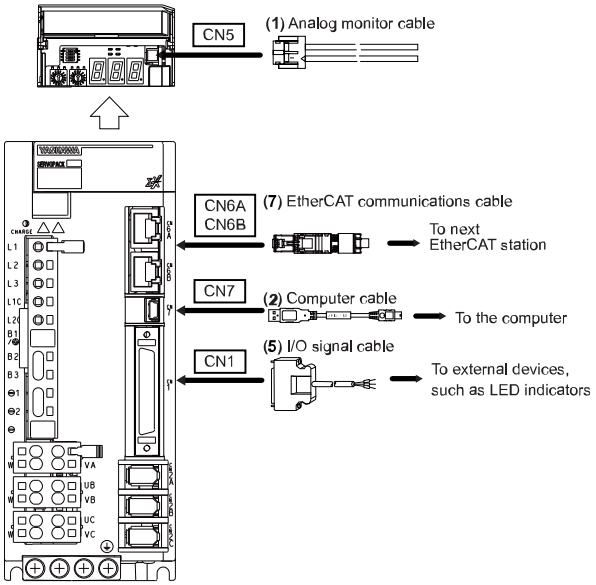
■ Σ-XS SERVOPACKs with EtherCAT Communications Reference



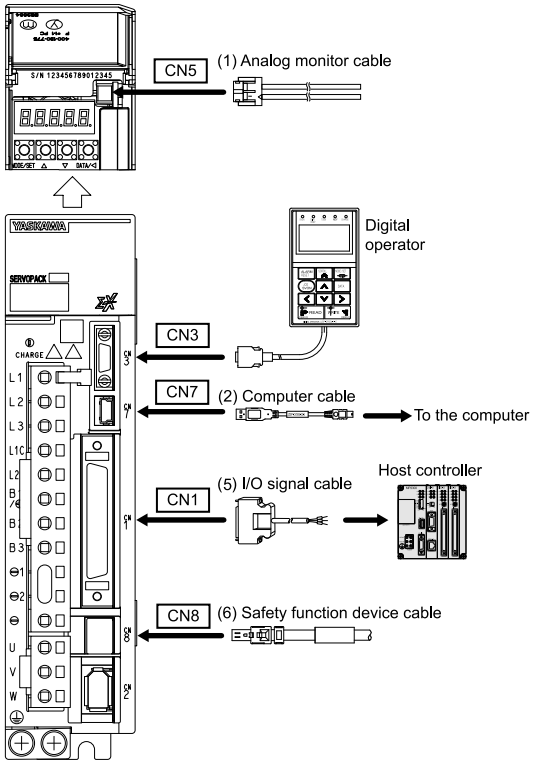
■ Σ-XW SERVOPACKs with EtherCAT Communications Reference



■ Σ-XT SERVOPACKs with EtherCAT Communications Reference
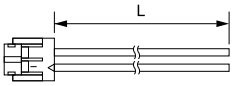


■ Σ-XS SERVOPACKs with Analog Voltage/Pulse Train Reference



Selection Table

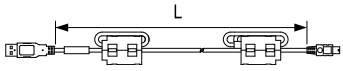
- (1) Analog Monitor Cable

Length (L)	Order Number	Appearance
1 m	JZSP-CA01-E	

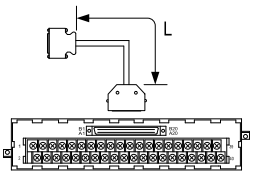
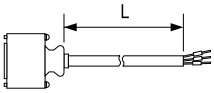
- (2) Computer Cable

Important

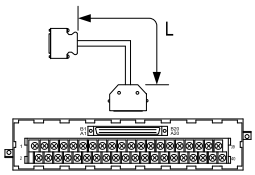
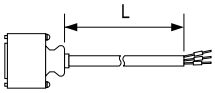
Use the Yaskawa-specified cable for the computer cable. Operation will not be dependable with any other cable.

Length (L)	Order Number	Appearance
2.5 m	JZSP-CVS06-02-E	

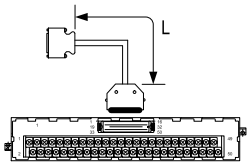
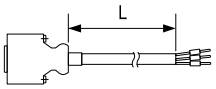
- (3) I/O Signal Cables for Σ-XS SERVOPACKs with EtherCAT Communications Reference

Name	Length (L)	Order Number	Appearance
Connector Kits (soldered)	–	JZSP-CSI9-2-E	
Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
	1 m	JUSP-TA26P-1-E	
	2 m	JUSP-TA26P-2-E	
Cables with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
	2 m	JZSP-CSI02-2-E	
	3 m	JZSP-CSI02-3-E	

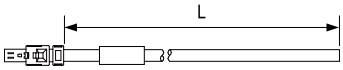
- (4) I/O Signal Cables for Σ-XW SERVOPACKs with EtherCAT Communications Reference

Name	Length (L)	Order Number	Appearance
Connector Kits (soldered)	–	DP9420007-E	
Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA36P-E	
	1 m	JUSP-TA36P-1-E	
	2 m	JUSP-TA36P-2-E	
Cables with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI03-1-E	
	2 m	JZSP-CSI03-2-E	
	3 m	JZSP-CSI03-3-E	

- (5) I/O Signal Cables for Σ-XT SERVOPACKs with EtherCAT Communications Reference and Σ-XS SERVOPACKs with Analog/Pulse Train Communications Reference

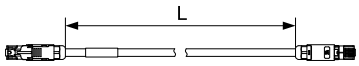
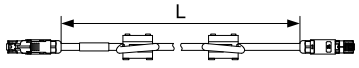
Name		Length (L)	Order Number	Appearance
Connector Kits (soldered)		–	JZSP-CSI9-1-E	
Connector-Terminal Block Converter Unit (Converter Unit and Cable required)	Cable	0.5 m	CBL-WA50P-A5A	
		1 m	CBL-WA50P-01A	
		3 m	CBL-WA50P-03A	
	Terminal Block Converter Unit		51176710	
Cables with Loose Wires at One End (loose wires on peripheral device end)		1 m	JZSP-CSI01-1-E	
		2 m	JZSP-CSI01-2-E	
		3 m	JZSP-CSI01-3-E	

- (6) Safety Function Device Cable

Name	Length (L)	Order Number	Appearance
Cables with Connectors *1	1 m	JZSP-CVH03-01-E	
	3 m	JZSP-CVH03-03-E	
Connector Kits *2	–	Manufacturer: Tyco Electronics Japan G.K. Inquiries: Global Electronics Corporation Product name: Industrial Mini I/O D-Shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1 When using safety functions, connect this cable to the safety function devices.
When not using safety functions, connect the enclosed safety jumper connector (JZSP-CVH05-E) to the SERVOPACK.
*2 Use the connector kit when you make cables yourself.

- (7) EtherCAT Communications Cables

Type		Length (L)	Order Number	Appearance
Cables without Ferrite Cores	RJ-45 connectors on both ends	0.2 m	JZSP-CM3RRM0-00P2-E	
		0.5 m	JZSP-CM3RRM0-00P5-E	
		1 m	JZSP-CM3RRM0-01-E	
		2 m	JZSP-CM3RRM0-02-E	
		3 m	JZSP-CM3RRM0-03-E	
		4 m	JZSP-CM3RRM0-04-E	
		5 m	JZSP-CM3RRM0-05-E	
		10 m	JZSP-CM3RRM0-10-E	
		20 m	JZSP-CM3RR00-20-E	
		30 m	JZSP-CM3RR00-30-E	
Cables with Ferrite Cores	RJ-45 connectors on both ends	0.3 m	JZSP-CM3RRM1-00P3-E	
		3 m	JZSP-CM3RRM1-03-E	
		10 m	JZSP-CM3RRM1-10-E	
		20 m	JZSP-CM3RR01-20-E	
		30 m	JZSP-CM3RR01-30-E	
		50 m	JZSP-CM3RR01-50-E	

The Ethernet cables with the following specifications can also be used to make the connections.

– Shielded: S/STP or S/UTP

– Category: CAT5e or better

– Length: 50 m max. (between nodes)

We recommend the following cable and connector.

Item	Manufacturer	Model
Ethernet Cable	Beckhoff	ZB9020
RJ-45 Connector	Beckhoff	ZS1090-0003

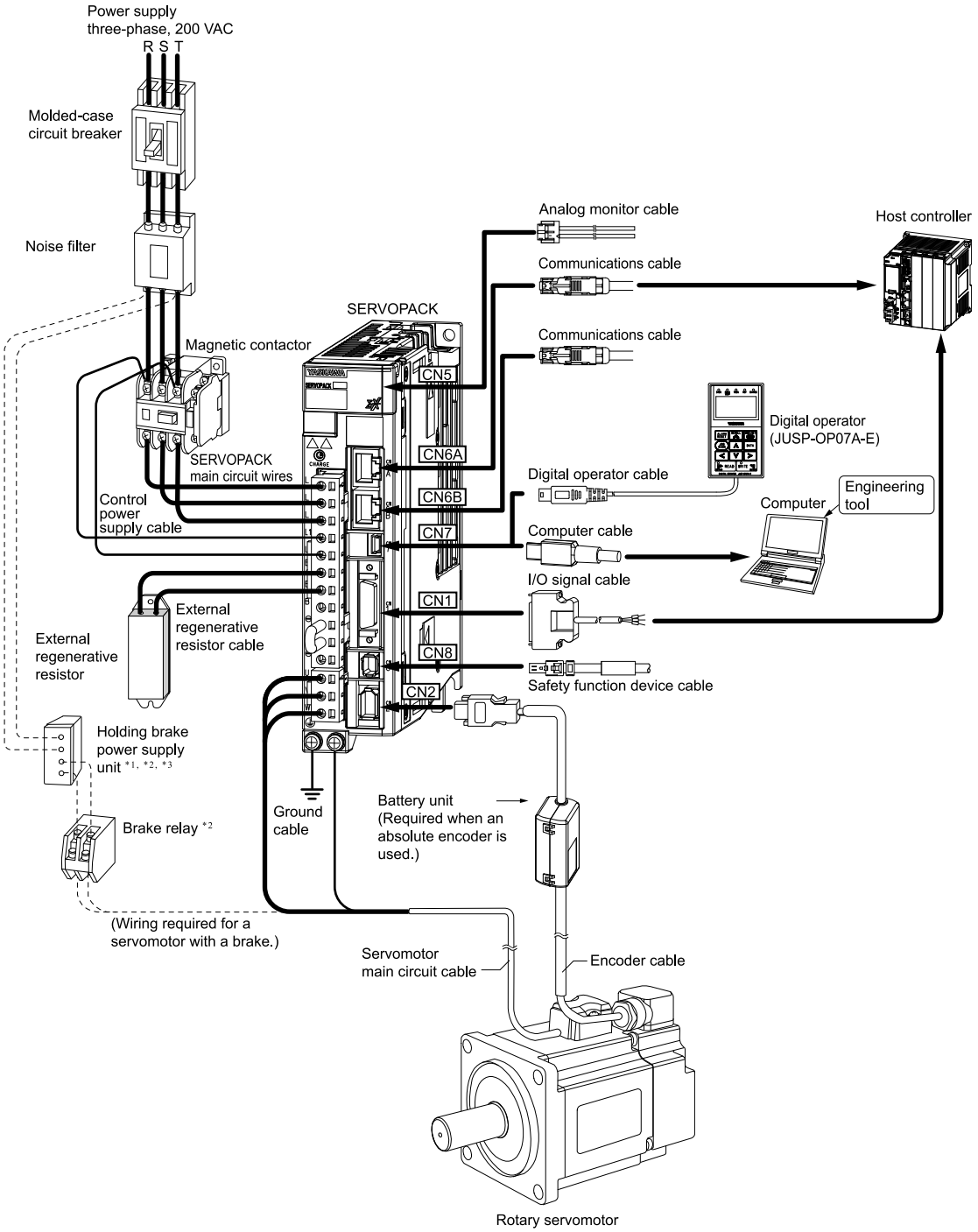
Connections between SERVOPACKs and Peripheral

Peripheral Devices and System Configurations

Configuration with a Rotary Servomotor

This section describes an example using a three-phase, 200-VAC power supply input SERVOPACK with EtherCAT communications references. The connector shapes and pin assignments depend on the power supply input specifications and interfaces of the SERVOPACK.

Refer to the product manual that corresponds to the references used by your SERVOPACK.



*1 A holding brake power supply unit is required to use a servomotor with a holding brake. Holding brake power supply units for 24 VDC are not provided by Yaskawa. Obtain these from other manufacturers.
Never connect holding brake power supply units with different output voltages to a SERVOPACK. Overcurrent may result in burning in the brake.

*2 If you use a servomotor with a holding brake, select a brake relay according to the power supply voltage and current of the brake. Select an appropriate brake relay using the selection method of the brake relay manufacturer.

*3 The holding brake power supply unit is not provided by Yaskawa. Select a power supply based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.

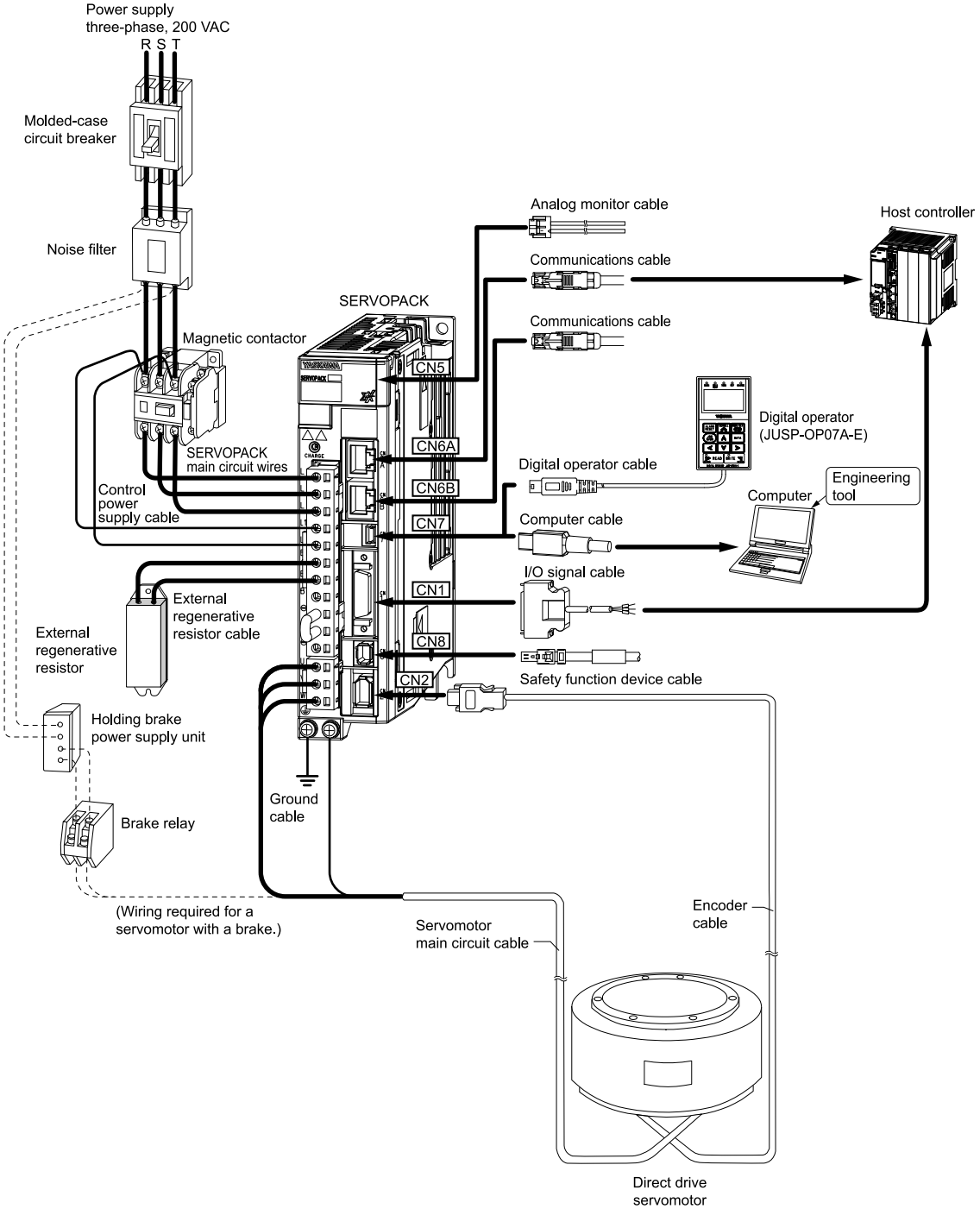
The following table gives the reference information for each device.

Item	Reference
Molded-case circuit breaker	*Molded-Case Circuit Breakers and Fuses on page 678*
Noise filter	*Noise Filter on page 715*
Magnetic contactor	*Magnetic Contactors on page 683*
External regenerative resistor	*Regenerative Resistor on page 727*
SERVOPACK main circuit wires	*SERVOPACK Main Circuit Wires on page 693*
Digital operator cable	The cable used to connect the digital operator is built into the digital operator.
Battery unit	*Batteries for Servomotors with Absolute Encoders on page 741*
Digital operator	*Digital Operators on page 733*
Software	*Software on page 735*
Surge absorbers	*Surge Absorbers on page 726*
AC/DC reactors	*AC/DC Reactors on page 722*
Surge Absorbers (Varistors), Diodes, and Brake Relays for Holding Brake Power Supplies	*Surge Absorbers (Varistors), Diodes, and Brake Relays for Holding Brake Power Supplies on page 739*

Direct Drive Servomotors

This section describes an example using a three-phase, 200-VAC power supply input SERVOPACK with EtherCAT communications references. The connector shapes and pin assignments depend on the power supply input specifications and interfaces of the SERVOPACK.

Refer to the product manual that corresponds to the references used by your SERVOPACK.



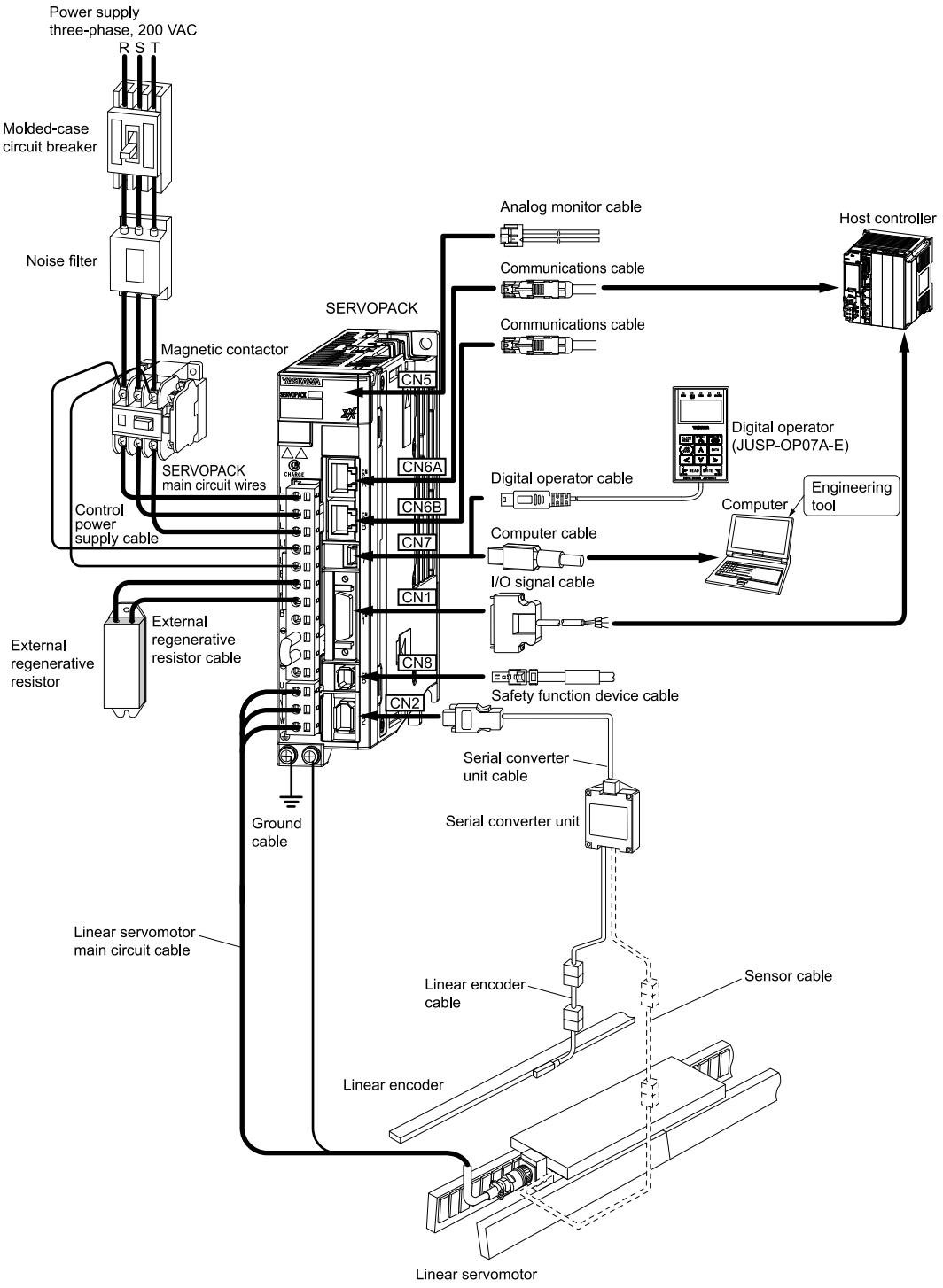
The following table gives the reference information for each device.

Item	Reference
Molded-case circuit breaker	*Molded-Case Circuit Breakers and Fuses on page 678*
Noise filters	*Noise Filter on page 715*
Magnetic contactor	*Magnetic Contactors on page 683*
External regenerative resistor	*Regenerative Resistor on page 727*
SERVOPACK main circuit wire	*SERVOPACK Main Circuit Wires on page 693*
Digital operator cable	The cable used to connect the digital operator is built into the digital operator.
Battery unit	*Batteries for Servomotors with Absolute Encoders on page 741*
Digital operator	*Digital Operators on page 733*
Engineering tool	*Software on page 735*
Surge absorber	*Surge Absorbers on page 726*
Reactor for harmonic suppression	*AC/DC Reactors on page 722*

Linear Servomotors

This section describes an example using a three-phase, 200-VAC power supply input SERVOPACK with EtherCAT communications references. The connector shapes and pin assignments depend on the power supply input specifications and interfaces of the SERVOPACK.

Refer to the product manual that corresponds to the references used by your SERVOPACK.



The following table gives the reference information for each device.

Item	Reference
Molded-case circuit breaker	*Molded-Case Circuit Breakers and Fuses on page 678*
Noise filters	*Noise Filter on page 715*
Magnetic contactor	*Magnetic Contactors on page 683*
External regenerative resistor	*Regenerative Resistor on page 727*
SERVOPACK main circuit wire	*SERVOPACK Main Circuit Wires on page 693*
Digital operator cable	The cable used to connect the digital operator is built into the digital operator.
Linear servomotor main circuit cable	*Servomotor Main Circuit Cables on page 556*
Linear encoder cable	*Linear Encoder Cables on page 558*
Serial converter unit cable	*Serial Converter Unit Cables on page 558*
Serial converter unit	*Serial Converter Unit on page 571*
Sensor cable	*Sensor Cables on page 559*
Digital operator	*Digital Operators on page 733*
Engineering tool	*Software on page 735*
Surge absorber	*Surge Absorbers on page 726*
Reactor for harmonic suppression	*AC/DC Reactors on page 722*

Molded-Case Circuit Breakers and Fuses

Using an AC Power Supply

Use a molded-case circuit breaker and fuse to protect the power supply line. They protect the power line by shutting OFF the circuit when overcurrent is detected. Select these devices based on the information in the following tables.

Note:

The following tables provide the net values of the current capacity and inrush current. Select a fuse and a molded-case circuit breaker that meet the following conditions.

• Main circuit and control circuit: No breaking at three times the current value given in the table for 5 s.

• Inrush current: No breaking at the current value given in the table for 20 ms.

■ Σ-XS SERVOPACKs

<table>
<tr><th rowspan="2">Main Circuit Power Supply</th><th rowspan="2">Maximum Applicable Motor Capacity [kW]</th><th rowspan="2">SERVOPACK Model: SGDXS-</th><th rowspan="2">Power Supply Capacity per SERVOPACK [kVA] *1</th><th colspan="2">Current Capacity</th><th colspan="2">Inrush Current</th><th colspan="2">Rated Voltage</th></tr>
<tr><th>Main Circuit [Arms] *1</th><th>Control power supply [Arms]</th><th>Main Circuit [A0-p]</th><th>Control power supply [A0-p]</th><th>Fuse [V]</th><th>MCCB [V]</th></tr>
<tr><td rowspan="15">Three-phase, 200 VAC</td><td>0.05</td><td>R70A</td><td>0.2</td><td>0.4</td><td rowspan="8">0.2</td><td rowspan="5">29</td><td rowspan="15">34</td><td rowspan="15">250</td><td rowspan="15">240</td></tr>
<tr><td>0.1</td><td>R90A</td><td>0.3</td><td>0.8</td></tr>
<tr><td>0.2</td><td>1R6A</td><td>0.5</td><td>1.3</td></tr>
<tr><td>0.4</td><td>2R8A</td><td>1.0</td><td>2.5</td></tr>
<tr><td>0.5</td><td>3R8A</td><td>1.3</td><td>3.0</td><td rowspan="6">34</td></tr>
<tr><td>0.75</td><td>5R5A</td><td>1.6</td><td>4.1</td></tr>
<tr><td>1.0</td><td>7R6A</td><td>2.3</td><td>5.7</td></tr>
<tr><td>1.5</td><td>120A</td><td>3.2</td><td>7.3</td></tr>
<tr><td>2.0</td><td>180A</td><td>4.0</td><td>10</td><td rowspan="2">0.25</td></tr>
<tr><td>3.0</td><td>200A</td><td>5.9</td><td>15</td></tr>
<tr><td>5.0</td><td>330A</td><td>7.5</td><td>25</td><td rowspan="3">0.3</td><td rowspan="3">68</td></tr>
<tr><td>6.0</td><td>470A</td><td>10.7</td><td>29</td></tr>
<tr><td>7.5</td><td>550A</td><td>14.6</td><td>37</td></tr>
<tr><td>11</td><td>590A</td><td>21.7</td><td>54</td><td rowspan="2">0.4</td><td rowspan="2">114</td></tr>
<tr><td>15</td><td>780A</td><td>29.6</td><td>73</td></tr>
<tr><td rowspan="6">Single-phase, 200 VAC</td><td>0.05</td><td>R70A</td><td>0.2</td><td>0.8</td><td rowspan="5">0.2</td><td rowspan="4">29</td></tr>
<tr><td>0.1</td><td>R90A</td><td>0.3</td><td>1.6</td></tr>
<tr><td>0.2</td><td>1R6A</td><td>0.6</td><td>2.4</td></tr>
<tr><td>0.4</td><td>2R8A</td><td>1.2</td><td>5.0</td></tr>
<tr><td>0.75</td><td>5R5A</td><td>1.9</td><td>8.7</td><td rowspan="2">34</td></tr>
<tr><td>1.5</td><td>120A □□□ 0008</td><td>4.0</td><td>16</td><td>0.25</td></tr>
</table>

*1 This is the net value at the rated load.

■ Σ-XW SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity (each axis) [kW]	SERVOPACK Model: SGDXW-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.2	1R6A	1.0	2.5	0.25	34	34	250	240
	0.4	2R8A	1.9	4.7					
	0.75	5R5A	3.2	7.8					
	1.0	7R6A	4.5	11					
Single-phase, 200 VAC	0.2	1R6A	1.3	5.5					
	0.4	2R8A	2.4	11					
	0.75	5R5A *2	2.7	12					

*1 This is the net value at the rated load.

*2 If you use the SGDXW-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)

■ Σ-XT SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity (each axis) [kW]	SERVOPACK Model: SGDXT-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.2	1R6A	1.5	3.9	0.3	34	57	250	240
	0.4	2R8A	3.0	7.5					
Single-phase, 200 VAC	0.2	1R6A	1.8	7.2					
	0.4	2R8A *2	3.6	12					

*1 This is the net value at the rated load.

*2 If you use the servomotor with a single-phase supply input, derate the total continuous output of the motor using the following equation: maximum applicable motor capacity × number of axes × 65%.
Example: When using the SGDXT-2R8A SERVOPACK, the total continuous output of the motor must be 0.78 kW or less (0.4 kW × 3 axes × 65% = 0.78 kW). When operating the first axis at an output of 0.4 kW and the second axis at 0.2 kW, the output of the third axis must be 0.18 kW or less.

■ Σ-XS SERVOPACKs for Use with Three-Phase, 400-VAC

Main Circuit Power Supply	Maximum Applicable Motor Capacity [kW]	SERVOPACK Model: SGDXS-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms] *1	Control Power Supply [A]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 400 VAC	0.5	1R9D	1.1	1.4	1.2	19	–	600	480
	1.0	3R5D	2.3	2.9		19	–		
	1.5	5R4D	3.5	4.3		19	–		
	2.0	8R4D	4.5	5.8	1.6	38	–		
	3.0	120D	7.1	8.6		38	–		
	5.0	170D	11.7	14.5		38	–		
	6.0	210D	12.4	17.4	1.7	34	–		
	7.5	260D	14.4	21.7		34	–		
	11	280D	21.9	31.8		68	–		
	15	370D	30.6	43.4		68	–		

*1 This is the net value at the rated load.

Using a DC Power Supply

This section gives the power supply specifications for using a DC power supply input. Use the fuses given in the following tables to protect the power supply line and SERVOPACK. They protect the power line by shutting OFF the circuit when overcurrent is detected.

Note:

The following tables provide the net values of the current capacity and inrush current.

■ Σ-XS SERVOPACKs

Main Circuit Power Supply	SERVOPACK Model: SGDXS-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number *2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	R70A	0.2	0.5	0.2	29	34	3,5URGJ17/16UL	16	400
	R90A	0.3	1.0						
	1R6A	0.5	1.5						
	2R8A	1.0	3.0				3,5URGJ17/20UL	20	
	3R8A	1.3	3.8	0.2	34		3,5URGJ17/40UL	40	
	5R5A	1.6	4.9						
	7R6A	2.3	6.9						
	120A	3.2	11	0.2					
	120A □□□ 0008			0.25			3,5URGJ17/63UL	63	
	180A	4.0	14						
	200A	5.9	20						
	330A	7.5	34	0.3	68 *3(external 5 Ω)		3,5URGJ17/100UL	100	
	470A	10.7	36				3,5URGJ23/160UL	160	
	550A	14.6	48						
	590A	21.7	68	0.4	114 *3(external 3 Ω)		3,5URGJ23/200UL	200	
	780A	29.6	92						

*1 This is the net value at the rated load.
*2 These fuses are manufactured by Mersen Japan.
*3 If you use a DC power supply input with any of the following SERVOPACKs, externally connect an inrush current limiting circuit and use the power ON and OFF sequences recommended by Yaskawa: SGDXS-330A, -470A, -550A, -590A, and -780A.
There is a risk of equipment damage.
Refer to the manual for your SERVOPACK for the power ON and OFF sequences.

■ Σ-XW SERVOPACKs

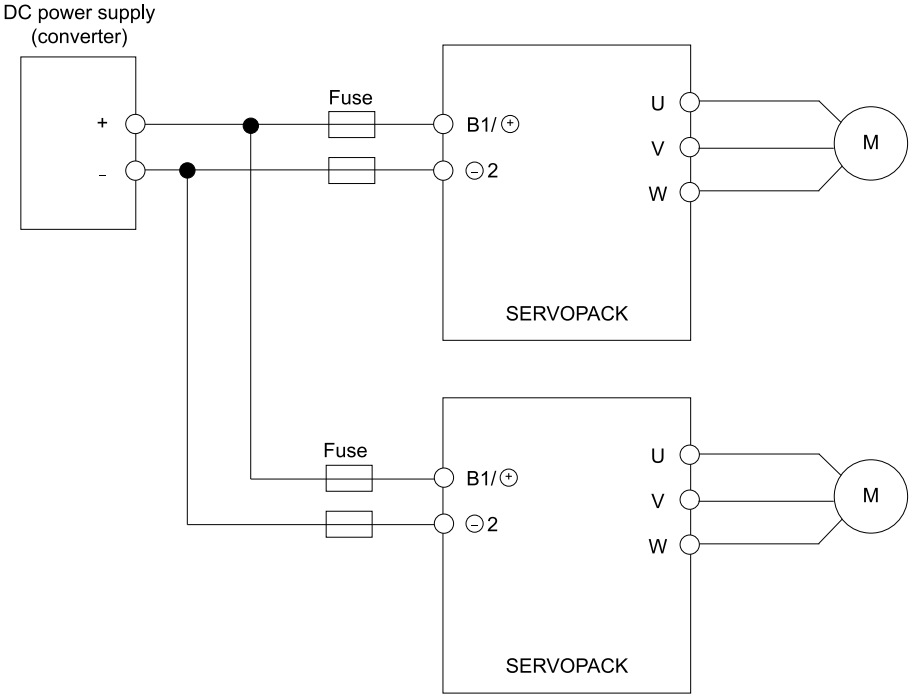
Main Circuit Power Supply	SERVOPACK Model: SGDXW-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number *2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	1R6A	1	3.0	0.25	34	34	3,5URGJ17/40UL	40	400
	2R8A	1.9	5.8						
	5R5A	3.2	9.7				3,5URGJ17/63UL	63	
	7R6A	4.5	14						

*1 This is the net value at the rated load.
*2 These fuses are manufactured by Mersen Japan.

■ Σ-XT SERVOPACKs

Main Circuit Power Supply	SERVOPACK Model: SGDXT-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number *2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	1R6A	1.8	4.5	0.3	34	57	3,5URGJ17/ 40UL	40	400
	2R8A	3.0	9.0						

*1 This is the net value at the rated load.
*2 These fuses are manufactured by Mersen Japan.



Note:

If you connect more than one SERVOPACK to the same DC power supply, connect fuses for each SERVOPACK.

■ Σ-XS SERVOPACKs for Use with 540-VDC Power Supply Input

Important

If you use a DC power supply input, externally connect an inrush current limiting circuit and use the power ON and OFF sequences recommended by Yaskawa.

For details, refer to "4. Wiring and Connecting SERVOPACKs" in your SERVOPACK product manual.

Main Circuit Power Supply	SERVOPACK Model: SGDXS-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current	
			Main Circuit [Arms] *1	Control Power Supply [A]	Main Circuit [A0-p] *2	Control Power Supply [A0-p]
540 VDC	1R9D	1.1	2	1.2	19 (External 36 Ω *3)	-
	3R5D	2.3	3			–
	5R4D	3.5	5.5			–
	8R4D	4.5	6.8	1.6	38 (External 18 Ω *3)	-
	120D	7.1	11			–
	170D	11.7	18			–
	210D	12.4	19.6	1.7	34 (External 20 Ω *3)	-
	260D	14.4	26.2			–
	280D	21.9	38.3		68 (External 10 Ω *3)	-
	370D	30.6	47.6			–

*1 This is the net value at the rated load.
*2 This is the value when the listed value of the external inrush current limiting resistor is used.
*3 This is the value of the external inrush current limiting resistor.

Magnetic Contactors

Use a magnetic contactor when you configure an external AC power supply sequence.

Note:

Always attach a surge absorber (e.g., a surge absorber unit) to the excitation coil of the magnetic contactor. Consult Fuji Electric FA Components & Systems Co., Ltd. for details.

Selection Table

■ Σ-XS SERVOPACKs

Main Circuit Power Supply	SERVOPACK		Order Number	Manufacturer
	Maximum Applicable Motor Capacity [kW]	Model SGDXS-		
Three-phase, 200 VAC	0.05	R70A	SC-03	Fuji Electric FA Components & Systems Co., Ltd.
	0.1	R90A		
	0.2	1R6A		
	0.4	2R8A		
	0.5	3R8A		
	0.75	5R5A	SC-4-1	
	1.0	7R6A		
	1.5	120A		
	2.0	180A	SC-5-1	
	3.0	200A		
	5.0	330A	SC-N1	
	6.0	470A		
	7.5	550A	SC-N2	
	11	590A	SC-N2S	
	15	780A	SC-N3	
Single-phase, 200 VAC	0.05	R70A	SC-03	
	0.1	R90A		
	0.2	1R6A		
	0.4	2R8A		
	0.75	5R5A	SC-4-1	
	1.5	120A□□□0008	SC-5-1	

■ Σ-XW SERVOPACKs

Main Circuit Power Supply	SERVOPACK		Order Number	Manufacturer
	Maximum Applicable Motor Capacity [kW]	Model SGDXW-		
Three-phase, 200 VAC	0.2	1R6A	SC-03	Fuji Electric FA Components & Systems Co., Ltd.
	0.75	2R8A	SC-4-1	
	0.75	5R5A		
	1.0	7R6A	C-5-1	
Single-phase, 200 VAC	0.2	1R6A	SC-03	
	0.4	2R8A	SC-4-1	
	0.75	5R5A	SC-5-1	

■ Σ-XT SERVOPACKs

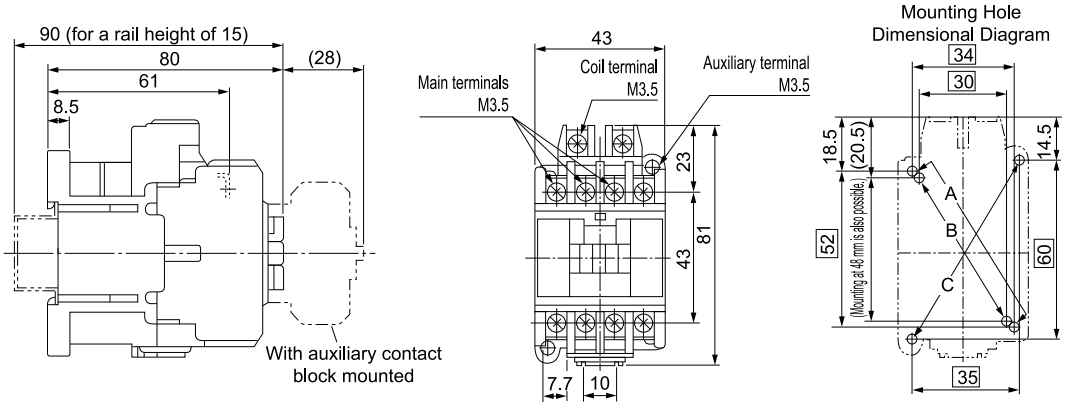
Main Circuit Power Supply	SERVOPACK		Order Number	Manufacturer
	Maximum Applicable Motor Capacity [kW]	Model SGDXT-		
Three-phase, 200 VAC	0.2	1R6A	SC-4-1	Fuji Electric FA Components & Systems Co., Ltd.
	0.4	2R8A		
Single-phase, 200 VAC	0.2	1R6A		
	0.4	2R8A	SC-5-1	

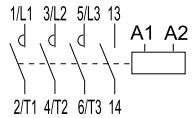
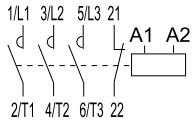
■ Σ-XS SERVOPACKs for Use with Three-Phase, 400-VAC

Main Circuit Power Supply	SERVOPACK		Order Number	Manufacturer
	Maximum Applicable Motor Capacity [kW]	Model SGDXS-		
Three-phase, 400 VAC	0.5	1R9D	SC-4-1/G	Fuji Electric FA Components & Systems Co., Ltd.
	1.0	3R5D		
	1.5	5R4D		
	2.0	8R4D	SC-5-1/G	
	3.0	120D		
	5.0	170D	SC-N1/G	
	6.0	210D		
	7.5	260D		
	11	280D	SC-N2S/G	
	15	370D		

External Dimensions

■ Model: SC-03



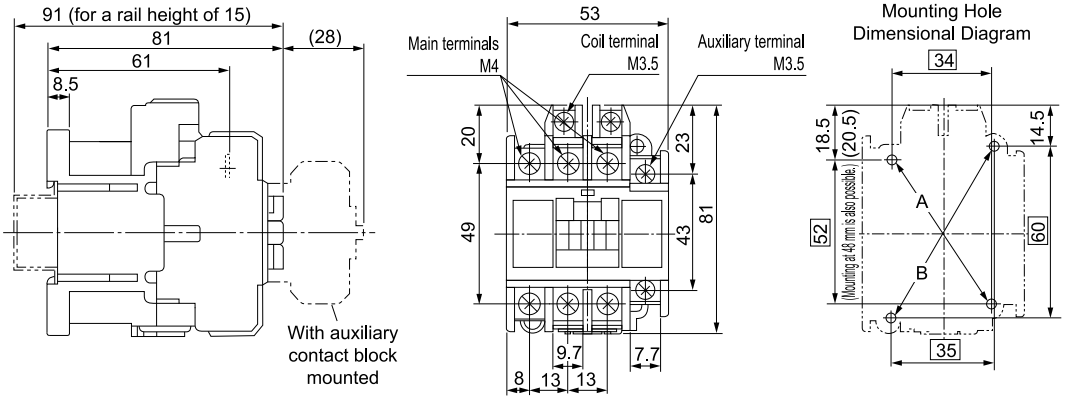
Auxiliary Contacts	Contact Structure
1a	
1b	

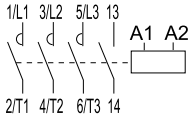
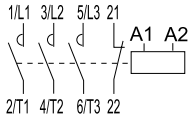
- You can use any of the following three mounting methods.
  A : 34 × (48 to) 52
  B : 30× 48
  C : 35× 60
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 0.32 kg

■ Model: SC-4-1



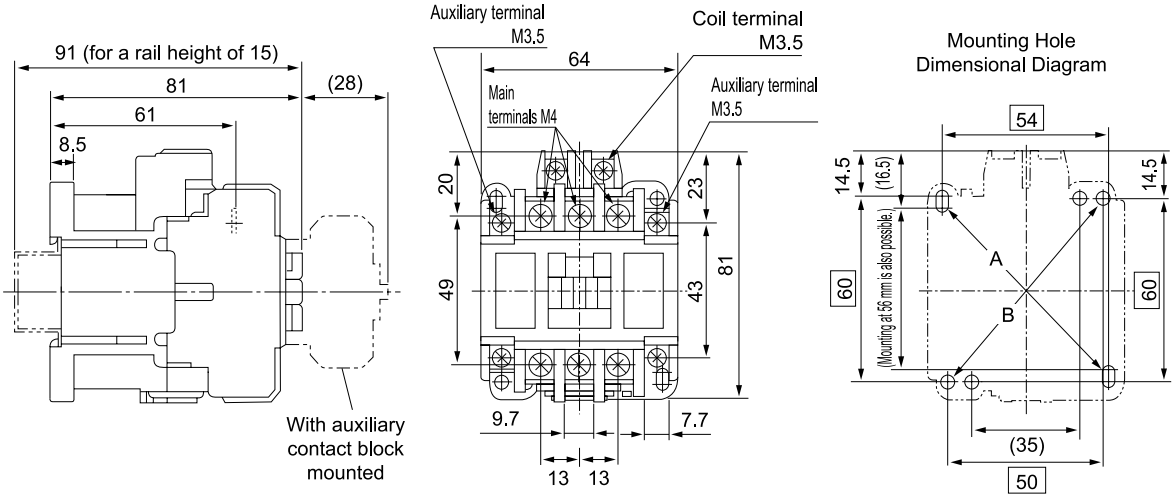
Auxiliary Contacts	Contact Structure
1a	
1b	

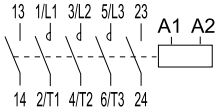
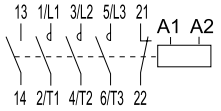
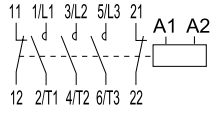
- You can use any of the following two mounting methods.
  A : 34 × (48 to) 52
  B : 35× 60
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 0.36 kg

■ Model: SC-5-1



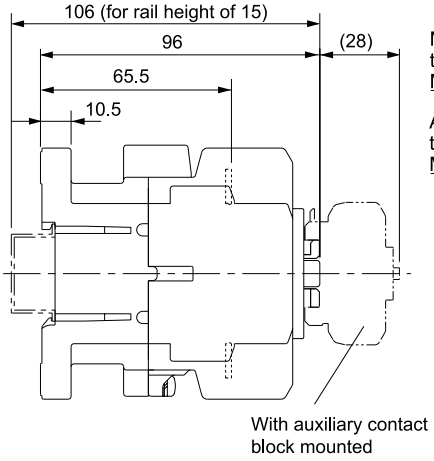
Auxiliary Contacts	Contact Structure
2a	
1a1b	
2b	

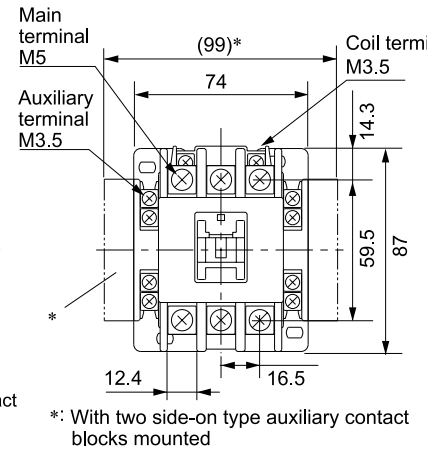
- You can use any of the following two mounting methods.
  A : 54 × (56 to) 60
  B : 50× 60
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

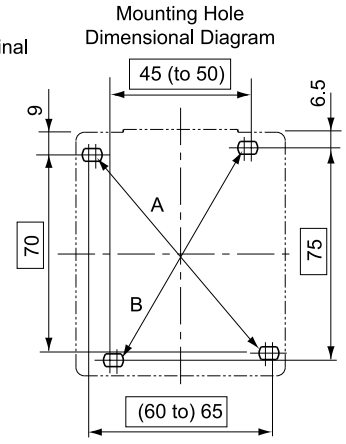
Unit: mm

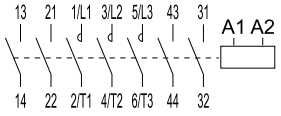
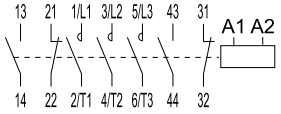
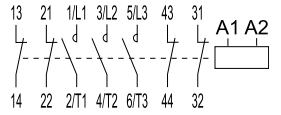
Approx. mass: 0.38 kg

■ Model: SC-N1, SC-N2







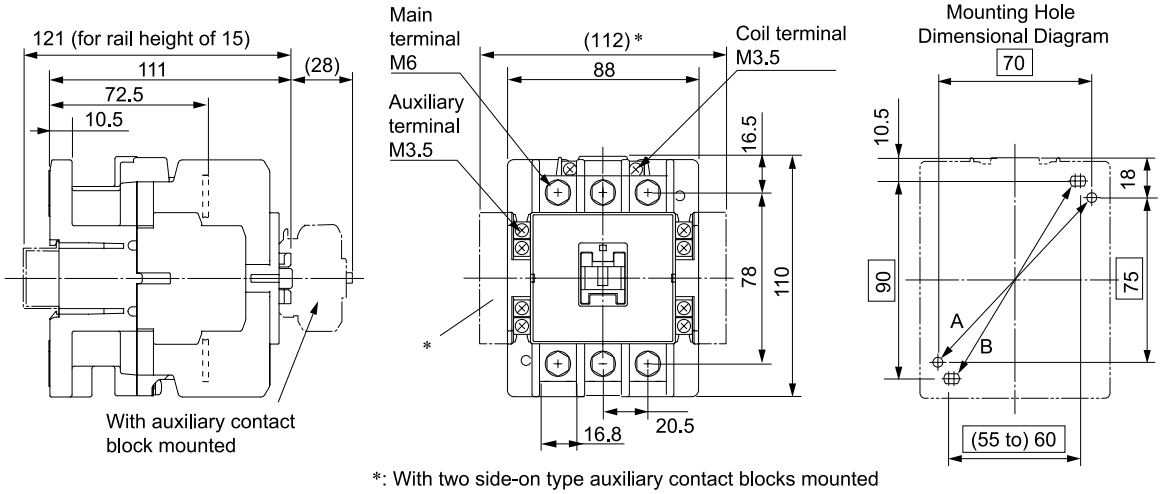
Auxiliary Contacts	Contact Structure
4a	
2a2b	
4b	

- You can use any of the following two mounting methods.
  A: 70 × 75
  B: (55 to) 65 × 90
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

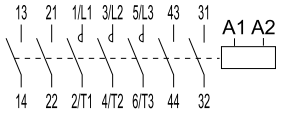
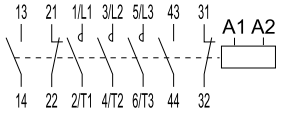
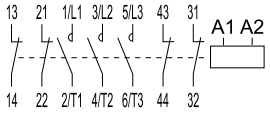
Unit: mm

Approx. mass: 0.59 kg

■ Model: SC-N2S, SC-N3



*: With two side-on type auxiliary contact blocks mounted

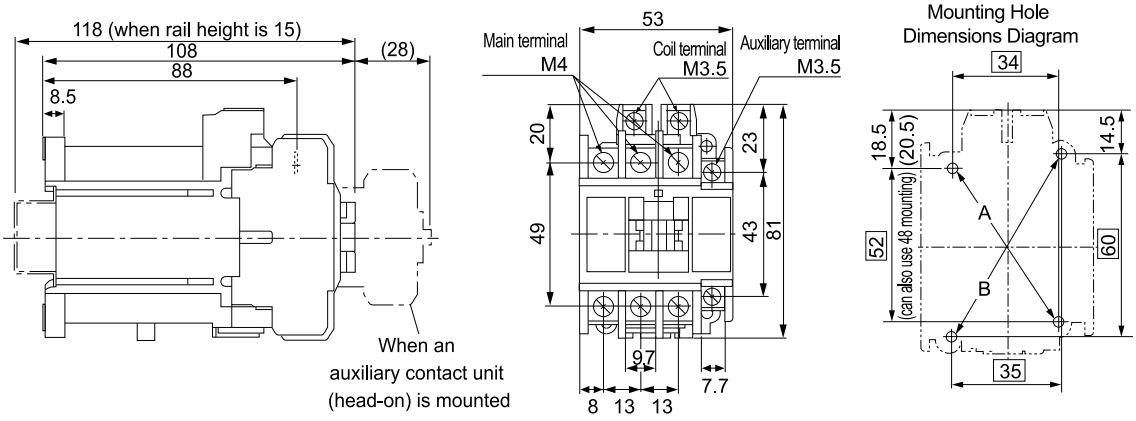
Auxiliary Contacts	Contact Structure
4a	
2a2b	
4b	

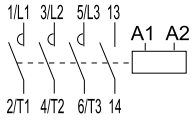
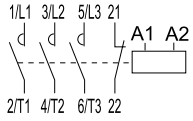
- You can use any of the following two mounting methods.
  A: 70 × 75
  B: (55 to) 60 × 90
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 1.1 kg

■ Model: SC-4-1/G



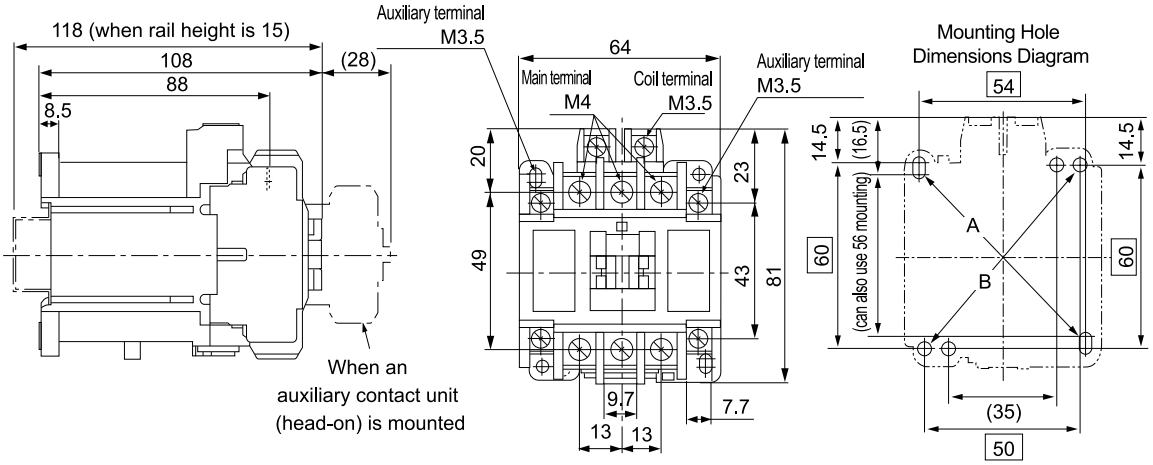
Auxiliary Contacts	Contact Structure
1a	
1b	

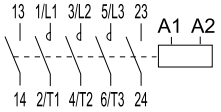
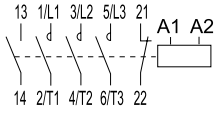
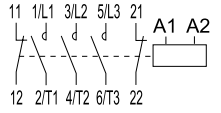
- You can use any of the following two mounting methods.
  A : 34 × (48 to) 52
  B : 35× 60
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 0.6 kg

■ Model: SC-5-1/G



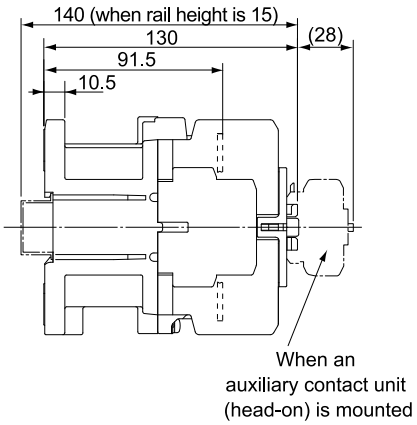
Auxiliary Contacts	Contact Structure
2a	
1a1b	
2b	

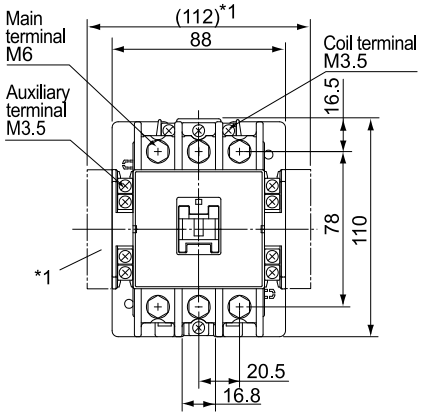
- You can use any of the following two mounting methods.
  A : 54 × (56 to) 60
  B : 50× 60
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

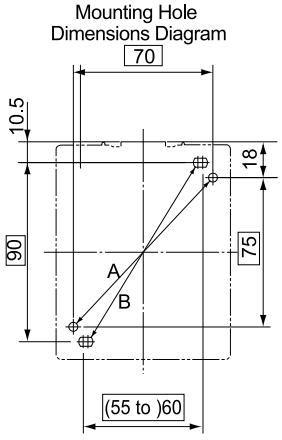
Unit: mm

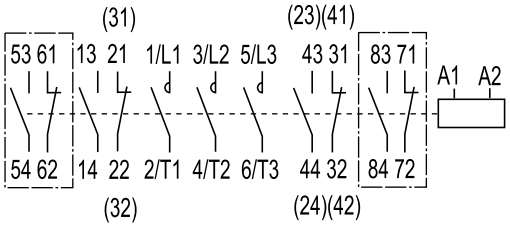
Approx. mass: 0.62 kg

■ Model: SC-N2S/G







Contact Structure


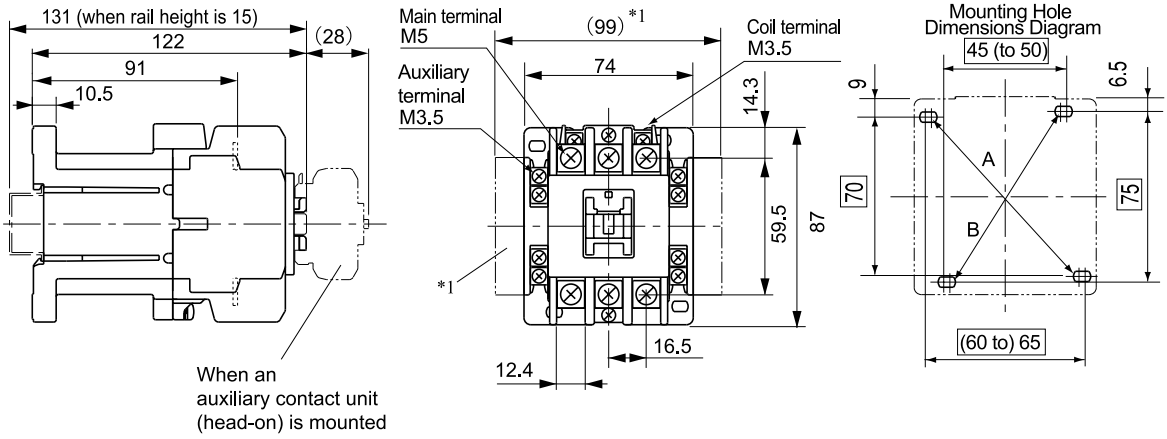
- You can use any of the following two mounting methods.
  A: 70 × 75
  B: (55 to) 65 × 90
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

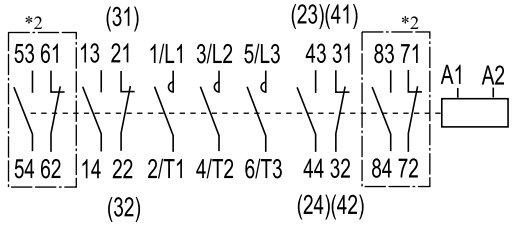
Approx. mass: 1.4 kg

*1 When two side-on auxiliary contact units are installed

■ Model: SC-N1/G



Contact Structure



- You can use any of the following two mounting methods.
  A: 70 × 75
  B: (55 to) 65 × 90
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 0.82 kg

*1 When two side-on auxiliary contact units are installed
*2 In the case of auxiliary contact 4a4b

Note:

The terminal numbers for auxiliary contacts are different from the previous version. The terminal numbers in parentheses are the previous numbers.

SERVOPACK Main Circuit Wires

This section describes the main circuit wires for SERVOPACKs.

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.

1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75°C or higher.
3. Use wires with a rated withstand voltage of 300 V or higher.

Note:

To use 600-V heat-resistant polyvinyl chloride-insulated wire (HIV), use the following table as reference for the applicable wires.

• The specified wire sizes are for three bundled leads when the rated current is applied with a surrounding air temperature of 40°C.

• Select the wires according to the surrounding air temperature.

Σ-XS SERVOPACKs for Use with Three-Phase, 200-VAC Power Supplies

SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
R90A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
1R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
3R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

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SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
7R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables *1	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cables	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables *1	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cables	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

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SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
470A	Main Circuit Power Supply Cables	L1, L2, L3	AWG8 (8.0 mm^2)	M5	2.2 to 2.4
	Servomotor Main Circuit Cables *1	U, V, W	AWG6 (14 mm^2)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm^2)		
	Ground Cable	⏚	AWG14 (2.0 mm^2) or larger		
550A	Main Circuit Power Supply Cables	L1, L2, L3	AWG8 (8.0 mm^2)		
	Servomotor Main Circuit Cables *1	U, V, W	AWG4 (22 mm^2)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG10 (5.5 mm^2)		
	Ground Cable	⏚	AWG14 (2.0 mm^2) or larger		
590A	Main Circuit Power Supply Cables	L1, L2, L3	AWG4 (22 mm^2)	M6	2.7 to 3.0
	Servomotor Main Circuit Cables *1	U, V, W	AWG4 (22 mm^2)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG10 (5.5 mm^2)		
	Ground Cable	⏚	AWG14 (2.0 mm^2) or larger		
780A	Main Circuit Power Supply Cables	L1, L2, L3	AWG3 (30 mm^2)		
	Servomotor Main Circuit Cables *1	U, V, W	AWG3 (30 mm^2)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG8 (8.0 mm^2)		
	Ground Cable	⏚	AWG14 (2.0 mm^2) or larger		

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XS SERVOPACKs with Single-Phase, 200-VAC

SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	Main Circuit Power Supply Cables	L1, L2	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
R90A	Main Circuit Power Supply Cables	L1, L2	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
1R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
120A□□□0008	Main Circuit Power Supply Cables	L1, L2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger		1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XS SERVOPACKs for Use with DC Power Supplies

SERVOPACK Model: SGDXS-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
R90A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
1R6A	Servomotor Main Circuit Cables *2	U, V, W *2	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
3R8A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
5R5A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
7R6A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
120A (Three-phase 200-VAC input)	Servomotor Main Circuit Cables *2	U, V, W	AWG14 (2.0 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
120A□□□0008 (Single-phase 200-VAC input)	Servomotor Main Circuit Cables *2	U, V, W	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

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SERVOPACK Model: SGDXS-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
180A	Servomotor Main Circuit Cables *2	U, V, W	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
200A	Servomotor Main Circuit Cables *2	U, V, W	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cables *2	U, V, W	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cables *2	U, V, W	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M5	2.2 to 2.4
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M5	2.2 to 2.4
550A	Servomotor Main Circuit Cables *2	U, V, W	AWG4 (22 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M5	2.2 to 2.4
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M5	2.2 to 2.4
590A	Servomotor Main Circuit Cables *2	U, V, W	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M6	2.7 to 3.0
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG3 (30 mm²)	M6	2.7 to 3.0
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M6	2.7 to 3.0
780A	Servomotor Main Circuit Cables *2	U, V, W	AWG3 (30 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M6	2.7 to 3.0
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG3 (30 mm²)	M6	2.7 to 3.0
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M6	2.7 to 3.0

*1 Do not wire the following terminals: L1, L2, L3, B2, B3, -1, and - terminals.
*2 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Three-Phase, 200-VAC Wires for Σ-XW SERVOPACKs

SERVOPACK Model: SGDXW-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
7R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XW SERVOPACKs with Single-Phase, 200-VAC

SERVOPACK Model: SGDXW-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²)以上	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²)以上	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cables	L1, L2	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²)以上	M4	1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

DC Power Supply Wires for Σ-XW SERVOPACKs

SERVOPACK Model: SGDXW-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
5R5A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
7R6A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

*1 Do not wire the following terminals: L1, L2, L3, B2, B3, -1, and - terminals.
*2 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XT SERVOPACKs for Use with Three-Phase, 200-VAC Power Supplies

SERVO-PACK Model: SGDXT-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)	–	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)	–	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XT SERVOPACKs for Use with Single-Phase, 200-VAC Power Supplies

SERVO-PACK Model SGDXT-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)	–	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)	–	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XT SERVOPACKs for Use with DC Power Supplies

SERVOPACK Model: SGDXT-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

*1 Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, and ⊖ terminals.
*2 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XS SERVOPACKs for Use with Three-Phase, 400-VAC

SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R9D	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	-	–
	Servomotor Main Circuit Cables *1	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	-	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
3R5D	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	-	–
	Servomotor Main Circuit Cables *1	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	-	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4

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SERVO-PACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
5R4D	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	-	–
	Servomotor Main Circuit Cables *1*	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	-	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
8R4D	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	M4	1.4
	Servomotor Main Circuit Cables *1*	U, V, W	AWG14 (2.0 mm²)	M4	1.4
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	M4	1.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *2*	M4	1.2 to 1.4
120D	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.4
	Servomotor Main Circuit Cables *1*	U, V, W	AWG14 (2.0 mm²)	M4	1.4
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	M4	1.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *2*	M4	1.2 to 1.4
170D	Main Circuit Power Supply Cables	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.4
	Servomotor Main Circuit Cables *1*	U, V, W	AWG10 (5.5 mm²)	M4	1.4
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)	M4	1.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *2*	M4	1.2 to 1.4

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SERVO-PACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
210D	Main Circuit Power Supply Cables	L1, L2, L3	AWG10 (5.5 mm²)	M6	5
	Servomotor Main Circuit Cables *1	U, V, W	AWG10 (5.5 mm²)	M6	5
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, B2	AWG12 (3.5 mm²)	M6	5
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *2	M6	2.7 to 3
260D	Main Circuit Power Supply Cables	L1, L2, L3	AWG10 (5.5 mm²)	M6	5
	Servomotor Main Circuit Cables *1	U, V, W	AWG8 (8.0 mm²)	M6	5
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, B2	AWG10 (5.5 mm²)	M6	5
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *2	M6	2.7 to 3
280D	Main Circuit Power Supply Cables	L1, L2, L3	AWG8 (8.0 mm²)	M6	5
	Servomotor Main Circuit Cables *1	U, V, W	AWG8 (8.0 mm²)	M6	5
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, B2	AWG10 (5.5 mm²)	M6	5
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *2	M6	2.7 to 3
370D	Main Circuit Power Supply Cables	L1, L2, L3	AWG6 (14 mm²)	M6	5
	Servomotor Main Circuit Cables *1	U, V, W	AWG6 (14 mm²)	M6	5
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, B2	AWG8 (8.0 mm²)	M6	5
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *2	M6	2.7 to 3

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.
*2 The power-side protective ground wire size should be AWG7 (10 mm²) or more.

Σ-XS SERVOPACKs for Use with 540-VDC Power Supply Input

SERVOPACK Model: SGDXS-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
1R9D	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	-
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	-	-
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	-
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
3R5D	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	-
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	-	-
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	-
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
5R4D	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	-
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	-	-
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	-
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
8R4D	Servomotor Main Circuit Cables *2	U, V, W	AWG14 (2.0 mm²)	M4	1.4
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	M4	1.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *3	M4	1.2 to 1.4
120D	Servomotor Main Circuit Cables *2	U, V, W	AWG14 (2.0 mm²)	M4	1.4
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG14 (2.0 mm²)	M4	1.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *3	M4	1.2 to 1.4

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SERVO-PACK Model: SGDXS-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
170D	Servomotor Main Circuit Cables *2	U, V, W	AWG10 (5.5 mm²)	M4	1.4
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG10 (5.5 mm²)	M4	1.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *3	M4	1.2 to 1.4
210D	Servomotor Main Circuit Cables *2	U, V, W	AWG10 (5.5 mm²)	M6	5
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG10 (5.5 mm²)	M6	5
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *3	M6	2.7 to 3
260D	Servomotor Main Circuit Cables *2	U, V, W	AWG8 (8 mm²)	M6	5
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG8 (8 mm²)	M6	5
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *3	M6	2.7 to 3
280D	Servomotor Main Circuit Cables *2	U, V, W	AWG8 (8.0 mm²)	M6	5
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG8 (8.0 mm²)	M6	5
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *3	M6	2.7 to 3
370D	Servomotor Main Circuit Cables *2	U, V, W	AWG6 (14 mm²)	M6	5
	Control Power Supply Cable	24 V, 0 V	AWG16 (1.25 mm²)	M4	1.4
	External Regenerative Resistor Cables	B1/⊕, ⊖2	AWG6 (14 mm²)	M6	5
	Ground Cable	⏚	AWG14 (2.0 mm²) or more *3	M6	2.7 to 3

*1 Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1 terminals.
*2 If you do not use the recommended servomotor main circuit cable, use this table to select wires.
*3 The power-side protective ground wire size should be AWG7 (10 mm²) or more.

Wire Types

The following table shows the wire sizes and allowable currents for three bundled leads.

HIV Specifications *1		Allowable Current at Surrounding Air Temperatures [Arms]		
Nominal Cross-Sectional Area [mm²]	Configuration [Wires/mm]	30°C	40°C	50°C
0.9	7/0.4	15	13	11
1.25	7/0.45	16	14	12
2.0	7/0.6	23	20	17
3.5	7/0.8	32	28	24
5.5	7/1.0	42	37	31
8.0	7/1.2	52	46	39
14.0	7/1.6	75	67	56
22.0	7/2.0	98	87	73
38.0	7/2.6	138	122	103

*1 This is reference data based on JIS C3317 600-V-grade heat-resistant polyvinyl chloride-insulated wires (HIV).

Crimp Terminals and Insulating Sleeves

If you use crimp terminals for wiring, use insulating sleeves. Do not allow the crimp terminals to come close to adjacent terminals or the case.

To comply with UL standards, you must use UL-compliant closed-loop crimp terminals and insulating sleeves for the main circuit terminals. Use the tool recommended by the crimp terminal manufacturer to attach the crimp terminals.

The following tables give the recommended tightening torques, closed-loop crimp terminals, and insulating sleeves in sets. Use the set that is suitable for your model and wire size.

Σ-XS SERVOPACKs with Three-Phase, 200-VAC or DC Power Supplies

SERVOPACK Model: SGDXS-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
180A, 200A	Terminal block	M4	1.0 to 1.2	7.7 mm max.	AWG10 (5.5 mm²)	5.5-S4	YHT-2210	–	TP-005
					AWG14 (2.0 mm²)	2-M4		–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
330A	Terminal block	M4	1.0 to 1.2	9.9 mm max.	AWG8 (8.0 mm²)	8-4NS	YPT-60N	TD-121 TD-111	TP-008
					AWG14 (2.0 mm²)	R2-4	YHT-2210	–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
470A, 550A	Terminal block	M5	2.2 to 2.4	13 mm max.	AWG4 (22 mm²)	22-S5	YPT-60N	TD-123 TD-112	TP-022
					AWG6 (14 mm²)	R14-5		TD-122 TD-111	TP-014
					AWG8 (8.0 mm²)	R8-5		TD-121 TD-111	TP-008
					AWG10 (5.5 mm²)	R5.5-5	YHT-2210	–	TP-005
					AWG14 (2.0 mm²)	R2-5		–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M5	2.2 to 2.4	12 mm max.	AWG14 (2.0 mm²)	R2-5	YHT-2210	–	–

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SERVOPACK Model: SGDXS-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
590A, 780A	Terminal block	M6	2.7 to 3.0	18 mm max.	AWG3 (30 mm²)	38-S6	YPT-60N	TD-124 TD-112	TP-038
					AWG4 (22 mm²)	R22-6		TD-123 TD-112	TP-022
					AWG8 (8.0 mm²)	R8-6		TD-121 TD-111	TP-008
					AWG10 (5.5 mm²)	R5.5-6	YHT-2210	–	TP-005
					AWG14 (2.0 mm²)	R2-6		–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M6	2.7 to 3.0	12 mm max.	AWG14 (2.0 mm²)	R2-6	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

Σ-XS SERVOPACKs for Use with Single-Phase, 200-VAC Power Supplies

SERVOPACK Model SGDXS-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
R70A, R90A, 1R6A, 2R8A, 5R5A, 120A □□□ 0008	Connectors	-							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

Σ-XW SERVOPACKs with Three-Phase, 200-VAC or DC Power Supplies

SERVOPACK Model: SGDXW-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
1R6A, 2R8A, 5R5A, 7R6A	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

Σ-XW SERVOPACKs with Single-Phase, 200-VAC

SERVOPACK Model: SGDXW-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
1R6A, 2R8A, 5R5A	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

Σ-XT SERVOPACKs with Three-Phase, 200-VAC or DC Power Supplies, or Single-Phase, 200-VAC

SERVOPACK Model: SGDXT-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
1R6A, 2R8A	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

Σ-XS SERVOPACKs for Use with Three-Phase, 400-VAC or 540-VDC Power Supply Input

SERVOPACK Model SGDXS-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
1R9D, 3R5D, 5R4D	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
8R4D, 120D, 170D	Terminal block	M4	1.4	10 mm max.	AWG10 (5.5 mm²)	R5.5-4	YHT-2210	–	TP-005
					AWG12 (3.5 mm²)				
					AWG14 (2.0 mm²)	R2-4			TP-003
					AWG16 (1.25 mm²)	R1.25-4			
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	TP-003
					AWG7 (10 mm²)	8-4NS	YPT-60N	TD-122 TD-111	TP-008

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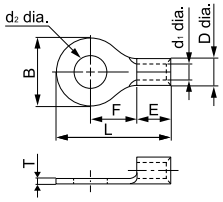
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SERVOPACK Model SGDXS-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
210D, 260D, 280D, 370D	Terminal block	M6	5	17 mm max.	AWG6 (14 mm²)	R14-6	YPT-60N	TD-122 TD-111	TP-014
					AWG8 (8.0 mm²)	R8-6		TD-121 TD-111	TP-008
					AWG10 (5.5 mm²)	R5.5-6	YHT-2210	–	TP-005
					AWG12 (3.5 mm²)				
		M4	1.4	8.6 mm max.	AWG16 (1.25 mm²)	R1.25-4	YHT-2210	-	TP-003
	⏚	M6	2.7 to 3	17 mm max.	AWG7 (10 mm²)	R8-6	YPT-60N	TD-121 TD-111	TP-008
					AWG6 (14 mm²)	R14-6		TD-122 TD-111	TP-014
				12 mm max.	AWG14 (2.0 mm²)	R2-6	YHT-2210	-	-

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

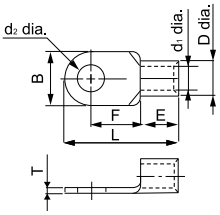
Crimp Terminal Dimensional Drawings

■ Crimp Terminal Model: 2-M4, R2-4, R2-5, R2-6, 5.5-S4, R5.5-5, R5.5-6



Crimp Terminal Model	Dimensions (mm)							
	d_2 dia.	B	L	F	E	D dia.	d_1 dia.	T
2-M4	4.3	6.6	14.4	6.3	4.8	4.1	2.3	0.8
R2-4		8.5	16.8	7.8				
R2-5	5.3	9.5	16.8	7.3				
R2-6	6.4	12.0	21.8	11.0				
5.5-S4	4.3	7.2	15.7	5.9	6.2	5.6	3.4	1.0
R5.5-5	5.3	9.5	19.8	8.3	6.8			
R5.5-6	6.4	12.0	25.8	13.0				

■ Crimp Terminal Model: 8-4NS, R8-5, R8-6, R14-5, 22-S5, R22-6, 38-S6



Crimp Terminal Model	Dimensions (mm)							
	d_2 dia.	B	L	F	E	D dia.	d_1 dia.	T
8-4NS	4.3	8.0	21.8	9.3	8.5	7.1	4.5	1.2
R8-5	5.3	12.0	23.8					
R8-6	6.4							
R14-5	5.3		29.8	13.3	10.5	9.0	5.8	1.5
22-S5	5.3		30.0	12.0	12.0	11.5	7.7	1.8
R22-6	6.4	16.5	33.7	13.5				
38-S6		15.5	38.0	16.0	14.0	13.3	9.4	

Noise Filter

Noise filters are used to reduce external noise that can enter on the power supply line or conductive noise from the SERVOPACK.

> Important
> Some noise filters have large leakage currents. The grounding conditions also affect the amount of the leakage current. If necessary, select an appropriate leakage detector or earth leakage circuit breaker taking into account the grounding conditions and the leakage current from the noise filter.

Selection Table

■ Σ-XS SERVOPACKs

Main Circuit Power Supply	SERVOPACK		Order Number	Specification	Mass	Leakage Current	Manufacturer	Inquiries
	Maximum Applicable Motor Capacity [kW]	Model SGDXS-						
Three-phase, 200 VAC	0.05	R70A	HF3010C-SZC	Three-phase, 500 VAC, 10A	1.0 kg	4mA 200 VAC/60 Hz	Soshin Electric Co., Ltd.	Yaskawa representative
	0.1	R90A						
	0.2	1R6A						
	0.4	2R8A						
	0.5	3R8A						
	0.75	5R5A	HF3020C-SZC	Three-phase, 500 VAC, 20A	1.4 kg			
	1.0	7R6A						
	1.5	120A						
	2.0	180A						
	3.0	200A	HF3030C-SZC	Three-phase, 500 VAC, 30A	1.4 kg			
	5.0	330A	HF3050C-SZC-47EDD	Three-phase, 500 VAC, 50A	2.0 kg	8mA 200 VAC/60 Hz		
	6.0	470A						
	7.5	550A	HF3060C-SZC	Three-phase, 500 VAC, 60A	2.1 kg	4mA 200 VAC/60 Hz		
	11	590A	HF3100C-SZC	Three-phase, 500 VAC, 100A	5.8 kg			
	15	780A						
Single-phase, 200 VAC	0.05	R70A	HF2010A-UPF	Single-phase, 250 VAC, 10 A	0.5 kg	1.2mA 250 VAC/60 Hz		
	0.1	R90A						
	0.2	1R6A						
	0.4	2R8A						
	0.75	5R5A	HF2020A-UPF-2BB	Single-phase, 250 VAC, 20 A	0.8 kg	3mA 250 VAC/60 Hz		
	1.5	120A□□□0008	HF2030A-UPF-2BB	Single-phase, 250 VAC, 30 A	0.8 kg			

■ Σ-XW SERVOPACKs

Main Circuit Power Supply	SERVOPACK		Order Number	Specification	Mass	Leakage Current	Manufacturer	Inquiries
	Maximum Applicable Motor Capacity [kW]	Model SGDXW-						
Three-phase, 200 VAC	0.2	1R6A	HF3010C-SZC	Three-phase, 500 VAC, 10A	1.0 kg	4mA 200 VAC/60 Hz	Soshin Electric Co., Ltd.	Yaskawa representative
	0.4	2R8A	HF3020C-SZC	Three-phase, 500 VAC, 20A	1.4 kg			
	0.75	5R5A						
	1.0	7R6A						
Single-phase, 200 VAC	0.2	1R6A	HF2010A-UPF	Single-phase, 250 VAC, 10 A	0.5 kg	1.2mA 250 VAC/60 Hz		
	0.4	2R8A	HF2020A-UPF-2BB	Single-phase, 250 VAC, 20 A	0.8 kg	3mA 250 VAC/60 Hz		
	0.75	5R5A	HF2030A-UPF-2BB	Single-phase, 250 VAC, 30 A	0.8 kg			

■ Σ-XT SERVOPACKs

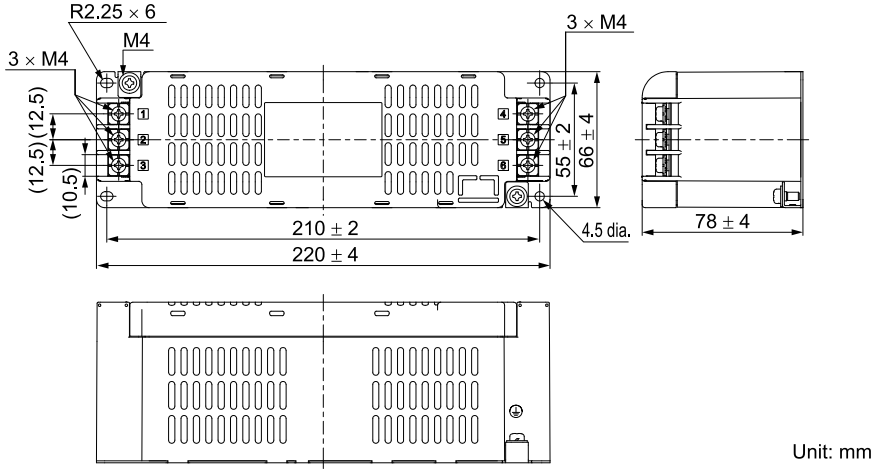
Main Circuit Power Supply	SERVOPACK		Order Number	Specification	Mass	Leakage Current	Manufacturer	Inquiries
	Maximum Applicable Motor Capacity [kW]	Model SGDXT-						
Three-phase, 200 VAC	0.2	1R6A	HF3020C-SZC	Three-phase, 500 VAC, 20A	1.4 kg	4mA 200 VAC/60 Hz	Soshin Electric Co., Ltd.	Yaskawa representative
	0.4	2R8A						
Single-phase, 200 VAC	0.2	1R6A	HF2020A-UPF-2BB	Single-phase, 250 VAC, 20 A	0.8 kg	3mA 250 VAC/60 Hz		
	0.4	2R8A	HF2030A-UPF-2BB	Single-phase, 250 VAC, 30 A	0.8 kg			

■ Σ-XS SERVOPACKs for Use with Three-Phase, 400-VAC

Main Circuit Power Supply	SERVOPACK		Order Number	Specification	Mass	Leakage Current	Manufacturer	Inquiries
	Maximum Applicable Motor Capacity [kW]	Model SGDXS-						
Three-phase, 400 VAC	0.5	1R9D	FN3288-10-44-C21-R65	Three-phase, 480 VAC, 10 A	0.8 kg	0.4 mA 530 VAC/50 Hz	Schaffner EMC Co., Ltd.	Yaskawa representative
	1.0	3R5D						
	1.5	5R4D						
	2.0	8R4D	FN3288-16-44-C17-R65	Three-phase, 480 VAC, 16 A	1.0 kg	0.1 mA 530 VAC/50 Hz		
	3.0	120D						
	5.0	170D	FN3120H-50-53	Three-phase, 480 VAC, 50 A	2.7 kg	10.5 mA 520 VAC/50 Hz		
	6.0	210D	HF3050C-UQC	Three-phase, 480 VAC, 50 A	4.0 kg	10 mA 400 VAC/50 Hz	Soshin Electric Co., Ltd.	
	7.5	260D						
	11	280D	HF3080C-UQB	Three-phase, 480 VAC, 80 A	9.0 kg			
	15	370D						

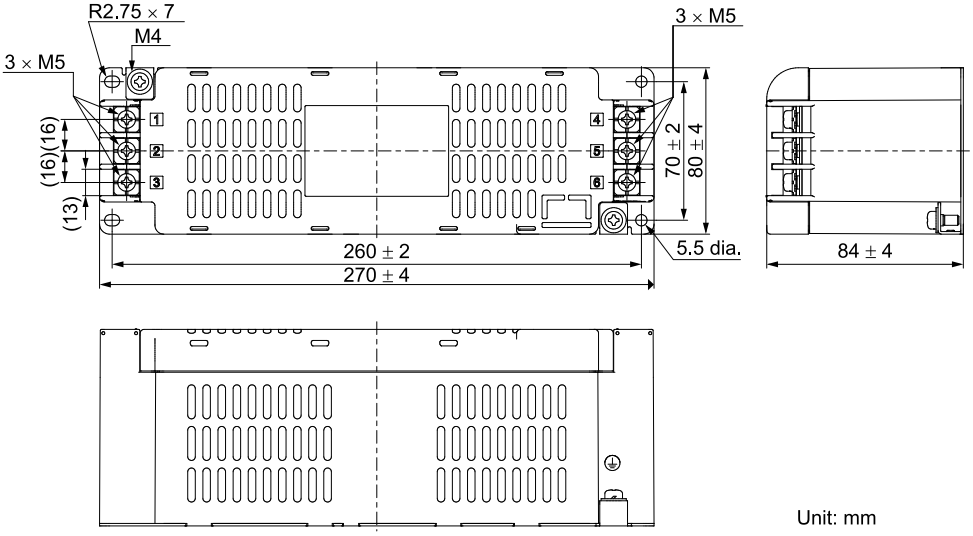
External Dimensions

■ Model: HF3010C-SZC, HF3020C-SZC, HF3030C-SZC



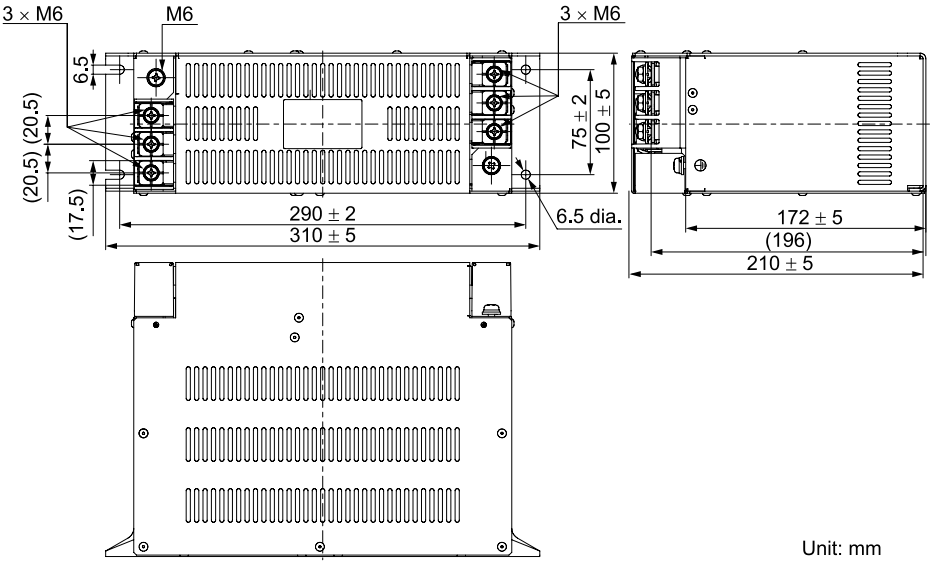
Unit: mm

■ Model: HF3050C-SZC-47EDD, HF3060C-SZC



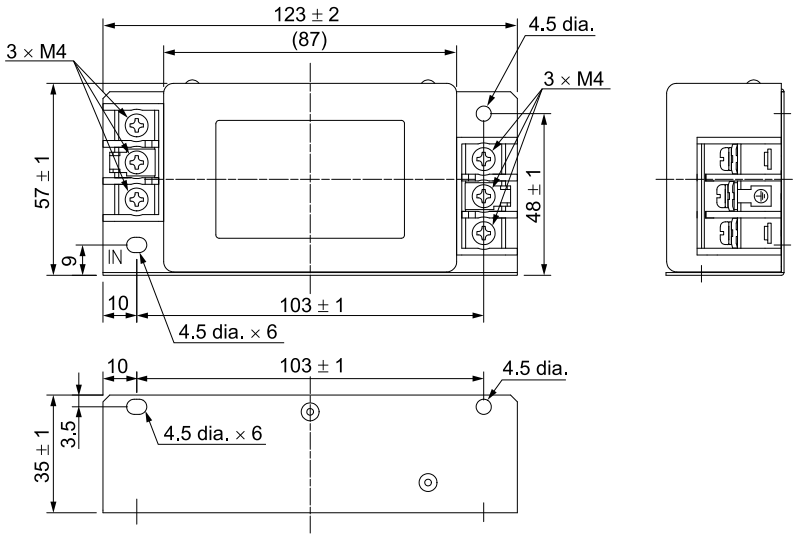
Unit: mm

■ Model: HF3100C-SZC



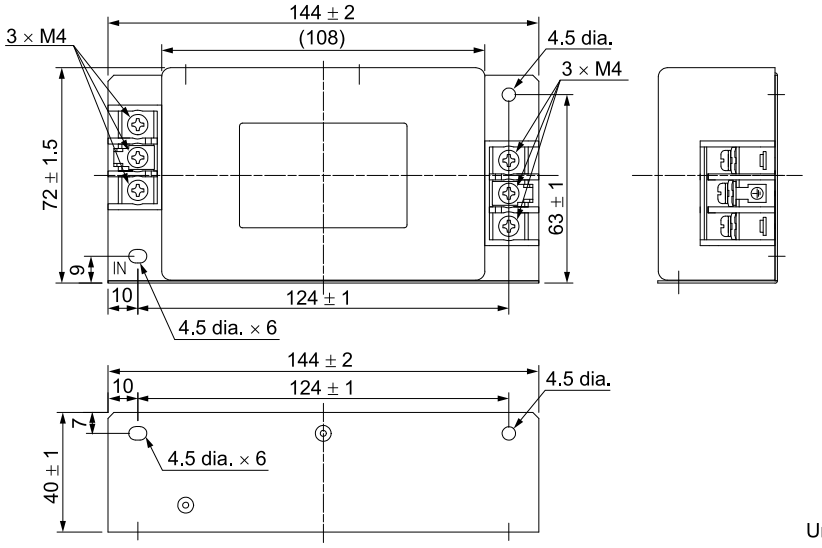
Unit: mm

■ Model: HF2010A-UPF



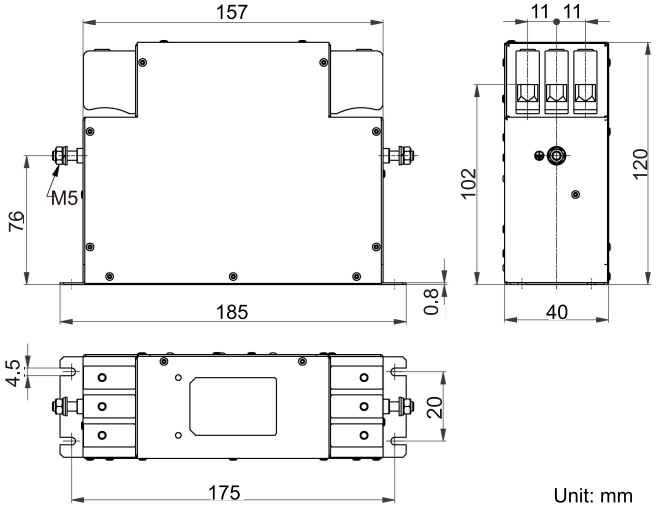
Unit: mm

■ Model: HF2020A-UPF-2BB, HF2030A-UPF-2BB

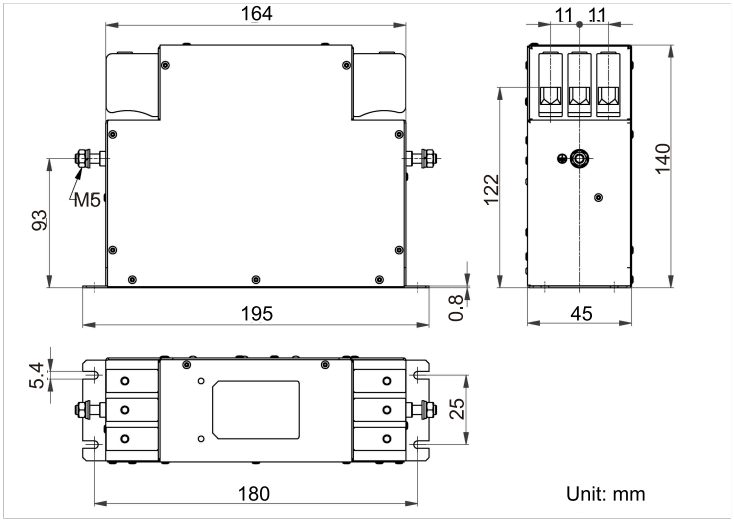


Unit: mm

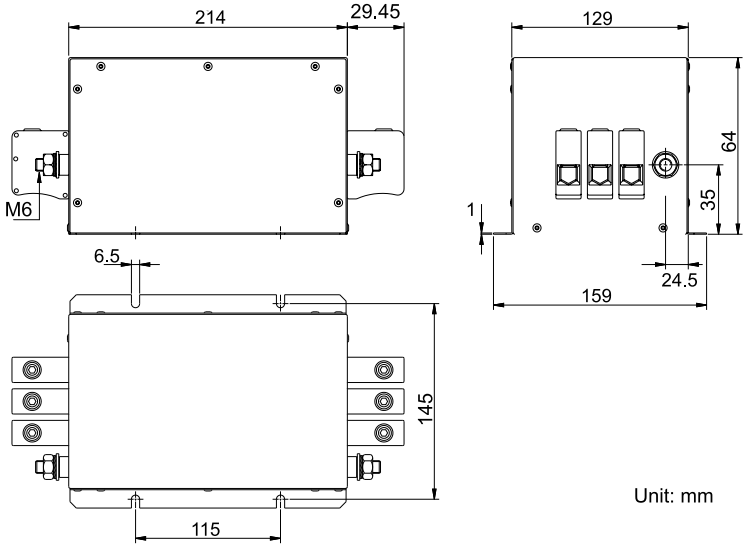
■ Model: FN3288-10-44-C21-R65



■ Model: FN3288-16-44-C17-R65

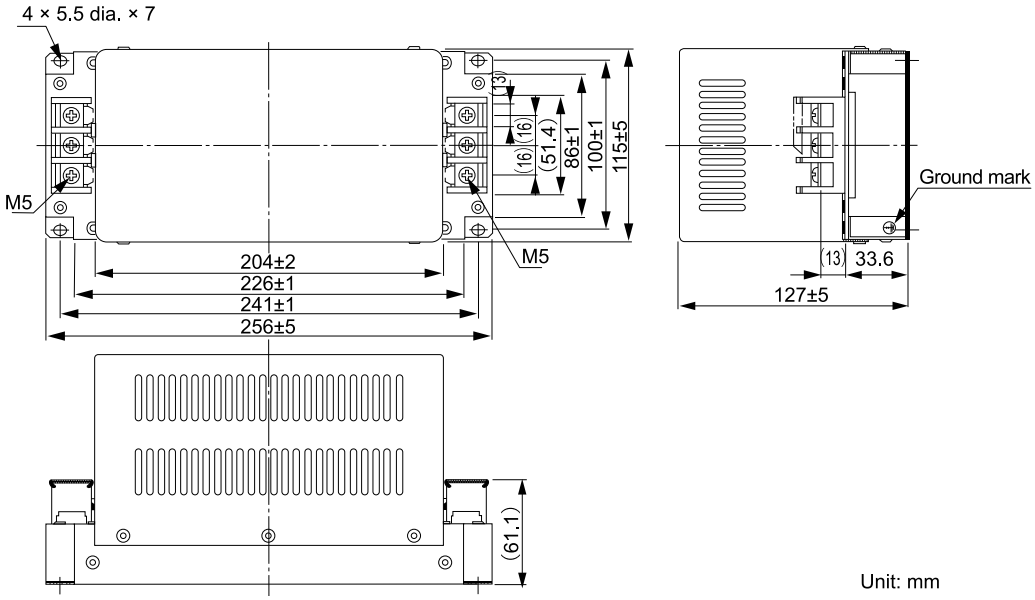


■ Model: FN3120H-50-53



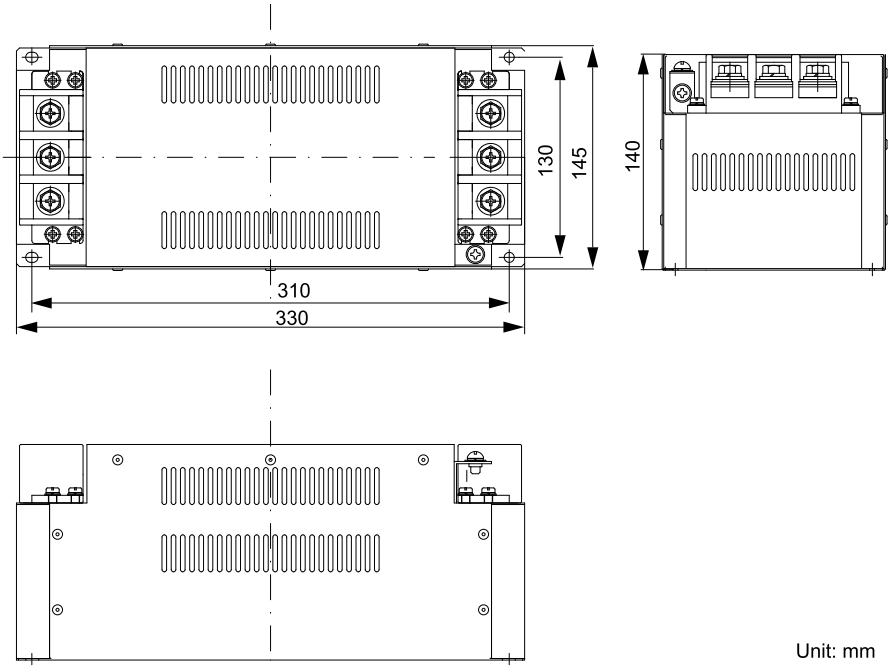
Unit: mm

■ Model: HF3050C-UQC



Unit: mm

■ Model: HF3080C-UQB



Unit: mm

AC/DC Reactors

Use the Reactors listed in the following tables if harmonic suppression is required.

Selection Table

■ Σ-XS SERVOPACKs for Use with Three-Phase, 200-VAC

SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXS-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.05	R70A	X5061	2.0	4.8	0.5 kg	M4
0.1	R90A					
0.2	1R6A					
0.4	2R8A					
0.5	3R8A					
0.75	5R5A					
1.0	7R6A					
1.5	120A	X5060	1.5	8.8	1.0 kg	M4
2.0	180A					
3.0	200A	X5059	1.0	14.0	1.1 kg	M5

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SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXS-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
5.0	330A	X5068	0.47	26.8	1.9 kg	M6
6.0	470A	X008025	0.49	28.3	2.6 kg	M6
7.5	550A	X008026	0.43	35.5	2.9 kg	M6
11	590A	X008027	0.32	49.7	3.5 kg	M6
15	780A	X008028	0.26	72.6	4.0 kg	M6

■ Σ-XS SERVOPACKs for Use with Single-Phase, 200-VAC

SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXS-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.05	R70A	X5071	40.0	0.85	0.5 kg	M4
0.1	R90A					
0.2	1R6A	X5070	20.0	1.65	0.8 kg	M4
0.4	2R8A	X5069	10.0	3.3	1.0 kg	M4
0.75	5R5A	X5079	4.0	5.3	1.2 kg	M4
1.5	120A□□□0008	X5078	2.5	10.5	2.0 kg	M5

■ Σ-XW SERVOPACKs for Use with Three-Phase, 200-VAC

SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXW-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.2	1R6A	X5061	2.0	4.8	0.5 kg	M4
0.4	2R8A					
0.75	5R5A	X5060	1.5	8.8	1.0 kg	M4
1.0	7R6A					

■ Σ-XW SERVOPACKs for Use with Single-Phase, 200-VAC

SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXW-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.2	1R6A	X5069	10.0	3.3	1.0 kg	M4
0.4	2R8A	X5079	4.0	5.3	1.2 kg	M4
0.75	5R5A	X5078	2.5	10.5	2.0 kg	M5

■ Σ-XT SERVOPACKs for Use with Three-Phase, 200-VAC

SERVOPACKs		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXT-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.2	1R6A	X5061	2.0	4.8	0.5 kg	M4
0.4	2R8A	X5060	1.5	8.8	1.0 kg	M4

■ Σ-XT SERVOPACKs for Use with Single-Phase, 200-VAC

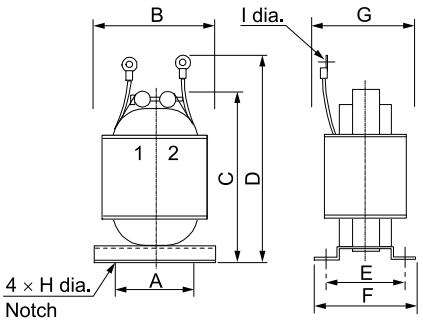
SERVOPACKs		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXT-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.2	1R6A	X5079	4.0	5.3	1.2 kg	M4
0.4	2R8A	X5078	2.5	10.5	2.0 kg	M5

■ Σ-XS SERVOPACKs for Use with Three-Phase, 400-VAC

SERVOPACKs		DC Reactors				
Maximum Applicable Motor Capacity [kW] *1	Model SGDXS-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.5	1R9D	X5074	4.7	4.7	0.3 kg	M4
1.0	3R5D	X5075	3.3	4.5	0.9 kg	M4
1.5	5R4D					
2.0	8R4D	X5076	2.2	8.6	1.1 kg	M4
3.0	120D					
5.0	170D	X5077	1.5	14.1	1.9 kg	M5

*1 DC reactors of 6 kW or more are in preparation.

External Dimensions



Unit: mm

AC/DC Reactors Order Number	External Dimensions [mm]									Approx. Mass [kg]
	A	B	C	D	E	F	G	H	I	
X5059	50	74	125	140	35	45	60	5	5.3	1.1
X5060	40	59	105	125	45	60	65	4	4.3	1.0
X5061	35	52	80	95	35	45	50	4	4.3	0.5
X5068	50	74	125	155	53	66	75	5	6.4	1.9
X5069	40	59	105	125	45	60	65	4	4.3	1.0
X5070	40	59	100	120	35	45	50	4	4.3	0.8
X5071	35	52	80	95	30	40	45	4	4.3	0.5
X5078	50	74	125	155	60	70	80	5	5.3	2.0
X5079	50	74	125	140	35	45	60	5	4.3	1.2
X008025	75	95	155	225	55	70	76	4.5	6.4	2.6
X008026	75	95	155	225	60	75	81	4.5	6.4	2.9
X008027	75	95	155	215	70	85	91	4.5	6.4	3.5
X008028	75	95	160	225	80	95	101	4.5	6.4	4.0

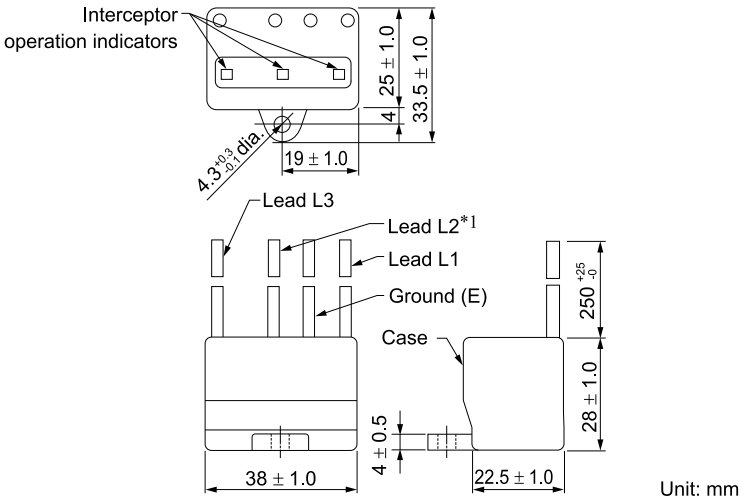
Surge Absorbers

A surge absorber absorbs lightning surge voltages and other abnormal voltages from the power supply input line to prevent faulty operation in or damage to electronic circuits.

Selection Table

Main Circuit Power Supply	SERVOPACK Model: SGDXS- SGDXW- SGDXT-	Order Number (Recommended Product)	Manufacturer	Inquiries
Three-phase, 200 VAC	□□□A	LT-C32G801WS	Soshin Electric Co., Ltd.	Yaskawa representative
Single-phase, 200 VAC		LT-C12G801WS		
Three-phase, 400 VAC	□□□D	LT-C35G102WS		

External Dimensions

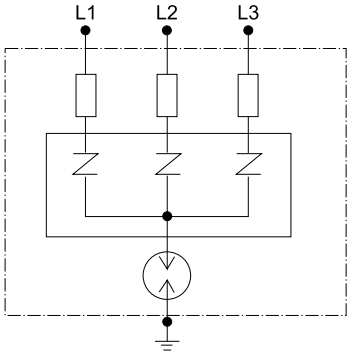


*1 The LT-C12G801WS does not have lead L2.

Note:

The wire size for all of the leads (L1, L2, and L3) and the ground wire (E) is AWG16 (UL1015).

Internal Cables Connections



Regenerative Resistor

If the regenerative power exceeds the amount that can be absorbed by charging the smoothing capacitor, a regenerative resistor is used.

Specifications of Built-in Regenerative Resistors in SERVOPACKs

The following table gives the specifications of the built-in regenerative resistors in the SERVOPACKs and the amount of regenerative power (average values) that they can process.

SERVOPACK Model:	Built-in Regenerative Resistor		Regenerative Power Processing Capacity of Built-in Regenerative Resistor [W]	Minimum Allowable Resistance [Ω]
SGDXS-	Resistance [Ω]	Capacity [W]		
R70A, R90A, 1R6A, 2R8A	-	-	-	40
3R8A, 5R5A, 7R6A	35	60	15	35
120A	20	60	30	20
180A	12	60	30	12
200A	10	60	30	10
330A	6	180	36	6
470A	(5) *1	(880) *1	(180) *1	5
550A, 590A, 780A	(3.13) *2	(1760) *2	(350) *2	2.9
1R9D, 3R5D, or 5R4D	56	70	14	56
8R4D or 120D	33	180	28	33
170D	22		36	22
210D or 260D	(12) *3	(880) *3	(180) *3	12
280D or 370D	(10) *4	(1760) *4	(350) *4	10

*1 The values in parentheses ( ) are for the optional JUSP-RA29-E regenerative resistor unit.
*2 The values in parentheses ( ) are for the optional JUSP-RA05-E regenerative resistor unit.
*3 The values in parentheses ( ) are for the optional JUSP-RA30-E regenerative resistor unit.
*4 The values in parentheses ( ) are for the optional JUSP-RA31-E regenerative resistor unit.

SERVOPACK Model:	Built-in Regenerative Resistor		Regenerative Power Processing Capacity of Built-in Regenerative Resistor [W]	Minimum Allowable Resistance [Ω]
SGDXW-	Resistance [Ω]	Capacity [W]		
1R6A, 2R8A	35	60	20	35
5R5A, 7R6A	12	70	25	12

SERVOPACK Model	Built-in Regenerative Resistor		Regenerative Power Processing Capacity of Built-in Regenerative Resistor [W]	Minimum Allowable Resistance [Ω]
SGDXT-	Resistance [Ω]	Capacity [W]		
1R6A, 2R8A	12	70	14	12

Specifications and Dimensions of External Regenerative Resistors

■ Selection Table

Model	Specification	Mass	Wire Size	Manufacturer
RH120	70 W, 1 Ω to 100 Ω	282 g	AWG16 (1.25 mm^2)	Iwaki Musen Kenkyusho Co., Ltd.
RH150	90 W, 1 Ω to 100 Ω	412 g	AWG14 (2.0 mm^2)	
RH220	120 W, 1 Ω to 100 Ω	500 g	AWG16 (1.25 mm^2)	
RH220B	120 W, 1 Ω to 100 Ω	495 g	AWG14 (2.0 mm^2)	
RH300C	200 W, 1 Ω to 10 kΩ	850 g	AWG14 (2.0 mm^2)	
RH450	150 W, 1 Ω to 100 Ω	880 g	AWG14 (2.0 mm^2)	
RH450FY	150 W, 2 Ω to 100 Ω	1.3 kg	AWG14 (2.0 mm^2)	
RH500	300 W, 2 Ω to 50 Ω	1.4 kg	AWG14 (2.0 mm^2)	

RH120 (Model) 10Ω (Resistance) J (Resistance Tolerance)

Code	Specification
K	±10%
J	±5%
H*1	±3%

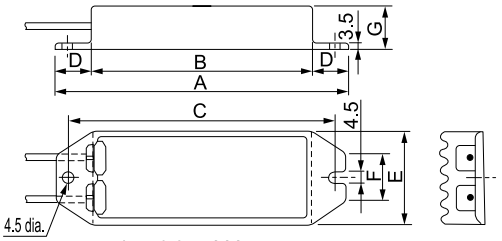
*1 An external regenerative resistor with resistance tolerance H (±3%) is not available for the RH450FY.

■ Specification

Item	Specification
Resistance Tolerance	K: ±10%, J: ±5%, H: ±3%
Temperature Resistance Characteristics	At less than 20 Ω: ±400 PPM/°C, at 20 Ω or higher: ±260 PPM/°C
Withstand Voltage	2,000 VAC/1 min, ΔR: ±(0.1% + 0.05 Ω)
Insulation Resistance	500 VDC, 20 MΩ min.
Short-Duration Overload	10 times the rated power applied for 5 s: ΔR: ±(2% + 0.05 Ω)
Service Life	1,000 hours at ratings, 90 min ON, 30 min OFF: ΔR: ±(5% + 0.05 Ω)
Flame Resistance	There must be no ignition when 10 times the rated power is applied for 1 min.
Surrounding Air Temperature Range	-25°C to 150°C

■ External Dimensions

◆ Model: RH120, 150, 220

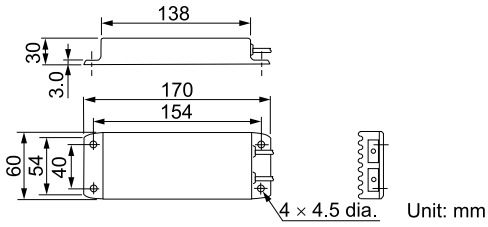


Lead: L = 300

Model	Rated Power	Resistance Range	Wire Size
RH120	70 W	1 Ω to 100 Ω	AWG16 (1.25 mm²)
RH150	90 W		AWG14 (2.0 mm²)
RH220	120 W		AWG16 (1.25 mm²)

External Dimensions [mm]							Mass
A	B	C	D	E	F	G	
182	150	172	16	42	22	20	282 g
212	180	202	16	44	24	30	412 g
230	200	220	15	60	24	20	500 g

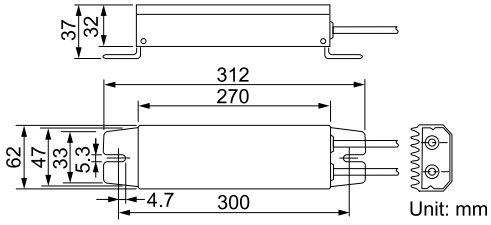
◆ Model: RH220B



Unit: mm

Lead: L = 500
Rated power: 120 W
Resistance range: 1 Ω to 100 Ω
Wire size: AWG14 (2.0 mm²)
Mass: 495 g

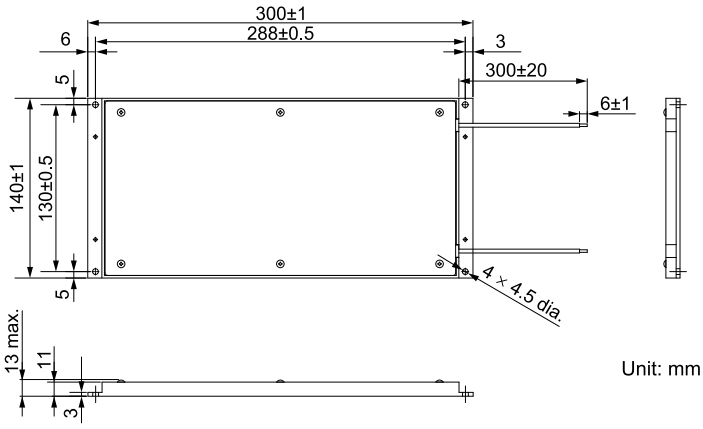
◆ Model: RH300C



Unit: mm

Lead: L = 300
Rated power: 200 W
Resistance range: 1 Ω to 10 kΩ
Wire size: AWG14 (2.0 mm²)
Mass: 850 g

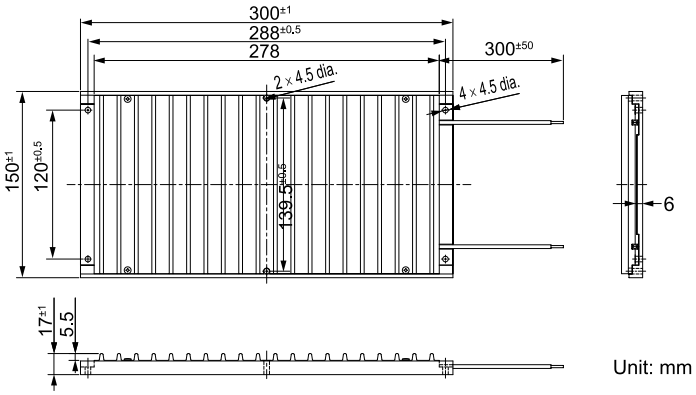
◆ Model: RH450



Lead: L = 300
Rated power: 150 W
Resistance range: 1 Ω to 100 Ω
Wire size: AWG14 (2.0 mm²)
Mass: 880 g

Unit: mm

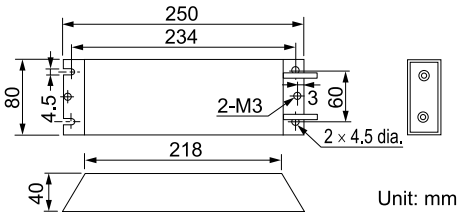
◆ Model: RH450FY



Lead: L = 300
Rated power: 150 W
Resistance range: 2 Ω to 100 Ω
Wire size: AWG14 (2.0 mm²)
Mass: 1.3 kg

Unit: mm

◆ Model: RH500



Lead: L = 450
Rated power: 300 W
Resistance range: 2 Ω to 50 Ω
Wire size: AWG14 (2.0 mm²)
Mass: 1.4 kg

Unit: mm

■ Regenerative Resistor Unit

Refer to the following table for the specifications of regenerative resistor units.

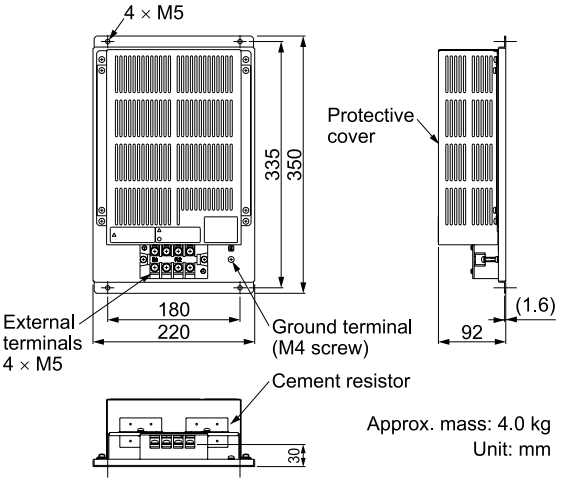
You do not need to change the setting of Pn600 (Regenerative Resistor Capacity) and Pn603 (Regenerative Resistance) when you use a regenerative resistor unit.

SERVOPACK Model: SGDXS-	Regenerative Resistor Unit Model	Specification	Allowable Power Loss
470A *1	JUSP-RA29-E	5 Ω, 880 W	180 W
550A, 590A, 780A	JUSP-RA05-E	3.13 Ω, 1760 W	350 W
210D, 260D	JUSP-RA30-E	12 Ω, 880 W	180 W
280D, 370D	JUSP-RA31-E	10 Ω, 1760 W	350 W

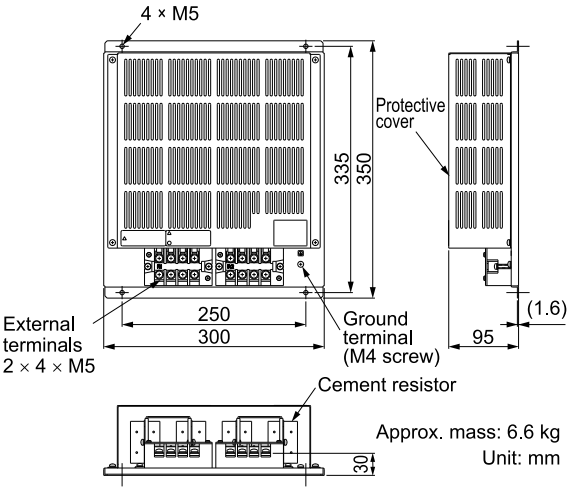
*1 When using a servomotor at a rotation speed that is equal to or less than the maximum rotation speed of the Σ-7 servomotor (e.g. after replacement of a Σ-7 servomotor) JUSP-RA04-E (6.25 Ω, 880 W) can be used. You need to change the setting of Pn603 (Regenerative Resistance) when you use JUSP-RA04-E (6.25 Ω, 880 W).

◆ External Dimensions

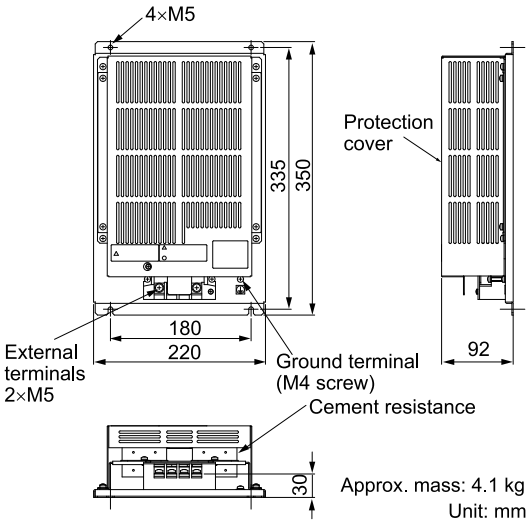
○ JUSP-RA29-E



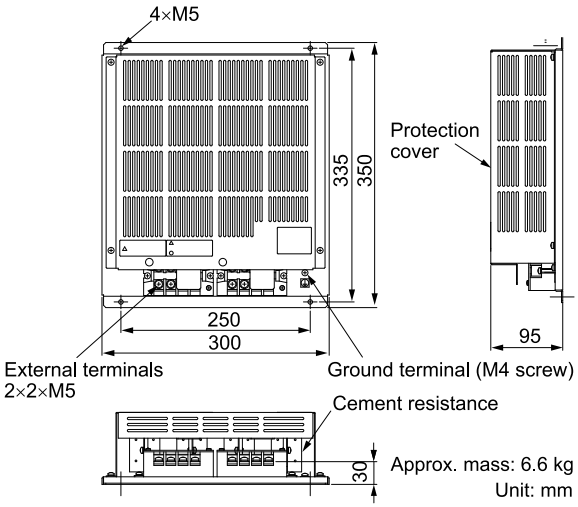
○ JUSP-RA05-E



○ JUSP-RA30-E



○ JUSP-RA31-E



Digital Operators

A digital operator is used to display and set parameters in a SERVOPACK, and its main functions are as follows.

- Changing and accessing the settings of parameters in the SERVOPACK
- Reading, writing, and verifying the settings of parameters in the SERVOPACK
- Operating the SERVOPACK
- Adjustment with SERVOPACK utility functions
- Monitoring the operating conditions of the SERVOPACK

There are two types of digital operators.

- JUSP-OP07A-E
- JUSP-OP05A-1-E (can be used with analog voltage/pulse train reference SERVOPACKs only)

Information The JUSP-OP05A-1-E and JUSP-OP07A-E cannot be connected at the same time.

Important The digital operator is used for test operation and maintenance. It is not intended to be installed into equipment and used continuously together with the SERVOPACK.

Type: JUSP-OP07A-E

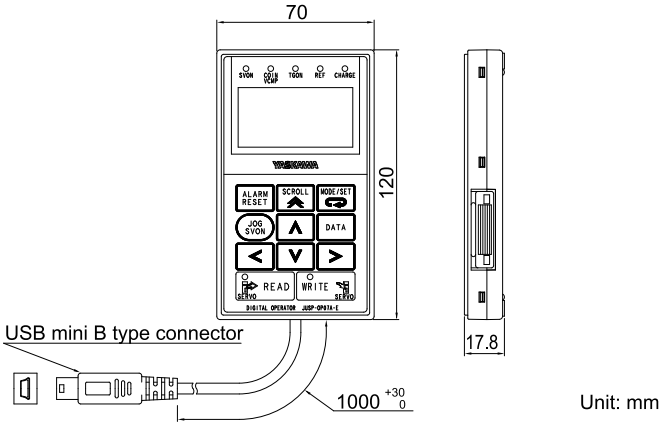
The JUSP-OP07A-E is used by connecting to the CN7 connector on the SERVOPACK.

Information If it is used in an environment with high levels of noise, implement noise countermeasures such as inserting a ferrite core.

■ Selection Table

Order Number	Accessories
JUSP-OP07A-E	Connection cable (1 m)

■ Dimensional Drawing



Unit: mm

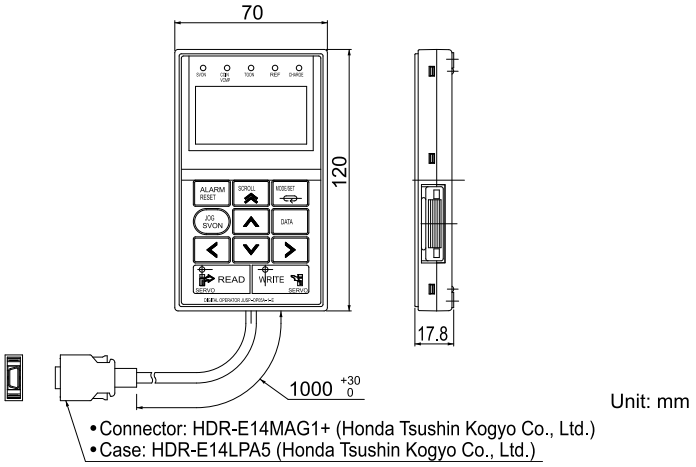
Type: JUSP-OP05A-1-E

The JUSP-OP05A-1-E is used by connecting to the Σ-XS SERVOPACK analog voltage/pulse train reference connector (CN3).

■ Selection Table

Order Number	Accessories
JUSP-OP05A-1-E	Connection cable (1 m)

■ Dimensional Drawing



Software

SigmaSize+: AC Servo Capacity Selection Program

You can use the SigmaSize+ to select servomotors and SERVOPACKs. Applicable to all standard servo products sold by Yaskawa.

You can also calculate whether an external regenerative resistor is required and select one.

Note:

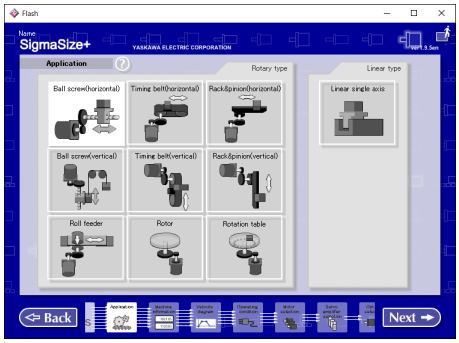
Contact your Yaskawa representative for information on SigmaSize+.

■ Features

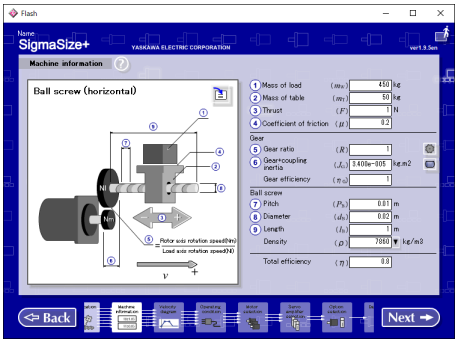
- Provides a vast amount of new product information.
- Lets you select servo products with a wizard.
- You can access and reuse previously entered data.

◆ Examples of the Servo Selection Interface

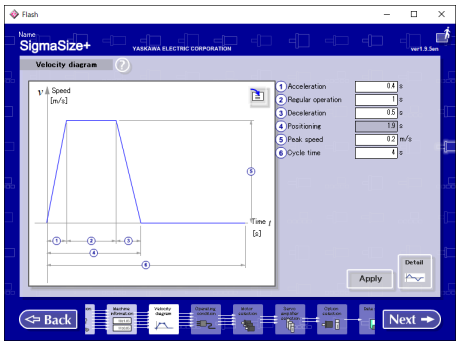
Mechanism Selection View



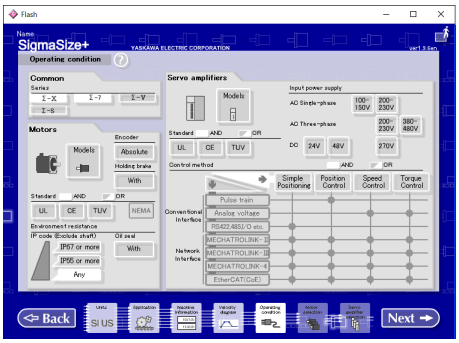
Machine Specification Entry View



Speed Diagram Entry View



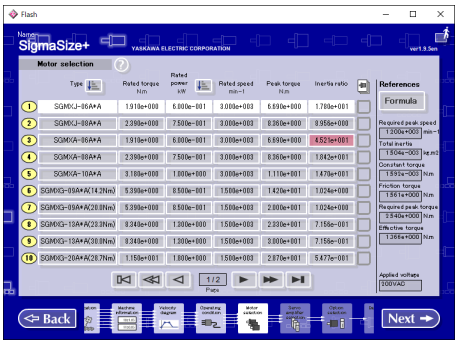
Operating Conditions Selection View



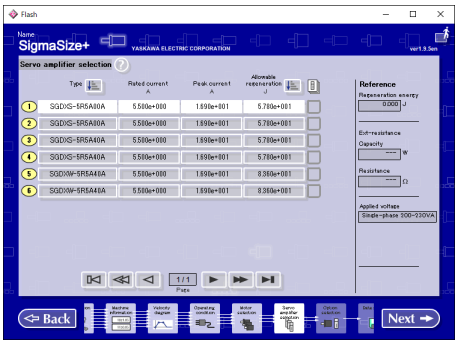
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Servomotor Selection View



SERVOPACK Selection View



■ System Requirements

Item	System Requirement
Browser	Internet Explorer version 10 or later
OS	Windows Vista/Windows 7 (32-bit or 64-bit edition)
CPU	Pentium 200 Mhz min.
Memory	64 MB min. (96 MB or greater recommended)
Available Hard Disk Space	20 MB min.

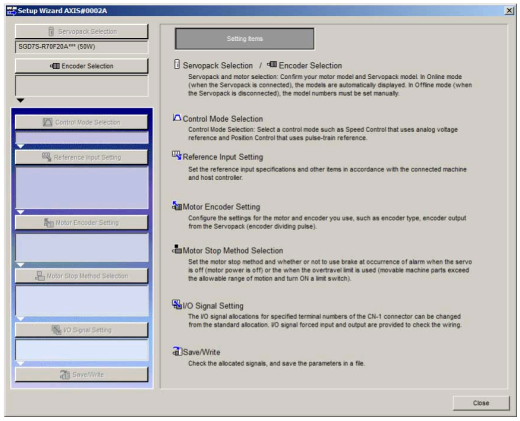
SigmaWin+: AC Servo Drive Engineering Tool

The SigmaWin+ engineering tool is used to set up and optimally tune Yaskawa Σ-series servo drives.

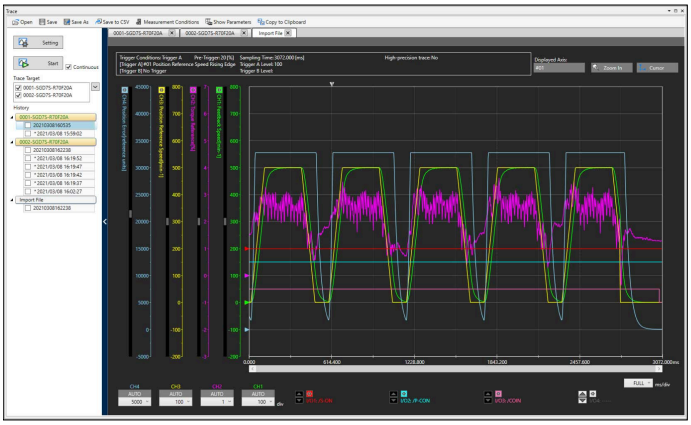
■ Features

- Sets parameters with a wizard.
- Displays SERVOPACK data on a computer just like on a oscilloscope.
- Estimates moments of inertia and measure vibration frequencies.
- Displays alarms and provides alarm diagnostics.

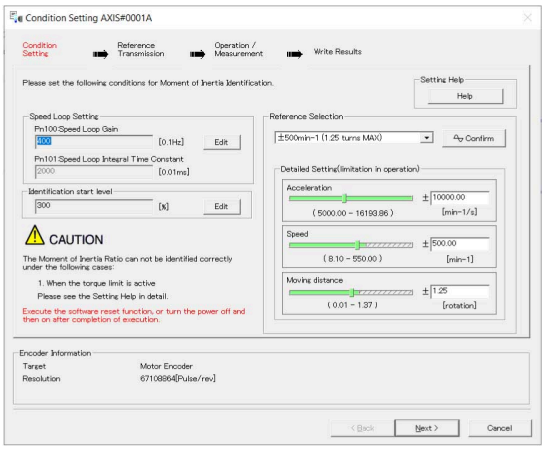
Sets parameters with a wizard.



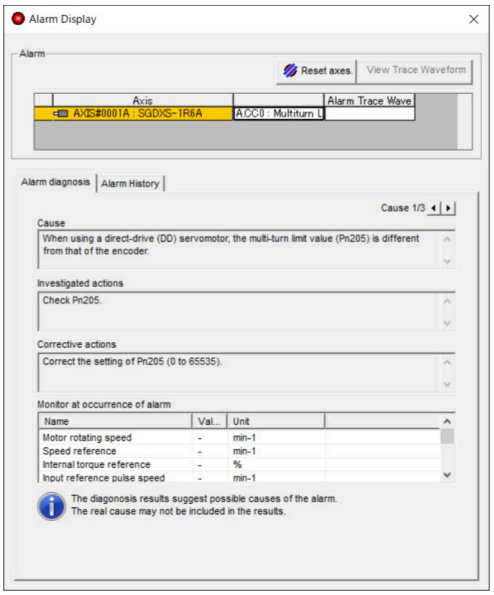
Displays SERVOPACK data on a computer just like on a oscilloscope.



Estimates moments of inertia and measure vibration frequencies.



Displays alarms and provides alarm diagnostics.



◆ System Requirements

Item	System Requirements
Version	7
Supported Languages	Japanese, English, and Chinese (simplified)
OS	Windows 10, Windows 8.1, Windows 8, or Windows 7 (32-bit or 64-bit edition)
Software Environment	Microsoft .NET Framework 4.5, .NET Framework 4.6
CPU	1 GHz min. (recommended)
Memory	1 GB min. (recommended)
Available Hard Disk Space	500 MB min.
Browser used to display Help	Internet Explorer 9 or higher

MPE720: System Integrated Engineering Tool

MPE720 version 7 is a system integrated engineering tool that provides the complete development functionality to set up, adjust, program, maintain, and inspect not only controller programs but also all of the devices necessary to design machine installations, including servo drives, AC drives, and distributed I/O devices.

It is installed in a PC and operated on a PC interface through a connection between the PC and machine controller.

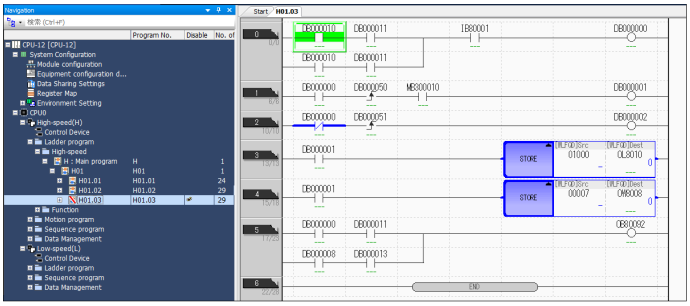
■ Features

◆ Performing Adjustment and Maintenance for All Equipment Drive Devices

MPE720 version 7 connected to the YRM-X or MP series enables one-stop setup, adjustment, and maintenance of AC servo drives, inverters, and I/O devices connected to the network. This eliminates the need change the connections, which improves efficiency.

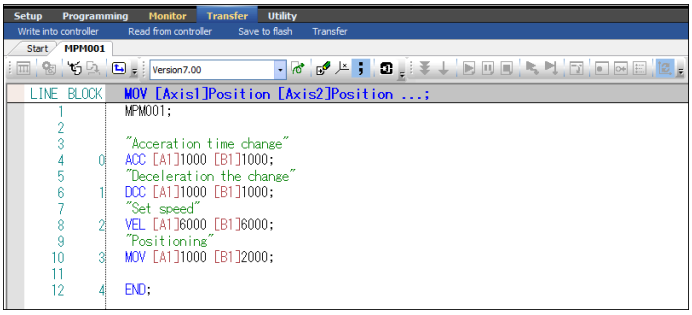
◆ Greater Efficiency with the Best Programming Method

Ladder Programming



- The new user interface lets just about anyone easily use the MPE720.
- An improved EXPRESSION instruction simplifies programming calculation in ladder diagrams.
- Support is provided for all types of control, including position, speed, torque, and phase control.

Motion Programming



- Positioning and interpolation can be programmed with one instruction.
- Programs can be very easily edited using expressions in a text format.
- New variable programming can provide PC-like programming.

■ System Requirements

Item	Specification
CPU	1 GHz or more recommended (manufactured by Intel or other companies)
Memory Capacity	1 GB or more recommended *1
Available Hard Disk Space	700 MB or more (includes standard workspace memory after installation of MPE720)
Display Resolution	1,280 × 800 pixels or more recommended
CD Drive	CD Drive
1 (only for installation)	RS-232C, Ethernet, MP2100 bus, and USB
OS	Windows 10, Windows 8, Windows 8.1, or Windows 7 (32-bit or 64-bit)
.NET Environment	.NET Framework 4.5
Supported Languages	English and Japanese

*1 Expand memory if other application programs are run simultaneously with MPE720 on the same computer.
Performance may be slow due to the use of memory by multiple application programs that are run simultaneously.

Other Peripheral Devices and Options

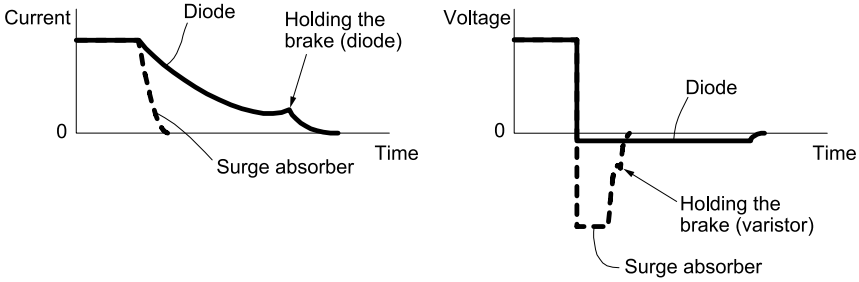
Surge Absorbers (Varistors), Diodes, and Brake Relays for Holding Brake Power Supplies

Surge absorbers (varistors) and diodes for holding brake power supplies help prevent damage to brake coils caused by voltage surges.

If you use a servomotor with a holding brake and switch the brake power supply circuit on the DC side, connect a surge absorber (varistor) or diode that is suitable for the brake power supply voltage and current.

Note:

1. When you select a surge absorber, varistor, or diode for your application, consider the service life and test all operations, including the brake timing, before you use the servomotor.
2. If you connect an SSR (i.e., a semiconductor relay) to switch the brake circuit, use a diode.
3. If you connect a diode, more time is required to brake than with a surge absorber. (Refer to the following figure.) If you use a diode, consider this in the application.



■ Surge Absorbers (Varistors) for Holding Brake Power Supplies

Use the following table as reference in selecting a surge absorber. Elements were selected for a surge absorber surrounding air temperature range of -20°C to 60°C and an ON/OFF switching frequency of 10 times or less per minute. The information in this table is for reference only, and does not ensure operation in combination with the holding brake.

Holding Brake Power Supply Voltage		24 VDC	
Manufacturer		Nippon Chemi-Con Corporation	Semitec Corporation
		Order Number	
Brake Rated Current	1 A max.	TNR5V121K	Z5D121
	2 A max.	TNR7V121K	Z7D121
	4 A max.	TNR10V121K	Z10D121
	8 A max.	TNR14V121K	Z15D121

■ Diodes for Holding Brake Power Supplies

Select a diode for the holding brake power supply with a rated current that is greater than that of the holding brake and with the recommended withstand voltage given in the following table.

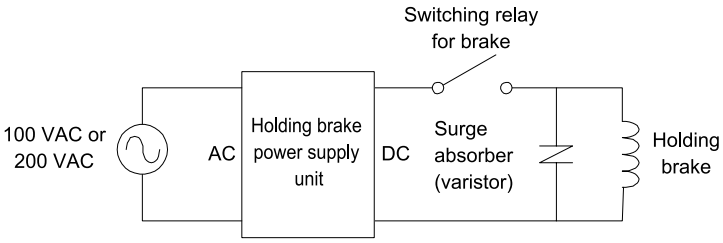
Diodes are not provided by Yaskawa.

Holding Brake Power Supply Unit Specifications		Withstand Voltage
Rated Output Voltage	Input Voltage	
24 VDC	200 V	100 V to 200 V

■ Circuit Diagrams

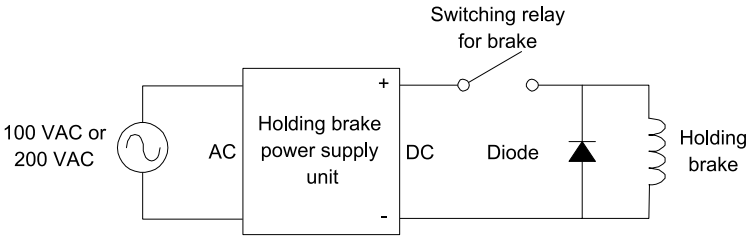
◆ Circuit for a Surge Absorber (varistor)

A surge absorber (varistor) has no polarity.



◆ Circuit for a Diode

A Diode has polarity. Refer to the following figure for connections.



Note:

Holding brake power supply units are not provided by Yaskawa.

■ Brake Relays

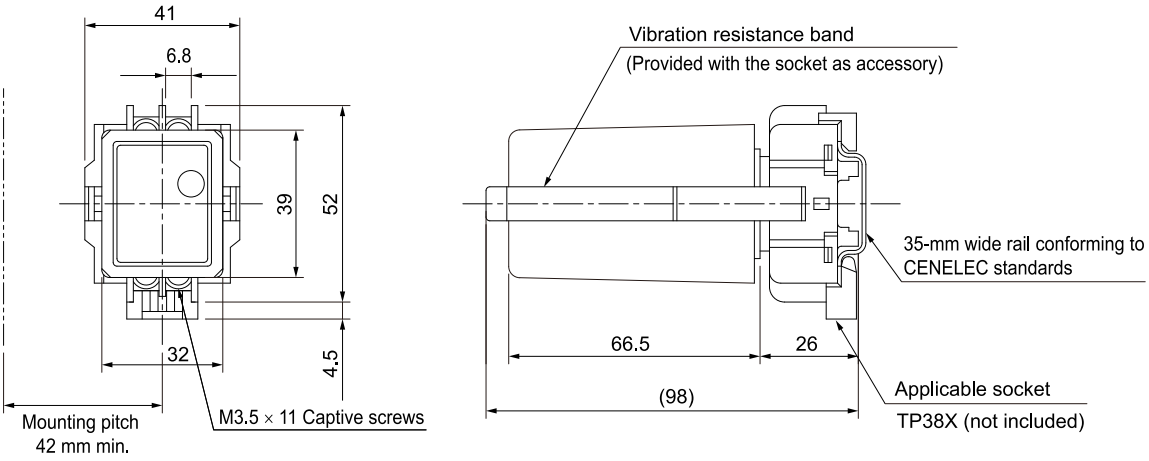
Brake relays are not provided by Yaskawa.

◆ Specification

Manufactured by BESTACT SOLUTIONS INC.

Item		Specification
Order Number		F2PE20/D24
Contact	Structure	2a
	Contact resistance	500 mΩ max.
	Rated operating voltage/current	110 VDC, 0.5 A (L/R=100 ms)/220 VAC, 1.0 A (inductive load)
	Rated insulation voltage	250 VAC
	Minimum operating voltage/current	24 VDC, 1 mA
Time	Operation	5 ms or less
	Recovery	3 ms or less
Contact life	Mechanical	100 million cycles or more
	Electrical life	3 million cycles are more (24 VDC, 0.5 A, L/R=10 ms)
Other	Failure rate (λ_{60})	4.6×10^{-9}(/cycle) or less
	Approx. mass	140 g
	Surrounding air temperature	-10°C to +60°C
	Connection method	External connection socket (TP38X)

◆ External Dimensions



Batteries for Servomotors with Absolute Encoders

If you use an absolute encoder, you can use an encoder cable with a battery unit connected to it to supply power and retain the absolute position data.

You can also retain the absolute position data by supplying power from a battery on the host controller.

Note:

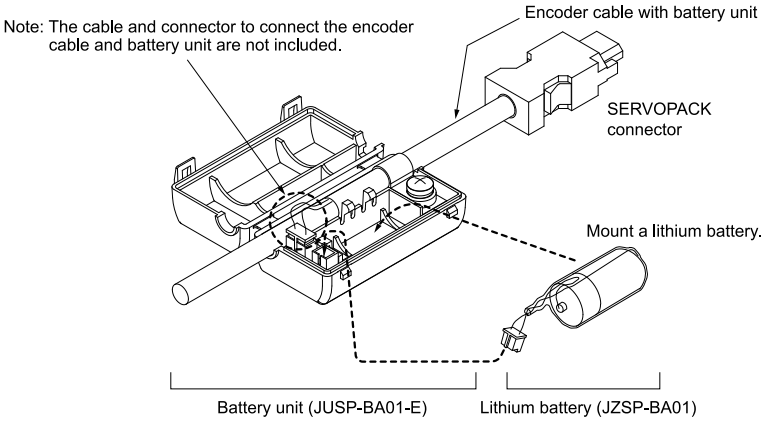
A battery unit is not required if you use a servomotor with a batteryless absolute encoder.

■ Using Encoder Cables with Battery Units

A battery unit is attached to an encoder cable with a battery unit. To replace the battery, obtain a lithium battery (JZSP-BA01) and mount it in the battery unit.

Important

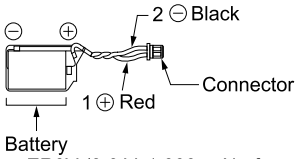
1. You cannot attach the battery unit to encoder cables for incremental encoders or batteryless absolute encoders.
2. Install the battery unit where the surrounding air temperature is between -5°C and 60°C.



◆ Selection Table

Name	Order Number	Remarks
Battery Unit (case only)	JUSP-BA01-E	The encoder cable and battery are not included. (This is a replacement part for a damaged battery unit.)
Lithium Battery	JZSP-BA01	This is a special battery that is mounted into the battery case.

◆ Lithium Battery Dimensional Drawing

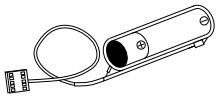


ER3V (3.6 V, 1,000 mAh, from Toshiba Battery Co., Ltd.)

■ When Installing a Battery on the Host Controller

Use a battery that meets the specifications of the host controller.

Use the recommended battery given in the following table or the equivalent.



◆ Selection Table

Order Number	Specification	Manufacturer
ER6VC3N	3.6 V, 2000 mAh	Toshiba Battery Co., Ltd.

Option Modules

Feedback Option Modules 744
Advanced Safety Module 754
Option Case Kit 756

Feedback Option Modules

Fully-Closed Modules

You can perform fully-closed loop control by combining a fully-closed module and SERVOPACK. Fully-closed loop control is used to perform high-accuracy, high-response position control by using a position feedback signal from a linear encoder or absolute rotary encoder mounted to the machine.

Model Designations

■ Purchasing a Module in a Set with the SERVOPACK

To order SERVOPACKs with a fully-closed module attached, use the following model numbers.

SGDXS *1 | R70 (1st+2nd+3rd digits) | A (4th digit) | 00 (5th+6th digits) | A (7th digit) | 0000 (8th+9th+10th+11th digits) | 001 (12th+13th+14th digits)

Σ-X-series Σ-XS model

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

Voltage	Code	Specification
Three-Phase, 200 VAC	R70*2	0.05 kW
	R90*2	0.1 kW
	1R6*2	0.2 kW
	2R8*2	0.4 kW
	3R8	0.5 kW
	5R5*2	0.75 kW
	7R6	1.0 kW
	120	1.5 kW
	180	2.0 kW
	200	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW

Non-Stock

4th digit Voltage

Code	Specification
A	200 VAC

5th+6th digits Interface

Code	Specification
A0	EtherCAT communications reference

7th digit Design Revision Order

A

8th+9th+10th+11th digits Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	SGDXS-R70A to -330A
	Duct-ventilated	SGDXS-470A to -550A
0002	Varnished	All models
0008	Single-phase, 200-VAC power supply input	SGDXS-120A
0020*3	No dynamic brake	SGDXS-R70A to -2R8A
	External dynamic brake resistor	SGDXS-3R8A to -550A

12th+13th+14th digits Option Module

Code	Specification
001	Fully-closed module

*1 The model number of a SERVOPACK with an option module is not hyphenated after SGDXS.
*2 You can use these models with either a single-phase or three-phase input.
*3 For details, refer to the following manual.

Σ-X-Series Σ-XS/Σ-XW SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

Note:

Contact your Yaskawa representative for information on combining options.

■ Purchasing a Module Separately

When ordering a SERVOPACK and a fully-closed module separately, use the following fully-closed module model number.

SGDV-OFA01A

Important
- One option case kit is required for each SERVOPACK.
  Option case kit model: SGDXS-OZA01A
- A fully-closed module does not support Σ-LINK II communications.

Basic Specifications

Item		Specification	
Operating Conditions	Surrounding Air Temperature	0°C to 55°C	
	Storage Temperature	-20°C to 85°C	
	Surrounding Air Humidity	90% relative humidity max.	There must be no freezing or condensation.
	Storage Humidity	90% relative humidity max.	
	Vibration Resistance	4.9 m/s^2	
	Impact Resistance	19.6 m/s^2	
	Degree of Protection	IP10	• Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Pollution Degree	2	
	Altitude	1000 m max.	
	Others	Do not use the junction box in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	

Pin Arrangement of External Encoder Connector (CN31)

The following table lists the signal names and functions.

Pin No.	Signal	Function
1	PG5V	Encoder power supply +5 V
2	PG0V	Encoder power supply 0 V
3	–	–
4	–	–
5	PS	Serial data (+)
6	/PS	Serial data (-)
Shell	Shield	–

Recommended Encoders

- Linear encoders
  Refer to the following section for the recommended linear encoder models and specifications.
  ☞ *Recommended Linear Encoders on page 536*
- Rotary Encoders
  - Absolute Rotary Encoders
    The following absolute rotary encoders are for fully-closed control. Do not use it to control the motor.

Output Signals	Manufacturer	Rotary Encoder Type	Model			Resolution Bits	Maximum Motor Speed *1 min^{-1}
			Scale	Sensor Head	Relay Device between Fully-Closed Module and Rotary Encoder		
Encoder for Yaskawa's Serial Interface	Magnescale Co., Ltd.	Sealed	RU77-4096ADF *2		–	20	2000
			RU77-4096AFFT01 *2		–	22	2000
	Dr. JOHANNES HEIDENHAIN GmbH	Exposed	ECA4412 *2		EIB3391Y	27	1600
					EIB3391Y	28	800
					EIB3391Y	29	400
		Sealed	RCN2310 *2		EIB3391Y	26	3000
			RCN5510 *2		EIB3391Y	28	800
			RCN8310 *2		EIB3391Y	29	400
			ROC2310 *2		EIB3391Y	26	3000
			ROC7310 *2		EIB3391Y	28	800
	Renishaw PLC	Exposed	RA23Y-□□□□□□□□□ *2		–	23	14600
			RA26Y-□□□□□□□□□ *2		–	26	3250
			RA30Y-□□□□□□□□□ *2		–	30	200

*1 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the rotary servomotor or the maximum speed of the rotary encoder (given above).
*2 This is a single-turn absolute encoder.

Note:

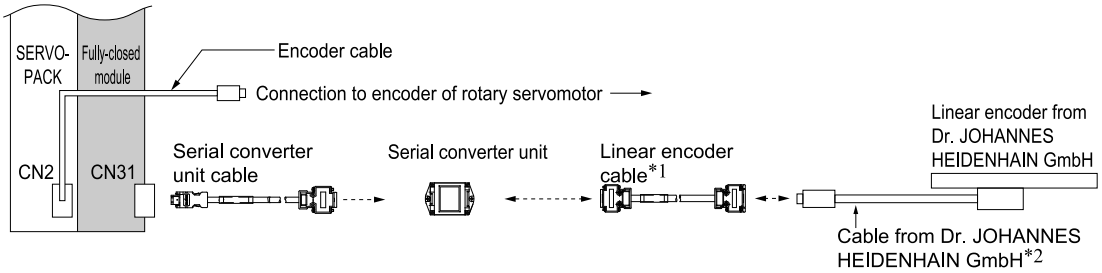
Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the rotary encoder before you use it.

Equipment Configurations

■ Connections to Linear Encoder from Dr. JOHANNES HEIDENHAIN GmbH

◆ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) in the serial converter unit.



*1 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.
*2 Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

Item	Model	Reference
Fully-Closed Modules (Purchased as a set with the SERVOPACK)	Without options: SGDXS□□□□□0A000□□1 *1* With options: SGDXS□□□□□0A■■■□□1 *1* **Note:** When a hardware option is mounted, ■■■ is replaced with a three-digit number that specifies the type of option.	–
Fully-Closed Modules (Purchased alone)	Fully-Closed Modules *2* SGDV-OFA01A	753
	Option Case Kit *3* SGDXS-OZA01A	756
Serial Converter Unit Cables	JZSP-CLP70-□□-E	558
Serial Converter Unit	JZDP-H003-□□□	571
Linear Encoder Cables	JZSP-CLL30-□□-E	558

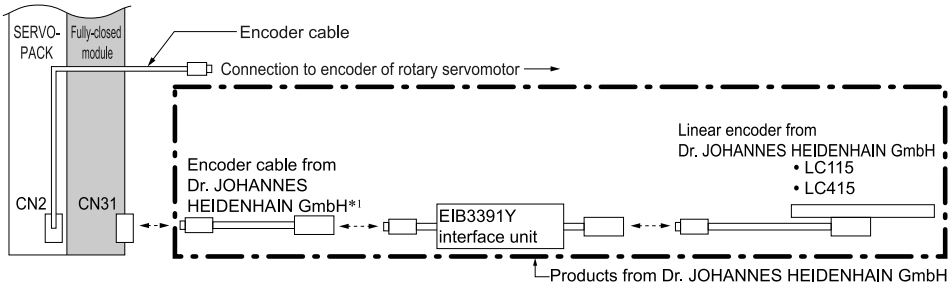
*1 The model number of a set that includes the SERVOPACK and an option module is not hyphenated after "SGDXS."
*2 When ordering a SERVOPACK and a fully-closed module separately, use this fully-closed module model number.
*3 One option case kit is required for each SERVOPACK. The set includes the module cover, PCB mounting plate, and two mounting screws.

Note:

1. Refer to the following section for a table of the recommended linear encoders.
   ☞ *Recommended Linear Encoders on page 536*
2. Refer to the following section for the specifications of the serial converter unit.
   ☞ *Serial Converter Unit on page 571*
3. Refer to the chapter for your rotary servomotor for information on servomotor main circuit cables and encoder cables.
4. If you purchase a fully-closed module by itself, refer to the following manual for the method to mount it to the SERVOPACK.
   🕮 Σ-V-Series/Σ-V-Series for Large-Capacity Models/Σ-7-Series/Σ-X-Series Installation Guide Fully-Closed Module (Manual No.: TOBP C720829 03)

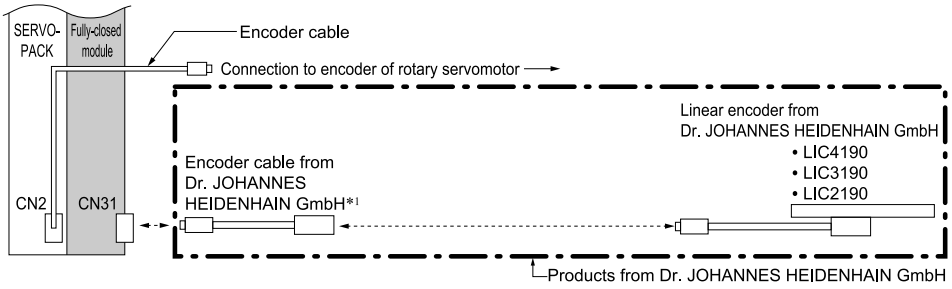
◆ Connections When Using a Yaskawa Serial Interface for the Output Signals

- LC115 or LC415 Linear Encoder with EIB3391Y Interface Unit



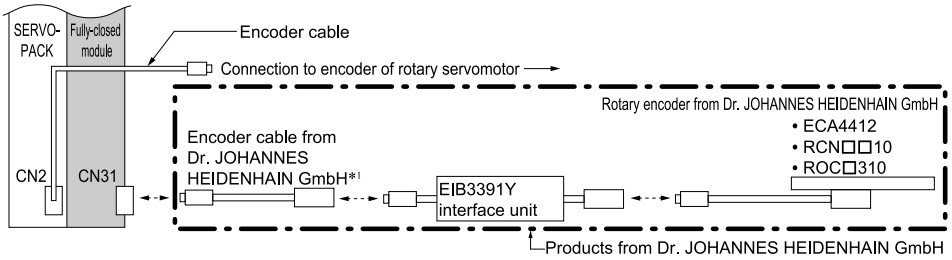
*1 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

- LIC4190, LIC3190, or LIC2190 Linear Encoders



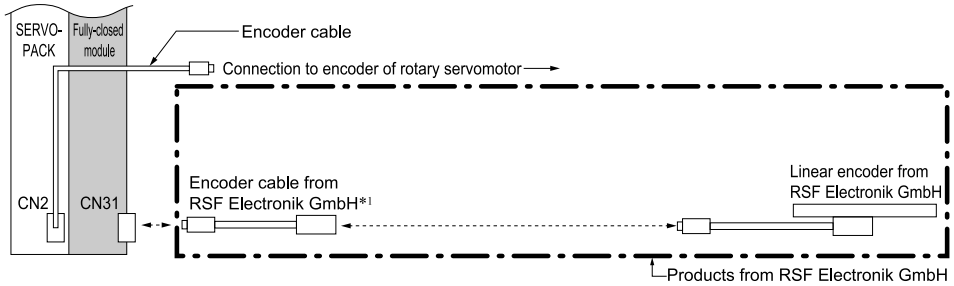
*1 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

- ECA4412, RCN□□10, or ROC□310 Rotary Encoder with EIB3391Y Interface Unit



*1 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

■ Connections to Linear Encoder from RSF Elektronik GmbH

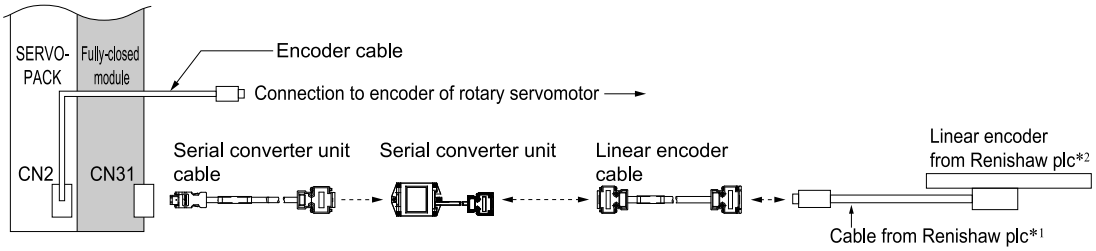


*1 Use an encoder cable from RSF Elektronik GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

■ Connections to Linear Encoder from Renishaw plc

◆ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) in the serial converter unit.



*1 Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.

*2 If you use the origin signals with a linear encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

Item	Model	Reference
Fully-Closed Modules (purchased as a set with the SERVOPACK)	Without options: SGDXS□□□□□0A000□□1 *1* With options: SGDXS□□□□□0A■■■□□1 *1* **Note:** When a hardware option is mounted, ■■■ is replaced with a three-digit number that specifies the type of option.	–
Fully-Closed Modules (purchased alone)	Fully-closed modules *2* SGDV-OFA01A	753
	Option case kit *3* SGDXS-OZA01A	756
Serial Converter Unit Cables	JZSP-CLP70-□□-E	558
Serial Converter Unit	JZDP-H005-□□□	573
Linear Encoder Cables	JZSP-CLL00-□□-E	558

*1 The model number of a set that includes the SERVOPACK and an option module is not hyphenated after "SGDXS."

*2 When ordering a SERVOPACK and a fully-closed module separately, use this fully-closed module model number.

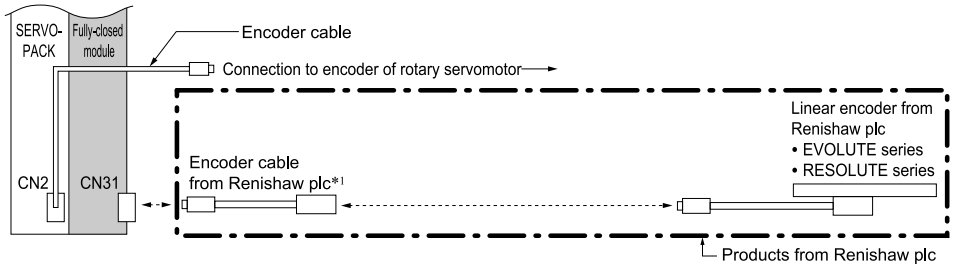
*3 One option case kit is required for each SERVOPACK. The set includes the module cover, PCB mounting plate, and two mounting screws.

Note:

1. Refer to the following section for a table of the recommended linear encoders.
   ☞ *Recommended Linear Encoders on page 536*
2. Refer to the following section for the specifications of the serial converter unit.
   ☞ *Serial Converter Unit on page 571*
3. Refer to the chapter for your rotary servomotor for information on servomotor main circuit cables and encoder cables.
4. If you purchase a fully-closed module by itself, refer to the following manual for the method to mount it to the SERVOPACK.
   🕮 Σ-V-Series/Σ-V Series for Large-Capacity Models/Σ-7 Series/Σ-X-Series Installation Guide Fully-Closed Module (Manual No.: TOBP C720829 03)

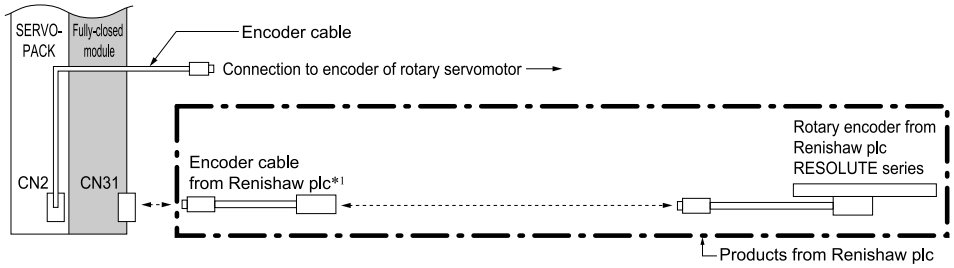
◆ Connections When Using a Yaskawa Serial Interface for the Output Signals

- EVOLUTE-Series or RESOLUTE-Series Linear Encoder



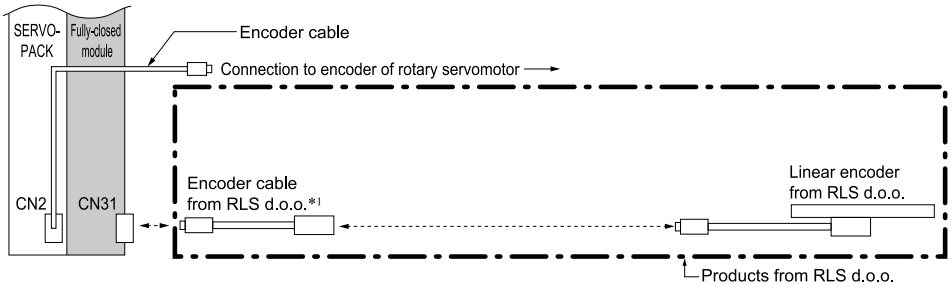
*1 Use an encoder cable from Renishaw plc. Contact Renishaw plc for detailed encoder cable specifications.

- RESOLUTE-Series Rotary Encoder



*1 Use an encoder cable from Renishaw plc. Contact Renishaw plc for detailed encoder cable specifications.

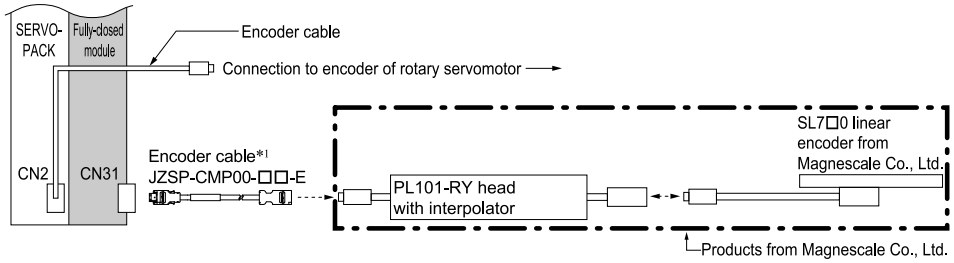
■ Connections to Linear Encoder from RLS d.o.o.



*1 Use an encoder cable from RLS d.o.o. Contact RLS d.o.o. or Renishaw plc for detailed encoder cable specifications.

■ Connections to Linear Encoder from Magnescale Co., Ltd.

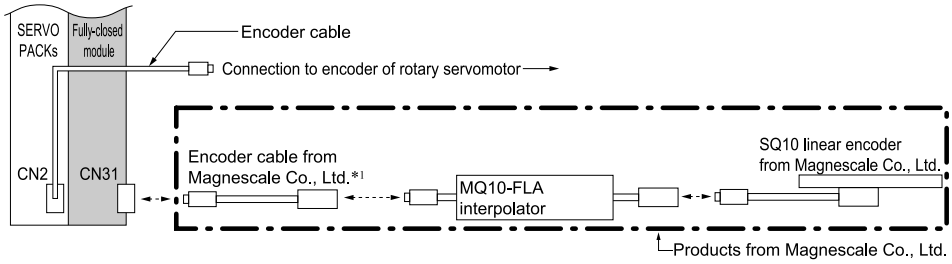
- SL7□0 Linear Encoder and PL101-RY Sensor Head with Interpolator



*1 Refer to the following section for details on encoder cables.

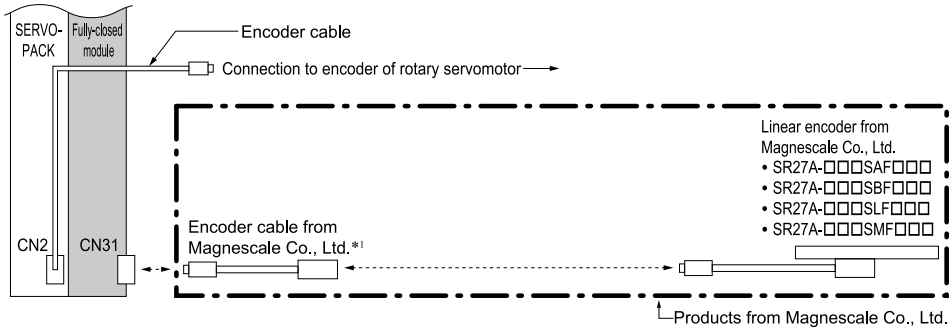
☞ *Encoder Cables on page 560*

- SmartSCALE Linear Encoder (SQ10 Scale and MQ10-FLA Interpolator)



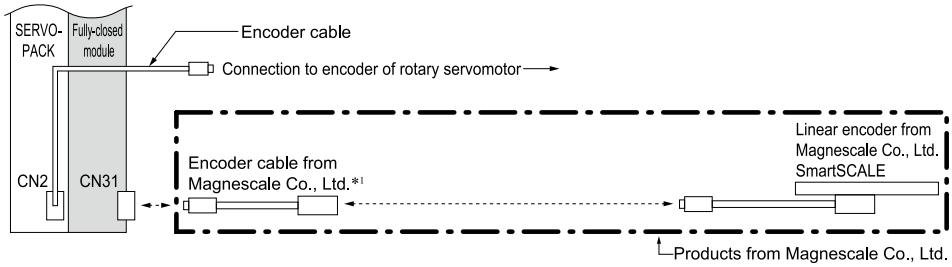
*1 Use an encoder cable from Magnescale Co., Ltd.. The maximum length of the encoder cable is 15 m. Contact Magnescale Co., Ltd. for specifications other than the cable length.

- SR27A Linear Encoder



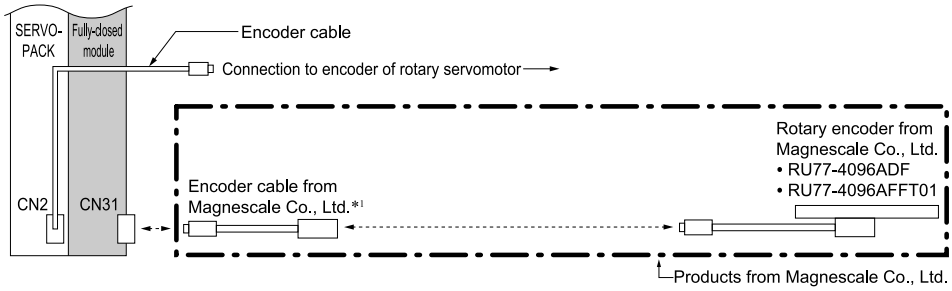
*1 Use a CH33-xx□□G cable from Magnescale Co., Ltd. (This cable has connectors designed for use with Yaskawa products.)

- SmartSCALE Linear Encoder (SQ47 or SQ57)



*1 Use an encoder cable from Magnescale Co., Ltd.. Contact Magnescale Co., Ltd. for details on encoder cable specifications.

- RU77-4096ADF or RU77-4096AFFT01 Absolute Rotary Encoders

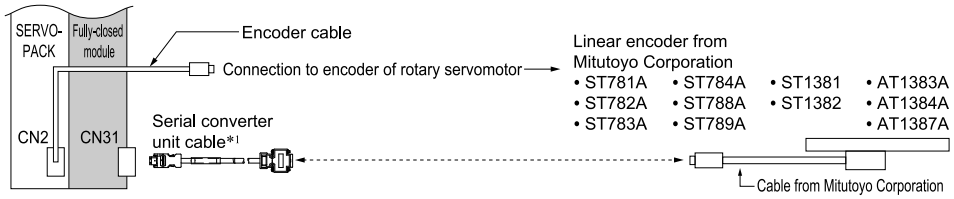


*1 Use a CE28-series extension cable for RU77 encoder from Magnescale Co., Ltd.

Note:

The RU77 is a single-turn absolute rotary encoder.

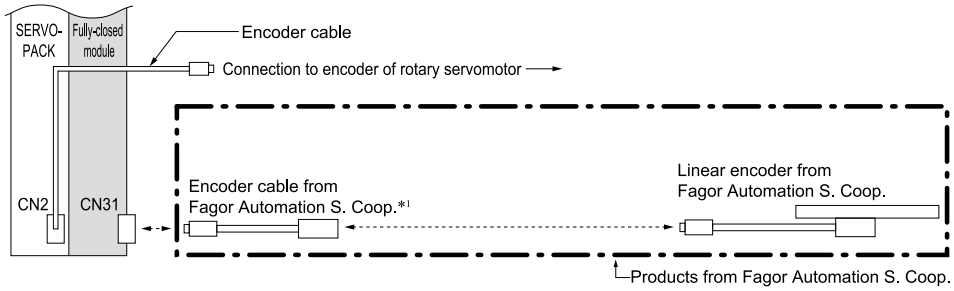
■ Connections to Linear Encoders from Mitutoyo Corporation



*1 Refer to the following section for details on serial converter unit cables.

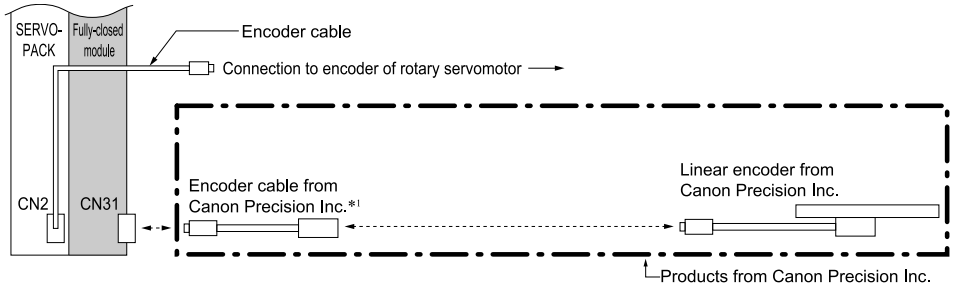
☞ *Serial Converter Unit Cables on page 558*

■ Connections to Linear Encoder from Fagor Automation S. Coop.



*1 Use encoder cables from Fagor Automation S. Coop. For detailed specifications of the encoder cables, consult Fagor Automation S. Coop. or its sales representative.

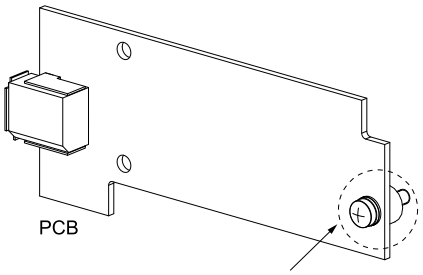
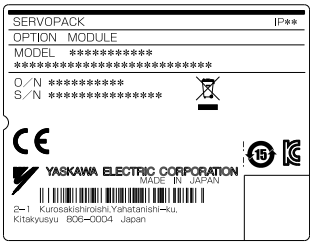
■ Connections to Linear Encoder from Canon Precision Inc.



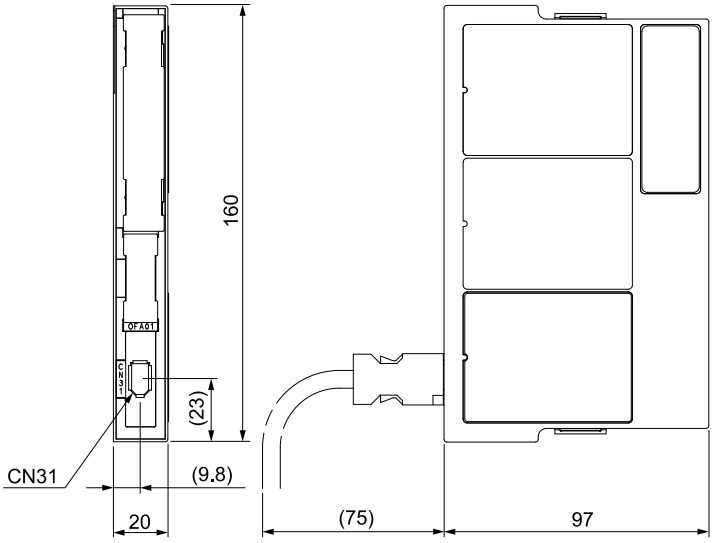
*1 Use encoder cables from Canon Precision Inc. Contact Canon Precision Inc. for detailed encoder cable specifications.

Accessories

If you purchase a fully-closed module by itself, the following accessories will be packed with it.

Order Number	SGDV-OFA01A
Accessories	  PCB set screws (two)  Ratings nameplate  Model number nameplate  Device label nameplates

External Dimensions



Unit: mm
Approx. mass: 0.1 kg

■ Connectors

Device Label	Model	Number of Pins	Manufacturer
CN31	3E106-0220KV	6	3M Japan Limited

Note:

The above connectors or their equivalents are used for the SERVOPACKs.

Advanced Safety Module

The advanced safety module (ASM-X) is a safety option module for Σ-X-series SERVOPACKs that is equipped with safety functions to monitor the position, speed, and acceleration of a servomotor. Its key features are listed below.

- A maximum of 10 *1 safety functions can be executed at the same time, which allows executing different types of safety functions at the same time, and switching the monitoring threshold between safety functions of the same type.
  *1 Eleven safety functions can be executed when the HWBB in the SERVOPACK is used at the same time.
- There are safe output signals that can control the power supply for the brake in the servomotor when combined with safety relays.
- The safety functions in the ASM-X can be started using FSoE communications.


Important

One option case kit is required for each SERVOPACK.
Option case kit model: SGDXS-OZA01A

Specifications

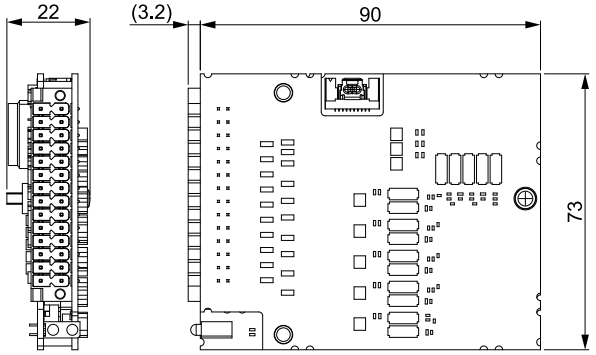
Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 60°C
Storage Temperature	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	When combined with the following SERVOPACK models IP20: SGDXS-R70A, -90A, -1R6A, -2R8A, -3R8A, -5R5A, -7R6A, -120A IP10: SGDXS-180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust. Gas resistance: 3C2 (IEC 60721-3-3) Dust resistance: 3S2 (IEC 60721-3-3)
Altitude	2000 m max.
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

External Dimensions

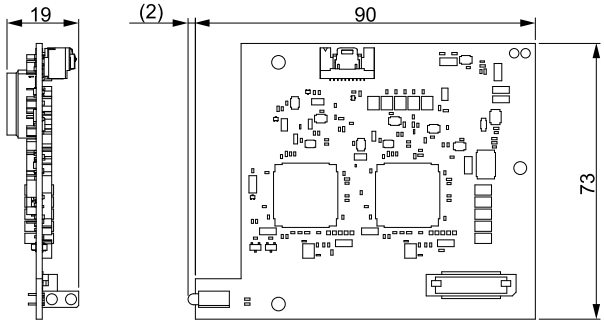
ASM-X Single

SGDXS-OSA01A/SGDXS-OSAA1A



Unit: mm

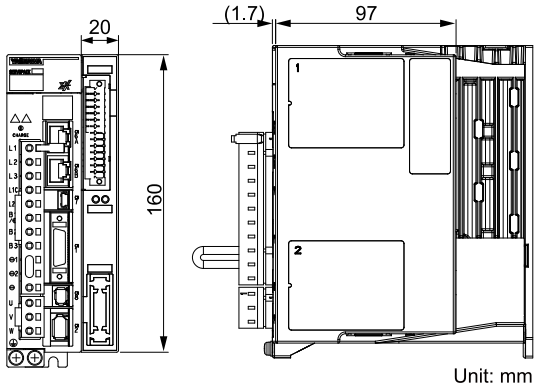
SGDXS-OSAA0A



Unit: mm

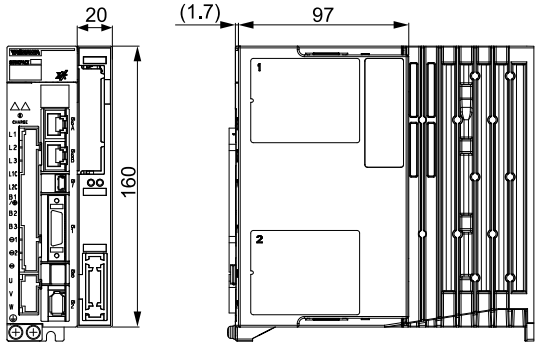
When ASM-X is Mounted to a SERVOPACK

SGDXS-OSA01A/SGDXS-OSAA1A



Unit: mm

SGDXS-OSAA0A



Unit: mm

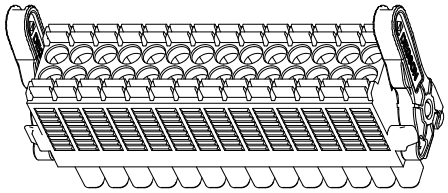
I/O Connector

Name: Plug

Model: 15EDGKNHG-3.5-28P-14-00A(H)

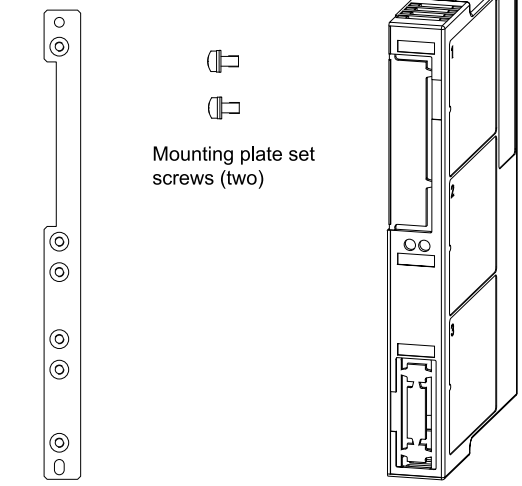
Manufacturer: NINGBO DEGSON ELECTRICAL CO., LTD.

Number of pins: 28



Option Case Kit

If you purchase the option module and SERVOPACK separately, one option case kit is required for each SERVOPACK.
The following accessories are packed with the option case kit.

Order Number	SGDXS-OZA01A
Accessories	 PCB mounting plate Module cover

Additional Information

Capacity Selection for Servomotors **758**

Capacity Selection for Regenerative Resistors **768**

International Standards **790**

Warranty **792**

Capacity Selection for Servomotors

Selecting the Servomotor Capacity

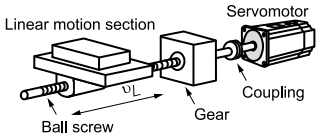
Use Yaskawa's SigmaSize+, an AC servo capacity selection program, to select the servomotor capacity. With the SigmaSize+, you can find the optimum servomotor capacity by simply selecting and entering information according to instructions from a wizard.

Contact your Yaskawa representative for information on this program.

Refer to the following selection examples to select servomotor capacities with manual calculations rather than with the above software.

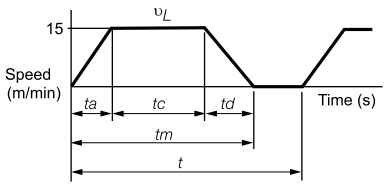
Capacity Selection Example for a Rotary Servomotor (Speed Control)

1. Machine Specifications



Item	Symbol	Value
Load Speed	υ_L	15 m/min
Linear Motion Section Mass	m	250 kg
Ball Screw Length	ℓ_B	1.0 m
Ball Screw Diameter	d_B	0.02 m
Ball Screw Lead	P_B	0.01 m
Ball Screw Material Density	ρ	7.87×10^3 kg/m^3
Gear Ratio	R	2 (gear ratio: 1/2)
External Force on Linear Motion Section	F	0 N
Gear and Coupling Moment of Inertia	J_G	0.40×10^{-4} kg·m^2
Number of Feeding Operations	n	40 rotations/min
Feeding Distance	ℓ	0.275 m
Feeding Time	tm	1.2 s max.
Friction Coefficient	μ	0.2
Mechanical Efficiency	η	0.9 (90%)

2. Operation Pattern



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

If $ta = td$,

$$ta = tm - \frac{60\ell}{\upsilon_L} = 1.2 - \frac{60 \times 0.275}{15} = 1.2 - 1.1 = 0.1 \text{ (s)}$$

$$tc = 1.2 - 0.1 \times 2 = 1.0 \text{ (s)}$$

3. Rotation Speed
   - Load Shaft Speed

     $$n_L = \frac{\upsilon_L}{P_B} = \frac{15}{0.01} = 1500 \text{ (min}^{-1}\text{)}$$

   - Motor Shaft Speed

     $n_M = n_L \cdot R = 1500 \times 2 = 3000 \text{ (min}^{-1}\text{)}$

4. Load Torque

$$T_L = \frac{(9.8 \cdot \mu \cdot m + F) \cdot P_B}{2\pi R \cdot \eta} = \frac{(9.8 \times 0.2 \times 250 + 0) \times 0.01}{2\pi \times 2 \times 0.9} = 0.43 \text{ (N·m)}$$

5. Load Moment of Inertia

   • Linear Motion Section

$$J_{L1} = m\left(\frac{P_B}{2\pi R}\right)^2 = 250 \times \left(\frac{0.01}{2\pi \times 2}\right)^2 = 1.58 \times 10^{-4} \text{ (kg·m}^2\text{)}$$

   • Ball Screw

$$J_B = \frac{\pi}{32} \rho \cdot \ell_B \cdot d_B{}^4 \cdot \frac{1}{R^2} = \frac{\pi}{32} \times 7.87 \times 10^3 \times 1.0 \times (0.02)^4 \cdot \frac{1}{2^2} = 0.31 \times 10^{-4} \text{ (kg·m}^2\text{)}$$

   • Coupling
   $J_G = 0.40 \times 10^{-4}$(kg·m^2)

   • Load Moment of Inertia at Motor Shaft
   $J_L = J_{L1} + J_B + J_G = (1.58 + 0.31 + 0.40) \times 10^{-4} = 2.29 \times 10^{-4}$(kg·m^2)

6. Load Moving Power

$$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3000 \times 0.43}{60} = 135 \text{ (W)}$$

7. Load Acceleration Power

$$Pa = \left(\frac{2\pi}{60} n_M\right)^2 \frac{J_L}{ta} = \left(\frac{2\pi}{60} \times 3000\right)^2 \times \frac{2.29 \times 10^{-4}}{0.1} = 226 \text{ (W)}$$

8. Servomotor Provisional Selection

   a. Selection Conditions

   • $T_L \leq$ Motor rated torque
   • $\frac{(Po + Pa)}{2} <$ Provisionally selected servomotor rated output $< (Po + Pa)$
   • $n_M \leq$ Motor rated speed
   • $J_L \leq$ Allowable load moment of inertia

   The following servomotor meets the selection conditions.

   • SGMXJ-02A servomotor

   b. Specifications of the Provisionally Selected Servomotor

Item	Value
Rated Output	200 (W)
Rated Rotation Speed	3000 (min^{-1})
Rated Torque	0.637 (N·m)
Instantaneous Maximum Torque	2.23 (N·m)
Rotor Moment of Inertia	0.263 × 10^{-4} (kg·m^2)
Allowable Load Moment of Inertia	0.263 × 10^{-4} × 15 = 3.94 × 10^{-4} (kg·m^2)

9. Verification of the Provisionally Selected Servomotor

- Verification of Required Acceleration Torque

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} + 0.43$$

$\approx$ 1.23 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of Required Deceleration Torque

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} - 0.43$$

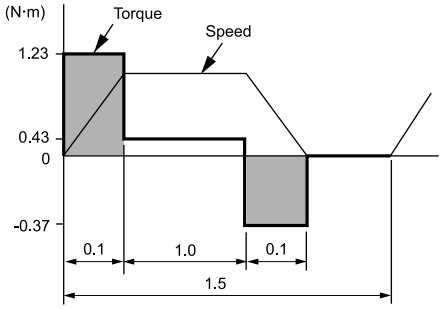
$\approx$ 0.37 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of Effective Torque Value

$$Trms = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(1.23)^2 \times 0.1 + (0.43)^2 \times 1.0 + (0.37)^2 \times 0.1}{1.5}}$$

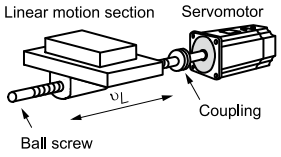
$\approx$ 0.483 (N·m) < Rated torque...Satisfactory

10. Selection Result
It has been verified that the provisionally selected servomotor is applicable.
The torque diagram is shown below.



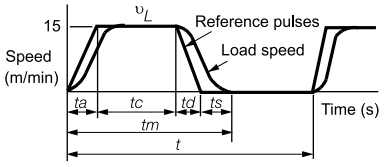
Capacity Selection Example for a Rotary Servomotor (Position Control)

1. Machine Specifications



Item	Symbol	Value
Load Speed	υ_L	15 m/min
Linear Motion Section Mass	m	80 kg
Ball Screw Length	ℓ_B	0.8 m
Ball Screw Diameter	d_B	0.016 m
Ball Screw Lead	P_B	0.005 m
Ball Screw Material Density	ρ	7.87×10^3 kg/m^3
External Force on Linear Motion Section	F	0 N
Coupling Mass	m_C	0.3 kg
Coupling Outer Diameter	d_C	0.03 m
Number of Feeding Operations	n	40 rotations/min
Feeding Distance	ℓ	0.25 m
Feeding Time	tm	1.2 s max.
Electrical Stopping Precision	δ	±0.01 mm
Friction Coefficient	μ	0.2
Mechanical Efficiency	η	0.9 (90%)

2. Speed Diagram



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

If $ta = td$, $ts = 0.1$ (s)

$$ta = tm - ts - \frac{60\ell}{\upsilon_L} = 1.2 - 0.1 - \frac{60 \times 0.25}{15} = 0.1 \text{ (s)}$$

$$tc = 1.2 - 0.1 - 0.1 \times 2 = 0.9 \text{ (s)}$$

3. Rotation Speed

- Load Shaft Speed

$$n_L = \frac{\upsilon_L}{P_B} = \frac{15}{0.005} = 3000 \text{ (min}^{-1}\text{)}$$

- Motor Shaft Speed
  Direct coupling gear ratio 1/R = 1/1
  Therefore, $n_M = n_L \cdot R = 3000 \times 1 = 3000$ (min^{-1})

4. Load Torque

$$T_L = \frac{(9.8\,\mu \cdot m + F) \cdot P_B}{2\pi R \cdot \eta} = \frac{(9.8 \times 0.2 \times 80 + 0) \times 0.005}{2\pi \times 1 \times 0.9} = 0.139\ (\text{N·m})$$

5. Load Moment of Inertia
   - Linear Motion Section

$$J_{L1} = m\left(\frac{P_B}{2\pi R}\right)^2 = 80 \times \left(\frac{0.005}{2\pi \times 1}\right)^2 = 0.507 \times 10^{-4}\ (\text{kg·m}^2)$$

   - Ball Screw

$$J_B = \frac{\pi}{32}\rho \cdot \ell_B \cdot d_B{}^4 = \frac{\pi}{32} \times 7.87 \times 10^3 \times 0.8 \times (0.016)^4 = 0.405 \times 10^{-4}\ (\text{kg·m}^2)$$

   - Coupling

$$Jc = \frac{1}{8} m_C \cdot d_C{}^2 = \frac{1}{8} \times 0.3 \times (0.03)^2 = 0.338 \times 10^{-4}\ (\text{kg·m}^2)$$

   - Load Moment of Inertia at Motor Shaft

$$J_L = J_{L1} + J_B + J_C = 1.25 \times 10^{-4}\ (\text{kg·m}^2)$$

6. Load Moving Power

$$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3000 \times 0.139}{60} = 43.7\ (\text{W})$$

7. Load Acceleration Power

$$Pa = \left(\frac{2\pi}{60} n_M\right)^2 \frac{J_L}{ta} = \left(\frac{2\pi}{60} \times 3000\right)^2 \times \frac{1.25 \times 10^{-4}}{0.1} = 123.4\ (\text{W})$$

8. Servomotor Provisional Selection
   a. Selection Conditions
      - $T_L \leq$ Motor rated torque
      - $\frac{(Po + Pa)}{2}$ < Provisionally selected servomotor rated output < $(Po + Pa)$
      - $n_M \leq$ Motor rated speed
      - $J_L \leq$ Allowable load moment of inertia

      The following servomotor meets the selection conditions.
      - SGMXJ-01A servomotor

   b. Specifications of the Provisionally Selected Servomotor

Item	Value
Rated Output	100 (W)
Rated Rotation Speed	3000 (min^{-1})
Rated Torque	0.318 (N·m)
Instantaneous Maximum Torque	1.11 (N·m)
Rotor Moment of Inertia	0.0669×10^{-4} (kg·m^2)
Allowable Load Moment of Inertia	$0.0659 \times 10^{-4} \times 35 = 2.31 \times 10^{-4}$ (kg·m^2)
Encoder Resolution	67108864 (pulses/rev) (26 bits)

9. Verification of the Provisionally Selected Servomotor

- Verification of Required Acceleration Torque

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} + 0.139$$

$$\approx 0.552 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of Required Deceleration Torque

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139$$

$$\approx 0.274 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of Effective Torque Value

$$Trms = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(0.552)^2 \times 0.1 + (0.139)^2 \times 0.9 + (0.274)^2 \times 0.1}{1.5}}$$

$$\approx 0.192 \text{ (N·m)} < \text{Rated torque...Satisfactory}$$

It has been verified that the provisionally selected servomotor is applicable in terms of capacity. Position control is considered next.

10. Positioning Resolution

The electrical stopping precision $\delta = \pm 0.01$ mm, so the positioning resolution $\Delta\ell = 0.01$ mm.
The ball screw lead $P_B = 0.005$ m, so the number of pulses per motor rotation is calculated using the following formula.

$$\text{Number of pulses per rotation (pulses)} = \frac{P_B}{\Delta\ell} = \frac{5 \text{ mm/rev}}{0.01 \text{ mm}} = 500 \text{ (P/rev)} < \text{Encoder resolution〔67108864 (P/rev)〕}$$

The number of pulses per motor rotation is less than the encoder resolution (pulses/rev), so the provisionally selected servomotor can be used.

11. Reference Pulse Frequency

The load speed $\upsilon_L = 15$ m/min = 1000 × 15/60 mm/s and the positioning resolution (travel distance per pulse) = 0.01 mm/pulse, so the reference pulse frequency is calculated with the following formula.

$$vs = \frac{1000\ \upsilon_L}{60 \times \Delta\ell} = \frac{1000 \times 15}{60 \times 0.01} = 25{,}000 \text{ (pps)}$$

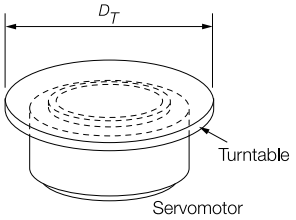
The reference pulse frequency is less than the maximum input pulse frequency *1, so the provisionally selected servomotor can be used.

*1 Refer to the specifications in the SERVOPACK manual for the maximum input pulse frequency.

It has been verified that the provisionally selected servomotor is applicable for position control.

Capacity Selection Example for Direct Drive Servomotors

1. Machine Specifications

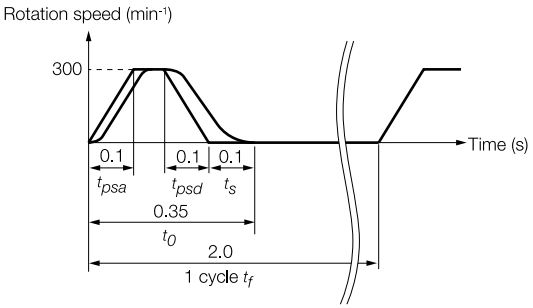


Item	Code	Value		Item	Code	Value
Turntable Mass	W	12 kg		Acceleration/Deceleration Time	t_p = t_{psa} = t_{psd}	0.1 s
Turntable Diameter	D_T	300 mm		Operating Frequency	t_f	2 s
Rotational Angle per Cycle	θ	270 deg		Load Torque	T_L	0 N· m
Positioning Time	t_0	0.35 s		Settling Time	t_s	0.1 s

2. Motor Speed of Direct Drive Servomotor

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

3. Operation Pattern



4. Load Moment of Inertia

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

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.

- SGMCV-17CEA11

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

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

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

- Verification of Required Deceleration Torque

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

$\fallingdotseq$ – 44.9 (N·m)<Maximum instantaneous torque···Satisfactory

- Verification of Effective Torque Value

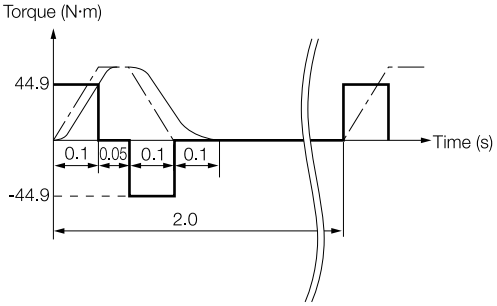
$$Trms = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{tf}} = \sqrt{\frac{44.9^2 \times 0.1 + 0^2 \times 0.05 + (-44.9)^2 \times 0.1}{2}}$$

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

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

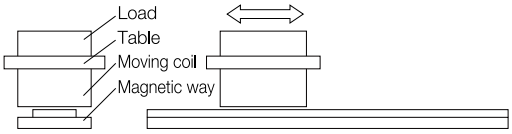
8. Result

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



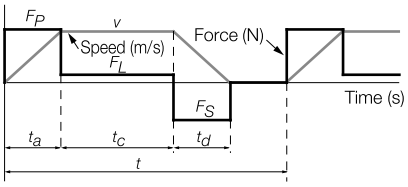
Capacity Selection Example for Linear Servomotors

1. Machine Specifications



Item	Code	Value		Item	Code	Value
Load Mass	m_W	1 kg		Acceleration Time	t_a	0.02 s
Table Mass	m_T	2 kg		Constant-speed Time	t_c	0.36 s
Motor Speed	v	2 m/s		Deceleration Time	t_d	0.02 s
Feeding Distance	l	0.76 m		Cycle Time	t	0.5 s
Friction Coefficient	μ	0.2		External Force on Linear Motion Section	F	0 N

2. Operation Pattern



3. Steady-State Force (Excluding Servomotor Moving Coil)

$F_L = \{9.8 \times \mu \times (m_W + m_T)\} + F = 9.8 \times 0.2 \times (1 + 2) + 0 = 5.88$ (N)

4. Acceleration Force (Excluding Servomotor Moving Coil)

$$F_P = (m_W + m_T) \times \frac{v}{t_a} + F_L = (1 + 2) \times \frac{2}{0.02} + 5.88 = 305.88 \text{ (N)}$$

5. Provisional Selection of Linear Servomotor

① Selection Conditions

- $F_p \leq$ Maximum force × 0.9
- $F_s \leq$ Maximum force × 0.9
- $F_{rms} \leq$ Rated force × 0.9

The following servomotor moving coil and magnetic way meet the selection conditions.

- SGLGW-60A253CP linear servomotor moving coil
- SGLGM-60□□□C linear servomotor magnetic way

② Specifications of the Provisionally Selected Servomotor

Item	Value
Maximum Force	440 (N)
Rated Force	140 (N)
Moving Coil Mass (m_M)	0.82 (kg)
Servomotor Magnetic Attraction (F_{att})	0 (N)

6. Verification of the Provisionally Selected Servomotor

- Steady-State Force
  $F_L = \mu \{9.8 \times (m_W + m_T + m_M) + F_{att}\} = 0.2 \{9.8 \times (1 + 2 + 0.82) + 0\} = 7.5$ (N)
- Verification of Acceleration Force

$$F_P = (m_W + m_T + m_M) \times \frac{v}{t_a} + F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} + 7.5$$

$$= 389.5 \text{ (N)} \leqq \text{Maximum force} \times 0.9 \text{ (= 396 N)} \cdots \text{Satisfactory}$$

- Verification of Deceleration Force

$$F_S = (m_W + m_T + m_M) \times \frac{v}{t_a} - F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} - 7.5$$

$$= 374.5 \text{ (N)} \leqq \text{Maximum force} \times 0.9 \text{ (= 396 N)} \cdots \text{Satisfactory}$$

- Verification of Effective Force

$$F_{rms} = \sqrt{\frac{F_P^2 \cdot t_a + F_L^2 \cdot t_c + F_S^2 \cdot t_d}{t}} = \sqrt{\frac{389.5^2 \times 0.02 + 7.5^2 \times 0.36 + 374.5^2 \times 0.02}{0.5}}$$

$$= 108.3 \text{ (N)} \leqq \text{Rated force} \times 0.9 \text{ (= 132.3 N)} \cdots \text{Satisfactory}$$

7. Result

It has been verified that the provisionally selected servomotor is applicable.

Capacity Selection for Regenerative Resistors

Regenerative Power and Regenerative Resistance

The rotational energy of a driven machine such as a servomotor that is returned to the SERVOPACK is called regenerative power. The regenerative power is absorbed by charging a smoothing capacitor. When the regenerative power exceeds the capacity of the capacitor, it is consumed by a regenerative resistor. (This is called resistance regeneration.)

The servomotor is driven in a regeneration state in the following circumstances:

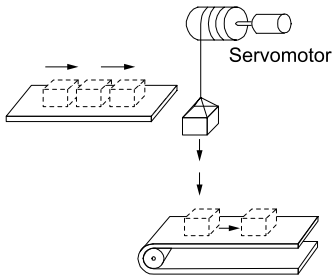
- While decelerating to a stop during acceleration/deceleration operation.
- While performing continuous downward operation on a vertical axis.
- During continuous operation in which the servomotor is rotated by the load (i.e., a negative load).

Important

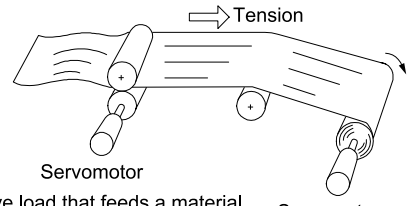
You cannot use the resistance regeneration provided by the SERVOPACK for continuous regeneration. For continuous operation with a negative load, you must design a system that also includes a power regenerative converter or power regenerative unit. If regenerative power is not appropriately processed, the regenerative energy from the load will exceed the allowable range and damage the SERVOPACK.

Examples of negative loads are shown below.

• Motor Drive to Lower Objects without a Counterweight



• Motor Drive for Feeding



Negative load that feeds a material at a constant speed under tension

Types of Regenerative Resistors

The following regenerative resistors can be used.

- Built-in regenerative resistor: A regenerative resistor that is built into the SERVOPACK. Not all SERVOPACKs have built in regenerative resistors.
- External regenerative resistor: A regenerative resistor that is connected externally to SERVOPACK. These resistors are used when the smoothing capacitor and built-in regenerative resistor in the SERVOPACK cannot consume all of the regenerative power.
  These resistors are also used when Yaskawa's SigmaSize+, an AC servo capacity selection program, determines an external regenerative resistor is necessary.

Note:

• Contact your Yaskawa representative for information on SigmaSize+.

• If you use an external regenerative resistor, you must change the setting of Pn600 (regenerative resistor capacity) and Pn603 (regenerative resistance).

Selection Table

SERVOPACK Model			Built-in Regenerative Resistor	External Regenerative Resistor	Description
SGDXS-	SGDXW-	SGDXT-			
R70A, R90A, 1R6A, 2R8A	–	–	Not provided.	Basically not required.	There is no built-in regenerative resistor, but normally an external regenerative resistor is not required. Install an external regenerative resistor when the smoothing capacitor in the SERVOPACK cannot consume all the regenerative power. *1
3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A	1R6A, 2R8A, 5R5A, 7R6A	1R6A, 2R8A	Standard feature *2	Basically not required.	A built-in regenerative resistor is provided as a standard feature. Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power. *1
470A, 550A, 590A, 780A	-	–	Not provided.	Required. *3	There is no built-in regenerative resistor. An external regenerative resistor is required. If an external regenerative resistor is not connected, Regeneration Error [A.300] will be displayed.

*1 Use Yaskawa's SigmaSize+, an AC servo capacity selection program, to select an external regenerative resistor.
Contact your Yaskawa representative for information on SigmaSize+.

*2 Refer to the following section for the specifications of built-in regenerative resistors.
☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 727*

*3 Regenerative resistor units are available from Yaskawa. For details, refer to the following section.
☞ *Regenerative Resistor Unit on page 731*

Selecting External Regenerative Resistor

You can use one of three methods to determine whether an external regenerative resistor is required.

☞ *Calculating With Yaskawa's Support Tool SigmaSize+: AC Servo Capacity Selection Program on page 770*
☞ *Simple Calculation on page 770*
☞ *Calculating the Regenerative Energy on page 777*

Calculating With Yaskawa's Support Tool SigmaSize+: AC Servo Capacity Selection Program

Using Yaskawa's support tool SigmaSize+, an AC servo capacity selection program, will allow you to use a wizard to calculate and select if external regenerative resistors are required or not.

Contact your Yaskawa representative for information on SigmaSize+.

Simple Calculation

When driving a servomotor with a horizontal shaft, check if an external regenerative resistor is required using the following calculation method. The calculation method depends on the model of the SERVOPACK.

■ SERVOPACK Models: SGDXS-R70A, -R90A, -1R6A, -2R8A,

Regenerative resistors are not built into the above SERVOPACKs. The total amount of energy that can be charged in the capacitors is given in the following table.

If the rotational energy (E_S) of the servomotor and load exceeds the processable regenerative energy, then connect an external regenerative resistor.

Applicable SERVOPACK		Processable Regenerative Energy (Joules)	Remarks
SGDXS-	R70A, R90A, 1R6A	24.2	Value when main circuit input voltage is 200 VAC
	2R8A	32.6	

Calculate the rotational energy (E_S) of the servo system with the following equation:

$E_S = J \times (n_M)^2/182$ (Joules)

- $J = J_M + J_L$
- J_M: Servomotor moment of inertia (kg·m^2)
- J_L: Load moment of inertia at motor shaft (kg·m^2)
- n_M: Servomotor operating motor speed (min^{-1})

■ SERVOPACK Models: SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A, SGDXW-1R6A, -2R8A, -5R5A, -7R6A, SGDXT-1R6A, -2R8A

For the above SERVOPACK models, an external regenerative resistor may be required depending on the allowable frequency for regenerative operation. (For SGDXS-470A, -550A, -590A, -780A, it is assumed that a regenerative resistor unit is connected.)

Use the following equation to calculate the allowable frequency for regenerative operation.

$$\text{Allowable frequency} = \frac{\text{Allowable frequency for regenerative operation for servomotor without load}}{(1+n)} \times \left(\frac{\text{Maximum motor speed}}{\text{Operating motor speed}}\right)^2 \text{(time/min)}$$

- $n = J_L/J_M$
- J_M: Servomotor moment of inertia (kg·m^2)
- J_L: Load moment of inertia at motor shaft (kg·m^2)

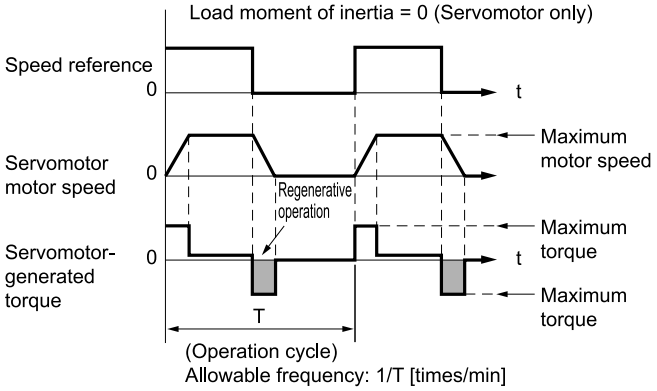
The allowable frequency for regenerative operation for a servomotor without load is explained below.

The operating conditions are acceleration and deceleration in an operation cycle with motor speed: 0 → specified motor speed → 0 (min^{-1}) as shown in the graph.

If the frequency (1/T) of the operation cycle is greater than the allowable frequency of the calculated result, an external regenerative resistor is required.

Finally, convert the data into the values for the actual motor speed and load moment of inertia to determine whether an external regenerative resistor is required.

If the specified motor speed is not designated, calculate by using the specified motor speed = maximum motor speed.



Operating Conditions for Calculating the Allowable Regenerative Frequency

Information **Allowable frequency for regenerative operation by a single servomotor without a load (described later)**

For SGDXS-470A, -550A, -590A, -780A, the values listed are with the optional regenerative resistor unit connected. Refer to the following sections for details on regenerative resistor unit.

☞ *Regenerative Resistor Unit on page 731*

◆ Rotary Servomotors

- SGMXJ Servomotors

Servomotor Model SGMXJ-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)		
		Single-Axis Operation	Simultaneous Operation of Two Axes	Simultaneous Operation of Three Axes
A5A	6000	-	300	300
01A	6000	-	180	180
C2A	6000	-	130	130
02A	6000	-	46	46

Continued on next page.

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Servomotor Model SGMXJ-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)		
		Single-Axis Operation	Simultaneous Operation of Two Axes	Simultaneous Operation of Three Axes
04A	6000	-	25	25
06A	6000	30	30	-
08A	6000	15	15	-

- SGMXA Servomotors

Servomotor Model SGMXA-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)		
		Single-Axis Operation	Simultaneous Operation of Two Axes	Simultaneous Operation of Three Axes
A5A	6000	-	560	560
01A	6000	-	360	360
C2A	6000	-	260	260
02A	6000	-	87	87
04A	6000	-	56	56
06A	6000	77	77	-
08A	6000	31	31	-
10A	6000	31	-	-
15A	6000	15	-	-
20A	6000	19	-	-
25A	6000	15	-	-
30A	6000	6.9	-	-
40A	6000	11	-	-
50A	6000	8.8	-	-
70A	6000	86	-	-

- SGMXP Servomotors

Servomotor Model SGMXP-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)		
		Single-Axis Operation	Simultaneous Operation of Two Axes	Simultaneous Operation of Three Axes
01A	6000	-	200	200
02A	6000	-	46	46
04A	6000	-	29	29
08A	6000	11	11	-
15A	6000	7.5	-	-

• SGMXG Servomotors

Servomotor Model SGMXG-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)	
		Single-Axis Operation	Simultaneous Operation of Two Axes
03A	3000	39	39
05A	3000	29	29
09A	3000	6.9	6.9
13A	3000	6.1	-
20A	3000	7.4	-
30A	3000	9.5	-
44A	3000	6.4	-
55A	3000	24	-
75A	3000	34	-
1AA	2000	39	-
1EA	2000	31	-

◆ Direct Drive Servomotors

• SGM7D Servomotors

Servomotor Model SGM7D-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
01G	-	-
1AF	120	-
1CI	74	-
1ZI	91	-
02K	-	-
03H	-	-
05G	-	-
06J	350	-
06L	-	-
07K	-	-
08G	430	-
08K	-	-
09J	250	-
09J	-	-
12L	-	-
18G	350	-
18J	210	-
20J	200	-
24G	270	-
28I	52	-

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Servomotor Model SGM7D-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
2BI	89	-
2DI	110	-
30F	210	-
30L	63	-
38J	150	-
34G	220	-
45G	190	-
58F	170	-
70I	100	-
90F	140	-

- SGM7E Servomotors

Servomotor Model SGM7E-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
02B	-	62
05B	-	34
07B	-	22
04C	-	22
08D	-	6.1
10C	-	19
14C	-	22
17D	-	7
25D	-	9.3
16E	3.7	3.7
35E	9.7	9.7

- SGM7F Servomotors

Servomotor Model SGM7F-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
02A	-	150
05A	-	83
07A	-	62
04B	-	75
08C	-	21
10B	-	48
14B	65	65
16D	13	13
17C	30	30

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Servomotor Model SGM7F-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
25C	31	31
35D	19	19
45M	25	25
80M	19	-
1AM	8.9	-
80N	22	-
1EN	11	-
2ZN	9.1	-

◆ Linear Servomotors

- SGLGW Servomotors

Servomotor Model SGLGW-		Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
		Single-Axis Operation	Simultaneous Operation of Two Axes
Using a Standard-Force Magnetic Way	30A050C	–	190
	30A080C	–	120
	40A140C	–	56
	40A253C	–	32
	40A365C	–	22
	60A140C	–	49
	60A253C	–	27
	60A365C	37	37
	90A200C	34	–
	90A370C	33	–
	90A535C	24	–
Using a High-Force Magnetic Way	40A140C	–	80
	40A253C	–	45
	40A365C	62	62
	60A140C	–	64
	60A253C	71	71
	60A365C	49	49

- SGLFW2 Servomotors

Servomotor Model SGLFW2-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
30A070A	–	38
30A120A	–	21
30A230A	22	11

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Servomotor Model SGLFW2-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
45A200A	16	16
45A380A	10 *1	–
	17 *2	–
90A200A	14	–
90A380A	11	–
90A560A	18	–
1DA380A	21	–
1DA560A	32	–

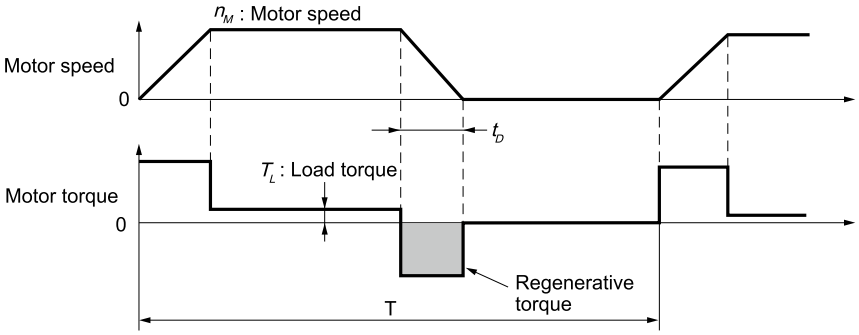
*1 This value is in combination with the SGDXS-120A.
*2 This value is in combination with the SGDXS-180A.

- SGLTW Servomotors

Servomotor Model SGLTW-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
20A170A	15	15
20A320A	8.3	8.3
20A460A	7.1	–
35A170A	10	10
35A170H	8.5	8.5
35A320A	7	–
35A320H	5.9	–
35A460A	7.6	–
40A400B	13	–
40A600B	19	–
50A170H	15	15
50A320H	11	11

Calculating the Regenerative Energy

This section shows how to calculate the regenerative resistor capacity for the acceleration/deceleration operation shown in the following figure.



- Calculation Procedure for Regenerative Resistor Capacity

Step	Item	Symbol	Formula
1	Calculate the rotational energy of the servomotor.	E_S	$E_S = Jn_M^2/182$
2	Calculate the energy consumed by load loss during the deceleration period	E_L	$E_L = (\pi/60)\ n_M T_L t_D$
3	Calculate the energy lost from servomotor winding resistance.	E_M	(Value calculated from the graphs in *Servomotor Winding Resistance Loss on page 780*) × t_D
4	Calculate the energy that can be absorbed by the SERVOPACK.	E_C	Calculate from the graphs in *SERVOPACK-absorbable Energy on page 778*
5	Calculate the energy consumed by the regenerative resistor.	E_K	$E_K = E_S - (E_L + E_M + E_C)$
6	Calculate the required regenerative resistor capacity (W).	W_K	$W_K = E_K/(0.2 \times T)$

Note:

1. The 0.2 in the equation for calculating W_K is the value when the regenerative resistor's utilized load ratio is 20%.
2. The units for the various symbols are given in the following table.

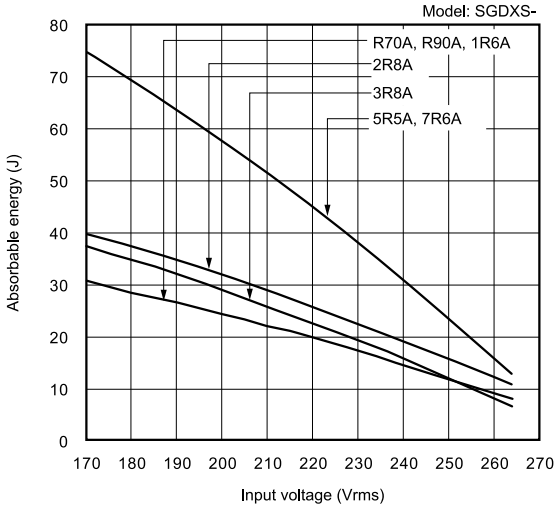
Symbol	Description
E_S to E_K	Energy in joules (J)
W_K	Required regenerative resistor capacity (W)
J	= J_M + J_L (kg·m^2)
n_M	Servomotor motor speed (min^{-1})
T_L	Load torque (N·m)
t_D	Deceleration stopping time (s)
T	Servomotor repeat operation cycle (s)

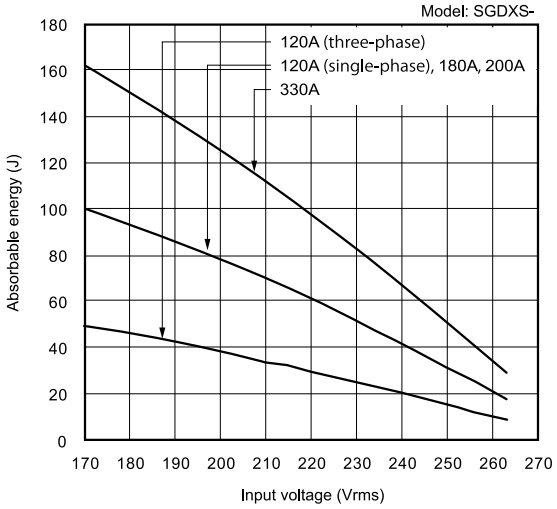
If the value of W_K does not exceed the capacity of the built-in regenerative resistor of the SERVOPACK, an external regenerative resistor is not required. For details on the built-in regenerative resisters, refer to the SERVOPACK specifications. If the value of W_K exceeds the capacity of the built-in regenerative resistor, install an external regenerative resistor with a capacity equal to the value for W calculated above.

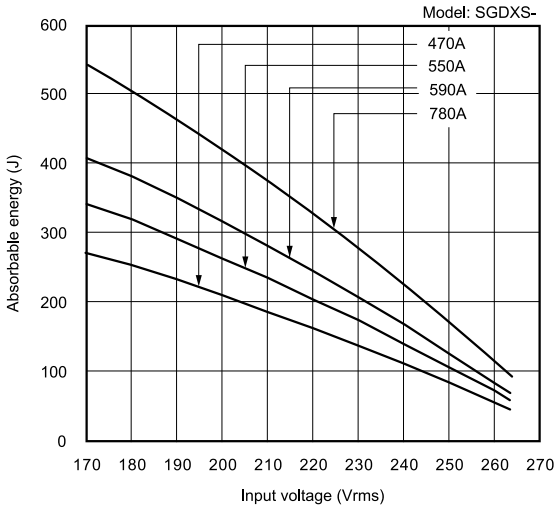
■ SERVOPACK-absorbable Energy

The following figures show the relationship between the SERVOPACK's input power supply voltage and its absorbable energy.

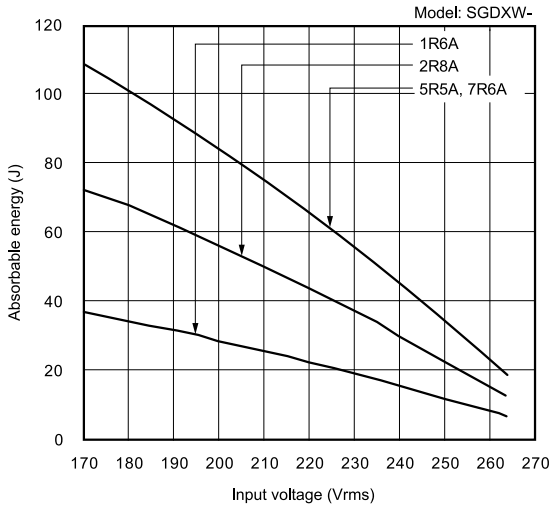
◆ Σ-XS SERVOPACKs



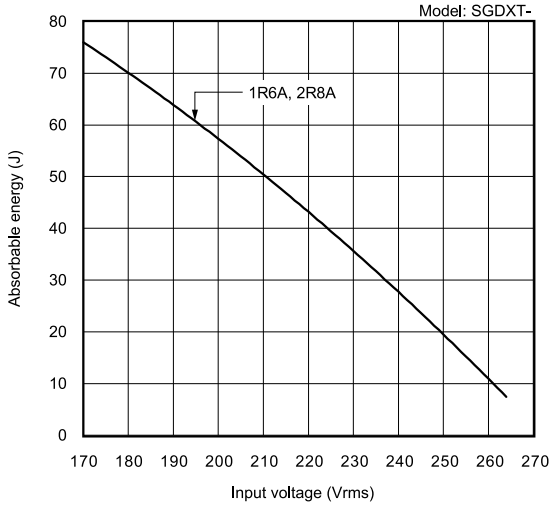




◆ Σ-XW SERVOPACKs



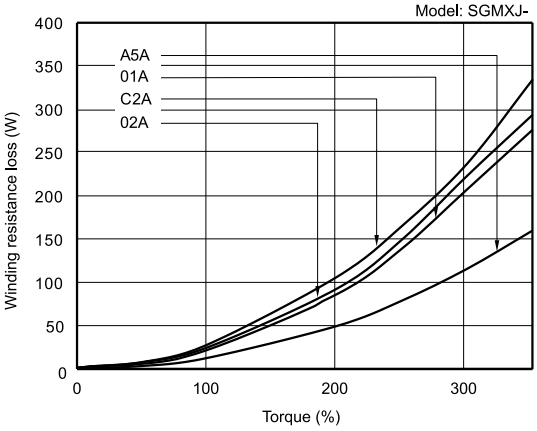
◆ Σ-XT SERVOPACKs

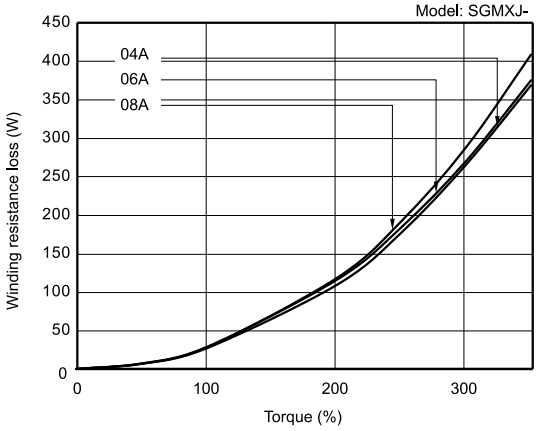


■ Servomotor Winding Resistance Loss

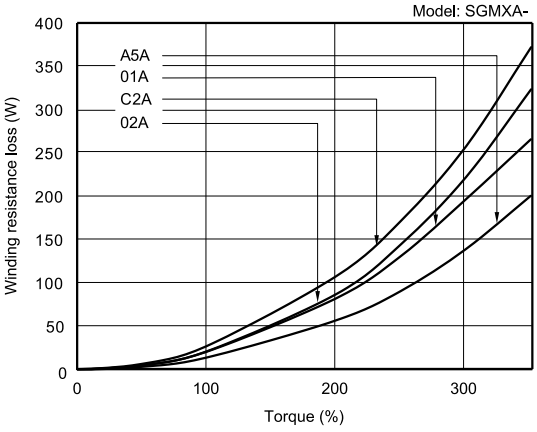
The following figures show the relationship for each servomotor between the servomotor's generated torque and the winding resistance loss.

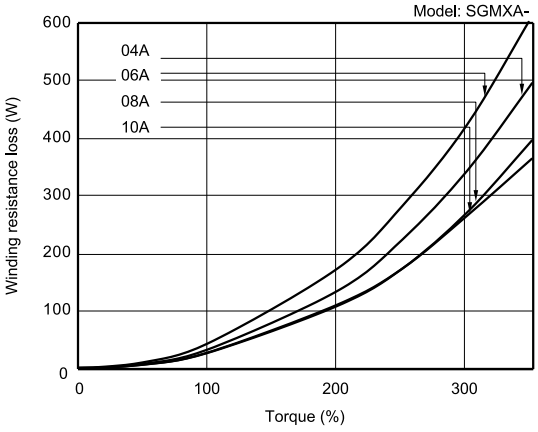
◆ SGMXJ Rotary Servomotors

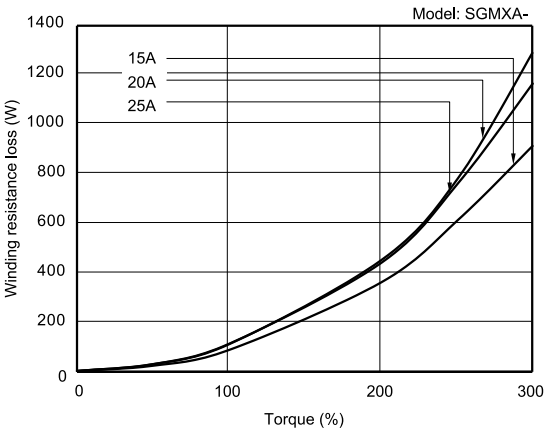


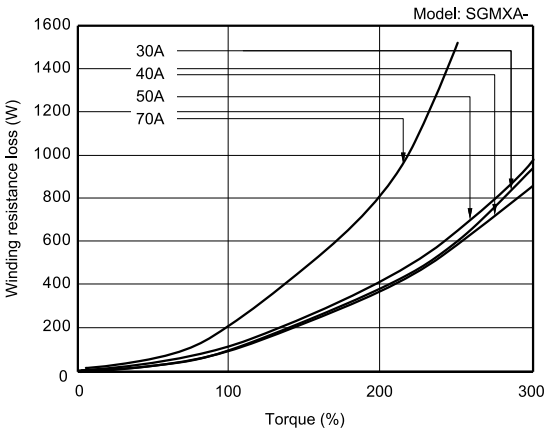


◆ SGMXA Rotary Servomotors

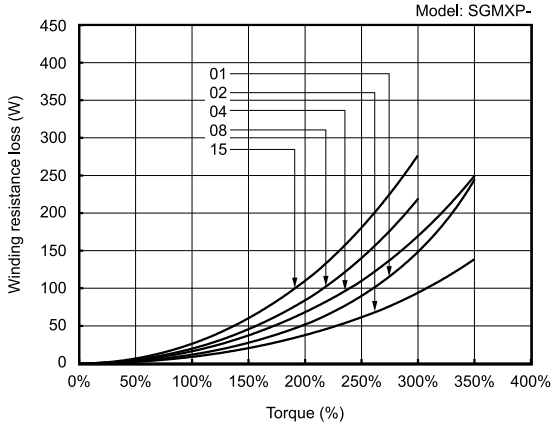




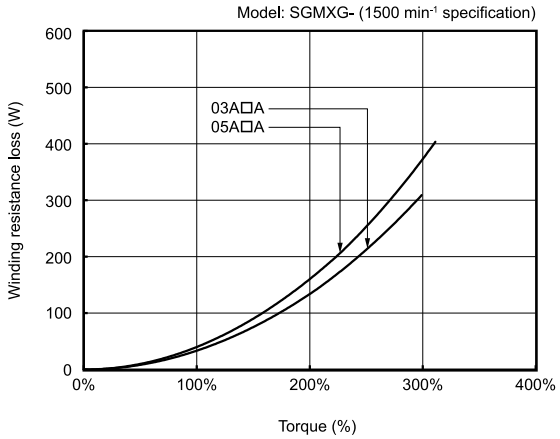


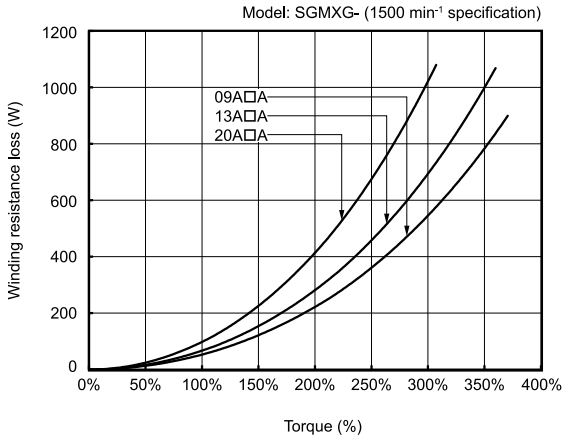


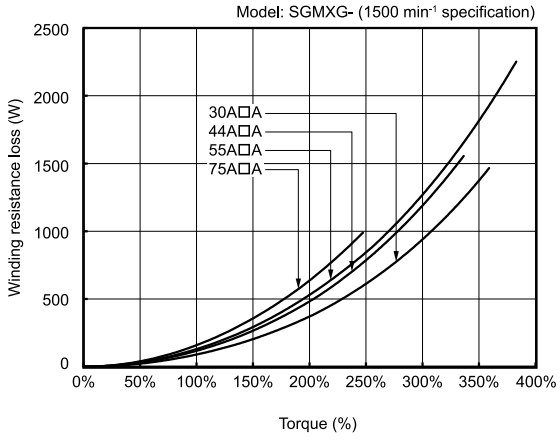
◆ SGMXP Rotary Servomotors

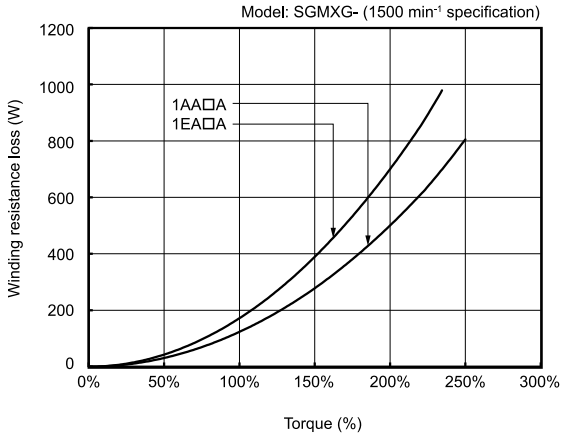


◆ SGMXG Rotary Servomotors (1500-min^{-1} Specification)

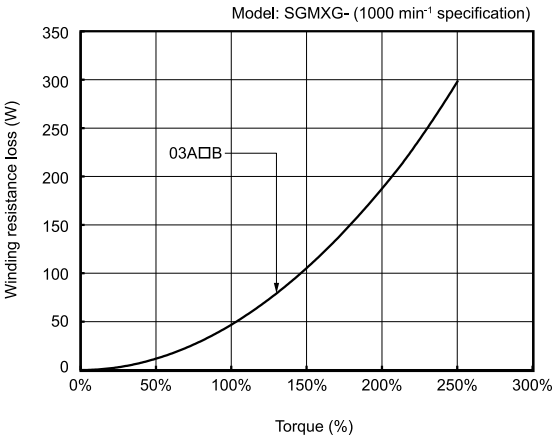


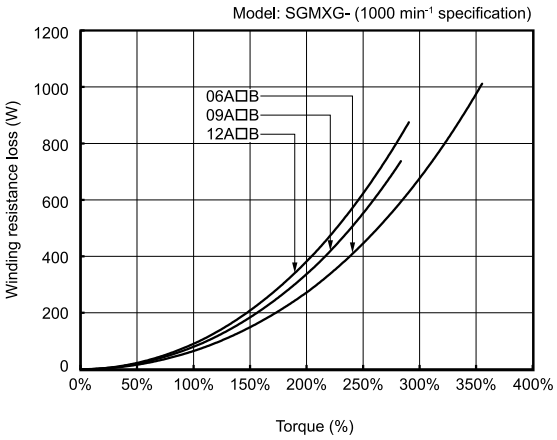


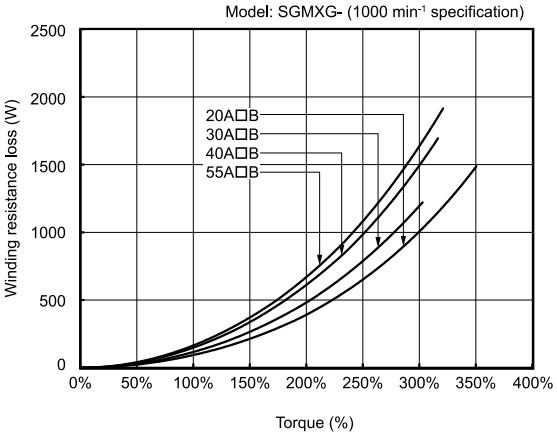




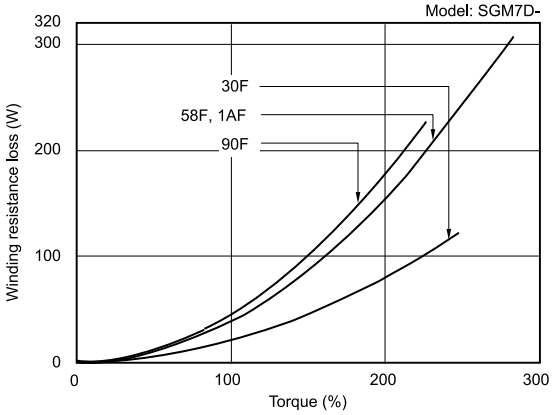
◆ SGMXG Rotary Servomotors (1000-min^{-1} Specification)

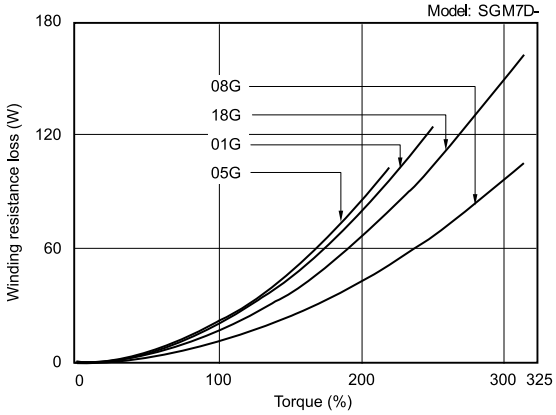


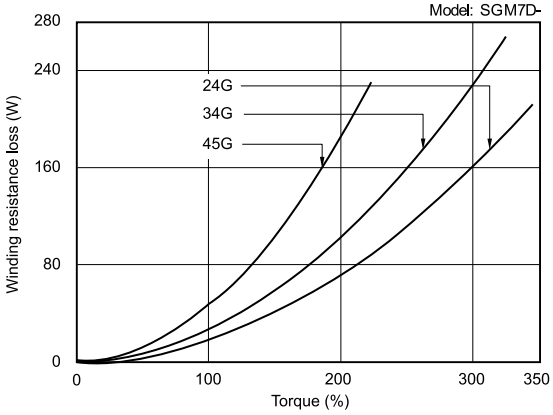


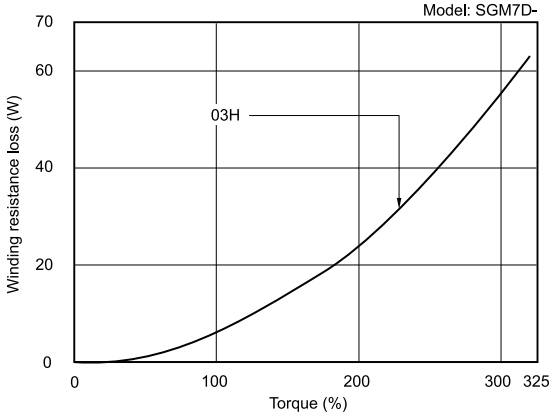


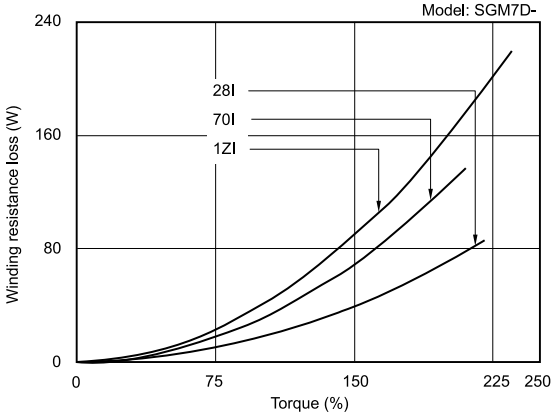
◆ SGM7D Direct Drive Servomotors

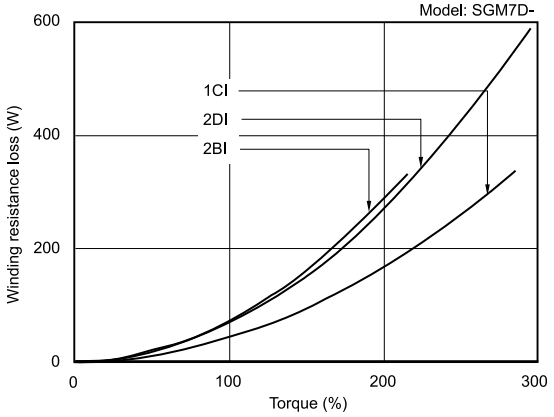


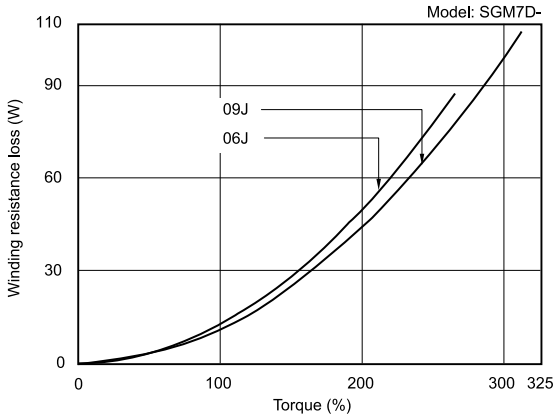


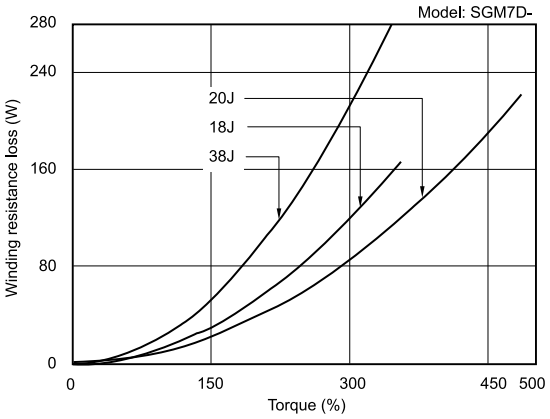


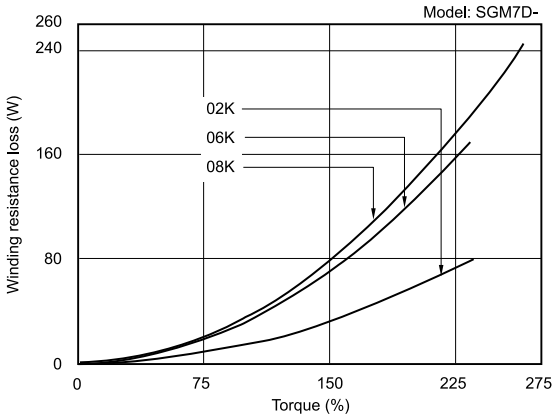


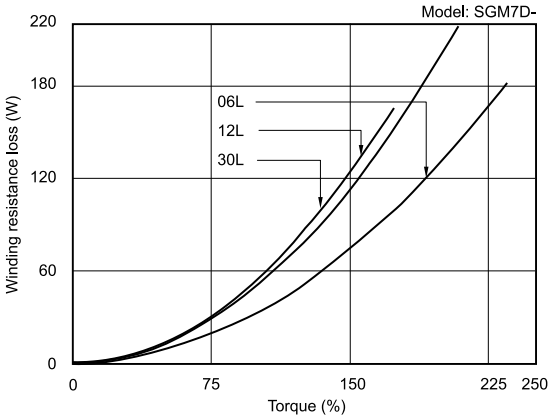




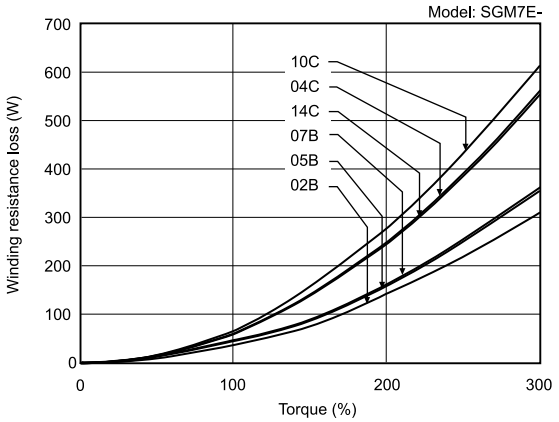


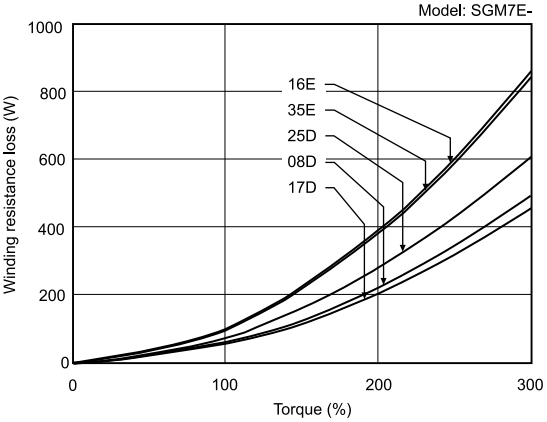




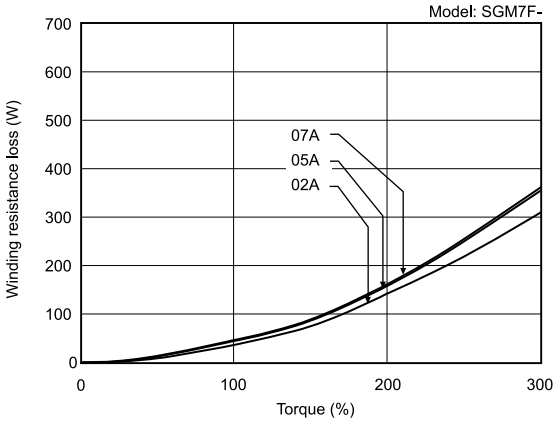


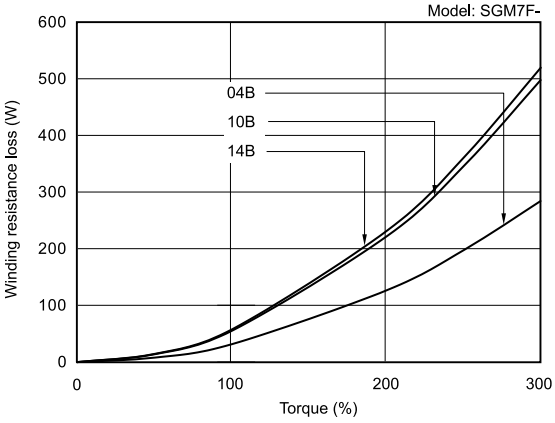
◆ SGM7E Direct Drive Servomotors

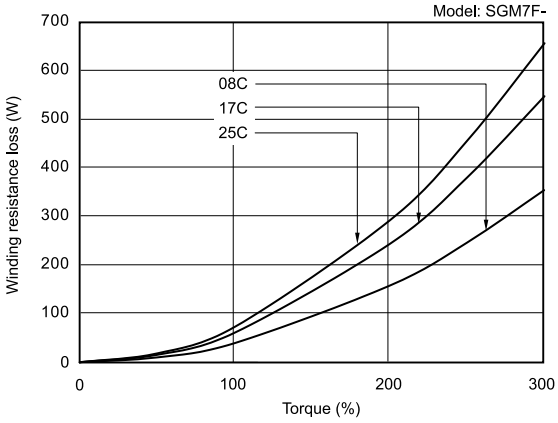


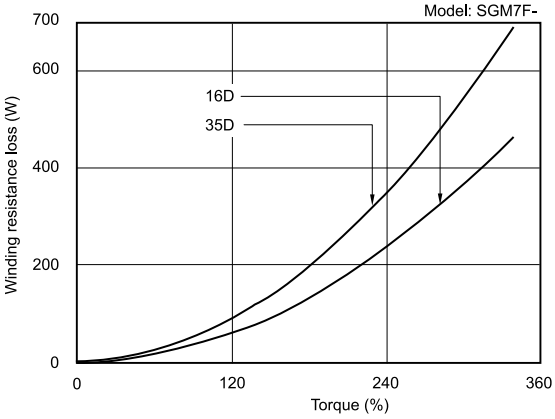


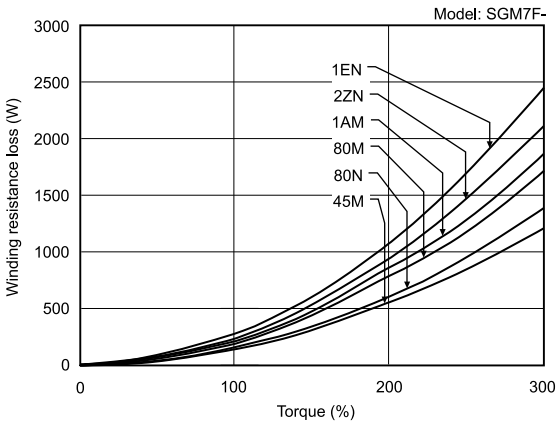
◆ SGM7F Direct Drive Servomotors



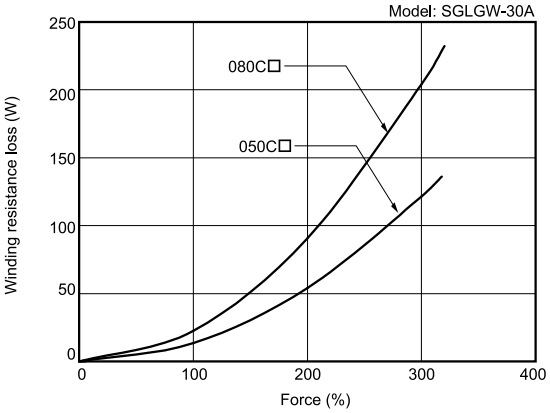


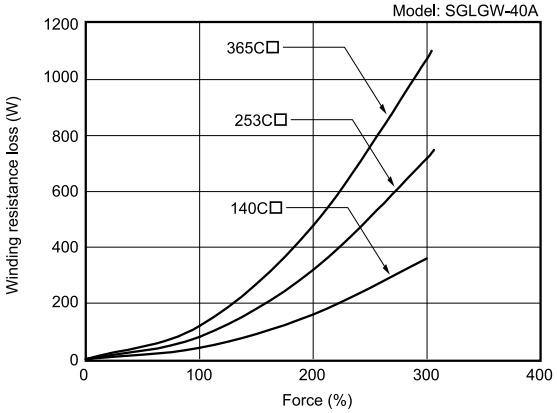


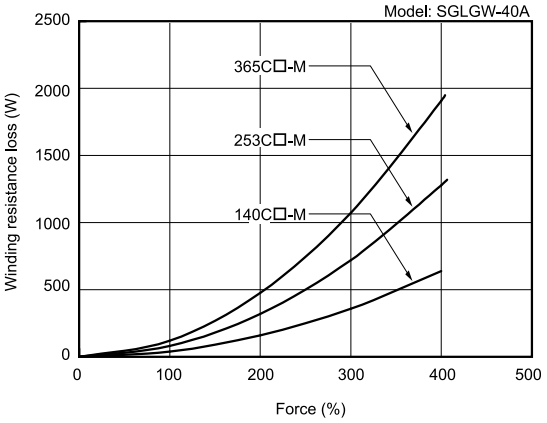


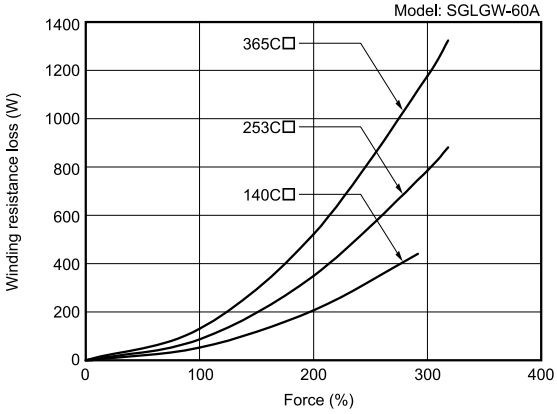


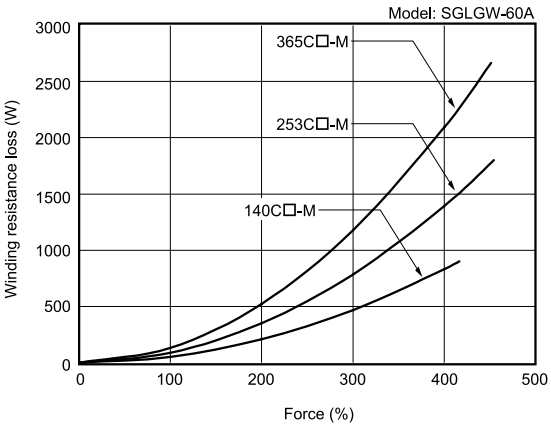
◆ SGLGW Linear Servomotors

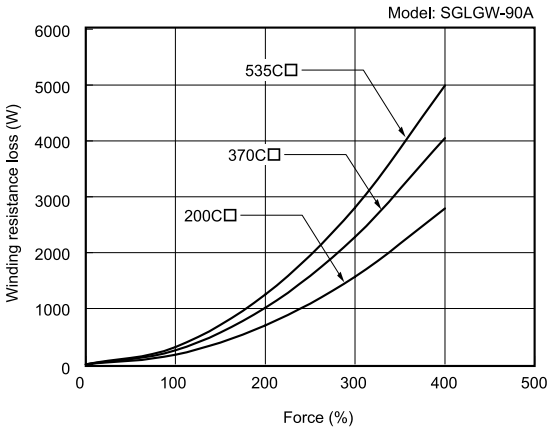




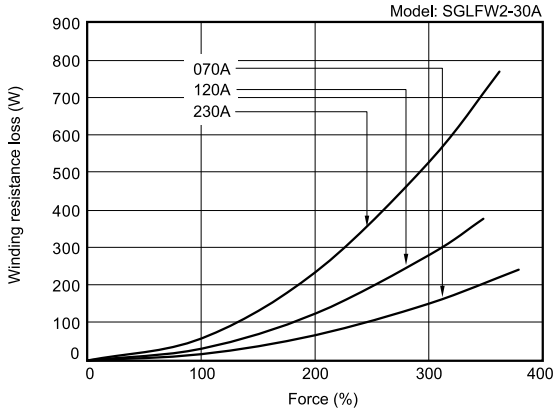


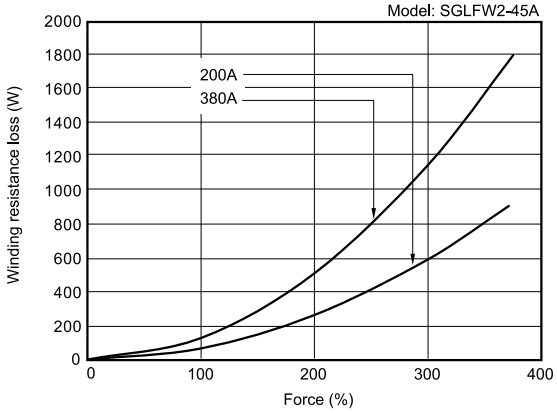


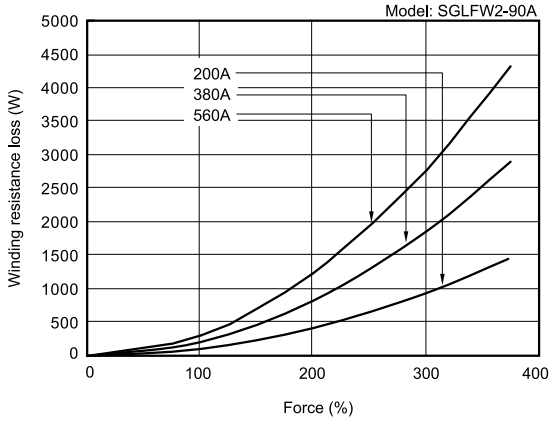


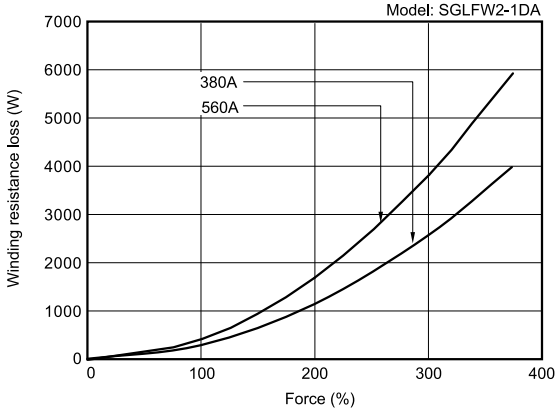


◆ SGLFW2 Linear Servomotors

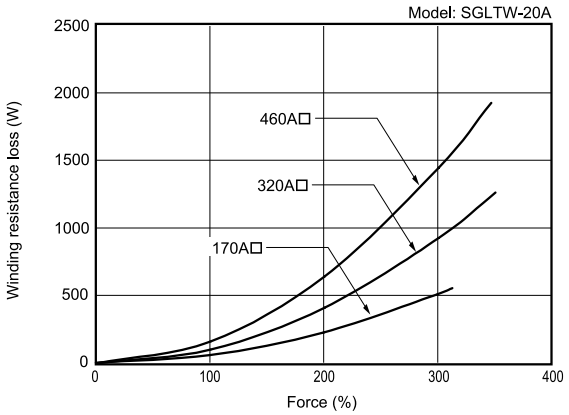


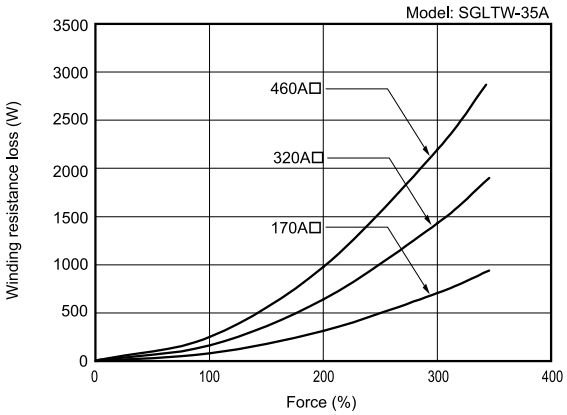


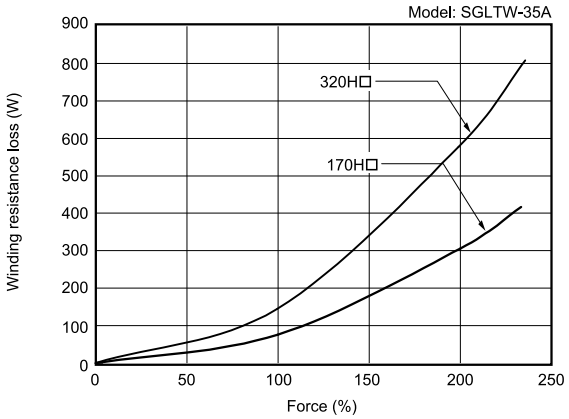


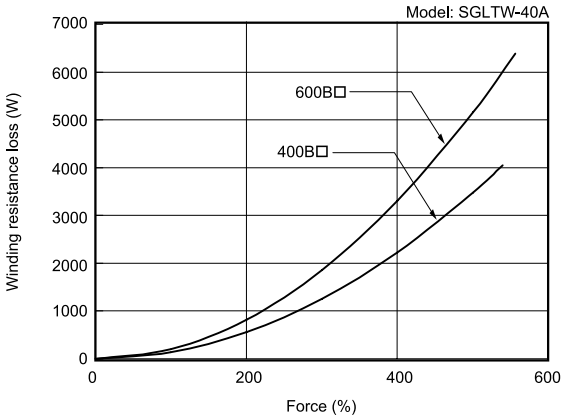


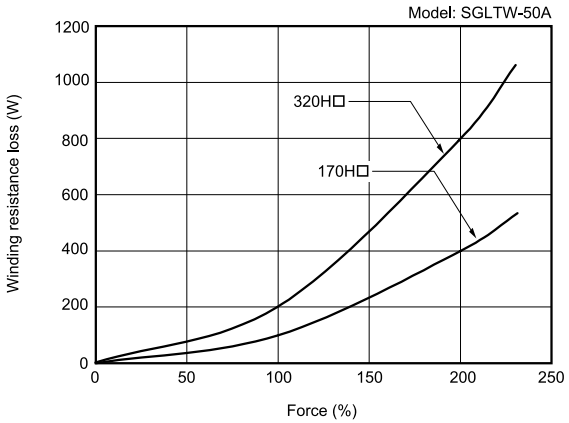
◆ SGLTW Linear Servomotors

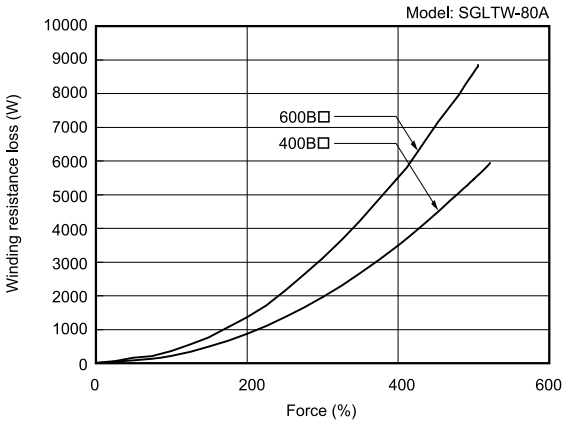












International Standards

●: Certified, △: Only Certified for Some Models, ○: Applied, – : Not Certified

Product Name		Model	UL/CSA Standards	EU Directives			KC Mark
			UL	CE	RoHS Directive	Safety Standards	KC
SERVOPACKs		SGDXS	●	○	○	○ *2*	△ *5*
		SGDXW	●	○	○	○ *3*	●
		SGDXT	●	○	○	○ *3*	△ *5*
Feedback Option	Fully-Closed Module	SGDV-OFA01A *1*	●	○	○	○ *4*	●
Peripheral Device	Σ-LINK II Sensor Hub	JUSP-SL2H	●	○	○	-	●
	Σ-LINK II Booster Unit	JUSP-SL2B1AA	●	○	○	-	●

*1 Use this model number to purchase the option module separately.
*2 Refer to the specifications of the SERVOPACKs for details on applicable standards.
*3 Only hardware option specification 1000 complies with safety standards.
*4 Option modules are not certified individually, but they do comply with safety standards when combined with the SERVOPACK.
*5 Contact your Yaskawa representative.

Product Name	Model	UL/CSA Standards	EU Directives	
		c UL us	CE	RoHS Directive
Rotary Servomotors	SGMXJ	●	○	○
	SGMXA	●	○	○
	SGMXP	●	○	○
	SGMXG	●	○	○
	SGM7M	●	○	○
Direct Drive Servomotors	SGM7D	-	○	○
	SGM7E	●	○	○
	SGM7F	● *1*	○	○
Linear Servomotors	SGLGW (SGLGM) *2 3*	●	*4*	○ *5*
	SGLFW2 (SGLFM2) *2 3*	●	○	○
	SGLTW (SGLTM) *2 3*	● *6*	*4*	○ *5*

*1 Only small-capacity servomotors with cores (SGM7F-□□A, -□□B, -□□C, -□□D) are in compliance with the UL standards. Medium-capacity servomotors with cores (SGM7F-□□M, -□□N) do not comply with the UL standards.
*2 The model numbers of the magnetic ways of linear servomotors are given in parentheses.
*3 Only products with derating specifications are in compliance with the standards. Estimates are available for those models. Contact your Yaskawa representative for details.
*4 CE marking certification has been received. Contact your Yaskawa representative if the CE marking label is required.
*5 Estimates are provided for RoHS-compliant products. The model numbers have an “-E” suffix.
*6 Certification has not yet been received for SGLTW-35A□□□H, -50A□□□H linear servomotors.

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.

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Yaskawa is the leading global manufacturer of low and medium voltage variable frequency drives, servo systems, machine controllers and industrial robots. Our standard products, as well as tailor-made solutions, are well known and have a high reputation for outstanding quality and reliability.

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Yaskawa America, Inc. | Drives & Motion Division
1-800-YASKAWA | Email: info@yaskawa.com | yaskawa.com
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