Ezi-STEP®

Micro Stepping System

- Motor + Drive + Controller + Network
- Embedded Controller
- Micro Stepping
- Sensorless Stall Detection
- Software Damping
- Run / Stop Signal Output

ALL

FASTECH

Fast, Accurate, Smooth Motion

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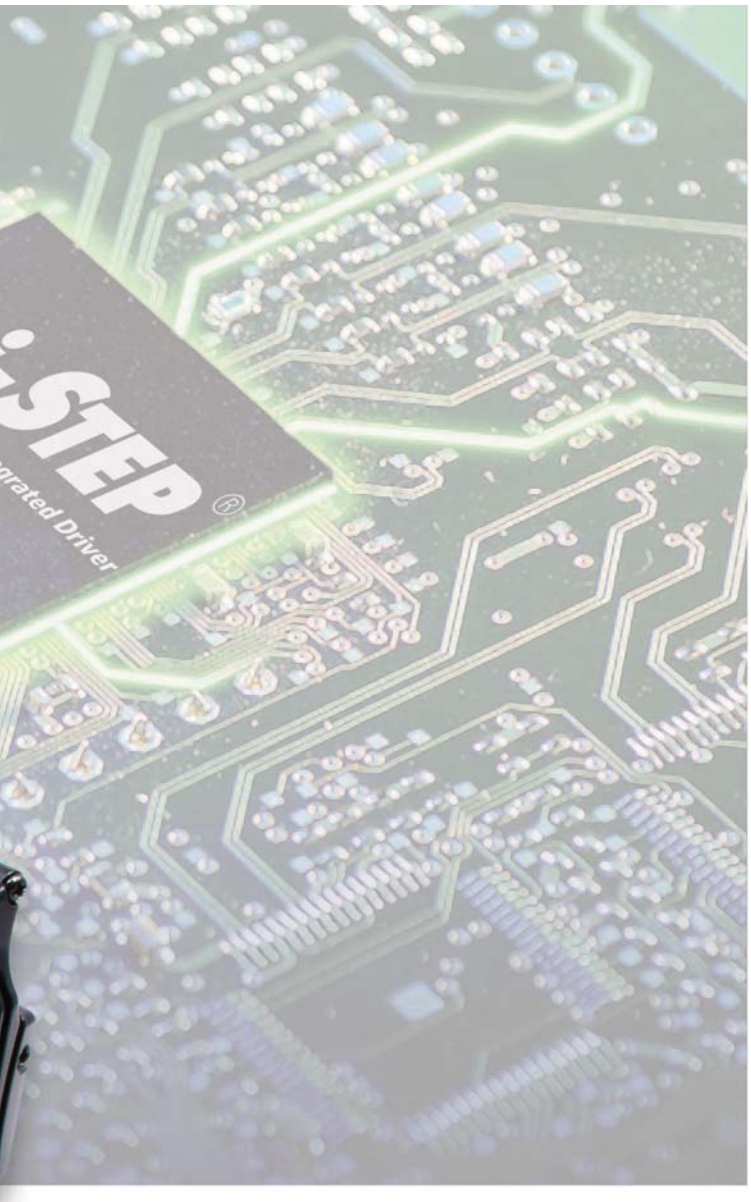
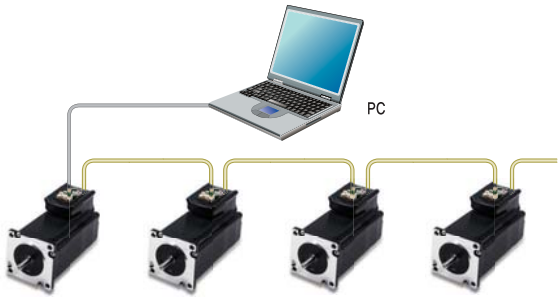
Ezi-STEP® ALL

Micro Stepping System



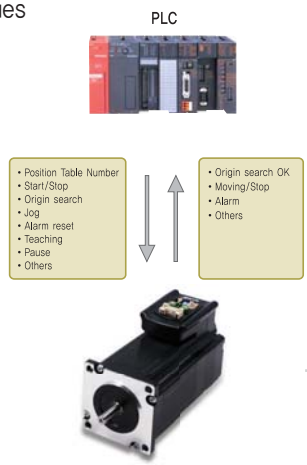
1 Network Based Motion Control

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 Microstep and Filtering

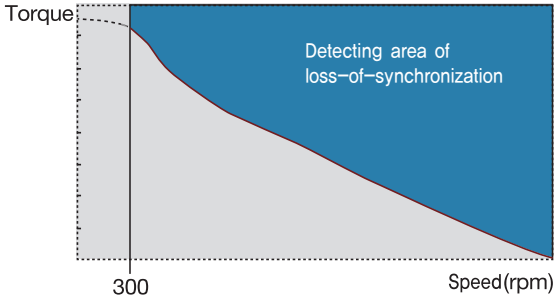
High precision Microstep function and Filtering (Patent pending)
The high-performance DSP operates at step resolutions of 1.8° up to maximum 0.0072° (1/250 steps) and Ezi-STEP adjusts PWM control signal in every 25μ sec, which makes it possible for more precise current control, resulting in high-precision Microstep operation.

4 Sensorless Stall Detection

Detecting the loss-of-synchronization with on-board DSP(Patent pending)

Ezi-STEP can detect the loss-of-synchronization of a stepping motor without the addition of an external sensor. By monitoring the voltage, current, and back-emf signal, the on-board DSP estimates the current position of a rotor and enables it to detect the loss-of-synchronization (an impossible task for a conventional stepping motor drive), this allows for high-speed operation at 100% torque rating without loss-of-synchronization*.

*Effective only over 300 rpm

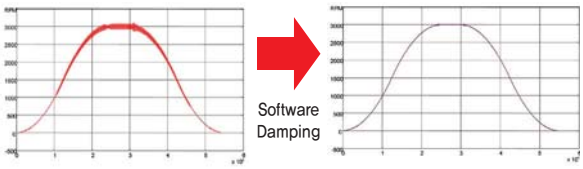


5 Software Damping

Vibration suppression and high-speed operation (Patent pending)

Vibration suppression and High-speed operation (Patent pending) Motor vibration is created by magnetic flux variations of the motor, lower current from the drive due to back-emf from the motor at high speeds and lowering of phase voltages from the drive.

Ezi-STEP drive detects these problems and the DSP adjusts the phase of the current according to the pole position of the motor, drastically suppressing vibration. This allows the smooth operation of the motor at high speeds.



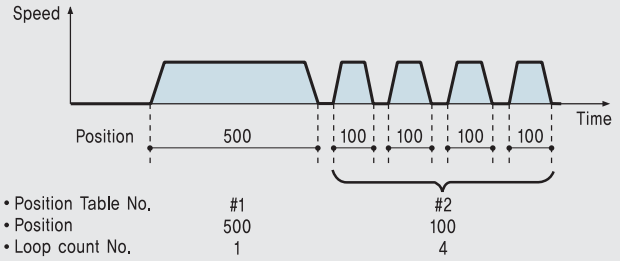
Software Damping OFF　　Software Damping ON

*This is real measured speed that using 100000[pulse/rev] encoder.

● Features of Motion Controller

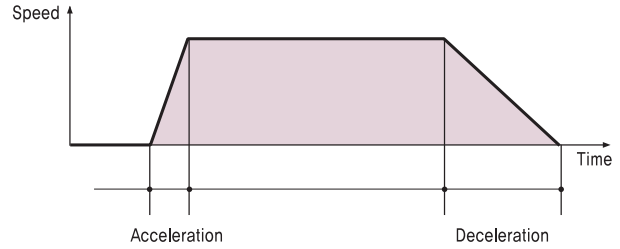
1. Loop Count

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



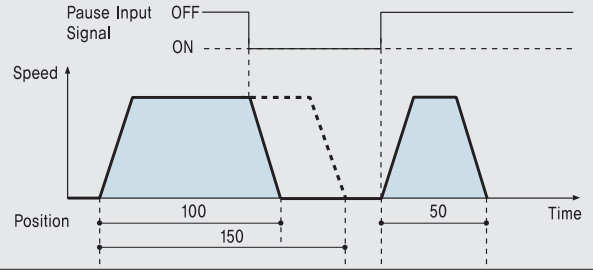
2. Acceleration/Deceleration

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



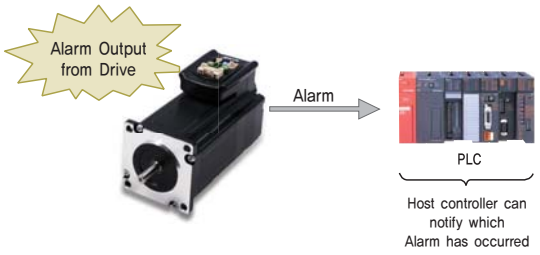
3. Pause

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.



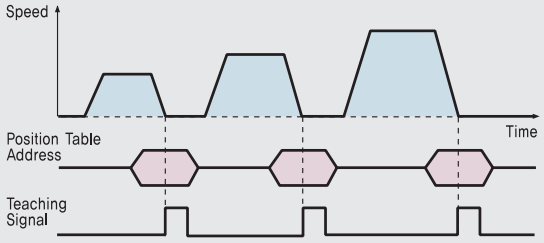
4. Alarm

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.

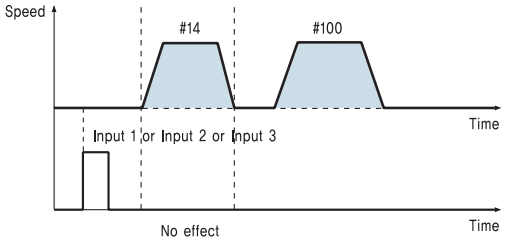


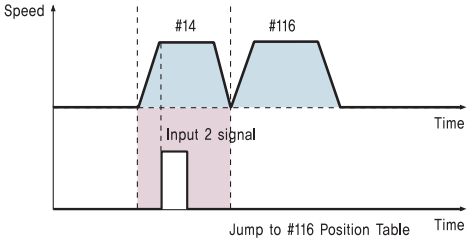
6. Jump

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-STEP-ALL-42S-□

- Drive Series Type
- Motor Flange Size
  - 42 : 42mm
  - 56 : 56mm
- Motor Length
  - S : Single
  - M : Middle
  - L : Large
  - XL: Extra Large
- User Code

Unit Part Number
Ezi-STEP-ALL-42S
Ezi-STEP-ALL-42M
Ezi-STEP-ALL-42L
Ezi-STEP-ALL-42XL
Ezi-STEP-ALL-56S
Ezi-STEP-ALL-56M
Ezi-STEP-ALL-56L

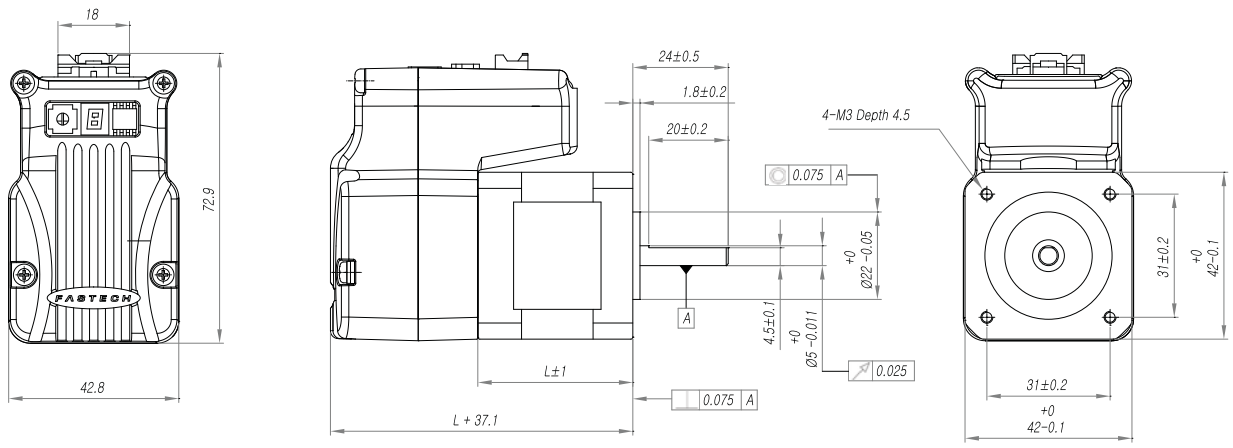
● Drive Specifications

Input Voltage		24VDC ±10%
Control Method		PWM drive 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 : 0~50℃ In Storage : -20~70℃
	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)	500, 1000, 1600, 2000, 3200, 3600, 4000, 5000, 6400, 8000, 10000, 20000, 25000, 36000, 40000, 50000 (Selectable by parameter) *Default : 10000
	Protection Functions	Over current error, Over speed error, Step out error, Over temperature error, Over regenerated voltage error, Motor connect error, Motor voltage error, System error, ROM error, Input voltage error
	7-Segment	Power, Alarm, Communication ID
	STOP Current	10%~100%. (Selectable by parameter) Be setted to set value of STOP current after 0.1 second after motor stop. *Default : 50%
	Rotational Direction	CW / CCW (Selectable by parameter) Used when changing the direction of motor rotate. *Default : CW
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), Brake Signal
Communication Interface		The RS-485 serial communication with PC Transmission speed : 9,600~921,600[bps]
Position Control		Incremental mode / Absolute mode Data Range : -134,217,727 to +134,217,727[pulse], Operating speed : Max. 3000[rpm]
Return to Origin		Origin Sensor, ±Limit sensor, Z phase (By connect external encoder)
GUI		User Interface Program within Windows
Software		Motion Library (DLL) for windows 2000/XP

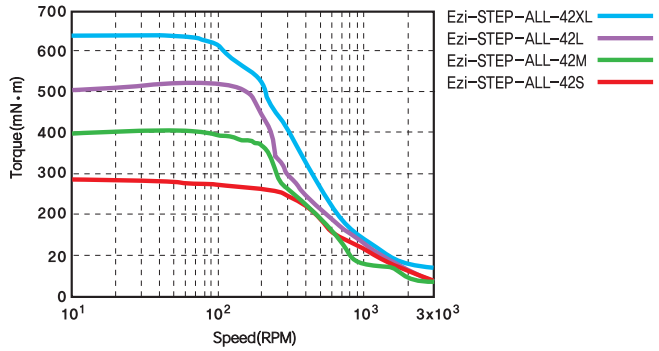
● Motor Specifications

M O D E L		UNIT	Ezi-STEP-ALL 42S	Ezi-STEP-ALL 42M	Ezi-STEP-ALL 42L	Ezi-STEP-ALL 42XL
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	6.0
INDUCTANCE per PHASE		mH	2.5	7.2	8.0	15.6
HOLDING TORQUE		N · m	0.32	0.44	0.5	0.65
ROTOR INERTIA		g · ㎠	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℃)			
OPERATING TEMPERATURE		℃	0 to 55			

● Motor Dimension [mm] and Torque Characteristics



Ezi-STEP-ALL-42 Series



※Measured Condition

Motor Voltage = 24VDC

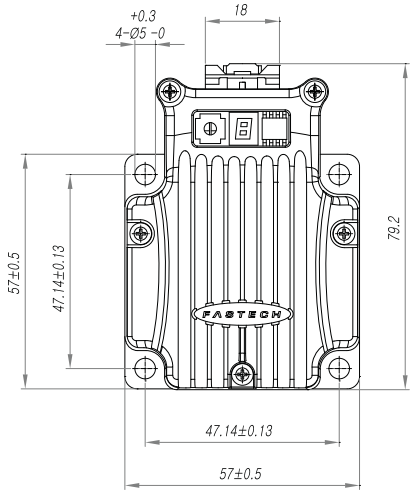
Motor Current = Rated Current (Refer to Motor Specification)

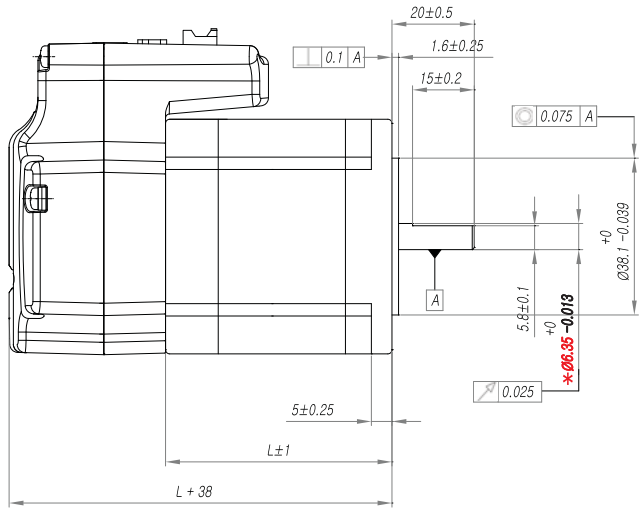
Drive = Ezi-STEP ALL

● Motor Specifications

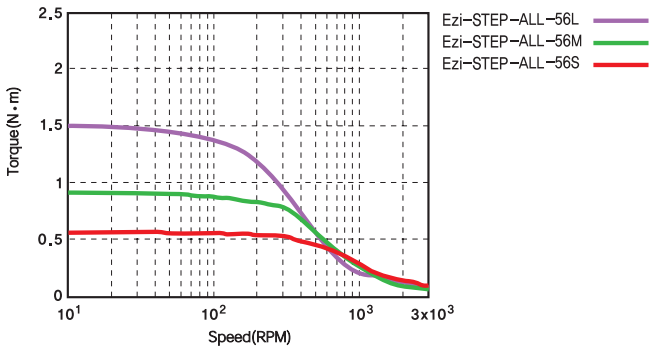
M O D E L		UNIT	Ezi-STEP-ALL-56S	Ezi-STEP-ALL-56M	Ezi-STEP-ALL-56L
DRIVE METHOD		----	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		----	2	2	2
VOLTAGE		VDC	1.56	1.62	2.7
CURRENT per PHASE		A	3	3	3
RESISTANCE per PHASE		Ohm	0.52	0.54	0.9
INDUCTANCE per PHASE		mH	1.0	2.0	3.8
HOLDING TORQUE		N · m	0.64	1.0	1.5
ROTOR INERTIA		g · ㎠	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℃)		
OPERATING TEMPERATURE		℃	0 to 55		

● Motor Dimension [mm] and Torque Characteristics





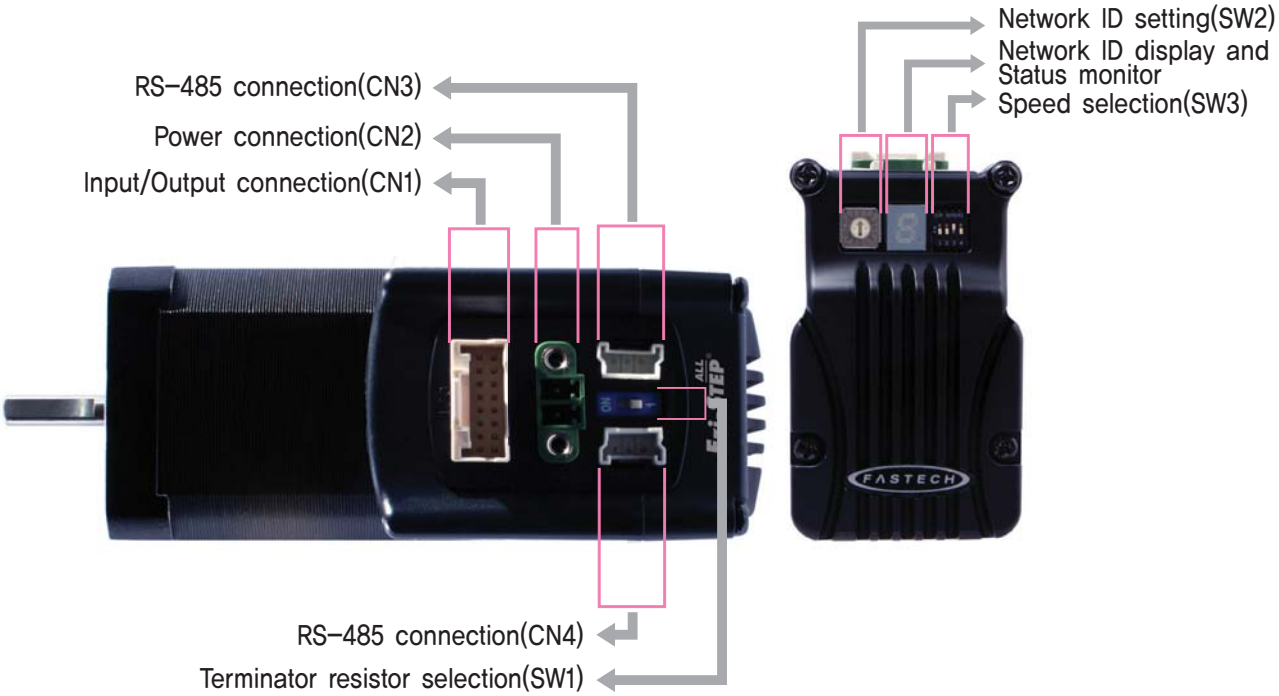
Ezi-STEP-ALL-56 Series



※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current (Refer to Motor Specification)
Drive = Ezi-STEP ALL

∗ : There are 2 kinds size of front shaft diameter for Ezi-STEP-ALL-56 series as Φ6.35 and Φ8.0.

● Setting and Operating



◆ Protection function and 7-Segment flash times

Times	Protection	Conditions
1	Over current error	Excessive current flowed into a motor
2	Over speed error	Motor speed exceeded 3000 rpm
3	Step out error	Abnormally motor do not followed pulsed input
5	Over temperature error	Internal temperature of a motor drive exceeded 55℃
6	Over regenerative voltage error	Back EMF more than 50V
7	Motor connect error	Power is ON without connection of motor cable to drive
9	Motor voltage error	Motor voltage is below 20V
11	System error	Error occurs in drive system
12	ROM error	Error occurs in parameter storage device(ROM)
14	Input voltage error	Power source voltage is out of limited value [20V~28V]

Alarm 7-Segment flash
(ex : Step out)

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.

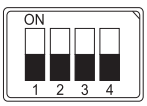
3. Speed Setting(SW3)

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

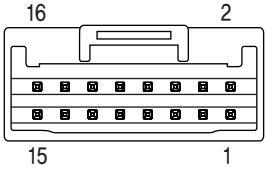
※Possible to use common PCI Bus type RS-485 communication board for High speed communication. (Please contact with Distributor)

*1 : Default setting value



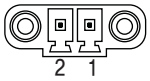
4. Input/Output Signal(CN1)

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 ConnectorCN2)

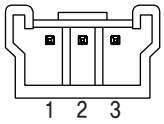
NO.	Function
1	24VDC ±10%
2	GND



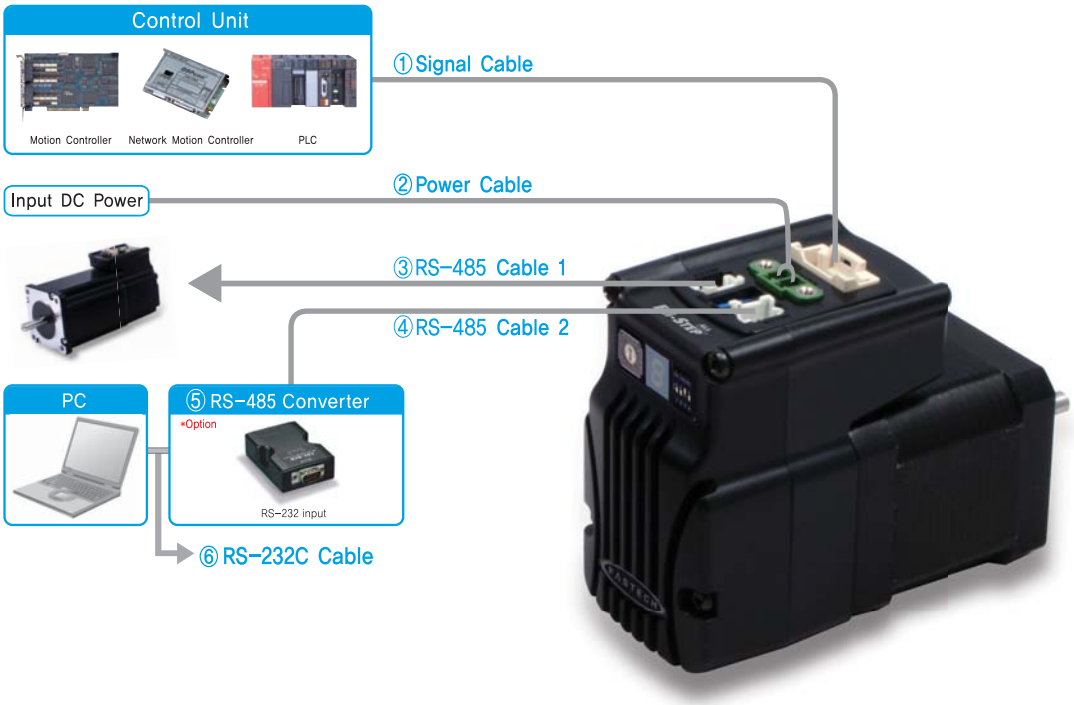
6. RS-485 Communication Connector(CN3, CN4)

There is a converter for connecting PC.

NO.	Function
1	+DATA
2	-DATA
3	GND



● System Configuration



Type	Signal Cable	Power Cable
Standard Length	–	–
Max. Length	20m	2m

1. Cable Option

①Signal Cable

Available to connect between Control System and Ezi-STEP 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-STEP 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
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	

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

2. Option

④RS-485 Cable 2

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

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	

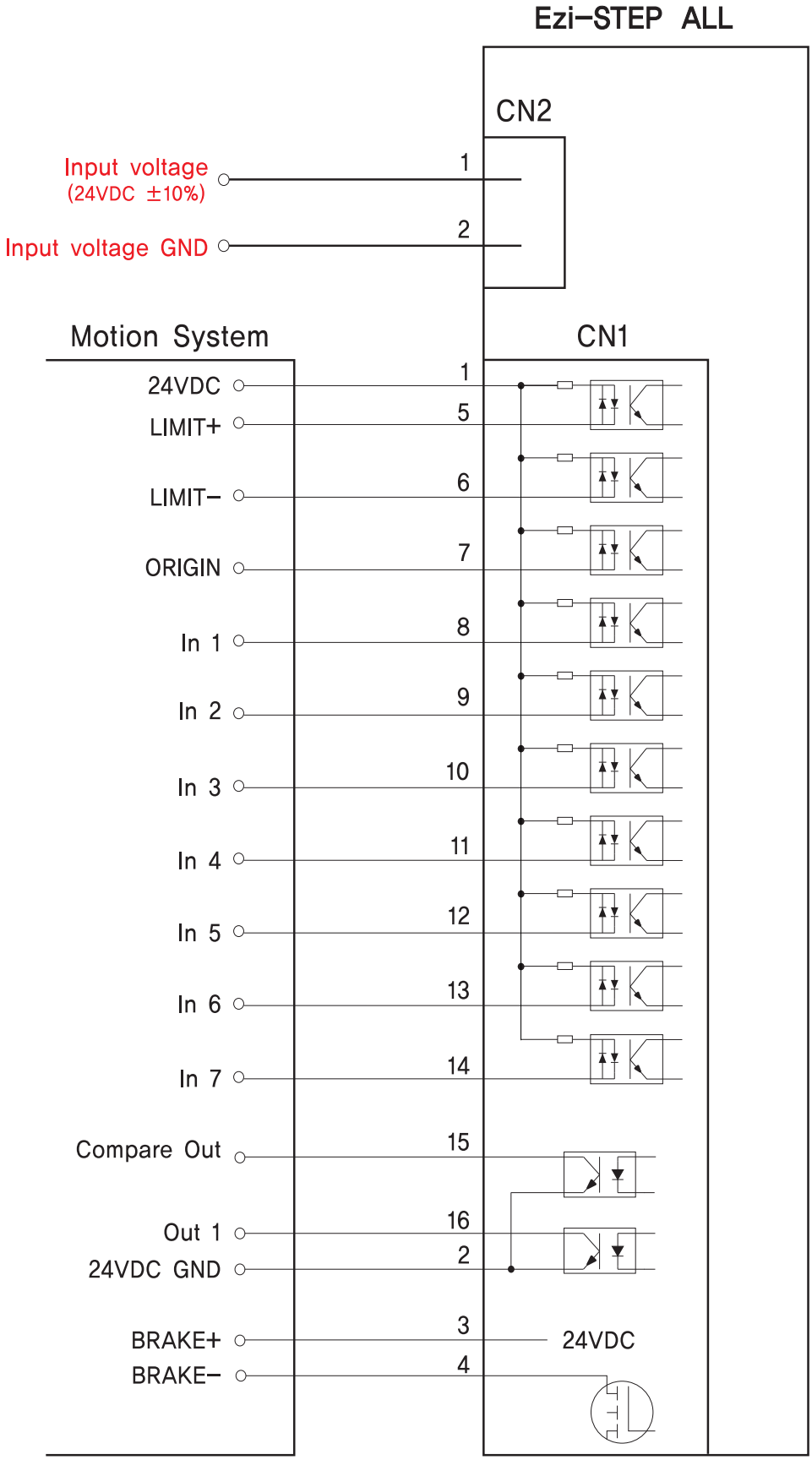
⑤FAS-RCR(RS-232C to RS-485 Converter)

Item	Specification
Comm. Speed	Max. 115.2Kbps
Comm. Distance	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)

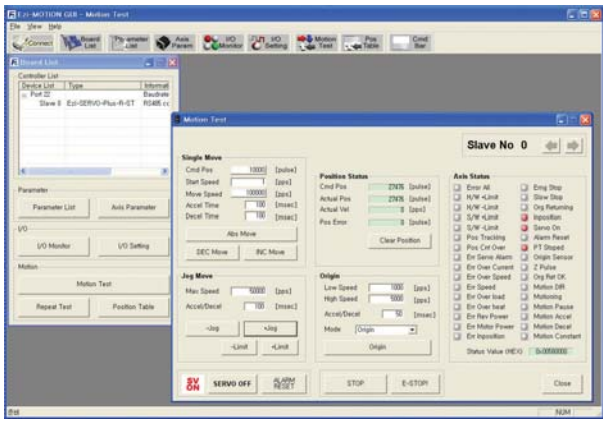
⑥RS-232C Cable

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

● External Wiring Diagram

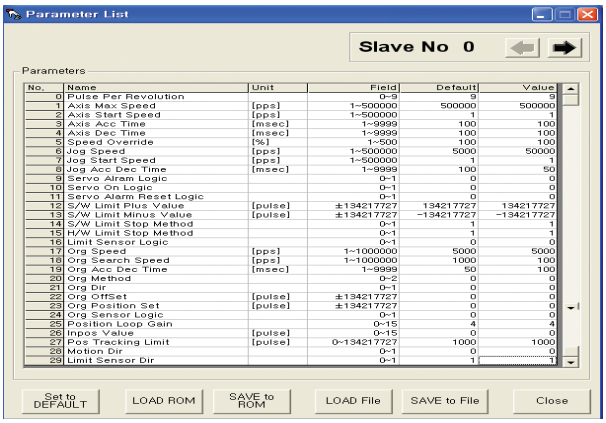


● GUI(Graphic User Interface) Screenshot



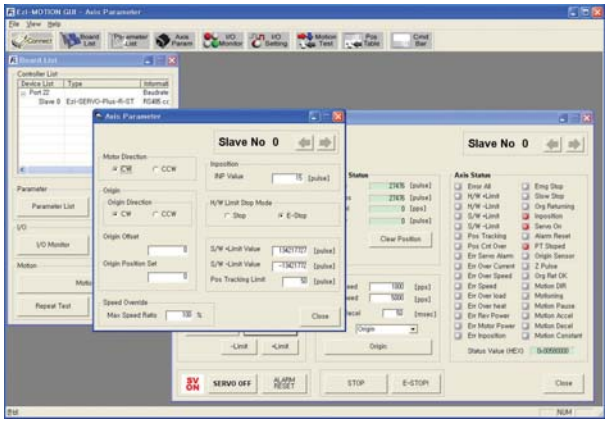
◆ Controller Lists and Motion Test

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



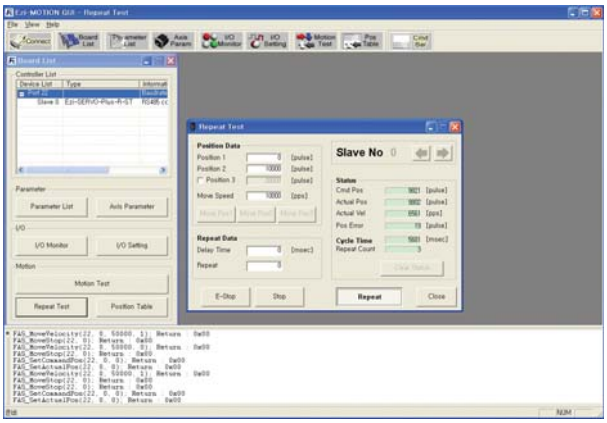
◆ Parameter List

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



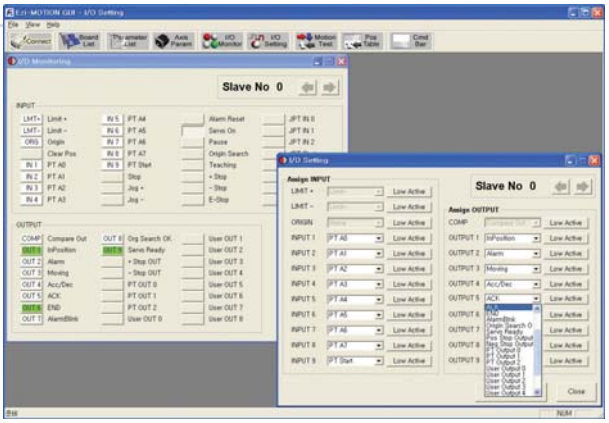
◆ Axis Parameter Setup

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



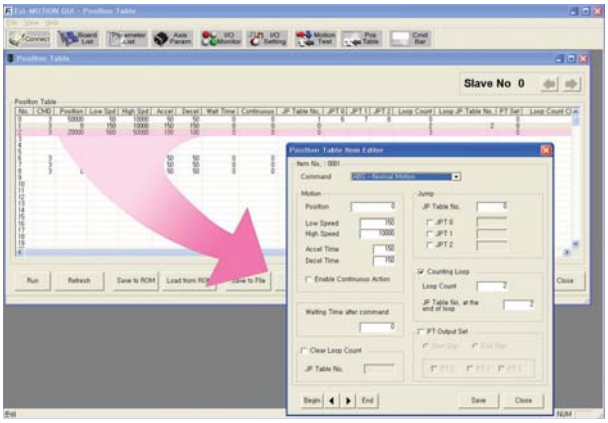
◆ Motion Repeat and Monitor Status

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



◆ I/O Monitoring and Setting

You can select various digital input and output signals of 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.

MEMO

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