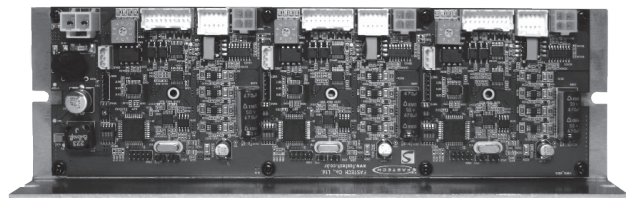# S·SERVO® Ⅱ

Stepping motor control system without step out
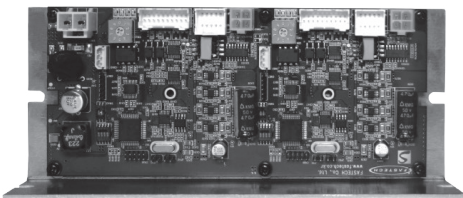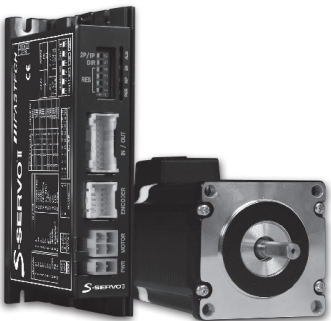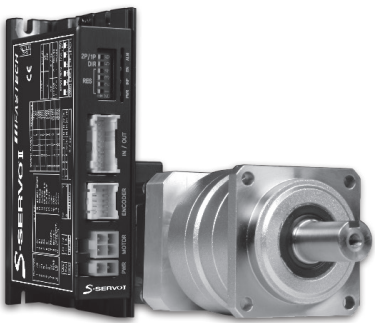
FASTECH

Fast, Accurate, Smooth Motion

www.fastech.co.kr

CE

Table of Contents

※ Before operation ※

· Thank you for your purchasing S-SERVO Ⅱ.

· S-SERVO Ⅱ is full digital position control step drive.

· This manual describes handling, maintenance, repair, diagnosis and troubleshooting of S-SERVO Ⅱ.

· Before operating S-SERVO Ⅱ, thoroughly read this manual.

· After reading the manual, keep the manual near the S-SERVO Ⅱ so that any user can read the manual whenever needed.

1. Precautions

◆ General Precautions

· Contents of this manual are subject to change without prior notice for functional improvement, change of specifications or user's better understanding. Thoroughly read the manual provided with the purchased S-SERVO Ⅱ.

· When the manual is damaged or lost, please go to the homepage(www.fastech.co.kr) and downloaded the manual.

· Our company is not responsible for a product breakdown due to user's dismantling for the product, and such a breakdown is not guaranteed by the warranty.

◆ Put the Safety First

· Before installation, operation and repairing the S-SERVO Ⅱ, thoroughly read the manual and fully understand the contents. Before operating the S-SERVO Ⅱ please, understand the mechanical characteristics of the S-SERVO Ⅱ and related safety information and precautions.

· This manual divides safety precautions into Attention and Warning.

⚠ **Attention** :	If user does not properly handle the product, the user may seriously or slightly injured and damages may occur in the machine.
⚠ **Warning** :	If user does not properly handle the product, a dangerous situation (such as an electric shock) may occur resulting in deaths or serious injuries.

· Although precaution is only a **Attention**, a serious result could be caused depending on the situation. Follow safety precautions.

◆ Check the Product

⚠ Attention	Check the Product is damaged or parts are missing. Otherwise, the machine may get damaged or the user may get injured.

◆ Installation

⚠ Attention	Carefully move the S-SERVO II. Otherwise the Product may get damaged or User's foot may get injured by dropping the product. Use non-flammable materials such as metal in the place where the S-SERVO II is to be installed. Otherwise, a fire may occur. When installing several S-SERVO II in a sealed place, install a cooling fan to keep the ambient temperature of the S-SERVO II as 50℃ or lower. Otherwise, a fire or other kinds of accidents may occur due to overheating.
⚠ Warning	The process of Installation, Connection, Operation, Checking and Repairing should be done with qualified person. Otherwise, a fire or other kinds of accidents may occur.

◆ Connect Cables

⚠ Attention	Keep the rated range of Input Voltage for S-SERVO II. Otherwise, a fire or other kinds of accidents may occur. Cable connection should follow the wiring diagram. Otherwise, a fire or other kinds of accidents may occur.
⚠ Warning	Before connecting cables, check if input power is off. Otherwise, an electric shock or a fire may occur. The case of the S-SERVO II is insulated from the ground of the internal circuit by the condenser. Ground the S-SERVO II. Otherwise, an electric shock or a fire may occur.

◆ Operation

⚠ **Attention**	If a protection function(alarm) occurs, firstly remove its cause and then release(alarm reset) the protection function. If you operate continuously without removing its cause, the machine may get damaged or the user may get injured. Do not make Motor Free and make input signal to ON during operation. Motor will stop and stop current will become zero. The machine may get damaged or the user may get injured. Make all input signals to OFF before supply input voltage to S-SERVO II. The machine may get damaged or the user may get injured by motor operation. All parameter values are set by default factory setting value. Change this value after reading this manual throughly. Otherwise, the machine may get damaged or other kinds of accidents may occur.

◆ Check and Repair

⚠ **Attention**	Stop to supply power to the main circuit and wait for a while before checking or repairing the S-SERVO II. Electricity remaining in the capacitor may cause danger. Do not change cabling while power is being supplied. Otherwise, the user may get injured or the product may get damaged. Do not reconstruct the S-SERVO II. Otherwise, an electric shock may occur or the reconstructed product can not get After-Service.

2. Main characteristics

1 No Step Out

(Alarm will be generated when step out)

Because of mounted encoder constantly monitor the current position, step out cannot be occurred. If step out occurred by external force of overloads, alarm signal will be sent to upper controller. Thus, upper controller can recognize step out of step motor.

Step out

Alarm
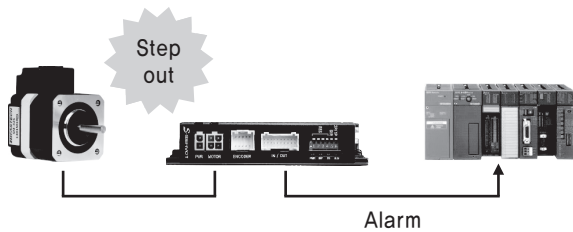
2 Perfect Positioning Completion Check

(Positioning completion signal will be generated)

When motor stops at the goal position, encoder detect it and send positioning completion signal to upper controller. Therefore S-SERVOⅡ resolve the problem of unclear positioning of current Open Loop System.

Movement of motor

Movement Stop Movement Stop

Positioning signal ON OFF
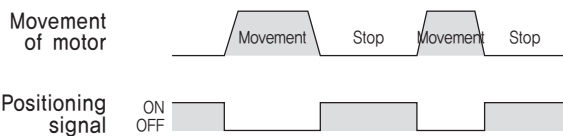
3 High Position Accuracy

S-SERVOⅡ controls position by using high precision of encoder. Regardless of motor type (2 Phase or 5 Phase), S-SERVOⅡ position precision is only related to mounted encoder resolution so high precision of positioning is possible unlike open loop micro step motor and driver which adapts 2 Phase or 5 Phase motor.

4 Heat Reduction / Energy Saving

(Motor Current Control according to load)

S-SERVOⅡ automatically controls motor current according to load. S-SERVOⅡ reduces motor current when motor load is low and increases motor current when load is high. By optimizing the motor current, motor heat can be minimized and energy can be saved.

Motor temperature [Measured by Thermal Imaging Camera]

Condition to measure the motor temperature
[4hours operation, Motor surface temperature saturation]

No Load ⬅ ➡ Load Increasing

Example of the Motor Current Control according to load
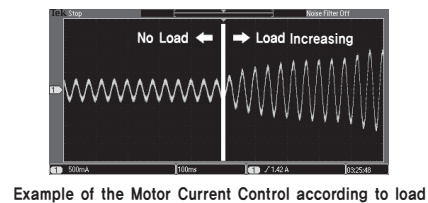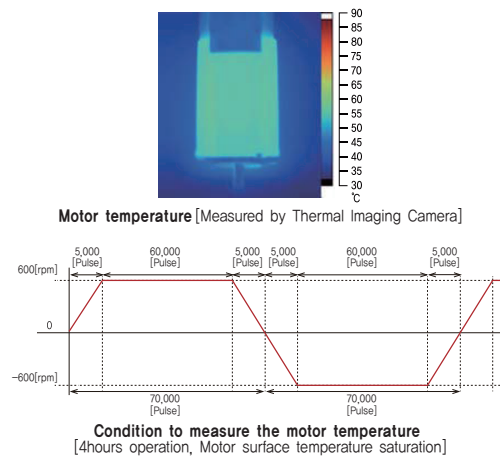
5　Torque Improvement

(Motor Current Setting)

S-SERVOⅡ can increase the motor current up to 150% by setting the Run Current by parameter. Therefore acceleration and deceleration characteristics and torque characteristics at low speed can be increased.

S-SERVOⅡ can improve the torque in the low speed range by about 30%.

Torque [N·m]

- Run current 100%
- Run current 110%
- Run current 120%
- Run current 130%
- Run current 140%
- Run current 150%

Speed [rpm] × 100
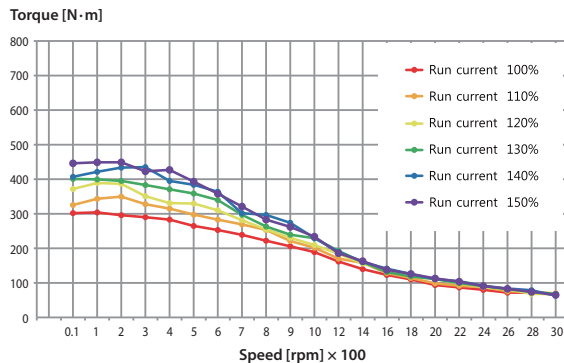
※ The torque at low speed is improved about 30%.

Measured Condition : Drive = S-SERVOⅡ-ST-42L
Motor Voltage = 24VDC
Input Voltage = 24VDC

6　No Hunting

Traditional servo motor drives overshoot their position and try to correct by overshooting the opposite direction, especially in high gain applications. This is called null hunt and is especially prevalent in systems that the break away or static friction is significantly higher than the running friction. The cure is lowering the gain, which affects accuracy or using S-SERVOⅡ Motion Control System. S-SERVOⅡ utilizes the unique characteristics of stepping motors and locks itself into the desired target position, eliminating Null Hunt. This feature is especially useful in applications such as nanotech manufacturing, semiconductor fabrication, vision systems and ink jet printing in which system oscillation and vibration could be a problem.

Complete stop　　　　Hunting

S-SERVOⅡ　　　　Servo motor

CW
+ pulse
0
− pulse
CCW

Time

7　High Torque

Compared with common step motors and drives, S-SERVOⅡ motion control systems can maintain a high torque state over relatively long period of time. This means that S-SERVOⅡ continuously operates without loss of position under 100% of the load. Unlike conventional Microstep drives, S-SERVOⅡ exploits continuous high torque operation during high speed motion due to its innovative optimum current phase control.

Torque

S-SERVOⅡ

Stepping

Speed

8　Variety of Protection Functions

Drive and equipment can be protected by the alarm (11 kinds) of such as motor connection error, encoder connection error etc.

9　Variety of Position Command Unit

According to the purpose of usage, S-SERVOⅡ offer 16 stage (500~50,000P/R) of position command unit.

3. S-SERVOⅡ Part Numbering

S-SERVOⅡ-ST-56L-F-BK-PN05-□
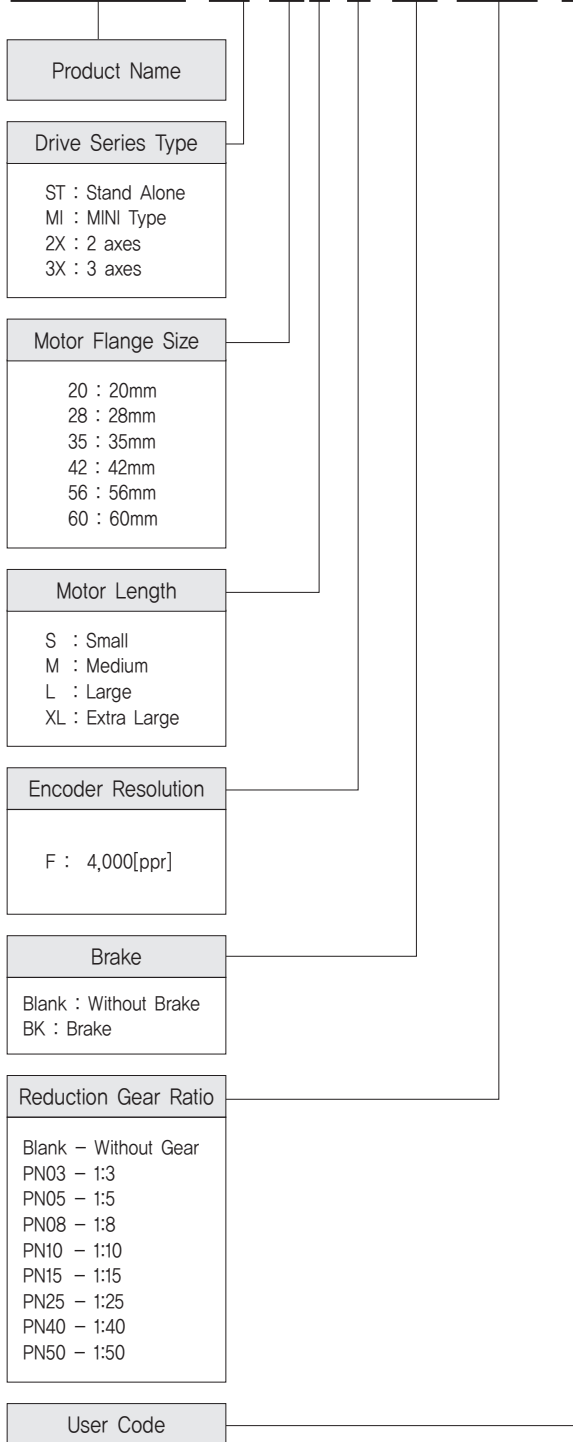
Product Name

Drive Series Type
- ST : Stand Alone
- MI : MINI Type
- 2X : 2 axes
- 3X : 3 axes

Motor Flange Size
- 20 : 20mm
- 28 : 28mm
- 35 : 35mm
- 42 : 42mm
- 56 : 56mm
- 60 : 60mm

Motor Length
- S : Small
- M : Medium
- L : Large
- XL : Extra Large

Encoder Resolution
- F : 4,000[ppr]

Brake
- Blank : Without Brake
- BK : Brake

Reduction Gear Ratio
- Blank － Without Gear
- PN03 － 1:3
- PN05 － 1:5
- PN08 － 1:8
- PN10 － 1:10
- PN15 － 1:15
- PN25 － 1:25
- PN40 － 1:40
- PN50 － 1:50

User Code

※ S-SERVOⅡ 2X, S-SERVOⅡ 3X product needs 2 or 3 sets of motors for one drive. Combination of drive and motors can be diversifed so please contact with sales division or distributor of FASTECH before purchasing product.

4. Standard Combination

◆ S-SERVOⅡ ST series

Unit Part Number	Motor Model Number	Drive Model Number
S-SERVOⅡ-ST-20M-F	SM-20M-F	SV2-PD-20M-F
S-SERVOⅡ-ST-20L-F	SM-20L-F	SV2-PD-20L-F
S-SERVOⅡ-ST-28S-F	SM-28S-F	SV2-PD-28S-F
S-SERVOⅡ-ST-28M-F	SM-28M-F	SV2-PD-28M-F
S-SERVOⅡ-ST-28L-F	SM-28L-F	SV2-PD-28L-F
S-SERVOⅡ-ST-35M-F	SM-35M-F	SV2-PD-35M-F
S-SERVOⅡ-ST-35L-F	SM-35L-F	SV2-PD-35L-F
S-SERVOⅡ-ST-42S-F	SM-42S-F	SV2-PD-42S-F
S-SERVOⅡ-ST-42M-F	SM-42M-F	SV2-PD-42M-F
S-SERVOⅡ-ST-42L-F	SM-42L-F	SV2-PD-42L-F
S-SERVOⅡ-ST-42XL-F	SM-42XL-F	SV2-PD-42XL-F
S-SERVOⅡ-ST-56S-F	SM-56S-F	SV2-PD-56S-F
S-SERVOⅡ-ST-56M-F	SM-56M-F	SV2-PD-56M-F
S-SERVOⅡ-ST-56L-F	SM-56L-F	SV2-PD-56L-F
S-SERVOⅡ-ST-60S-F	SM-60S-F	SV2-PD-60S-F
S-SERVOⅡ-ST-60M-F	SM-60M-F	SV2-PD-60M-F
S-SERVOⅡ-ST-60L-F	SM-60L-F	SV2-PD-60L-F

4. Standard Combination

◆ S-SERVOⅡ MINI series

Unit Part Number	Motor Model Number	Drive Model Number
S-SERVOⅡ-MI-20M-F	SM-20M-F	SV2-PD-MI-20M-F
S-SERVOⅡ-MI-20L-F	SM-20L-F	SV2-PD-MI-20L-F
S-SERVOⅡ-MI-28S-F	SM-28S-F	SV2-PD-MI-28S-F
S-SERVOⅡ-MI-28M-F	SM-28M-F	SV2-PD-MI-28M-F
S-SERVOⅡ-MI-28L-F	SM-28L-F	SV2-PD-MI-28L-F
S-SERVOⅡ-MI-35M-F	SM-35M-F	SV2-PD-MI-35M-F
S-SERVOⅡ-MI-35L-F	SM-35L-F	SV2-PD-MI-35L-F
S-SERVOⅡ-MI-42S-F	SM-42S-F	SV2-PD-MI-42S-F
S-SERVOⅡ-MI-42M-F	SM-42M-F	SV2-PD-MI-42M-F
S-SERVOⅡ-MI-42L-F	SM-42L-F	SV2-PD-MI-42L-F
S-SERVOⅡ-MI-42XL-F	SM-42XL-F	SV2-PD-MI-42XL-F

◆ S-SERVOⅡ 2X series

Unit Part Number	Motor Model Number	Drive Model Number
	SM-20M-F	
	SM-20L-F	
	SM-28S-F	
	SM-28M-F	
	SM-28L-F	
	SM-35M-F	
	SM-35L-F	
S-SERVOⅡ-2X	SM-42S-F	SV2-PD-2X
	SM-42M-F	
	SM-42L-F	
	SM-42XL-F	
	SM-56S-F	
	SM-56M-F	
	SM-56L-F	
	SM-60S-F	
	SM-60M-F	
	SM-60L-F	

4. Standard Combination

◆ S-SERVOⅡ 3X series

Unit Part Number	Motor Model Number	Drive Model Number
S-SERVOⅡ-3X	SM-20M-F	SV2-PD-3X
	SM-20L-F	
	SM-28S-F	
	SM-28M-F	
	SM-28L-F	
	SM-35M-F	
	SM-35L-F	
	SM-42S-F	
	SM-42M-F	
	SM-42L-F	
	SM-42XL-F	
	SM-56S-F	
	SM-56M-F	
	SM-56L-F	
	SM-60S-F	
	SM-60M-F	
	SM-60L-F	

5. Combination with Brake

◆ S-SERVOⅡ ST series

Unit Part Number	Motor Model Number	Drive Model Number
S-SERVOⅡ-ST-42S-F-BK	SM-42S-F-BK	SV2-PD-42S-F
S-SERVOⅡ-ST-42M-F-BK	SM-42M-F-BK	SV2-PD-42M-F
S-SERVOⅡ-ST-42L-F-BK	SM-42L-F-BK	SV2-PD-42L-F
S-SERVOⅡ-ST-42XL-F-BK	SM-42XL-F-BK	SV2-PD-42XL-F
S-SERVOⅡ-ST-56S-F-BK	SM-56S-F-BK	SV2-PD-56S-F
S-SERVOⅡ-ST-56M-F-BK	SM-56M-F-BK	SV2-PD-56M-F
S-SERVOⅡ-ST-56L-F-BK	SM-56L-F-BK	SV2-PD-56L-F
S-SERVOⅡ-ST-60S-F-BK	SM-60S-F-BK	SV2-PD-60S-F
S-SERVOⅡ-ST-60M-F-BK	SM-60M-F-BK	SV2-PD-60M-F
S-SERVOⅡ-ST-60L-F-BK	SM-60L-F-BK	SV2-PD-60L-F

◆ S-SERVOⅡ MINI series

Unit Part Number	Motor Model Number	Drive Model Number
S-SERVOⅡ-MI-42S-F-BK	SM-42S-F-BK	SV2-PD-MI-42S-F
S-SERVOⅡ-MI-42M-F-BK	SM-42M-F-BK	SV2-PD-MI-42M-F
S-SERVOⅡ-MI-42L-F-BK	SM-42L-F-BK	SV2-PD-MI-42L-F
S-SERVOⅡ-MI-42XL-F-BK	SM-42XL-F-BK	SV2-PD-MI-42XL-F

6. Combination with Gearbox

◆ S-SERVOⅡ ST series

Unit Part Number	Motor Model Number	Drive Model Number	Reduction gear ratio	Unit Part Number	Motor Model Number	Drive Model Number	Reduction gear ratio
S-SERVOⅡ-ST-42S-A-PN3	SM-42S-A-PN3	SV2-PD-42S	1:3	S-SERVOⅡ-ST-56S-A-PN3	SM-56S-A-PN3	SV2-PD-56S	1:3
S-SERVOⅡ-ST-42S-F-PN3	SM-42S-F-PN3			S-SERVOⅡ-ST-56S-F-PN3	SM-56S-F-PN3		
S-SERVOⅡ-ST-42S-A-PN5	SM-42S-A-PN5		1:5	S-SERVOⅡ-ST-56S-A-PN5	SM-56S-A-PN5		1:5
S-SERVOⅡ-ST-42S-F-PN5	SM-42S-F-PN5			S-SERVOⅡ-ST-56S-F-PN5	SM-56S-F-PN5		
S-SERVOⅡ-ST-42S-A-PN8	SM-42S-A-PN8		1:8	S-SERVOⅡ-ST-56S-A-PN8	SM-56S-A-PN8		1:8
S-SERVOⅡ-ST-42S-F-PN8	SM-42S-F-PN8			S-SERVOⅡ-ST-56S-F-PN8	SM-56S-F-PN8		
S-SERVOⅡ-ST-42S-A-PN10	SM-42S-A-PN10		1:10	S-SERVOⅡ-ST-56S-A-PN10	SM-56S-A-PN10		1:10
S-SERVOⅡ-ST-42S-F-PN10	SM-42S-F-PN10			S-SERVOⅡ-ST-56S-F-PN10	SM-56S-F-PN10		
S-SERVOⅡ-ST-42S-A-PN15	SM-42S-A-PN15		1:15	S-SERVOⅡ-ST-56S-A-PN15	SM-56S-A-PN15		1:15
S-SERVOⅡ-ST-42S-F-PN15	SM-42S-F-PN15			S-SERVOⅡ-ST-56S-F-PN15	SM-56S-F-PN15		
S-SERVOⅡ-ST-42S-A-PN25	SM-42S-A-PN25		1:25	S-SERVOⅡ-ST-56S-A-PN25	SM-56S-A-PN25		1:25
S-SERVOⅡ-ST-42S-F-PN25	SM-42S-F-PN25			S-SERVOⅡ-ST-56S-F-PN25	SM-56S-F-PN25		
S-SERVOⅡ-ST-42S-A-PN40	SM-42S-A-PN40		1:40	S-SERVOⅡ-ST-56S-A-PN40	SM-56S-A-PN40		1:40
S-SERVOⅡ-ST-42S-F-PN40	SM-42S-F-PN40			S-SERVOⅡ-ST-56S-F-PN40	SM-56S-F-PN40		
S-SERVOⅡ-ST-42S-A-PN50	SM-42S-A-PN50		1:50	S-SERVOⅡ-ST-56S-A-PN50	SM-56S-A-PN50		1:50
S-SERVOⅡ-ST-42S-F-PN50	SM-42S-F-PN50			S-SERVOⅡ-ST-56S-F-PN50	SM-56S-F-PN50		
S-SERVOⅡ-ST-42M-A-PN3	SM-42M-A-PN3	SV2-PD-42M	1:3	S-SERVOⅡ-ST-56M-A-PN3	SM-56M-A-PN3	SV2-PD-56M	1:3
S-SERVOⅡ-ST-42M-F-PN3	SM-42M-F-PN3			S-SERVOⅡ-ST-56M-F-PN3	SM-56M-F-PN3		
S-SERVOⅡ-ST-42M-A-PN5	SM-42M-A-PN5		1:5	S-SERVOⅡ-ST-56M-A-PN5	SM-56M-A-PN5		1:5
S-SERVOⅡ-ST-42M-F-PN5	SM-42M-F-PN5			S-SERVOⅡ-ST-56M-F-PN5	SM-56M-F-PN5		
S-SERVOⅡ-ST-42M-A-PN8	SM-42M-A-PN8		1:8	S-SERVOⅡ-ST-56M-A-PN8	SM-56M-A-PN8		1:8
S-SERVOⅡ-ST-42M-F-PN8	SM-42M-F-PN8			S-SERVOⅡ-ST-56M-F-PN8	SM-56M-F-PN8		
S-SERVOⅡ-ST-42M-A-PN10	SM-42M-A-PN10		1:10	S-SERVOⅡ-ST-56M-A-PN10	SM-56M-A-PN10		1:10
S-SERVOⅡ-ST-42M-F-PN10	SM-42M-F-PN10			S-SERVOⅡ-ST-56M-F-PN10	SM-56M-F-PN10		
S-SERVOⅡ-ST-42M-A-PN15	SM-42M-A-PN15		1:15	S-SERVOⅡ-ST-56M-A-PN15	SM-56M-A-PN15		1:15
S-SERVOⅡ-ST-42M-F-PN15	SM-42M-F-PN15			S-SERVOⅡ-ST-56M-F-PN15	SM-56M-F-PN15		
S-SERVOⅡ-ST-42M-A-PN25	SM-42M-A-PN25		1:25	S-SERVOⅡ-ST-56M-A-PN25	SM-56M-A-PN25		1:25
S-SERVOⅡ-ST-42M-F-PN25	SM-42M-F-PN25			S-SERVOⅡ-ST-56M-F-PN25	SM-56M-F-PN25		
S-SERVOⅡ-ST-42M-A-PN40	SM-42M-A-PN40		1:40	S-SERVOⅡ-ST-56M-A-PN40	SM-56M-A-PN40		1:40
S-SERVOⅡ-ST-42M-F-PN40	SM-42M-F-PN40			S-SERVOⅡ-ST-56M-F-PN40	SM-56M-F-PN40		
S-SERVOⅡ-ST-42M-A-PN50	SM-42M-A-PN50		1:50	S-SERVOⅡ-ST-56M-A-PN50	SM-56M-A-PN50		1:50
S-SERVOⅡ-ST-42M-F-PN50	SM-42M-F-PN50			S-SERVOⅡ-ST-56M-F-PN50	SM-56M-F-PN50		
S-SERVOⅡ-ST-42L-A-PN3	SM-42L-A-PN3	SV2-PD-42L	1:3	S-SERVOⅡ-ST-56L-A-PN3	SM-56L-A-PN3	SV2-PD-56L	1:3
S-SERVOⅡ-ST-42L-F-PN3	SM-42L-F-PN3			S-SERVOⅡ-ST-56L-F-PN3	SM-56L-F-PN3		
S-SERVOⅡ-ST-42L-A-PN5	SM-42L-A-PN5		1:5	S-SERVOⅡ-ST-56L-A-PN5	SM-56L-A-PN5		1:5
S-SERVOⅡ-ST-42L-F-PN5	SM-42L-F-PN5			S-SERVOⅡ-ST-56L-F-PN5	SM-56L-F-PN5		
S-SERVOⅡ-ST-42L-A-PN8	SM-42L-A-PN8		1:8	S-SERVOⅡ-ST-56L-A-PN8	SM-56L-A-PN8		1:8
S-SERVOⅡ-ST-42L-F-PN8	SM-42L-F-PN8			S-SERVOⅡ-ST-56L-F-PN8	SM-56L-F-PN8		
S-SERVOⅡ-ST-42L-A-PN10	SM-42L-A-PN10		1:10	S-SERVOⅡ-ST-56L-A-PN10	SM-56L-A-PN10		1:10
S-SERVOⅡ-ST-42L-F-PN10	SM-42L-F-PN10			S-SERVOⅡ-ST-56L-F-PN10	SM-56L-F-PN10		
S-SERVOⅡ-ST-42L-A-PN15	SM-42L-A-PN15		1:15	S-SERVOⅡ-ST-56L-A-PN15	SM-56L-A-PN15		1:15
S-SERVOⅡ-ST-42L-F-PN15	SM-42L-F-PN15			S-SERVOⅡ-ST-56L-F-PN15	SM-56L-F-PN15		
S-SERVOⅡ-ST-42L-A-PN25	SM-42L-A-PN25		1:25	S-SERVOⅡ-ST-56L-A-PN25	SM-56L-A-PN25		1:25
S-SERVOⅡ-ST-42L-F-PN25	SM-42L-F-PN25			S-SERVOⅡ-ST-56L-F-PN25	SM-56L-F-PN25		
S-SERVOⅡ-ST-42L-A-PN40	SM-42L-A-PN40		1:40	S-SERVOⅡ-ST-56L-A-PN40	SM-56L-A-PN40		1:40
S-SERVOⅡ-ST-42L-F-PN40	SM-42L-F-PN40			S-SERVOⅡ-ST-56L-F-PN40	SM-56L-F-PN40		
S-SERVOⅡ-ST-42L-A-PN50	SM-42L-A-PN50		1:50	S-SERVOⅡ-ST-56L-A-PN50	SM-56L-A-PN50		1:50
S-SERVOⅡ-ST-42L-F-PN50	SM-42L-F-PN50			S-SERVOⅡ-ST-56L-F-PN50	SM-56L-F-PN50		
S-SERVOⅡ-ST-42XL-A-PN3	SM-42XL-A-PN3	SV2-PD-42XL	1:3	S-SERVOⅡ-ST-60S-A-PN3	SM-60S-A-PN3	SV2-PD-60S	1:3
S-SERVOⅡ-ST-42XL-F-PN3	SM-42XL-F-PN3			S-SERVOⅡ-ST-60S-F-PN3	SM-60S-F-PN3		
S-SERVOⅡ-ST-42XL-A-PN5	SM-42XL-A-PN5		1:5	S-SERVOⅡ-ST-60S-A-PN5	SM-60S-A-PN5		1:5
S-SERVOⅡ-ST-42XL-F-PN5	SM-42XL-F-PN5			S-SERVOⅡ-ST-60S-F-PN5	SM-60S-F-PN5		
S-SERVOⅡ-ST-42XL-A-PN8	SM-42XL-A-PN8		1:8	S-SERVOⅡ-ST-60S-A-PN8	SM-60S-A-PN8		1:8
S-SERVOⅡ-ST-42XL-F-PN8	SM-42XL-F-PN8			S-SERVOⅡ-ST-60S-F-PN8	SM-60S-F-PN8		
S-SERVOⅡ-ST-42XL-A-PN10	SM-42XL-A-PN10		1:10	S-SERVOⅡ-ST-60S-A-PN10	SM-60S-A-PN10		1:10
S-SERVOⅡ-ST-42XL-F-PN10	SM-42XL-F-PN10			S-SERVOⅡ-ST-60S-F-PN10	SM-60S-F-PN10		
S-SERVOⅡ-ST-42XL-A-PN15	SM-42XL-A-PN15		1:15	S-SERVOⅡ-ST-60S-A-PN15	SM-60S-A-PN15		1:15
S-SERVOⅡ-ST-42XL-F-PN15	SM-42XL-F-PN15			S-SERVOⅡ-ST-60S-F-PN15	SM-60S-F-PN15		
S-SERVOⅡ-ST-42XL-A-PN25	SM-42XL-A-PN25		1:25	S-SERVOⅡ-ST-60S-A-PN25	SM-60S-A-PN25		1:25
S-SERVOⅡ-ST-42XL-F-PN25	SM-42XL-F-PN25			S-SERVOⅡ-ST-60S-F-PN25	SM-60S-F-PN25		
S-SERVOⅡ-ST-42XL-A-PN40	SM-42XL-A-PN40		1:40	S-SERVOⅡ-ST-60S-A-PN40	SM-60S-A-PN40		1:40
S-SERVOⅡ-ST-42XL-F-PN40	SM-42XL-F-PN40			S-SERVOⅡ-ST-60S-F-PN40	SM-60S-F-PN40		
S-SERVOⅡ-ST-42XL-A-PN50	SM-42XL-A-PN50		1:50	S-SERVOⅡ-ST-60S-A-PN50	SM-60S-A-PN50		1:50
S-SERVOⅡ-ST-42XL-F-PN50	SM-42XL-F-PN50			S-SERVOⅡ-ST-60S-F-PN50	SM-60S-F-PN50		

6. Combination with Gearbox

◆ S-SERVOⅡ MINI series

Unit Part Number	Motor Model Number	Drive Model Number	Reduction gear ratio
S-SERVOⅡ-ST-60M-A-PN3	SM-60M-A-PN3		1:3
S-SERVOⅡ-ST-60M-F-PN3	SM-60M-F-PN3		
S-SERVOⅡ-ST-60M-A-PN5	SM-60M-A-PN5		1:5
S-SERVOⅡ-ST-60M-F-PN5	SM-60M-F-PN5		
S-SERVOⅡ-ST-60M-A-PN8	SM-60M-A-PN8		1:8
S-SERVOⅡ-ST-60M-F-PN8	SM-60M-F-PN8		
S-SERVOⅡ-ST-60M-A-PN10	SM-60M-A-PN10		1:10
S-SERVOⅡ-ST-60M-F-PN10	SM-60M-F-PN10		
S-SERVOⅡ-ST-60M-A-PN15	SM-60M-A-PN15	SV2-PD-60M	1:15
S-SERVOⅡ-ST-60M-F-PN15	SM-60M-F-PN15		
S-SERVOⅡ-ST-60M-A-PN25	SM-60M-A-PN25		1:25
S-SERVOⅡ-ST-60M-F-PN25	SM-60M-F-PN25		
S-SERVOⅡ-ST-60M-A-PN40	SM-60M-A-PN40		1:40
S-SERVOⅡ-ST-60M-F-PN40	SM-60M-F-PN40		
S-SERVOⅡ-ST-60M-A-PN50	SM-60M-A-PN50		1:50
S-SERVOⅡ-ST-60M-F-PN50	SM-60M-F-PN50		
S-SERVOⅡ-ST-60L-A-PN3	SM-60L-A-PN3		1:3
S-SERVOⅡ-ST-60L-F-PN3	SM-60L-F-PN3		
S-SERVOⅡ-ST-60L-A-PN5	SM-60L-A-PN5		1:5
S-SERVOⅡ-ST-60L-F-PN5	SM-60L-F-PN5		
S-SERVOⅡ-ST-60L-A-PN8	SM-60L-A-PN8		1:8
S-SERVOⅡ-ST-60L-F-PN8	SM-60L-F-PN8		
S-SERVOⅡ-ST-60L-A-PN10	SM-60L-A-PN10		1:10
S-SERVOⅡ-ST-60L-F-PN10	SM-60L-F-PN10		
S-SERVOⅡ-ST-60L-A-PN15	SM-60L-A-PN15	SV2-PD-60L	1:15
S-SERVOⅡ-ST-60L-F-PN15	SM-60L-F-PN15		
S-SERVOⅡ-ST-60L-A-PN25	SM-60L-A-PN25		1:25
S-SERVOⅡ-ST-60L-F-PN25	SM-60L-F-PN25		
S-SERVOⅡ-ST-60L-A-PN40	SM-60L-A-PN40		1:40
S-SERVOⅡ-ST-60L-F-PN40	SM-60L-F-PN40		
S-SERVOⅡ-ST-60L-A-PN50	SM-60L-A-PN50		1:50
S-SERVOⅡ-ST-60L-F-PN50	SM-60L-F-PN50		

Unit Part Number	Motor Model Number	Drive Model Number	Reduction gear ratio
S-SERVOⅡ-MI-42S-A-PN3	SM-42S-A-PN3		1:3
S-SERVOⅡ-MI-42S-F-PN3	SM-42S-F-PN3		
S-SERVOⅡ-MI-42S-A-PN5	SM-42S-A-PN5		1:5
S-SERVOⅡ-MI-42S-F-PN5	SM-42S-F-PN5		
S-SERVOⅡ-MI-42S-A-PN8	SM-42S-A-PN8		1:8
S-SERVOⅡ-MI-42S-F-PN8	SM-42S-F-PN8		
S-SERVOⅡ-MI-42S-A-PN10	SM-42S-A-PN10		1:10
S-SERVOⅡ-MI-42S-F-PN10	SM-42S-F-PN10		
S-SERVOⅡ-MI-42S-A-PN15	SM-42S-A-PN15	SV2-PD-MI-42S	1:15
S-SERVOⅡ-MI-42S-F-PN15	SM-42S-F-PN15		
S-SERVOⅡ-MI-42S-A-PN25	SM-42S-A-PN25		1:25
S-SERVOⅡ-MI-42S-F-PN25	SM-42S-F-PN25		
S-SERVOⅡ-MI-42S-A-PN40	SM-42S-A-PN40		1:40
S-SERVOⅡ-MI-42S-F-PN40	SM-42S-F-PN40		
S-SERVOⅡ-MI-42S-A-PN50	SM-42S-A-PN50		1:50
S-SERVOⅡ-MI-42S-F-PN50	SM-42S-F-PN50		
S-SERVOⅡ-MI-42M-A-PN3	SM-42M-A-PN3		1:3
S-SERVOⅡ-MI-42M-F-PN3	SM-42M-F-PN3		
S-SERVOⅡ-MI-42M-A-PN5	SM-42M-A-PN5		1:5
S-SERVOⅡ-MI-42M-F-PN5	SM-42M-F-PN5		
S-SERVOⅡ-MI-42M-A-PN8	SM-42M-A-PN8		1:8
S-SERVOⅡ-MI-42M-F-PN8	SM-42M-F-PN8		
S-SERVOⅡ-MI-42M-A-PN10	SM-42M-A-PN10		1:10
S-SERVOⅡ-MI-42M-F-PN10	SM-42M-F-PN10		
S-SERVOⅡ-MI-42M-A-PN15	SM-42M-A-PN15	SV2-PD-MI-42M	1:15
S-SERVOⅡ-MI-42M-F-PN15	SM-42M-F-PN15		
S-SERVOⅡ-MI-42M-A-PN25	SM-42M-A-PN25		1:25
S-SERVOⅡ-MI-42M-F-PN25	SM-42M-F-PN25		
S-SERVOⅡ-MI-42M-A-PN40	SM-42M-A-PN40		1:40
S-SERVOⅡ-MI-42M-F-PN40	SM-42M-F-PN40		
S-SERVOⅡ-MI-42M-A-PN50	SM-42M-A-PN50		1:50
S-SERVOⅡ-MI-42M-F-PN50	SM-42M-F-PN50		
S-SERVOⅡ-MI-42L-A-PN3	SM-42L-A-PN3		1:3
S-SERVOⅡ-MI-42L-F-PN3	SM-42L-F-PN3		
S-SERVOⅡ-MI-42L-A-PN5	SM-42L-A-PN5		1:5
S-SERVOⅡ-MI-42L-F-PN5	SM-42L-F-PN5		
S-SERVOⅡ-MI-42L-A-PN8	SM-42L-A-PN8		1:8
S-SERVOⅡ-MI-42L-F-PN8	SM-42L-F-PN8		
S-SERVOⅡ-MI-42L-A-PN10	SM-42L-A-PN10		1:10
S-SERVOⅡ-MI-42L-F-PN10	SM-42L-F-PN10		
S-SERVOⅡ-MI-42L-A-PN15	SM-42L-A-PN15	SV2-PD-MI-42L	1:15
S-SERVOⅡ-MI-42L-F-PN15	SM-42L-F-PN15		
S-SERVOⅡ-MI-42L-A-PN25	SM-42L-A-PN25		1:25
S-SERVOⅡ-MI-42L-F-PN25	SM-42L-F-PN25		
S-SERVOⅡ-MI-42L-A-PN40	SM-42L-A-PN40		1:40
S-SERVOⅡ-MI-42L-F-PN40	SM-42L-F-PN40		
S-SERVOⅡ-MI-42L-A-PN50	SM-42L-A-PN50		1:50
S-SERVOⅡ-MI-42L-F-PN50	SM-42L-F-PN50		
S-SERVOⅡ-MI-42XL-A-PN3	SM-42XL-A-PN3		1:3
S-SERVOⅡ-MI-42XL-F-PN3	SM-42XL-F-PN3		
S-SERVOⅡ-MI-42XL-A-PN5	SM-42XL-A-PN5		1:5
S-SERVOⅡ-MI-42XL-F-PN5	SM-42XL-F-PN5		
S-SERVOⅡ-MI-42XL-A-PN8	SM-42XL-A-PN8		1:8
S-SERVOⅡ-MI-42XL-F-PN8	SM-42XL-F-PN8		
S-SERVOⅡ-MI-42XL-A-PN10	SM-42XL-A-PN10		1:10
S-SERVOⅡ-MI-42XL-F-PN10	SM-42XL-F-PN10		
S-SERVOⅡ-MI-42XL-A-PN15	SM-42XL-A-PN15	SV2-PD-MI-42XL	1:15
S-SERVOⅡ-MI-42XL-F-PN15	SM-42XL-F-PN15		
S-SERVOⅡ-MI-42XL-A-PN25	SM-42XL-A-PN25		1:25
S-SERVOⅡ-MI-42XL-F-PN25	SM-42XL-F-PN25		
S-SERVOⅡ-MI-42XL-A-PN40	SM-42XL-A-PN40		1:40
S-SERVOⅡ-MI-42XL-F-PN40	SM-42XL-F-PN40		
S-SERVOⅡ-MI-42XL-A-PN50	SM-42XL-A-PN50		1:50
S-SERVOⅡ-MI-42XL-F-PN50	SM-42XL-F-PN50		

7. Specifications of Motor

MODEL			SM-20 series		SM-28 series			SM-35 series	
		UNIT	20M	20L	28S	28M	28L	35M	35L
DRIVE METHOD		−	BI-POLAR						
NUMBER OF PHASES		−	2	2	2	2	2	2	2
CURRENT per PHASE		A	0.6	0.6	0.67	0.67	0.67	0.8	1.0
HOLDING TORQUE		N·m	0.018	0.037	0.069	0.098	0.118	0.078	0.137
ROTOR INERTIA		g·cm^2	3.0	3.3	9.0	13	18	10	14
WEIGHTS		g	92	105	146	203	227	152	210
LENGTH(L)		mm	33	38	32	45	50	26	36
PERMISSIBLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	18	18	30	30	30	22	22
	8mm		30	30	38	38	38	26	26
	13mm		−	−	53	53	53	33	33
	18mm		−	−	−	−	−	46	46
PERMISSIBLE THRUST LOAD		N	Lower than motor weight						
INSULATION RESISTANCE		Mohm	100 MIN.(at 500VDC)						
INSULATION CLASS		−	CLASS B(130℃)						
OPERATING TEMPERATURE		℃	0 to 55						

MODEL			SM-42 series				SM-56 series			SM-60 series		
		UNIT	42S	42M	42L	42XL	56S	56M	56L	60S	60M	60L
DRIVE METHOD		−	BI-POLAR									
NUMBER OF PHASES		−	2	2	2	2	2	2	2	2	2	2
CURRENT per PHASE		A	1.3	1.68	1.68	1.2	2.8	2.8	2.8	4.0	4.0	4.0
HOLDING TORQUE		N·m	0.216	0.353	0.431	0.650	0.539	1.00	1.72	0.88	1.28	2.40
ROTOR INERTIA		g·cm^2	35	54	68	114	120	300	480	240	490	690
WEIGHTS		g	278	341	416	566	506	742	1075	700	864	1418
LENGTH(L)		mm	33	39	47	60	41	56	76	47	56	85
PERMISSIBLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	22	22	22	22	52	52	52	70	70	70
	8mm		26	26	26	26	65	65	65	87	87	87
	13mm		33	33	33	33	85	85	85	114	114	114
	18mm		46	46	46	46	123	123	123	165	165	165
PERMISSIBLE THRUST LOAD		N	Lower than motor weight									
INSULATION RESISTANCE		Mohm	100 MIN.(at 500VDC)									
INSULATION CLASS		−	CLASS B(130℃)									
OPERATING TEMPERATURE		℃	0 to 55									

8. Torque Characteristics of Motor

S-SERVOⅡ-ST/MI/2X/3X-20 series
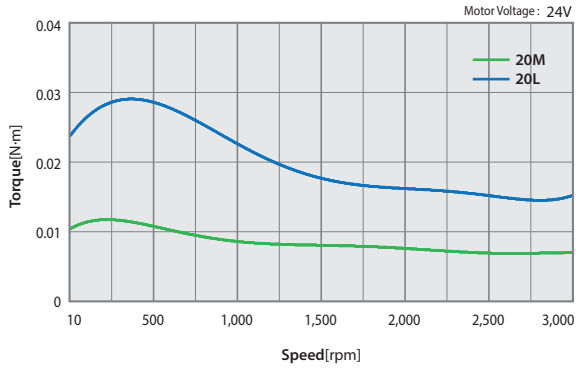
Motor Voltage: 24V
- 20M
- 20L

S-SERVOⅡ-ST/MI/2X/3X-28 series
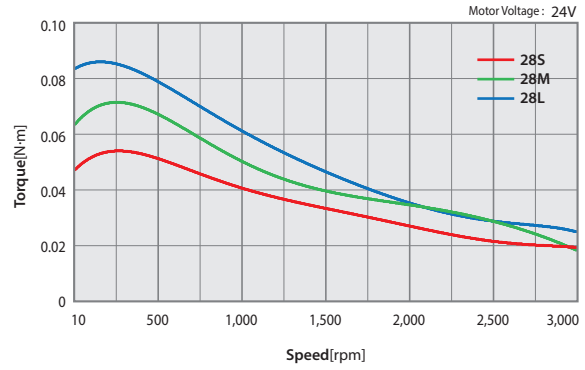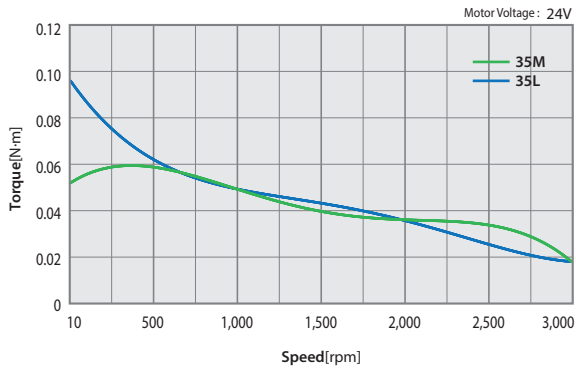
Motor Voltage: 24V
- 28S
- 28M
- 28L

S-SERVOⅡ-ST/MI/2X/3X-35 series

Motor Voltage: 24V
- 35M
- 35L

S-SERVOⅡ-ST/MI/2X/3X-42 series

Motor Voltage: 24V
- 42S
- 42M
- 42L
- 42XL

S-SERVOⅡ-ST/2X/3X-56 series

Motor Voltage: 24V
- 56S
- 56M
- 56L

S-SERVOⅡ-ST/2X/3X-60 series

Motor Voltage: 24V
- 60S
- 60M
- 60L
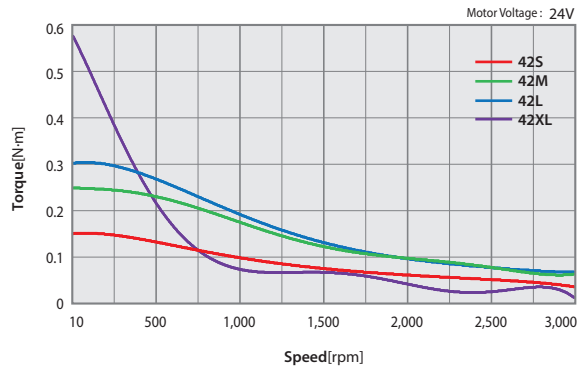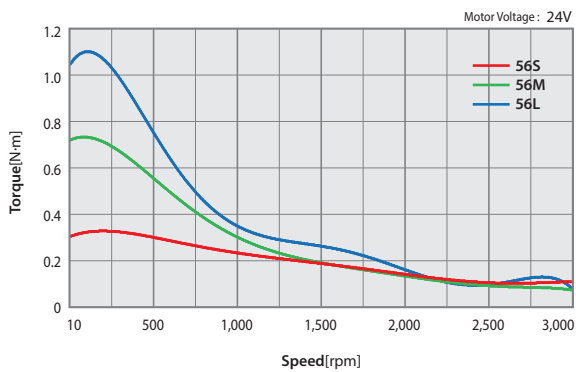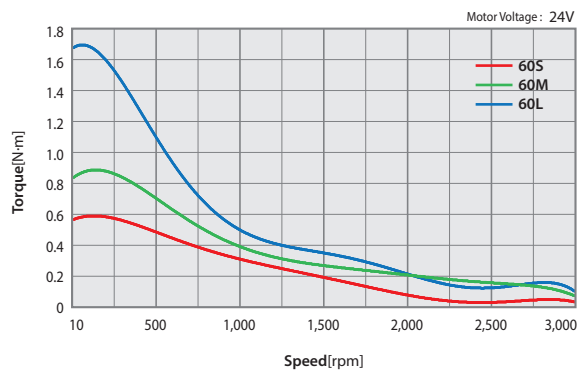
9. Dimensions of Motor [mm]
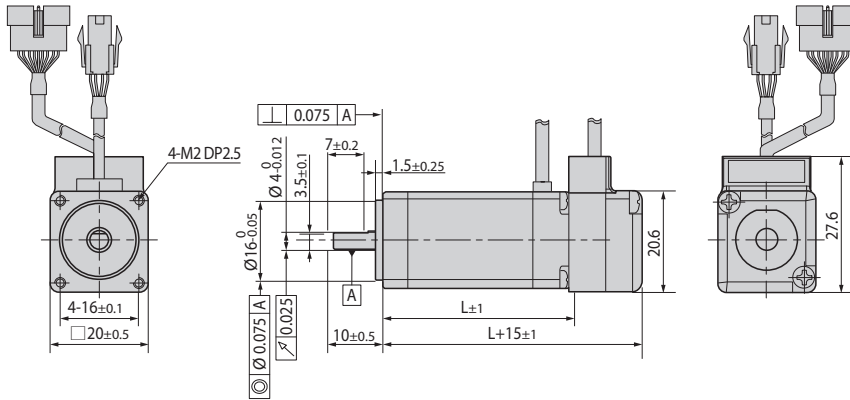
20mm

Model name	Length(L)
SM-20M	33
SM-20L	38

4-M2 DP2.5

⊥ 0.075 A
7±0.2
1.5±0.25
Ø4-0.012
3.5±0.1
Ø16-0.05
A
20.6
27.6
L±1
4-16±0.1
□20±0.5
Ø0.075 A
0.025
Ø0.075 ◎
10±0.5
L+15±1
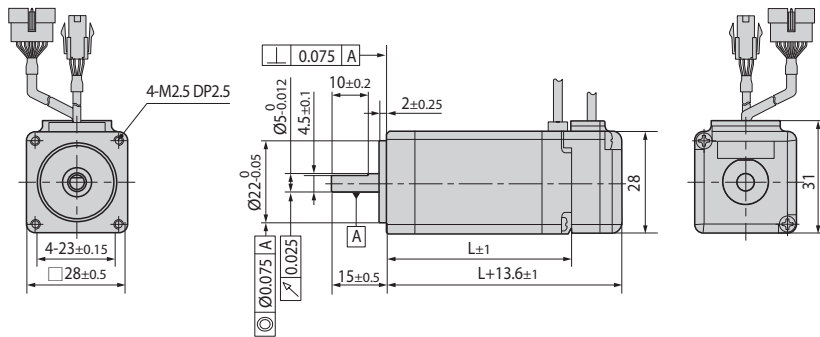
28mm

Model name	Length(L)
SM-28S	32
SM-28M	45
SM-28L	50

4-M2.5 DP2.5

⊥ 0.075 A
10±0.2
2±0.25
Ø5-0.012
4.5±0.1
Ø22-0.05
A
28
31
L±1
4-23±0.15
□28±0.5
Ø0.075 A
0.025
Ø0.075 ◎
15±0.5
L+13.6±1
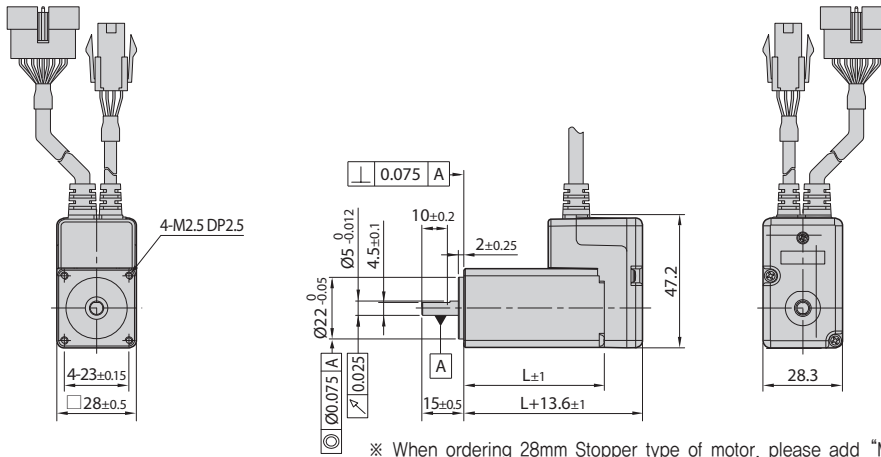
28mm
(Stopper type)

Model name	Length(L)
SM-28SM	32
SM-28MM	45
SM-28LM	50

4-M2.5 DP2.5

⊥ 0.075 A
10±0.2
2±0.25
Ø5-0.012
4.5±0.1
Ø22-0.05
A
47.2
28.3
L±1
4-23±0.15
□28±0.5
Ø0.075 A
0.025
Ø0.075 ◎
15±0.5
L+13.6±1

※ When ordering 28mm Stopper type of motor, please add "M" after standard motor model number.
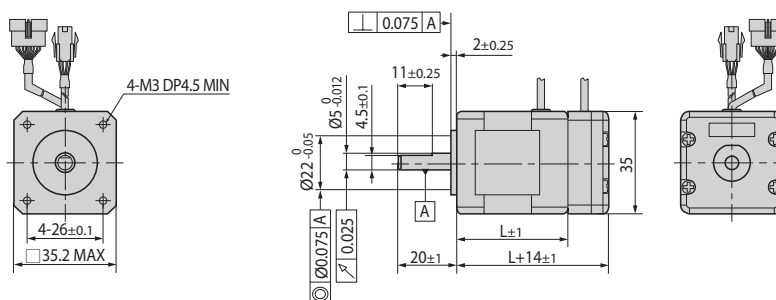
35mm

Model name	Length(L)
SM-35M	26
SM-35L	36

4-M3 DP4.5 MIN

⊥ 0.075 A
2±0.25
11±0.25
Ø5-0.012
4.5±0.1
Ø22-0.05
A
35
L±1
4-26±0.1
□35.2 MAX
Ø0.075 A
0.025
Ø0.075 ◎
20±1
L+14±1

9. Dimensions of Motor [mm]
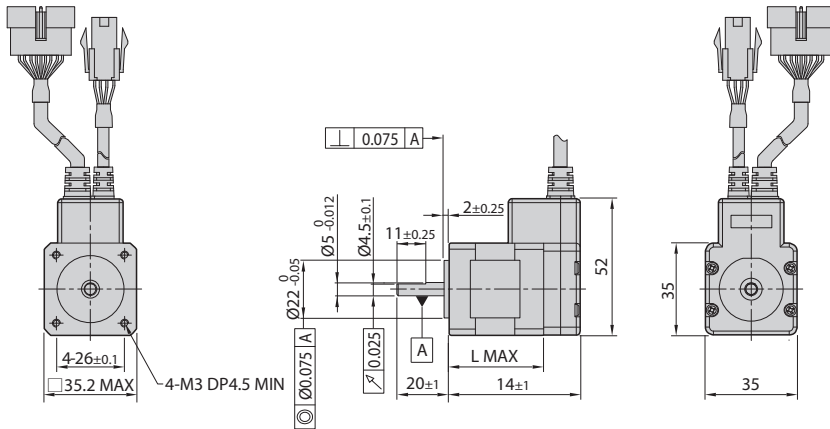
35mm
(Stopper type)

Model name	Length(L)
SM–35MM	26
SM–35LM	36

4-26±0.1
□35.2 MAX
4-M3 DP4.5 MIN

0.075 A
⌀5 0/-0.012
⌀4.5±0.1
11±0.25
⌀22 0/-0.05
0.075 A
0.025
A
2±0.25
52
L MAX
20±1 14±1
35
35

※ When ordering 28mm Stopper type of motor, please add "M" after standard motor model number.
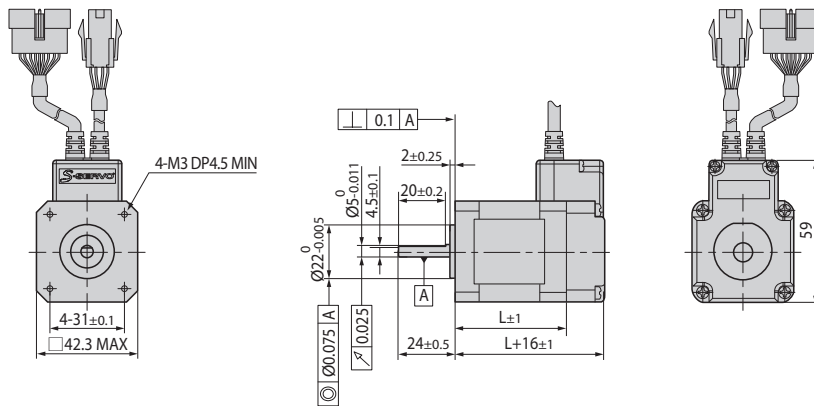
42mm

Model name	Length(L)
SM–42S	33
SM–42M	39
SM–42L	47
SM–42XL	60

4-M3 DP4.5 MIN
4-31±0.1
□42.3 MAX

0.1 A
⌀5-0.011
⌀4.5±0.1
⌀22 0/-0.005
0.075 A
0.025
A
2±0.25
20±0.2
L±1
24±0.5 L+16±1
59
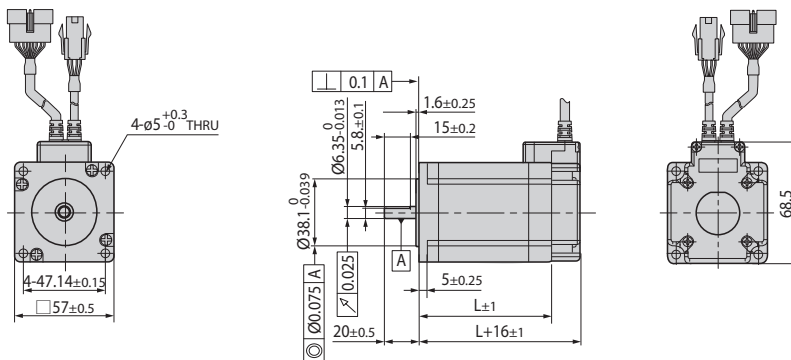
56mm

Model name	Length(L)
SM–56S	41
SM–56M	56
SM–56L	76

4-ø5 +0.3/-0 THRU
4-47.14±0.15
□57±0.5

0.1 A
⌀6.35-0.013
5.8±0.1
⌀38.1 0/-0.039
0.075 A
0.025
A
1.6±0.25
15±0.2
5±0.25
L±1
20±0.5 L+16±1
68.5
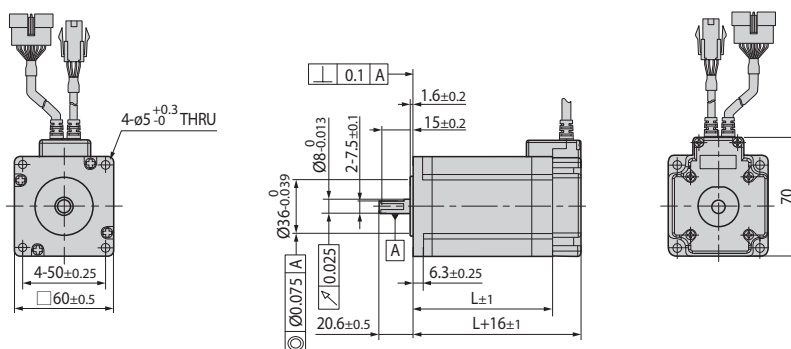
60mm

Model name	Length(L)
SM–60S	47
SM–60M	56
SM–60L	85

4-ø5 +0.3/-0 THRU
4-50±0.25
□60±0.5

0.1 A
⌀8-0.013
2-7.5±0.1
⌀36 0/-0.039
0.075 A
0.025
A
1.6±0.2
15±0.2
6.3±0.25
L±1
20.6±0.5 L+16±1
70

10. Notes on Installation

1) This unit is intented for indoor usage only.

2) Must be used under ambient temperature of 0℃~50℃.

3) When the temperature of the drive case is over 50℃ the heat dissipation is required.

4) Should avoid from direct sunlight, magnetic or radioactive when install drive.

5) When connect I/O cable between host controller and drive, must turn off power of host controller and drive. Otherwise drive can be damaged.

6) Drive and motor should be grounded. To prevent the potential difference with surrounding control system device, it should be grounded directly to the ground point as short as possible.

7) When install two or more drives side-by-side, must be installed at a distance of at least 20mm at the horizontal direction and at a distance of at least 50mm at the vertical direction.
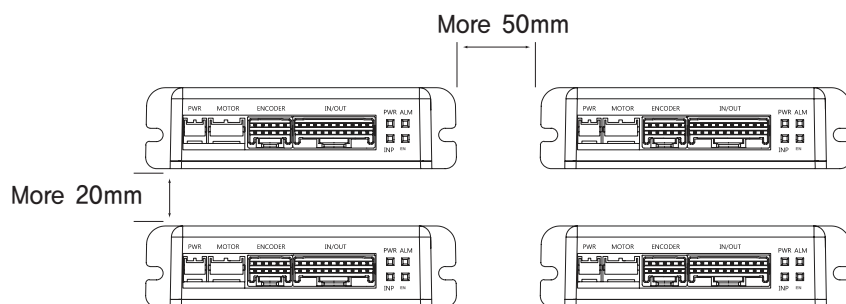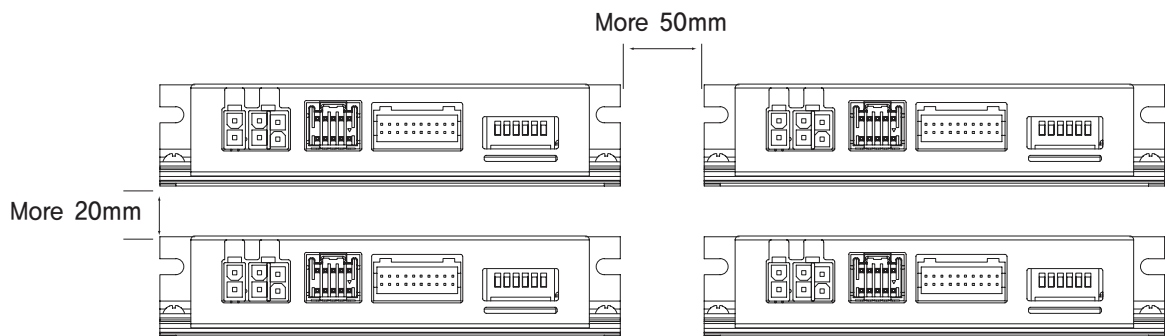
11. Specifications of Motor with Brake

Unit Part Number	Motor Model Number	Electronic Brake					Motor Unit Weight [g]	Permitted Overhung Load [N]				Permitted Thrust Load [N]
		Type	Voltage Input [V]	Rated Current [A]	Power Consumption [W]	Statical Friction Torque [N·m]		Length from Motor Point [mm]				
								3	8	13	18	
S−SERVOⅡ−ST−42S−■−BK	SM−42S−■−BK	Non− exci− tation run Type	24VDC ±10%	0.2	5	0.2	510	22	26	33	46	Must be Lower than Unit's Weight
S−SERVOⅡ−MI−42S−■−BK												
S−SERVOⅡ−ST−42M−■−BK	SM−42M−■−BK						570					
S−SERVOⅡ−MI−42M−■−BK												
S−SERVOⅡ−ST−42L−■−BK	SM−42L−■−BK						640					
S−SERVOⅡ−MI−42L−■−BK												
S−SERVOⅡ−ST−42XL−■−BK	SM−42XL−■−BK						770					
S−SERVOⅡ−MI−42XL−■−BK												
S−SERVOⅡ−ST−56S−■−BK	SM−56S−■−BK			0.27	6.6	0.7	870	52	65	85	123	
S−SERVOⅡ−ST−56M−■−BK	SM−56M−■−BK						1190					
S−SERVOⅡ−ST−56L−■−BK	SM−56L−■−BK						1380					
S−SERVOⅡ−ST−60S−■−BK	SM−60S−■−BK						1150	70	87	114	165	
S−SERVOⅡ−ST−60M−■−BK	SM−60M−■−BK						1350					
S−SERVOⅡ−ST−60L−■−BK	SM−60L−■−BK						1960					

* The code of encoder resolution will be marked in "■"
* S−SERVOⅡ 2X, S−SERVOⅡ 3X product needs 2 or 3 sets of motors for one drive. Combination of drive and motors can be diversifed so please contact with sales division or distributor of Fastech before purchasing product.
* Electronic Brake cannot be used for braking. Position hold purpose only when power OFF.
* The weight means Motor Unit Weight including Motor and Electronic Brake.
* Motor Model Number is combined model name of Motor and Brake.
* Motor specification and torque characteristic are same as Standard Motor.

* Brake Operation Timing Chart

S−SERVOⅡ control Brake by Drive automatically.
Please refer to below Timing Chart when control Brake from upper controller other than using S−SERVOⅡ Brake control.
Otherwise, Drive malfunctioning and loads can be fall down.
Also, please do not operate Brake while motor operation to prevent damage.
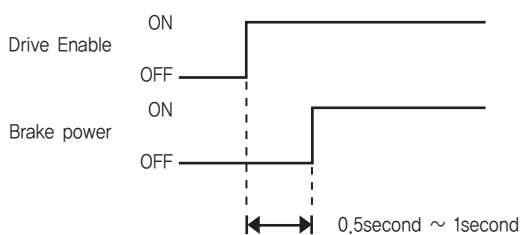
12. Dimensions of Motor with Brake [mm]

42mm

SMR-04V-N(JST)

4-M3 THRU
P.C.D 43.8

Lead wire UL3398 AWG26
Length : 400mm
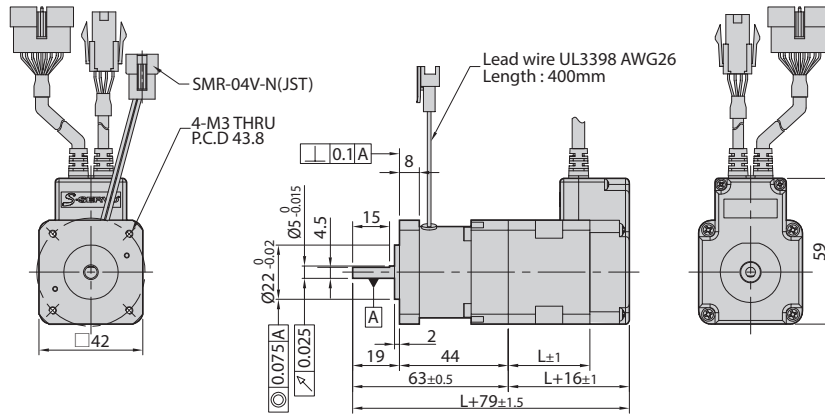
Model Name	Length(L)	Weight(kg)
SM–42S	33	0.51
SM–42M	39	0.57
SM–42L	47	0.64
SM–42XL	60	0.77

56mm

SMR-04V-N(JST)

4-Ø4.5 THRU
P.C.D 66.7

Lead wire UL3398 AWG26
Length : 400mm
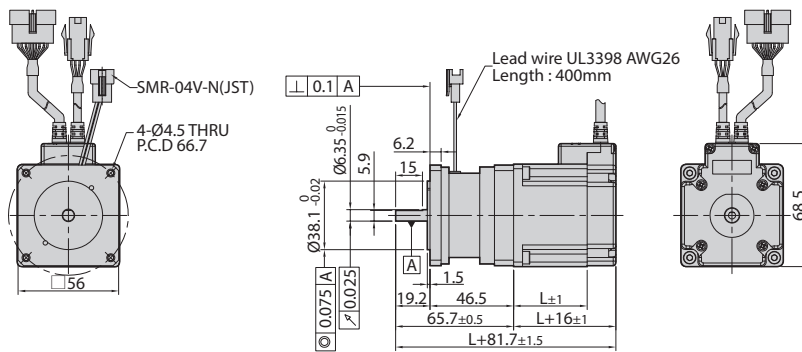
Model Name	Length(L)	Weight(kg)
SM–56S	41	0.87
SM–56M	56	1.19
SM–56L	76	1.38

60mm

SMR-04V-N(JST)

4-Ø4.5 THRU
P.C.D 70.7

Lead wire UL3398 AWG26
Length : 400mm
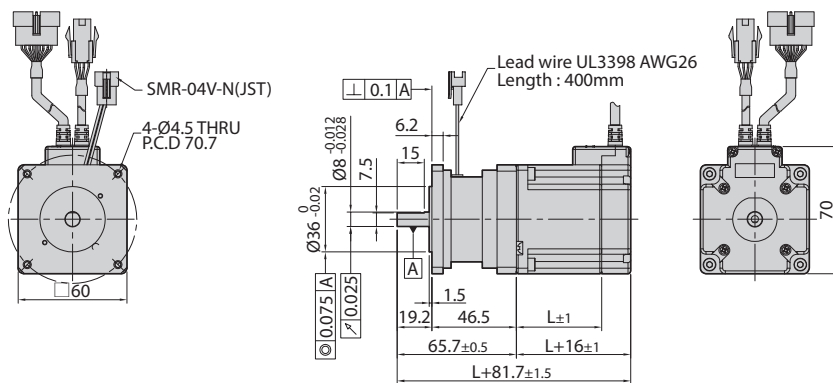
Model Name	Length(L)	Weight(kg)
SM–60S	47	1.15
SM–60M	56	1.35
SM–60L	85	1.96

13. Specifications of Motor with Gearbox

42mm

Model Name	Maximum Holding Torque [N·m]	Rotor Inertia Moment [kg·m²]	Backlash [min]	Angle Transmission Error [min]	Reduction Gear Ratio	Resolution (4,000 ppr Standard)	Permitted Torque [N·m]	Maximum Torque [N·m]	Permitted Speed Range [rpm]	Unit Weight [kg]	Permitted Overhung Load [N] Axis Center Standard	Permitted Thrust Load [N]
S-SERVOⅡ-ST-42S-■-PN3 S-SERVOⅡ-MI-42S-■-PN3	0.43	35×10^{-7}	3	5	3	0.03°	6	12	0~1000	0.89	240	270
S-SERVOⅡ-ST-42S-■-PN5 S-SERVOⅡ-MI-42S-■-PN5	0.72				5	0.018°	9	18	0~600		290	330
S-SERVOⅡ-ST-42S-■-PN8 S-SERVOⅡ-MI-42S-■-PN8	1.15				8	0.01125°	9	18	0~375		340	410
S-SERVOⅡ-ST-42S-■-PN10 S-SERVOⅡ-MI-42S-■-PN10	1.44				10	0.009°	6	12	0~300		360	450
S-SERVOⅡ-ST-42S-■-PN15 S-SERVOⅡ-MI-42S-■-PN15	2.09		5	7	15	0.006°	6	12	0~200	0.99	410	540
S-SERVOⅡ-ST-42S-■-PN25 S-SERVOⅡ-MI-42S-■-PN25	3.49				25	0.0036°	9	18	0~120		490	640
S-SERVOⅡ-ST-42S-■-PN40 S-SERVOⅡ-MI-42S-■-PN40	5.59				40	0.00225°	9	18	0~75		570	640
S-SERVOⅡ-ST-42S-■-PN50 S-SERVOⅡ-MI-42S-■-PN50	6.99				50	0.0018°	9	18	0~60		620	640
S-SERVOⅡ-ST-42M-■-PN3 S-SERVOⅡ-MI-42M-■-PN3	0.70	54×10^{-7}	3	5	3	0.03°	6	18	0~1000	0.96	240	270
S-SERVOⅡ-ST-42M-■-PN5 S-SERVOⅡ-MI-42M-■-PN5	1.17				5	0.018°	9	18	0~600		290	330
S-SERVOⅡ-ST-42M-■-PN8 S-SERVOⅡ-MI-42M-■-PN8	1.88				8	0.01125°	9	18	0~375		340	410
S-SERVOⅡ-ST-42M-■-PN10 S-SERVOⅡ-MI-42M-■-PN10	2.35				10	0.009°	6	12	0~300		360	450
S-SERVOⅡ-ST-42M-■-PN15 S-SERVOⅡ-MI-42M-■-PN15	3.42		5	7	15	0.006°	6	12	0~200	1.06	410	540
S-SERVOⅡ-ST-42M-■-PN25 S-SERVOⅡ-MI-42M-■-PN25	5.70				25	0.0036°	9	18	0~120		490	640
S-SERVOⅡ-ST-42M-■-PN40 S-SERVOⅡ-MI-42M-■-PN40	9.00				40	0.00225°	9	18	0~75		570	640
S-SERVOⅡ-ST-42M-■-PN50 S-SERVOⅡ-MI-42M-■-PN50	9.00				50	0.0018°	9	18	0~60		620	640
S-SERVOⅡ-ST-42L-■-PN3 S-SERVOⅡ-MI-42L-■-PN3	0.86	68×10^{-7}	3	5	3	0.03°	6	18	0~1000	1.02	240	270
S-SERVOⅡ-ST-42L-■-PN5 S-SERVOⅡ-MI-42L-■-PN5	1.43				5	0.018°	9	18	0~600		290	330
S-SERVOⅡ-ST-42L-■-PN8 S-SERVOⅡ-MI-42L-■-PN8	2.29				8	0.01125°	9	18	0~375		340	410
S-SERVOⅡ-ST-42L-■-PN10 S-SERVOⅡ-MI-42L-■-PN10	2.86				10	0.009°	6	12	0~300		360	450
S-SERVOⅡ-ST-42L-■-PN15 S-SERVOⅡ-MI-42L-■-PN15	4.16		5	7	15	0.006°	6	12	0~200	1.12	410	540
S-SERVOⅡ-ST-42L-■-PN25 S-SERVOⅡ-MI-42L-■-PN25	6.94				25	0.0036°	9	18	0~120		490	640
S-SERVOⅡ-ST-42L-■-PN40 S-SERVOⅡ-MI-42L-■-PN40	9.00				40	0.00225°	9	18	0~75		570	640
S-SERVOⅡ-ST-42L-■-PN50 S-SERVOⅡ-MI-42L-■-PN50	9.00				50	0.0018°	9	18	0~60		620	640
S-SERVOⅡ-ST-42XL-■-PN3 S-SERVOⅡ-MI-42XL-■-PN3	1.55	114×10^{-7}	3	5	3	0.03°	6	18	0~1000	1.15	240	270
S-SERVOⅡ-ST-42XL-■-PN5 S-SERVOⅡ-MI-42XL-■-PN5	2.59				5	0.018°	9	18	0~600		290	330
S-SERVOⅡ-ST-42XL-■-PN8 S-SERVOⅡ-MI-42XL-■-PN8	4.15				8	0.01125°	9	18	0~375		340	410
S-SERVOⅡ-ST-42XL-■-PN10 S-SERVOⅡ-MI-42XL-■-PN10	5.18				10	0.009°	6	12	0~300		360	450
S-SERVOⅡ-ST-42XL-■-PN15 S-SERVOⅡ-MI-42XL-■-PN15	6.00		5	7	15	0.006°	6	12	0~200	1.25	410	540
S-SERVOⅡ-ST-42XL-■-PN25 S-SERVOⅡ-MI-42XL-■-PN25	9.00				25	0.0036°	9	18	0~120		490	640
S-SERVOⅡ-ST-42XL-■-PN40 S-SERVOⅡ-MI-42XL-■-PN40	9.00				40	0.00225°	9	18	0~75		570	640
S-SERVOⅡ-ST-42XL-■-PN50 S-SERVOⅡ-MI-42XL-■-PN50	9.00				50	0.0018°	9	18	0~60		620	640

* The code of encoder resolution will be marked in "■"

13. Specifications of Motor with Gearbox

56mm

Model Name	Maximum Holding Torque [N·m]	Rotor Inertia Moment [kg·m²]	Backlash [min]	Angle Trans-mission Error [min]	Reduction Gear Ratio	Resolution (4,000 ppr Standard)	Permitted Torque [N·m]	Maximum Torque [N·m]	Permitted Speed Range [rpm]	Unit Weight [kg]	Permitted Overhung Load [N] Axis Center Standard	Per-mitted Thrust Load [N]
S-SERVO II -ST-56S-■-PN3	0.8	120×10⁻⁷	3	5	3	0.03°	18	35	0~1000	1.88	430	310
S-SERVO II -ST-56S-■-PN5	1.3				5	0.018°	27	50	0~600		510	390
S-SERVO II -ST-56S-■-PN8	2.1				8	0.01125°	27	50	0~375		600	480
S-SERVO II -ST-56S-■-PN10	2.7				10	0.009°	18	35	0~300		640	530
S-SERVO II -ST-56S-■-PN15	3.9				15	0.006°	18	35	0~200	2.08	740	630
S-SERVO II -ST-56S-■-PN25	6.6				25	0.0036°	27	50	0~120		870	790
S-SERVO II -ST-56S-■-PN40	10.6				40	0.00225°	27	50	0~75		1000	970
S-SERVO II -ST-56S-■-PN50	13.2				50	0.0018°	27	50	0~60		1100	1000
S-SERVO II -ST-56M-■-PN3	2.0	300×10⁻⁷	3	5	3	0.03°	18	35	0~1000	2.15	430	310
S-SERVO II -ST-56M-■-PN5	3.3				5	0.018°	27	50	0~600		510	390
S-SERVO II -ST-56M-■-PN8	5.3				8	0.01125°	27	50	0~375		600	480
S-SERVO II -ST-56M-■-PN10	6.6				10	0.009°	18	35	0~300		640	530
S-SERVO II -ST-56M-■-PN15	9.7				15	0.006°	18	35	0~200	2.35	740	630
S-SERVO II -ST-56M-■-PN25	16.1				25	0.0036°	27	50	0~120		870	790
S-SERVO II -ST-56M-■-PN40	25.9				40	0.00225°	27	50	0~75		1000	970
S-SERVO II -ST-56M-■-PN50	27.0				50	0.0018°	27	50	0~60		1100	1000
S-SERVO II -ST-56L-■-PN3	2.9	480×10⁻⁷	3	5	3	0.03°	18	35	0~1000	2.22	430	310
S-SERVO II -ST-56L-■-PN5	4.8				5	0.018°	27	50	0~600		510	390
S-SERVO II -ST-56L-■-PN8	7.7				8	0.01125°	27	50	0~375		600	480
S-SERVO II -ST-56L-■-PN10	9.6				10	0.009°	18	35	0~300		640	530
S-SERVO II -ST-56L-■-PN15	14.0				15	0.006°	18	35	0~200	2.42	740	630
S-SERVO II -ST-56L-■-PN25	23.4				25	0.0036°	27	50	0~120		870	790
S-SERVO II -ST-56L-■-PN40	27.0				40	0.00225°	27	50	0~75		1000	970
S-SERVO II -ST-56L-■-PN50	27.0				50	0.0018°	27	50	0~60		1100	1000

* The code of encoder resolution will be marked in "■"

60mm

Model Name	Maximum Holding Torque [N·m]	Rotor Inertia Moment [kg·m²]	Backlash [min]	Angle Transmission Error [min]	Reduction Gear Ratio	Resolution (4,000 ppr Standard)	Permitted Torque [N·m]	Maximum Torque [N·m]	Permitted Speed Range [rpm]	Unit Weight [kg]	Permitted Overhung Load [N] Axis Center Standard	Permitted Thrust Load [N]
S−SERVO II −ST−60S−■−PN3	1.5	240×10^{-7}	3	5	3	0.03°	18	35	0~1000	2.0	430	310
S−SERVO II −ST−60S−■−PN5	2.5				5	0.018°	27	50	0~600		510	390
S−SERVO II −ST−60S−■−PN8	4.1				8	0.01125°	27	50	0~375		600	480
S−SERVO II −ST−60S−■−PN10	5.1				10	0.009°	18	35	0~300		640	530
S−SERVO II −ST−60S−■−PN15	7.5				15	0.006°	18	35	0~200		740	630
S−SERVO II −ST−60S−■−PN25	12.5				25	0.0036°	27	50	0~120	2.2	870	790
S−SERVO II −ST−60S−■−PN40	20.1				40	0.00225°	27	50	0~75		1000	970
S−SERVO II −ST−60S−■−PN50	25.1				50	0.0018°	27	50	0~60		1100	1000
S−SERVO II −ST−60M−■−PN3	2.3	490×10^{-7}	3	5	3	0.03°	18	35	0~1000	2.3	430	310
S−SERVO II −ST−60M−■−PN5	3.8				5	0.018°	27	50	0~600		510	390
S−SERVO II −ST−60M−■−PN8	6.2				8	0.01125°	27	50	0~375		600	480
S−SERVO II −ST−60M−■−PN10	7.7				10	0.009°	18	35	0~300		640	530
S−SERVO II −ST−60M−■−PN15	11.2				15	0.006°	18	35	0~200		740	630
S−SERVO II −ST−60M−■−PN25	18.8				25	0.0036°	27	50	0~120	2.5	870	790
S−SERVO II −ST−60M−■−PN40	27.0				40	0.00225°	27	50	0~75		1000	970
S−SERVO II −ST−60M−■−PN50	27.0				50	0.0018°	27	50	0~60		1100	1000
S−SERVO II −ST−60L−■−PN3	4.7	690×10^{-7}	3	5	3	0.03°	18	35	0~1000	3.0	430	310
S−SERVO II −ST−60L−■−PN5	7.8				5	0.018°	27	50	0~600		510	390
S−SERVO II −ST−60L−■−PN8	12.5				8	0.01125°	27	50	0~375		600	480
S−SERVO II −ST−60L−■−PN10	15.7				10	0.009°	18	35	0~300		640	530
S−SERVO II −ST−60L−■−PN15	18.0				15	0.006°	18	35	0~200		740	630
S−SERVO II −ST−60L−■−PN25	27.0				25	0.0036°	27	50	0~120	3.64	870	790
S−SERVO II −ST−60L−■−PN40	27.0				40	0.00225°	27	50	0~75		1000	970
S−SERVO II −ST−60L−■−PN50	27.0				50	0.0018°	27	50	0~60		1100	1000

* The code of encoder resolution will be marked in "■"

42_{mm}

Unit Part Number	Motor	Stage	□Reduction Gear Ratio	L Length [mm]
S-SERVO II -ST-42S-■-PN□ S-SERVO II -MI-42S-■-PN□	SM-42S-■-PN□	Single Stage	3, 5, 8, 10	33
S-SERVO II -ST-42M-■-PN□ S-SERVO II -MI-42M-■-PN□	SM-42M-■-PN□		3, 5, 8, 10	39
S-SERVO II -ST-42L-■-PN□ S-SERVO II -MI-42L-■-PN□	SM-42L-■-PN□		3, 5, 8, 10	47
S-SERVO II -ST-42XL-■-PN□ S-SERVO II -MI-42XL-■-PN□	SM-42XL-■-PN□		3, 5, 8, 10	60

* The code of encoder resolution will be marked in "■"

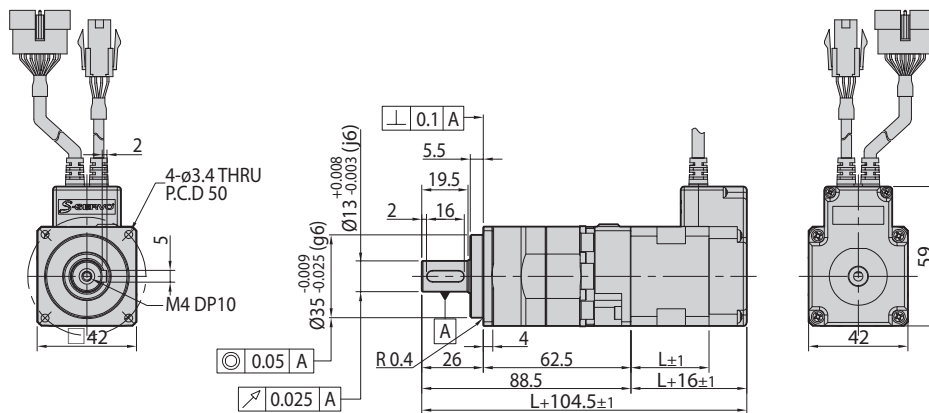| Unit Part Number	Motor	Stage	□Reduction Gear Ratio	L Length [mm]
S-SERVO II -ST-42S-■-PN□ S-SERVO II -MI-42S-■-PN□	SM-42S-■-PN□	Double Stage	15, 25, 40, 50	33
S-SERVO II -ST-42M-■-PN□ S-SERVO II -MI-42M-■-PN□	SM-42M-■-PN□		15, 25, 40, 50	39
S-SERVO II -ST-42L-■-PN□ S-SERVO II -MI-42L-■-PN□	SM-42L-■-PN□		15, 25, 40, 50	47
S-SERVO II -ST-42XL-■-PN□ S-SERVO II -MI-42XL-■-PN□	SM-42XL-■-PN□		15, 25, 40, 50	60

* The code of encoder resolution will be marked in "■"
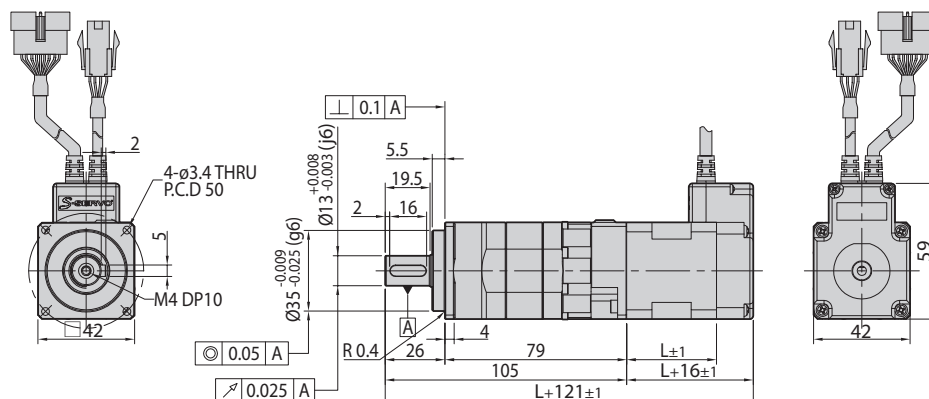
14. Dimensions of Motor with Gearbox [mm]

56mm

Unit Part Number	Motor	Stage	□Reduction Gear Ratio	L Length [mm]
S-SERVO II -ST-56S-■-PN□	SM-56S-■-PN□	Single Stage	3, 5, 8, 10	41
S-SERVO II -ST-56M-■-PN□	SM-56M-■-PN□		3, 5, 8, 10	56
S-SERVO II -ST-56L-■-PN□	SM-56L-■-PN□		3, 5, 8, 10	76

* The code of encoder resolution will be marked in " ■ "
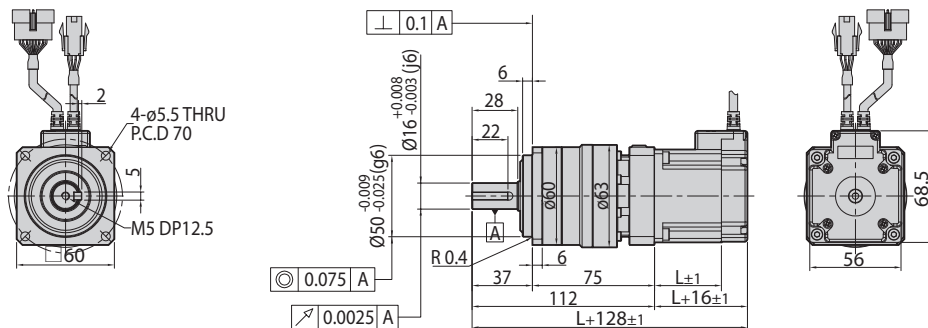
Unit Part Number	Motor	Stage	□Reduction Gear Ratio	L Length [mm]
S-SERVO II -ST-56S-■-PN□	SM-56S-■-PN□	Double Stage	15, 25, 40, 50	41
S-SERVO II -ST-56M-■-PN□	SM-56M-■-PN□		15, 25, 40, 50	56
S-SERVO II -ST-56L-■-PN□	SM-56L-■-PN□		15, 25, 40, 50	76

* The code of encoder resolution will be marked in " ■ "

60mm

Unit Part Number	Motor	Stage	□Reduction Gear Ratio	L Length [mm]
S−SERVOⅡ−ST−60S−■−PN□	SM−60S−■−PN□	Single Stage	3, 5, 8, 10	47
S−SERVOⅡ−ST−60M−■−PN□	SM−60M−■−PN□		3, 5, 8, 10	56
S−SERVOⅡ−ST−60L−■−PN□	SM−60L−■−PN□		3, 5, 8, 10	85

* The code of encoder resolution will be marked in "■"
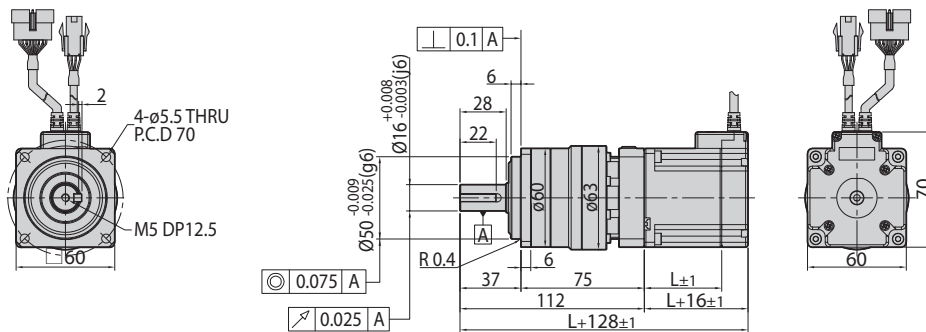
Unit Part Number	Motor	Stage	□Reduction Gear Ratio	L Length [mm]
S−SERVOⅡ−ST−60S−■−PN□	SM−60S−■−PN□	Double Stage	15, 25, 40, 50	47
S−SERVOⅡ−ST−60M−■−PN□	SM−60M−■−PN□		15, 25, 40, 50	56
S−SERVOⅡ−ST−60L−■−PN□	SM−60L−■−PN□		15, 25, 40, 50	85

* The code of encoder resolution will be marked in "■"
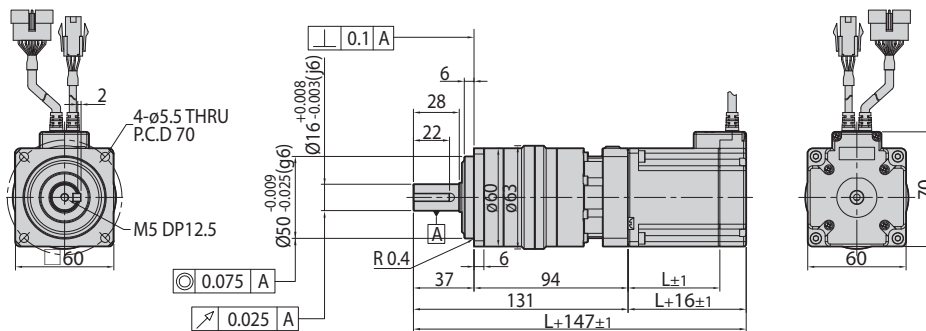
15. Specifications of Drive [S-SERVOII ST]

Motor Model	SM-20 series	SM-28 series	SM-35 series	SM-42 series	SM-56 series	SM-60 series
Driver Model	SV2-PD-20 series	SV2-PD-28 series	SV2-PD-35 series	SV2-PD-42 series	SV2-PD-56 series	SV2-PD-60 series
Input Voltage	24VDC ±10%					
Control Method	Closed loop control with 32bit MCU					
Current Consumption	Max 500mA (Except motor current)					

Operating Condition	Ambient Temperature	· In Use: 0~50℃ · In Storage: −20~70℃
	Humidity	· In Use: 35~85% RH (Non-Condensing) · In Storage: 10~90% RH (Non-Condensing)
	Vib. Resist.	0.5g
Function [2]	Rotation Speed	0~3,000 [rpm] [1]
	Resolution [ppr] [4]	500 1,000 1,600 2,000 3,200 3,600 4,000 5,000 6,400 8,000 10,000 20,000 25,000 36,000 40,000 50,000 (Selectable by DIP Switch)
	Maximum Frequency	500kHz (Duty 50%)
	Protection Functions	Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperature Error, Over Regenerated Voltage Error, Motor Connect Error, Encoder Connect Error, In-Position Error, ROM Error, Position Overflow Error
	LED Display	Power status, In-Position status, Enable status, Alarm status
	RUN Current	50%~150% (Selectable by parameter) RUN current is current value which flows onto the motor during operation (rotation) of the motor and it is set based on rated current of the motor. * Default: 100%
	STOP Current	20%~100% (Selectable by parameter) When motor stop operation, 0.1 second after motor current will be set to STOP current value. STOP current value is a percentage of the rated current of motor. * Default: 50%
	Pulse Input Method	1 Pulse / 2 Pulse (Selectable by DIP Switch) * Default: 2 Pulse
	Rotational Direction	CW/CCW (Selectable by DIP Switch) * Default: CW
	Speed/Position Control Command	Pulse Train Input
I/O Signal [3]	Input Signals	Position Command Pulse, Enable, Alarm Reset (Photocoupler Input)
	Output Signals	In-Position, Alarm (Photocoupler Output), Brake

[1] : Up to the resolution of 10,000[ppr], maximum speed can be reached by 3,000[rpm] and with the resolution more than 10,000[ppr], maximum speed shall be reduced accordingly.
[2] : Please refer to 「Settings and Operating」 to obtain detailed function information.
[3] : Please refer to 「Control Input/Output Explanation」 to obtain detailed Input/Output signal information.
[4] : When selected resolution is more than encoder resolution, motor shall be operated by microstep between pulses.

16. Dimensions of Drive [mm] [S-SERVOII ST]

17. Settings and Operation [S-SERVOII ST]

Pulse input setting switch(SW1.6)
Rotation direction setting switch(SW1.5)
Resolution setting switch(SW1.1~1.4)

Drive status LED

Parameter setting communication connection(CN5)

Input/Output signal connection(CN1)

Encoder connection(CN2)

Motor connection(CN3)

Power connection(CN4)

17.1 Drive Status LED

Indication	Color	Function	ON/OFF Condition
PWR	Green	Power input indication	LED is turned ON when power is applied
INP	Yellow	Complete Positioning Motion	Light on when Position Deviation located within preset value[*1] from target position, after Position Command Pulse Input is completed
EN	Orange	Motor Enable Status	Enable: Lights On, Disable: Lights Off
ALM	Red	Alarm indication	Flash when protection function is activated (Identifiable which protection mode is activated by counting the blinking times)

*1 : Default = 0
Can be selected by parameter setting GUI

◆ Protection functions and LED flash times

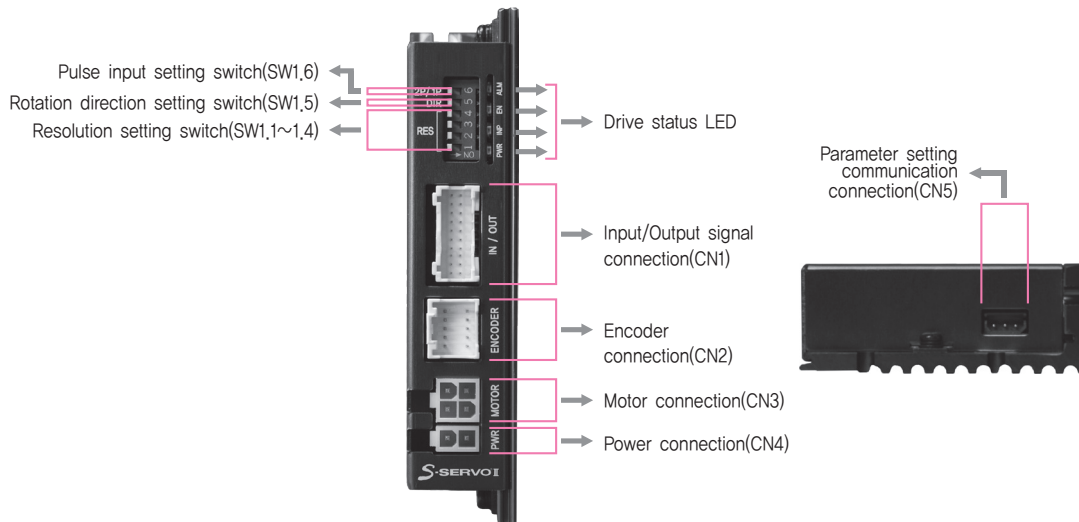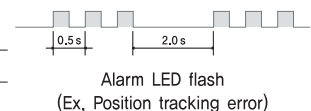| Times	Protection	Conditions
1	Over Current Error	The current through power devices in drive exceeds 4.8A
2	Over Speed Error	Motor speed exceed 3,000 [rpm]
3	Position Tracking Error	Position error value is higher than 180° in motor run state
4	Over Load Error	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over Temperature Error	Inside temperature of drive exceeds 85℃
6	Over Regeneratived Voltage Error	Back-EMF more than 48V
7	Motor Connect Error	The power is ON without connection of the motor cable to drive
8	Encoder Connect Error	Cable connection error in Encoder connection of drive
10	In-Position Error	After operation is finished, position error more than 1 pulse is continued for more than 3 seconds
12	ROM Error	Error occurs in parameter storage device(ROM)
15	Position Overflow Error	Position error value is higher than 180° in motor stop state

0.5 s   2.0 s

Alarm LED flash
(Ex, Position tracking error)

17.2 Resolution Setting Switch(SW1.1~SW1.4)

The Number of pulse per revolution.

Position				Pulse/Revolution	Position				Pulse/Revolution
1	2	3	4		1	2	3	4	
ON	ON	ON	ON	500	OFF	ON	ON	ON	6,400
ON	ON	ON	OFF	1,000	OFF	ON	ON	OFF	8,000
ON	ON	OFF	ON	1,600	OFF	ON	OFF	ON	10,000
ON	ON	OFF	OFF	2,000	OFF	ON	OFF	OFF	20,000
ON	OFF	ON	ON	3,200	OFF	OFF	ON	ON	25,000
ON	OFF	ON	OFF	3,600	OFF	OFF	ON	OFF	36,000
ON	OFF	OFF	ON	4,000	OFF	OFF	OFF	ON	40,000
ON	OFF	OFF	OFF	5,000	OFF	OFF	OFF	OFF	50,000[*1]

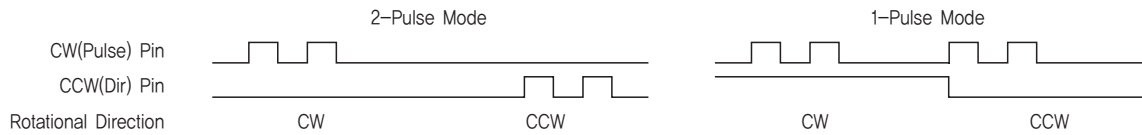*1 : In case of products with an encoder resolution of 16,000, the corresponding pulse/rotation is 16,000.

17.3 Rotational Direction Setting Switch(SW1.5)

Indication	Switch Name	Functions
DIR	Switching Rotational Direction	Based on CW(+Dir signal) input to driver. ON: CCW(−Direction) OFF: CW(+Direction) ※ Default: CW mode

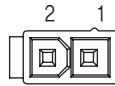Direction setting switch: ON

CCW Dir

Direction setting switch: OFF

CW Dir

17.4 Pulse Input Setting Switch(SW1.6)

Indication	Switch Name	Functions
2P/1P	Selecting pulse input mode	Selectable 1−Pulse input mode or 2−Pulse input mode as Pulse input signal. ON: 1−Pulse mode OFF: 2−Pulse mode ※ Default: 2−Pulse mode

	2−Pulse Mode		1−Pulse Mode	
CW(Pulse) Pin				
CCW(Dir) Pin				
Rotational Direction	CW	CCW	CW	CCW

17.5 Power Connector(CN4)

NO.	Function	I/O
1	24VDC	Input
2	GND	Input

17.6 Motor Connector(CN3)

NO.	Function	I/O
1	A Phase	Output
2	B Phase	Output
3	/A Phase	Output
4	/B Phase	Output

17.7 Encoder Connector(CN2)

NO.	Function	I/O
1	A+	Input
2	A−	Input
3	B+	Input
4	B−	Input
5	Z+	Input
6	Z−	Input
7	5VDC	Output
8	GND	Output
9	F.GND	−−−−
10	F.GND	−−−−

17.8 Input/Output Signal Connector(CN1)

NO.	Function	I/O
1	A−	Output
2	A+	Output
3	B−	Output
4	B+	Output
5	Z−	Output
6	Z+	Output
7	BRAKE−	Output
8	BRAKE+	Output
9	EXT_GND	Input
10	EXT_24VDC	Input
11	Alarm Reset	Input
12	Enable	Input
13	Alarm	Output
14	In−Position	Output
15	O.C Input	Input
16	S−GND	Output
17	CW−(Pulse−)	Input
18	CW+(Pulse+)	Input
19	CCW−(Dir−)	Input
20	CCW+(Dir+)	Input

17.9 Parameter Setting Communication Connector(CN5)

NO.	Function	I/O
1	Tx	Output
2	Rx	Input
3	GND	−−−−

⑤ Parameter setting cable

PC

Control Unit

Motion Controller   Network Motion Controller   PLC

① Signal cable

② Encoder extension cable

③ Motor extension cable

Input DC Power

④ Power cable

IN / OUT

ENCODER

MOTOR   PWR
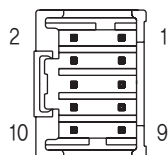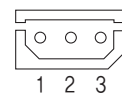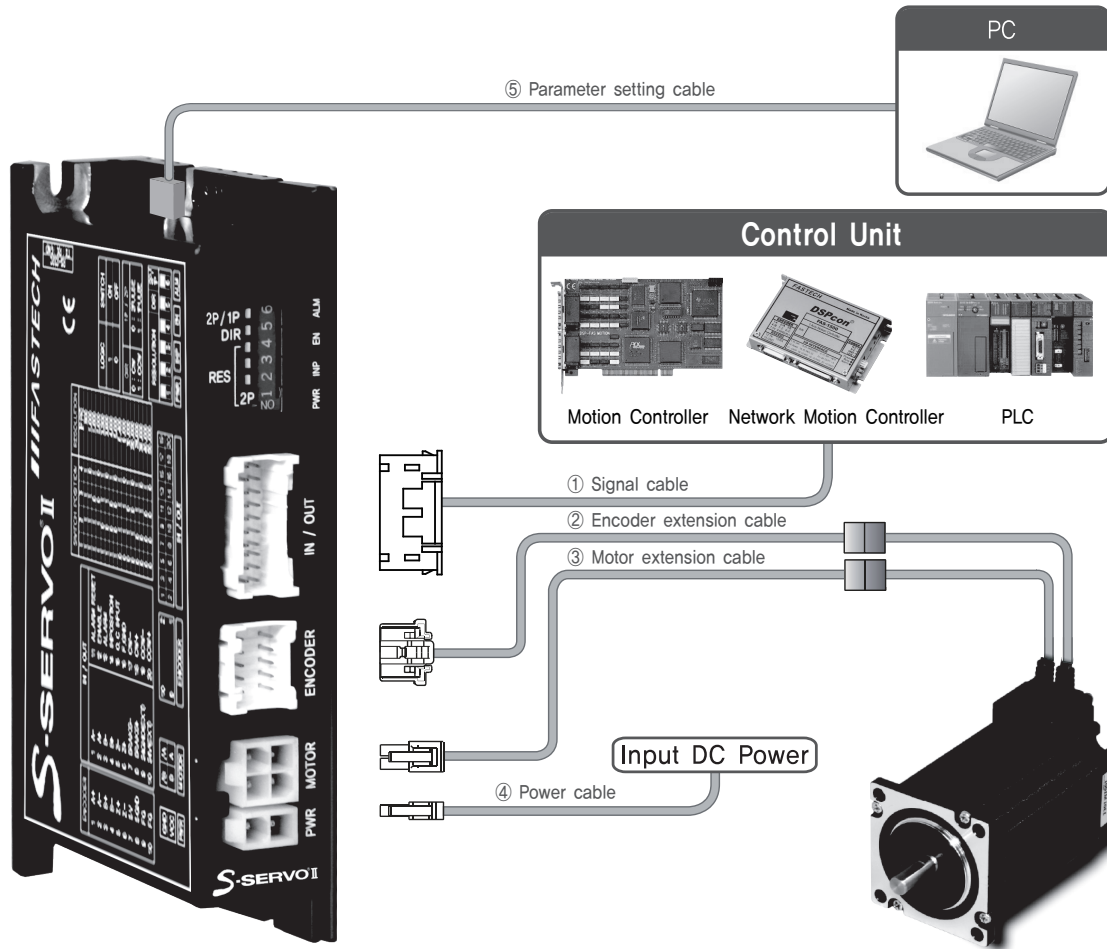
Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable	Parameter Setting Cable
Length supplied	–	30cm	30cm	–	–
Max. Length	20m	20m	20m	2m	3m

18.1 Options

① Signal Cable

Item	Length [m]	Remark
CSS2-S-□□□F	□□□	Normal Cable
CSS2-S-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : JST
Housing : PADP-20V-1-S
Terminal : SPH-002T-P0.5L

② Encoder Extension Cable

Item	Length [m]	Remark
CSVO-E-□□□F	□□□	Normal Cable
CSVO-E-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : MOLEX
Housing : 51353-1000
Terminal : 56134-9000

JST : Manufacturer
SMP-09V-NC : Housing
SHF-001T-0.8BS : Terminal

③ Motor Extension Cable

Item	Length [m]	Remark
CSVO-M-□□□F	□□□	Normal Cable
CSVO-M-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : MOLEX
Housing : 5557-04R
Terminal : 5556T

MOLEX : Manufacturer
5557-04R : Housing
5556T : Terminal

④ Power Cable

Item	Length [m]	Remark
CSVO-P-□□□F	□□□	Normal Cable
CSVO-P-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 2m length.
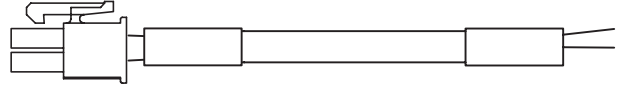
Manufacturer : MOLEX
Housing : 5557-02R
Terminal : 5556T

⑤ Parameter Setting Cable

Item	Length [m]	Remark
CBTS-C-□□F	□□□	Normal Cable

□ is for Cable Length. The unit is 1m and Max. 3m length.
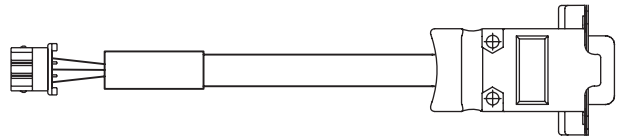
Manufacturer : MOLEX
Housing : 5264-03
Terminal : 5263

AMPHENOL : Manufacturer
L177SDE09S : Connector
17E-1657-09 : Backshell

18.2 Connector Specifications

Connector specifications for cabling to drive.

Purpose		Item	Part Number	Manufacturer
I/O (CN1)		Housing	PAPD-20V-1S	JST
		Terminal	SPH-002T-P0.5L	
Encoder	Drive Side (CN2)	Housing	51353-1000	MOLEX
		Terminal	56134-9000	
	Encoder Side	Housing	SMP-09V-NC	JST
		Terminal	SHF-001T-0.8BS	
Motor	Drive Side (CN3)	Housing	5557-04R	MOLEX
		Terminal	5556T	
	Motor Side	Housing	5557-04R	MOLEX
		Terminal	5556T	
Power (CN4)		Housing	5557-02R	MOLEX
		Terminal	5556T	

※ Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.

19. External Wiring Diagram [S-SERVOII ST]
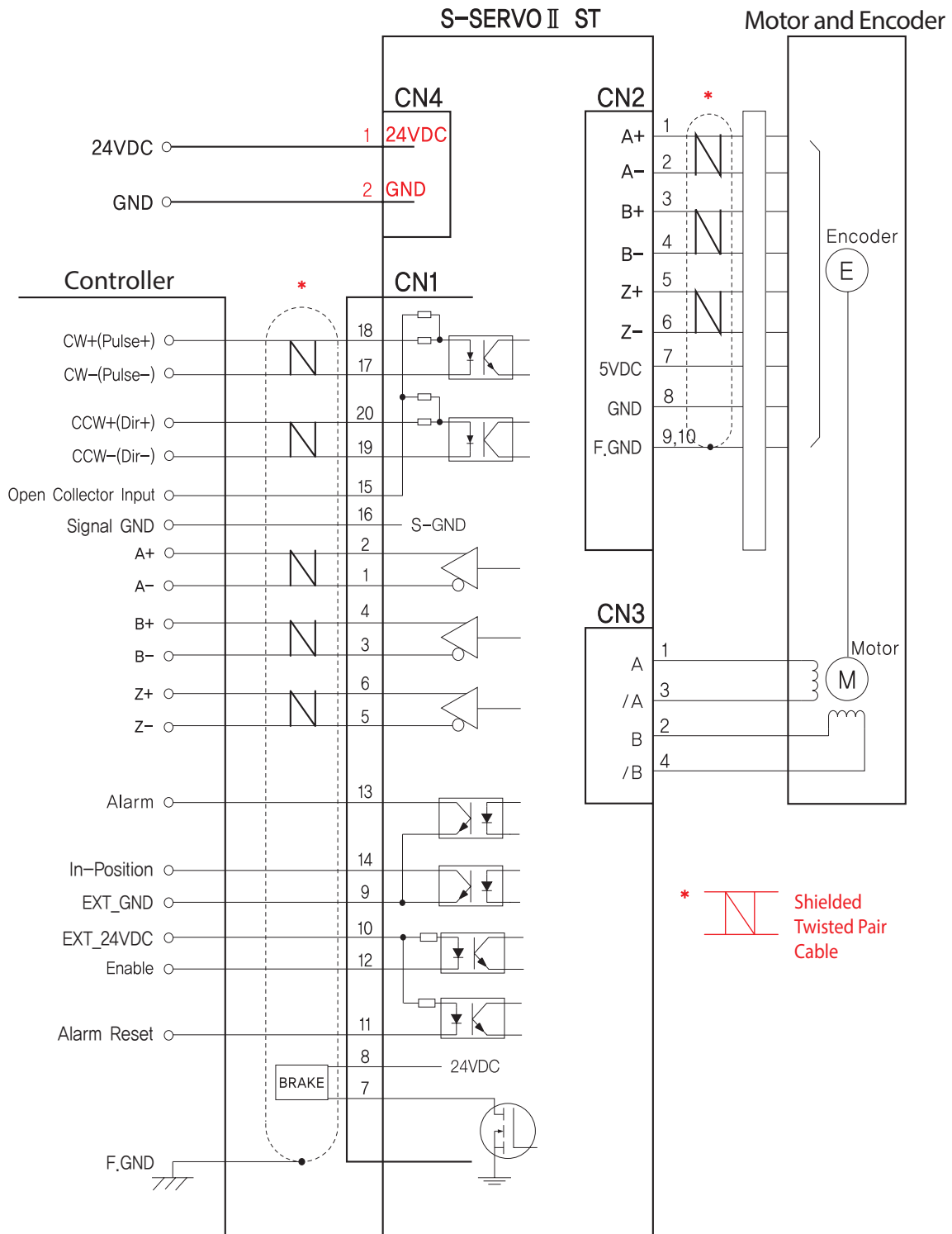
S-SERVOII ST

Motor and Encoder

CN4
- 1 24VDC ← 24VDC
- 2 GND ← GND

CN2
- 1 A+
- 2 A−
- 3 B+
- 4 B−
- 5 Z+
- 6 Z−
- 7 5VDC
- 8 GND
- 9,10 F.GND

Encoder E

Controller

CN1
- CW+(Pulse+) — 18
- CW−(Pulse−) — 17
- CCW+(Dir+) — 20
- CCW−(Dir−) — 19
- Open Collector Input — 15
- Signal GND — 16 S-GND
- A+ — 2
- A− — 1
- B+ — 4
- B− — 3
- Z+ — 6
- Z− — 5
- Alarm — 13
- In−Position — 14
- EXT_GND — 9
- EXT_24VDC — 10
- Enable — 12
- Alarm Reset — 11
- 8 24VDC
- BRAKE — 7
- F.GND

CN3
- 1 A
- 3 /A
- 2 B
- 4 /B

Motor M

* Shielded Twisted Pair Cable

※ When connects I/O cable between controller and drive, please turn off the power of both controller and drive, in order to protect the drive from any damage.

CAUTION

Please refer to the Appendix when connects motor extension cable.

Careful connection will be required to protect the drive from any damages.

20. Specifications of Drive [S-SERVOII MINI]

	Motor Model	SM-20 series	SM-28 series	SM-35 series	SM-42 series
	Driver Model	SV2-PD-MI-20 series	SV2-PD-MI-28 series	SV2-PD-MI-35 series	SV2-PD-MI-42 series
	Input Voltage	24VDC ±10%			
	Control Method	Closed loop control with 32bit MCU			
	Current Consumption	Max 500mA (Except motor current)			
Operating Condition	Ambient Temperature	· In Use: 0~50℃ · In Storage: -20~70℃			
	Humidity	· In Use: 35~85% RH (Non-Condensing) · In Storage: 10~90% RH (Non-Condensing)			
	Vib. Resist.	0.5g			
Function [2]	Rotation Speed	0~3,000 [rpm] [1]			
	Resolution [ppr] [4]	500 1,000 1,600 2,000 3,200 3,600 4,000 5,000 6,400 8,000 10,000 20,000 25,000 36,000 40,000 50,000 (Selectable by DIP Switch)			
	Maximum Frequency	500kHz (Duty 50%)			
	Protection Functions	Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperature Error, Over Regenerated Voltage Error, Motor Connect Error, Encoder Connect Error, In-Position Error, ROM Error, Position Overflow Error			
	LED Display	Power status, In-Position status, Enable status, Alarm status			
	RUN Current	50%~150% (Selectable by parameter) RUN current is current value which flows onto the motor during operation (rotation) of the motor and it is set based on rated current of the motor. * Default: 100%			
	STOP Current	20%~100% (Selectable by parameter) When motor stop operation, 0.1 second after motor current will be set to STOP current value. STOP current value is a percentage of the rated current of motor. * Default: 50%			
	Pulse Input Method	1 Pulse / 2 Pulse (Selectable by DIP Switch) * Default: 2 Pulse			
	Rotational Direction	CW/CCW (Selectable by DIP Switch) * Default: CW			
	Speed/Position Control Command	Pulse Train Input			
I/O Signal [3]	Input Signals	Position Command Pulse, Enable, Alarm Reset (Photocoupler Input)			
	Output Signals	In-Position, Alarm (Photocoupler Output), Brake			

[1] : Up to the resolution of 10,000[ppr], maximum speed can be reached by 3,000[rpm] and with the resolution more than 10,000[ppr], maximum speed shall be reduced accordingly.
[2] : Please refer to 「Settings and Operating」 to obtain detailed function information.
[3] : Please refer to 「Control Input/Output Explanation」 to obtain detailed Input/Output signal information.
[4] : When selected resolution is more than encoder resolution, motor shall be operated by microstep between pulses.

21. Dimensions of Drive [mm] [S-SERVOII MINI]
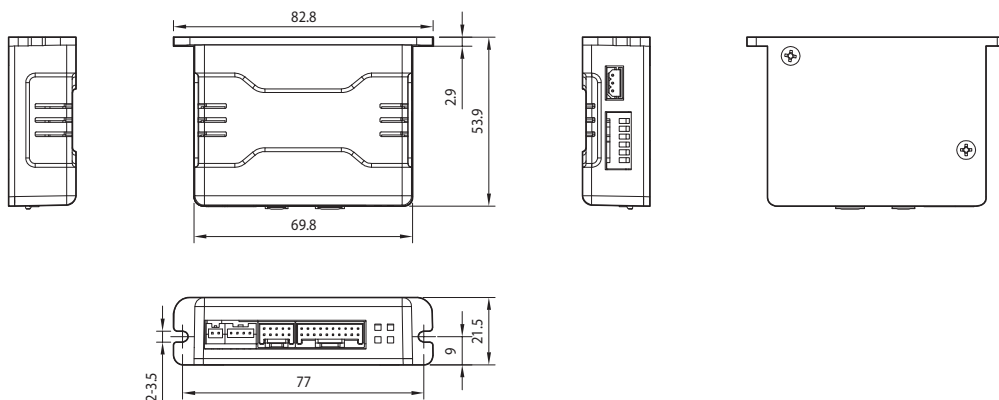
22. Settings and Operation [S-SERVOII MINI]

Parameter setting connection(CN5)

Drive status LED

Input/Output signal connection(CN1)

Encoder connection(CN2)

Motor connection(CN3)

Power connection(CN4)

Resolution setting switch(SW1.1~1.4)
Direction setting switch(SW1.5)
Pulse input setting switch(SW1.6)

22.1 Drive Status LED

Indication	Color	Function	ON/OFF Condition
PWR	Green	Power input indication	LED is turned ON when power is applied
INP	Yellow	Complete Positioning Motion	Light on when Position Deviation located within preset value[*1] from target position, after Position Command Pulse Input is completed
EN	Orange	Motor Enable Status	Enable: Lights On, Disable: Lights Off
ALM	Red	Alarm indication	Flash when protection function is activated (Identifiable which protection mode is activated by counting the blinking times)

*1 : Default = 0
Can be selected by parameter setting GUI

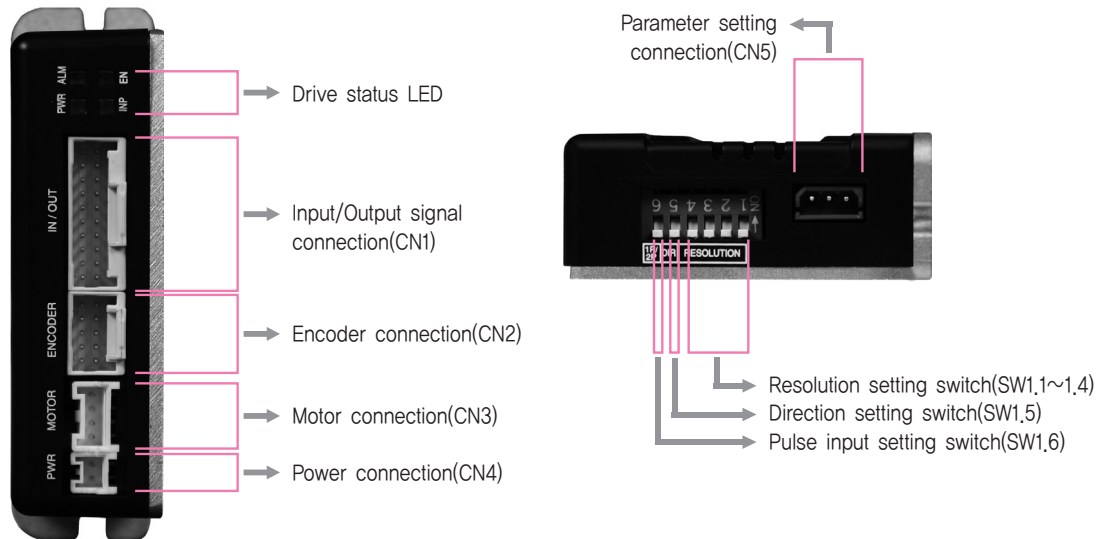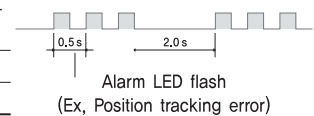### ◆ Protection functions and LED flash times

Times	Protection	Conditions
1	Over Current Error	The current through power devices in drive exceeds 4.8A
2	Over Speed Error	Motor speed exceed 3,000 [rpm]
3	Position Tracking Error	Position error value is higher than 180° in motor run state
4	Over Load Error	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over Temperature Error	Inside temperature of drive exceeds 85℃
6	Over Regeneratived Voltage Error	Back-EMF more than 48V
7	Motor Connect Error	The power is ON without connection of the motor cable to drive
8	Encoder Connect Error	Cable connection error in Encoder connection of drive
10	In-Position Error	After operation is finished, position error more than 1 pulse is continued for more than 3 seconds
12	ROM Error	Error occurs in parameter storage device(ROM)
15	Position Overflow Error	Position error value is higher than 180° in motor stop state

0.5 s   2.0 s

Alarm LED flash
(Ex, Position tracking error)

22.2 Resolution Setting Switch(SW1.1~SW1.4)

The Number of pulse per revolution.

Position				Pulse/Revolution	Position				Pulse/Revolution
1	2	3	4		1	2	3	4	
ON	ON	ON	ON	500	OFF	ON	ON	ON	6,400
ON	ON	ON	OFF	1,000	OFF	ON	ON	OFF	8,000
ON	ON	OFF	ON	1,600	OFF	ON	OFF	ON	10,000
ON	ON	OFF	OFF	2,000	OFF	ON	OFF	OFF	20,000
ON	OFF	ON	ON	3,200	OFF	OFF	ON	ON	25,000
ON	OFF	ON	OFF	3,600	OFF	OFF	ON	OFF	36,000
ON	OFF	OFF	ON	4,000	OFF	OFF	OFF	ON	40,000
ON	OFF	OFF	OFF	5,000	OFF	OFF	OFF	OFF	50,000[*1]

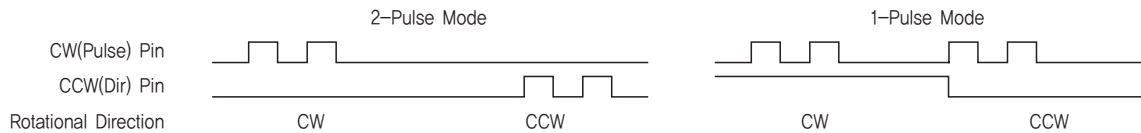*1 : In case of products with an encoder resolution of 16,000, the corresponding pulse/rotation is 16,000.

22.3 Rotational Direction Setting Switch(SW1.5)

Indication	Switch Name	Functions
DIR	Switching Rotational Direction	Based on CW(+Dir signal) input to driver. ON: CCW(−Direction) OFF: CW(+Direction) ※ Default: CW mode

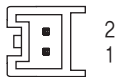Direction setting switch: ON

CCW Dir

Direction setting switch: OFF

CW Dir

22.4 Pulse Input Setting Switch(SW1.6)

Indication	Switch Name	Functions
1P/2P	Selecting pulse input mode	Selectable 1−Pulse input mode or 2−Pulse input mode as Pulse input signal. ON: 1−Pulse mode OFF: 2−Pulse mode ※ Default: 2−Pulse mode

	2−Pulse Mode		1−Pulse Mode	
CW(Pulse) Pin				
CCW(Dir) Pin				
Rotational Direction	CW	CCW	CW	CCW

22.5 Power Connector(CN4)

NO.	Function	I/O
1	24VDC	Input
2	GND	Input

22.6 Motor Connector(CN3)

NO.	Function	I/O
1	B Phase	Output
2	/B Phase	Output
3	/A Phase	Output
4	A Phase	Output

22.7 Encoder Connector(CN2)

NO.	Function	I/O
1	A+	Input
2	A−	Input
3	B+	Input
4	B−	Input
5	Z+	Input
6	Z−	Input
7	5VDC	Output
8	GND	Output
9	F.GND	−−−−
10	F.GND	−−−−

22.8 Input/Output Signal Connector(CN1)

NO.	Function	I/O
1	CW+(Pulse+)	Input
2	CW−(Pulse−)	Input
3	CCW+(Dir+)	Input
4	CCW−(Dir−)	Input
5	A+	Output
6	A−	Output
7	B+	Output
8	B−	Output
9	Z+	Output
10	Z−	Output
11	Alarm	Output
12	In−Position	Output
13	Enable	Input
14	Alarm Reset	Input
15	O.C Input	Input
16	BRAKE+	Output
17	BRAKE−	Output
18	S−GND	Output
19	EXT_GND	Input
20	EXT_24VDC	Input
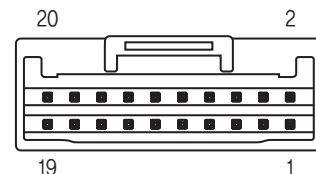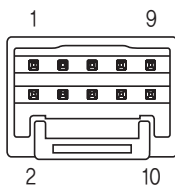
22.9 Parameter Setting Connector(CN5)

NO.	Function	I/O
1	Tx	Output
2	Rx	Input
3	GND	−−−−
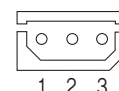
⑤ Parameter setting cable

PC

Control Unit

Motion Controller   Network Motion Controller   PLC

① Signal cable
② Encoder extension cable
③ Motor extension cable

Input DC Power
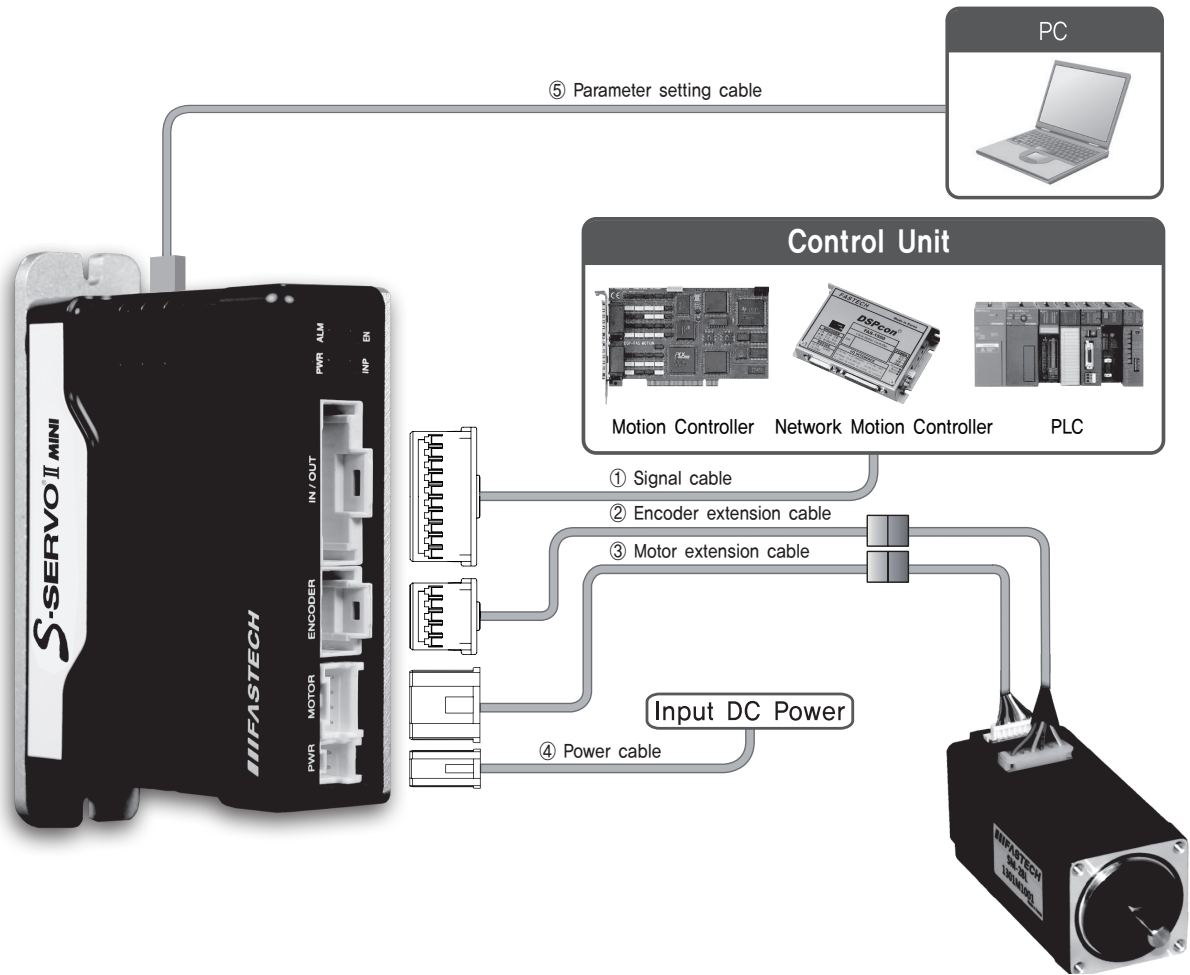
④ Power cable

Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable	Parameter Setting Cable
Length supplied	–	30cm	30cm	–	–
Max. Length	20m	20m	20m	2m	3m

23.1 Options

① Signal Cable

Item	Length [m]	Remark
CSM3-S-□□□F	□□□	Normal Cable
CSM3-S-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.
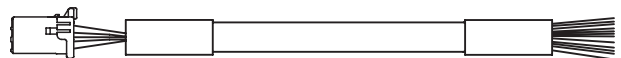
Manufacturer : MOLEX
Housing : 501646-2000
Terminal : 501648-1000

② Encoder Extension Cable

Item	Length [m]	Remark
CSVI-E-□□□F	□□□	Normal Cable
CSVI-E-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.
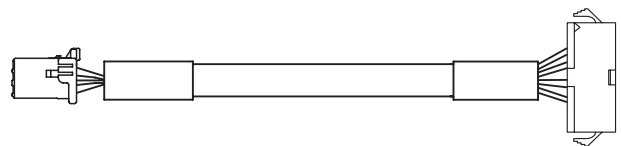
Manufacturer : MOLEX
Housing : 501646-1000
Terminal : 501648-1000

JST : Manufacturer
SMP-09V-NC : Housing
SHF-001T-0.8BS : Terminal

③ Motor Extension Cable

Item	Length [m]	Remark
CMNB-M-□□□F	□□□	Normal Cable
CMNB-M-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : JST
Housing : PAP-04V-S
Terminal : SPHD-001T-P0.5

MOLEX : Manufacturer
5557-04R : Housing
5556T : Terminal

④ Power Cable

Item	Length [m]	Remark
CMNB-P-□□□F	□□□	Normal Cable
CMNB-P-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 2m length.
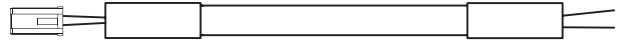
Manufacturer : JST
Housing : PAP-02V-S
Terminal : SPHD-001T-P0.5

⑤ Parameter Setting Cable

Item	Length [m]	Remark
CBTS-C-□□□F	□□□	Normal Cable

□ is for Cable Length. The unit is 1m and Max. 3m length.

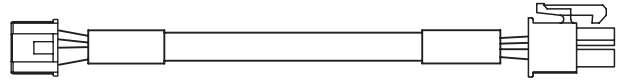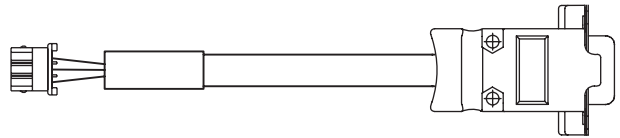Manufacturer : MOLEX
Housing : 5264-03
Terminal : 5263

AMPHENOL : Manufacturer
L177SDE09S : Connector
17E-1657-09 : Backshell

23.2 Connector Specifications

Connector specifications for cabling to drive.

Purpose		Item	Part Number	Manufacturer
I/O (CN1)		Housing	501646-2000	MOLEX
		Terminal	501648-1000	
Encoder	Drive Side (CN2)	Housing	501646-1000	MOLEX
		Terminal	501648-1000	
	Encoder Side	Housing	SMP-09V-NC	JST
		Terminal	SHF-001T-0.8BS	
Motor	Drive Side (CN3)	Housing	PAP-04V-S	JST
		Terminal	SPHD-001T-P0.5	
	Motor Side	Housing	5557-04R	MOLEX
		Terminal	5556T	
Power (CN4)		Housing	PAP-02V-S	JST
		Terminal	SPHD-004T-P0.5	

※ Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.

S-SERVO II MINI

Motor and Encoder

CN4

24VDC	1 24VDC
GND	2 GND

CN2

A+	1
A-	2
B+	3
B-	4
Z+	5
Z-	6
5VDC	7
GND	8
F.GND	9,10

Encoder E

Controller

CN1

CW+(Pulse+)	1
CW-(Pulse-)	2
CCW+(Dir+)	3
CCW-(Dir-)	4
Open Collector Input	15
Signal GND	18 S-GND
A+	5
A-	6
B+	7
B-	8
Z+	9
Z-	10
Alarm	11
In-Position	12
EXT_GND	19
EXT_24VDC	20
Enable	13
Alarm Reset	14
	16 24VDC
BRAKE	17
F.GND	

CN3

A	4
/A	3
B	1
/B	2

Motor M

* ╲╱ Shielded Twisted Pair Cable

CAUTION

Please refer to the Appendix when connects motor extension cable.

Careful connection will be required to protect the drive from any damages.

※ When connects I/O cable between controller and drive, please turn off the power of both controller and drive, in order to protect the drive from any damage.

25. Specifications of Drive [S-SERVOII 2X]

Driver Model		S-SERVOII-2X
Input Voltage		24VDC ±10%
Control Method		Closed loop control with 32bit MCU
Current Consumption		Max 1A (Except motor current)
Operating Condition	Ambient Temperature	· In Use: 0~50℃ · In Storage: −20~70℃
	Humidity	· In Use: 35~85% RH (Non−Condensing) · In Storage: 10~90% RH (Non−Condensing)
	Vib. Resist.	0.5g
Function [*2]	Rotation Speed	0~3,000 [rpm] [*1]
	Resolution [ppr] [*4]	500 1,000 1,600 2,000 3,200 3,600 4,000 5,000 6,400 8,000 10,000 20,000 25,000 36,000 40,000 50,000 (Selectable by DIP Switch)
	Maximum Frequency	500kHz (Duty 50%)
	Protection Functions	Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperature Error, Over Regenerated Voltage Error, Motor Connect Error, Encoder Connect Error, In−Position Error, ROM Error, Position Overflow Error
	LED Display	Power status, In−Position status, Enable status, Alarm status
	RUN Current	50%~150% (Selectable by parameter) RUN current is current value which flows onto the motor during operation (rotation) of the motor and it is set based on rated current of the motor. * Default: 100%
	STOP Current	20%~100% (Selectable by parameter) When motor stop operation, 0.1 second after motor current will be set to STOP current value. STOP current value is a percentage of the rated current of motor. * Default: 50%
	Pulse Input Method	1 Pulse / 2 Pulse (Selectable by DIP Switch) * Default: 2 Pulse
	Rotational Direction	CW/CCW (Selectable by DIP Switch) * Default: CW
	Speed/Position Control Command	Pulse Train Input
I/O Signal [*3]	Input Signals	Position Command Pulse, Enable, Alarm Reset (Photocoupler Input)
	Output Signals	In−Position, Alarm (Photocoupler Output), Brake

*1 : Up to the resolution of 10,000[ppr], maximum speed can be reached by 3,000[rpm] and with the resolution more than 10,000[ppr], maximum speed shall be reduced accordingly.

*2 : Please refer to 「Settings and Operating」 to obtain detailed function information.

*3 : Please refer to 「Control Input/Output Explanation」 to obtain detailed Input/Output signal information.

*4 : When selected resolution is more than encoder resolution, motor shall be operated by microstep between pulses.

26. Dimensions of Drive [mm] [S-SERVOII 2X]

27. Settings and Operation [S-SERVOII 2X]

Parameter setting communication connection(CNA5)

Power connection(CNE4)

Direction setting switch(SWA3,2)
Pulse input setting switch(SWA3,1)
Resolution setting switch(SWA1)

Drive status LED

I/O signal connection(CNA1)

Encoder connection(CNA2)

Motor connection(CNA3)

Direction setting switch(SWB3,2)
Pulse input setting switch(SWB3,1)
Resolution setting switch(SWB1)

Parameter setting communication connection(CNB5)

Drive Status LED

I/O signal connection(CNB1)

Encoder connection(CNB2)

Motor connection(CNB3)

Parameter setting communication connection (CNA5 ,CNB5)

27.1 Drive Status LED

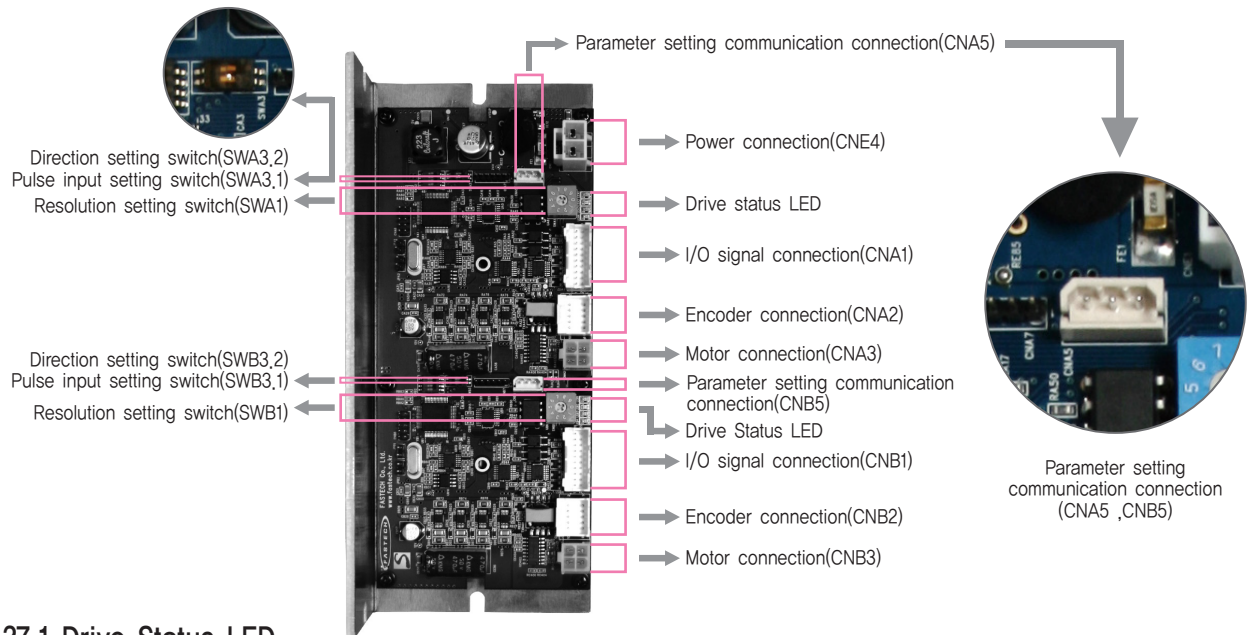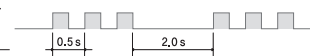| Indication	Color	Function	ON/OFF Condition
PWR	Green	Power input indication	LED is turned ON when power is applied
INP	Yellow	Complete Positioning Motion	Light on when Position Deviation located within preset value[*1] from target position, after Position Command Pulse Input is completed
EN	Orange	Motor Enable Status	Enable: Lights On, Disable: Lights Off
ALM	Red	Alarm indication	Flash when protection function is activated (Identifiable which protection mode is activated by counting the blinking times)

[*1] : Default = 0
Can be selected by parameter setting GUI

◆ Protection functions and LED flash times

Times	Protection	Conditions
1	Over Current Error	The current through power devices in drive exceeds 4.8A
2	Over Speed Error	Motor speed exceed 3,000 [rpm]
3	Position Tracking Error	Position error value is higher than 180° in motor run state
4	Over Load Error	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over Temperature Error	Inside temperature of drive exceeds 85℃
6	Over Regenerativated Voltage Error	Back-EMF more than 48V
7	Motor Connect Error	The power is ON without connection of the motor cable to drive
8	Encoder Connect Error	Cable connection error in Encoder connection of drive
10	In-Position Error	After operation is finished, position error more than 1 pulse is contin-ued for more than 3 seconds
12	ROM Error	Error occurs in parameter storage device(ROM)
15	Position Overflow Error	Position error value is higher than 180° in motor stop state

0.5 s   2.0 s

Alarm LED flash
(Ex, Position tracking error)

27.2 Resolution Setting Switch(SWA1, SWB1)

The Number of pulse per revolution.

Position	Pulse/Revolution	Position	Pulse/Revolution
0	500	8	6,400
1	1,000	9	8,000
2	1,600	A	10,000
3	2,000	B	20,000
4	3,200	C	25,000
5	3,600	D	36,000
6	4,000	E	40,000
7	5,000	F	50,000[*1]
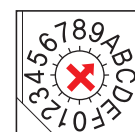
* Please refer to the manual for detail information.
*1 : In case of products with an encoder resolution of 16,000, the corresponding pulse/rotation is 16,000.

27.3 Rotational Direction Setting Switch(SWA3.2, SWB3.2)

Indication	Switch Name	Functions
DIR	Switching Rotational Direction	Based on CW(+Dir signal) input to driver. ON: CCW(−Direction) OFF: CW(+Direction) ※ Default: CW mode

Direction setting switch: ON

CCW Dir

Direction setting switch: OFF

CW Dir

27.4 Pulse Input Setting Switch(SWA3.1, SWB3.1)

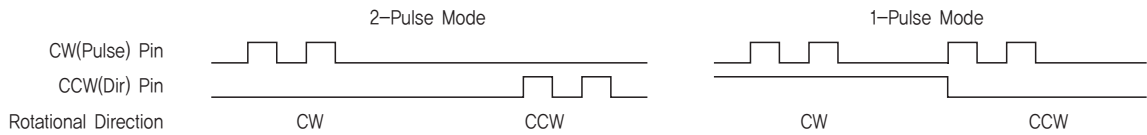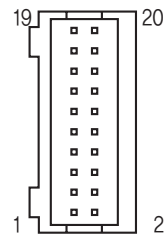| Indication	Switch Name	Functions
1P/2P	Selecting pulse input mode	Selectable 1−Pulse input mode or 2−Pulse input mode as Pulse input signal. ON: 1−Pulse mode OFF: 2−Pulse mode ※ Default: 2−Pulse mode

	2−Pulse Mode		1−Pulse Mode	
CW(Pulse) Pin				
CCW(Dir) Pin				
Rotational Direction	CW	CCW	CW	CCW

27.5 Power Connector(CNE4)

NO.	Function	I/O
1	24VDC	Input
2	GND	Input

27.6 Motor Connector(CNA3, CNB3)

NO.	Function	I/O
1	A Phase	Output
2	B Phase	Output
3	/A Phase	Output
4	/B Phase	Output
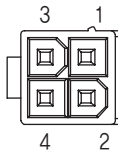
27.7 Encoder Connector(CNA2, CNB2)

NO.	Function	I/O
1	A+	Input
2	A−	Input
3	B+	Input
4	B−	Input
5	Z+	Input
6	Z−	Input
7	5VDC	Output
8	GND	Output
9	F.GND	-----
10	F.GND	-----

27.8 Input/Output Signal Connector(CNA1, CNB1)

NO.	Function	I/O
1	A−	Output
2	A+	Output
3	B−	Output
4	B+	Output
5	Z−	Output
6	Z+	Output
7	BRAKE−	Output
8	BRAKE+	Output
9	EXT_GND	Input
10	EXT_24VDC	Input
11	Alarm Reset	Input
12	Enable	Input
13	Alarm	Output
14	In−Position	Output
15	O.C Input	Input
16	S−GND	Output
17	CW−(Pulse−)	Input
18	CW+(Pulse+)	Input
19	CCW−(Dir−)	Input
20	CCW+(Dir+)	Input
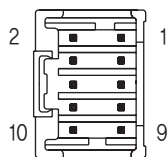
27.9 Parameter Setting Communication Connector(CNA5, CNB5)

NO.	Function	I/O
1	Tx	Output
2	Rx	Input
3	GND	-----
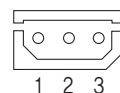
28. System Configuration [S-SERVOII 2X]
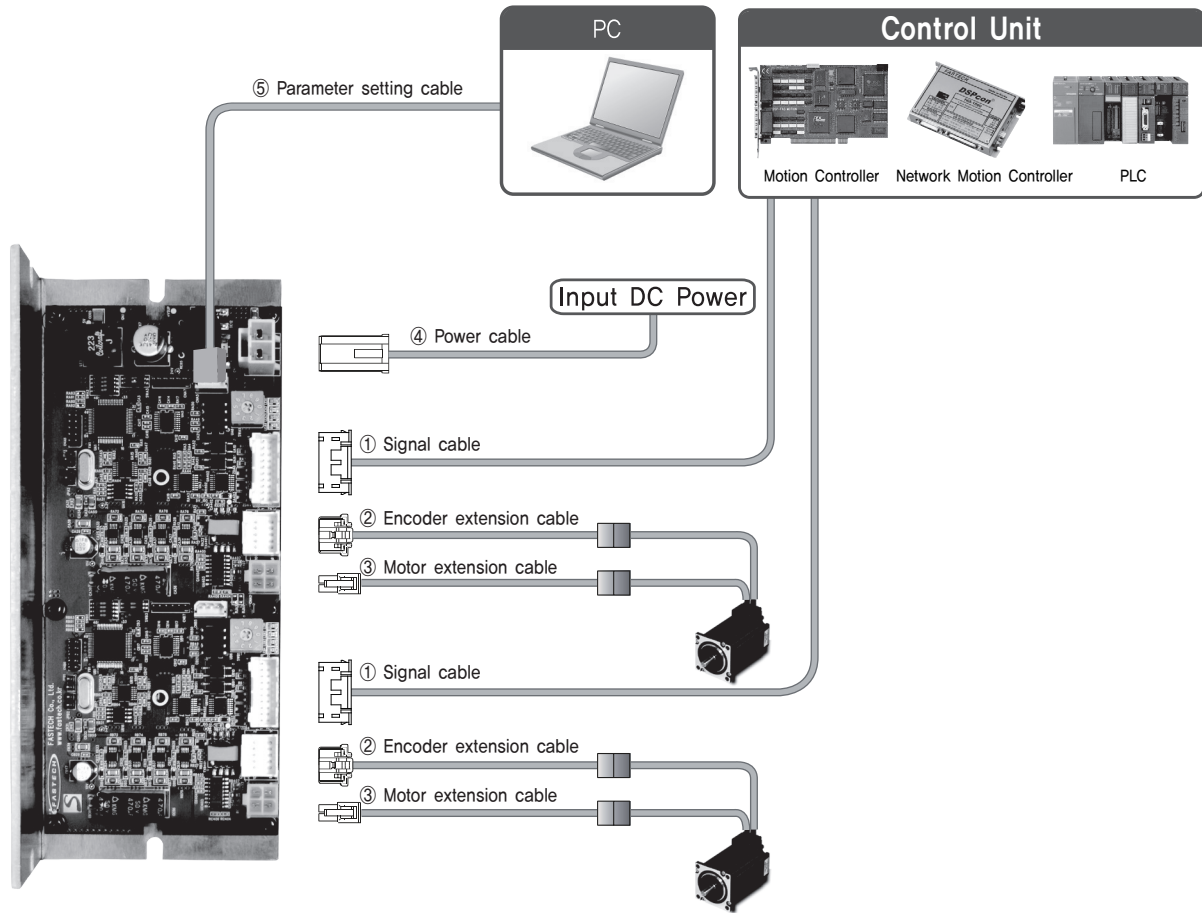
Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable	Parameter Setting Cable
Length supplied	–	30cm	30cm	–	–
Max. Length	20m	20m	20m	2m	3m

28.1 Options

① Signal Cable

Item	Length [m]	Remark
CSS2-S-□□□F	□□□	Normal Cable
CSS2-S-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : JST
Housing : PADP-20V-1-S
Terminal : SPH-002T-P0.5L

② Encoder Extension Cable

Item	Length [m]	Remark
CSVO-E-□□□F	□□□	Normal Cable
CSVO-E-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : MOLEX
Housing : 51353-1000
Terminal : 56134-9000

JST : Manufacturer
SMP-09V-NC : Housing
SHF-001T-0.8BS : Terminal

③ Motor Extension Cable

Item	Length [m]	Remark
CSVO-M-□□□F	□□□	Normal Cable
CSVO-M-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : MOLEX
Housing : 5557-04R
Terminal : 5556T

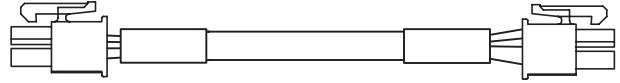MOLEX : Manufacturer
5557-04R : Housing
5556T : Terminal

④ Power Cable

Item	Length [m]	Remark
CSVX-P-□□□F	□□□	Normal Cable
CSVX-P-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 2m length.

Manufacturer : JST
Housing : VLP-02V
Terminal : SVF-61T-P2.0

⑤ Parameter Setting Cable

Item	Length [m]	Remark
CBTS-C-□□□F	□□□	Normal Cable

□ is for Cable Length. The unit is 1m and Max. 3m length.

Manufacturer : MOLEX
Housing : 5264-03
Terminal : 5263

AMPHENOL : Manufacturer
L177SDE09S : Connector
17E-1657-09 : Backshell

28.2 Connector Specifications

Connector specifications for cabling to drive.

Purpose		Item	Part Number	Manufacturer
I/O (CNA1, CNB1)		Housing	PADP-20V-1-S	JST
		Terminal	SPH-002T-P0.5L	
Encoder	Drive Side (CNA2, CNB2)	Housing	51353-1000	MOLEX
		Terminal	56134-9000	
	Encoder Side	Housing	SMP-09V-NC	JST
		Terminal	SHF-001T-0.8BS	
Motor	Drive Side (CNA3, CNB3)	Housing	5557-04R	MOLEX
		Terminal	5556T	
	Motor Side	Housing	5557-04R	MOLEX
		Terminal	5556T	
Power (CNE4)		Housing	VLP-02V	JST
		Terminal	SVF-61T-P2.0	

※ Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.

S-SERVOII 2X

Motor and Encoder

CNE4

24VDC	1 24VDC
GND	2 GND

Controller

CNA1, CNB1

CW+(Pulse+)	18
CW−(Pulse−)	17
CCW+(Dir+)	20
CCW−(Dir−)	19
Open Collector Input	15
Signal GND	16 S−GND
A+	2
A−	1
B+	4
B−	3
Z+	6
Z−	5
Alarm	13
In−Position	14
EXT_GND	9
EXT_24VDC	10
Enable	12
Alarm Reset	11
	8 24VDC
BRAKE	7
F.GND	F.GND

CNA2, CNB2

A+	1
A−	2
B+	3
B−	4
Z+	5
Z−	6
5VDC	7
GND	8
F.GND	9,10

Encoder
E

CNA3, CNB3

A	1
/A	3
B	2
/B	4

Motor
M

* ⟍ Shielded Twisted Pair Cable

※ Except common usage of power ofr S−SERVOII 2X, 3X, external wiring diagram for each drive of motor, encoder and I/O are all same.

※ When connects I/O cable between controller and drive, please turn off the power of both controller and drive, in order to protect the drive from any damage.

CAUTION

Please refer to the Appendix when connects motor extension cable.

Careful connection will be required to protect the drive from any damages.

30. Specifications of Drive [S-SERVOII 3X]

Driver Model		S-SERVOII-3X
Input Voltage		24VDC ±10%
Control Method		Closed loop control with 32bit MCU
Current Consumption		Max 1.5A (Except motor current)
Operating Condition	Ambient Temperature	· In Use: 0~50℃ · In Storage: -20~70℃
	Humidity	· In Use: 35~85% RH (Non-Condensing) · In Storage: 10~90% RH (Non-Condensing)
	Vib. Resist.	0.5g
Function *2	Rotation Speed	0~3,000 [rpm] *1
	Resolution [ppr] *4	500 1,000 1,600 2,000 3,200 3,600 4,000 5,000 6,400 8,000 10,000 20,000 25,000 36,000 40,000 50,000 (Selectable by DIP Switch)
	Maximum Frequency	500kHz (Duty 50%)
	Protection Functions	Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperature Error, Over Regenerated Voltage Error, Motor Connect Error, Encoder Connect Error, In-Position Error, ROM Error, Position Overflow Error
	LED Display	Power status, In-Position status, Enable status, Alarm status
	RUN Current	50%~150% (Selectable by parameter) RUN current is current value which flows onto the motor during operation (rotation) of the motor and it is set based on rated current of the motor. * Default: 100%
	STOP Current	20%~100% (Selectable by parameter) When motor stop operation, 0.1 second after motor current will be set to STOP current value. STOP current value is a percentage of the rated current of motor. * Default: 50%
	Pulse Input Method	1 Pulse / 2 Pulse (Selectable by DIP Switch) * Default: 2 Pulse
	Rotational Direction	CW/CCW (Selectable by DIP Switch) * Default: CW
	Speed/Position Control Command	Pulse Train Input
I/O Signal *3	Input Signals	Position Command Pulse, Enable, Alarm Reset (Photocoupler Input)
	Output Signals	In-Position, Alarm (Photocoupler Output), Brake

*1 : Up to the resolution of 10,000[ppr], maximum speed can be reached by 3,000[rpm] and with the resolution more than 10,000[ppr], maximum speed shall be reduced accordingly.

*2 : Please refer to 「Settings and Operating」 to obtain detailed function information.

*3 : Please refer to 「Control Input/Output Explanation」 to obtain detailed Input/Output signal information.

*4 : When selected resolution is more than encoder resolution, motor shall be operated by microstep between pulses.

31. Dimensions of Drive [mm] [S-SERVOII 3X]

Parameter setting communication connection(CNA5)

Direction setting switch(SWA3.2)
Pulse input setting switch(SWA3.1)
Resolution setting switch(SWA1)

Power connection(CNE4)
Drive Status LED
I/O signal connection(CNA1)
Encoder connection(CNA2)
Motor connection(CNA3)

Direction setting switch(SWB3.2)
Pulse input setting switch(SWB3.1)
Resolution setting switch(SWB1)

Parameter setting communication connection(CNB5)
Drive status LED
I/O signal connection(CNB1)
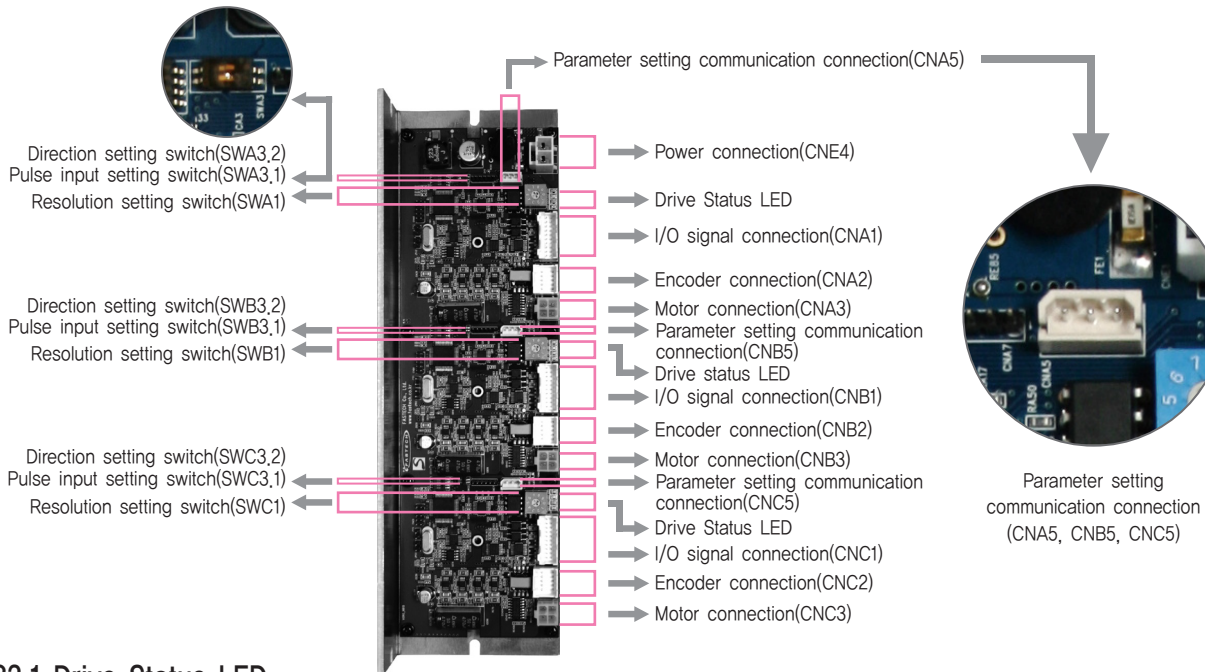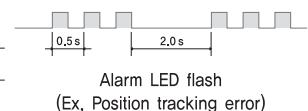Encoder connection(CNB2)
Motor connection(CNB3)

Direction setting switch(SWC3.2)
Pulse input setting switch(SWC3.1)
Resolution setting switch(SWC1)

Parameter setting communication connection(CNC5)
Drive Status LED
I/O signal connection(CNC1)
Encoder connection(CNC2)
Motor connection(CNC3)

Parameter setting communication connection (CNA5, CNB5, CNC5)

32.1 Drive Status LED

Indication	Color	Function	ON/OFF Condition
PWR	Green	Power input indication	LED is turned ON when power is applied
INP	Yellow	Complete Positioning Motion	Light on when Position Deviation located within preset value[*1] from target position, after Position Commando Pulse Input is completed
EN	Orange	Motor Enable Status	Enable: Lights On, Disable: Lights Off
ALM	Red	Alarm indication	Flash when protection function is activated (Identifiable which protection mode is activated by counting the blinking times)

*1 : Default = 0
    Can be selected by parameter setting GUI

◆ Protection functions and LED flash times

Times	Protection	Conditions
1	Over Current Error	The current through power devices in drive exceeds 4.8A
2	Over Speed Error	Motor speed exceed 3,000 [rpm]
3	Position Tracking Error	Position error value is higher than 180° in motor run state
4	Over Load Error	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over Temperature Error	Inside temperature of drive exceeds 85℃
6	Over Regeneratived Voltage Error	Back-EMF more than 48V
7	Motor Connect Error	The power is ON without connection of the motor cable to drive
8	Encoder Connect Error	Cable connection error in Encoder connection of drive
10	In-Position Error	After operation is finished, position error more than 1 pulse is continued for more than 3 seconds
12	ROM Error	Error occurs in parameter storage device(ROM)
15	Position Overflow Error	Position error value is higher than 180° in motor stop state

0.5 s   2.0 s

Alarm LED flash
(Ex, Position tracking error)

32.2 Resolution Setting Switch(SWA1, SWB1, SWC1)

The Number of pulse per revolution.

Position	Pulse/Revolution	Position	Pulse/Revolution
0	500	8	6,400
1	1,000	9	8,000
2	1,600	A	10,000
3	2,000	B	20,000
4	3,200	C	25,000
5	3,600	D	36,000
6	4,000	E	40,000
7	5,000	F	50,000[*1]

*1 : In case of products with an encoder resolution of 16,000, the corresponding pulse/rotation is 16,000.

32.3 Rotational Direction Setting Switch(SWA3.2, SWB3.2, SWC3.2)

Indication	Switch Name	Functions
DIR	Switching Rotational Direction	Based on CW(+Dir signal) input to driver. ON: CCW(−Direction)　OFF: CW(+Direction)　※ Default: CW mode

Direction setting switch: ON

CCW Dir

Direction setting switch: OFF

CW Dir

32.4 Pulse Input Setting Switch(SWA3.1, SWB3.1, SWC3.1)

| Indication	Switch Name	Functions
1P/2P	Selecting pulse input mode	Selectable 1−Pulse input mode or 2−Pulse input mode as Pulse input signal. ON: 1−Pulse mode　OFF: 2−Pulse mode　※ Default: 2−Pulse mode

2−Pulse Mode　　　　　1−Pulse Mode

CW(Pulse) Pin

CCW(Dir) Pin

| Rotational Direction | CW | CCW | CW | CCW |
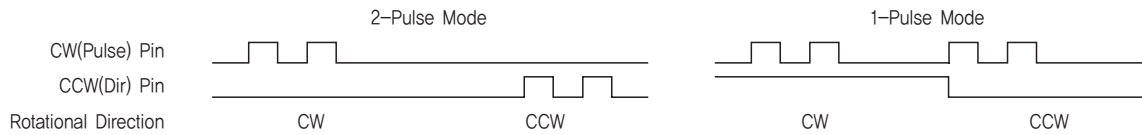
32.5 Power Connector(CNE4)

NO.	Function	I/O
1	24VDC	Input
2	GND	Input

32.6 Motor Connector(CNA3, CNB3, CNC3)

NO.	Function	I/O
1	A Phase	Output
2	B Phase	Output
3	/A Phase	Output
4	/B Phase	Output
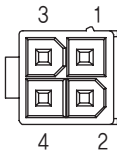
32.7 Encoder Connector(CNA2, CNB2, CNC2)

NO.	Function	I/O
1	A+	Input
2	A−	Input
3	B+	Input
4	B−	Input
5	Z+	Input
6	Z−	Input
7	5VDC	Output
8	GND	Output
9	F.GND	----
10	F.GND	----
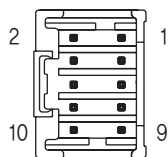
32.8 Input/Output Signal Connector(CNA1, CNB1, CNC1)

NO.	Function	I/O
1	A−	Output
2	A+	Output
3	B−	Output
4	B+	Output
5	Z−	Output
6	Z+	Output
7	BRAKE−	Output
8	BRAKE+	Output
9	EXT_GND	Input
10	EXT_24VDC	Input
11	Alarm Reset	Input
12	Enable	Input
13	Alarm	Output
14	In−Position	Output
15	O.C Input	Input
16	S−GND	Output
17	CW−(Pulse−)	Input
18	CW+(Pulse+)	Input
19	CCW−(Dir−)	Input
20	CCW+(Dir+)	Input
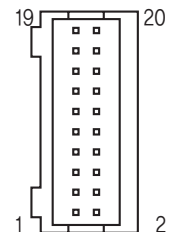
32.9 Parameter Setting Communication Connector(CNA5, CNB5, CNC5)

NO.	Function	I/O
1	Tx	Output
2	Rx	Input
3	GND	----
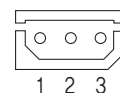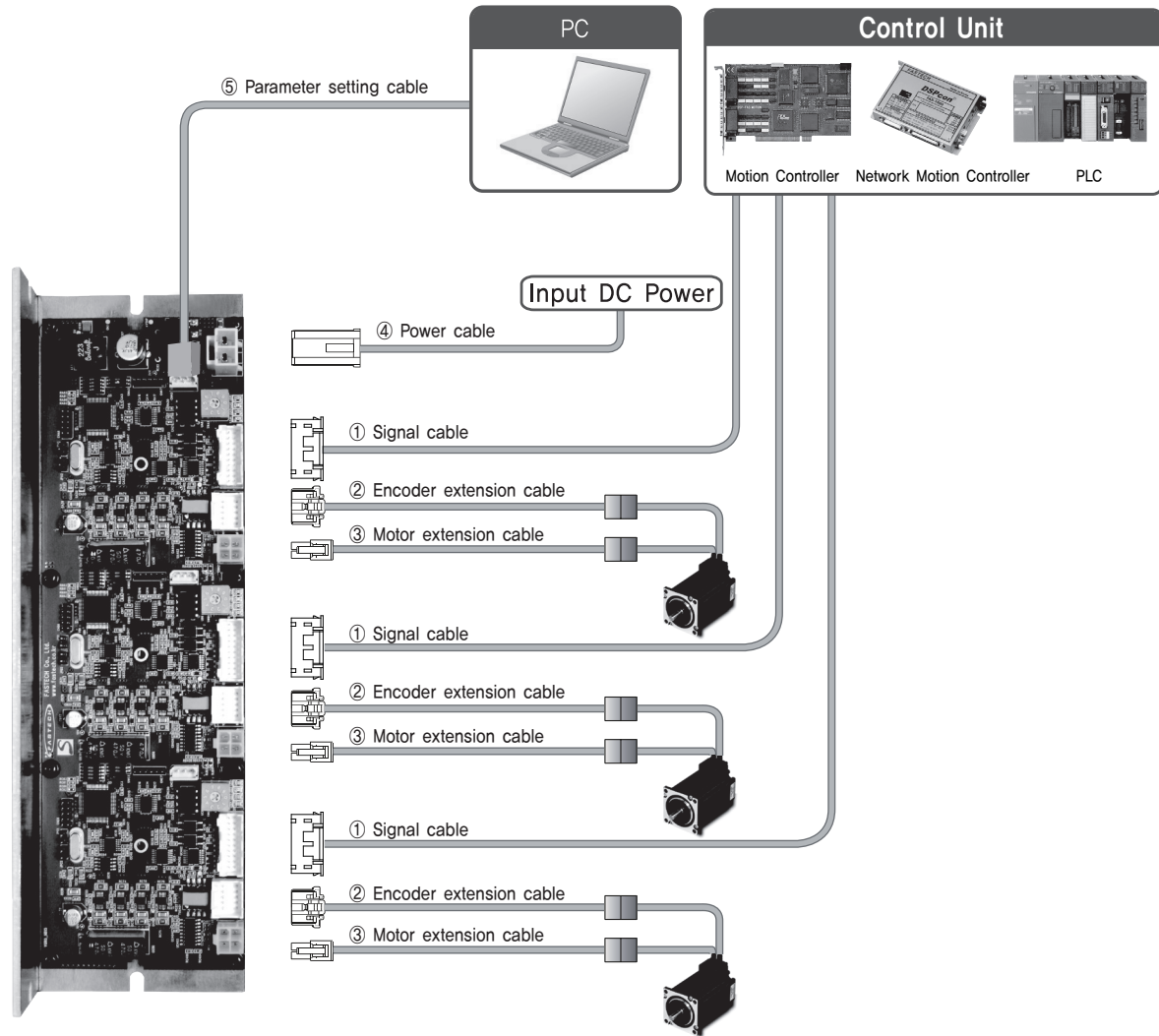
PC

⑤ Parameter setting cable

Control Unit

Motion Controller   Network Motion Controller   PLC

Input DC Power

④ Power cable

① Signal cable

② Encoder extension cable
③ Motor extension cable

① Signal cable

② Encoder extension cable
③ Motor extension cable

① Signal cable

② Encoder extension cable
③ Motor extension cable

Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable	Parameter Setting Cable
Length supplied	–	30cm	30cm	–	–
Max. Length	20m	20m	20m	2m	3m

33.1 Options

① Signal Cable

Item	Length [m]	Remark
CSS2-S-□□□F	□□□	Normal Cable
CSS2-S-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : JST
Housing : PADP-20V-1-S
Terminal : SPH-002T-P0.5L

② Encoder Extension Cable

Item	Length [m]	Remark
CSVO-E-□□□F	□□□	Normal Cable
CSVO-E-□□□M	□□□	Robot Cable

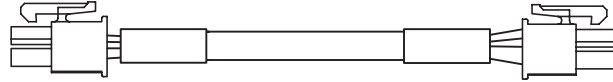□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : MOLEX
Housing : 51353-1000
Terminal : 56134-9000

JST : Manufacturer
SMP-09V-NC : Housing
SHF-001T-0.8BS : Terminal

③ Motor Extension Cable

Item	Length [m]	Remark
CSVO-M-□□□F	□□□	Normal Cable
CSVO-M-□□□M	□□□	Robot Cable

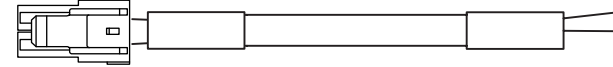□ is for Cable Length. The unit is 1m and Max. 20m length.

Manufacturer : MOLEX
Housing : 5557-04R
Terminal : 5556T

MOLEX : Manufacturer
5557-04R : Housing
5556T : Terminal

④ Power Cable

Item	Length [m]	Remark
CSVX-P-□□□F	□□□	Normal Cable
CSVX-P-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 2m length.

Manufacturer : JST
Housing : VLP-02V
Terminal : SVF-61T-P2.0

⑤ Parameter Setting Cable

Item	Length [m]	Remark
CBTS-C-□□□F	□□□	Normal Cable

□ is for Cable Length. The unit is 1m and Max. 3m length.

Manufacturer : MOLEX
Housing : 5264-03
Terminal : 5263

AMPHENOL : Manufacturer
L177SDE09S : Connector
17E-1657-09 : Backshell

33.2 Connector Specifications

Connector specifications for cabling to drive.

Purpose		Item	Part Number	Manufacturer
I/O (CNA1, CNB1, CNC1)		Housing	PADP-20V-1-S	JST
		Terminal	SPH-002T-P0.5L	
Encoder	Drive Side (CNA2, CNB2, CNC2)	Housing	51353-1000	MOLEX
		Terminal	56134-9000	
	Encoder Side	Housing	SMP-09V-NC	JST
		Terminal	SHF-001T-0.8BS	
Motor	Drive Side (CNA3, CNB3, CNC3)	Housing	5557-04R	MOLEX
		Terminal	5556T	
	Motor Side	Housing	5557-04R	MOLEX
		Terminal	5556T	
Power (CNE4)		Housing	VLP-02V	JST
		Terminal	SVF-61T-P2.0	

※ Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.

34. External Wiring Diagram [S-SERVOII 3X]
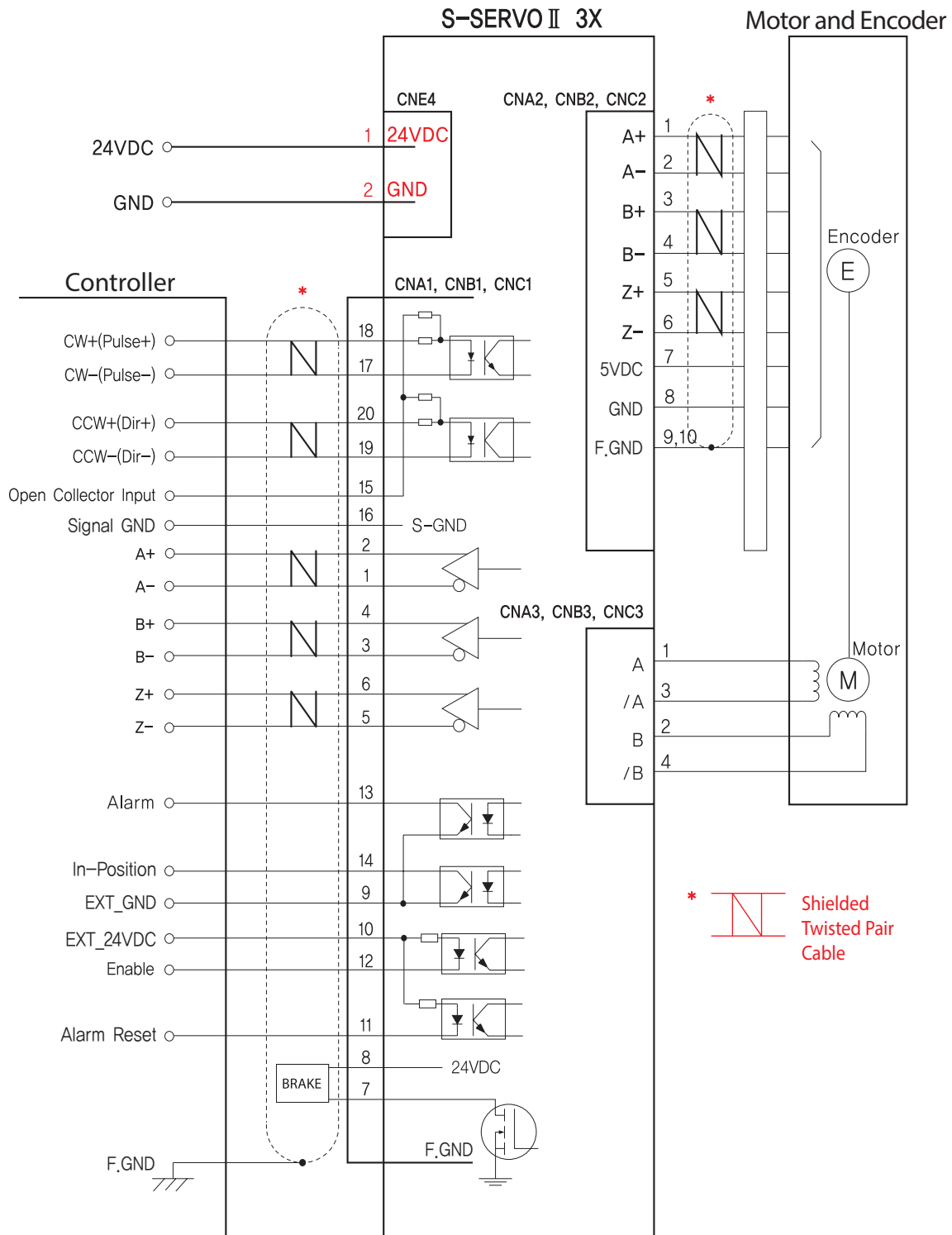
S-SERVOII 3X

Motor and Encoder

CNE4

24VDC	1 24VDC
GND	2 GND

CNA2, CNB2, CNC2

Pin	Signal
1	A+
2	A−
3	B+
4	B−
5	Z+
6	Z−
7	5VDC
8	GND
9,10	F.GND

Encoder E

Controller

CNA1, CNB1, CNC1

Signal	Pin
CW+(Pulse+)	18
CW−(Pulse−)	17
CCW+(Dir+)	20
CCW−(Dir−)	19
Open Collector Input	15
Signal GND	16 S-GND
A+	2
A−	1
B+	4
B−	3
Z+	6
Z−	5

CNA3, CNB3, CNC3

Pin	Signal
1	A
3	/A
2	B
4	/B

Motor M

Signal	Pin
Alarm	13
In−Position	14
EXT_GND	9
EXT_24VDC	10
Enable	12
Alarm Reset	11
BRAKE	8 24VDC
	7
F.GND	F.GND

* ⊠ Shielded Twisted Pair Cable

※ Except common usage of power ofr S-SERVOII 2X, 3X, external wiring diagram for each drive of motor, encoder and I/O are all same.

※ When connects I/O cable between controller and drive, please turn off the power of both controller and drive, in order to protect the drive from any damage.
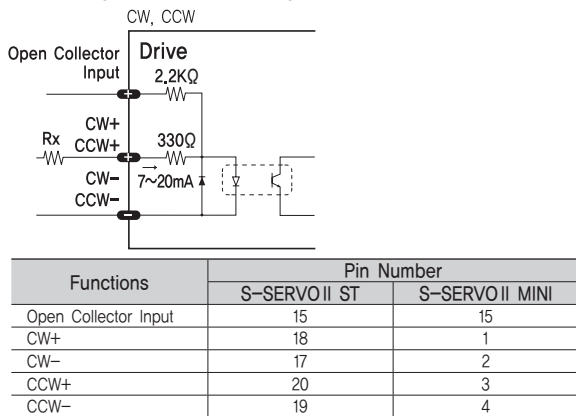
CAUTION

Please refer to the Appendix when connects motor extension cable.

Careful connection will be required to protect the drive from any damages.

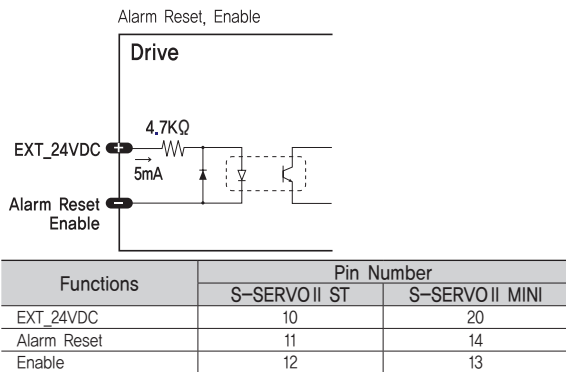# 35. Control Signal Input/Output Description

1 Input Signal

Input signals of the drive are all photocoupler protected. The signal shows the status of internal photocouplers [ON: conduction], [OFF: Non-conduction], not displaying the voltage levels of the signal.

CW, CCW

Open Collector Input | Drive

Functions	Pin Number	
	S-SERVO II ST	S-SERVO II MINI
Open Collector Input	15	15
CW+	18	1
CW-	17	2
CCW+	20	3
CCW-	19	4

※ S-SERVO II 2X and 3X's pin number is the same as S-SERVO II ST.

◆ CW, CCW Input

This signal can be used to receive a positioning pulse command from a user host motion controller. The user can select 1-pulse input mode or 2-pulse input mode.
The input schematic of CW, CCW is designed for 5V TTL level. When using 5V level as an input signal, the resistor Rx is not used and connect to the driver directly. When the level of input signal is more than 5V, Rx resistor is required. If the resistor is absent, the drive will be damaged. If the input signal level is 12V, Rx value is 680ohm and 24V, Please use Open Collector Input.

Alarm Reset, Enable

Drive

Functions	Pin Number	
	S-SERVO II ST	S-SERVO II MINI
EXT_24VDC	10	20
Alarm Reset	11	14
Enable	12	13

※ S-SERVO II 2X and 3X's pin number is the same as S-SERVO II ST.

◆ Enable Input

This input can be used only to adjust the position by manually moving the motor shaft from the load-side. By setting the signal [ON], the driver cuts off the power supply to the motor. Then, one can manually adjust output position. When setting the signal back to [OFF], the driver resumes the power to the motor and recovers the holding torque. When driving a motor, one needs to set the signal [OFF].
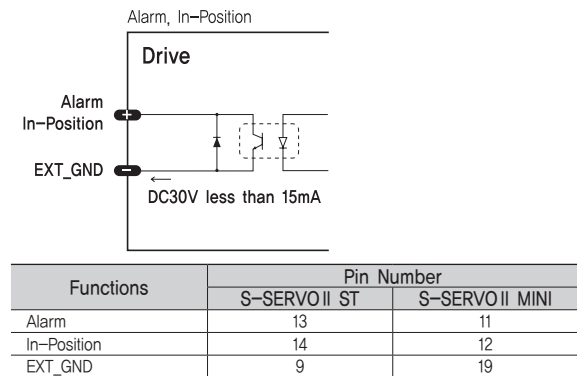
◆ Alarm Reset Input

When a protection mode has been activated, a signal to this alarm reset input cancels the Alarm output.

Alarm Reset — ON / OFF — more than 0.1s
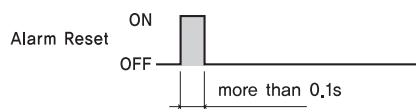
※ By setting the alarm reset input signal [ON], cancel the Alarm output. Before cancel the Alarm output, have to remove the source of alarm.

2 Output Signal

Output signals from the driver are photocoupler protected: Alarm, In-Position. The signal indicates the status of internal photocouplers [ON: conduction], [OFF: Non-conduction], not displaying the voltage levels of the signal.

Alarm, In-Position

Drive

Functions	Pin Number	
	S-SERVO II ST	S-SERVO II MINI
Alarm	13	11
In-Position	14	12
EXT_GND	9	19

※ S-SERVO II 2X and 3X's pin number is the same as S-SERVO II ST.

◆ Alarm Output

The Alarm output indicates [ON] when the driver is in abnormal operation. If a protection mode has been activated, it goes [OFF]. A host controller needs to detect this signal and stop sending a motor driving command. When the driver detects an abnormal operation such as overload or over current of the motor, it sets the Alarm output to [OFF], flashes the Alarm LED, disconnect the power to a motor and stops the motor simultaneously.

[Caution] Only at the Alarm output port, the photocoupler isolation is in reverse. When the driver is in normal operation the Alarm output is [ON].

◆ In-Position Output

In-Position signal is [ON] when positioning is completed. This signal is [ON] when the motor position error is within the value set by the switch SW4.

Motor Speed — Movement / Stop / Movement / Stop

In-Position Signal — ON / OFF
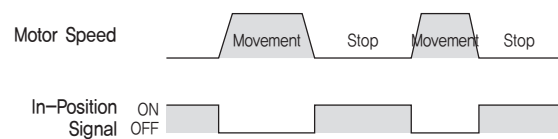
36. Parameter Settings GUI [User Interface]

S-SERVOⅡ driver utilizes various parameters for operation.
Some parameters need to be adjusted once users feel inconvenience to use or in order to maximize efficiency.
S-SERVOⅡ provides parameter modification program for convenience of product usage for users.

The screen shot as below is computer program (GUI) which used for operation process. Users can change and set the parameters of drive for Enable Level, Alarm Reset Level, In-Position Level, Alarm Output Level. Users can use S-SERVOⅡ according to its own system.

Please connect parameter setting GUI when S-SERVOⅡ is Disable state.
For safety reason, S-SERVOⅡ can not be connected to setting GUI when it is Enable state.
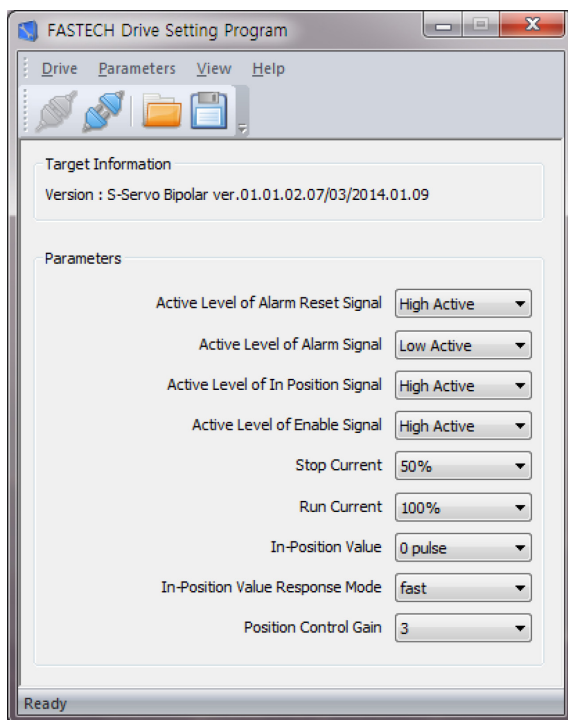
※ Graphic User Interface(GUI) Program can be downloaded from website. (www.fastech.co.kr)
※ Graphic User Interface(GUI) Program can support Window 7/8/10.
※ Graphic User Interface(GUI) Program can be update without prior notice for improving the performance or convenience of user.

37. Diagnosis and Rectification of Faults

37.1 When the Alarm LED is not Blinking

Even though the alarm LED is not blinking if the motor can not be operated as normal, please refer to below chart.

Phenomenon	Possible Cause	Rectification
Motor axis can be moved by hand	Servo On/Off input is [ON].	When Alarm LED(RED) does not blink and SON LED(Orange)is turned off, this is not a state of Motor Servo On. Please check signal of Controller.
Motor axis can not be moved by hand	Bad connection of input terminal.	Please check connection between Controller and Drive.
	When Pulse Mode of Drive is CW/CCW input method (2Pulse input method), CW+ line and CW- line may have been reversed or CCW+ line and CCW- line may have been reversed.	Please check connection status of CW+, CW-, CCW+ and CCW- lines.
	The brake is locked. (Only for brake installed type)	Please loosening the brake by energized.
Motor shaft moves only one direction	Pulse Mode of Drive is set as CW/CCW input method (2Pulse input method), then Controller send Pulse by CW/CCW method(1Pulse method).	Please check signal method of Controller.
	Pulse Mode of Drive is set as Pulse/Dir input method(1Pulse input method), then Controller send Pulse by Pulse/Dir method(2Pulse method).	Please check signal method of Controller.
Motor axis moves in the opposite direction to the specified direction	When Pulse Mode of Drive is CW/CCW input method (2Pulse input method), CW input and CCW input is connected reversely.	The CW Pulse signal should be connected to CW input, CCW Pulse signal should be connected to CCW input.
	When Pulse Mode of Drive is CW/CCW input method (2Pulse input method), setting of Motion Direction is set reversely.	Please check switch of rotation direction (SW 1.5)
	When Pulse Mode of Drive is Pulse/Dir input method (1Pulse input method), setting of Motion Direction is set reversely.	Please check switch of rotation direction (SW 1.5)
	When Pulse Mode of Drive is Pulse/Dir input method (1Pulse input method), CCW+(Dir+)line and CCW-(Dir-) may have been reversed.	Please check connection status of CCW+(Dir+), CCW-(Dir-) lines.
Motion of motor is unstable	Bad connection of Pulse signal cable	Please check connection of Controller and Drive.
No retention of the brake	The brake is released. (Only for brake installed type)	Please stop the power supply to brake, so keep the locked state of brake.
Motor axis movement does not match to the set amount	The setting of resolution is difference.	Please check setting switch of resolution (SW1.1~4)

37.2 When the Alarm LED is Blinking

When Alarm LED of drive is blinking, the protection function is generated. Please count the number of blink-ing and refer to chart below. The Alarm LED is blinking 1 to 15 times (0.5 seconds on, 0.5 seconds off), the same number of blinking will be repeated after 2 seconds.

Flash Times	Alarm Contents	Conditions	The Cause of Error	Checking Point	Corrective Measure
1	Over Current	The cur-rent through motor-driv-en devices exceeds the limit value	If motor has a problem	Checking the status of the short-circuit of the motor cable. (A and/A, B and B, A or /A and motor body, B or /B and Motor body)	① Replace the motor.
			If drive has a problem		① If Alarm keep blinking after replace the motor, replace drive.
2	Over Speed	Motor speed exceed 3,000rpm	The host controller like PLC send speed command of over 3,000rpm	Checking speed command of host controller (PLC)	① Lower the speed command of the host controller.
3	Position Tracking Error	Position error value is higher than 90° in motor run state	The rotation of motor is not smooth because of mechani-cal problem	Checking the assemble status of the unit(unscrews, debris, and deformation structures)	① Fix the defected structure of the equipment.
			Operate brake when it is locked	Checking the brake cable by brake operation sound. Checking if 24V is supplied to No.2(ST) and No.16(MINI) termi-nal of I/O connector. Checking the terminal signal of No.1(ST) and No.17(MINI) of I/O connector. If brake hold it self, it means 24V. if not it is 0v.	① Fix the defect of brake. ② If brake control signal is correct, replace the brake.
			Motor does not operate because motor is damaged	Checking if the motor bearing is damaged. -> Power off the mo-tor, and listening to sound while rotate shaft of motor by hand. Checking a short circuit and disconnection of motor cable. -> Checking a short circuit and disconnection by multimeter.	① Replace the motor when bearing is damaged, discon-nection of motor cable and short circuit.
			Motor does not operate be-cause encoder is damaged	Checking the connection status of encoder cable. -> Checking short circuit, disconnection, faulty wiring of cable.	① Correct the mis-wiring. ② Replace the cable when cable is disconnected. ③ Correct the short circuit.
			Motor does not operate because of transient shock to mechanical part	Cause of Shock elimination	① Remove the cause of the shock.
			If drive has a problem		② If Alarm keep blinking after tried all of above, replace the drive.

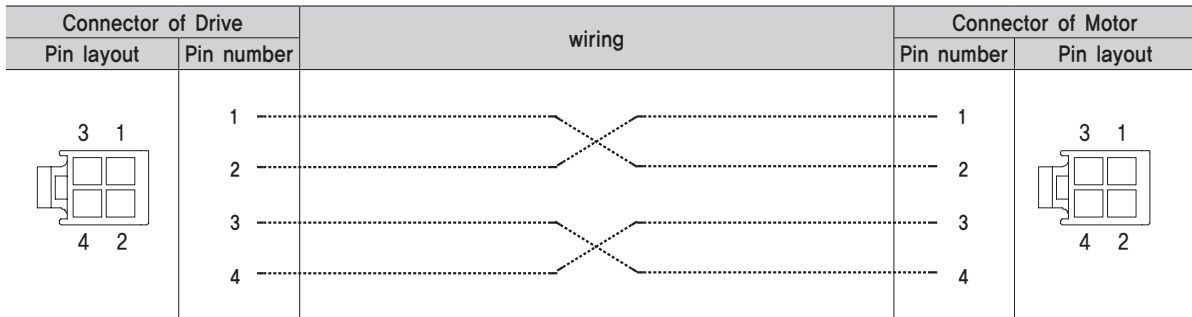| Flash Times	Alarm Contents	Conditions	The Cause of Error	Checking Point	Corrective Measure
4	Over Load	The motor is continuously operated more than 5second under a load exceeding the max torque	If send the command to move into the distance beyond the end of the structure	Checking the command of distance from host controller(PLC).	① Fix the command of distance to reasonable value.
			It does not operate normally, because its deformable structure	Checking the assemble status of the equipment. (Unscrews, debris, and deformation structures)	① Fix the assemble status of the equipment.
			It reaches end of structure because S/W Limit value is not set	Checking the S/W Limit value.	① Fix the S/W Limit value to suit to the equipment.
			It reached end of structure because sensor of H/W Limit is not operated	Checking whether H/W Limit sensor working correctly.	① Replace the H/W Limit ensor.
			The load exceeding the Max torque of motor	Checking whether motor has enough torque by comparing to load of instrument.	① Lower the speed of operation. (Step motor generate higher torque when speed is low) ② When ① is impossible, replace the motor to higher torque than load.
			Motor does not operate because motor is damaged	Checking whether motor is damaged because motor bearing damage. –> Power off the motor, and listening to sound while rotate shaft of motor by hand.	① If find any damage, replace the motor.
			The drive may have problem		① If Alarm keep blinking after tried all of above, replace the drive.
5	Over Temperature	Inside temperature of drive exceeds 65℃	If the ambient temperature is too high or the heating element is near the drive	Checking the ambient temperature and make sure no heating element near the drive.	① Lower the room ambient temperature to under 25℃, and do heat dissipation by fan when the temperature of the case is over 50℃ ② Remove the heating element from the drive.
			Distance between drive is below 50mm, so heat dissipation is difficult	Make sure the distance between drive is more than 50mm.	① Keeping the distance more than 50mm between drive. ② If ① is impossible, do heat dissipation by FAN.
			The drive may have problem		③ If Alarm keep blinking after tried all of above, replace the drive.
6	Over Re-generative Voltage	Back-EMF of motor exceeds 40V	The acceleration and deceleration value is too small	Checking the Acceleration and Deceleration conditions. (Difference depending on load and speed)	① Change the condition of Acceleration and Deceleration. ② Lower the operation speed of motor relatively.
			The drive may have problem		① If Alarm keep blinking after tried all of above, replace the drive.
7	Motor Connect Error	An error with the connection between the drive and the motor	The motor may have problem	Checking the disconnection of motor phase. (A and/A, B and/B)	① Replace the motor.
			If the motor cable between motor and drive is damaged	Checking the connection of the motor cable.	① Fix the error after check connection status of motor cable. ② Replace the extension cable between motor and drive, if there is problem.
			The drive may have problem		① If Alarm keep blinking after tried all of above, replace the drive.

Flash Times	Alarm Contents	Conditions	The Cause of Error	Checking Point	Corrective Measure
8	Encoder Connect Error	An error with the connection between the drive and the encoder	If the encoder extension cable is damaged	Checking the connection status of motor and the extension cable of encoder.	① Make sure connection of cable connector.
				Checking if the extension cable of encoder is disconnected.	① Replace the extension cable of encoder.
				Checking the wiring status of the extension cable of encoder.	① Fix the extension cable of encoder. ② If same alarm is generated after correction, drive and motor may have damaged by faulty cable, so replace the motor and drive.
			The encoder may have problem	Checking if the encoder is damaged, unscrew or extension cable of encoder is disconnected. (Can not be checked when assembled)	① Replace the motor.
			The drive may have problem		① If Alarm keep blinking after tried all of above, replace the drive.

■ S-SERVOII ST, 2X, 3X Extension Cable for Motor

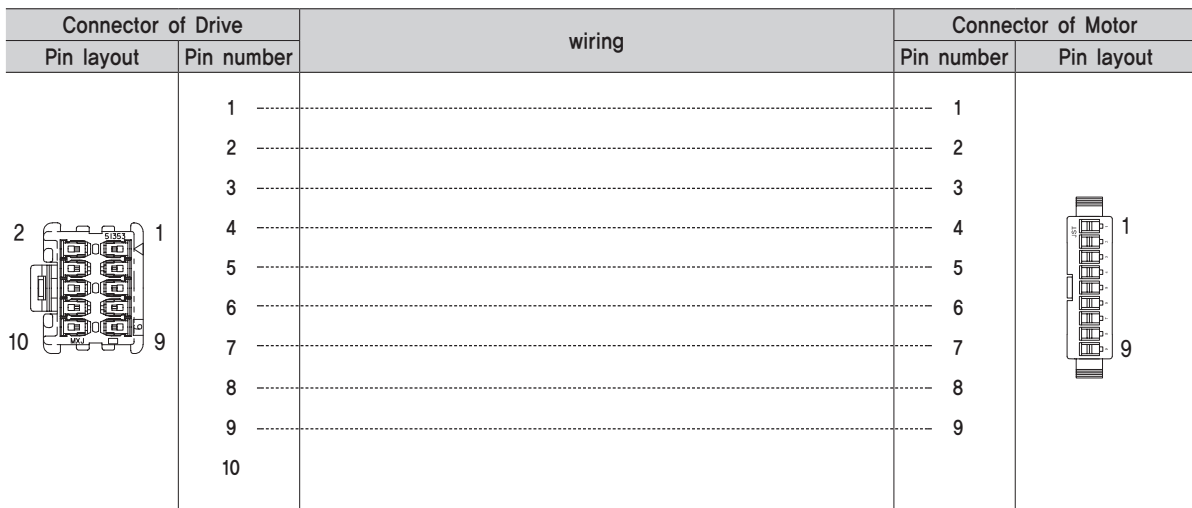S-SERVOII ST, 2X, 3X for cable extension between Motor and Drive.

WIRING DIAGRAM

Connector of Drive		wiring	Connector of Motor	
Pin layout	Pin number		Pin number	Pin layout
3 1 4 2	1 2 3 4	(crossed wiring)	1 2 3 4	3 1 4 2

■ S-SERVOII ST, 2X, 3X Extension Cable for Motor

S-SERVOII ST, 2X, 3X for cable extension between Motor and Drive.

WIRING DIAGRAM

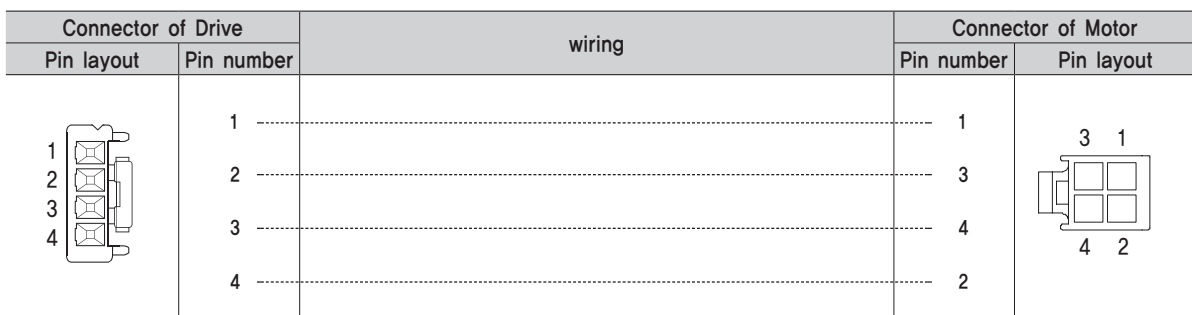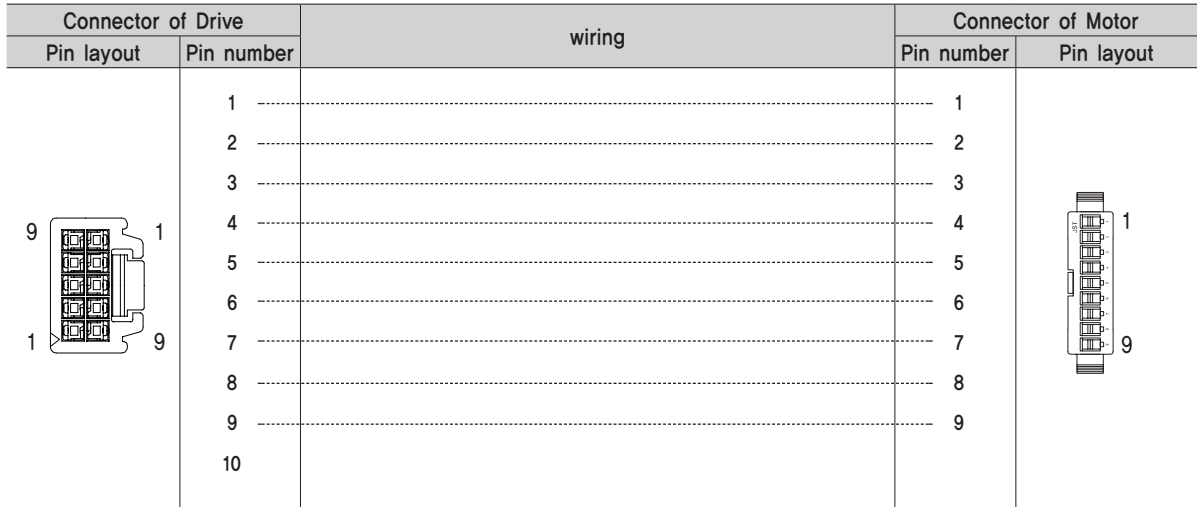| Connector of Drive		wiring	Connector of Motor	
Pin layout	Pin number		Pin number	Pin layout
2 1 10 9	1 2 3 4 5 6 7 8 9 10	(straight wiring)	1 2 3 4 5 6 7 8 9	1 9

■ S-SERVOII MINI Extension Cable for Motor

S-SERVOII MINI for cable extension between Motor and Drive.

WIRING DIAGRAM

Connector of Drive		wiring	Connector of Motor	
Pin layout	Pin number		Pin number	Pin layout
1 2 3 4	1 2 3 4	(straight wiring)	1 3 4 2	3 1 4 2

▪ S-SERVOⅡ MINI Extension Cable for Motor

S-SERVOⅡ MINI for cable extension between Motor and Drive.

WIRING DIAGRAM

Connector of Drive		wiring	Connector of Motor	
Pin layout	Pin number		Pin number	Pin layout
	1		1	
	2		2	
	3		3	
	4		4	
	5		5	
	6		6	
	7		7	
	8		8	
	9		9	
	10			

▪ Extension Cable for Parameter

S-SERVOⅡ ST, MINI, 2X, 3X for cable extension between Computer.

WIRING DIAGRAM

Connector of Drive		wiring	Connector of Motor	
Pin layout	Pin number		Pin number	Pin layout
	1		1	
	2		2	
	3		3	
			4	
			5	
			6	
			7	
			8	
			9	
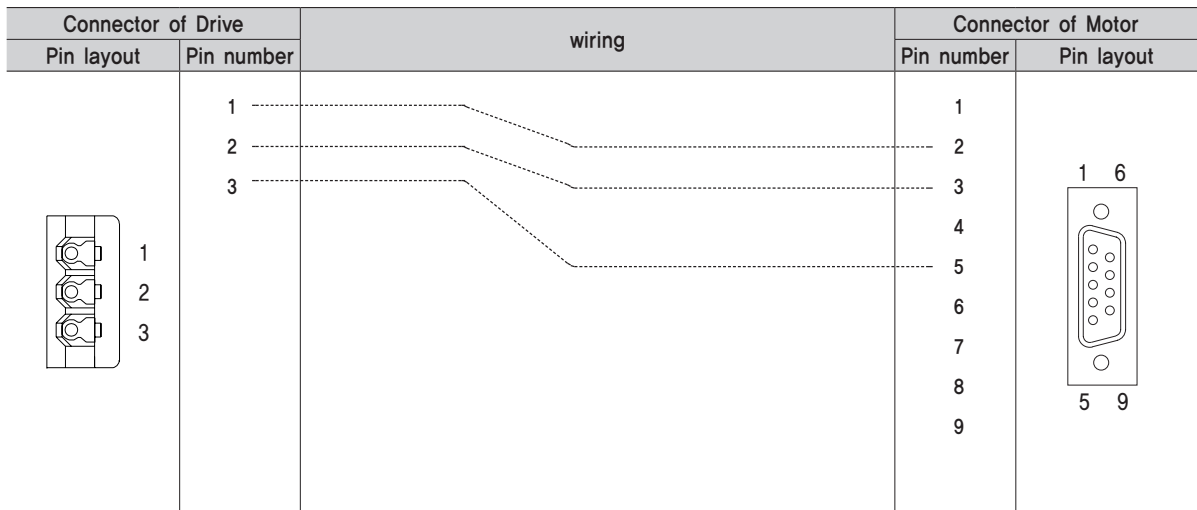
MEMO

MEMO

FASTECH

Fast, Accurate, Smooth Motion

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