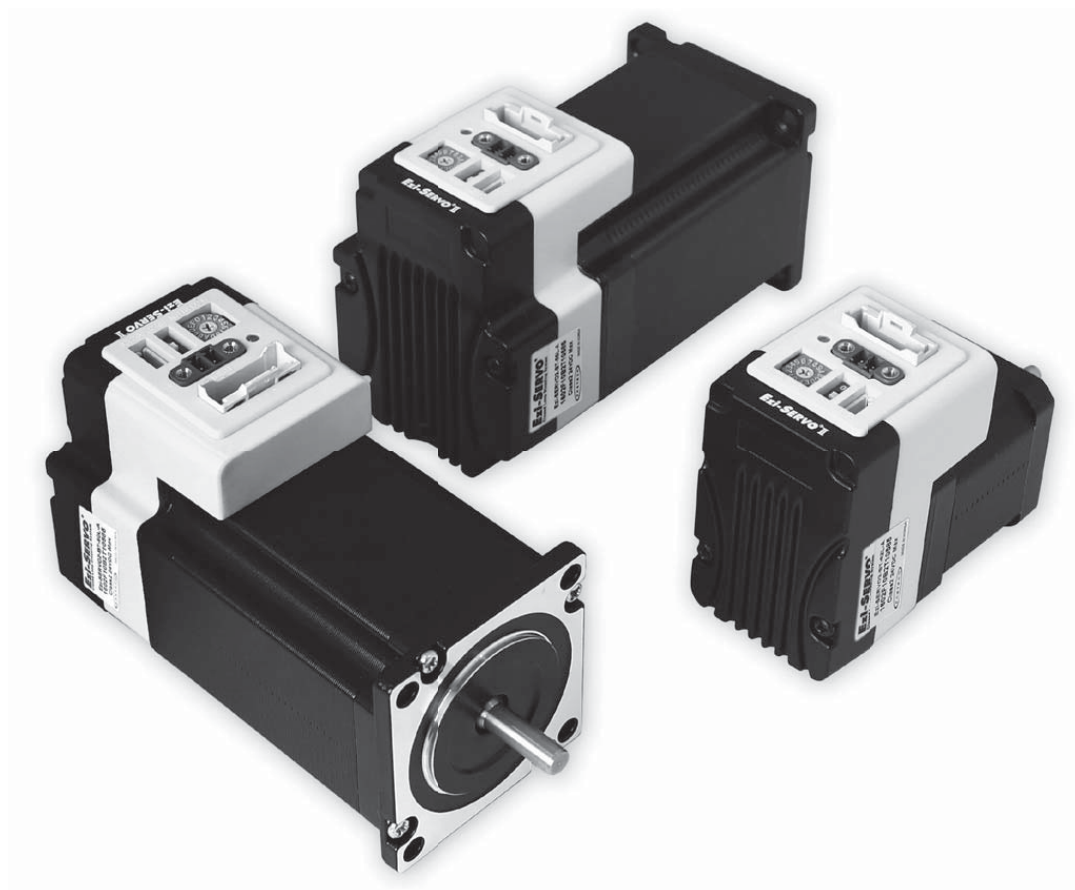


Ezi-SERVO[®] II

Closed Loop Stepping System

BT



Fast, Accurate, Smooth Motion

www.fastech.co.kr

Table of Contents

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※ Before Operation ※

- Thank you for your purchasing Ezi-SERVO II BT.
- Ezi-SERVO II BT is full digital position control step drive.
- This manual describes handling, maintenance, repair, diagnosis and troubleshooting of Ezi-SERVO II BT.
- Before operating Ezi-SERVO II BT, thoroughly read this manual.
- After reading the manual, keep the manual near the Ezi-SERVO II BT so that any user can read the manual whenever needed.

1. Precautions

◆ General Precautions

- Contents of this manual are subject to change without prior notice for functional improvement, change of specifications or user's better understanding.
Thoroughly read the manual provided with the purchased Ezi-SERVO II BT.
- When the manual is damaged or lost, please contact with Fastech's agents or our company at the address on the last page of the manual.
- Our company is not responsible for a product breakdown due to user's dismantling for the product, and such a breakdown is not guaranteed by the warranty.

◆ Put the Safety First

- Before installation, operation and repairing the Ezi-SERVO II BT, thoroughly read the manual and fully understand the contents. Before operating the Ezi-SERVO II BT please, understand the mechanical characteristics of the Ezi-SERVO II BT and related safety information and precautions.
- This manual divides safety precautions into **Attention** and **Warning**.



Attention :

If user does not properly handle the product, the user may seriously or slightly injured and damages may occur in the machine.




Warning :



If user does not properly handle the product, a dangerous situation (such as an electric shock) may occur resulting in deaths or serious injuries.

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



◆ Check the Product

 Attention	<p>Check the Product is damaged or parts are missing. Otherwise, the machine may get damaged or the user may get injured.</p>
--	---

◆ Installation

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

◆ Connect Cables

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

◆ Operation



Attention

If a protection function(alarm) occurs, firstly remove its cause and then release(alarm reset) the protection function.

If you operate continuously without removing its cause, the machine may get damaged or the user may get injured.

Do not make Motor Free and make input signal to ON during operation.

Motor will stop and stop current will become zero. The machine may get damaged or the user may get injured.

Make all input signals to OFF before supply input voltage to Ezi-SERVO II BT.

The machine may get damaged or the user may get injured by motor operation.

All parameter values are set by default factory setting value. Change this value after reading this manual thoroughly.

Otherwise, the machine may get damaged or other kinds of accidents may occur.

◆ Check and Repair



Warning

Stop to supply power to the main circuit and wait for a while before checking or repairing the Ezi-SERVO II BT.

Electricity remaining in the capacitor may cause danger.

Do not change cabling while power is being supplied.

Otherwise, the user may get injured or the product may get damaged.

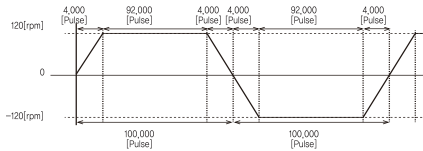
Do not reconstruct the Ezi-SERVO II BT.

Otherwise, an electric shock may occur or the reconstructed product can not get After-Service.

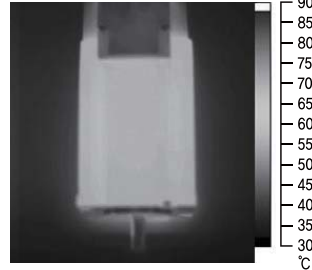
2. Main Characteristics

1 Current control according to load

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



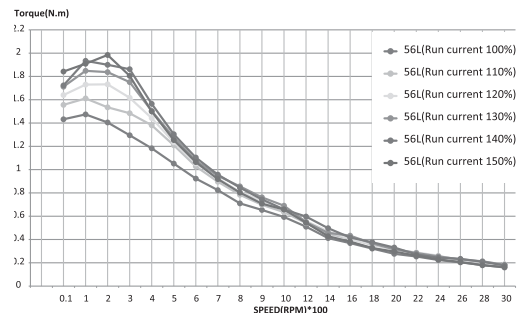
Motor temperature [measured by thermograph]



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

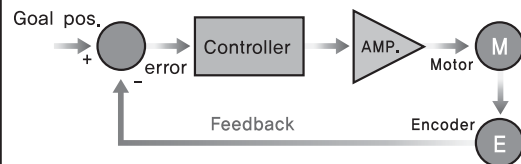
2 Torque increase by the Boost Current Control

By Boost Current Setting by Parameter setting enables acceleration and deceleration characteristics to be improved.



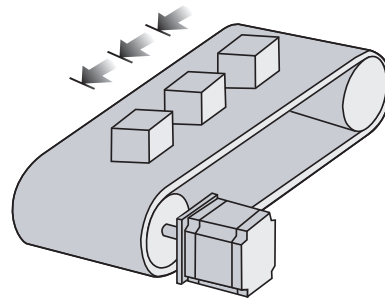
3 Closed Loop System

Ezi-SERVO II 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-SERVO II to update the current motor shaft position information every 25 micro seconds. This allows the Ezi-SERVO II 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!



4 No Gain Tuning

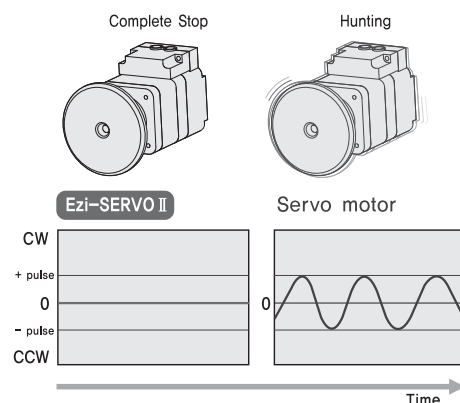
Conventional servo systems, to ensure machine performance, smoothness, positional error and low servo noise, require the adjustment of its servo's gains as an initial crucial step. Even systems that employ auto-tuning require manual tweaking after the system is installed, especially if more than one 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 wasting 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!



Belt and Pulley System

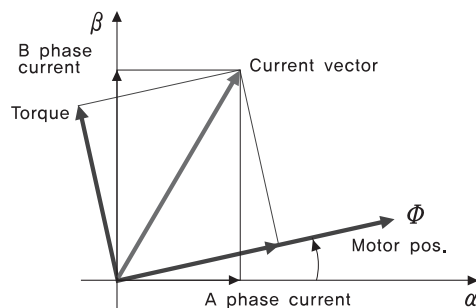
5 No Hunting

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.



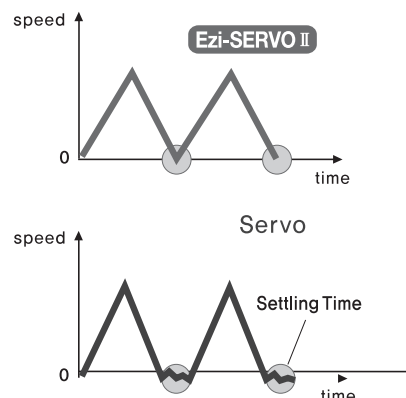
6 Smooth and Accurate

Ezi-SERVO II is a high-precision servo drive, using a high-resolution encoder with Max. 20,000 pulses/revolution. Unlike a conventional Microstep drive, the on-board high performance DSP(Digital Signal Processor) performs vector control and filtering, producing a smooth rotational control with minimum ripples.



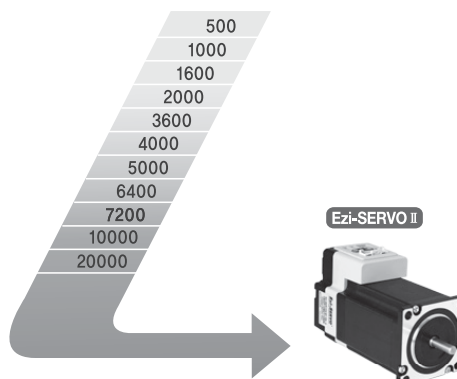
7 Fast Response

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.



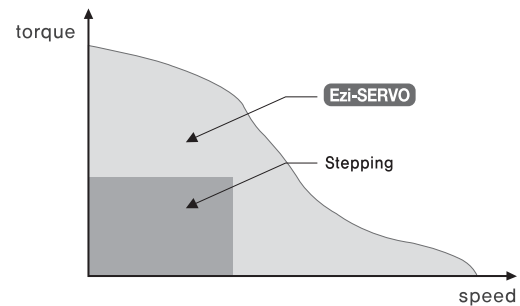
8 High Resolution

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



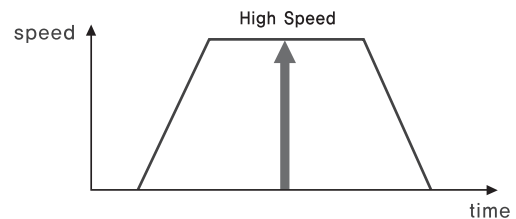
9 High Torque

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.



10 High Speed

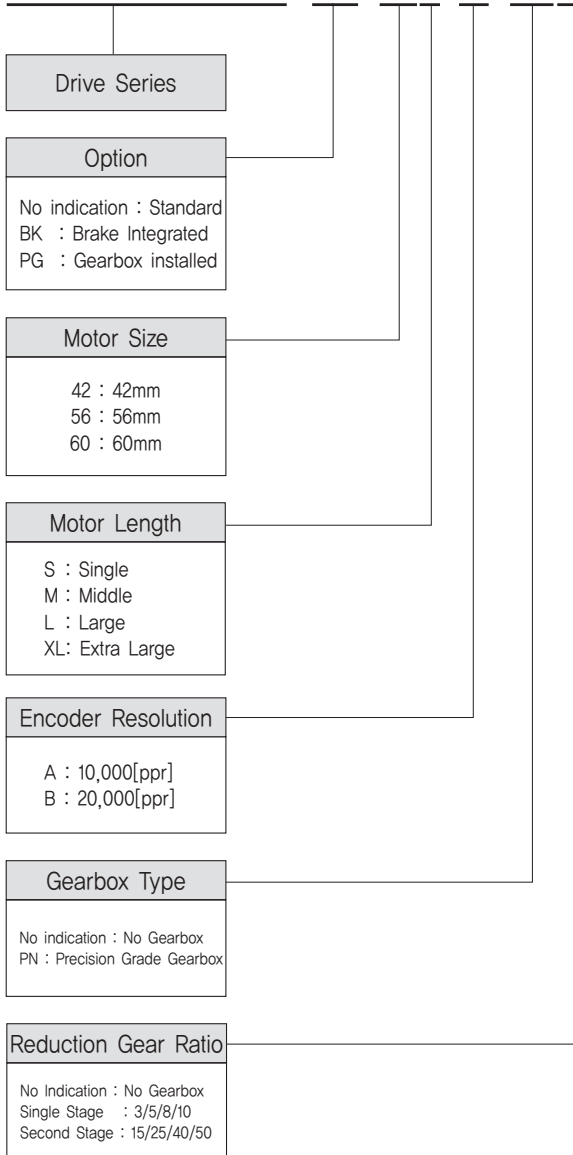
The Ezi-SERVO II functions well at high speed without the loss of Synchronism or positioning error. Ezi-SERVO II's ability of continuous monitoring of current position enables the stepping motor to generate high-torque, even under a 100% load condition.



3. Model and Motor Drive Combination

Ezi-SERVO II BT Part Numbering

Ezi-SERVO II -BT-BK-42S-A-PN10



Ezi-SERVO II BT Combination

Unit Part Number
Ezi-SERVO II -BT-42S-A
Ezi-SERVO II -BT-42S-B
Ezi-SERVO II -BT-42M-A
Ezi-SERVO II -BT-42M-B
Ezi-SERVO II -BT-42L-A
Ezi-SERVO II -BT-42L-B
Ezi-SERVO II -BT-42XL-A
Ezi-SERVO II -BT-42XL-B
Ezi-SERVO II -BT-56S-A
Ezi-SERVO II -BT-56S-B
Ezi-SERVO II -BT-56M-A
Ezi-SERVO II -BT-56M-B
Ezi-SERVO II -BT-56L-A
Ezi-SERVO II -BT-56L-B
Ezi-SERVO II -BT-60S-A
Ezi-SERVO II -BT-60S-B
Ezi-SERVO II -BT-60M-A
Ezi-SERVO II -BT-60M-B
Ezi-SERVO II -BT-60L-A
Ezi-SERVO II -BT-60L-B

Gearbox Integrated

Unit Part Number	Reduction gear ratio
Ezi-SERVO II -BT-PG-42S-A-PN3	1:3
Ezi-SERVO II -BT-PG-42S-A-PN5	1:5
Ezi-SERVO II -BT-PG-42S-A-PN8	1:8
Ezi-SERVO II -BT-PG-42S-A-PN10	1:10
Ezi-SERVO II -BT-PG-42S-A-PN15	1:15
Ezi-SERVO II -BT-PG-42S-A-PN25	1:25
Ezi-SERVO II -BT-PG-42S-A-PN40	1:40
Ezi-SERVO II -BT-PG-42S-A-PN50	1:50
Ezi-SERVO II -BT-PG-42M-A-PN3	1:3
Ezi-SERVO II -BT-PG-42M-A-PN5	1:5
Ezi-SERVO II -BT-PG-42M-A-PN8	1:8
Ezi-SERVO II -BT-PG-42M-A-PN10	1:10
Ezi-SERVO II -BT-PG-42M-A-PN15	1:15
Ezi-SERVO II -BT-PG-42M-A-PN25	1:25
Ezi-SERVO II -BT-PG-42M-A-PN40	1:40
Ezi-SERVO II -BT-PG-42M-A-PN50	1:50
Ezi-SERVO II -BT-PG-42L-A-PN3	1:3
Ezi-SERVO II -BT-PG-42L-A-PN5	1:5
Ezi-SERVO II -BT-PG-42L-A-PN8	1:8
Ezi-SERVO II -BT-PG-42L-A-PN10	1:10
Ezi-SERVO II -BT-PG-42L-A-PN15	1:15
Ezi-SERVO II -BT-PG-42L-A-PN25	1:25
Ezi-SERVO II -BT-PG-42L-A-PN40	1:40
Ezi-SERVO II -BT-PG-42L-A-PN50	1:50
Ezi-SERVO II -BT-PG-42XL-A-PN3	1:3
Ezi-SERVO II -BT-PG-42XL-A-PN5	1:5
Ezi-SERVO II -BT-PG-42XL-A-PN8	1:8
Ezi-SERVO II -BT-PG-42XL-A-PN10	1:10
Ezi-SERVO II -BT-PG-42XL-A-PN15	1:15
Ezi-SERVO II -BT-PG-42XL-A-PN25	1:25
Ezi-SERVO II -BT-PG-42XL-A-PN40	1:40
Ezi-SERVO II -BT-PG-42XL-A-PN50	1:50

Unit Part Number	Reduction gear ratio
Ezi-SERVO II -BT-PG-56S-A-PN3	1:3
Ezi-SERVO II -BT-PG-56S-A-PN5	1:5
Ezi-SERVO II -BT-PG-56S-A-PN8	1:8
Ezi-SERVO II -BT-PG-56S-A-PN10	1:10
Ezi-SERVO II -BT-PG-56S-A-PN15	1:15
Ezi-SERVO II -BT-PG-56S-A-PN25	1:25
Ezi-SERVO II -BT-PG-56S-A-PN40	1:40
Ezi-SERVO II -BT-PG-56S-A-PN50	1:50
Ezi-SERVO II -BT-PG-56M-A-PN3	1:3
Ezi-SERVO II -BT-PG-56M-A-PN5	1:5
Ezi-SERVO II -BT-PG-56M-A-PN8	1:8
Ezi-SERVO II -BT-PG-56M-A-PN10	1:10
Ezi-SERVO II -BT-PG-56M-A-PN15	1:15
Ezi-SERVO II -BT-PG-56M-A-PN25	1:25
Ezi-SERVO II -BT-PG-56M-A-PN40	1:40
Ezi-SERVO II -BT-PG-56M-A-PN50	1:50
Ezi-SERVO II -BT-PG-56L-A-PN3	1:3
Ezi-SERVO II -BT-PG-56L-A-PN5	1:5
Ezi-SERVO II -BT-PG-56L-A-PN8	1:8
Ezi-SERVO II -BT-PG-56L-A-PN10	1:10
Ezi-SERVO II -BT-PG-56L-A-PN15	1:15
Ezi-SERVO II -BT-PG-56L-A-PN25	1:25
Ezi-SERVO II -BT-PG-56L-A-PN40	1:40
Ezi-SERVO II -BT-PG-56L-A-PN50	1:50

Gearbox Integrated

Unit Part Number	Reduction gear ratio
Ezi-SERVO II -BT-PG-60S-A-PN3	1:3
Ezi-SERVO II -BT-PG-60S-A-PN5	1:5
Ezi-SERVO II -BT-PG-60S-A-PN8	1:8
Ezi-SERVO II -BT-PG-60S-A-PN10	1:10
Ezi-SERVO II -BT-PG-60S-A-PN15	1:15
Ezi-SERVO II -BT-PG-60S-A-PN25	1:25
Ezi-SERVO II -BT-PG-60S-A-PN40	1:40
Ezi-SERVO II -BT-PG-60S-A-PN50	1:50
Ezi-SERVO II -BT-PG-60M-A-PN3	1:3
Ezi-SERVO II -BT-PG-60M-A-PN5	1:5
Ezi-SERVO II -BT-PG-60M-A-PN8	1:8
Ezi-SERVO II -BT-PG-60M-A-PN10	1:10
Ezi-SERVO II -BT-PG-60M-A-PN15	1:15
Ezi-SERVO II -BT-PG-60M-A-PN25	1:25
Ezi-SERVO II -BT-PG-60M-A-PN40	1:40
Ezi-SERVO II -BT-PG-60M-A-PN50	1:50
Ezi-SERVO II -BT-PG-60L-A-PN3	1:3
Ezi-SERVO II -BT-PG-60L-A-PN5	1:5
Ezi-SERVO II -BT-PG-60L-A-PN8	1:8
Ezi-SERVO II -BT-PG-60L-A-PN10	1:10
Ezi-SERVO II -BT-PG-60L-A-PN15	1:15
Ezi-SERVO II -BT-PG-60L-A-PN25	1:25
Ezi-SERVO II -BT-PG-60L-A-PN40	1:40
Ezi-SERVO II -BT-PG-60L-A-PN50	1:50

Brake Integrated Motor, Drive Combination

Unit Part Number
Ezi-SERVO II -BT-BK-42S-A
Ezi-SERVO II -BT-BK-42M-A
Ezi-SERVO II -BT-BK-42L-A
Ezi-SERVO II -BT-BK-42XL-A
Ezi-SERVO II -BT-BK-56S-A
Ezi-SERVO II -BT-BK-56M-A
Ezi-SERVO II -BT-BK-56L-A
Ezi-SERVO II -BT-BK-60S-A
Ezi-SERVO II -BT-BK-60M-A
Ezi-SERVO II -BT-BK-60L-A

4. Drive Specification and Size

4.1 Drive Specifications

MODEL		Ezi-SERVO II –BT-42 Series	Ezi-SERVO II –BT-56 Series	Ezi-SERVO II –BT-60 Series
Input Voltage		24VDC $\pm 10\%$		
Control Method		Closed Loop control by ARM-Based 32-bit MCU		
Current Consumption		Max 500mA (Except motor current)		
Operating Condition	Ambient Temperature	In Use : 0~50°C In Storage : -20~70°C		
	Humidity	In Use : 35~85%RH (Non-Condensing) In Storage : 10~90%RH (Non-Condensing)		
	Vib. Resist.	0.5G		
Function	Rotation Speed	0~3,000rpm		
	Resolution (P/R)	10,000/Rev. Encoder model : 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 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 with Rotary switch)		
	Max. Input Pulse Frequency	500KHz (Duty 50%)		
	Protection Functions	Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperature Error, Over Regenerated Voltage Error, Motor Connect Error, Encoder Connect Error, Motor Voltage Error, In-Position Error, System Error, ROM Error, Position Overflow Error		
	In-Position Selection	0~63 (Selectable with Parameter) * Default : 0		
	Position Gain Selection	0~63 (Selectable with Parameter) * Default : 3		
	Pulse Input Method	1-Pulse / 2-Pulse (Selectable with DIP switch) * Default : 2-Pulse		
	Speed/Position Control Command	Pulse train input		
I/O Signals	Input Signals	Position command pulse, Servo On/Off, Alarm reset (Photocoupler input)		
	Output Signals	In-Position, Alarm (Photocoupler output) Encoder signal (A+, A-, B+, B-, Z+, Z-, 26C31 of Equivalent) (Line Driver output)		

5. Standard Motor Specification and Size

5.1. Motor Specification

42

Motor	Unit	EzM2-42S	EzM2-42M	EzM2-42L	EzM2-42XL
Current per Phase	A	1,2	1,2	1,2	1,2
Holding Torque	N · m	0,32	0,44	0,5	0,65
Rotor Inertia	g · cm ²	35	54	77	114
Weight	g	250	280	350	500
Length(L)	mm	34	40	48	60

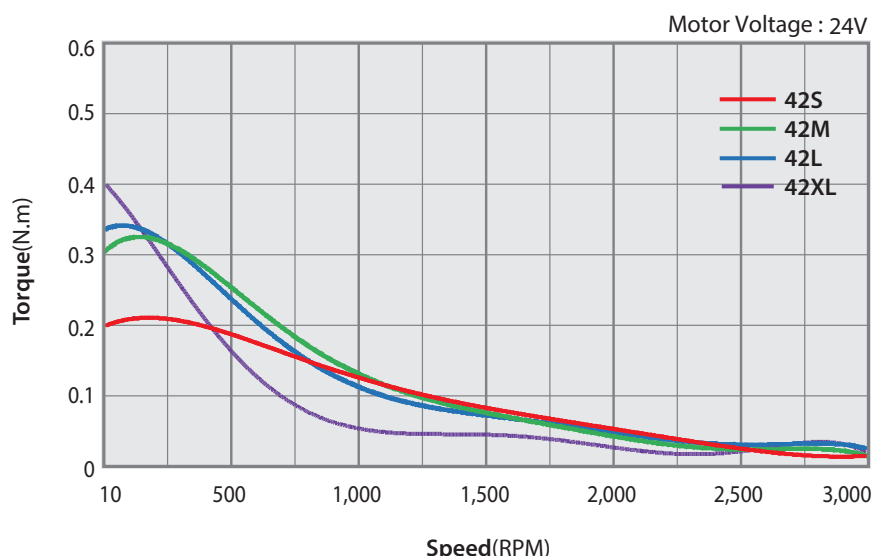
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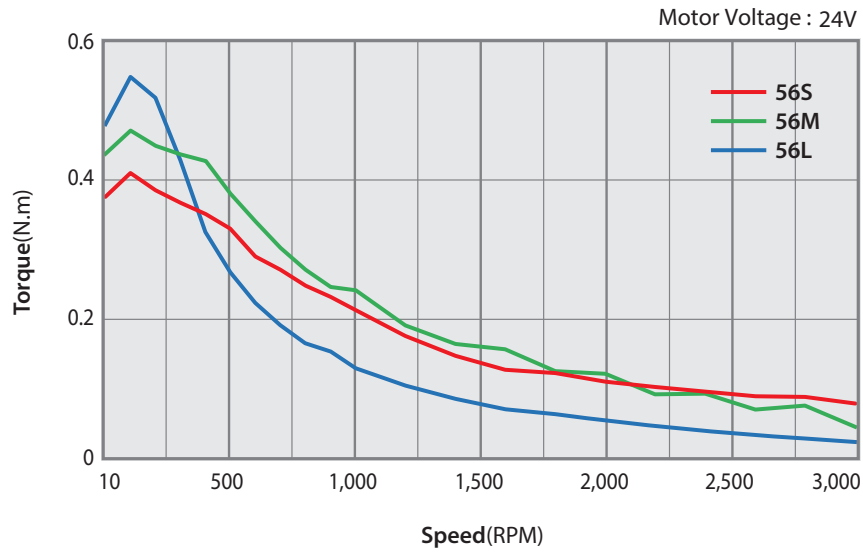
Motor	Unit	EzM2-56S	EzM2-56M	EzM2-56L	EzM2-60S	EzM2-60M	EzM2-60L
Current per Phase	A	3,0	3,0	3,0	4,0	4,0	4,0
Holding Torque	N · m	0,64	1,0	1,5	0,88	1,28	2,4
Rotor Inertia	g · cm ²	180	280	520	240	490	690
Weight	g	500	720	1150	600	1000	1300
Length(L)	mm	46	55	80	47	56	85

5.2 Torque Characteristic

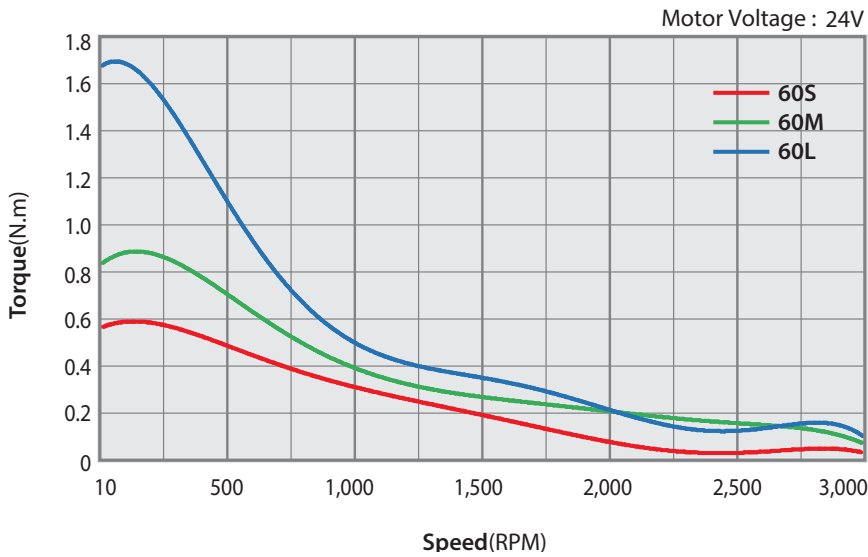
Ezi-SERVOII BT_ 42 Series



Ezi-SERVOII BT_ 56 Series

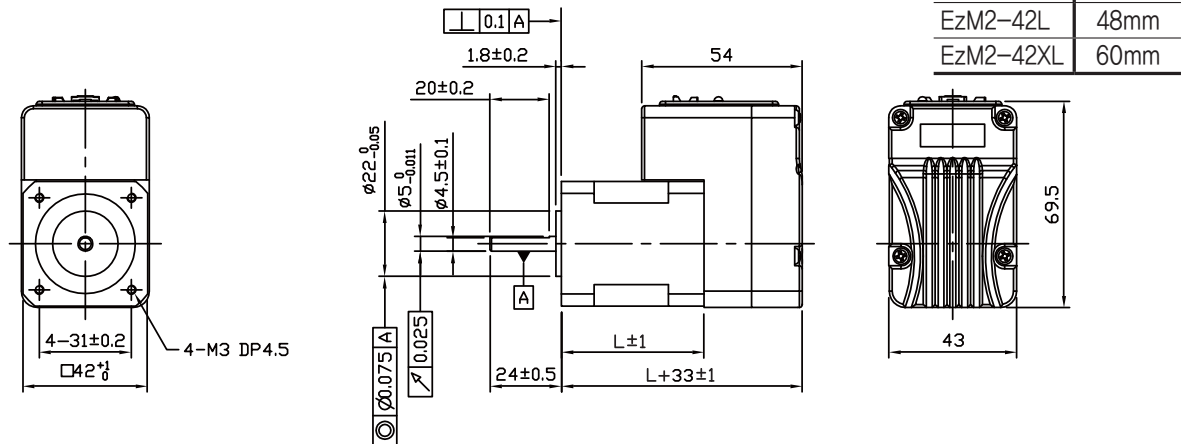


Ezi-SERVOII BT_ 60 Series

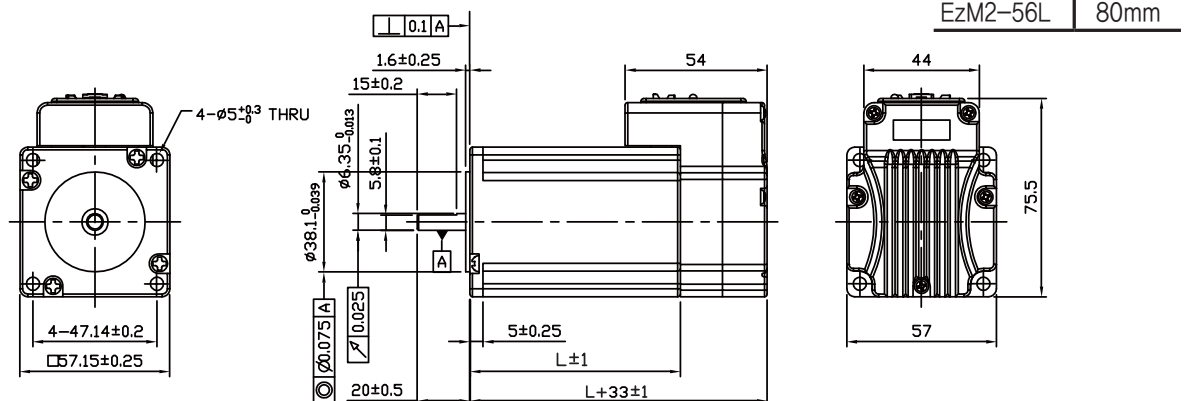


5.3 Motor Size

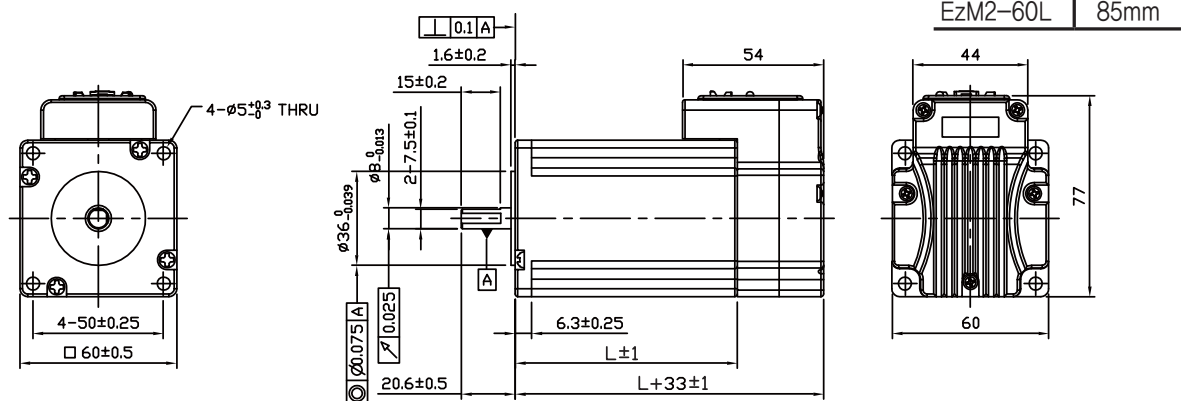
42



56



60

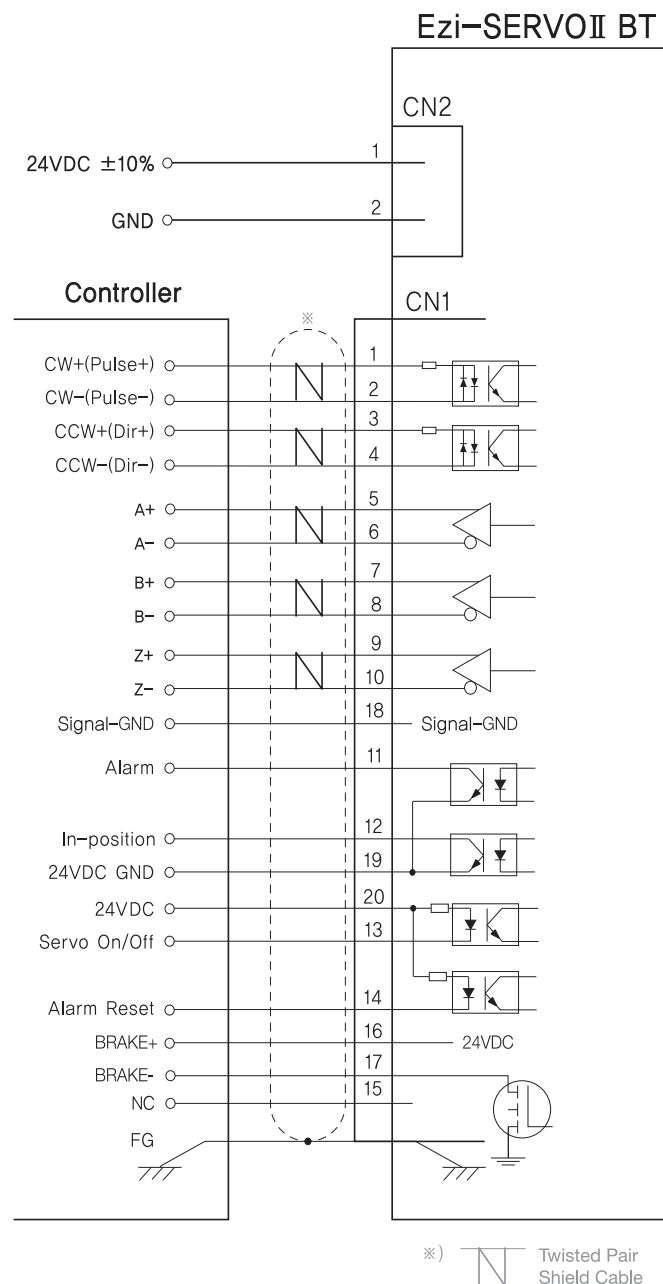


6. Installation and Cabling

6.1 Notes on Installation

- 1) Ezi-SERVO II BT is designed for indoor use only.
- 2) The ambient temperature of the room should be 0°C~50°C.
- 3) If the temperature of the product case is higher than 50°C, radiate heat of the outside to cool down.
- 4) Do not install Ezi-SERVO II BT under direct rays, near magnetic or radioactive objects.

6.2 External Wiring Diagram



7. Ezi-SERVO II-BT BK Series Specification

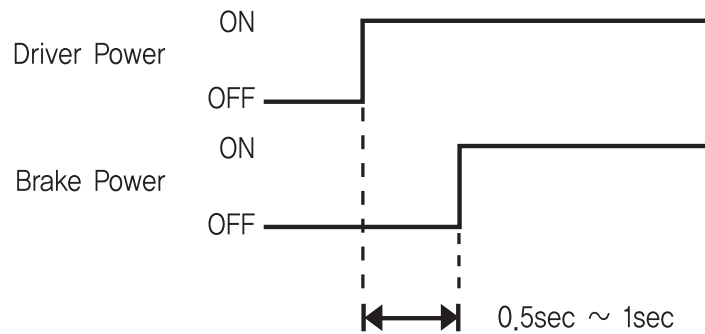
Unit Part Number	Motor						Electromagnetic Brake					Unit
	Size (mm)	Length L (mm)	Inertia Moment (g · cm ²)	Rated Current (A/Phase)	Voltage (V)	Holding Torque (N · m)	Form	Input Voltage (V)	Rated Current (A)	Power Consumption (W)	Friction Torque (N · m)	Weight (g)
Ezi-SERVO II-BT-BK-42S	42	34	35	1,2	3,36	0,32	Non-excitation Type	24VDC ±10%	0,2	5	0,2	590
Ezi-SERVO II-BT-BK-42M		40	54		4,32	0,44						650
Ezi-SERVO II-BT-BK-42L		48	77		4,56	0,65						720
Ezi-SERVO II-BT-BK-42XL		60	180		7,2	0,8						850
Ezi-SERVO II-BT-BK-56S	56	46	280	3	1,56	0,64			0,27	6,6	0,7	1120
Ezi-SERVO II-BT-BK-56M		55	520		2,64	1,5						1280
Ezi-SERVO II-BT-BK-56L		80	240		1,32	2						1720
Ezi-SERVO II-BT-BK-60S	60	47	490	4	1,48	0,88			0,27	6,6	0,7	1240
Ezi-SERVO II-BT-BK-60M		56	690		2,2	1,28						1440
Ezi-SERVO II-BT-BK-60L		85	800		2,6	2,4						2050

- * Electromagnetic brake will not be using for braking but for holding position when power-off.
- * Weight is total sum of motor and electromagnetic brake integrated.

8. Ezi-SERVO II-BT BK Series Permissible Overhung Load and Thrust Load

Unit Part Number	Allowable Overhung Load (N)				Allowable Thrust Load (N)
Ezi-SERVO ST Series	Distance from the end of motor shaft (mm)				
	3	8	13	18	
Ezi-SERVO II –BT–BK–42S	22	26	33	46	Must be lower than Unit’ s weight
Ezi-SERVO II –BT–BK–42M					
Ezi-SERVO II –BT–BK–42L					
Ezi-SERVO II –BT–BK–42XL					
Ezi-SERVO II –BT–BK–56S	52	65	85	123	
Ezi-SERVO II –BT–BK–56M					
Ezi-SERVO II –BT–BK–56L					
Ezi-SERVO II –BT–BK–60S	70	87	114	165	
Ezi-SERVO II –BT–BK–60M					
Ezi-SERVO II –BT–BK–60L					

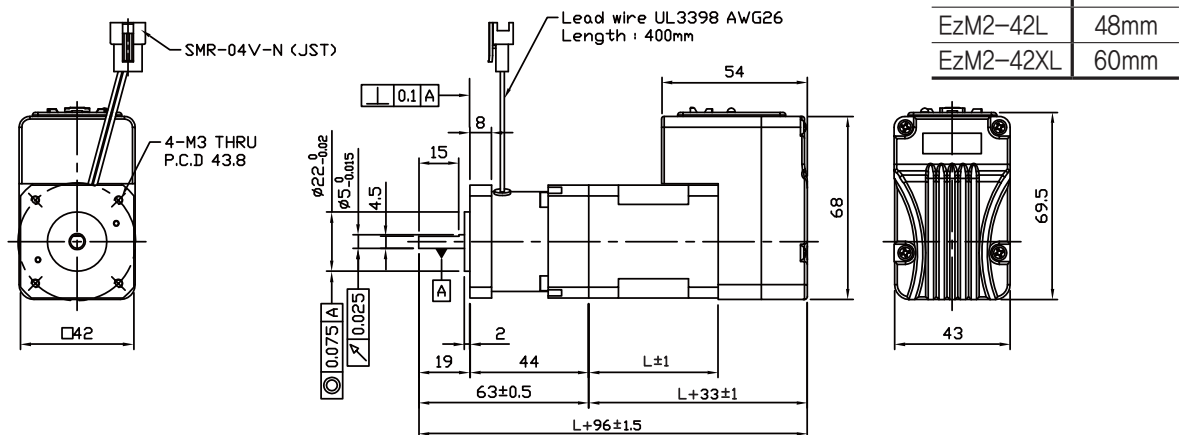
9. Brake Operation Timing Chart



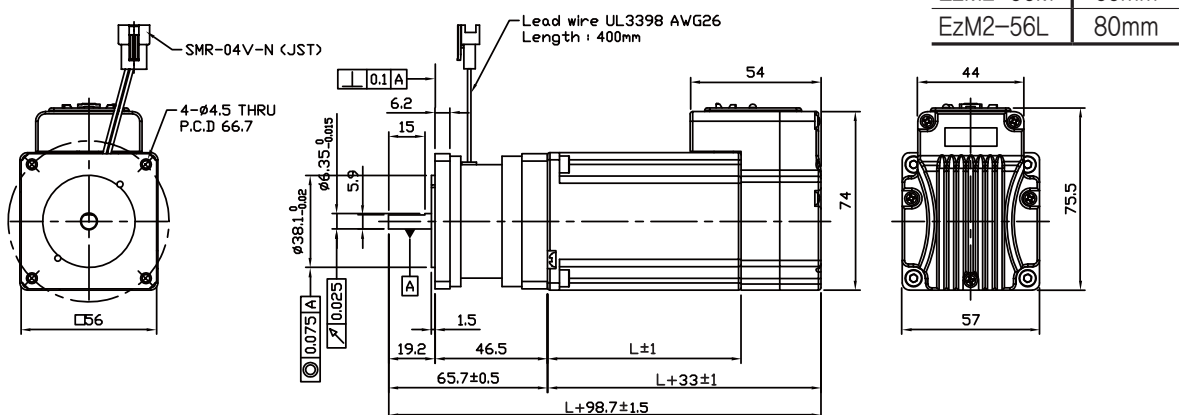
- Please carry out the electric brake release more than 5 seconds after power input, it is apprehended that the work might be falling down.
- Please use Cable at least thicker than AWG24 (0.2mm^2) when connect electromagnetic brake and power.
- Electromagnetic Brake is non-polar so there is no polarity in Brake Cable
- Over input voltage can induce high temperature of electromagnetic brake and motor so it can be main reason of failure
- Reversely too low input voltage will cause non-operation of electromagnetic brake.

10. Brake Integrated Motor Outline Drawings

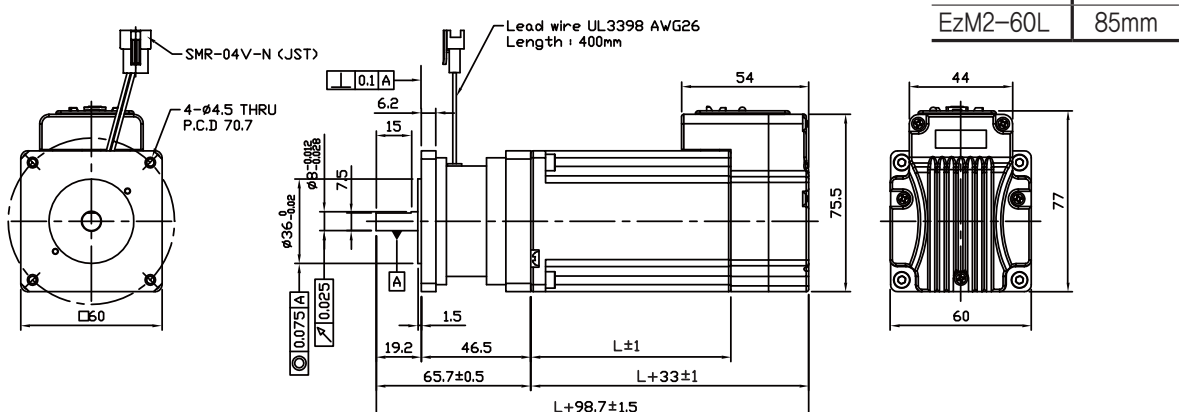
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11. Ezi-SERVO II –BT PG Series Specification

11.1 Gearbox for 42mm Motor Specification

Package	Maximum Holding Torque (N · m)	Rotor Inertia Moment (Kg · m2)	Backlash (min)	Angle Trans- mission Error (min)	Reduction Gear Ratio	Resolution (10,000ppr Standard)	Permitted Torque (N · m)	Maximum Torque (N · m)	Permitted Speed Range (rpm)	Unit Weight (Kg)
Ezi-SERVO II –BT-PG-42S-PN3	0.8	35x10 ⁻⁷	3	5	3	0.012 °	6	12	0~1000	0.92
Ezi-SERVO II –BT-PG-42S-PN5	1.4				5	0.0072 °	9	18	0~600	
Ezi-SERVO II –BT-PG-42S-PN8					8	0.0045 °	9	18	0~375	
Ezi-SERVO II –BT-PG-42S-PN10	2.7				10	0.0036 °	6	12	0~300	
Ezi-SERVO II –BT-PG-42S-PN15	4.0		5	7	15	0.0024 °	6	12	0~200	1.02
Ezi-SERVO II –BT-PG-42S-PN25	6.6				25	0.00144 °	9	18	0~120	
Ezi-SERVO II –BT-PG-42S-PN40	9.0				40	0.0009 °	9	18	0~75	
Ezi-SERVO II –BT-PG-42S-PN50					50	0.00072 °	9	18	0~60	
Ezi-SERVO II –BT-PG-42M-PN3	1.1	54x10 ⁻⁷	3	5	3	0.012 °	6	12	0~1000	0.96
Ezi-SERVO II –BT-PG-42M-PN5	1.9				5	0.0072 °	9	18	0~600	
Ezi-SERVO II –BT-PG-42M-PN8					8	0.0045 °	9	18	0~375	
Ezi-SERVO II –BT-PG-42M-PN10	3.7				10	0.0036 °	6	12	0~300	
Ezi-SERVO II –BT-PG-42M-PN15	5.4		5	7	15	0.0024 °	6	12	0~200	1.06
Ezi-SERVO II –BT-PG-42M-PN25	9.0				25	0.00144 °	9	18	0~120	
Ezi-SERVO II –BT-PG-42M-PN40					40	0.0009 °	9	18	0~75	
Ezi-SERVO II –BT-PG-42M-PN50					50	0.00072 °	9	18	0~60	
Ezi-SERVO II –BT-PG-42L-PN3	1.4	77x10 ⁻⁷	3	5	3	0.012 °	6	12	0~1000	1.02
Ezi-SERVO II –BT-PG-42L-PN5	2.4				5	0.0072 °	9	18	0~600	
Ezi-SERVO II –BT-PG-42L-PN8	3.8				8	0.0045 °	9	18	0~375	
Ezi-SERVO II –BT-PG-42L-PN10	4.7				10	0.0036 °	6	12	0~300	
Ezi-SERVO II –BT-PG-42L-PN15	6.0		5	7	15	0.0024 °	6	12	0~200	1.12
Ezi-SERVO II –BT-PG-42L-PN25	9.0				25	0.00144 °	9	18	0~120	
Ezi-SERVO II –BT-PG-42L-PN40					40	0.0009 °	9	18	0~75	
Ezi-SERVO II –BT-PG-42L-PN50					50	0.00072 °	9	18	0~60	
Ezi-SERVO II –BT-PG-42XL-PN3	1.8	114x10 ⁻⁷	3	5	3	0.012 °	6	12	0~1000	1.17
Ezi-SERVO II –BT-PG-42XL-PN5	3.0				5	0.0072 °	9	18	0~600	
Ezi-SERVO II –BT-PG-42XL-PN8	4.8				8	0.0045 °	9	18	0~375	
Ezi-SERVO II –BT-PG-42XL-PN10	6.0				10	0.0036 °	6	12	0~300	
Ezi-SERVO II –BT-PG-42XL-PN15			5	7	15	0.0024 °	6	12	0~200	1.27
Ezi-SERVO II –BT-PG-42XL-PN25	25				0.00144 °	9	18	0~120		
Ezi-SERVO II –BT-PG-42XL-PN40	40				0.0009 °	9	18	0~75		
Ezi-SERVO II –BT-PG-42XL-PN50	9.0				50	0.00072 °	9	18	0~60	

* Possible to choose and set one of encoder resolution among 500, 1000, 1600, 2000, 3600, 5000, 6400, 7200, 10000

* Allowable Torque is max. torque that can be added to gearbox output shaft during constant speed of operation

* Max. Torque is max. torque that can be added to gearbox output shaft during Acceleration and deceleration of inertia load as like start and stop.

* Allowable Torque and Max. Torque is only specifications from mechanical part of gearbox so please refer to speed-torque curve to check output torque of motor combined with gearbox.

* During normal operation of constant speed, please drive less than Max. allowable torque except starts and stops because excess of permissible torque of gearbox can cause shortened life.

* The direction of rotation of the motor and output shaft of gearbox is the same.

11.2 Gearbox for 56mm Motor Specification

Package	Maximum Holding Torque (N · m)	Rotor Inertia Moment (Kg · m ²)	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)
Ezi-SERVO II –BT-PG-56S-PN3	1,6	120x10 ⁻⁷	3	5	3	0,012 °	18	35	0~1000	1,94
Ezi-SERVO II –BT-PG-56S-PN5	2,7				5	0,0072 °	27	50	0~600	
Ezi-SERVO II –BT-PG-56S-PN8	4,3				8	0,0045 °	27	50	0~375	
Ezi-SERVO II –BT-PG-56S-PN10	5,3				10	0,0036 °	18	35	0~300	
Ezi-SERVO II –BT-PG-56S-PN15	7,7				15	0,0024 °	18	35	0~200	2,14
Ezi-SERVO II –BT-PG-56S-PN25	12,9				25	0,00144 °	27	50	0~120	
Ezi-SERVO II –BT-PG-56S-PN40	20,6				40	0,0009 °	27	50	0~75	
Ezi-SERVO II –BT-PG-56S-PN50	25,8				50	0,00072 °	27	50	0~60	
Ezi-SERVO II –BT-PG-56M-PN3	2,6	200x10 ⁻⁷	3	5	3	0,0012 °	18	35	0~1000	2,15
Ezi-SERVO II –BT-PG-56M-PN5	4,4				5	0,0072 °	27	50	0~600	
Ezi-SERVO II –BT-PG-56M-PN8	7,0				8	0,0045 °	27	50	0~375	
Ezi-SERVO II –BT-PG-56M-PN10	8,7				10	0,0036 °	18	35	0~300	
Ezi-SERVO II –BT-PG-56M-PN15	12,7				15	0,0024 °	18	35	0~200	2,35
Ezi-SERVO II –BT-PG-56M-PN25	21,1				25	0,00144 °	27	50	0~120	
Ezi-SERVO II –BT-PG-56M-PN40	27,0				40	0,0009 °	27	50	0~75	
Ezi-SERVO II –BT-PG-56M-PN50					50	0,00072 °	27	50	0~60	
Ezi-SERVO II –BT-PG-56L-PN3	4,3	480x10 ⁻⁷	3	5	3	0,012 °	18	35	0~1000	2,59
Ezi-SERVO II –BT-PG-56L-PN5	7,2				5	0,0072 °	27	50	0~600	
Ezi-SERVO II –BT-PG-56L-PN8	11,4				8	0,0045 °	27	50	0~375	
Ezi-SERVO II –BT-PG-56L-PN10	14,3				10	0,0036 °	18	35	0~300	
Ezi-SERVO II –BT-PG-56L-PN15	18,0				15	0,0024 °	18	35	0~200	2,79
Ezi-SERVO II –BT-PG-56L-PN25	27,0				25	0,00144 °	27	50	0~120	
Ezi-SERVO II –BT-PG-56L-PN40					40	0,0009 °	27	50	0~75	
Ezi-SERVO II –BT-PG-56L-PN50					50	0,00072 °	27	50	0~60	

* Possible to choose and set one of encoder resolution among 500, 1000, 1600, 2000, 3600, 5000, 6400, 7200, 10000

* Allowable Torque is max. torque that can be added to gearbox output shaft during constant speed of operation

* Max. Torque is max. torque that can be added to gearbox output shaft during Acceleration and deceleration of inertia load as like start and stop.

* Allowable Torque and Max. Torque is only specifications from mechanical part of gearbox so please refer to speed-torque curve to check output torque of motor combined with gearbox.

* During normal operation of constant speed, please drive less than Max. allowable torque except starts and stops because excess of permissible torque of gearbox can cause shortened life.

* The direction of rotation of the motor and output shaft of gearbox is the same.

11.3 Gearbox for 60mm Motor Specification

Package	Maximum Holding Torque (N · m)	Rotor Inertia Moment (Kg · m2)	Backlash (min)	Angle Trans- mission Error (min)	Reduction Gear Ratio	Resolution (10,000ppr Standard)	Permitted Torque (N · m)	Maximum Torque (N · m)	Permitted Speed Range (rpm)	Unit Weight (Kg)
Ezi-SERVO II –BT-PG-60S-PN3	2,6	140x10 ⁻⁷	3	5	3	0,012 °	18	35	0~1000	2,0
Ezi-SERVO II –BT-PG-60S-PN5	4,4				5	0,0072 °	27	50	0~600	
Ezi-SERVO II –BT-PG-60S-PN8	7,0				8	0,0045 °	27	50	0~375	
Ezi-SERVO II –BT-PG-60S-PN10	8,8				10	0,0036 °	18	35	0~300	
Ezi-SERVO II –BT-PG-60S-PN15	12,7				15	0,0024 °	18	35	0~200	2,2
Ezi-SERVO II –BT-PG-60S-PN25	21,2				25	0,00144 °	27	50	0~120	
Ezi-SERVO II –BT-PG-60S-PN40	27,0				40	0,0009 °	27	50	0~75	
Ezi-SERVO II –BT-PG-60S-PN50					50	0,00072 °	27	50	0~60	
Ezi-SERVO II –BT-PG-60M-PN3	3,6	320x10 ⁻⁷	3	5	3	0,012 °	18	35	0~1000	2,4
Ezi-SERVO II –BT-PG-60M-PN5	6,0				5	0,0072 °	27	50	0~600	
Ezi-SERVO II –BT-PG-60M-PN8	9,6				8	0,0045 °	27	50	0~375	
Ezi-SERVO II –BT-PG-60M-PN10	12,0				10	0,0036 °	18	35	0~300	
Ezi-SERVO II –BT-PG-60M-PN15	17,4				15	0,0024 °	18	35	0~200	2,6
Ezi-SERVO II –BT-PG-60M-PN25	27,0				25	0,00144 °	27	50	0~120	
Ezi-SERVO II –BT-PG-60M-PN40					40	0,0009 °	27	50	0~75	
Ezi-SERVO II –BT-PG-60M-PN50					50	0,00072 °	27	50	0~60	
Ezi-SERVO II –BT-PG-60L-PN3	7,1	800x10 ⁻⁷	3	5	3	0,012 °	18	35	0~1000	2,7
Ezi-SERVO II –BT-PG-60L-PN5	11,9				5	0,0072 °	27	50	0~600	
Ezi-SERVO II –BT-PG-60L-PN8	19,0				8	0,0045 °	27	50	0~375	
Ezi-SERVO II –BT-PG-60L-PN10	18,0				10	0,0036 °	18	35	0~300	
Ezi-SERVO II –BT-PG-60L-PN15					15	0,0024 °	18	35	0~200	2,9
Ezi-SERVO II –BT-PG-60L-PN25	27,0				25	0,00144 °	27	50	0~120	
Ezi-SERVO II –BT-PG-60L-PN40					40	0,0009 °	27	50	0~75	
Ezi-SERVO II –BT-PG-60L-PN50					50	0,00072 °	27	50	0~60	

* Possible to choose and set one of encoder resolution among 500, 1000, 1600, 2000, 3600, 5000, 6400, 7200, 10000

* Allowable Torque is max. torque that can be added to gearbox output shaft during constant speed of operation

* Max. Torque is max. torque that can be added to gearbox output shaft during Acceleration and deceleration of inertia load as like start and stop.

* Allowable Torque and Max. Torque is only specifications from mechanical part of gearbox so please refer to speed-torque curve to check output torque of motor combined with gearbox.

* During normal operation of constant speed, please drive less than Max. allowable torque except starts and stops because excess of permissible torque of gearbox can cause shortened life.

* The direction of rotation of the motor and output shaft of gearbox is the same.

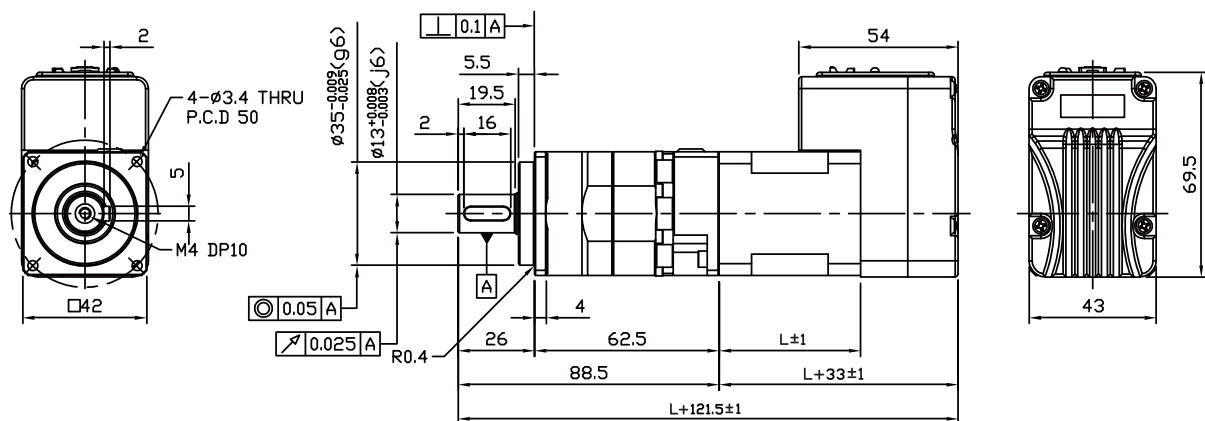
12. Ezi-SERVO II -BT PG Series Allowable Overhung Load and Allowable Thrust Load

Part Name	Allowable Overhung Load (N)	Allowable Thrust Load (N)
	Based on Center of Shaft	
Ezi-SERVO II -BT-PG-42S-PN3 Ezi-SERVO II -BT-PG-42M-PN3 Ezi-SERVO II -BT-PG-42L-PN3 Ezi-SERVO II -BT-PG-42XL-PN3	240	270
Ezi-SERVO II -BT-PG-42S-PN5 Ezi-SERVO II -BT-PG-42M-PN5 Ezi-SERVO II -BT-PG-42L-PN5 Ezi-SERVO II -BT-PG-42XL-PN5	290	330
Ezi-SERVO II -BT-PG-42S-PN8 Ezi-SERVO II -BT-PG-42M-PN8 Ezi-SERVO II -BT-PG-42L-PN8 Ezi-SERVO II -BT-PG-42XL-PN8	340	410
Ezi-SERVO II -BT-PG-42S-PN10 Ezi-SERVO II -BT-PG-42M-PN10 Ezi-SERVO II -BT-PG-42L-PN10 Ezi-SERVO II -BT-PG-42XL-PN10	360	450
Ezi-SERVO II -BT-PG-42S-PN15 Ezi-SERVO II -BT-PG-42M-PN15 Ezi-SERVO II -BT-PG-42L-PN15 Ezi-SERVO II -BT-PG-42XL-PN15	410	540
Ezi-SERVO II -BT-PG-42M-PN25 Ezi-SERVO II -BT-PG-42L-PN25 Ezi-SERVO II -BT-PG-42XL-PN25	490	640
Ezi-SERVO II -BT-PG-42S-PN40 Ezi-SERVO II -BT-PG-42M-PN40 Ezi-SERVO II -BT-PG-42L-PN40 Ezi-SERVO II -BT-PG-42XL-PN40	570	640
Ezi-SERVO II -BT-PG-42S-PN50 Ezi-SERVO II -BT-PG-42M-PN50 Ezi-SERVO II -BT-PG-42L-PN50 Ezi-SERVO II -BT-PG-42XL-PN50	620	640

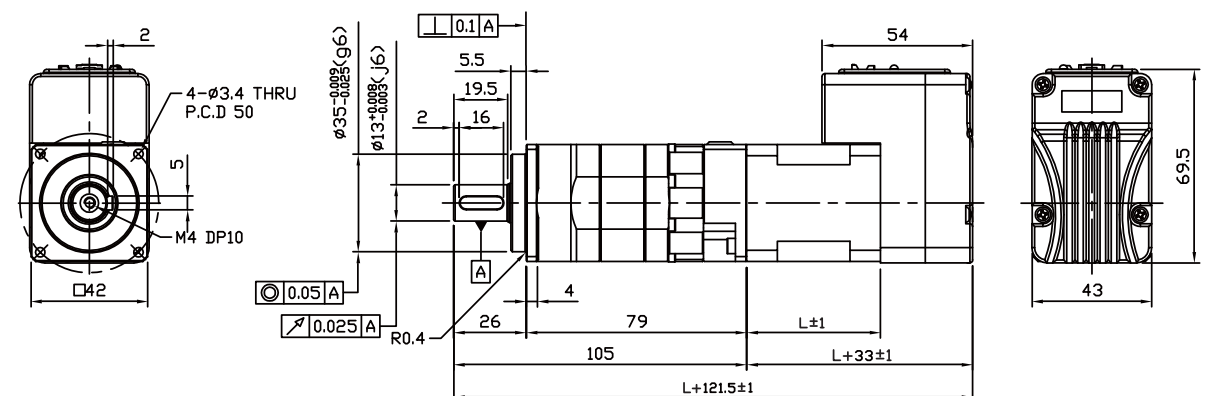
품명	Allowable Overhung Load (N)	Allowable Thrust Load (N)
	Based on Center of Shaft	
Ezi-SERVO II -BT-PG-56S-PN3 Ezi-SERVO II -BT-PG-56M-PN3 Ezi-SERVO II -BT-PG-56L-PN3 Ezi-SERVO II -BT-PG-60S-PN3 Ezi-SERVO II -BT-PG-60M-PN3 Ezi-SERVO II -BT-PG-60L-PN3	430	310
Ezi-SERVO II -BT-PG-56S-PN5 Ezi-SERVO II -BT-PG-56M-PN5 Ezi-SERVO II -BT-PG-56L-PN5 Ezi-SERVO II -BT-PG-60S-PN5 Ezi-SERVO II -BT-PG-60M-PN5 Ezi-SERVO II -BT-PG-60L-PN5	510	390
Ezi-SERVO II -BT-PG-56S-PN8 Ezi-SERVO II -BT-PG-56M-PN8 Ezi-SERVO II -BT-PG-56L-PN8 Ezi-SERVO II -BT-PG-60S-PN8 Ezi-SERVO II -BT-PG-60M-PN8 Ezi-SERVO II -BT-PG-60L-PN8	600	480
Ezi-SERVO II -BT-PG-56S-PN10 Ezi-SERVO II -BT-PG-56M-PN10 Ezi-SERVO II -BT-PG-56L-PN10 Ezi-SERVO II -BT-PG-60S-PN10 Ezi-SERVO II -BT-PG-60M-PN10 Ezi-SERVO II -BT-PG-60L-PN10	640	530
Ezi-SERVO II -BT-PG-56S-PN15 Ezi-SERVO II -BT-PG-56M-PN15 Ezi-SERVO II -BT-PG-56L-PN15 Ezi-SERVO II -BT-PG-60S-PN15 Ezi-SERVO II -BT-PG-60M-PN15 Ezi-SERVO II -BT-PG-60L-PN15	740	630
Ezi-SERVO II -BT-PG-56S-PN25 Ezi-SERVO II -BT-PG-56M-PN25 Ezi-SERVO II -BT-PG-56L-PN25 Ezi-SERVO II -BT-PG-60S-PN25 Ezi-SERVO II -BT-PG-60M-PN25 Ezi-SERVO II -BT-PG-60L-PN25	870	790
Ezi-SERVO II -BT-PG-56S-PN40 Ezi-SERVO II -BT-PG-56M-PN40 Ezi-SERVO II -BT-PG-56L-PN40 Ezi-SERVO II -BT-PG-60S-PN40 Ezi-SERVO II -BT-PG-60M-PN40 Ezi-SERVO II -BT-PG-60L-PN40	1000	970
Ezi-SERVO II -BT-PG-56S-PN50 Ezi-SERVO II -BT-PG-56M-PN50 Ezi-SERVO II -BT-PG-56L-PN50 Ezi-SERVO II -BT-PG-60S-PN50 Ezi-SERVO II -BT-PG-60M-PN50 Ezi-SERVO II -BT-PG-60L-PN50	1100	1000

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Package	Stage	□Second Stage	L Length (mm)
Ezi-SERVO II-BT-PG-42S-PN□	Single Stage	3, 5, 8, 10	34
Ezi-SERVO II-BT-PG-42M-PN□		3, 5, 8, 10	40
Ezi-SERVO II-BT-PG-42L-PN□		3, 5, 8, 10	48
Ezi-SERVO II-BT-PG-42XL-PN□		3, 5, 8, 10	60



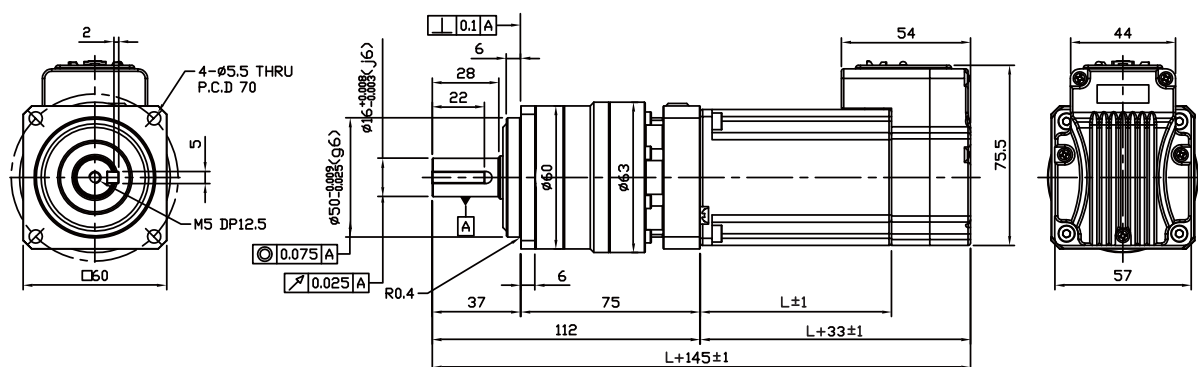
Package	Stage	□ 감속비	L Length (mm)
Ezi-SERVO II-BT-PG-42S-PN□	Second Stage	15, 25, 40, 50	34
Ezi-SERVO II-BT-PG-42M-PN□		15, 25, 40, 50	40
Ezi-SERVO II-BT-PG-42L-PN□		15, 25, 40, 50	48
Ezi-SERVO II-BT-PG-42XL-PN□		15, 25, 40, 50	60



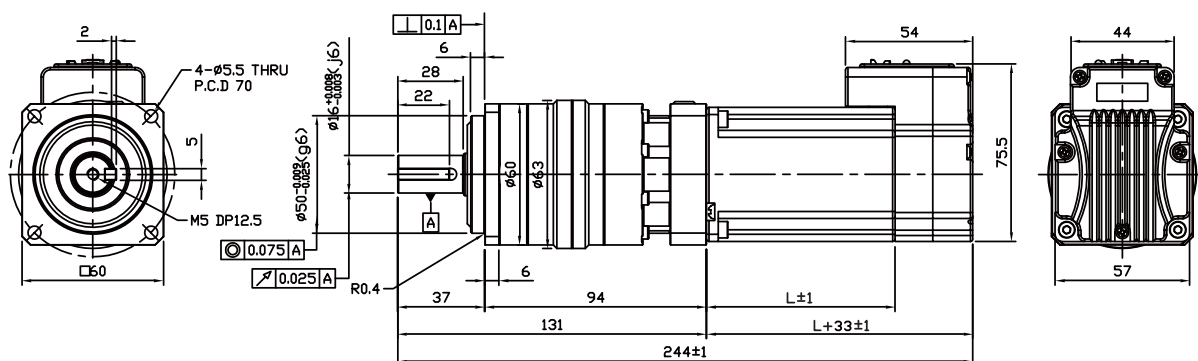
13. Ezi-SERVO II -BT PG Series Specifications and Outline Drawings

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Package	Stage	□Second Stage	L Length (mm)
Ezi-SERVO II -BT-PG-56S-PN□	Single Stage	3, 5, 8, 10	46
Ezi-SERVO II -BT-PG-56M-PN□		3, 5, 8, 10	55
Ezi-SERVO II -BT-PG-56L-PN□		3, 5, 8, 10	80

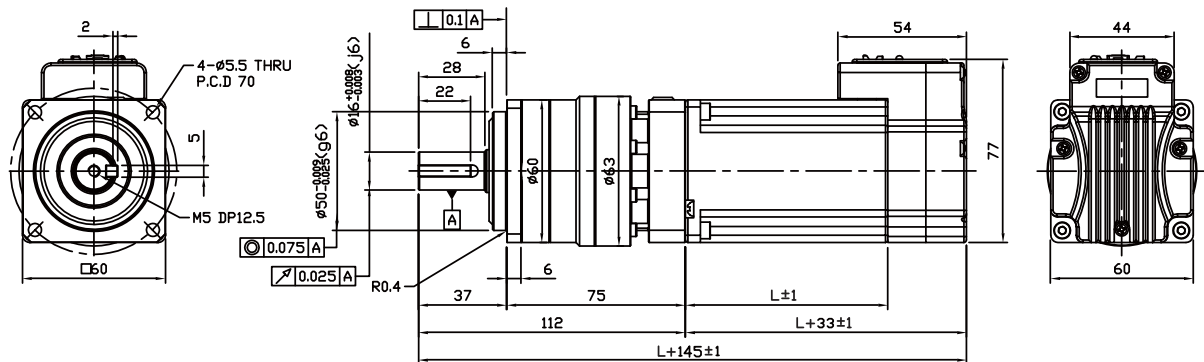


Package	Stage	□Second Stage	L Length (mm)
Ezi-SERVO II -BT-PG-56S-PN□	Second Stage	15, 25, 40, 50	46
Ezi-SERVO II -BT-PG-56M-PN□		15, 25, 40, 50	55
Ezi-SERVO II -BT-PG-56L-PN□		15, 25, 40, 50	80

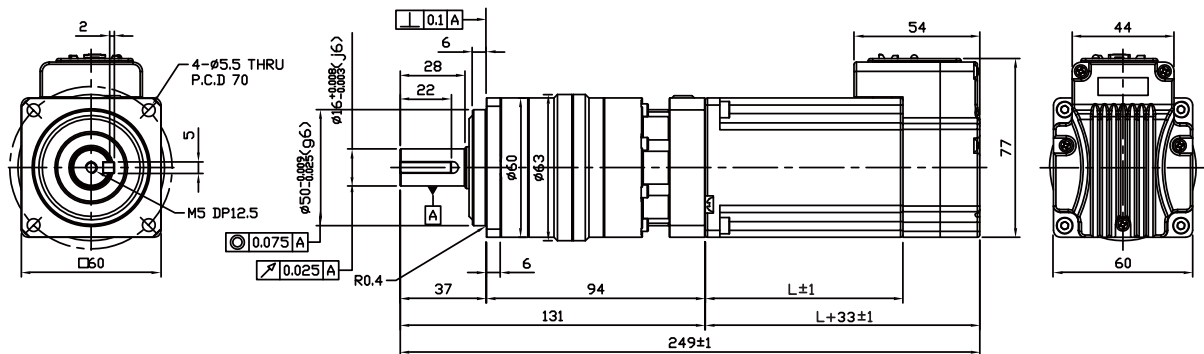


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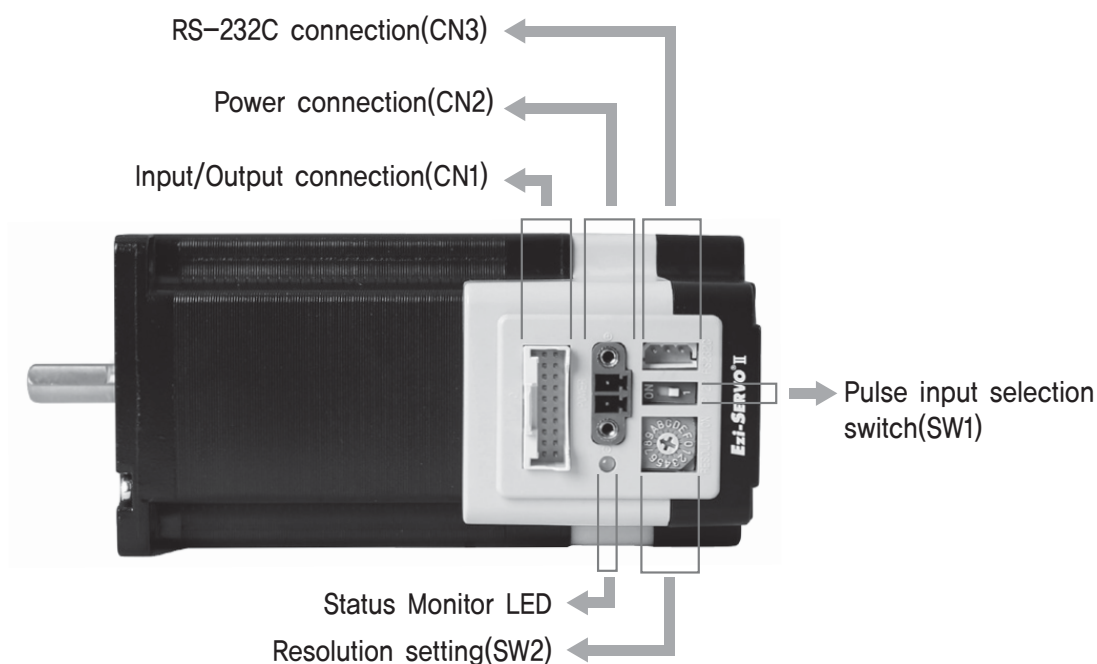
Package	Stage	□Second Stage	L Length (mm)
Ezi-SERVO II –BT–PG–60S–PN□	Single Stage	3, 5, 8, 10	47
Ezi-SERVO II –BT–PG–60M–PN□		3, 5, 8, 10	56
Ezi-SERVO II –BT–PG–60L–PN□		3, 5, 8, 10	85



Package	Stage	□Second Stage	L Length (mm)
Ezi-SERVO II-BT-PG-60S-PN□	Second Stage	15, 25, 40, 50	47
Ezi-SERVO II-BT-PG-60M-PN□		15, 25, 40, 50	56
Ezi-SERVO II-BT-PG-60L-PN□		15, 25, 40, 50	85

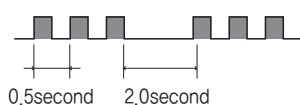


14. Setting and Operation



◆ Protection function and LED flash times

Times	Protection	Conditions
1	Over Current Error	The current through power devices in inverter exceeds the limit value
2	Over Speed Error	Motor speed exceed 3,000rpm
3	Position Tracking Error	Position error value is higher than 90 ° in motor run state
4	Over Load Error	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over Temperature Error	Inside temperature of drive exceeds 85°C
6	Over Regeneratived Voltage Error	Back-EMF more than 48V
7	Motor Connect Error	The power is ON without connection of the motor cable to drive
8	Encoder Connect Error	Cable connection error with Encoder connector in drive
9	Motor Voltage Error	Motor voltage is less than 20V
10	In-Position Error	After operation is finished, a position error occurs
12	ROM Error	Error occurs in parameter storage device(ROM)
15	Position Overflow Error	Position error value is higher than 90 ° in motor stop state

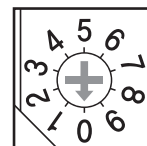


Alarm LED flash
(ex: Position tracking error)

14.1 Resolution Selection Switch(SW2)

The Number of pulse per revolution,

Position	Pulse/Rotation	Position	Pulse/Rotation
0	500*1	5	3,600
1	500	6	5,000
2	1,000	7	6,400
3	1,600	8	7,200
4	2,000	9	10,000*2

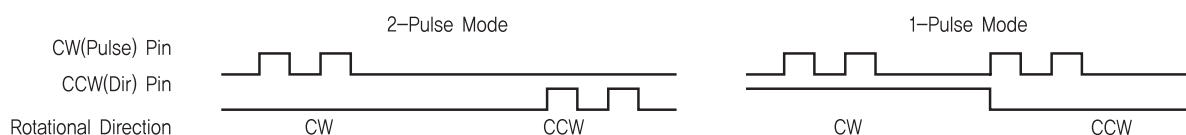


*1 : Resolution value depend on encoder type,

*2 : Default = 10,000

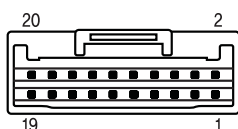
14.2 Pulse Input and Motor Direction Selection Switch(SW1)

Indication	Switch Name	Functions
2P/1P	Selecting Pulse Input Mode	Selectable 1-Pulse input mode or 2-Pulse input mode as Pulse input signal, ON : 1-Pulse mode OFF : 2-Pulse mode ※Default : 2-Pulse mode



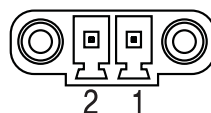
14.3 Input/Output Signal(CN1)

NO.	Function	I/O
1	CW+(Pulse+)	Input
2	CW-(Pulse-)	Input
3	CCW+(Dir+)	Input
4	CCW-(Dir-)	Input
5	A+	Output
6	A-	Output
7	B+	Output
8	B-	Output
9	Z+	Output
10	Z-	Output
11	Alarm	Output
12	In-Position	Output
13	Servo On/Off	Input
14	Alarm Reset	Input
15	NC	----
16	BRAKE+	Output
17	BRAKE-	Output
18	S-GND	Output
19	24VDC GND	Input
20	24VDC	Input



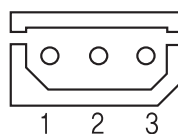
14.4 Power Connector(CN2)

NO.	Function
1	24VDC $\pm 10\%$
2	GND

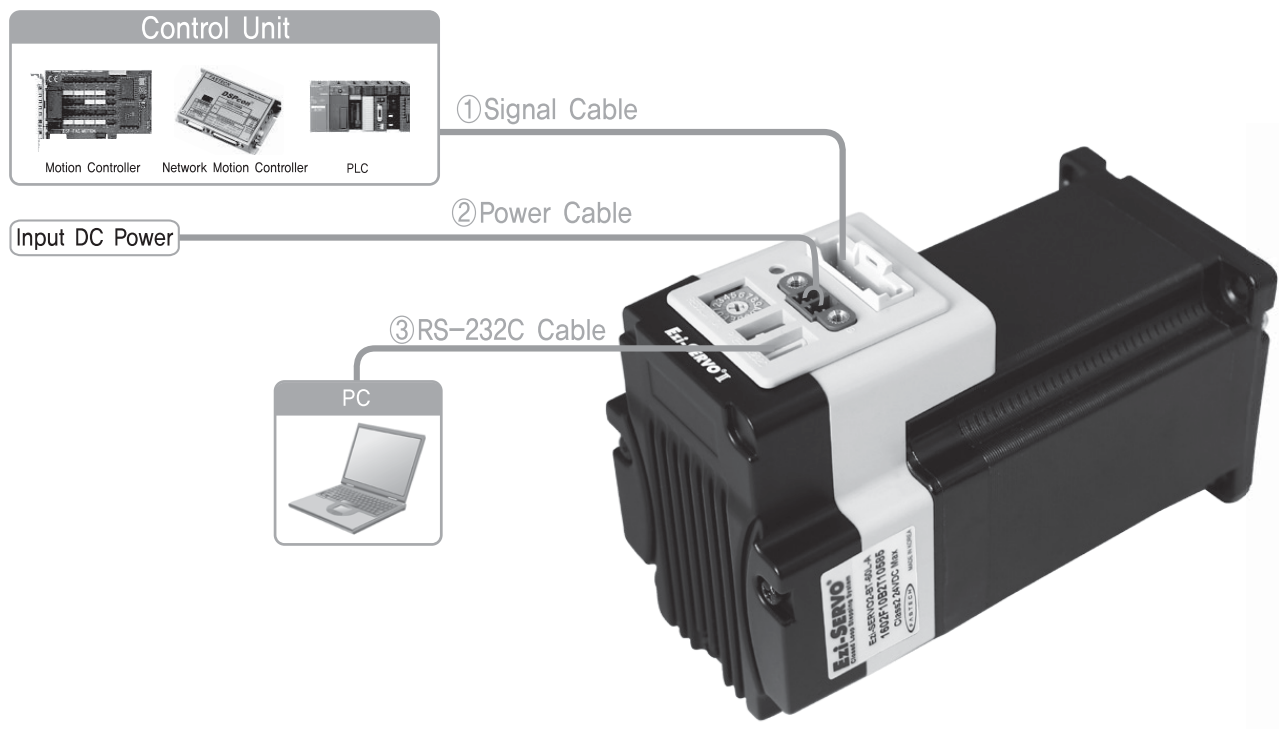


14.5 Parameter Setting Connector(CN3)

NO.	Function	I/O
1	TX	Output
2	RX	Input
3	GND	----



15. System Configuration



Type	Signal Cable	Power Cable	Parameter Setting Cable
Standard Length	—	—	—
Max. Length	20m	2m	3m

15.1 Cable Option

①Signal Cable

Available to connect between Control System and Ezi-SERVO II BT.

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

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

②Power Cable

Available to connect between Power and Ezi-SERVO II BT.

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

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

③Parameter Setting Cable (RS-232C Cable)

This cable is for connection between the Ezi-SERVO II BT series and computer.

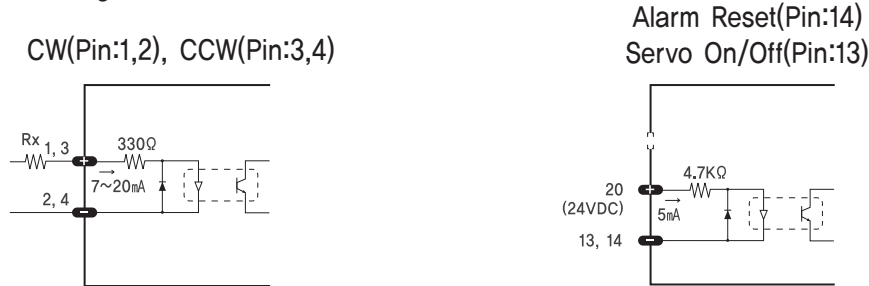
Item	Length[m]	Remark
CBTS-C-□□□F	□□□	Normal Cable
	□□□	

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

16. Control signal Input/Output Description

16.1 Input Signal

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



◆ CW, CCW Input

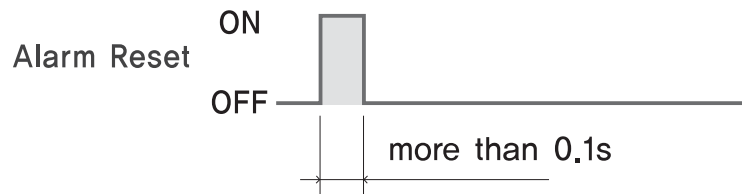
This signal can be used to receive a positioning pulse command from a user host motion controller. A user can select 1-pulse input mode or 2-pulse input mode (refer to switch No.1, SW1). The input schematic of CW, CCW is designed for 5V TTL level. When using 5V level as an input signal, the resistor Rx is not used and connect to the driver directly. When the level of input signal is more than 5V, Rx Resistor is required. If the resistor is absent, the drive will be damaged! In input signal level is 12V case, Rx value is 680ohm and in 24V case, 1.8kohm is suitable for Rx value.

◆ Servo On/Off Input

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

◆ Alarm Reset Input

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

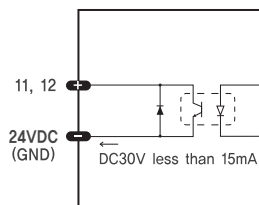


※By setting the alarm reset input signal [ON], cancel the Alarm output.
Before cancel the Alarm output, have to remove the source of Alarm.

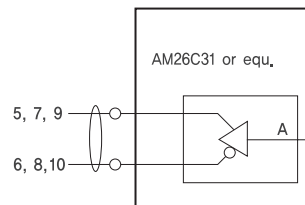
16.2 Output Signal

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

Alarm(Pin:11),In-Position(Pin:12)



Encoder Signal
(Pin:5,6,7,8,9,10)



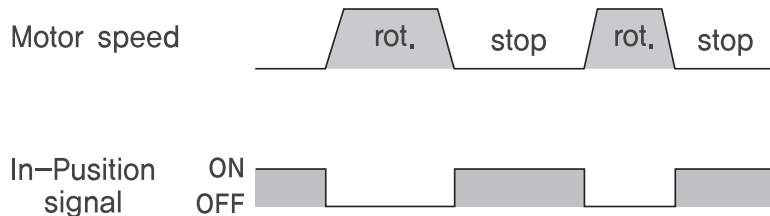
◆ Alarm Output

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

[Caution] Only at the Alarm output port, the photocoupler operation is in reverse. When the driver is in normal operation the Alarm output is [ON]. On the contrary when the driver is in abnormal operation that start protection mode, the Alarm output is [OFF].

◆ In-Position Output

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



[Caution] In-Position signal is [ON] when low speed(under 50[pps]) Motioning even if The position command is not finished.

◆ Encoder Signal Output

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

17. Diagnosis and Rectification of Faults

17.1 When the Alarm LED is not Blinking

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

Phenomenon	Possible Cause	Rectification
Motor axis can be moved by hand	Servo On/Off input is [ON].	When Alarm LED(RED) does not blink and SON LED(Orange) is turned off, this is not a state of Motor Servo On. Please check signal of Controller.
Motor axis can not be moved by hand	Bad connection of input terminal.	Please check connection between Controller and Drive.
	When Pulse Mode of Drive is CW/CCW input method (2Pulse input method), CW+ line and CW- line may have been reversed or CCW+ line and CCW- line may have been reversed.	Please check connection status of CW+, CW-, CCW+ and CCW- lines.
	The brake is locked. (Only for brake installed type)	Please loosening the brake by energized.
Motor shaft moves only one direction	Pulse Mode of Drive is set as CW/CCW input method (2Pulse input method), then Controller send Pulse by CW/CCW method(1Pulse method).	Please check signal method of Controller.
	Pulse Mode of Drive is set as Pulse/Dir input method(1Pulse input method), then Controller send Pulse by Pulse/Dir method(2Pulse method).	Please check signal method of Controller.
Motor axis moves in the opposite direction to the specified direction	When Pulse Mode of Drive is CW/CCW input method (2Pulse input method), CW input and CCW input is connected reversely.	The CW Pulse signal should be connected to CW input, CCW Pulse signal should be connected to CCW input.
	When Pulse Mode of Drive is Pulse/Dir input method (1Pulse input method), CCW+(Dir+)line and CCW-(Dir-) may have been reversed.	Please check connection status of CCW+(Dir+), CCW-(Dir-) lines.
Motion of motor is unstable	Bad connection of Pulse signal cable	Please check connection of Controller and Drive.
No retention of the brake	The brake is released. (Only for brake installed type)	Please stop the power supply to brake, so keep the locked state of brake.
Motor axis movement does not match to the set amount	The setting of resolution is difference.	Please check setting switch of resolution (SW2)

17.2 When the Alarm LED is Blinking

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

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

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

Flash Times	Alarm Contents	Conditions	The Cause of Error	Checking Point	Corrective Measure
7	Motor Connect Error	An error with the connection between the drive and the motor	The motor may have problem	Checking the disconnection of motor phase. (A and/A, B and/B)	① Replace the motor.
			If the motor cable between motor and drive is damaged	Checking the connection of the motor cable.	① Fix the error after check connection status of motor cable. ② Replace the extension cable between motor and drive, if there is problem.
			The drive may have problem		① If Alarm keep blinking after tried all of above, replace the drive.
8	Encoder Connect Error	An error with the connection between the drive and the encoder	If the encoder extension cable is damaged	Checking the connection status of motor and the extension cable of encoder.	① Make sure connection of cable connector.
				Checking if the extension cable of encoder is disconnected.	① Replace the extension cable of encoder.
				Checking the wiring status of the extension cable of encoder.	① Fix the extension cable of encoder. ② If same alarm is generated after correction, drive and motor may have damaged by faulty cable, so replace the motor and drive.
			The encoder may have problem	Checking if the encoder is damaged, unscrew or extension cable of encoder is disconnected. (Can not be checked when assembled)	① Replace the motor.
			The drive may have problem		① If Alarm keep blinking after tried all of above, replace the drive.
9	Motor Voltage Error	Motor supply voltage is lower than 20V	The voltage of power supply device is lower than 24V	Checking whether voltage of power supply device is 24V.	① If voltage of power supply is not 24V, disconnect drive and power supply and checking the voltage of power supply. If not reach 24V, adjust the voltage to 24V. ② If voltage of power supply can not adjusted as 24V, replace the power supply.
			The voltage input to the drive is lower than 24V	Checking the length and thickness of power cable of power supply to the motor.	① If not using standard cable, replace it to standard cable. ② If length of cable is too long, shorten it. ③ If ① and ② is impossible, adjust voltage of SMPS to make sure measured voltage of drive side will be bigger than 24V.
			The drive may have problem		① If Alarm keep blinking after tried all of above, replace the drive.

Flash Times	Alarm Contents	Conditions	The Cause of Error	Checking Point	Corrective Measure
10	In-Position Error	After operation is finished, a position error (more than 1) occur for more than 3 seconds	The mechanical part is in vibration status	Checking the status of vibration of mechanical part by hand.	① Remove the cause of vibration.
			The tension of pulley is not suitable if the pulley is applied	Checking the tension of the pulley.	① Adjust to suitable tension by tension gage.
			After Enable, motor does not grab the STEP degree by external force	Checking whether mechanical part not moving due to external force.	① Reassemble the mechanical part.
			The wiring of extension cable of motor and encoder is not correct	Checking the wiring status of extension cable of motor and encoder.	① Fix the wiring of the cable.
			The motor may have problem	Checking the status of the short-circuit or disconnection of the motor cable. (A and /A, B and B, A or /A and motor body, B or /B and Motor body)	① Replace the motor.
			The drive may have problem		① If Alarm keep blinking after tried all of above, replace the drive.
12	ROM Error	The ROM may have problem	The parameter Storage Devices(ROM) in the motor controller may have problem	Checking whether any problem with power. Make sure voltage of drive input terminal is over 23V.	① If power is correct, turn off and turn it back on. If alarm keep blinking after tried above, replace the drive.
15	Position Overflow Error	Position error value is higher than 90° in motor stop status.	The motor is rotated by external force	Checking whether external force generate motor rotation.	① Remove the external force. ② If ① is impossible, install the brake so motor does not rotate when it stopped. ③ ① and ② are impossible, replace the motor, so can have higher holding torque bearable to external force.
			The brake may have problem	Checking the operation status of brake.	① Replace the brake. ② If motor rotate when brake is working well, it means external force exceeds power of brake. Replace the brake to have higher torque.
			The encoder may have problem	Checking the install status of encoder and the output signal.	① Replace the motor.
			The drive may have problem		① If alarm is keep generated, after tried all of above, replace the drive.

18. Parameter Setting GUI [User Interface]

Ezi-SERVO II BT driver using many parameters to do operation.

Some parameters need to be changed when user feel inconvenience to use or in purpose of maximize the efficiency.

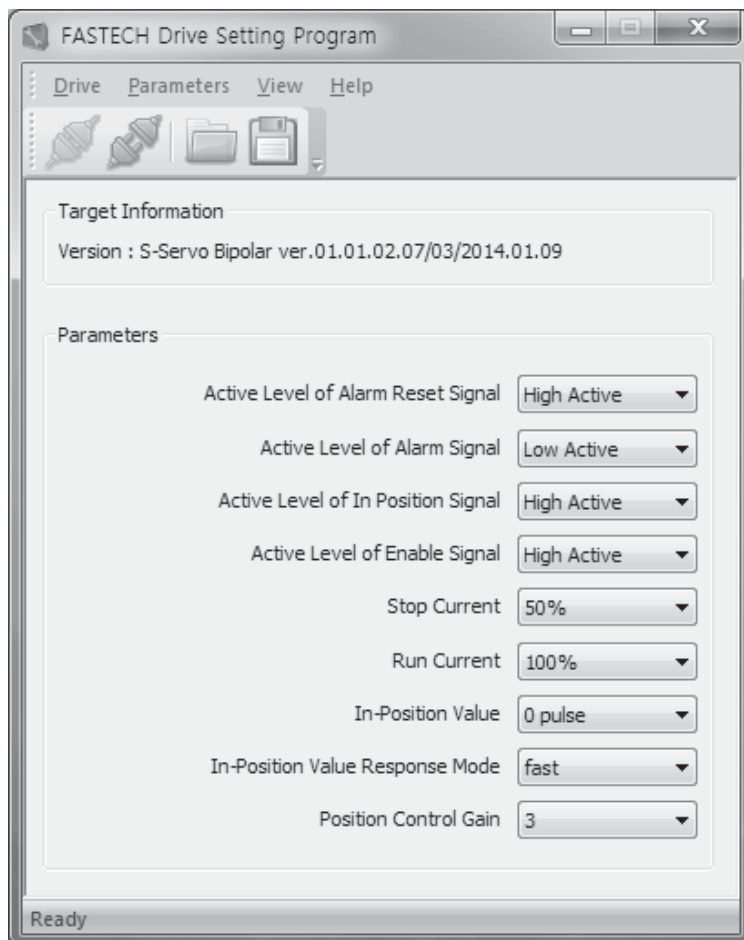
Ezi-SERVO II BT provides parameter modify program for convenience of user.

The screen shot in the below is computer program (GUI) which used for operation process.

User can change the parameter of drive to Enable level, Alarm reset level, Imposition level, Alarm output level. User can use Ezi-SERVO II BT according to their system.

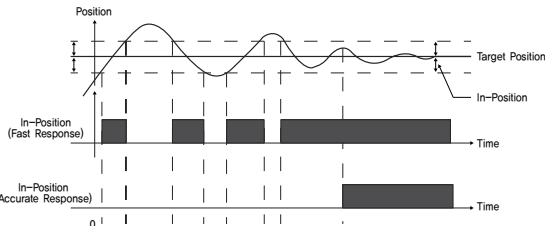
Please connect parameter setting GUI when Ezi-SERVO II BT is Servo Off state.

For safety reason, Ezi-SERVO II BT can not be connected to setting GUI when it is Servo On state.



- * Parameter setting program (GUI) can be downloaded from website (www.fastech.co.kr).
- * Parameter setting program (GUI) support Windows XP, VISTA, 7, 8, 10 (32, 64bit).
- * Parameter setting program (GUI) can be updated without warning to increase performance and convenience of user.

The content below is a description of the function for the parameter. Please refer to the attached sheet when set the parameters. The input and output terminal of drive are all photocoupler. The signal shows the status of internal photocouplers [ON: conduction], [OFF: Non-conduction], not displaying the voltage levels of the signal.

Parameters	The Initial Value	Range	Function
Active Level of Alarm Reset Signal	High	Low, High	Set the level of input signal of Alarm Reset. When set it to High and input of Alarm Reset is [ON], the Alarm output will be offed.
Active Level of Alarm Signal	Low	Low, High	Set the level of output signal of Alarm Reset. When set it to Low, the Alarm output is [ON] when normal state, and the Alarm output is [OFF] when protection function is operated.
Active Level of In-Position Signal	High	Low, High	Set the level of output signal of In-Position. When set it to High, In-Position output after completion of motor movement, output become [ON]
Active Level of Enable Signal	High	Low, High	Set the level of input signal of Servo On input. When set it to High, if Servo On input is [ON], drive will stop to power supply to the motor.
Stop Current	50%	20%~100%	Stop Current means motor current which is set automatically after 0.1 seconds of motor is stopped. This parameter is used for reduce the temperature when the motor is stopped for a long time. The motor temperature can rises If set the Stop Current more than 60%.
Run Current	100%	50%~150%	Run Current is value of the current through the motor, while motor is operating (rotating), and it is set based on Rated Current of the motor. Run Current value is related to torque while motor is operating (rotating). If Run Current value is high, torque value also become higher while motor is operating (rotating). Therefore, if it is determined as lack of torque while motor is operating (rotating), torque value while motor is operating (rotating) can be raised by increasing the value of Run Current Parameter. Warning) 1) If Run Current value is high, also the motor temperature can be increased, so please be aware. 2) The maximum setting value (150%) of Run Current is limited to the 4A. Therefore, if rated current value of motor exceeds 2.7A (55mm, 60mm), Run Current value cannot be increased by raise the Run Current value. 3) In case of Ezi-SERVO II BT, Run Current is automatically adjusted according to the load. Therefore, please raise the Run Current only in case of lack of operating torque.
In-Position Value	0pulse	0~63pulse	It shows output conditions of positioning complete signal. In-Position output signal is generated when the pulse number of positional error is lower than selected In-position value set by this switch after positioning command is executed.
In-Position Value Response Mode	Fast	Fast, Accurate	It shows output conditions of positioning complete signal. 
Position Control Gain	3	0~63	When the motor is stopping, it is used to adjust the response of motor according to load mounted on the motor. This value is not the actual value that used inside of drive, it is relative value. For example, if the value is changed from 3 to 6, it does not mean response time will be doubled. If value of this parameter is small, the motion of stopping of motor is become sensitive, and takes less time to stop. If value of this parameter is large, the motion of stopping of motor is become insensitive, and takes more time to stop. In the normal conditions, use the factory default value. Especially, if the load of inertia moment is greater than the motor so motor cannot stop normally, normal operation is possible by increasing the value of this parameter.

Appendix

■ Connector

Connector specifications for cabling to Ezi-SERVO BT.

ITEM		Part Number	Maker
Power (CN2)	Terminal Block	AKZ1550/2F-3.81	PTR
Signal (CN1)	Housing	501646-2000	MOLEX
	Terminal	501648-1000(AWG 26~28)	MOLEX
RS-232C communication (CN3)	Housing	33507-0300	MOLEX
	Terminal	50212-8100	MOLEX

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

※Above connector is the most suitable product for Ezi-SERVO II BT. Another equivalent connector can be used.

Advantages Over Open-Loop Control Stepping Drive

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

Advantages Over Servo Motor Controller

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

▪ **Memo**

▪ Memo

▪ **Memo**



Fast, Accurate, Smooth Motion

FASTECH Co., Ltd.

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

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