Ezi-SERVO®

Closed Loop Stepping System

MINI

FASTECH

Fast, Accurate, Smooth Motion

www.fastech.co.kr

CE

Table of Contents

※ Before operation ※

· Thank you for your purchasing Ezi-SERVO MINI.
· For high-speed and high-precision drive of a stepping motor, Ezi-SERVO MINI is an unique drive that adopts a new control scheme owing to an on-board high-performance 32bit digital signal processor.
· This manual describes handling, maintenance, repair, diagnosis and troubleshooting of Ezi-SERVO MINI.
· Before operating Ezi-SERVO MINI, thoroughly read this manual.
· After reading the manual, keep the manual near the Ezi-SERVO MINI 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 Ezi-SERVO MINI.

· 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 Ezi-SERVO MINI, thoroughly read the manual and fully understand the contents. Before operating the Ezi-SERVO MINI please, understand the mechanical characteristics of the Ezi-SERVO MINI 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 Ezi-SERVO MINI. 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 Ezi-SERVO MINI is to be installed. Otherwise, a fire may occur. When installing several Ezi-SERVO MINI in a sealed place, install a cooling fan to keep the ambient temperature of the Ezi-SERVO MINI 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 Ezi-SERVO MINI. 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 Ezi-SERVO MINI is insulated from the ground of the internal circuit by the condenser. Ground the Ezi-SERVO MINI. 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 Ezi-SERVO MINI. 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 Ezi-SERVO MINI. 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 Ezi-SERVO MINI. Otherwise, an electric shock may occur or the reconstructed product can not get After-Service.

1 Closed Loop System

Ezi−SERVO is an innovative Closed Loop System that utilizes a high−resolution motor mounted encoder constantly to monitor the current position. The encoder feedback allows the Ezi−SERVO to update the current position every 25 μsec. It allows the Ezi−SERVO drive to compensate for the loss of position, ensuring accurate positioning. For example, due to a sudden load change, a conventional stepper motor and drive could lose a step but Ezi−SERVO automatically correct the position by encoder feedback.
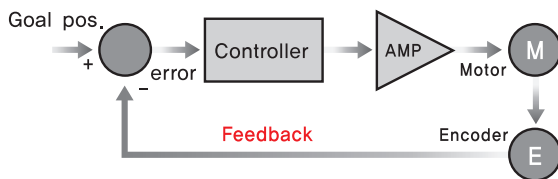
2 No Gain Tuning

To ensure machine performance, smoothness, positional error and low servo noise, conventional servo systems require the adjustment of its servo's gains as an initial crucial step. Even systems that employ auto−tuning require manual tuning after the system is installed, especially if more that one axis are interdependent. Ezi−SERVO employs the best characteristics of stepper, closed loop motion controls and algorithms to eliminate the need of tedious gain tuning required for conventional closed loop servo systems. This means that Ezi−SERVO is optimized for the application and ready to work right out of the box. The Ezi−SERVO system employs the unique characteristics of the closed loop stepping motor control, eliminating these cumbersome steps and giving the engineer a high performance servo system without wasting setup time. Ezi−SERVO is especially well suited for low stiffness loads (for example, a belt and pulley system) that sometime require conventional servo systems to inertia match with the additional expensive and bulky gearbox. Ezi−SERVO also performs exceptionally, even under heavy loads and high speeds.
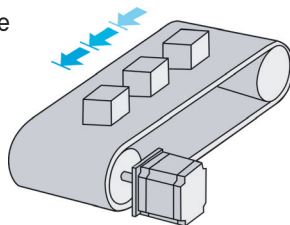
3 Heat Reduction / Energy Saving

(Motor Current Control according to load)

Ezi−SERVO automatically controls motor current according to load. Ezi−SERVO 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]
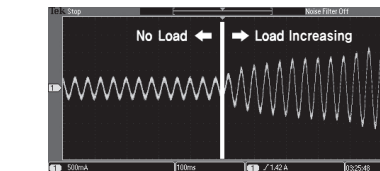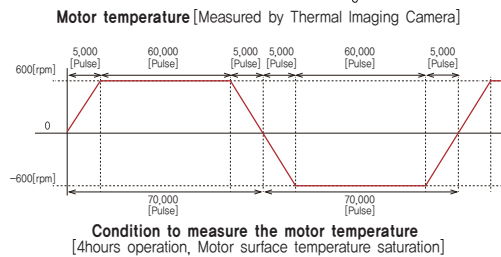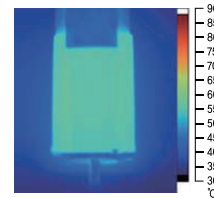
Example of the Motor Current Control according to load

4 No Hunting

Traditional servo motor drives overshoot their position and try to correct overshooting by moving 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 Ezi-SERVO Motion Control System. Ezi-SERVO 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

Ezi-SERVO　　　　Servo motor

CW
+ pulse
0
− pulse
CCW
Time
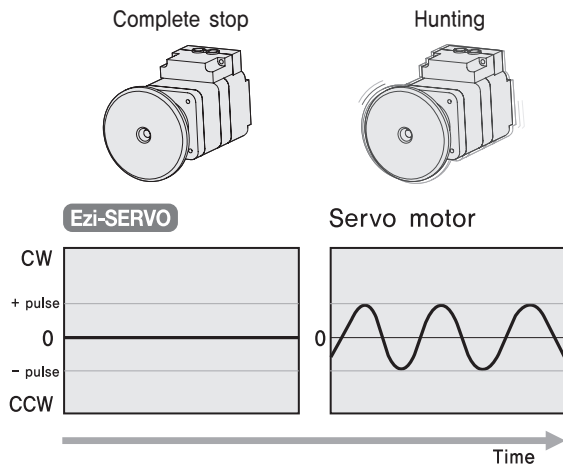
6 Fast Response

Similar to conventional stepping motors, Ezi-SERVO instantly synchronizes with command pulses providing fast positional response. Ezi-SERVO is the optimum choice when zero-speed stability and rapid motions within a short distance are required. Traditional servo motor systems have a natural delay called settling time between the command input signals and the resultant motion because of the constant monitoring of the current position.

Speed　Ezi-SERVO　　Speed　Servo motor

Settling Time

0　　　　Time　　0　　　　Time
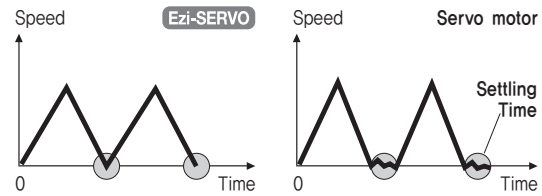
7 High Resolution

The unit of the position command can be divided precisely. (Max. 32,000 pulses/revolution)

500
1000
1600
2000
3600
4000
5000
6400
7200
10000
16000
20000
32000
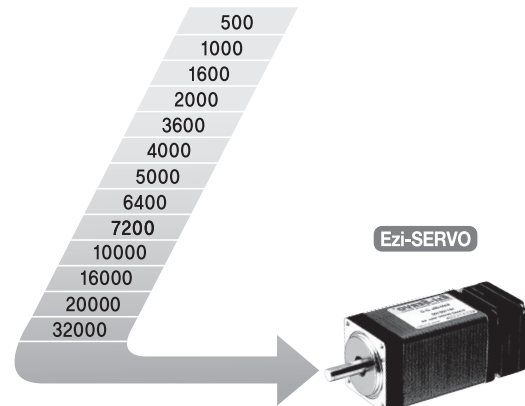
Ezi-SERVO

5 Smooth and Accurate

Ezi-SERVO is a high-precision servo drive, using a high-resolution encoder with 32,000 pulses/revolution. Unlike a conventional Microstep drive, the on-board high performance MCU (Micro Controller Unit) performs vector control and filtering, producing a smooth rotational control with minimum ripples.

β
B phase current
Current vector
Torque
Φ
Motor pos.
A phase current
α
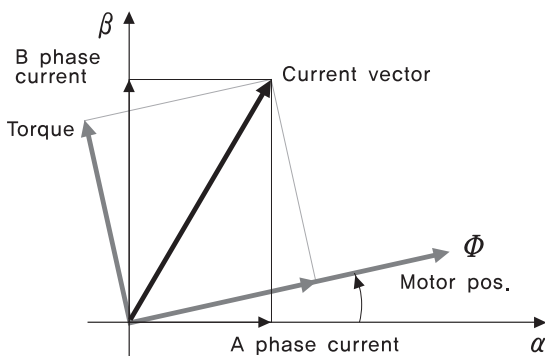
8 High Torque

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

Torque
Ezi-SERVO
Stepping
Speed
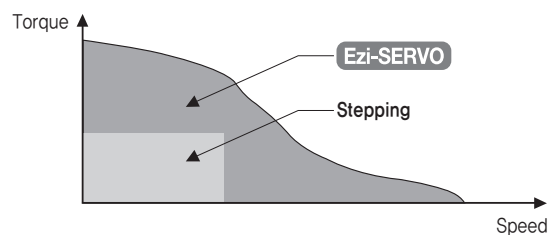
9 High Speed

The Ezi-SERVO operates well at high speed without the loss of synchronism or positioning error. Ezi-SERVO's ability of continuous current position monitoring of enables the stepping motor to generate high torque, even under a 100% load condition.
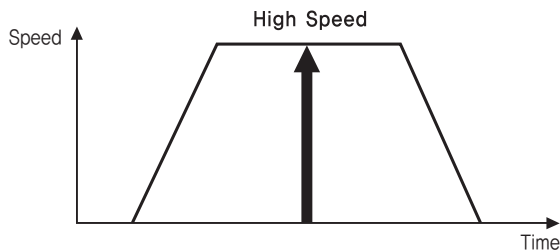
● Advantages over Open-Loop Control Stepping Drive

1. Reliable positioning without loss of synchronism.
2. Holding stable position and automatically recovering to the original position even after experiencing positioning error due to external forces, such as mechanical vibration or vertical positional holding.
3. Ezi-SERVO utilizes 100% of the full range of rated motor torque, contrary to a conventional open-loop stepping driver that can use up to 50% of the rated motor torque due to the loss of synchronism.
4. Capability to operate at high speed due to load-dependent current control, open-loop stepping drivers use a constant current control at all speed ranges without considering load variations.

● Advantages over Servo Motor Controller

1. No gain tuning. (Automatic gain adjustment in response to a load change)
2. Maintains the stable holding position without oscillation after completion of positioning.
3. Fast positioning due to the independent control by on-board MCU.
4. Continuous operation during rapid short-stroke movement due to instantaneous positioning.

3. Ezi-SERVO MINI Part Numbering

4. Standard Combination

Ezi-SERVO-MI-42M-A-BK-PN05-□
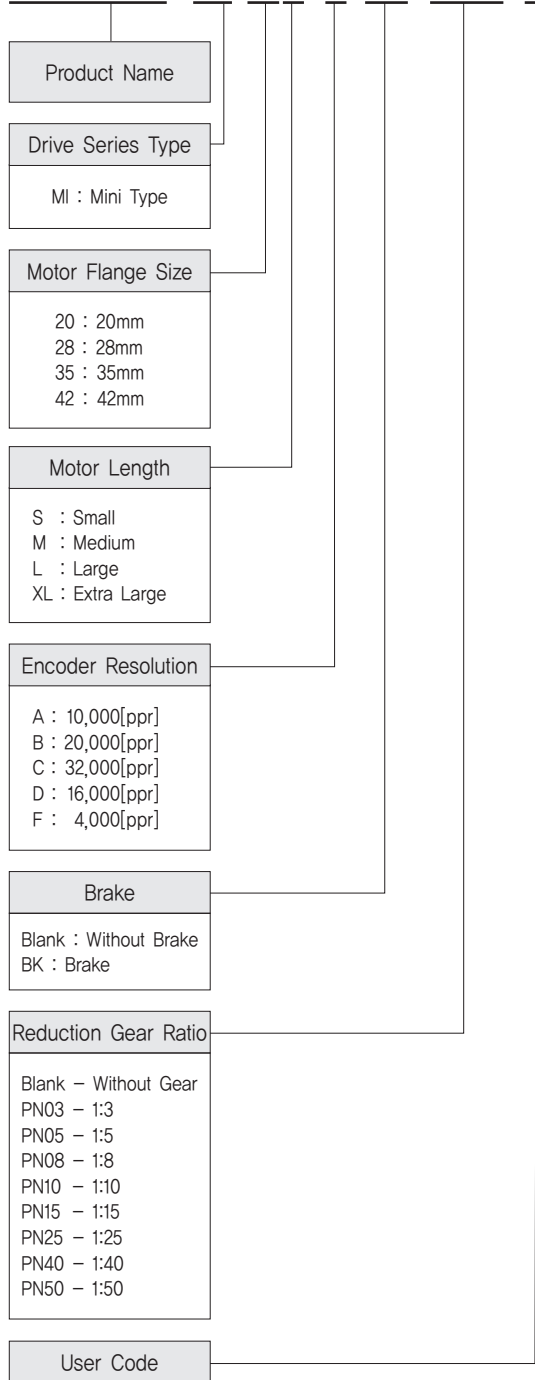
Product Name

Drive Series Type
MI : Mini Type

Motor Flange Size
20 : 20mm 28 : 28mm 35 : 35mm 42 : 42mm

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

Encoder Resolution
A : 10,000[ppr] B : 20,000[ppr] C : 32,000[ppr] D : 16,000[ppr] 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

Unit Part Number	Motor Model Number	Drive Model Number
Ezi-SERVO-MI-20M-F	EzM-20M-F	EzS-PD-MI-20M-F
Ezi-SERVO-MI-20L-F	EzM-20L-F	EzS-PD-MI-20L-F
Ezi-SERVO-MI-28S-D	EzM-28S-D	EzS-PD-MI-28S-D
Ezi-SERVO-MI-28SM-D	EzM-28SM-D	EzS-PD-MI-28S-D
Ezi-SERVO-MI-28M-D	EzM-28M-D	EzS-PD-MI-28M-D
Ezi-SERVO-MI-28MM-D	EzM-28MM-D	EzS-PD-MI-28M-D
Ezi-SERVO-MI-28L-D	EzM-28L-D	EzS-PD-MI-28L-D
Ezi-SERVO-MI-28LM-D	EzM-28LM-D	EzS-PD-MI-28L-D
Ezi-SERVO-MI-35M-D	EzM-35M-D	EzS-PD-MI-35M-D
Ezi-SERVO-MI-35MM-D	EzM-35MM-D	EzS-PD-MI-35M-D
Ezi-SERVO-MI-35L-D	EzM-35L-D	EzS-PD-MI-35L-D
Ezi-SERVO-MI-35LM-D	EzM-35LM-D	EzS-PD-MI-35L-D
Ezi-SERVO-MI-42S-A	EzM-42S-A	EzS-PD-MI-42S-A
Ezi-SERVO-MI-42S-B	EzM-42S-B	EzS-PD-MI-42S-B
Ezi-SERVO-MI-42S-C	EzM-42S-C	EzS-PD-MI-42S-C
Ezi-SERVO-MI-42M-A	EzM-42M-A	EzS-PD-MI-42M-A
Ezi-SERVO-MI-42M-B	EzM-42M-B	EzS-PD-MI-42M-B
Ezi-SERVO-MI-42M-C	EzM-42M-C	EzS-PD-MI-42M-C
Ezi-SERVO-MI-42L-A	EzM-42L-A	EzS-PD-MI-42L-A
Ezi-SERVO-MI-42L-B	EzM-42L-B	EzS-PD-MI-42L-B
Ezi-SERVO-MI-42L-C	EzM-42L-C	EzS-PD-MI-42L-C
Ezi-SERVO-MI-42XL-A	EzM-42XL-A	EzS-PD-MI-42XL-A
Ezi-SERVO-MI-42XL-B	EzM-42XL-B	EzS-PD-MI-42XL-B
Ezi-SERVO-MI-42XL-C	EzM-42XL-C	EzS-PD-MI-42XL-C

* When places an order for Stopper type 28mm, 35mm motor, please write "M" additionally after motor length of Unit Part Number.
   (Ex : Ezi-SERVO-MI-28LM-D, Ezi-SERVO-MI-35LM-D)

5. Combination with Brake

Unit Part Number	Motor Model Number	Drive Model Number
Ezi-SERVO-MI-42S-A-BK	EzM-42S-A-BK	EzS-PD-MI-42S-A
Ezi-SERVO-MI-42S-B-BK	EzM-42S-B-BK	EzS-PD-MI-42S-B
Ezi-SERVO-MI-42M-A-BK	EzM-42M-A-BK	EzS-PD-MI-42M-A
Ezi-SERVO-MI-42M-B-BK	EzM-42M-B-BK	EzS-PD-MI-42M-B
Ezi-SERVO-MI-42L-A-BK	EzM-42L-A-BK	EzS-PD-MI-42L-A
Ezi-SERVO-MI-42L-B-BK	EzM-42L-B-BK	EzS-PD-MI-42L-B
Ezi-SERVO-MI-42XL-A-BK	EzM-42XL-A-BK	EzS-PD-MI-42XL-A
Ezi-SERVO-MI-42XL-B-BK	EzM-42XL-B-BK	EzS-PD-MI-42XL-B

6. Combination with Gearbox

| Unit Part Number	Motor Model Number	Drive Model Number	Reduction gear ratio
Ezi-SERVO-MI-42S-A-PN3	EzM-42S-A-PN3	EzS-PD-MI-42S-A	1:3
Ezi-SERVO-MI-42S-B-PN3	EzM-42S-B-PN3	EzS-PD-MI-42S-B	
Ezi-SERVO-MI-42S-A-PN5	EzM-42S-A-PN5	EzS-PD-MI-42S-A	1:5
Ezi-SERVO-MI-42S-B-PN5	EzM-42S-B-PN5	EzS-PD-MI-42S-B	
Ezi-SERVO-MI-42S-A-PN8	EzM-42S-A-PN8	EzS-PD-MI-42S-A	1:8
Ezi-SERVO-MI-42S-B-PN8	EzM-42S-B-PN8	EzS-PD-MI-42S-B	
Ezi-SERVO-MI-42S-A-PN10	EzM-42S-A-PN10	EzS-PD-MI-42S-A	1:10
Ezi-SERVO-MI-42S-B-PN10	EzM-42S-B-PN10	EzS-PD-MI-42S-B	
Ezi-SERVO-MI-42S-A-PN15	EzM-42S-A-PN15	EzS-PD-MI-42S-A	1:15
Ezi-SERVO-MI-42S-B-PN15	EzM-42S-B-PN15	EzS-PD-MI-42S-B	
Ezi-SERVO-MI-42S-A-PN25	EzM-42S-A-PN25	EzS-PD-MI-42S-A	1:25
Ezi-SERVO-MI-42S-B-PN25	EzM-42S-B-PN25	EzS-PD-MI-42S-B	
Ezi-SERVO-MI-42S-A-PN40	EzM-42S-A-PN40	EzS-PD-MI-42S-A	1:40
Ezi-SERVO-MI-42S-B-PN40	EzM-42S-B-PN40	EzS-PD-MI-42S-B	
Ezi-SERVO-MI-42S-A-PN50	EzM-42S-A-PN50	EzS-PD-MI-42S-A	1:50
Ezi-SERVO-MI-42S-B-PN50	EzM-42S-B-PN50	EzS-PD-MI-42S-B	
Ezi-SERVO-MI-42M-A-PN3	EzM-42M-A-PN3	EzS-PD-MI-42M-A	1:3
Ezi-SERVO-MI-42M-B-PN3	EzM-42M-B-PN3	EzS-PD-MI-42M-B	
Ezi-SERVO-MI-42M-A-PN5	EzM-42M-A-PN5	EzS-PD-MI-42M-A	1:5
Ezi-SERVO-MI-42M-B-PN5	EzM-42M-B-PN5	EzS-PD-MI-42M-B	
Ezi-SERVO-MI-42M-A-PN8	EzM-42M-A-PN8	EzS-PD-MI-42M-A	1:8
Ezi-SERVO-MI-42M-B-PN8	EzM-42M-B-PN8	EzS-PD-MI-42M-B	
Ezi-SERVO-MI-42M-A-PN10	EzM-42M-A-PN10	EzS-PD-MI-42M-A	1:10
Ezi-SERVO-MI-42M-B-PN10	EzM-42M-B-PN10	EzS-PD-MI-42M-B	
Ezi-SERVO-MI-42M-A-PN15	EzM-42M-A-PN15	EzS-PD-MI-42M-A	1:15
Ezi-SERVO-MI-42M-B-PN15	EzM-42M-B-PN15	EzS-PD-MI-42M-B	
Ezi-SERVO-MI-42M-A-PN25	EzM-42M-A-PN25	EzS-PD-MI-42M-A	1:25
Ezi-SERVO-MI-42M-B-PN25	EzM-42M-B-PN25	EzS-PD-MI-42M-B	
Ezi-SERVO-MI-42M-A-PN40	EzM-42M-A-PN40	EzS-PD-MI-42M-A	1:40
Ezi-SERVO-MI-42M-B-PN40	EzM-42M-B-PN40	EzS-PD-MI-42M-B	
Ezi-SERVO-MI-42M-A-PN50	EzM-42M-A-PN50	EzS-PD-MI-42M-A	1:50
Ezi-SERVO-MI-42M-B-PN50	EzM-42M-B-PN50	EzS-PD-MI-42M-B	
Ezi-SERVO-MI-42L-A-PN3	EzM-42L-A-PN3	EzS-PD-MI-42L-A	1:3
Ezi-SERVO-MI-42L-B-PN3	EzM-42L-B-PN3	EzS-PD-MI-42L-B	
Ezi-SERVO-MI-42L-A-PN5	EzM-42L-A-PN5	EzS-PD-MI-42L-A	1:5
Ezi-SERVO-MI-42L-B-PN5	EzM-42L-B-PN5	EzS-PD-MI-42L-B	
Ezi-SERVO-MI-42L-A-PN8	EzM-42L-A-PN8	EzS-PD-MI-42L-A	1:8
Ezi-SERVO-MI-42L-B-PN8	EzM-42L-B-PN8	EzS-PD-MI-42L-B	
Ezi-SERVO-MI-42L-A-PN10	EzM-42L-A-PN10	EzS-PD-MI-42L-A	1:10
Ezi-SERVO-MI-42L-B-PN10	EzM-42L-B-PN10	EzS-PD-MI-42L-B	
Ezi-SERVO-MI-42L-A-PN15	EzM-42L-A-PN15	EzS-PD-MI-42L-A	1:15
Ezi-SERVO-MI-42L-B-PN15	EzM-42L-B-PN15	EzS-PD-MI-42L-B	
Ezi-SERVO-MI-42L-A-PN25	EzM-42L-A-PN25	EzS-PD-MI-42L-A	1:25
Ezi-SERVO-MI-42L-B-PN25	EzM-42L-B-PN25	EzS-PD-MI-42L-B	
Ezi-SERVO-MI-42L-A-PN40	EzM-42L-A-PN40	EzS-PD-MI-42L-A	1:40
Ezi-SERVO-MI-42L-B-PN40	EzM-42L-B-PN40	EzS-PD-MI-42L-B	
Ezi-SERVO-MI-42L-A-PN50	EzM-42L-A-PN50	EzS-PD-MI-42L-A	1:50
Ezi-SERVO-MI-42L-B-PN50	EzM-42L-B-PN50	EzS-PD-MI-42L-B	
Ezi-SERVO-MI-42XL-A-PN3	EzM-42XL-A-PN3	EzS-PD-MI-42XL-A	1:3
Ezi-SERVO-MI-42XL-B-PN3	EzM-42XL-B-PN3	EzS-PD-MI-42XL-B	
Ezi-SERVO-MI-42XL-A-PN5	EzM-42XL-A-PN5	EzS-PD-MI-42XL-A	1:5
Ezi-SERVO-MI-42XL-B-PN5	EzM-42XL-B-PN5	EzS-PD-MI-42XL-B	
Ezi-SERVO-MI-42XL-A-PN8	EzM-42XL-A-PN8	EzS-PD-MI-42XL-A	1:8
Ezi-SERVO-MI-42XL-B-PN8	EzM-42XL-B-PN8	EzS-PD-MI-42XL-B	
Ezi-SERVO-MI-42XL-A-PN10	EzM-42XL-A-PN10	EzS-PD-MI-42XL-A	1:10
Ezi-SERVO-MI-42XL-B-PN10	EzM-42XL-B-PN10	EzS-PD-MI-42XL-B	
Ezi-SERVO-MI-42XL-A-PN15	EzM-42XL-A-PN15	EzS-PD-MI-42XL-A	1:15
Ezi-SERVO-MI-42XL-B-PN15	EzM-42XL-B-PN15	EzS-PD-MI-42XL-B	
Ezi-SERVO-MI-42XL-A-PN25	EzM-42XL-A-PN25	EzS-PD-MI-42XL-A	1:25
Ezi-SERVO-MI-42XL-B-PN25	EzM-42XL-B-PN25	EzS-PD-MI-42XL-B	
Ezi-SERVO-MI-42XL-A-PN40	EzM-42XL-A-PN40	EzS-PD-MI-42XL-A	1:40
Ezi-SERVO-MI-42XL-B-PN40	EzM-42XL-B-PN40	EzS-PD-MI-42XL-B	
Ezi-SERVO-MI-42XL-A-PN50	EzM-42XL-A-PN50	EzS-PD-MI-42XL-A	1:50
Ezi-SERVO-MI-42XL-B-PN50	EzM-42XL-B-PN50	EzS-PD-MI-42XL-B	

7. Drive Specification and Dimension

7.1 Specifications of Drive

Motor Model		EzM-20 series	EzM-28 series	EzM-35 series	EzM-42 series
Driver Model		EzS-PD-MI-20 series	EzS-PD-MI-28 series	EzS-PD-MI-35 series	EzS-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	Rotation Speed	0~3,000 [rpm] [*1]			
	Resolution [ppr]	4,000/Rev. Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 4,000 10,000/Rev. Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 16,000/Rev. Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 16,000 20,000/Rev. Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 20,000 32,000/Rev. Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 32,000 (Selectable with DIP switch) [*2]			
	Max. Input Pulse 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, System Error, ROM Error, Position Overflow Error			
	LED Display	Power status, In-Position status, Servo On status, Alarm status			
	In-Position Selection	0~F (Selectable with DIP switch)			
	Position Gain Selection	0~F (Selectable with DIP switch)			
	Pulse Input Method	1-Pulse / 2-Pulse (Selectable with DIP switch)			
	Rotational Direction	CW/CCW (Selectable with DIP switch)			
	Speed/Position Control Command	Pulse Train Input			
I/O Signal	Input Signals	Position Command Pulse, Servo On/Off, Alarm Reset (Photocoupler Input)			
	Output Signals	In-Position, Alarm (Photocoupler Output) Encoder Signal (A+, A−, B+, B−, Z+, Z−, 26C31 of Equivalent) (Line Driver 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] : When selected resolution is more than encoder resolution, motor shall be operated by microstep between pulses.

## 7.2 Dimensions of Drive [mm]
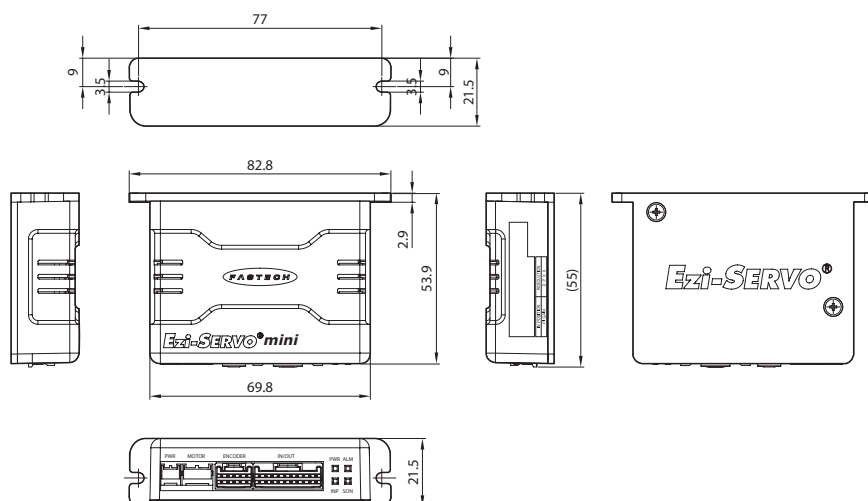
8. Specifications of Motor

| MODEL		UNIT	EzM-20 series		EzM-28 series			EzM-35 series		EzM-42 series			
			20M	20L	28S	28M	28L	35M	35L	42S	42M	42L	42XL
DRIVE METHOD		–	BI-POLAR										
NUMBER OF PHASES		–	2	2	2	2	2	2	2	2	2	2	2
CURRENT per PHASE		A	0.5	0.5	0.95	0.95	0.95	1.5	1.5	1.2	1.2	1.2	1.2
HOLDING TORQUE		N·m	0.016	0.025	0.069	0.098	0.118	0.13	0.23	0.32	0.44	0.5	0.65
ROTOR INERTIA		g·cm²	2.5	3.3	9.0	13	18	15	20	35	54	77	114
WEIGHTS		g	79	104	147	204	232	194	226	299	364	433	567
LENGTH(L)		mm	28	38	32	45	50	32	36	34	40	48	60
PERMISSIBLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	18	18	30	30	30	22	22	22	22	22	22
	8mm		30	30	38	38	38	26	26	26	26	26	26
	13mm		–	–	53	53	53	33	33	33	33	33	33
	18mm		–	–	–	–	–	46	46	46	46	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										

9. Torque Characteristics of Motor

Ezi-SERVO-MI-20 series
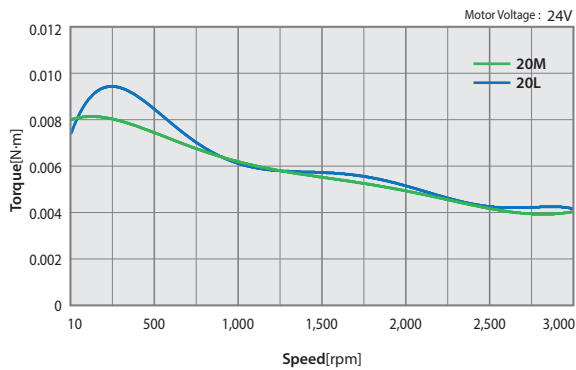
Ezi-SERVO-MI-28 series
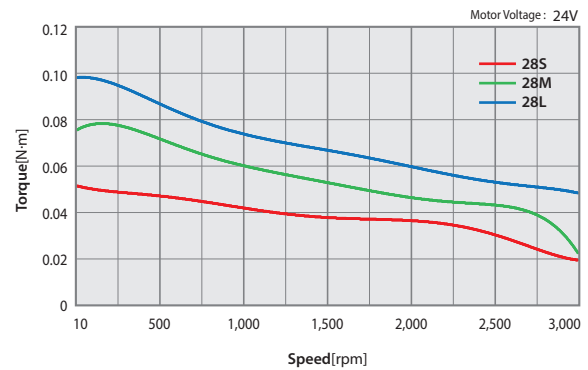
Ezi-SERVO-MI-35 series
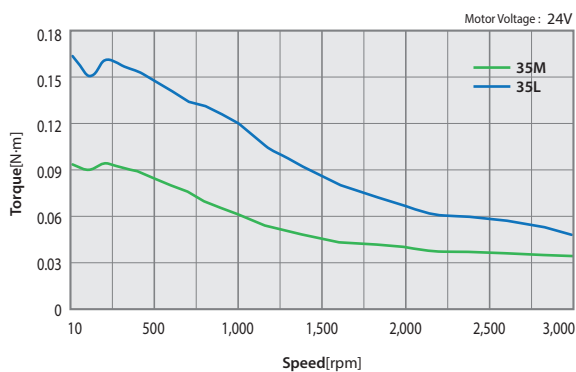
Ezi-SERVO-MI-42 series
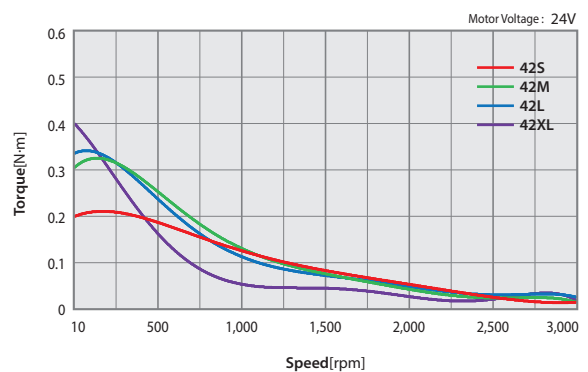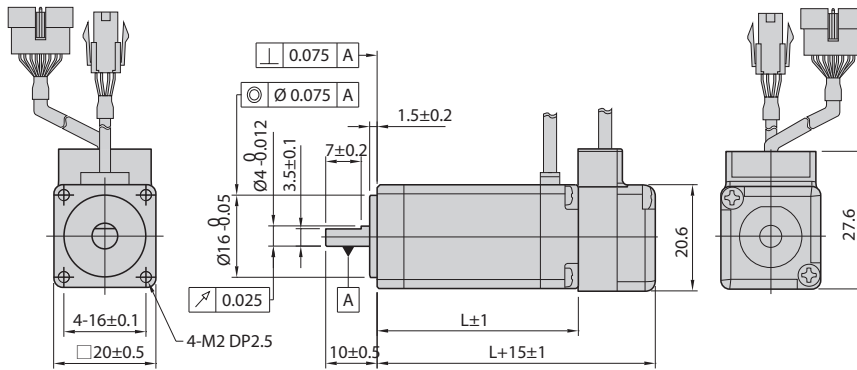
20mm

Model name	Length(L)
EzM–20M	28
EzM–20L	38
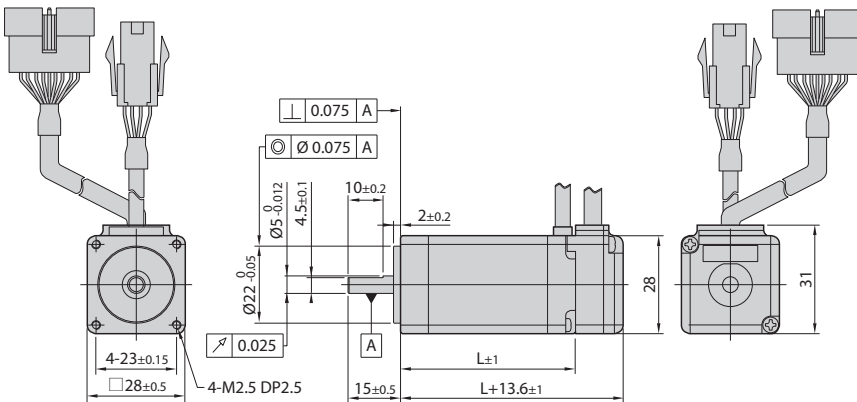
28mm

Model name	Length(L)
EzM–28S	32
EzM–28M	45
EzM–28L	50
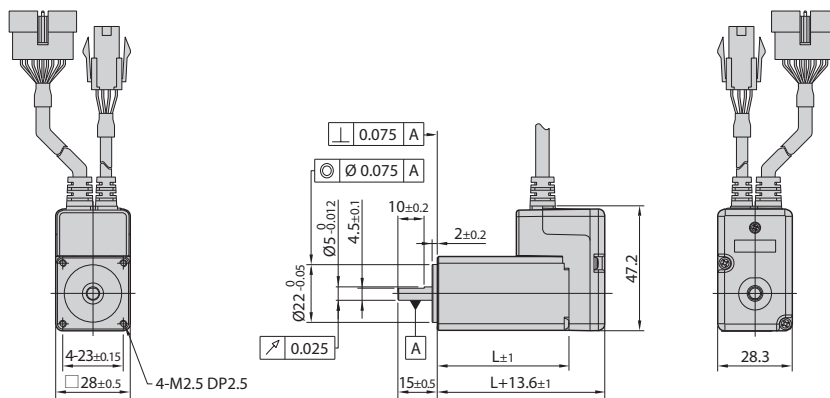
28mm
(Stopper type)

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

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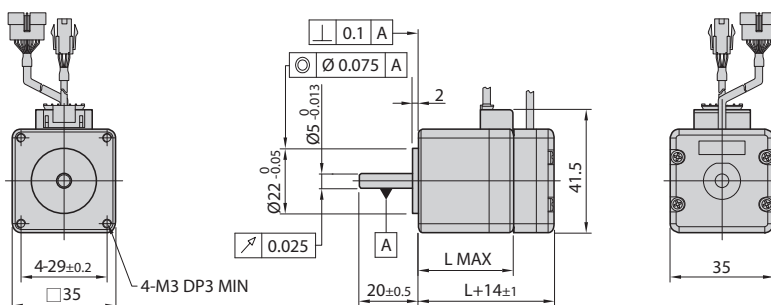
35mm

Model name	Length(L)
EzM–35M	32
EzM–35L	36

10. Dimensions of Motor [mm]

| ⊥ | 0.1 | A |
| ◎ | Ø 0.075 | A |
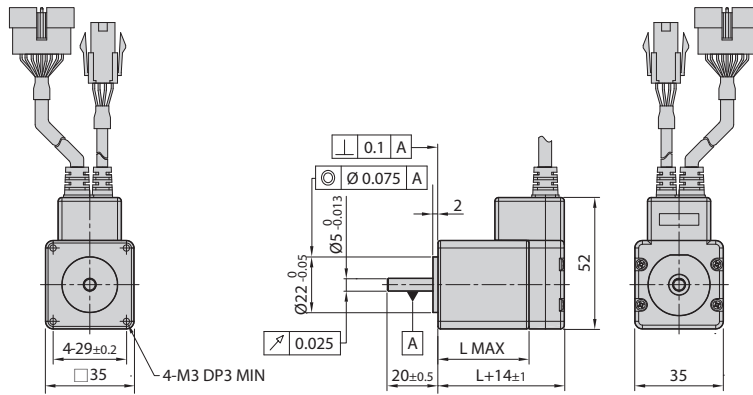
35mm
(Stopper type)

Model name	Length(L)
EzM-35MM	32
EzM-35LM	36

※ When ordering 35mm Stopper type of motor, please add "M" after standard motor model number.
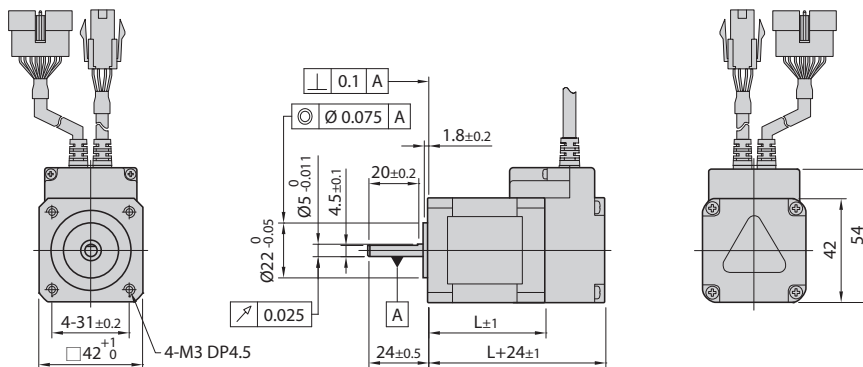
42mm

Model name	Length(L)
EzM-42S	34
EzM-42M	40
EzM-42L	48
EzM-42XL	60

11. Notes on Installation

1) Ezi-SERVO MINI is designed for indoor use only.

2) The ambient temperature of the room should be 0℃~50℃.

3) If the temperature of the product case is higher than 50℃, radiate heat of the outside to cool down.

4) Do not install Ezi-SERVO MINI under direct rays, near magnetic or radioactive objects.

5) If you set more than 2 drives, you must set over 20mm vertically and over 50mm horizontally as shown below.
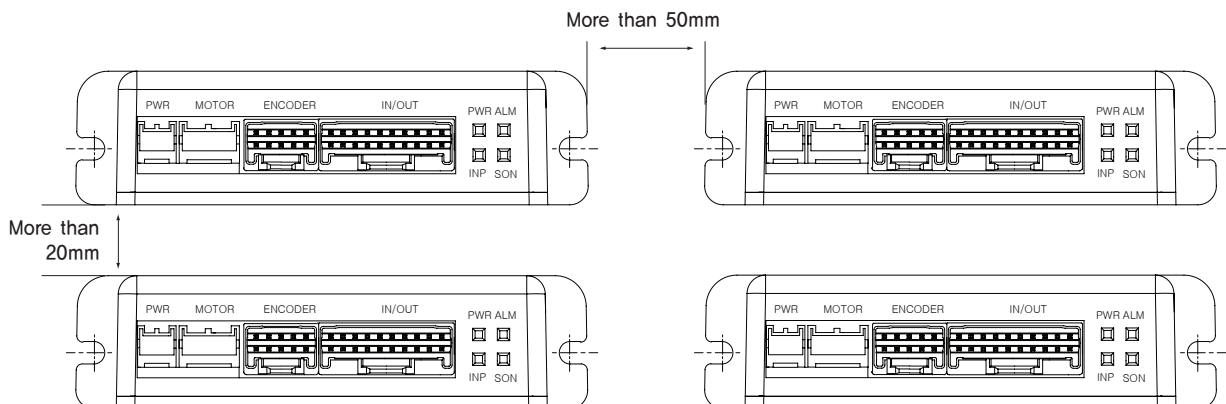
12. Specifications of Motor with Brake

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	
Ezi−SERVO−MI−42S−■−BK	EzM−42S−■−BK	Non−excitation run Type	24VDC ±10%	0.2	5	0.2	510	22	26	33	46	Must be Lower than Unit's Weight
Ezi−SERVO−MI−42M−■−BK	EzM−42M−■−BK						570					
Ezi−SERVO−MI−42L−■−BK	EzM−42L−■−BK						640					
Ezi−SERVO−MI−42XL−■−BK	EzM−42XL−■−BK						770					

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

Ezi−SERVO MINI controls Brake by Drive automatically.
Please refer to below Timing Chart when Brake is controlled
by the upper controller other than using Ezi−SERVO MINI Brake control.
Otherwise, Drive malfunctioning and loads can be fall down.
Also, please do not operate Brake while motor operation to prevent damage.
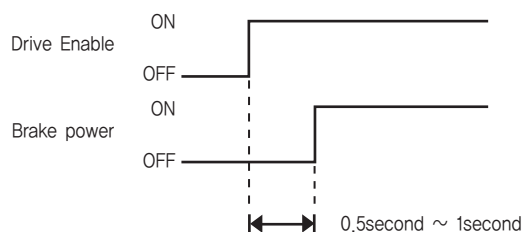
13. Dimensions of Motor with Brake [mm]
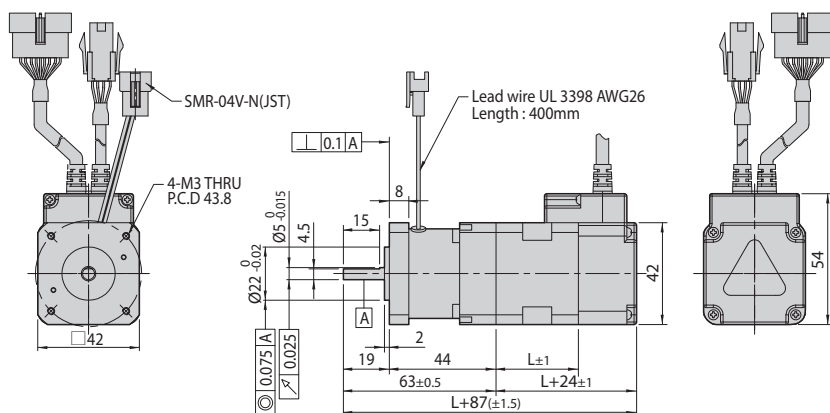
42mm

Model Name	Length(L)	Weight(kg)
EzM−42S	34	0.51
EzM−42M	40	0.57
EzM−42L	48	0.64
EzM−42XL	60	0.77

42mm

Unit Part Number	Maximum Holding Torque [N·m]	Rotor Inertia Moment [kg·m²]	Back-lash [min]	Angle Trans-mission Error [min]	Re-duction Gear Ratio	Resolution (10,000 [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]
Ezi-SERVO-MI-42S-■-PN3	0.55	35x10⁻⁷	3	5	3	0.012°	6	12	0~1000	0.89	240	270
Ezi-SERVO-MI-42S-■-PN5	0.92				5	0.0072°	9	18	0~600		290	330
Ezi-SERVO-MI-42S-■-PN8	1.47				8	0.0045°	9	18	0~375		340	410
Ezi-SERVO-MI-42S-■-PN10	1.84				10	0.0036°	6	12	0~300		360	450
Ezi-SERVO-MI-42S-■-PN15	2.67		5	7	15	0.0024°	6	12	0~200	0.99	410	540
Ezi-SERVO-MI-42S-■-PN25	4.46				25	0.00144°	9	18	0~120		490	640
Ezi-SERVO-MI-42S-■-PN40	7.13				40	0.0009°	9	18	0~75		570	640
Ezi-SERVO-MI-42S-■-PN50	9.00				50	0.00072°	9	18	0~60		620	640
Ezi-SERVO-MI-42M-■-PN3	0.85	54x10⁻⁷	3	5	3	0.012°	6	12	0~1000	0.96	240	270
Ezi-SERVO-MI-42M-■-PN5	1.42				5	0.0072°	9	18	0~600		290	330
Ezi-SERVO-MI-42M-■-PN8	2.28				8	0.0045°	9	18	0~375		340	410
Ezi-SERVO-MI-42M-■-PN10	2.85				10	0.0036°	6	12	0~300		360	450
Ezi-SERVO-MI-42M-■-PN15	4.14		5	7	15	0.0024°	6	12	0~200	1.06	410	540
Ezi-SERVO-MI-42M-■-PN25	6.90				25	0.00144°	9	18	0~120		490	640
Ezi-SERVO-MI-42M-■-PN40	9.00				40	0.0009°	9	18	0~75		570	640
Ezi-SERVO-MI-42M-■-PN50	9.00				50	0.00072°	9	18	0~60		620	640
Ezi-SERVO-MI-42L-■-PN3	0.93	77x10⁻⁷	3	5	3	0.012°	6	12	0~1000	1.02	240	270
Ezi-SERVO-MI-42L-■-PN5	1.55				5	0.0072°	9	18	0~600		290	330
Ezi-SERVO-MI-42L-■-PN8	2.48				8	0.0045°	9	18	0~375		340	410
Ezi-SERVO-MI-42L-■-PN10	3.10				10	0.0036°	6	12	0~300		360	450
Ezi-SERVO-MI-42L-■-PN15	4.51		5	7	15	0.0024°	6	12	0~200	1.12	410	540
Ezi-SERVO-MI-42L-■-PN25	7.52				25	0.00144°	9	18	0~120		490	640
Ezi-SERVO-MI-42L-■-PN40	9.00				40	0.0009°	9	18	0~75		570	640
Ezi-SERVO-MI-42L-■-PN50	9.00				50	0.00072°	9	18	0~60		620	640
Ezi-SERVO-MI-42XL-■-PN3	1.42	114x10⁻⁷	3	5	3	0.012°	6	12	0~1000	1.15	240	270
Ezi-SERVO-MI-42XL-■-PN5	2.38				5	0.0072°	9	18	0~600		290	330
Ezi-SERVO-MI-42XL-■-PN8	3.80				8	0.0045°	9	18	0~375		340	410
Ezi-SERVO-MI-42XL-■-PN10	4.76				10	0.0036°	6	12	0~300		360	450
Ezi-SERVO-MI-42XL-■-PN15	6.00		5	7	15	0.0024°	6	12	0~200	1.25	410	540
Ezi-SERVO-MI-42XL-■-PN25	9.00				25	0.00144°	9	18	0~120		490	640
Ezi-SERVO-MI-42XL-■-PN40	9.00				40	0.0009°	9	18	0~75		570	640
Ezi-SERVO-MI-42XL-■-PN50	9.00				50	0.00072°	9	18	0~60		620	640

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

42mm

Unit Part Number	Motor	Stage	□Reduction Gear Ratio	L Length [mm]
Ezi−SERVO−MI−42S−■−PN□	EzM−42S−■−PN□	Single Stage	3, 5, 8, 10	34
Ezi−SERVO−MI−42M−■−PN□	EzM−42M−■−PN□		3, 5, 8, 10	40
Ezi−SERVO−MI−42L−■−PN□	EzM−42L−■−PN□		3, 5, 8, 10	48
Ezi−SERVO−MI−42XL−■−PN□	EzM−42XL−■−PN□		3, 5, 8, 10	60

* The code of encoder resolution will be marked in " ■ "
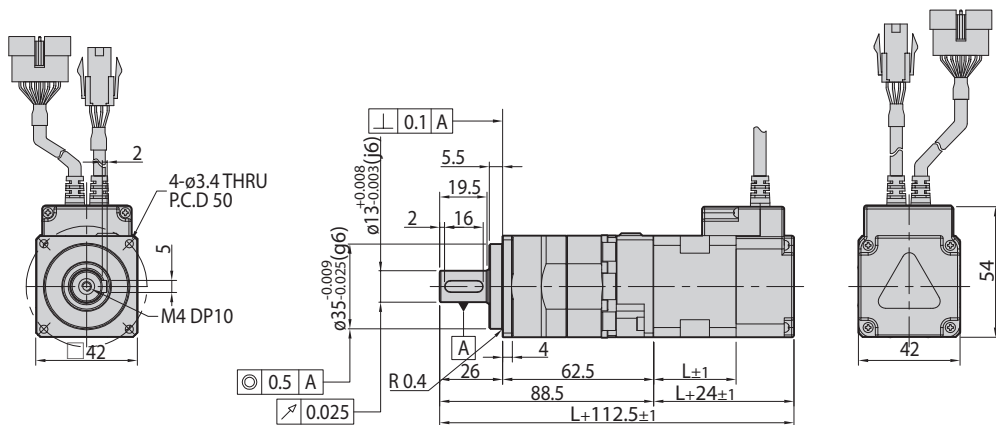
Unit Part Number	Motor	Stage	□Reduction Gear Ratio	L Length [mm]
Ezi−SERVO−MI−42S−■−PN□	EzM−42S−■−PN□	Double Stage	15, 25, 40, 50	34
Ezi−SERVO−MI−42M−■−PN□	EzM−42M−■−PN□		15, 25, 40, 50	40
Ezi−SERVO−MI−42L−■−PN□	EzM−42L−■−PN□		15, 25, 40, 50	48
Ezi−SERVO−MI−42XL−■−PN□	EzM−42XL−■−PN□		15, 25, 40, 50	60

* The code of encoder resolution will be marked in " ■ "
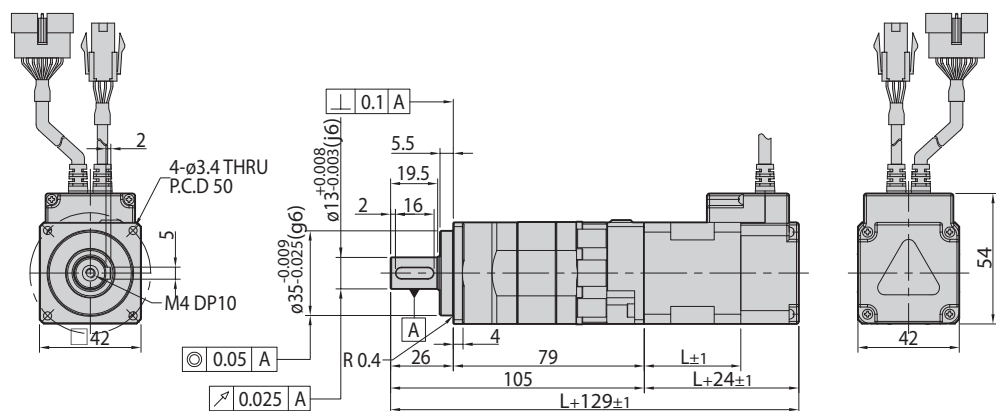
16. Settings and Operation

Drive status LED

Input/Output signal connection(CN1)

Encoder connection(CN2)

Motor connection(CN3)

Power connection(CN4)

In-Position value setting switch (SW1.1~1.4)

Resolution setting switch(SW1.5~1.8)

Pulse input setting switch(SW2.6)

Direction setting switch(SW2.5)

Position controller gain setting switch(SW2.1~2.4)
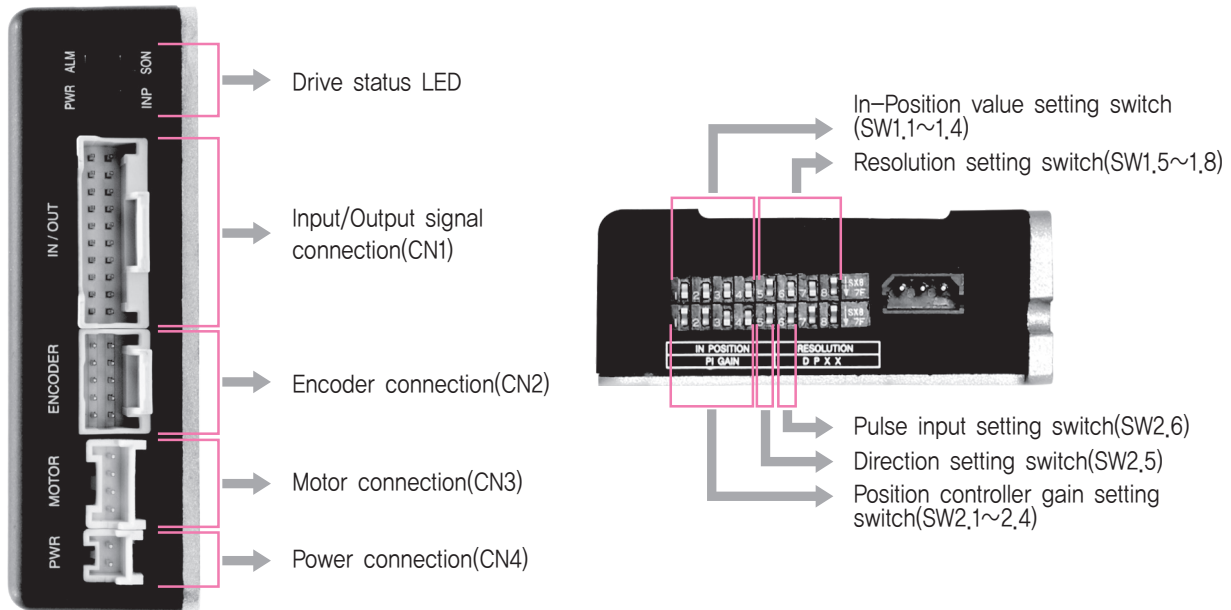
16.1 Drive Status LED

| Indication	Color	Function	ON/OFF Condition
PWR	Green	Power input indication	LED is turned ON when power is applied
INP	Yellow	Complete Positioning Motion	Lights On when Positioning error reaches within the preset pulse selected by dip switch
SON	Orange	Servo On/Off Indication	Servo On: Lights On, Servo Off: Lights Off
ALM	Red	Alarm indication	Flash when protection function is activated (Identifiable which protection mode is activated by counting the blinking times)

◆ Protection functions and LED flash times

Times	Protection	Conditions
1	Over Current Error	The current through power devices in inverter exceeds 4.8A
2	Over Speed Error	Motor speed exceeds 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 seconds under a load exceeding the max. torque
5	Over Temperature Error	Inside temperature of drive exceeds 85℃
6	Over Regenerated Voltage Error	Back-EMF is higher 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
11	System Error	Error occurs in drive system
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
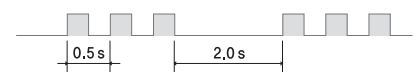
Alarm LED flash
(Ex, Position tracking error)

16.2 Pulse Input Setting Switch(SW2.6)

| Indication	Switch Name	Functions
P	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
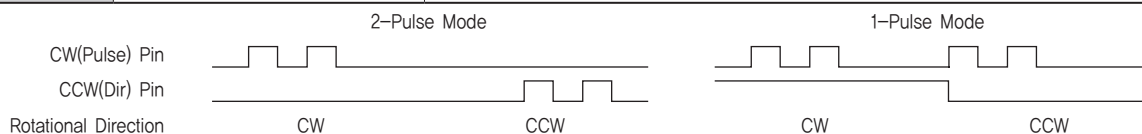
16.3 Rotational Direction Setting Switch(SW2.5)

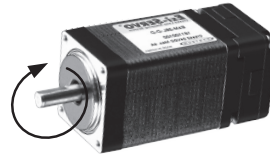| Indication	Switch Name	Functions
D	Switching Rotational Direction	Based on CW(+Dir signal) input to driver. ON: CCW(−Direction) OFF: CW(+Direction) ※ Default: CW mode

Direction setting switch: ON

CCW Dir.
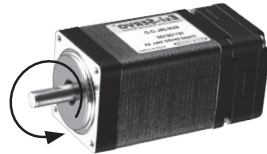
Direction setting switch: OFF

CW Dir.

16.4 Resolution Setting Switch(SW1.5~1.8)

The Number of pulse per revolution.

Position				Pulse/ Revolution	Position				Pulse/ Revolution
8	7	6	5		8	7	6	5	
ON	ON	ON	ON	500*1	OFF	ON	ON	ON	7,200
ON	ON	ON	OFF	500	OFF	ON	ON	OFF	10,000
ON	ON	OFF	ON	1,000	OFF	ON	OFF	ON	NC
ON	ON	OFF	OFF	1,600	OFF	ON	OFF	OFF	NC
ON	OFF	ON	ON	2,000	OFF	OFF	ON	ON	NC
ON	OFF	ON	OFF	3,600	OFF	OFF	ON	OFF	NC
ON	OFF	OFF	ON	5,000	OFF	OFF	OFF	ON	NC
ON	OFF	OFF	OFF	6,400	OFF	OFF	OFF	OFF	NC

*1 : Will be different according to the resolution of encoder adopted to the product.
     But in case of the encoder with 10,000[ppr] resolution, it will be set as 500.

※ When selected resolution is more than encoder resolution, motor shall be operated by microstep between pulse.

16.5 Position Controller Gain Settingn Switch(SW2.1~2.4)

The Position Controller Gain Switch allows for the correction of the motor position deviation after stopping caused by load and friction. Depending on the motor load, the user may have to select a different gain position to stabilize and to correct positional error quickly.

To tune the controller
1. Set the switch to "ON" position.
2. Start to rotate the switch until system becomes stable.
3. Rotate the switch 1~2 position to reach better performance.

Position				Time Constant of the Integral part	Proportional Gain*1
4	3	2	1		
ON	ON	ON	ON	1	1
ON	ON	ON	OFF	1	2
ON	ON	OFF	ON	1	3
ON	ON	OFF	OFF	1	4*2
ON	OFF	ON	ON	1	5
ON	OFF	ON	OFF	2	1
ON	OFF	OFF	ON	2	2
ON	OFF	OFF	OFF	2	3
OFF	ON	ON	ON	2	4
OFF	ON	ON	OFF	2	5
OFF	ON	OFF	ON	3	1
OFF	ON	OFF	OFF	3	2
OFF	OFF	ON	ON	3	3
OFF	OFF	ON	OFF	3	4
OFF	OFF	OFF	ON	3	5
OFF	OFF	OFF	OFF	3	6

*1 : Value in the columns are in relative units. They only show the parameter changes depending on the switch's position.
*2 : Default = ON ON OFF OFF

16.6 In-Position Value Setting Switch(SW1.1~1.4)

To select the output condition of In-Position signal. In-Position output signal is generated when the pulse number of positional error is lower than selected In-Position value set by this switch after positioning command is executed.

| Position				In-Position Value[Pulse]	Position				In-Position Value[Pulse]
4	3	2	1	Fast Response	4	3	2	1	Accurate Response
ON	ON	ON	ON	0[*1]	OFF	ON	ON	ON	0
ON	ON	ON	OFF	1	OFF	ON	ON	OFF	1
ON	ON	OFF	ON	2	OFF	ON	OFF	ON	2
ON	ON	OFF	OFF	3	OFF	ON	OFF	OFF	3
ON	OFF	ON	ON	4	OFF	OFF	ON	ON	4
ON	OFF	ON	OFF	5	OFF	OFF	ON	OFF	5
ON	OFF	OFF	ON	6	OFF	OFF	OFF	ON	6
ON	OFF	OFF	OFF	7	OFF	OFF	OFF	OFF	7

*1 : Default = 0

Setting method of Fast Response and Accurate Response
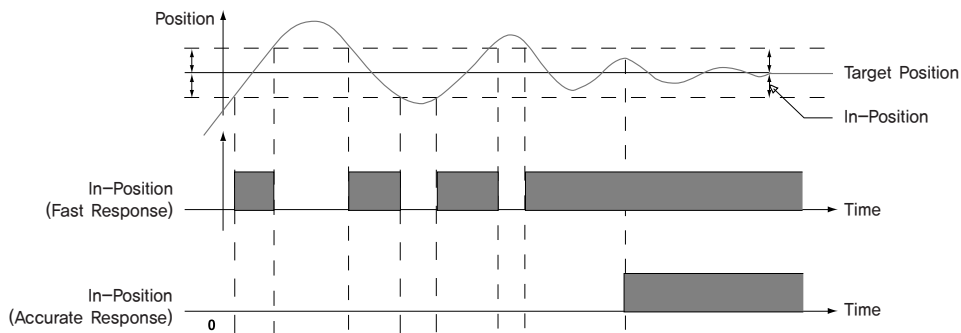
16.7 Input/Output Signal Connector(CN1)

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	Servo On/Off	Input
14	Alarm Reset	Input
15	NC	----
16	BRAKE+	Output
17	BRAKE-	Output
18	S-GND	Output
19	EXT_GND	Input
20	EXT_24VDC	Input
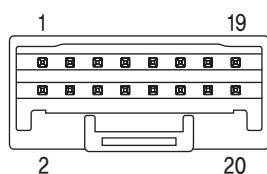
16.8 Encoder Connector(CN2)

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	----
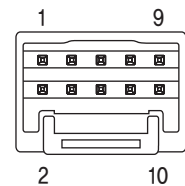
16.9 Motor Connector(CN3)

NO.	Function	I/O
1	B Phase	Output
2	/B Phase	Output
3	/A Phase	Output
4	A Phase	Output
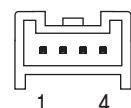
16.10 Power Connector(CN4)

NO.	Function	I/O
1	24VDC	Input
2	GND	Input
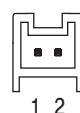
17. System Configuration
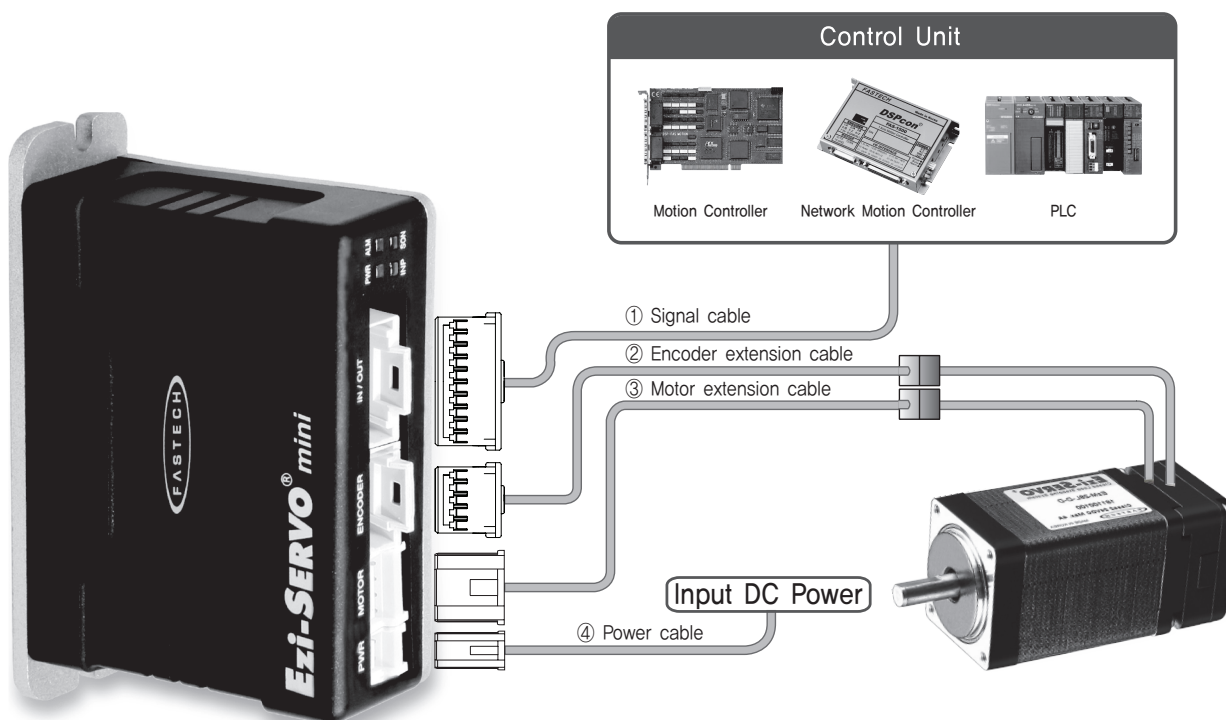
Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable
Length supplied	–	30cm	30cm	–
Max. Length	20m	20m	20m	2m

17.1 Options

① Signal Cable

Available to connect between Input/Output Control System and Ezi−SERVO MINI.

Item	Length [m]	Remark
CSVI−S−□□□F	□□□	Normal Cable
CSVI−S−□□□M	□□□	Robot Cable

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

③ Motor Extension Cable

Available to extended connection between motor and Ezi−SERVO MINI.

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.

② Encoder Extension Cable

Available to extended connection between Encoder and Ezi−SERVO MINI.

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.

④ Power Cable

Available to connect between Power and Ezi−SERVO MINI.

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.
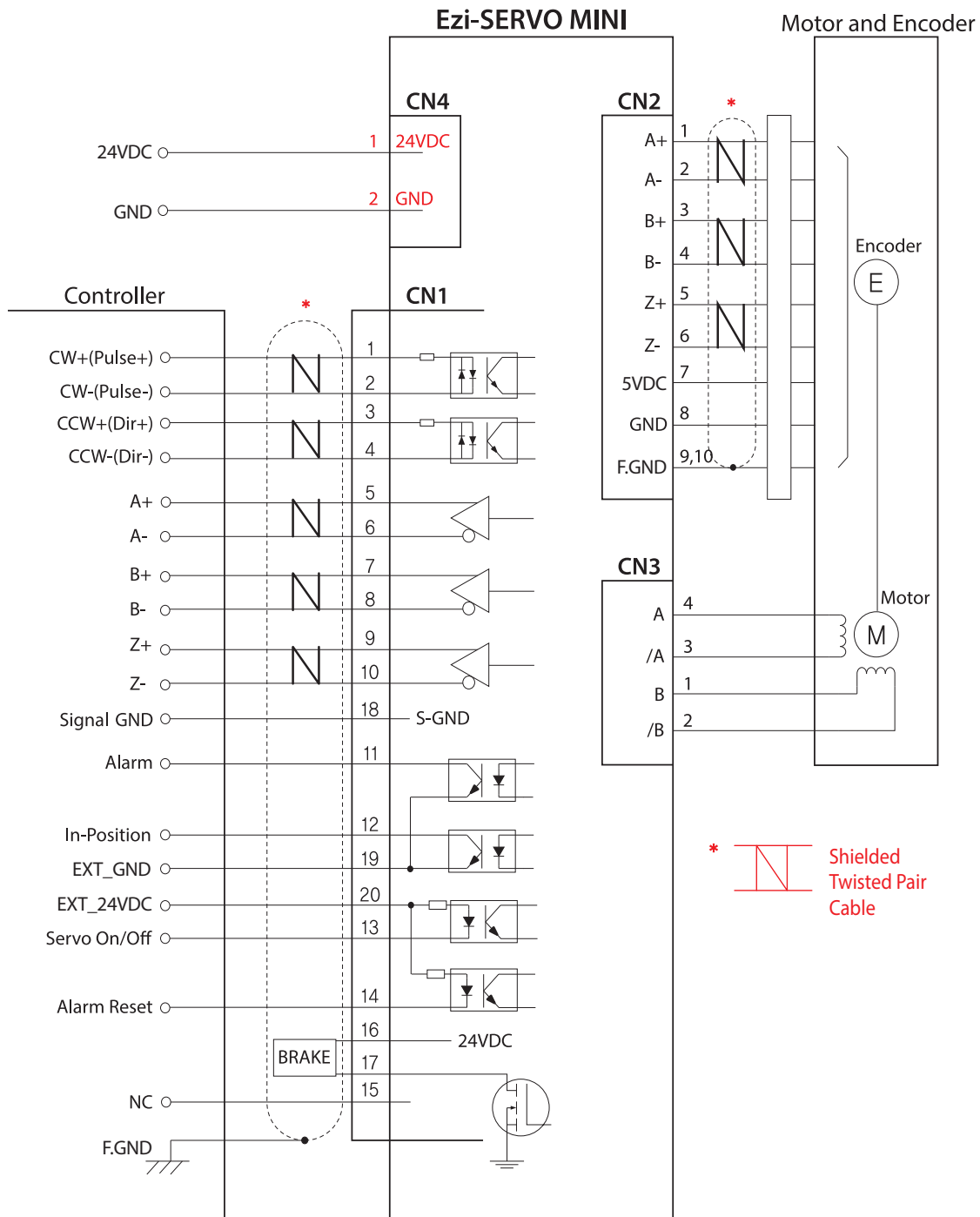
17.2 Connector Specifications

Connector specifications for cabling to drive.

Purpose		Item	Part Number	Manufacturer
Power (CN4)		Housing Terminal	PAP−02V−S SPHD−001T−P0.5	JST
Motor	Drive Side (CN3)	Housing Terminal	PAP−04V−S SPHD−001T−P0.5	JST
	Motor Side	Housing Terminal	5557−04R 5556T	MOLEX
Encoder	Drive Side (CN2)	Housing Terminal	501646−1000 501648−1000(AWG 26~28)	MOLEX
	Encoder Side	Housing Terminal	SMP−09V−NC SHF−001T−0.8BS	JST
Signal (CN1)		Housing Terminal	501646−2000 501648−1000(AWG 26~28)	MOLEX

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

Ezi-SERVO MINI

Motor and Encoder

CN4

1	24VDC
2	GND

24VDC

GND

Controller

CN1

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

CN2

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

Encoder
E

CN3

A	4
/A	3
B	1
/B	2

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.
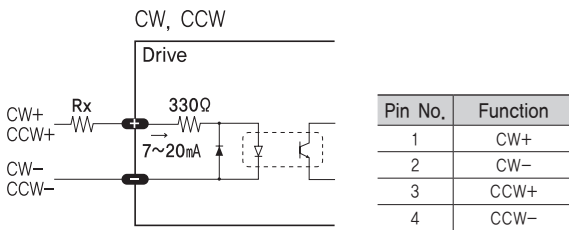
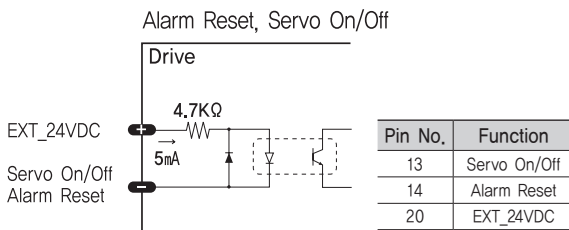# 19. Control Signal Input/Output Description

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

Pin No.	Function
1	CW+
2	CW−
3	CCW+
4	CCW−

Rx 330Ω, 7~20mA

◆ CW, CCW Input

This signal can be used to receive a positioning pulse command from a user's 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 connected 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 can be damaged. In the caseinput signal level is 12V, Rx value is 680ohm and 24V, Rx value is 1.8Kohm.

Alarm Reset, Servo On/Off

EXT_24VDC, 4.7KΩ, 5mA

| Pin No.	Function
13	Servo On/Off
14	Alarm Reset
20	EXT_24VDC

◆ Servo On/Off Input

This input can be used only to adjust the position by moving the motor shaft manually from the load−side.

By setting the signal [ON], the driver cuts off the power supplied to the motor. Then, output position can be adjusted manually. When setting the signal back to [OFF], the driver resumes to supply the power to the motor and recovers the holding torque. When driving a motor, the signal shall be set [OFF].
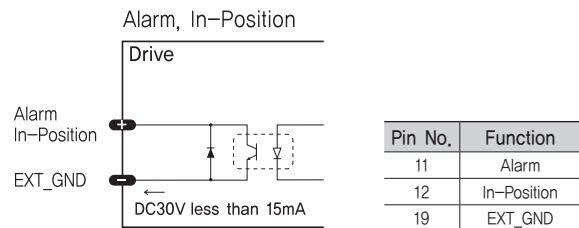
◆ Alarm Reset Input

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
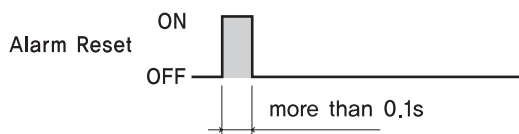
※ By setting the alarm reset input signal [ON], cancel the Alarm output. Before cancel the Alarm output, have to remove the source of alarm.

2. Output Signal

Output signals from the driver are photocoupler protected: Alarm, In−Position and the Line Driver Outputs (encoder signal). In the case of photocoupler outputs, the signal indicates the status of internal photocouplers [ON: conduction], [OFF: Non−conduction], not displaying the voltage levels of the signal.

Alarm, In−Position

Alarm In−Position, EXT_GND, DC30V less than 15mA

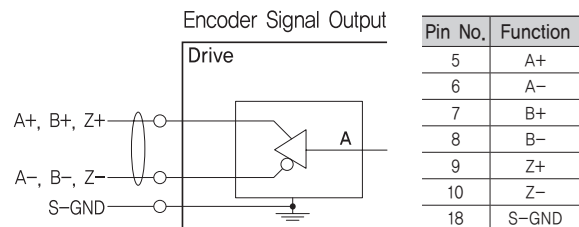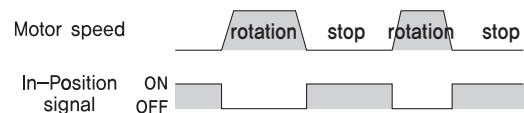| Pin No.	Function
11	Alarm
12	In−Position
19	EXT_GND

◆ Alarm Output

The Alarm output indicates [ON] when the driver is in a normal operation. If a protection mode has been activated, it goes [OFF]. User's 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]. On the contrary when the driver is in abnormal operation that start protection mode, the Alarm output is [OFF].

◆ 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.

Motor speed — rotation, stop, rotation, stop
In−Position signal — ON / OFF

Encoder Signal Output

A+, B+, Z+ / A−, B−, Z− / S−GND

Pin No.	Function
5	A+
6	A−
7	B+
8	B−
9	Z+
10	Z−
18	S−GND

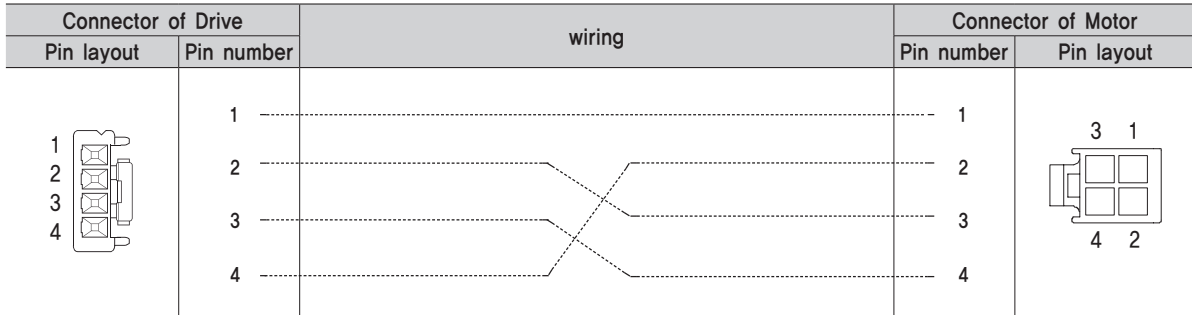### ◆ Encoder Signal Output

The encoder signal is a line driver output. This can be used to confirm the stop position.

Appendix

▪ Extension Cable for Motor
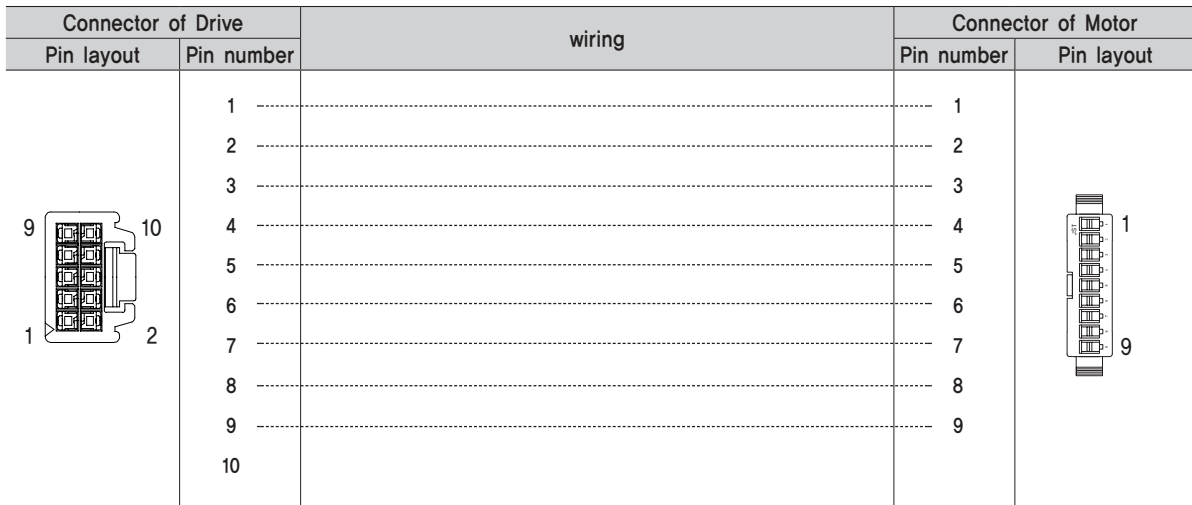
For cable extension between Motor and Drive.

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		1 2 3 4	3 1 4 2

▪ Extension Cable for Encoder

For cable extension between Encoder and Drive.

WIRING DIAGRAM

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

F A S T E C H

Fast, Accurate, Smooth Motion

FASTECH Co., Ltd.

Rm#1202, 401-dong, Bucheon Techno-Park,
655, Pyeongcheon-ro, Bucheon-si Gyeonggi-do,
Republic of Korea (Zip:14502)
TEL : +82-32-234-6300 FAX : +82-32-234-6302
E-mail : sales2@fastech.co.kr
Homepage : www.fastech.co.kr