

# Ezi-SERVO<sup>®</sup> CC-Link IE TSN

## Closed Loop Stepping System 4X

- CC-Link IE TSN-compatible Closed Loop Stepper System
- CiA402 Drive Profile
- Compact Multi-Axis Drive (Max. 4-Axis)
- Space Saving, Reduced Wiring
- Tuning Not Required, No Hunting
- High Resolution Encoder, Fast Response
- Low Heat Generation, High Torque

[Draft ver.]



Fast Accurate Smooth Motion

# **Ezi-SERVO<sup>®</sup>** CC-LinkIE TSN

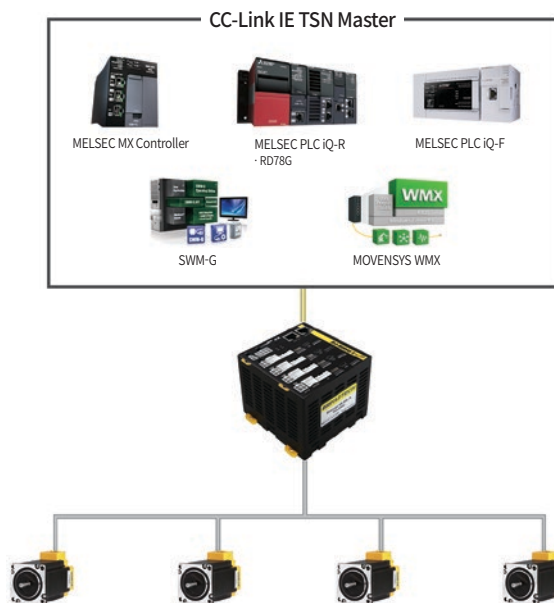
Closed Loop Stepping System **4X**



## CC-Link IE TSN-compatible Motion Control

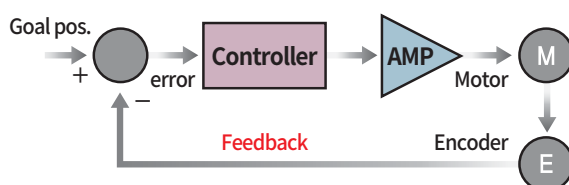
Ezi-SERVO CC-Link IE TSN 4X is stepper motor control system using CC-Link IE TSN, high speed Ethernet (1 Gbps Full-Duplex) based industrial network.

Ezi-SERVO CC-Link IE TSN 4X employs CiA402 drive profile and supports Profile Position Mode (PP Mode), Homing Mode (HM Mode) and Cyclic Synchronous Position Mode (CSP Mode).



## Closed-Loop System

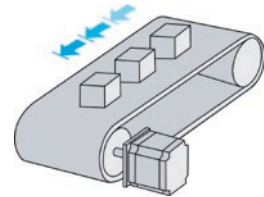
Ezi-SERVO is an innovative Closed-Loop System that utilizes a high-resolution motor mounted encoder constantly to monitor the current position. The encoder feedback allows the Ezi-SERVO to update the current position every 50  $\mu$ s. It allows the Ezi-SERVO drive to compensate for the loss of position, 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.



## Tuning Not Required

To ensure machine performance, 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.

Ezi-SERVO employs the best characteristics of the stepper motor to eliminate the need of tedious gain tuning required for conventional closed-loop servo systems. Ezi-SERVO is especially well suited for low-rigidity loads (e.g., a belt and pulley system) that sometimes require conventional servo systems to use the additional bulky and expensive gearbox.

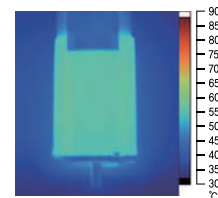


## Low Heat Generation / Energy Savings

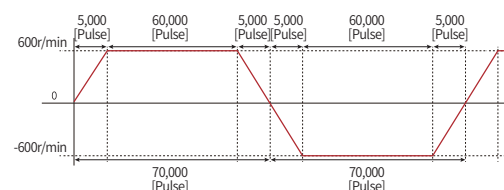
(Motor Current Control according to load)

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.

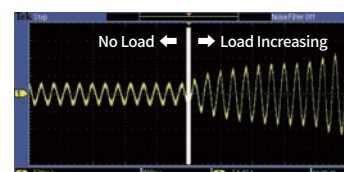


**Motor temperature** [Measured by Thermal Imaging Camera]



**Condition to measure the motor temperature**

[4 hours operation, Motor surface temperature saturation]



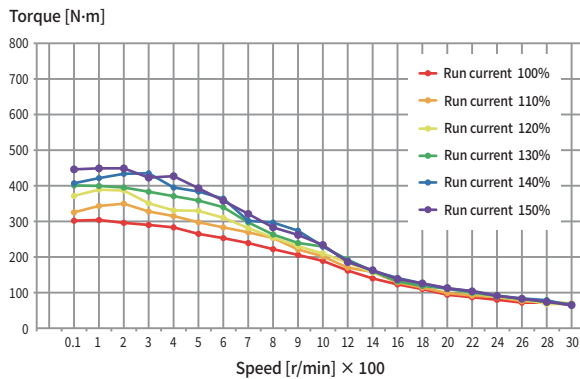
**Motor Current**

[Example of the Motor Current Control according to load]

## High Torque

### (Motor Voltage Increasing and Motor Current Setting)

Ezi-SERVO features an internal voltage boosting circuit that increases the motor supply voltage above the drive's input voltage. This elevated motor voltage enhances torque at high speeds and allows the run current to be set up to 150 %. As a result, torque is also improved at low speeds. Ezi-SERVO can achieve approximately 30 % torque improvement across the entire speed range.



※ Torque is improved by approximately 30 % at both low speeds.

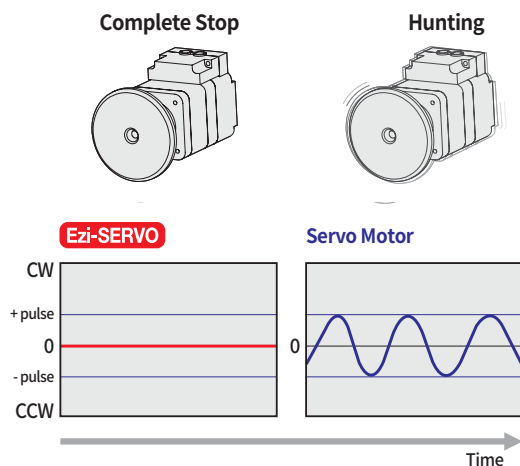
Measurement Condition: Drive = Ezi-SERVOV-CT-4X-42L

- Motor Voltage = 24 V DC
- Input Voltage = 24 V DC

## No Hunting

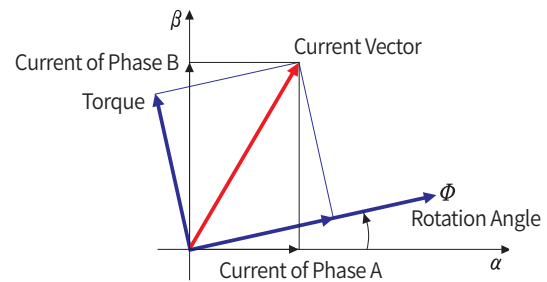
Ezi-SERVO utilizes the unique characteristics of stepper motors and locks itself into the desired target position, preventing vibration and eliminating Null Hunt which happens to the conventional servo systems.

This feature is especially useful in applications such as vision systems in which system oscillation and vibration could be a problem.



## Smooth and Accurate Operation

Ezi-SERVO is a high-precision servo drive, using a high-resolution encoder with 20,000 pulse/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.



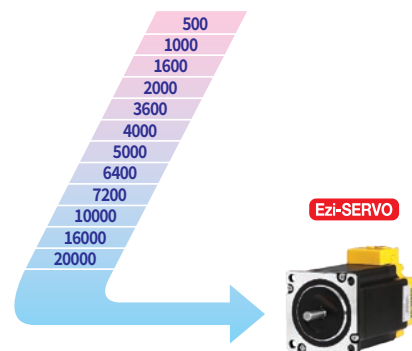
## Fast Response

Similar to conventional stepper 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.



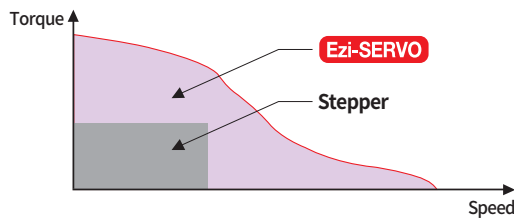
## High Resolution

The unit of the position command can be divided precisely. (Max. 20,000 pulse/revolution)



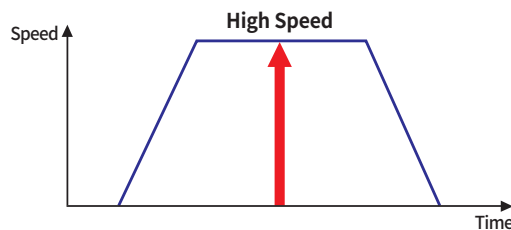
## High Torque / Continuous Operation

Compared with common stepper 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.



## High Speed

The Ezi-SERVO operates well at high speed without the loss of synchronism or positioning error. Ezi-SERVO's ability to monitor current position continuously enables the stepper motor to generate high torque, even under a 100 % load condition.



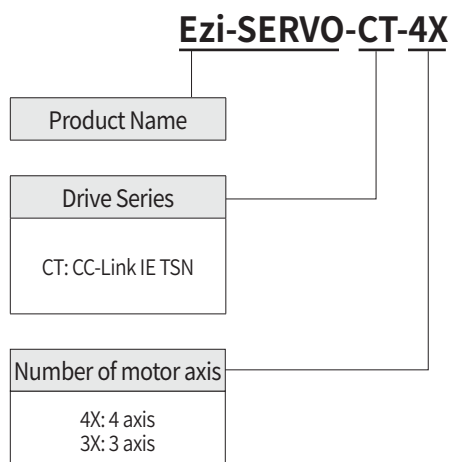
## Advantages over Open-Loop Stepper Systems

1. Reliable Positioning Control without loss of synchronism.
2. Excellent holding torque at standstill, 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 stepper drive 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 stepper drives use a constant current control at all speed ranges without considering load variations. (Max. Speed : 3,000 r/min)

## 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.

## Ezi-SERVO CC-Link IE TSN 4X Part Numbering



※ Ezi-SERVO CC-Link IE TSN 4X can connect up to 4 motors to one drive. Standard motors, motors with brake, and motors with gearbox can be connected, and different types of motors can be connected to each axis.

### Standard Motor

| Motor Model Number |
|--------------------|
| EzM2-20M-F         |
| EzM2-20L-F         |
| EzM2-28S-D         |
| EzM2-28SM-D        |
| EzM2-28M-D         |
| EzM2-28MM-D        |
| EzM2-28L-D         |
| EzM2-28LM-D        |
| EzM2-35M-D         |
| EzM2-35MM-D        |
| EzM2-35L-D         |
| EzM2-35LM-D        |
| EzM2-42S-A         |
| EzM2-42S-B         |
| EzM2-42M-A         |
| EzM2-42M-B         |
| EzM2-42L-A         |
| EzM2-42L-B         |
| EzM2-42XL-A        |
| EzM2-42XL-B        |

| Motor Model Number |
|--------------------|
| EzM2-56S-A         |
| EzM2-56S-B         |
| EzM2-56M-A         |
| EzM2-56M-B         |
| EzM2-56L-A         |
| EzM2-56L-B         |
| EzM2-60S-A         |
| EzM2-60S-B         |
| EzM2-60M-A         |
| EzM2-60M-B         |
| EzM2-60L-A         |
| EzM2-60L-B         |

### Combination with Brake

| Motor Model Number |
|--------------------|
| EzM2-42S-A-BK      |
| EzM2-42S-B-BK      |
| EzM2-42M-A-BK      |
| EzM2-42M-B-BK      |
| EzM2-42L-A-BK      |
| EzM2-42L-B-BK      |
| EzM2-42XL-A-BK     |
| EzM2-42XL-B-BK     |
| EzM2-56S-A-BK      |
| EzM2-56S-B-BK      |
| EzM2-56M-A-BK      |
| EzM2-56M-B-BK      |
| EzM2-56L-A-BK      |
| EzM2-56L-B-BK      |
| EzM2-60S-A-BK      |
| EzM2-60S-B-BK      |
| EzM2-60M-A-BK      |
| EzM2-60M-B-BK      |
| EzM2-60L-A-BK      |
| EzM2-60L-B-BK      |

※ When places an order for Stopper type 28 mm, 35 mm motor, please write "M" additionally after motor length of unit part number. (e.g., Ezi-SERVO-CT-4X-28LM-D, Ezi-SERVO-CT-4X-35LM-D)

## Combination with Gearbox

| Motor Model Number | Gear Ratio |
|--------------------|------------|
| EzM2-42S-A-PN3     | 1:3        |
| EzM2-42S-B-PN3     |            |
| EzM2-42S-A-PN5     | 1:5        |
| EzM2-42S-B-PN5     |            |
| EzM2-42S-A-PN8     | 1:8        |
| EzM2-42S-B-PN8     |            |
| EzM2-42S-A-PN10    | 1:10       |
| EzM2-42S-B-PN10    |            |
| EzM2-42S-A-PN15    | 1:15       |
| EzM2-42S-B-PN15    |            |
| EzM2-42S-A-PN25    | 1:25       |
| EzM2-42S-B-PN25    |            |
| EzM2-42S-A-PN40    | 1:40       |
| EzM2-42S-B-PN40    |            |
| EzM2-42S-A-PN50    | 1:50       |
| EzM2-42S-B-PN50    |            |
| EzM2-42M-A-PN3     | 1:3        |
| EzM2-42M-B-PN3     |            |
| EzM2-42M-A-PN5     | 1:5        |
| EzM2-42M-B-PN5     |            |
| EzM2-42M-A-PN8     | 1:8        |
| EzM2-42M-B-PN8     |            |
| EzM2-42M-A-PN10    | 1:10       |
| EzM2-42M-B-PN10    |            |
| EzM2-42M-A-PN15    | 1:15       |
| EzM2-42M-B-PN15    |            |
| EzM2-42M-A-PN25    | 1:25       |
| EzM2-42M-B-PN25    |            |
| EzM2-42M-A-PN40    | 1:40       |
| EzM2-42M-B-PN40    |            |
| EzM2-42M-A-PN50    | 1:50       |
| EzM2-42M-B-PN50    |            |
| EzM2-42L-A-PN3     | 1:3        |
| EzM2-42L-B-PN3     |            |
| EzM2-42L-A-PN5     | 1:5        |
| EzM2-42L-B-PN5     |            |
| EzM2-42L-A-PN8     | 1:8        |
| EzM2-42L-B-PN8     |            |
| EzM2-42L-A-PN10    | 1:10       |
| EzM2-42L-B-PN10    |            |
| EzM2-42L-A-PN15    | 1:15       |
| EzM2-42L-B-PN15    |            |
| EzM2-42L-A-PN25    | 1:25       |
| EzM2-42L-B-PN25    |            |
| EzM2-42L-A-PN40    | 1:40       |
| EzM2-42L-B-PN40    |            |
| EzM2-42L-A-PN50    | 1:50       |
| EzM2-42L-B-PN50    |            |
| EzM2-42XL-A-PN3    | 1:3        |
| EzM2-42XL-B-PN3    |            |
| EzM2-42XL-A-PN5    | 1:5        |
| EzM2-42XL-B-PN5    |            |
| EzM2-42XL-A-PN8    | 1:8        |
| EzM2-42XL-B-PN8    |            |
| EzM2-42XL-A-PN10   | 1:10       |
| EzM2-42XL-B-PN10   |            |
| EzM2-42XL-A-PN15   | 1:15       |
| EzM2-42XL-B-PN15   |            |
| EzM2-42XL-A-PN25   | 1:25       |
| EzM2-42XL-B-PN25   |            |
| EzM2-42XL-A-PN40   | 1:40       |
| EzM2-42XL-B-PN40   |            |
| EzM2-42XL-A-PN50   | 1:50       |
| EzM2-42XL-B-PN50   |            |

| Motor Model Number | Gear Ratio |
|--------------------|------------|
| EzM2-56S-A-PN3     | 1:3        |
| EzM2-56S-B-PN3     |            |
| EzM2-56S-A-PN5     | 1:5        |
| EzM2-56S-B-PN5     |            |
| EzM2-56S-A-PN8     | 1:8        |
| EzM2-56S-B-PN8     |            |
| EzM2-56S-A-PN10    | 1:10       |
| EzM2-56S-B-PN10    |            |
| EzM2-56S-A-PN15    | 1:15       |
| EzM2-56S-B-PN15    |            |
| EzM2-56S-A-PN25    | 1:25       |
| EzM2-56S-B-PN25    |            |
| EzM2-56S-A-PN40    | 1:40       |
| EzM2-56S-B-PN40    |            |
| EzM2-56S-A-PN50    | 1:50       |
| EzM2-56S-B-PN50    |            |
| EzM2-56M-A-PN3     | 1:3        |
| EzM2-56M-B-PN3     |            |
| EzM2-56M-A-PN5     | 1:5        |
| EzM2-56M-B-PN5     |            |
| EzM2-56M-A-PN8     | 1:8        |
| EzM2-56M-B-PN8     |            |
| EzM2-56M-A-PN10    | 1:10       |
| EzM2-56M-B-PN10    |            |
| EzM2-56M-A-PN15    | 1:15       |
| EzM2-56M-B-PN15    |            |
| EzM2-56M-A-PN25    | 1:25       |
| EzM2-56M-B-PN25    |            |
| EzM2-56M-A-PN40    | 1:40       |
| EzM2-56M-B-PN40    |            |
| EzM2-56M-A-PN50    | 1:50       |
| EzM2-56M-B-PN50    |            |
| EzM2-56L-A-PN3     | 1:3        |
| EzM2-56L-B-PN3     |            |
| EzM2-56L-A-PN5     | 1:5        |
| EzM2-56L-B-PN5     |            |
| EzM2-56L-A-PN8     | 1:8        |
| EzM2-56L-B-PN8     |            |
| EzM2-56L-A-PN10    | 1:10       |
| EzM2-56L-B-PN10    |            |
| EzM2-56L-A-PN15    | 1:15       |
| EzM2-56L-B-PN15    |            |
| EzM2-56L-A-PN25    | 1:25       |
| EzM2-56L-B-PN25    |            |
| EzM2-56L-A-PN40    | 1:40       |
| EzM2-56L-B-PN40    |            |
| EzM2-56L-A-PN50    | 1:50       |
| EzM2-56L-B-PN50    |            |

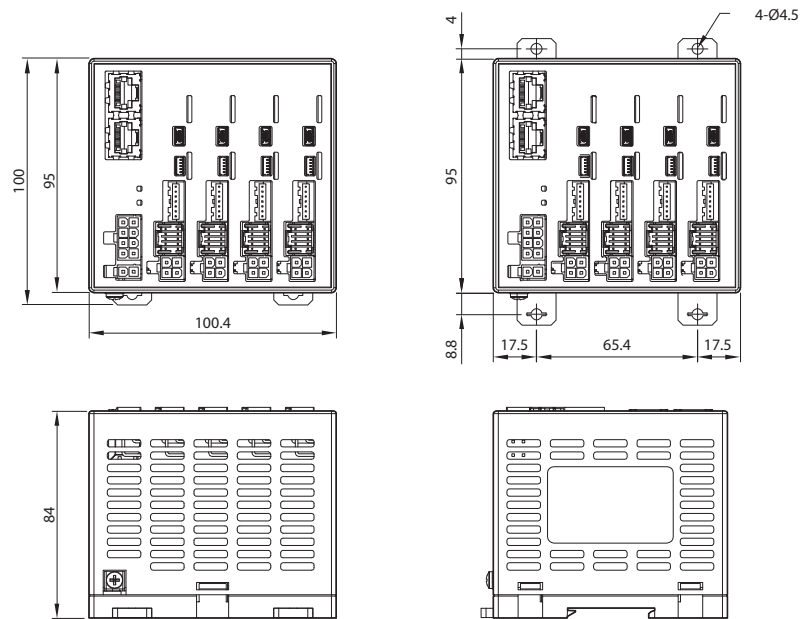
| Motor Model Number | Gear Ratio |
|--------------------|------------|
| EzM2-60S-A-PN3     | 1:3        |
| EzM2-60S-B-PN3     |            |
| EzM2-60S-A-PN5     | 1:5        |
| EzM2-60S-B-PN5     |            |
| EzM2-60S-A-PN8     | 1:8        |
| EzM2-60S-B-PN8     |            |
| EzM2-60S-A-PN10    | 1:10       |
| EzM2-60S-B-PN10    |            |
| EzM2-60S-A-PN15    | 1:15       |
| EzM2-60S-B-PN15    |            |
| EzM2-60S-A-PN25    | 1:25       |
| EzM2-60S-B-PN25    |            |
| EzM2-60S-A-PN40    | 1:40       |
| EzM2-60S-B-PN40    |            |
| EzM2-60S-A-PN50    | 1:50       |
| EzM2-60S-B-PN50    |            |
| EzM2-60M-A-PN3     | 1:3        |
| EzM2-60M-B-PN3     |            |
| EzM2-60M-A-PN5     | 1:5        |
| EzM2-60M-B-PN5     |            |
| EzM2-60M-A-PN8     | 1:8        |
| EzM2-60M-B-PN8     |            |
| EzM2-60M-A-PN10    | 1:10       |
| EzM2-60M-B-PN10    |            |
| EzM2-60M-A-PN15    | 1:15       |
| EzM2-60M-B-PN15    |            |
| EzM2-60M-A-PN25    | 1:25       |
| EzM2-60M-B-PN25    |            |
| EzM2-60M-A-PN40    | 1:40       |
| EzM2-60M-B-PN40    |            |
| EzM2-60M-A-PN50    | 1:50       |
| EzM2-60M-B-PN50    |            |
| EzM2-60L-A-PN3     | 1:3        |
| EzM2-60L-B-PN3     |            |
| EzM2-60L-A-PN5     | 1:5        |
| EzM2-60L-B-PN5     |            |
| EzM2-60L-A-PN8     | 1:8        |
| EzM2-60L-B-PN8     |            |
| EzM2-60L-A-PN10    | 1:10       |
| EzM2-60L-B-PN10    |            |
| EzM2-60L-A-PN15    | 1:15       |
| EzM2-60L-B-PN15    |            |
| EzM2-60L-A-PN25    | 1:25       |
| EzM2-60L-B-PN25    |            |
| EzM2-60L-A-PN40    | 1:40       |
| EzM2-60L-B-PN40    |            |
| EzM2-60L-A-PN50    | 1:50       |
| EzM2-60L-B-PN50    |            |

## Specifications of Drive

| Motor Model         |                        | EzM2-20 series                                                                                                                                                                                                                                                             | EzM2-28 series | EzM2-35 series                | EzM2-42 series | EzM2-56 series | EzM2-60 series                              |
|---------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------|----------------|----------------|---------------------------------------------|
| Drive Model         |                        | EzS2-CT-4X, 3X series                                                                                                                                                                                                                                                      |                |                               |                |                |                                             |
| Input Voltage       |                        | 24 V DC $\pm$ 10 %                                                                                                                                                                                                                                                         |                |                               |                |                |                                             |
| Control Method      |                        | Closed loop control with 32bit MCU                                                                                                                                                                                                                                         |                |                               |                |                |                                             |
| Current Consumption |                        | Max. 500 mA/axis (Except motor current)                                                                                                                                                                                                                                    |                |                               |                |                |                                             |
| Operating Condition | Ambient Temperature    | · In Use: 0 ~ 50 °C<br>· In Storage: -20 ~ 70 °C                                                                                                                                                                                                                           |                |                               |                |                |                                             |
|                     | Humidity               | · In Use: 35 ~ 85 % RH (Non-Condensing)<br>· In Storage: 10 ~ 90 % RH (Non-Condensing)                                                                                                                                                                                     |                |                               |                |                |                                             |
|                     | Vib. Resist.           | 0.5 g                                                                                                                                                                                                                                                                      |                |                               |                |                |                                             |
| Function            | Rotation Speed         | 0 ~ 3,000 r/min <sup>*1</sup>                                                                                                                                                                                                                                              |                |                               |                |                |                                             |
|                     | Resolution             | Encoder Resolution [P/R]                                                                                                                                                                                                                                                   |                | Configurable Resolution [P/R] |                |                |                                             |
|                     |                        | 4,000                                                                                                                                                                                                                                                                      |                | 500                           | 1,000          | 1,600          | 2,000 3,600 4,000 5,000 6,400 7,200 10,000  |
|                     |                        | 10,000                                                                                                                                                                                                                                                                     |                | 500                           | 1,000          | 1,600          | 2,000 3,600 5,000 6,400 7,200 10,000        |
|                     |                        | 16,000                                                                                                                                                                                                                                                                     |                | 500                           | 1,000          | 1,600          | 2,000 3,600 5,000 6,400 7,200 10,000 16,000 |
|                     |                        | 20,000                                                                                                                                                                                                                                                                     |                | 500                           | 1,000          | 1,600          | 2,000 3,600 5,000 6,400 7,200 10,000 20,000 |
|                     |                        | (Selectable by parameter)                                                                                                                                                                                                                                                  |                |                               |                |                |                                             |
| CC-Link IE TSN      | Error Type             | Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperature Error, Over Regenerative Voltage Error, Motor Connection Error, Encoder Connection Error, Main Power Voltage Error, In-Position Error, ROM Error, Position Overflow Error |                |                               |                |                |                                             |
|                     | LED Display            | Power status, In-Position status, Servo On status, Alarm status                                                                                                                                                                                                            |                |                               |                |                |                                             |
|                     | Communication Protocol | CC-Link IE TSN Class B                                                                                                                                                                                                                                                     |                |                               |                |                |                                             |
| I/O Signal          | Operation Mode         | CiA402 Drive Profile: Cyclic Synchronous Position Mode(CSP), Profile Position Mode(PP), Homing Mode(HM)                                                                                                                                                                    |                |                               |                |                |                                             |
|                     | Synchronization        | Minimum Cycle Time: 250 $\mu$ s / Synchronous Comm. (CSP, PP, HM) / Asynchronous Comm. (PP, HM)                                                                                                                                                                            |                |                               |                |                |                                             |
|                     | Input Signals          | 3 dedicated inputs (LIMIT+, LIMIT-, ORIGIN) for each axis                                                                                                                                                                                                                  |                |                               |                |                |                                             |
| I/O Signal          | Output Signals         | 1 brake signal output for each axis                                                                                                                                                                                                                                        |                |                               |                |                |                                             |

<sup>\*1</sup>: Up to the resolution of 10,000 P/R, maximum speed can be reached by 3,000 r/min and with the resolution more than 10,000 P/R, maximum speed shall be reduced accordingly.

## Dimensions of Drive [mm]



※ Can be installed on DIN Rail. (35 mm)

※ Outer dimension of Ezi-SERVO CC-Link IE TSN 3X drive is the same as Ezi-SERVO CC-Link IE TSN 4X drive.

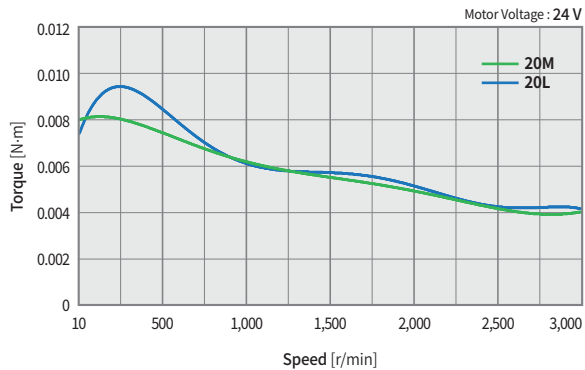
## Specifications of Motor

| MODEL                   |                            |       | EzM2-20 series      |                                                                      | EzM2-28 series |       |       | EzM2-35 series |       | EzM2-42 series |       |       |       |       |
|-------------------------|----------------------------|-------|---------------------|----------------------------------------------------------------------|----------------|-------|-------|----------------|-------|----------------|-------|-------|-------|-------|
|                         |                            |       | UNIT                | 20M                                                                  | 20L            | 28S   | 28M   | 28L            | 35M   | 35L            | 42S   | 42M   | 42L   | 42XL  |
| Drive method            |                            |       | -                   | Bipolar                                                              |                |       |       |                |       |                |       |       |       |       |
| Number of phase         |                            |       | -                   | 2 Phase                                                              |                |       |       |                |       |                |       |       |       |       |
| Current per Phase       |                            |       | A/Phase             | 0.5                                                                  | 0.5            | 0.95  | 0.95  | 0.95           | 1.5   | 1.5            | 1.2   | 1.2   | 1.2   | 1.2   |
| Maximum 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 · cm <sup>2</sup> | 2.5                                                                  | 3.3            | 9.0   | 13    | 18             | 15    | 20             | 35    | 54    | 77    | 114   |
| Weight                  |                            |       | kg                  | 0.080                                                                | 0.104          | 0.147 | 0.204 | 0.232          | 0.194 | 0.226          | 0.294 | 0.357 | 0.426 | 0.564 |
| Length (L)              |                            |       | mm                  | 28                                                                   | 38             | 32    | 45    | 50             | 32    | 36             | 34    | 40    | 48    | 60    |
| Permissible Radial Load | Distance From End of Shaft | 3 mm  | N                   | 18                                                                   | 18             | 30    | 30    | 30             | 22    | 22             | 22    | 22    | 22    | 22    |
|                         |                            | 8 mm  |                     | 30                                                                   | 30             | 38    | 38    | 38             | 26    | 26             | 26    | 26    | 26    |       |
|                         |                            | 13 mm |                     | -                                                                    | -              | 53    | 53    | 53             | 33    | 33             | 33    | 33    | 33    |       |
|                         |                            | 18 mm |                     | -                                                                    | -              | -     | -     | -              | 46    | 46             | 46    | 46    | 46    |       |
| Permissible Axial Load  |                            |       | N                   | Lower than motor unit's weight                                       |                |       |       |                |       |                |       |       |       |       |
| Insulation Resistance   |                            |       | MΩ                  | Min. 100 (When measured with a 500 V DC insulation resistance meter) |                |       |       |                |       |                |       |       |       |       |
| Insulation Class        |                            |       | -                   | Class B (130 °C)                                                     |                |       |       |                |       |                |       |       |       |       |
| Operating Temperature   |                            |       | °C                  | 0 ~ 55                                                               |                |       |       |                |       |                |       |       |       |       |

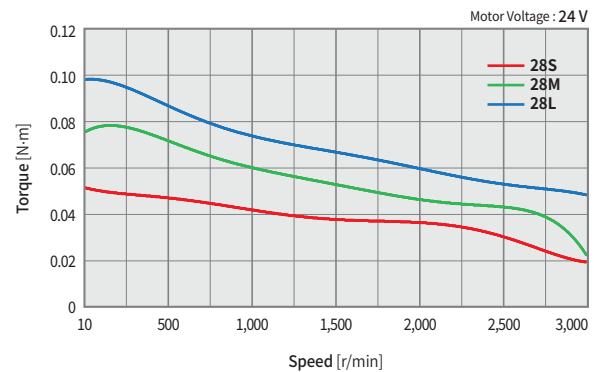
| MODEL                   |                            |       | EzM2-56 series      |                                                                      |       | EzM2-60 series |       |       |       |
|-------------------------|----------------------------|-------|---------------------|----------------------------------------------------------------------|-------|----------------|-------|-------|-------|
|                         |                            |       | UNIT                | 56S                                                                  | 56M   | 56L            | 60S   | 60M   | 60L   |
| Drive method            |                            |       | -                   | Bipolar                                                              |       |                |       |       |       |
| Number of phase         |                            |       | -                   | 2 Phase                                                              |       |                |       |       |       |
| Current per Phase       |                            |       | A/Phase             | 3.0                                                                  | 3.0   | 3.0            | 4.0   | 4.0   | 4.0   |
| Maximum Holding Torque  |                            |       | N · m               | 0.64                                                                 | 1.0   | 1.5            | 0.88  | 1.28  | 2.4   |
| Rotor Inertia           |                            |       | g · cm <sup>2</sup> | 180                                                                  | 280   | 520            | 240   | 490   | 690   |
| Weight                  |                            |       | kg                  | 0.608                                                                | 0.784 | 1.230          | 0.693 | 0.856 | 1.419 |
| Length (L)              |                            |       | mm                  | 46                                                                   | 55    | 80             | 47    | 56    | 85    |
| Permissible Radial Load | Distance From End of Shaft | 3 mm  | N                   | 52                                                                   | 52    | 52             | 70    | 70    | 70    |
|                         |                            | 8 mm  |                     | 65                                                                   | 65    | 65             | 87    | 87    | 87    |
|                         |                            | 13 mm |                     | 85                                                                   | 85    | 85             | 114   | 114   | 114   |
|                         |                            | 18 mm |                     | 123                                                                  | 123   | 123            | 165   | 165   | 165   |
| Permissible Axial Load  |                            |       | N                   | Lower than motor unit's weight                                       |       |                |       |       |       |
| Insulation Resistance   |                            |       | MΩ                  | Min. 100 (When measured with a 500 V DC insulation resistance meter) |       |                |       |       |       |
| Insulation Class        |                            |       | -                   | Class B (130 °C)                                                     |       |                |       |       |       |
| Operating Temperature   |                            |       | °C                  | 0 ~ 55                                                               |       |                |       |       |       |

## Torque Characteristics of Motor

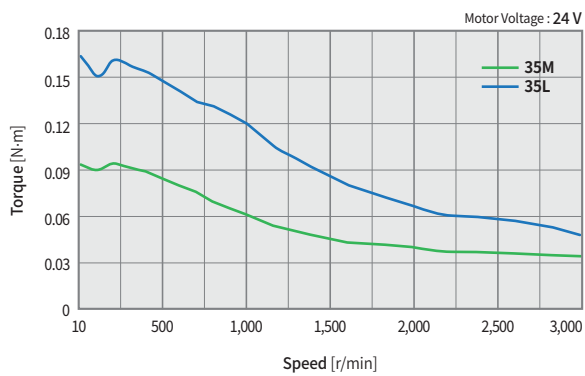
Ezi-SERVO-CT-4X-20 series



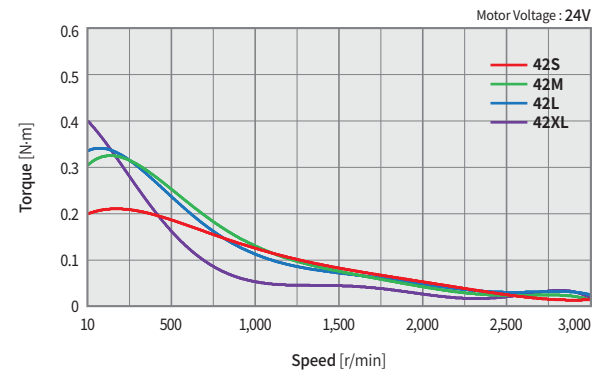
Ezi-SERVO-CT-4X-28 series



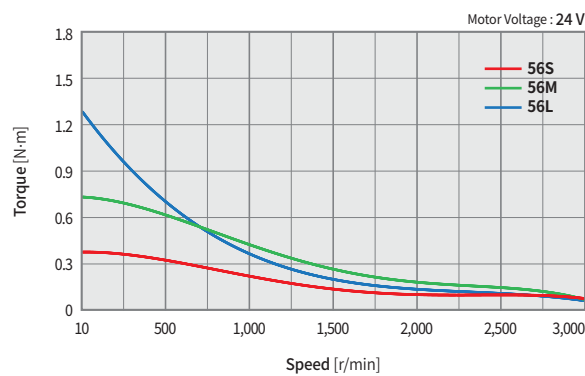
Ezi-SERVO-CT-4X-35 series



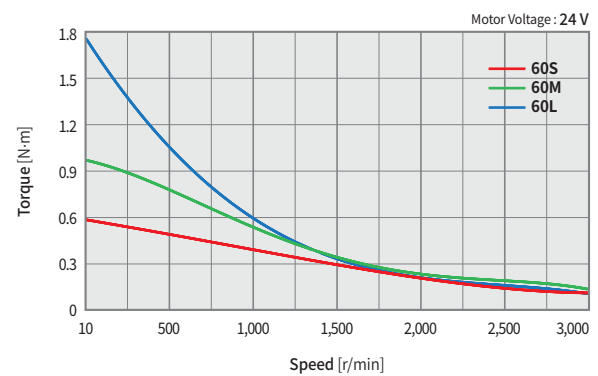
Ezi-SERVO-CT-4X-42 series



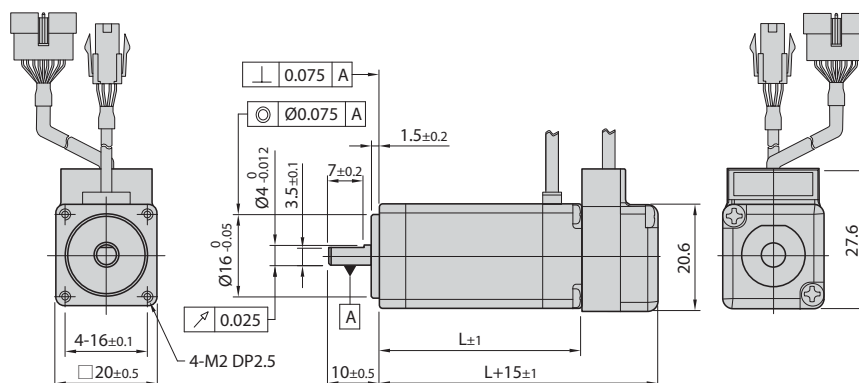
Ezi-SERVO-CT-4X-56 series



Ezi-SERVO-CT-4X-60 series

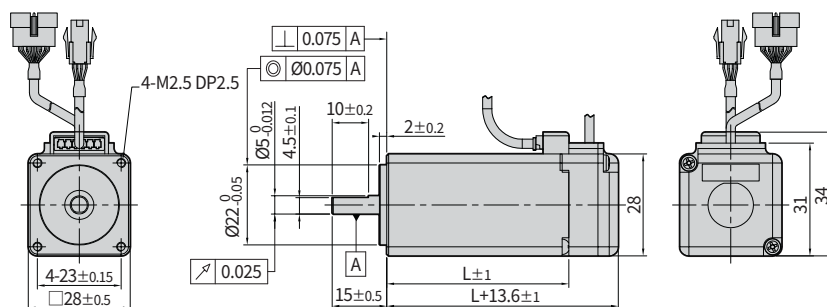


## Dimensions of Motor [mm]



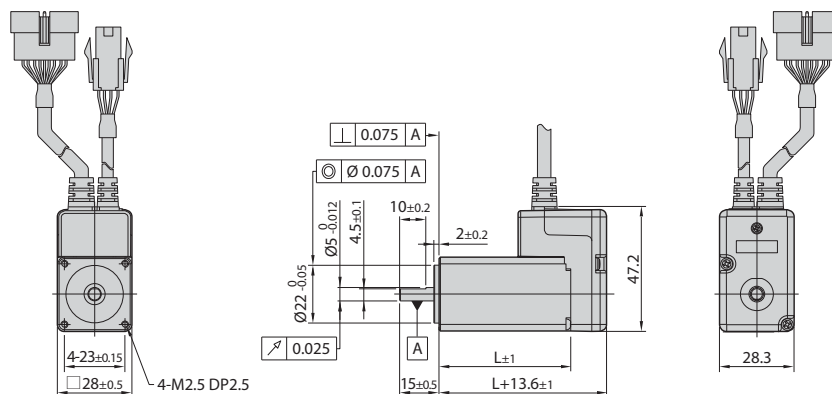
### 20 mm

| Model name | Length (L) |
|------------|------------|
| EzM2-20M   | 27.3       |
| EzM2-20L   | 37.6       |



### 28 mm

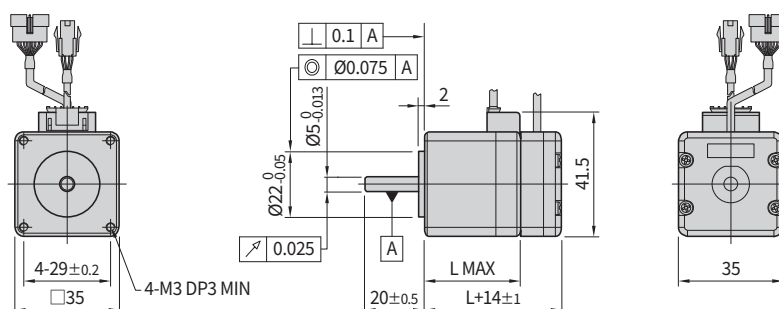
| Model name | Length (L) |
|------------|------------|
| EzM2-28S   | 32         |
| EzM2-28M   | 45         |
| EzM2-28L   | 50         |



### 28 mm (Stopper type)

| Model name | Length (L) |
|------------|------------|
| EzM2-28SM  | 32         |
| EzM2-28MM  | 45         |
| EzM2-28LM  | 50         |

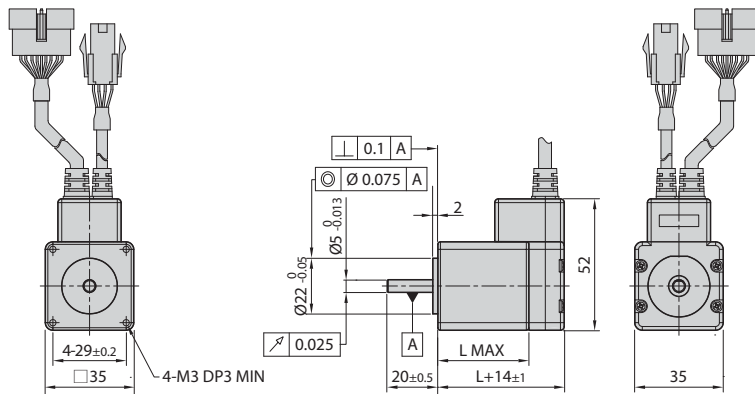
※ When ordering 28 mm Stopper type of motor, please add "M" after standard motor model number.



### 35 mm

| Model name | Length (L) |
|------------|------------|
| EzM2-35M   | 32         |
| EzM2-35L   | 36         |

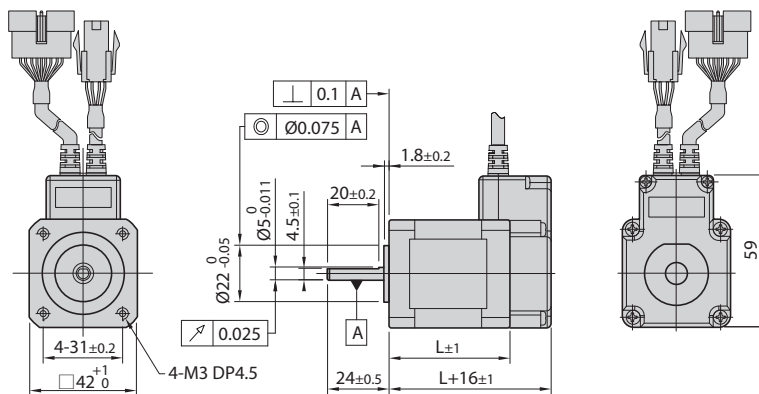
## Dimensions of Motor [mm]



### 35 mm (Stopper type)

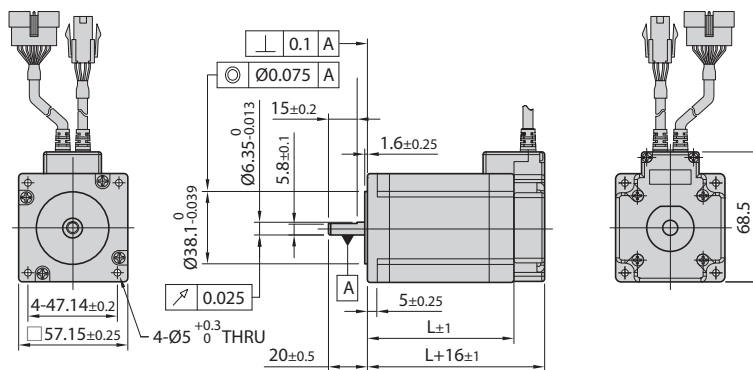
| Model name | Length (L) |
|------------|------------|
| EzM2-35MM  | 32         |
| EzM2-35LM  | 36         |

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



### 42 mm

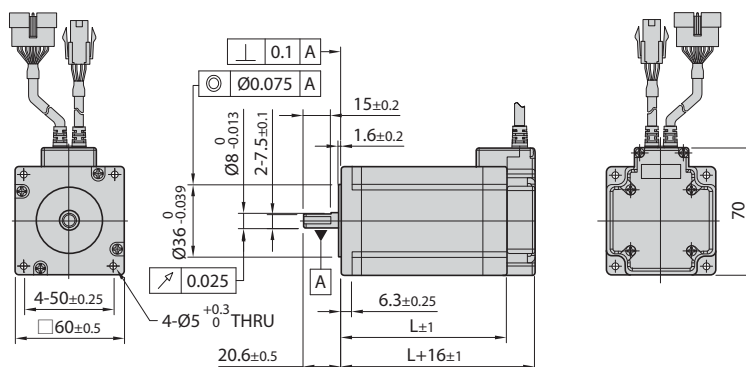
| Model name | Length (L) |
|------------|------------|
| EzM2-42S   | 34         |
| EzM2-42M   | 40         |
| EzM2-42L   | 48         |
| EzM2-42XL  | 60         |



### 56 mm

| Model name | Length (L) |
|------------|------------|
| EzM2-56S   | 46         |
| EzM2-56M   | 55         |
| EzM2-56L   | 80         |

※ There are 2 kinds of size of front shaft diameter for EzM2-56 series as Ø 6.35 and Ø 8.0



### 60 mm

| Model name | Length (L) |
|------------|------------|
| EzM2-60S   | 47         |
| EzM2-60M   | 56         |
| EzM2-60L   | 85         |

## Specifications of Motor with Brake

| Motor Model Number | Electromagnetic Brake   |                   |                   |                       |                              | Motor Unit Weight [kg] | Permissible Radial Load [N]     |    |     |     | Permissible Axial Load [N]           |
|--------------------|-------------------------|-------------------|-------------------|-----------------------|------------------------------|------------------------|---------------------------------|----|-----|-----|--------------------------------------|
|                    | Type                    | Voltage Input [V] | Rated Current [A] | Power Consumption [W] | Static Friction Torque [N·m] |                        | Distance from End of Shaft [mm] |    |     |     |                                      |
|                    |                         |                   |                   |                       |                              |                        | 3                               | 8  | 13  | 18  |                                      |
| EzM2-42S-■-BK      | Non-excitation run Type | 24 V DC<br>± 10 % | 0.2               | 5                     | 0.2                          | 0.55                   | 22                              | 26 | 33  | 46  | Must be Lower than Motor Unit Weight |
| EzM2-42M-■-BK      |                         |                   |                   |                       |                              | 0.62                   |                                 |    |     |     |                                      |
| EzM2-42L-■-BK      |                         |                   |                   |                       |                              | 0.69                   |                                 |    |     |     |                                      |
| EzM2-42XL-■-BK     |                         |                   |                   |                       |                              | 0.82                   |                                 |    |     |     |                                      |
| EzM2-56S-■-BK      |                         |                   | 0.27              | 6.6                   | 0.7                          | 1.03                   | 52                              | 65 | 85  | 123 |                                      |
| EzM2-56M-■-BK      |                         |                   |                   |                       |                              | 1.20                   |                                 |    |     |     |                                      |
| EzM2-56L-■-BK      |                         |                   |                   |                       |                              | 1.65                   |                                 |    |     |     |                                      |
| EzM2-60S-■-BK      |                         |                   |                   |                       |                              | 1.11                   | 70                              | 87 | 114 | 165 |                                      |
| EzM2-60M-■-BK      |                         |                   |                   |                       |                              | 1.30                   |                                 |    |     |     |                                      |
| EzM2-60L-■-BK      |                         |                   |                   |                       |                              | 1.86                   |                                 |    |     |     |                                      |

\* The code of encoder resolution is marked in "■".

\* Electromagnetic Brake cannot be used for braking. Position hold purpose only when power OFF.

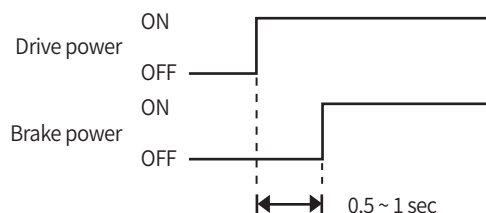
\* The weight means Motor Unit Weight including Motor and Electromagnetic Brake.

\* Motor Model Number is combined model name of Motor and Brake.

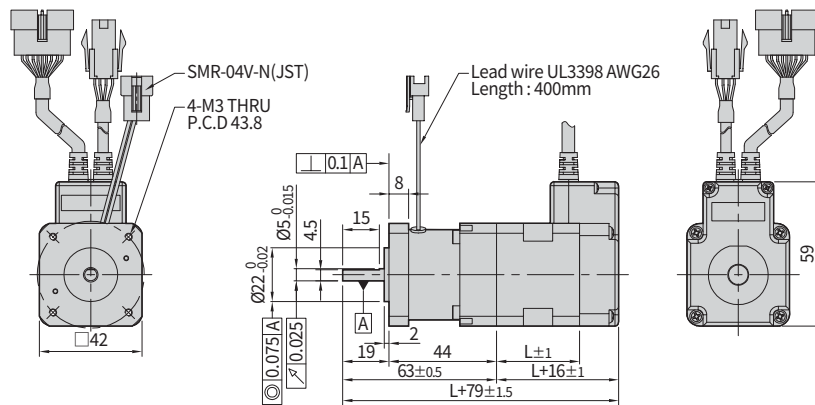
\* Motor specification and torque characteristic are same as Standard Motor.

### \* Brake Operation Timing Chart

Ezi-SERVO CC-Link IE TSN 4X controls Brake by Drive automatically. Please refer to timing chart on the right when Brake is controlled by the upper controller other than using Ezi-SERVO CC-Link IE TSN 4X Brake control. Otherwise, Drive might malfunction and loads might fall down. Also, please do not operate Brake during motor operation to prevent damage.

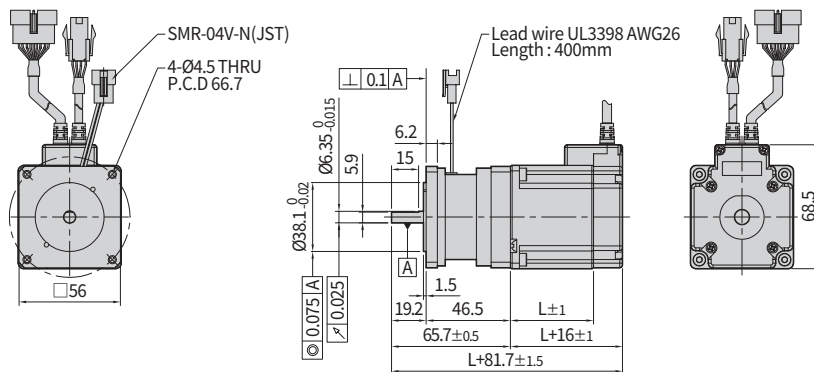


## Dimensions of Motor with Brake [mm]



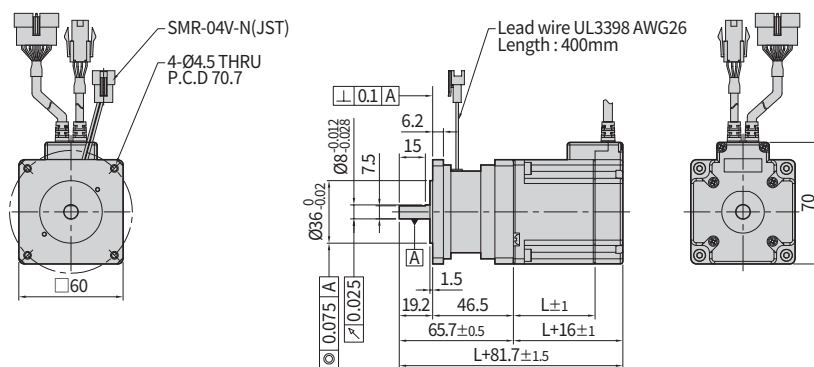
# 42 mm

| Model name | Length (L) |
|------------|------------|
| EzM2-42S   | 34         |
| EzM2-42M   | 40         |
| EzM2-42L   | 48         |
| EzM2-42XL  | 60         |



# 56 mm

| Model name | Length (L) |
|------------|------------|
| EzM2-56S   | 46         |
| EzM2-56M   | 55         |
| EzM2-56L   | 80         |



# 60 mm

| Model name | Length (L) |
|------------|------------|
| EzM2-60S   | 47         |
| EzM2-60M   | 56         |
| EzM2-60L   | 85         |

## How to Read Specifications

| Motor Model Number | ① Maximum Holding Torque [N·m] | ② Rotor Inertia Moment [kg·m <sup>2</sup> ] | ③ Backlash [arc·min] | ④ Angle Transmission Error [arcmin] | ⑤ Gear Ratio | ⑥ Resolution (10,000 P/R Standard) | ⑦ Permissible Torque [N·m] | ⑧ Instantaneous Maximum Torque [N·m] | ⑨ Permissible Speed Range [r/min] | ⑩ Unit Weight [kg] | ⑪ Permissible Radial Load (At Center of Axis) [N] | ⑫ Permissible Axial Load [N] |
|--------------------|--------------------------------|---------------------------------------------|----------------------|-------------------------------------|--------------|------------------------------------|----------------------------|--------------------------------------|-----------------------------------|--------------------|---------------------------------------------------|------------------------------|
| EzM2-42S-■-PN3     | 0.57                           | 35 x 10 <sup>-7</sup>                       | 3                    | 5                                   | 3            | 0.012 °                            | 6                          | 12                                   | 0 ~ 1000                          | 0.76               | 240                                               | 270                          |
| EzM2-42S-■-PN5     | 0.95                           |                                             |                      |                                     | 5            | 0.0072 °                           | 9                          | 18                                   | 0 ~ 600                           |                    | 290                                               | 330                          |
| EzM2-42S-■-PN8     | 1.52                           |                                             |                      |                                     | 8            | 0.0045 °                           | 9                          | 18                                   | 0 ~ 375                           |                    | 340                                               | 410                          |
| EzM2-42S-■-PN10    | 1.90                           |                                             |                      |                                     | 10           | 0.0036 °                           | 6                          | 12                                   | 0 ~ 300                           |                    | 360                                               | 450                          |
| EzM2-42S-■-PN15    | 2.76                           | 35 x 10 <sup>-7</sup>                       | 5                    | 7                                   | 15           | 0.0024 °                           | 6                          | 12                                   | 0 ~ 200                           | 0.91               | 410                                               | 540                          |
| EzM2-42S-■-PN25    | 4.60                           |                                             |                      |                                     | 25           | 0.00144 °                          | 9                          | 18                                   | 0 ~ 120                           |                    | 490                                               | 640                          |
| EzM2-42S-■-PN40    | 7.36                           |                                             |                      |                                     | 40           | 0.0009 °                           | 9                          | 18                                   | 0 ~ 75                            |                    | 570                                               | 640                          |
| EzM2-42S-■-PN50    | 9.00                           |                                             |                      |                                     | 50           | 0.00072 °                          | 9                          | 18                                   | 0 ~ 60                            |                    | 620                                               | 640                          |

## Description of Specification Items

| No. | Item                         | Description                                                                                                                                                                                                                                            |
|-----|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ①   | Maximum Holding Torque       | This is the maximum torque that can be exerted through the gearbox when the motor is stopped.<br>(Based on 100 % of stop current)<br>Use the torque below the permissible torque of the gearbox.                                                       |
| ②   | Rotor Inertia Moment         | It is the value of the moment of inertia of the motor.                                                                                                                                                                                                 |
| ③   | Backlash                     | It is the gap between the gear and the gear, and it is the angle at which the gearbox shaft moves without external force when stopped.                                                                                                                 |
| ④   | Angle Transmission Error     | This is the transmission characteristic of the gearbox, which means the difference between the theoretical rotation angle and the actual rotation angle of the output shaft.                                                                           |
| ⑤   | Gear Ratio                   | It is the value obtained by dividing the number of output rotation by the number of input rotation.                                                                                                                                                    |
| ⑥   | Resolution                   | This is the angle at which the gearbox output shaft moves when the motor is driven by 1 pulse.                                                                                                                                                         |
| ⑦   | Permissible Torque           | It refers to the maximum value of the torque that can be continuously applied to the output shaft of the gearbox during constant speed operation.<br>(When the input rotation speed is 3,000 r/min and the lifetime of the motor becomes 20,000 hours) |
| ⑧   | Instantaneous Maximum Torque | This is the maximum torque allowed to the output shaft of the gearbox during acceleration/deceleration.                                                                                                                                                |
| ⑨   | Permissible Speed Range      | It is the range of rotation speed based on the output shaft of the gearbox.                                                                                                                                                                            |
| ⑩   | Unit Weight                  | It is the sum of the weight of the gearbox and the motor.                                                                                                                                                                                              |
| ⑪   | Permissible Radial Load      | It is the maximum value of the load applied in the direction perpendicular to the gearbox output shaft.                                                                                                                                                |
| ⑫   | Permissible Axial Load       | It is the maximum value of the load applied in the axial direction to the gearbox output shaft.                                                                                                                                                        |

## Specifications of Motor with Gearbox

# 42 mm

| Motor Model Number | Maximum Holding Torque [N·m] | Rotor Inertia Moment [kg·m <sup>2</sup> ] | Backlash [arc·min] | Angle Transmission Error [arcmin] | Gear Ratio | Resolution (10,000 P/R Standard) | Permissible Torque [N·m] | Instantaneous Maximum Torque [N·m] | Permissible Speed Range [r/min] | Unit Weight [kg] | Permissible Radial Load (At Center of Axis) [N] | Permissible Axial Load [N] |
|--------------------|------------------------------|-------------------------------------------|--------------------|-----------------------------------|------------|----------------------------------|--------------------------|------------------------------------|---------------------------------|------------------|-------------------------------------------------|----------------------------|
| EzM2-42S-■-PN3     | 0.57                         | 35 x 10 <sup>-7</sup>                     | 3                  | 5                                 | 3          | 0.012 °                          | 6                        | 12                                 | 0~1000                          | 0.76             | 240                                             | 270                        |
| EzM2-42S-■-PN5     | 0.95                         |                                           |                    |                                   | 5          | 0.0072 °                         | 9                        | 18                                 | 0~600                           |                  | 290                                             | 330                        |
| EzM2-42S-■-PN8     | 1.52                         |                                           |                    |                                   | 8          | 0.0045 °                         | 9                        | 18                                 | 0~375                           |                  | 340                                             | 410                        |
| EzM2-42S-■-PN10    | 1.90                         |                                           |                    |                                   | 10         | 0.0036 °                         | 6                        | 12                                 | 0~300                           |                  | 360                                             | 450                        |
| EzM2-42S-■-PN15    | 2.76                         |                                           | 5                  | 7                                 | 15         | 0.0024 °                         | 6                        | 12                                 | 0~200                           | 0.91             | 410                                             | 540                        |
| EzM2-42S-■-PN25    | 4.60                         |                                           |                    |                                   | 25         | 0.00144 °                        | 9                        | 18                                 | 0~120                           |                  | 490                                             | 640                        |
| EzM2-42S-■-PN40    | 7.36                         |                                           |                    |                                   | 40         | 0.0009 °                         | 9                        | 18                                 | 0~75                            |                  | 570                                             | 640                        |
| EzM2-42S-■-PN50    | 9.00                         |                                           |                    |                                   | 50         | 0.00072 °                        | 9                        | 18                                 | 0~60                            |                  | 620                                             | 640                        |
| EzM2-42M-■-PN3     | 0.85                         | 54 x 10 <sup>-7</sup>                     | 3                  | 5                                 | 3          | 0.012 °                          | 6                        | 12                                 | 0~1000                          | 0.81             | 240                                             | 270                        |
| EzM2-42M-■-PN5     | 1.42                         |                                           |                    |                                   | 5          | 0.0072 °                         | 9                        | 18                                 | 0~600                           |                  | 290                                             | 330                        |
| EzM2-42M-■-PN8     | 2.28                         |                                           |                    |                                   | 8          | 0.0045 °                         | 9                        | 18                                 | 0~375                           |                  | 340                                             | 410                        |
| EzM2-42M-■-PN10    | 2.85                         |                                           |                    |                                   | 10         | 0.0036 °                         | 6                        | 12                                 | 0~300                           |                  | 360                                             | 450                        |
| EzM2-42M-■-PN15    | 4.14                         |                                           | 5                  | 7                                 | 15         | 0.0024 °                         | 6                        | 12                                 | 0~200                           | 0.97             | 410                                             | 540                        |
| EzM2-42M-■-PN25    | 6.90                         |                                           |                    |                                   | 25         | 0.00144 °                        | 9                        | 18                                 | 0~120                           |                  | 490                                             | 640                        |
| EzM2-42M-■-PN40    | 9.00                         |                                           |                    |                                   | 40         | 0.0009 °                         | 9                        | 18                                 | 0~75                            |                  | 570                                             | 640                        |
| EzM2-42M-■-PN50    | 9.00                         |                                           |                    |                                   | 50         | 0.00072 °                        | 9                        | 18                                 | 0~60                            |                  | 620                                             | 640                        |
| EzM2-42L-■-PN3     | 0.92                         | 77 x 10 <sup>-7</sup>                     | 3                  | 5                                 | 3          | 0.012 °                          | 6                        | 12                                 | 0~1000                          | 0.89             | 240                                             | 270                        |
| EzM2-42L-■-PN5     | 1.54                         |                                           |                    |                                   | 5          | 0.0072 °                         | 9                        | 18                                 | 0~600                           |                  | 290                                             | 330                        |
| EzM2-42L-■-PN8     | 2.47                         |                                           |                    |                                   | 8          | 0.0045 °                         | 9                        | 18                                 | 0~375                           |                  | 340                                             | 410                        |
| EzM2-42L-■-PN10    | 3.09                         |                                           |                    |                                   | 10         | 0.0036 °                         | 6                        | 12                                 | 0~300                           |                  | 360                                             | 450                        |
| EzM2-42L-■-PN15    | 4.49                         |                                           | 5                  | 7                                 | 15         | 0.0024 °                         | 6                        | 12                                 | 0~200                           | 1.04             | 410                                             | 540                        |
| EzM2-42L-■-PN25    | 7.49                         |                                           |                    |                                   | 25         | 0.00144 °                        | 9                        | 18                                 | 0~120                           |                  | 490                                             | 640                        |
| EzM2-42L-■-PN40    | 9.00                         |                                           |                    |                                   | 40         | 0.0009 °                         | 9                        | 18                                 | 0~75                            |                  | 570                                             | 640                        |
| EzM2-42L-■-PN50    | 9.00                         |                                           |                    |                                   | 50         | 0.00072 °                        | 9                        | 18                                 | 0~60                            |                  | 620                                             | 640                        |
| EzM2-42XL-■-PN3    | 1.45                         | 114 x 10 <sup>-7</sup>                    | 3                  | 5                                 | 3          | 0.012 °                          | 6                        | 12                                 | 0~1000                          | 1.03             | 240                                             | 270                        |
| EzM2-42XL-■-PN5    | 2.42                         |                                           |                    |                                   | 5          | 0.0072 °                         | 9                        | 18                                 | 0~600                           |                  | 290                                             | 330                        |
| EzM2-42XL-■-PN8    | 3.87                         |                                           |                    |                                   | 8          | 0.0045 °                         | 9                        | 18                                 | 0~375                           |                  | 340                                             | 410                        |
| EzM2-42XL-■-PN10   | 4.84                         |                                           |                    |                                   | 10         | 0.0036 °                         | 6                        | 12                                 | 0~300                           |                  | 360                                             | 450                        |
| EzM2-42XL-■-PN15   | 6.00                         |                                           | 5                  | 7                                 | 15         | 0.0024 °                         | 6                        | 12                                 | 0~200                           | 1.18             | 410                                             | 540                        |
| EzM2-42XL-■-PN25   | 9.00                         |                                           |                    |                                   | 25         | 0.00144 °                        | 9                        | 18                                 | 0~120                           |                  | 490                                             | 640                        |
| EzM2-42XL-■-PN40   | 9.00                         |                                           |                    |                                   | 40         | 0.0009 °                         | 9                        | 18                                 | 0~75                            |                  | 570                                             | 640                        |
| EzM2-42XL-■-PN50   | 9.00                         |                                           |                    |                                   | 50         | 0.00072 °                        | 9                        | 18                                 | 0~60                            |                  | 620                                             | 640                        |

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

## Specifications of Motor with Gearbox

# 56 mm

| Motor Model Number | Maximum Holding Torque [N·m] | Rotor Inertia Moment [kg·m <sup>2</sup> ] | Backlash [arc-min] | Angle Transmission Error [arcmin] | Gear Ratio | Resolution (10,000 P/R Standard) | Permissible Torque [N·m] | Instantaneous Maximum Torque [N·m] | Permissible Speed Range [r/min] | Unit Weight [kg] | Permissible Radial Load (At Center of Axis) [N] | Permissible Axial Load [N] |
|--------------------|------------------------------|-------------------------------------------|--------------------|-----------------------------------|------------|----------------------------------|--------------------------|------------------------------------|---------------------------------|------------------|-------------------------------------------------|----------------------------|
| EzM2-56S-■-PN3     | 1.1                          | 180 x 10 <sup>-7</sup>                    | 3                  | 5                                 | 3          | 0.012°                           | 18                       | 35                                 | 0~1000                          | 1.75             | 430                                             | 310                        |
| EzM2-56S-■-PN5     | 1.9                          |                                           |                    |                                   | 5          | 0.0072°                          | 27                       | 50                                 | 0~600                           |                  | 510                                             | 390                        |
| EzM2-56S-■-PN8     | 3.0                          |                                           |                    |                                   | 8          | 0.0045°                          | 27                       | 50                                 | 0~375                           |                  | 600                                             | 480                        |
| EzM2-56S-■-PN10    | 3.8                          |                                           |                    |                                   | 10         | 0.0036°                          | 18                       | 35                                 | 0~300                           |                  | 640                                             | 530                        |
| EzM2-56S-■-PN15    | 5.5                          |                                           |                    |                                   | 15         | 0.0024°                          | 18                       | 35                                 | 0~200                           | 2.05             | 740                                             | 630                        |
| EzM2-56S-■-PN25    | 9.3                          |                                           |                    |                                   | 25         | 0.00144°                         | 27                       | 50                                 | 0~120                           |                  | 870                                             | 790                        |
| EzM2-56S-■-PN40    | 14.9                         |                                           |                    |                                   | 40         | 0.0009°                          | 27                       | 50                                 | 0~75                            |                  | 1000                                            | 970                        |
| EzM2-56S-■-PN50    | 18.6                         |                                           |                    |                                   | 50         | 0.00072°                         | 27                       | 50                                 | 0~60                            |                  | 1100                                            | 1100                       |
| EzM2-56M-■-PN3     | 2.0                          | 280 x 10 <sup>-7</sup>                    | 3                  | 5                                 | 3          | 0.012°                           | 18                       | 35                                 | 0~1000                          | 1.92             | 430                                             | 310                        |
| EzM2-56M-■-PN5     | 3.4                          |                                           |                    |                                   | 5          | 0.0072°                          | 27                       | 50                                 | 0~600                           |                  | 510                                             | 390                        |
| EzM2-56M-■-PN8     | 5.4                          |                                           |                    |                                   | 8          | 0.0045°                          | 27                       | 50                                 | 0~375                           |                  | 600                                             | 480                        |
| EzM2-56M-■-PN10    | 6.8                          |                                           |                    |                                   | 10         | 0.0036°                          | 18                       | 35                                 | 0~300                           |                  | 640                                             | 530                        |
| EzM2-56M-■-PN15    | 9.9                          |                                           |                    |                                   | 15         | 0.0024°                          | 18                       | 35                                 | 0~200                           | 2.23             | 740                                             | 630                        |
| EzM2-56M-■-PN25    | 16.6                         |                                           |                    |                                   | 25         | 0.00144°                         | 27                       | 50                                 | 0~120                           |                  | 870                                             | 790                        |
| EzM2-56M-■-PN40    | 27.0                         |                                           |                    |                                   | 40         | 0.0009°                          | 27                       | 50                                 | 0~75                            |                  | 1000                                            | 970                        |
| EzM2-56M-■-PN50    | 27.0                         |                                           |                    |                                   | 50         | 0.00072°                         | 27                       | 50                                 | 0~60                            |                  | 1100                                            | 1100                       |
| EzM2-56L-■-PN3     | 4.0                          | 520 x 10 <sup>-7</sup>                    | 3                  | 5                                 | 3          | 0.012°                           | 18                       | 35                                 | 0~1000                          | 2.37             | 430                                             | 310                        |
| EzM2-56L-■-PN5     | 6.8                          |                                           |                    |                                   | 5          | 0.0072°                          | 27                       | 50                                 | 0~600                           |                  | 510                                             | 390                        |
| EzM2-56L-■-PN8     | 10.8                         |                                           |                    |                                   | 8          | 0.0045°                          | 27                       | 50                                 | 0~375                           |                  | 600                                             | 480                        |
| EzM2-56L-■-PN10    | 13.6                         |                                           |                    |                                   | 10         | 0.0036°                          | 18                       | 35                                 | 0~300                           |                  | 640                                             | 530                        |
| EzM2-56L-■-PN15    | 18.0                         |                                           |                    |                                   | 15         | 0.0024°                          | 18                       | 35                                 | 0~200                           | 2.67             | 740                                             | 630                        |
| EzM2-56L-■-PN25    | 27.0                         |                                           |                    |                                   | 25         | 0.00144°                         | 27                       | 50                                 | 0~120                           |                  | 870                                             | 790                        |
| EzM2-56L-■-PN40    | 27.0                         |                                           |                    |                                   | 40         | 0.0009°                          | 27                       | 50                                 | 0~75                            |                  | 1000                                            | 970                        |
| EzM2-56L-■-PN50    | 27.0                         |                                           |                    |                                   | 50         | 0.00072°                         | 27                       | 50                                 | 0~60                            |                  | 1100                                            | 1100                       |

\* The code of encoder resolution will be marked in “■”

## Specifications of Motor with Gearbox

# 60mm

| Motor Model Number | Maximum Holding Torque [N·m] | Rotor Inertia Moment [kg·m <sup>2</sup> ] | Backlash [arc·min] | Angle Transmission Error [arcmin] | Gear Ratio | Resolution (10,000 P/R Standard) | Permissible Torque [N·m] | Instantaneous Maximum Torque [N·m] | Permissible Speed Range [r/min] | Unit Weight [kg] | Permissible Radial Load (At Center of Axis) [N] | Permissible Axial Load [N] |
|--------------------|------------------------------|-------------------------------------------|--------------------|-----------------------------------|------------|----------------------------------|--------------------------|------------------------------------|---------------------------------|------------------|-------------------------------------------------|----------------------------|
| EzM2-60S-■-PN3     | 1.5                          | 240 x 10 <sup>-7</sup>                    | 3                  | 5                                 | 3          | 0.012 °                          | 18                       | 35                                 | 0~1000                          | 1.84             | 430                                             | 310                        |
| EzM2-60S-■-PN5     | 2.5                          |                                           |                    |                                   | 5          | 0.0072 °                         | 27                       | 50                                 | 0~600                           |                  | 510                                             | 390                        |
| EzM2-60S-■-PN8     | 4.0                          |                                           |                    |                                   | 8          | 0.0045 °                         | 27                       | 50                                 | 0~375                           |                  | 600                                             | 480                        |
| EzM2-60S-■-PN10    | 5.1                          |                                           |                    |                                   | 10         | 0.0036 °                         | 18                       | 35                                 | 0~300                           |                  | 640                                             | 530                        |
| EzM2-60S-■-PN15    | 7.4                          |                                           |                    |                                   | 15         | 0.0024 °                         | 18                       | 35                                 | 0~200                           | 2.13             | 740                                             | 630                        |
| EzM2-60S-■-PN25    | 12.3                         |                                           |                    |                                   | 25         | 0.00144 °                        | 27                       | 50                                 | 0~120                           |                  | 870                                             | 790                        |
| EzM2-60S-■-PN40    | 19.8                         |                                           |                    |                                   | 40         | 0.0009 °                         | 27                       | 50                                 | 0~75                            |                  | 1000                                            | 970                        |
| EzM2-60S-■-PN50    | 24.7                         |                                           |                    |                                   | 50         | 0.00072 °                        | 27                       | 50                                 | 0~60                            |                  | 1100                                            | 1100                       |
| EzM2-60M-■-PN3     | 2.6                          | 490 x 10 <sup>-7</sup>                    | 3                  | 5                                 | 3          | 0.012 °                          | 18                       | 35                                 | 0~1000                          | 1.20             | 430                                             | 310                        |
| EzM2-60M-■-PN5     | 4.4                          |                                           |                    |                                   | 5          | 0.0072 °                         | 27                       | 50                                 | 0~600                           |                  | 510                                             | 390                        |
| EzM2-60M-■-PN8     | 7.0                          |                                           |                    |                                   | 8          | 0.0045 °                         | 27                       | 50                                 | 0~375                           |                  | 600                                             | 480                        |
| EzM2-60M-■-PN10    | 8.8                          |                                           |                    |                                   | 10         | 0.0036 °                         | 18                       | 35                                 | 0~300                           |                  | 640                                             | 530                        |
| EzM2-60M-■-PN15    | 12.8                         |                                           |                    |                                   | 15         | 0.0024 °                         | 18                       | 35                                 | 0~200                           | 2.30             | 740                                             | 630                        |
| EzM2-60M-■-PN25    | 21.4                         |                                           |                    |                                   | 25         | 0.00144 °                        | 27                       | 50                                 | 0~120                           |                  | 870                                             | 790                        |
| EzM2-60M-■-PN40    | 27.0                         |                                           |                    |                                   | 40         | 0.0009 °                         | 27                       | 50                                 | 0~75                            |                  | 1000                                            | 970                        |
| EzM2-60M-■-PN50    | 27.0                         |                                           |                    |                                   | 50         | 0.00072 °                        | 27                       | 50                                 | 0~60                            |                  | 1100                                            | 1100                       |
| EzM2-60L-■-PN3     | 5.2                          | 690 x 10 <sup>-7</sup>                    | 3                  | 5                                 | 3          | 0.012 °                          | 18                       | 35                                 | 0~1000                          | 2.61             | 430                                             | 310                        |
| EzM2-60L-■-PN5     | 8.7                          |                                           |                    |                                   | 5          | 0.0072 °                         | 27                       | 50                                 | 0~600                           |                  | 510                                             | 390                        |
| EzM2-60L-■-PN8     | 13.9                         |                                           |                    |                                   | 8          | 0.0045 °                         | 27                       | 50                                 | 0~375                           |                  | 600                                             | 480                        |
| EzM2-60L-■-PN10    | 18.0                         |                                           |                    |                                   | 10         | 0.0036 °                         | 18                       | 35                                 | 0~300                           |                  | 640                                             | 530                        |
| EzM2-60L-■-PN15    | 18.0                         |                                           |                    |                                   | 15         | 0.0024 °                         | 18                       | 35                                 | 0~200                           | 2.86             | 740                                             | 630                        |
| EzM2-60L-■-PN25    | 27.0                         |                                           |                    |                                   | 25         | 0.00144 °                        | 27                       | 50                                 | 0~120                           |                  | 870                                             | 790                        |
| EzM2-60L-■-PN40    | 27.0                         |                                           |                    |                                   | 40         | 0.0009 °                         | 27                       | 50                                 | 0~75                            |                  | 1000                                            | 970                        |
| EzM2-60L-■-PN50    | 27.0                         |                                           |                    |                                   | 50         | 0.00072 °                        | 27                       | 50                                 | 0~60                            |                  | 1100                                            | 1100                       |

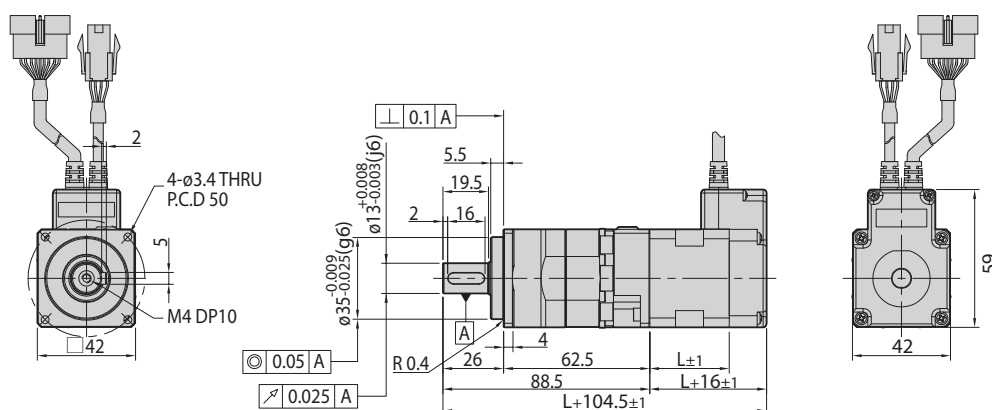
\* The code of encoder resolution will be marked in “■”

## Dimensions of Motor with Gearbox [mm]

# 42mm

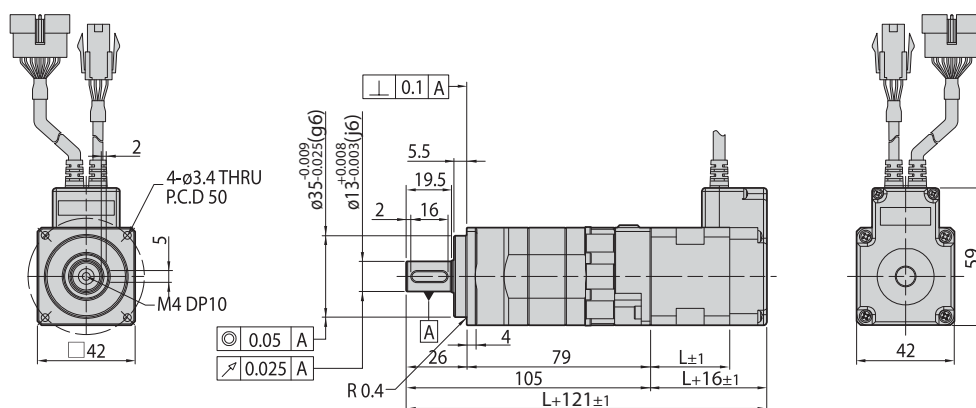
| Motor           | Stage        | □ Gear Ratio | L [mm] |
|-----------------|--------------|--------------|--------|
| EzM2-42S-■-PN□  | Single Stage | 3, 5, 8, 10  | 34     |
| EzM2-42M-■-PN□  |              | 3, 5, 8, 10  | 40     |
| EzM2-42L-■-PN□  |              | 3, 5, 8, 10  | 48     |
| EzM2-42XL-■-PN□ |              | 3, 5, 8, 10  | 60     |

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



| Motor           | Stage        | □ Gear Ratio   | L [mm] |
|-----------------|--------------|----------------|--------|
| EzM2-42S-■-PN□  | Double Stage | 15, 25, 40, 50 | 34     |
| EzM2-42M-■-PN□  |              | 15, 25, 40, 50 | 40     |
| EzM2-42L-■-PN□  |              | 15, 25, 40, 50 | 48     |
| EzM2-42XL-■-PN□ |              | 15, 25, 40, 50 | 60     |

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

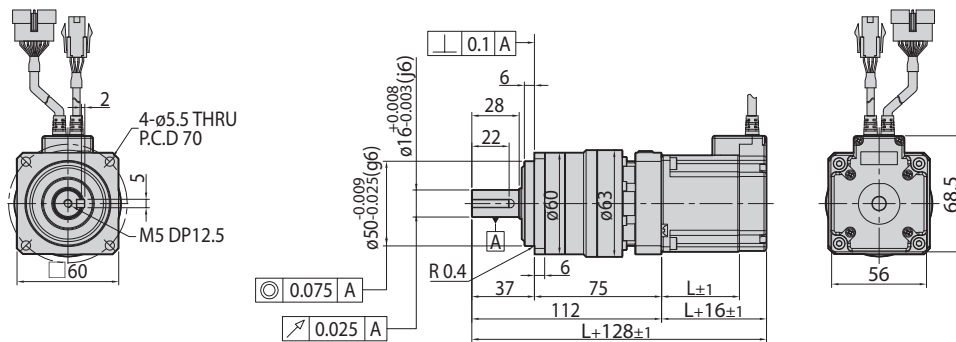


## Dimensions of Motor with Gearbox [mm]

# 56mm

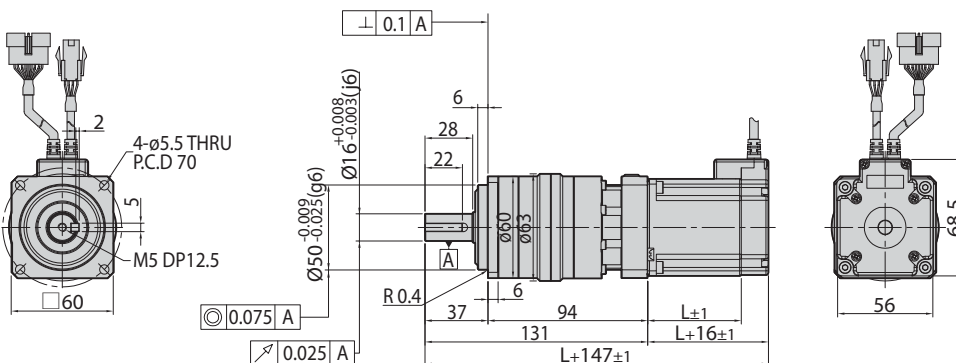
| Motor          | Stage        | □ Gear Ratio | L [mm] |
|----------------|--------------|--------------|--------|
| EzM2-56S-■-PN□ | Single Stage | 3, 5, 8, 10  | 46     |
| EzM2-56M-■-PN□ |              | 3, 5, 8, 10  | 55     |
| EzM2-56L-■-PN□ |              | 3, 5, 8, 10  | 80     |

\* The code of encoder resolution will be marked in “■”



| Motor          | Stage        | □ Gear Ratio   | L [mm] |
|----------------|--------------|----------------|--------|
| EzM2-56S-■-PN□ | Double Stage | 15, 25, 40, 50 | 46     |
| EzM2-56M-■-PN□ |              | 15, 25, 40, 50 | 55     |
| EzM2-56L-■-PN□ |              | 15, 25, 40, 50 | 80     |

\* The code of encoder resolution will be marked in “■”

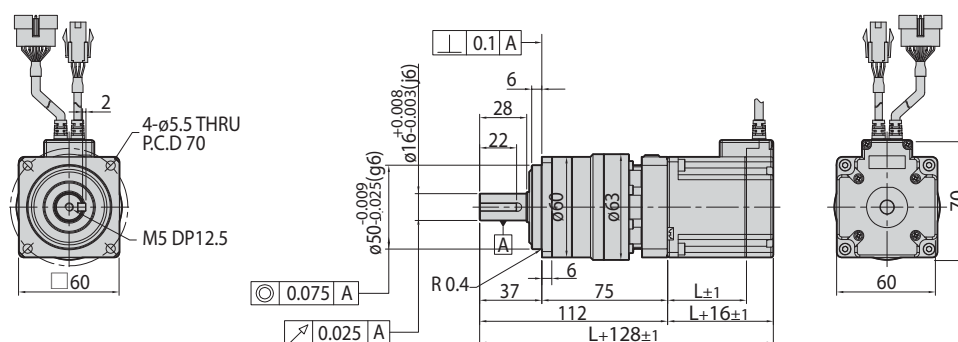


## Dimensions of Motor with Gearbox [mm]

# 60 mm

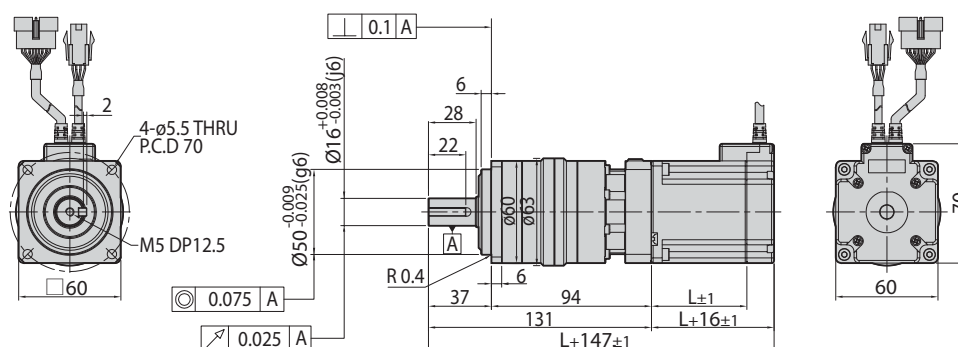
| Motor          | Stage        | □ Gear Ratio | L [mm] |
|----------------|--------------|--------------|--------|
| EzM2-60S-■-PN□ | Single Stage | 3, 5, 8, 10  | 47     |
| EzM2-60M-■-PN□ |              | 3, 5, 8, 10  | 56     |
| EzM2-60L-■-PN□ |              | 3, 5, 8, 10  | 85     |

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

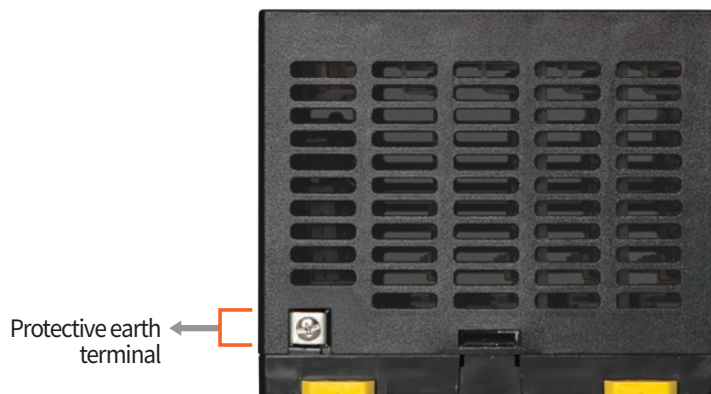
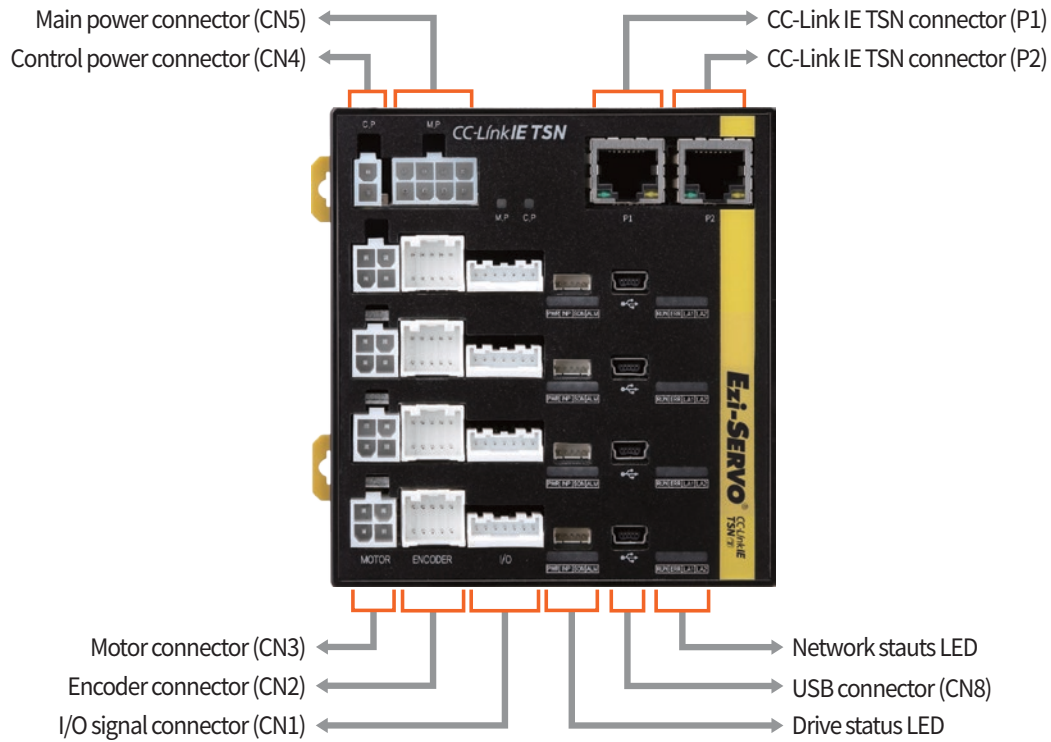


| Motor          | Stage        | □ Gear Ratio   | L [mm] |
|----------------|--------------|----------------|--------|
| EzM2-60S-■-PN□ | Double Stage | 15, 25, 40, 50 | 47     |
| EzM2-60M-■-PN□ |              | 15, 25, 40, 50 | 56     |
| EzM2-60L-■-PN□ |              | 15, 25, 40, 50 | 85     |

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



## Settings and Operation

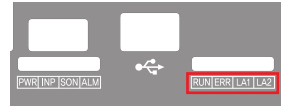


※ Basic configuration of 3X drive is the same as 4X and only difference is number of axis.

## 1. Network Status LED

LED indicates communication status of CC-Link IE TSN.

| Indicator | Color | Status       | Description             |
|-----------|-------|--------------|-------------------------|
| RUN       | Green | OFF          | Power off               |
|           |       | Single Flash | Not connected to master |
|           |       | Double Flash | Pre-operational state   |
|           |       | Blinking     | Safe-operational state  |
|           |       | Interval Off | Operational state       |



| Indicator | Color | Status       | Description                        |
|-----------|-------|--------------|------------------------------------|
| ERR       | Red   | OFF          | No error or power off              |
|           |       | Blinking     | Drive error                        |
|           |       | Single Flash | CC-Link IE TSN communication error |
|           |       | Double Flash | IP address conflict error          |

| Indicator       | Color | Status | Description   |
|-----------------|-------|--------|---------------|
| LINK1/<br>LINK2 | Green | OFF    | Link inactive |
|                 |       | ON     | Link active   |

## 2. Drive Status LED

LED informs operation status of the drive.

| Indicator | Color  | Function                    | Description                                                                                                |
|-----------|--------|-----------------------------|------------------------------------------------------------------------------------------------------------|
| PWR       | Green  | Power Input Indicator       | Lights up when power is supplied.                                                                          |
| INP       | Yellow | Complete Positioning Motion | LED is turned on when Positioning error reaches within the preset pulse after the positioning is complete. |
| SON       | Orange | Servo ON / OFF Indicator    | Lights up when Servo is on; turns off when Servo is off.                                                   |
| ALM       | Red    | Alarm Indicator             | Blinks repeatedly when an error occurs.                                                                    |

### List of error types by the the number of LED blinking

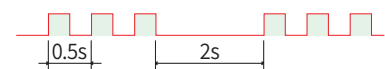
| No. | Error Type                      | Causes                                                                                               |
|-----|---------------------------------|------------------------------------------------------------------------------------------------------|
| 1   | Over Current Error              | The current through power devices in drive exceeds the limit. <sup>*1</sup>                          |
| 2   | Over Speed Error                | The motor speed exceeds 3,000 r/min                                                                  |
| 3   | Position Tracking Error         | Position error value is greater than the reference value while the motor is running <sup>*2</sup>    |
| 4   | Over Load Error                 | The motor is continuously operated more than 5 seconds under a load exceeding the Max. torque.       |
| 5   | Over Temperature Error          | Internal temperature of the drive exceeds 85 °C                                                      |
| 6   | Over Regenerative Voltage Error | Back-EMF is higher than limit value <sup>*3</sup>                                                    |
| 7   | Motor Connect Error             | There is a problem with the connection between the drive and the motor                               |
| 8   | Encoder Connect Error           | There is a problem with the connection between the drive and the encoder                             |
| 9   | Main Power Voltage Error        | Main supply voltage is approximately below 18 V                                                      |
| 10  | In-Position Error               | After operation is finished, position error larger 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 greater than the reference value while the motor is stopped <sup>*2</sup>    |

<sup>\*1</sup>: Limit value depends on motor model. (Refer to the Manual)

<sup>\*2</sup>: The default setting value is 180°, and it can be changed by parameter. (Refer to the Manual)

<sup>\*3</sup>: Voltage limit of Back-EMF depends on motor model. (Refer to the Manual)

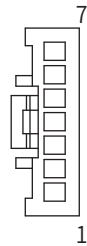
※ Please refer to user Manual for the details of protection functions.



Alarm LED flash (e.g., Position tracking error)

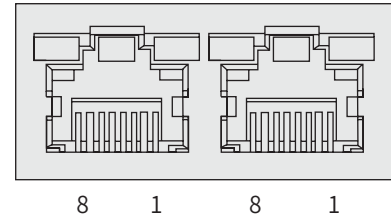
### 3. I/O Signal Connector (CN1)

| No. | Function    | I/O    |
|-----|-------------|--------|
| 1   | EXT_24 V DC | Input  |
| 2   | EXT_GND     | Input  |
| 3   | LIMIT+      | Input  |
| 4   | LIMIT-      | Input  |
| 5   | ORIGIN      | Input  |
| 6   | BRAKE+      | Output |
| 7   | BRAKE-      | Output |



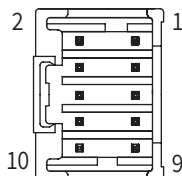
### 8. CC-Link IE TSN Connector (CN6, CN7)

| No. | Function | No.            | Function |
|-----|----------|----------------|----------|
| 1   | TD+      | 6              | RD-      |
| 2   | TD-      | 7              | ----     |
| 3   | RD+      | 8              | ----     |
| 4   | ----     | Connector hood | F.GND    |
| 5   | ----     |                |          |



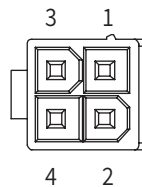
### 4. Encoder Connector (CN2)

| No. | Function | I/O    |
|-----|----------|--------|
| 1   | A+       | Input  |
| 2   | A-       | Input  |
| 3   | B+       | Input  |
| 4   | B-       | Input  |
| 5   | Z+       | Input  |
| 6   | Z-       | Input  |
| 7   | 5 V DC   | Output |
| 8   | GND      | Output |
| 9   | F.GND    | ----   |
| 10  | F.GND    | ----   |



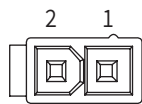
### 5. Motor Connector (CN3)

| No. | Function        | I/O    |
|-----|-----------------|--------|
| 1   | A Phase         | Output |
| 2   | B Phase         | Output |
| 3   | $\bar{A}$ Phase | Output |
| 4   | $\bar{B}$ Phase | Output |



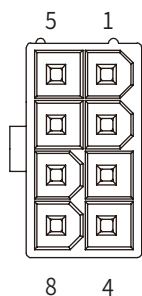
### 6. Control Power Connector (CN4)

| No. | Function | I/O   |
|-----|----------|-------|
| 1   | 24 V DC  | Input |
| 2   | GND      | Input |

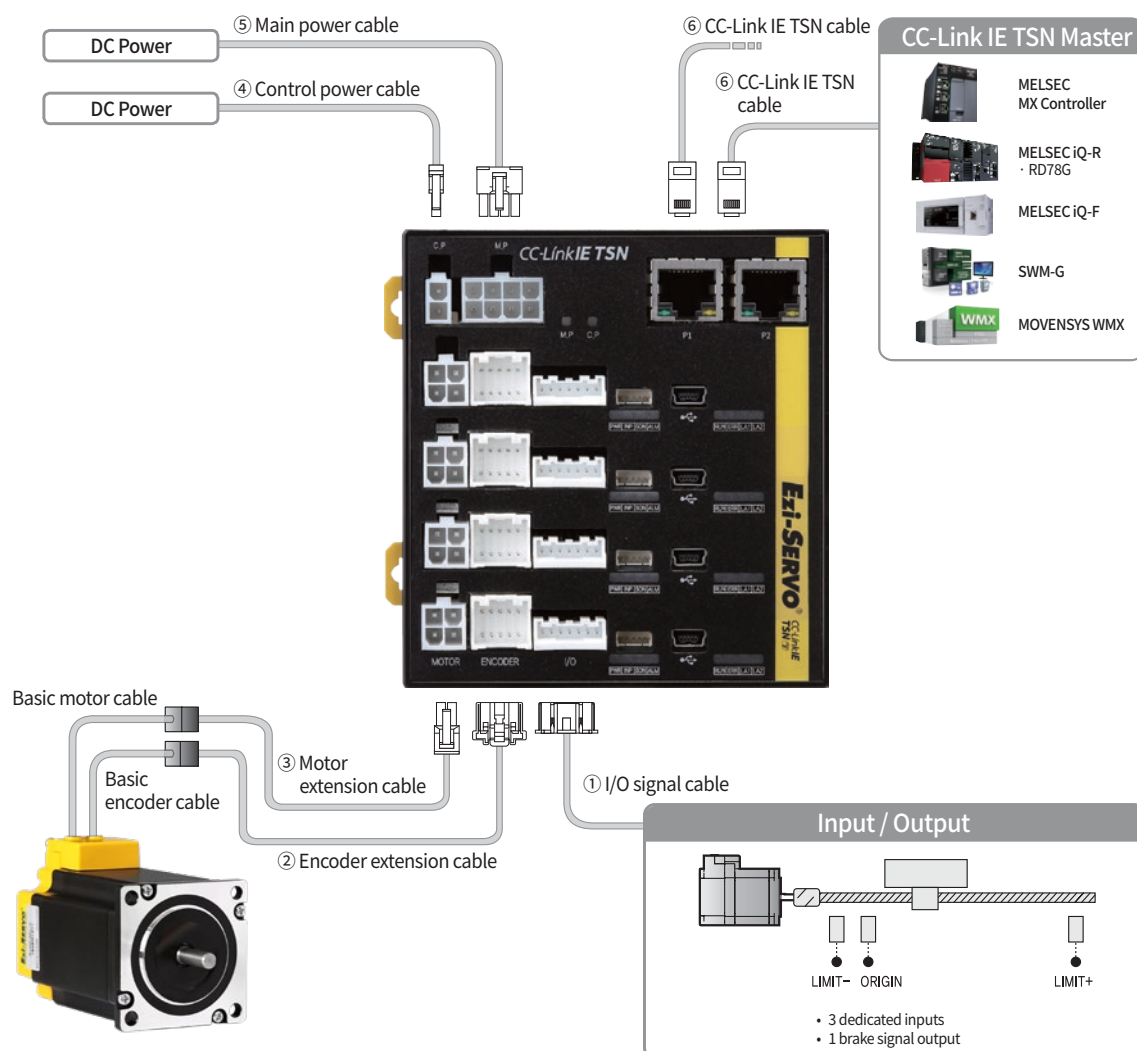


### 7. Main Power Connector (CN5)

| No. | Function | I/O   |
|-----|----------|-------|
| 1   | 24 V DC  | Input |
| 2   | 24 V DC  | Input |
| 3   | 24 V DC  | Input |
| 4   | F.GND    | ----  |
| 5   | GND      | Input |
| 6   | GND      | Input |
| 7   | GND      | Input |
| 8   | F.GND    | ----  |



## System Configuration



| Cable Type                | Max. Cable Length    | Remarks                              |
|---------------------------|----------------------|--------------------------------------|
| ① I/O Signal Cable        | 20 m                 | Options (Sold separately)            |
| ② Encoder Extension Cable | 20 m                 |                                      |
| ③ Motor Extension Cable   | 20 m                 |                                      |
| ④ Control Power Cable     | 2 m                  |                                      |
| ⑤ Main Power Cable        | 2 m                  |                                      |
| ⑥ CC-Link IE TSN Cable    | 100 m                | Basic cables are attached to motors. |
| Basic Encoder Cable       | 0.3 m (Basic length) |                                      |
| Basic Motor Cable         | 0.3 m (Basic length) |                                      |

Basic configuration of 3X drive is the same as 4X and only difference is number of axis.

## 1. Accessories

### Connectors

These are connector specifications for drive cabling.

| Purpose             |                  | Item     | Part Number    | Manufacturer |
|---------------------|------------------|----------|----------------|--------------|
| Main Power (CN5)    |                  | Housing  | 5557-08R       | MOLEX        |
|                     |                  | Terminal | 5556T          |              |
| Control Power (CN4) |                  | Housing  | 5557-02R       | MOLEX        |
|                     |                  | Terminal | 5556T          |              |
| Motor               | Drive Side (CN3) | Housing  | 5557-04R       | MOLEX        |
|                     |                  | Terminal | 5556T          |              |
|                     | Motor Side       | Housing  | 5557-04R       | MOLEX        |
|                     |                  | Terminal | 5556T          |              |
| Encoder             | Drive Side (CN2) | Housing  | 51353-1000     | MOLEX        |
|                     |                  | Terminal | 56134-9000     |              |
|                     | Encoder Side     | Housing  | SMP-09V-NC     | JST          |
|                     |                  | Terminal | SHF-001T-0.8BS |              |
| I/O Signal (CN1)    |                  | Housing  | PAP-07V-S      | JST          |
|                     |                  | Terminal | SPHD-001T-P0.5 |              |

The connectors above are supplied with the product. If you are using other parts, please make sure they meet the specifications.

## 2. Options

### ① I/O Signal Cable

These are the cables to connect Ezi-SERVO CC-Link IE TSN 4X drive and other input / output devices.

| Purpose                       | Part Number | Length [m] | Cable Type     | Remarks                 |
|-------------------------------|-------------|------------|----------------|-------------------------|
| Drive - I/O Device Connection | CECM-S-001F | 1          | Fixed Cable    | Max. Cable Length: 20 m |
|                               | CECM-S-002F | 2          |                |                         |
|                               | CECM-S-003F | 3          |                |                         |
|                               | CECM-S-005F | 5          |                |                         |
|                               | CECM-S-001M | 1          | Flexible Cable |                         |
|                               | CECM-S-002M | 2          |                |                         |
|                               | CECM-S-003M | 3          |                |                         |
|                               | CECM-S-005M | 5          |                |                         |

\* If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

### ② Encoder Extension Cable

These are the cables to connect Ezi-SERVO CC-Link IE TSN 4X drive and the encoder.

| Purpose                                   | Part Number | Length [m] | Cable Type     | Remarks                 |
|-------------------------------------------|-------------|------------|----------------|-------------------------|
| Drive - Basic Encoder<br>Cable Connection | CSVO-E-001F | 1          | Fixed Cable    | Max. Cable Length: 20 m |
|                                           | CSVO-E-002F | 2          |                |                         |
|                                           | CSVO-E-003F | 3          |                |                         |
|                                           | CSVO-E-005F | 5          |                |                         |
|                                           | CSVO-E-001M | 1          | Flexible Cable |                         |
|                                           | CSVO-E-002M | 2          |                |                         |
|                                           | CSVO-E-003M | 3          |                |                         |
|                                           | CSVO-E-005M | 5          |                |                         |

\* If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

### ③ Motor Extension Cable

These are the cables to connect Ezi-SERVO CC-Link IE TSN 4X drive and the motor.

| Purpose                              | Part Number | Length [m] | Cable Type     | Remarks                 |
|--------------------------------------|-------------|------------|----------------|-------------------------|
| Drive - Basic Motor Cable Connection | CSVO-M-001F | 1          | Fixed Cable    | Max. Cable Length: 20 m |
|                                      | CSVO-M-002F | 2          |                |                         |
|                                      | CSVO-M-003F | 3          |                |                         |
|                                      | CSVO-M-005F | 5          |                |                         |
|                                      | CSVO-M-001M | 1          | Flexible Cable |                         |
|                                      | CSVO-M-002M | 2          |                |                         |
|                                      | CSVO-M-003M | 3          |                |                         |
|                                      | CSVO-M-005M | 5          |                |                         |

\* If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

### ④ Control Power Cable

These are the cables to connect Ezi-SERVO CC-Link IE TSN 4X drive and the control power.

| Purpose                          | Part Number | Length [m] | Cable Type     | Remarks                |
|----------------------------------|-------------|------------|----------------|------------------------|
| Drive - Control Power Connection | CSVO-P-001F | 1          | Fixed Cable    | Max. Cable Length: 2 m |
|                                  | CSVO-P-002F | 2          |                |                        |
|                                  | CSVO-P-001M | 1          | Flexible Cable |                        |
|                                  | CSVO-P-002M | 2          |                |                        |

### ⑤ Main Power Cable

These are the cables to connect Ezi-SERVO CC-Link IE TSN 4X drive and the main power.

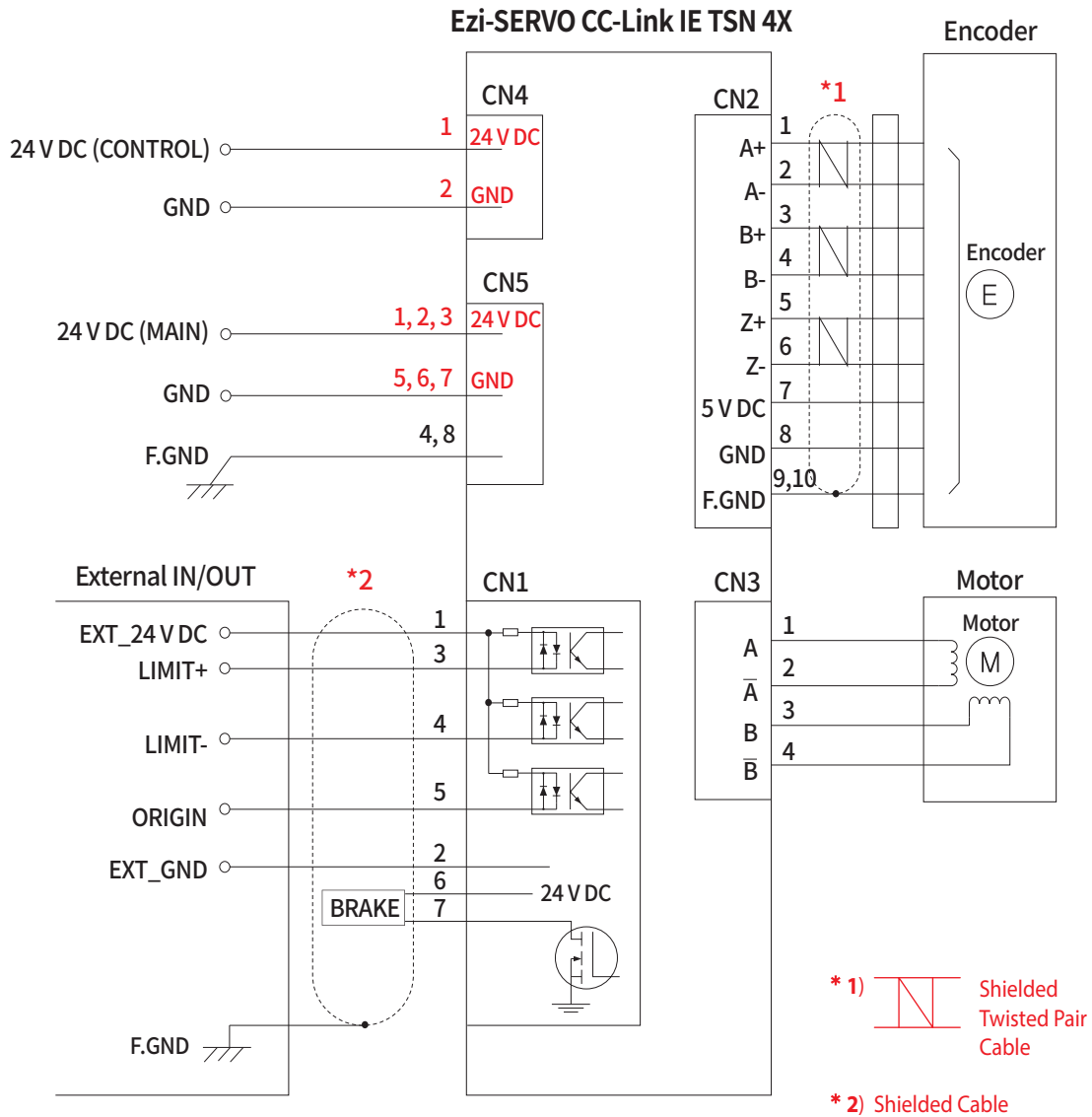
| Purpose                             | Part Number | Length [m] | Cable Type     | Remarks                |
|-------------------------------------|-------------|------------|----------------|------------------------|
| Drive - Main Power Cable Connection | CECM-P-001F | 1          | Fixed Cable    | Max. Cable Length: 2 m |
|                                     | CECM-P-002F | 2          |                |                        |
|                                     | CECM-P-001M | 1          | Flexible Cable |                        |
|                                     | CECM-P-002M | 2          |                |                        |

### ⑥ CC-Link IE TSN Cable

| Purpose                   | Part Number  | Length [m] | Remarks                                                                                                                                                                          |
|---------------------------|--------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CC-Link IE TSN Connection | CGNR-CT-001F | 1          | <ul style="list-style-type: none"> <li>• STP(Shielded Twisted Pair) Cable</li> <li>• Category 5e or higher</li> <li>• Max. Cable Length: 100 m</li> <li>• Fixed Cable</li> </ul> |
|                           | CGNR-CT-002F | 2          |                                                                                                                                                                                  |
|                           | CGNR-CT-003F | 3          |                                                                                                                                                                                  |
|                           | CGNR-CT-005F | 5          |                                                                                                                                                                                  |

\* If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

## External Wiring Diagram



### CAUTION

To ensure the safe and proper use of the products listed in this catalog, please be sure to read the user manual thoroughly before use.

※ When connecting the I/O cable between the drive and the master controller, be sure to turn off the power to both the master controller and the drive. Failure to do so may result in electric shock or product damage.



Fast Accurate Smooth Motion

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※ Please note that the color and size of the products in this catalog may different depending on the measurement method  
and the specifications can be changed without prior notice for quality improvement.