Ezi-SERVO ® II

Closed Loop Stepping System

- CiA 402 Drive Profile Support
- Closed Loop Stepping System
- No Gain Tuning / No Hunting
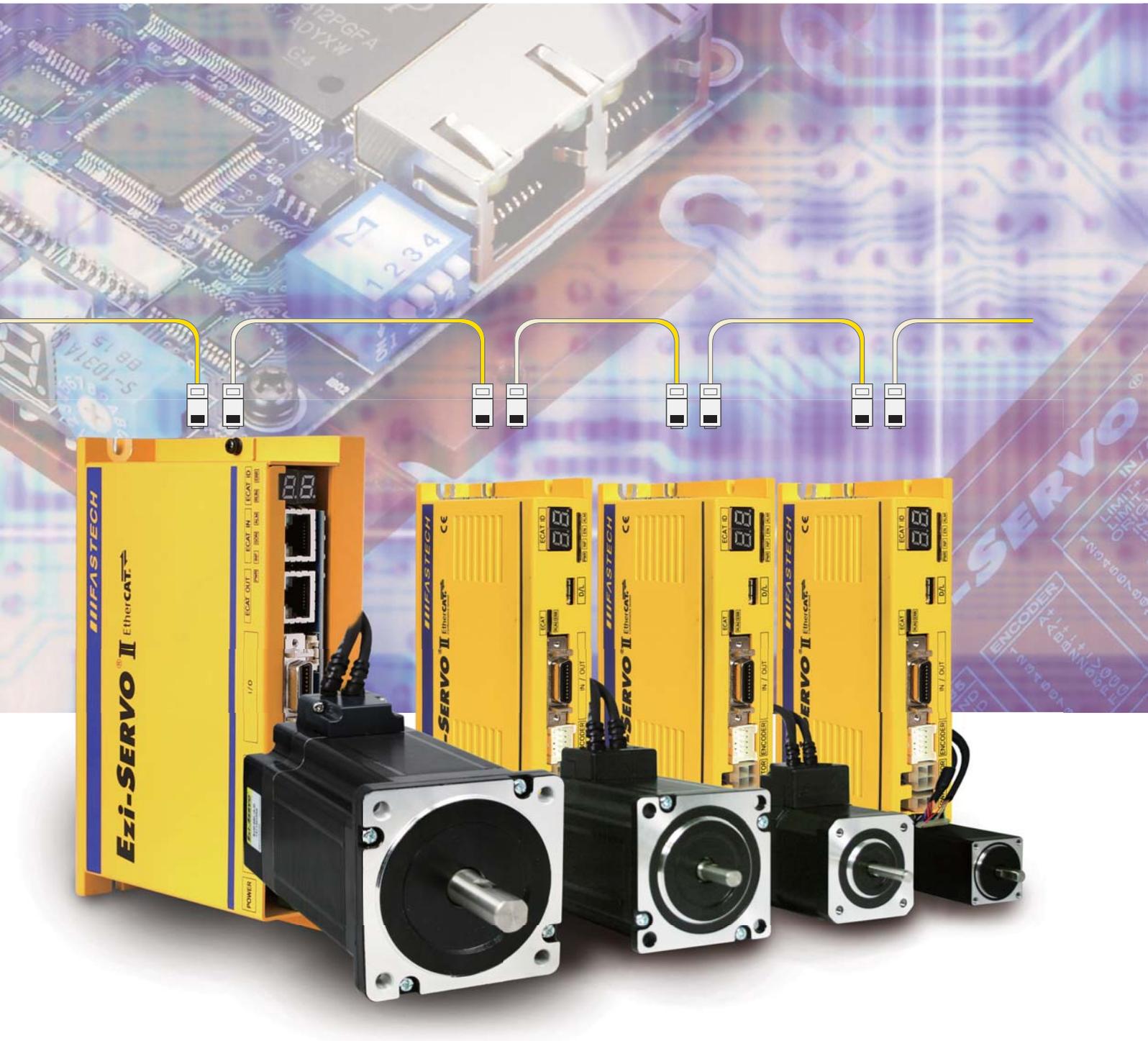- Torque Improvement by Boost Current Control

EtherCAT®
Conformance tested

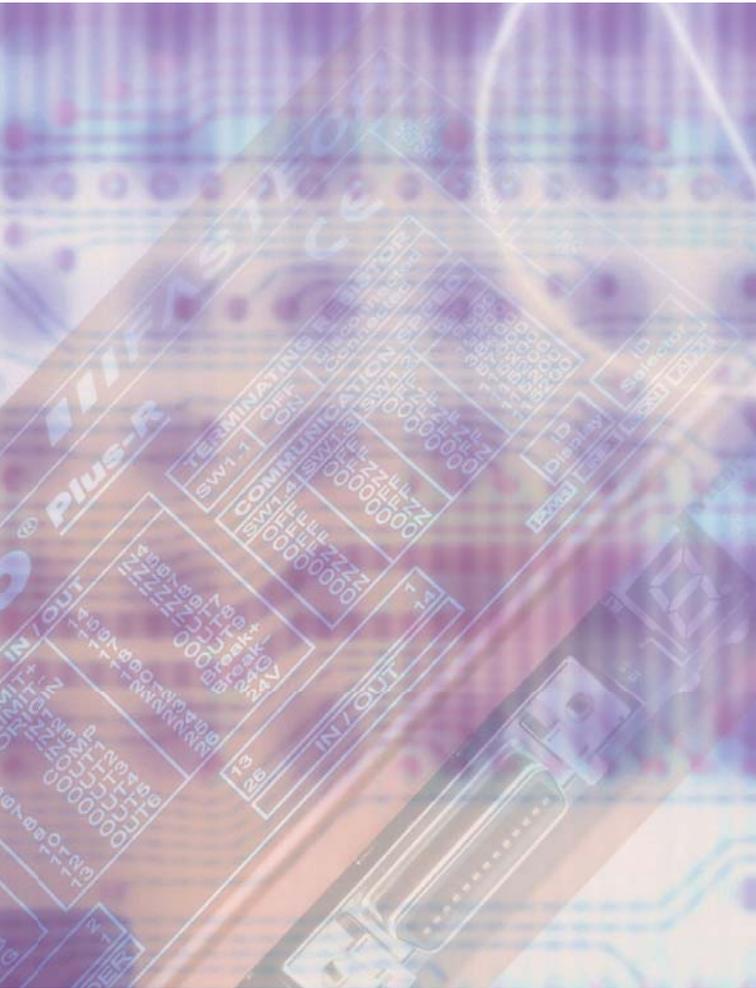

CE RoHS COMPLIANT

FASTECH
Fast, Accurate, Smooth Motion

FASTECH

Fast, Accurate, Smooth Motion

Ezi-SERVO® II EtherCAT
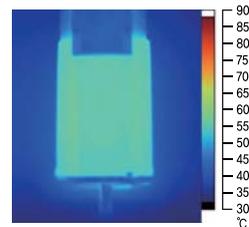Conformance tested

Closed Loop Stepping System

2 Closed Loop Stepping System

Ezi-SERVOⅡ is an innovative closed loop stepping motor and controller that utilizes a high-resolution motor mounted encoder to constantly monitor the motor shaft position. The encoder feedback feature allows the Ezi-SERVOⅡ to update the current motor shaft position information every 25 micro seconds. This allows the Ezi-SERVOⅡ 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 creating a positioning error and a great deal of cost to the end user!
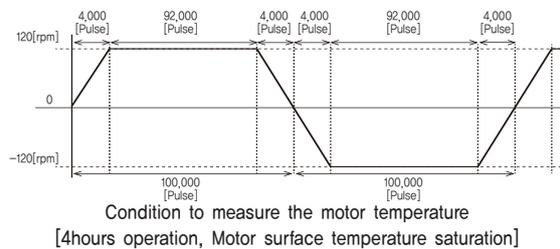
Goal pos.

Controller AMP. Motor M

error + −

Feedback Encoder E
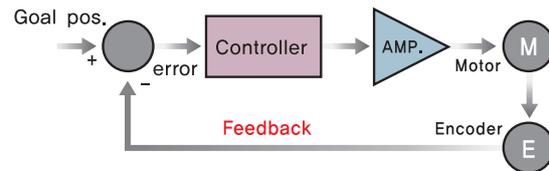
3 Current control according to load

Ezi-SERVOⅡ automatically control the motor current according to loads. Thus, febricity of motor and drive are minimized so can save the energy as well.

90
85
80
75
70
65
60
55
50
45
40
35
30
℃

Motor temperature [measured by thermograph]

4,000 [Pulse] 92,000 [Pulse] 4,000 [Pulse] 4,000 [Pulse] 92,000 [Pulse] 4,000 [Pulse]

120[rpm]

0

−120[rpm]

100,000 [Pulse] 100,000 [Pulse]

Condition to measure the motor temperature
[4hours operation, Motor surface temperature saturation]
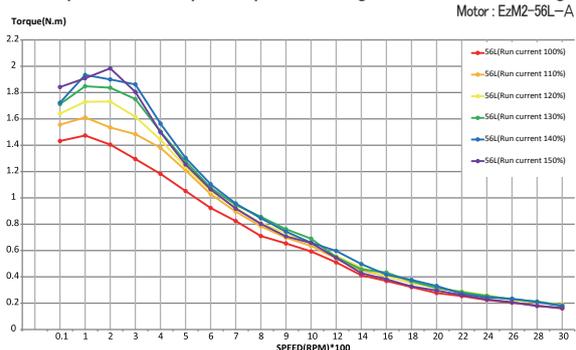
1 EtherCAT Based Motion Control

Ezi-SERVOⅡ EtherCAT is stepping motor control system using EtherCAT, high speed ethernet (100Mbps full-duplex) based fieldbus. Ezi-SERVOⅡ EtherCAT is EtherCAT slave module which support CAN application layer over EtherCAT (CoE). CiA402 Drive profile implemented. Supported modes are CSP Profile, Position Profile, Homing Profile.

EtherCAT Master
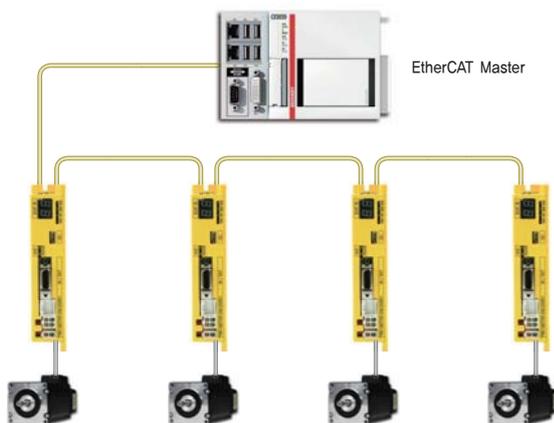
4 Boost Current / Run Current

Accel / Decel characteristics can be improved by set the Boost Current Parameters.
Torque can be improved when driving by set the Run Current Parameters.

[Example of the Torque Graph according to Run Current setting]

Motor : EzM2-56L-A

Torque(N.m)

2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0

0.1 1 2 3 4 5 6 7 8 9 10 12 14 16 18 20 22 24 26 28 30

SPEED(RPM)*100

- 56L(Run current 100%)
- 56L(Run current 110%)
- 56L(Run current 120%)
- 56L(Run current 130%)
- 56L(Run current 140%)
- 56L(Run current 150%)

Measured Condition Motor Voltage : Drive = Ezi-SERVOⅡ EtherCAT
Motor Current = 40VDC
Input Voltage = 24VDC

5 No Gain Tuning

Conventional servo systems, to ensure machine performance, smoothness, positional error and low servo noise, require the adjustment of its servo's gains as an initial crucial step. Even systems that employ auto-tuning require manual tweaking after the system is installed, especially if more that one axis are interdependent. Ezi-SERVO II employs the best characteristics of stepper and closed loop motion controls and algorithms to eliminate the need of tedious gain tuning required for conventional closed loop servo systems. This means that Ezi-SERVO II is optimized for the application and ready to work right out of the box! The Ezi-SERVO II system employs the unique characteristics of the closed loop stepping motor control, eliminating these cumbersome steps and giving the engineer a high performance servo system without waisting setup time. Ezi-SERVO II is especially well suited for low stiffness loads (for example, a belt and pulley system) that some-time require conventional servo systems to inertia match with the added expense and bulk of a gearbox. Ezi-SERVO II also performs exceptionally, even under heavy loads and high speeds!
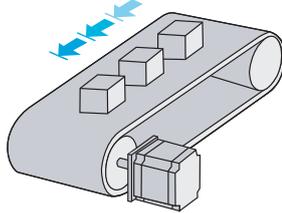
6 No Hunting

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

Complete stop   Hunting

Ezi-SERVO II   Servo motor

CW
+ pulse
0
− pulse
CCW

0

Time
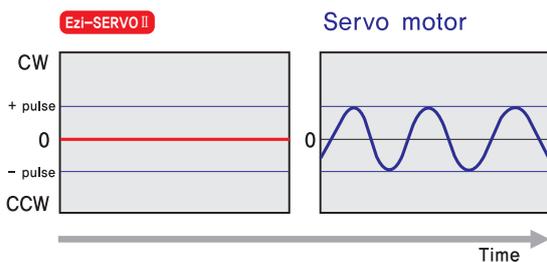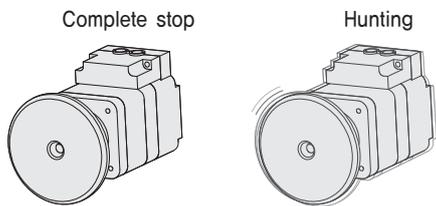
7 Fast Response

Similar to conventional stepping motors, Ezi-SERVO II instantly synchronizes with command pulses providing fast positional response. Ezi-SERVO II 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 between the commanding input signals and the resultant motion because of the constant monitoring of the current position, necessitating in a waiting time until it settles, called settling time.

speed   Ezi-SERVO II   speed   Servo

Settling Time

0   time   0   time
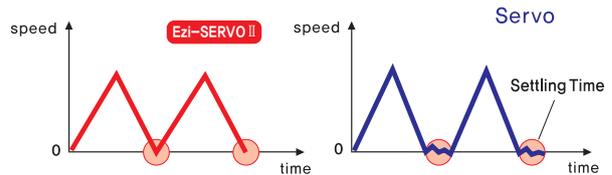
8 High Torque

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

torque

Ezi-SERVO II
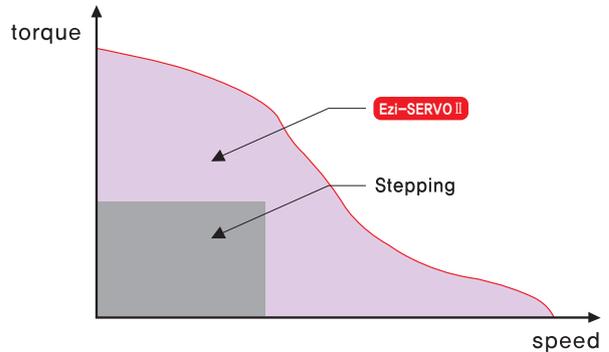
Stepping

speed

9 High Speed

The Ezi-SERVO II functions well at high speed without the loss of Synchronism or positioning error. Ezi-SERVO II's ability of continuous monitoring of current position enables the stepping motor to generate high-torque, even under a 100% load condition.

speed   High Speed

time
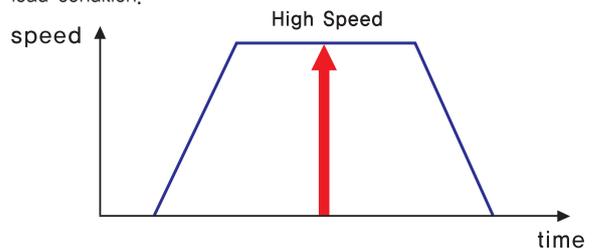
● Ezi-SERVO Ⅱ EtherCAT Part Numbering

Ezi-SERVO Ⅱ -EC-56L-A-BK-PN05-□

Drive Series

Motor Size

20 : 20mm
28 : 28mm
35 : 35mm
42 : 42mm
56 : 56mm
60 : 60mm
86 : 86mm

Motor Length

S : Single
M : Middle
L : Large
XL : Extra Large

Encoder Resolution

A − 10,000[ppr]
B − 20,000[ppr]
D − 16,000[ppr]
F − 4,000[ppr]

Brake

No indication : Standard
BK : Brake

Encoder Resolution

No Indication : No
PN03 − 1:3
PN05 − 1:5
PN08 − 1:8
PN10 − 1:10
PN15 − 1:15
PN25 − 1:25
PN40 − 1:40
PN50 − 1:50

User Code

● Standard Motor, Drive Combination

◆ Ezi-SERVO Ⅱ EtherCAT Drive Products
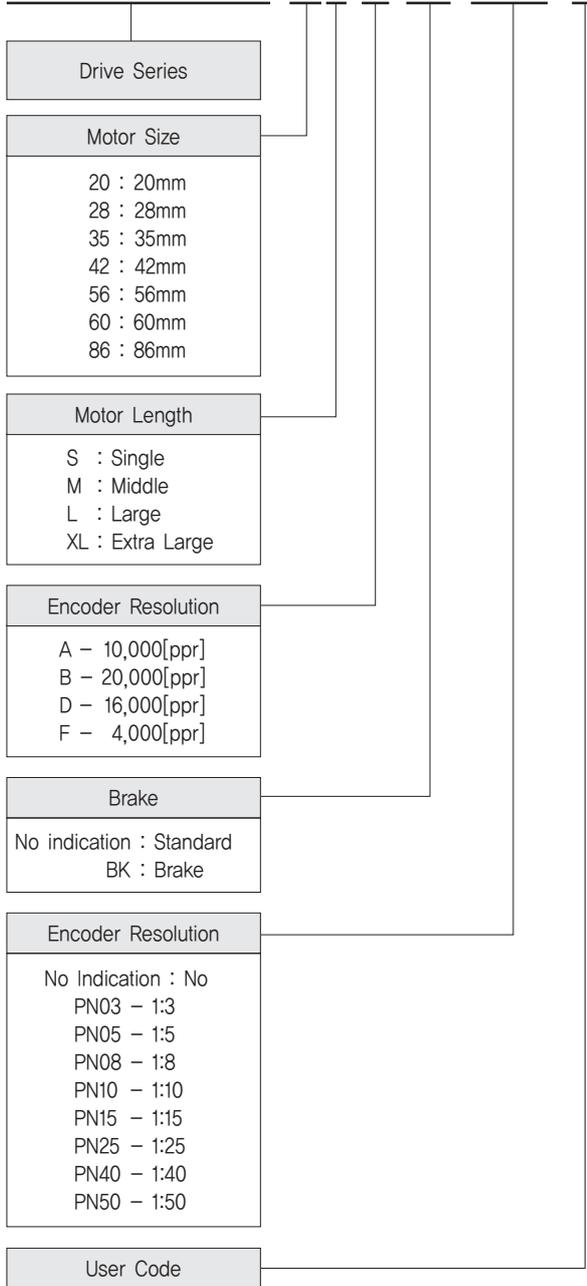
Package Part Number	Motor Part Number	Drive Part Number
Ezi-SERVO Ⅱ -EC-20M-F	EzM2-20M-F	EzS2-EC-20M-F
Ezi-SERVO Ⅱ -EC-20L-F	EzM2-20L-F	EzS2-EC-20L-F
Ezi-SERVO Ⅱ -EC-28S-D	EzM2-28S-D	EzS2-EC-28S-D
Ezi-SERVO Ⅱ -EC-28M-D	EzM2-28M-D	EzS2-EC-28M-D
Ezi-SERVO Ⅱ -EC-28L-D	EzM2-28L-D	EzS2-EC-28L-D
Ezi-SERVO Ⅱ -EC-35S-D	EzM2-35S-D	EzS2-EC-35S-D
Ezi-SERVO Ⅱ -EC-35M-D	EzM2-35M-D	EzS2-EC-35M-D
Ezi-SERVO Ⅱ -EC-35L-D	EzM2-35L-D	EzS2-EC-35L-D
Ezi-SERVO Ⅱ -EC-35XL-D	EzM2-35XL-D	EzS2-EC-35XL-D
Ezi-SERVO Ⅱ -EC-42S-A	EzM2-42S-A	EzS2-EC-42S-A
Ezi-SERVO Ⅱ -EC-42S-B	EzM2-42S-B	EzS2-EC-42S-B
Ezi-SERVO Ⅱ -EC-42M-A	EzM2-42M-A	EzS2-EC-42M-A
Ezi-SERVO Ⅱ -EC-42M-B	EzM2-42M-B	EzS2-EC-42M-B
Ezi-SERVO Ⅱ -EC-42L-A	EzM2-42L-A	EzS2-EC-42L-A
Ezi-SERVO Ⅱ -EC-42L-B	EzM2-42L-B	EzS2-EC-42L-B
Ezi-SERVO Ⅱ -EC-42XL-A	EzM2-42XL-A	EzS2-EC-42XL-A
Ezi-SERVO Ⅱ -EC-42XL-B	EzM2-42XL-B	EzS2-EC-42XL-B
Ezi-SERVO Ⅱ -EC-56S-A	EzM2-56S-A	EzS2-EC-56S-A
Ezi-SERVO Ⅱ -EC-56S-B	EzM2-56S-B	EzS2-EC-56S-B
Ezi-SERVO Ⅱ -EC-56M-A	EzM2-56M-A	EzS2-EC-56M-A
Ezi-SERVO Ⅱ -EC-56M-B	EzM2-56M-B	EzS2-EC-56M-B
Ezi-SERVO Ⅱ -EC-56L-A	EzM2-56L-A	EzS2-EC-56L-A
Ezi-SERVO Ⅱ -EC-56L-B	EzM2-56L-B	EzS2-EC-56L-B
Ezi-SERVO Ⅱ -EC-60S-A	EzM2-60S-A	EzS2-EC-60S-A
Ezi-SERVO Ⅱ -EC-60S-B	EzM2-60S-B	EzS2-EC-60S-B
Ezi-SERVO Ⅱ -EC-60M-A	EzM2-60M-A	EzS2-EC-60M-A
Ezi-SERVO Ⅱ -EC-60M-B	EzM2-60M-B	EzS2-EC-60M-B
Ezi-SERVO Ⅱ -EC-60L-A	EzM2-60L-A	EzS2-EC-60L-A
Ezi-SERVO Ⅱ -EC-60L-B	EzM2-60L-B	EzS2-EC-60L-B
Ezi-SERVO Ⅱ -EC-86M-A	EzM2-86M-A	EzS2-EC-86M-A
Ezi-SERVO Ⅱ -EC-86M-B	EzM2-86M-B	EzS2-EC-86M-B
Ezi-SERVO Ⅱ -EC-86L-A	EzM2-86L-A	EzS2-EC-86L-A
Ezi-SERVO Ⅱ -EC-86L-B	EzM2-86L-B	EzS2-EC-86L-B
Ezi-SERVO Ⅱ -EC-86XL-A	EzM2-86XL-A	EzS2-EC-86XL-A
Ezi-SERVO Ⅱ -EC-86XL-B	EzM2-86XL-B	EzS2-EC-86XL-B

● Brake Integrated Motor, Drive Combination

◆ Ezi-SERVO II EtherCAT Drive Products

Package Part Number	Motor Part Number	Drive Part Number
Ezi-SERVO II -EC-42S-A-BK	EzM2-42S-A-BK	EzS2-EC-42S-A-BK
Ezi-SERVO II -EC-42S-B-BK	EzM2-42S-B-BK	EzS2-EC-42S-B-BK
Ezi-SERVO II -EC-42M-A-BK	EzM2-42M-A-BK	EzS2-EC-42M-A-BK
Ezi-SERVO II -EC-42M-B-BK	EzM2-42M-B-BK	EzS2-EC-42M-B-BK
Ezi-SERVO II -EC-42L-A-BK	EzM2-42L-A-BK	EzS2-EC-42L-A-BK
Ezi-SERVO II -EC-42L-B-BK	EzM2-42L-B-BK	EzS2-EC-42L-B-BK
Ezi-SERVO II -EC-42XL-A-BK	EzM2-42XL-A-BK	EzS2-EC-42XL-A-BK
Ezi-SERVO II -EC-42XL-B-BK	EzM2-42XL-B-BK	EzS2-EC-42XL-B-BK
Ezi-SERVO II -EC-56S-A-BK	EzM2-56S-A-BK	EzS2-EC-56S-A-BK
Ezi-SERVO II -EC-56S-B-BK	EzM2-56S-B-BK	EzS2-EC-56S-B-BK
Ezi-SERVO II -EC-56M-A-BK	EzM2-56M-A-BK	EzS2-EC-56M-A-BK
Ezi-SERVO II -EC-56M-B-BK	EzM2-56M-B-BK	EzS2-EC-56M-B-BK
Ezi-SERVO II -EC-56L-A-BK	EzM2-56L-A-BK	EzS2-EC-56L-A-BK
Ezi-SERVO II -EC-56L-B-BK	EzM2-56L-B-BK	EzS2-EC-56L-B-BK
Ezi-SERVO II -EC-60S-A-BK	EzM2-60S-A-BK	EzS2-EC-60S-A-BK
Ezi-SERVO II -EC-60S-B-BK	EzM2-60S-B-BK	EzS2-EC-60S-B-BK
Ezi-SERVO II -EC-60M-A-BK	EzM2-60M-A-BK	EzS2-EC-60M-A-BK
Ezi-SERVO II -EC-60M-B-BK	EzM2-60M-B-BK	EzS2-EC-60M-B-BK
Ezi-SERVO II -EC-60L-A-BK	EzM2-60L-A-BK	EzS2-EC-60L-A-BK
Ezi-SERVO II -EC-60L-B-BK	EzM2-60L-B-BK	EzS2-EC-60L-B-BK
Ezi-SERVO II -EC-86M-A-BK	EzM2-86M-A-BK	EzS2-EC-86M-A-BK
Ezi-SERVO II -EC-86M-B-BK	EzM2-86M-B-BK	EzS2-EC-86M-B-BK
Ezi-SERVO II -EC-86L-A-BK	EzM2-86L-A-BK	EzS2-EC-86L-A-BK
Ezi-SERVO II -EC-86L-B-BK	EzM2-86L-B-BK	EzS2-EC-86L-B-BK
Ezi-SERVO II -EC-86XL-A-BK	EzM2-86XL-A-BK	EzS2-EC-86XL-A-BK
Ezi-SERVO II -EC-86XL-B-BK	EzM2-86XL-B-BK	EzS2-EC-86XL-B-BK

● Gearbox Integrated Motor, Drive Combination

◆ Ezi-SERVO II EtherCAT Drive Products

Package Part Number	Motor Part Number	Drive Part Number	Reduction gear ratio
Ezi-SERVO II -EC-42S-PN3	EzM2-42S-PN3	EzS2-EC-42S	1:3
Ezi-SERVO II -EC-42S-PN5	EzM2-42S-PN5		1:5
Ezi-SERVO II -EC-42S-PN8	EzM2-42S-PN8		1:8
Ezi-SERVO II -EC-42S-PN10	EzM2-42S-PN10		1:10
Ezi-SERVO II -EC-42S-PN15	EzM2-42S-PN15		1:15
Ezi-SERVO II -EC-42S-PN25	EzM2-42S-PN25		1:25
Ezi-SERVO II -EC-42S-PN40	EzM2-42S-PN40		1:40
Ezi-SERVO II -EC-42S-PN50	EzM2-42S-PN50		1:50
Ezi-SERVO II -EC-42M-PN3	EzM2-42M-PN3	EzS2-EC-42M	1:3
Ezi-SERVO II -EC-42M-PN5	EzM2-42M-PN5		1:5
Ezi-SERVO II -EC-42M-PN8	EzM2-42M-PN8		1:8
Ezi-SERVO II -EC-42M-PN10	EzM2-42M-PN10		1:10
Ezi-SERVO II -EC-42M-PN15	EzM2-42M-PN15		1:15
Ezi-SERVO II -EC-42M-PN25	EzM2-42M-PN25		1:25
Ezi-SERVO II -EC-42M-PN40	EzM2-42M-PN40		1:40
Ezi-SERVO II -EC-42M-PN50	EzM2-42M-PN50		1:50
Ezi-SERVO II -EC-42L-PN3	EzM2-42L-PN3	EzS2-EC-42L	1:3
Ezi-SERVO II -EC-42L-PN5	EzM2-42L-PN5		1:5
Ezi-SERVO II -EC-42L-PN8	EzM2-42L-PN8		1:8
Ezi-SERVO II -EC-42L-PN10	EzM2-42L-PN10		1:10
Ezi-SERVO II -EC-42L-PN15	EzM2-42L-PN15		1:15
Ezi-SERVO II -EC-42L-PN25	EzM2-42L-PN25		1:25
Ezi-SERVO II -EC-42L-PN40	EzM2-42L-PN40		1:40
Ezi-SERVO II -EC-42L-PN50	EzM2-42L-PN50		1:50

● Gearbox Integrated Motor, Drive Combination

◆ Ezi-SERVO II EtherCAT Drive Products

Package Part Number	Motor Part Number	Drive Part Number	Reduction gear ratio
Ezi-SERVO II -EC-42XL-PN3	EzM2-42XL-PN3	EzS2-EC-42XL	1:3
Ezi-SERVO II -EC-42XL-PN5	EzM2-42XL-PN5		1:5
Ezi-SERVO II -EC-42XL-PN8	EzM2-42XL-PN8		1:8
Ezi-SERVO II -EC-42XL-PN10	EzM2-42XL-PN10		1:10
Ezi-SERVO II -EC-42XL-PN15	EzM2-42XL-PN15		1:15
Ezi-SERVO II -EC-42XL-PN25	EzM2-42XL-PN25		1:25
Ezi-SERVO II -EC-42XL-PN40	EzM2-42XL-PN40		1:40
Ezi-SERVO II -EC-42XL-PN50	EzM2-42XL-PN50		1:50
Ezi-SERVO II -EC-56S-PN3	EzM2-56S-PN3	EzS2-EC-56S	1:3
Ezi-SERVO II -EC-56S-PN5	EzM2-56S-PN5		1:5
Ezi-SERVO II -EC-56S-PN8	EzM2-56S-PN8		1:8
Ezi-SERVO II -EC-56S-PN10	EzM2-56S-PN10		1:10
Ezi-SERVO II -EC-56S-PN15	EzM2-56S-PN15		1:15
Ezi-SERVO II -EC-56S-PN25	EzM2-56S-PN25		1:25
Ezi-SERVO II -EC-56S-PN40	EzM2-56S-PN40		1:40
Ezi-SERVO II -EC-56S-PN50	EzM2-56S-PN50		1:50
Ezi-SERVO II -EC-56M-PN3	EzM2-56M-PN3	EzS2-EC-56M	1:3
Ezi-SERVO II -EC-56M-PN5	EzM2-56M-PN5		1:5
Ezi-SERVO II -EC-56M-PN8	EzM2-56M-PN8		1:8
Ezi-SERVO II -EC-56M-PN10	EzM2-56M-PN10		1:10
Ezi-SERVO II -EC-56M-PN15	EzM2-56M-PN15		1:15
Ezi-SERVO II -EC-56M-PN25	EzM2-56M-PN25		1:25
Ezi-SERVO II -EC-56M-PN40	EzM2-56M-PN40		1:40
Ezi-SERVO II -EC-56M-PN50	EzM2-56M-PN50		1:50
Ezi-SERVO II -EC-56L-PN3	EzM2-56L-PN3	EzS2-EC-56L	1:3
Ezi-SERVO II -EC-56L-PN5	EzM2-56L-PN5		1:5
Ezi-SERVO II -EC-56L-PN8	EzM2-56L-PN8		1:8
Ezi-SERVO II -EC-56L-PN10	EzM2-56L-PN10		1:10
Ezi-SERVO II -EC-56L-PN15	EzM2-56L-PN15		1:15
Ezi-SERVO II -EC-56L-PN25	EzM2-56L-PN25		1:25
Ezi-SERVO II -EC-56L-PN40	EzM2-56L-PN40		1:40
Ezi-SERVO II -EC-56L-PN50	EzM2-56L-PN50		1:50
Ezi-SERVO II -EC-60S-PN3	EzM2-60S-PN3	EzS2-EC-60S	1:3
Ezi-SERVO II -EC-60S-PN5	EzM2-60S-PN5		1:5
Ezi-SERVO II -EC-60S-PN8	EzM2-60S-PN8		1:8
Ezi-SERVO II -EC-60S-PN10	EzM2-60S-PN10		1:10
Ezi-SERVO II -EC-60S-PN15	EzM2-60S-PN15		1:15
Ezi-SERVO II -EC-60S-PN25	EzM2-60S-PN25		1:25
Ezi-SERVO II -EC-60S-PN40	EzM2-60S-PN40		1:40
Ezi-SERVO II -EC-60S-PN50	EzM2-60S-PN50		1:50
Ezi-SERVO II -EC-60M-PN3	EzM2-60M-PN3	EzS2-EC-60M	1:3
Ezi-SERVO II -EC-60M-PN5	EzM2-60M-PN5		1:5
Ezi-SERVO II -EC-60M-PN8	EzM2-60M-PN8		1:8
Ezi-SERVO II -EC-60M-PN10	EzM2-60M-PN10		1:10
Ezi-SERVO II -EC-60M-PN15	EzM2-60M-PN15		1:15
Ezi-SERVO II -EC-60M-PN25	EzM2-60M-PN25		1:25
Ezi-SERVO II -EC-60M-PN40	EzM2-60M-PN40		1:40
Ezi-SERVO II -EC-60M-PN50	EzM2-60M-PN50		1:50
Ezi-SERVO II -EC-60L-PN3	EzM2-60L-PN3	EzS2-EC-60L	1:3
Ezi-SERVO II -EC-60L-PN5	EzM2-60L-PN5		1:5
Ezi-SERVO II -EC-60L-PN8	EzM2-60L-PN8		1:8
Ezi-SERVO II -EC-60L-PN10	EzM2-60L-PN10		1:10
Ezi-SERVO II -EC-60L-PN15	EzM2-60L-PN15		1:15
Ezi-SERVO II -EC-60L-PN25	EzM2-60L-PN25		1:25
Ezi-SERVO II -EC-60L-PN40	EzM2-60L-PN40		1:40
Ezi-SERVO II -EC-60L-PN50	EzM2-60L-PN50		1:50

● Gearbox Integrated Motor, Drive Combination

◆ Ezi-SERVO II EtherCAT Drive Products

| Package Part Number	Motor Part Number	Drive Part Number	Reduction gear ratio
Ezi-SERVO II -EC-86M-PN3	EzM2-86M-PN3	EzS2-EC-86M	1:3
Ezi-SERVO II -EC-86M-PN5	EzM2-86M-PN5		1:5
Ezi-SERVO II -EC-86M-PN8	EzM2-86M-PN8		1:8
Ezi-SERVO II -EC-86M-PN10	EzM2-86M-PN10		1:10
Ezi-SERVO II -EC-86M-PN15	EzM2-86M-PN15		1:15
Ezi-SERVO II -EC-86M-PN25	EzM2-86M-PN25		1:25
Ezi-SERVO II -EC-86M-PN40	EzM2-86M-PN40		1:40
Ezi-SERVO II -EC-86M-PN50	EzM2-86M-PN50		1:50
Ezi-SERVO II -EC-86L-PN3	EzM2-86L-PN3	EzS2-EC-86L	1:3
Ezi-SERVO II -EC-86L-PN5	EzM2-86L-PN5		1:5
Ezi-SERVO II -EC-86L-PN8	EzM2-86L-PN8		1:8
Ezi-SERVO II -EC-86L-PN10	EzM2-86L-PN10		1:10
Ezi-SERVO II -EC-86L-PN15	EzM2-86L-PN15		1:15
Ezi-SERVO II -EC-86L-PN25	EzM2-86L-PN25		1:25
Ezi-SERVO II -EC-86L-PN40	EzM2-86L-PN40		1:40
Ezi-SERVO II -EC-86L-PN50	EzM2-86L-PN50		1:50
Ezi-SERVO II -EC-86XL-PN3	EzM2-86XL-PN3	EzS2-EC-86XL	1:3
Ezi-SERVO II -EC-86XL-PN5	EzM2-86XL-PN5		1:5
Ezi-SERVO II -EC-86XL-PN8	EzM2-86XL-PN8		1:8
Ezi-SERVO II -EC-86XL-PN10	EzM2-86XL-PN10		1:10
Ezi-SERVO II -EC-86XL-PN15	EzM2-86XL-PN15		1:15
Ezi-SERVO II -EC-86XL-PN25	EzM2-86XL-PN25		1:25
Ezi-SERVO II -EC-86XL-PN40	EzM2-86XL-PN40		1:40
Ezi-SERVO II -EC-86XL-PN50	EzM2-86XL-PN50		1:50

● Drive Specifications

1. Functions / Specifications

		EzM2-20 series	EzM2-28 series	EzM2-35 series	EzM2-42 series	EzM2-56 series	EzM2-60- series	EzM2-86- series
Motor		EzM2-20 series	EzM2-28 series	EzM2-35 series	EzM2-42 series	EzM2-56 series	EzM2-60- series	EzM2-86- series
Drive		EzS2-EC-20 series	EzS2-EC-28 series	EzS2-EC-35 series	EzS2-EC-42 series	EzS2-EC-56 series	EzS2-EC-60 series	EzS2-EC-86 series
Input Voltage		24VDC ± 10%						40~70VDC
Control Method		Closed Loop control by ARM-based 32-bit MCU						
Current Consumption		Max 500mA (Except motor current)						
Operating Condition	Temperature	In use : 0~50℃ In Storage : -20~70℃						
	Humidity	In use : 35~85%RH (Non-condensing) In Storage : 10~90%RH (Non-condensing)						
	Vib. Resist	0.5G						
Drive	Rotation Speed	0~3,000rpm						
	Resolution [P/R]	4,000/Rev. Encoder model : 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 4,000 10,000/Rev. Encoder model : 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 16,000/Rev. Encoder model : 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 16,000 20,000/Rev. Encoder model : 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 20,000 (Selectable by parameter)						
	Protection Functions	Over Current, Over Speed, Position Tracking Error, Over Load, Over Temperature, Over Regenerated Voltage, Motor Connection Error, Encoder Connection Error, Motor Voltage Error, In-Position Error, ROM Error, Position Overflow Error						
	LED Display	Power status, In-Position status, Servo On status, Alarm status						
EtherCAT	Supported Protocol	CoE (CiA402 Drive profile), FoE (Firmware download)						
	Supported Mode	Cyclic Synchronous position profile, Position profile, Homing Profile						
	Synchronization	Free Run, SM Event, DC SYNC Event						
IN/OUT Signal	Input Signal Functions	3 dedicated inputs (Limit+, Limit-, Origin), 7 user inputs						
	Output Signal Functions	2 dedicated outputs (Brake+, Brake-), 6 user outputs (photocoupler)						

● Drive Size[mm]

134
127
20
41
4-4.6
26.5
83
127
2-4.6
15

● Drive Size[mm] (86mm)

157
100.5
41
150
4.5
26.7
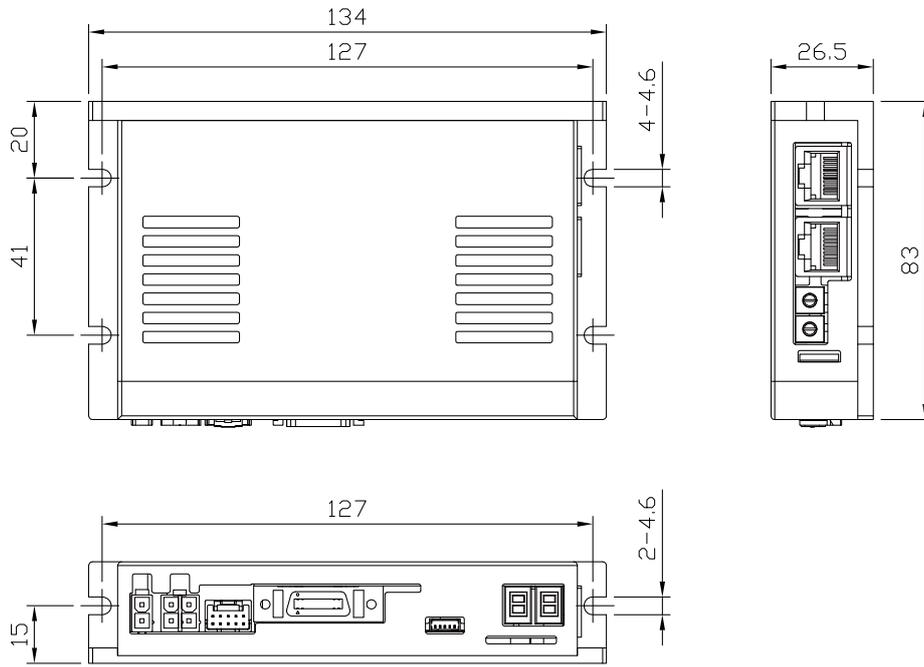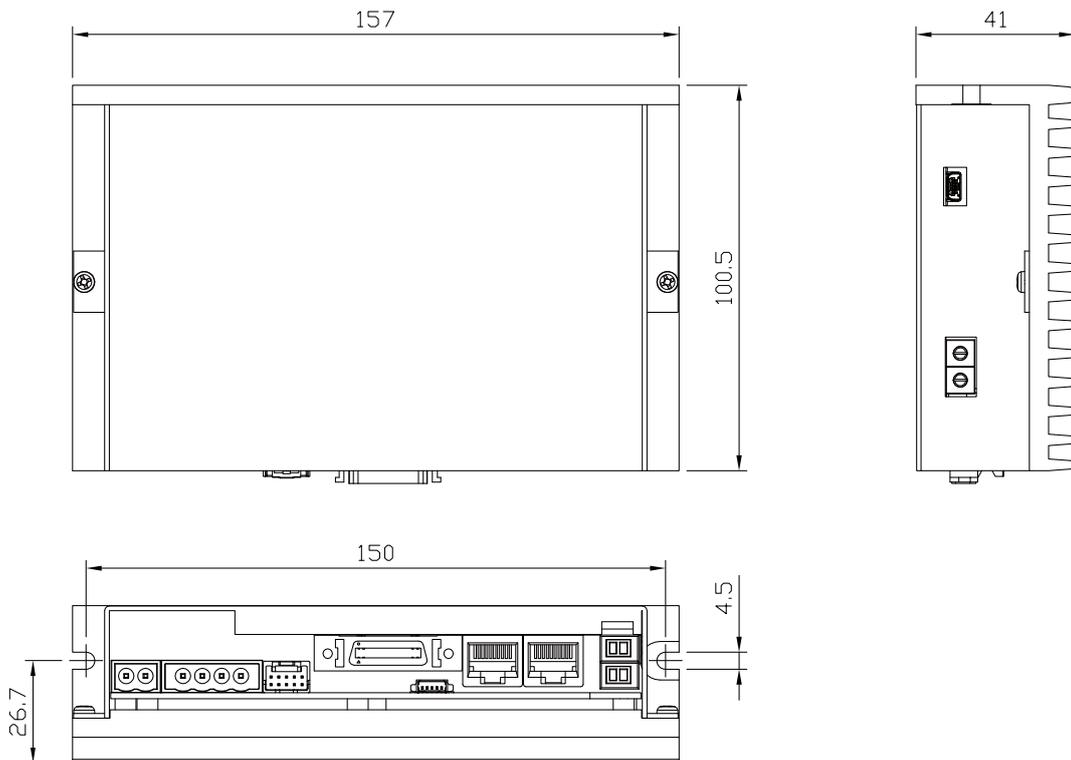
● Standard Motor Specification and Size

1. Motor Specification

20　　28　　35

Motor	Unit	EzM2-20M	EzM2-20L	EzM2-28S	EzM2-28M-A	EzM2-28L	EzM2-35S	EzM2-35M	EzM2-35L	EzM2-35XL
Current per Phase	A	0.5	0.5	0.95	0.95	0.95	0.6	0.6	0.85	0.7
Holding Torque	N·m	0.016	0.025	0.069	0.10	0.12	0.034	0.050	0.176	0.225
Rotor Inertia	g·cm²	2.5	3.3	9	13	18	5	8	11	32
Weight	g	50	80	110	140	200	165	180	260	360
Length(L)	mm	28	38	32	45	50	22	26	38	53

42　　56　　60

Motor	Unit	EzM2-42S	EzM2-42M	EzM2-42L	EzM2-42XL	EzM2-56S	EzM2-56M	EzM2-56L	EzM2-60S	EzM2-60M	EzM2-60L
Current per Phase	A	1.2	1.2	1.2	1.2	3.0	3.0	3.0	4.0	4.0	4.0
Holding Torque	N·m	0.32	0.44	0.5	0.65	0.64	1.0	1.5	0.88	1.28	2.4
Rotor Inertia	g·cm²	35	54	77	114	180	280	520	240	490	690
Weight	g	250	280	350	500	500	720	1150	600	1000	1300
Length(L)	mm	34	40	48	60	46	55	80	47	56	85

86

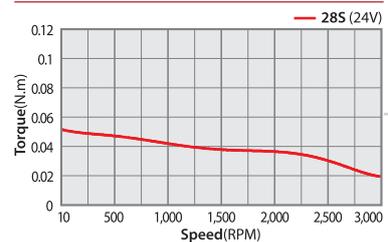| Motor	Unit	EzM2-86M	EzM2-86L	EzM2-86XL
Current per Phase	A	6.0	6.0	6.0
Holding Torque	N·m	4.5	8.5	12
Rotor Inertia	g·cm²	1800	3600	5400
Weight	g	2300	3800	5300
Length(L)	mm	78	117	155

2. Torque Characteristic

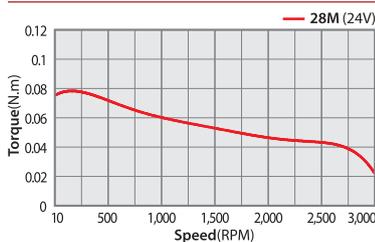**Ezi-SERVO II EtherCAT_ 20M Series**
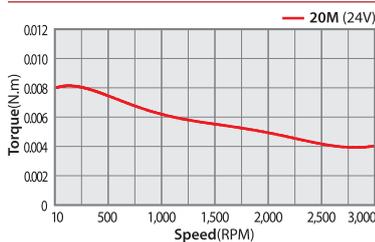
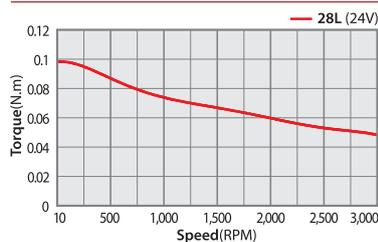
Ezi-SERVO II EtherCAT_ 20L Series
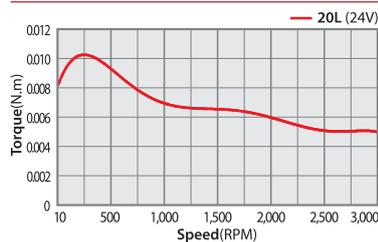
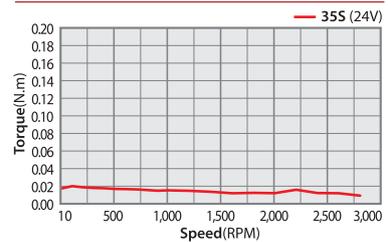**Ezi-SERVO II EtherCAT_ 28S Series**

Ezi-SERVO II EtherCAT_ 28M Series
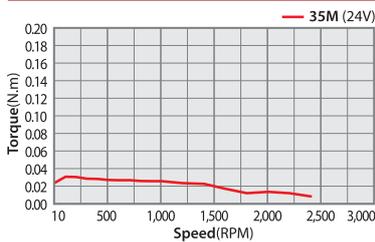

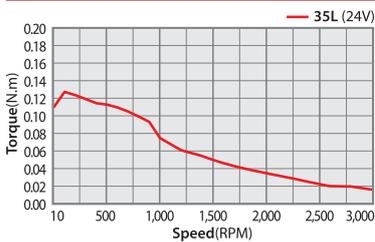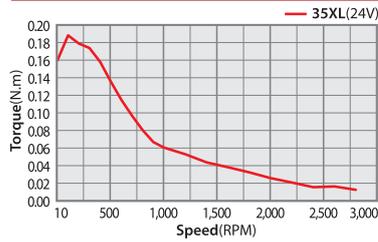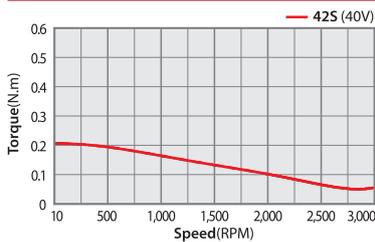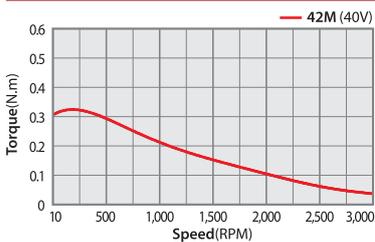**Ezi-SERVO II EtherCAT_ 28L Series**

Ezi-SERVO II EtherCAT_ 35S Series

9

● Standard Motor Specification and Size

Ezi-SERVO II EtherCAT_ 35M Series

— 35M (24V)

Ezi-SERVO II EtherCAT_ 35L Series

— 35L (24V)

Ezi-SERVO II EtherCAT_ 35XL Series

— 35XL(24V)

Ezi-SERVO II EtherCAT_ 42S Series

— 42S (40V)

Ezi-SERVO II EtherCAT_ 42M Series

— 42M (40V)

Ezi-SERVO II EtherCAT_ 42L Series

— 42L (40V)
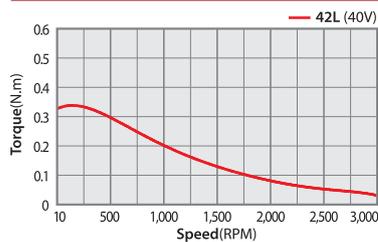
Ezi-SERVO II EtherCAT_ 42XL Series

— 42XL (40V)
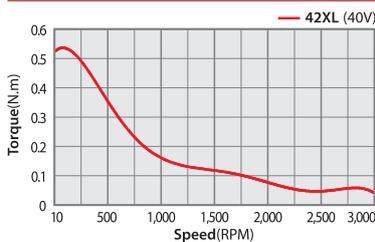
Ezi-SERVO II EtherCAT_ 56S Series

— 56S (40V)
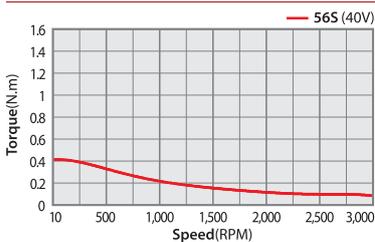
Ezi-SERVO II EtherCAT_ 56M Series

— 56M (40V)
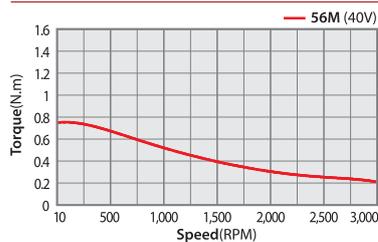
Ezi-SERVO II EtherCAT_ 56L Series

— 56L (40V)
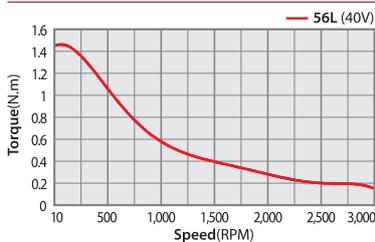
Ezi-SERVO II EtherCAT_ 60S Series

— 60S (40V)
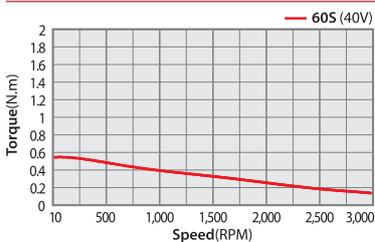
Ezi-SERVO II EtherCAT_ 60M Series

— 60M (40V)
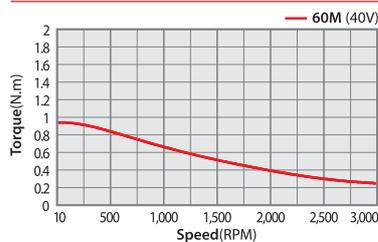
Ezi-SERVO II EtherCAT_ 60L Series

— 60L (40V)
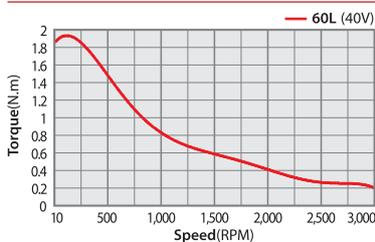
Ezi-SERVO II EtherCAT_ 86M Series

— 86M (70V)
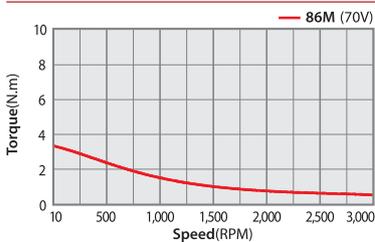
Ezi-SERVO II EtherCAT_ 86L Series

— 86L (70V)
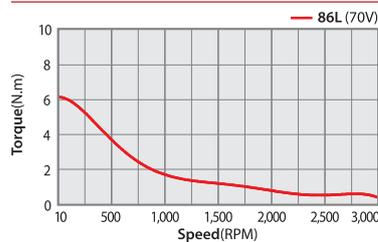
Ezi-SERVO II EtherCAT_ 86XL Series

— 86XL (70V)
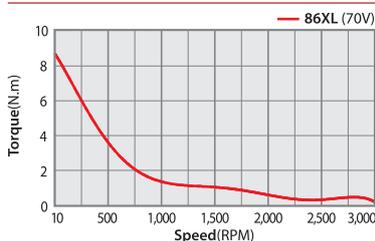
3. Motor Size(mm)
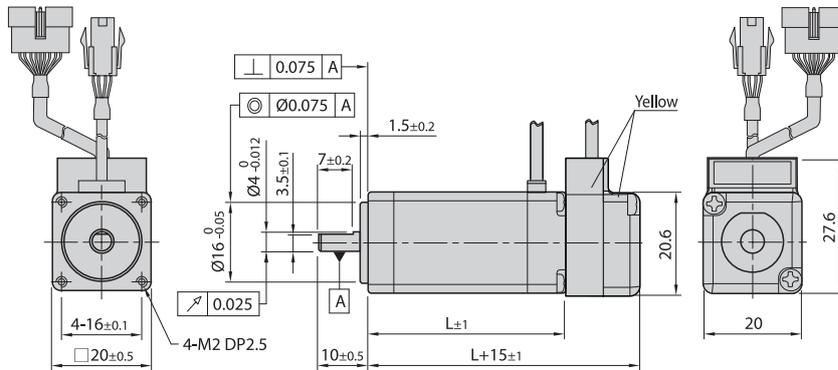
20mm

Model name	Length(L)
EzM2-20M	28
EzM2-20L	38
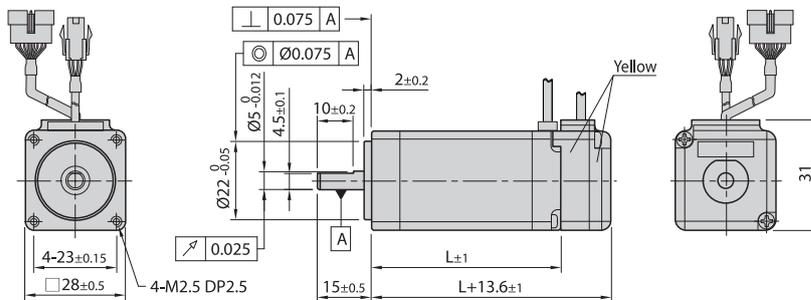
28mm

Model name	Length(L)
EzM2-28S	32
EzM2-28M	45
EzM2-28L	50
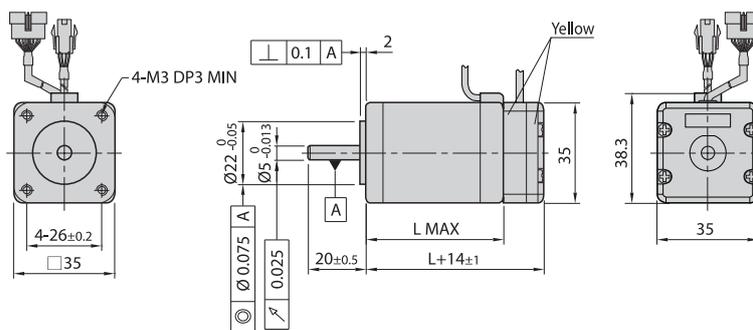
35mm

Model name	Length(L)
EzM2-35S	22
EzM2-35M	26
EzM2-35L	38
EzM2-35XL	53
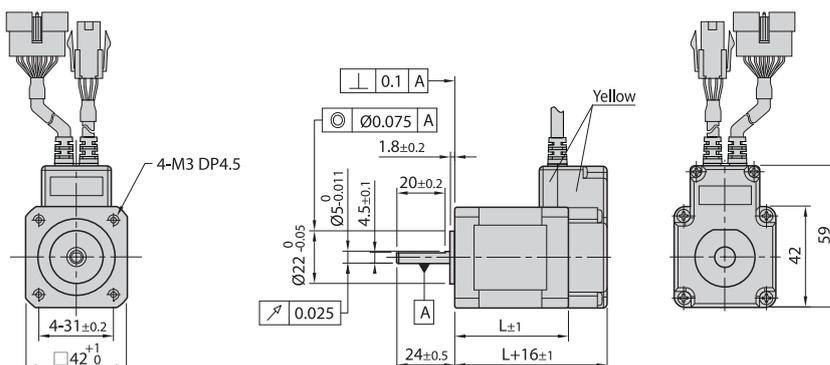
42mm

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

3. Motor Size(mm)

※ There are 2 kinds size of front shaft diameter for EzM2-56 series as Ø6.35 and Ø8.0.
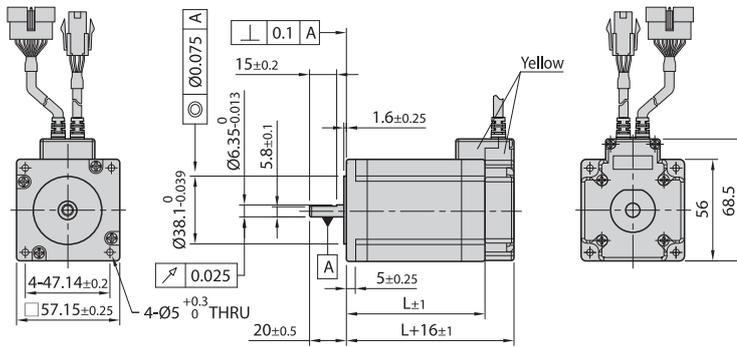
56mm

Model name	Length (L)
EzM2-56S	46
EzM2-56M	55
EzM2-56L	80
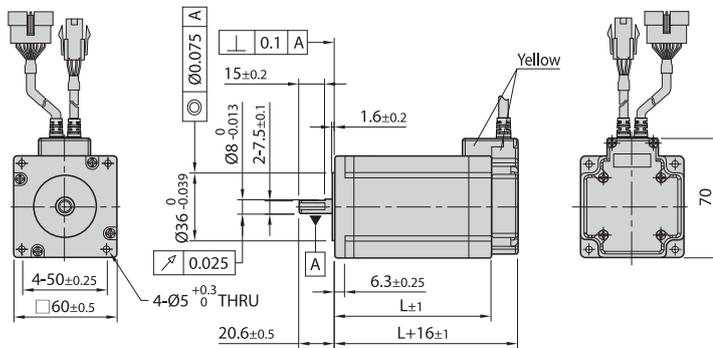
60mm

Model name	Length (L)
EzM2-60S	47
EzM2-60M	56
EzM2-60L	85
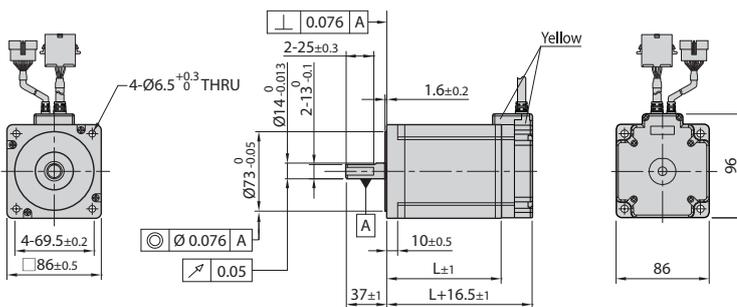
86mm

Model name	Length (L)
EzM2-86M	78
EzM2-86L	117
EzM2-86XL	155

● Brake Installed Motor Specification and Size

1. Motor Specification

Package	Motor	Electronic Brake					Motor Unit Weight (g)	Permitted Overhung Load (N)				Permitted Thrust Load (N)
		Type	Voltage Input (V)	Rated Current (A)	Power Consumption	Statical Friction Torque (N·m)		Length from Motor Point (mm)				
								3	8	13	18	
Ezi-SERVO II -EC-42S-BK	EzM2-42S-BK	Non-excitation run Type	24VDC ±10%	0.2A ±10%	5	0.2	510	22	26	33	46	Must be Lower than Unit's Weight
Ezi-SERVO II -EC-42M-BK	EzM2-42M-BK						570					
Ezi-SERVO II -EC-42L-BK	EzM2-42L-BK						640					
Ezi-SERVO II -EC-42XL-BK	EzM2-42XL-BK						770					
Ezi-SERVO II -EC-56S-BK	EzM2-56S-BK			0.27A ±10%	6.6	0.7	870	52	65	85	123	
Ezi-SERVO II -EC-56M-BK	EzM2-56M-BK						1190					
Ezi-SERVO II -EC-56L-BK	EzM2-56L-BK						1380					
Ezi-SERVO II -EC-60S-BK	EzM2-60S-BK				7.5	0.7	1150	70	87	114	165	
Ezi-SERVO II -EC-60M-BK	EzM2-60M-BK						1350					
Ezi-SERVO II -EC-60L-BK	EzM2-60L-BK						1960					
Ezi-SERVO II -EC-86M-BK	EzM2-86M-BK			0.43A ±10%	10.5	2.5	3600	270	300	350	400	
Ezi-SERVO II -EC-86L-BK	EzM2-86L-BK						6100					
Ezi-SERVO II -EC-86XL-BK	EzM2-86XL-BK						6600					

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

＊ The weight means Motor Unit Weight including Motor and Electronic Brake.

＊ Motor Model Name is combined model name of Motor and Brake.

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

* Brake Operation Timing Chart

Ezi-SERVO II EtherCAT control Brake by Drive automatically.
Please refer to below Timing Chart when control Brake from upper controller other than using Ezi-SERVO II EtherCAT Brake control.
Otherwise, Drive malfunctioning and loads can be fall down.
Also, please do not operate Brake while motor operation to prevent damage.
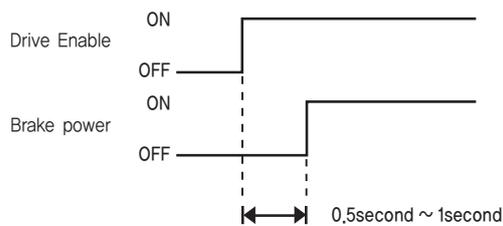
2. Motor Size(mm)
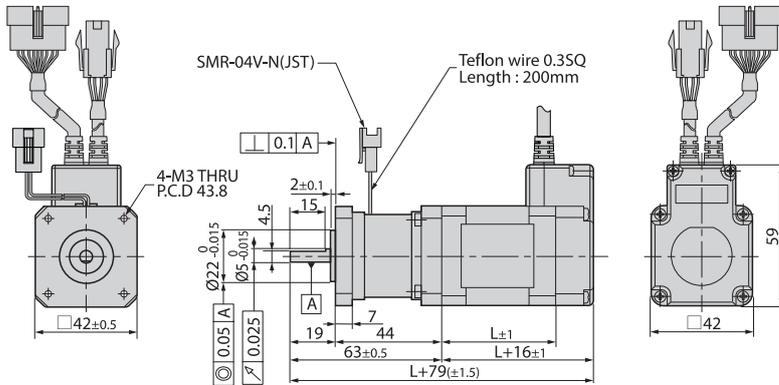
42 mm

Model name	Length(L)	Weight(Kg)
EzM2-42S-BK	34	0.51
EzM2-42M-BK	40	0.57
EzM2-42L-BK	48	0.64
EzM2-42XL-BK	60	0.77

SMR-04V-N(JST)
Teflon wire 0.3SQ
Length : 200mm
4-M3 THRU P.C.D 43.8
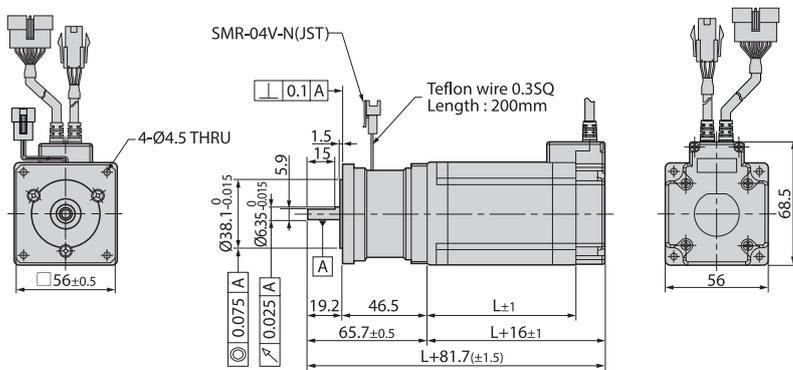
56 mm

Model name	Length(L)	Weight(Kg)
EzM2-56S-BK	46	0.87
EzM2-56M-BK	55	1.19
EzM2-56L-BK	80	1.38

SMR-04V-N(JST)
Teflon wire 0.3SQ
Length : 200mm
4-Ø4.5 THRU
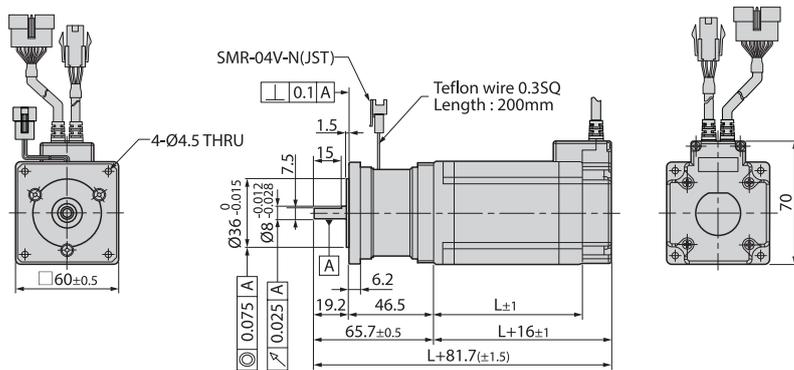
60 mm

Model name	Length(L)	Weight(Kg)
EzM2-60S-BK	47	1.15
EzM2-60M-BK	56	1.35
EzM2-60L-BK	85	1.96

SMR-04V-N(JST)
Teflon wire 0.3SQ
Length : 200mm
4-Ø4.5 THRU
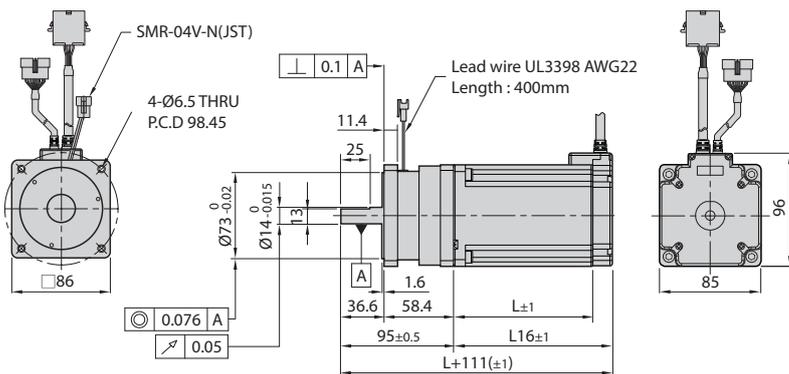
86 mm

Model name	Length(L)	Weight(Kg)
EzM2-86S-BK	78	3.6
EzM2-86M-BK	117	6.1
EzM2-86L-BK	155	6.6

SMR-04V-N(JST)
Lead wire UL3398 AWG22
Length : 400mm
4-Ø6.5 THRU P.C.D 98.45

● Gearbox Installed Motor Specification and Size

1. Gearbox for 42mm Motor Specification

Package	Maximum Holding Torque (N · m)	Rotor Inertia Moment (Kg · m²)	Backlash (min)	Angle Transmission Error (min)	Reduction Gear Ratio	Resolution (10,000ppr Standard)	Permitted Torque (N · m)	Maximum Torque (N · m)	Permitted Speed Range (rpm)	Unit Weight (Kg)	Permitted Overhung Load (N) Axis Center Standard	Permitted Thrust Load (N)
Ezi−SERVO II −EC−42S−PN3	0.57				3	0.012 °	6	12	0~1000		240	270
Ezi−SERVO II −EC−42S−PN5	0.95				5	0.0072 °	9	18	0~600		290	330
Ezi−SERVO II −EC−42S−PN8	1.52		3	5	8	0.0045 °	9	18	0~375	0.89	340	410
Ezi−SERVO II −EC−42S−PN10	1.90	35x10⁻⁷			10	0.0036 °	6	12	0~300		360	450
Ezi−SERVO II −EC−42S−PN15	2.76				15	0.0024 °	6	12	0~200		410	540
Ezi−SERVO II −EC−42S−PN25	4.60				25	0.00144 °	9	18	0~120	0.99	490	640
Ezi−SERVO II −EC−42S−PN40	7.36		5	7	40	0.0009 °	9	18	0~75		570	640
Ezi−SERVO II −EC−42S−PN50	9.00				50	0.00072 °	9	18	0~60		620	640
Ezi−SERVO II −EC−42M−PN3	0.85				3	0.012 °	6	18	0~1000		240	270
Ezi−SERVO II −EC−42M−PN5	1.42				5	0.0072 °	9	18	0~600		290	330
Ezi−SERVO II −EC−42M−PN8	2.28		3	5	8	0.0045 °	9	18	0~375	0.96	340	410
Ezi−SERVO II −EC−42M−PN10	2.85	54x10⁻⁷			10	0.0036 °	6	12	0~300		360	450
Ezi−SERVO II −EC−42M−PN15	4.14				15	0.0024 °	6	12	0~200		410	540
Ezi−SERVO II −EC−42M−PN25	4.90				25	0.00144 °	9	18	0~120	1.06	490	640
Ezi−SERVO II −EC−42M−PN40	9.00		5	7	40	0.0009 °	9	18	0~75		570	640
Ezi−SERVO II −EC−42M−PN50	9.00				50	0.00072 °	9	18	0~60		620	640
Ezi−SERVO II −EC−42L−PN3	0.93				3	0.012 °	6	18	0~1000		240	270
Ezi−SERVO II −EC−42L−PN5	1.55				5	0.0072 °	9	18	0~600		290	330
Ezi−SERVO II −EC−42L−PN8	2.48		3	5	8	0.0045 °	9	18	0~375	1.02	340	410
Ezi−SERVO II −EC−42L−PN10	3.10	77x10⁻⁷			10	0.0036 °	6	12	0~300		360	450
Ezi−SERVO II −EC−42L−PN15	4.51				15	0.0024 °	6	12	0~200		410	540
Ezi−SERVO II −EC−42L−PN25	7.52				25	0.00144 °	9	18	0~120	1.12	490	640
Ezi−SERVO II −EC−42L−PN40	9.00		5	7	40	0.0009 °	9	18	0~75		570	640
Ezi−SERVO II −EC−42L−PN50	9.00				50	0.00072 °	9	18	0~60		620	640
Ezi−SERVO II −EC−42XL−PN3	1.42				3	0.012 °	6	18	0~1000		240	270
Ezi−SERVO II −EC−42XL−PN5	2.38				5	0.0072 °	9	18	0~600		290	330
Ezi−SERVO II −EC−42XL−PN8	3.80		3	5	8	0.0045 °	9	18	0~375	1.15	340	410
Ezi−SERVO II −EC−42XL−PN10	4.76	114x10⁻⁷			10	0.0036 °	6	12	0~300		360	450
Ezi−SERVO II −EC−42XL−PN15	6.00				15	0.0024 °	6	12	0~200		410	540
Ezi−SERVO II −ST−42XL−PN25	9.00				25	0.00144 °	9	18	0~120	1.25	490	640
Ezi−SERVO II −EC−42XL−PN40	9.00		5	7	40	0.0009 °	9	18	0~75		570	640
Ezi−SERVO II −EC−42XL−PN50	9.00				50	0.00072 °	9	18	0~60		620	640

● **Gearbox Installed Motor Specification and Size**

2. Gearbox for 56mm Motor Specification

Package	Maximum Holding Torque (N · m)	Rotor Inertia Moment (Kg · m²)	Backlash (min)	Angle Transmis-sion Error (min)	Reduction Gear Ratio	Resolution (10,000ppr Standard)	Permitted Torque (N · m)	Maximum Torque (N · m)	Permitted Speed Range (rpm)	Unit Weight (Kg)	Permitted Overhung Load (N) Axis Center Standard	Per-mitted Thrust Load (N)
Ezi-SERVO II -EC-56S-PN3	1.1	180x10⁻⁷	3	5	3	0.012 °	18	35	0~1000	1.4	430	310
Ezi-SERVO II -EC-56S-PN5	1.9				5	0.0072 °	27	50	0~600	1.94	510	390
Ezi-SERVO II -EC-56S-PN8	3.0				8	0.0045 °	27	50	0~375		600	480
Ezi-SERVO II -EC-56S-PN10	3.8				10	0.0036 °	18	35	0~300		640	530
Ezi-SERVO II -EC-56S-PN15	5.5				15	0.0024 °	18	35	0~200	2.14	740	630
Ezi-SERVO II -EC-56S-PN25	9.3				25	0.00144 °	27	50	0~120		870	790
Ezi-SERVO II -EC-56S-PN40	14.9				40	0.0009 °	27	50	0~75		1000	970
Ezi-SERVO II -EC-56S-PN50	18.6				50	0.00072 °	27	50	0~60		1100	1000
Ezi-SERVO II -EC-56M-PN3	2.0	280x10⁻⁷	3	5	3	0.0012 °	18	35	0~1000	1.4	430	310
Ezi-SERVO II -EC-56M-PN5	3.4				5	0.0072 °	27	50	0~600		510	390
Ezi-SERVO II -EC-56M-PN8	5.4				8	0.0045 °	27	50	0~375	2.15	600	480
Ezi-SERVO II -EC-56M-PN10	6.8				10	0.0036 °	18	35	0~300		640	530
Ezi-SERVO II -EC-56M-PN15	9.9				15	0.0024 °	18	35	0~200		740	630
Ezi-SERVO II -EC-56M-PN25	16.6				25	0.00144 °	27	50	0~120	2.35	870	790
Ezi-SERVO II -EC-56M-PN40	27.0				40	0.0009 °	27	50	0~75		1000	970
Ezi-SERVO II -EC-56M-PN50	27.0				50	0.00072 °	27	50	0~60		1100	1000
Ezi-SERVO II -EC-56L-PN3	4.0	520x10⁻⁷	3	5	3	0.012 °	18	35	0~1000	1.4	430	310
Ezi-SERVO II -EC-56L-PN5	6.8				5	0.0072 °	27	50	0~600		510	390
Ezi-SERVO II -EC-56L-PN8	10.8				8	0.0045 °	27	50	0~375	2.52	600	480
Ezi-SERVO II -EC-56L-PN10	13.6				10	0.0036 °	18	35	0~300		640	530
Ezi-SERVO II -EC-56L-PN15	18.0				15	0.0024 °	18	35	0~200		740	630
Ezi-SERVO II -EC-56L-PN25	27.0				25	0.00144 °	27	50	0~120	2.72	870	790
Ezi-SERVO II -EC-56L-PN40	27.0				40	0.0009 °	27	50	0~75		1000	970
Ezi-SERVO II -EC-56L-PN50	27.0				50	0.00072 °	27	50	0~60		1100	1000

● Gearbox Installed Motor Specification and Size

2. Gearbox for 60mm Motor Specification

Package	Maximum Holding Torque (N · m)	Rotor Inertia Moment (Kg · m²)	Backlash (min)	Angle Transmis-sion Error (min)	Reduction Gear Ratio	Resolution (10,000ppr Standard)	Permitted Torque (N · m)	Maximum Torque (N · m)	Permitted Speed Range (rpm)	Unit Weight (Kg)	Permitted Overhung Load (N) Axis Center Standard	Permit-ted Thrust Load (N)
Ezi−SERVO II −EC−60S−PN3	1.5				3	0.012 °	18	35	0~1000	1.4	430	310
Ezi−SERVO II −EC−60S−PN5	2.5				5	0.0072 °	27	50	0~600		510	390
Ezi−SERVO II −EC−60S−PN8	4.0				8	0.0045 °	27	50	0~375	2.0	600	480
Ezi−SERVO II −EC−60S−PN10	5.1	240x10⁻⁷	3	5	10	0.0036 °	18	35	0~300		640	530
Ezi−SERVO II −EC−60S−PN15	7.4				15	0.0024 °	18	35	0~200		740	630
Ezi−SERVO II −EC−60S−PN25	12.3				25	0.00144 °	27	50	0~120	2.2	870	790
Ezi−SERVO II −EC−60S−PN40	19.8				40	0.0009 °	27	50	0~75		1000	970
Ezi−SERVO II −EC−60S−PN50	24.7				50	0.00072 °	27	50	0~60		1100	1000
Ezi−SERVO II −EC−60M−PN3	2.6				3	0.012 °	18	35	0~1000	1.4	430	310
Ezi−SERVO II −EC−60M−PN5	4.4				5	0.0072 °	27	50	0~600		510	390
Ezi−SERVO II −EC−60M−PN8	7.0				8	0.0045 °	27	50	0~375	2.3	600	480
Ezi−SERVO II −EC−60M−PN10	8.8	490x10⁻⁷	3	5	10	0.0036 °	18	35	0~300		640	530
Ezi−SERVO II −EC−60M−PN15	12.8				15	0.0024 °	18	35	0~200		740	630
Ezi−SERVO II −EC−60M−PN25	21.4				25	0.00144 °	27	50	0~120	2.5	870	790
Ezi−SERVO II −EC−60M−PN40	27.0				40	0.0009 °	27	50	0~75		1000	970
Ezi−SERVO II −EC−60M−PN50	27.0				50	0.00072 °	27	50	0~60		1100	1000
Ezi−SERVO II −EC−60L−PN3	5.2				3	0.012 °	18	35	0~1000	1.4	430	310
Ezi−SERVO II −EC−60L−PN5	8.7				5	0.0072 °	27	50	0~600		510	390
Ezi−SERVO II −EC−60L−PN8	13.9				8	0.0045 °	27	50	0~375	3.0	600	480
Ezi−SERVO II −EC−60L−PN10	18.0	690x10⁻⁷	3	5	10	0.0036 °	18	35	0~300		640	530
Ezi−SERVO II −EC−60L−PN15	18.0				15	0.0024 °	18	35	0~200		740	630
Ezi−SERVO II −EC−60L−PN25	27.0				25	0.00144 °	27	50	0~120	3.2	870	790
Ezi−SERVO II −EC−60L−PN40	27.0				40	0.0009 °	27	50	0~75		1000	970
Ezi−SERVO II −EC−60L−PN50	27.0				50	0.00072 °	27	50	0~60		1100	1000

2. Gearbox for 86mm Motor Specification

| Package	Maximum Holding Torque (N·m)	Rotor Inertia Moment (Kg·m²)	Backlash (min)	Angle Transmission Error (min)	Reduction Gear Ratio	Resolution (10,000ppr Standard)	Permitted Torque (N·m)	Maximum Torque (N·m)	Permitted Speed Range (rpm)	Unit Weight (Kg)	Permitted Overhung Load (N) Axis Center Standard	Permitted Thrust Load (N)
Ezi−SERVO II −EC−86M−PN3	10.6	1400×10⁻⁷	3	5	3	0.012 °	50	80	0~1000	6.0	810	930
Ezi−SERVO II −EC−86M−PN5	17.7				5	0.0072 °	75	125	0~600		960	1200
Ezi−SERVO II −EC−86M−PN8	28.3				8	0.0045 °	75	125	0~375		1100	1400
Ezi−SERVO II −EC−86M−PN10	35.4				10	0.0036 °	50	80	0~300		1200	1600
Ezi−SERVO II −EC−86M−PN15	50.0				15	0.0024 °	50	80	0~200	6.5	1200	1900
Ezi−SERVO II −EC−86M−PN25	75.0				25	0.00144 °	75	125	0~120		1600	2200
Ezi−SERVO II −EC−86M−PN40	75.0				40	0.0009 °	75	125	0~75		1900	2200
Ezi−SERVO II −EC−86M−PN50	75.0				50	0.00072 °	75	125	0~60		2100	2200
Ezi−SERVO II −EC−86L−PN3	20.5	2700×10⁻⁷	3	5	3	0.012 °	50	80	0~1000	7.5	810	930
Ezi−SERVO II −EC−86L−PN5	34.1				5	0.0072 °	75	125	0~600		960	1200
Ezi−SERVO II −EC−86L−PN8	54.5				8	0.0045 °	75	125	0~375		1100	1400
Ezi−SERVO II −EC−86L−PN10	50.0				10	0.0036 °	50	80	0~300		1200	1600
Ezi−SERVO II −EC−86L−PN15	50.0				15	0.0024 °	50	80	0~200	8.0	1200	1900
Ezi−SERVO II −EC−86L−PN25	75.0				25	0.00144 °	75	125	0~120		1600	2200
Ezi−SERVO II −EC−86L−PN40	75.0				40	0.0009 °	75	125	0~75		1900	2200
Ezi−SERVO II −EC−86L−PN50	75.0				50	0.00072 °	75	125	0~60		2100	2200
Ezi−SERVO II −EC−86XL−PN3	24.7	4000×10⁻⁷	3	5	3	0.012 °	50	80	0~1000	9.0	810	930
Ezi−SERVO II −EC−86XL−PN5	41.1				5	0.0072 °	75	125	0~600		960	1200
Ezi−SERVO II −EC−86XL−PN8	65.8				8	0.0045 °	75	125	0~375		1100	1400
Ezi−SERVO II −EC−86XL−PN10	50.0				10	0.0036 °	50	80	0~300		1200	1600
Ezi−SERVO II −EC−86XL−PN15	50.0				15	0.0024 °	50	80	0~200	9.5	1200	1900
Ezi−SERVO II −EC−86XL−PN25	75.0				25	0.00144 °	75	125	0~120		1600	2200
Ezi−SERVO II −EC−86XL−PN40	75.0				40	0.0009 °	75	125	0~75		1900	2200
Ezi−SERVO II −EC−86XL−PN50	75.0				50	0.00072 °	75	125	0~60		2100	2200

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● Gearbox Installed Motor Specification and Size

4. Motor Size(mm)

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Package	Motor	Stage	□Second Stage	L Length (mm)
Ezi-SERVOⅡ-EC-42S-PN□	EzM2-42S-PN□		3, 5, 8, 10	34
Ezi-SERVOⅡ-EC-42M-PN□	EzM2-42M-PN□		3, 5, 8, 10	40
Ezi-SERVOⅡ-EC-42L-PN□	EzM2-42L-PN□	Single Stage	3, 5, 8, 10	48
Ezi-SERVOⅡ-EC-42XL-PN□	EzM2-42XL-PN□		3, 5, 8, 10	60
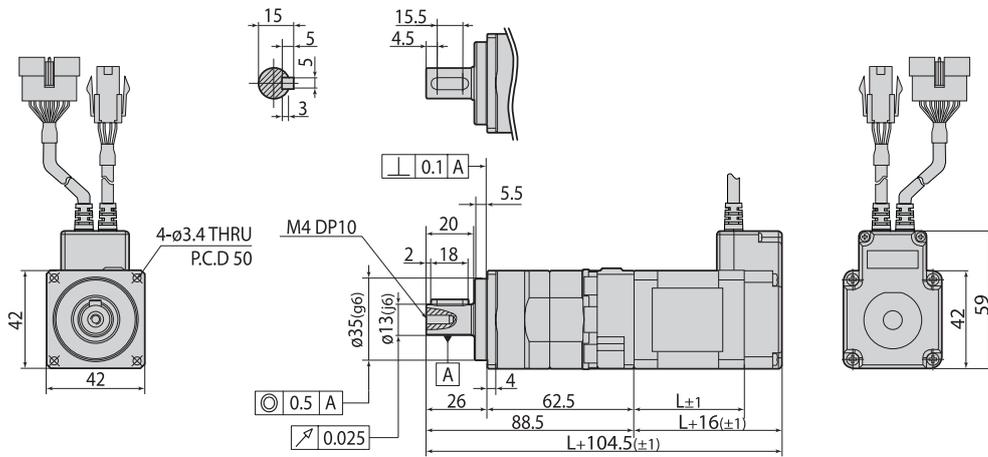
Package	Motor	Stage	□Second Stage	L Length (mm)
Ezi-SERVOⅡ-EC-42S-PN□	EzM2-42S-PN□		15, 25, 40, 50	34
Ezi-SERVOⅡ-EC-42M-PN□	EzM2-42M-PN□		15, 25, 40, 50	40
Ezi-SERVOⅡ-EC-42L-PN□	EzM2-42L-PN□	Second Stage	15, 25, 40, 50	48
Ezi-SERVOⅡ-EC-42XL-PN□	EzM2-42XL-PN□		15, 25, 40, 50	60
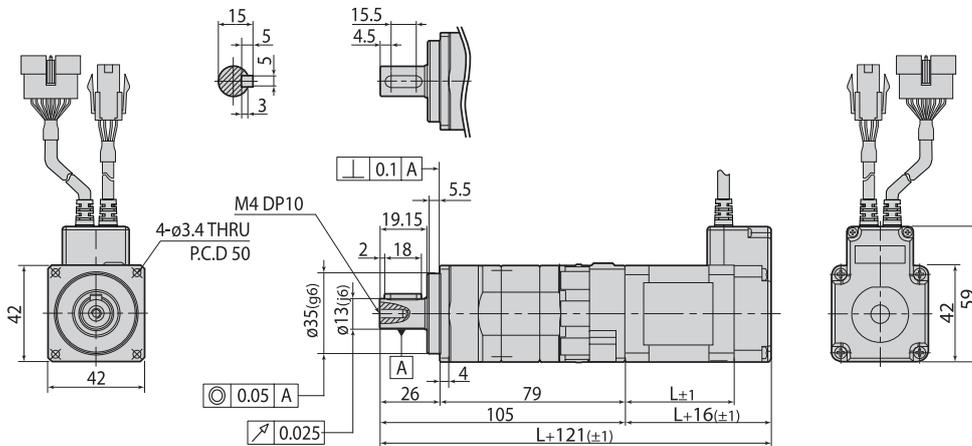
5. Motor Size(mm)

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Package	Motor	Stage	□Second Stage	L Length (mm)
Ezi-SERVOⅡ-EC-56S-PN□	EzM2-56S-PN□		3, 5, 8, 10	46
Ezi-SERVOⅡ-EC-56M-PN□	EzM2-56M-PN□	Single Stage	3, 5, 8, 10	55
Ezi-SERVOⅡ-EC-56L-PN□	EzM2-56L-PN□		3, 5, 8, 10	80
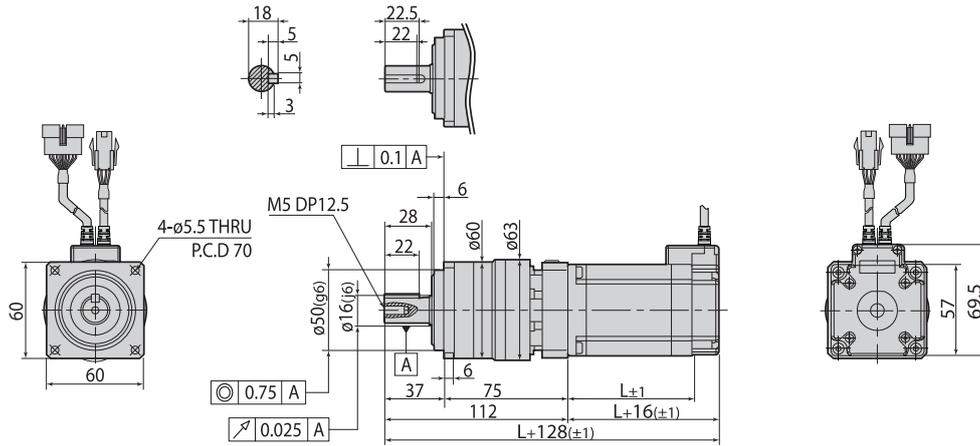
Package	Motor	Stage	□Second Stage	L Length (mm)
Ezi-SERVOⅡ-EC-56S-PN□	EzM2-56S-PN□		15, 25, 40, 50	46
Ezi-SERVOⅡ-EC-56M-PN□	EzM2-56M-PN□	Second Stage	15, 25, 40, 50	55
Ezi-SERVOⅡ-EC-56L-PN□	EzM2-56L-PN□		15, 25, 40, 50	80

● Gearbox Installed Motor Specification and Size

6. Motor Size(mm)

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Package	Motor	Stage	□Second Stage	L Length (mm)
Ezi−SERVOⅡ−EC−60S−PN□	EzM2−60S−PN□	Single Stage	3, 5, 8, 10	47
Ezi−SERVOⅡ−EC−60M−PN□	EzM2−60M−PN□		3, 5, 8, 10	56
Ezi−SERVOⅡ−EC−60L−PN□	EzM2−60L−PN□		3, 5, 8, 10	85
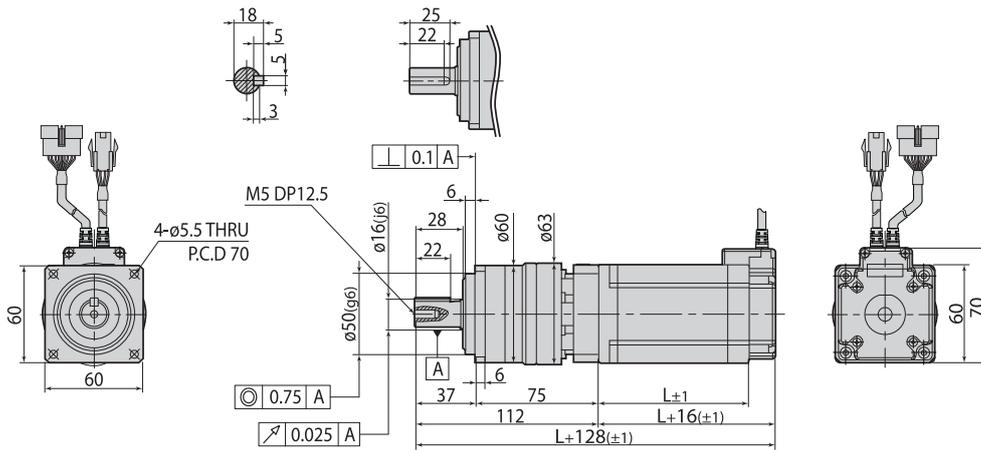
Package	Motor	Stage	□Second Stage	L Length (mm)
Ezi−SERVOⅡ−EC−60S−PN□	EzM2−60S−PN□	Second Stage	15, 25, 40, 50	47
Ezi−SERVOⅡ−EC−60M−PN□	EzM2−60M−PN□		15, 25, 40, 50	56
Ezi−SERVOⅡ−EC−60L−PN□	EzM2−60L−PN□		15, 25, 40, 50	85
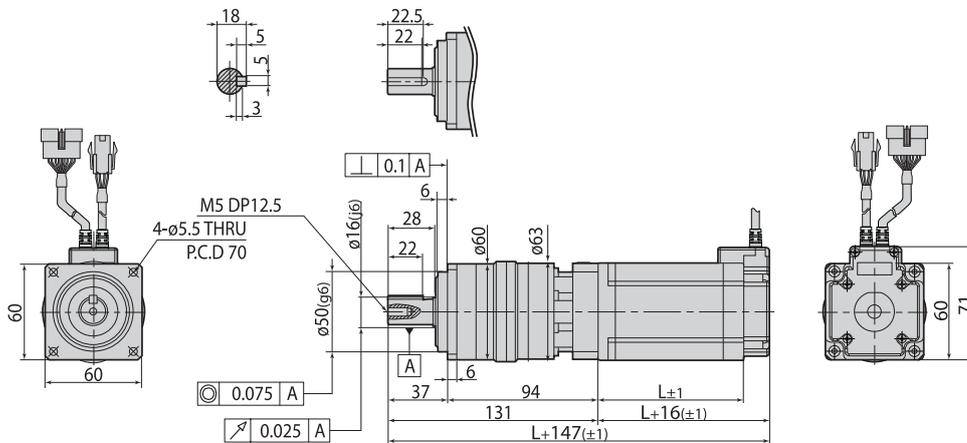
7. Motor Size(mm)

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Package	Motor	Stage	□Second Stage	L Length (mm)
Ezi−SERVO II −EC−86M−PN□	EzM2−86M−PN□		3, 5, 8, 10	78
Ezi−SERVO II −EC−86L−PN□	EzM2−86L−PN□	Single Stage	3, 5, 8, 10	117
Ezi−SERVO II −EC−86XL−PN□	EzM2−86XL−PN□		3, 5, 8, 10	155
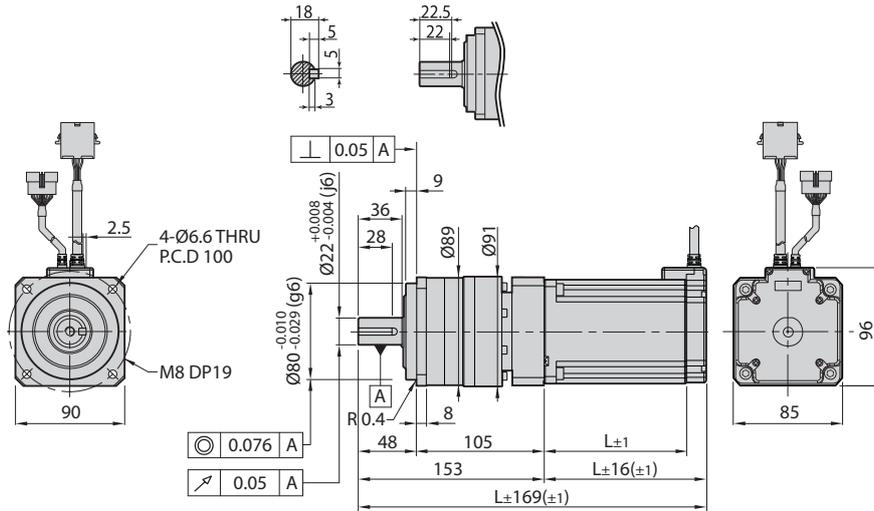
Package	Motor	Stage	□Second Stage	L Length (mm)
Ezi−SERVO II −EC−86M−PN□	EzM2−86M−PN□		15, 25, 40, 50	78
Ezi−SERVO II −EC−86L−PN□	EzM2−86L−PN□	Second Stage	15, 25, 40, 50	117
Ezi−SERVO II −EC−86XL−PN□	EzM2−86XL−PN□		15, 25, 40, 50	155

Power Connector (PWR)

Motor Connector (MOTOR)

Encoder Connector (ENCODER)

Digital I/O Connector (IN/OUT)

EtherCAT Status LED (ECAT RUN / ERR)

Drive Status LED

EtherCAT ID Display (ECAT ID)

EtherCAT Connector (ECAT IN)

EtherCAT Connector (ECAT OUT)

EtherCAT ID Select Switch (ECAT ID)

Power Connector (PWR)

Motor Connector (MOTOR)

Encoder Connector (ENCODER)

Digital I/O Connector (IN/OUT)

EtherCAT Connector (ECAT OUT)

EtherCAT Connector (ECAT IN)

EtherCAT ID Display (ECAT ID)

USB

EtherCAT ID Select Switch (ECAT ID)

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1. EtherCAT ID Display and Select Switch

There are two Rotary Switches to set value of EtherCAT ID (ECAT Device ID). Switch on the right side indicates the ones' place(X1), and Switch on the left side indicates the tens' place(X10).

(x10)   (x1)   (x10)   (x1)

SW2   SW1

2. EtherCAT Status LED

LED indicates communication status of EtherCAT. Link/Activity LED exists on each port of EtherCAT.

Name	Color	Status	Explanation
Run	Green	OFF	State INIT or Power OFF
		Blinking	State PRE-OPERATIONAL
		Single Flash	State SAFE-OPERATIONAL
		ON	State OPERATIONAL
		Flickering	State BOOTSTRAP

Name	Color	Status	Explanation
Error	Red	OFF	No Error or Power OFF
		Blinking	Invalid Configuration
		Single Flash	Local Error
		Double Flash	Watchdog Time Out

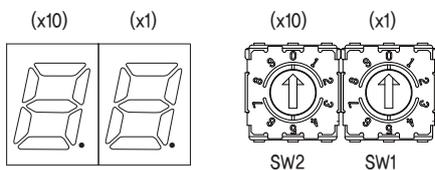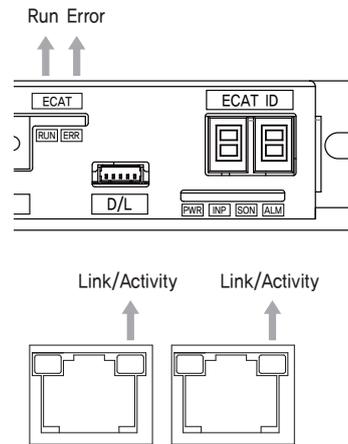| Name	Color	Status	Explanation
Link/ Activity	Green	OFF	Link not Established
		ON	Link Established
		Flickering	Link Established and in Operation

3. Drive Status LED

Indication	Color	Function	ON/OFF Condition
PWR	Green	Power Input Indication	LED is turned ON when power is applied
INP	Yellow	Complete Positioning Motion	Lights On when Positioning error reaches within the preset pulse selected by rotary switch
SON	Orange	Servo On / Off Indication	Servo On : Lights On, Servo Off : Lights Off
ALM	Red	Alarm indication	Flash when protection function is activated

◆ Drive Protection Functions

Error Code*4	Protection	Conditions
E-001	Over current Error	The current through power devices in inverter exceeds the limit value
E-002	Over speed Error	Motor speed exceed 3,000rpm
E-003	Position tracking Error	Position error value is higher than 90˚ in motor run state
E-004	Over load Error	The motor is continuously operated more than 5 second under a load exceeding the max. torque
E-005	Over temperature Error	Temperature of inside of drive exceed 85℃
E-006	Over regeneratived voltage Error	Back EMF of motor exceeds limit value*1
E-007	Motor connect Error	The power is ON without connection of the motor cable to drive
E-008	Encoder connect Error	There is connection error between drive and encoder
E-009	Motor voltage Error	Motor voltage is out of limited value*2
E-010	In-Position Error	After operation is finished, a position error occurs
E-011	System Error	Error occurs in drive system
E-012	ROM Error	Error occurs in parameter storage device(ROM)
E-014	Input voltage Error	Power source voltage is out of limited value*3
E-015	Position overflow Error	Position error value is higher than 90˚ in motor stop state

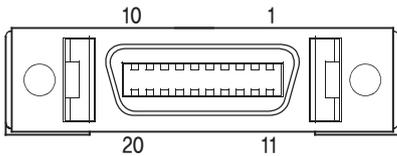*1 : Voltage limit of Back-EMF depends on motor model (Please refer to the manual)
*2 : Limit voltage value of Motor is depends on motor model (Please refer to the manual)
*3 : Rated value of input voltage to the drive is depends on model (Please refer to the manual)
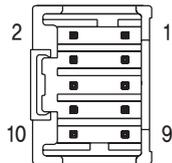*4 : When an alarm occurs, error code is displayed instead of EtherCAT ID on the EtherCAT ID Display (ECAT ID).

4. Input/Output Signal (IN / OUT)

NO.	Function	I/O
1	LIMIT+	Input
2	LIMIT−	Input
3	ORIGIN	Input
4	Digital Input 1	Input
5	Digital Input 2	Input
6	Digital Input 3	Input
7	Digital Input 4	Input
8	Digital Input 5	Input
9	Digital Input 6	Input
10	Digital Input 7	Input
11	Digital Output 1	Output
12	Digital Output 2	Output
13	Digital Output 3	Output
14	Digital Output 4	Output
15	Digital Output 5	Output
16	Digital Output 6	Output
17	BRAKE+	Output
18	BRAKE−	Output
19	24VDC GND	Input
20	24VDC	Input

6. Motor Connector (MOTOR)

NO.	Function
1	A Phase
2	B Phase
3	/A Phase
4	/B Phase
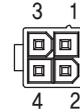
NO.	Function
1	/B 상
2	B 상
3	/A 상
4	A 상
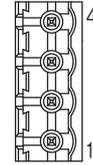
※Only for 86mm motor drive.

7. Power Connector(PWR)

NO.	Function
1	24VDC ±10%
2	GND

NO.	Function
1	GND
2	40∼70VDC

※Only for 86mm motor drive.

5. Encoder Connector (ENCODER)

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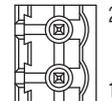
8. EtherCAT Communication Connector

NO.	Function	NO.	Function
1	TD+	6	RD−
2	TD−	7	−−−−
3	RD+	8	−−−−
4	−−−−	Connector hood	FG
5	−−−−		
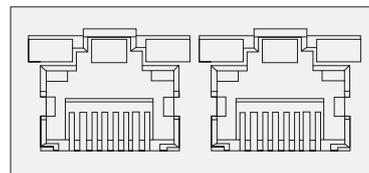
◆ Connector for Cabling

These connectors are serviced together with Ezi-SERVO II EtherCAT except when purchasing option cables.

CN1 : Input/Output Connector (IN/OUT)

Item	Specification	Maker
Connector	10120-3000PE	3M
Shell	10320-52FO-008	3M

CN2 : Encoder Connector (ENCODER)

Item	Specification	Maker
Housing	51353-1000	MOLEX
Terminal	56134-9000	MOLEX

CN3 : Motor Connector (MOTOR)

Item	Specification	Maker
Housing	5557-04R	MOLEX
Terminal	5556T	MOLEX

Item	Specification	Maker
Terminal Block	AK-950-4	PTR

※Only for 86mm motor drive.

CN4 : Power Connector (PWR)

Item	Specification	Maker
Housing	5557-02R	MOLEX
Terminal	5556T	MOLEX

Item	Specification	Maker
Terminal Block	AK-950-2	PTR

※Only for 86mm motor drive.

● System Configuration

EtherCAT Master

⑤EtherCAT Cable

ECAT IN   ECAT OUT

Input / Output

LIMIT- ORIGIN   LIMIT+

● 10 Inputs (3 dedicated)   ● 8 Outputs (2 dedicated)

IN/OUT   ①Signal Cable

②Encoder Extension Cable

③Motor Extension Cable

ENCODER

MOTOR

Input DC Power

PWR   ④Power Cable

Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable	EtherCAT Cable
Standard Length	–	30cm	30cm	–	–
Max. Length	20m	20m	20m	2m	100m

1. Cable Option

① Signal Cable

Available to connect between Ezi-SERVO Ⅱ EtherCAT and Input/Output signals.

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

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

② Encoder Extension Cable

Available to extended connection between Encoder and Ezi-SERVO Ⅱ EtherCAT.

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

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

③ Motor Extension Cable

Available to extended connection between motor and Ezi-SERVOⅡ EtherCAT.

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

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

④ Power Cable

Available to connect between Power and Ezi-SERVOⅡ EtherCAT.

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

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

⑤ EtherCAT Cable

Shielded twisted pair(STP) cable of category 5 or higher.

Item	Length[m]	Remark
CGNR-EC-001F	1	
CGNR-EC-002F	2	Normal Cable
CGNR-EC-003F	3	
CGNR-EC-005F	5	

2. Option

① TB-Plus(Interface Board)

Available to connect more conveniently between Input/Output signal and Ezi-SERVOⅡ EtherCAT.

② Interface Cable

Available to Connect between TB-Plus Interface Board and Ezi-SERVOⅡ EtherCAT.

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

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

⑤EtherCAT Cable

EtherCAT Master

ECAT IN

ECAT OUT

Input / Output

LIMIT- ORIGIN   LIMIT+

● 10 Inputs (3 dedicated)   ● 8 Outputs (2 dedicated)

IN/OUT   ①Signal Cable

②Encoder Extension Cable

③Motor Extension Cable

ENCODER

MOTOR

Input DC Power

PWR   ④Power Cable

29

Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable	EtherCAT Cable
Standard Length	–	30cm	30cm	–	–
Max. Length	20m	20m	20m	2m	100m

1. Cable Option

① Signal Cable

Available to connect between Ezi-SERVO II EtherCAT and Input/Output signals.

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

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

② Encoder Extension Cable

Available to extended connection between Encoder and Ezi-SERVO II EtherCAT.

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

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

③ Motor Extension Cable

Available to extended connection between motor and Ezi-SERVOⅡ EtherCAT.

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

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

⑤ EtherCAT Cable

Shielded twisted pair(STP) cable of category 5 or higher.

Item	Length[m]	Remark
CGNR-EC-001F	1	
CGNR-EC-002F	2	Normal Cable
CGNR-EC-003F	3	
CGNR-EC-005F	5	

④ Power Cable

Available to connect between Power and Ezi-SERVOⅡ EtherCAT.

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

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

2. Option

① TB-Plus(Interface Board)

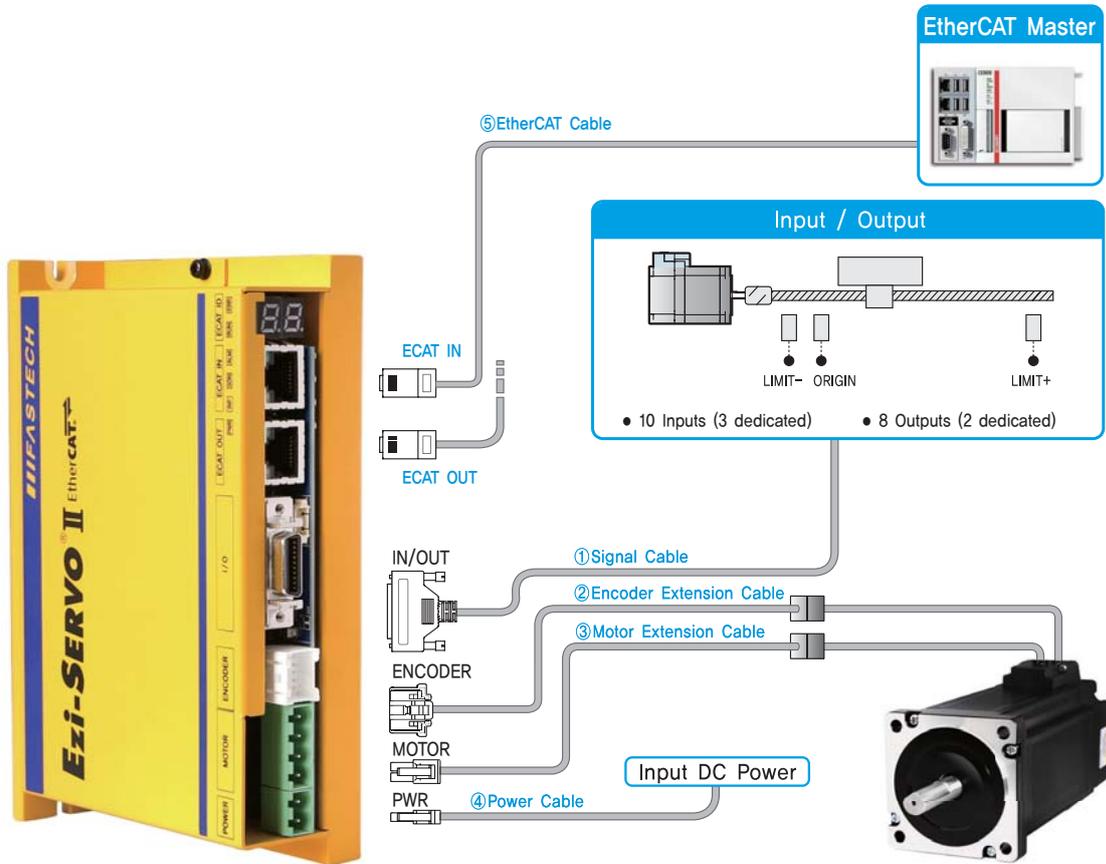Available to connect more conveniently between Input/Output signal and Ezi-SERVOⅡ EtherCAT.

② Interface Cable

Available to Connect between TB-Plus Interface Board and Ezi-SERVOⅡ EtherCAT.

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

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

Ezi-SERVOⅡ EtherCAT

Encoder

CN4

Input voltage (24VDC ±10%)	1
Input voltage GND	2

CN2

A+	1
A−	2
B+	3
B−	4
Z+	5
Z−	6
+5V	7
GND	8
FG	9,10

Encoder E

External IN/OUT

CN1

24VDC	20
LIMIT+	1
LIMIT−	2
ORIGIN	3
In1	4
In2	5
In3	6
In4	7
In5	8
In6	9
In7	10
Out1	11
Out2	12
Out3	13
Out4	14
Out5	15
Out6	16
24VDC GND	19
BRAKE+	17
BRAKE−	18
FG	

24VDC

CN3

A	1
/A	3
B	2
/B	4

Motor

Motor M

※) Twisted Pair Shield Cable

※ CAUTION ※

Please refer to the Manual when connects motor extension cable. Careful connection will be required to protect from any damages.

Ezi-SERVO II EtherCAT

Encoder

CN4

Input voltage GND	1
Input voltage (40~70VDC)	2

CN2

A+	1
A−	2
B+	3
B−	4
Z+	5
Z−	6
+5V	7
GND	8
FG	9,10

Encoder
E

External IN/OUT

CN1

24VDC	20
LIMIT+	1
LIMIT−	2
ORIGIN	3
In1	4
In2	5
In3	6
In4	7
In5	8
In6	9
In7	10
Out1	11
Out2	12
Out3	13
Out4	14
Out5	15
Out6	16
24VDC GND	19
BRAKE+	17
BRAKE−	18
FG	

24VDC

CN3

A	4
/A	3
B	2
/B	1

Motor
Motor
M

※) ⊠ Twisted Pair Shield Cable

※ CAUTION ※

Please refer to the Manual when connects motor extension cable. Careful connection will be required to protect from any damages.

MEMO

MEMO

MEMO

FASTECH

*F*ast, *A*ccurate, *S*mooth Motion

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