

Ezi-STEP®

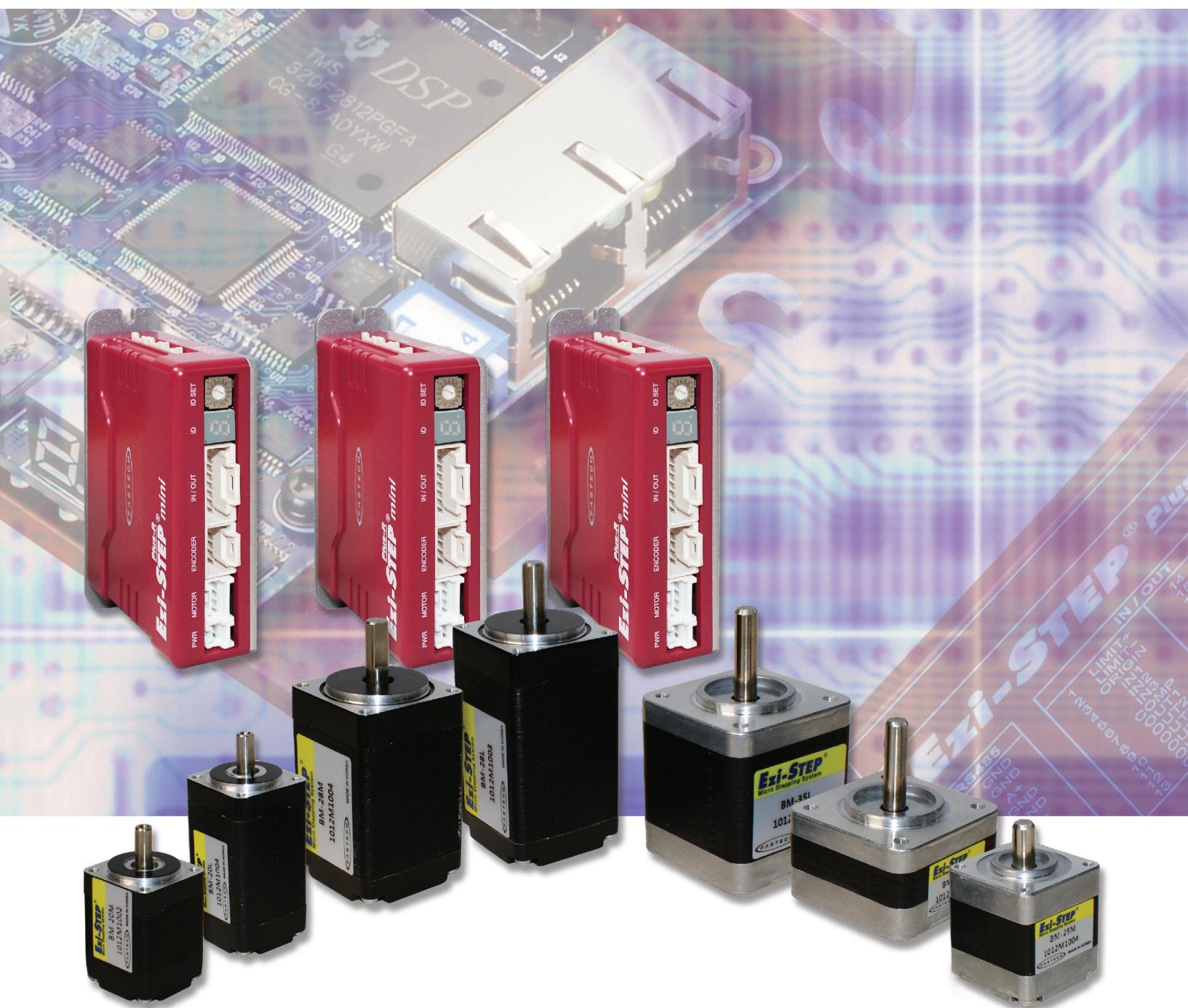
Micro Stepping System

- Embedded Controller
- Position Table
- Micro Stepping
- Software Damping
- Run/Stop Signal Output

**Plus-R
MINI**

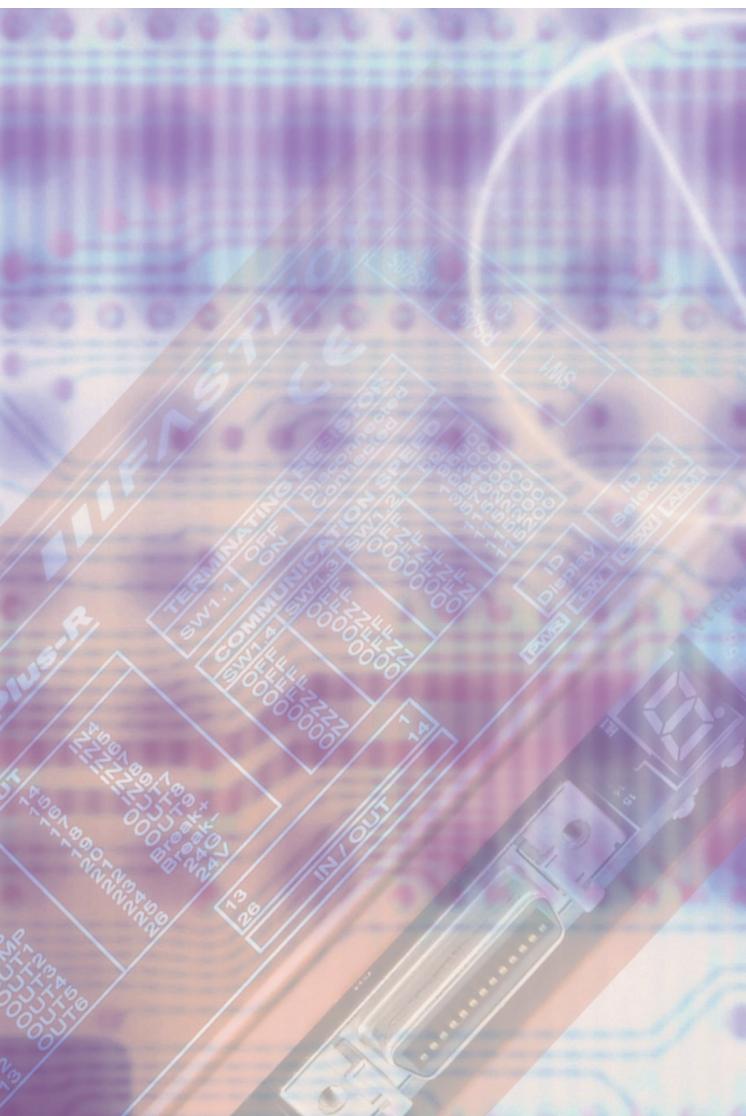


CE



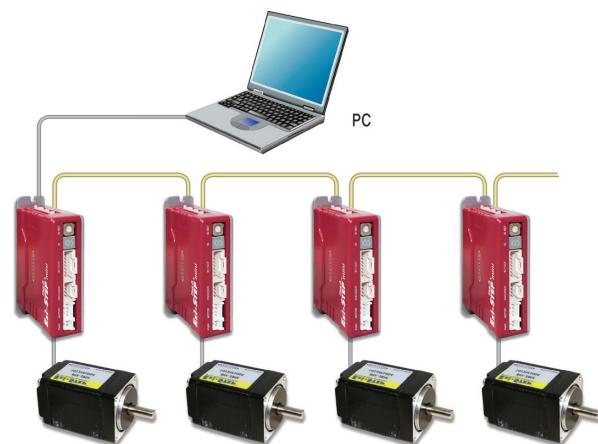
Fast, Accurate, Smooth Motion

Ezi-STEP®
Plus-R
MINI
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 XP/7/8/10.



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 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

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 $25\mu\text{sec}$, which makes it possible for more precise current control, resulting in high-precision Microstep operation.

4

Drive Output Signal Monitoring

Ezi-STEP provides loss of step, run/stop, over-current, over-heat, over-voltage, power, and motor connection alarms that can be monitored by the controller and visible by a motor-mounted flashing 7-Segment indicator.

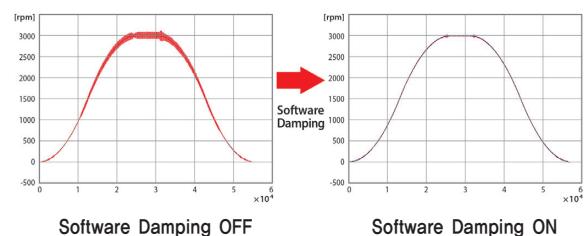
5

Software Damping

Vibration suppression and high-speed operation

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.

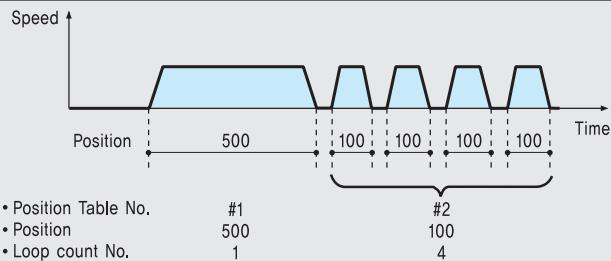


※ This is real measured speed that using 100,000 [pulse/rev] encoder.

● Features of Motion Controller

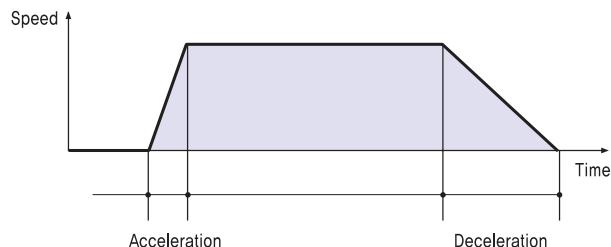
1. Loop Count

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



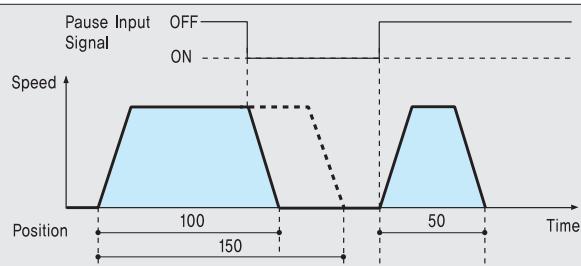
2. Acceleration/Deceleration

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



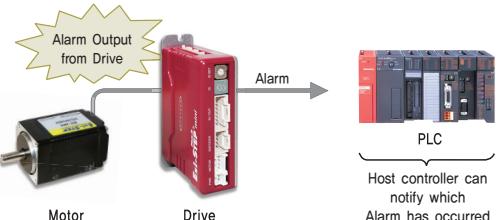
3. Pause

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.



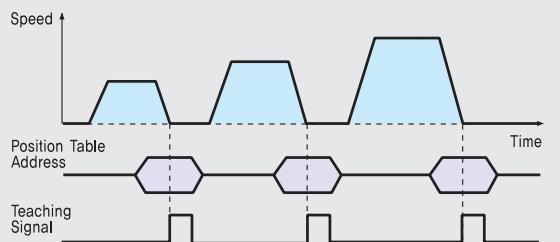
4. Alarm

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.

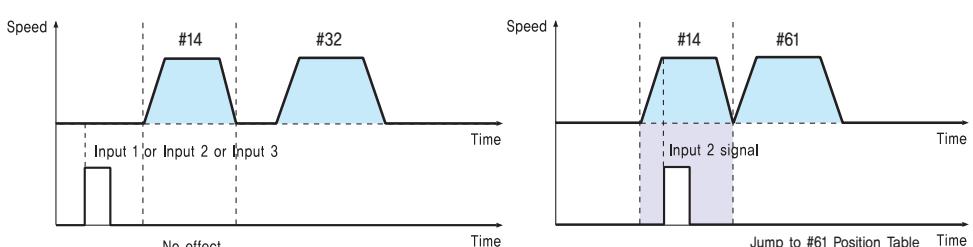


6. Jump

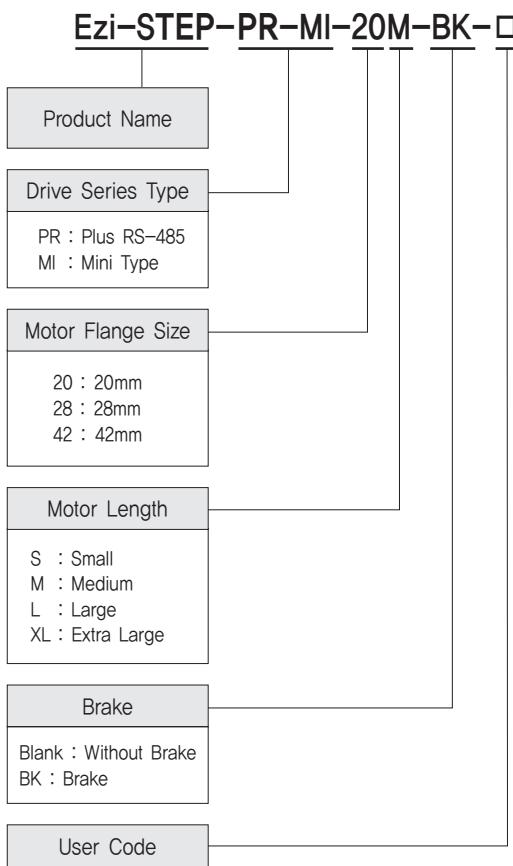
Within one Position Table, you can select various Position Table numbers that you want to jump. With three external input signal during movement, the next jump Position Table number can be select,

◆ Position Table #14

Position	---	Next	---	Input 1	Input 2	Input 3	---
10000		32		60	61	62	



● Ezi-STEP Plus-R MINI Part Numbering



● Standard Combination

Unit Part Number	Motor Model Number	Drive Model Number
Ezi-STEP-PR-MI-20M	BM-20M	EzT-NDR-MI-20M
Ezi-STEP-PR-MI-20L	BM-20L	EzT-NDR-MI-20L
Ezi-STEP-PR-MI-28S	BM-28S	EzT-NDR-MI-28S
Ezi-STEP-PR-MI-28M	BM-28M	EzT-NDR-MI-28M
Ezi-STEP-PR-MI-28L	BM-28L	EzT-NDR-MI-28L
Ezi-STEP-PR-MI-42S	BM-42S	EzT-NDR-MI-42S
Ezi-STEP-PR-MI-42M	BM-42M	EzT-NDR-MI-42M
Ezi-STEP-PR-MI-42L	BM-42L	EzT-NDR-MI-42L
Ezi-STEP-PR-MI-42XL	BM-42XL	EzT-NDR-MI-42XL

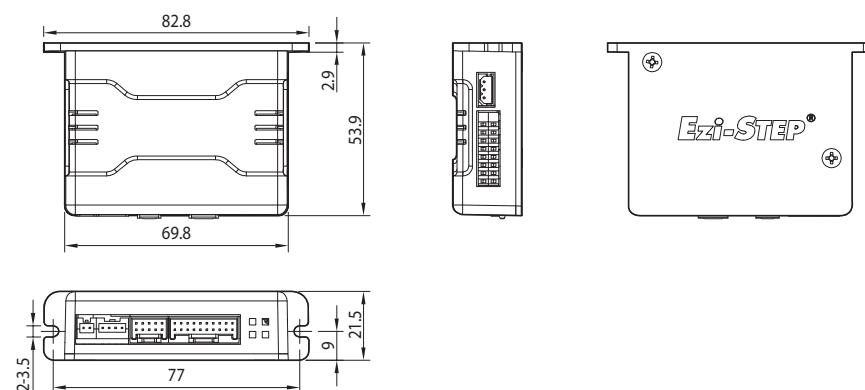
● Combination with Brake

Unit Part Number	Motor Model Number	Drive Model Number
Ezi-STEP-PR-MI-42S-BK	BM-42S-BK	EzT-NDR-MI-42S
Ezi-STEP-PR-MI-42M-BK	BM-42M-BK	EzT-NDR-MI-42M
Ezi-STEP-PR-MI-42L-BK	BM-42L-BK	EzT-NDR-MI-42L
Ezi-STEP-PR-MI-42XL-BK	BM-42XL-BK	EzT-NDR-MI-42XL

● Specifications of Drive

Motor Model	BM-20 series	BM-28 series	BM-42 series
Driver Model	EzT-NDR-MI-20 series	EzT-NDR-MI-28 series	EzT-NDR-MI-42 series
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	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	0~3,000 [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 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	
	7-Segment	Network ID, Status monitor	
	STOP Current	10%~100% (Selectable by parameter) Current after 0.1 second after motor stop. * Default: 50%	
I/O Signal	Rotational Direction	CW/CCW (Selectable by parameter) Used when changing the direction of motor rotate. * Default: CW	
	Input Signals	3 dedicated inputs (LIMIT+, LIMIT-, ORIGIN), 7 programmable inputs (Photocoupler)	
	Output Signals	1 dedicated output (Compare Out), 1 programmable output (Photocoupler), Brake	
Communication Interface		RS-485 serial communication Communication speed: 9,600~921,600 [bps]	
Position Control		· Incremental mode / Absolute mode Data Range: -134,217,728 to +134,217,727 [pulse] · Operating speed: Max. 3,000 [rpm]	
Return to Origin		Origin Sensor, ±Limit sensor, Z phase (By external encoder)	
GUI		User Interface Program within Windows	
Software		Motion Library (DLL) for Windows XP/7/8/10	

● Dimensions of Drive [mm]

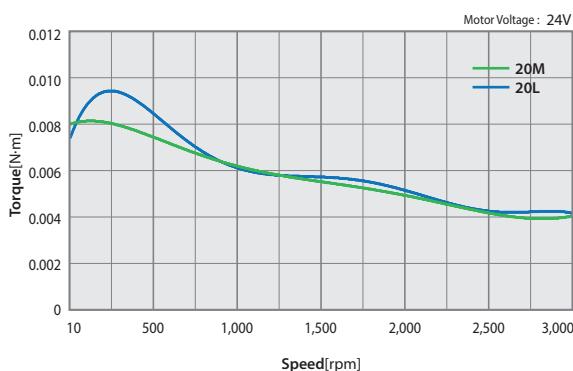


● Specifications of Motor

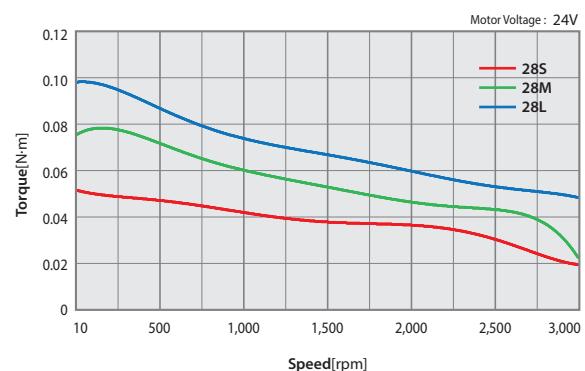
MODEL		BM-20 series		BM-28 series			BM-42 series					
		UNIT	20M	20L	28S	28M	28L	42S	42M	42L	42XL	
DRIVE METHOD		-	BI-POLAR									
NUMBER OF PHASES		-	2	2	2	2	2	2	2	2	2	
VOLTAGE		VDC	2.75	3.0	3.0	3.0	3.0	3.36	4.32	4.56	7.2	
CURRENT per PHASE		A	0.5	0.5	0.95	0.95	0.95	1.2	1.2	1.2	1.2	
RESISTANCE per PHASE		Ohm	5.5	6.0	3.2	3.2	3.2	2.8	3.6	3.8	6.0	
INDUCTANCE per PHASE		mH	2.0	2.6	2.0	2.7	3.2	5.4	7.2	8.0	15.6	
HOLDING TORQUE		N·m	0,016	0,025	0,069	0,098	0,118	0,32	0,44	0,5	0,65	
ROTOR INERTIA		g·cm ²	2,5	3,3	9,0	13	18	35	54	77	114	
WEIGHTS		g	50	80	110	140	200	250	280	350	500	
LENGTH(L)		mm	28	38	32	45	50	34	40	48	60	
PERMISSIBLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	18	18	30	30	30	22	22	22	22	
	8mm		30	30	38	38	38	26	26	26	26	
	13mm		-	-	53	53	53	33	33	33	33	
	18mm		-	-	-	-	-	46	46	46	46	
PERMISSIBLE THRUST LOAD		N	Lower than motor weight									
INSULATION RESISTANCE		Mohm	100 MIN.(at 500VDC)									
INSULATION CLASS		-	CLASS B(130°C)									
OPERATING TEMPERATURE		°C	0 to 55									

● Torque Characteristics of Motor

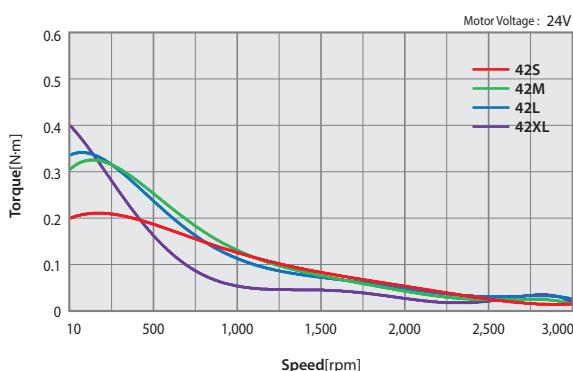
Ezi-STEP-PR-MI-20 series



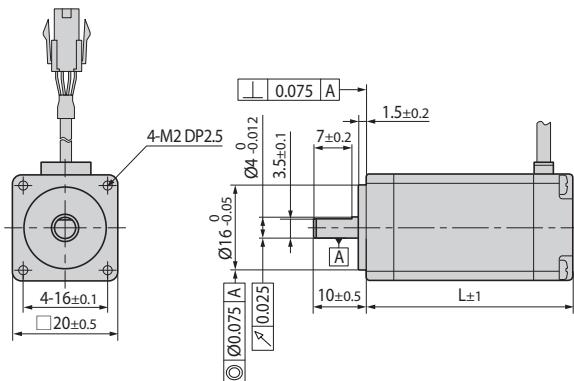
Ezi-STEP-PR-MI-28 series



Ezi-STEP-PR-MI-42 series

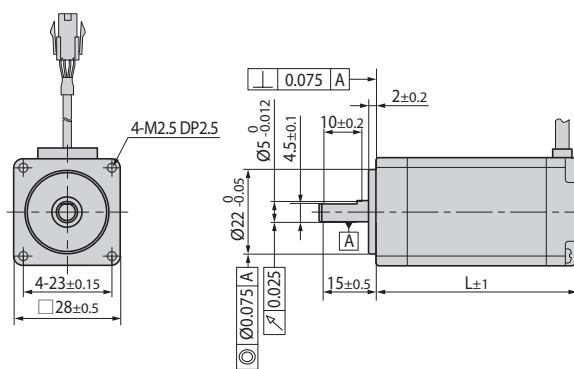


● Dimensions of Motor [mm]



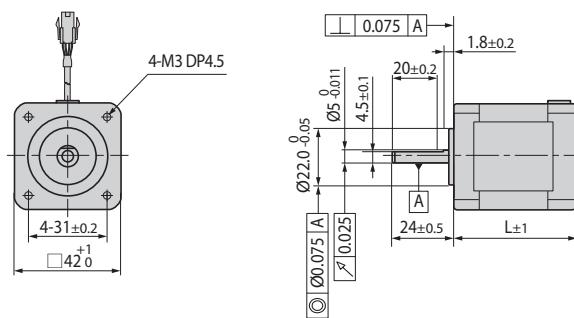
20mm

Model name	Length(L)
BM-20M	28
BM-20L	38



28mm

Model name	Length(L)
BM-28S	32
BM-28M	45
BM-28L	50



42mm

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

● Specifications of Motor with Brake

Unit Part Number	Motor Model Number	Electronic Brake					Motor Unit Weight [g]	Permitted Overhung Load [N]				Permitted Thrust Load [N]		
		Type	Voltage Input [V]	Rated Current [A]	Power Consumption [W]	Statical Friction Torque [N·m]		Length from Motor Point [mm]						
								3	8	13	18			
Ezi-STEP-PR-MI-42S-BK	BM-42S-BK	Non-excitation run Type	24VDC ±10%	0.2	5	0.2	440	22	26	33	46	Must be Lower than Unit's Weight		
Ezi-STEP-PR-MI-42M-BK	BM-42M-BK						510							
Ezi-STEP-PR-MI-42L-BK	BM-42L-BK						580							
Ezi-STEP-PR-MI-42XL-BK	BM-42XL-BK						700							

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

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

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

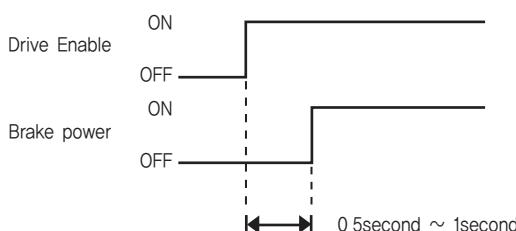
* Motor specification and torque characteristic are same as Standard Motor.

* Brake Operation Timing Chart

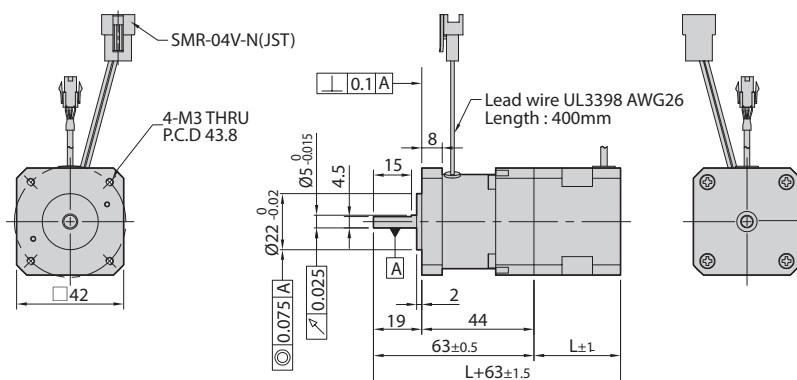
Ezi-STEP Plus-R MINI control Brake by Drive automatically.

Please refer to below Timing Chart when control Brake from upper controller other than using Ezi-STEP Plus-R MINI Brake control. Otherwise, Drive malfunctioning and loads can be fall down.

Also, please do not operate Brake while motor operation to prevent damage.



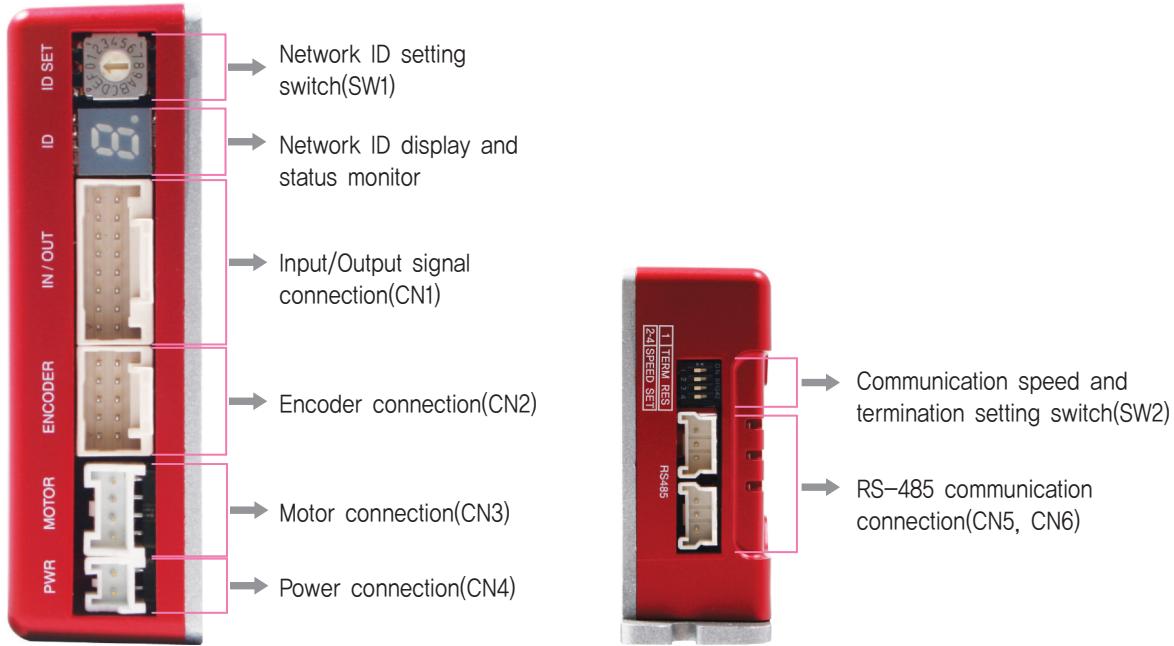
● Dimensions of Motor with Brake [mm]



42mm

Model Name	Length(L)	Weight(kg)
BM-42S	34	0,44
BM-42M	40	0,51
BM-42L	48	0,58
BM-42XL	60	0,70

● Settings and Operation



1. Protection functions and 7-Segment flash times

Times	Protection	Conditions
1	Over Current Error	The current through power devices in drive exceeds the limit value*1
2	Over Speed Error	Motor speed exceeded 3,000 [rpm]
3	Step Out Error	Abnormally motor do not followed pulsed input
5	Over Temperature Error	Internal temperature of a motor drive exceeded 85°C
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)

*1 : Limit value depends on motor model (Refer to the Manual)



7-Segment flash
(Ex, Step Out Error)

2. Network ID Setting Switch(SW1)

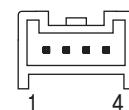
Position	ID Number	Position	ID Number
0	0	8	8
1	1	9	9
2	2	A	10
3	3	B	11
4	4	C	12
5	5	D	13
6	6	E	14
7	7	F	15



※ Maximum 16 axis can be connected in one network.

3. Motor Connector(CN3)

NO.	Function	I/O
1	B Phase	Output
2	/B Phase	Output
3	/A Phase	Output
4	A Phase	Output



4. Communication Speed and Termination Setting Switch(SW2)

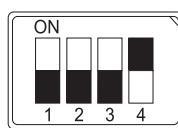
Termination Setting Switch(SW2.1)

The drive installed at the end of the network must be terminated for reliable operation. Please termination setting switch is ON if drive install at the end of the network.

Speed Setting Switch(SW2.2~2.4)

SW2.2~SW2.4 used for setting speed as follows.

SW2.1	SW2.2	SW2.3	SW2.4	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

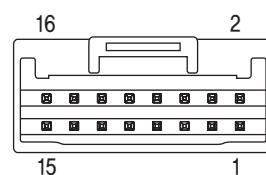


*1 : Default setting value

Speed setting switch
Termination setting switch

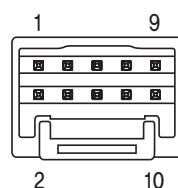
5. Input/Output Signal Connector(CN1)

NO.	Function	I/O
1	EXT_24VDC	Input
2	EXT_GND	Input
3	BRAKE+	Output
4	BRAKE-	Output
5	LIMIT+	Input
6	LIMIT-	Input
7	ORIGIN	Input
8	Digital In1	Input
9	Digital In2	Input
10	Digital In3	Input
11	Digital In4	Input
12	Digital In5	Input
13	Digital In6	Input
14	Digital In7	Input
15	Compare Out	Output
16	Digital Out1	Output



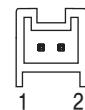
6. Encoder Connector(CN2)

NO.	Function	I/O
1	A+	Input
2	A-	Input
3	B+	Input
4	B-	Input
5	Z+	Input
6	Z-	Input
7	5VDC	Output
8	GND	Output
9	F.GND	-----
10	F.GND	-----



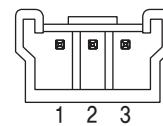
7. Power Connector(CN4)

NO.	Function	I/O
1	24VDC	Input
2	GND	Input

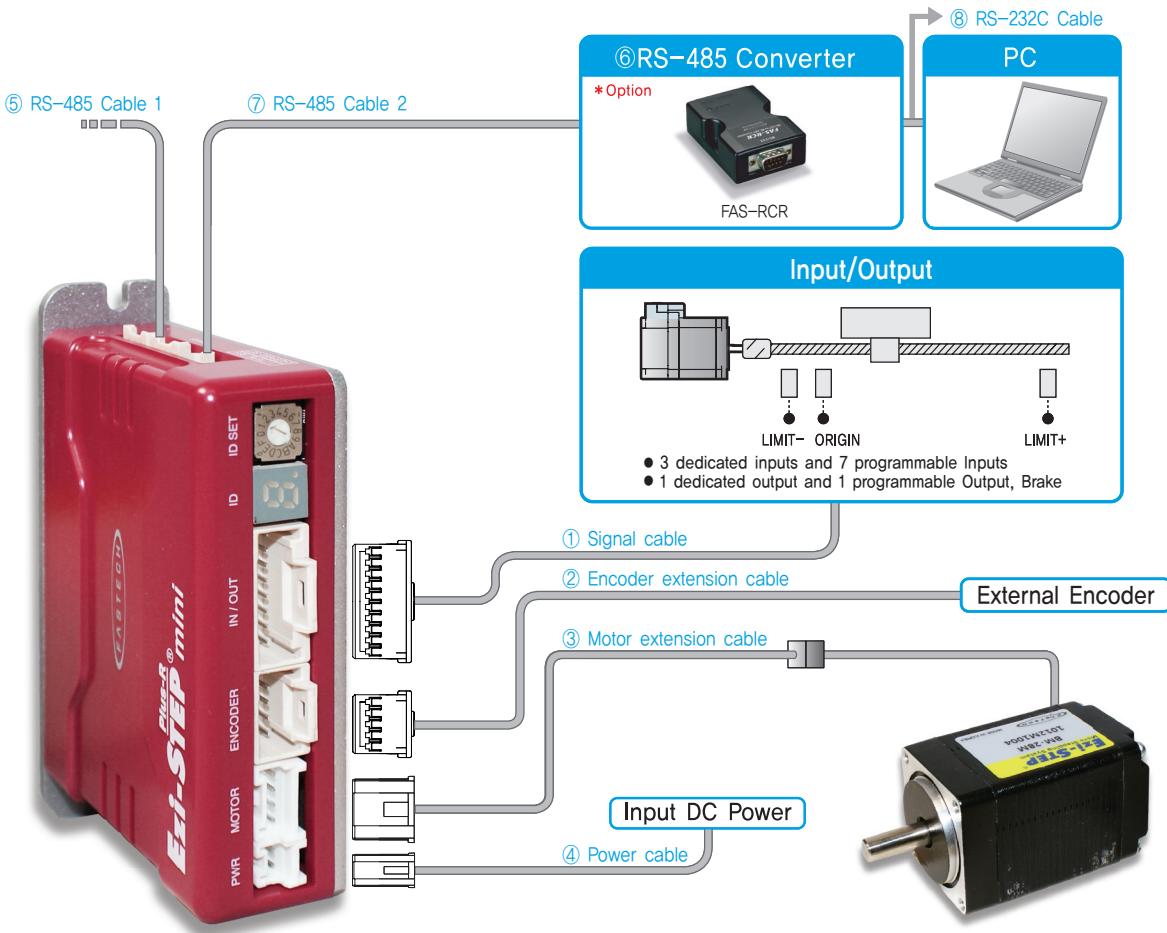


8. RS-485 Communication Connector(CN5, CN6)

NO.	Function
1	Data+
2	Data-
3	GND



● System Configuration



Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable	RS-485 Cable
Length supplied	—	—	30cm	—	—
Max. Length	20m	20m	20m	2m	30m

FASTECH Ezi-STEP Plus-R MINI

1. Options

① Signal Cable

Available to connect between Input/Output signals and Ezi-STEP Plus-R MINI.

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.

② Encoder Extension Cable

Available to extended connection between Encoder and Ezi-STEP Plus-R MINI.

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

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

③ Motor Extension Cable

Available to extended connection between motor and Ezi-STEP Plus-R MINI.

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

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

⑥ FAS-RCR(RS-232C to RS-485 Converter)

Item	Specification
Comm. Speed	Max. 115,2 [kbps]
Comm. Distance	RS-232C: Max. 15m RS-485: Max. 1,2km
Connection Type	RS-232C: DB9 Female RS-485: RJ-45
Dimension	50×75×23mm
Weight	38g
Power	Powered from PC (Usable for external DC5~24V)

④ Power Cable

Available to connect between Power and Ezi-STEP Plus-R MINI.

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

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

⑤ RS-485 Cable 1

Common cable to connect Ezi-SERVO-ALL-42/56, Ezi-STEP-ALL-42/56, Ezi-MOTIONLINK Plus-R and Ezi-SERVO Plus-R MINI thru by Network.

Item	Length [m]	Remark
CGNB-R-0R6F	0,6	
CGNB-R-001F	1	
CGNB-R-1R5F	1,5	
CGNB-R-002F	2	
CGNB-R-003F	3	
CGNB-R-005F	5	

⑦ RS-485 Cable 2

RCR to Ezi-SERVO-ALL-42/56, FAS-RCR to Ezi-STEP-ALL-42/56, FAS-RCR to Ezi-SERVO Plus-R MINI, FAS-RCR to Ezi-MOTIONLINK Plus-R.

Item	Length [m]	Remark
CGNA-R-0R6F	0,6	
CGNA-R-001F	1	
CGNA-R-1R5F	1,5	
CGNA-R-002F	2	
CGNA-R-003F	3	
CGNA-R-005F	5	

⑧ RS-232C Cable

Available to connect between RS-232C port of master and FAS-RCR.

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

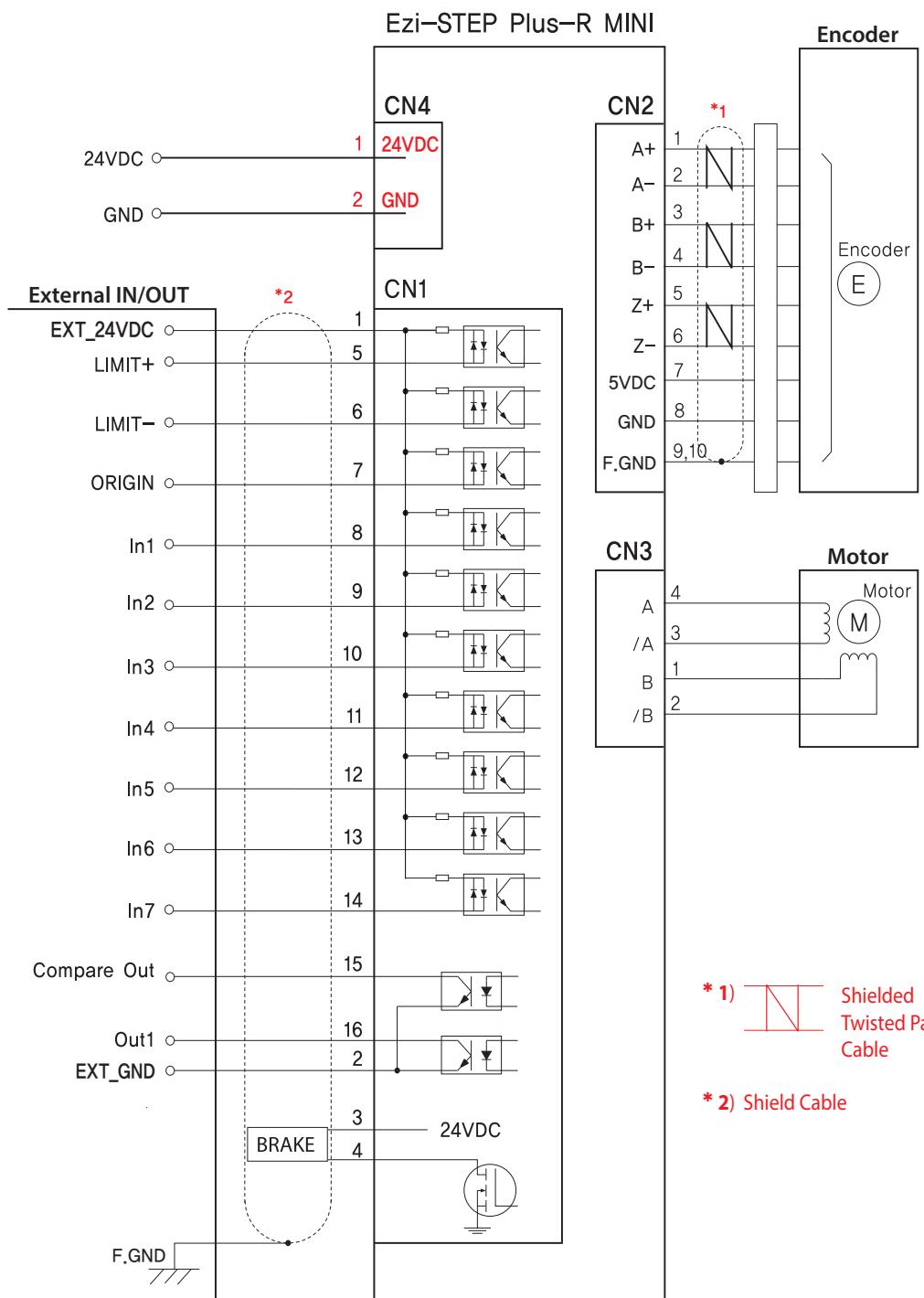
2. Connector Specifications

Connector specifications for cabling to drive.

Purpose		Item	Part Number	Manufacturer
RS-485 Communication (CN5, CN6)		Housing Terminal	35507-0300 50212-8100	MOLEX
Power (CN4)		Housing Terminal	PAP-02V-S SPHD-001T-P0.5	JST
Motor	Drive Side (CN3)	Housing Terminal	PAP-04V-S SPHD-001T-P0.5	JST
	Motor Side	Housing Terminal	5557-04R 5556T	MOLEX
Encoder	Drive Side (CN2)	Housing Terminal	501646-1000 501648-1000(AWG 26~28)	MOLEX
	Signal (CN1)	Housing Terminal	501646-1600 501648-1000(AWG 26~28)	MOLEX

* Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.

● External Wiring Diagram

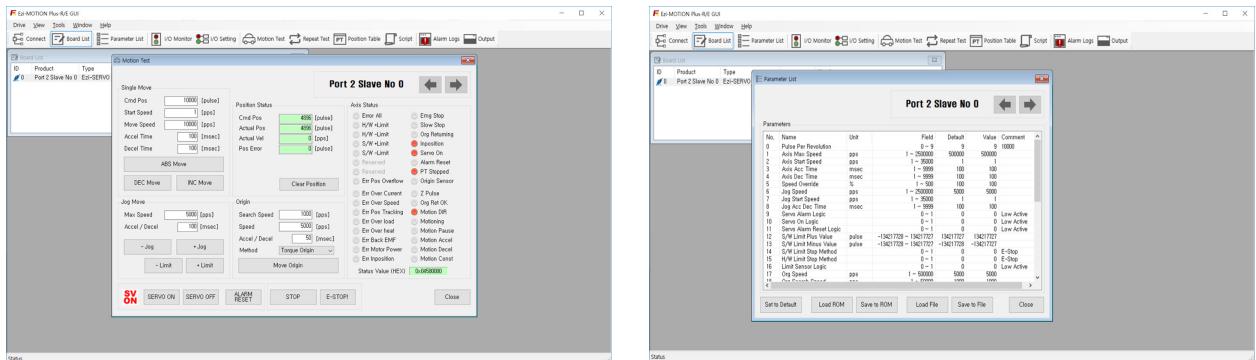


CAUTION

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

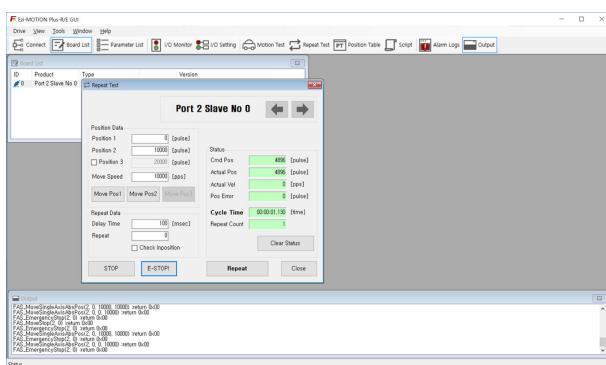
※ When connects I/O cable between controller and drive, please turn off the power of both controller and drive, in order to protect the drive from any damage.

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.

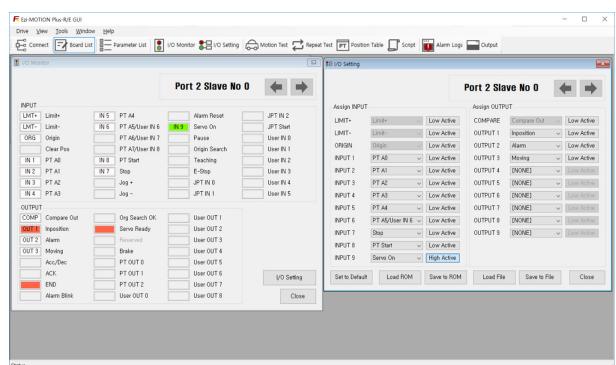


◆ Motion Repeat and Monitor Status

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

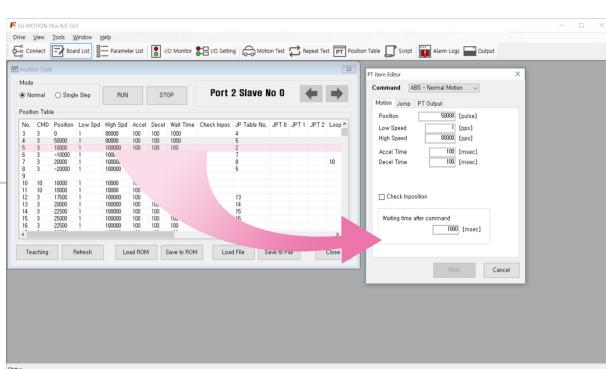
◆ Parameter List

All of the parameters are displayed and modified on this 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.

- ※ Graphic User Interface(GUI) Program can be downloaded from website, (www.fastech.co.kr)
- ※ Graphic User Interface(GUI) Program can support Window XP/7/8/10,
- ※ Graphic User Interface(GUI) Program can be update without prior notice for improving the performance or convenience of user.

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