

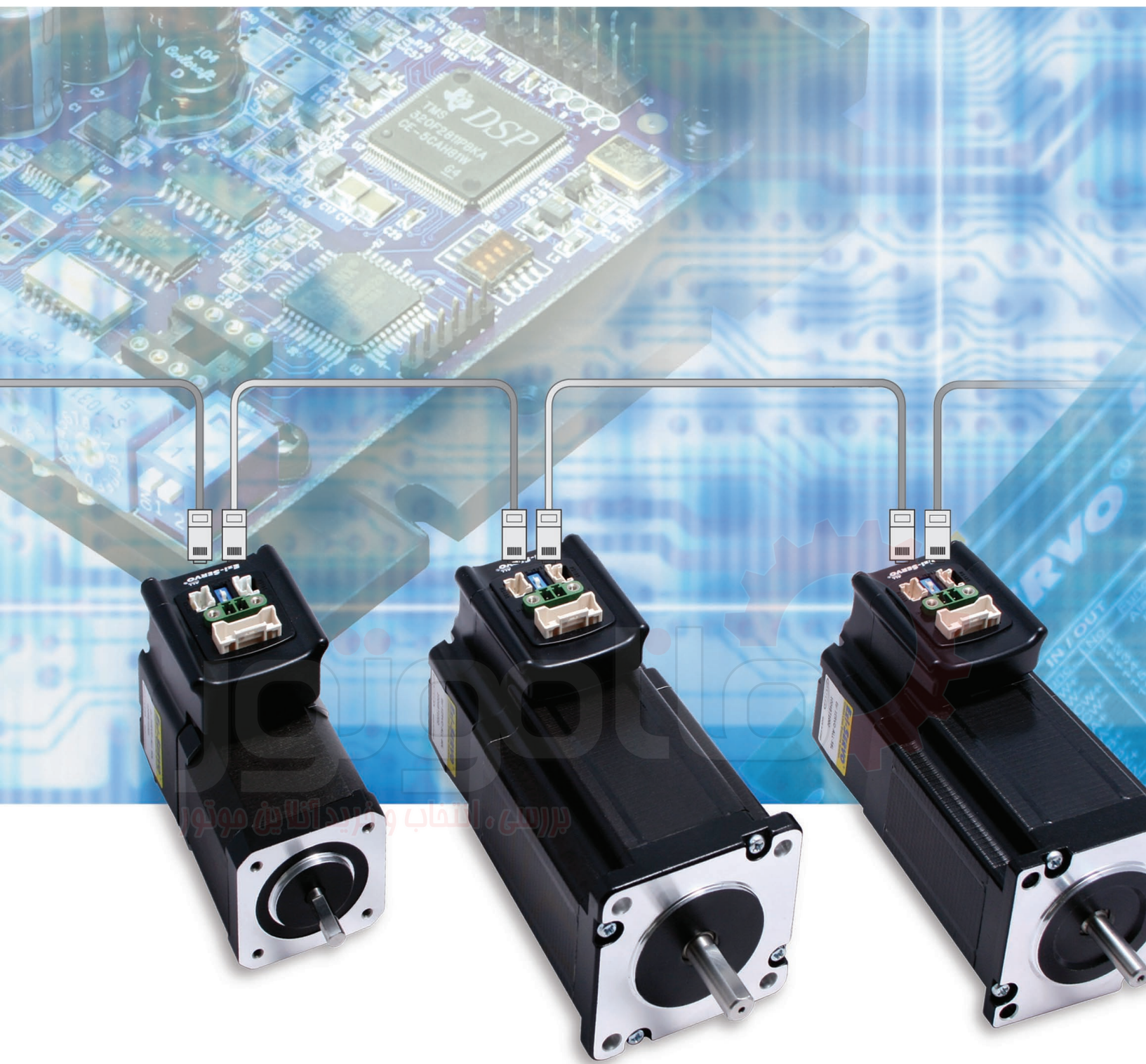
# Ezi-SERVO<sup>®</sup>

## Closed Loop Stepping System

- Motor + Encoder + Drive + Controller + Network
- Embedded Controller
- Position Table
- Closed Loop System
- No Gain Tuning / No Hunting
- High Resolution / Fast Response

# ALL





**FASTECH**

**Ezi-SERVO<sup>®</sup> ALL**

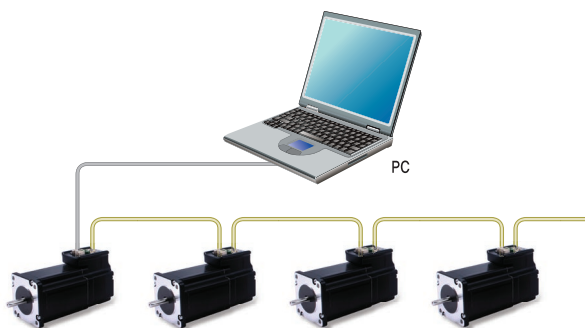
Closed Loop Stepping System



بررسی، انتخاب و خرید آنلاین موتور

## 1 Network Based Motion Control

A maximum of 16 axis can be operated from a PC through RS-485 communications. All of the Motion conditions are set through the network and saved in Flash ROM as a parameter. Motion Library(DLL) is provided for programming under Windows 2000/XP.



## 2 Position Table Function

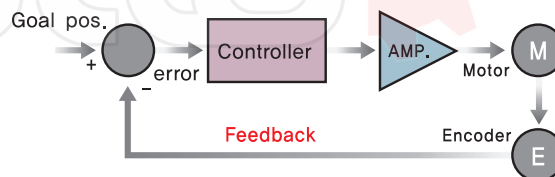
Position Table can be used for motion control by digital input and output signals of host controller. You can operate the motor directly by sending the position table number, start/stop, origin search and other digital input values from a PLC.

The PLC can monitor the In-position, origin search, moving/stop, servo ready and other digital output signals from a drive. A maximum of 256 positioning points can be set from PLC.



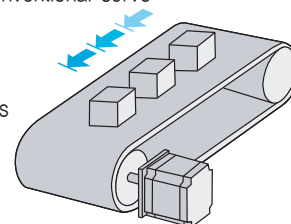
## 3 Closed Loop System

Ezi-SERVO<sup>®</sup> 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<sup>®</sup> to update the current motor shaft position information every 25 micro seconds. This allows the Ezi-SERVO<sup>®</sup> 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!



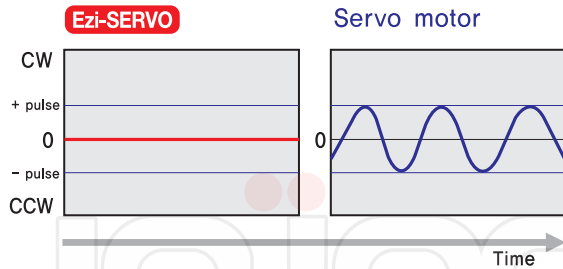
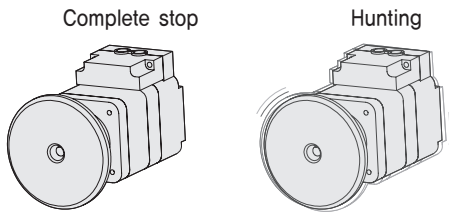
## 4 No Gain Tuning

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<sup>®</sup> 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<sup>®</sup> is optimized for the application and ready to work right out of the box! The Ezi-SERVO<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> also performs exceptionally, even under heavy loads and high speeds!



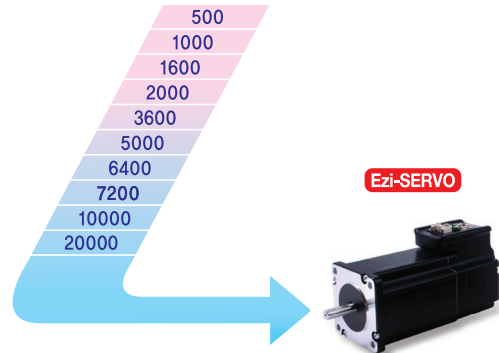
## 5 No Hunting

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<sup>®</sup> Motion Control System! Ezi-SERVO<sup>®</sup> 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.



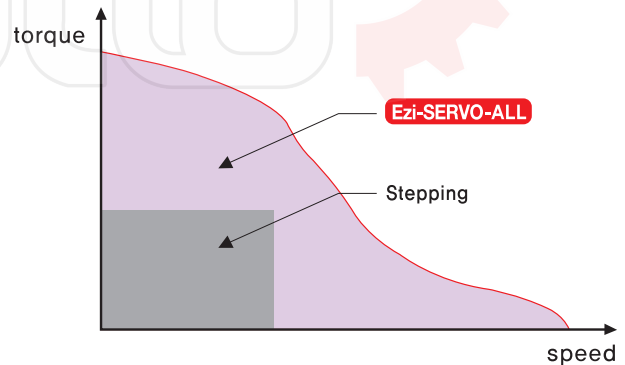
## 8 High Resolution

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



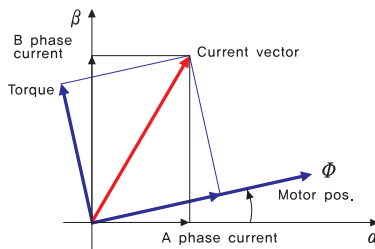
## 9 High Torque

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



## 6 Smooth and Accurate

Ezi-SERVO<sup>®</sup> is a high-precision servo drive, using a high-resolution encoder with 32,000 pulses/revolution. Unlike a conventional Microstep drive, the on-board high performance DSP (Digital Signal Processor) performs vector control and filtering, producing a smooth rotational control with minimum ripples.



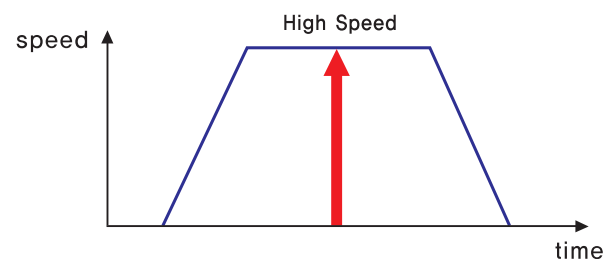
## 7 Fast Response

Similar to conventional stepping motors, Ezi-SERVO<sup>®</sup> instantly synchronizes with command pulses providing fast positional response. Ezi-SERVO<sup>®</sup> 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.



## 10 High Speed

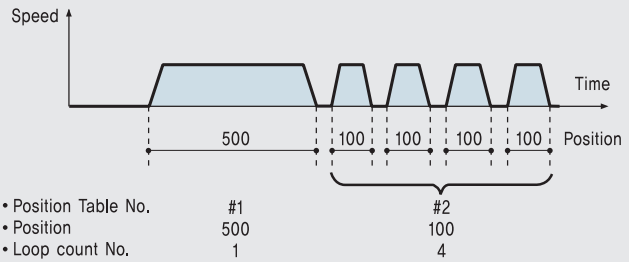
The Ezi-SERVO<sup>®</sup> functions well at high speed without the loss of Synchronism or positioning error. Ezi-SERVO<sup>®</sup>'s ability of continuous monitoring of current position enables the stepping motor to generate high-torque, even under a 100% load condition.



# ● Features of Motion Controller

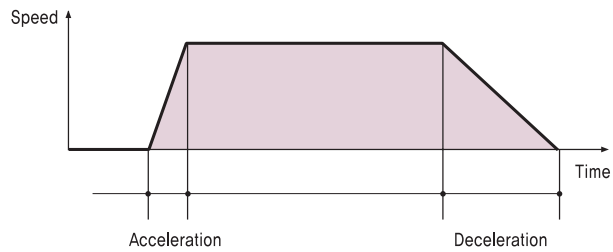
## 1. Loop Count

This function allows positioning repeatedly according to the Loop Count Number.



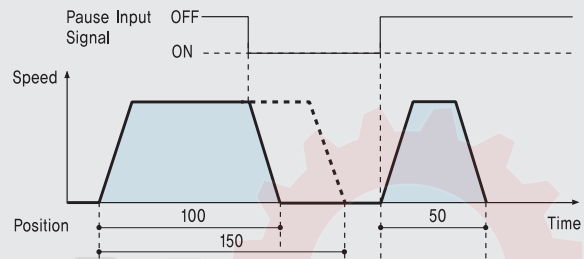
## 2. Acceleration/Deceleration

For quick acceleration and gradual deceleration, you can set each acceleration and deceleration time separately.



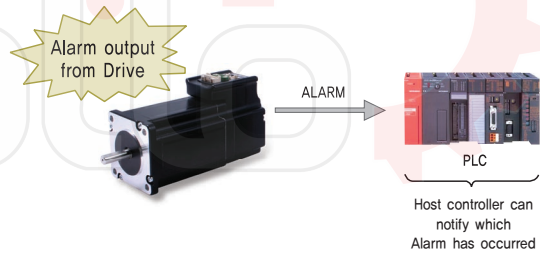
## 3. Pause

You can pause the motion upon the input of an external signal. When Pause signal change to OFF, the motor will restart to original target position.



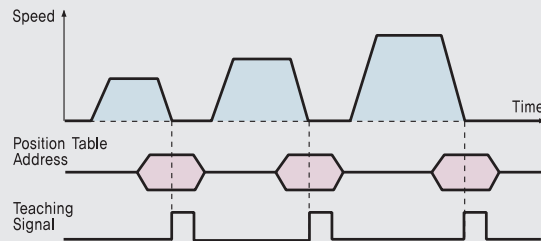
## 4. Alarm

The number of 7-Segment flashing time indicates which Alarm has occurred.



## 5. Teaching

Teaching signal is used to memorize current Position data into the selected Position Table item.

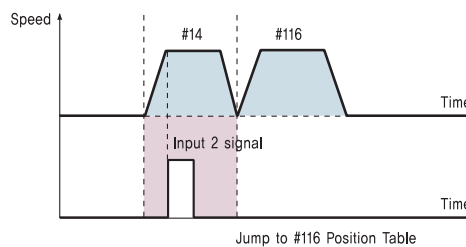
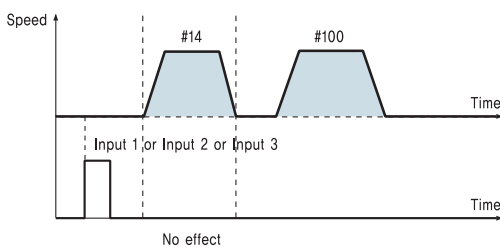


## 6. Jump

Within one Position Table, you can select various Position Table numbers that you want to jump. With three external input signal during movement, the next jump Position Table number can be select.

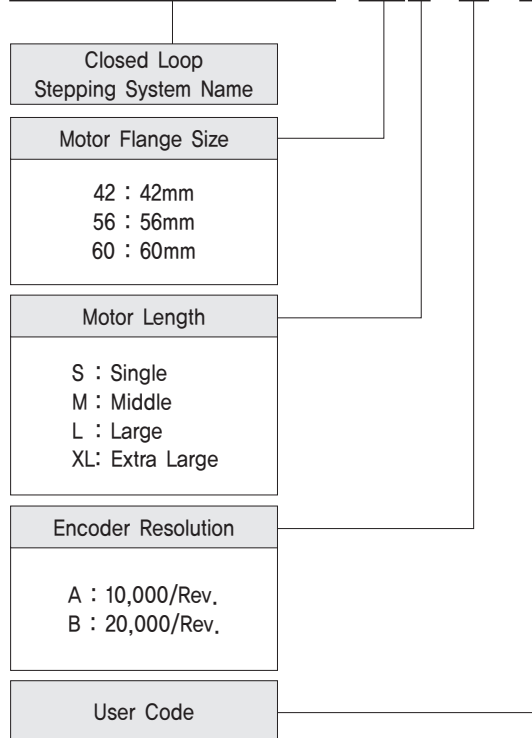
◆ Position Table #14

Position	---	Next	---	Input 1	Input 2	Input 3	---
10000		100		115	116	117	



## ● Part Numbering

### Ezi-SERVO-ALL-42S-A-□



## ● Combination List of Ezi-SERVO ALL

Part Number
Ezi-SERVO-ALL-42S-A
Ezi-SERVO-ALL-42S-B
Ezi-SERVO-ALL-42M-A
Ezi-SERVO-ALL-42M-B
Ezi-SERVO-ALL-42L-A
Ezi-SERVO-ALL-42L-B
Ezi-SERVO-ALL-42XL-A
Ezi-SERVO-ALL-42XL-B
Ezi-SERVO-ALL-56S-A
Ezi-SERVO-ALL-56S-B
Ezi-SERVO-ALL-56M-A
Ezi-SERVO-ALL-56M-B
Ezi-SERVO-ALL-56L-A
Ezi-SERVO-ALL-56L-B
Ezi-SERVO-ALL-60S-A
Ezi-SERVO-ALL-60S-B
Ezi-SERVO-ALL-60M-A
Ezi-SERVO-ALL-60M-B
Ezi-SERVO-ALL-60L-A
Ezi-SERVO-ALL-60L-B



## ● Advantages over Open-loop Control Stepping Drive

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

## ● Advantages over Servo Motor Controller

1. No gain tuning (Automatic adjustment of gain in response to a load change.)
2. Maintains the stable holding position without oscillation 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.

## ● Specifications

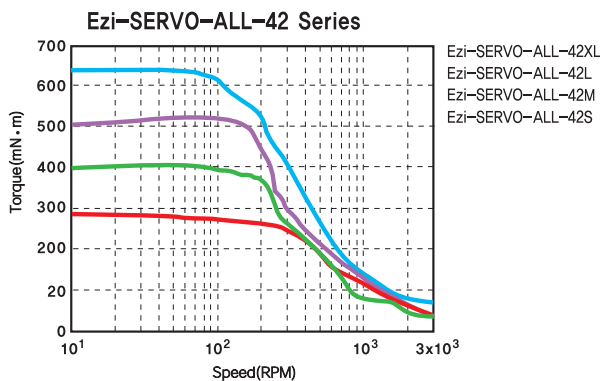
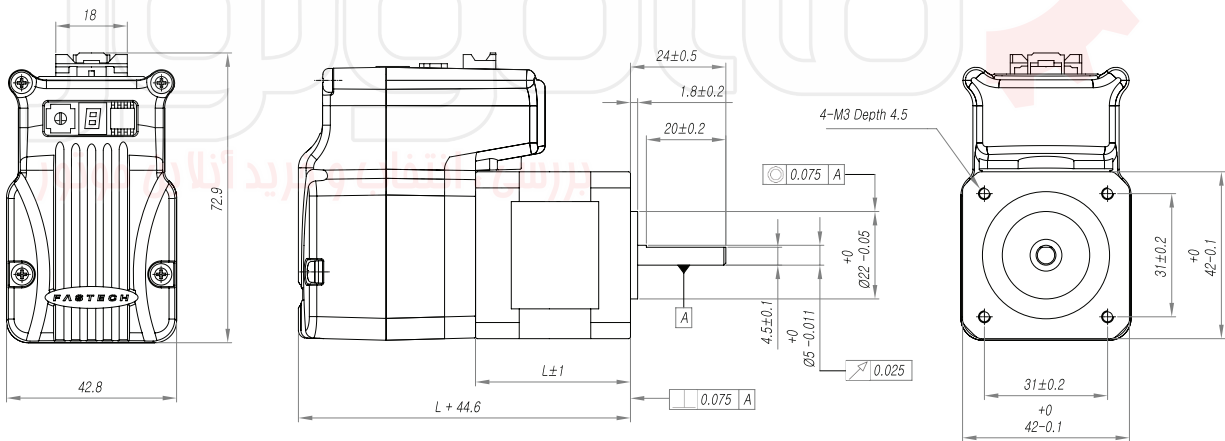
Input Voltage	24VDC $\pm$ 10%
Control Method	Closed loop control with 32bit DSP
Multi Axes Drive	Maximum 16 axes through Daisy-Chain
Position Table	64 motion command steps (Continuous, Wait, Loop, Jump and External start etc.)
Current Consumption	Max 500mA (Except motor current)
Operating Condition	Ambient Temperature In Use : 0~55°C In Storage : -20~70°C
	Humidity In Use : 35~85% (Non-condensing) In Storage : 10~90% (Non-condensing)
	Vib. Resist. 0.5G
Function	Rotation Speed 0~3000rpm
	Resolution(P/R) 10000/Rev. Encoder model : 500, 1000, 1600, 2000, 3600, 5000, 6400, 7200, 10000 20000/Rev. Encoder model : 500, 1000, 1600, 2000, 3600, 5000, 6400, 7200, 10000, 20000
	Protection Functions Over current, Over speed, Position tracking error, Over load, Over temperature, Over regenerated voltage, Motor connect error, Encoder connect error, Motor voltage error, Inposition error, System error, ROM error, Position overflow error
	In-Position Selection 0~15 (Selectable by parameter)
	Position Gain Selection 0~15 (Selectable by parameter)
	Rotational Direction CW / CCW (Selectable by parameter)
I/O Signal	Input Signal 3 dedicated input (LIMIT+, LIMIT-, ORIGIN), 7 programmable input (photocoupler)
	Output Signal 1 dedicated output (Compare Out), 1 programmable output (photocoupler)
Communication Interface	The RS-485 serial communication with PC Transmission speed : 9,6k~921,600[bps]
Position Control	Incremental mode/Absolute mode Data Range : -134,217,727 to +134,217,727[pulse], Operating speed : Max. 1[Mpps]
Return to Origin	Origin Sensor, Z phase, $\pm$ Limit sensor
GUI	User Interface Program within Windows
Software	Motion Library (DLL) for windows 2000/XP

## ● Motor Specifications

MODEL		UNIT	Ezi-SERVO-ALL 42S Series	Ezi-SERVO-ALL 42M Series	Ezi-SERVO-ALL 42L Series	Ezi-SERVO-ALL 42XL Series
DRIVE METHOD		----	BI-POLAR	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		----	2	2	2	2
VOLTAGE		VDC	3,36	4,32	4,56	7,2
CURRENT per PHASE		A	1,2	1,2	1,2	1,2
RESISTANCE per PHASE		Ohm	2,8	3,6	3,8	6
INDUCTANCE per PHASE		mH	2,5	7,2	8	15,6
HOLDING TORQUE		N · m	0,32	0,44	0,54	0,8
ROTOR INERTIA		$g \cdot \text{cm}^2$	35	54	77	114
WEIGHTS		g	220	280	350	500
LENGTH (L)		mm	33	39	47	59
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	22	22	22	22
	8mm		26	26	26	26
	13mm		33	33	33	33
	18mm		46	46	46	46
ALLOWABLE THRUST LOAD		N	Lower than motor weight			
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)			
INSULATION CLASS		----	CLASS B (130°C)			
OPERATING TEMPERATURE		°C	0 to 55			

## ● Motor Dimension [mm] and Torque Characteristics

FASTECH Ezi-SERVO ALL



※ Measured Condition

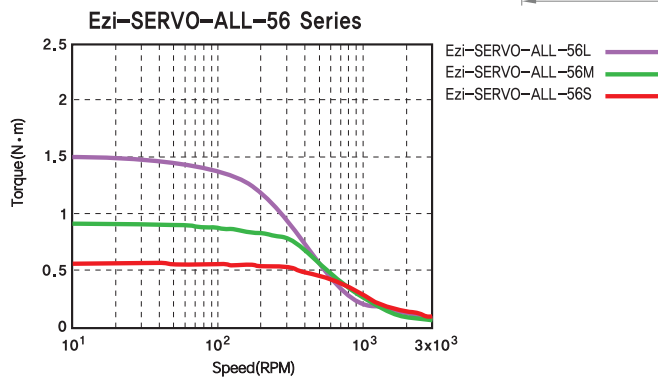
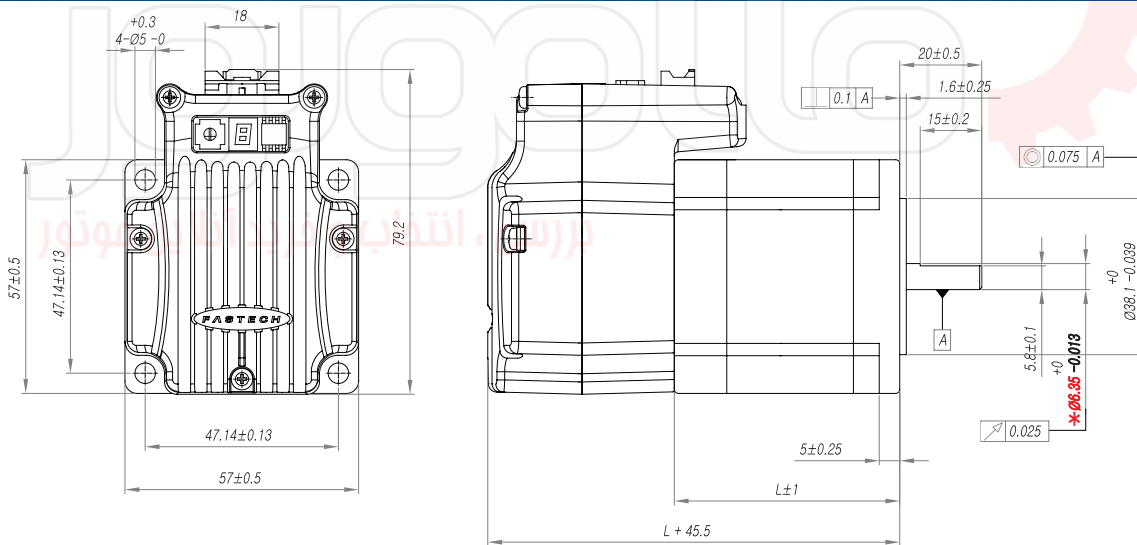
Motor Voltage = 24VDC  
 Motor Current = Rated Current (Refer to Motor Specification)  
 Drive = Ezi-SERVO-ALL



## ● Motor Specifications

MODEL		UNIT	Ezi-SERVO-ALL 56S Series	Ezi-SERVO-ALL 56M Series	Ezi-SERVO-ALL 56L Series
DRIVE METHOD		----	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		----	2	2	2
VOLTAGE		VDC	1,56	2,1	2,7
CURRENT per PHASE		A	3	3	3
RESISTANCE per PHASE		Ohm	0,52	0,7	0,9
INDUCTANCE per PHASE		mH	1	2	3,8
HOLDING TORQUE		N · m	0,64	1	1,5
ROTOR INERTIA		g · cm <sup>2</sup>	120	200	480
WEIGHTS		g	500	700	1150
LENGTH (L)		mm	46	54	80
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	52	52	52
	8mm		65	65	65
	13mm		85	85	85
	18mm		123	123	123
ALLOWABLE THRUST LOAD		N	Lower than motor weight		
INSULATION RESISTANCE		MOhm	100min, (at 500VDC)		
INSULATION CLASS		----	CLASS B (130°C)		
OPERATING TEMPERATURE		°C	0 to 55		

## ● Motor Dimension [mm] and Torque Characteristics



### ※ Measured Condition

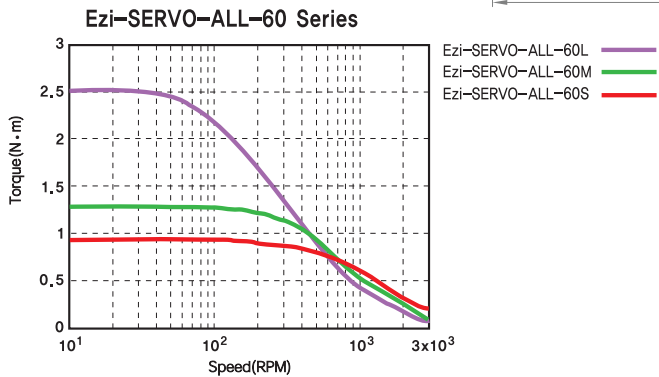
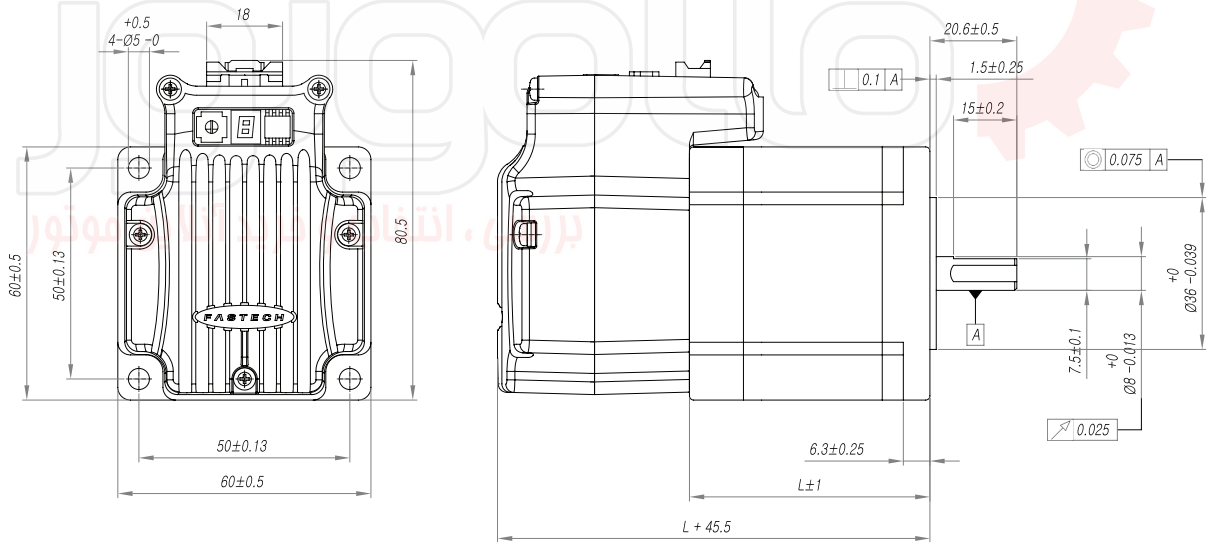
Motor Voltage = 24VDC  
 Motor Current = Rated Current (Refer to Motor Specification)  
 Drive = Ezi-SERVO-ALL

\* : There are 2 kinds size of front shaft diameter for Ezi-SERVO-ALL-56 series as  $\phi 6.35$  and  $\phi 8.0$ .

## ● Motor Specifications

MODEL		UNIT	Ezi-SERVO-ALL 60S Series	Ezi-SERVO-ALL 60M Series	Ezi-SERVO-ALL 60L Series
DRIVE METHOD		----	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		----	2	2	2
VOLTAGE		VDC	1,52	1,56	2,6
CURRENT per PHASE		A	4	4	4
RESISTANCE per PHASE		Ohm	0,38	0,39	0,65
INDUCTANCE per PHASE		mH	064	1,2	2,4
HOLDING TORQUE		N · m	0,88	1,28	2,4
ROTOR INERTIA		g · cm <sup>2</sup>	140	320	800
WEIGHTS		g	600	900	1600
LENGTH (L)		mm	46	56	90
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	70	70	70
	8mm		87	87	87
	13mm		114	114	114
	18mm		165	165	165
ALLOWABLE THRUST LOAD		N	Lower than motor weight		
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)		
INSULATION CLASS		----	CLASS B (130°C)		
OPERATING TEMPERATURE		°C	0 to 55		

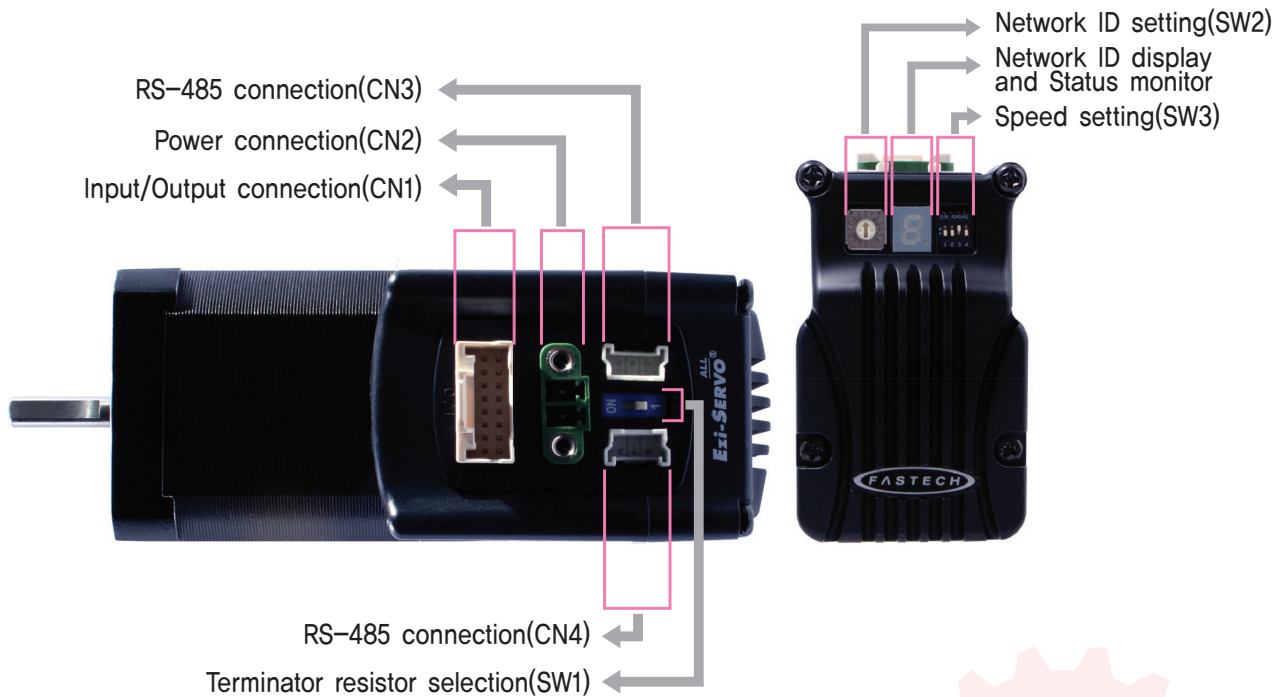
## ● Motor Dimension [mm] and Torque Characteristics



### ※ Measured Condition

Motor Voltage = 24VDC  
 Motor Current = Rated Current (Refer to Motor Specification)  
 Drive = Ezi-SERVO-ALL

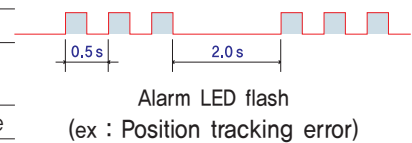
## ● Setting and Operating



### ◆ Protection function and 7-Segment flash times

When Alarm occurs, can recognize main reason of alarming thru by 7-Segment flash times which indicates Network ID.

Times	Protection	Conditions
1	Over current	The current through power devices in inverter exceeds the limit value
2	Over speed	Motor speed exceed 3000rpm
3	Position tracking error	Position error value is higher than 90° in motor run state
4	Over load	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over temperature	Inside temperature of drive exceeds 55°C
6	Over regenerative voltage	Back-EMF more than 50V
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	Inposition error	After operation is finished, a position error occurs
11	System error	Error occurs in drive system
12	ROM error	Error occurs in parameter storage device(ROM)
15	Position overflow error	Position error value is higher than 90° in motor stop state



### 1. Terminator resistor selection(SW1)

Terminator resistor selection switch under RS-485 communication. Please set ON for Terminator Controller of Network.

### 2. Network ID selection switch(SW2)

Position	ID number	Position	ID number
0	0	8	8
1	1	9	9
2	2	A	10
3	3	B	11
4	4	C	12
5	5	D	13
6	6	E	14
7	7	F	15



※Maximum 16 axis can be connected in one network.

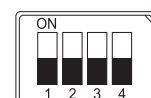
### 3. Speed selection switch(SW3)

The purpose of this is to setting the communication speed

SW 3.2	SW 3.3	SW 3.4	Baud rate[bps]
OFF	OFF	OFF	9600
ON	OFF	OFF	19200
OFF	ON	OFF	38400
ON	ON	OFF	57600
OFF	OFF	ON	115200*1
ON	OFF	ON	230400
OFF	ON	ON	460800
ON	ON	ON	921600

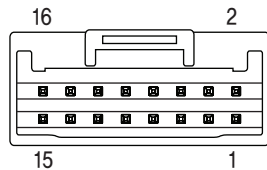
※Possible to use common PCI Bus type RS-485 communication board for High speed communication. (Please contact with Distributor)

\*1 : Default setting value



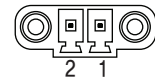
#### 4. Input/Output signal(CN1)

NO.	Function	I/O
1	24VDC	Input
2	24VDC GND	Input
3	BRAKE+	Output
4	BRAKE-	Output
5	+Limit Sensor	Input
6	-Limit Sensor	Input
7	Origin Sensor	Input
8	Digital IN 1	Input
9	Digital IN 2	Input
10	Digital IN 3	Input
11	Digital IN 4	Input
12	Digital IN 5	Input
13	Digital IN 6	Input
14	Digital IN 7	Input
15	Compare Out	Output
16	Digital OUT 1	Output



#### 5. Power connector(CN2)

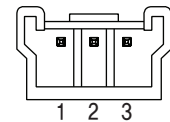
NO.	Function
1	24VDC ±10%
2	GND



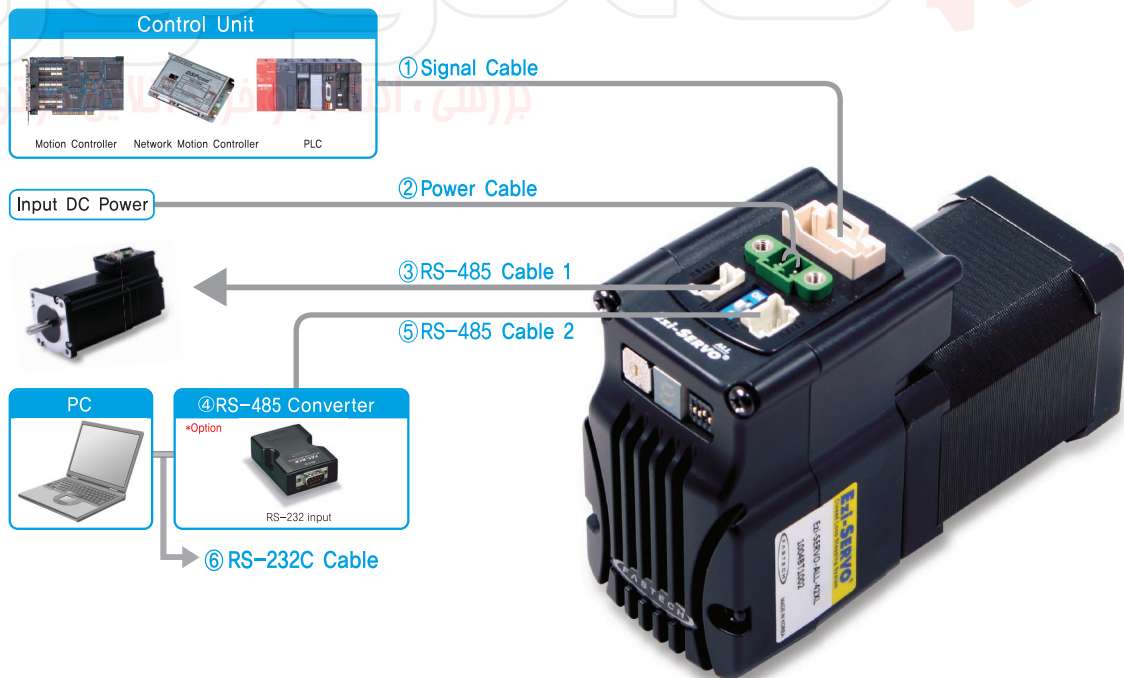
#### 6. RS-485 Communication Connector(CN3, CN4)

There is a converter for connecting PC.

NO.	Function
1	+DATA
2	-DATA
3	GND



### ● System Configuration



Type	Signal Cable	Power Cable	RS-485 Cable
Standard Length	-	-	-
Max. Length	20m	2m	30m

## 1. Cable Option

### ①Signal Cable

Available to connect between Control System and Ezi-SERVO-ALL.

Item	Length[m]	Remark
CSVA-S-□□□F	□□□	Normal Cable
CSVA-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-ALL.

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.

### ③RS-485 Cable 1

Item	Length[m]	Remark
CGNA-R-0R6F	0.6	Normal Cable
CGNA-R-001F	1	
CGNA-R-1R5F	1.5	
CGNA-R-002F	2	
CGNA-R-003F	3	
CGNA-R-005F	5	

\*Common cable to connect Ezi-SERVO-ALL, Ezi-STEP-ALL, Ezi-MotionLink and Ezi-SERVO-MINI-Plus R thru by Network.

## 2. Option

### ④FAS-RCR(RS-232C to RS-485 Converter)

Item	Specification
Comm. Speed	Max. 115,2Kbps
Comm. Dis- tance	RS-232C : Max, 15m RS-485 : Max, 1,2km
Connector Type	RS-232C : DB9 Female RS-485 : RJ-45
Operating System	Windows 98/2000/XP/Vista
Dimension	50X75X23mm
Weight	38g
Power	Powered from PC (Usable for external DC5~24V)

### ⑤RS-485 Cable 2

(FAS-RCR to Ezi-SERVO-ALL, FAS-RCR to Ezi-STEP-ALL, FAS-RCR to Ezi-SERVO-MINI-Plus R, FAS-RCR to Ezi-MotionLink)

Item	Length[m]	Remark
CGNB-R-0R6F	0.6	Normal Cable
CGNB-R-001F	1	
CGNB-R-1R5F	1.5	
CGNB-R-002F	2	
CGNB-R-003F	3	
CGNB-R-005F	5	

### ⑥RS-232C Cable

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

## 3. Connector for Cabling

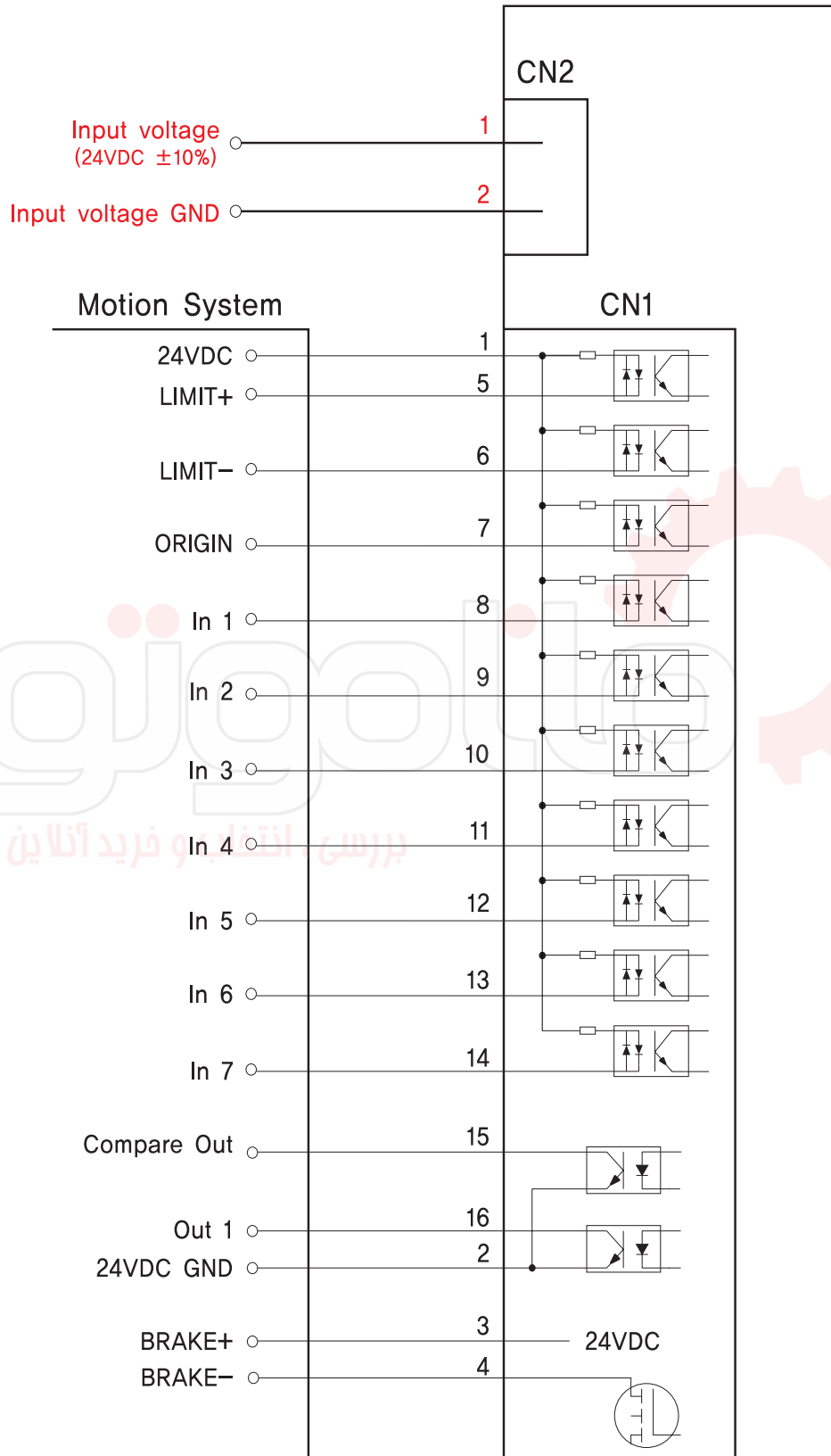
ITEM		Specification	Maker
Power Connector (CN2)	Terminal Block	AKZ1550/2F-3,81	PTR
	Housing	501646-1600	MOLEX
Signal Connector (CN1)	Terminal	501648-1000(AWG 26~28)	MOLEX
	Housing	33507-0300	MOLEX
RS-485 Connector (CN3,CN4)	Housing	33507-0300	MOLEX
	Terminal	50212-8100	MOLEX

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

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

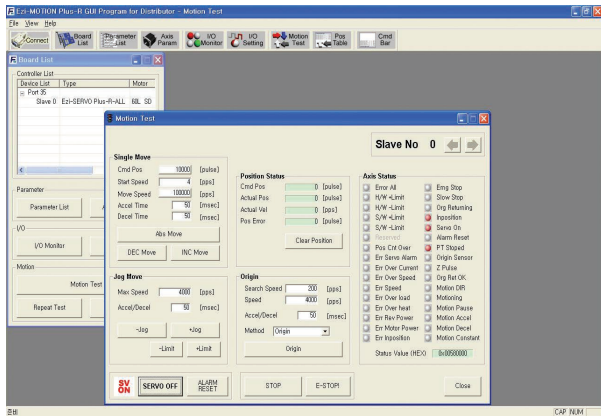
● External Wiring Diagram

Ezi-SERVO-ALL



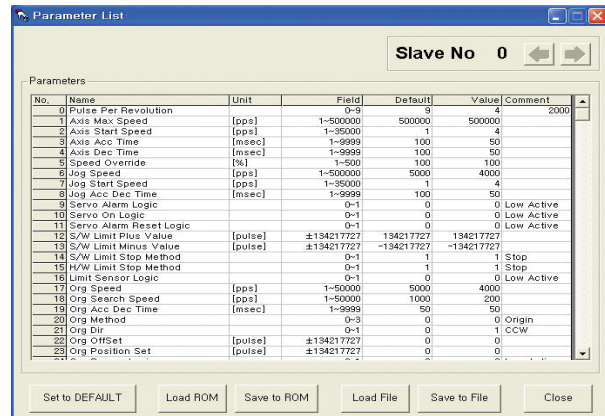
FASTECH Ezi-SERVO ALL

# GUI(Graphic User Interface) Screenshot



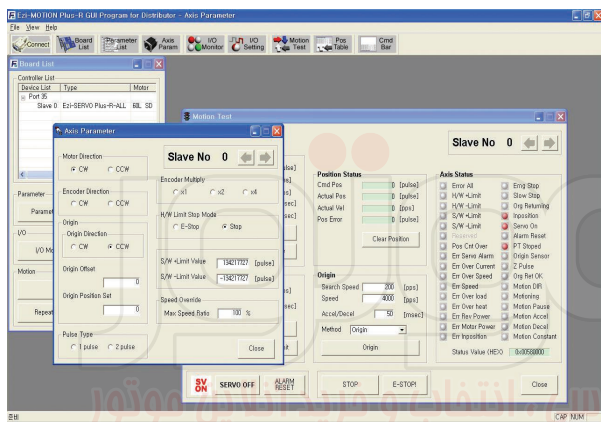
## ◆ Controller Lists and Motion Test

This screen displays the controller list that is connected to the system. You can make a single move, jog, and origin command, and also the motor status is displayed.



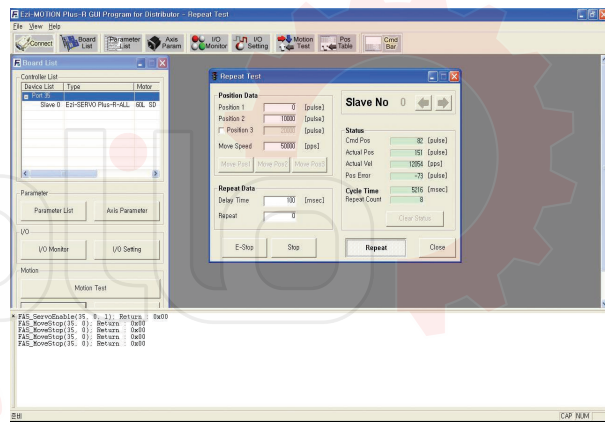
## ◆ Parameter List

All of the parameters are displayed and modified on this screen.



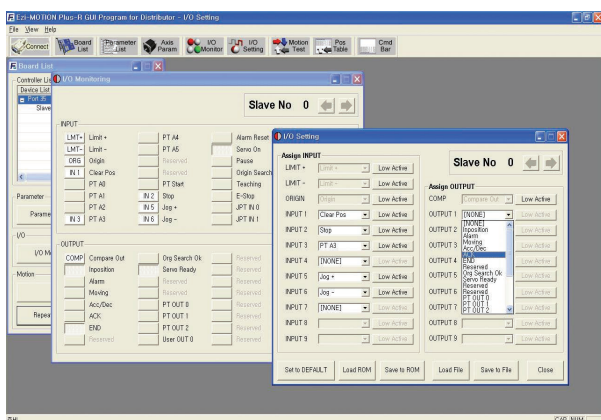
## ◆ Axis Parameter Setup

You can select various parameters that are frequently used. (ex : sensor input logic)



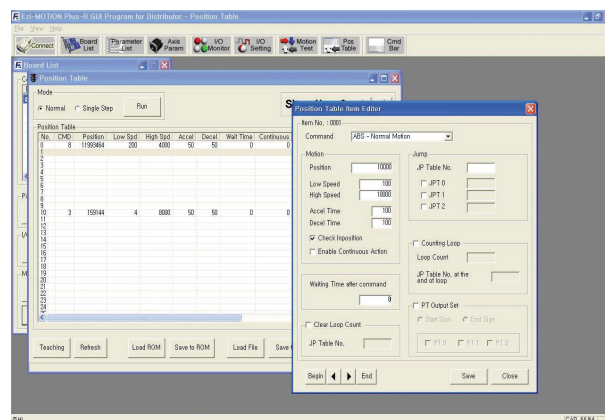
## ◆ Motion Repeat and Monitor Status

Target position, speed, delay time, and repeat count are selected for repeat motion test. Motion library (DLL) is also displayed on the screen.



## ◆ I/O Monitoring and Setting

You can select various digital input and output signals of the controller.



## ◆ Position Table

You can edit the position table and execute it. The position table data can be saved and loaded from Flash ROM and Windows file.





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