Ezi-STEP®

Micro Stepping System

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

ALL

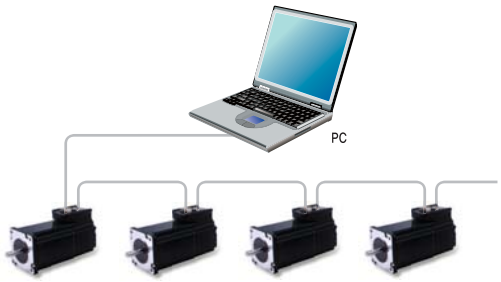
FASTECH

Fast, Accurate, Smooth Motion

Features

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 / 7 / 8 / 10 / Vista.



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 64 positioning points can be set from PLC.

3. Microstep and Filtering

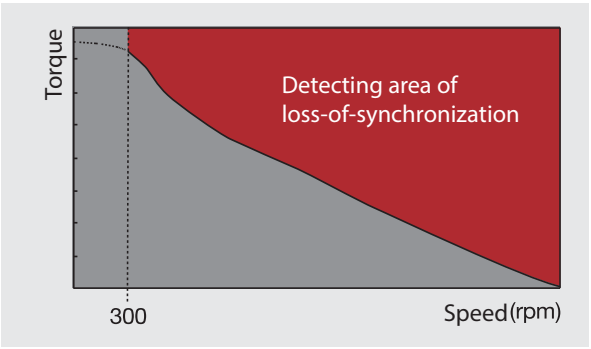
High precision Microstep function and Filtering(Patent pending) The high-performance DSP operates at step resolutions of 1.8° up to maximum 0.0072°steps) and Ezi-STEP ALL adjusts PWM control signal in every 25μsec, which makes it possible for more precise current control, resulting in high-precision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

4. Sensorless Stall Detection

Detecting the loss-of-synchronization with on-board DSP(Patent pending Ezi-STEP ALL can detect the loss-of-synchronization of a stepping motor without the addition of an external sensor.

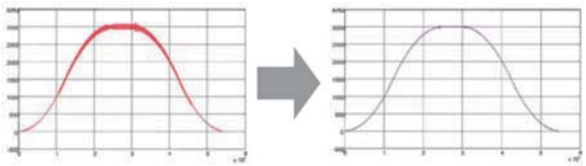
By monitoring the voltage, current, and back-emf signal, the on-board DSP estimates the current position of a rotor and enables it to detect the loss-of-synchronization(an impossible task for a conventional stepping motor drive), this allows for high-speed operation at 100% torque rating without loss-of-synchronization. *1

*1 : Effective only over 300[rpm]



5. Software Damping

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 ALL 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.



[This is real measured speed that using 100000[ppr]encoder.]

Part Numbering Method

Ezi-STEP-ALL-56L-BK-□

Ezi-STEP	**Product Name**

MNB : Mini	**Drive Series Type**
MPB : Mini Power	
HPB : High Power	
MI : Mini Type	
PR : Plus RS-485	
PR-MI : Plus RS-485 Mini Type	
BT : Built In	
ALL : All Type	

42mm	**Motor Flange Size**
56mm	

User Code	

Brake	No Indication : No
	BK-Brake

Motor Length	**S :** Single
	M : Middle
	L : Large
	XL : Extra Large

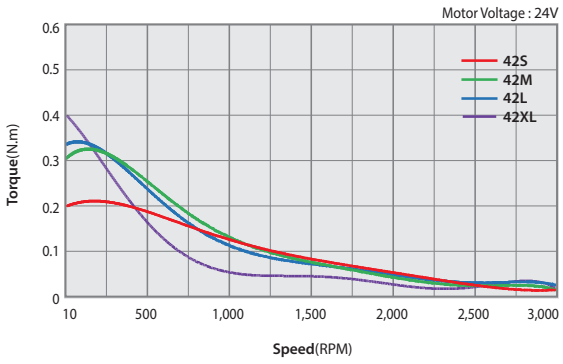
Motor, Drive Combination

UNIT No.	MOTOR No.	DRIVE No.
Ezi-STEP-ALL-42S	Motor & Drive & Controller Integrated	
Ezi-STEP-ALL-42M		
Ezi-STEP-ALL-42L		
Ezi-STEP-ALL-42XL		
Ezi-STEP-ALL-56S		
Ezi-STEP-ALL-56M		
Ezi-STEP-ALL-56L		

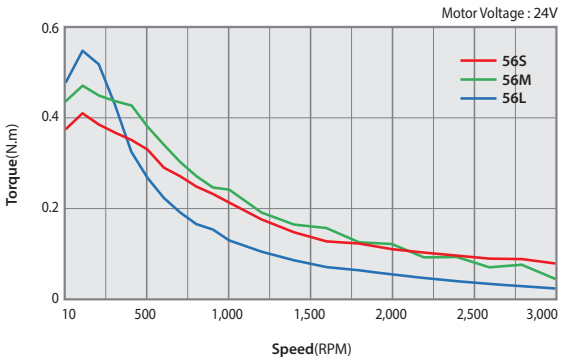
Motor Specification Table

Model		Unit	42				56		
			42S	42M	42L	42XL	56S	56M	56L
DRIVE METHOD		-	BI-POLAR						
Number OF PHASES		-	2	2	2	2	2	2	2
VOLTAGE		VDC	3.36	4.32	4.56	7.2	1.35	1.62	2.58
CURRENT per PHASE		A	1.2	1.2	1.2	1.2	3.0	3.0	3.0
RESISTANCE per PHASE		Ohm	2.8	3.6	3.8	6.0	0.45	0.54	0.86
INDUCTANCE per PHASE		mH	5.4	7.2	8.0	15.6	1.2	2.0	4.0
HOLDING TORQUE		N·m	0.32	0.44	0.5	0.8	0.64	1.0	2.0
ROTOR INERTIA		$g·cm^2$	35	54	77	114	180	280	520
WEIGHTS		g	250	280	350	500	500	720	1150
LENGTH(L)		mm	34	40	48	60	46	55	80
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	22	22	22	22	52	52	52
	8mm		26	26	26	26	65	65	65
	13mm		33	33	33	33	85	85	85
	18mm		46	46	46	46	123	123	123
ALLOWABLE THRUST LOAD		N	Lower than motor weight						
INSULATION RESISTANCE		Mohm	100 MΩ MIN.(at 500VDC)						
INSULATION CLASS		-	CLASS B(130℃)						
OPERATING TEMPERATURE		℃	0 to 55						

Ezi-STEP ALL_ 42 Series

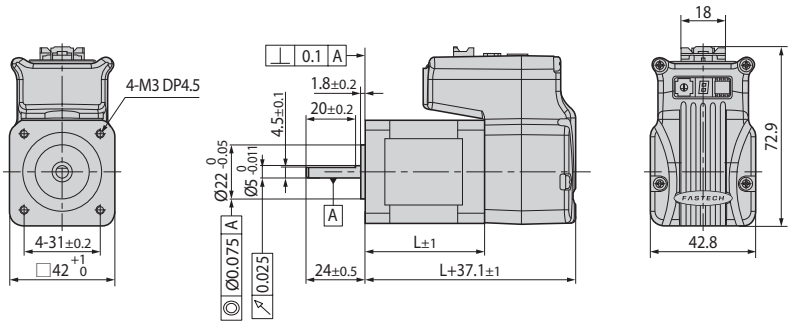


Ezi-STEP ALL_ 56 Series



Motor Drawing

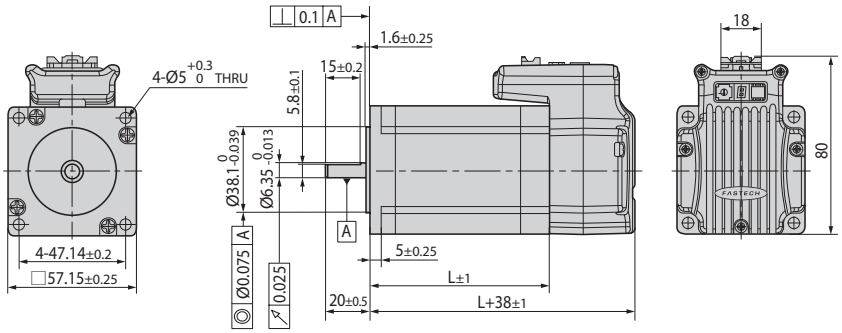
Ezi-STEP ALL_ 42mm



42mm

Model Name	Length(L)
42S	34
42M	40
42L	48
42XL	60

Ezi-STEP ALL_ 56mm



56mm

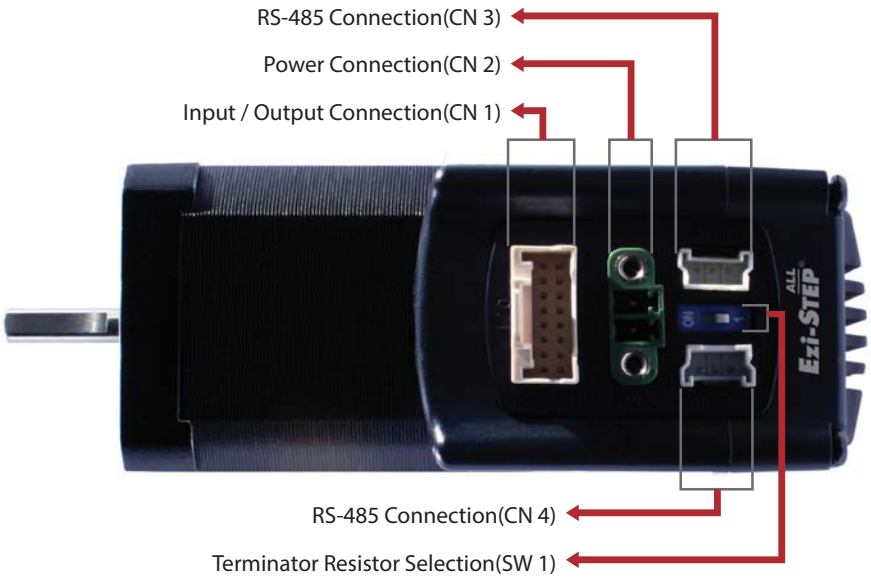
Model Name	Length(L)
56S	46
56M	55
56L	80

Drive Specification

Specifications

Input Voltage		24VDC ±10%
Control Method		Bipolar 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	**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 ~ 3,000[rpm]
	Resolution[ppr]	500 / 1,000 / 1,600 / 2,000 / 3,200 / 3,600 / 4,000 / 5,000 / 6,400 / 8,000 / 10,000 / 20,000 / 25,000 / 36,000 / 40,000 / 50,000(Selectable by Parameter) ※ Default : 10,000
	Protection	Over Current Error, Over Speed Error, Step Out Error, Over Temperature Error, Over Regenerated Voltage Error, Motor Connection Error, Motor Voltage Error, System Error, ROM 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 Input)
	Output Signal	1 dedicated output(Compare Out), 1 programmable output(Photocoupler Output), 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 +134,217,727pulse, Operating speed : Max. 3000[rpm]
MPI Version		Origin Sensor, ±Limit sensor, Z phase(By External Encoder)
GUI		User Interface Program within Windows
Software		Motion Library(DLL) for windows 2000 / XP / 7 / 8 / 10 / Vista.

Setting and Operation



Status Monitor LED

1. Protection function and 7-Segment flash times

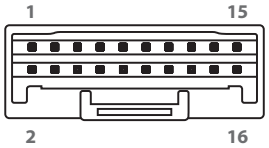
Time	Protection	Conditions
1	Over Current Error	Excessive current flowed into a motor
2	Over Speed Error	Motor speed exceed 3,000[rpm]
3	Step out Error	Abnormally motor do not followed pulsed input
5	Over Temperature Error	Inside temperature of drive exceeds 55˚C
6	Over Regeneratived Voltage Error	Back EMF more than 50V
7	Motor Connect Error	The power is ON without connection of the 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)

Alarm 7-Segment flash(ex : Step out)

Connector

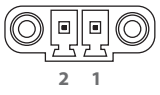
1. Input / Output Connection(CN 1)

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



2. Power Connection(CN 2)

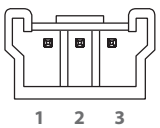
No.	Function
1	24VDC ±10%
2	GND



3. RS-485 Connection(CN 3, CN 4)

RS-485 Communication port to connect with Host Controller

No.	Function
1	+DATA
2	-DATA
3	GND



Cable Connector

1. Input / Output Connection(CN 1)

Item	Specification	Maker
Housing	501646-1600	MOLEX
Terminal	501648-1000(AWG 26 ~ 28)	

2. Power Connection(CN 2)

Item	Specification	Maker
Terminal Block	AKZ1550 / 2F-3.81	PTR

3. RS-485 Connection(CN 3, CN 4)

Item	Specification	Maker
Housing	33507-0300	MOLEX
Terminal	50212-8100	

Switch

1. Terminator Resistor Selection(SW 1)

Terminator Resistor Selection switch under RS-485 communication.
Please set ON for Terminator Controller of Network.

2. Network ID Setting(SW 2)

Position	ID No.	Position	ID No.
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(SW 3)

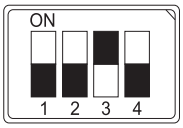
The purpose of this is to setting the communication speed.

SW 3.1	SW 3.2	SW 3.3	Baud Rate[bps]
OFF	OFF	OFF	9,600
ON	OFF	OFF	19,200
OFF	ON	OFF	38,400
ON	ON	OFF	57,600
OFF	OFF	ON	115,200*1
ON	OFF	ON	230,400
OFF	ON	ON	460,800
ON	ON	ON	921,600

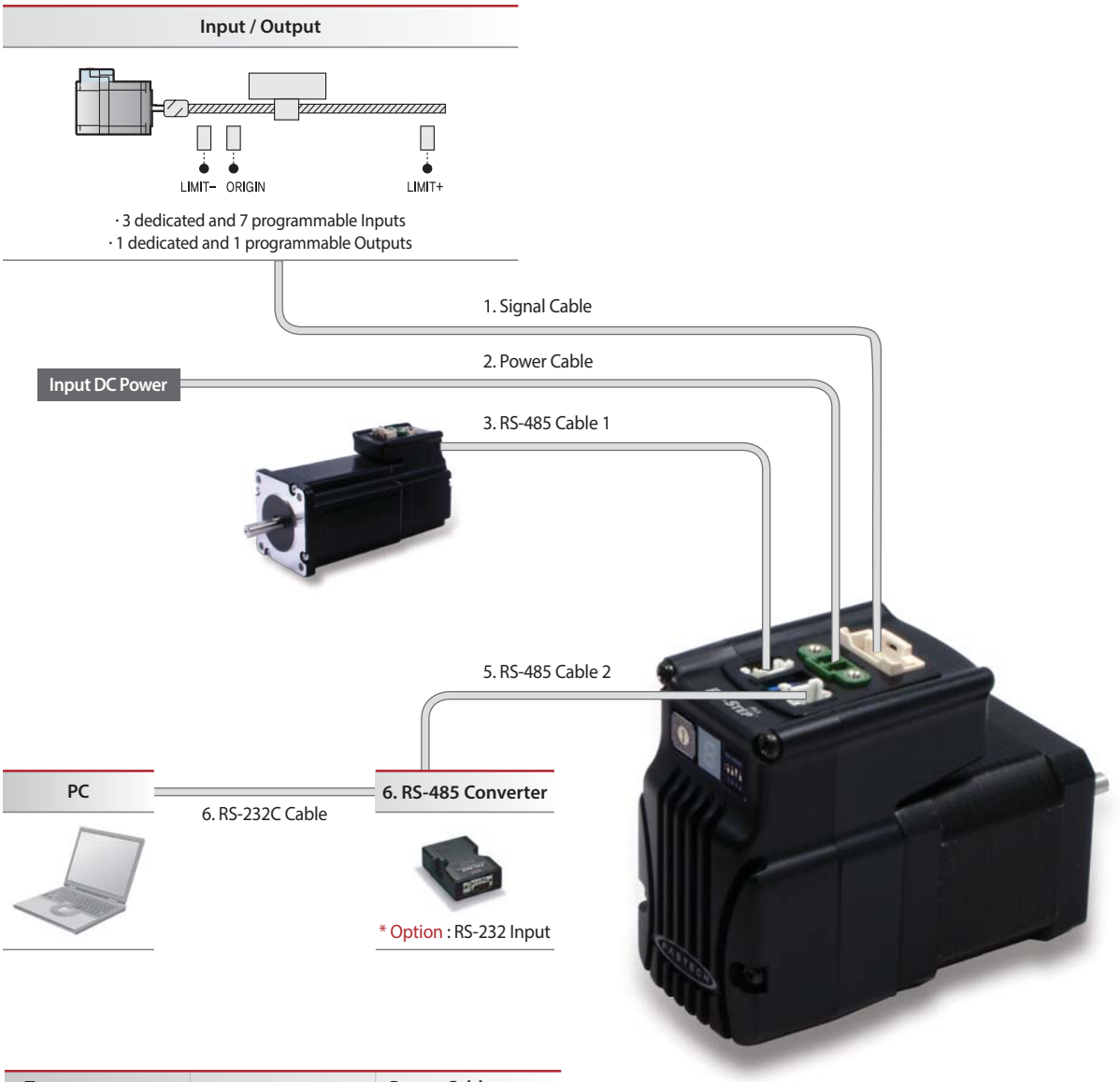
※ Possible to use common PCI Bus type RS-485 communication board for High speed communication.
(Please contact with Distributor)

*1 : Default setting value

※ If SW 3.4 is disconnected.



System Configuration



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

Option

1. Signal Cable

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

Model Name	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.

2. Power Cable

Available to connect between Power and Ezi-STEP ALL.

Model Name	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.

3. RS-485 Cable 1

Model Name	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.

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

Type	Specification
Transmission speed	Max. 115.2Kbps
Comm. Distance	RS-232C : Max. 15m RS-485 : Max. 1.2km
Connector	RS-232C : DB9 Female RS-485 : RJ-45
Dimension	50×75×23mm
Weight	38g
Power Status	Powered from PC (Usable for external DC5~24V)

5. RS-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

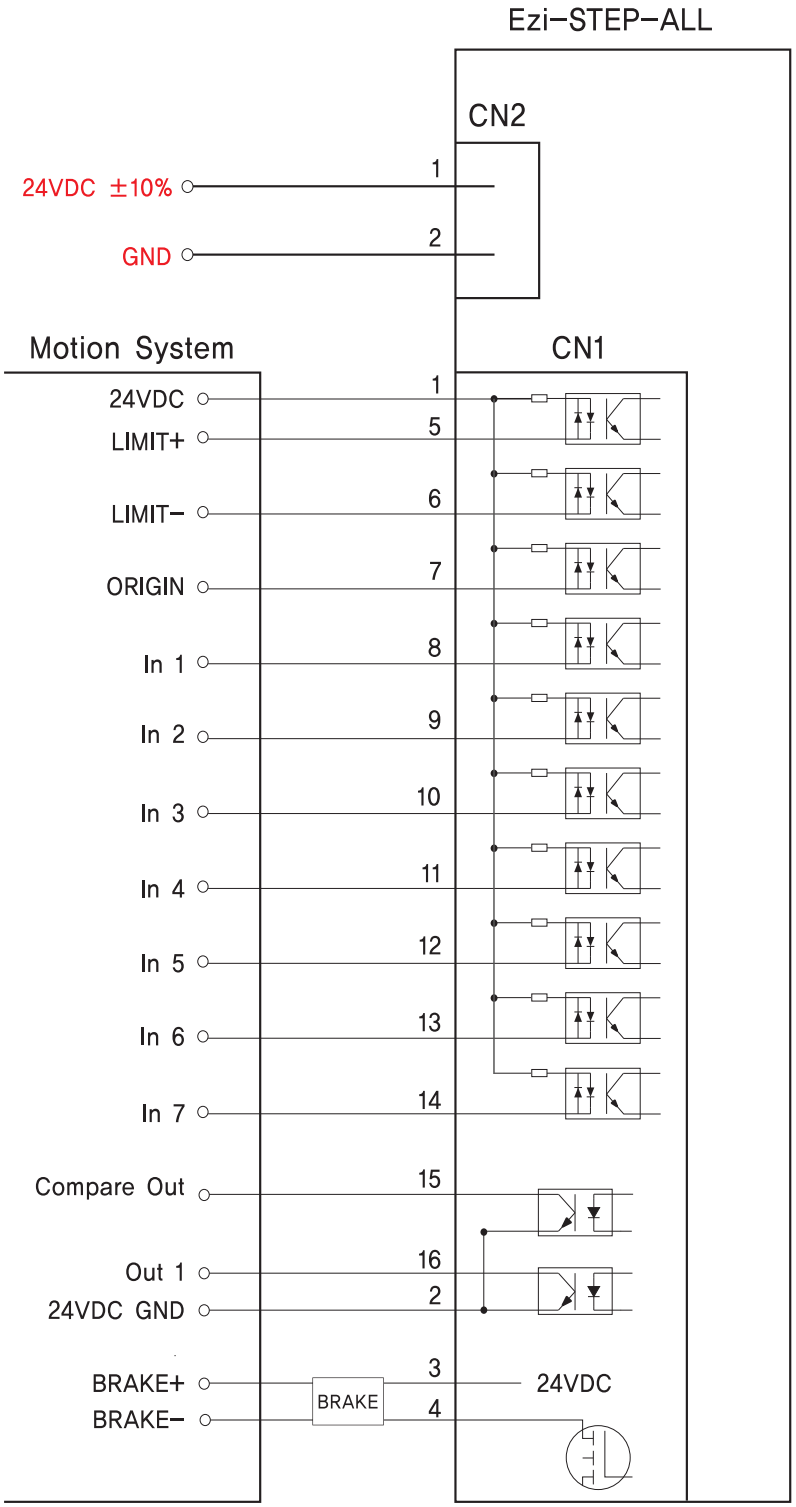
Model Name	Length[m]	Remark
CGNA-R-0R6F	0.6	Normal Cable
CGNA-R-001F	1	
CGNA-R-1R5F	1.5	
CGNA-R-002F	2	
CGNA-R-003F	3	
CGNA-R-005F	5	

6. RS-232C Cable

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

External Wiring Diagram

Ezi-STEP ALL

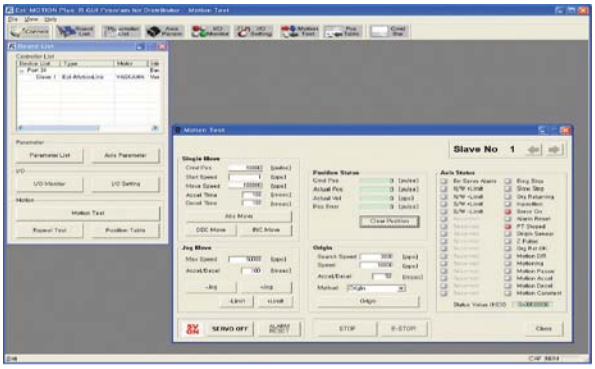


Graphic User Interface(GUI)

Screen Configuration

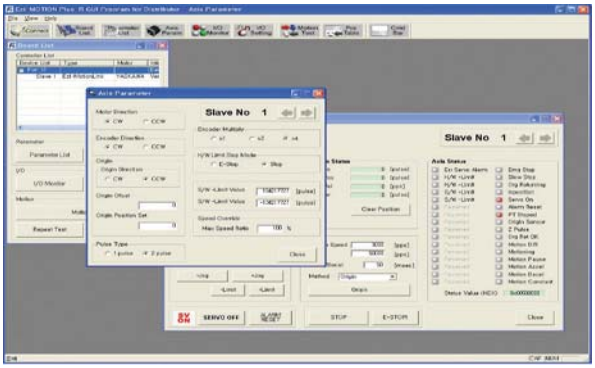
1. Controller Lists and Motion Test

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.



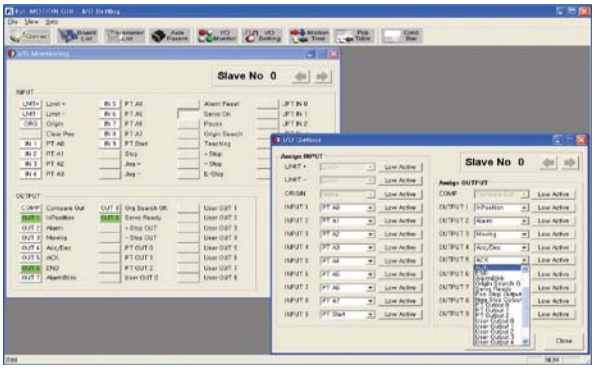
2. Axis Parameter Setup

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



3. I/O Monitoring and Setting

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

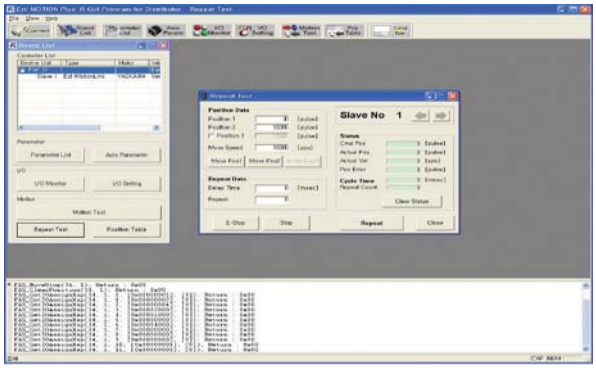


4. Parameter List

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

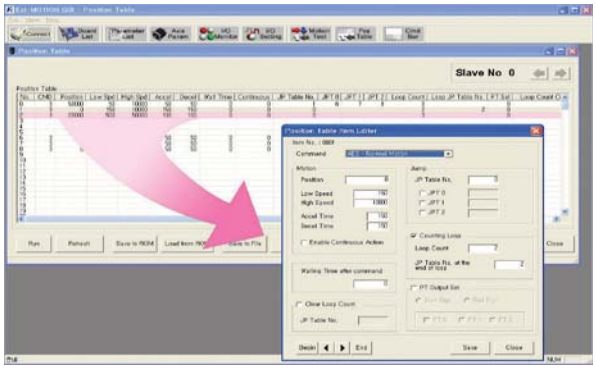
5. Motion Repeat and Monitor Status

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



6. 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.



FASTECH

Fast, Accurate, Smooth Motion

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