Ezi-STEP®

Micro Stepping System

- Microstepping
- Space Saving / Reduced Wiring by Compact Drive
- Software Damping
- Run/Stop Signal Output

MINI



CE

FASTECH

Fast, Accurate, Smooth Motion



FASTECH

Fast, Accurate, Smooth Motion

Ezi-STEP® MINI

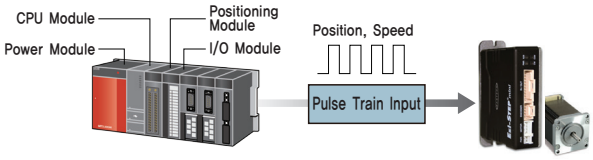
Micro Stepping System





1 Standalone Motion Control

Ezi-STEP MINI is a standalone stepping motor control system that drives the motor by receiving pulse signals from the positioning module (pulse oscillator).

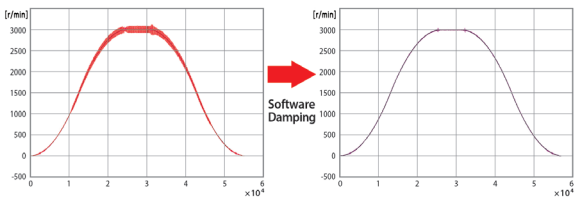


2 Microstep and Filtering

The high-performance MCU operates at step resolutions of 1.8° up to maximum 0.0072° (1/250 steps) and Ezi-STEP adjusts PWM control signal in every 25μsec, which makes it possible for more precise current control, resulting in high-precision Microstep operation. In addition, Ezi-STEP applies filtering control to enable smooth operation even at very low-speed.

3 Software Damping

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 MCU 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.



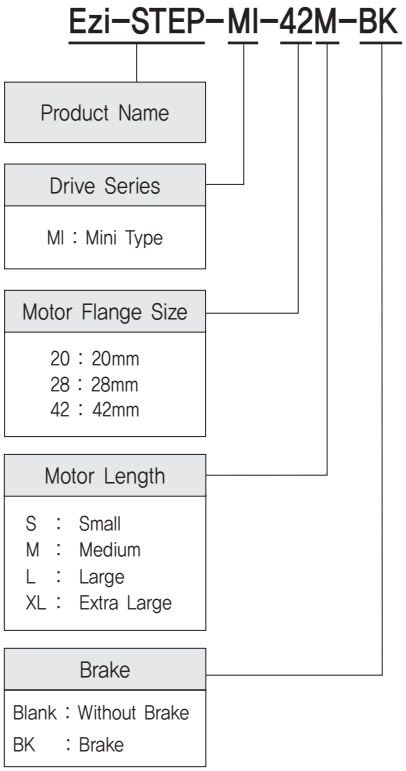
Software Damping OFF　　Software Damping ON

※ This is real measured speed that using 100,000 P/R encoder.

4 Signal Output for Motion Monitoring

Ezi-STEP outputs the Run/Stop signal during operation, so you can check whether the motor is operating normally through the host controller.

Ezi-STEP MINI Part Numbering



Standard Combination

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

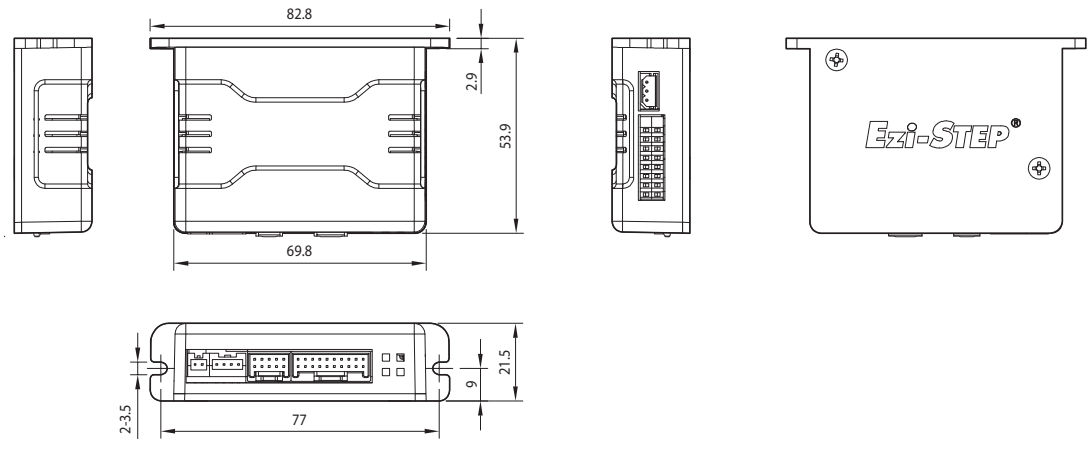
Combination with Brake

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

● Specifications of Drive

Motor Model		BM-20 series	BM-28 series	BM-42 series
Driver Model		EzStep-MI-20 series	EzStep-MI-28 series	EzStep-MI-42 series
Input Voltage		DC24V±10%		
Control Method		Bipolar PWM drive with 32bit MCU		
Current Consumption		Max. 500mA (Except motor current)		
Operating Condition	Ambient Temperature	· In Use: 0~50℃ · In Storage: -20~70℃		
	Humidity	· In Use: 35~85% RH (Non-Condensing) · In Storage: 10~90% RH (Non-Condensing)		
	Vib. Resist.	0.5g		
Function	Rotation Speed	0~3,000r/min		
	Resolution	Configurable Resolution [P/R] 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 (Set by DIP Switch)		
	Max. Input Frequency	500kHz (Duty 50%)		
	Error Types	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		
	LED Display	Power Status, Alarm Status, Motor Rotation Direction		
	STOP Current Selection	10~100% (Set by DIP Switch)		
	Pulse Input Mode	1-Pulse / 2-Pulse (Set by DIP Switch)		
	Rotation Direction	CW/CCW (Set by DIP Switch)		
	Speed/Position Control Command	Pulse Train Input (Photocoupler Input)		
I/O Signal	Input Signals	Position Command Pulse, Alarm Reset, Motor Free (Photocoupler Input)		
	Output Signals	Alarm, Run/Stop (Photocoupler Output)		

● Dimensions of Drive [mm]

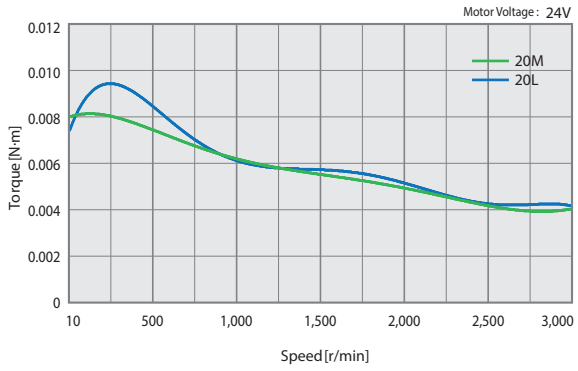


Specifications of Motor

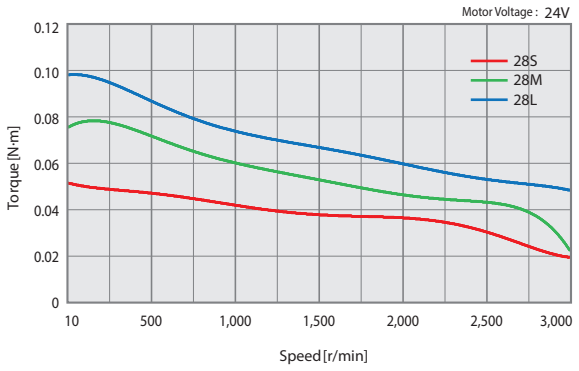
MODEL			UNIT	BM-20 series 20M	BM-20 series 20L	BM-28 series 28S	BM-28 series 28M	BM-28 series 28L	BM-42 series 42S	BM-42 series 42M	BM-42 series 42L	BM-42 series 42XL
DRIVE METHOD			–	Bipolar								
NUMBER OF PHASES			–	2 Phase								
CURRENT per PHASE			A/Phase	0.5	0.5	0.95	0.95	0.95	1.2	1.2	1.2	1.2
MAXIMUM HOLDING TORQUE			N·m	0.016	0.025	0.069	0.098	0.118	0.32	0.44	0.5	0.65
ROTOR INERTIA			$g \cdot cm^2$	2.5	3.3	9.0	13	18	35	54	77	114
WEIGHTS			kg	0.053	0.078	0.115	0.174	0.202	0.238	0.303	0.374	0.508
LENGTH(L)			mm	28	38	32	45	50	34	40	48	60
PERMISSIBLE RADIAL 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 AXIAL LOAD			N	Lower than Motor Unit's Weight								
INSULATION RESISTANCE			MΩ	Min. 100(When measured with a DC500V insulation resistance meter)								
INSULATION CLASS			–	CLASS B(130℃)								
OPERATING TEMPERATURE			℃	0 ~ 55								

Torque Characteristics of Motor

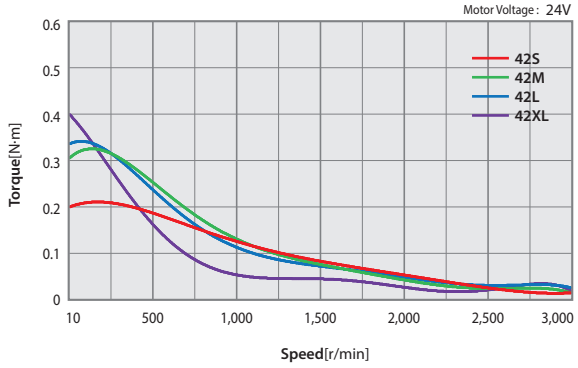
Ezi-STEP-MI-20 series



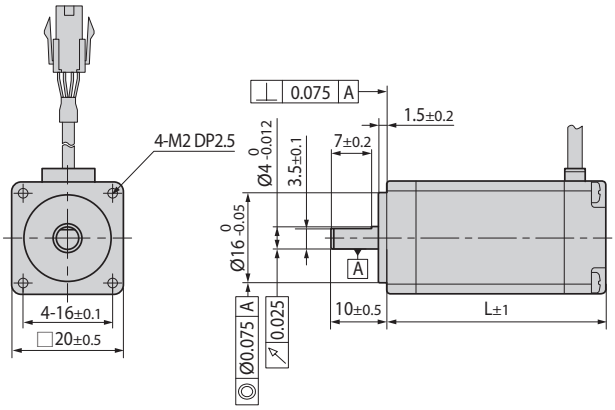
Ezi-STEP-MI-28 series



Ezi-STEP-MI-42 series

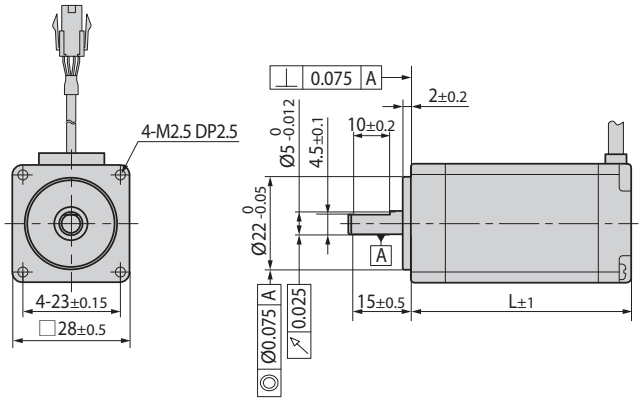


● Dimensions of Motor [mm]



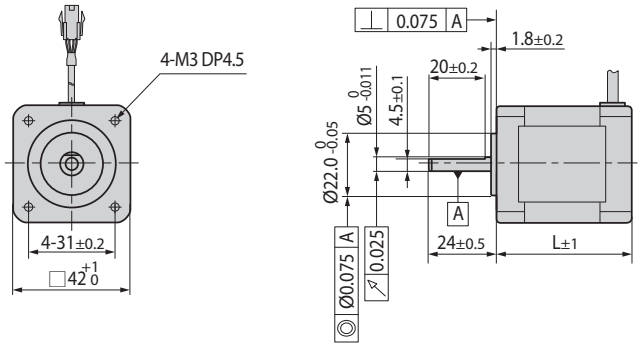
20mm

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

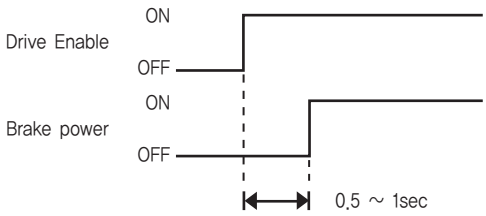
● Specifications of Motor with Brake

Unit Part Number	Motor Model Number	Electromagnetic Brake					Motor Unit Weight [kg]	Permissible Radial Load [N]				Permissible Axial Load [N]
		Type	Voltage Input [V]	Rated Current [A]	Power Consumption [W]	Static Friction Torque [N·m]		Distance from End of Shaft [mm]				
								3	8	13	18	
Ezi-STEP-MI-42S-BK	BM-42S-BK	Non-excitation run Type	DC24V ±10%	0.2	5	0.2	0.500	22	26	33	46	Must be Lower than Motor Unit Weight
Ezi-STEP-MI-42M-BK	BM-42M-BK						0.560					
Ezi-STEP-MI-42L-BK	BM-42L-BK						0.630					
Ezi-STEP-MI-42XL-BK	BM-42XL-BK						0.770					

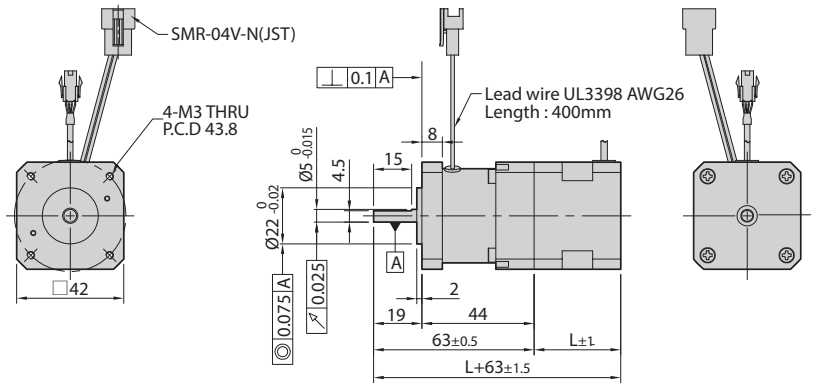
* Electronic Brake cannot be used for braking. Position hold purpose only when power OFF.
* The weight means Motor Unit Weight including Motor and Electronic Brake.
* Motor Model Number is combined model name of Motor and Brake.
* Motor specification and torque characteristic are same as Standard Motor.

* Brake Operation Timing Chart

Ezi-STEP MINI controls Brake by Drive automatically.
Please refer to below Timing Chart when Brake is controlled by the upper controller other than using Ezi-STEP MINI Brake control.
Otherwise, Drive might malfunction and loads might fall down.
Also, please do not operate Brake during motor operation to prevent damage.



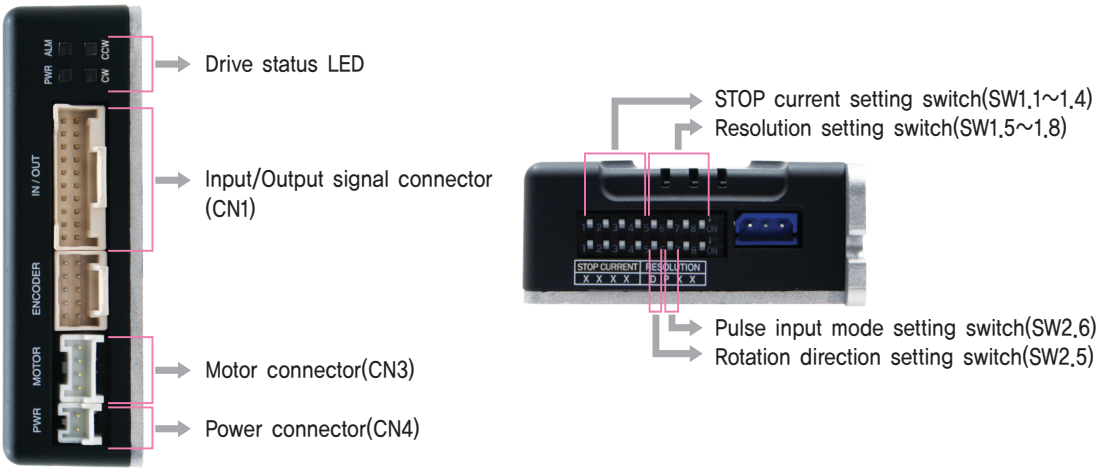
● Dimensions of Motor with Brake [mm]



42mm

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

● Settings and Operation



1. Drive Status LED

Name	Color	Function	Description
PWR	Green	Power Input Indication	LED is turned ON when power is applied
ALM	Red	Alarm Indication	LED blinks when an error occurs.
CW	Yellow	Rotation Direction Indication	LED is turned on when the motor rotates CW.
CCW	Orange	Rotation Direction Indication	LED is turned on when the motor rotates CCW.

◆ List of error types by the number of LED blinking

No.	Error Type	Causes
1	Over Current Error	The current through power devices in drive exceeds the limit.*1
2	Over Speed Error	The motor speed exceeds 3,000r/min.
3	Step Out Error	The motor does not follow the pulse input normally.
5	Over Temperature Error	Internal temperature of the drive exceeds 85℃.
6	Over Regenerative Voltage Error	Back-EMF is higher than 50V.
7	Motor Power Error	There is a problem with the connection between the drive and the motor.
9	Motor Voltage Error	The voltage supplied to the motor is lower than 20V.
11	System Error	There is a problem in the drive system (Watchdog Timer Out).
12	ROM Error	Error occurs in parameter storage device(ROM).



Alarm LED flash (e.g., Step Out Error)

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

2. STOP Current Setting Switch(SW1.1~SW1.4)

Switch No.				STOP Current (%)	Switch No.				STOP Current (%)
4	3	2	1		4	3	2	1	
ON	ON	ON	ON	10	OFF	ON	ON	ON	90
ON	ON	ON	OFF	20	OFF	ON	ON	OFF	100
ON	ON	OFF	ON	30	OFF	ON	OFF	ON	10
ON	ON	OFF	OFF	40	OFF	ON	OFF	OFF	10
ON	OFF	ON	ON	50	OFF	OFF	ON	ON	10
ON	OFF	ON	OFF	60	OFF	OFF	ON	OFF	10
ON	OFF	OFF	ON	70	OFF	OFF	OFF	ON	10
ON	OFF	OFF	OFF	80	OFF	OFF	OFF	OFF	10

3. Resolution Setting Switch(SW1.5~1.8)

Switch No.				P/R	Switch No.				P/R
8	7	6	5		8	7	6	5	
ON	ON	ON	ON	500	OFF	ON	ON	ON	6,400
ON	ON	ON	OFF	1,000	OFF	ON	ON	OFF	8,000
ON	ON	OFF	ON	1,600	OFF	ON	OFF	ON	10,000
ON	ON	OFF	OFF	2,000	OFF	ON	OFF	OFF	20,000
ON	OFF	ON	ON	3,200	OFF	OFF	ON	ON	25,000
ON	OFF	ON	OFF	3,600	OFF	OFF	ON	OFF	36,000
ON	OFF	OFF	ON	4,000	OFF	OFF	OFF	ON	40,000
ON	OFF	OFF	OFF	5,000	OFF	OFF	OFF	OFF	50,000

4. Rotation Direction Setting Switch(SW2.5)

Name	Function	Description
D	Motor Rotation Direction Setting	It determines the rotation direction of the motor. The rotation direction indicated in the catalog is based on CW input. ON: CCW(−Direction) OFF: CW(+Direction)

Rotation Direction
Setting Switch: ON

CCW Direction



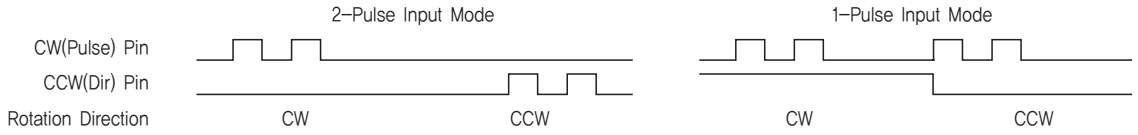


Rotation Direction
Setting Switch: OFF

CW Direction

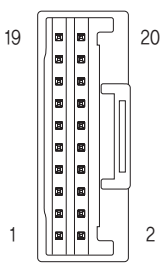
5. Pulse Input Mode Setting Switch(SW2.6)

Name	Function	Description
P	Pulse Input Mode Setting	1−Pulse Input Mode or 2−Pulse Input Mode can be selected. ON: 1−Pulse Mode OFF: 2−Pulse Mode



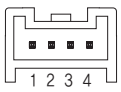
6. Input/Output Signal Connector(CN1)

No.	Function	I/O
1	CW+(Pulse+)	Input
2	CW−(Pulse−)	Input
3	CCW+(Dir+)	Input
4	CCW−(Dir−)	Input
11	Alarm	Output
12	Run/Stop	Output
13	Motor Free	Input
14	Alarm Reset	Input
19	EXT_GND	Input
20	EXT_DC24V	Input



7. Motor Connector(CN3)

No.	Function	I/O
1	B Phase	Output
2	$\overline{B}$ Phase	Output
3	$\overline{A}$ Phase	Output
4	A Phase	Output

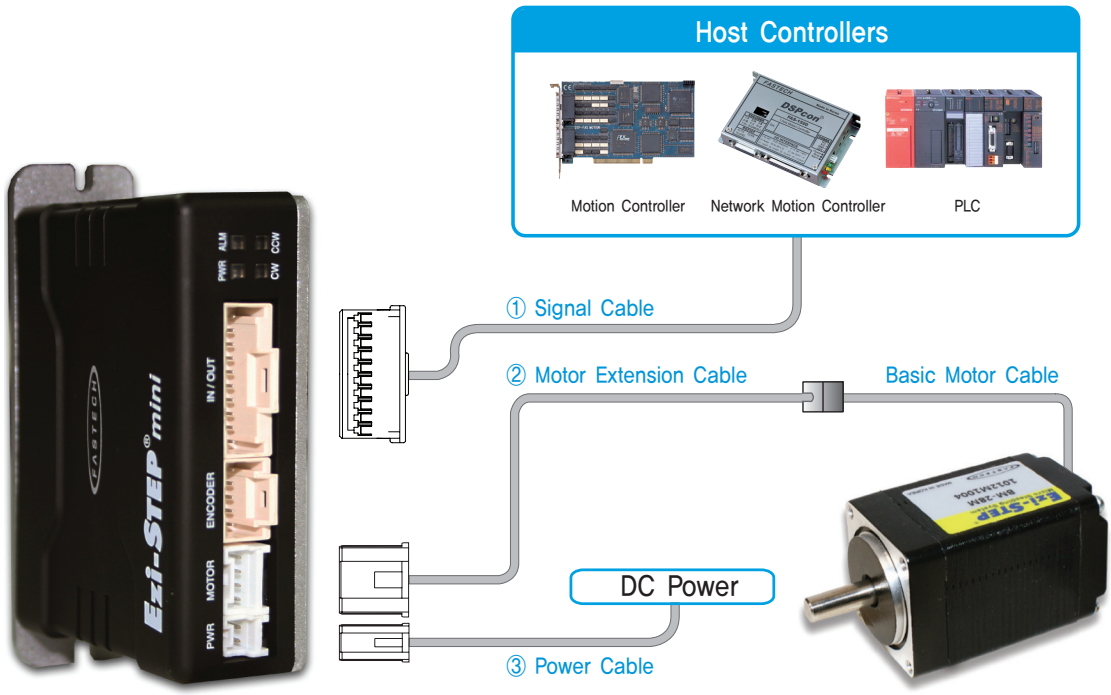


8. Power Connector(CN4)

No.	Function	I/O
1	DC24V	Input
2	GND	Input



System Configuration



Cable Type	Max. Length	Remarks
① Signal Cable	20m	Options (Sold separately)
② Motor Extension Cable	20m	
③ Power Cable	2m	
Basic Motor Cable	0.3m (Basic length)	Basic cables are attached to motors.

1. Accessories

Connectors

These are connector specifications for drive cabling.

Purpose		Item	Part Number	Manufacturer
Power (CN4)		Housing	PAP-02V-S	JST
		Terminal	SPHD-001T-P0.5	
Motor	Drive Side (CN3)	Housing	PAP-04V-S	JST
		Terminal	SPHD-001T-P0.5	
	Motor Side	Housing	5557-04R	MOLEX
		Terminal	5556T	
Signal (CN1)		Housing	501646-2000	MOLEX
		Terminal	501648-1000(AWG 26~28)	

※ The connectors above are supplied with the product. If you are using other parts, please make sure they meet the specifications.

2. Options

① Signal Cable

These are the cables to connect Ezi-STEP MINI drive and other input/output devices.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive – I/O Device Connection	CSVI-S-001F	1	Normal Cable	Maximum Length: 20m
	CSVI-S-002F	2		
	CSVI-S-003F	3		
	CSVI-S-005F	5		
	CSVI-S-001M	1	Robot Cable	
	CSVI-S-002M	2		
	CSVI-S-003M	3		
	CSVI-S-005M	5		

* If you need cables with length(in units of 1m) not listed on the table, please contact FASTECH for more information.

② Motor Extension Cable

These are the cables to connect Ezi-STEP MINI drive and the motor.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive – Basic Motor Cable Connection	CMNB-M-001F	1	Normal Cable	Maximum Length: 20m
	CMNB-M-002F	2		
	CMNB-M-003F	3		
	CMNB-M-005F	5		
	CMNB-M-001M	1	Robot Cable	
	CMNB-M-002M	2		
	CMNB-M-003M	3		
	CMNB-M-005M	5		

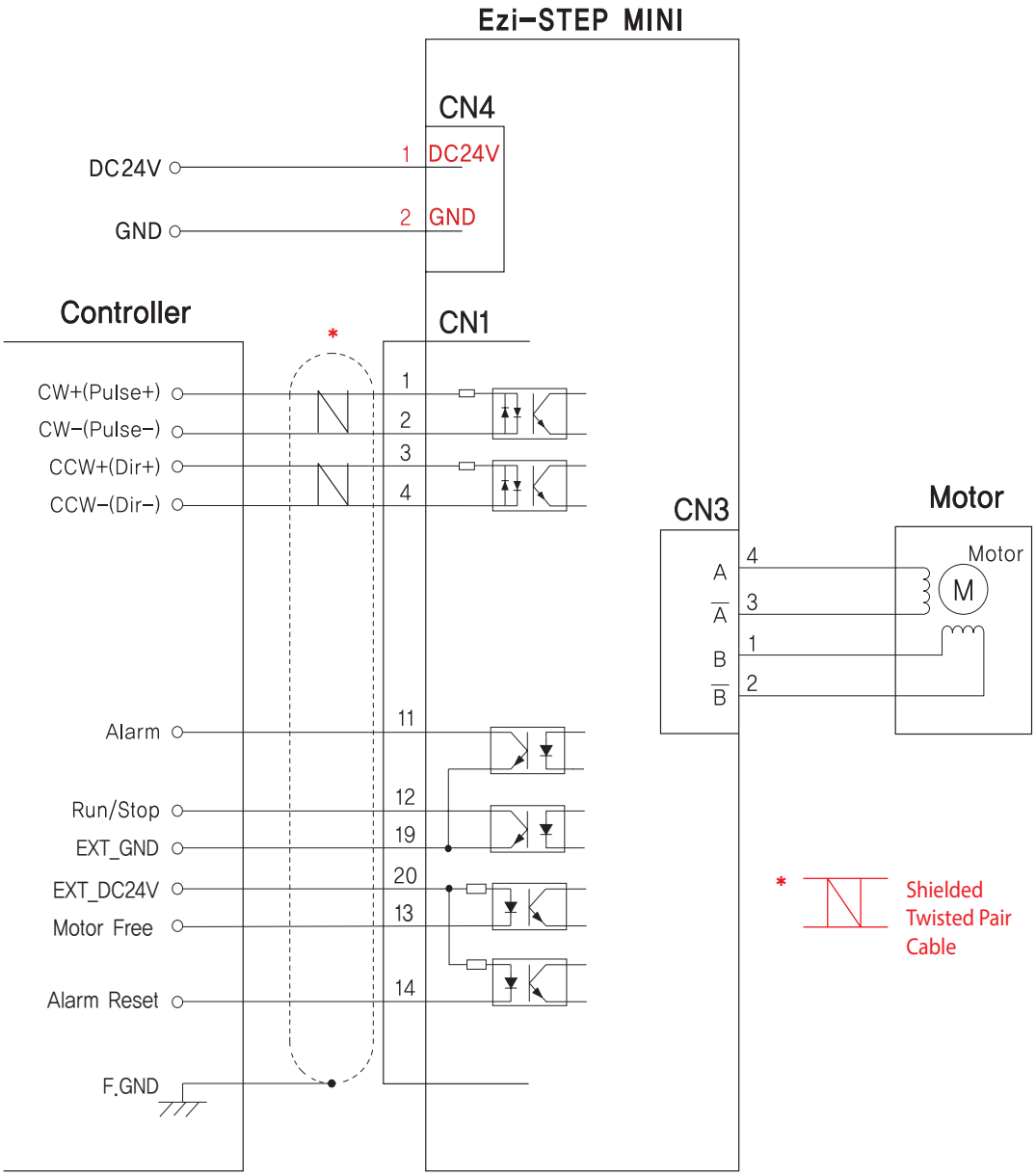
* If you need cables with length(in units of 1m) not listed on the table, please contact FASTECH for more information.

③ Drive Power Cable

These are the cables to connect Ezi-STEP MINI drive and the power.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive – Power Connection	CMNB-P-001F	1	Normal Cable	Maximum Length: 2m
	CMNB-P-002F	2		
	CMNB-P-001M	1	Robot Cable	
	CMNB-P-002M	2		

External Wiring Diagram



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

CAUTION

In order to use the products listed in this catalog safely and correctly, be sure to read the instruction manual before using the product.

FASTECH

Fast, Accurate, Smooth Motion

FASTECH Co., Ltd.
Rm#1202, 401-dong, Bucheon Techno-Park,
655, Pyeongcheon-ro, Bucheon-si Gyeonggi-do,
Republic of Korea (Postal Code: 14502)
TEL : +82-32-234-6317 FAX : +82-32-234-6302
E-mail : sales@fastech-motions.com
Homepage : www.fastech-motions.com

© Copyright 2007 FASTECH Co., Ltd.
All Rights Reserved. Jan 8, 2024 Rev.16