



YASKAWA

# AC SERVO DRIVES Σ-III SERIES



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電話：037-466333  
Email: service@repairtw.com  
Line ID: @zzz  
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*another step ahead*

Σ-III

AC SERVODRIVE Σ-III  
AC SERVOMOTOR Σ-III

Certified for  
ISO9001 and  
ISO14001



JQA-0422



JQA-EM0202

JQA-EM0924

# *Get faster positioning speeds with the new enhanced $\Sigma$ -III.*

The  $\Sigma$ -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**



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

**Rotary Servomotors**



**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

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

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

**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.  
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Email: service@repairtw.com  
Line id: @zzzz  
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**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

|                 |         |
|-----------------|---------|
| <b>Features</b> | Pages 2 |
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|                       |    |
|-----------------------|----|
| <b>Product Lineup</b> | 11 |
|-----------------------|----|

- Rotary Servomotors
- Direct-drive Servomotors
- Linear Servomotors
- Linear Sliders
- SERVOPACKs

|                           |    |
|---------------------------|----|
| <b>Rotary Servomotors</b> | 14 |
|---------------------------|----|

- Specifications
- Dimensions

|                                 |    |
|---------------------------------|----|
| <b>Direct-drive Servomotors</b> | 19 |
|---------------------------------|----|

- Specifications
- Dimensions

|                                 |    |
|---------------------------------|----|
| <b>SGDS-□□□01/02 SERVOPACKs</b> | 22 |
|---------------------------------|----|

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

- Rating and Specifications
- Dimensions
- Connection Diagrams

|                              |    |
|------------------------------|----|
| <b>SGDS-□□□12 SERVOPACKs</b> | 26 |
|------------------------------|----|

(MECHATROLINK Communications)

- Rating and Specifications
- Dimensions
- Connection Diagrams

|                           |    |
|---------------------------|----|
| <b>Ordering Reference</b> | 30 |
|---------------------------|----|

- System Configurations
- Servo Drives
- Peripheral Devices
- Absolute Encoder Battery
- Cables and Connectors
- Encoder Cable Extension

|                 |    |
|-----------------|----|
| <b>Appendix</b> | 38 |
|-----------------|----|

- Rotary Motor Selection
- Rotary Motor Selection Example

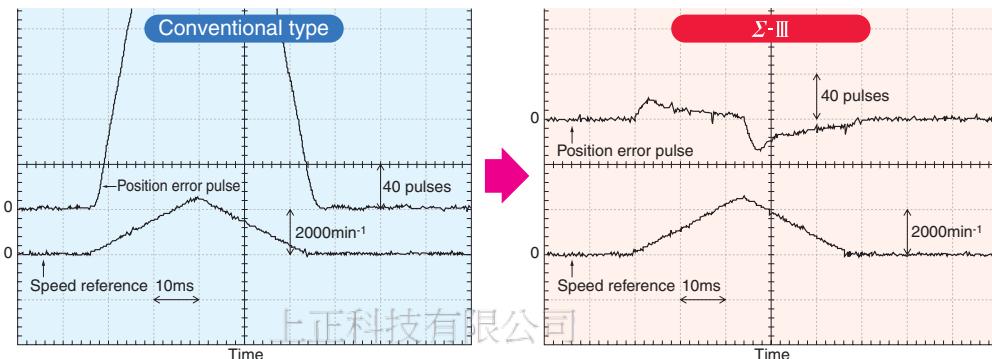
## Features



### 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  $\Sigma$ -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.



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### Wide motor selection

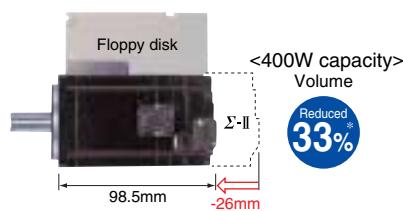
Email: [service@reparttw.com](mailto:service@reparttw.com)

Four types of servomotors are available: rotary servomotors with a maximum speed of 6000 min<sup>-1</sup>, 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.



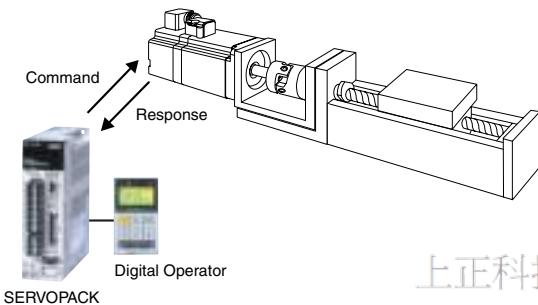
## Various tuning functions

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.

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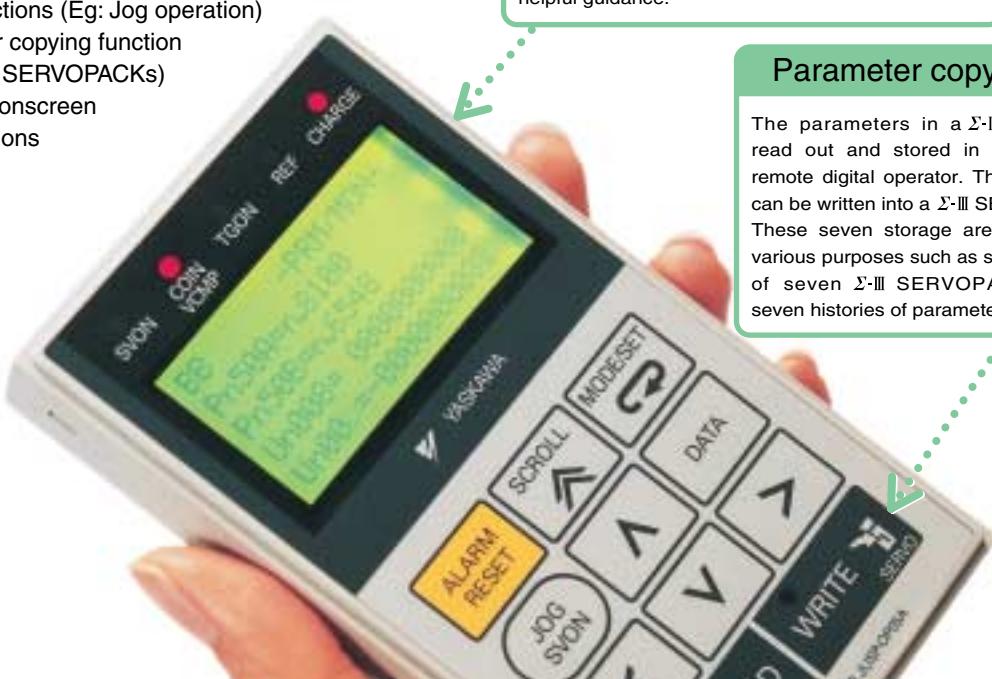


## New Digital Operator

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 x 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.

# Features



## New functions

New functions to suppress vibrations have been added to the  $\Sigma$ -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

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#### ● 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

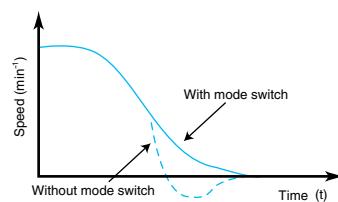
Maximum motor speed: 6000 min<sup>-1</sup>

This brings the machine's performance to that of a higher grade.



#### ● Mode switch

To improve transient characteristics during motor acceleration 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 encoder 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.

### ● 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.



Easy 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.

## 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 divided 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.

CCW CW



|                   | 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.

### ● 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

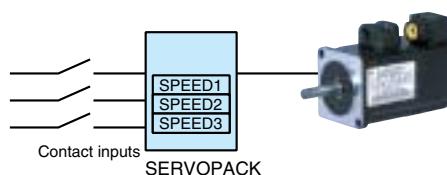
Shows the value of the error counter if it is within the positioning completed range that is specified as a parameter.

### ● 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.

## Features



### MECHATROLINK-II Network

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



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#### ● 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  $250\mu\text{s}$  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.  $\Sigma$ -III SERVOPACKs also support MECHATROLINK-II communications with a transmission speed of 4 Mbps and a transmission cycle of 2 ms.

Email: [service@repartwtw.com](mailto:service@repartwtw.com)  
@zzzz

#### ● 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  $\Sigma$ -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.

| Applicable SERVOPACK Model     | SGDS-<br>□□□1□□ (All Capacities)      |   |
|--------------------------------|---------------------------------------|---|
| MECHATROLINK Communications    | Communications Protocol               | MECHATROLINK-II      MECHATROLINK-I   |
|                                | Max Number of Slaves                  | 30      15  |
|                                | Transmission Speed                    | 10Mbps      4Mbps   |
|                                | Transmission Cycle                    | 250 $\mu\text{s}$ , 0.5 ms to 4 ms<br>(Multiples of 0.5)<br>In accordance with the setting of the host controller.  |
|                                | Number of Words for Link Transmission | Can choose between 17-bytes/station and 32-bytes/station with the DIP switch.   |
| Command Method                 | Performance                           | Position control, speed control, and torque control with MECHATROLINK-II communications.  |
|                                | Commands                              | MECHATROLINK-I and MECHATROLINK-II commands (For sequence, motion, 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.  |



## 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.

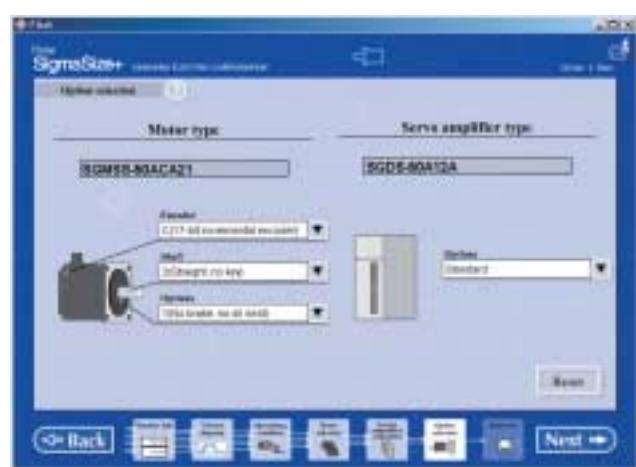
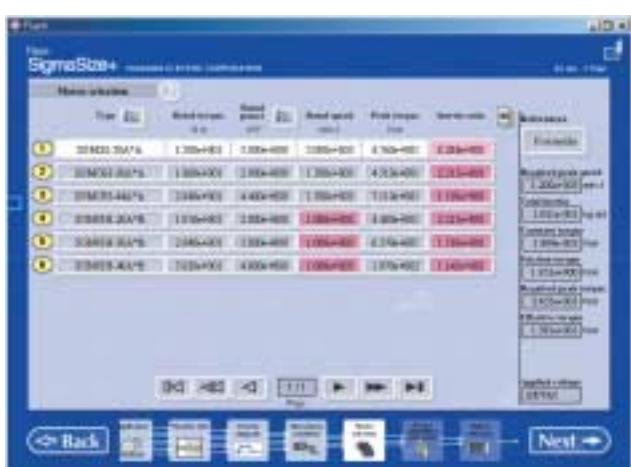
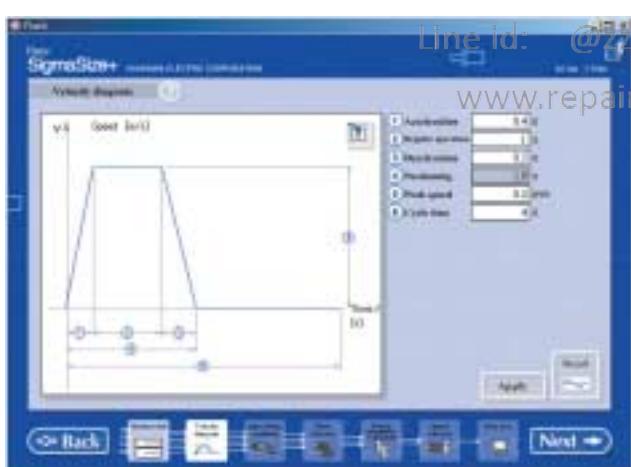
### AC Servomotor Selection Program **SigmaSize+**

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



## Features

### PC Software for AC Servomotor Drive Control

## SigmaWin+

SigmaWin+ is a Windows-based engineering PC tool to make adjustments to Yaskawa's  $\Sigma$ -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

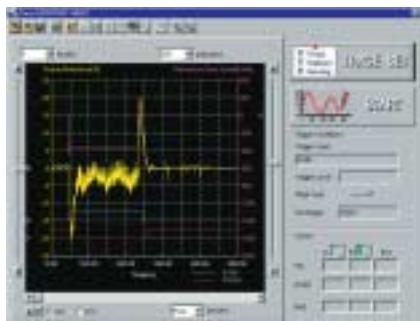
Edit parameters from the PC, and download them to multiple machines. Monitoring and offset adjustment are simple, too, for faster set-up.



#### 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

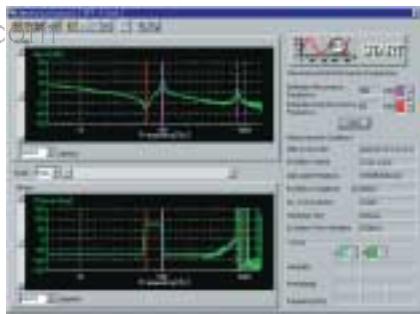
Using SigmaWin+, set the servo drive to run so that you can tune the parameters, and the optimum settings for the load moment of inertia, the servo gains, and the filter for the connected machine will be automatically set.



#### 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 | ○                  | ○                  |

○ : Available

○ : Available, but limited according to SERVOPACK version (Note 1)

△ : Available only with SigmaWin+ Professional (Note 2)

— : Not available

| 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)                   |                                       | △                  | —                  |

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.14 to P.18

| Rotary Servomotor |          | SERVOPACK<br>Type SGDS-..... |                   |                  |
|-------------------|----------|------------------------------|-------------------|------------------|
| Type              | Capacity | Single-Phase 100V            | Single-Phase 200V | Three-Phase 200V |
| 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               | —                |

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### Type Designation

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#### ● 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

##### Rated Output

| Code | Output | Code | Output | Code | Output |
|------|--------|------|--------|------|--------|
| A5   | 50W    | 06   | 600W   | 20   | 2.0kW  |
| 01   | 100W   | 08   | 750W   | 25   | 2.5kW  |
| C2   | 150W   | 10   | 1.0kW  | 30   | 3.0kW  |
| 02   | 200W   | 12   | 1.15kW | 40   | 4.0kW  |
| 04   | 400W   | 15   | 1.5kW  | 50   | 5.0kW  |

##### Supply Voltage

A:200VAC Note: 200 VAC of supply voltage can be used for motors even when 100 VAC is used for SERVOPACKs

##### Serial Encoder Specifications

2:17-bit Absolute (Standard)

C:17-bit Incremental (Standard)

##### Design Revision Order

A:SGMAS,SGMPS,SGMSS

E:IP67 (only for SGMPS)

##### Shaft End Specifications

| Code | Specifications   | SGMAS    | SGMPS    | SGMSS |
|------|------------------|----------|----------|-------|
| 2    | Straight,No key  | Standard | Standard |       |
| 3    | Taper 1/10,Key   | —        | Option   |       |
| 4    | Straight,Key     | Option   | —        |       |
| 6    | Straight,Key,Tap | Option   | Option   |       |
| 8    | Straight,Tap     | —        | —        |       |

##### Options

- 1:No Option
- D:Oil Seal,90-VDC Brake
- B:90-VDC Brake
- E:Oil Seal,24-VDC Brake
- C:24-VDC Brake
- S:Oil Seal

#### ● With gears SGMAS- 01 A C A H 1 2 B

##### Σ-III SGMC Servomotor

SGMAS:Super High Power Rate Series

SGMPS:Flat Series

SGMSS:Super High Power Rate Series

##### Rated Output

| Code | Output | Code | Output | Code | Output |
|------|--------|------|--------|------|--------|
| A5   | 50W    | 06   | 600W   | 20   | 2.0kW  |
| 01   | 100W   | 08   | 750W   | 25   | 2.5kW  |
| C2   | 150W   | 10   | 1.0kW  | 30   | 3.0kW  |
| 02   | 200W   | 12   | 1.15kW | 40   | 4.0kW  |
| 04   | 400W   | 15   | 1.5kW  | 50   | 5.0kW  |

##### Supply Voltage

A:200VAC Note: 200 VAC of supply voltage can be used for motors even when 100 VAC is used for SERVOPACKs

##### Serial Encoder Specifications

2:17-bit Absolute (Standard) C:17-bit Incremental (Standard)

##### Design Revision Order

A: SGMAS,SGMPS,SGMSS E: IP67 (only for SGMPS)

##### Gears

| Code | Specifications                  | SGMAS | SGMPS | SGMSS |
|------|---------------------------------|-------|-------|-------|
| H    | Low-backlash HDS Planetary Gear | ○     | ○     |       |
| J    | Standard Backlash Gear          | ○     | ○     |       |
| L    | Low-backlash Gear               |       |       | ○     |

##### Gear Ratio

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

##### Shaft End Specifications

| Code | Specifications           | SGMAS | SGMPS | SGMSS | Code | Specifications   | SGMAS | SGMPS | SGMSS |
|------|--------------------------|-------|-------|-------|------|------------------|-------|-------|-------|
| 0    | Flange-mounted, No Shaft | H     | H     | —     | 6    | Straight,Key,Tap | H, J  | H, J  | —     |
| 2    | Straight, No Key         | H, J  | H, J  | —     | 8    | Straight,Tap     | H     | H     | —     |
| 4    | Straight,Key             | —     | —     | L     |      |                  |       |       |       |

##### Options

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

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

# Product Lineup (cont'd)

## ●Direct-drive Servomotors



Details P.19 to P.21

| Direct-drive Servomotor |          | SERVOPACK<br>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 |
|------|------------------|-------------------|
| 02   | 2.0              | ○ B(135 dia.)     |
| 04   | 4.0              | ○ C(175 dia.)     |
| 05   | 5.0              | ○ D(230 dia.)     |
| 07   | 7.0              | ○ E(290 dia.)     |
| 08   | 8.0              | ○ F(280 dia.)     |
| 10   | 10.0             | ○ G(360 dia.)     |
| 14   | 14.0             | ○ H(335 dia.)     |
| 16   | 16.0             | ○ I(350 dia.)     |
| 17   | 17.0             | ○ J(350 dia.)     |
| 25   | 25.0             | ○ K(350 dia.)     |
| 35   | 35.0             | ○ L(350 dia.)     |
| 45   | 45.0             | ○ M(350 dia.)     |
| 80   | 80.0             | ○ N(350 dia.)     |
| 1A   | 110.0            | ○ O(350 dia.)     |
| 1E   | 150.0            | ○ P(350 dia.)     |
| 2Z   | 200.0            | ○ Q(350 dia.)     |

Serial Encoder Specifications

3:20-bit Absolute (Standard)(Within one rotation)

D:20-bit Incremental (Option)

Design Revision Order

A: 45N·m to 200N·m

B: 2N·m to 35N·m

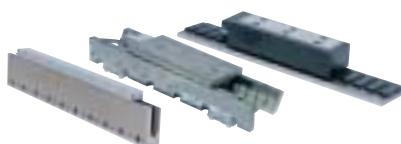
Flange Specifications

1: C face

Brake Specification

1:No Brake

## ●Linear Servomotors



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

| Linear Servomotor   |                  | SERVOPACK<br>Type SGDS-..... |                   |                  |
|---------------------|------------------|------------------------------|-------------------|------------------|
| Type                | Continuous Force | Single-phase 100V            | Single-phase 200V | Three-phase 200V |
| <b>SGLGW series</b> |                  |                              |                   |                  |
| SGLGW-30A050C       | 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       | 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              |
| <b>SGLFW series</b> |                  |                              |                   |                  |
| 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              |
| <b>SGLTW series</b> |                  |                              |                   |                  |
| 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              |

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電話 : 03-5720-0200

Email: service@reparatw.com

www.reparatw.com



# Rotary Servomotors

## ● Specifications

### SGMAS, SGMPS, SGMSS

|                       |                        |                              |                                 |                   |  |
|-----------------------|------------------------|------------------------------|---------------------------------|-------------------|--|
| Time Rating           | : Continuous           | Ambient Humidity             | : 20% to 80%RH (non-condensing) | Enclosure         | : Totally-enclosed, self-cooled IP55                         |
| Vibration Resistance  | : V15                  | Mounting Method              | : Flange-mounted                |                   | (IP67 for the SGMSS; through part of the shaft not included) |
| Insulation Resistance | : 500VDC, 10MΩ or more | Thermal Class                | : B (SGMAS, SGMPS)<br>F (SGMSS) | Excitation Format | : Permanent magnet   |
| Ambient Temperature   | : 0°C to +40°C         | Insulation Withstand Voltage | : 1500VAC at 200V, 1min         | Drive Method      | : Direct drive   |

| Servomotor Type                    | SGMAS-             |                    |                    |                  |                  |                  |                  |                 | SGMPS-             |                  |                  |                |                |                | SGMSS- |       |       |       |       |       |  |
|------------------------------------|--------------------|--------------------|--------------------|------------------|------------------|------------------|------------------|-----------------|--------------------|------------------|------------------|----------------|----------------|----------------|--------|-------|-------|-------|-------|-------|--|
|                                    | A5A                | 01A                | C2A                | 02A              | 04A              | 06A              | 08A              | 12A             | 01A                | 02A              | 04A              | 08A            | 15A            | 10A            | 15A    | 20A   | 25A   | 30A   | 40A   | 50A   |  |
| Rated Output*1 W                   | 50                 | 100                | 150                | 200              | 400              | 600              | 750              | 1150            | 100                | 200              | 400              | 750            | 1500           | 1000           | 1500   | 2000  | 2500  | 3000  | 4000  | 5000  |  |
| Rated Torque*1,*2 N·m              | 0.159              | 0.318              | 0.477              | 0.637            | 1.27             | 1.91             | 2.39             | 3.66            | 0.318              | 0.637            | 1.27             | 2.39           | 4.77           | 3.18           | 4.90   | 6.36  | 7.96  | 9.80  | 12.6  | 15.8  |  |
| Instantaneous Peak Torque*1 N·m    | 0.477              | 0.955              | 1.43               | 1.91             | 3.82             | 5.73             | 7.16             | 11.0            | 0.955              | 1.91             | 3.82             | 7.16           | 14.3           | 9.54           | 14.7   | 19.1  | 23.9  | 29.4  | 37.8  | 47.6  |  |
| Rated Current*1 Arms               | 0.66               | 0.91               | 1.8                | 1.9              | 2.6              | 4.3              | 5.4              | 8.5             | 0.86               | 2.0              | 2.6              | 5.4            | 9.2            | 5.7            | 9.3    | 12.1  | 13.8  | 17.9  | 25.4  | 27.6  |  |
| Instantaneous Max Current*1 Arms   | 2.1                | 2.8                | 5.7                | 6.5              | 8.5              | 13.6             | 16.9             | 26.0            | 2.8                | 6.4              | 8.4              | 16.5           | 28.0           | 17.0           | 28.0   | 42.0  | 44.5  | 56.0  | 77.0  | 84.0  |  |
| Rated Speed*1 min⁻¹                | 3000               |                    |                    |                  |                  |                  |                  |                 | 3000               |                  |                  |                |                |                | 3000   |       |       |       |       |       |  |
| Max. Speed*1 min⁻¹                 | 6000               |                    |                    |                  |                  |                  |                  |                 | 6000               |                  |                  |                |                |                | 6000   |       |       |       |       |       |  |
| Torque Constant N·m/Arms           | 0.265              | 0.375              | 0.284              | 0.375            | 0.527            | 0.496            | 0.487            | 0.467           | 0.401              | 0.361            | 0.524            | 0.476          | 0.559          | 0.636          | 0.590  | 0.561 | 0.610 | 0.581 | 0.520 | 0.600 |  |
| Rotor Moment kg·m²×10⁻⁴ of Inertia | 0.0242<br>(0.0312) | 0.0380<br>(0.0450) | 0.0531<br>(0.0601) | 0.116<br>(0.180) | 0.190<br>(0.254) | 0.326<br>(0.390) | 0.769<br>(0.940) | 1.20<br>(1.424) | 0.0592<br>(0.0892) | 0.263<br>(0.415) | 0.409<br>(0.561) | 2.10<br>(2.98) | 4.02<br>(4.90) | 1.74<br>(1.99) | 2.00   | 2.47  | 3.19  | 7.00  | 9.60  | 12.3  |  |
| Rated Power Rate*1 kW/s            | 10.4<br>(8.10)     | 26.6<br>(22.5)     | 42.8<br>(37.9)     | 35.0<br>(22.5)   | 84.9<br>(63.5)   | 112<br>(93.5)    | 74.1<br>(60.8)   | 112<br>(94.1)   | 17.1<br>(11.3)     | 15.4<br>(9.78)   | 39.6<br>(28.8)   | 27.2<br>(19.2) | 56.6<br>(46.4) | 58.1<br>(50.8) | 120    | 164   | 199   | 137   | 165   | 203   |  |

\*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°C(20°C for the SGMSS servomotor). All others are for a coil temperature of 20°C.

\*2 : These values for the Rated Torque are for the continuous allowable torque with the following heatsinks at an ambient temperature of 40°C.

Heatsink dimensions : 250×250×6 mm : SGMAS-A5A, 01A, C2A, 02A, 04A, 08A

SGMPS-01A, 02A, 04A

300×300×12mm : SGMAS-06A SGMPS-08A, 15A SGMSS-10A, 15A, 20A, 25A

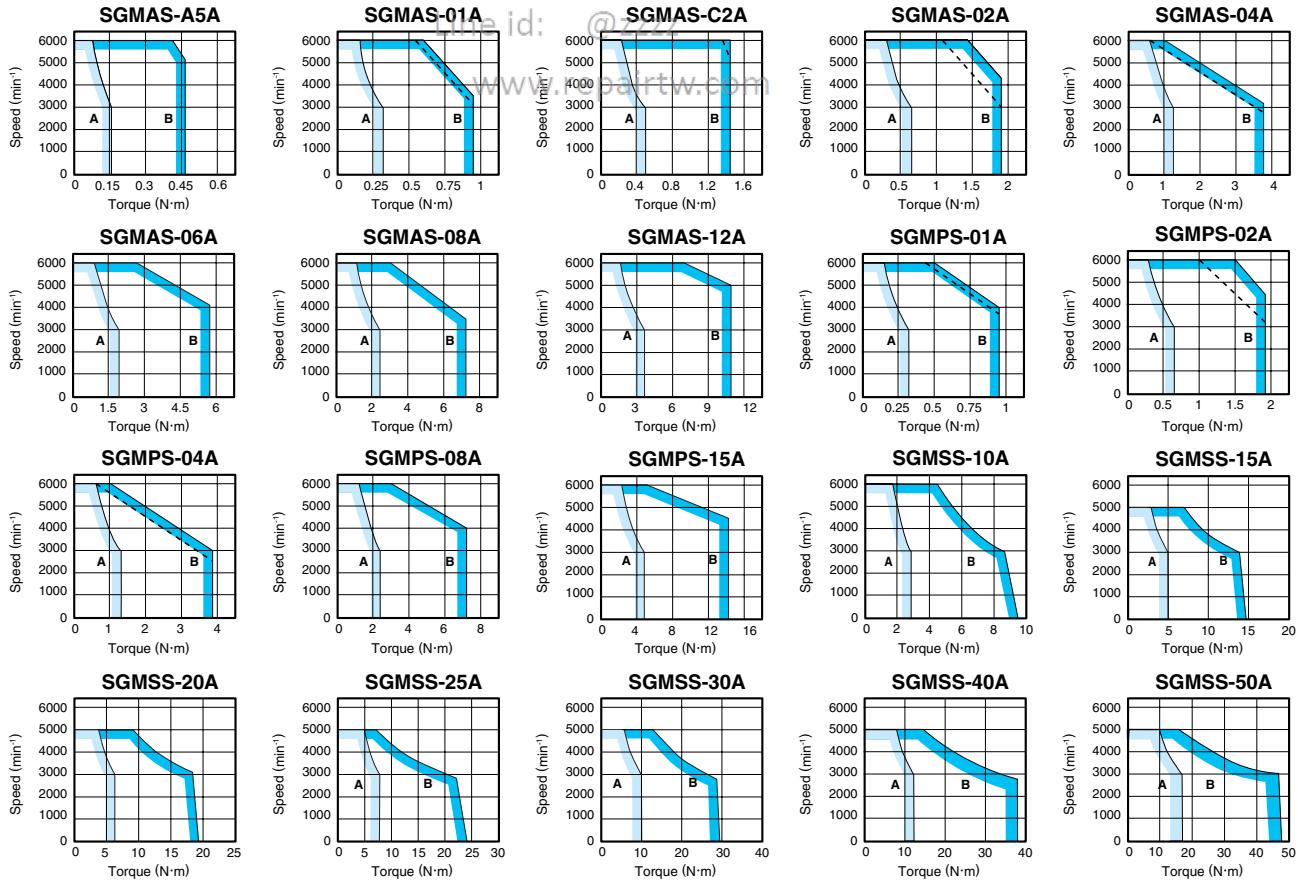
350×350×12mm : SGMAS-12A

400×400×20mm : SGMSS-30A, 40A, 50A

Note : Values in parentheses are for servomotors with a brake. Contact us 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 100VAC.

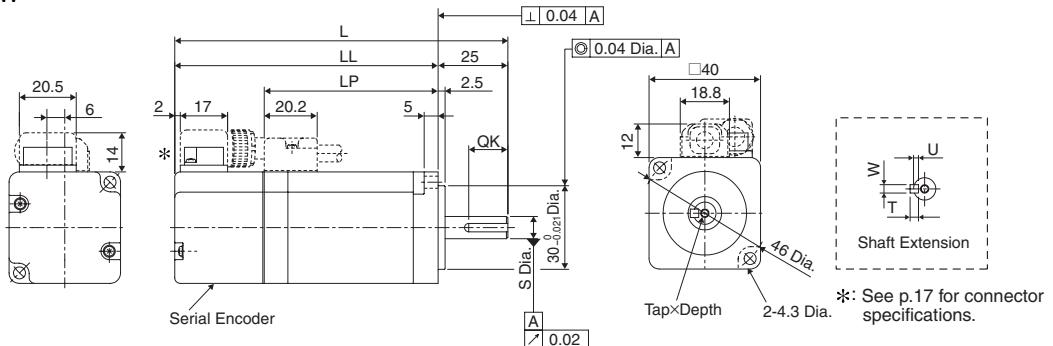


## ●Dimensions Units : mm

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

**SGMAS-A5A, 01A, C2A**

50W to 150W



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

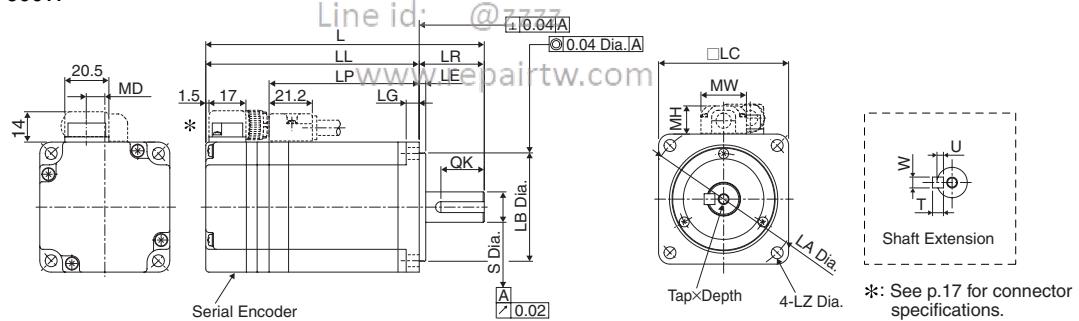
Note: Values in parentheses are for servomotors with a brake.

電話： 037-466333

**SGMAS-02A, 04A, 06A**

Email: service@repairtw.com

200W to 600W



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

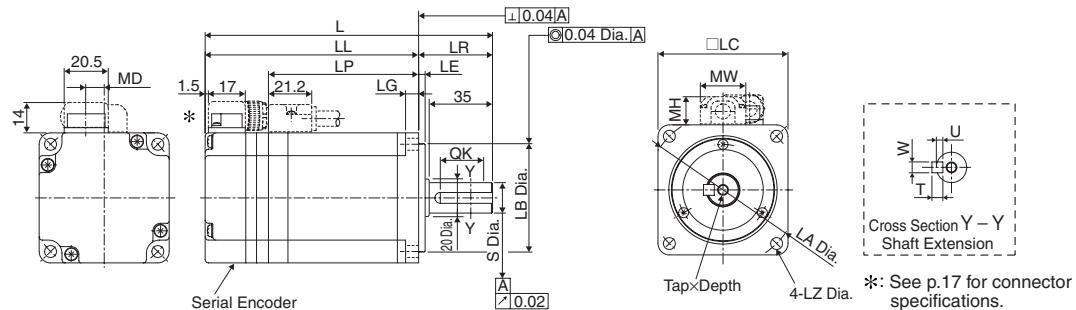
# Rotary Servomotors (cont'd)

## ●Dimensions Units : mm

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

### SGMAS-08A, 12A

750W, 1.15kW



| Servomotor Type<br>SGMAS- <span style="border-bottom: 1px solid black; padding: 0 2px;"> </span> | L                | LL               | LP  | LR | LE | LG | LC | LA | LB                                | LZ | S                                 | Tap x Depth | QK     | U | W | T | MD | MW | MH | Approx.Mass<br>kg |
|--|------------------|------------------|-----|----|----|----|----|----|-----------------------------------|----|-----------------------------------|-------------|--------|---|---|---|----|----|----|-------------------|
| 08A□A2□  |                  |                  |     |    |    |    |    |    |                                   |    |                                   | No tap      | No key |   |   |   |    |    |    | 2.3<br>(3.2)      |
| 08A□A4□  | 155<br>(200)     | 115<br>(160)     | 85  |    |    |    |    |    |                                   |    |                                   | M5 x 8L     | 30     | 3 | 5 | 5 |    |    |    |                   |
| 08A□A6□  |                  |                  |     |    |    |    |    |    |                                   |    |                                   | No tap      | No key |   |   |   |    |    |    | 3.6<br>(4.5)      |
| 12A□A2□  |                  |                  |     |    |    |    |    |    |                                   |    |                                   | M5 x 8L     | 30     | 3 | 5 | 5 |    |    |    |                   |
| 12A□A4□  | 186.5<br>(236.5) | 146.5<br>(196.5) | 115 | 40 | 3  | 8  | 80 | 90 | 70 <sup>0</sup> <sub>-0.030</sub> | 7  | 16 <sup>0</sup> <sub>-0.011</sub> |             |        |   |   |   |    |    |    |                   |
| 12A□A6□  |                  |                  |     |    |    |    |    |    |                                   |    |                                   |             |        |   |   |   |    |    |    |                   |

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

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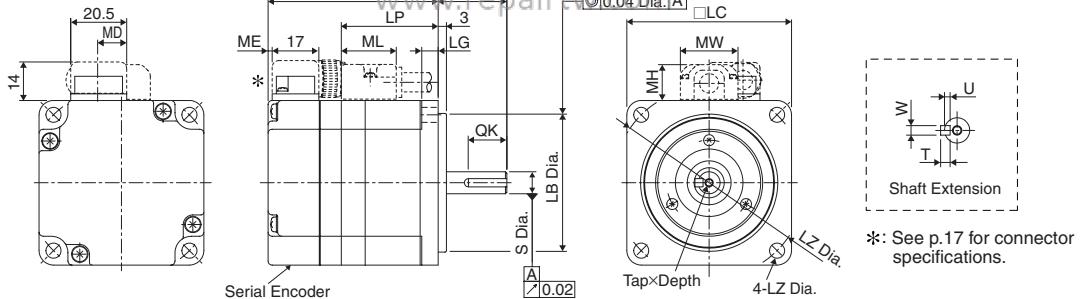
電話 : 037-466333

### SGMPS-01A, 02A, 04A

100W to 400W

Email: service@repairtw.com

Line id: @zzzz

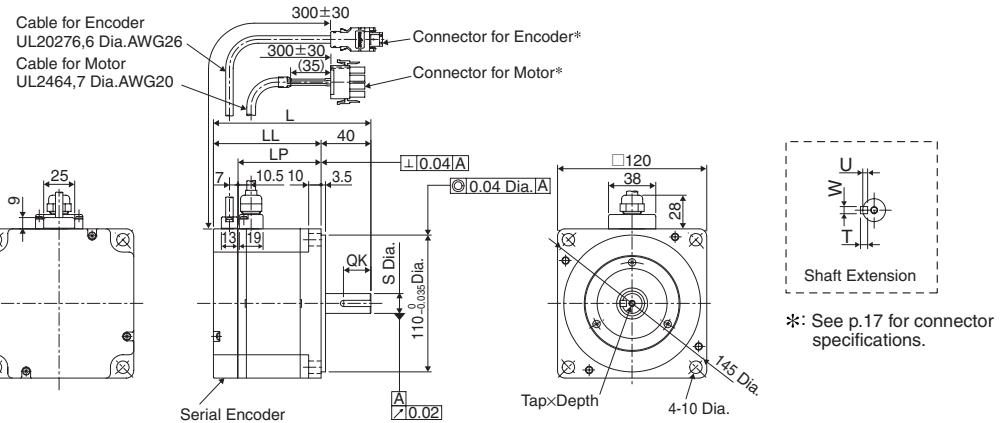


| Servomotor Type<br>SGMPS- <span style="border-bottom: 1px solid black; padding: 0 2px;"> </span> | L              | LL            | LP   | LR | LC | LA | LB                                | LZ  | LG | S                                 | Tap x Depth | QK     | U   | W | T | MD | ME  | MH | ML   | MW   | Approx.Mass<br>kg |
|--|----------------|---------------|------|----|----|----|-----------------------------------|-----|----|-----------------------------------|-------------|--------|-----|---|---|----|-----|----|------|------|-------------------|
| 01A□A2□  |                |               |      |    |    |    |                                   |     |    |                                   | No tap      | No key |     |   |   |    |     |    |      |      | 0.5<br>(0.7)      |
| 01A□A4□  | 87<br>(116)    | 62<br>(91)    | 35   | 25 | 60 | 70 | 50 <sup>0</sup> <sub>-0.025</sub> | 5.5 | 6  | 8 <sup>0</sup> <sub>-0.009</sub>  | M3 x 6L     | 14     | 1.8 | 3 | 3 | 9  | 1   | 12 | 20.2 | 18.8 |                   |
| 01A□A6□  |                |               |      |    |    |    |                                   |     |    |                                   |             |        |     |   |   |    |     |    |      |      |                   |
| 02A□A2□  |                |               |      |    |    |    |                                   |     |    |                                   | No tap      | No key |     |   |   |    |     |    |      |      | 1.1<br>(1.6)      |
| 02A□A4□  | 97<br>(128.5)  | 67<br>(98.5)  | 42.5 |    |    |    |                                   |     |    |                                   | M5 x 8L     | 16     | 3   | 5 | 5 |    |     |    |      |      |                   |
| 02A□A6□  |                |               |      |    |    |    |                                   |     |    |                                   |             |        |     |   |   |    |     |    |      |      |                   |
| 04A□A2□  |                |               |      |    |    |    |                                   |     |    |                                   | No tap      | No key |     |   |   | 14 | 1.5 | 13 | 21.2 | 21   | 1.4<br>(1.9)      |
| 04A□A4□  | 107<br>(148.5) | 77<br>(118.5) | 52.5 | 30 | 80 | 90 | 70 <sup>0</sup> <sub>-0.030</sub> | 7   | 8  | 14 <sup>0</sup> <sub>-0.011</sub> | M5 x 8L     | 16     | 3   | 5 | 5 |    |     |    |      |      |                   |
| 04A□A6□  |                |               |      |    |    |    |                                   |     |    |                                   |             |        |     |   |   |    |     |    |      |      |                   |

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

## SGMPS-08A, 15A

750W, 1.5kW



\*: See p.17 for connector specifications.

| Servomotor Type<br>SGMPS-□□□ | L              | LL             | LP   | S                                  | Tap×Depth | QK     | U   | W | T | Approx.Mass<br>kg |
|------------------------------|----------------|----------------|------|------------------------------------|-----------|--------|-----|---|---|-------------------|
| 08A□A2□                      | 126.5<br>(160) | 86.5<br>(120)  | 66.7 | 16. <sup>0</sup> <sub>-0.011</sub> | M5×8L     | No key |     |   |   | 4.2<br>(5.7)      |
| 08A□A4□                      |                |                |      |                                    |           | 22     | 3   | 5 | 5 |                   |
| 08A□A6□                      |                |                |      |                                    |           | No key |     |   |   |                   |
| 15A□A2□                      | 154.5<br>(188) | 114.5<br>(148) | 94.7 | 19. <sup>0</sup> <sub>-0.013</sub> | M6×10L    | 22     | 3.5 | 6 | 6 | 6.6<br>(8.1)      |
| 15A□A4□                      |                |                |      |                                    |           | No key |     |   |   |                   |
| 15A□A6□                      |                |                |      |                                    |           | No key |     |   |   |                   |

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

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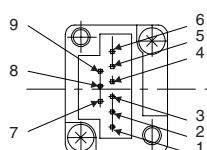
### Connector Specifications

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

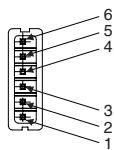
### Connector Specifications

[SGMPS-08A, 15A]

Encoder Connector



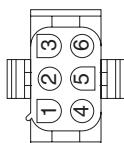
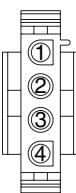
Motor Connector



Encoder Connector



Motor Connector (Standard) (With Brake)



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

|   | 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 |

|       | Absolute<br>Encoder | Incremental<br>Encoder |
|-------|---------------------|------------------------|
| 1     | PG5V                | PG5V                   |
| 2     | PG0V                | PG0V                   |
| 3     | BAT                 | —                      |
| 4     | OBAT                | —                      |
| 5     | DATA+               | DATA+                  |
| 6     | DATA-               | DATA-                  |
| Shell | FG                  | FG                     |

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

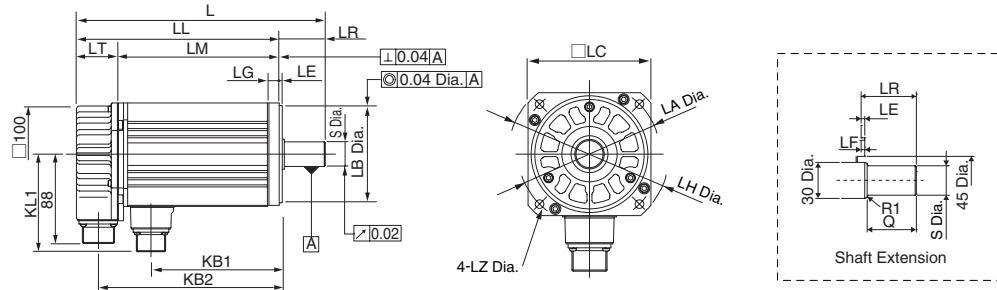
# Rotary Servomotors (cont'd)

## ●Dimensions Units : mm

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

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

1.0kW to 5.0kW



| Servomotor Type<br>SGMSS- <span style="border-bottom: 1px solid black; padding: 0 2px;"> </span> | L            | LL           | LM           | LR | LT | KB1        | KB2          | KL1         | Shaft End                         |    | Flange Face |                                    |     |    |    |    |     |    | Approx.Mass<br>kg |
|--|--------------|--------------|--------------|----|----|------------|--------------|-------------|-----------------------------------|----|-------------|------------------------------------|-----|----|----|----|-----|----|-------------------|
|  |              |              |              |    |    |            |              |             | S                                 | Q  | LA          | LB                                 | LC  | LE | LF | LG | LH  | LZ |                   |
| 10A <span style="border-bottom: 1px solid black; padding: 0 2px;">A2</span>                      | 194<br>(238) | 149<br>(193) | 105<br>(149) | 45 | 44 | 76<br>(67) | 128<br>(172) | 96<br>(102) | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 115         | 95 <sup>0</sup> <sub>-0.035</sub>  | 100 | 3  | 3  | 10 | 130 | 7  | 4.6<br>(6.0)      |
| 15A <span style="border-bottom: 1px solid black; padding: 0 2px;">A2</span>                      | 205          | 160          | 116          | 45 | 44 | 87         | 139          | 96          | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 115         | 95 <sup>0</sup> <sub>-0.035</sub>  | 100 | 3  | 3  | 10 | 130 | 7  | 5.1               |
| 20A <span style="border-bottom: 1px solid black; padding: 0 2px;">A2</span>                      | 220          | 175          | 131          | 45 | 44 | 102        | 154          | 96          | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 115         | 95 <sup>0</sup> <sub>-0.035</sub>  | 100 | 3  | 3  | 10 | 130 | 7  | 5.8               |
| 25A <span style="border-bottom: 1px solid black; padding: 0 2px;">A2</span>                      | 249          | 204          | 154          | 45 | 50 | 125        | 183          | 96          | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 115         | 95 <sup>0</sup> <sub>-0.035</sub>  | 100 | 3  | 3  | 10 | 130 | 7  | 7.0               |
| 30A <span style="border-bottom: 1px solid black; padding: 0 2px;">A2</span>                      | 262          | 199          | 155          | 63 | 44 | 124        | 178          | 114         | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 145         | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 6  | 12 | 165 | 9  | 11                |
| 40A <span style="border-bottom: 1px solid black; padding: 0 2px;">A2</span>                      | 299          | 236          | 192          | 63 | 44 | 161        | 215          | 114         | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 145         | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 6  | 12 | 165 | 9  | 14                |
| 50A <span style="border-bottom: 1px solid black; padding: 0 2px;">A2</span>                      | 339          | 276          | 232          | 63 | 44 | 201        | 255          | 114         | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 145         | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 6  | 12 | 165 | 9  | 17                |

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

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#### Connector Specifications

[SGMSS-10A to 50A]

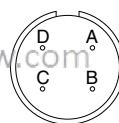
Email: service@repairtw.com

Encoder Connector

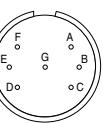


| Absolute Encoder |       | Incremental Encoder |       |
|------------------|-------|---------------------|-------|
| A                | K     | A                   | K     |
| B                | —     | L                   | —     |
| C                | DATA+ | M                   | —     |
| D  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

Motor Connector (Standard)



Motor Connector (With Brake)



# Direct-drive Servomotors

## ● Specifications

### SGMCS

|                       |                         |                              |  |   |   |
|-----------------------|-------------------------|------------------------------|--|---|---|
| Time Rating           | Continuous              | Ambient Humidity             | 20% to 80%RH (non-condensing)              | Enclosure   | : Totally-enclosed, self-cooled IP42 (SGMCS-02B to 35E) |
| Vibration Resistance  | V15                     | Mounting Method              | Flange-mounted                             | Totally-enclosed, self-cooled IP44 (SGMCS-45M to 2ZN) |   |
| Insulation Resistance | 500VDC,<br>10MΩ or more | Thermal Class                | A(SGMCS-02B to 35E)<br>F(SGMCS-45M to 2ZN) | (Through part of the shaft not included)              |   |
| Ambient Temperature   | 0°C to + 40°C           | Insulation Withstand Voltage | 1500VAC, 1min                              | Excitation Format                                     | Permanent magnet  |
|                       |                         |                              |  | Drive Method  | Direct drive  |

| Servomotor Type              |            | SGMCS- |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |   |
|------------------------------|------------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|
|                              |            | 02B    | 05B  | 07B  | 04C  | 10C  | 14C  | 08D  | 17D  | 25D  | 16E  | 35E  | 45M  | 80M  | 1AM  | 80N  | 1EN  | 2ZN  | A |
| Rated Output*1               | W          | 42     | 105  | 147  | 84   | 209  | 293  | 168  | 356  | 393  | 335  | 550  | 707  | 1260 | 1730 | 1260 | 2360 | 3140 |   |
| Rated Torque*1, *2           | N·m        | 2.00   | 5.00 | 7.00 | 4.00 | 10.0 | 14.0 | 8.00 | 17.0 | 25.0 | 16.0 | 35.0 | 45   | 80   | 110  | 80   | 150  | 200  |   |
| Instantaneous Peck Torque*1  | N·m        | 6.00   | 15.0 | 21.0 | 12.0 | 30.0 | 42.0 | 24.0 | 51.0 | 75.0 | 48.0 | 105  | 135  | 240  | 330  | 240  | 450  | 600  |   |
| Stall Torque*1(60min⁻¹)      | N·m        | 2.05   | 5.15 | 7.32 | 4.15 | 10.4 | 14.9 | 8.64 | 19.2 | 27.2 | 17.6 | 38.3 | 45   | 80   | 110  | 80   | 150  | 200  |   |
| Rated Current*1              | Arms       | 1.8    | 1.8  | 1.4  | 2.1  | 2.0  | 2.0  | 2.0  | 2.3  | 2.7  | 3.3  | 3.5  | 5.80 | 9.74 | 13.4 | 9.35 | 17.4 | 18.9 |   |
| Instantaneous Max.Current*1  | Arms       | 5.1    | 5.1  | 4.1  | 6.0  | 5.8  | 5.9  | 5.9  | 6.6  | 7.9  | 9.4  | 10.0 | 17   | 28   | 42   | 28   | 56   | 56   |   |
| Rated Speed*1                | min⁻¹      | 200    |      |      | 200  |      |      | 200  |      |      | 150  |      |      | 200  |      |      | 150  |      |   |
| Max. Speed*1                 | min⁻¹      | 500    |      |      | 500  |      |      | 400  |      |      | 300  |      |      | 350  |      |      | 250  |      |   |
| Torque Constant              | N·m/Arms   | 1.28   | 3.12 | 5.51 | 2.16 | 5.56 | 7.60 | 4.46 | 8.28 | 10.3 | 5.58 | 11.1 | 8.39 | 8.91 | 8.45 | 9.08 | 9.05 | 11.5 |   |
| Rotor Moment of Inertia      | kg·m²×10⁻⁴ | 25.0   | 51.0 | 77.0 | 77.0 | 140  | 220  | 285  | 510  | 750  | 930  | 1430 | 388  | 627  | 865  | 1360 | 2470 | 3060 |   |
| Rated Power Rate*1           | kW/s       | 1.60   | 4.90 | 6.36 | 2.08 | 7.14 | 8.91 | 2.25 | 5.67 | 8.33 | 2.75 | 8.57 | 52.2 | 102  | 140  | 47.1 | 91.1 | 131  |   |
| Rated Angular Acceleration*1 | rad/s²     | 800    | 980  | 910  | 520  | 710  | 640  | 280  | 330  | 330  | 170  | 240  | 1160 | 1280 | 1270 | 588  | 607  | 654  |   |
| Absolute Accuracy            | s          | ±15    |      |      | ±15  |      |      | ±15  |      |      | ±15  |      |      | ±15  |      |      | —    |      |   |
| Repeatability                | s          | ±1.3   |      |      | ±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°C (20°C for servomotors of SGMCS-45M to 2ZN). All others are for a coil temperature of 20°C.

\*2 : These values for the Rated Torque are for the continuous allowable torque with the following heatsinks at an ambient temperature of 40°C.

Heatsink dimensions : 350×350×12mm : SGMCS-02B 650×650×12mm : SGMCS-05B  
 450×450×12mm : SGMCS-07B 750×750×45mm : SGMCS-10C, 14C  
 550×550×12mm : SGMCS-17D

Notes : 1 Servomotors with brakes are not provided.

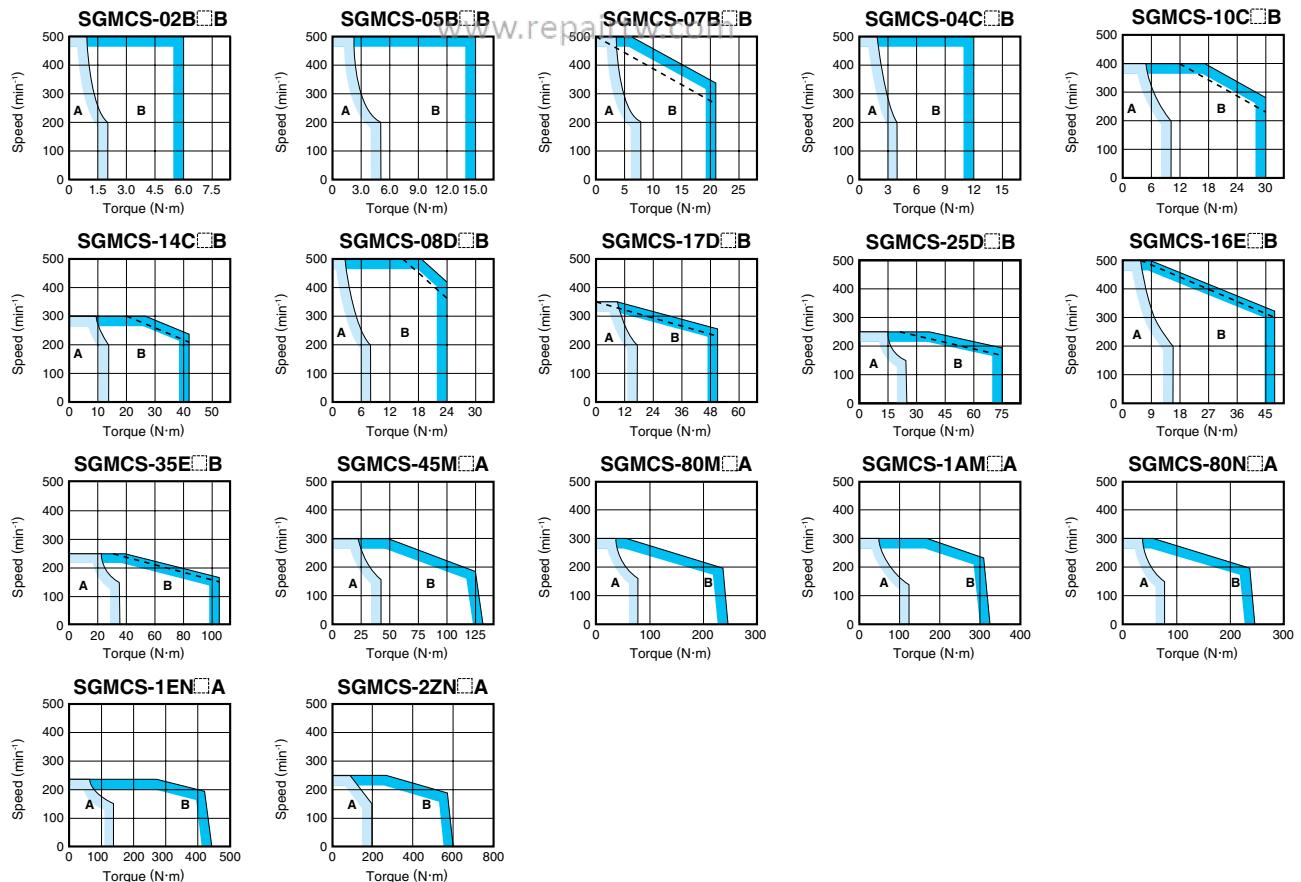
2 Bearing loss depends on the temperature of the bearing. The bearing loss will increase at low temperatures.

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### 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.

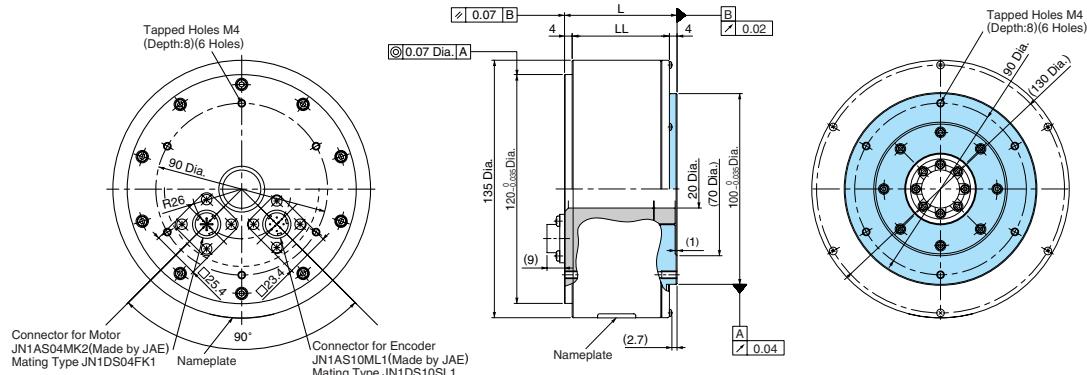


# Direct-drive Servomotors (cont'd)

## ●Dimensions Units : mm

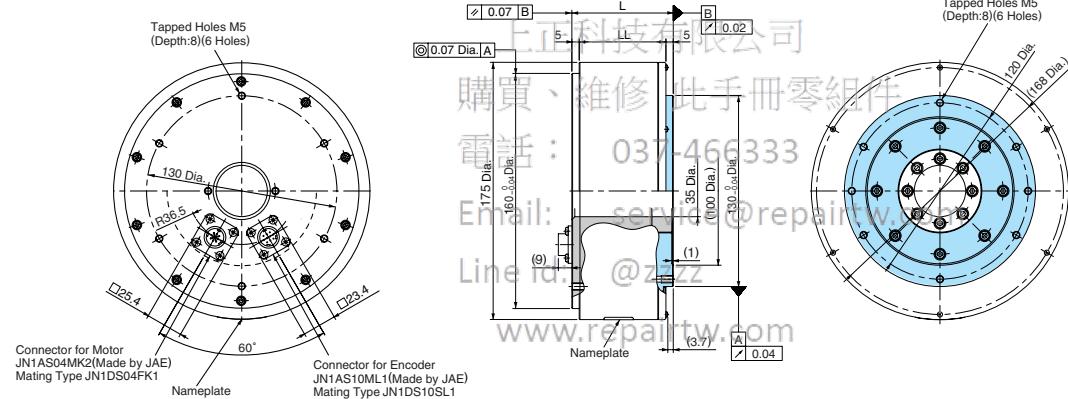
Rotating: Non Rotating Part:

### SGMCS-02B□B, 05B□B, 07B□B outer diameter: 135



| Servomotor Type<br>SGMCS-□□ | L   | LL  | Approx.Mass<br>kg |
|-----------------------------|-----|-----|-------------------|
| 02B□B11                     | 59  | 51  | 5.0               |
| 05B□B11                     | 88  | 80  | 6.2               |
| 07B□B11                     | 128 | 120 | 8.6               |

### SGMCS-04C□B, 10C□B, 14C□B outer diameter: 175



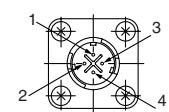
| Servomotor Type<br>SGMCS-□□ | L   | LL  | Approx.Mass<br>kg |
|-----------------------------|-----|-----|-------------------|
| 04C□B11                     | 69  | 59  | 7.2               |
| 10C□B11                     | 90  | 80  | 10.2              |
| 14C□B11                     | 130 | 120 | 14.2              |

#### Connector Specifications

SGMCS-02B to 35E

##### Motor Connector

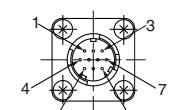
Model : JN1AS04MK2  
(Made by JAE)



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

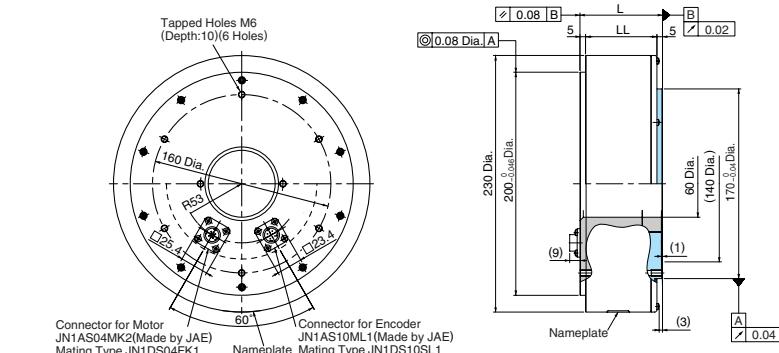
##### Encoder Connector

Model : JN1AS10ML1  
(Made by JAE)



|    |                      |                  |
|----|----------------------|------------------|
| 1  | PS                   | Light Blue       |
| 2  | *PS                  | Light Blue/White |
| 3  | -                    | -                |
| 4  | PG5V                 | Red              |
| 5  | -                    | -                |
| 6  | -                    | -                |
| 7  | FG<br>(Frame Ground) | Shield           |
| 8  | -                    | -                |
| 9  | PG0V                 | Black            |
| 10 | -                    | -                |

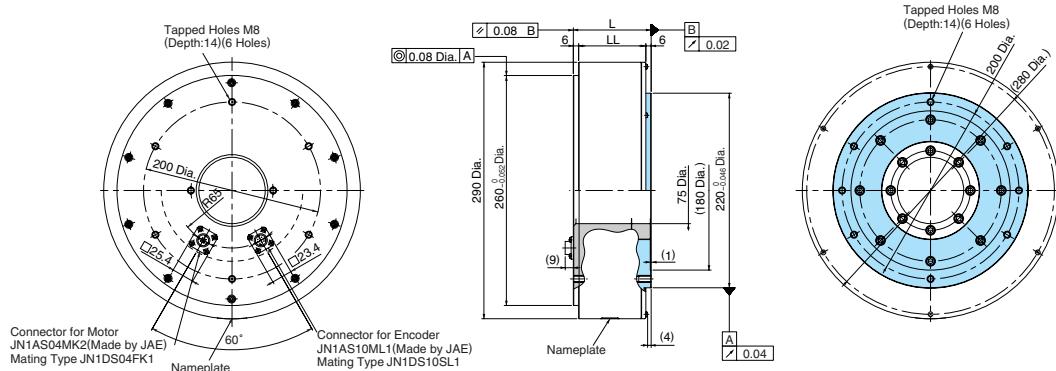
### SGMCS-08D□B, 17D□B, 25D□B outer diameter: 230



| Servomotor Type<br>SGMCS-□□ | L   | LL  | Approx.Mass<br>kg |
|-----------------------------|-----|-----|-------------------|
| 08D□B11                     | 74  | 64  | 14.0              |
| 17D□B11                     | 110 | 100 | 22.0              |
| 25D□B11                     | 160 | 150 | 29.7              |

**SGMCS-16E□B, 35E□B**

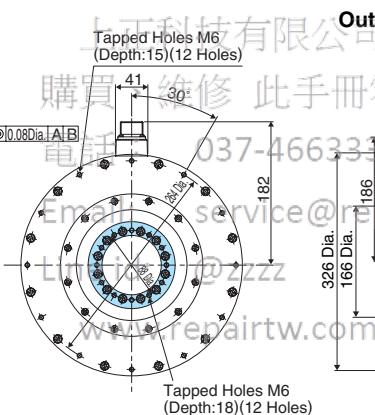
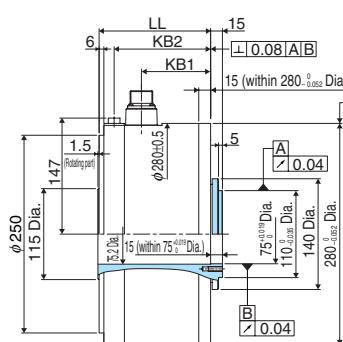
**Outer diameter: 290**



| Servomotor Type<br>SGMCS- <input type="text"/> | L   | LL  | Approx.Mass<br>kg |
|--|-----|-----|-------------------|
| 16E <input type="text"/> B11                   | 88  | 76  | 26.0              |
| 35E <input type="text"/> B11                   | 112 | 100 | 34.0              |

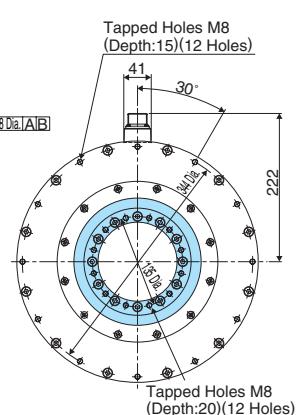
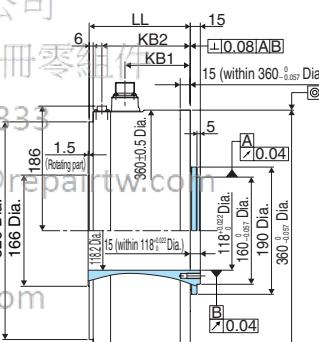
## SGMCS-45M□A, 80M□A, 1AM□A

**Outer diameter: 280**



**SGMCS-80N□A, 1EN□A, 2ZN□A**

**Outer diameter: 360**



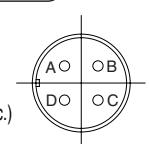
| Servomotor Type<br>SGMCS- <u>      </u> | LL  | KB1   | KB2 | Approx.Mass<br>kg |
|---|-----|-------|-----|-------------------|
| 45M <u>      </u> A11                   | 141 | 87.5  | 122 | 38                |
| 80M <u>      </u> A11                   | 191 | 137.5 | 172 | 45                |
| 1AM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

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

**Connector Specifications** [SGMCS-45M to 2ZN]

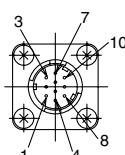
Motor Connector

Model  
: CE05-2A18-10PD  
(Made by DDK Electronics)



#### Encoder Connector

Model  
: JN1AS10ML1  
(Made by Japan Aviation  
Electronics Industry. Ltd.)

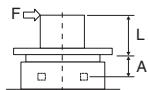
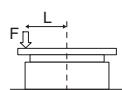
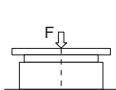


|    |                      |  |
|----|----------------------|--|
| 1  | PS                   |  |
| 2  | *PS                  |  |
| 3  | -                    |  |
| 4  | PG5V                 |  |
| 5  | -                    |  |
| 6  | -                    |  |
| 7  | FG<br>(Frame Ground) |  |
| 8  | -                    |  |
| 9  | PG0V                 |  |
| 10 | -                    |  |

#### **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:  $F_a = F + \text{Load's Mass}$   
Moment Loading:  $M = 0$

Force:  $F$   
Thrust Loading:  $F_a = F + \text{Load's Mass}$   
Moment Loading:  $M = F \times L$

Force:  $F$   
Thrust Loading:  $F_a = \text{Load's Mass}$   
Moment Loading:  $M = F \times (L + A)$

| Moment Loading - N·m   | Moment Loading - N·m  | Moment Loading - N·m (EPA)  |
|--|---|---|
| Servomotor Type<br>SGMCS- <span style="color:red">■■■■■</span> | 02B <span style="color:red">■■■■■</span> 05B <span style="color:red">■■■■■</span> 07B <span style="color:red">■■■■■</span> 04C <span style="color:red">■■■■■</span> 10C <span style="color:red">■■■■■</span> 14C <span style="color:red">■■■■■</span> 08D <span style="color:red">■■■■■</span> 17D <span style="color:red">■■■■■</span> 25D <span style="color:red">■■■■■</span> 16E <span style="color:red">■■■■■</span> 35E <span style="color:red">■■■■■</span> 45M <span style="color:red">■■■■■</span> A80M <span style="color:red">■■■■■</span> A1AM <span style="color:red">■■■■■</span> A80N <span style="color:red">■■■■■</span> A1EN <span style="color:red">■■■■■</span> A2ZN <span style="color:red">■■■■■</span> A | 02B <span style="color:red">■■■■■</span> 05B <span style="color:red">■■■■■</span> 07B <span style="color:red">■■■■■</span> 04C <span style="color:red">■■■■■</span> 10C <span style="color:red">■■■■■</span> 14C <span style="color:red">■■■■■</span> 08D <span style="color:red">■■■■■</span> 17D <span style="color:red">■■■■■</span> 25D <span style="color:red">■■■■■</span> 16E <span style="color:red">■■■■■</span> 35E <span style="color:red">■■■■■</span> 45M <span style="color:red">■■■■■</span> A80M <span style="color:red">■■■■■</span> A1AM <span style="color:red">■■■■■</span> A80N <span style="color:red">■■■■■</span> A1EN <span style="color:red">■■■■■</span> A2ZN <span style="color:red">■■■■■</span> 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   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | 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   | Single-phase 100VAC/Single-phase 200VAC  |      | Three-phase 200VAC | Single-phase 200VAC                 | Three-phase 200VAC |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Main Circuit   | Three-phase (or Single-phase) 200 to 230 VAC +10 to -15% 50/60 Hz  |      | Single-phase       | 100 to 115 VAC +10 to -15% 50/60 Hz |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Control Circuit  | Single-phase 200 to 230 VAC +10 to -15% 50/60 Hz   |      | Single-phase       | 100 to 115 VAC +10 to -15% 50/60 Hz |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | Control Method                 | Single-phase or three-phase full-wave rectification (Single-phase voltage doubler rectifier at 100V), IGBT, PWM control, Sin wave power drive system   |  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | Feedback                       | 17-bit or 20-bit serial encoder (incremental/absolute value)   |  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Torque Control Mode      | Conditions                     | Usage/Storage Temperature  | 0 to +55°C / -20 to +85°C  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Usage/Storage Humidity   | 90% RH or less (non-condensing)  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Vibration/Shock Resistance   | 4.9 m/s <sup>2</sup> / 19.6 m/s <sup>2</sup>   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | 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   | 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%  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Speed Control Mode       |                                | Soft Start Time Setting  | 0 to 10s (Acceleration, deceleration can each be set.)   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | Input Signals                  | Reference Voltage  | ±3VDC (±1V to ±10VDC: Variable setting range)/ Rated torque  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Input Impedance  | Input voltage: ±12V max. (Forward rotation if positive reference)  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Circuit Time Constant  | 30μs   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | Performance                    | Soft Start Time Setting  | 0 to 10s (Acceleration, deceleration can each be set.)   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Positioning Control Mode | Input Signals                  | Reference Voltage  | ±6VDC (±2V to ±10VDC: Variable setting range)/ Rated torque  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Input Impedance  | Input voltage: ±12V max. (Forward rotation if positive reference)  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Circuit Time Constant  | 30μs   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | Contact Speed Reference        | Rotation Direction   | Selected by P control Signal.  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| I/O Signals              |                                | Speed Selection  | Selected the speed (1st to 3rd) by forward/reverse current control signal.<br>When both signals are OFF, other control mode is selected. |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | Performance                    | Bias Setting   | 0 to 450 min <sup>-1</sup> (setting resolution 1 min <sup>-1</sup> )   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Feed Forward   | 0 to 100% (setting resolution 1%)  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Positioning Completion Width Setting   | 0 to 1073741824 reference unit (setting resolution 1 reference unit)   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | Input Signals                  | Pulse Type   | Select one signal from: sign+pulse train, CCW +CW pulse train, and 90° phase difference 2-phase pulse (phase A + phase B)                |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Integrated Functions     |                                | Pulse Form   | Non-isolated line driver (+5V level)   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Pulse Frequency  | Max.1Mpps (Non-isolated line driver)   |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          |                                | Control Signal   | CLEAR  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | 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                    |  |      |                    |                                     |                    |      |      |      |      |      | www.electroptech.com.tw<br>Line id: 037-466333<br>Email: service@electroptech.com.tw |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                          | Fixing Signal                  | Servo alarm, alarm code (3-bit output)   |  |      |                    |                                     |                    |      |      |      |      |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sequence Output Signal   | 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<br>Analog monitor connector for supervision of speed and torque reference signals, etc. integrated Speed : 1V/1000 min <sup>-1</sup><br>Torque : 1V/at rated torque 100%<br>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.

## ●Dimensions Units: mm

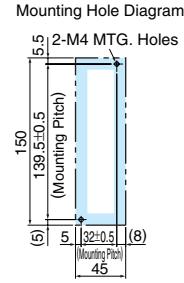
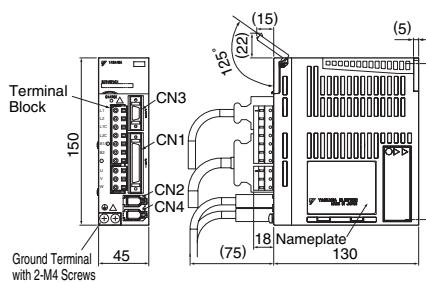
Connectors on SERVOPACK Side(Common for all types)

| 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

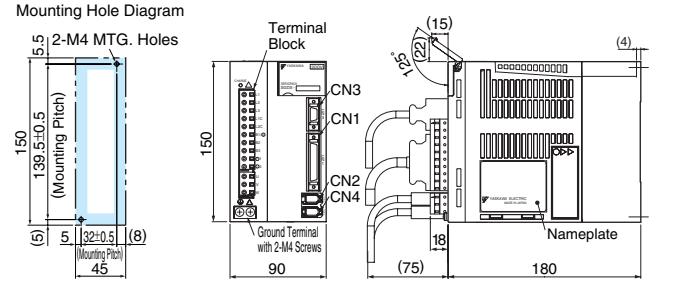
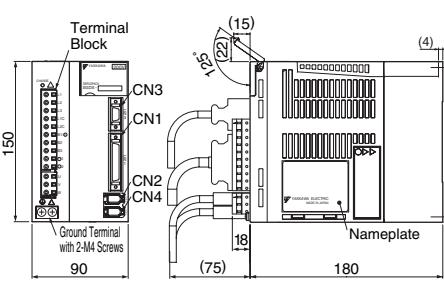
Single-phase 100V/200V 50W to 200W



Approx.mass : 0.7kg

### SGDS-15

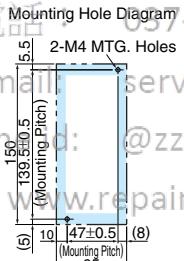
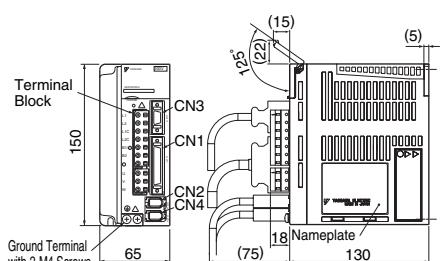
Three-phase 200V 1.5kW



Approx.mass : 2.1kg

### SGDS-04A

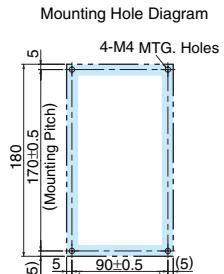
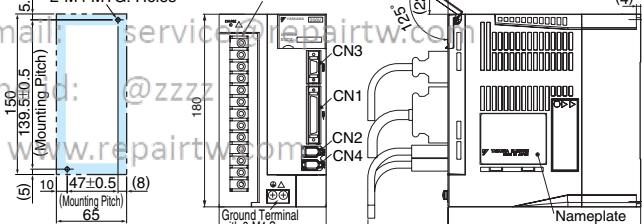
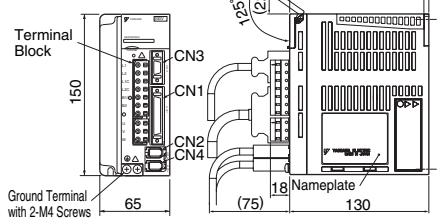
Single-phase 200V 400W



Approx.mass : 0.9kg

### SGDS-20, 30

Three-phase 200V 2.0kW/3.0kW



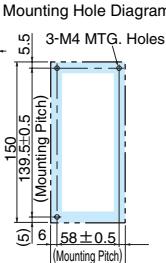
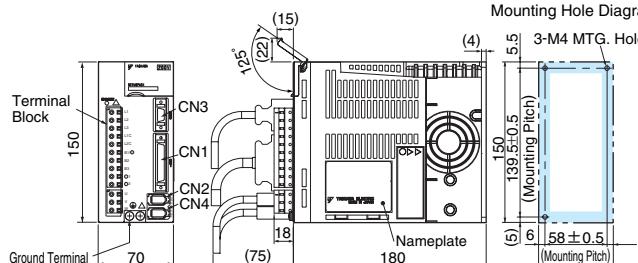
Approx.mass : 2.8kg

### SGDS-04F, 05, 08,10

Single-phase 100V 400W

Single-phase 200V 750W

Three-phase 200V 500W / 1.0kW

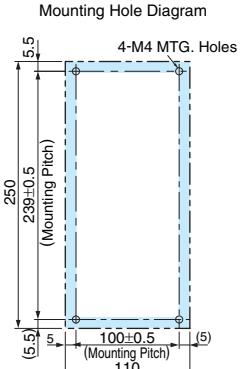
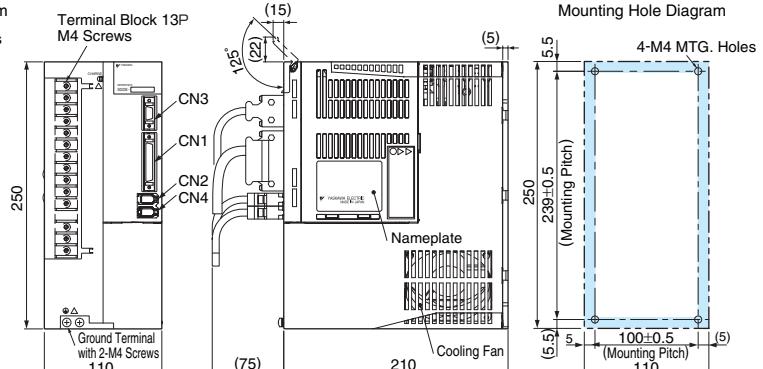


Approx.mass : 1.4kg

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

### SGDS-50

Three-phase 200V 5.0kW



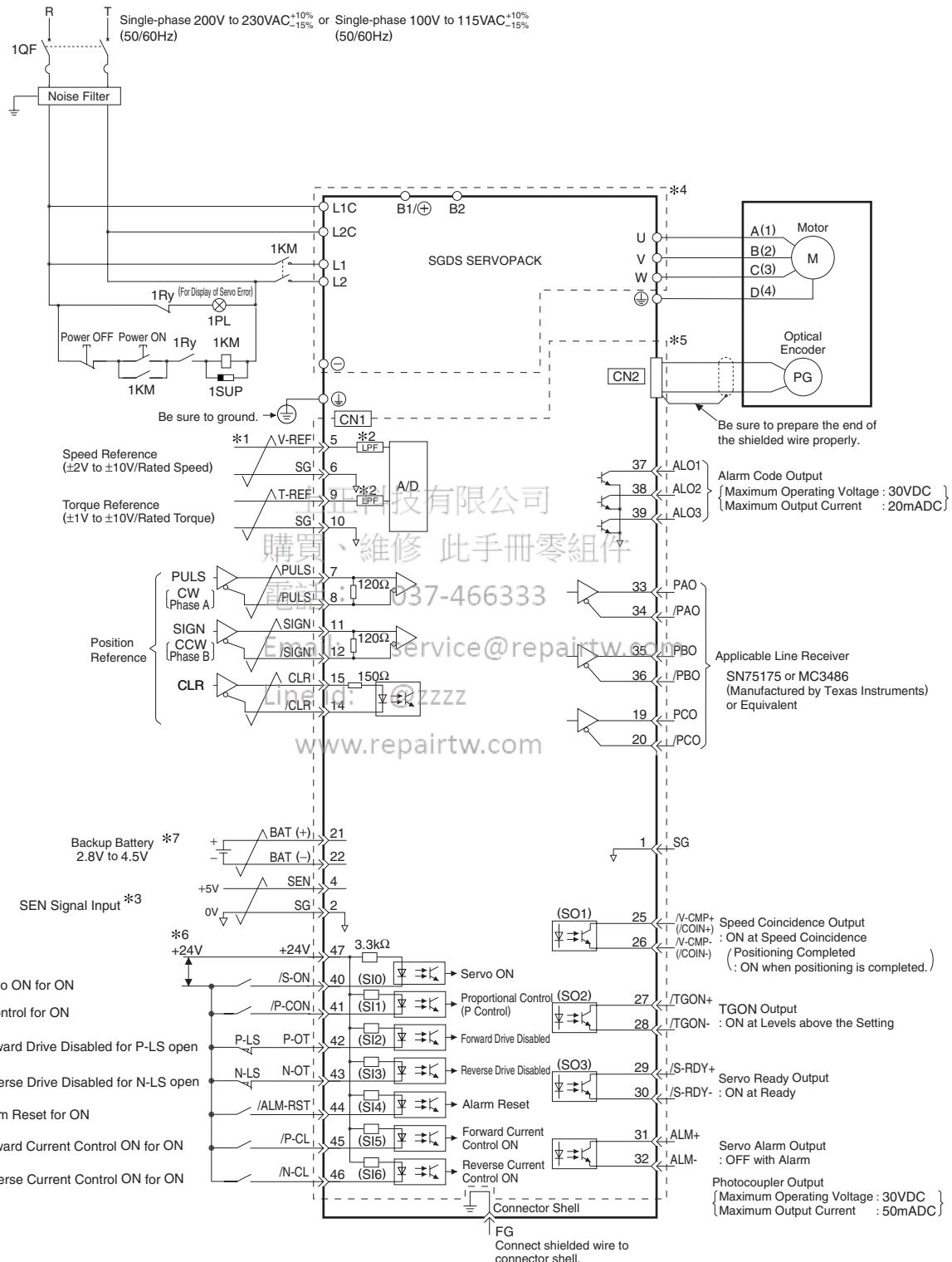
Approx.mass : 5.0kg

# SGDS-□□□ 01/02 SERVOPACKs (cont'd)

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

## ● Connection Diagrams

Single-phase (100V/200VAC)



\*1 : represents twisted-pair wire.

\*2 : Primary filter. The time constant is 30μs.

\*3 : Required when using an absolute encoder.

\*4 : This circuit is electrically separated from the outside to prevent electrical shock.

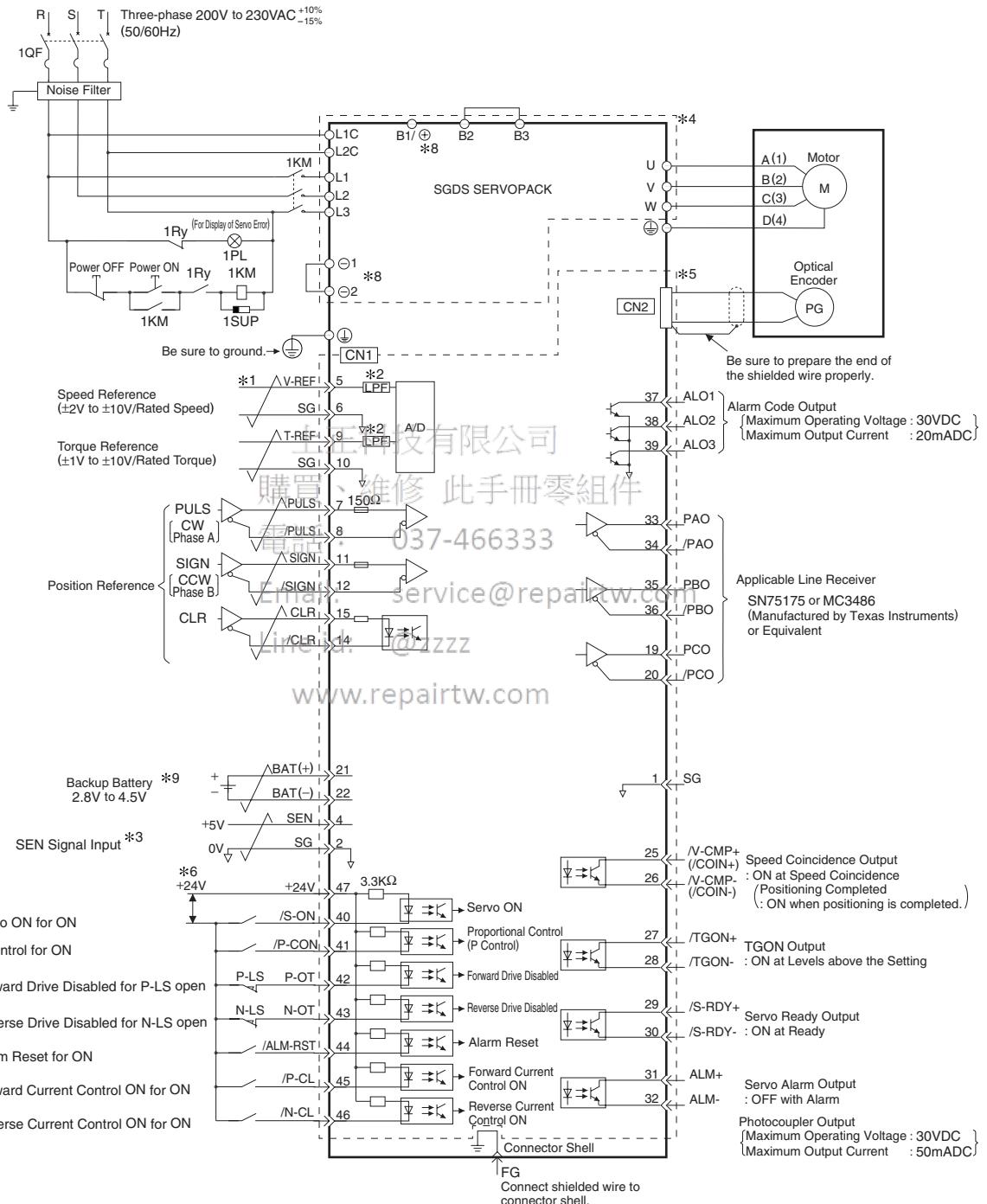
\*5 : This is a SELV circuit separated from other circuit by double insulation or reinforced insulation.

\*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.

### Three-phase (200VAC)



\*1:  represents twisted-pair wire.

\*2 : Primary filter. The time constant is 47  $\mu$ s.

\*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.

\*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 resistor between terminals B1/⊕ and B2 or terminals B1 and B3.

\*8 : Place a DC reactor between terminals  $\ominus$ 1 and  $\ominus$ 2 to suppress high harmonic waves.

**\*8** : Place a DC reactor between terminals  $\ominus$  and  $\odot$  to suppress high harmonic waves.  
**\*9** : Connect an external backup battery if using an absolute encoder. Do not connect the battery

不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

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 |
|                        | 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 |      |      |      |      |      |   |      |
|                        |                                | 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 (Sigle-phase voltage doubler rectifier at 100V), IGBT, PWMcontrol, Sin wave power drive system   |  |                    |          |      |      |      |      |      |   |      |
| Integrated Functions   | 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 <sup>2</sup> / 19.6 m/s <sup>2</sup>  |  |                    |          |      |      |      |      |      |   |      |
|                        | 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                                    | Load Variance   | During 0 to 100 load: ±0.01% max. (at rated speed) |                    |          |      |      |      |      |      |   |      |
|                        |                                | Variance                                 | 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 <sub>L</sub> = J <sub>M</sub> )       |                    |          |      |      |      |      |      |   |      |
| I/O Signals            |                                | Torque Control Accuracy(Reproducibility) | ±1%   |  |                    |          |      |      |      |      |      |   |      |
|                        |                                | Soft Start Time Setting                  | 0 to 10s (Acceleration, deceleration can each be set.)  |  |                    |          |      |      |      |      |      |   |      |
|                        | Analog Monitor (CN5)           |  | Output voltage : ±8VDC  |  |                    |          |      |      |      |      |      |   |      |
|                        |                                |  | Analog monitor connector for supervision of speed and torque reference signals, etc. integrated   |  |                    |          |      |      |      |      |      |   |      |
|                        |                                |  | Speed : 1V/1000 min <sup>-1</sup>   |  |                    |          |      |      |      |      |      |   |      |
|                        |                                |  | 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.   |  |                    |          |      |      |      |      |      |   |      |
| Control Specifications | Dynamic Brake (DB)             |  | Automatic built-in DB motivates at main power OFF, servo alarm, servo OFF, and overtravel.  |  |                    |          |      |      |      |      |      |   |      |
|                        | Regeneration                   |  | External regenerative resistor (SGDS-A5 to 04)  | Built-in regenerative resistor (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  |
|  |  | Station Address                       | 41H to 5FH<br>(Max. number of slaves: 30)  |
|  |  | Transmission Speed                    | 10Mbps   |
|  |  | Transmission Cycle                    | 250 μs , 0.5 ms to 4 ms (Multiples of 0.5)<br>In accordance with the setting of the host controller.   |
|  |  | Number of Words for Link Transmission | Can choose between 17-bytes/station and 32-bytes/station with the DIP switch(SW2).   |
|  | Command Method                                 | Performance                           | Position control, speedcontrol, and torque control with MECHATROLINK-II communications   |
|  |  | Commands                              | MECHATROLINK-I and MECHATROLINK-II commands<br>(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.                 |  |
|  | 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 |
|  |  | Fixed Output                          | Alarm  |
|  | Position Output                                | 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.                        |
|  |  | 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.

## ●Dimensions Units: mm

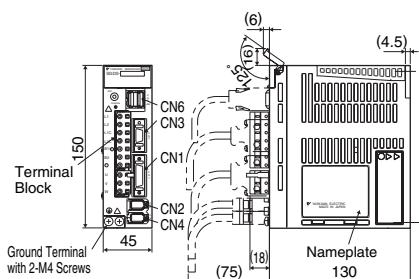
Connectors on SERVOPACK Side (Common for all types)

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

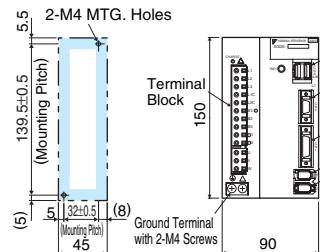
Note: Use connectors above or equivalent.

### SGDS-A5, 01, 02

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



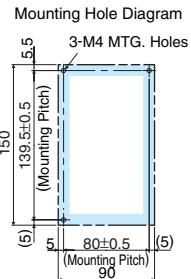
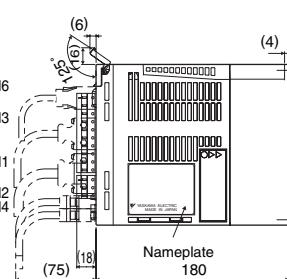
Mounting Hole Diagram



Approx.mass : 0.7kg

### SGDS-15

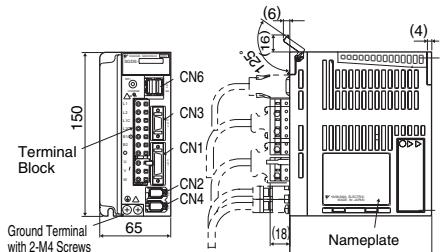
Three-phase 200V 1.5kW



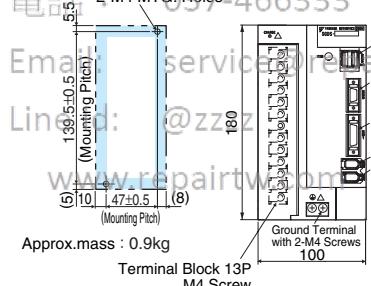
Approx.mass : 2.1kg

### SGDS-04A

Single-phase 200V 400W



Mounting Hole Diagram

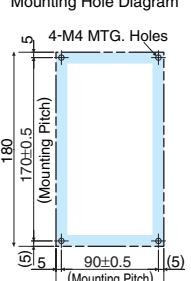
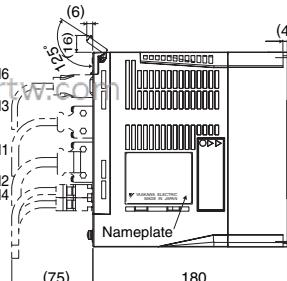


Approx.mass : 0.9kg

Terminal Block 13P M4 Screw

### SGDS-20, 30

Three-phase 200V 2.0kW/3.0kW



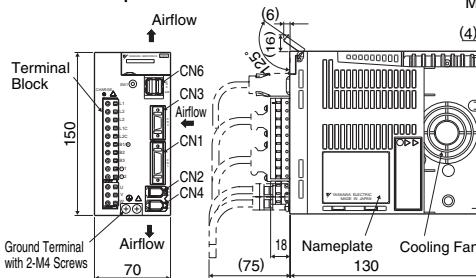
Approx.mass : 2.8kg

### SGDS-04F, 05, 08, 10

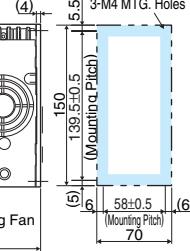
Single-phase 100V 400W

Single-phase 200V 750W

Three-phase 200V 500W/1.0kW



Mounting Hole Diagram

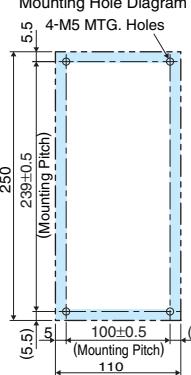
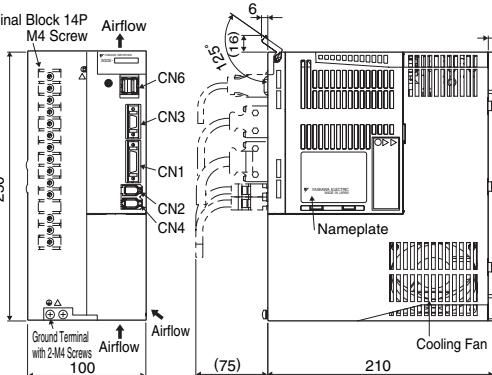


Approx.mass : 1.4kg

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

### SGDS-50

Three-phase 200V 5.0kW



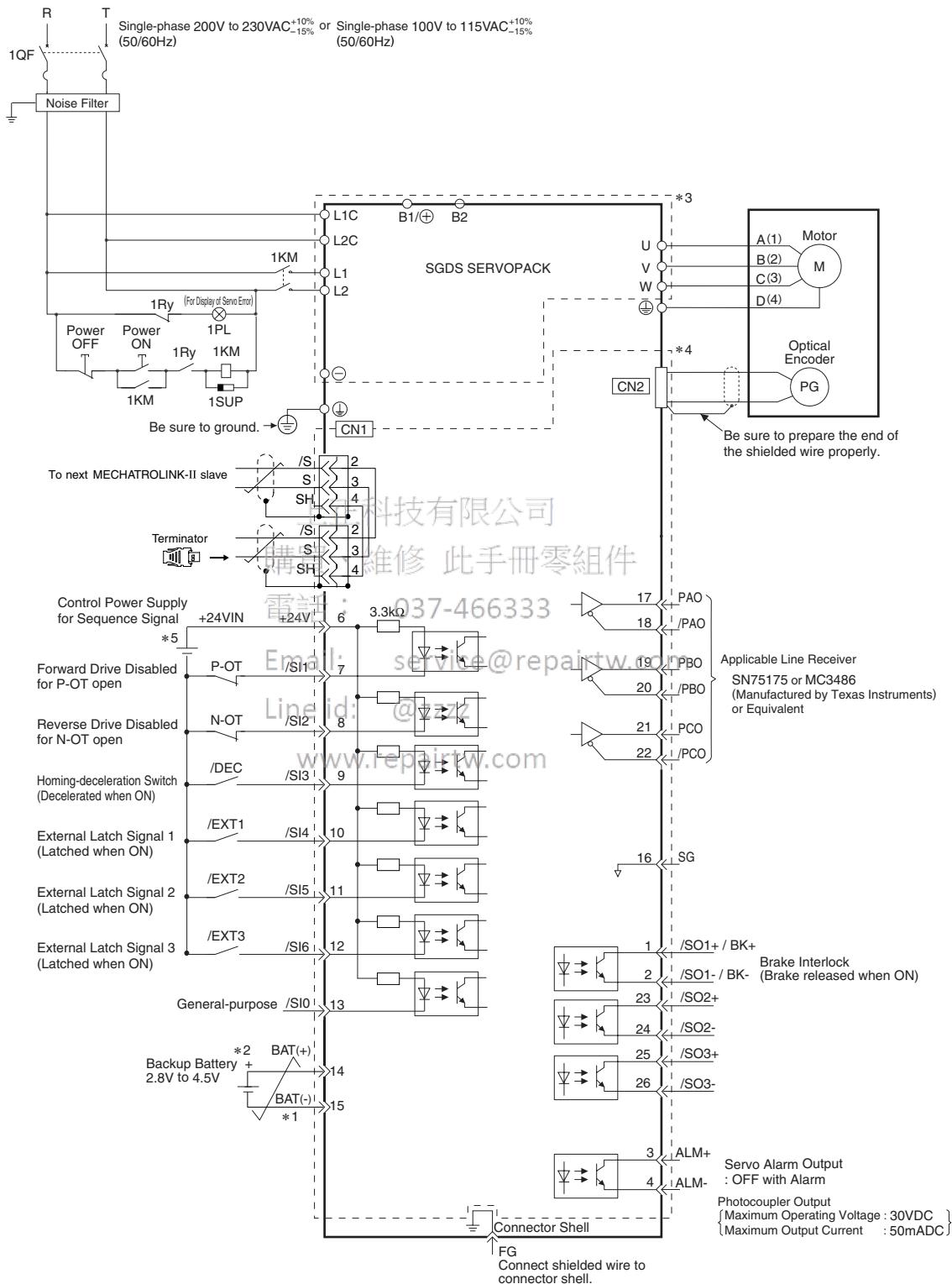
Approx.mass : 5.0kg

# SGDS-□□□ 12 SERVOPACKs (cont'd)

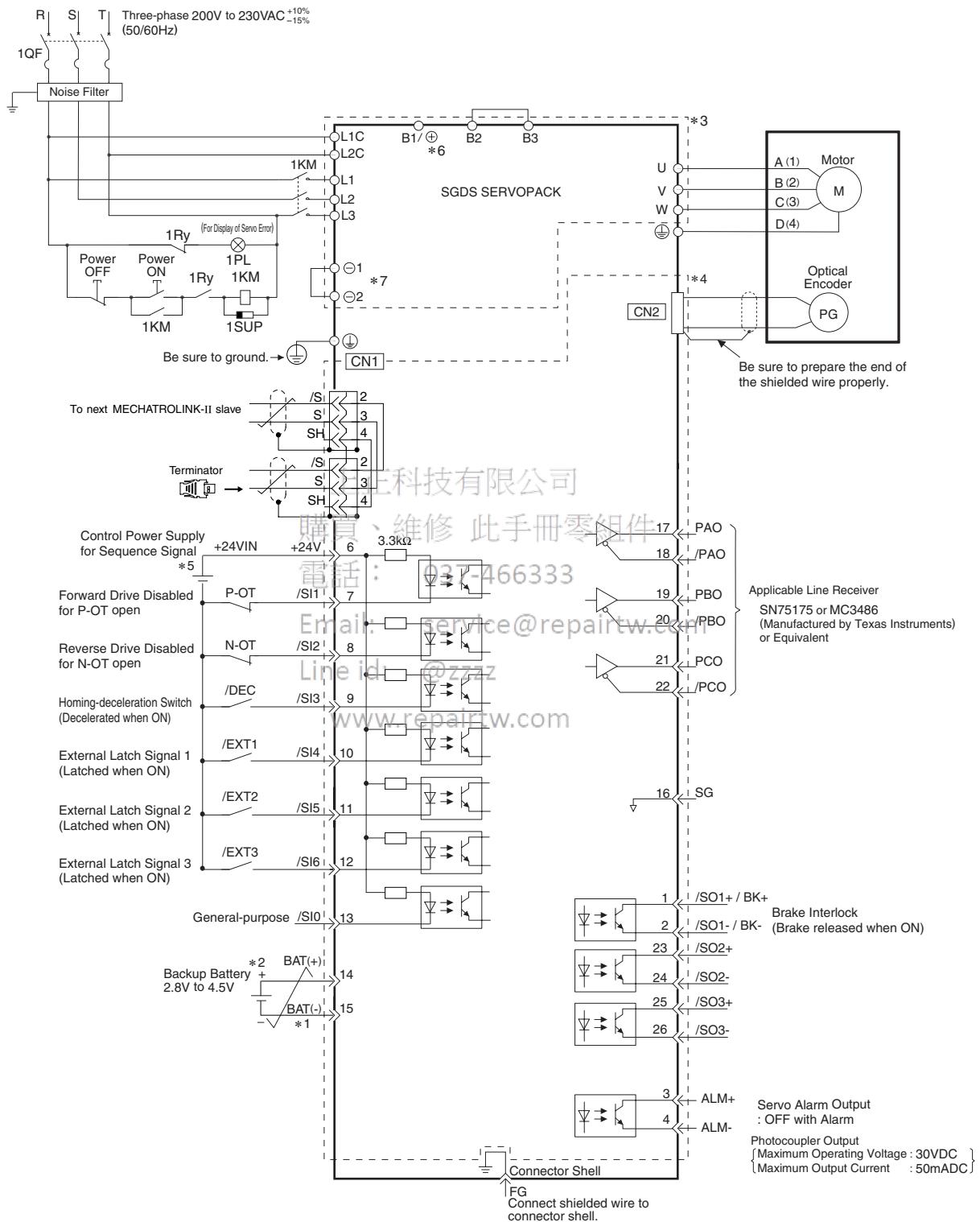
(MECHATROLINK Communications)

## ● Connection Diagrams

Single-phase (100V/200VAC)

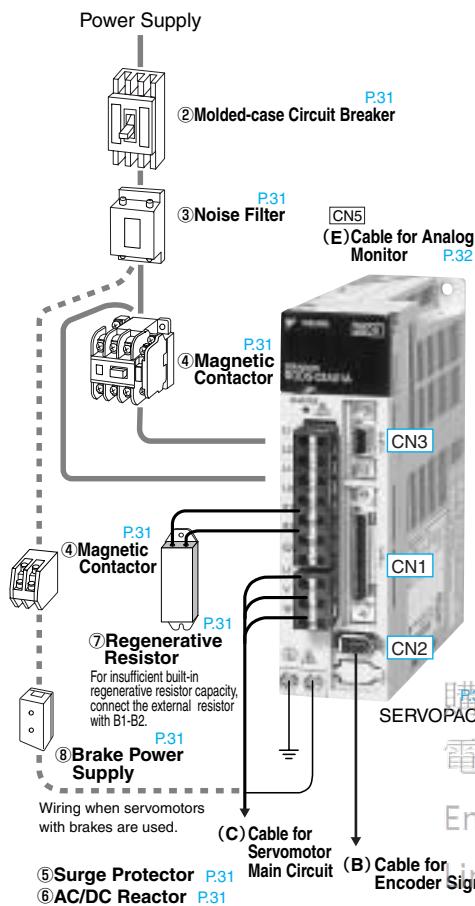


## Three-phase (200VAC)



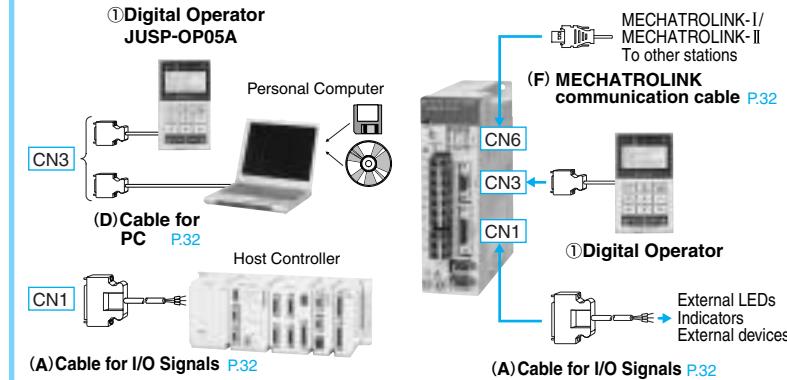
# Ordering Reference

## ● System Configurations



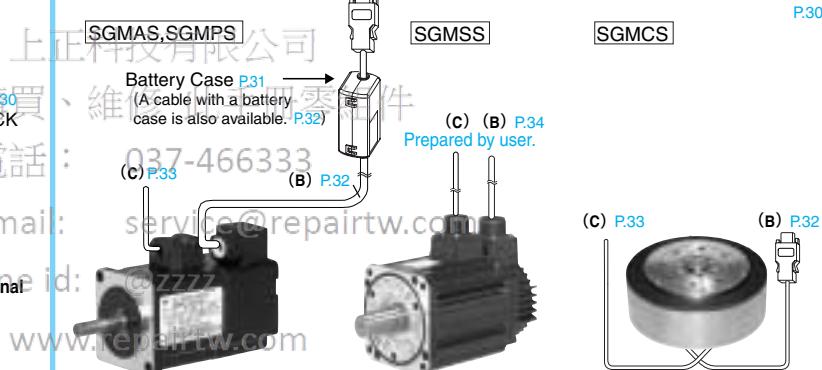
### Command Methods from Host Controller

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



### Servomotors

- Rotary Servomotors P30
- Direct-drive Servomotors P30



Note: Servomotors with brakes are not provided.

## ● Servo Drives

### Rotary Servo Drives

| Servomotor |          | SERVOPACK Type SGDS-□□□□ |                   |                  |
|------------|----------|--------------------------|-------------------|------------------|
| Type       | Capacity | Single-phase 100V        | Single-phase 200V | Three-phase 200V |
| 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              |

### Direct Drives

| Servomotor |              | SERVOPACK Type SGDS-□□□□ |                   |                  |
|------------|--------------|--------------------------|-------------------|------------------|
| 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.

## ●Peripheral Devices

### For All Motors

(Refer to dimensions for peripheral devices on P.35.)

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

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

\*1: Values are at a rated load. Select an appropriate fuse after derating. Operating characteristics (25°C) are 2s min. for 200% and 0.01s min. for 700%.

\*2: 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.

\*3: 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 Brake Power Supply Unit made by YASKAWA Controls Co., Ltd

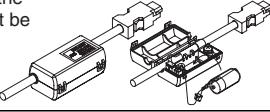
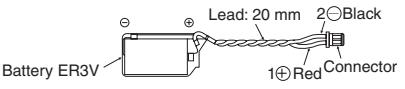
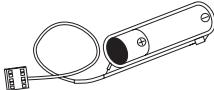
- Surge Protector made by Okaya Electric Industries Co., Ltd

\*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.<br> |
| 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.)<br>   |

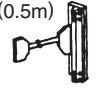
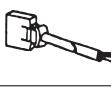
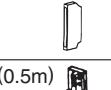
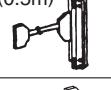
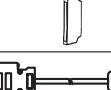
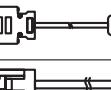
Note: Install the battery at either the host controller or the battery case of the encoder. It is dangerous to install batteries at both simultaneously, because that sets up a loop circuit between the batteries.

# Ordering Reference (cont'd)

## ●Cables and Connectors

### For All Motors

(Refer to dimensions for peripheral devices on P.36 to P.37)

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

電話： 037-466333

### SGMAS/SGMPS Rotary Servomotors and SGMCS Direct-drive Servomotors

Email: [servicerepairtw.com](mailto:servicerepairtw.com)

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

### (B) CN2 Cable for Encoder Signal

Line id: @zzzz

| Name  | Motor Type          | Type          | Specifications | Name   | Motor Type                 | Type   | Specifications                                   |
|---|---------------------|---------------|----------------|--|----------------------------|--|--|
| Cable with Connectors at Both Ends (For Incremental)                | SGMAS 50W to 1.15kW | JZSP-CSP01-03 | 3m             | Cable with Single Connector on SERVOPACK End | SGMAS 50W to 1.15kW        | JZSP-CSP04-03  | 3m SERVOPACK End Absolute Encoder End            |
|   |                     | JZSP-CSP01-05 | 5m             |  | JZSP-CSP04-05              | 5m   |  |
|   | SGMPS 100W to 400W  | JZSP-CSP01-10 | 10m            |  | JZSP-CSP04-10              | 10m  |  |
|   |                     | JZSP-CSP01-15 | 15m            |  | JZSP-CSP04-15              | 15m  |  |
|   |                     | JZSP-CSP01-20 | 20m            |  | JZSP-CSP04-20              | 20m  | Battery Case With Battery                        |
|   | SGMPS 750W, 1.5kW   | JZSP-CMP00-03 | 3m             |  | SGMAS                      | JZSP-CSP04-03  | 3m SERVOPACK End Absolute Encoder End            |
|   |                     | JZSP-CMP00-05 | 5m             |  | SGMPS                      | JZSP-CSP04-05  | 5m   |
|   |                     | JZSP-CMP00-10 | 10m            |  | SGMCS*                     | JZSP-CSP04-10  | 10m  |
|   |                     | JZSP-CMP00-15 | 15m            |  | JZSP-CSP04-15              | 15m  |  |
|   |                     | JZSP-CMP00-20 | 20m            |  | JZSP-CSP04-20              | 20m  |  |
| Cable with Connectors at Both Ends (With Battery Case for Absolute) | SGMAS 50W to 1.15kW | JZSP-CSP05-03 | 3m             | Connector Kit on SERVOPACK End               | SGMAS                      | JZSP-CMP9-1  | Solder Type                                      |
|   |                     | JZSP-CSP05-05 | 5m             |  | SGMPS                      |  |  |
|   | SGMPS 100W to 400W  | JZSP-CSP05-10 | 10m            |  | SGMCS                      |  |  |
|   |                     | JZSP-CSP05-15 | 15m            |  |                            |  |  |
|   |                     | JZSP-CSP05-20 | 20m            |  |                            |  |  |
|   | SGMPS 750W, 1.5kW   | JZSP-CSP19-03 | 3m             |  | Connector Kit on Motor End | JZSP-CSP9-2  | Calking Type (Special tool is required for use.) |
|   |                     | JZSP-CSP19-05 | 5m             |  | SGMAS 50W to 1.15kW        |  |  |
|   |                     | JZSP-CSP19-10 | 10m            |  | SGMPS 100W to 400W         |  |  |
|   |                     | JZSP-CSP19-15 | 15m            |  |                            |  |  |
|   |                     | JZSP-CSP19-20 | 20m            |  | SGMPS 750W, 1.5kW          | JZSP-CMP9-2  | Solder Type                                      |
| Cable with Single Connector on SERVOPACK End (For Incremental)      | SGMAS 50W to 1.15kW | JZSP-CMP03-03 | 3m             | Cable  | SGMCS                      | Order from Japan Aviation Electronics Industry, Ltd. | Calking Type (Special tool is required for use.) |
|   |                     | JZSP-CMP03-05 | 5m             |  |                            |  | • Straight Connector JN1DS10SL1                  |
|   | SGMPS 100W to 1.5kW | JZSP-CMP03-10 | 10m            |  |                            |  | • Socket Contact JN1-22-22S-PKG100               |
|   |                     | JZSP-CMP03-15 | 15m            |  |                            |  |  |
|   | SGMCS*              | JZSP-CMP03-20 | 20m            |  |                            |  |  |

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

## (C) Cable for Servomotor Main Circuit

| Name                          | Motor Type                         | Type              | Specifications  |                              | Name                       | Motor Type         | Type  | Specifications                                      |
|-------------------------------|------------------------------------|-------------------|---|------------------------------|----------------------------|--------------------|---|---|
| Cable for Motor without Brake | SGMAS 50W to 150W                  | JZSP-CSM01-03     | 3m  |                              | Cable for Motor with Brake | SGMPS 750W         | JZSP-CMM10-03                                       | 3m  |
|                               |                                    | JZSP-CSM01-05     | 5m  |                              |                            |                    | JZSP-CMM10-05                                       | 5m  |
|                               |                                    | JZSP-CSM01-10     | 10m   |                              |                            |                    | JZSP-CMM10-10                                       | 10m   |
|                               |                                    | JZSP-CSM01-15     | 15m   |                              |                            |                    | JZSP-CMM10-15                                       | 15m   |
|                               |                                    | JZSP-CSM01-20     | 20m   |                              |                            |                    | JZSP-CMM10-20                                       | 20m   |
|                               | SGMAS 200W to 600W                 | JZSP-CSM02-03     | 3m  | SERVOPACK End      Motor End |                            | SGMPS 1.5kW        | JZSP-CMM30-03                                       | 3m  |
|                               |                                    | JZSP-CSM02-05     | 5m  |                              |                            |                    | JZSP-CMM30-05                                       | 5m  |
|                               |                                    | JZSP-CSM02-10     | 10m   |                              |                            |                    | JZSP-CMM30-10                                       | 10m   |
|                               |                                    | JZSP-CSM02-15     | 15m   |                              |                            |                    | JZSP-CMM30-15                                       | 15m   |
|                               |                                    | JZSP-CSM02-20     | 20m   |                              |                            |                    | JZSP-CMM30-20                                       | 20m   |
| Cable for Motor without Brake | SGMAS 750W, 1.15kW                 | JZSP-CSM03-03     | 3m  |                              | Connector Kit on Motor End | SGMAS 50W to 150W  | JZSP-CSM9-1   |   |
|                               |                                    | JZSP-CSM03-05     | 5m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CSM03-10     | 10m   |                              |                            | SGMPS 100W         |   |   |
|                               |                                    | JZSP-CSM03-15     | 15m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CSM03-20     | 20m   |                              |                            | SGMAS 200W to 600W | JZSP-CSM9-2   | Calking Type<br>(Special tool is required for use.) |
|                               | SGMPS 750kW                        | JZSP-CMM00-03     | 3m  | SERVOPACK End      Motor End |                            |                    |   |   |
|                               |                                    | JZSP-CMM00-05     | 5m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM00-10     | 10m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM00-15     | 15m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM00-20     | 20m   |                              |                            |                    |   |   |
| Cable for Motor without Brake | SGMPS 1.5kW                        | JZSP-CMM20-03     | 3m  | SERVOPACK End      Motor End | SGMAS 750W, 1.15kW         | JZSP-CSM9-3        |   |   |
|                               |                                    | JZSP-CMM20-05     | 5m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM20-10     | 10m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM20-15     | 15m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM20-20     | 20m   |                              |                            |                    |   |   |
|                               | SGMCS -□□B<br>-□□C<br>-□□D<br>-□□E | JZSP-CMM60-03     | 3m  | SERVOPACK End      Motor End | SGMPS 750W (Without Brake) | JZSP-CMM9-1        | Calking Type<br>(Special tool is required for use.) |   |
|                               |                                    | JZSP-CMM60-05     | 5m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM60-10     | 10m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM60-15     | 15m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM60-20     | 20m   |                              |                            |                    |   |   |
| Cable for Motor with Brake    | SGMCS -□□M<br>-□□N                 | Prepared by user. | L-shaped Plug: MS3108B18-10S<br>Straight Plug: MS3106B18-10S<br>Cable Clamp: MS3057-10A |                              | SGMPS 750W (With Brake)    | JZSP-CMM9-2        | Calking Type<br>(Special tool is required for use.) |   |
|                               |                                    | JZSP-CMM60-03     | 3m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM60-05     | 5m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM60-10     | 10m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM60-15     | 15m   |                              |                            |                    |   |   |
|                               | SGMAS 50W to 150W                  | JZSP-CMM11-03     | 3m  | SERVOPACK End      Motor End | SGMCS -□□B,C,D,E           | JZSP-CMM9-3        | Calking Type<br>(Special tool is required for use.) |   |
|                               |                                    | JZSP-CMM11-05     | 5m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM11-10     | 10m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM11-15     | 15m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM11-20     | 20m   |                              |                            |                    |   |   |
| Cable for Motor with Brake    | SGMAS 200W to 600W                 | JZSP-CMM12-03     | 3m  | SERVOPACK End      Motor End | SGMCS -□□B,C,D,E           | JZSP-CMM9-15       |   |   |
|                               |                                    | JZSP-CMM12-05     | 5m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM12-10     | 10m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM12-15     | 15m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CMM12-20     | 20m   |                              |                            |                    |   |   |
|                               | SGMPS 200W to 400W                 | JZSP-CSM13-03     | 3m  | SERVOPACK End      Motor End | SGMAS 750W, 1.15kW         | JZSP-CSM90-20      | 20 m max.   |   |
|                               |                                    | JZSP-CSM13-05     | 5m  |                              |                            |                    |   |   |
|                               |                                    | JZSP-CSM13-10     | 10m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CSM13-15     | 15m   |                              |                            |                    |   |   |
|                               |                                    | JZSP-CSM13-20     | 20m   |                              |                            |                    |   |   |

# Ordering Reference (cont'd)

## ●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

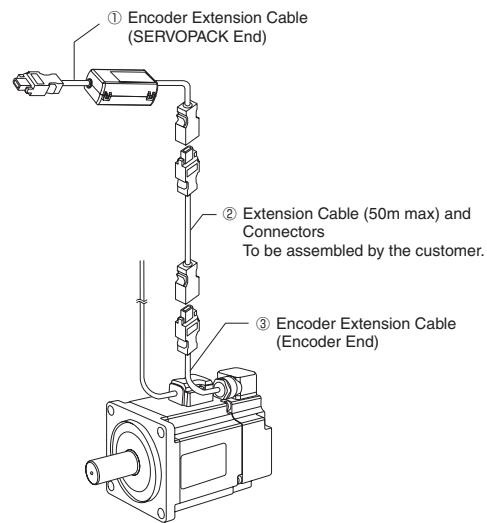
| Name   | Type               | Specifications               |
|--|--------------------|------------------------------|
| Cable with Single Connector on SERVOPACK End (For Incremental)   | JZSP-CMP03-03      | 3m                           |
|  | JZSP-CMP03-05      | 5m                           |
| 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

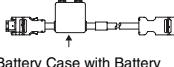
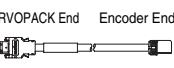
#### (C) Cable for Servomotor Main Circuit

Prepared by user.

## ●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 (P.33 to P.34).



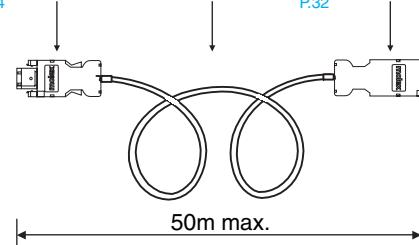
| Name   | Type   |
|--|--|
| ① Encoder Extension Cable with Connectors (SERVOPACK End: with a Battery Case for Absolute Encoder)            | JZSP-CSP12 (0.3m)<br>SERVOPACK End Encoder End<br><br>Battery Case with Battery |
| ② Encoder Extension Cable  | JZSP-CMP19-30 (30m)*<br>JZSP-CMP19-40 (40m)*<br>JZSP-CMP19-50 (50m)*   |
| ③ Encoder Extension Cable with Connectors (Encoder End: Applicable for Both Incremental and Absolute Encoders) | JZSP-CSP11 (0.3m)<br>SERVOPACK End Encoder End<br>                              |

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

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

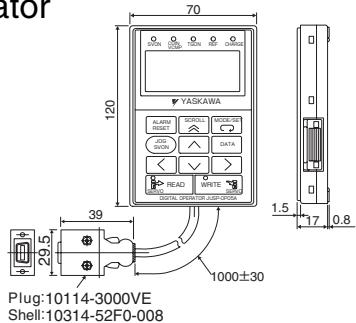
P.32, P.34

P.32



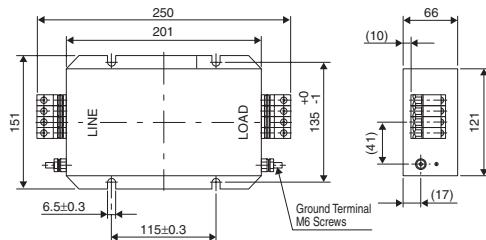
## Dimensions for Peripheral Devices Units: mm

### ① Digital Operator



### ③ Noise Filter For Three-phase 200 V FMAC type made by Schurter, Inc.

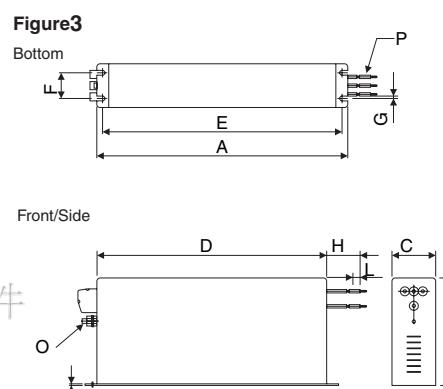
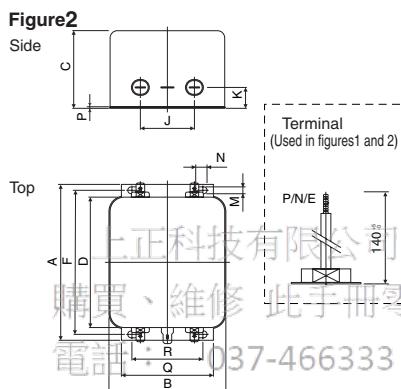
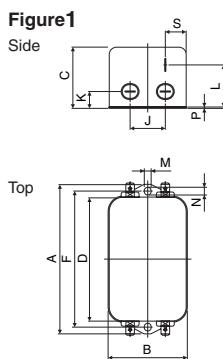
FMAC-0934-5010



Specifications : 480VAC,50A

### ③ Noise Filter

FN type made by Schaffner EMC Inc.



Email: [service@repairtw.com](mailto:service@repairtw.com)

### For Single-phase 100 V/200 V

| Code    | Error | Type      | Line Id: (@zzz) |              |              |
|---------|-------|-----------|-----------------|--------------|--------------|
|         |       |           | FN2070-6/07     | FN2070-10/07 | FN2070-16/07 |
| Figure1 |       | Figure1   | 113.5±1         | 156±1        | 119±0.5      |
| A       | —     |           |                 |              |              |
| 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   |              |

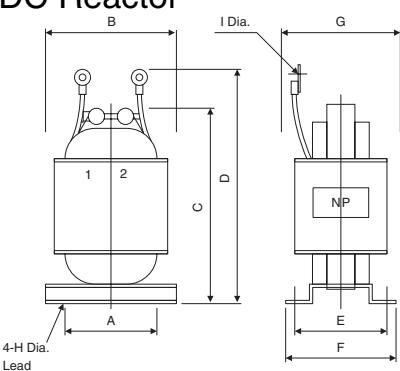
\* : The rated current is +40°C.

### For Three-phase 200 V

| Code   | Error | Type      | Figure3     |              |              |
|--------|-------|-----------|-------------|--------------|--------------|
|        |       |           | FN258L-7/07 | FN258L-16/07 | FN258L-30/07 |
| 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°C.

### ⑥ AC/DC Reactor

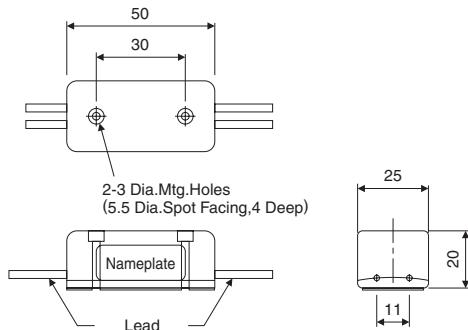


| Reactor Type | Inductance mH | Rated Current A | Dimensions in mm |    |     |     |    |    |    |   |     | Approx. Mass kg |
|--------------|---------------|-----------------|------------------|----|-----|-----|----|----|----|---|-----|-----------------|
|              |               |                 | 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             |

# Ordering Reference (cont'd)

## Dimensions for Peripheral Devices Units: mm

### ⑧ Brake Power Supply Unit Note: This brake power supply is used for 90 VDC. The 24-VDC brake power supply is not included.



- 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

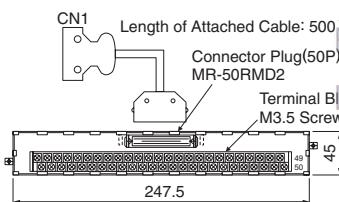
## Dimensions for Cables and Connectors Units: mm

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

For analog voltage references or pulse train references

#### Connector to Terminal Conversion Unit

JUSP-TA50P

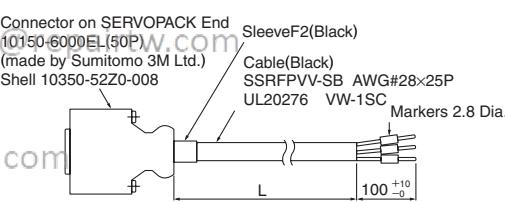


Email: [service@repairtw.com](mailto:service@repairtw.com)

電話 : 037-466555

#### Cables with Single Connector

JZSP-CSI01-□

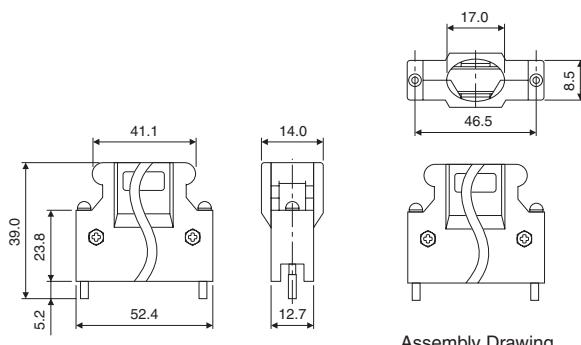
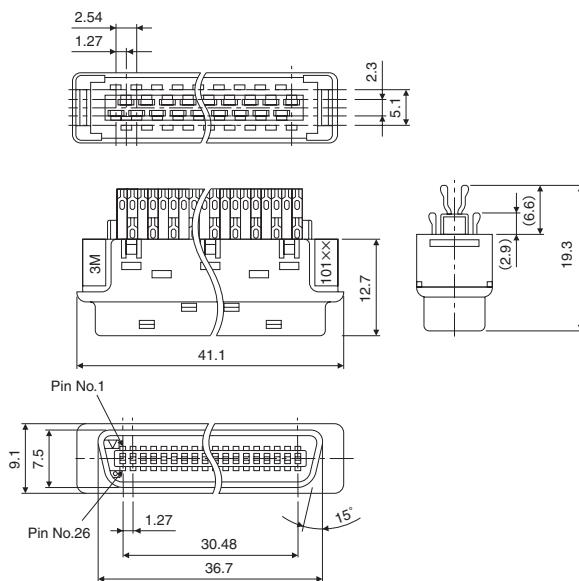


#### Connector Kit (for CN1)

JZSP-CSI9-1

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

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



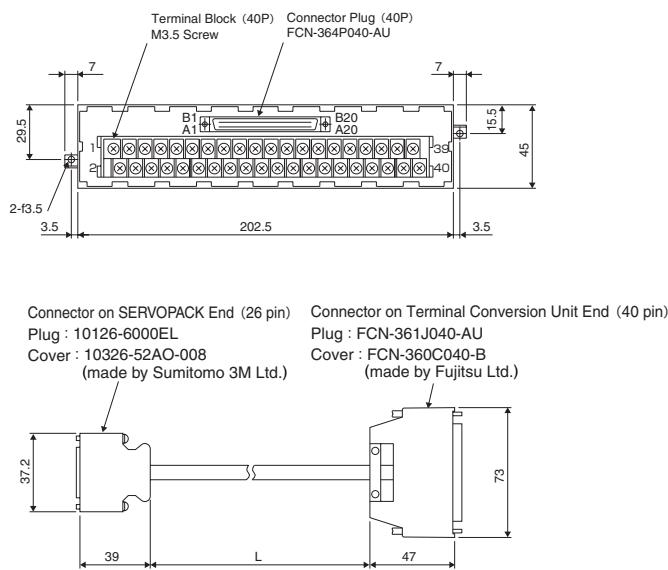
Assembly Drawing

#### 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.                                      |

For MECHATROLINK communications

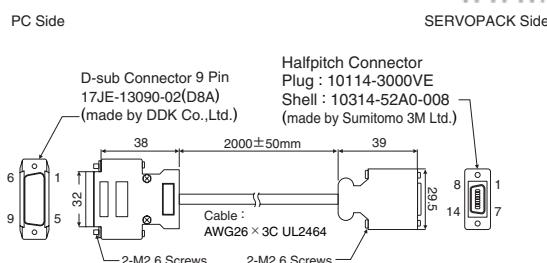
**Connector to Terminal Conversion Unit**  
JUSP-TA26P



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

Email: [service@repairtw.com](mailto:service@repairtw.com)

**(D) CN3 Cable for PC**

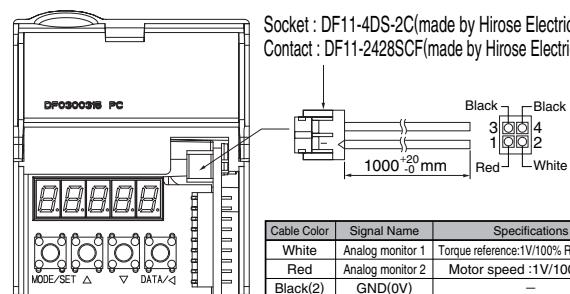


Line id: @zzzz  
[www.repairtw.com](http://www.repairtw.com)

**(E) CN5 Cable for Analog Monitor**

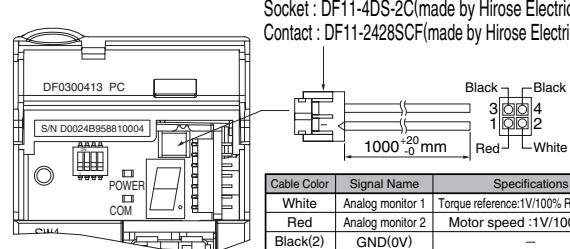
For analog voltage references or pulse train references

Without Front Cover



For MECHATROLINK communications

Without Front Cover



# Appendix

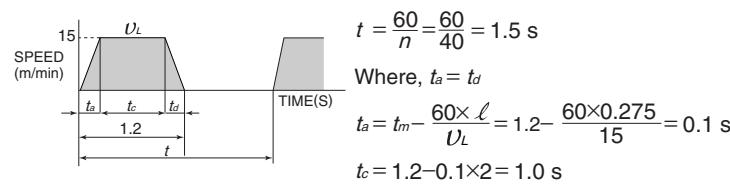
## ● Rotary Motor Selection

|   |   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
|---|---|-----------------------------|-------------|-----------------------------|---------------|--------|---------------------------|-----------------------|----------------------|-------|-------------------------------|-----------------------|--------|-------------------------------|-------------------------------|-----------------------------|-----------------------|-----------------|-----------------------------|-------------------------------|-----------------|-----------------------------|---------------------|---------------------|-----------------------------|-------------------|-------------------|----------|----|
| Load Data   | <p><b>① Ball Screw Horizontal Axis</b></p> <table> <tr> <td>Load weight</td> <td><math>m</math></td> <td>kg</td> </tr> <tr> <td>Thrust</td> <td><math>F</math></td> <td>N</td> </tr> <tr> <td>Friction coefficient</td> <td><math>\mu</math></td> <td></td> </tr> <tr> <td>Mechanical efficiency</td> <td><math>\eta</math></td> <td></td> </tr> <tr> <td>Reduction ratio <math>R(=n_M/n_L)</math></td> <td></td> <td></td> </tr> <tr> <td>Gear + Coupling</td> <td><math>J_G</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> <tr> <td>Ball screw lead</td> <td><math>P_B</math></td> <td>mm</td> </tr> <tr> <td>Ball screw diameter</td> <td><math>d_B</math></td> <td>mm</td> </tr> <tr> <td>Ball screw length</td> <td><math>\ell_B</math></td> <td>mm</td> </tr> </table> |                             | Load weight | $m$                         | kg            | Thrust | $F$                       | N                     | Friction coefficient | $\mu$ |                               | Mechanical efficiency | $\eta$ |                               | Reduction ratio $R(=n_M/n_L)$ |                             |                       | Gear + Coupling | $J_G$                       | $\text{kg}\cdot\text{cm}^2$   | Ball screw lead | $P_B$                       | mm                  | Ball screw diameter | $d_B$                       | mm                | Ball screw length | $\ell_B$ | mm |
|   | Load weight   | $m$                         | kg          |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
|   | Thrust  | $F$                         | N           |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
|   | Friction coefficient  | $\mu$                       |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
|   | Mechanical efficiency   | $\eta$                      |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
|   | Reduction ratio $R(=n_M/n_L)$   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Gear + Coupling   | $J_G$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Ball screw lead   | $P_B$   | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Ball screw diameter   | $d_B$   | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Ball screw length   | $\ell_B$  | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| <p><b>② Ball Screw Vertical Axis</b></p> <table> <tr> <td>Load weight</td> <td><math>m_1</math></td> <td>kg</td> </tr> <tr> <td>Counterweight</td> <td><math>m_2</math></td> <td>kg</td> </tr> <tr> <td>Friction coefficient</td> <td><math>\mu</math></td> <td></td> </tr> <tr> <td>Mechanical efficiency</td> <td><math>\eta</math></td> <td></td> </tr> <tr> <td>Reduction ratio <math>R(=n_M/n_L)</math></td> <td></td> <td></td> </tr> <tr> <td>Gear + Coupling</td> <td><math>J_G</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> <tr> <td>Ball screw lead</td> <td><math>P_B</math></td> <td>mm</td> </tr> <tr> <td>Ball screw diameter</td> <td><math>d_B</math></td> <td>mm</td> </tr> <tr> <td>Ball screw length</td> <td><math>\ell_B</math></td> <td>mm</td> </tr> </table> |   | Load weight                 | $m_1$       | kg                          | Counterweight | $m_2$  | kg                        | Friction coefficient  | $\mu$                |       | Mechanical efficiency         | $\eta$                |        | Reduction ratio $R(=n_M/n_L)$ |                               |                             | Gear + Coupling       | $J_G$           | $\text{kg}\cdot\text{cm}^2$ | Ball screw lead               | $P_B$           | mm                          | Ball screw diameter | $d_B$               | mm                          | Ball screw length | $\ell_B$          | mm       |    |
| Load weight   | $m_1$   | kg                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Counterweight   | $m_2$   | kg                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Friction coefficient  | $\mu$   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Mechanical efficiency   | $\eta$  |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Reduction ratio $R(=n_M/n_L)$   |   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Gear + Coupling   | $J_G$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Ball screw lead   | $P_B$   | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Ball screw diameter   | $d_B$   | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Ball screw length   | $\ell_B$  | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| <p><b>③ Timing Belt</b></p> <table> <tr> <td>Load weight</td> <td><math>m</math></td> <td>kg</td> </tr> <tr> <td>Thrust</td> <td><math>F</math></td> <td>N</td> </tr> <tr> <td>Friction coefficient</td> <td><math>\mu</math></td> <td></td> </tr> <tr> <td>Mechanical efficiency</td> <td><math>\eta</math></td> <td></td> </tr> <tr> <td>Reduction ratio <math>R(=n_M/n_L)</math></td> <td></td> <td></td> </tr> <tr> <td>Gear + Coupling</td> <td><math>J_G</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> <tr> <td>Pulley</td> <td><math>J_p</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> <tr> <td>Pulley diameter</td> <td><math>d_p</math></td> <td>mm</td> </tr> </table>  |   | Load weight                 | $m$         | kg                          | Thrust        | $F$    | N                         | Friction coefficient  | $\mu$                |       | Mechanical efficiency         | $\eta$                |        | Reduction ratio $R(=n_M/n_L)$ |                               |                             | Gear + Coupling       | $J_G$           | $\text{kg}\cdot\text{cm}^2$ | Pulley                        | $J_p$           | $\text{kg}\cdot\text{cm}^2$ | Pulley diameter     | $d_p$               | mm                          |                   |                   |          |    |
| Load weight   | $m$   | kg                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Thrust  | $F$   | N                           |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Friction coefficient  | $\mu$   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Mechanical efficiency   | $\eta$  |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Reduction ratio $R(=n_M/n_L)$   |   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Gear + Coupling   | $J_G$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Pulley  | $J_p$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Pulley diameter   | $d_p$   | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| <p><b>④ Rack &amp; Pinion</b></p> <table> <tr> <td>Load weight</td> <td><math>m</math></td> <td>kg</td> </tr> <tr> <td>Thrust</td> <td><math>F</math></td> <td>N</td> </tr> <tr> <td>Friction coefficient</td> <td><math>\mu</math></td> <td></td> </tr> <tr> <td>Mechanical efficiency</td> <td><math>\eta</math></td> <td></td> </tr> <tr> <td>Reduction ratio <math>R(=n_M/n_L)</math></td> <td></td> <td></td> </tr> <tr> <td>Gear + Coupling</td> <td><math>J_G</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> <tr> <td>Pinion diameter</td> <td><math>d</math></td> <td>mm</td> </tr> <tr> <td>Pinion Thickness</td> <td><math>t</math></td> <td>mm</td> </tr> </table>  |   | Load weight                 | $m$         | kg                          | Thrust        | $F$    | N                         | Friction coefficient  | $\mu$                |       | Mechanical efficiency         | $\eta$                |        | Reduction ratio $R(=n_M/n_L)$ |                               |                             | Gear + Coupling       | $J_G$           | $\text{kg}\cdot\text{cm}^2$ | Pinion diameter               | $d$             | mm                          | Pinion Thickness    | $t$                 | mm                          |                   |                   |          |    |
| Load weight   | $m$   | kg                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Thrust  | $F$   | N                           |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Friction coefficient  | $\mu$   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Mechanical efficiency   | $\eta$  |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Reduction ratio $R(=n_M/n_L)$   |   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Gear + Coupling   | $J_G$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Pinion diameter   | $d$   | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Pinion Thickness  | $t$   | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| <p><b>⑤ Roll Feeder</b></p> <table> <tr> <td>Load Moment of Inertia</td> <td><math>J_L</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> <tr> <td>Tension</td> <td><math>F</math></td> <td>N</td> </tr> <tr> <td>Pressure</td> <td><math>P</math></td> <td>N</td> </tr> <tr> <td>Roll diameter</td> <td><math>d</math></td> <td>mm</td> </tr> <tr> <td>Friction coefficient</td> <td><math>\mu</math></td> <td></td> </tr> <tr> <td>Mechanical efficiency</td> <td><math>\eta</math></td> <td></td> </tr> <tr> <td>Reduction ratio <math>R(=n_M/n_L)</math></td> <td></td> <td></td> </tr> <tr> <td>Gear + Coupling</td> <td><math>J_G</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> </table>   |   | Load Moment of Inertia      | $J_L$       | $\text{kg}\cdot\text{cm}^2$ | Tension       | $F$    | N                         | Pressure              | $P$                  | N     | Roll diameter                 | $d$                   | mm     | Friction coefficient          | $\mu$                         |                             | Mechanical efficiency | $\eta$          |                             | Reduction ratio $R(=n_M/n_L)$ |                 |                             | Gear + Coupling     | $J_G$               | $\text{kg}\cdot\text{cm}^2$ |                   |                   |          |    |
| Load Moment of Inertia  | $J_L$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Tension   | $F$   | N                           |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Pressure  | $P$   | N                           |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Roll diameter   | $d$   | mm                          |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Friction coefficient  | $\mu$   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Mechanical efficiency   | $\eta$  |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Reduction ratio $R(=n_M/n_L)$   |   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Gear + Coupling   | $J_G$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| <p><b>⑥ Rotor</b></p> <table> <tr> <td>Load Moment of Inertia</td> <td><math>J_L</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> <tr> <td>Load Torque</td> <td><math>T_L</math></td> <td><math>\text{kg}\cdot\text{cm}</math></td> </tr> <tr> <td>Mechanical efficiency</td> <td><math>\eta</math></td> <td></td> </tr> <tr> <td>Reduction ratio <math>R(=n_M/n_L)</math></td> <td></td> <td></td> </tr> <tr> <td>Gear + Coupling</td> <td><math>J_G</math></td> <td><math>\text{kg}\cdot\text{cm}^2</math></td> </tr> </table>   |   | Load Moment of Inertia      | $J_L$       | $\text{kg}\cdot\text{cm}^2$ | Load Torque   | $T_L$  | $\text{kg}\cdot\text{cm}$ | Mechanical efficiency | $\eta$               |       | Reduction ratio $R(=n_M/n_L)$ |                       |        | Gear + Coupling               | $J_G$                         | $\text{kg}\cdot\text{cm}^2$ |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Load Moment of Inertia  | $J_L$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Load Torque   | $T_L$   | $\text{kg}\cdot\text{cm}$   |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Mechanical efficiency   | $\eta$  |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Reduction ratio $R(=n_M/n_L)$   |   |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Gear + Coupling   | $J_G$   | $\text{kg}\cdot\text{cm}^2$ |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |
| Driving Pattern   | <ul style="list-style-type: none"> <li>Duty Cycle</li> </ul> <p>DUTY <math>t</math> s</p> <p>Positioning distance <math>\ell</math> m</p> <p>Speed <math>v_L</math> m/s</p> <p>Positioning time <math>t_m</math> s</p> <p>Accel/decel time <math>t_a</math> s</p> <p>Note : Fill in either <math>v_L</math> or <math>t_m</math>. If both are filled in, specify the prior one.</p>  |                             |             |                             |               |        |                           |                       |                      |       |                               |                       |        |                               |                               |                             |                       |                 |                             |                               |                 |                             |                     |                     |                             |                   |                   |          |    |

## ●Rotary Motor Selection Example

| MECHANICAL SPECIFICATIONS |            |               |  |
|---------------------------|------------|---------------|--|
| SERVOMOTOR                | BALL SCREW | LINEAR MOTION |  |

### (1) Speed Diagram



### (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

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

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#### <Ratings>

- Rated Output : 200 W
- Rated Speed : 3000 min<sup>-1</sup>
- Rated Torque : 0.637 N·m
- Instantaneous Peak Torque : 1.91 N·m
- Motor Moment of Inertia :  $0.116 \times 10^{-4} \text{ kg}\cdot\text{m}^2$
- Allowable Load Inertia of SERVOPACK :  $3.48 \times 10^{-4} \text{ kg}\cdot\text{m}^2$

### (4) Servomotor Checking

#### ① Required Starting Torque

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60 t_a} + T_L$$

$$= \frac{2\pi \times 3000 \times (0.116 + 1.25) \times 10^{-4}}{60 \times 0.1} + 0.139$$

$$\approx 0.568 \text{ N}\cdot\text{m} < \text{Peak Torque} \cdots \text{Satisfactory}$$

#### ② Required Braking Torque

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60 t_a} - T_L$$

$$= \frac{2\pi \times 3000 \times (0.116 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139$$

$$\approx 0.290 \text{ N}\cdot\text{m} < \text{Peak Torque} \cdots \text{Satisfactory}$$

#### ③ Torque Efficiency

$$T_{rms} = \sqrt{\frac{T_P^2 \cdot t_a + T_L^2 \cdot t_c + T_S^2 \cdot t_d}{t}}$$

$$= \sqrt{\frac{(0.568)^2 \times 0.1 + (0.139)^2 \times 1.0 + (0.290)^2 \times 0.1}{1.5}}$$

$$\approx 0.200 \text{ N}\cdot\text{m} < \text{Rated Torque} \cdots \text{Satisfactory}$$

### (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

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

### (7) Temporary Servomotor Selection

Selection Condition •  $T_L \leq \text{Motor Rated Torque}$

•  $P_a + P_o = (1 \text{ to } 2) \times \text{Motor Rated Output}$

•  $n_M \leq \text{Motor Rated Speed}$

•  $J_L \leq \text{Allowable Load Moment of Inertia of SERVOPACK}$

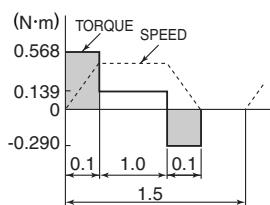
From the above condition, the following are temporarily selected :

• Servomotor : SGMAS-02ACA21

• SERVOPACK : SGDS-02A01A

### (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**

480, Kamifujisawa, Iruma, Saitama 358-8555, Japan  
Phone 81-4-2962-5696 Fax 81-4-2962-6138

## **YASKAWA ELECTRIC AMERICA, INC.**

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Phone 1-847-887-7000 Fax 1-847-887-7370

## **MOTOMAN INC. HEADQUARTERS**

805 Liberty Lane West Carrollton, OH 45449, U.S.A.  
Phone 1-937-847-6200 Fax 1-937-847-6277

## **YASKAWA ELÉTRICO DO BRASIL COMÉRCIO LTD.A.**

Avenida Fagundes Filho, 620 Bairro Saude-Sao Paulo-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

## **Motoman Robotics Europe AB**

Box 504 S38525 Torsås, Sweden  
Phone 46-486-48800 Fax 46-486-41410

## **Motoman Robotec GmbH**

Kammerfeldstraße 1, 85391 Allershausen, Germany  
Phone 49-8166-90-100 Fax 49-8166-90-103

## **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 Singapore 556741, Singapore  
Phone 65-6282-3003 Fax 65-6289-3003

## **YASKAWA ELECTRIC (SHANGHAI) CO., LTD.**

No.18 Xizang Zhong Road, Room 1805, Harbour Ring Plaza Shanghai 20000, China  
Phone 86-21-5385-2200 Fax 86-21-5385-3299

## **YATEC ENGINEERING CORPORATION**

4F., No.49 Wu Kong 6 Rd, WU-KU Industrial Park, Taipei, Taiwan  
Phone 886-2-2298-3676 Fax 886-2-2298-3677

## **YASKAWA ELECTRIC (HK) COMPANY LIMITED**

Rm. 2909-10, Hong Kong Plaza, 186-191 Connaught Road West, Hong Kong  
Phone 852-2803-2385 Fax 852-2547-5773

## **BEIJING OFFICE**

Room No. 301 Office Building of Beijing International Club, 21  
Jianguomenwai Avenue, Beijing 100020, China  
Phone 86-10-6532-1850 Fax 86-10-6532-1851

## **TAIPEI OFFICE**

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

## **SHANGHAI YASKAWA-TONGJI M & E CO., LTD.**

27 Hui He Road Shanghai China 200437  
Phone 86-21-6553-6060 Fax 86-21-5588-1190

## **BEIJING YASKAWA BEIKE AUTOMATION ENGINEERING CO., LTD.**

30 Xue Yuan Road, Haidian, Beijing P.R. China Post Code: 100083  
Phone 86-10-6233-2782 Fax 86-10-6232-1536

## **SHOUGANG MOTOMAN ROBOT CO., LTD.**

7, Yongchang-North Street, Beijing Economic Technological Investment & Development Area,  
Beijing 100076, P.R. China  
Phone 86-10-6788-0551 Fax 86-10-6788-2878



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