YASKAWA

AC SERVO DRIVES
Σ-Ⅲ SERIES

another step ahead

Σ-Ⅲ

AC SERVODRIVE Σ-Ⅲ

Certified for
ISO9001 and
ISO14001

JQA-0422

JQA-EM0202
JQA-EM0924

Get faster positioning speeds with the new enhanced Σ-Ⅲ.

The Σ-Ⅲ series, developed for high-speed, high-frequency and accurate positioning, is equipped with functions that use cutting-edge technology to adapt the servo drive to your machine and to get the top performance to drive your machine rapidly and accurately. Three types of servomotors allow you to choose the best combination for your application to make the design of your system more simple and the positioning more accurate. Plus, following our policy to make user-friendly products, the software is designed so you can easily and speedily select your servomotor, adjust the servo, and maintain your equipment.

SERVOPACKs SGDS-□□□01/02

SERVOPACK SGDS-□□□12

Rotary Servomotors

Note: The motors do not include the connectors shown in the photo.

Linear Servomotors

Direct-drive Servomotors

Top Performance
realizes high-speed and smooth positioning with minimum machine vibration.
→ Page 4

Software for Easy Application
enables you to select a servomotor and adjust the servo on your personal computer.
→ Page 9

Wide Motor Selection
enables construction of optimum system.
→ Page 4

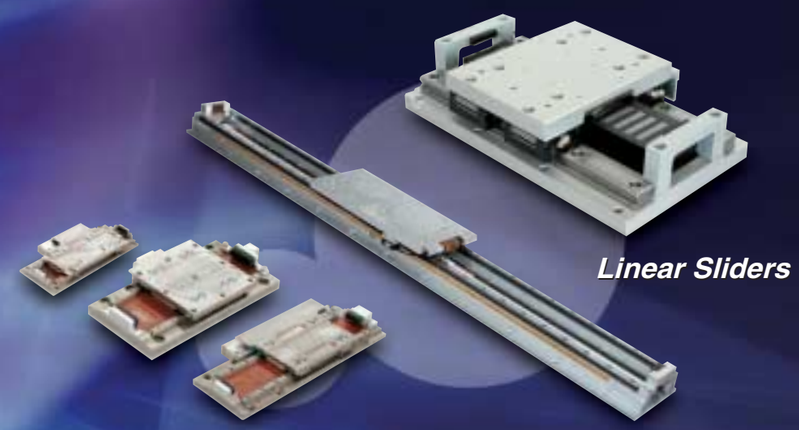
MECHATROLINK-Ⅱ Network
Real-time communications and cost savings.
→ Page 8

Σ-Ⅲ

Various Tuning Functions
enables the servo to be adjusted according to the actual operation conditions.
→ Page 5

New Functions
to maximize machine performance enables you to easily customize your servo system with a wide selection of functions.
→ Page 6

New Digital Operator
with 5-line display Improves operability.
→ Page 5



Linear Sliders

Applications

For high-speed and high-response performance, especially for machines that require high productivity with a quick tact time.

Equipment
- Semiconductor-manufacturing machines
- Electronic parts assembling machines
- Inspection units
- Metal-processing machines
- Food-packing machines

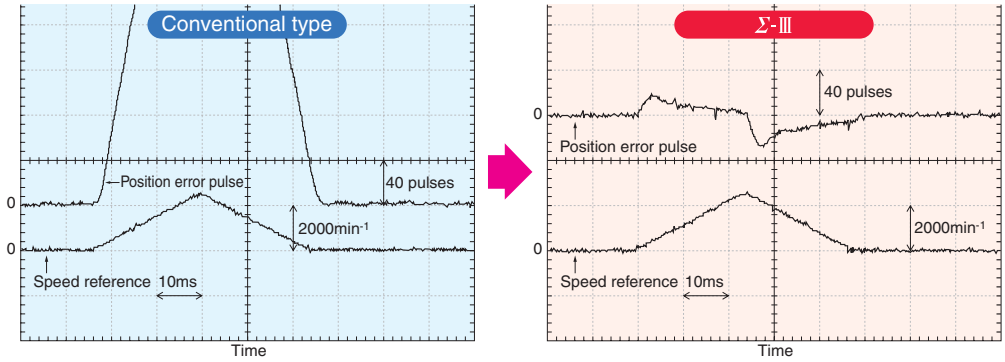
Machines
- Die-bonding machines and wire-bonding machines
- Chip mounters and IC handlers
- Probers and in-circuit testers
- Winding machines, feeders, and loaders
- Pillow-packing machines

CONTENTS

Top performance

With the finest cutting-edge technology in the world, such as the 600-Hz response, less deviation control, and vibration suppression control, the Σ-Ⅲ series realizes high-speed but smooth positioning with minimum vibration to your machine.

- The less deviation control reduces the positioning settling time for high-rigidity machines to 1 ms or less.
- The advanced control enables smooth, high-speed operations and minimizes the positioning deviation for low-rigidity machines.
- Upgraded Follow-up Control for triangle patterns
- 17-bit encoder mounted as a standard feature
  The highly accurate absolute position data and upgraded vibration suppression control on stopping are indispensable for extra-fine processing and high-precision mounting.
- The torque ripple is greatly reduced to assure smooth rotation.

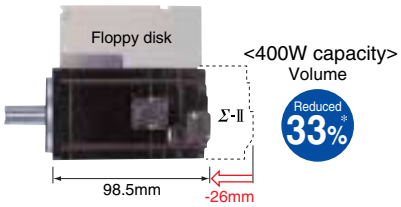


Wide motor seleciton

Four types of servomotors are available: rotary servomotors with a maximum speed of 6000 min-1, gearless direct-drive servomotors, linear servomotors that directly drive a load, and linear sliders that combine our expertise for linear motors, guides, and scales.

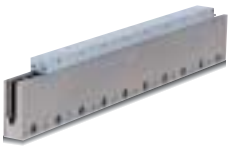
Rotary servomotors

Smaller but more powerful machine drive section.



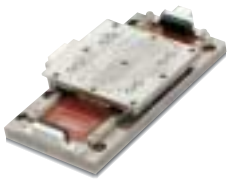
Direct-drive servomotors

Directly drives a load without gears because of its flat, thin, and hollow structure.
For example, in an application with a turning table, not only the positioning accuracy improves but also a simplified and maintenance-free mechanical structure is realized.



Linear servomotors

Features uniform linear motion, stable performance, clean operation, a maintenance-free structure and a direct-feed mechanism. So, it can be used for applications that require high speeds, high acceleration or deceleration, and long strokes.
The linear servomotors contribute to the improvement of machine function and performance.



Linear sliders

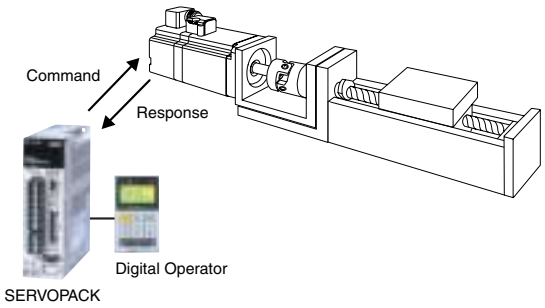
Includes a linear servomotor, a linear scale, and a linear guide for immediate mounting on your machine. Wide lineup from ultra-thin, compact sliders to long-stroke ones.

Various tuning functions

Adjusts the servo according to the actual operation conditions, which reduces the setting time.

Advanced Autotuning

With the remote digital operator or the built-in panel operator, set the servo drive to run so that you can tune the parameters, and the optimum settings for the load moment of inertia, the servo gains, and the filter for the connected machine will be automatically set.



<Note>
To be used when the results of normal autotuning are not satisfactory.
The advanced autotuning is applicable when the stroke is long enough to allow the auto run.

One-parameter Autotuning

Four servo gains can be automatically adjusted by tuning just one parameter for a servo gain with the onscreen slider.

<Note>
To be used when you want to judge the results of servo tuning.
Using this function shortens the time required for tuning.
To be used when you want to improve the servo response after advanced autotuning.

EasyFFT

A simplified version of the FFT function is pre-installed in the SERVOPACKs in the Σ-Ⅲ series.
The mechanical vibration frequency is monitored on the remote digital operator or the built-in panel operator, and a notch filter is automatically set to minimize the vibration.

<Note>
To be used this function to set a notch filter for the individual machine that is connected before adjusting the servo gains.

New Digital Operator

The liquid-crystal JUSP-OP05A digital operator (optional) displays the four specified data such as parameter settings and monitored data at the same time to make tuning the servodrive even easier.

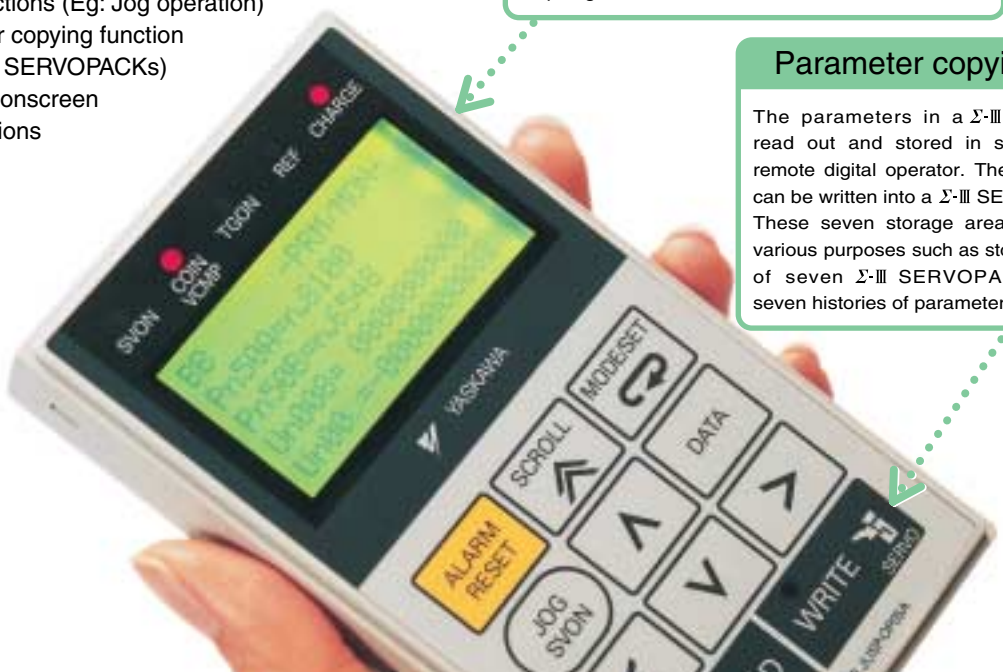
<Functions>
- Parameter editing
- Monitoring
- Utility functions (Eg: Jog operation)
- Parameter copying function (for seven SERVOPACKs)
- Saving of onscreen configurations

Liquid crystal display (17 letters × 5 lines)

Simple messages in alphanumeric characters give helpful guidance.

Parameter copying function

The parameters in a Σ-Ⅲ SERVOPACK are read out and stored in seven areas in the remote digital operator. The stored parameters can be written into a Σ-Ⅲ SERVOPACK.
These seven storage areas can be used for various purposes such as storing the parameters of seven Σ-Ⅲ SERVOPACKs or recording seven histories of parameter modifications.



New functions

New functions to suppress vibrations have been added to the Σ-Ⅱ series.
The necessary settings can be made more speedily than ever.

New Functions

Online vibration monitor

To detect the vibration frequency while the machine is running and to automatically set the required frequency of the notch filter.

Vibration suppression control*

To minimize the vibration caused by the resonance of a low-rigidity machine.

Less deviation control

To improve the machine's follow-up accuracy. Almost no error is caused in not only triangle but also trapezoid patterns for references.

Predictive control

To amend the command being executed for improved servo response.

Backlash compensation

To compensate the machine backlash in one direction by adding a value to the position reference in one direction.

High Performance

Model follow-up control

This function is effective for the high-speed positioning of low rigidity machines. The optimum positioning control for machines suppresses vibrations and reduces the positioning time of your machines.

Vibration control*

The observer reduces the vibration, which allows high servo gain to be used in the drive if a machine drive system is subject to vibrations. This function enhances the servo characteristics.

Notch filter

Resonance is suppressed by setting the notch filter in accordance with mechanical system resonance frequency when a high frequency resonance noise is made by the machine.

Torque reference filter

In the event that shaft resonance causes vibration in the servo system, the torque reference filter suppresses resonance.

Speed observer control

The speed observer enables smooth motion even at low speeds and a shorter position settling time.

Speed bias

Load conditions are optimized to shorten positioning time.

Vibration suppression control on stopping

To minimize vibration when the motor is stopped (servo-lock). If no position reference is input, a damping is set to the torque reference so that the torque variation at stopping is moderated.

Automatic gain switching

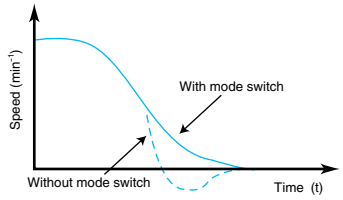
To shorten the settling time and minimize vibration on stopping. Four combinations of four parameters for the speed loop gain, the speed control integral time constant, the position loop gain, and the filter time constant for torque reference are possible. The combinations can be switched by the G-SEL1 and G-SEL2 external input signals, or two combinations can be switched by setting the automatic gain switching function.

High-speed rotation

Maximum motor speed: 6000 min^{-1}
This brings the machine's performance to that of a higher grade.

Mode switch

To improve transient characteristics during motor acceleraion and deceleration, the system can be switched between speed loop PI (proportional and integral) and P (proportional) control, helping to prevent overshoot.



Feed-forward compensation

Feed-forward compensation provides reduced positioning time.

Zero clamp operation

When speed control is used, drift may occur even with a speed command of 0V. The zero clamp function uses a position loop to stop motor (servo-lock) below a preset speed command.

*: Contact your YASKAWA representatives if planning to use these functions.

Easy Setup

Normal autotuning
Enhanced precision of the identification of the moment of inertia eliminates the need for servo gain adjustment.

Automatic motor discrimination function
The use of the serial encorder makes it possible for the SERVOPACK to automatically sense motor capacity and type, and set motor parameters accordingly.
Using a non-recommended motor may result in an alarm.

Load ratio monitor
Allows monitoring of effective torque for torque reference.

Regenerative load ratio monitor
Allows monitoring of regenerative ratio.

Regenerative overload warning
Allows a warning to be issued before a regenerative overload alarm is triggered.

Password
Prevents unauthorized alteration of parameters.

Flexible Adjustment

I/O signal mapping function
For input signals, used to allocate a function. For output signals, used to select three types of the nine signals.

Zero position search
The SERVOPACK moves a motor to the zero position pulse position of the encoder and then stops: handy for positioning motor shaft and machine.

All-in-one control
Position, torque and speed can be controlled independently, with simple switching between control modes.

Torque limit
Used to limit the maximum torque so to reduce damage to the machinery.

Support for encoders
Can also be used with an absolute encoder so that zero-return operations are unnecessary and that operation is possible immediately after a power loss.

Encoder divider
The encoder pulses can be devided in any ratio, and the positioning resolution for the host controller can be set without any limits.

Reverse mode
Motor forward and reverse rotation directions can be defined through a simple parameters, without rewiring the motor or the encoder.

	Standard mode	Reverse mode
Forward reference	CCW	CW
Reverse reference	CW	CCW

Soft start
Used to set the motor acceleration and deceleration times and to smoothly start rotations.

PC interface
Simplifies parameter settings, supports the waveforms of speed and torque references, and supports 1:n communications(n≦14).

Jog operation
The motor can be controlled through the remote digital operator, even without inputting speed references. Handy for trial operation.

Alarm traceback
Even if the power is turned OFF, a total running hours and data for the last ten alarms are stored, simplifying troubleshooting.

Brake interlock
A brake ON or OFF signal can be output for motors with brakes. This signal is interlocked with the servo-ON state and the motor's speed.

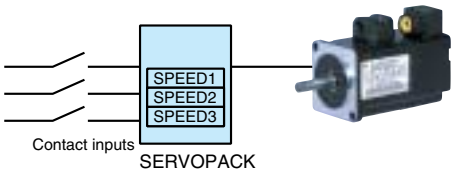
Overtravel prevention
Motor run can be stopped when the machinery exceeds its defined motion range.

Regenerative processing
The regenerative power regenerated during motor deceleration is absorbed by the SERVOPACK regenerative circuit. A larger capacity may be required for external regenerative resistor, depending on the load moment of inertia and operating conditions.

Positioning completed signal
Shows the value of the error counter if it is within the positioning completed range that is specified as a parameter.

Dynamic brake
If a power loss occurs while operating the machine, the dynamic brake enables the motor energy that was generated to be consumed by the resistance in the motor's coil and by external resistance. As a result, the machine stops rapidly to minimize damage and accidents.

Internally set speed selection
The motor can be operated at any of the three preset user speeds.



Reference pulses
Supports all types of reference pulses: Sign+pulse train, 90° phase displacement 2-phase pulse train, CCW/CW pulse train.

MECHATROLINK-Ⅱ Network

In practical applications, MECHATROLINK-Ⅱ enables real-time communications at a low cost for high-accuracy motion control.

Real-time communications

MECHATROLINK-Ⅱ communications enables high-speed control for 30 stations at a maximum transmission speed of 10 Mbps in a transmission cycle from 250μm to 4 ms (user setting). Such a high transmission speed allows real-time transmission of various kinds of data, such as position data, speed data, and I/O status, required for motion control. The synchronized motion of multiple axes is also possible by designating slave stations from the master station. Σ-Ⅲ SERVOPACKs also support MECHATROLINK-Ⅰ communications with a transmission speed of 4 Mbps and a transmission cycle of 2 ms.

Applicable SERVOPACK Model		SGDS-□□□1□□ (All Capacities)	
MECHATROLINK Communications	Communications Protocol	MECHATROLINK-Ⅱ	MECHATROLINK-Ⅰ
	Max. Number of Slaves	30	15
	Transmission Speed	10Mbps	4Mbps
	Transmission Cycle	250μs, 0.5 ms to 4 ms (Multiples of 0.5) In accordance with the setting of the host controller.	2ms
	Number of Words for Link Transmission	Can choose between 17-bytes/station and 32-bytes/station with the DIP switch.	17-bytes/station.
Command Method	Performance	Position control, speed control, and torque control with MECHATROLINK-Ⅱ communications.	Position control with MECHATROLINK-Ⅰ communications.
	Commands	MECHATROLINK-Ⅰ and MECHATROLINK-Ⅱ commands (For sequence, motion, setting/reference, monitoring, adjustment, and other commands.)	
	Acceleration/ deceleration	Asymmetrical acceleration/deceleration for linear 1st and 2nd steps, exponential position reference filter, and movement average position reference filter.	
Functions for Position Control	Fully-closed Control	Position control using fully-closed feedback is available.	

Cost savings

Thirty stations can be connected in one communication line, which greatly reduces wiring cost and time. Only one signal cable connector is required on the host controller. And the all-digital network eliminates the need for conversion from digital to analog and for a pulse generator for position reference.

High-precision motion control

The Σ-Ⅲ series of SERVOPACKs connected to the host controller in the high-speed MECHATROLINK-Ⅱ network provides not only torque, position, and speed control but also synchronous phase control that requires advanced control technology. The control mode can be changed online so that the machine can efficiently and smoothly make sophisticated motions.

Synchronous phase control

To control several servomotors at the same time and to enable the use of electronic cams and electronic shafts.

Torque control

To generate a constant torque regardless of the speed.

Speed control

To turn the motor at the specified speed with the user-defined acceleration/deceleration slopes.

Position control

To advance to the target position, and stops or holds.

Software for easy application

SigmaSize+, a servomotor selection program at Yaskawa's website, and SigmaWin+, an engineering PC tool to analyze the machine's unique characteristics and adjust the servo accordingly, are available.

AC Servomotor Selection Program

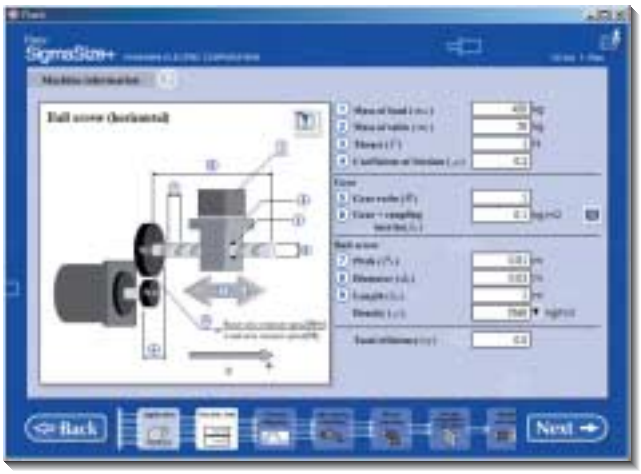
SigmaSize+

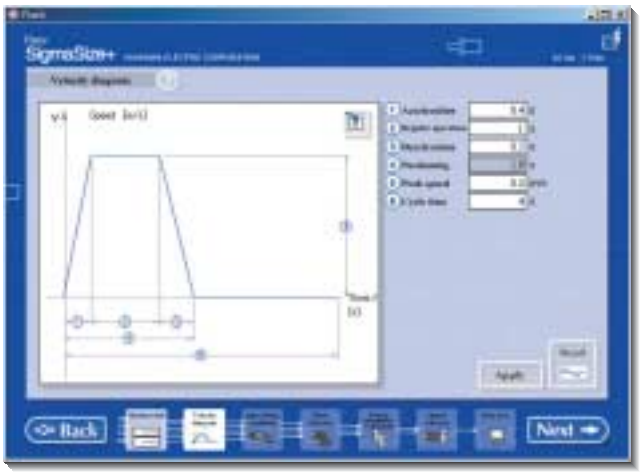
The SigmaSize+ is CD-ROM based application software to select the optimal YASKAWA servomotor drive for your machinery.

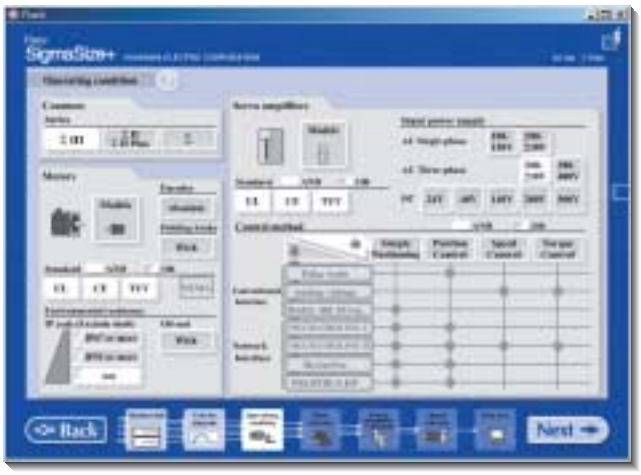
<Features>

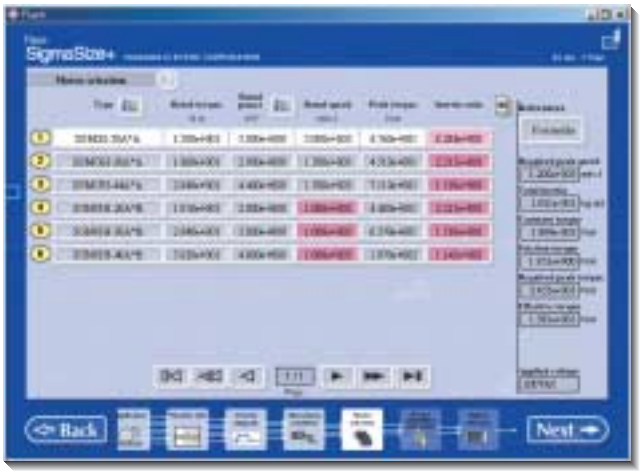
1 A host of product information
2 A wizard system with conversational mode to select optimal servomotors
3 References and reuses previously input and stored data.

■Servomotor Selection Screen









PC Software for AC Servomotor Drive Control

SigmaWin+

SigmaWin+ is a Windows-based engineering PC tool to make adjustments to Yaskawa's Σ-series of servo drives. With a wizard to help you, each setting for the servo drives is easily made following a series of dialog boxes in a conversational style. Two types of SigmaWin+ are available:
SigmaWin+ Standard with user-friendly functions, and SigmaWin+ Professional with a full range of functions including tunings.

Standard Professional

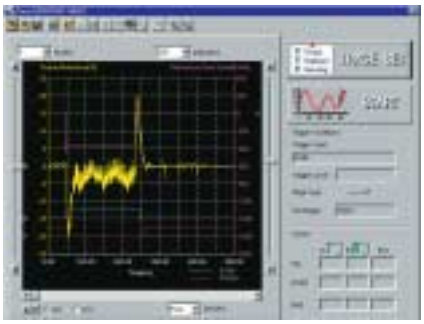
Servo setup

Edit parameters from the PC, and download them to multiple machines. Monitoring and offset adjustment are simple, too, for faster set-up.

Standard Professional

Trace

Display data stored in SERVOPACK memory right on the PC, just like an oscilloscope. Graphed data can be printed and stored, too.



Standard Professional

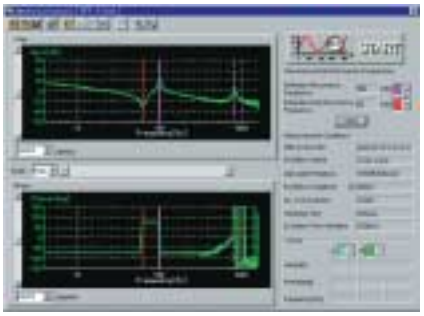
Advanced autotuning

Using SigmaWin+, set the servo drive to run so that you can tune the parameters, and the optimum settings for the load moment of inertia, the servo gains, and the filter for the connected machine will be automatically set.

Professional

Mechanical analysis

The motor is activated from the PC, which measures and displays transmission functions, determining the specific vibration frequency of the system.



Functions of SigmaWin+

Functions			Rotary servomotors	Linear servomotors
System	Printer setup		◎	◎
Parameter	Parameter editing		◎	◎
	Parameter online editing		◎	◎
Alarm	Alarm display		◎	◎
Monitor	Product information display		◎	◎
	Monitoring	Status	◎	◎
		Motion	◎	◎
		Input signals	◎	◎
		Output signals	◎	◎
	Online vibration monitor		○	◎
	Monitoring selection		◎	◎
Setup	Absolute encoder settings	Absolute encoder reset	◎	–
		Multi-turn limit	◎	–
	Online autotuning settings	Machine rigidity	◎	◎
		Identified moment of inertia ratio	◎	◎

Functions			Rotary servomotors	Linear servomotors
Setup	Offset adjustment	Speed/Torque reference offset	◎	◎
		Analog monitor output	◎	◎
		Motor current detection signal offset	◎	◎
	Origin search		◎	◎
	Parameter write prohibited (password)		◎	◎
	Initialization of vibration detection level		○	◎
	Easy FFT		○	◎
Trace and Tuning	Trace		◎	◎
	Real-time trace		◎	◎
	One-parameter autotuning		◎	◎
	Less-deviation one-parameter autotuning		◎	◎
	Advanced autotuning		○	–
Trial operation	Jog operation		◎	◎
	Program Jog operation		○	○
Solution	Moment of inertia setting		△	–
	Mechanical analysis (FFT)		△	–

◎ : Available
○ : Available, but limited according to SERVOPACK version (Note 1)
△ : Available only with SigmaWin+ Professional (Note 2)
– : Not available

Notes 1: Restricted by SERVOPACK version.
SGDS-□01A and -□02A: 0010 or later
2: Restricted by SERVOPACK version.
SGDS-□12A: 0010 or later

Product Lineup

●Rotary Servomotors

Details P.15 to P.24

Rotary Servomotor		SERVOPACK Type SGDS-□		
Type	Capacity	Single-phase 100V	Single-phase 200V	Three-phase 200V
SGMMJ-A1B	10W	A3B	—	—
SGMMJ-A2B	20W	A3B	—	—
SGMMJ-A3B	30W	A3B	—	—
SGMAS-A5A	50W	A5F	A5A	—
SGMAS-01A	100W	01F	01A	—
SGMAS-C2A	150W	02F	02A	—
SGMAS-02A	200W	02F	02A	—
SGMAS-04A	400W	04F	04A	—
SGMAS-06A	600W	—	08A	—
SGMAS-08A	750W	—	08A	—
SGMAS-12A	1.15kW	—	—	15A
SGMPS-01A	100W	01F	01A	—
SGMPS-02A	200W	02F	02A	—
SGMPS-04A	400W	04F	04A	—
SGMPS-08A	750W	—	08A	—
SGMPS-15A	1.5kW	—	—	15A
SGMSS-10A	1.0kW	—	—	10A
SGMSS-15A	1.5kW	—	—	15A
SGMSS-20A	2.0kW	—	—	20A
SGMSS-25A	2.5kW	—	—	30A
SGMSS-30A	3.0kW	—	—	30A
SGMSS-40A	4.0kW	—	—	50A
SGMSS-50A	5.0kW	—	—	50A
SGMSS-70A	7.0kW	—	—	75A

Rotary Servomotor		SERVOPACK Type SGDS-□		
Type	Capacity	Single-phase 100V	Single-phase 200V	Three-phase 200V
SGMGH-05A□A	450W	—	—	05A
SGMGH-09A□A	850W	—	—	10A
SGMGH-13A□A	1.3kW	—	—	15A
SGMGH-20A□A	1.8kW	—	—	20A
SGMGH-30A□A	2.9kW	—	—	50A(30A)*
SGMGH-44A□A	4.4kW	—	—	50A
SGMGH-55A□A	5.5kW	—	—	60A
SGMGH-75A□A	7.5kW	—	—	75A
SGMGH-03A□B	300W	—	—	05A
SGMGH-06A□B	600W	—	—	10A
SGMGH-09A□B	900W	—	—	10A
SGMGH-12A□B	1.2kW	—	—	15A
SGMGH-20A□B	2.0kW	—	—	20A
SGMGH-30A□B	3.0kW	—	—	50A(30A)*
SGMGH-40A□B	4.0kW	—	—	50A
SGMGH-55A□B	5.5kW	—	—	60A

∗: The rated value will vary if the SGMGH-30 servomotor is driven from the SGDS-30A SERVOPACK.

Type Designation

●Without gears SGMAS – 01 A C A 2 1

Σ-Ⅲ Servomotor Series
SGMAS: Super High Power Rate Series
SGMPS: Flat Series
SGMSS: Super High Power Rate Series
SGMMJ: Mini Series
SGMGH

Rated Output

Code	Output	Code	Output	Code	Output
A1	10W	05	450W	25	2.5kW
A2	20W	06	600W	30	3.0kW∗4
A3	30W	08	750W	40	4.0kW
A5	50W	09	900W∗1	44	4.4kW
01	100W	10	1.0kW	50	5.0kW
C2	150W	12	1.15kW∗2	55	5.5kW
02	200W	13	1.3kW	70	7.0kW
03	300W	15	1.5kW	75	7.5kW
04	400W	20	2.0kW∗3		

∗1: 850 W for SGMGH (1500 min^{-1}).
∗2: 1.2 kW for SGMGH (1000 min^{-1}).
∗3: 1.8 kW for SGMGH (1500 min^{-1}).
∗4: 2.9 kW for SGMGH (1500 min^{-1}).

Supply Voltage
A:200 VAC(SGMAS, SGMPS, SGMSS, SGMGH)
Note: 200 VAC of supply voltage can be used for motors even when 100 VAC is used for SERVOPACKs
B: 100 VAC (SGMMJ)

Serial Encoder Specifications
2:17-bit Absolute (Standard)
A:13-bit Incremental (Standard only for SGMMJ)
C:17-bit Incremental (Standard)

Options
1: No Option
B: 90-VDC Brake
C: 24-VDC Brake
D: Oil Seal, 90-VDC Brake
E: Oil Seal, 24-VDC Brake
S: Oil Seal
Note: Contact your Yaskawa representative for more information about servomotors with these options.

Shaft End Specifications

Code	Specifications	SGMAS	SGMPS	SGMSS	SGMMJ	SGMGH
2	Straight, No key	Standard		Standard	Standard	Standard
3	Taper 1/10, Key	—		Option	—	Option
4	Straight, Key	Option		–	—	—
5	Taper 1/10, Woodruff Key	—		–	—	Option∗5
6	Straight, Key,Tap	Option		Option	—	Option
8	Straight, Tap			–	—	—
A	Straight, Flat Key Seat			–	Standard	—

∗5: Applicable only for models of SGMGH-03, -05, -06, and -09.

Design Revision Order
A: SGMAS, SGMPS, SGMSS, SGMGH (1500 min^{-1})
B: SGMMJ, SGMGH (1000 min^{-1})
C: For high-performance machine tool SGMGH (1500 min^{-1})∗6
D: For high-performance machine tool SGMGH (1000 min^{-1})∗7
E: IP67 (Only for SGMPS)

∗6: Applicable only for models SGMGH-05□□A to -44□□A.
∗7: Applicable only for models SGMGH-03□□B to -30□□B.

Product Lineup (cont'd)

●With gears SGMAS – 01 A C A H 1 2 B

Σ-Ⅲ Servomotor Series
SGMAS: Super High Power Rate Series
SGMPS: Flat Series
SGMSS: Super High Power Rate Series
SGMMJ: Mini Series
SGMGH

Rated Output

Code	Output	Code	Output	Code	Output
A1	10W	05	450W	25	2.5kW
A2	20W	06	600W	30	3.0kW※4
A3	30W	08	750W	40	4.0kW
A5	50W	09	900W※1	44	4.4kW
01	100W	10	1.0kW	50	5.0kW
C2	150W	12	1.15kW※2	55	5.5kW
02	200W	13	1.3kW	75	7.5kW
03	300W	15	1.5kW		
04	400W	20	2.0kW※3		

※1: 850 W for SGMGH (1500 min-1).
※2: 1.2 kW for SGMGH (1000 min-1).
※3: 1.8 kW for SGMGH (1500 min-1).
※4: 2.9 kW for SGMGH (1500 min-1).

Supply Voltage
A: 200 VAC(SGMAS, SGMPS, SGMSS, SGMGH with Low-backlash Gear)
Note: 200 VAC of supply voltage can be used for motors even when 100 VAC is used for SERVOPACKs
B: 100 VAC (SGMMJ)
P: 200 VAC (SGMGH with Standard-backlash Gear)

Serial Encoder Specifications
2:17-bit Absolute (Standard)
A:13-bit Incremental (Standard only for SGMMJ)
C:17-bit Incremental (Standard)

Design Revision Order
A: SGMAS, SGMPS, SGMSS, SGMGH (1500 min-1)
B: SGMMJ, SGMGH (1000 min-1)
C: For high-performance machine tool SGMGH (1500 min-1)※5
D: For high-performance machine tool SGMGH (1000 min-1)※6
E: IP67 (Only for SGMPS)

※5: Applicable only for models SGMGH-05□□A to -44□□A.
※6: Applicable only for models SGMGH-03□□B to -30□□B.

Options
1: No Brake B: 90-VDC Brake C: 24-VDC Brake

Note: Contact your Yaskawa representative for more information about the specifications, dimensions of servomotors with gears, and servomotors with these options.

Shaft End Specifications

Code	Specifications	SGMAS	SGMPS	SGMSS	SGMMJ	SGMGH
0	Flange-mounted	H	H	–	–	–
2	Straight, No Key	H, J	H, J	–	J	–
4	Straight, Key	–	–	L	–	L
6	Straight, Key,Tap	H, J	H, J	–	–	E, F
8	Straight, Tap	H	H	–	–	–
A	Straight, Flat Key Seat	–	–	–	J	–

Gear Ratio

Code	Specifications	SGMAS	SGMPS	SGMSS
A	1/5	–	–	–
B	1/11	H (-01A to -12A), J (Only for -12A)	H (-01A to -15A), J (Only for -15A)	–
	1/16	–	–	–
C	1/21	H, J	H, J	–
	1/25	–	–	–
1	1/5	H, J	H, J	L
2	1/9	H (Only for -A5A)	–	L
	1/16	–	–	–
3	3/31	J (-A5A to -08A)	J (-01A to -08A)	–
	1/25	–	–	–
5	1/20	–	–	L
7	1/29	–	–	L (-10A to -40A)
	1/33	H, J	H, J	–
8	1/45	–	–	L (-10A to -30A)

Code	Specifications	SGMMJ	SGMGH
A	1/5	J (For -A1 and -A2, Flange Size□25)	–
	1/6	–	E, F (-05A□A to -55A□A/-03A□B to -40A□B)
B	1/11	–	E, F (-05A□A to -75A□A/-03A□B to -55A□B)
	1/16	J (For -A1 and -A2, Flange Size□25)	–
C	1/21	–	E, F (-05A□A to -75A□A/-03A□B to -55A□B)
	1/25	J (For -A1 and -A2, Flange Size□25)	–
1	1/5	J (For -A3, Flange Size□40)	L (-05A□A to -44A□A/-03A□B to -30A□B)
2	1/9	–	L (-05A□A to -44A□A/-03A□B to -30A□B)
	1/16	J (For -A3, Flange Size□40)	–
3	3/31	–	–
	1/25	J (For -A3, Flange Size□40)	–
5	1/20	–	L (-05A□A to -30A□A/-03A□B to -20A□B)
7	1/29	–	E, F (-05A□A to -75A□A/-03A□B to -55A□B) L (-05A□A to -20A□A/-03A□B to -12A□B)
	1/33	–	–
8	1/45	–	L (-05A□A to -13A□A/-03A□B to -12A□B)

Gears

Code	Specifications	SGMAS	SGMPS	SGMSS	SGMMJ	SGMGH
H	Low-backlash HDS Planetary Gear	○	○	–	–	–
J	Standard Backlash Gear	○	○	–	○	–
L	Low-backlash Gear	–	–	○	–	○
E	Standard Backlash Gear (Foot mounted)	–	–	–	–	○
F	Standard Backlash Gear (Flange mounted)	–	–	–	–	○

●Direct-drive Servomotors

Details P.25 to P.32

Direct-drive Servomotor		SERVOPACK Type SGDS-		
Type	Capacity	Single-phase 100V	Single-phase 200V	Three-phase 200V
SGMCS-02B	42W	02F	02A	—
SGMCS-05B	105W	02F	02A	—
SGMCS-07B	147W	02F	02A	—
SGMCS-04C	84W	04F	04A	—
SGMCS-10C	209W	04F	04A	—
SGMCS-14C	293W	04F	04A	—
SGMCS-08D	168W	04F	04A	—
SGMCS-17D	356W	04F	04A	—
SGMCS-25D	393W	04F	04A	—
SGMCS-16E	335W	—	08A	—
SGMCS-35E	550W	—	08A	—
SGMCS-45M	707W	—	—	10A
SGMCS-80M	1260W	—	—	15A
SGMCS-1AM	1730W	—	—	20A
SGMCS-80N	1260W	—	—	15A
SGMCS-1EN	2360W	—	—	30A
SGMCS-2ZN	3140W	—	—	30A

Type Designation

SGMCS − 02 B 3 B 1 1

Direct-drive Σ Servomotor
SGMCS

Rated Output, Motor Outer Diameter

Code	Rated Output N·m	Outer Diameter mm					
		B(135 dia.)	C(175 dia.)	D(230 dia.)	E(290 dia.)	M(280 dia.)	N(360 dia.)
02	2.0	○					
04	4.0		○				
05	5.0	○					
07	7.0	○					
08	8.0			○			
10	10.0		○				
14	14.0		○				
16	16.0				○		
17	17.0			○			
25	25.0			○			
35	35.0				○		
45	45.0					○	
80	80.0					○	○
1A	110.0					○	
1E	150.0						○
2Z	200.0						○

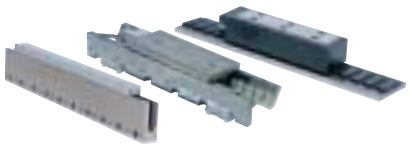
Serial Encoder Specifications
3: 20-bit Absolute (Standard)(Within one rotation)
D: 20-bit Incremental (Option)

Design Revision Order
A: 45 N · m to 200 N · m
B: 16 N · m and 35 N · m
C: 2 N · m to 14 N · m, 17 N · m and 25 N · m

Flange Specifications
1: C face mounted opposite drive end : 2 N · m to 35 N · m
C face mounted drive end : 45 N · m to 200 N · m
3: C face mounted opposite drive end : 45 N · m to 200 N · m
4: C face mounted opposite drive end with cable on side : 2 N · m to 35 N · m

Brake Specification
1: No Brake

●Linear Servomotors



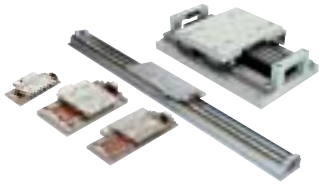
Details

Refer to the "**Linear Σ** Series" (Literature No.: KAE-S800-39.10) for more information.

Linear Servomotor			SERVOPACK Type SGDS-		
Type		Continuous Force	Single-phase 100V	Single-phase 200V	Three-phase 200V
SGLGW series					
SGLGW-30A050C	With standard magnetic way	13.5N	A5F	A5A	—
SGLGW-30A080C		27N	01F	01A	—
SGLGW-40A140C		47N	01F	01A	—
SGLGW-40A253C		93N	02F	02A	—
SGLGW-40A365C		140N	04F	04A	—
SGLGW-60A140C		73N	02F	02A	—
SGLGW-60A253C		147N	04F	04A	—
SGLGW-60A365C		220N	—	08A	—
SGLGW-90A200C		325N	—	—	15A
SGLGW-90A370C		550N	—	—	20A
SGLGW-90A535C		750N	—	—	30A
SGLGW-40A140C	With high-force magnetic way	57N	02F	02A	
SGLGW-40A253C		114N	04F	04A	—
SGLGW-40A365C		171N	—	—	05A
SGLGW-60A140C		89N	02F	02A	—
SGLGW-60A253C		178N	—	—	05A
SGLGW-60A365C		267N	—	—	10A
SGLFW series					
SGLFW-20A090A		25N	02F	02A	—
SGLFW-20A120A		40N	02F	02A	—
SGLFW-35A120A		80N	02F	02A	—
SGLFW-35A230A		160N	—	—	05A
SGLFW-50A200B		280N	—	08A	—
SGLFW-50A380B		560N	—	—	15A
SGLFW-1ZA200B		560N	—	—	15A
SGLFW-1ZA380B		1120N	—	—	30A
SGLTW series					
SGLTW-20A170A		130N	—	—	05A
SGLTW-20A320A		250N	—	—	10A
SGLTW-20A460A		380N	—	—	15A
SGLTW-35A170A		220N	—	08A	—
SGLTW-35A320A		440N	—	—	15A
SGLTW-35A460A		670N	—	—	20A
SGLTW-35A170H		300N	—	08A	—
SGLTW-35A320H		600N	—	—	15A
SGLTW-50A170H		450N	—	08A	—
SGLTW-50A320H		900N	—	—	15A
SGLTW-40A400B		670N	—	—	20A

Product Lineup (cont'd)

●Linear Sliders



Details

Refer to the "**Σ-Trac** Series" (Literature No.: KAJP S800000 26 only in Japanese) for more information.

Linear Servomotor			SERVOPACK Type SGDS-□		
Type	Continuous Force	Peak Force	Single-phase 100V	Single-phase 200V	Three-phase 200V
Σ-Trac series					
SGT□G1□-□□□	47N	140N	01F	01A	—
SGT□G2□-□□□	93N	280N	02F	02A	—
SGT□G3□-□□□	140N	420N	04F	04A	—
SGT□G4□-□□□	73N	220N	02F	02A	—
SGT□G5□-□□□	147N	440N	04F	04A	—
SGT□G6□-□□□	220N	660N	—	—	08A
SGT□F3□-□□□	80N	220N	02F	02A	—
SGT□F4□-□□□	160N	440N	—	—	05A
SGT□F7□-□□□	200N	600N	—	—	08A
SGT□F5□-□□□	400N	1200N	—	—	20A
Σ-Trac -μ series					
SGTMM01	3.5N	10N	A5F	A5A	—
SGTMM03	7N	25N	01F	01A	—
Σ-Trac -MAG series					
SGTMF4A-027	90N	270N	02F	02A	—
SGTMF4B-036	120N	360N	02F	02A	—
SGTMF5A-054	90N	270N	—	—	08A
SGTMF5B-072	120N	360N	—	—	08A

●SERVOPACKs

SGDS-□□□ 01 Details P.33 to P.36
(For entering an analog voltage reference or a pulse train reference)

Use to drive rotary motors by simply entering an analog voltage reference or a pulse train reference.

SGDS-□□□ 02 Details P.33 to P.36
(For fully-closed control)

Applicable for fully-closed control.

SGDS-□□□ 12 Details P.37 to P.40
(For MECHATROLINK communications)

Use to drive rotary motors with MECHATROLINK communications.

Type Designation

SGDS –02 A 01 A □

Σ-Ⅲ SGDS SERVOPACK
SGDS

Rated Output

Code	Output W	Code	Output W	Code	Output W	Code	Output W
A5	50W	04	400W	10	1.0kW	30	3.0kW
01	100W	05	500W	15	1.5kW	50	5.0kW
02	200W	08	750W	20	2.0kW		

Supply Voltage
A : 200VAC
F : 100VAC (100V input, 200V output: double voltage)

Interface Specifications
01 : Analog and pulse train for rotary servomotors
02 : Fully-closed control for rotary servomotors
05 : Analog and pulse train for linear servomotors
12 : MECHATROLINK-Ⅱ or fully-closed control for rotary servomotors
15 : MECHATROLINK-Ⅱ for linear servomotors

Design Revision Order (A, B, ···)

Mouting Method
Blank : Base-mounted
R : Rack-mounted

Rotary Servomotors

●Specifications

SGMMJ, SGMAS

Time Rating : Continuous
Vibration Class : 15μm or below
Insulation Resistance : 500 VDC, 10MΩ min.
Ambient Temperature : 0℃ to + 40℃
Ambient Humidity : 20% to 80% (no condensation)
Mounting Method : Flange-mounted
Thermal Class : B
Withstand Voltage : 1000 VAC at 100 V, 1 min (SGMMJ)
1500 VAC at 200 V, 1 min (SGMAS)
Enclosure : Totally-enclosed, self-cooled IP55 (for SGMMJ and SGMAS; except for shaft opening)
Excitation : Parmanent magnet
Drive Method : Direct drive

Servomotor Type	SGMMJ-			SGMAS-							
	A1B	A2B	A3B	A5A	01A	C2A	02A	04A	06A	08A	12A
Rated Output*1 W	10	20	30	50	100	150	200	400	600	750	1150
Rated Torque*1, *2 N·m	0.0318	0.0637	0.0955	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.66
Instantaneous Peak Torque*1 N·m	0.0955	0.191	0.286	0.477	0.955	1.43	1.91	3.82	5.73	7.16	11.0
Rated Current*1 Arms	0.70	0.66	0.98	0.66	0.91	1.8	1.9	2.6	4.3	5.4	8.5
Instantaneous Max.Current*1 Arms	2.0	1.9	2.9	2.1	2.8	5.7	6.5	8.5	13.6	16.9	26.0
Rated Speed*1 min^{-1}	3000			3000							
Max. Speed*1 min^{-1}	5000			6000							
Torque Constant N·m/Arms	0.0516	0.107	0.107	0.265	0.375	0.284	0.375	0.527	0.496	0.487	0.467
Rotor Moment of Inertia kg·m^2×10^{-4}	0.00354 (0.00479)	0.00548 (0.00673)	0.00750 (0.00875)	0.0242 (0.0312)	0.0380 (0.0450)	0.0531 (0.0601)	0.116 (0.180)	0.190 (0.254)	0.326 (0.390)	0.769 (0.940)	1.20 (1.424)
Rated Power Rate*1 kW/s	2.87 (2.11)	7.41 (6.03)	12.2 (10.4)	10.4 (8.10)	26.6 (22.5)	42.8 (37.9)	35.0 (22.5)	84.9 (63.5)	112 (93.5)	74.1 (60.8)	112 (94.1)

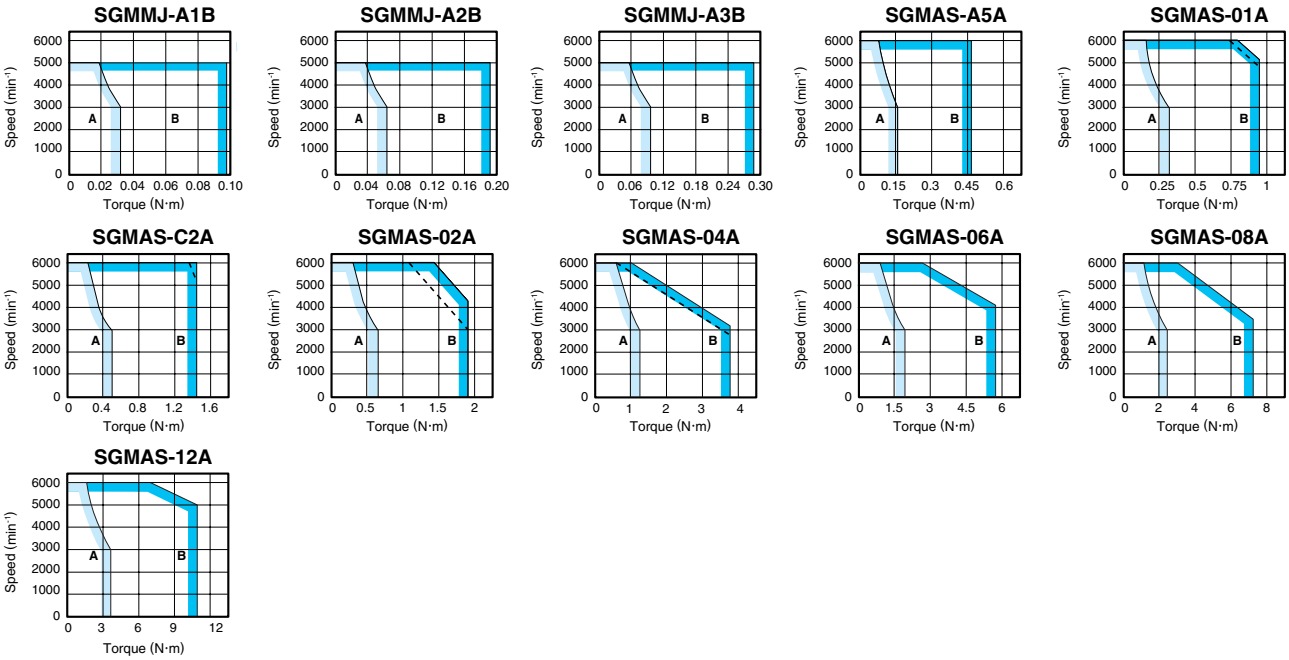
*1 : These values and the Torque/Speed characteristics listed here are representative of the values obtained when the motor is driven from the SERVOPACK and the coil temperature is at 100℃. All others are for a coil temperature of 20℃.
*2 : These values for the Rated Torque are for the continuous allowable torque with the following heatsinks at an ambient temperature of 40℃.
Heatsink dimensions : 150×150×3 mm : SGMMJ-A1B, A2B
250×250×6 mm : SGMMJ-A3B, SGMAS-A5A, 01A, C2A, 02A, 04A, 08A
300×300×12mm : SGMAS-06A
350×350×12mm : SGMAS-12A

Note : Values in parentheses are for servomotors with a brake. Contact your Yaskawa representative for more information about servomotors with gears.

Torque / Speed Characteristics

A : Continuous Duty Zone B : Intermittent Duty Zone

Note: Dashed lines in the Intermittent Duty Zone show torque/speed characteristics when used with a SERVOPACK for 100 VAC.



Rotary Servomotors (cont'd)

●Specifications

SGMPS, SGMSS

Time Rating : Continuous
Vibration Class : 15μm or below
Insulation Resistance : 500 VDC, 10MΩ min.
Ambient Temperature : 0℃ to + 40℃
Ambient Humidity : 20% to 80% (no condensation)
Mounting Method : Flange-mounted
Thermal Class : B (SGMPS)
F (SGMSS)
Withstand Voltage : 1500 VAC at 200 V, 1 min
Enclosure : Totally-enclosed, self-cooled IP55 (for SGMPS) and IP67 (for SGMSS); (except for shaft opening)
Excitation : Parmanent magnet
Drive Method : Direct drive

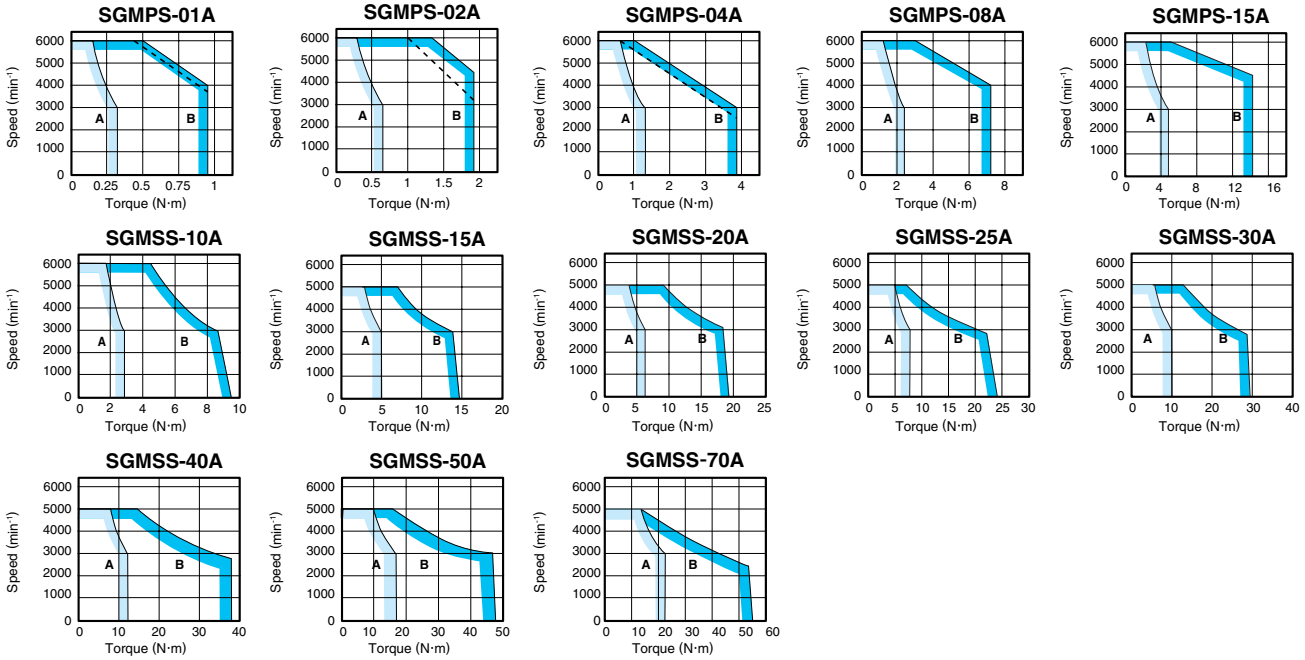
Servomotor Type	SGMPS-					SGMSS-							
	01A	02A	04A	08A	15A	10A	15A	20A	25A	30A	40A	50A	70A
Rated Output*1 W	100	200	400	750	1500	1000	1500	2000	2500	3000	4000	5000	7000
Rated Torque*1, *2 N·m	0.318	0.637	1.27	2.39	4.77	3.18	4.90	6.36	7.96	9.80	12.6	15.8	22.3
Instantaneous Peak Torque*1 N·m	0.955	1.91	3.82	7.16	14.3	9.54	14.7	19.1	23.9	29.4	37.8	47.6	54.0
Rated Current*1 Arms	0.86	2.0	2.6	5.4	9.2	5.7	9.3	12.1	13.8	17.9	25.4	27.6	38.3
Instantaneous Max.Current*1 Arms	2.8	6.4	8.4	16.5	28.0	17.0	28.0	42.0	44.5	56.0	77.0	84.0	105.0
Rated Speed*1 min^{-1}	3000					3000							
Max. Speed*1 min^{-1}	6000					6000	5000						
Torque Constant N·m/Arms	0.401	0.361	0.524	0.476	0.559	0.636	0.590	0.561	0.610	0.581	0.520	0.600	0.600
Rotor Moment of Inertia kg·m^2×10^{-4}	0.0592 (0.0892)	0.263 (0.415)	0.409 (0.561)	2.10 (2.98)	4.02 (4.90)	1.74 (1.99)	2.00 (2.25)	2.47 (2.72)	3.19 (3.44)	7.00 (8.6)	9.60	12.3	12.3
Rated Power Rate*1 kW/s	17.1 (11.3)	15.4 (9.78)	39.6 (28.8)	27.2 (19.2)	56.6 (46.4)	58.1 (50.8)	120 (107)	164 (148)	199 (184)	137 (111)	165	203	404

*1 : These values and the Torque/Speed characteristics listed here are representative of the values obtained when the motor is driven from the SERVOPACK and the coil temperature is at 100℃(20℃ for the SGMSS servomotor). All others are for a coil temperature of 20℃.
*2 : These values for the Rated Torque are for the continuous allowable torque with the following heatsinks at an ambient temperature of 40℃.
Heatsink dimensions : 250×250×6 mm : SGMPS-01A, 02A, 04A
300×300×12mm : SGMPS-08A, 15A, SGMSS-10A, 15A, 20A, 25A
400×400×20mm : SGMSS-30A, 40A, 50A, 70A
Note : Values in parentheses are for servomotors with a brake. Contact your Yaskawa representative for more information about servomotors with gears.

Torque / Speed Characteristics

A : Continuous Duty Zone B : Intermittent Duty Zone

Note: Dashed lines in the Intermittent Duty Zone show torque/speed characteristics when used with a SERVOPACK for 100 VAC.



SGMGH

Time Rating : Continuous
Vibration Class : 15μm or below
Insulation Resistance : 500 VDC, 10MΩ min.
Ambient Temperature : 0℃ to + 40℃
Ambient Humidity : 20% to 80% (no condensation)
Mounting Method : Flange-mounted
Thermal Class : F
Withstand Voltage : 1500 VAC, 1 min
Enclosure : Totally-enclosed, self-cooled IP67(except for shaft opening)
Excitation : Parmanent magnet
Drive Method : Direct drive

Servomotor Type	SGMGH (1500min⁻¹)								SGMGH (1000min⁻¹)							
	05A□A	09A□A	13A□A	20A□A	30A□A	44A□A	55A□A	75A□A	03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	40A□B	55A□B
Rated Output*1 kW	0.45	0.85	1.3	1.8	2.9	4.4	5.5	7.5	0.3	0.6	0.9	1.2	2.0	3.0	4.0	5.5
Rated Torque*1, *2 N·m	2.84	5.39	8.34	11.5	18.6 (14.8)*	28.4	35.0	48.0	2.84	5.68	8.62	11.5	19.1	28.4 (21.6)*	38.2	52.6
Instantaneous Peak Torque*1 N·m	8.92	13.8	23.3	28.7	45.1	71.1	87.6	119	7.17	14.1	19.3	28.0	44.0	63.7	107	136.9
Rated Current*1 Arms	3.8	7.1	10.7	16.7	23.8 (18.9)*	32.8	42.1	54.7	3.0	5.7	7.6	11.6	18.5	24.8 (18.9)*	30.0	43.2
Instantaneous Max.Current*1 Arms	11	17	28	42	56	84	110	130	7.3	13.9	16.6	28	42	56	84	110
Rated Speed*1 min⁻¹	1500								1000							
Max. Speed*1 min⁻¹	3000								2000							
Torque Constant N·m/Arms	0.82	0.83	0.84	0.73	0.83	0.91	0.88	0.93	1.03	1.06	1.21	1.03	1.07	1.19	1.34	1.26
Rotor Moment of Inertia kg·m²×10⁻⁴	7.24 (9.34)	13.9 (16.0)	20.5 (22.6)	31.7 (40.2)	46.0 (54.5)	67.5 (76.0)	89.0 (97.5)	125 (133.5)	7.24 (9.34)	13.9 (16.0)	20.5 (22.6)	31.7 (40.2)	46.0 (54.5)	67.5 (76.0)	89.0 (97.5)	125 (133.5)
Rated Power Rate*1 kW/s	11.2	20.9	33.8	41.5	75.3	120	137	184	11.2	23.2	36.3	41.5	79.4	120	164	221
Rated Angular Acceleration rad/s²	3930	3880	4060	3620	4050	4210	3930	3850	3930	4080	4210	3620	4150	4210	4290	4200

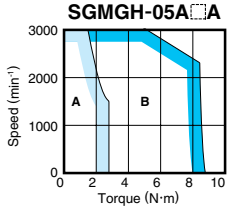
*1 : These values and the Torque/Speed characteristics listed here are representative of the values obtained when the motor is driven from the SERVOPACK and the coil temperature is at 20℃.
*2 : If the SGMGH-30A□A or SGMGH-30A□B servomotor is driven from the SGDS-30 SERVOPACK, derate the system, taking into consideration the rated values shown in parentheses. These values are obtained with the following iron heatsinks attached for cooling.
Heatsink dimensions : 400×400×20mm : SGMGH-03, 05, 06, 09, 13
550×550×30mm : SGMGH-12, 20, 30, 40, 44, 55, 75
Note : Values in parentheses are for servomotors with a brake. Contact your Yaskawa representative for more information about servomotors with gears.

Torque / Speed Characteristics

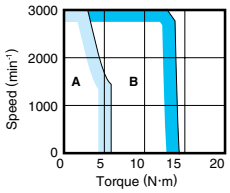
A : Continuous Duty Zone B : Intermittent Duty Zone

Note: Dashed lines in the Intermittent Duty Zone show torque/speed characteristics when used with a SERVOPACK for 100 VAC.

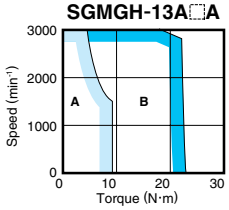
SGMGH-05A□A



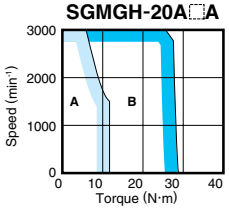
SGMGH-09A□A



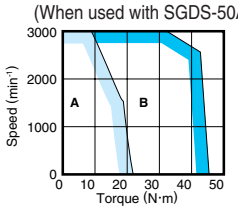
SGMGH-13A□A



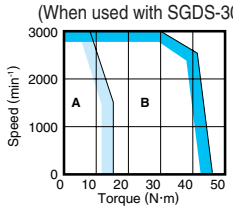
SGMGH-20A□A



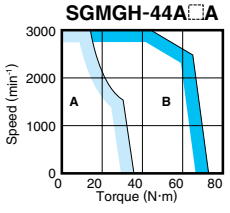
SGMGH-30A□A (When used with SGDS-50A)



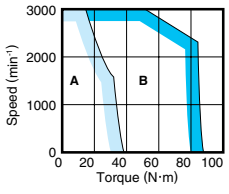
SGMGH-30A□A (When used with SGDS-30A)



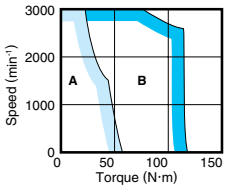
SGMGH-44A□A



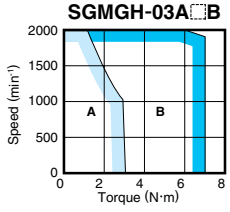
SGMGH-55A□A



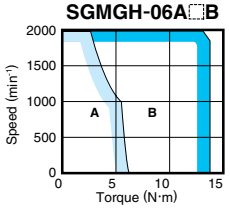
SGMGH-75A□A



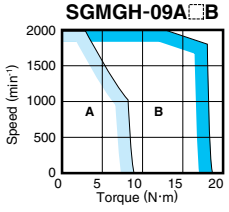
SGMGH-03A□B



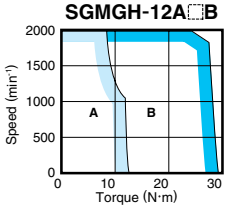
SGMGH-06A□B



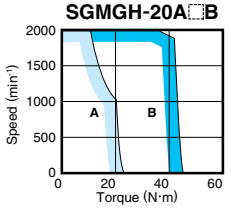
SGMGH-09A□B



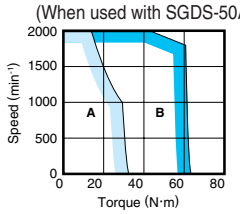
SGMGH-12A□B



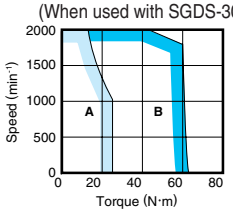
SGMGH-20A□B



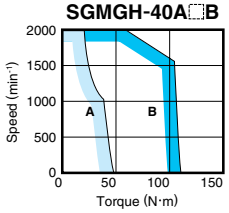
SGMGH-30A□B (When used with SGDS-50A)



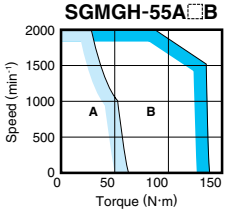
SGMGH-30A□B (When used with SGDS-30A)



SGMGH-40A□B



SGMGH-55A□B



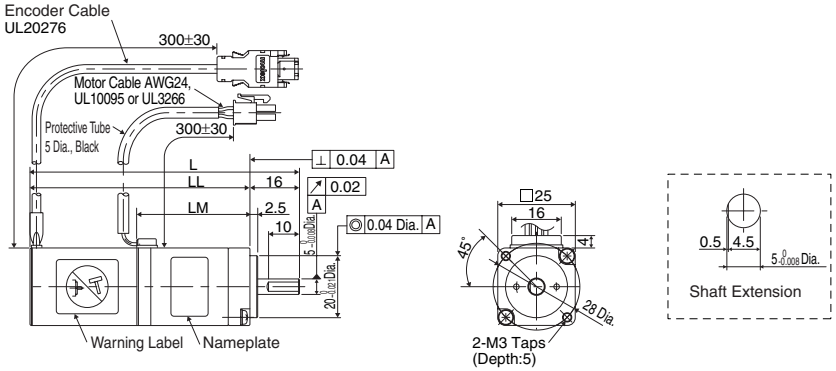
Rotary Servomotors (cont'd)

●Dimensions Units: mm

Note: Contact your Yaskawa representative for more information about the dimensions of servomotors with gears.

SGMMJ-A1B, A2B, A3B

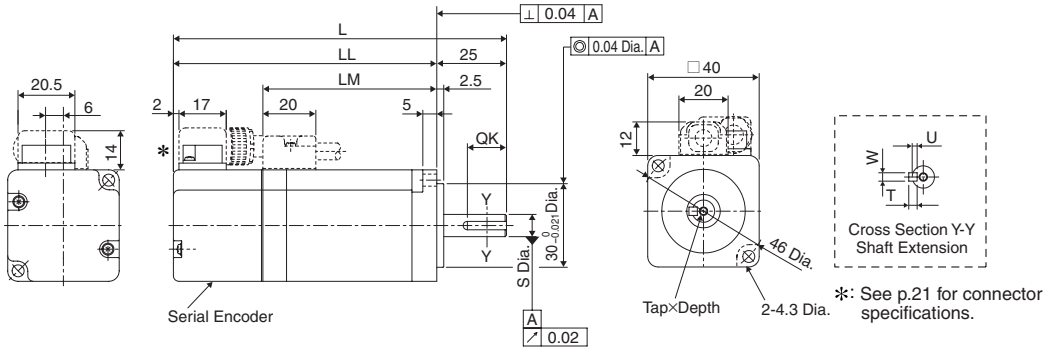
10W to 30W



Servomotor Type SGMMJ-	L	LL	LM	Flat Key Seat	Approx. Mass g
A1B B21	77	61	26.5	Not applied	130
A1B BA1				Applied	
A2B B21	87	71	36.5	Not applied	170
A2B BA1				Applied	
A3B B21	97	81	46.5	Not applied	210
A3B BA1				Applied	

SGMAS-A5A, 01A, C2A

50W to 150W



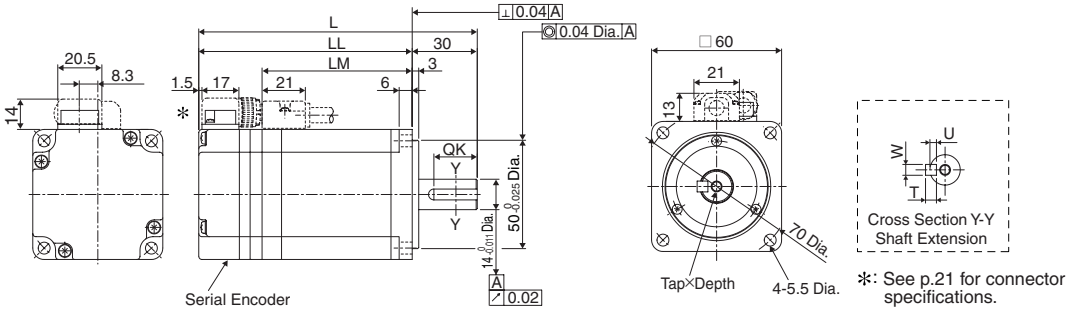
✻: See p.21 for connector specifications.

Servomotor Type SGMAS-	L	LL	LM	S	Tap×Depth	QK	U	W	T	Approx. Mass kg
A5A A2	95.5 (140.5)	70.5 (115.5)	38.5	6 $^{0}_{-0.008}$	No tap	No key				0.3 (0.6)
A5A A4						14	1.2	2	2	
A5A A6					M2.5×5L					
01A A2	107.5 (152.5)	82.5 (127.5)	50.5	8 $^{0}_{-0.009}$	No tap	No key				0.4 (0.7)
01A A4						14	1.8	3	3	
01A A6					M3×6L					
C2A A2	119.5 (164.5)	94.5 (139.5)	62.5	8 $^{0}_{-0.009}$	No tap	No key				0.5 (0.8)
C2A A4						14	1.8	3	3	
C2A A6					M3×6L					

Note: Values in parentheses are for servomotors with a brake.

SGMAS-02A, 04A, 06A

200W to 600W

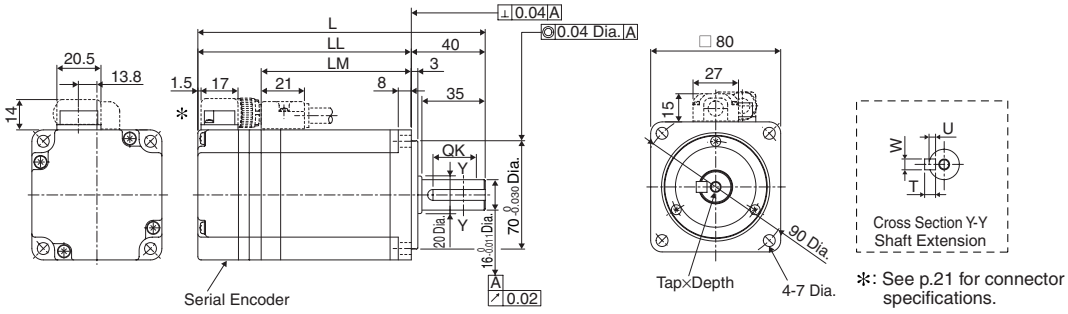


Servomotor Type SGMAS-⬚	L	LL	LM	Tap×Depth	QK	U	W	T	Approx.Mass kg
02A⬚A2⬚	110 (150)	80 (120)	51	No tap	No key				0.9 (1.5)
02A⬚A4⬚					20	3	5	5	
02A⬚A6⬚				M5×8L					
04A⬚A2⬚	128.5 (168.5)	98.5 (138.5)	69.5	No tap	No key				1.2 (1.8)
04A⬚A4⬚					20	3	5	5	
04A⬚A6⬚				M5×8L					
06A⬚A2⬚	154.5 (202)	124.5 (172)	95.5	No tap	No key				1.7 (2.4)
06A⬚A4⬚					20	3	5	5	
06A⬚A6⬚				M5×8L					

Note: Values in parentheses are for servomotors with a brake.

SGMAS-08A, 12A

750W, 1.15kW



Servomotor Type SGMAS-⬚	L	LL	LM	Tap×Depth	QK	U	W	T	Approx.Mass kg
08A⬚A2⬚	155 (200)	115 (160)	85	No tap	No key				2.3 (3.2)
08A⬚A4⬚					30	3	5	5	
08A⬚A6⬚				M5×8L					
12A⬚A2⬚	186.5 (236.5)	146.5 (196.5)	115	No tap	No key				3.6 (4.5)
12A⬚A4⬚					30	3	5	5	
12A⬚A6⬚				M5×8L					

Note: Values in parentheses are for servomotors with a brake.

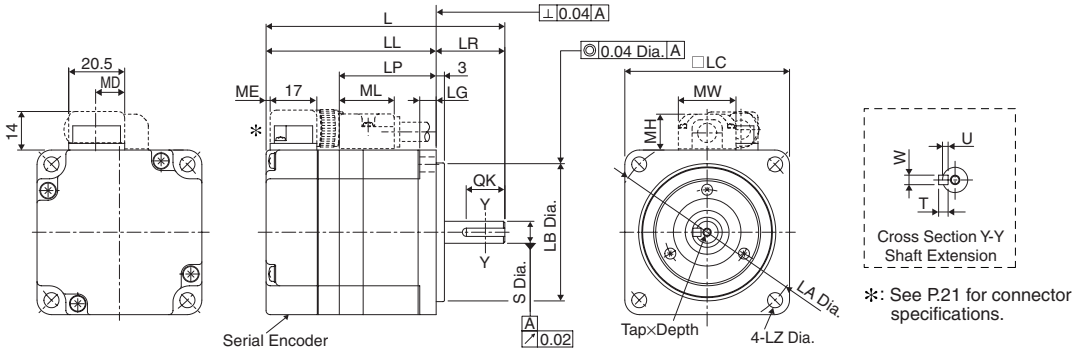
Rotary Servomotors (cont'd)

●Dimensions Units: mm

Note: Contact your Yaskawa representative for more information about the dimensions of servomotors with gears.

SGMPS-01A, 02A, 04A

100W to 400W

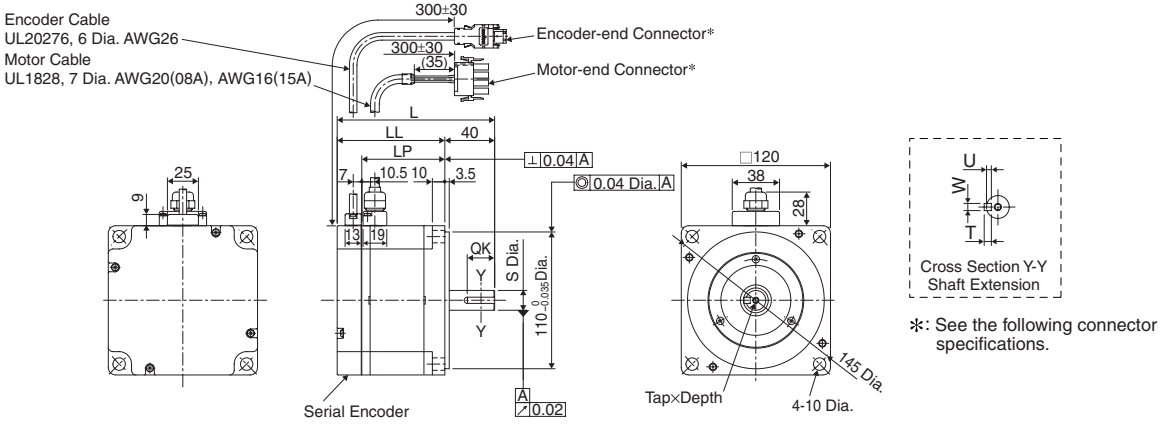


Servomotor Type SGMPS-	L	LL	LP	LR	LC	LA	LB	LZ	LG	S	Tap×Depth	QK	U	W	T	MD	ME	MH	ML	MW	Approx. Mass kg
01A□A2□	87 (115)	62 (90)	35	25	60	70	$50^{0}_{-0.025}$	5.5	6	$8^{0}_{-0.009}$	No tap	No key				9	1	12	20	20	0.5 (0.7)
01A□A4□											M3×6L	14	1.8	3	3						
01A□A6□																					
02A□A2□	97 (128.5)	67 (98.5)	48.5	30	80	90	$70^{0}_{-0.030}$	7	8	$14^{0}_{-0.011}$	No tap	No key				14	1.5	13	21	21	1.1 (1.6)
02A□A4□											M5×8L	16	3	5	5						
02A□A6□																					
04A□A2□	107 (138.5)	77 (108.5)	58.5								No tap	No key									1.4 (1.9)
04A□A4□											M5×8L	16	3	5	5						
04A□A6□																					

Note: Values in parentheses are for servomotors with a brake.

SGMPS-08A, 15A

750W, 1.5kW

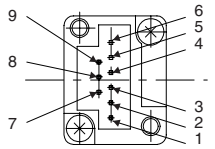


Servomotor Type SGMPS-	L	LL	LP	S	Tap×Depth	QK	U	W	T	Approx. Mass kg
08A A2	126.5 (160)	86.5 (120)	66.7	16 0 -0.011	M5×8L	No key				4.2 (5.7)
08A A4						22	3	5	5	
08A A6										
15A A2	154.5 (187.5)	114.5 (147.5)	94.7	19 0 -0.013	M6×10L	No key				6.6 (8.1)
15A A4						22	3.5	6	6	
15A A6										

Note: Values in parentheses are for servomotors with a brake.

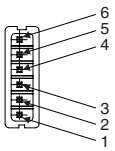
Connector Specifications [SGMAS] [SGMPS-01A to 04A]

Encoder-end Connector



Absolute Encoder				Incremental Encoder			
1	—	6	PG5V	1	—	6	PG5V
2	—	7	—	2	—	7	—
3	PG0V	8	0BAT	3	PG0V	8	—
4	DATA+	9	BAT	4	DATA+	9	—
5	DATA−	Shell	FG	5	DATA−	Shell	FG

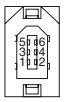
Motor-end Connector



	Without Brake	With Brake
1	FG	FG
2	Phase W	Phase W
3	Phase V	Phase V
4	Phase U	Phase U
5	—	Brake Terminal
6	—	Brake Terminal

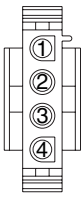
Connector Specifications [SGMPS-08A, 15A]

Encoder-end Connector



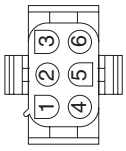
	Absolute Encoder	Incremental Encoder
1	PG5V	PG5V
2	PG0V	PG0V
3	BAT	—
4	0BAT	—
5	DATA+	DATA+
6	DATA−	DATA−
Shell	FG	FG

Motor-end Connector (Standard)



1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green/Yellow

(With Brake)



1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG	Green/Yellow
5	Brake Terminal	Black
6	Brake Terminal	Black

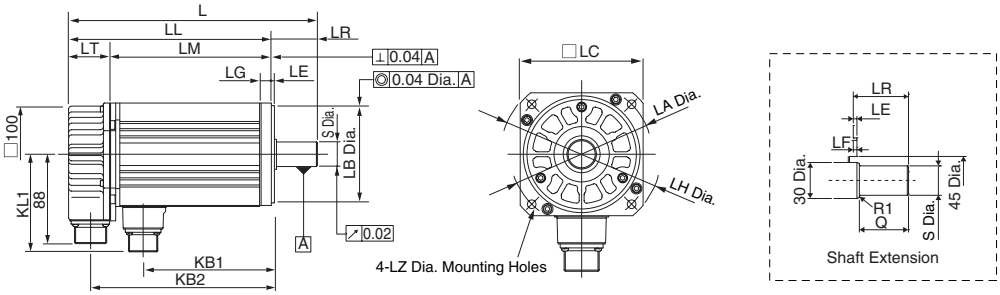
Rotary Servomotors (cont'd)

●Dimensions Units: mm

Note: Contact your Yaskawa representative for more information about the dimensions of servomotors with gears.

SGMSS-10A, 15A, 20A, 25A, 30A, 40A, 50A, 70A

1.0kW to 5.0kW



Servomotor Type SGMSS-□	L	LL	LM	LR	LT	KB1	KB2	KL1	Shaft End S	Shaft End Q	Flange Face LA	LB	LC	LE	LF	LG	LH	LZ	Approx. Mass kg
10A□A2□	194 (238)	149 (193)	105 (147)	45	44 (46)	76 (67)	128 (171)	96 (102)	$24^{0}_{-0.013}$	40	115	$95^{0}_{-0.035}$	100	3	3	10	130	7	4.6 (6.0)
15A□A2□	205 (252)	160 (207)	116 (157)	45	44 (50)	87 (77)	139 (185)	96 (102)	$24^{0}_{-0.013}$	40	115	$95^{0}_{-0.035}$	100	3	3	10	130	7	5.1 (6.8)
20A□A2□	220 (268)	175 (223)	131 (173)	45	44 (50)	102 (93)	154 (201)	96 (102)	$24^{0}_{-0.013}$	40	115	$95^{0}_{-0.035}$	100	3	3	10	130	7	5.8 (7.5)
25A□A2□	249 (300)	204 (255)	154 (205)	45	50 (50)	125 (115)	183 (233)	96 (102)	$24^{0}_{-0.013}$	40	115	$95^{0}_{-0.035}$	100	3	3	10	130	7	7.0 (10)
30A□A2□	262 (298)	199 (235)	155 (191)	63	44 (44)	124 (114)	178 (214)	114 (119)	$28^{0}_{-0.013}$	55	145	$110^{0}_{-0.035}$	130	6	6	12	165	9	11 (16)
40A□A2□	299	236	192	63	44	161	215	114	$28^{0}_{-0.013}$	55	145	$110^{0}_{-0.035}$	130	6	6	12	165	9	14
50A□A2□	339	276	232	63	44	201	255	114	$28^{0}_{-0.013}$	55	145	$110^{0}_{-0.035}$	130	6	6	12	165	9	17

Note: Values in parentheses are for servomotors with a brake.

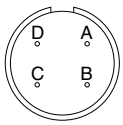
Connector Specifications [SGMSS-10A to 50A]

Encoder-end Connector

Receptacle: MS3102A20-29P
Applicable Plug
(To be provided by the customer.)
Plug: MS3108B20-29S
Cable Clamp: MS3057-12A

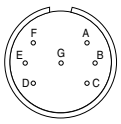
Absolute Encoder				Incremental Encoder			
A	—	K	—	A	—	K	—
B	—	L	—	B	—	L	—
C	DATA+	M	—	C	DATA+	M	—
D	DATA−	N	—	D	DATA−	N	—
E	—	P	—	E	—	P	—
F	—	R	—	F	—	R	—
G	0V	S	BATT−	G	0V	S	—
H	+5VDC	T	BATT+	H	+5VDC	T	—
J	FG			J	FG		

Motor-end Connector (Standard)



A	Phase U
B	Phase V
C	Phase W
D	FG

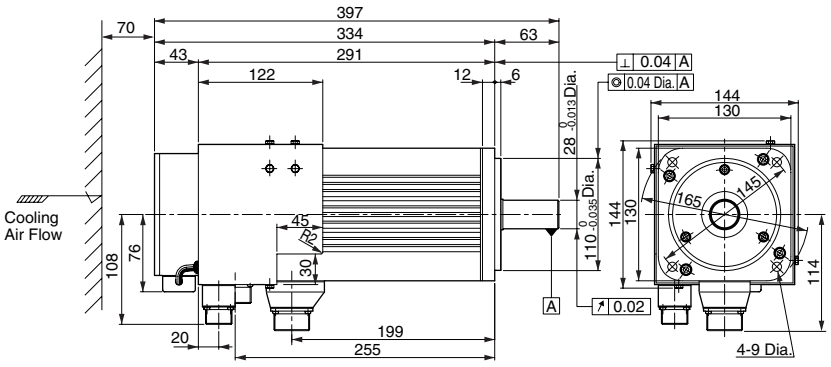
Motor-end Connector (With Brake)



A	Phase U
B	Phase V
C	Phase W
D	FG
E	Brake Terminal
F	Brake Terminal
G	–

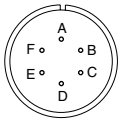
7.0kW

Note: Leave a minimum space of 70 mm around the servomotor to allow for sufficient amount of cooling air.



Connector Specifications

Fan-end Connector



Receptacle: MS3102A14S-6P
Applicable plug
(To be provided by the customer.)
Plug: MS3108B14S-6S
Cable clamp: MS3057-6A

A	Fan motor
B	Fan motor
C	–
D	Alarm terminal
E	Alarm terminal
F	FG (Frame ground)

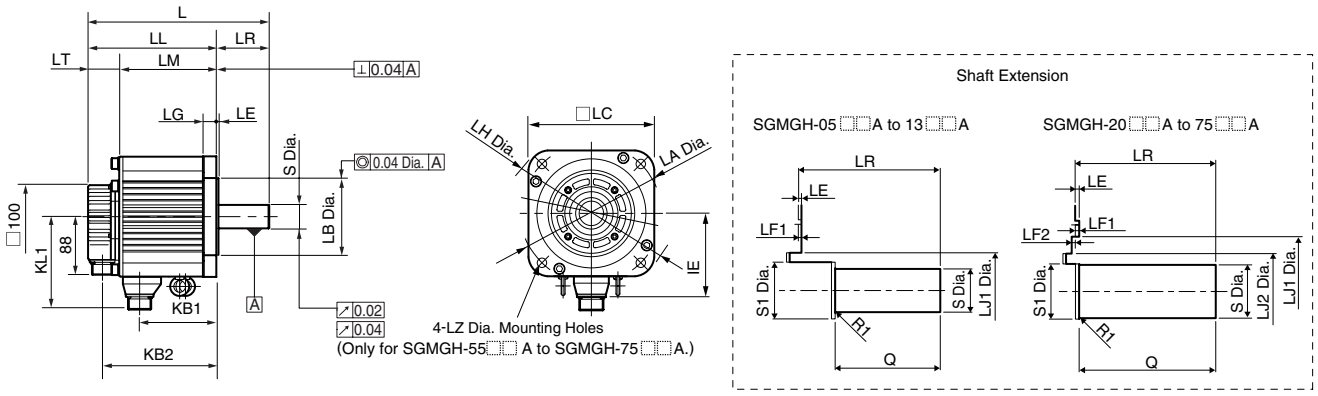
Note: The connector specifications for the encoder and servomotor are same as those for the SGMSS-30 to the SGMSS-50 servomotors without brakes.

●Dimensions Units: mm

Note: Contact your Yaskawa representative for more information about the dimensions of servomotors with gears and about servomotors with brakes (excluding those with the 10A brake).

SGMGH-05A, 09A, 13A, 20A, 30A, 44A, 55A, 75A

500W to 7.5kW



Servomotor Type SGMGH-□□□□	L	LL	LM	LR	LT	KB1	KB2	IE	KL1	Flange Face										Shaft End			Approx. Mass
										LA	LB	LC	LE	LF1	LF2	LG	LH	LJ1	LJ2	LZ	S	S1	Q	kg
05A□A21□	196	138	92	58	46	65	117	–	109	145	110 $^{0}_{-0.035}$	130	6	6	–	12	165	45	–	9	19 $^{0}_{-0.013}$	30	40	5.5
09A□A21□	219	161	115	58	46	88	140	–	109	145	110 $^{0}_{-0.035}$	130	6	6	–	12	165	45	–	9	19 $^{0}_{-0.013}$	30	40	7.6
13A□A21□	243	185	139	58	46	112	164	–	109	145	110 $^{0}_{-0.035}$	130	6	6	–	12	165	45	–	9	22 $^{0}_{-0.013}$	30	40	9.6
20A□A21□	245	166	119	79	47	89	144	–	140	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	35 $^{+0.01}_{0}$	45	76	14
30A□A21□	271	192	145	79	47	115	170	–	140	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	35 $^{+0.01}_{0}$	45	76	18
44A□A21□	305	226	179	79	47	149	204	–	140	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	35 $^{+0.01}_{0}$	45	76	23
55A□A21□	373	260	213	113	47	174	238	128	150	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	42 $^{0}_{-0.016}$	45	110	30
75A□A21□	447	334	287	113	47	248	312	123	150	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	42 $^{0}_{-0.016}$	45	110	40

Note: Servomotors with oil seals have also same dimensions.

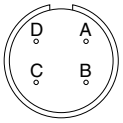
Connector Specifications (17-bit Encoder)

Encoder-end Connector

Receptacle: MS3102A20-29P
Applicable Plug
(To be provided by the customer.)
Plug: MS3108B20-29S
Cable Clamp: MS3057-12A

Absolute Encoder				Incremental Encoder			
A	—	K	—	A	—	K	—
B	—	L	—	B	—	L	—
C	DATA+	M	—	C	DATA+	M	—
D	DATA−	N	—	D	DATA−	N	—
E	—	P	—	E	—	P	—
F	—	R	—	F	—	R	—
G	0V	S	BATT−	G	0V	S	—
H	+5VDC	T	BATT+	H	+5VDC	T	—
J	FG			J	FG		

Motor-end Connector (Standard)



A	Phase U
B	Phase V
C	Phase W
D	FG

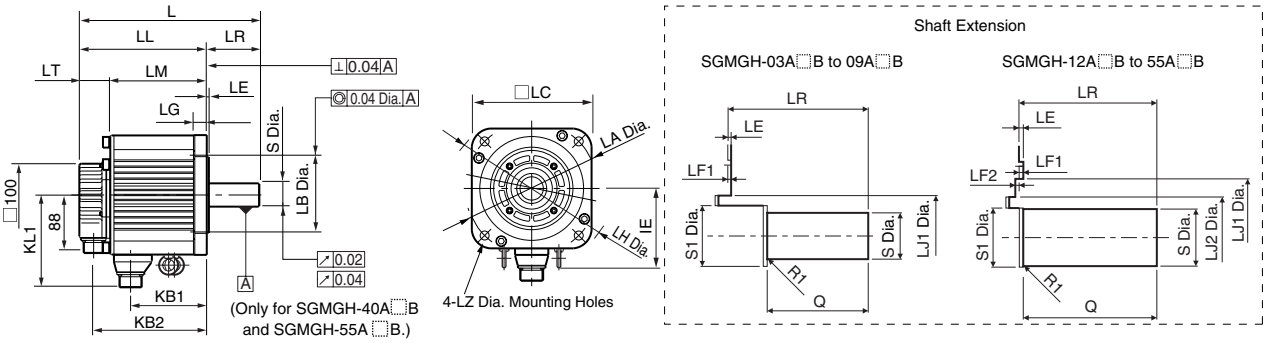
Rotary Servomotors (cont'd)

●Dimensions Units: mm

Note: Contact your Yaskawa representative for more information about the dimensions of servomotors with gears and about servomotors with brakes (excluding those with the 10A brake).

SGMGH-03A, 06A, 09A, 12A, 20A, 30A, 40A, 55A

300W to 5.5kW



Servomotor Type SGMGH-□□□□	L	LL	LM	LR	LT	KB1	KB2	IE	KL1	Flange Face											Shaft End			Approx. Mass
										LA	LB	LC	LE	LF1	LF2	LG	LH	LJ1	LJ2	LZ	S	S1	Q	kg
03A□B21□	196	138	92	58	46	65	117	–	109	145	110 $^{0}_{-0.035}$	130	6	6	–	12	165	45	–	9	19 $^{0}_{-0.013}$	30	40	5.5
06A□B21□	219	161	115	58	46	88	140	–	109	145	110 $^{0}_{-0.035}$	130	6	6	–	12	165	45	–	9	19 $^{0}_{-0.013}$	30	40	7.6
09A□B21□	243	185	139	58	46	112	164	–	109	145	110 $^{0}_{-0.035}$	130	6	6	–	12	165	45	–	9	22 $^{0}_{-0.013}$	30	40	9.6
12A□B21□	245	166	119	79	47	89	144	–	140	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	35 $^{+0.01}_{0}$	45	76	14
20A□B21□	271	192	145	79	47	115	170	–	140	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	35 $^{+0.01}_{0}$	45	76	18
30A□B21□	305	226	179	79	47	149	204	–	140	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	35 $^{+0.01}_{0}$	45	76	23
40A□B21□	373	260	213	113	47	174	238	123	150	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	42 $^{0}_{-0.016}$	45	110	30
55A□B21□	447	334	287	113	47	248	312	123	150	200	114.3 $^{0}_{-0.025}$	180	3.2	3	0.5	18	230	76	62	13.5	42 $^{0}_{-0.016}$	45	110	40

Note: Servomotors with oil seals have also same dimensions.

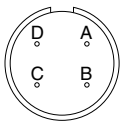
Connector Specifications (17-bit Encoder)

Encoder-end Connector

Receptacle: MS3102A20-29P
Applicable Plug
(To be provided by the customer.)
Plug: MS3108B20-29S
Cable Clamp: MS3057-12A

Absolute Encoder				Incremental Encoder			
A	—	K	—	A	—	K	—
B	—	L	—	B	—	L	—
C	DATA+	M	—	C	DATA+	M	—
D	DATA−	N	—	D	DATA−	N	—
E	—	P	—	E	—	P	—
F	—	R	—	F	—	R	—
G	0V	S	BATT−	G	0V	S	—
H	+5VDC	T	BATT+	H	+5VDC	T	—
J	FG			J	FG		

Motor-end Connector (Standard)



A	Phase U
B	Phase V
C	Phase W
D	FG

Direct-drive Servomotors

●Specifications

SGMCS (Small-capacity)

Time Rating	: Continuous	**Ambient Humidity**	: 20% to 80% (no condensation)	**Excitation**	: Parmanent magnet
Vibration Class	: 15μm or below	**Mounting Method**	: Flange-mounted	**Drive Method**	: Direct drive
Insulation Resistance	: 500 VDC, 10MΩ min.	**Thermal Class**	: A		
		Withstand Voltage	: 1500 VAC, 1 min		
Ambient Temperature	: 0℃ to + 40℃	**Enclosure**	: Totally-enclosed, self-cooled IP42 (except for shaft opening)		

Servomotor Type		SGMCS-										
		02B□C	05B□C	07B□C	04C□C	10C□C	14C□C	08D□C	17D□C	25D□C	16E□B	35E□B
Rated Output*1	W	42	105	147	84	209	293	168	356	393	335	550
Rated Torque*1, *2	N·m	2.0	5.0	7.0	4.0	10.0	14.0	8.0	17.0	25.0	16.0	35.0
Instantaneous Peck Torque*1	N·m	6.0	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque*1(60 min^{-1})	N·m	2.05	5.15	7.32	4.09	10.1	14.2	8.23	17.4	25.4	17.6	38.3
Rated Current*1	Arms	1.8	1.7	1.4	2.2	2.2	2.8	1.9	2.5	2.6	3.3	3.5
Instantaneous Max. Current*1	Arms	5.4	5.1	4.1	7.0	7.0	8.3	5.6	7.5	8.0	9.4	10.0
Rated Speed*1	min^{-1}	200			200			200		150	200	150
Max. 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	5.1	7.79	10.8	5.58	11.1
Rotor Moment of Inertia	$kg·m^2×10^{-4}$	28	51	77	77	140	220	285	510	750	930	1430
Rated Power Rate*1	kW/s	1.4	4.9	6.4	2.1	7.1	8.9	2.25	5.67	8.33	2.75	8.57
Rated Angular Acceleration*1	rad/s^2	710	980	910	520	710	640	280	330	330	170	240
Absolute Accuracy	s	±15			±15			±15			±15	
Repeatability	s	±1.3			±1.3			±1.3			±1.3	

*1 : These values and the Torque/Speed characteristics listed here are representative of the values obtained when the motor is driven from the SERVOPACK and the coil temperature is at 100℃ (20℃ for servomotors of SGMCS-45M to 2ZN). All others are for a coil temperature of 20℃.

*2 : These values for the Rated Torque are for the continuous allowable torque with the following heatsinks at an ambient temperature of 40℃.
Heatsink dimensions : 350×350×12mm : SGMCS-□□B 650×650×12mm : SGMCS-□□E
450×450×12mm : SGMCS-□□C 750×750×45mm : SGMCS-□□M, □□N
550×550×12mm : SGMCS-□□D

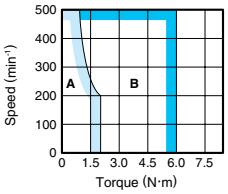
Notes : 1 Servomotors with brakes are not provided.
2 Bearing loss depends on the temperature of the bearing. The bearing loss will increase at low temperatures.

Torque / Speed Characteristics

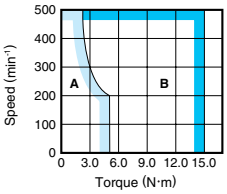
A : Continuous Duty Zone B : Intermittent Duty Zone

Note: Dashed lines in the Intermittent Duty Zone show torque/speed characteristics when used with a SERVOPACK for 100VAC.

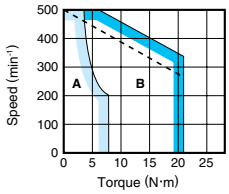
SGMCS-02B□B



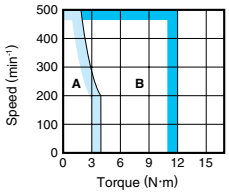
SGMCS-05B□B



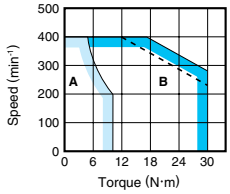
SGMCS-07B□B



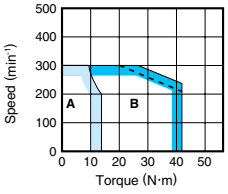
SGMCS-04C□B



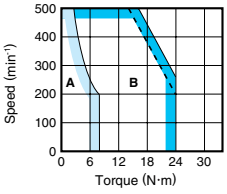
SGMCS-10C□B



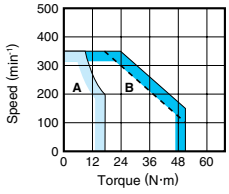
SGMCS-14C□B



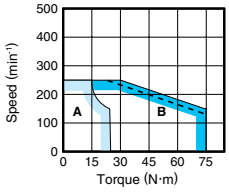
SGMCS-08D□B



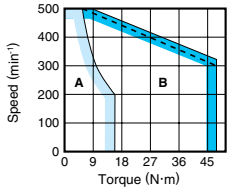
SGMCS-17D□B



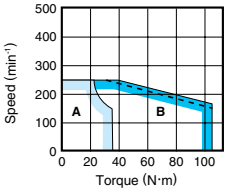
SGMCS-25D□B



SGMCS-16E□B



SGMCS-35E□B



Direct-drive Servomotors (cont'd)

●Specifications

SGMCS (Medium-capacity)

Time Rating : Continuous
Vibration Class : 15μm or below
Insulation Resistance : 500 VDC 10MΩ min.
Ambient Temperature : 0℃ to + 40℃
Ambient Humidity : 20% to 80% (no condensation)
Mounting Method : Flange-mounted
Thermal Class : F
Withstand Voltage : 1500 VAC, 1 min
Enclosure : Totally-enclosed, self-cooled IP44 (except for shaft opening)
Excitation : Parmanent magnet
Drive Method : Direct drive

Servomotor Type		SGMCS-					
		45M□A	80M□A	1AM□A	80N□A	1AN□A	2ZN□A
Rated Output*1	W	707	1260	730	1260	2360	3140
Rated Torque*1, *2	N·m	45	80	110	80	150	200
Instantaneous Peck Torque*1	N·m	135	240	330	240	450	600
Stall Torque*1(60 min^{-1})	N·m	45	80	110	80	150	200
Rated Current*1	Arms	5.80	9.74	13.4	9.35	17.4	18.9
Instantaneous Max. Current*1	Arms	17	28	42	28	56	56
Rated Speed*1	min^{-1}	150	150	150	150	150	150
Max. Speed*1	min^{-1}	300	300	300	300	250	250
Torque Constant	N·m/Arms	8.39	8.91	8.45	9.08	9.05	11.5
Rotor Moment of Inertia	$kg·m^2×10^{-4}$	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
Absolute Accuracy	s	±15	–	–	–	–	–
Repeatability	s	±1.3	–	–	–	–	–

*1 : These values and the Torque/Speed characteristics listed here are representative of the values obtained when the motor is driven from the SERVOPACK and the coil temperature is at 100℃ (20℃ for servomotors of SGMCS-45M to 2ZN). All others are for a coil temperature of 20℃.
*2 : These values for the Rated Torque are for the continuous allowable torque with the following heatsinks at an ambient temperature of 40℃.
Heatsink dimensions : 350×350×12mm : SGMCS-□□B 650×650×12mm : SGMCS-□□E
450×450×12mm : SGMCS-□□C 750×750×45mm : SGMCS-□□M, □□N
550×550×12mm : SGMCS-□□D

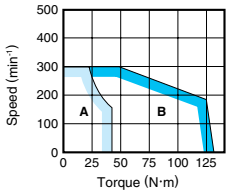
Notes : 1 Servomotors with brakes are not provided.
2 Bearing loss depends on the temperature of the bearing. The bearing loss will increase at low temperatures.

Torque / Speed Characteristics

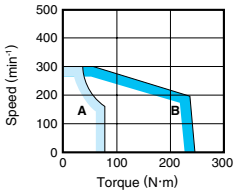
A : Continuous Duty Zone B : Intermittent Duty Zone

Note: Dashed lines in the Intermittent Duty Zone show torque/speed characteristics when used with a SERVOPACK for 100VAC.

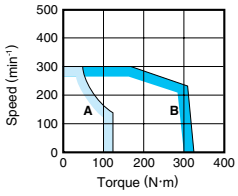
SGMCS-45M□A



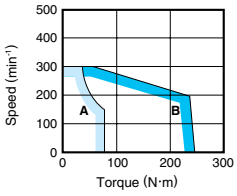
SGMCS-80M□A



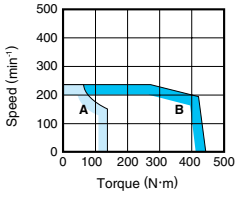
SGMCS-1AM□A



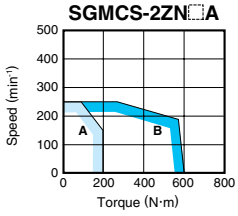
SGMCS-80N□A



SGMCS-1EN□A



SGMCS-2ZN□A

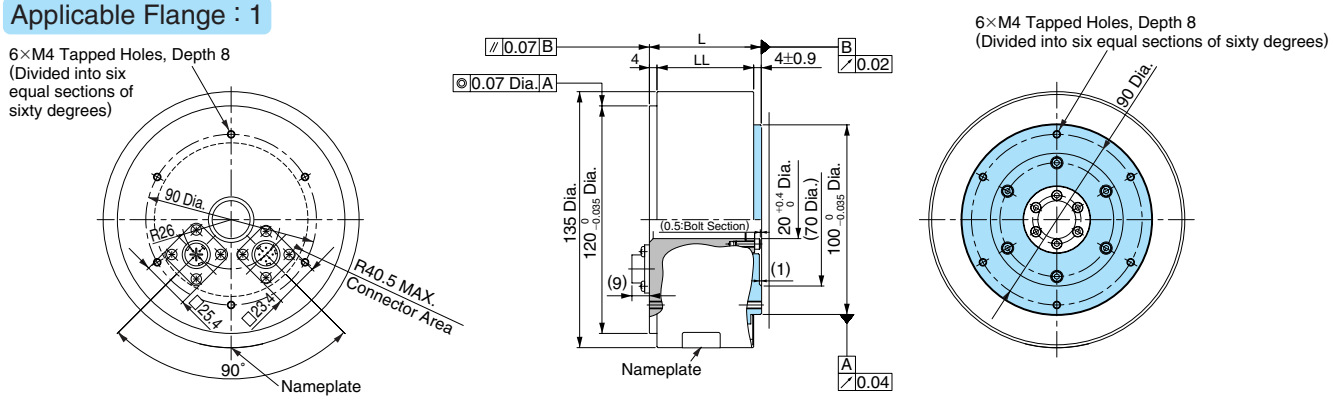


●Dimensions Units: mm

Rotating: Non Rotating Part:

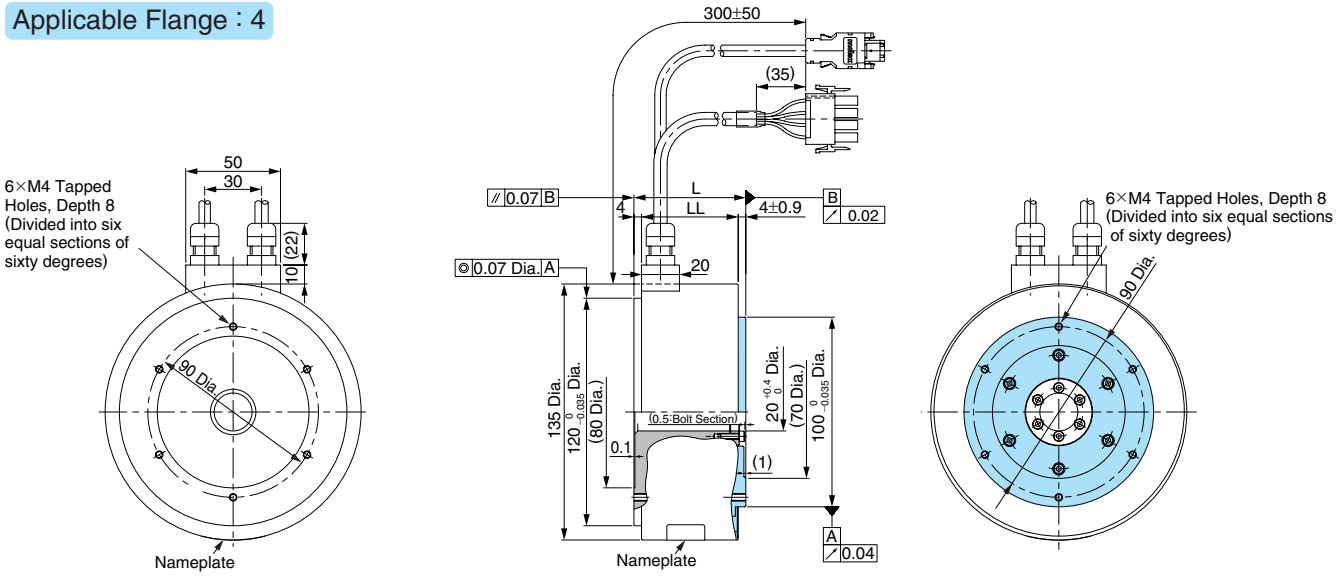
SGMCS-02B□C□1, 05B□C□1, 07B□C□1 **Outer Diameter: 135 mm, Inner Diameter: 20 mm**

Applicable Flange : 1



Servomotor Type SGMCS-□	L	LL	Approx. Mass kg
02B□C11	59	51	4.8
05B□C11	88	80	5.8
07B□C11	128	120	8.2

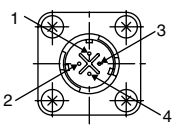
Applicable Flange : 4



Servomotor Type SGMCS-□	L	LL	Approx. Mass kg
02B□C41	59	51	4.8
05B□C41	88	80	5.8
07B□C41	128	120	8.2

Connectors Specifications (Applicable Flange: 1) [SGMCS-02B to 35E]

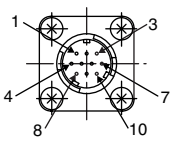
Servomotor-end Connector



Model: JN1AS04MK2
Manufacturer: Japan Aviation Electronics Industry, Ltd.
Applicable plug: JN1DS04FK1
(To be provided by customers.)

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

Encoder-end Connector



Model: JN1AS10ML1
Manufacturer: Japan Aviation Electronics Industry, Ltd.
Applicable plug: JN1DS10SL1
(To be provided by customers.)

1	PS	Light blue	6	–	–
2	/PS	Light blue/white	7	FG(Frame ground)	Shield
3	–	–	8	–	–
4	PG5V	Red	9	PG0V	Black
5	–	–	10	–	–

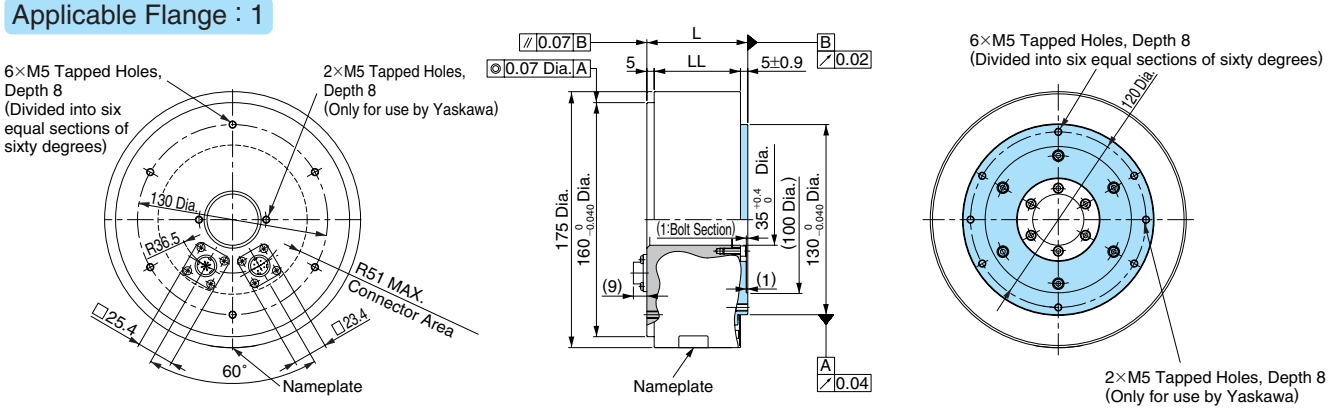
Direct-drive Servomotors (cont'd)

●Dimensions Units: mm

Rotating: Non Rotating Part:

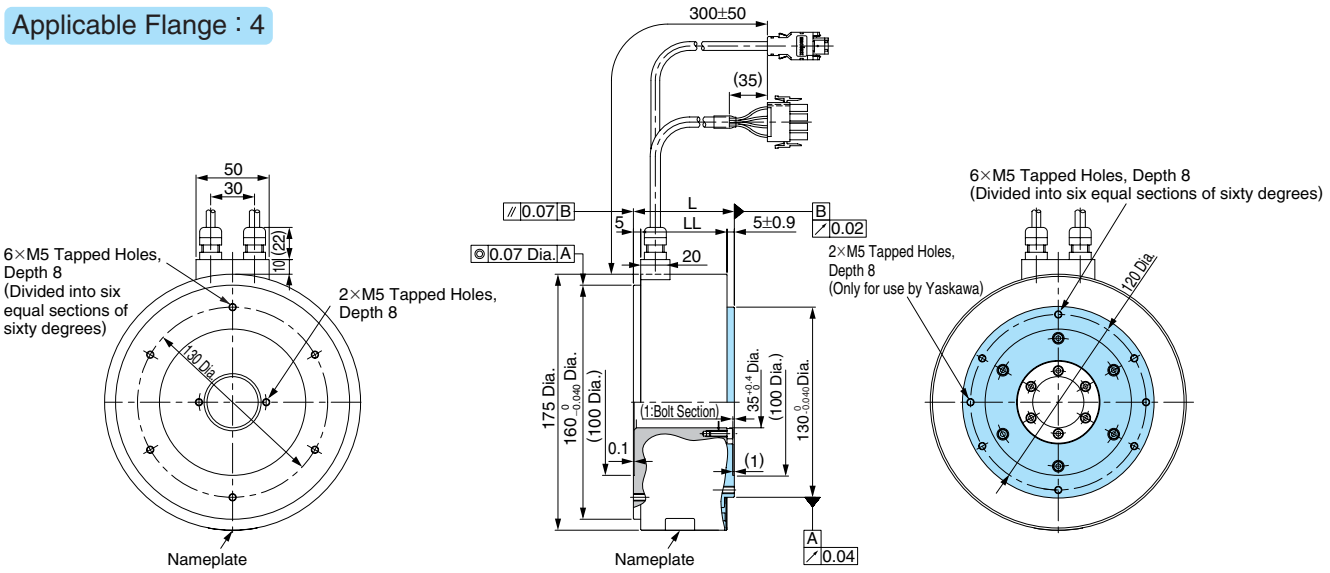
SGMCS-04C□C□1, 10C□C□1, 14C□C□1 **Outer Diameter: 175 mm, Inner Diameter: 35 mm**

Applicable Flange : 1



Servomotor Type SGMCS-□	L	LL	Approx. Mass kg
04C□C11	69	59	7.2
10C□C11	90	80	10.2
14C□C11	130	120	14.2

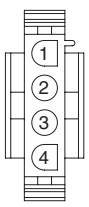
Applicable Flange : 4



Servomotor Type SGMCS-□	L	LL	Approx. Mass kg
04C□C41	69	59	7.2
10C□C41	90	80	10.2
14C□C41	130	120	14.2

Connector Specifications (Applicable Flange: 4) [SGMCS-02B to 35E]

Servomotor-end Connector

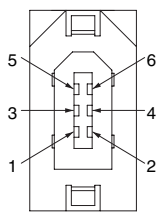


Model
- Plug : 350779-1
- Pin : 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1or 350669-1 (No.4)

Manufacturer : Tyco Electronics AMP K.K.
Applicable plug
- Cap : 350780-1
- Socket : 350570-3 or 350689-3

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

Encoder-end Connector

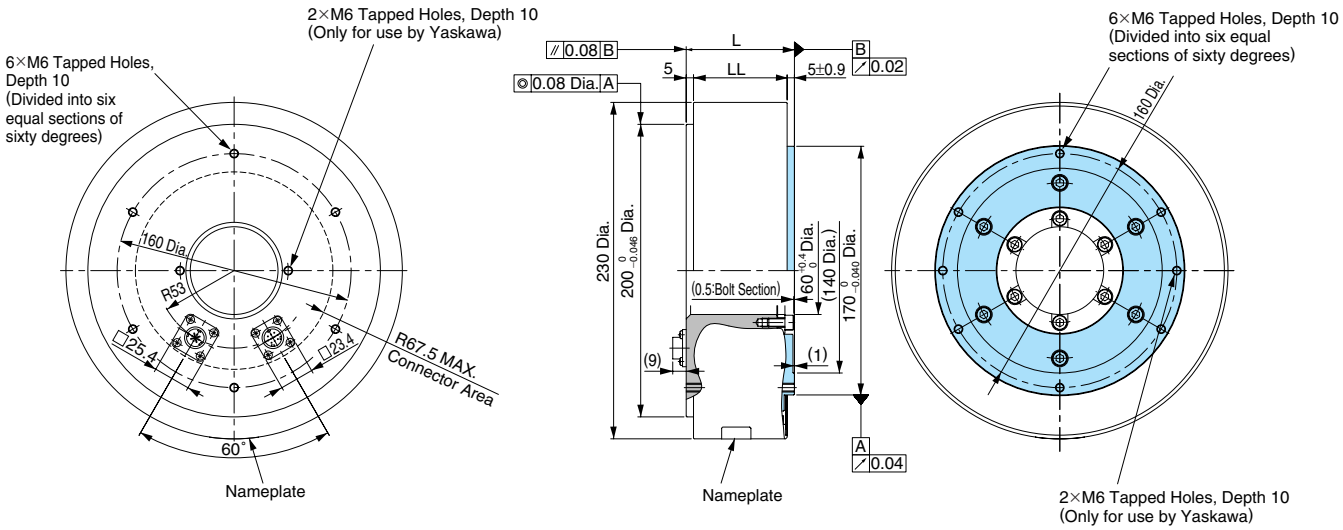


Model : 55102-0600
Manufacturer : Molex Japan Co., Ltd
Applicable plug : 54280-0600

1	PG5V	Red
2	PG0V	Black
3	–	–
4	–	–
5	PS	Light blue
6	/PS	Light blue/white
Connector Case	FG(Frame ground)	Shield

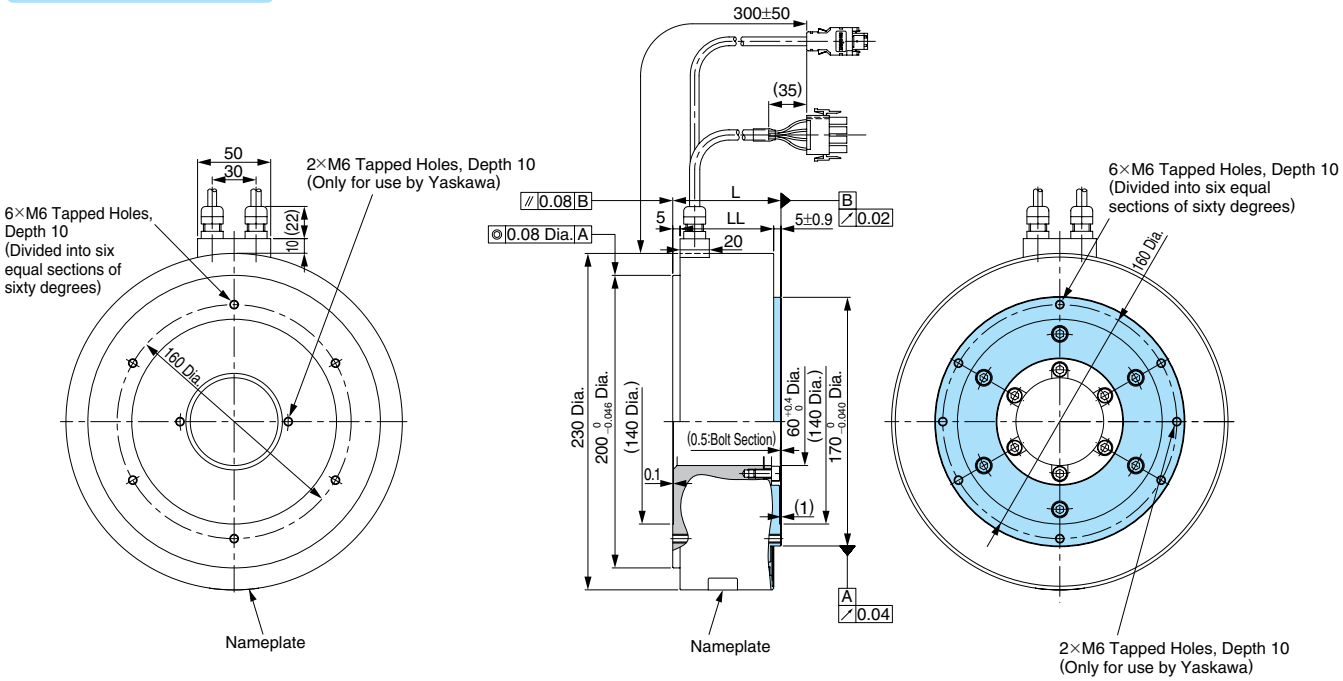
SGMCS-08D□C□1, 17D□C□1, 25D□C□1 Outer Diameter: 230 mm, Inner Diameter: 60 mm

Applicable Flange : 1



Servomotor Type SGMCS-□	L	LL	Approx. Mass kg
08D□C11	74	64	14.0
17D□C11	110	100	22.0
25D□C11	160	150	29.7

Applicable Flange : 4



Servomotor Type SGMCS-□	L	LL	Approx. Mass kg
08D□C41	74	64	14.0
17D□C41	110	100	22.0
25D□C41	160	150	29.7

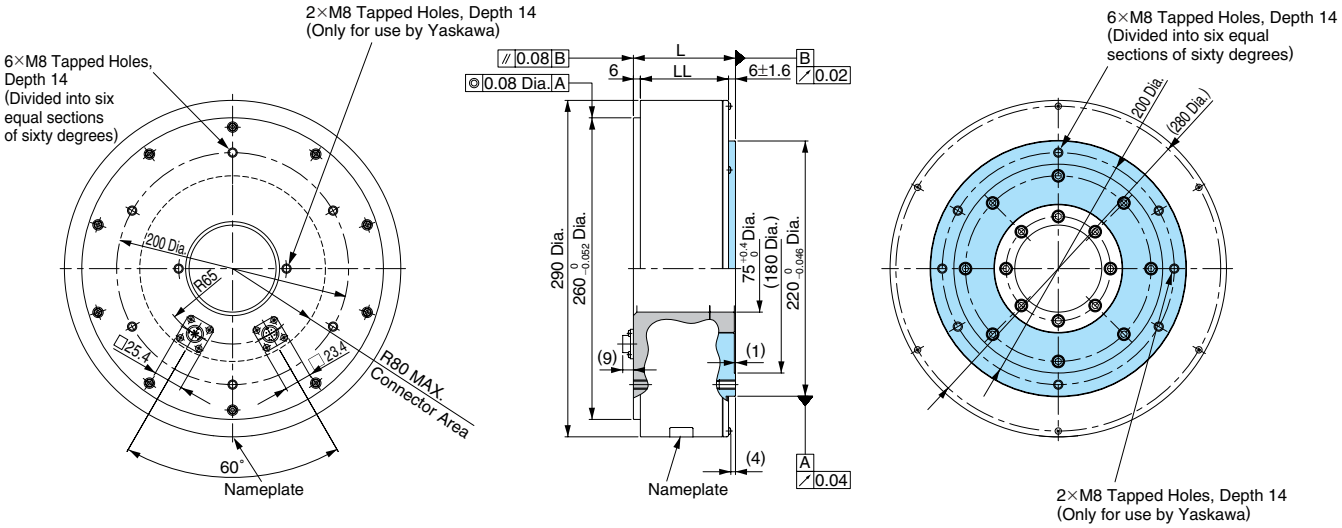
Direct-drive Servomotors (cont'd)

●Dimensions Units: mm

Rotating: Non Rotating Part:

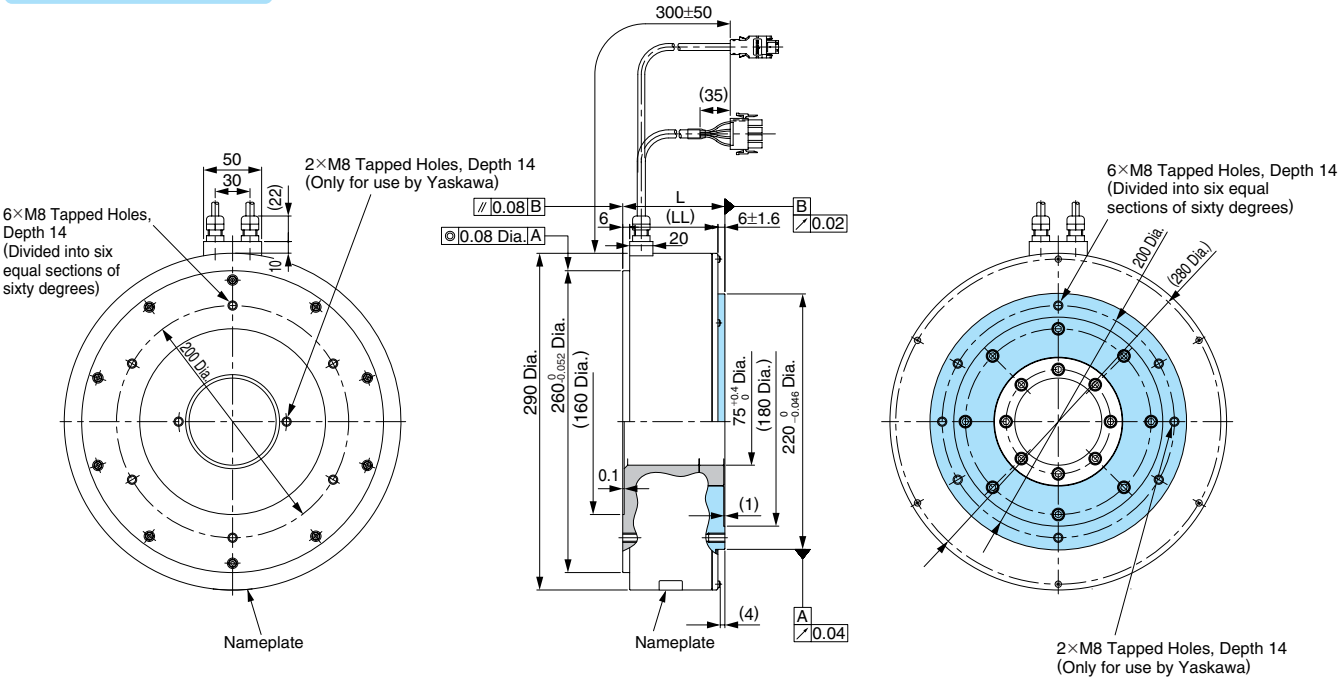
SGMCS-16E□B□1, 35E□B□1 **Outer Diameter: 290 mm, Inner Diameter: 75 mm**

Applicable Flange : 1



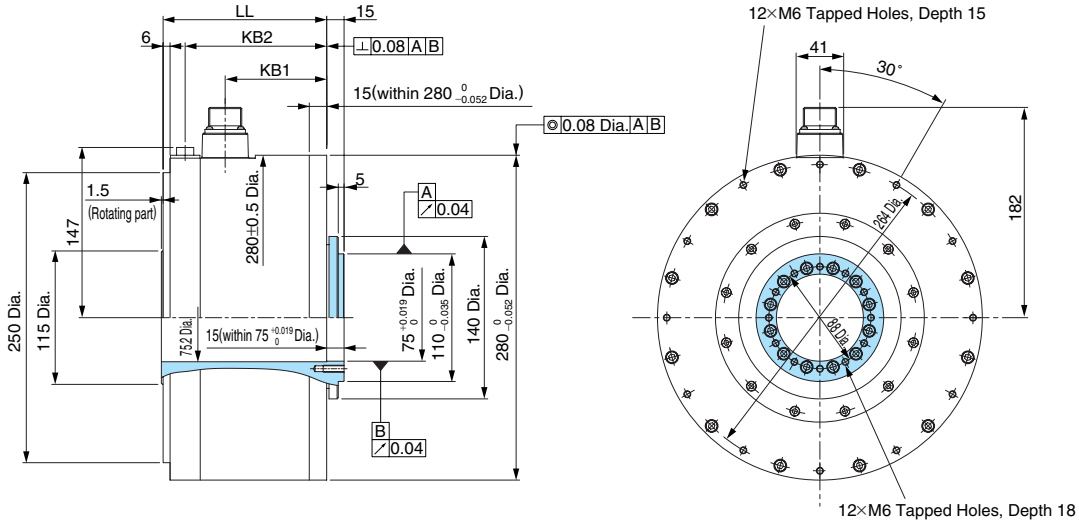
Servomotor Type SGMCS-□	L	LL	Approx. Mass kg
16E□B11	88	76	26.0
35E□B11	112	100	34.0

Applicable Flange : 4



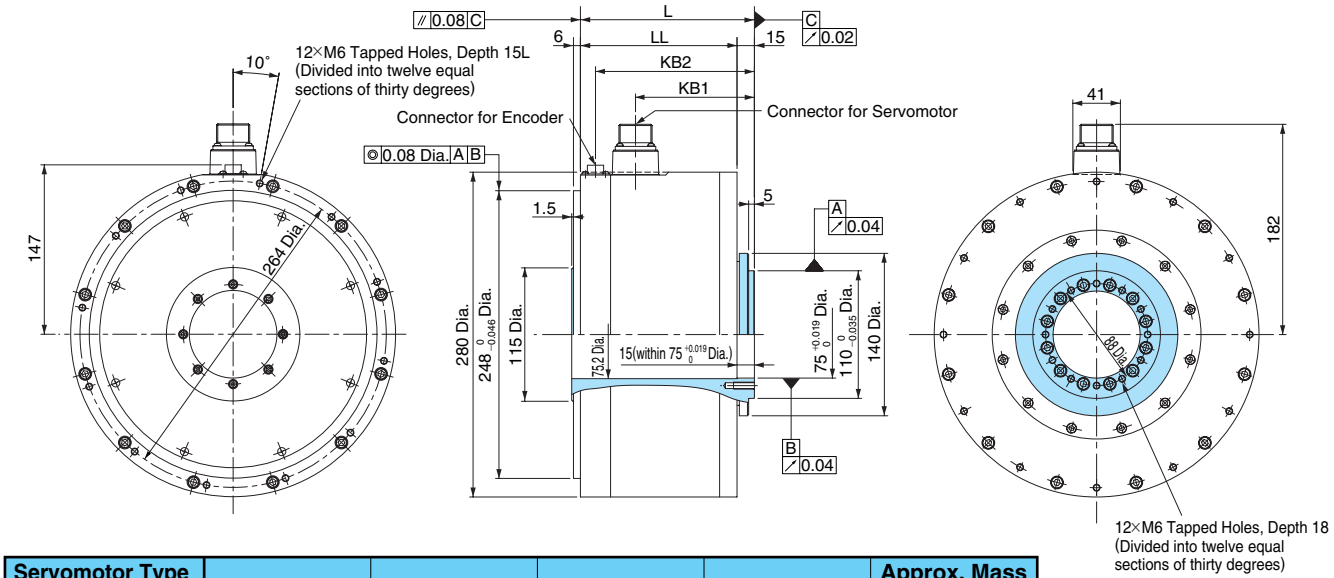
Servomotor Type SGMCS-□	L	LL	Approx. Mass kg
16E□B41	88	76	26.0
35E□B41	112	100	34.0

SGMCS-45M□A11, 80M□A11, 1AM□A11 Outer diameter: 280



Servomotor Type SGMCS-□	LL	KB1	KB2	Approx. Mass kg
45M□A11	141	87.5	122	38
80M□A11	191	137.5	172	45
1AM□A11	241	187.5	222	51

SGMCS-45M□A31, 80M□A31, 1AM□A31 Outer diameter: XXX

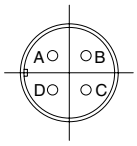


Servomotor Type SGMCS-□	L	LL	KB1	KB2	Approx. Mass kg
45M□A31	150	135	102.5	137	38
80M□A31	200	185	152.5	187	45
1AM□A31	250	235	202.5	237	51

Connector Specifications [SGMCS-45M to 2ZN]

Motor-end Connector

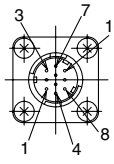
Model: CE05-2A18-10PD
Manufacture: DDK Electronics, Inc.



A	Phase U
B	Phase V
C	Phase W
D	FG (Frame Ground)

Encoder-end Connector

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



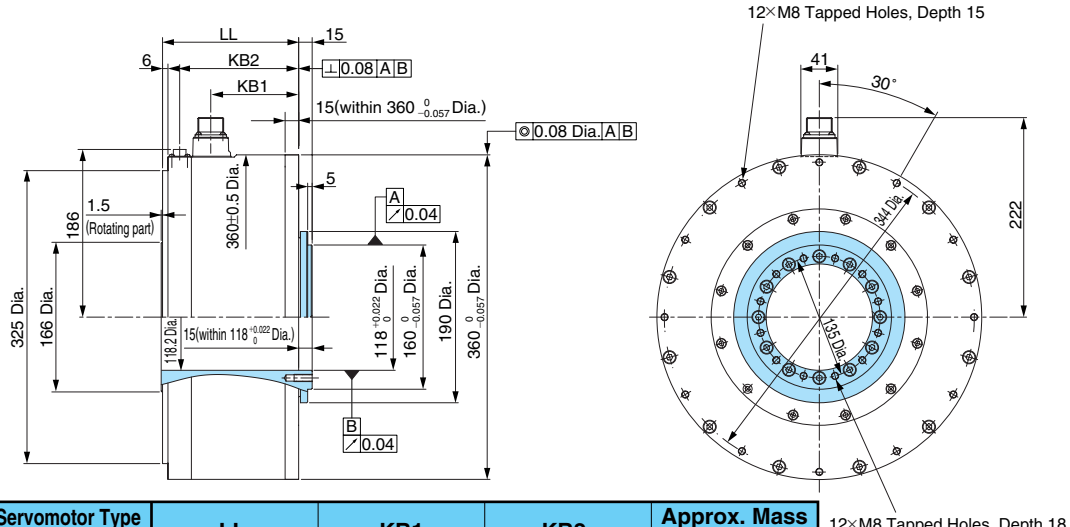
1	PS
2	/PS
3	–
4	PG5V
5	–
6	–
7	FG (Frame Ground)
8	–
9	PG0V
10	–

Direct-drive Servomotors (cont'd)

●Dimensions Units: mm

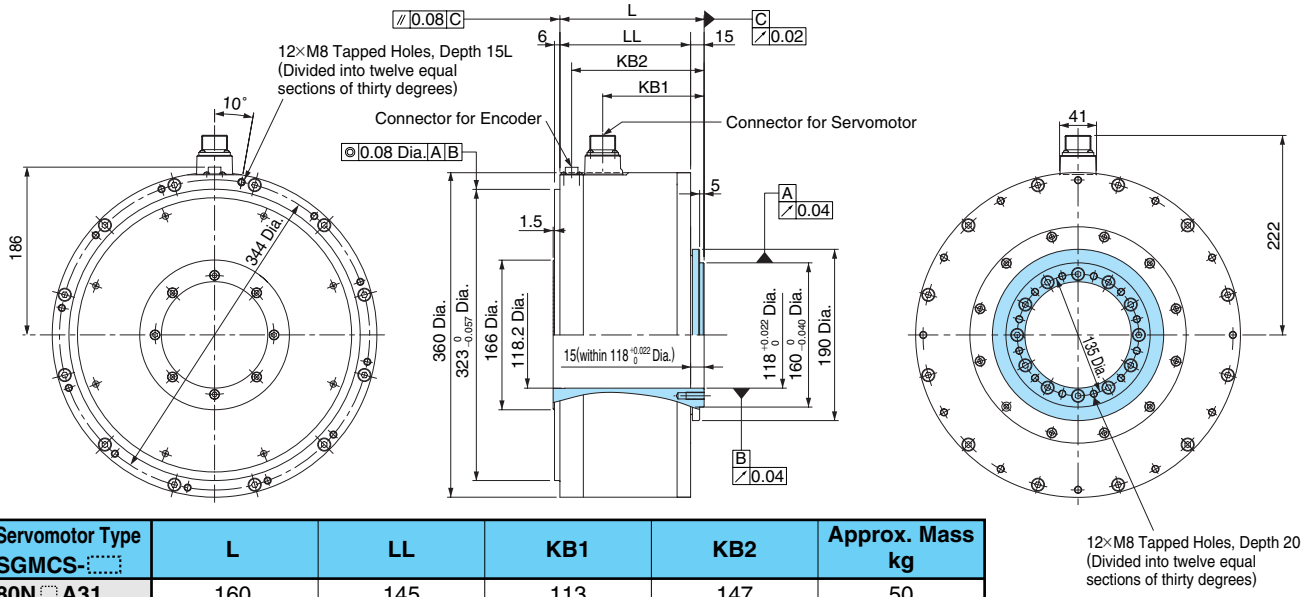
Rotating: Non Rotating Part:

SGMCS-80N□A11, 1EN□A11, 2ZN□A11 Outer diameter: 360



Servomotor Type SGMCS-□	LL	KB1	KB2	Approx. Mass kg
80N□A11	151	98	132	50
1EN□A11	201	148	182	68
2ZN□A11	251	198	232	86

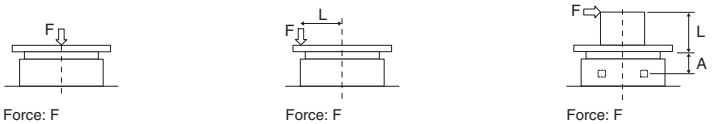
SGMCS-80N□A31, 1EN□A31, 2ZN□A31 Outer diameter: XXX



Servomotor Type SGMCS-□	L	LL	KB1	KB2	Approx. Mass kg
80N□A31	160	145	113	147	50
1EN□A31	210	195	163	197	68
2ZN□A31	260	245	213	247	86

Load Capacity

The following figures show the load capacity during motor operation.
Design motors so as not to exceed the values in the table for thrust and moment loading.



Force: F
Thrust Loading: Fa = F+Load's Mass
Moment Loading: M = 0

Force: F
Thrust Loading: Fa = F+Load's Mass
Moment Loading: M = F × L

Force: F
Thrust Loading: Fa = Load's Mass
Moment Loading: M = F × (L+A)

Servomotor Type SGMCS-□	02B□C	05B□C	07B□C	04C□C	10C□C	14C□C	08D□C	17D□C	25D□C	16E□B	35E□B	45M□A	80M□A	1AM□A	80N□A	1EN□A	2ZN□A
Dimensions of A mm	0	0	0	0	0	0	0	0	0	0	0	33			37.5		
Allowable Moment Load Fa N	1500			3300			4000			11000		9000			16000		
Allowable Thrust Load M N·m	40	50	64	70	75	90	93	103	135	250	320	180			350		

SGDS-□□□ 01/02 SERVOPACKs

(Analog voltage reference or pulse train reference) (Fully-closed control)

●Ratings and Specifications

SERVOPACK Type SGDS-□□□					A5※	01※	02※	04※	05※	08※	10※	15※	20※	30※	50※
Basic Specifications	Max. 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
	100V	Continuous Output Current		Arms	0.66	0.91	2.1	2.8	—	—	—	—	—	—	—
		Max. Output Current		Arms	2.1	2.8	6.5	8.5	—	—	—	—	—	—	—
	200V	Continuous Output Current		Arms	0.66	0.91	2.1	2.8	3.8	5.5	7.6	11.6	18.5	18.9	32.9
		Max. Output Current		Arms	2.1	2.8	6.5	8.5	11.0	16.9	17.0	28.0	42.0	56.0	84.0
	Input Power Supply	Capacity Range			Sigle-phase 100VAC/Sigle-phase 200VAC				Three-phase 200VAC	Sigle-phase 200VAC	Three-phase 200VAC				
		Main Circuit			Three-phase (or Sigle-phase) 200 to 230 VAC +10 to −15% 50/60 Hz Sigle-phase 100 to 115 VAC +10 to −15% 50/60 Hz										
		Control Circuit			Sigle-phase 200 to 230 VAC +10 to −15% 50/60 Hz Sigle-phase 100 to 115 VAC +10 to −15% 50/60 Hz										
	Control Method				Sigle-phase or three-phase full-wave rectification (Single-phase voltage doubler rectifier at 100V), IGBT, PWMcontrol, Sin wave power drive system										
	Feedback				17-bit or 20-bit serial encoder (incremental/absolute value)										
	Conditions	Usage/Strage Temperature			0 to +55℃ / −20 to +85℃										
		Usage/Strage Humidity			90% RH or less (non-condensing)										
		Vibration/Shock Resistance			4.9 m/s^2 / 19.6 m/s^2										
	Structure				Base-mounted type (Rack-mounted type is also available.)										
	Performance	Speed Control Range			1 : 5000 (The lower limit is within the range not to stop at the torque load.)										
		Speed Variance	Load Variance		During 0 to 100 load: ±0.01% max. (at rated speed)										
			Voltage Variance		Rated voltage ±10%: 0% (at rated speed)										
			Temperature Variance		25±25℃ : ±0.1%max. (at rated speed)										
		Frequency Characteristics			600 Hz (at $J_L = J_M$)										
		Torque Control Accuracy(Reproducibility)			±1%										
		Soft Start Time Setting			0 to 10s (Acceleration, deceleration can each be set.)										
Torque Control Mode	Input Signals	Reference Voltage			±3VDC (±1V to ±10VDC: Variable setting range)/ Rated torque Input voltage: ±12V max. (Forward rotation if positive reference)										
		Input Impedance			Approx. 14kΩ or more										
		Circuit Time Constant			30μs										
Speed Control Mode	Performance	Soft Start Time Setting			0 to 10s (Acceleration, deceleration can each be set.)										
	Input Signals	Reference Voltage			±6VDC (±2V to ±10VDC: Variable setting range)/ Rated torque Input voltage: ±12V max. (Forward rotation if positive reference)										
		Input Impedance			Approx. 14kΩ or more										
		Circuit Time Constant			30μs										
	Contact Speed Reference	Rotation Direction			Selected by P control Signal.										
		Speed Selection			Selected the speed (1st to 3rd) by forward/reverse current control signal. When both signals are OFF, other control mode is selected.										
Positioning Control Mode	Performance	Bias Setting			0 to 450 min^{-1} (setting resolution 1 min^{-1})										
		Feed Forward			0 to 100% (setting resolution 1%)										
		Positioning Completion Width Setting			0 to 1073741824 reference unit (setting resolution 1reference unit)										
	Input Signals	Reference Pulse	Pulse Type		Select one signal from: sign+pulse train, CCW +CW pulse train, and 90° phase difference 2-phase pulse (phase A + phase B)										
			Pulse Form		Non-isolated line driver (+5V level)										
			Pulse Frequency		Max.1Mpps (Non-isolated line driver)										
		Control Signal			CLEAR										
I/O Signals	Position Output	Output Form			Phase A, phase B, phase C: Line driver output										
		Frequency Dividing Ratio			Arbitrary dividing										
	Sequence Input Signal	Signal Allocation			Servo ON, P control (or control mode switching, forward/reverse run control by internal speed setting, zero clamp, reference pulse block), forward/reverse run prohibit (P-OT/N-OT), alarm reset, forward/reverse external torque limit (or internal speed switching), gain switching										
	Sequence Output Signal	Fixing Signal			Servo alarm, alarm code (3-bit output)										
		Signal Allocation			Select three signals from: positioning completed (speed agree), motor-rotation detection, servo ready, current limit, warning, position proximity, and brake signal.										
Integrated Functions	Analog Monitor (CN5)				Output voltage : ±8VDC Analog monitor connector for supervision of speed and torque reference signals, etc. integrated Speed : 1V/1000 min^{-1} Torque : 1V/at rated torque 100% Position error pulse : 0.05V/1 reference unit ＊Can be changed to other monitors by parameter setting.										
	Indicators (LED Display)				CHARGE, 7segment-LED×5 (Integrated digital operator function)										
	Communications	Interface			Digital operator (hand-held type)										
		Functions			Status display, parameter settings, monitor display, alarm traceback display, JOG run, etc.										
	Dynamic Brake (DB)				Automatic built-in DB motivates at main power OFF, servo alarm, servo OFF, and overtravel.										
	Regeneration				External regenerative resister (SGDS-A5□ to 04□), Built-in regenerative resister (SGDS-05□ to 50□)										
	Overtravel (OT) Prevention				DB stop, deceleration stop, or coast to stop at P-OT or N-OT										
	Electronic Gear				0.001≦B/A≦1000										
	Protective Functions				Overcurrent, overvoltage, undervoltage, regeneration error, main circuit detection error, heatsink overheating, power phase loss, overflow, overspeed, encoder error, overrun protection, CPU error, parameter error, etc.										
	Others				Reverse connection, zero search, automatic motor discrimination function										

Note: ※ in the SERVOPACK type should be F or A.
F = Input power supply is 100VAC. Input power supply for applicable motor is 200VAC.
A = Input power supply is 200VAC.

SGDS-□□□01/02 SERVOPACKs (cont'd)

(Analog voltage reference or pulse train reference) (Fully-closed control)

●Dimensions Units: mm

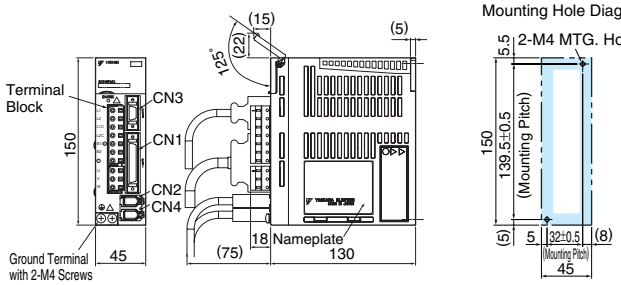
Connectors on SERVOPACK Side(Common for all types)

Connector Code	Type	Manufacture
CN1	10250-52A2JL	SUMITOMO 3M Ltd.
CN2	53460-0611	Molex Japan Co., Ltd.
CN3	10214-52A2JL	SUMITOMO 3M Ltd.

Note: Use connectors above or equivalent.

SGDS-A5, 01, 02

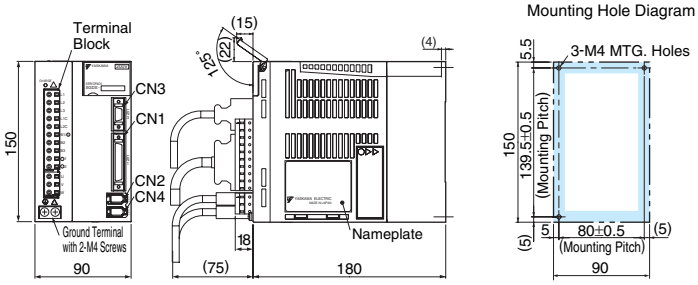
Single-phase 100V/200V 50W to 200W



Approx.mass : 0.7kg

SGDS-15

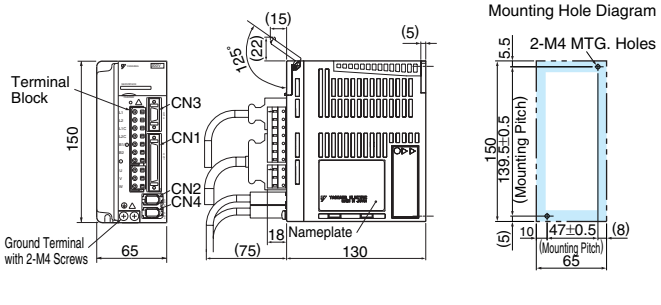
Three-phase 200V 1.5kW



Approx.mass : 2.1kg

SGDS-04A

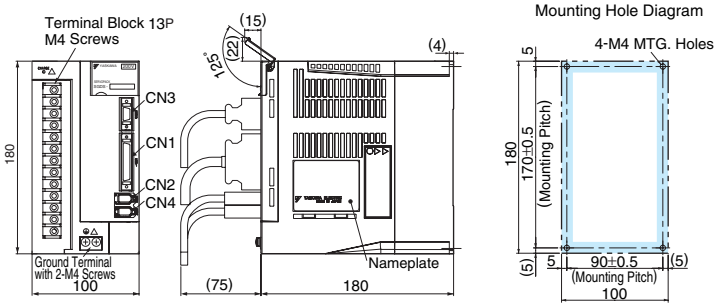
Single-phase 200V 400W



Approx.mass : 0.9kg

SGDS-20, 30

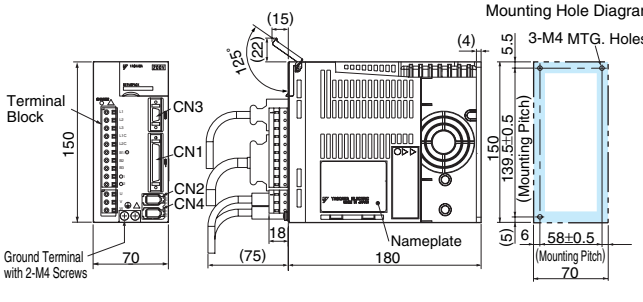
Three-phase 200V 2.0kW/3.0kW



Approx.mass : 2.8kg

SGDS-04F, 05, 08,10

Single-phase 100V 400W
Single-phase 200V 750W
Three-phase 200V 500W / 1.0kW

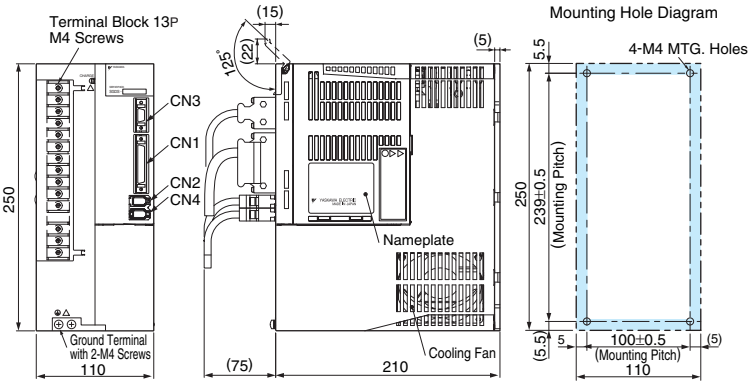


Approx.mass : 1.4kg

Note: The terminal block of the SGDS-04F differs from the one in the diagram.

SGDS-50

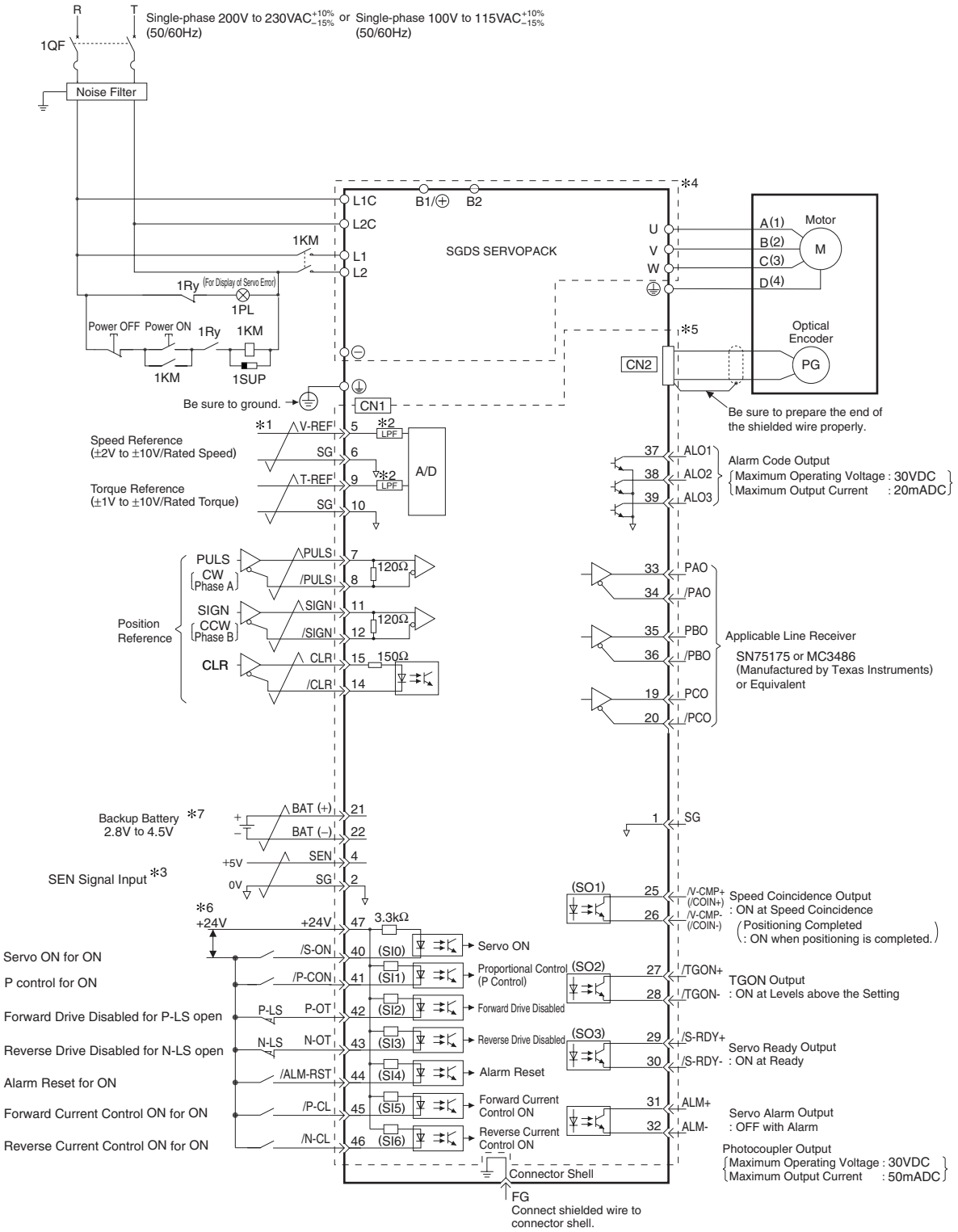
Three-phase 200V 5.0kW



Approx.mass : 5.0kg

●Connection Diagrams

Single-phase (100V/200VAC)

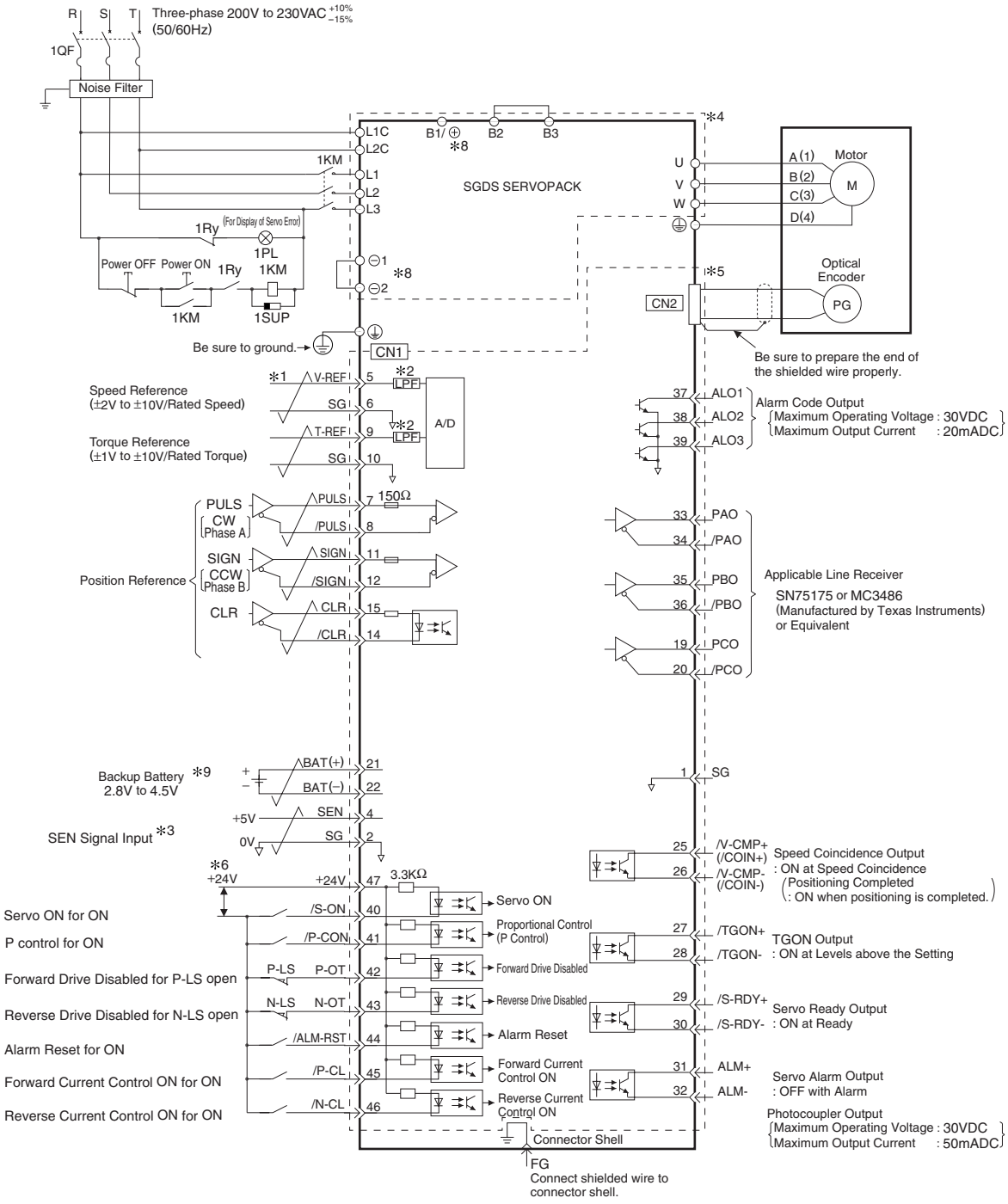


*1 : represents twisted-pair wire.
*2 : Primary filter. The time constant is 30 μs.
*3 : Required when using an absolute encoder.
*4 : This circuit is electrically separated from the outside to prevent electrical shock.
*5 : This is a SELV circuit separated from other circuit by double insulation or reinforced insulation.
*6 : The 24-VDC power supply is not included. Use a double-insulated power supply.
*7 : Connect an external backup battery if using an absolute encoder. Do not connect the battery if using a cable with a battery case.

Note: Set the parameters to allocate the functions for the input signals, SI0 to SI6, and the output signals, SO1 to SO3, in the drawing.

●Connection Diagrams (cont'd)

Three-phase (200VAC)



∗1 : ⫽ represents twisted-pair wire.
∗2 : Primary filter. The time constant is 47μs.
∗3 : Reguired when using an absolute encoder.
∗4 : This circuit is electrically separated from the outside to prevent electrical shock.
∗5 : This is a SELV circuit separated from other circuit by double insulation or reinforced insulation.
∗6 : Use a double insulated 24VDC power supply.
∗7 : If placing an external resister between terminals B1/⊕ and B2 or terminals B1 and B2, disconnect terminals B2 and B3.
∗8 : Place a DC reactor between terminals ⊖1 and ⊖2 to suppress high harmonic waves.
∗9 : Connect an external backup battery if using an absolute encoder. Do not connect the battery if using a cable with a battery case.
Note: Set the parameters to allocate the functions for the input signals, SI0 to SI6, and the output signals, SO1 to SO3, in the drawing.

SGDS-□□□ 12 SERVOPACKs

(MECHATROLINK Communications)

●Ratings and Specifications

SERVOPACK Type SGDS-□□□				A5✻	01✻	02✻	04✻	05✻	08✻	10✻	15✻	20✻	30✻	50✻
Basic Specifications	Max. 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
	100V	Continuous Output Current	Arms	0.66	0.91	2.1	2.8	–	–	–	–	–	–	–
		Max. Output Current	Arms	2.1	2.8	6.5	8.5	–	–	–	–	–	–	–
	200V	Continuous Output Current	Arms	0.66	0.91	2.1	2.8	3.8	5.5	7.6	11.6	18.5	18.9	32.9
		Max. Output Current	Arms	2.1	2.8	6.5	8.5	11.0	16.9	17.0	28.0	42.0	56.0	84.0
	Input Power Supply	Capacity Range		Sigle-phase 100VAC/Sigle-phase 200VAC				Three-phase 200VAC	Sigle-phase 200VAC	Three-phase 200VAC				
		Main Circuit		Three-phase (or Sigle-phase) 200 V to 230 VAC +10 to −15% 50/60 Hz Sigle-phase 100 V to 115 VAC +10 to −15% 50/60 Hz										
		Control Circuit		Sigle-phase 100 V to 115 VAC +10 to −15% 50/60 Hz Sigle-phase 200 V to 230 VAC +10 to −15% 50/60 Hz										
	Control Method			Sigle-phase or three-phase full-wave rectification (Single-phase voltage doubler rectifier at 100V), IGBT, PWMcontrol, Sin wave power drive system										
	Feedback			17-bit or 20-bit serial encoder (incremental/absolute value)										
	Conditions	Usage/Strage Temperature		0 to +55°C / −20 to +85°C										
		Usage/Strage Humidity		90% RH or less (non-condensing)										
		Vibration/Shock Resistance		4.9 m/s^2 / 19.6 m/s^2										
	Structure			Base-mounted type (Rack-mounted type is also available.)										
	Performance	Speed Control Range		1 : 5000 (The lower limit is within the range not to stop at the torque load.)										
		Speed Variance	Load Variance	During 0 to 100 load: ±0.01% max. (at rated speed)										
			Voltage Variance	Rated voltage ±10%: 0% (at rated speed)										
			Temperature Variance	25±25°C : ±0.1%max. (at rated speed)										
		Frequency Characteristics		600 Hz (at $J_L = J_M$)										
		Torque Control Accuracy(Reproducibility)		±1%										
		Soft Start Time Setting		0 to 10s (Acceleration, deceleration can each be set.)										
Integrated Functions	Analog Monitor (CN5)			Output voltage : ±8VDC Analog monitor connector for supervision of speed and torque reference signals, etc. integrated Speed : 1V/1000 min^{-1} Torque : 1V/at rated torque 100% Position error pulse : 0.05V/1 reference unit ✻Can be changed to other monitors by parameter setting.										
	Indicators (LED Display)			CHARGE, 7segment-LED×5 (Integrated digital operator function)										
	Communications	Interface		Digital operator (hand-held type)										
		Functions		Status display, parameter settings, monitor display, alarm traceback display, JOG run, etc.										
	Dynamic Brake (DB)			Automatic built-in DB motivates at main power OFF, servo alarm, servo OFF, and overtravel.										
	Regeneration			External regenerative resister (SGDS-A5□ to 04□), Built-in regenerative resister (SGDS-05□ to 50□)										
	Overtravel (OT) Prevention			DB stop, deceleration stop, or coast to stop at P-OT or N-OT										
	Electronic Gear			0.001 ≦ B/A ≦1000										
	Protective Functions			Overcurrent, overvoltage, undervoltage, overload, regeneration error, main circuit detection error, heatsink overheating, power phase loss, position error pulse overflow, overspeed, encoder error, overrun protection, CPU error, parameter error, etc.										
	Others			Reverse connection, zero search, automatic motor discrimination function										

Control Specifications				
Communications Specifications	MECHATROLINK Communications	Communications Protocol	MECHATROLINK-Ⅱ	MECHATROLINK-Ⅰ
		Station Address	41H to 5FH (Max. number of slaves: 30)	41H to 4FH (Max. number of slaves: 15)
		Transmission Speed	10Mbps	4Mbps
		Transmission Cycle	250 μs , 0.5 ms to 4 ms (Multiples of 0.5) In accordance with the setting of the host controller.	2ms
		Number of Words for Link Transmission	Can choose between 17-bytes/station and 32-bytes/station with the DIP switch(SW2).	17-bytes/station
	Command Method	Performance	Position control, speedcontrol, and torque control with MECHATROLINK-Ⅱ communications	Position control with MECHATROLINK-Ⅰ communications
		Commands	MECHATROLINK-Ⅰand MECHATROLINK-Ⅱ commands (For sequence, motion, data setting/reference, monitoring, adjustment, and other commands.)	
Functions for Position Control		Acceleration/deceleration	Asymmetrical acceleration/deceleration for linear 1st and 2nd steps, exponential position reference filter, and movement average position reference filter.	
		Fully-closed Control	Position control using fully-closed feedback is available.	
Fully-closed Control System Requirements		Interface	Serial communication interface	
		Power Supply and Converter for Fully-closed PG	Prepared by the user.	
I/O Signals	Sequence Input	Signal Allocation	Select any seven of the following signals: forward drive disabled (P-OT), reverse drive disabled (N-OT), homing-deceleration limit switch, forward external torque limit, reverse external torque limit, or external latch signal 1, 2, or 3	
	Sequence Output	Fixed Output	Alarm	
		Signal Allocation	Select any three of the following signals: positioning completion (speed coincidence), motor-rotation detection, speed-limit detection, servo ready, current limit detection, release brake, warning, or NEAR signal.	
	Position Output	Output Form	Phase A, Phase B, Phase C: line driver output	
		Frequency Dividing Ratio	Arbitrary dividing	

Note: ✻ in the SERVOPACK type should be F or A.
F = Input power supply is 100VAC. Input power supply for applicable motor is 200VAC.
A = Input power supply is 200VAC.

SGDS-□□□ 12 SERVOPACKs (cont'd)

(MECHATROLINK Communications)

●Dimensions Units: mm

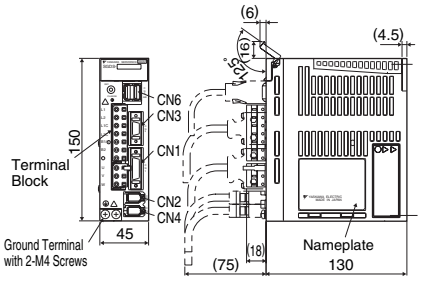
Connectors on SERVOPACK Side(Common for all types)

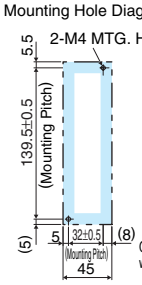
Connector Code	Type	Manufacture
CN1	10250-52A2JL	SUMITOMO 3M Ltd.
CN2	53460-0611	Molex Japan Co., Ltd.
CN3	10214-52A2JL	SUMITOMO 3M Ltd.

Note: Use connectors above or equivalent.

SGDS-A5, 01, 02

Single-phase 100V/200V 50W to 200W

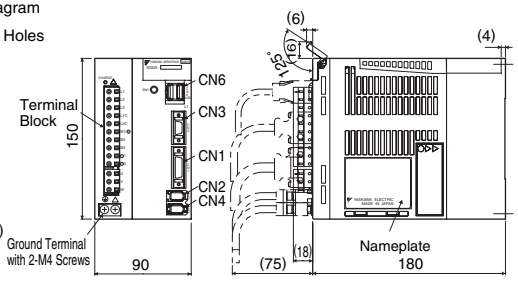


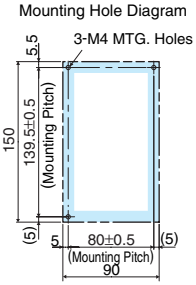


Approx.mass : 0.7kg

SGDS-15

Three-phase 200V 1.5kW

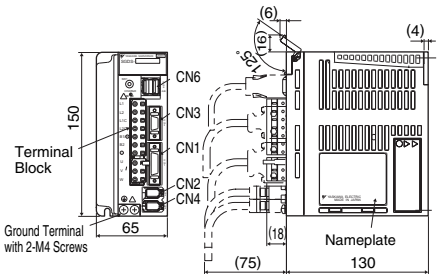


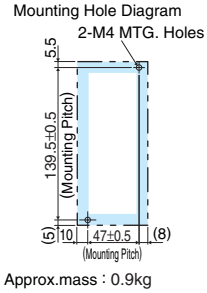


Approx.mass : 2.1kg

SGDS-04A

Single-phase 200V 400W

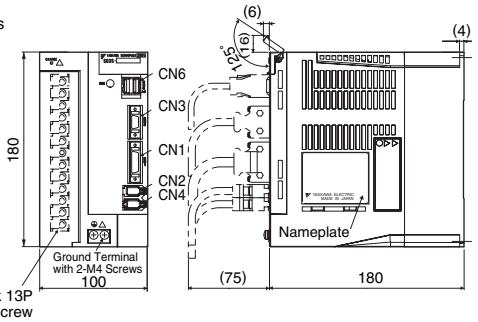


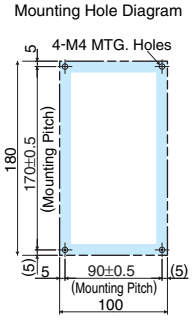


Approx.mass : 0.9kg

SGDS-20, 30

Three-phase 200V 2.0kW/3.0kW

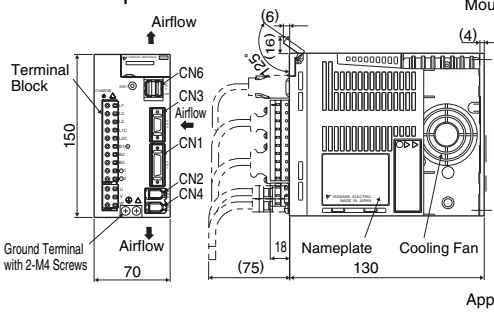


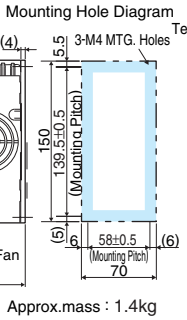


Approx.mass : 2.8kg

SGDS-04F, 05, 08, 10

Single-phase 100V 400W
Single-phase 200V 750W
Three-phase 200V 500W/1.0kW



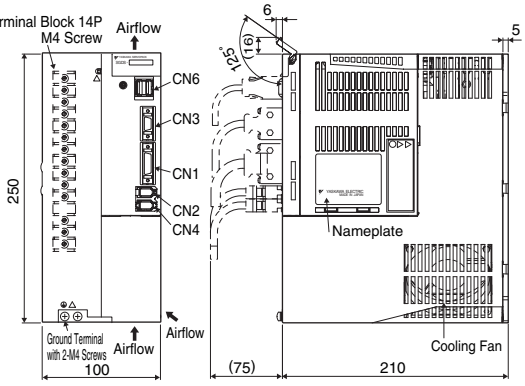


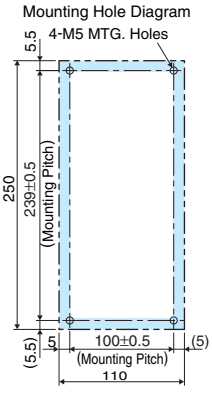
Approx.mass : 1.4kg

Note: The terminal block of the SGDS-04F differs from the one in the diagram.

SGDS-50

Three-phase 200V 5.0kW

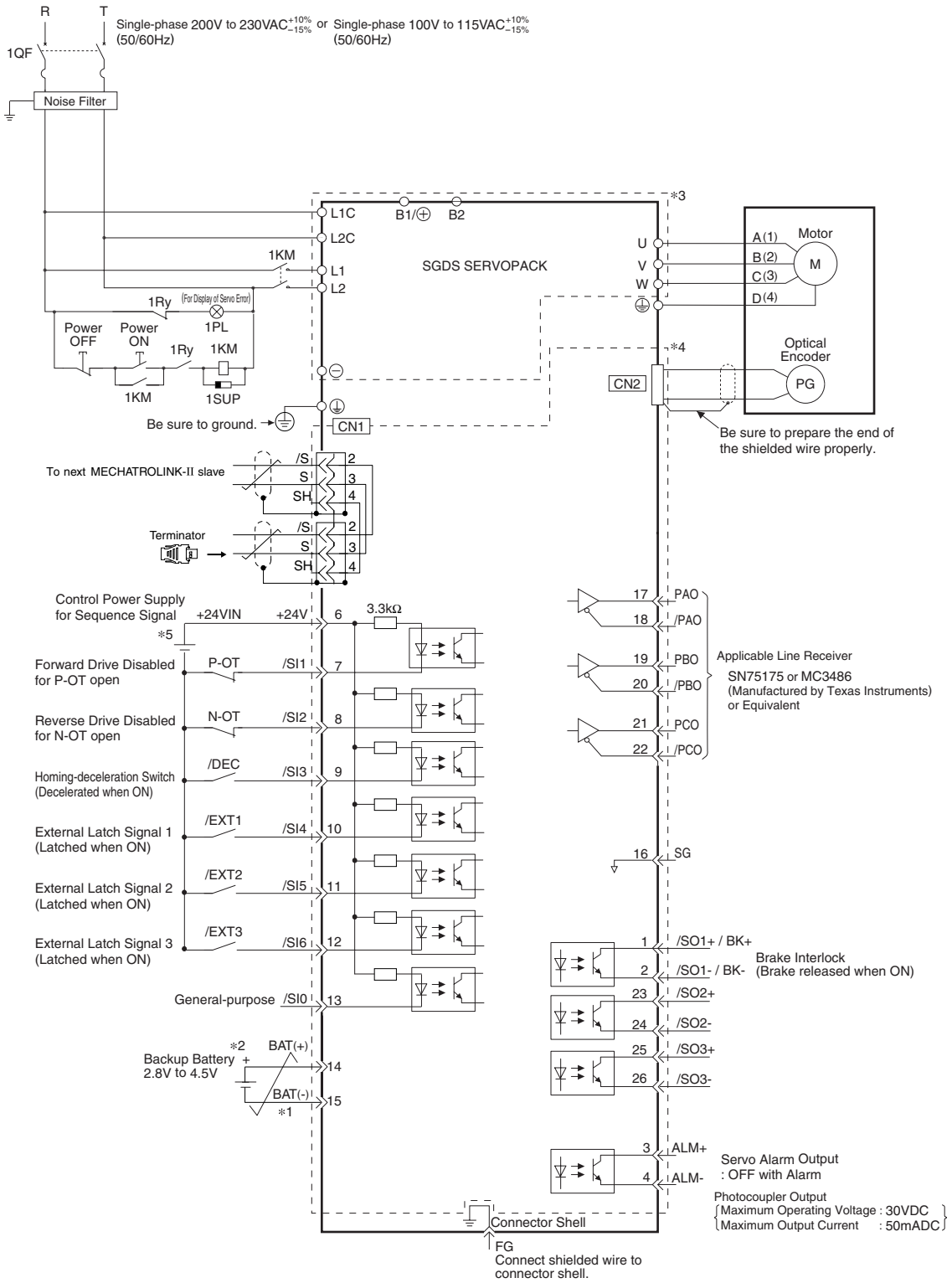




Approx.mass : 5.0kg

●Connection Diagrams

Single-phase (100V/200VAC)

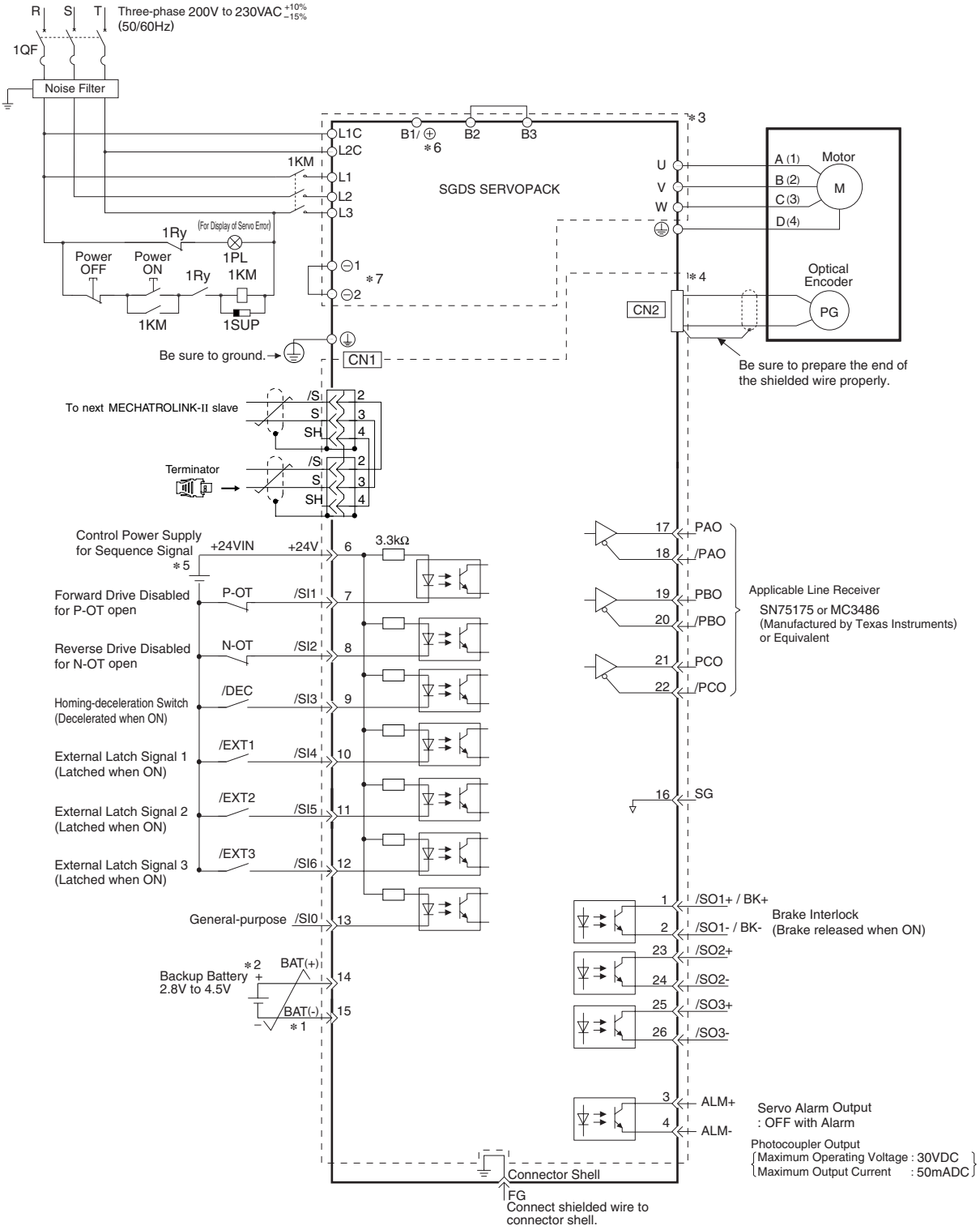


*1 : represents twisted-pair wire.
*2 : Connect an external backup battery if using an absolute encoder.
Disconnect the battery if using a cable with a battery case.
*3 : This circuit is electrically separated from the outside to prevent electrical shock.
*4 : This is a SELV circuit separated from other circuit by double insulation or reinforced insulation.
*5 : The 24-VDC power supply is not included. Use a double insulated 24VDC power supply.

Note: Set the parameters to allocate the functions for the /SO2 and /SO3 output signals.

●Connection Diagrams (cont'd)

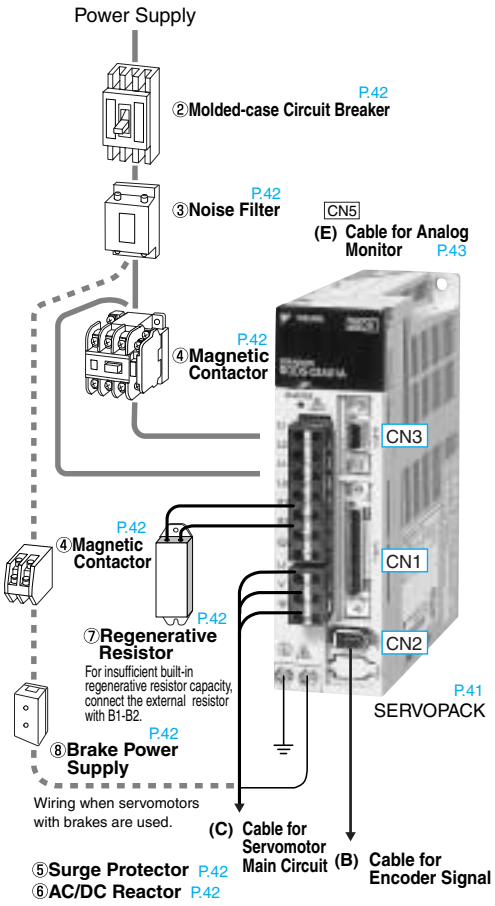
Three-phase (200VAC)



∗1 : represents twisted-pair wire.
∗2 : Connect an external backup battery if using an absolute encoder.
Disconnect the battery if using a cable with a battery case.
∗3 : This circuit is electrically separated from the outside to prevent electrical shock.
∗4 : This is a SELV circuit separated from other circuit by double insulation or reinforced insulation.
∗5 : The 24-VDC power supply is not included. Use a double insulated 24VDC power supply.
∗6 : If placing an external resister between terminals B1/⊕ and B2 or terminals B1 and B2, disconnect terminals B2 and B3.
∗7 : Place a DC reactor between terminals⊖1 and ⊖2 to suppress high harmonic waves.
Note: Set the parameters to allocate the functions for the /SO2 and /SO3 output signals.

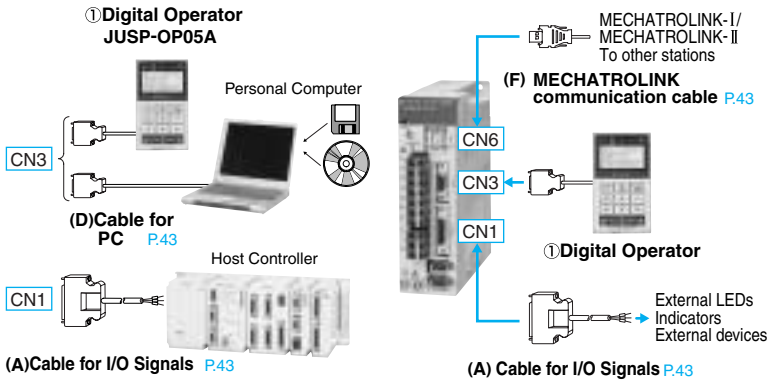
Ordering Reference

●System Configurations



Command Methods from Host Controller

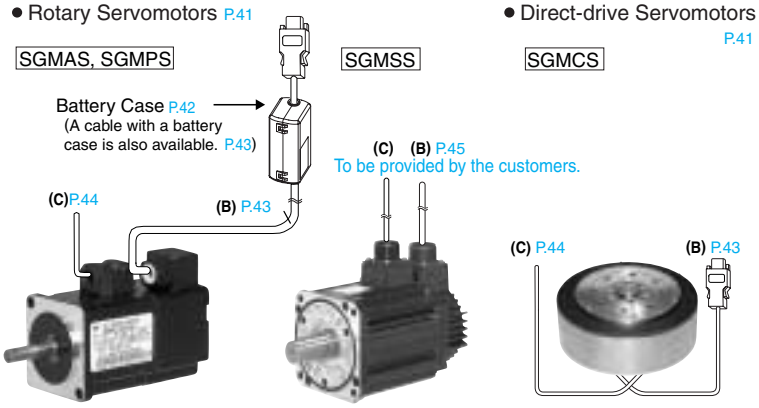
- For an analog voltage reference or a pulse train reference SGDS-□□□01/02 SERVOPACKs
- For MECHATRONLINK communications SGDS-□□□12 SERVOPACKs



Servomotors

- Rotary Servomotors P.41
- Direct-drive Servomotors P.41

SGMAS, SGMPS | SGMSS | SGMCS



Note: The motors do not include the connectors shown. The SGMPS servomotor is different in appearance from the figure above.

Note: Servomotors with brakes are not provided.

●Servo Drives

Rotary Servo Drives

Servomotor		SERVOPACK Type SGDS-□□□ ＊1 □□ ＊2			Servomotor		SERVOPACK Type SGDS-□□□ ＊1 □□ ＊2		
Type	Capacity	Single-phase 100V	Single-phase 200V	Three-phase 200V	Type	Capacity	Single-phase 100V	Single-phase 200V	Three-phase 200V
SGMMJ-A1B	10W	A3B	—	—	SGMSS-30A	3.0kW	—	—	30A
SGMMJ-A2B	20W	A3B	—	—	SGMSS-40A	4.0kW	—	—	50A
SGMMJ-A3B	30W	A3B	—	—	SGMSS-50A	5.0kW	—	—	50A
SGMAS-A5A	50W	A5F	A5A	—	SGMSS-70A	7.0kW	—	—	75A
SGMAS-01A	100W	01F	01A	—	SGMGH-05A□A	450W	—	—	05A
SGMAS-C2A	150W	02F	02A	—	SGMGH-09A□A	850W	—	—	10A
SGMAS-02A	200W	02F	02A	—	SGMGH-13A□A	1.3kW	—	—	15A
SGMAS-04A	400W	04F	04A	—	SGMGH-20A□A	1.8kW	—	—	20A
SGMAS-06A	600W	—	08A	—	SGMGH-30A□A	2.9kW	—	—	50A(30A)＊3
SGMAS-08A	750W	—	08A	—	SGMGH-44A□A	4.4kW	—	—	50A
SGMAS-12A	1.15kW	—	—	15A	SGMGH-55A□A	5.5kW	—	—	60A
SGMPS-01A	100W	01F	01A	—	SGMGH-75A□A	7.5kW	—	—	75A
SGMPS-02A	200W	02F	02A	—	SGMGH-03A□B	300W	—	—	05A
SGMPS-04A	400W	04F	04A	—	SGMGH-06A□B	600W	—	—	10A
SGMPS-08A	750W	—	08A	—	SGMGH-09A□B	900W	—	—	10A
SGMPS-15A	1.5kW	—	—	15A	SGMGH-12A□B	1.2kW	—	—	15A
SGMSS-10A	1.0kW	—	—	10A	SGMGH-20A□B	2.0kW	—	—	20A
SGMSS-15A	1.5kW	—	—	15A	SGMGH-30A□B	3.0kW	—	—	50A(30A)＊3
SGMSS-20A	2.0kW	—	—	20A	SGMGH-40A□B	4.0kW	—	—	50A
SGMSS-25A	2.5kW	—	—	30A	SGMGH-55A□B	5.5kW	—	—	60A

＊1: Shown as three characters in the table.
＊2: "01" for analog voltage reference or pulse train reference.
"02" for fully-closed control.
"12" for MECHATROLINK communications.
＊3: The rated value varies if the SGMGH-30 servomotor is driven from the SGDS-30A SERVOPACK.

Direct Drives

Servomotor		SERVOPACK Type SGDS-□□□ ＊1 □□ ＊2		
Type	Rated Torque	Single-phase 100V	Single-phase 200V	Three-phase 200V
SGMCS-02B	2N·m	02F	02A	—
SGMCS-05B	5N·m	02F	02A	—
SGMCS-07B	7N·m	02F	02A	—
SGMCS-04C	4N·m	04F	04A	—
SGMCS-10C	10N·m	04F	04A	—
SGMCS-14C	14N·m	04F	04A	—
SGMCS-08D	8N·m	04F	04A	—
SGMCS-17D	17N·m	04F	04A	—
SGMCS-25D	25N·m	04F	04A	—
SGMCS-16E	16N·m	—	08A	—
SGMCS-35E	35N·m	—	08A	—
SGMCS-45M	45N·m	—	—	10A
SGMCS-80M	80N·m	—	—	15A
SGMCS-1AM	110N·m	—	—	20A
SGMCS-80N	80N·m	—	—	15A
SGMCS-1EN	150N·m	—	—	30A
SGMCS-2ZN	200N·m	—	—	30A

＊1: Shown as three characters in the table.
＊2: "01" for analog voltage reference or pulse train reference.
"02" for fully-closed control.
"12" for MECHATROLINK communications.

Ordering Reference (cont'd)

●Peripheral Devices

For All Motors (Refer to dimensions for peripheral devices on P.46.)

Power Supply Voltage	SERVOPACK Rated Output	SERVOPACK SGDS-	①Digital Operator	②Molded-case Circuit Breaker: Power Supply Capacity per SERVOPACK	②Molded-case Circuit Breaker: Current Capacity for Molded-case Circuit Breakers or Fuses*1	③Noise Filter (Recommended)*2 *3	④Magnetic Contactor*2
Single-phase 100V	50W	A5F	JUSP-OP05A (A cable (1m) is provided.)	0.25kVA	4 Arms	FN2070-6/07(Single-phase 250VAC, 6A)	HI-11J(20A)
	100W	01F		0.40kVA			
	200W	02F		0.60kVA	6 Arms	FN2070-10/07(Single-phase 250VAC, 10A)	
	400W	04F		1.2kVA	12 Arms	FN2070-16/07(Single-phase 250VAC, 16A)	HI-15J(35A)
Single-phase 200V	50W	A5A		0.25kVA	4 Arms	FN2070-6/07(Single-phase 250VAC, 6A)	HI-11J(20A)
	100W	01A		0.40kVA			
	200W	02A		0.75kVA			
	400W	04A		1.2kVA	8 Arms	FN2070-10/07(Single-phase 250VAC, 10A)	
	750W	08A		2.2kVA	16 Arms	FN2070-16/07(Single-phase 250VAC, 16A)	HI-15J(35A)
Three-phase 200V	500W	05A		1.4kVA	4 Arms	FN258L-7/07(Three-phase 480VAC, 7A)	HI-11J(20A)
	1.0kW	10A		2.3kVA	7 Arms	FN258L-16/07(Three-phase 480VAC, 16A)	HI-15J(35A)
	1.5kW	15A		3.2kVA	10 Arms		
	2.0kW	20A		4.3kVA	13 Arms		
	3.0kW	30A		5.9kVA	17 Arms	FN258L-30/07(Three-phase 480VAC, 30A)	HI-20J(35A)
	5.0kW	50A		7.5kVA	28 Arms	FMAC-0934-5010(Three-phase 480VAC, 50A)	HI-25J(50A)

Power Supply Voltage	SERVOPACK Rated Output	SERVOPACK SGDS-	⑤Surge Protector*2	⑥AC/DC Reactor	⑦Built-in Regenerative Registor: Registance Ω	⑦Built-in Regenerative Registor: Capacity W	⑧Brake Power*4 Supply Unit
Single-phase 100V	50W	A5F	R・C・M -601BQZ-4	X5053	—	—	LPDE-1H01 (For 100VAC input and 90VDC output)
	100W	01F					
	200W	02F		X5054			
	400W	04F		X5056			
Single-phase 200V	50W	A5A		X5052	—	—	
	100W	01A					
	200W	02A		X5053			
	400W	04A		X5054			
	750W	08A		X5056	50	60	
Three-phase 200V	500W	05A	R・C・M -601BUZ-4	X5061	50	40	LPSE-2H01 (For 200VAC input and 90VDC output)
	1.0kW	10A			50	60	
	1.5kW	15A		X5060	20	50	
	2.0kW	20A			12	80	
	3.0kW	30A		X5059	12	80	
	5.0kW	50A		X5068	8	180	

*1: Values are at a rated load. Select an appropriate fuse after derating. Operating characteristics (25℃) are 2s min. for 200% and 0.01s min. for 700%.
- A fast-blow fuse cannot be selected because the SGDS SERVOPACK uses the power supply built in a condenser. Therefore, the fast-blow fuse may trip when power is ON.
- Because the SGDS SERVOPACK has no protective circuit for grounding, prepare a ground fault interrupter for overload and short-circuit, or that for ground fault protection in combination with a molded-case circuit breaker.

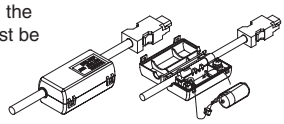
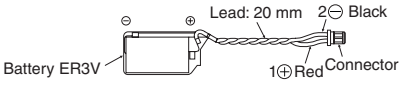
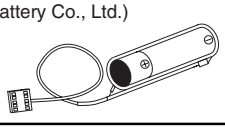
*2 : Contact the following companies for more information about devices.
- Noise Filter: FN type made by Schaffner EMC Inc.
  FMAC type made by Schurter, Inc. (formerly Timonta)
- Magnetic contactor, AC/DC Reactor, and Breke Power Supply Unit made by YASKAWA Controls Co., Ltd
- Surge Protector made by Okaya Electric Industries Co., Ltd

*3 : Use the following noise filter at the brake power input for 400 W or less servomotors with holding brakes.
Model: FN2070-6/07 made by Schaffner EMC Inc.

*4 : The 24-VDC brake power supply is not included.

●Absolute Encoder Battery

For All Motors

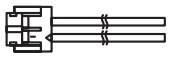
Name	Type	Specifications
Battery Case	JUSP-BA01	Note: A battery is not mounted in the battery case. A battery must be purchased separately. 
Battery for Battery Case	JZSP-BA01	
Battery Installed on the Host Controller End (prepared by user)	ER6VC3N	3.6V, 2000mAh (Made by Toshiba Battery Co., Ltd.) 

Note: Install the battery at either the host controller or the battery case of the encoder. It is dangerous to install batteries at both simultaneously, because that sets up a loop circuit between the batteries.

●Cables and Connectors

For All Motors

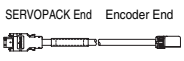
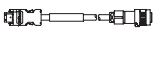
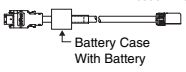
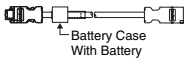
(Refer to dimensions for peripheral devices on P.47 to P.48)

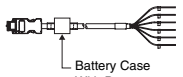
Name			Type	Specifications
(A) CN1 Cable for I/O Signals	For Analog Voltage References or Pulse Train References	Connector to Terminal Conversion Unit	JUSP-TA50P	Terminal block and cable (0.5m) 
		Cable with Single Connector (can be used for Σ-Ⅱ series.)	JZSP-CSI01-1	1m
			JZSP-CSI01-2	2m 
			JZSP-CSI01-3	3m
		Connector Kit for CN1	JZSP-CSI9-1	Connector and Case 
	For MECHATROLINK Communications	Connector to Terminal Conversion Unit	JUSP-TA26P	Terminal block and cable (0.5m) 
		Connector Kit for CN1	DE9411354	Connector and Case 
(D) CN3	Cable for PC		JZSP-CMS02	2m 
(E) CN5	Cable for Analog Monitor (can be used for Σ and Σ-Ⅱ series.)		JZSP-CA01	1m 
(F) CN6A CN6B	MECHATROLINK Communication Cable	Cable with Connectors at Both Ends	JEPMC-W6002-A5	0.5m
			JEPMC-W6002-01	1m 
			JEPMC-W6002-□□	Note: □□ is the ordered length (m).
		Terminator	JEPMC-W6022	

SGMMJ/SGMAS/SGMPS Rotary Servomotors and SGCMS Direct-drive Servomotors

Note: Contact your Yaskawa representative for more information about flexible cables.

(B) CN2 Cable for Encoder Signal

Name	Motor Type	Type	Specifications
Cable with Connectors at Both Ends (For Incremental)	SGMAS 50W to 1.15kW SGMPS 100W to 400W SGMJS 50W to 750W	JZSP-CSP01-03	3m
		JZSP-CSP01-05	5m SERVOPACK End Encoder End 
		JZSP-CSP01-10	10m
		JZSP-CSP01-15	15m
		JZSP-CSP01-20	20m
	SGMPS 750W, 1.5kW SGMMJ 10W to 30W	JZSP-CMP00-03	3m
		JZSP-CMP00-05	5m SERVOPACK End Encoder End 
		JZSP-CMP00-10	10m
		JZSP-CMP00-15	15m
		JZSP-CMP00-20	20m
	SGMCS*	JZSP-CMP60-03	3m
		JZSP-CMP60-05	5m SERVOPACK End Encoder End 
		JZSP-CMP60-10	10m
		JZSP-CMP60-15	15m
		JZSP-CMP60-20	20m
Cable with Connectors at Both Ends (With Battery Case for Absolute)	SGMAS 50W to 1.15kW SGMPS 100W to 400W SGMJS 50W to 750W	JZSP-CSP05-03	3m
		JZSP-CSP05-05	5m SERVOPACK End Absolute Encoder End  Battery Case With Battery
		JZSP-CSP05-10	10m
		JZSP-CSP05-15	15m
		JZSP-CSP05-20	20m
	SGMPS 750W, 1.5kW SGMMJ 10W to 30W	JZSP-CSP19-03	3m
		JZSP-CSP19-05	5m SERVOPACK End Absolute Encoder End  Battery Case With Battery
		JZSP-CSP19-10	10m
		JZSP-CSP19-15	15m
		JZSP-CSP19-20	20m
Cable with Single Connector on SERVOPACK End (For Incremental)	SGMAS SGMPS SGMCS* SGMJS SGMMJ	JZSP-CMP03-03	3m
		JZSP-CMP03-05	5m SERVOPACK End Encoder End 
		JZSP-CMP03-10	10m
		JZSP-CMP03-15	15m
		JZSP-CMP03-20	20m

Name	Motor Type	Type	Specifications
Cable with Single Connector on SERVOPACK End (With Battery Case for Absolute)	SGMAS SGMPS SGMJS SGMMJ	JZSP-CSP04-03	3m
		JZSP-CSP04-05	5m SERVOPACK End Absolute Encoder End  Battery Case With Battery
		JZSP-CSP04-10	10m
		JZSP-CSP04-15	15m
		JZSP-CSP04-20	20m
Connector Kit on SERVOPACK End	SGMAS SGMPS SGMCS SGMJS SGMMJ	JZSP-CMP9-1	Solder Type 
Connector Kit on Motor End	SGMAS SGMPS 100W to 400W SGMJS	JZSP-CSP9-2	Calking Type (Special tool is required for use.) 
	SGMPS 750W, 1.5kW SGMMJ	JZSP-CMP9-2	Solder Type 
	SGMCS	Order from Japan Aviation Electronics Industry, Ltd.	Calking Type (Special tool is required for use.) • Straight Connector JN1DS10SL1 • Socket Contact JN1-22-22S-PKG100 
Cable		JZSP-CMP09-05	5m
		JZSP-CMP09-10	10m 20 m max. 
		JZSP-CMP09-15	15m
		JZSP-CMP09-20	20m

∗: If using the SGMCS servomotor, no battery is required. Use the same cable for both the incremental and absolute encoders.

Ordering Reference (cont'd)

(C)Cable for Servomotor Main Circuit

Name	Motor Type	Type	Specifications
Cable for Motor without Brake	SGMAS 50W to 150W SGMPS 100W	JZSP-CSM01-03	3m
		JZSP-CSM01-05	5m
		JZSP-CSM01-10	10m
		JZSP-CSM01-15	15m
		JZSP-CSM01-20	20m
	SGMAS 200W to 600W SGMPS 200W to 400W	JZSP-CSM02-03	3m
		JZSP-CSM02-05	5m
		JZSP-CSM02-10	10m
		JZSP-CSM02-15	15m
		JZSP-CSM02-20	20m
	SGMAS 750W,1.15kW	JZSP-CSM03-03	3m
		JZSP-CSM03-05	5m
		JZSP-CSM03-10	10m
		JZSP-CSM03-15	15m
		JZSP-CSM03-20	20m
	SGMPS 750W	JZSP-CMM00-03	3m
		JZSP-CMM00-05	5m
		JZSP-CMM00-10	10m
		JZSP-CMM00-15	15m
		JZSP-CMM00-20	20m
	SGMPS 1.5kW	JZSP-CMM20-03	3m
		JZSP-CMM20-05	5m
		JZSP-CMM20-10	10m
		JZSP-CMM20-15	15m
		JZSP-CMM20-20	20m
Cable for Motor without Brake	SGMCS -□□B -□□C -□□D -□□E	JZSP-CMM60-03	3m
		JZSP-CMM60-05	5m
		JZSP-CMM60-10	10m
		JZSP-CMM60-15	15m
		JZSP-CMM60-20	20m
	SGMCS -□□M -□□N	Prepared by user.	L-shaped Plug: MS3108B18-10S Straight Plug: MS3106B18-10S Cable Clamp: MS3057-10A
Cable for Motor with Brake	SGMAS 50W to 150W SGMPS 100W	JZSP-CSM11-03	3m
		JZSP-CSM11-05	5m
		JZSP-CSM11-10	10m
		JZSP-CSM11-15	15m
		JZSP-CSM11-20	20m
	SGMAS 200W to 600W SGMPS 200W to 400W	JZSP-CSM12-03	3m
		JZSP-CSM12-05	5m
		JZSP-CSM12-10	10m
		JZSP-CSM12-15	15m
		JZSP-CSM12-20	20m
	SGMAS 750W,1.15kW	JZSP-CSM13-03	3m
		JZSP-CSM13-05	5m
		JZSP-CSM13-10	10m
		JZSP-CSM13-15	15m
		JZSP-CSM13-20	20m

Name	Motor Type	Type	Specifications
Cable for Motor with Brake	SGMPS 750W	JZSP-CMM10-03	3m
		JZSP-CMM10-05	5m
		JZSP-CMM10-10	10m
		JZSP-CMM10-15	15m
		JZSP-CMM10-20	20m
	SGMPS 1.5kW	JZSP-CMM30-03	3m
		JZSP-CMM30-05	5m
		JZSP-CMM30-10	10m
		JZSP-CMM30-15	15m
		JZSP-CMM30-20	20m
Connector Kit on Motor End	SGMAS 50W to 150W SGMPS 100W	JZSP-CSM9-1	Calking Type (Special tool is required for use.)
	SGMAS 200W to 600W SGMPS 200W to 400W	JZSP-CSM9-2	
	SGMAS 750W,1.15kW	JZSP-CSM9-3	
	SGMPS 750W (Without Brake)	JZSP-CMM9-1	Calking Type (Special tool is required for use.)
	SGMPS 750W (With Brake)	JZSP-CMM9-2	Calking Type (Special tool is required for use.)
	SGMPS 1.5kW (Without Brake)	JZSP-CMM9-3	Calking Type (Special tool is required for use.)
	SGMPS 1.5kW (With Brake)	JZSP-CMM9-4	Calking Type (Special tool is required for use.)
	SGMCS -□□B -□□C -□□D -□□E	Order from Japan Aviation Electronics Industry, Ltd.	JN1DS04 FK1 (Solder Type) Made by Japan Aviation Electronics Industry, Ltd.
	SGMMJ (Without Brake)	JZSP-CDM03-03	3m
		JZSP-CDM03-05	5m
		JZSP-CDM03-10	10m
		JZSP-CDM03-15	15m
		JZSP-CDM03-20	20m
	SGMMJ (With Brake)	JZSP-CDM33-03	3m
		JZSP-CDM33-05	5m
		JZSP-CDM33-10	10m
		JZSP-CDM33-15	15m
		JZSP-CDM33-20	20m
Cable	SGMAS 50W to 600W SGMPS 100W to 400W SGMMJ SGMCS SGMCS-□□ B,C,D,E	JZSP-CSM90-05	5m
		JZSP-CSM90-10	10m
		JZSP-CSM90-15	15m
		JZSP-CSM90-20	20m
	SGMAS 750W, 1.15kW SGMJS 750W SGMPS 750W	JZSP-CSM91-05	5m
		JZSP-CSM91-10	10m
		JZSP-CSM91-15	15m
		JZSP-CSM91-20	20m

●Cables and Connectors (cont'd)

SGMSS Rotary Servomotors

Note: Contact your Yaskawa representative for more information about flexible cables.

(B) CN2 Cable for Encoder Signal

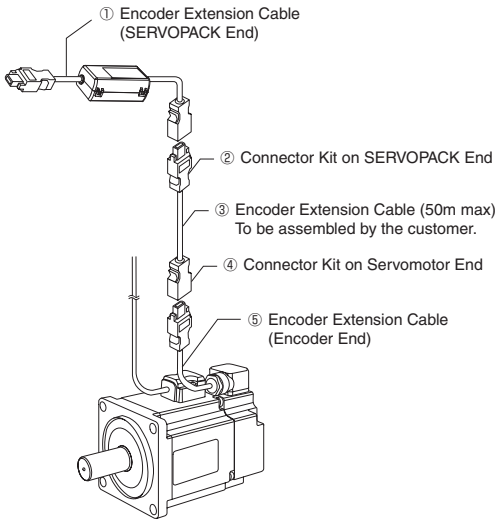
Name	Type	Specifications
Cable with Single Connector on SERVOPACK End (For Incremental)	JZSP-CMP03-03 JZSP-CMP03-05 JZSP-CMP03-10 JZSP-CMP03-15 JZSP-CMP03-20	3m 5m 10m 15m 20m SERVOPACK End Encoder End
Cable with Single Connector on SERVOPACK End (With Battery Unit for Absolute)	JZSP-CSP04-03 JZSP-CSP04-05 JZSP-CSP04-10 JZSP-CSP04-15 JZSP-CSP04-20	3m 5m 10m 15m 20m SERVOPACK End Encoder End Battery Case With Battery
Cable with Connectors at Both Ends (For Incremental)	JZSP-CMP01-03 JZSP-CMP01-05 JZSP-CMP01-10 JZSP-CMP01-15 JZSP-CMP01-20	3m 5m 10m 15m 20m With Straight Connector SERVOPACK End Encoder End
	JZSP-CMP02-03 JZSP-CMP02-05 JZSP-CMP02-10 JZSP-CMP02-15 JZSP-CMP02-20	3m 5m 10m 15m 20m With Angle Connector SERVOPACK End Encoder End
Cable with Connectors at Both Ends (With Battery Unit for Absolute)	JZSP-CSP06-03 JZSP-CSP06-05 JZSP-CSP06-10 JZSP-CSP06-15 JZSP-CSP06-20	3m 5m 10m 15m 20m With Straight Connector SERVOPACK End Encoder End Battery Case With Battery
	JZSP-CSP07-03 JZSP-CSP07-05 JZSP-CSP07-10 JZSP-CSP07-15 JZSP-CSP07-20	3m 5m 10m 15m 20m With Angle Connector SERVOPACK End Encoder End Battery Case With Battery
Connector Kit on SERVOPACK End	JZSP-CMP9-1	Solder Type
Connector on Encoder End (Standard Environment) Order from DDK Ltd.	MS3106B20-29S	Straight Connector
	MS3108B20-29S	Angle Connector
	MS3057-12A	Cable Clamp
Connector on Encoder End (Protective Construction) Order from Japan Aviation Electronics Industry, Ltd.	JA06A-20-29S-J1-EB	Straight Connector
	JA08A-20-29S-J1-EB	Angle Connector
	JL04-2022CKE(09) JL04-2022CKE(12) JL04-2022CKE(14)	Cable Size: 6.5 to 9.5 Cable Size: 9.5 to 13 Cable Size: 12.9 to 15.9 Cable Clamp
Cable	JZSP-CMP09-05 JZSP-CMP09-10 JZSP-CMP09-15 JZSP-CMP09-20	5m 10m 15m 20m 20 m max.

(C) Cable for Servomotor Main Circuit

To be prepared (assembled) by customers.

●Encoder Cable Extension

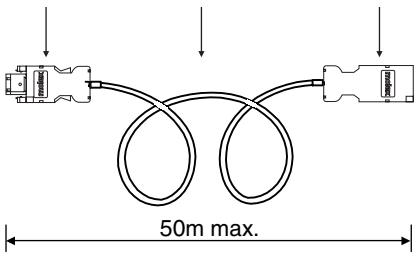
The maximum length of the encoder cable is 20m. If the wiring distance between the encoder and the SERVOPACK is longer than 20m, use one of the following extension cables and the standard connectors.



Name	Type
① Encoder Extension Cable with Connectors (SERVOPACK End: with a Battery Case for Absolute Encoder) Note: Not applicable for SGMCS servomotors.	JZSP-CSP12 (0.3m) SERVOPACK End Encoder End Battery Case with Battery
② Connector Kit on SERVOPACK End	JZSP-CMP9-1 Solder Type
③ Encoder Extension Cable	JZSP-CMP19-30 (30m)* JZSP-CMP19-40 (40m)* JZSP-CMP19-50 (50m)*
④ Connector Kit on Motor End	JZSP-CMP9-2 Solder Type
⑤ Encoder Extension Cable with Connectors (Encoder End: Applicable for Both Incremental and Absolute Encoders) Note: Applicable only for the following servomotor models: SGMAS 50W to 1.15 kW SGMPS 100W to 400W	JZSP-CSP11 (0.3m) SERVOPACK End Encoder End

*: Assemble the cable and connectors as shown in the diagram.

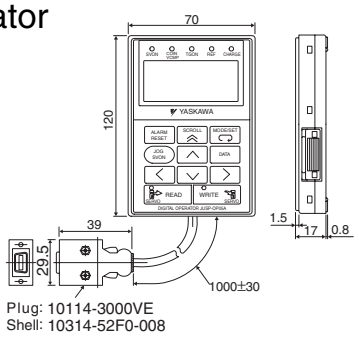
Connector Kit on SERVOPACK End + Cable + Connector Kit on Motor End



Ordering Reference (cont'd)

Dimensions for Peripheral Devices Units: mm

①Digital Operator

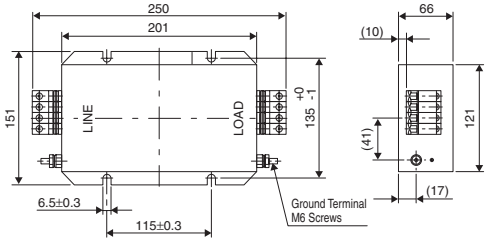


Plug: 10114-3000VE
Shell: 10314-52F0-008

③Noise Filter For Three-phase 200 V

FMAC type made by Schurter, Inc.

FMAC-0934-5010



Specifications : 480VAC,50A

③Noise Filter

FN type made by Schaffner EMC Inc.

Figure1

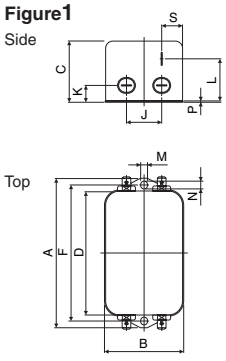


Figure2

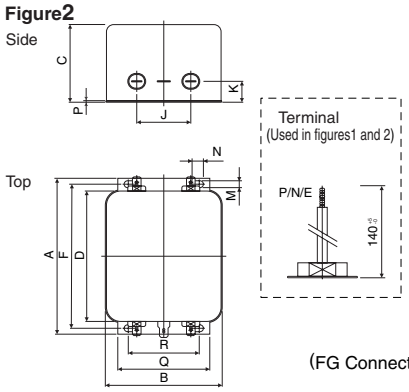
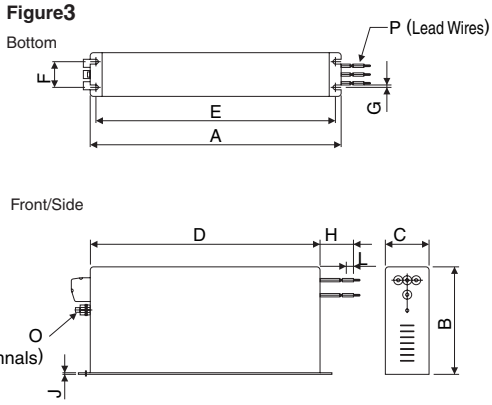


Figure3



For Single-phase 100 V/200 V

Code	Error	Type		
		FN2070-6/07	FN2070-10/07	FN2070-16/07
		Figure1		Figure2
A	–	113.5±1	156±1	119±0.5
B	±1	57.5		85.5
C	–	45.4±1.2		57.6±1
D	±1	94	130.5	98.5
F	±0.3	103	143	109
J	±0.2	25		40
K	±0.5	8.4		8.6
L	±0.5	32.4		–
M	±0.1	4.4	5.3	4.4
N	±0.1	6		7.4
P	±0.1	0.9		1.2
Q	±0.3	–		66
R	±0.2	–		51
S	±0.5	38		–
Spec:*		250VAC,6A	250VAC,10A	250VAC,16A

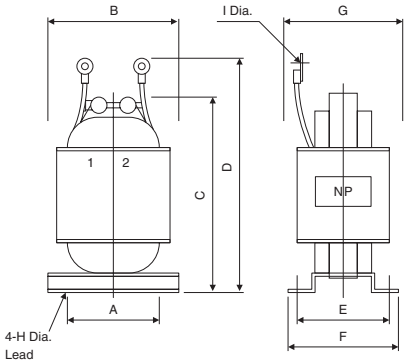
* : The rated current is +40℃.

For Three-phase 200 V

Code	Error	Type		
		FN258L-7/07	FN258L-16/07	FN258L-30/07
		Figure3		
A	±1	255	305	335
B	–	126±0.8	142±0.8	150±1
C	±0.6	50	55	60
D	–	225±0.8	275±0.8	305±1
E	±0.5	240	290	320
F	±0.3	25	30	35
G	±0.2	6.5		
H	±10	300		400
J	±0.1	1		
L	±1	9		
O	–	M5		
P	–	AWG16	AWG14	AWG10
Spec:*		480VAC,7A	480VAC,16A	480VAC,30A

* : The rated current is +50℃.

⑥AC/DC Reactor



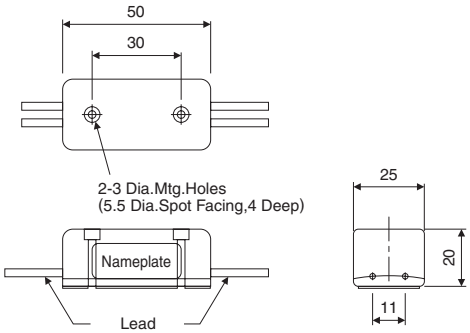
Reactor Type	Inductance mH	Rated Current A	Dimensions in mm									Approx. Mass kg
			A	B	C	D	E	F	G	H	I	
X5052	45.0	1.0	35	52	80	95	30	40	45	4	4.3	0.4
X5053	20.0	2.0	35	52	90	105	35	45	50	4	4.3	0.6
X5054	5.0	3.0	35	52	80	95	30	40	45	4	4.5	0.4
X5056	2.0	5.0	35	52	80	95	30	40	45	4	4.3	0.4
X5059	1.0	14.0	50	74	125	140	35	45	60	5	5.3	1.1
X5060	1.5	8.8	40	59	105	125	45	60	65	4	4.3	1.0
X5061	2.0	4.8	35	52	80	95	35	45	50	4	4.3	0.5
X5068	0.47	26.8	50	74	125	155	53	66	75	5	6.4	1.9

Dimensions for Peripheral Devices Units: mm

⑧Brake Power Supply Unit

Note: This brake power supply is used for 90 VDC. The 24-VDC brake power supply is not included.

200V input : LPSE-2H01
100V input : LPDE-1H01



- Lead length : 500mm each
- Maximum ambient temperature : 60˚C max
- Lead connection : Distinguished by color

AC Input Side		Brake Side
100V	200V	
Blue,White	Yellow,White	Red,Blue

- Output voltage : 90VDC
- Output current : 1.0ADC

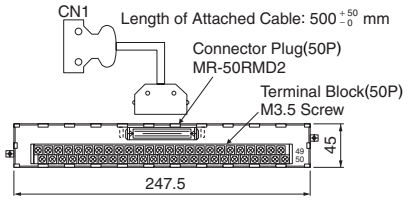
Dimensions for Cables and Connectors Units: mm

(A) CN1 Cables and Connectors for I/O Signals

For analog voltage references or pulse train references

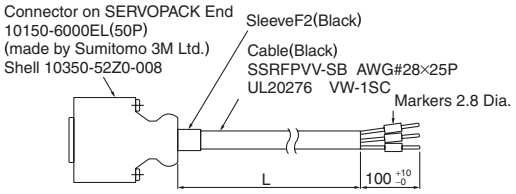
Connector to Terminal Conversion Unit

JUSP-TA50P



Cables with Single Connector

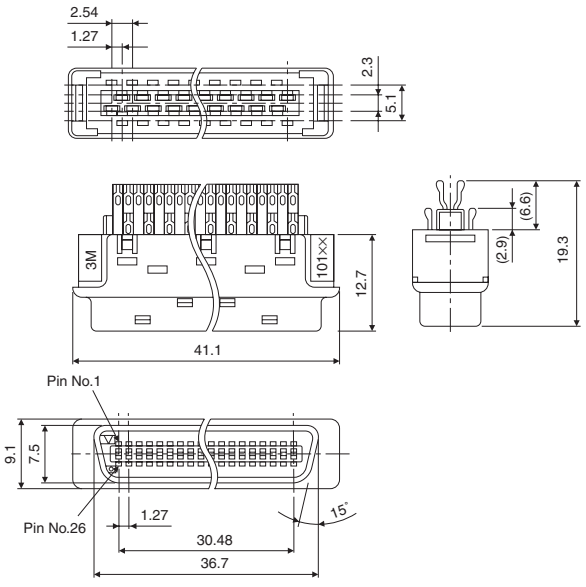
JZSP-CSI01-□



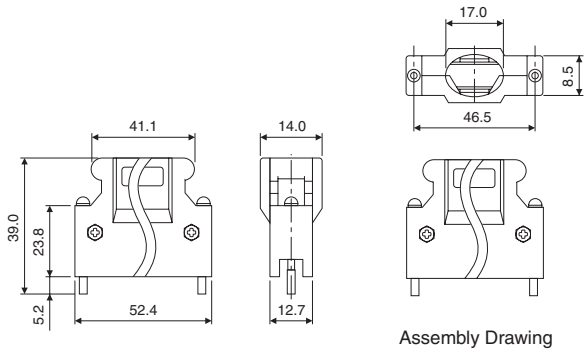
Connector Kit (for CN1)

JZSP-CSI9-1

· **Connector :** 10150-3000VE [made by Sumitomo 3M Ltd.]



· **Case :** 10350-52Z0-008 [made by Sumitomo 3M Ltd.]



Assembly Drawing

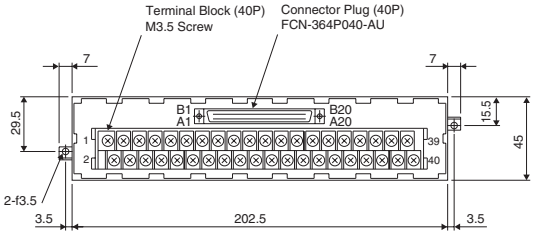
Cable Size

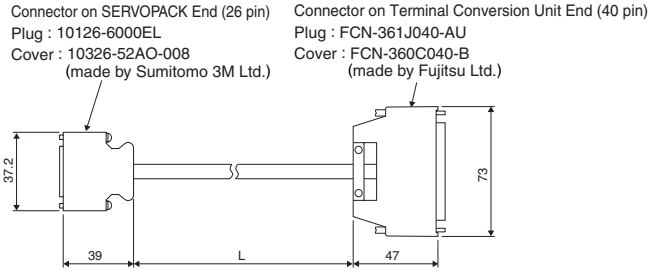
Item	Specifications
Cable	Use twisted-pair or twisted-pair shielded wire.
Applicable Wires	AWG24, 26, 28, 30
Cable Finished Diameter	16 mm max.

Ordering Reference (cont'd)

For MECHATROLINK communications

Connector to Terminal Conversion Unit
JUSP-TA26P

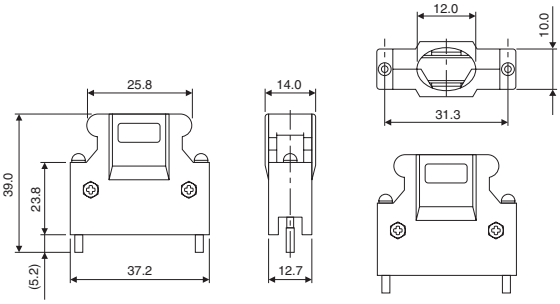




Type	Cable Length	Approx. Mass
JUSP-TA26P	500 mm	100g
JUSP-TA26P-1	1000 mm	200g
JUSP-TA26P-2	2000 mm	400g

Connector Kit (for CN1)
DE9411354

Case : 10326-52A0-008
(made by Sumitomo 3M Ltd.)

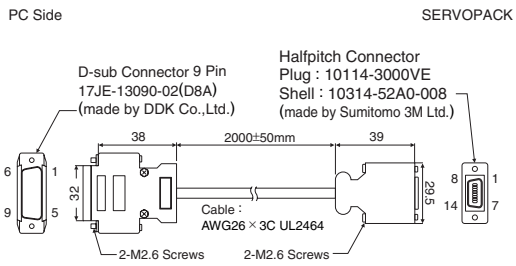


Connector : 10126-3000VE (Solder Type)
(made by Sumitomo 3M Ltd.)

Cable Size

Item	Specifications
Cable	Use twisted-pair or twisted-pair shielded wire.
Applicable Wires	AWG24, 26, 28, 30
Cable Finished Diameter	16 mm max.

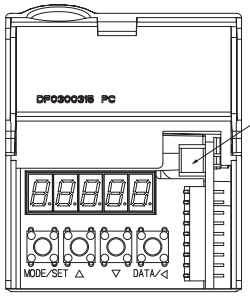
(D) CN3 Cable for PC



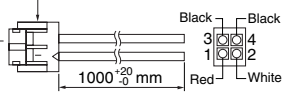
(E) CN5 Cable for Analog Monitor

For analog voltage references or pulse train references

Without Front Cover



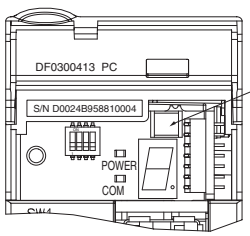
Socket : DF11-4DS-2C(made by Hirose Electric Co.,Ltd.)
Contact : DF11-2428SCF(made by Hirose Electric Co.,Ltd.)



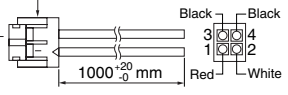
Cable Color	Signal Name	Specifications
White	Analog monitor 1	Torque reference:1V/100% Rated torque
Red	Analog monitor 2	Motor speed :1V/1000min-1
Black(2)	GND(0V)	—

For MECHATROLINK communications

Without Front Cover



Socket : DF11-4DS-2C(made by Hirose Electric Co.,Ltd.)
Contact : DF11-2428SCF(made by Hirose Electric Co.,Ltd.)



Cable Color	Signal Name	Specifications
White	Analog monitor 1	Torque reference:1V/100% Rated torque
Red	Analog monitor 2	Motor speed :1V/1000min-1
Black(2)	GND(0V)	—

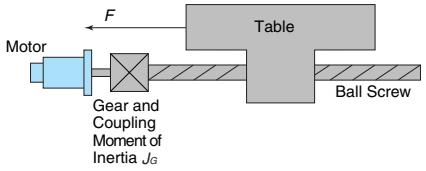
Appendix

●Rotary Motor Selection

Load Date

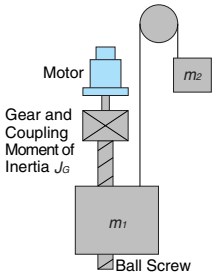
① Ball Screw Horizontal Axis

Load weight	m	_____	kg
Thrust	F	_____	N
Friction coefficient	μ	_____	
Mechanical efficiency	η	_____	
Reduction ratio	R(=n_M/n_L)	_____	
Gear + Coupling	J_G	_____	kg·cm^2
Ball screw lead	P_B	_____	mm
Ball screw diameter	d_B	_____	mm
Ball screw length	ℓ_B	_____	mm



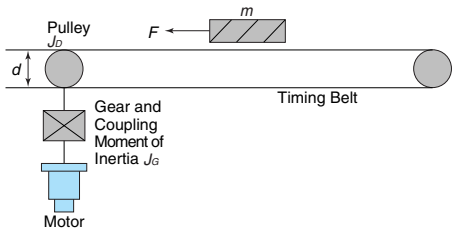
② Ball Screw Vertical Axis

Load weight	m_1	_____	kg
Counterweight	m_2	_____	kg
Friction coefficiency	μ	_____	
Mechanical efficiency	η	_____	
Reduction ratio	R(=n_M/n_L)	_____	
Gear + Coupling	J_G	_____	kg·cm^2
Ball screw lead	P_B	_____	mm
Ball screw diameter	d_B	_____	mm
Ball screw length	ℓ_B	_____	mm



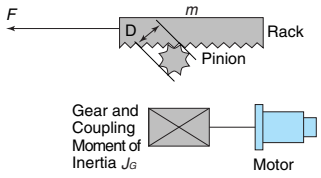
③ Timing Belt

Load weight	m	_____	kg
Thrust	F	_____	N
Friction coefficiency	μ	_____	
Mechanical efficiency	η	_____	
Reduction ratio	R(=n_M/n_L)	_____	
Gear + Coupling	J_G	_____	kg·cm^2
Pulley	J_P	_____	kg·cm^2
Pulley diameter	d_P	_____	mm



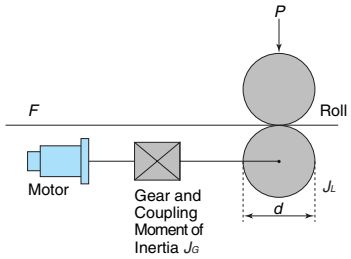
④ Rack & Pinion

Load weight	m	_____	kg
Thrust	F	_____	N
Friction coefficiency	μ	_____	
Mechanical efficiency	η	_____	
Reduction ratio	R(=n_M/n_L)	_____	
Gear + Coupling	J_G	_____	kg·cm^2
Pinion diameter	d	_____	mm
Pinion Thickness	t	_____	mm



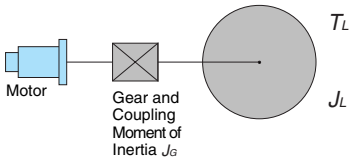
⑤ Roll Feeder

Load Moment of Inertia	J_L	_____	kg·cm^2
Tension	F	_____	N
Pressure	P	_____	N
Roll diameter	d	_____	mm
Friction coefficiency	μ	_____	
Mechanical efficiency	η	_____	
Reduction ratio	R(=n_M/n_L)	_____	
Gear + Coupling	J_G	_____	kg·cm^2



⑥ Rotor

Load Moment of Inertia	J_L	_____	kg·cm^2
Load Torque	T_L	_____	kg·cm
Mechanical efficiency	η	_____	
Reduction ratio	R(=n_M/n_L)	_____	
Gear + Coupling	J_G	_____	kg·cm^2

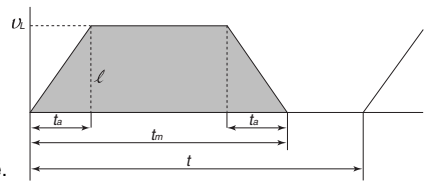


Driving Pattern

· Duty Cycle

DUTY	t	_____	s
Positioning distance	ℓ	_____	m
Speed	v_L	_____	m/s
Positioning time	t_m	_____	s
Accel/decel time	t_a	_____	s

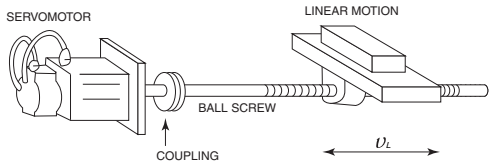
Note : Fill in either Vℓ or ts. If both are filled in, specify the prior one.



Appendix (cont'd)

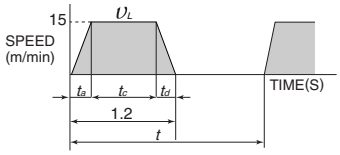
●Rotary Motor Selection Example

MECHANICAL SPECIFICATIONS



· Load Speed	: v_L	=15 m/min	· Coupling Outer Diameter	: d_C	=0.03 m
· Linear Motion Weight	: m	=80 kg	· Number of Feeds	: n	=40/min
· Ball Screw Length	: ℓ_B	=0.8 m	· Feed Stroke	: ℓ	=0.275 m
· Ball Screw Diameter	: d_B	=0.016 m	· Feed Time	: t_m	=1.2 s or less
· Ball Screw Lead	: P_B	=0.005 m	· Friction Coefficient	: μ	=0.2
· Coupling Weight	: m_C	=0.3 kg	· Mechanical Efficiency	: η	=0.9(90 %)

(1)Speed Diagram



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ s}$$

Where, $t_a = t_d$

$$t_a = t_m - \frac{60 \times \ell}{v_L} = 1.2 - \frac{60 \times 0.275}{15} = 0.1 \text{ s}$$

$$t_c = 1.2 - 0.1 \times 2 = 1.0 \text{ s}$$

(2)Speed

· Driven Motor Speed $n_L = \frac{v_L}{P_B} = \frac{15}{0.005} = 3000 \text{ min}^{-1}$

· Motor Speed Because of direct coupling, gear ratio : $1/R = 1/1$
Therefore, $n_M = n_L \cdot R = 3000 \times 1 = 3000 \text{ min}^{-1}$

(3)Load Torque

$$T_L = \frac{9.8 \mu \cdot m \cdot P_B}{2\pi R \cdot \eta} = \frac{9.8 \times 0.2 \times 80 \times 0.005}{2\pi \times 1 \times 0.9} = 0.139 \text{ N·m}$$

(4)Load Moment of Inertia

· Linear Motion $J_{L1} = m \left(\frac{P_B}{2\pi R}\right)^2 = 80 \times \left(\frac{0.005}{2\pi \times 1}\right)^2 = 0.507 \times 10^{-4} \text{ kg·m}^2$

· 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 $J_C = \frac{1}{8} m_C \cdot d_C^2 = \frac{1}{8} \times 0.3 \times (0.03)^2 = 0.338 \times 10^{-4} \text{ kg·m}^2$

· Load Moment of Inertia at Motor Shaft $J_L = J_{L1} + J_B + J_C = 1.25 \times 10^{-4} \text{ kg·m}^2$

(5)Load Moving Power

$$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3000 \times 0.139}{60} = 43.7 \text{ W}$$

(6)Load Acceleration Power

$$P_a = \left(\frac{2\pi}{60} n_M\right)^2 \frac{J_L}{t_a} = \left(\frac{2\pi}{60} \times 3000\right)^2 \times \frac{1.25 \times 10^{-4}}{0.1} = 123.4 \text{ W}$$

(7)Temporary Servomotor Selection

Selection Condition · $T_L \leqq$ Motor Rated Torque
· $P_a + P_o$=(1 to 2)× Motor Rated Output
· $n_M \leqq$ Motor Rated Speed
· $J_L \leqq$ Allowable Load Moment of Inertia of SERVOPACK

From the above condition,the following are temporarily selected :
·Servomotor : SGMAS-02ACA21
·SERVOPACK :SGDS-02A01A

<Ratings>

· Rated Output	: 200 W
· Rated Speed	: 3000 min^{-1}
· Rated Torque	: 0.637 N·m
· Instantaneous Peak Torque	: 1.91 N·m
· Motor Moment of Inertia	: 0.116×10^{-4} kg·m²
· Allowable Load Inertia of SERVOPACK	: 3.48×10^{-4} kg·m²

(8)Servomotor Checking

① Required Starting Torque

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60 t_a} + T_L$$
$$= \frac{2\pi \times 3000 \times (0.116 + 1.25) \times 10^{-4}}{60 \times 0.1} + 0.139$$
$$\fallingdotseq 0.568 \text{ N·m} < \text{Peak Torque} \cdots \text{Satisfactory}$$

② Required Braking Torque

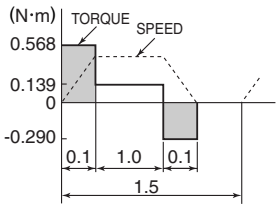
$$T_S = \frac{2\pi n_M (J_M + J_L)}{60 t_a} - T_L$$
$$= \frac{2\pi \times 3000 \times (0.116 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139$$
$$\fallingdotseq 0.290 \text{ N·m} < \text{Peak Torque} \cdots \text{Satisfactory}$$

③ Torque Efficiency

$$T_{rms} = \sqrt{\frac{T_P^2 \cdot t_a + T_L^2 \cdot t_c + T_S^2 \cdot t_d}{t}}$$
$$= \sqrt{\frac{(0.568)^2 \times 0.1 + (0.139)^2 \times 1.0 + (0.290)^2 \times 0.1}{1.5}}$$
$$\fallingdotseq 0.200 \text{ N·m} < \text{Rated Torque} \cdots \text{Satisfactory}$$

(9)Final Selection of Servomotor

Temporarily selected SERVOPACK,
servomotor suitable for position control can be used.
The graph below is the torque diagram.



Σ-Ⅲ SERIES

IRUMA BUSINESS CENTER (SOLUTION CENTER)
480, Kamifujisawa, Iruma, Saitama 358-8555, Japan
Phone 81-4-2962-5696 Fax 81-4-2962-6138

YASKAWA ELECTRIC AMERICA, INC.
2121 Norman Drive South, Waukegan, IL 60085, U.S.A.
Phone 1-847-887-7000 Fax 1-847-887-7370

YASKAWA ELÉTRICO DO BRASIL LTDA.
Avenida Fagundes Filho, 620 Bairro Saude-Sao Pãulo-SP, Brazil CEP: 04304-000
Phone 55-11-5071-2552 Fax 55-11-5581-8795

YASKAWA ELECTRIC EUROPE GmbH
Am Kronberger Hang 2, 65824 Schwalbach, Germany
Phone 49-6196-569-300 Fax 49-6196-569-312

YASKAWA ELECTRIC UK LTD.
1 Hunt Hill Orchardton Woods Cumbernauld, G68 9LF, United Kingdom
Phone 44-1236-735000 Fax 44-1236-458182

YASKAWA ELECTRIC KOREA CORPORATION
7F, Doore Bldg. 24, Yeoido-dong, Youngdungpo-Ku, Seoul 150-877, Korea
Phone 82-2-784-7844 Fax 82-2-784-8495

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
151 Lorong Chuan, #04-01, New Tech Park 556741, Singapore
Phone 65-6282-3003 Fax 65-6289-3003

YASKAWA ELECTRIC (SHANGHAI) CO., LTD.
No.18 Xizang Zhong Road. Room 1702-1707, Harbour Ring Plaza Shanghai 200001, China
Phone 86-21-5385-2200 Fax 86-21-5385-3299

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

YASKAWA ELECTRIC TAIWAN CORPORATION
9F, 16, Nanking E. Rd., Sec. 3, Taipei, Taiwan
Phone 886-2-2502-5003 Fax 886-2-2505-1280

YASKAWA ELECTRIC CORPORATION

YASKAWA

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

LITERATURE NO. KAEP S800000 00D

Published in Japan October 2007 02-8 ◇4-0
07-8-9