Ezi-SERVO®

Closed Loop Stepping System

CC-Link IE TSN ALL

- CC-Link IE TSN-compatible Closed Loop Stepper System
- CiA402 Drive Profile
- Motor + Drive Integrated
- Space Saving, Reduced Wiring
- Tuning Not Required, No Hunting
- High Resolution Encoder, Fast Response
- Low Heat Generation, High Torque



FASTECH

Fast Accurate Smooth Motion

Ezi-SERVO®

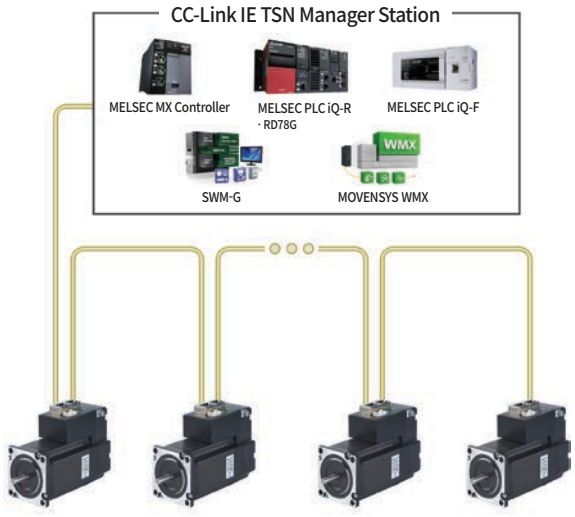
Closed Loop Stepping System

CC-LinkIE TSN ALL



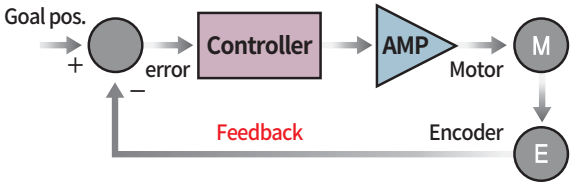
CC-Link IE TSN-compatible Motion Control

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



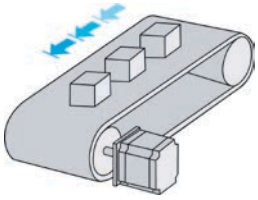
Closed-Loop System

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 µs. 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

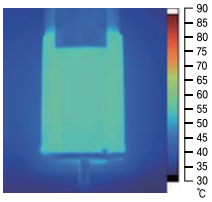
To ensure machine performance, conventional servo systems require the adjustment of its servo's gains as an initial crucial step. Even systems that employ auto-tuning require manual tuning after the system is installed.
Ezi-SERVO employs the best characteristics of the stepper motor to eliminate the 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.



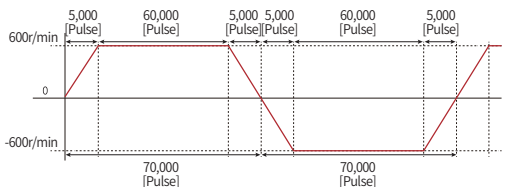
Low Heat Generation / Energy Savings

(Motor Current Control according to load)

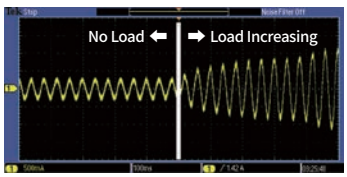
Ezi-SERVO automatically controls motor current according to load.
Ezi-SERVO reduces motor current when motor load is low and increases motor current when load is high. By optimizing the motor current, motor heat can be minimized and energy can be saved.



Motor temperature [Measured by Thermal Imaging Camera]



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

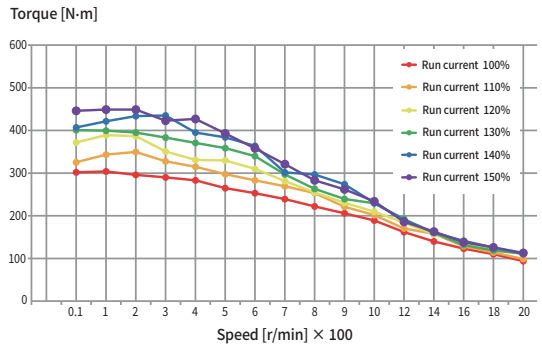


Motor Current
[Example of the Motor Current Control according to load]

High Torque

(Motor Current Setting)

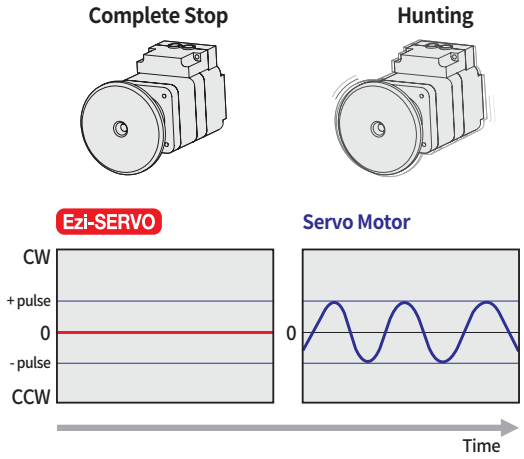
Ezi-SERVO features an internal voltage boosting circuit that increases the motor supply voltage above the drive's input voltage. This elevated motor voltage enhances torque at high speeds and allows the run current to be set up to 150 %. As a result, torque is also improved at low speeds. Ezi-SERVO can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



※ The torque at low speed is improved about 30 %
Measurement Conditions: Drive = Ezi-SERVO-CT-ALL-42L

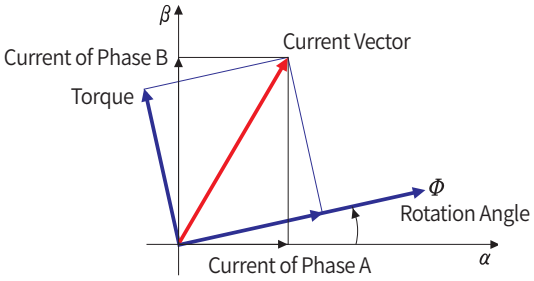
No Hunting

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.



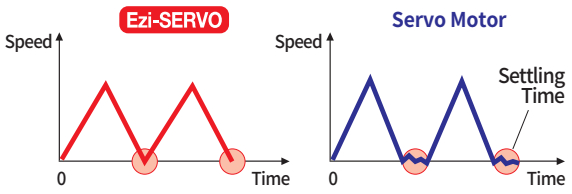
Smooth and Accurate Operation

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.



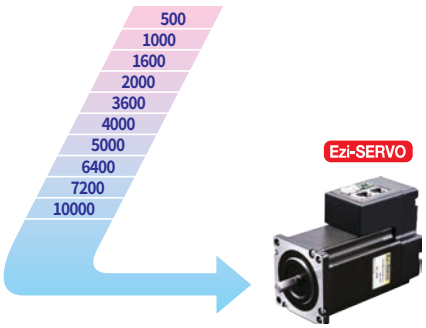
Fast Response

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.



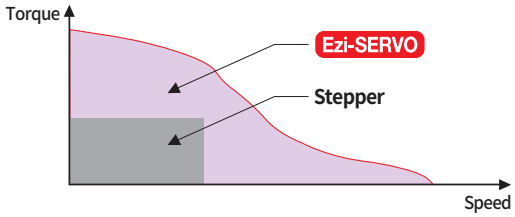
High Resolution

The unit of the position command can be divided precisely. (Max. 10,000 pulse/revolution)



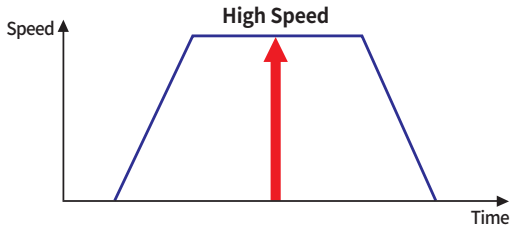
High Torque / Continuous Operation

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 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 : 2,000 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-CT-ALL Part Numbering

Ezi-SERVO-CT-ALL-56L-A-BK-PN5-R

Product Name

Drive Series

CT-ALL : CC-Link IE TSN ALL

Motor Flange Size

42 : 42 mm
56 : 56 mm
60 : 60 mm

Motor Length

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

Encoder Resolution

A : 10,000 P/R

Brake

Blank : Without Brake
BK : Brake

Gear Ratio

Blank : Without Gearbox
PN3 : 1:3
PN5 : 1:5
PN8 : 1:8
PN10 : 1:10
PN15 : 1:15
PN25 : 1:25
PN40 : 1:40
PN50 : 1:50

Connector Type

R : RJ45 connector

Standard Combination

Unit Part Number	Motor Model Number	Drive Model Number
Ezi-SERVO-CT-ALL-42M-A-R	Motor & Drive Integrated Unit	
Ezi-SERVO-CT-ALL-42L-A-R		
Ezi-SERVO-CT-ALL-42XL-A-R		
Ezi-SERVO-CT-ALL-56S-A-R		
Ezi-SERVO-CT-ALL-56M-A-R		
Ezi-SERVO-CT-ALL-56L-A-R		
Ezi-SERVO-CT-ALL-60S-A-R		
Ezi-SERVO-CT-ALL-60M-A-R		
Ezi-SERVO-CT-ALL-60L-A-R		

Combination with Brake

Unit Part Number	Motor Model Number	Drive Model Number
Ezi-SERVO-CT-ALL-42M-A-BK-R	Motor & Drive Integrated Unit	
Ezi-SERVO-CT-ALL-42L-A-BK-R		
Ezi-SERVO-CT-ALL-42XL-A-BK-R		
Ezi-SERVO-CT-ALL-56S-A-BK-R		
Ezi-SERVO-CT-ALL-56M-A-BK-R		
Ezi-SERVO-CT-ALL-56L-A-BK-R		
Ezi-SERVO-CT-ALL-60S-A-BK-R		
Ezi-SERVO-CT-ALL-60M-A-BK-R		
Ezi-SERVO-CT-ALL-60L-A-BK-R		

Combination with Gearbox

Unit Part Number	Motor Model Number	Drive Model Number	Gear Ratio
Ezi-SERVO-CT-ALL-42M-A-PN3-R	Motor & Drive Integrated Unit		1:3
Ezi-SERVO-CT-ALL-42M-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-42M-A-PN8-R			1:5
Ezi-SERVO-CT-ALL-42M-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-42M-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-42M-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-42M-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-42M-A-PN50-R			1:50
Ezi-SERVO-CT-ALL-42L-A-PN3-R			1:3
Ezi-SERVO-CT-ALL-42L-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-42L-A-PN8-R			1:8
Ezi-SERVO-CT-ALL-42L-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-42L-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-42L-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-42L-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-42L-A-PN50-R			1:50
Ezi-SERVO-CT-ALL-42XL-A-PN3-R			1:3
Ezi-SERVO-CT-ALL-42XL-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-42XL-A-PN8-R			1:8
Ezi-SERVO-CT-ALL-42XL-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-42XL-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-42XL-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-42XL-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-42XL-A-PN50-R			1:50

Unit Part Number	Motor Model Number	Drive Model Number	Gear Ratio
Ezi-SERVO-CT-ALL-56S-A-PN3-R	Motor & Drive Integrated Unit		1:3
Ezi-SERVO-CT-ALL-56S-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-56S-A-PN8-R			1:8
Ezi-SERVO-CT-ALL-56S-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-56S-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-56S-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-56S-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-56S-A-PN50-R			1:50
Ezi-SERVO-CT-ALL-56M-A-PN3-R			1:3
Ezi-SERVO-CT-ALL-56M-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-56M-A-PN8-R			1:8
Ezi-SERVO-CT-ALL-56M-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-56M-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-56M-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-56M-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-56M-A-PN50-R			1:50
Ezi-SERVO-CT-ALL-56L-A-PN3-R			1:3
Ezi-SERVO-CT-ALL-56L-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-56L-A-PN8-R			1:8
Ezi-SERVO-CT-ALL-56L-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-56L-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-56L-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-56L-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-56L-A-PN50-R			1:50

Combination with Gearbox

Unit Part Number	Motor Model Number	Drive Model Number	Gear Ratio
Ezi-SERVO-CT-ALL-60S-A-PN3-R	Motor & Drive Integrated Unit		1:3
Ezi-SERVO-CT-ALL-60S-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-60S-A-PN8-R			1:8
Ezi-SERVO-CT-ALL-60S-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-60S-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-60S-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-60S-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-60S-A-PN50-R			1:50
Ezi-SERVO-CT-ALL-60M-A-PN3-R			1:3
Ezi-SERVO-CT-ALL-60M-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-60M-A-PN8-R			1:8
Ezi-SERVO-CT-ALL-60M-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-60M-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-60M-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-60M-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-60M-B-PN40-R			
Ezi-SERVO-CT-ALL-60M-A-PN50-R			1:50
Ezi-SERVO-CT-ALL-60L-A-PN3-R			1:3
Ezi-SERVO-CT-ALL-60L-A-PN5-R			1:5
Ezi-SERVO-CT-ALL-60L-A-PN8-R			1:8
Ezi-SERVO-CT-ALL-60L-A-PN10-R			1:10
Ezi-SERVO-CT-ALL-60L-A-PN15-R			1:15
Ezi-SERVO-CT-ALL-60L-A-PN25-R			1:25
Ezi-SERVO-CT-ALL-60L-A-PN40-R			1:40
Ezi-SERVO-CT-ALL-60L-A-PN50-R			1:50

Specifications of Drive

<table>
<tr><th colspan="2">Model</th><th>Ezi-SERVO-CT-ALL-42 series</th><th>Ezi-SERVO-CT-ALL-56 series</th><th>Ezi-SERVO-CT-ALL-60 series</th></tr>
<tr><td colspan="2">Input Voltage</td><td colspan="3">24 V DC ± 10 %</td></tr>
<tr><td colspan="2">Control Method</td><td colspan="3">Closed loop control with 32 bit MCU</td></tr>
<tr><td colspan="2">Current Consumption</td><td colspan="3">Max. 500 mA (Except motor current)</td></tr>
<tr><td rowspan="3">Operating Condition</td><td>Ambient Temperature</td><td colspan="3">· In Use: 0 ~ 50 °C
· In Storage : -20 ~ 70 °C</td></tr>
<tr><td>Humidity</td><td colspan="3">· In Use: 35 ~ 85 % RH (Non-Condensing)
· In Storage: 10 ~ 90 % RH (Non-Condensing)</td></tr>
<tr><td>Vib. Resist.</td><td colspan="3">0.5 g</td></tr>
<tr><td rowspan="3">Function</td><td>Rotation Speed</td><td colspan="3">0 ~ 2,000 r/min *1</td></tr>
<tr><td>Resolution</td><td colspan="3">Encoder Resolution [P/R] | Configurable Resolution [P/R]
10,000 | 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000
(Selectable by parameter)</td></tr>
<tr><td>Error Type</td><td colspan="3">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, Torque Off Circuit Error</td></tr>
<tr><td rowspan="3">CC-Link IE TSN</td><td>Communication Protocol</td><td colspan="3">CC-Link IE TSN Class B</td></tr>
<tr><td>Operation Mode</td><td colspan="3">CiA402 Drive Profile: Cyclic Synchronous Position Mode, Profile Position Mode, Homing Mode</td></tr>
<tr><td>Synchronization</td><td colspan="3">Minimum Cycle Time: 250 µs / Synchronous Comm. (CSP, PP, HM) / Asynchronous Comm. (PP, HM)</td></tr>
<tr><td rowspan="2">I/O Signal</td><td>Input Signals</td><td colspan="3">3 dedicated inputs (LIMIT+, LIMIT-, ORIGIN), 3 user inputs (photocoupler inputs)</td></tr>
<tr><td>Output Signals</td><td colspan="3">2 user outputs (photocoupler outputs), 1 brake signal output</td></tr>
</table>

*1: Up to the resolution of 10,000 P/R, maximum speed can be reached by 2,000 r/min and with the resolution more than 10,000 P/R, maximum speed shall be reduced accordingly.

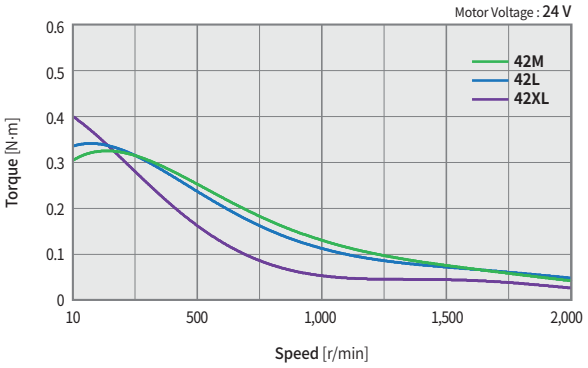
Specifications of Motor

MODEL				Ezi-SERVO-CT-ALL-42 series			Ezi-SERVO-CT-ALL-56 series		
			UNIT	42M	42L	42XL	56S	56M	56L
Drive method			-	Bipolar					
Number of phase			-	2 Phase					
Current per Phase			A/Phase	1.2	1.2	1.2	3.0	3.0	3.0
Maximum Holding Torque			N·m	0.44	0.5	0.65	0.64	1.0	1.5
Rotor Inertia			g·cm²	54	77	114	180	280	520
Motor Weight			kg	0.440	0.520	0.660	0.760	0.920	1.360
Length (L)			mm	40	48	60	46	55	80
Permissible Radial Load	Distance From End of Shaft	3 mm	N	22	22	22	52	52	52
		8 mm		26	26	26	65	65	65
		13 mm		33	33	33	85	85	85
		18 mm		46	46	46	123	123	123
Permissible Axial Load			N	Must be less than the motor 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					

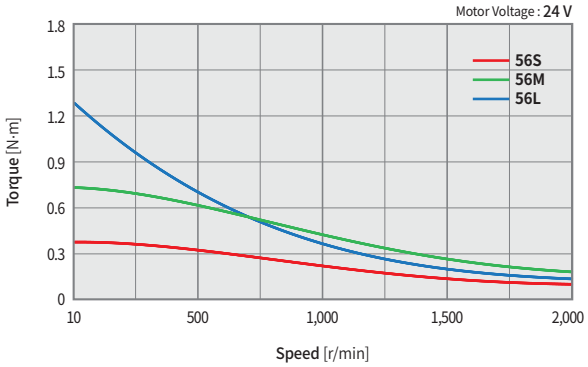
MODEL				Ezi-SERVO-CT-ALL-60 series		
			UNIT	60S	60M	60L
Drive method			-	Bipolar		
Number of phase			-	2 Phase		
Current per Phase			A/Phase	4.0	4.0	4.0
Maximum Holding Torque			N·m	0.88	1.28	2.4
Rotor Inertia			g·cm²	240	490	690
Motor Weight			kg	0.840	0.980	1.540
Length (L)			mm	47	56	85
Permissible Radial Load	Distance From End of Shaft	3 mm	N	70	70	70
		8 mm		87	87	87
		13 mm		114	114	114
		18 mm		165	165	165
Permissible Axial Load			N	Must be less than the motor 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

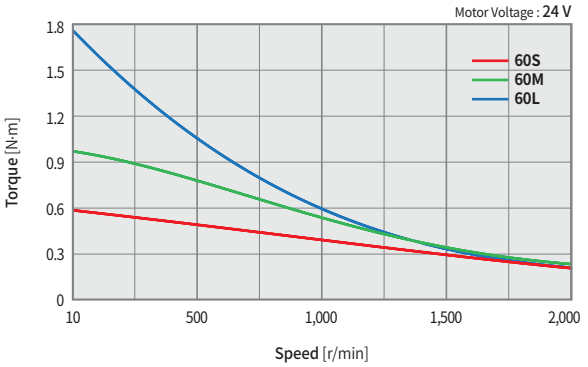
Ezi-SERVO-CT-ALL-42 series



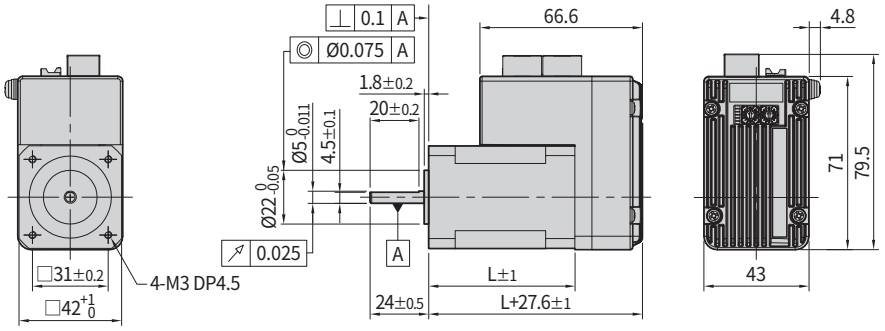
Ezi-SERVO-CT-ALL-56 series



Ezi-SERVO-CT-ALL-60 series

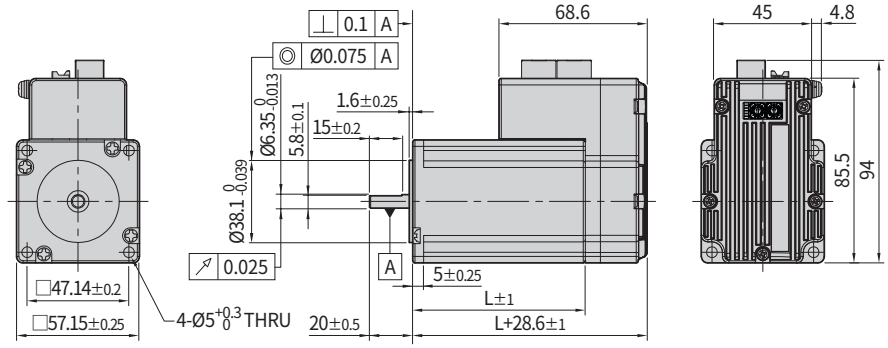


Dimensions of Motor [mm]



42 mm

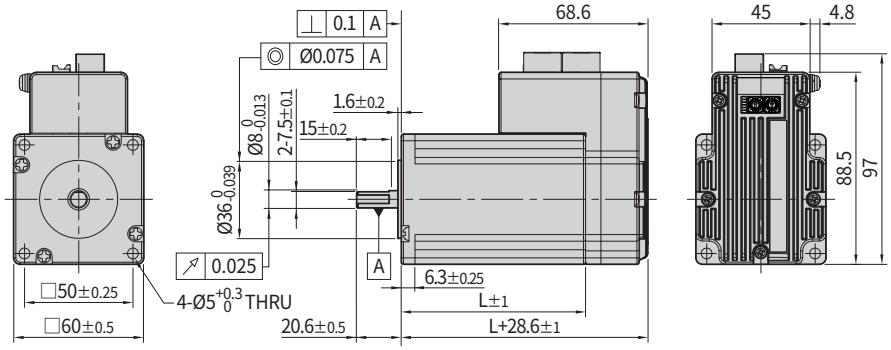
Model name	Length (L)
42M	40
42L	48
42XL	60



56 mm

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

※ There are 2 kinds size of front shaft diameter for Ezi-SERVO-CT-ALL-56 type as Ø 6.35 and Ø 8.0.



60 mm

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

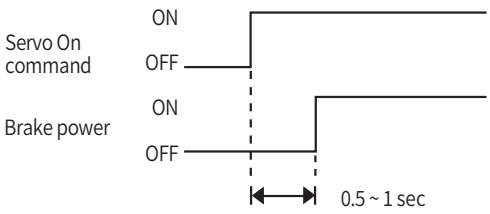
Specifications of Motor with Brake

Unit Part Number	Motor Model Name	Electromagnetic Brake					Motor 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	
Ezi-SERVO-CT-ALL-42M-■-BK-▲	Motor & Drive Integrated	Non-excitation run Type	24 V DC ± 10 %	0.2	5	0.2	0.700	22	26	33	46	Must be less than the motor weight
Ezi-SERVO-CT-ALL-42L-■-BK-▲							0.780					
Ezi-SERVO-CT-ALL-42XL-■-BK-▲							0.920					
Ezi-SERVO-CT-ALL-56S-■-BK-▲				0.27	6.6	0.7	1.180	52	65	85	123	
Ezi-SERVO-CT-ALL-56M-■-BK-▲							1.340					
Ezi-SERVO-CT-ALL-56L-■-BK-▲							1.780					
Ezi-SERVO-CT-ALL-60S-■-BK-▲							1.280	70	87	114	165	
Ezi-SERVO-CT-ALL-60M-■-BK-▲							1.420					
Ezi-SERVO-CT-ALL-60L-■-BK-▲							1.980					

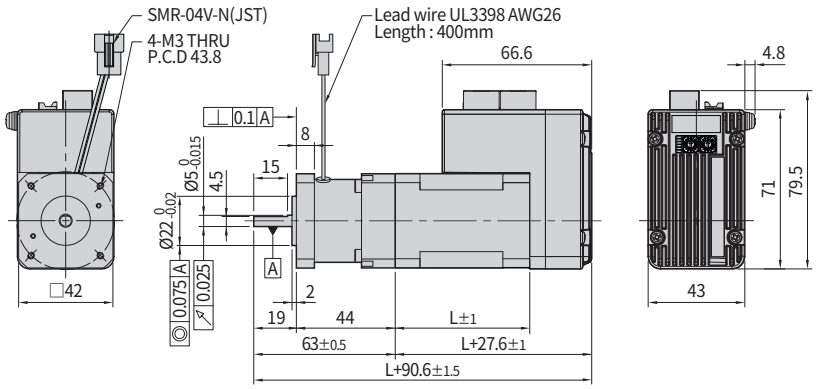
* "■" indicates the encoder resolution.
* "▲" indicates the connector type.
* The electromagnetic brake can be used to hold position when the power is turned OFF. Do not use it for braking purposes.
* The motor weight refers to the total weight of the motor, including the integrated electromagnetic brake.
* The motor specifications and torque characteristics are identical to those of the standard motor.

* Brake Operation Timing Chart

The Ezi-SERVO-CT-ALL automatically controls the brake via the drive. If you choose not to use the brake control function of the Ezi-SERVO-CT-ALL and instead control the brake via an external controller, please refer to the timing chart on the right and ensure that the brake power is applied accordingly. Failure to do so may cause the drive to malfunction or the load to fall. Also, be careful not to operate the brake while the motor is rotating, as it may damage the product.

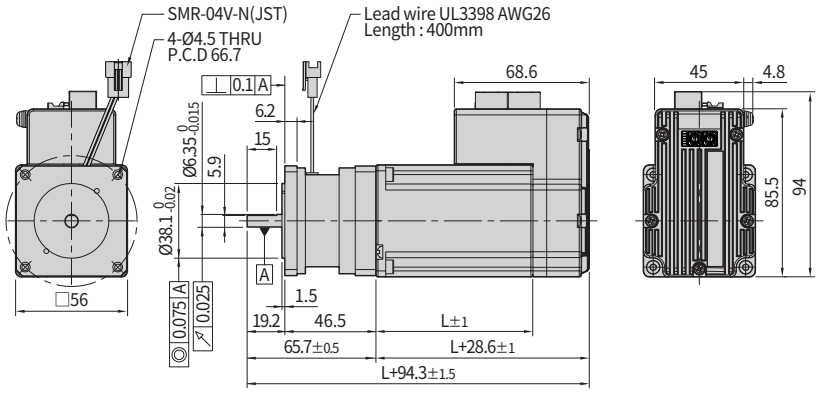


Dimensions of Motor with Brake [mm]



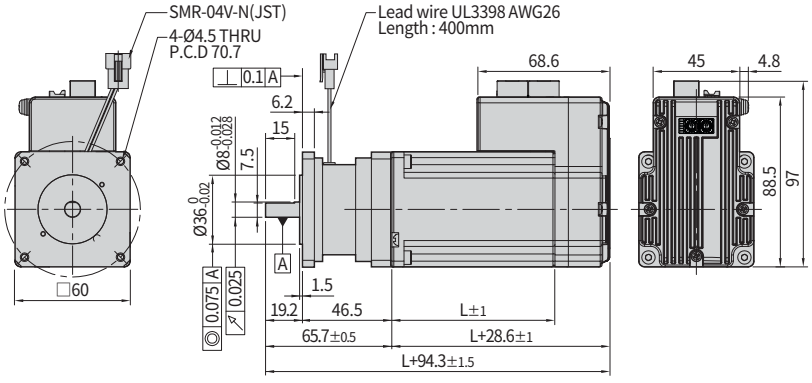
42 mm

Model name	Length (L)
42M	40
42L	48
42XL	60



56 mm

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



60 mm

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

How to Read Specifications

Unit Part Number	① Maximum Holding Torque [N·m]	② Rotor Inertia Moment [kg·m²]	③ Backlash [arc-min]	④ Angle Transmission Error [arc-min]	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 Motor Weight [kg]	⑪ Permissible Radial Load (At Center of Axis) [N]	⑫ Permissible Axial Load [N]
Ezi-SERVO-CT-ALL-42M-■-PN3-▲	0.85	54×10^{-7}	3	5	3	0.012 °	6	12	0 ~ 1000	0.90	240	270
Ezi-SERVO-CT-ALL-42M-■-PN5-▲	1.42				5	0.0072 °	9	18	0 ~ 600		290	330
Ezi-SERVO-CT-ALL-42M-■-PN8-▲	2.28				8	0.0045 °	9	18	0 ~ 375		340	410
Ezi-SERVO-CT-ALL-42M-■-PN10-▲	2.85				10	0.0036 °	6	12	0 ~ 300		360	450
Ezi-SERVO-CT-ALL-42M-■-PN15-▲	4.14		5	7	15	0.0024 °	6	12	0 ~ 200	1.06	410	540
Ezi-SERVO-CT-ALL-42M-■-PN25-▲	6.90				25	0.00144 °	9	18	0 ~ 120		490	640
Ezi-SERVO-CT-ALL-42M-■-PN40-▲	9.00				40	0.0009 °	9	18	0 ~ 75		570	640
Ezi-SERVO-CT-ALL-42M-■-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. (Based on 100 % of stop current) 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. (When the input rotation speed is 2,000 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	Motor 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

Unit Part Number	Maximum Holding Torque [N·m]	Rotor Inertia Moment [kg·m²]	Backlash [arc-min]	Angle Transmission Error [arc-min]	Gear Ratio	Resolution (10,000 P/R Standard)	Permissible Torque [N·m]	Instantaneous Maximum Torque [N·m]	Permissible Speed Range [r/min]	Motor Weight [kg]	Permissible Radial Load (At Center of Axis) [N]	Permissible Axial Load [N]
Ezi-SERVO-CT-ALL-42M-■-PN3-▲	0.85	54×10^{-7}	3	5	3	0.012 °	6	12	0 ~ 1000	0.90	240	270
Ezi-SERVO-CT-ALL-42M-■-PN5-▲	1.42				5	0.0072 °	9	18	0 ~ 600		290	330
Ezi-SERVO-CT-ALL-42M-■-PN8-▲	2.28				8	0.0045 °	9	18	0 ~ 375		340	410
Ezi-SERVO-CT-ALL-42M-■-PN10-▲	2.85				10	0.0036 °	6	12	0 ~ 300		360	450
Ezi-SERVO-CT-ALL-42M-■-PN15-▲	4.14		5	7	15	0.0024 °	6	12	0 ~ 200	1.06	410	540
Ezi-SERVO-CT-ALL-42M-■-PN25-▲	6.90				25	0.00144 °	9	18	0 ~ 120		490	640
Ezi-SERVO-CT-ALL-42M-■-PN40-▲	9.00				40	0.0009 °	9	18	0 ~ 75		570	640
Ezi-SERVO-CT-ALL-42M-■-PN50-▲	9.00				50	0.00072 °	9	18	0 ~ 60		620	640
Ezi-SERVO-CT-ALL-42L-■-PN3-▲	0.92	77×10^{-7}	3	5	3	0.012 °	6	12	0 ~ 1000	0.98	240	270
Ezi-SERVO-CT-ALL-42L-■-PN5-▲	1.54				5	0.0072 °	9	18	0 ~ 600		290	330
Ezi-SERVO-CT-ALL-42L-■-PN8-▲	2.47				8	0.0045 °	9	18	0 ~ 375		340	410
Ezi-SERVO-CT-ALL-42L-■-PN10-▲	3.09				10	0.0036 °	6	12	0 ~ 300		360	450
Ezi-SERVO-CT-ALL-42L-■-PN15-▲	4.49		5	7	15	0.0024 °	6	12	0 ~ 200	1.14	410	540
Ezi-SERVO-CT-ALL-42L-■-PN25-▲	7.49				25	0.00144 °	9	18	0 ~ 120		490	640
Ezi-SERVO-CT-ALL-42L-■-PN40-▲	9.00				40	0.0009 °	9	18	0 ~ 75		570	640
Ezi-SERVO-CT-ALL-42L-■-PN50-▲	9.00				50	0.00072 °	9	18	0 ~ 60		620	640
Ezi-SERVO-CT-ALL-42XL-■-PN3-▲	1.45	114×10^{-7}	3	5	3	0.012 °	6	12	0 ~ 1000	1.12	240	270
Ezi-SERVO-CT-ALL-42XL-■-PN5-▲	2.42				5	0.0072 °	9	18	0 ~ 600		290	330
Ezi-SERVO-CT-ALL-42XL-■-PN8-▲	3.87				8	0.0045 °	9	18	0 ~ 375		340	410
Ezi-SERVO-CT-ALL-42XL-■-PN10-▲	4.84				10	0.0036 °	6	12	0 ~ 300		360	450
Ezi-SERVO-CT-ALL-42XL-■-PN15-▲	6.00		5	7	15	0.0024 °	6	12	0 ~ 200	1.28	410	540
Ezi-SERVO-CT-ALL-42XL-■-PN25-▲	9.00				25	0.00144 °	9	18	0 ~ 120		490	640
Ezi-SERVO-CT-ALL-42XL-■-PN40-▲	9.00				40	0.0009 °	9	18	0 ~ 75		570	640
Ezi-SERVO-CT-ALL-42XL-■-PN50-▲	9.00				50	0.00072 °	9	18	0 ~ 60		620	640

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.

Specifications of Motor with Gearbox

56mm

Unit Part Number	Maximum Holding Torque [N·m]	Rotor Inertia Moment [kg·m²]	Backlash [arc-min]	Angle Transmission Error [arc-min]	Gear Ratio	Resolution (10,000 P/R Standard)	Permissible Torque [N·m]	Instantaneous Maximum Torque [N·m]	Permissible Speed Range [r/min]	Motor Weight [kg]	Permissible Radial Load (At Center of Axis) [N]	Permissible Axial Load [N]
Ezi-SERVO-CT-ALL-56S-■-PN3-▲	1.1	180×10^{-7}	3	5	3	0.012°	18	35	0 ~ 1000	1.90	430	310
Ezi-SERVO-CT-ALL-56S-■-PN5-▲	1.9				5	0.0072°	27	50	0 ~ 600		510	390
Ezi-SERVO-CT-ALL-56S-■-PN8-▲	3.0				8	0.0045°	27	50	0 ~ 375		600	480
Ezi-SERVO-CT-ALL-56S-■-PN10-▲	3.8				10	0.0036°	18	35	0 ~ 300		640	530
Ezi-SERVO-CT-ALL-56S-■-PN15-▲	5.5				15	0.0024°	18	35	0 ~ 200	2.20	740	630
Ezi-SERVO-CT-ALL-56S-■-PN25-▲	9.3				25	0.00144°	27	50	0 ~ 120		870	790
Ezi-SERVO-CT-ALL-56S-■-PN40-▲	14.9				40	0.0009°	27	50	0 ~ 75		1000	970
Ezi-SERVO-CT-ALL-56S-■-PN50-▲	18.6				50	0.00072°	27	50	0 ~ 60		1100	1100
Ezi-SERVO-CT-ALL-56M-■-PN3-▲	2.0	280×10^{-7}	3	5	3	0.012°	18	35	0 ~ 1000	2.06	430	310
Ezi-SERVO-CT-ALL-56M-■-PN5-▲	3.4				5	0.0072°	27	50	0 ~ 600		510	390
Ezi-SERVO-CT-ALL-56M-■-PN8-▲	5.4				8	0.0045°	27	50	0 ~ 375		600	480
Ezi-SERVO-CT-ALL-56M-■-PN10-▲	6.8				10	0.0036°	18	35	0 ~ 300		640	530
Ezi-SERVO-CT-ALL-56M-■-PN15-▲	9.9				15	0.0024°	18	35	0 ~ 200	2.36	740	630
Ezi-SERVO-CT-ALL-56M-■-PN25-▲	16.6				25	0.00144°	27	50	0 ~ 120		870	790
Ezi-SERVO-CT-ALL-56M-■-PN40-▲	27.0				40	0.0009°	27	50	0 ~ 75		1000	970
Ezi-SERVO-CT-ALL-56M-■-PN50-▲	27.0				50	0.00072°	27	50	0 ~ 60		1100	1100
Ezi-SERVO-CT-ALL-56L-■-PN3-▲	4.0	520×10^{-7}	3	5	3	0.012°	18	35	0 ~ 1000	2.50	430	310
Ezi-SERVO-CT-ALL-56L-■-PN5-▲	6.8				5	0.0072°	27	50	0 ~ 600		510	390
Ezi-SERVO-CT-ALL-56L-■-PN8-▲	10.8				8	0.0045°	27	50	0 ~ 375		600	480
Ezi-SERVO-CT-ALL-56L-■-PN10-▲	13.6				10	0.0036°	18	35	0 ~ 300		640	530
Ezi-SERVO-CT-ALL-56L-■-PN15-▲	18.0				15	0.0024°	18	35	0 ~ 200	2.80	740	630
Ezi-SERVO-CT-ALL-56L-■-PN25-▲	27.0				25	0.00144°	27	50	0 ~ 120		870	790
Ezi-SERVO-CT-ALL-56L-■-PN40-▲	27.0				40	0.0009°	27	50	0 ~ 75		1000	970
Ezi-SERVO-CT-ALL-56L-■-PN50-▲	27.0				50	0.00072°	27	50	0 ~ 60		1100	1100

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.

Specifications of Motor with Gearbox

60mm

Unit Part Number	Maximum Holding Torque [N·m]	Rotor Inertia Moment [kg·m²]	Backlash [arc-min]	Angle Transmission Error [arc-min]	Gear Ratio	Resolution (10,000 P/R Standard)	Permissible Torque [N·m]	Instantaneous Maximum Torque [N·m]	Permissible Speed Range [r/min]	Motor Weight [kg]	Permissible Radial Load (At Center of Axis) [N]	Permissible Axial Load [N]
Ezi-SERVO-CT-ALL-60S-■-PN3-▲	1.5	240 x 10^{-7}	3	5	3	0.012°	18	35	0 ~ 1000	1.98	430	310
Ezi-SERVO-CT-ALL-60S-■-PN5-▲	2.5				5	0.0072°	27	50	0 ~ 600		510	390
Ezi-SERVO-CT-ALL-60S-■-PN8-▲	4.0				8	0.0045°	27	50	0 ~ 375		600	480
Ezi-SERVO-CT-ALL-60S-■-PN10-▲	5.1				10	0.0036°	18	35	0 ~ 300		640	530
Ezi-SERVO-CT-ALL-60S-■-PN15-▲	7.4				15	0.0024°	18	35	0 ~ 200	2.28	740	630
Ezi-SERVO-CT-ALL-60S-■-PN25-▲	12.3				25	0.00144°	27	50	0 ~ 120		870	790
Ezi-SERVO-CT-ALL-60S-■-PN40-▲	19.8				40	0.0009°	27	50	0 ~ 75		1000	970
Ezi-SERVO-CT-ALL-60S-■-PN50-▲	24.7				50	0.00072°	27	50	0 ~ 60		1100	1100
Ezi-SERVO-CT-ALL-60M-■-PN3-▲	2.6	490 x 10^{-7}	3	5	3	0.012°	18	35	0 ~ 1000	2.12	430	310
Ezi-SERVO-CT-ALL-60M-■-PN5-▲	4.4				5	0.0072°	27	50	0 ~ 600		510	390
Ezi-SERVO-CT-ALL-60M-■-PN8-▲	7.0				8	0.0045°	27	50	0 ~ 375		600	480
Ezi-SERVO-CT-ALL-60M-■-PN10-▲	8.8				10	0.0036°	18	35	0 ~ 300		640	530
Ezi-SERVO-CT-ALL-60M-■-PN15-▲	12.8				15	0.0024°	18	35	0 ~ 200	2.42	740	630
Ezi-SERVO-CT-ALL-60M-■-PN25-▲	21.4				25	0.00144°	27	50	0 ~ 120		870	790
Ezi-SERVO-CT-ALL-60M-■-PN40-▲	27.0				40	0.0009°	27	50	0 ~ 75		1000	970
Ezi-SERVO-CT-ALL-60M-■-PN50-▲	27.0				50	0.00072°	27	50	0 ~ 60		1100	1100
Ezi-SERVO-CT-ALL-60L-■-PN3-▲	5.2	690 x 10^{-7}	3	5	3	0.012°	18	35	0 ~ 1000	2.68	430	310
Ezi-SERVO-CT-ALL-60L-■-PN5-▲	8.7				5	0.0072°	27	50	0 ~ 600		510	390
Ezi-SERVO-CT-ALL-60L-■-PN8-▲	13.9				8	0.0045°	27	50	0 ~ 375		600	480
Ezi-SERVO-CT-ALL-60L-■-PN10-▲	18.0				10	0.0036°	18	35	0 ~ 300		640	530
Ezi-SERVO-CT-ALL-60L-■-PN15-▲	18.0				15	0.0024°	18	35	0 ~ 200	2.98	740	630
Ezi-SERVO-CT-ALL-60L-■-PN25-▲	27.0				25	0.00144°	27	50	0 ~ 120		870	790
Ezi-SERVO-CT-ALL-60L-■-PN40-▲	27.0				40	0.0009°	27	50	0 ~ 75		1000	970
Ezi-SERVO-CT-ALL-60L-■-PN50-▲	27.0				50	0.00072°	27	50	0 ~ 60		1100	1100

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.

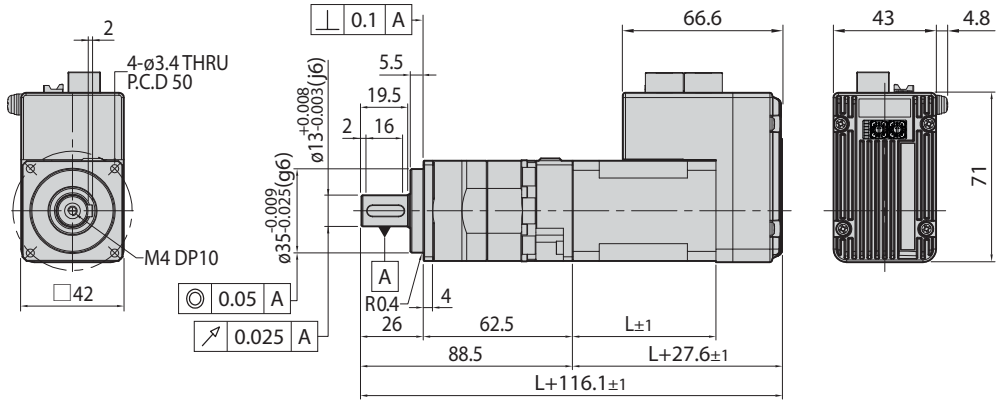
Dimensions of Motor with Gearbox [mm]

Single Stage

42mm

Unit Part Number	Motor	Stage	□Gear Ratio	L [mm]
Ezi-SERVO-CT-ALL-42M-■-PN□-▲	Motor & Drive Integrated	Single Stage	3, 5, 8, 10	40
Ezi-SERVO-CT-ALL-42L-■-PN□-▲			3, 5, 8, 10	48
Ezi-SERVO-CT-ALL-42XL-■-PN□-▲			3, 5, 8, 10	60

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.

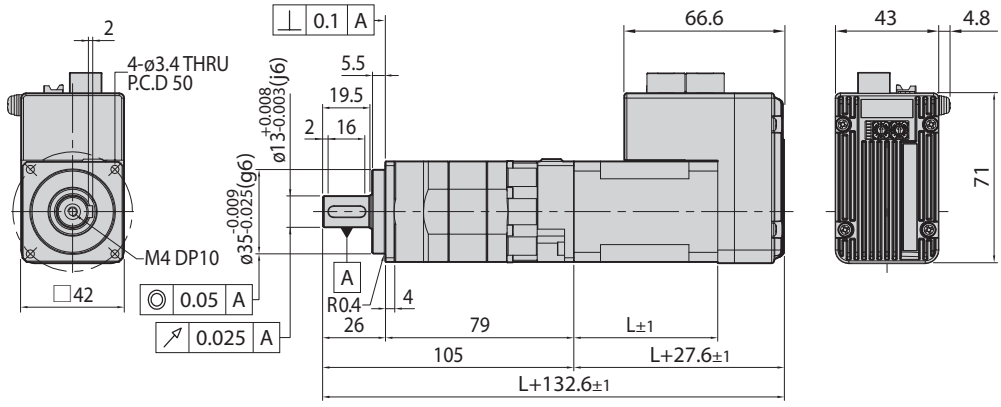


Double Stage

42mm

Unit Part Number	Motor	Stage	□Gear Ratio	L [mm]
Ezi-SERVO-CT-ALL-42M-■-PN□-▲	Motor & Drive Integrated	Double Stage	15, 25, 40, 50	40
Ezi-SERVO-CT-ALL-42L-■-PN□-▲			15, 25, 40, 50	48
Ezi-SERVO-CT-ALL-42XL-■-PN□-▲			15, 25, 40, 50	60

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.



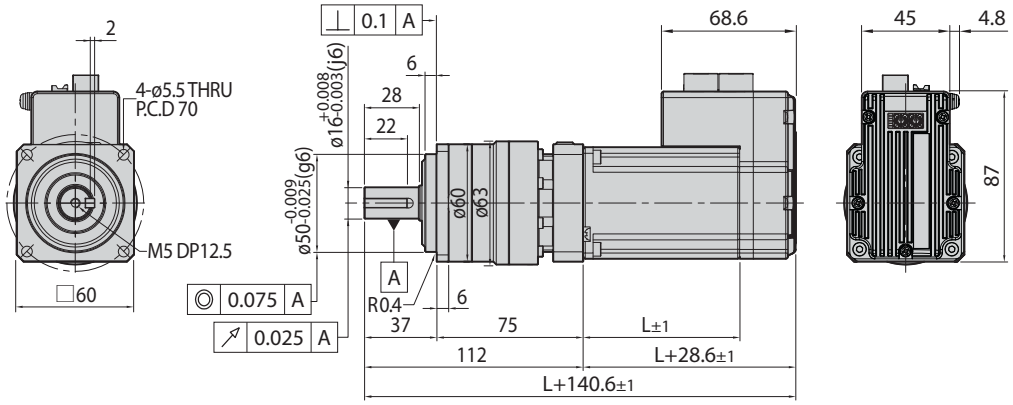
Dimensions of Motor with Gearbox [mm]

Single Stage

56mm

Unit Part Number	Motor	Stage	□Gear Ratio	L [mm]
Ezi-SERVO-CT-ALL-56S-■-PN□-▲	Motor & Drive Integrated	Single Stage	3, 5, 8, 10	46
Ezi-SERVO-CT-ALL-56M-■-PN□-▲			3, 5, 8, 10	55
Ezi-SERVO-CT-ALL-56L-■-PN□-▲			3, 5, 8, 10	80

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.

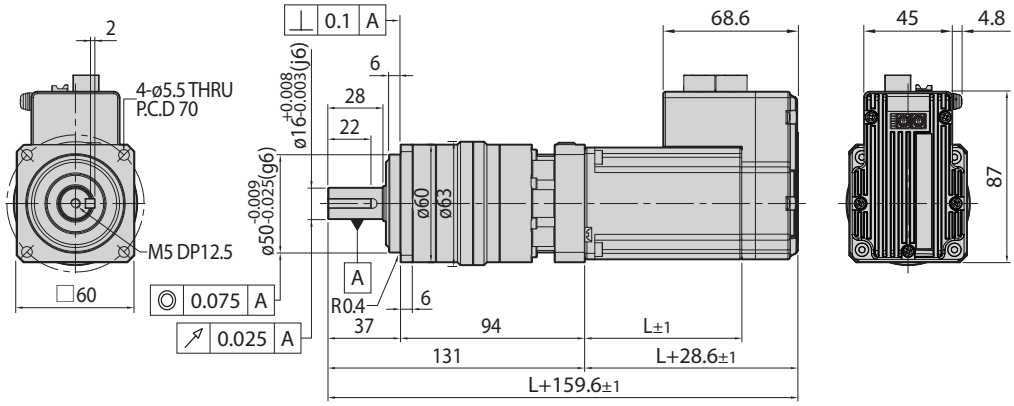


Double Stage

56mm

Unit Part Number	Motor	Stage	□Gear Ratio	L [mm]
Ezi-SERVO-CT-ALL-56S-■-PN□-▲	Motor & Drive Integrated	Double Stage	15, 25, 40, 50	46
Ezi-SERVO-CT-ALL-56M-■-PN□-▲			15, 25, 40, 50	55
Ezi-SERVO-CT-ALL-56L-■-PN□-▲			15, 25, 40, 50	80

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.



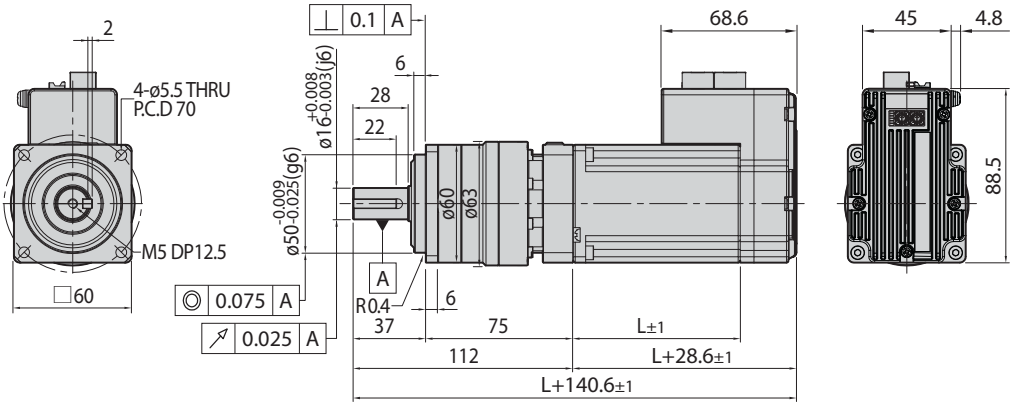
Dimensions of Motor with Gearbox [mm]

Single Stage

60mm

Unit Part Number	Motor	Stage	□Gear Ratio	L [mm]
Ezi-SERVO-CT-ALL-60S-■-PN□-▲	Motor & Drive Integrated	Single Stage	3, 5, 8, 10	47
Ezi-SERVO-CT-ALL-60M-■-PN□-▲			3, 5, 8, 10	56
Ezi-SERVO-CT-ALL-60L-■-PN□-▲			3, 5, 8, 10	85

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.

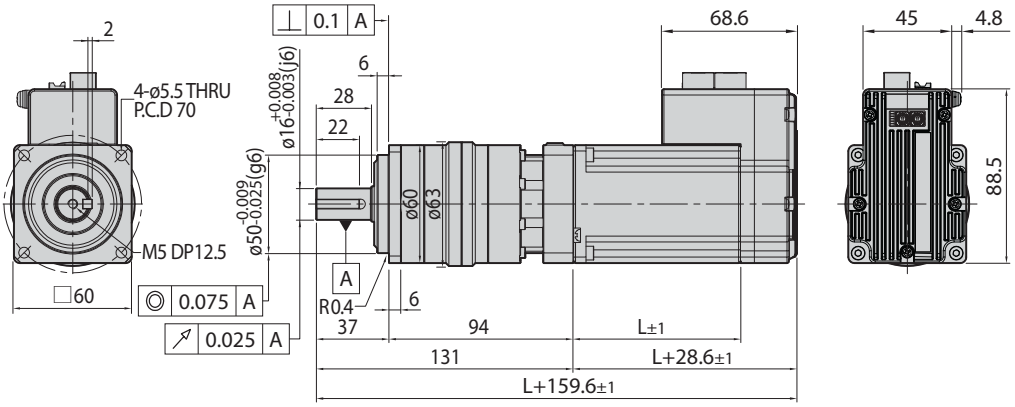


Double Stage

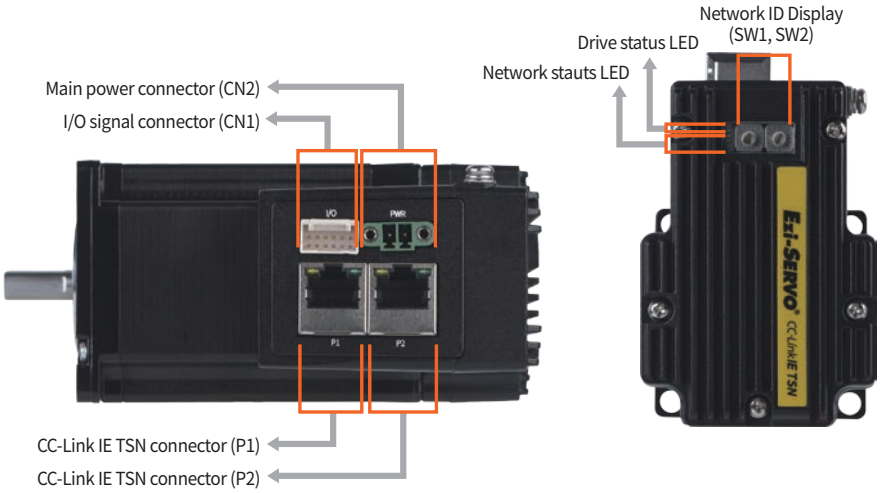
60mm

Unit Part Number	Motor	Stage	□Gear Ratio	L [mm]
Ezi-SERVO-CT-ALL-60S-■-PN□-▲	Motor & Drive Integrated	Double Stage	15, 25, 40, 50	47
Ezi-SERVO-CT-ALL-60M-■-PN□-▲			15, 25, 40, 50	56
Ezi-SERVO-CT-ALL-60L-■-PN□-▲			15, 25, 40, 50	85

* "■" indicates the encoder resolution.
* "▲" indicates the connector type.

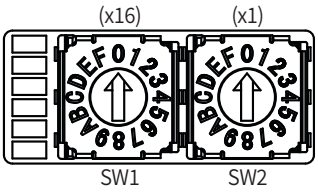


Names and Functions of Each Part



1. Network ID Switch (SW1, SW2)

These switches are used to configure the fourth octet of the IP address. The value is displayed on the 7-segment LED in hexadecimal format. SW1 sets the X16 digit, and SW2 sets the X1 digit. (For more details, please refer to the relevant user manual.)



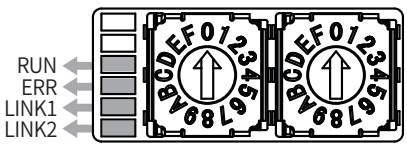
2. Network Status LED

Indicates the current communication status of the CC-Link IE TSN network.

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

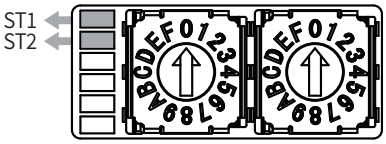
Indicator	Color	Status	Description
LINK1/ LINK2	Green	OFF	Link inactive
		ON	Link active



3. Drive Status LED

LED informs operation status of the drive.

LED Display	LED Status	Description
ST1 : ST2 :	ST1 blinks, and ST2 is off.	Servo Off state
ST1 : ST2 :	ST1 is on, and ST2 is off.	Servo On state
ST1 : ST2 :	Both ST1 and ST2 are on.	Operation
ST1 : ST2 :	ST1 and ST2 blink alternately.	Position error exceeding the set value has occurred while the motor is stopped.
ST1 : ST2 :	ST1 is off, and ST2 blinks repeatedly based on the specific error type.	Error state



List of error types by the number of ST2 LED blinking

No.	Error Code	Causes
1	Over Current Error	The current through power devices in drive exceeds the limit. *1
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 *2
4	Over Load Error	Load exceeding the motor's maximum torque is applied for more than 5 seconds
5	Over Temperature Error	Internal temperature of the drive exceeds 85 °C
6	Over Regenerative Voltage Error	Back-EMF is higher than limit value *3
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
10	In-Position Error	Position Error of More Than One Pulse Persists for Over 3 Seconds After Operation is Completed
12	ROM Error	Error occurs in parameter storage device(ROM)
14	Position Overflow Error	Position error value is greater than the reference value while the motor is stopped
15	Abnormal Safety State Error	Input states of TQOFF1 and TQOFF2 are different from each other. *2

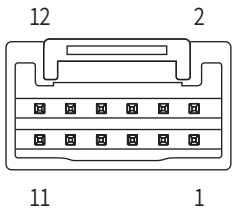
*1: Limit value depends on motor model. (Refer to the Manual)
*2: The default setting value is 180 °, and it can be changed by parameter. (Refer to the Manual)
*3: Voltage limit of Back-EMF depends on motor model. (Refer to the Manual)
※ Please refer to user Manual for the details of protection functions.



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

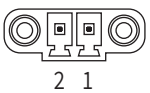
4. I/O Signal Connector (CN1)

No.	Function	I/O
1	EXT_24 V DC	Input
2	EXT_GND	Input
3	BRAKE+	Output
4	BRAKE-	Output
5	LIMIT+	Input
6	LIMIT-	Input
7	ORIGIN	Input
8	Digital In1	Input
9	Digital In2	Input
10	Digital In3	Input
11	Digital Out1	Output
12	Digital Out2	Output



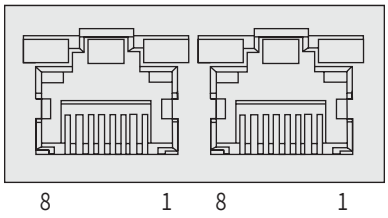
5. Main Power Connector (CN2)

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

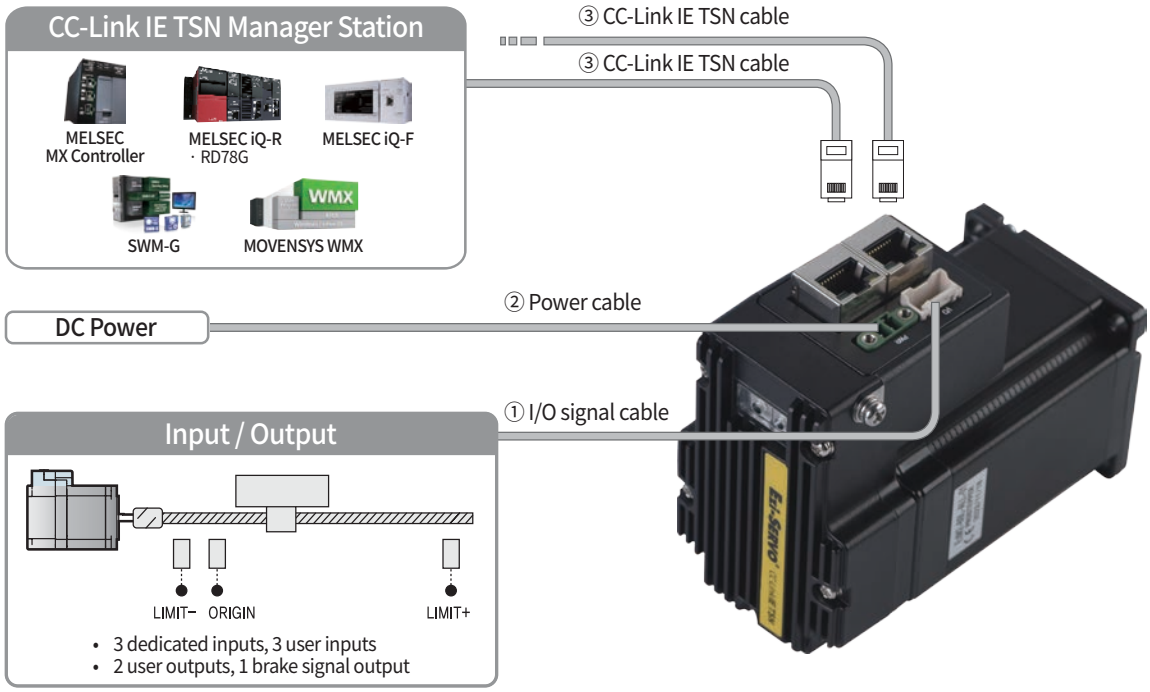


6. CC-Link IE TSN Connector (P1, P2)

No.	Function	No.	Function
1	DA+	6	DB-
2	DA-	7	DD+
3	DB+	8	DD-
4	DC+	Connector hood	F.GND
5	DC-		



System Configuration [R Type]



Cable Type	Max. Cable Length	Remarks
① I/O Signal Cable	20 m	Options (Sold separately)
② Power Cable	2 m	
③ CC-Link IE TSN Cable	100 m	

1. Accessories

Connectors

These are connector specifications for drive cabling.

Purpose	Item	Part Number	Manufacturer
Main Power (CN2)	Terminal Block	MC421-38102	DECA
I/O Signal (CN1)	Housing	501646-1200	MOLEX
	Terminal	501648-1000 (AWG 26 ~ 28)	

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 ALL drive and other input / output devices.

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

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

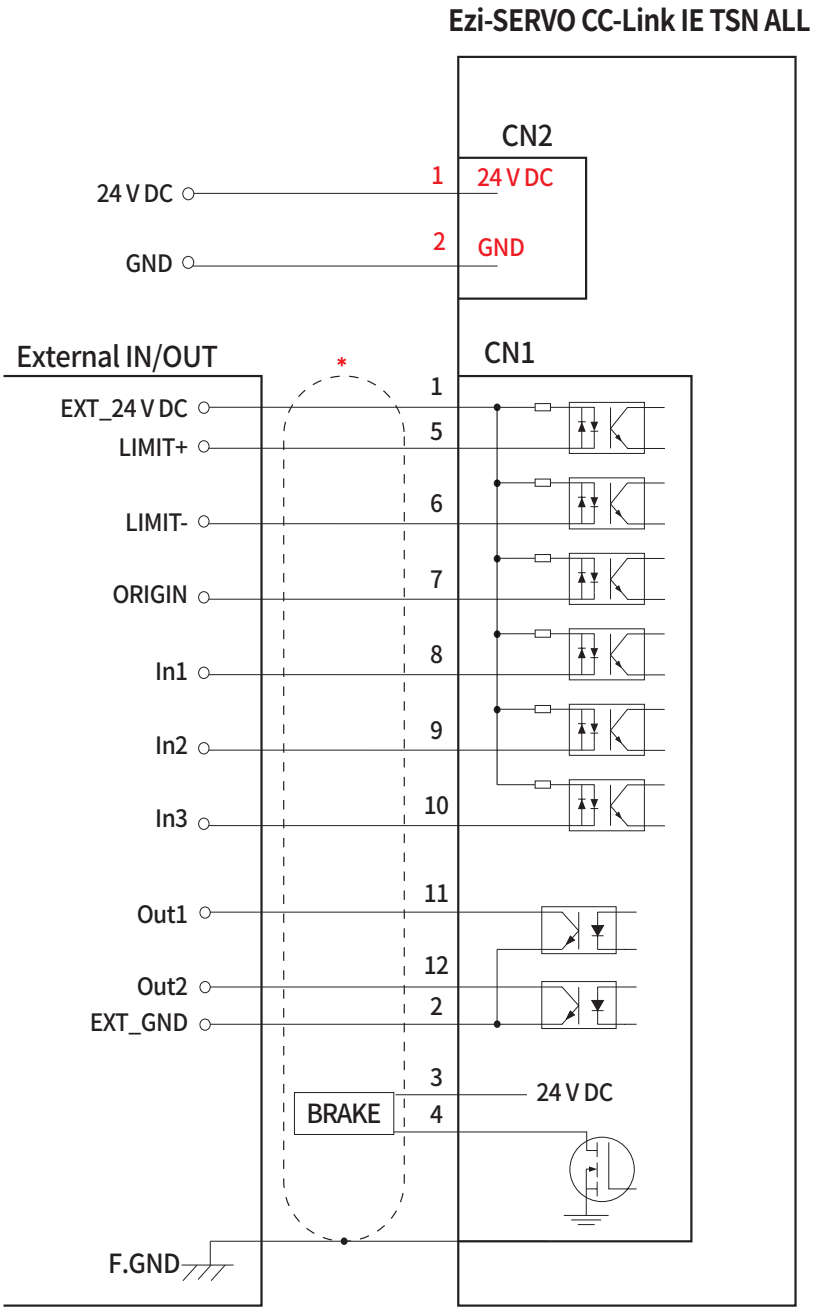
Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - Power Connection	CSVA-P-001F	1	Fixed Cable	Max. Cable Length: 2 m
	CSVA-P-002F	2		
	CSVA-P-001M	1	Flexible Cable	
	CSVA-P-002M	2		

③ CC-Link IE TSN Cable

Purpose	Part Number	Length [m]	Cable Type	Remarks
CC-Link IE TSN Connection	CGNR-EC-001F	1	Fixed Cable	• STP(Shielded Twisted Pair) Cable • Category 5e or higher • Max. Cable Length: 100 m
	CGNR-EC-002F	2		
	CGNR-EC-003F	3		
	CGNR-EC-005F	5		
	CGNR-EC-001M	1	Flexible Cable	
	CGNR-EC-002M	2		
	CGNR-EC-003M	3		
	CGNR-EC-005M	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



* Shielded Cable

※ 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.

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.

MEMO

FASTECH

Fast Accurate Smooth Motion

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

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