Operating Manual

# Ezi-STEP®

## Micro Stepping System

# MINI


FASTECH

www.fastech.co.kr

# Table of Contents

## ※ Before operation ※

- Thank you for your purchasing Ezi-STEP.
- Ezi-STEP is an all-in-one Unit. For high-speed and high-precision drive of a stepping motor, Ezi-STEP is an unique drive that adopts a new control scheme owing to an on-board high-performance 32bit digital signal processor.
- This manual describes handling, maintenance, repair, diagnosis and troubleshooting of Ezi-STEP.
- Before operating Ezi-STEP, thoroughly read this manual.
- After reading the manual, keep the manual near the Ezi-STEP so that any user can read the manual whenever needed.

# 1. Precautions

### ◆ General Precautions

- Contents of this manual are subject to change without prior notice for functional improvement, change of specifications or user's better understanding.
  Thoroughly read the manual provided with the purchased Ezi-STEP.
- When the manual is damaged or lost, please contact with Fastech's agents or our company at the address on the last page of the manual.
- Our company is not responsible for a product breakdown due to user's dismantling for the product, and such a breakdown is not guaranteed by the warranty.

### ◆ Put the Safety First

- Before installation, operation and repairing the Ezi-STEP, thoroughly read the manual and fully understand the contents. Before operating the Ezi-STEP please, understand the mechanical characteristics of the Ezi-STEP and related safety information and precautions.
- This manual divides safety precautions into **Attention** and **Warning**.

| | |
|---|---|
| ⚠ **Attention** : | If user does not properly handle the product, the user may seriously or slightly injured and damages may occur in the machine. |
| ⚠ **Warning** : | If user does not properly handle the product, a dangerous situation (such as an electric shock) may occur resulting in deaths or serious injuries. |

- Although precaution is only a **Attention**, a serious result could be caused depending on the situation. Follow safety precautions.

### ◆ Check the Product

| | |
|---|---|
| ⚠ **Attention** | Check the Product is damaged or parts are missing.<br>Otherwise, the machine may get damaged or the user may get injured. |

### ◆ Installation

| | |
|---|---|
| ⚠ **Attention** | Carefully move the Ezi-STEP.<br>Otherwise the Product may get damaged or User's foot may get injured by dropping the product.<br><br>Use non-flammable materials such as metal in the place where the Ezi-STEP is to be installed.<br>Otherwise, a fire may occur.<br><br>When installing several Ezi-STEP in a sealed place, install a cooling fan to keep the ambient temperature of the Ezi-STEP as 50℃ or lower.<br>Otherwise, a fire or other kinds of accidents may occur due to overheating. |
| ⚠ **Warning** | The process of Installation, Connection, Operation, Checking and Repairing should be done with qualified person.<br>Otherwise, a fire or other kinds of accidents may occur. |

### ◆ Connect Cables

| | |
|---|---|
| ⚠ **Attention** | Keep the rated range of Input Voltage for Ezi-STEP.<br>Otherwise, a fire or other kinds of accidents may occur.<br><br>Cable connection should follow the wiring diagram.<br>Otherwise, a fire or other kinds of accidents may occur. |
| ⚠ **Warning** | Before connecting cables, check if input power is off.<br>Otherwise, an electric shock or a fire may occur.<br><br>The case of the Ezi-STEP is insulated from the ground of the internal circuit by the condenser. Ground the Ezi-STEP.<br>Otherwise, an electric shock or a fire may occur. |

## ◆ Operation

| | |
|---|---|
| ⚠ **Attention** | If a protection function(alarm) occurs, firstly remove its cause and then release(alarm reset) the protection function.<br>If you are operating continuously without removing its cause, the machine may get damaged or the user may get injured.<br><br>Do not make Motor Free and make input signal to ON during operation.<br>Motor will stop and stop current will become zero. The machine may get damaged or the user may get injured.<br><br>Make all input signals to OFF before supply input voltage to Ezi-STEP.<br>The machine may get damaged or the user may get injured by motor operation.<br><br>All parameter values are set by default factory setting value. Change this value after reading this manual throughly.<br>Otherwise, the machine may get damaged or other kinds of accidents may occur. |

## ◆ Check and Repair

| | |
|---|---|
| ⚠ **Warning** | Stop supplying power to the main circuit and wait for a while before checking or repairing the Ezi-STEP.<br>Electricity remaining in the capacitor may cause danger.<br><br>Do not change cabling while power is being supplied.<br>Otherwise, the user may get injured or the product may get damaged.<br><br>Do not reconstruct the Ezi-STEP.<br>Otherwise, an electric shock may occur or the reconstructed product can not get After-Service. |

## ■ Part Numbering

**Ezi-STEP-MI-20S-□**

**Drive Series Type**

**Motor Flange Size**

20 : 20mm
25 : 25mm
28 : 28mm
35 : 35mm
42 : 42mm
56 : 56mm

**Motor Length**

S : Single
M : Middle
L : Large
XL: Extra Large

**Motor Type**

Blank : Standard
L : Low Vibration
H : High Speed

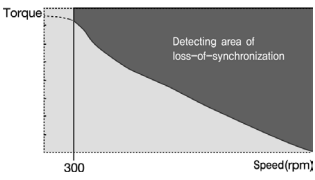
## ■ Combination List of Ezi-STEP-MINI

| 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-25S | BM-25S | EzStep-MI-25S |
| Ezi-STEP-MI-25M | BM-225M | EzStep-MI-25M |
| Ezi-STEP-MI-25L | BM-25L | EzStep-MI-25L |
| 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-35S | BM-35S | EzStep-MI-35S |
| Ezi-STEP-MI-35M | BM-35M | EzStep-MI-35M |
| Ezi-STEP-MI-35L | BM-35L | EzStep-MI-35L |
| Ezi-STEP-MI-35XL | BM-35XL | EzStep-MI-35XL |
| 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 |
| Ezi-STEP-MI-56S | BM-56S | EzStep-MI-56S |
| Ezi-STEP-MI-56M | BM-56M | EzStep-MI-56M |
| Ezi-STEP-MI-56L | BM-56L | EzStep-MI-56L |

## 2. Main characteristics

### 1 Sensorless Stall Detection

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

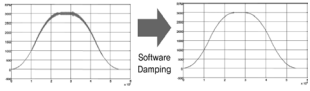



### 2 Microstep and Filtering

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

### 3 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® 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

## 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 led indicator.

## 5 Improvement of High-Speed Driving

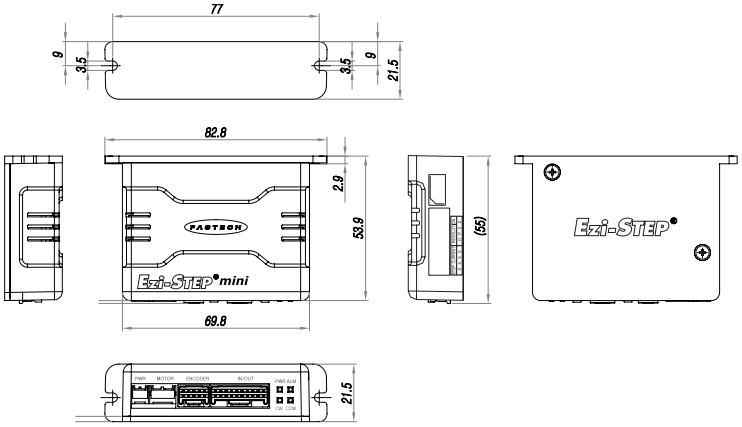
Depending on the speed of a stepping motor, Ezi-STEP® automatically increases the supply voltage and prevents the torque lowering due to the low operating voltage to the motor caused by back-emf voltage, this enables high-speed operation. Additionally, the software damping algorithm minimizes the vibration and prevents the loss-of-synchronization at high-speed.

# 3. Drive Specification and Dimension

## 3.1 Drive Specification

| Motor Model | | BM-20 series | BM-25 series | BM-28 series | BM-35 series | BM-42 series | BM-42 series |
|---|---|---|---|---|---|---|---|
| Driver Model | | EzStep-MI-20 series | EzStep-MI-25 series | EzStep-MI-28 series | EzStep-MI-35 series | EzStep-MI-42 series | EzStep-MI-42 series |
| Input Voltage | | 24VDC ±10% | | | | | |
| Control Method | | Closed loop control with 32bit DSP | | | | | |
| Current Consumption | | Max : 500mA (Except motor current) | | | | | |
| Operating Condition | Ambient Temperature | In Use : 0~50℃<br>In Storage : -20~70℃ | | | | | |
| | Humidity | In Use : 35~85%RH (Non-Condensing)<br>In Storage : 10~90%RH (Non-Condensing) | | | | | |
| | Vib. Resist. | 0.5G | | | | | |
| Function | Rotation Speed | 0~3,000rpm | | | | | |
| | Resolution (P/R) | 500, 1000, 1600, 2000, 3200, 3600, 4000, 5000, 6400, 8000, 10000, 20000, 25000, 36000, 40000, 50000, *Default : 10,000 | | | | | |
| | Max. Input Pulse Frequency | 500KHz (Duty 50%) | | | | | |
| | Protection Functions | Over current, Over speed, Position tracking error, Over load,<br>Over temperature, Over regenerated voltage, Motor connect error,<br>Encoder connect error, Motor voltage error, Inposition error, System error, ROM error,<br>Input voltage error, Position overflow error | | | | | |
| | LED Display | Power, Alarm, CW Rotation, CCW Rotation | | | | | |
| | STOP Current | 10%~100% (Set by DIP Switch) Be setted to set value of STOP Current after 0.1 second after motor stop. *Default : 50% | | | | | |
| | Pulse Input Method | 1-Pulse/2-Pulse (Selectable with DIP switch) *Default : 2 pulse | | | | | |
| | Rotational Direction | CW/CCW (Selectable with DIP switch) *Default : CW | | | | | |
| | Speed/Position Control Command | Pulse train input | | | | | |
| I/O Signal | Input Signal | Alarm reset (Photocoupler input) | | | | | |
| | Output Signal | Alarm, Run/stop (Phhotocoupler) | | | | | |

### 3.2 Drive Dimension(mm)



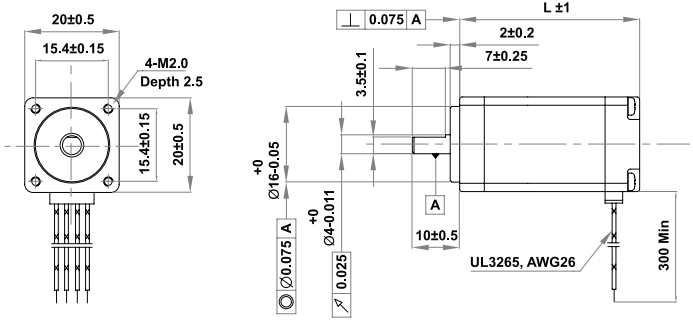
# 4. Motor specifications and Size

## 4.1 BM-20 Series

4.1.1 Motor Specifications

| M O D E L | | UNIT | BM-20M | BM-20L |
|---|---|---|---|---|
| DRIVE METHOD | | ----- | BI-POLAR | BI-POLAR |
| NUMBER OF PHASES | | ----- | 2 | 2 |
| VOLTAGE | | VDC | 2.9 | 3.25 |
| CURRENT per PHASE | | A | 0.5 | 0.5 |
| RESISTANCE per PHASE | | Ohm | 5.8 | 6.5 |
| INDUCTANCE per PHASE | | mH | 2.5 | 5 |
| HOLDING TORQUE | | N · m | 0.018 | 0.035 |
| ROTOR INERTIA | | g · ㎠ | 2.5 | 5 |
| WEIGHTS | | g | 50 | 80 |
| LENGTH (L) | | mm | 28 | 38 |
| ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT) | 3mm | N | 18 | 18 |
| | 8mm | | 30 | 30 |
| ALLOWABLE THRUST LOAD | | N | Lower than motor weight | |
| INSULATION RESISTANCE | | MOhm | 100min. (at 500VDC) | |
| INSULATION CLASS | | ----- | CLASS B (130℃) | |
| OPERATING TEMPERATURE | | ℃ | 0 to 55 | |

4.1.2 Motor Dimension (mm)



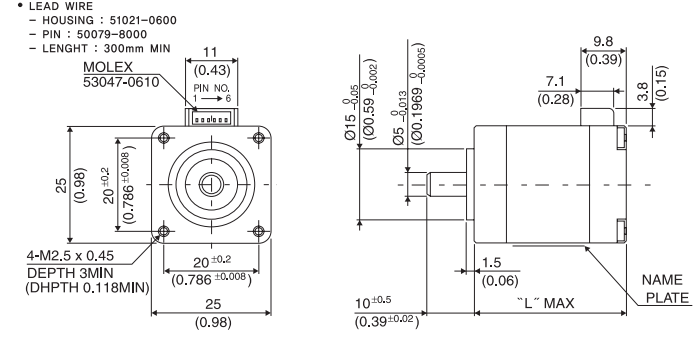
## 4.2 BM-25 Series

### 4.2.1 Motor Specifications

*Low Vibration*

| M O D E L | | UNIT | BM-25S | BM-25M | BM-25L |
|---|---|---|---|---|---|
| DRIVE METHOD | | ---- | BI-POLAR | BI-POLAR | BI-POLAR |
| NUMBER OF PHASES | | ---- | 2 | 2 | 2 |
| VOLTAGE | | VDC | 2.66 | 9.87 | 3.654 |
| CURRENT per PHASE | | A | 0.7 | 0.21 | 0.63 |
| RESISTANCE per PHASE | | Ohm | 3.8 | 47 | 5.8 |
| INDUCTANCE per PHASE | | mH | 2.0 | 30 | 5.4 |
| HOLDING TORQUE | | N · m | 0.033 | 0.049 | 0.062 |
| ROTOR INERTIA | | g · ㎠ | 2 | 3 | 7 |
| WEIGHTS | | g | 85 | 100 | 120 |
| LENGTH (L) | | mm | 23.5 | 27.5 | 33 |
| ALLOWABLE OVERHUNG LOAD | 3mm | N | 30 | 30 | 30 |
| (DISTANCE FROM END OF SHAFT) | 8mm | | 38 | 38 | 38 |
| ALLOWABLE THRUST LOAD | | N | Lower than motor weight | | |
| INSULATION RESISTANCE | | MOhm | 100min. (at 500VDC) | | |
| INSULATION CLASS | | ---- | CLASS B (130℃) | | |
| OPERATING TEMPERATURE | | ℃ | 0 to 55 | | |

### 4.2.2 Motor Dimension (mm)

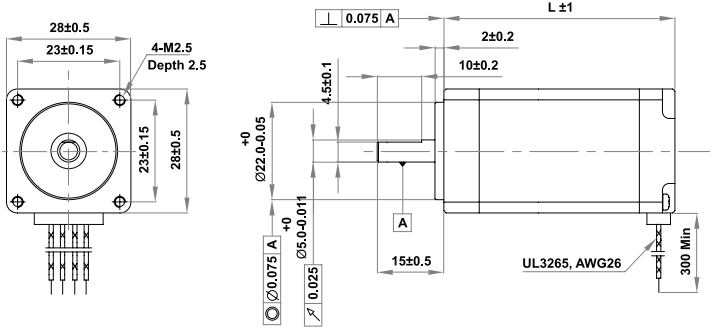


## 4.3 BM-28 Series

4.3.1 Motor Specifications

| M O D E L | | UNIT | BM-28S | BM-28M | BM-28L |
|---|---|---|---|---|---|
| DRIVE METHOD | | ---- | BI-POLAR | BI-POLAR | BI-POLAR |
| NUMBER OF PHASES | | ---- | 2 | 2 | 2 |
| VOLTAGE | | VDC | 3.04 | 3.04 | 3.42 |
| CURRENT per PHASE | | A | 0.95 | 0.95 | 0.95 |
| RESISTANCE per PHASE | | Ohm | 3.2 | 3.2 | 3.6 |
| INDUCTANCE per PHASE | | mH | 2 | 5 | 5.8 |
| HOLDING TORQUE | | N · m | 0.07 | 0.12 | 0.14 |
| ROTOR INERTIA | | g · ㎠ | 9 | 13 | 18 |
| WEIGHTS | | g | 110 | 140 | 200 |
| LENGTH (L) | | mm | 32 | 45 | 52 |
| ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT) | 3mm | N | 30 | 30 | 30 |
| | 8mm | | 38 | 38 | 38 |
| | 13mm | | 53 | 53 | 53 |
| ALLOWABLE THRUST LOAD | | N | Lower than motor weight | | |
| INSULATION RESISTANCE | | MOhm | 100min. (at 500VDC) | | |
| INSULATION CLASS | | ---- | CLASS B (130℃) | | |
| OPERATING TEMPERATURE | | ℃ | 0 to 55 | | |

4.3.2 Motor Dimension (mm)

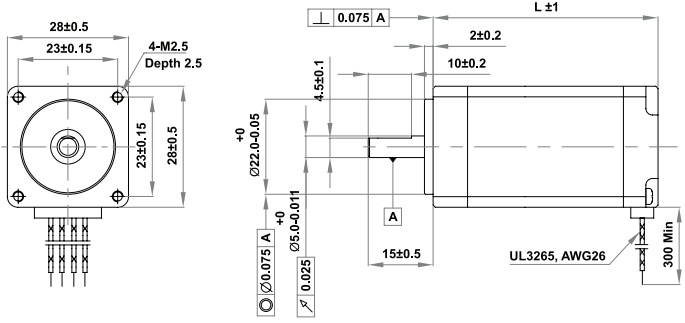


## 4.4 BM-35 Series

4.4.1 Motor Specifications

| M O D E L | | UNIT | BM-35S | BM-35M | BM-35L | BM-35XL |
|---|---|---|---|---|---|---|
| DRIVE METHOD | | ---- | BI-POLAR | | | |
| NUMBER OF PHASES | | ---- | 2 | | | |
| VOLTAGE | | VDC | 2.28 | 2.88 | 4.59 | 5.39 |
| CURRENT per PHASE | | A | 0.6 | 0.6 | 0.85 | 0.7 |
| RESISTANCE per PHASE | | Ohm | 3.8 | 4.8 | 5.4 | 7.7 |
| INDUCTANCE per PHASE | | mH | 3.2 | 6.1 | 6.5 | 8.4 |
| HOLDING TORQUE | | N · m | 0.034 | 0.050 | 0.176 | 0.225 |
| ROTOR INERTIA | | g · ㎠ | 5 | 8 | 11 | 32 |
| WEIGHTS | | g | 165 | 180 | 260 | 360 |
| LENGTH (L) | | mm | 22 | 26 | 38 | 53 |
| 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 | | | |

4.4.2 Motor Dimension(mm) and Torque Characteristics

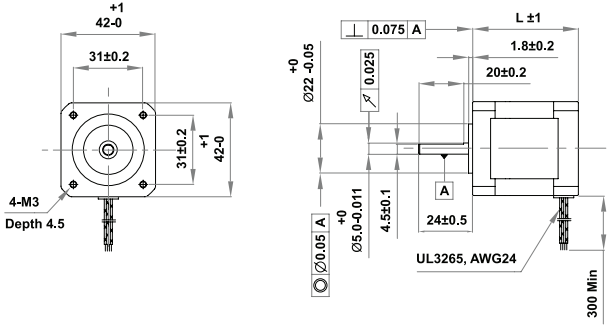


## 4.5 BM-42 Series

4.5.1 Motor Specifications

| M O D E L | | UNIT | BM-42S | BM-42M | BM-42L | BM-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 |
| INDUCTANCE per PHASE | | mH | 2.5 | 7.2 | 8 | 15.6 |
| HOLDING TORQUE | | N · m | 0.32 | 0.44 | 0.5 | 0.8 |
| 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 | | | |

4.5.2 Motor Dimension (mm)

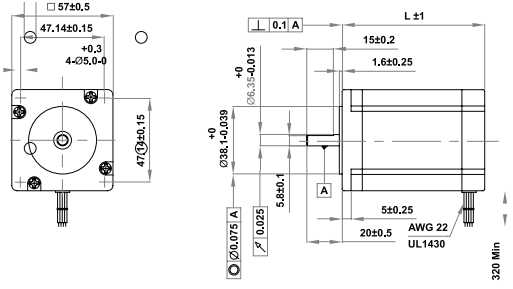


## 4.6 BM-56 Series

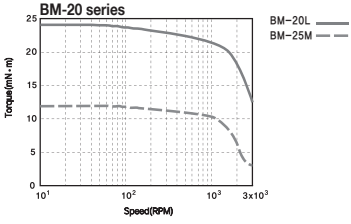
4.6.1 Motor Specifications

| M O D E L | | UNIT | BM-56S | BM-56M | BM-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 | 2 | 3.8 |
| HOLDING TORQUE | | N · m | 0.64 | 1 | 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 | | |

4.5.2 Motor Dimension (mm)

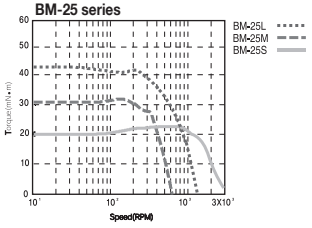


## BM-20 series



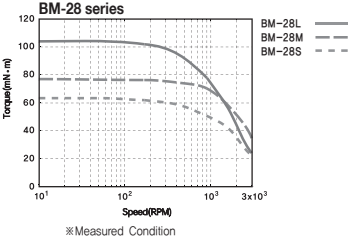

※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP-MINI

## BM-25 series



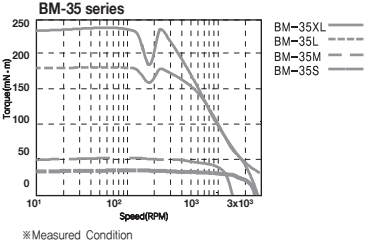

※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP-MINI

## BM-28 series



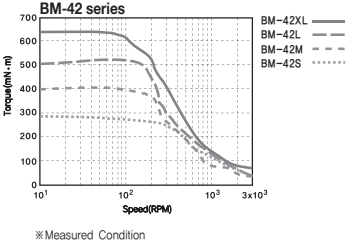

※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP-MINI

## BM-35 series



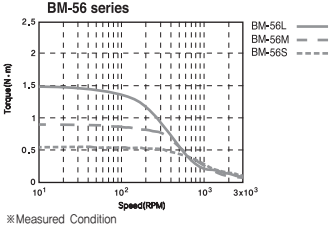

※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP-MINI

## BM-42 series




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

## BM-56 series

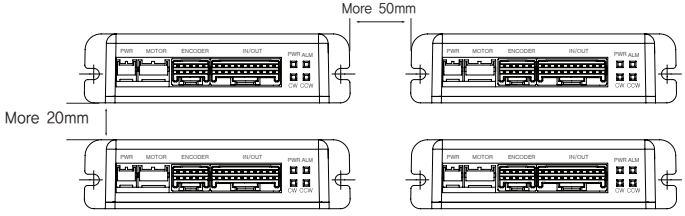



※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP-MINI

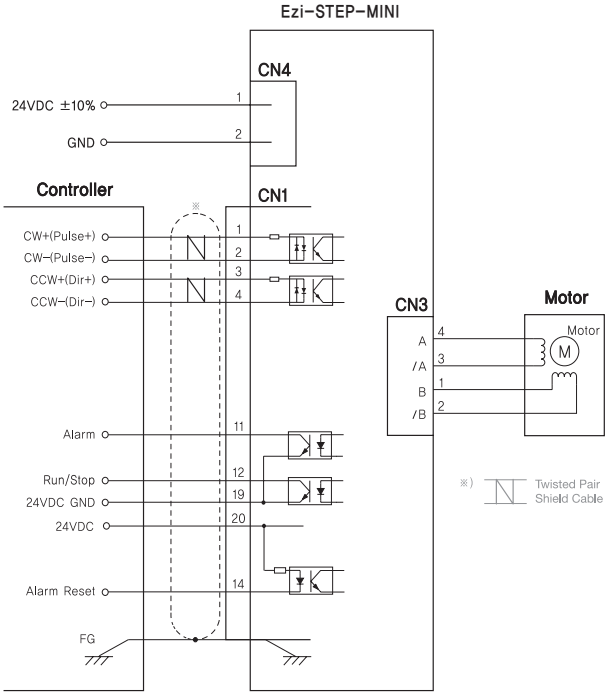
## 5.Installation and Cabling

### 5.1 Notes on Installation

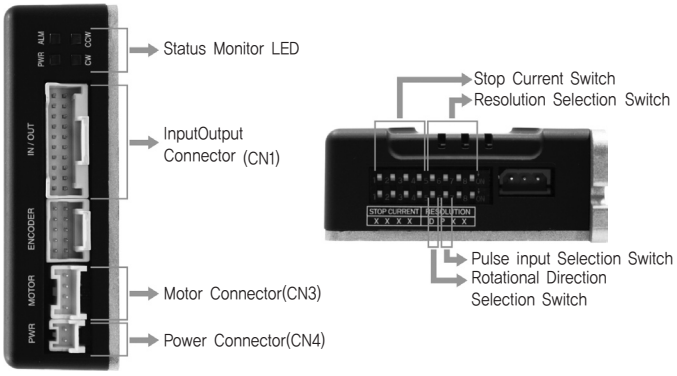
1) Ezi-STEP is designed for indoor use only.
2) The ambient temperature of the room should be 0℃~50℃.
3) If the temperature of the product case is higher than 50℃, radiate heat of the outside to cool down.
4) Do not install Ezi-STEP under direct rays, near magnetic or radioactive objects.
5) If you set more than 2 drives, you must set over 20mm horizontally and over 50mm vertically as shown below.



## 5.2 Connection Diagram



## 6. Setting and Operation



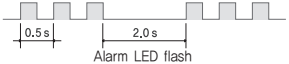

### 6.1 Status Monitor LED

6.1.1 Status LED Function and Condition

| Indication | Color | Function | Flash Condition |
|---|---|---|---|
| PWR | Green | Power input Indication | Lights when power is ON Flashs when motor is Free status |
| ALM | Red | Alarm indication | Flash when protection function is activated (Identifiable which protection mode is activated by counting the flash times) |
| CW | Yellow | Motor Rotation Direction | Lights when motor rotate CW direction |
| CCW | Orange | Motor Rotation Direction | Lights when motor rotate CCW direction |

6.1.2 Protection functions and LED flash times

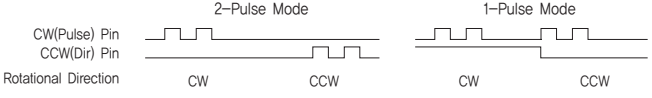
| Times | Protection | Conditions |
|---|---|---|
| 1 | Over current | Excessive current flowed into a motor |
| 2 | Over speed | Motor speed exceeded 3000 rpm |
| 3 | Step out | Abnormally motor do not followed pulsed input |
| 5 | Over temperature | Internal temperature of a motor drive exceeded 55℃ |
| 6 | Over regenerative voltage | 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 LED flash
(ex: Synchronization error)

## 6.2 Pulse Input Selection Switch

| Indication | Switch Name | Functions |
|---|---|---|
| 2P/1P | Selecting pulse input mode | Selectable 1–Pulse input mode or 2–Pulse input mode as Pulse input signal. ON : 1–Pulse mode OFF : 2–Pulse mode<br>※Default : 2–Pulse mode |



## 6.3 Rotational Direction Selection Switch

| Indication | Switch Name | Functions |
|---|---|---|
| DIR | Switching Rotational Direction | Based on CW(+Dir signal) input to driver.<br>ON : CCW(-Direction) OFF : CW(+Direction)<br>※Default : CW mode |

Direction selection switch : ON

CCW Dir.

Direction selection switch : OFF

CW Dir.

## 6.4 Resolution Selection Switch

The number of pulse per revolution.

| Position | | | | Pulse/Rotation | Position | | | | Pulse/Rotation |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 7 | 6 | 5 | | 8 | 7 | 6 | 5 | |
| ON | ON | ON | ON | 500 | OFF | ON | ON | ON | 6400 |
| ON | ON | ON | OFF | 1000 | OFF | ON | ON | OFF | 8000 |
| ON | ON | OFF | ON | 1600 | OFF | ON | OFF | ON | 10000*1 |
| ON | ON | OFF | OFF | 2000 | OFF | ON | OFF | OFF | 20000 |
| ON | OFF | ON | ON | 3200 | OFF | OFF | ON | ON | 25000 |
| ON | OFF | ON | OFF | 3600 | OFF | OFF | ON | OFF | 36000 |
| ON | OFF | OFF | ON | 4000 | OFF | OFF | OFF | ON | 40000 |
| ON | OFF | OFF | OFF | 5000 | OFF | OFF | OFF | OFF | 50000 |

*1 : Default = 10,000

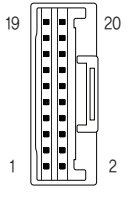
## 6.5 Stop Current Selection

Stop Current means the motor current value automatically set in 0.1 sec after motor stops. This is to prevent the overheart of a motor when the motor is under long time idling. The unit of the selection value is a percentage.

| Indication | | | | STOP Current(%) | Indication | | | | 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*1 | 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 |

*1 : Default : '50%'

## 6.6 Input/Output signal(CN1)

| Pin No. | Function | I/O Signal | Pin Layout |
|---|---|---|---|
| 1 | CW+(Pulse+) | Input |  |
| 2 | CW–(Pulse–) | Input | |
| 3 | CCW+(Dir+) | Input | |
| 4 | CCW–(Dir–) | Input | |
| 11 | Alarm | Output | |
| 12 | Run/stop | Output | |
| 14 | Alarm Reset | Input | |
| 19 | 24VDC GND | Input | |
| 20 | 24VDC | Input | |

### 6.7 Motor Connector(CN3)

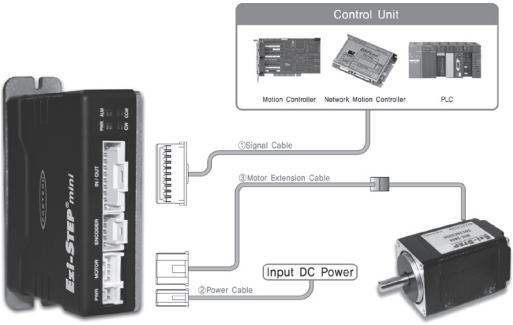
| Pin No. | Function | Pin Layout |
|---|---|---|
| 1 | B Phase |  |
| 2 | /B Phase | |
| 3 | /A Phase | |
| 4 | A Phase | |



### 6.8 Power Connector(CN4)

| Pin No. | Function | Pin Layout |
|---|---|---|
| 1 | Input Power : 24VDC ±10% |  |
| 2 | Input Power : GND | |

# 7. System Configuration




| Type | Signal Cable | Motor Cable | Power Cable |
|---|---|---|---|
| Standard Length | – | 30cm | – |
| Max. Length | 20m | 20m | 2m |

※Motor can not be directly connected to Drives so please use extension cable for connection. (Option)

## 7.1 Option

### ①Signal Cable

Available to connect between Control Unit and Ezi-STEP-MINi.

| Item | Length[m] | Remark |
|---|---|---|
| CSVI-S-□□□F | □□□ | Normal Cable |
| CSVI-S-□□□M | □□□ | Robot Cable |

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

### ②Motor Extension Cable

Available to extended connection between motor and Ezi-STEP-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.

### ③Power Cable

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

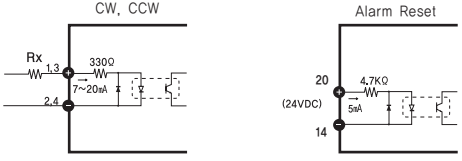
| Item | Length[m] | Remark |
|---|---|---|
| CMNB-P-□□□F | □□□ | Normal Cable |
| CMNB-P-□□□M | □□□ | Robot Cable |

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

# 8. Control signal Input/Output Description

## 8.1 Input Signal

Input signal of the drive are all photocoupler inputs. The signal shows the status of internal photocouplers [ON: conduction], [OFF: Non-conduction], not displaying the voltage levels of the signal.

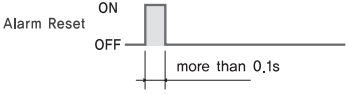



◆ CW, CCW Input

This signal can be used to receive a positioning pulse command from a user-side host motion controller. A user can select 1-pulse input mode of 2-pulse input mode.The input schematic of CW, CCW is designed for 5V TTL level. When using 5V level as an input signal, the resistor Rx is used and connect to the drive directly. When the level of input si9gnal is more than 5V, have to add Rx. If this resistor is absent, the inner schematic can be broken. In input signal level is 12V case, Rx value is 2.2kohm and in 24V case, 4.7kohm is suitable for Rx value.

◆ Alarm Reset Input

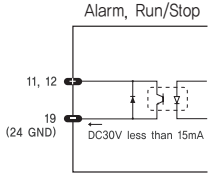
When a protection mode has been activated, a signal to this Alarm Reset input cancels the Alarm output. By setting the alarm reset input signal [ON], cancel Alarm output.
Before cancel the Alarm output, have to remove the source of alarm.




**[Caution]** If Alarm Reset input signal still remains [ON], motor will be Free state. Keep in mind to change [ON]→[OFF] state. It operates reversely compare to Normal mode, when you set Inverse mode.

## 8.2 Output Signal

As the output signal from the drive, there are the photocoupler outputs(Alarm, Run/Stop). The signal status operate as [ON : conduction], [OFF : Non-conduction] of photocoupler not as the voltage level of signal.

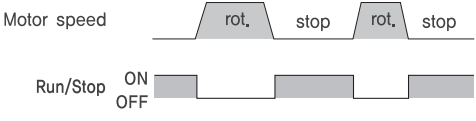



◆ Alarm Output

The Alarm output indicates [OFF] when the drive is in a normal operation. If a protection mode has been activated,it goes [ON]. A host controller meeds to detect this signal and stop sending a motor driving command. When the drive detects an abnormal operation such as overload of overcurrent of a motor, it sets the Alarm output to [ON], flash the Alarm LED, disconnects the power to a motor, and stops the motor, simultaneously. It operates reversely compare to Normal mode, when you set Inverse mode.

◆ Run/Stop Output

Run/Stop Output state is [ON] is when motor positioning is completed. It operates reversely compare to Normal mode, when you set inverse mode.



# Appendix

## ▪ Extension cable for Motor

For cable extension between Motor and Drive.

### WIRING DIAGRAM

| Drive Connector | | Cabling | Motor Connector | |
|---|---|---|---|---|
| Pin Layout | Number | | Number | Pin Layout |
|  | 1<br>2<br>3<br>4 | 1 ----------- 1<br>2 ----------- 3<br>3 ----------- 4<br>4 ----------- 2 | |  |





### CONNECTOR

| ITEM | | Part Number | Maker |
|---|---|---|---|
| Drive Connector (CN3) | Housing | PAP-04V-S | JST |
| | Terminal | SPHD-001T-P0.5 | JST |
| Motor Connector | Housing | 5557-04R | MOLEX |
| | Terminal | 5556T | MOLEX |

## ▪ Connector

Connector specifications for cabling to Ezi-STEP-MINI.

| ITEM | | | Part Number | Maker |
|---|---|---|---|---|
| | Signal (CN1) | Housing | 501646-2000 | MOLEX |
| | | Terminal | 501648-1000(AWG 26~28) | MOLEX |
| | | Connector | 10120-3000VE | 3M |
| | | Backshell | 10320-52A0-008 | 3M |
| Motor | Motor (CN3) | Housing | PAP-04V-S | JST |
| | | Terminal | SPHD-001T-P0.5 | JST |
| | Motor Side | Housing | 5557-04R | MOLEX |
| | | Terminal | 5556T | MOLEX |
| | Power (CN4) | Housing | PAP-02V-S | JST |
| | | Terminal | SPHD-001T-P0.5 | JST |
| | | Housing | 5557-02R | MOLEX |
| | | Terminal | 5556T | MOLEX |

※These connectors are serviced together with Ezi-STEP-MINI except when purchasing option cables.
※Above connector is the most suitable product for Ezi-STEP-MINI. Another equivalent connector can be used.


**FASTECH Co., Ltd.**

Rm #1202, Bucheon Technopark 401 Dong, Yakdea-dong,
Wonmi-Gu, Bucheon-si, Gyeonggi-do, Rep. Of Korea (Zip)420-734
TEL : 82-32-234-6300,6301 FAX : 82-32-234-6302
E-mail : daniel@fastech.co.kr website: www.fastech.co.kr

- Please note that the specifications are subject to change without notice due to product improvements.