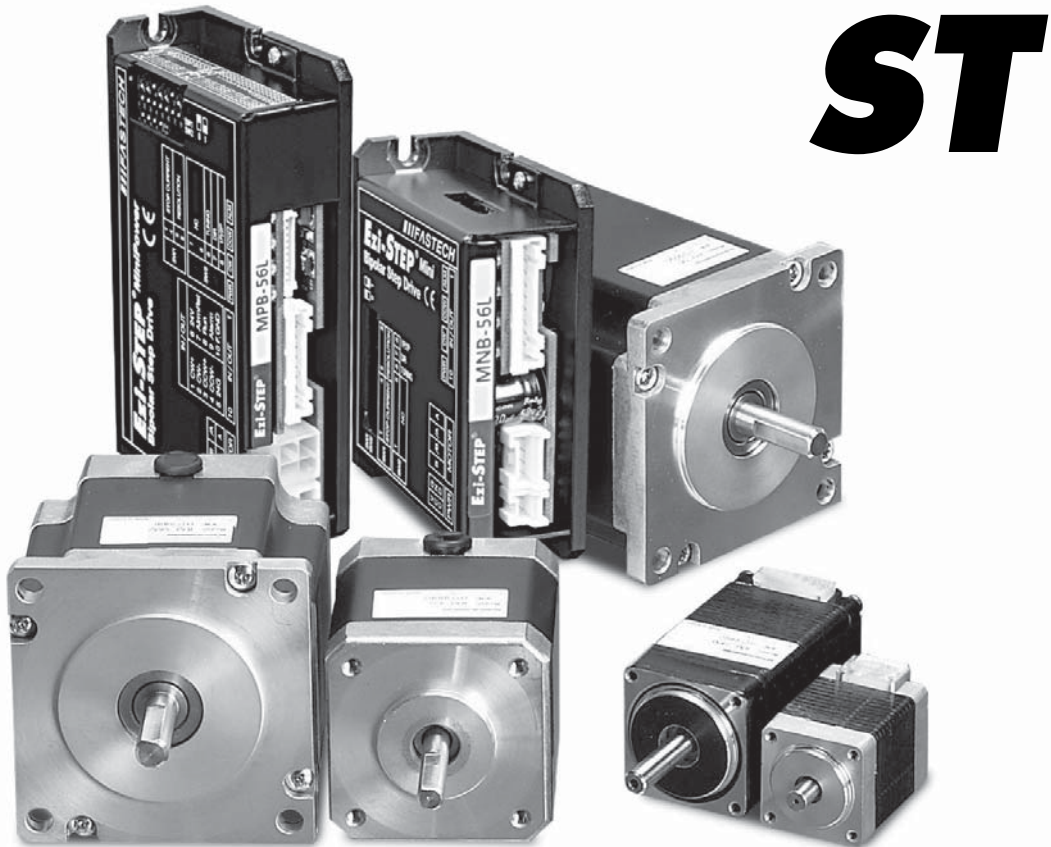


[MNB / MPB Series] Operating Manual

# **Ezi-STEP<sup>®</sup>**

## **Micro Stepping System**



**CE**

**FASTECH**

*Fast, Accurate, Smooth Motion*

[www.fastech.co.kr](http://www.fastech.co.kr)

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## ※ 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 a 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

 <b>Attention</b>	<p>Check the Product is damaged or parts are missing. Otherwise, the machine may get damaged or the user may get injured.</p>
--	---

## ◆ Installation

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

## ◆ Connect Cables

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

## ◆ Operation

### **Attention**

If a protection function(alarm) occurs, firstly remove its cause and then release(alarm reset) the protection function.

If you are operating continuously without removing its cause, the machine may get damaged or the user may get injured.

**Do not make Motor Free and make input signal to ON during operation.**

Motor will stop and stop current will become zero. The machine may get damaged or the user may get injured.

**Make all input signals to OFF before supply input voltage to Ezi-STEP.**

The machine may get damaged or the user may get injured by motor operation.

**All parameter values are set by default factory setting value.**

**Change this value after reading this manual thoroughly.**

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.**

Electricity remaining in the capacitor may cause danger.

**Do not change cabling while power is being supplied.**

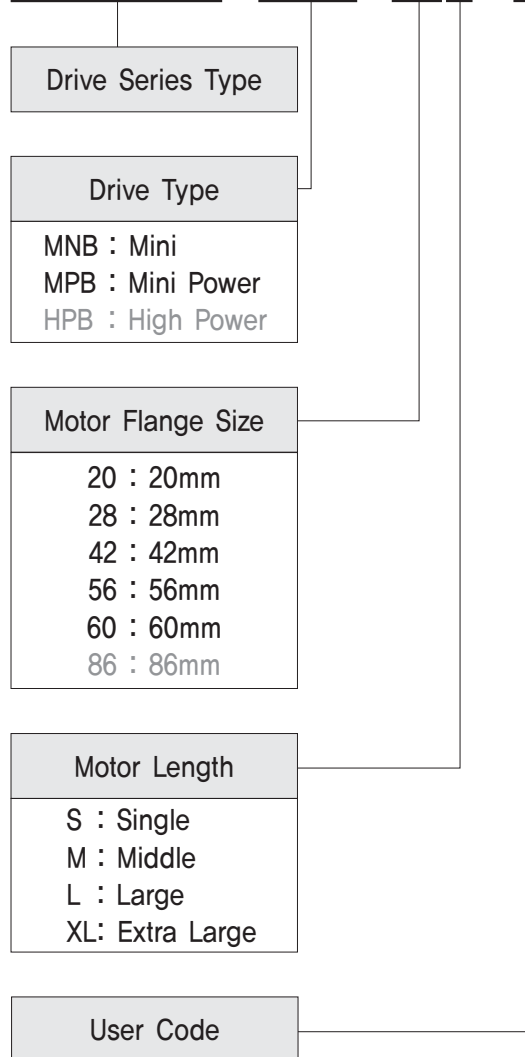
Otherwise, the user may get injured or the product may get damaged.

**Do not reconstruct the Ezi-STEP.**

Otherwise, an electric shock may occur or the reconstructed product can not get After-Service.

## ■ Part Numbering

### Ezi-STEP-MNB-42S-□



## ■ Combination List of Ezi-STEP

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

Unit Part Number	Motor Model Number	Drive Model Number
Ezi-STEP-MPB-42S	BM-42S	EzStep-MPB-42S
Ezi-STEP-MPB-42M	BM-42M	EzStep-MPB-42M
Ezi-STEP-MPB-42L	BM-42L	EzStep-MPB-42L
Ezi-STEP-MPB-42XL	BM-42XL	EzStep-MPB-42XL
Ezi-STEP-MPB-56S	BM-56S	EzStep-MPB-56S
Ezi-STEP-MPB-56M	BM-56M	EzStep-MPB-56M
Ezi-STEP-MPB-56L	BM-56L	EzStep-MPB-56L
Ezi-STEP-MPB-60S	BM-60S	EzStep-MPB-60S
Ezi-STEP-MPB-60M	BM-60M	EzStep-MPB-60M
Ezi-STEP-MPB-60L	BM-60L	EzStep-MPB-60L

Unit Part Number	Motor Model Number	Drive Model Number
Ezi-STEP-HPB-86M	BM-86M	EzStep-HPB-86M
Ezi-STEP-HPB-86L	BM-86L	EzStep-HPB-86L
Ezi-STEP-HPB-86XL	BM-86XL	EzStep-HPB-86XL

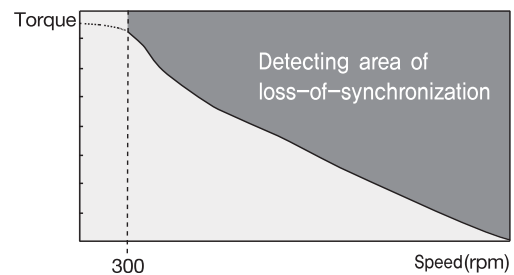
## 2. Main characteristics

### 1 Sensorless Stall Detection

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

Ezi-STEP<sup>®</sup> 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 300rpm



### 2 Microstep and Filtering

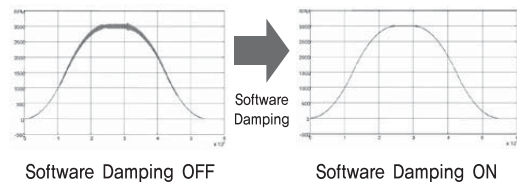
#### High precision Microstep function and Filtering (Patent pending)

The high-performance DSP operates at step resolutions of  $1.8^\circ$  up to maximum  $0.0072^\circ$  (1/250 steps) and Ezi-STEP<sup>®</sup> 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)

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<sup>®</sup> 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 speed.



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

## **4 Drive Output Signal Monitoring**

Ezi-STEP<sup>®</sup> 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<sup>®</sup> 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.



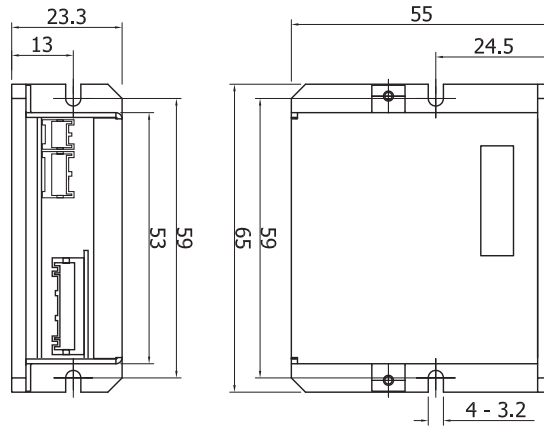
### 3. Drive Specification and Dimension

#### 3.1 Drive Specification

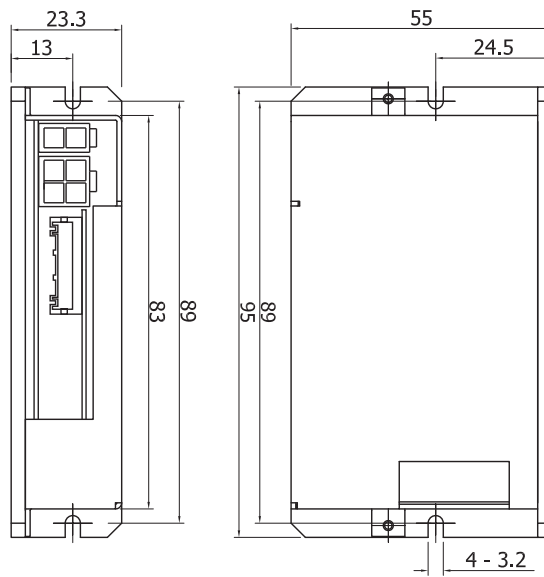
Driver Model		Ezi-STEP MNB Series	Ezi-STEP MPB Series
Input Voltage		24VDC $\pm$ 10%	
Control Method		Bipolar PWM drive with 32bit DSP	
Current Consumption		Max : 500mA (Except motor current)	
Operating Condition	Ambient Temperature	In Use : 0~50°C In Storage : -20~70°C	
	Humidity	In Use : 35~85%RH (Non-Condensing) In Storage : 10~90%RH (Non-Condensing)	
	Vib. Resist.	0.5G	
Function	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) *Default : 10000	
	Max. Input Pulse Frequency	500KHz (Duty 50%)	
	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 (Identifiable which alarm is activated by counting the blinking times of status monitor LED)	
	LED Display	Power Status(Green), Alarm Status(Red), CW Rotation(Yellow), CCW Rotation(Orange)	
	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 (Set by DIP Switch) 1 Pulse : Pulse/Direction, 2 Pulse : CW/CCW *Default : 2 Pulse	
	Rotational Direction	CW/CCW (Set by DIP Switch) Used when changing the direction of motor rotate. *Default : CW	
	Speed/Position Control Command	Pulse train input (Photocoupler Input)	
	I/O Signal	Input Signal	Motor Free/Alarm Reset (Photocoupler Input)
Output Signal		Alarm, Run/Stop (Photocoupler Output)	

### 3.2 Drive Dimension(mm)

#### 3.2.1 MNB Series



#### 3.2.2 MPB Series



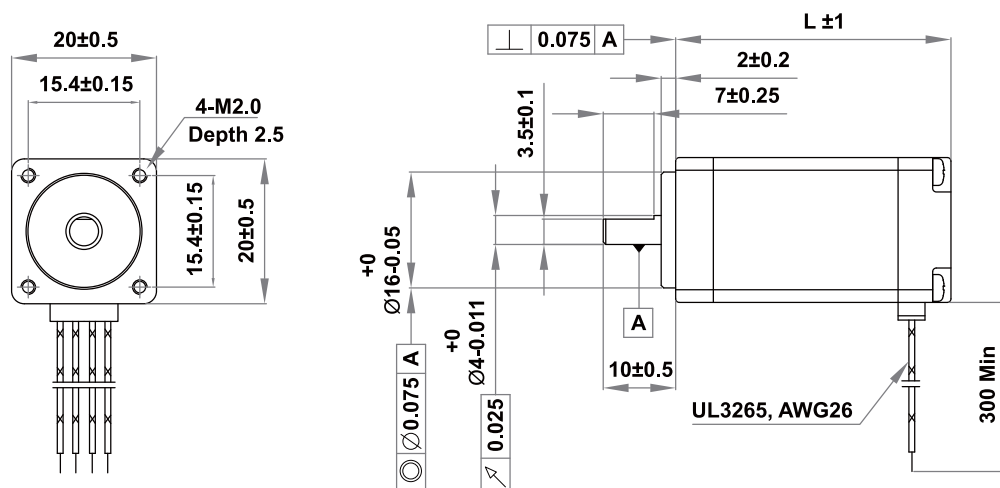
## 4. Motor specifications and Size

### 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	5.0
HOLDING TORQUE		N · m	0.018	0.035
ROTOR INERTIA		g · cm <sup>2</sup>	2.5	5.0
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°C)	
OPERATING TEMPERATURE		°C	0 to 55	

#### 4.1.2 Motor Dimension (mm)

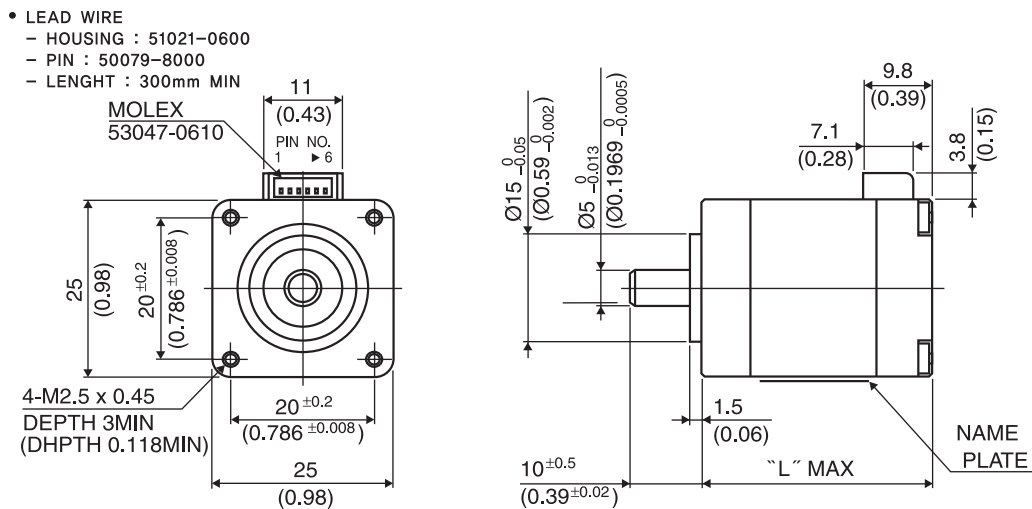


## 4.2 BM-25 Series

### 4.2.1 Motor Specifications

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 · cm <sup>2</sup>	2	3	7
WEIGHTS		g	55	70	90
LENGTH (L)		mm	23,5	27,5	33
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	30	30	30
	8mm		38	38	38
ALLOWABLE THRUST LOAD		N	Lower than motor weight		
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)		
INSULATION CLASS		----	CLASS B (130°C)		
OPERATING TEMPERATURE		°C	0 to 55		

### 4.2.2 Motor Dimension (mm)



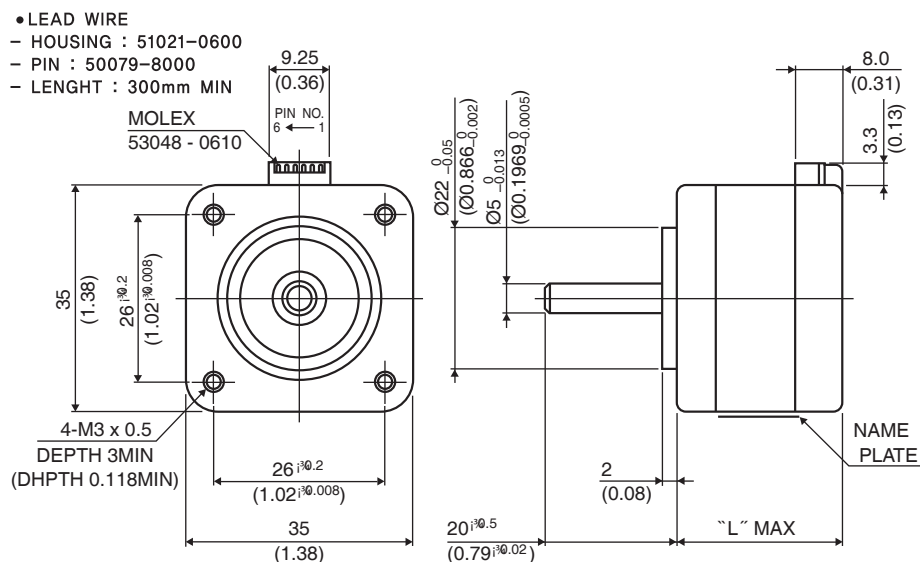


## 4.4 BM-35 Series

### 4.4.1 Motor Specifications

M O D E L		UNIT	BM-35S	BM-35M	BM-35L	BM-35XL
DRIVE METHOD		----	BI-POLAR	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		----	2	2	2	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 · cm <sup>2</sup>	5	8	11	32
WEIGHTS		g	105	120	200	300
LENGTH (L)		mm	22	26	38	535
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°C)			
OPERATING TEMPERATURE		°C	0 to 55			

### 4.4.2 Motor Dimension (mm)







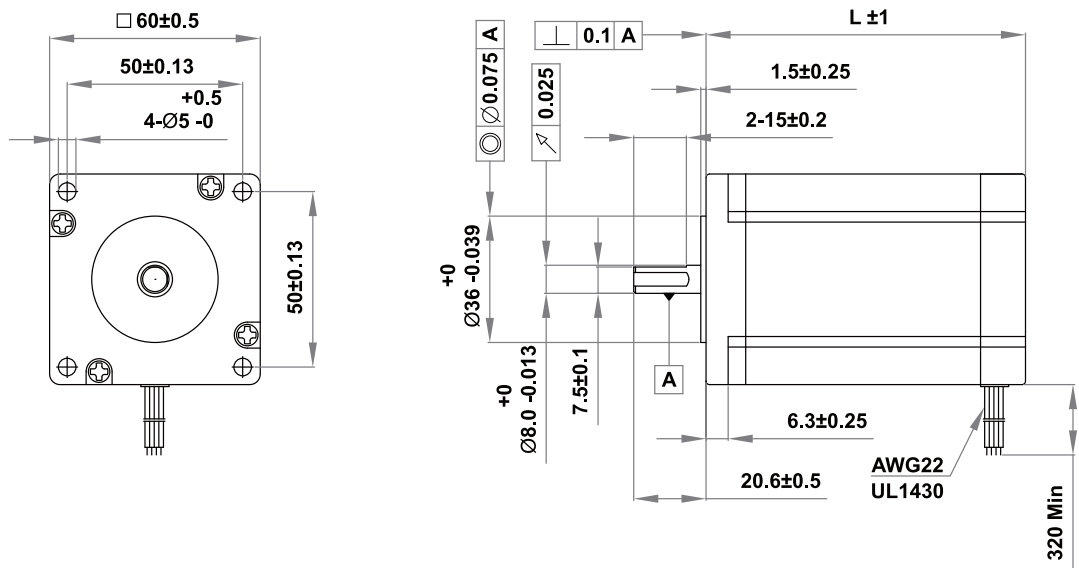


## 4.5 BM-60 Series

### 4.5.1 Motor Specifications

M O D E L		UNIT	BM-60S	BM-60M	BM-60L
DRIVE METHOD		----	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		----	2	2	2
VOLTAGE		VDC	1.52	1.56	2.6
CURRENT per PHASE		A	4	4	4
RESISTANCE per PHASE		Ohm	0.38	0.39	0.65
INDUCTANCE per PHASE		mH	0.64	1.2	2.4
HOLDING TORQUE		N · m	0.88	1.28	2.4
ROTOR INERTIA		g · cm <sup>2</sup>	140	320	800
WEIGHTS		g	600	900	1600
LENGTH (L)		mm	46	56	90
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	70	70	70
	8mm		87	87	87
	13mm		114	114	114
	18mm		165	165	165
ALLOWABLE THRUST LOAD		N	Lower than motor weight		
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)		
INSULATION CLASS		----	CLASS B (130°C)		
OPERATING TEMPERATURE		°C	0 to 55		

### 4.5.2 Motor Dimension (mm)

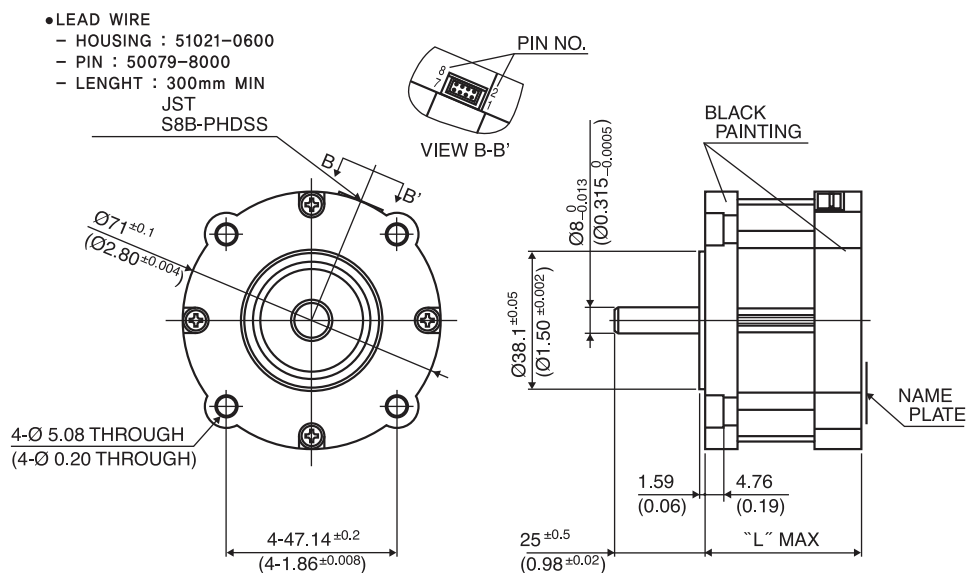


## 4.8 BM-71 Series

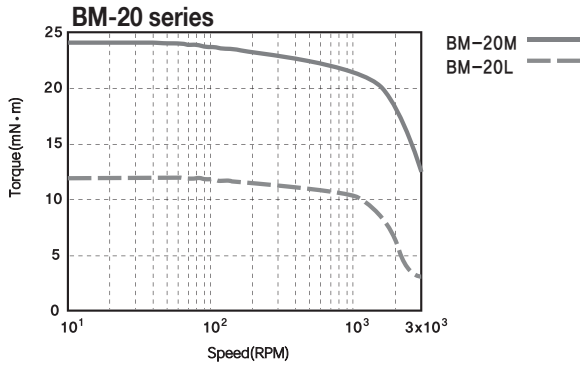
### 4.8.1 Motor Specifications

M O D E L		UNIT	BM-71M	BM-71L
DRIVE METHOD		----	BI-POLAR	BI-POLAR
NUMBER OF PHASES		----	2	2
VOLTAGE		VDC	4.68	4.4
CURRENT per PHASE		A	1.3	2.2
RESISTANCE per PHASE		Ohm	3.6	2
INDUCTANCE per PHASE		mH	11	8.3
HOLDING TORQUE		N · m	1.1	2.1
ROTOR INERTIA		g · cm <sup>2</sup>	330	660
WEIGHTS		Kg	820	1390
LENGTH (L)		mm	51.5	77.5
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	70	70
	8mm		87	87
	13mm		114	114
	18mm		165	165
ALLOWABLE THRUST LOAD		N	Lower than motor weight	
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)	
INSULATION CLASS		----	CLASS B (130°C)	
OPERATING TEMPERATURE		°C	0 to 55	

### 4.8.2 Motor Dimension (mm)

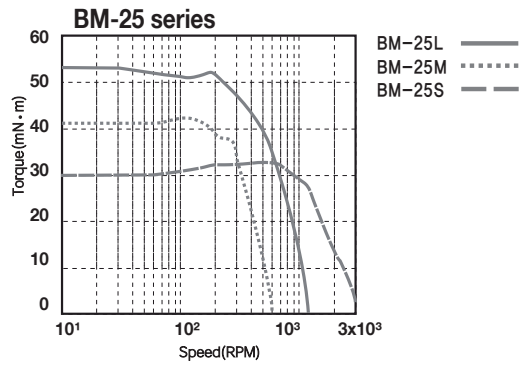


## 4.6 Motor Torque Characteristics



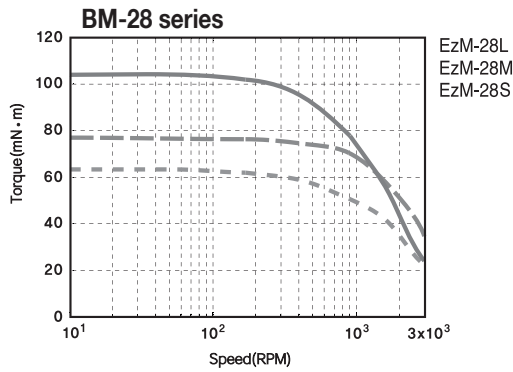
※ Measured Condition

Motor Voltage = 24VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MNB



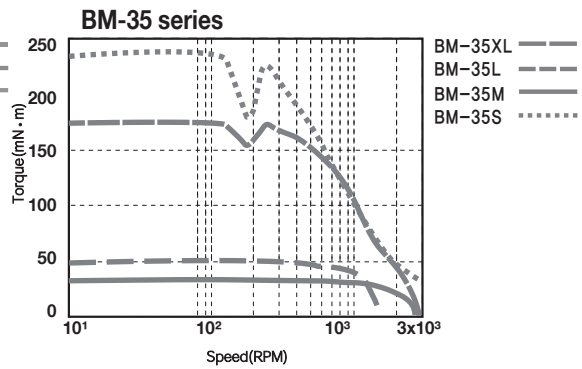
※ Measured Condition

Motor Voltage = 24VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MNB



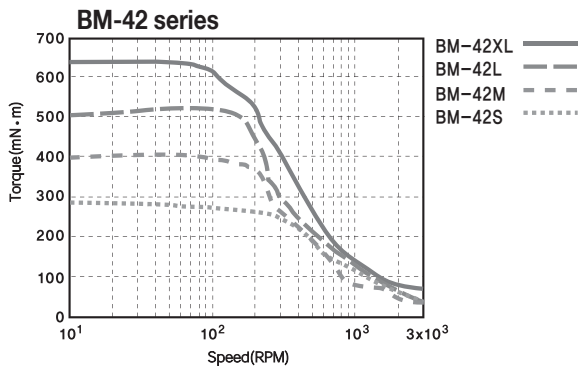
※ Measured Condition

Motor Voltage = 24VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MNB



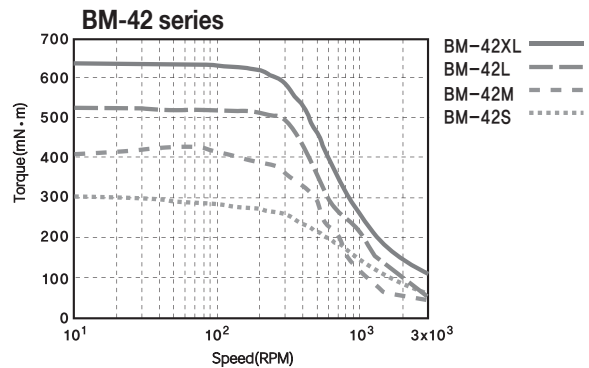
※ Measured Condition

Motor Voltage = 24VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MNB



※ Measured Condition

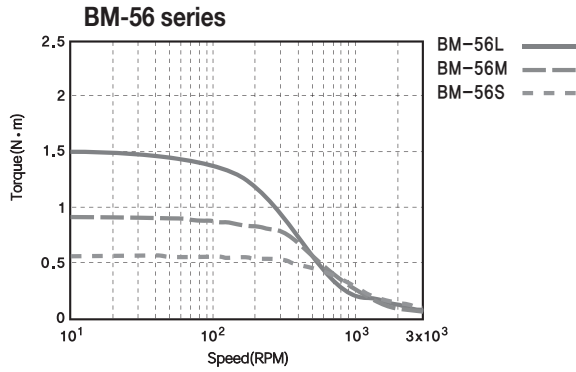
Motor Voltage = 24VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MNB



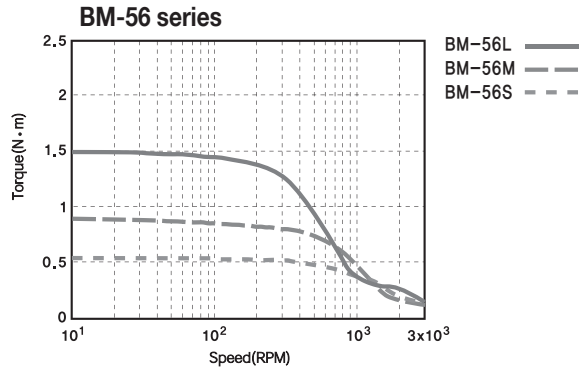
※ Measured Condition

Motor Voltage = 40VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MNB

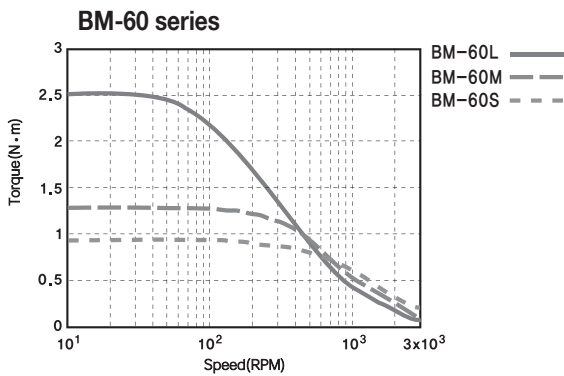
## 4.6 Motor Torque Characteristics



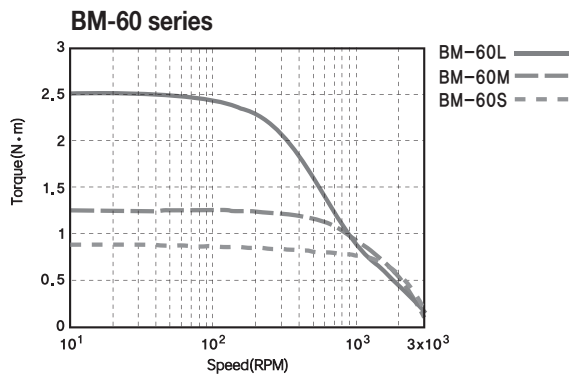
※Measured Condition  
 Motor Voltage = 24VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MPB



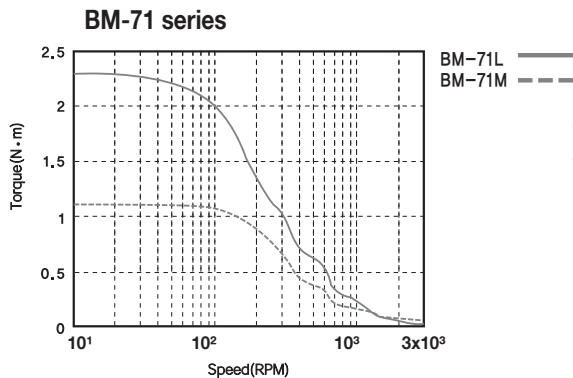
※Measured Condition  
 Motor Voltage = 40VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MPB



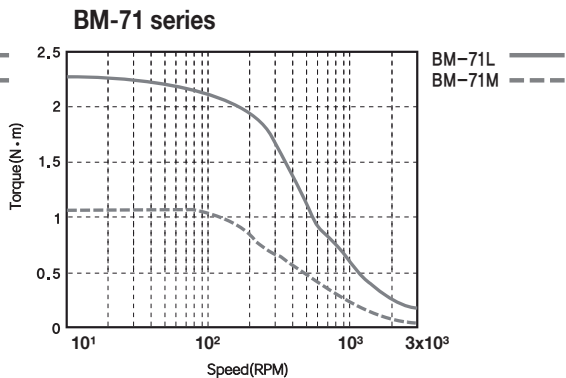
※Measured Condition  
 Motor Voltage = 24VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MPB



※Measured Condition  
 Motor Voltage = 40VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MPB



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



※Measured Condition  
 Motor Voltage = 40VDC  
 Motor Current = Rated Current(Refer to Motor Specification)  
 Drive = Ezi-STEP MPB

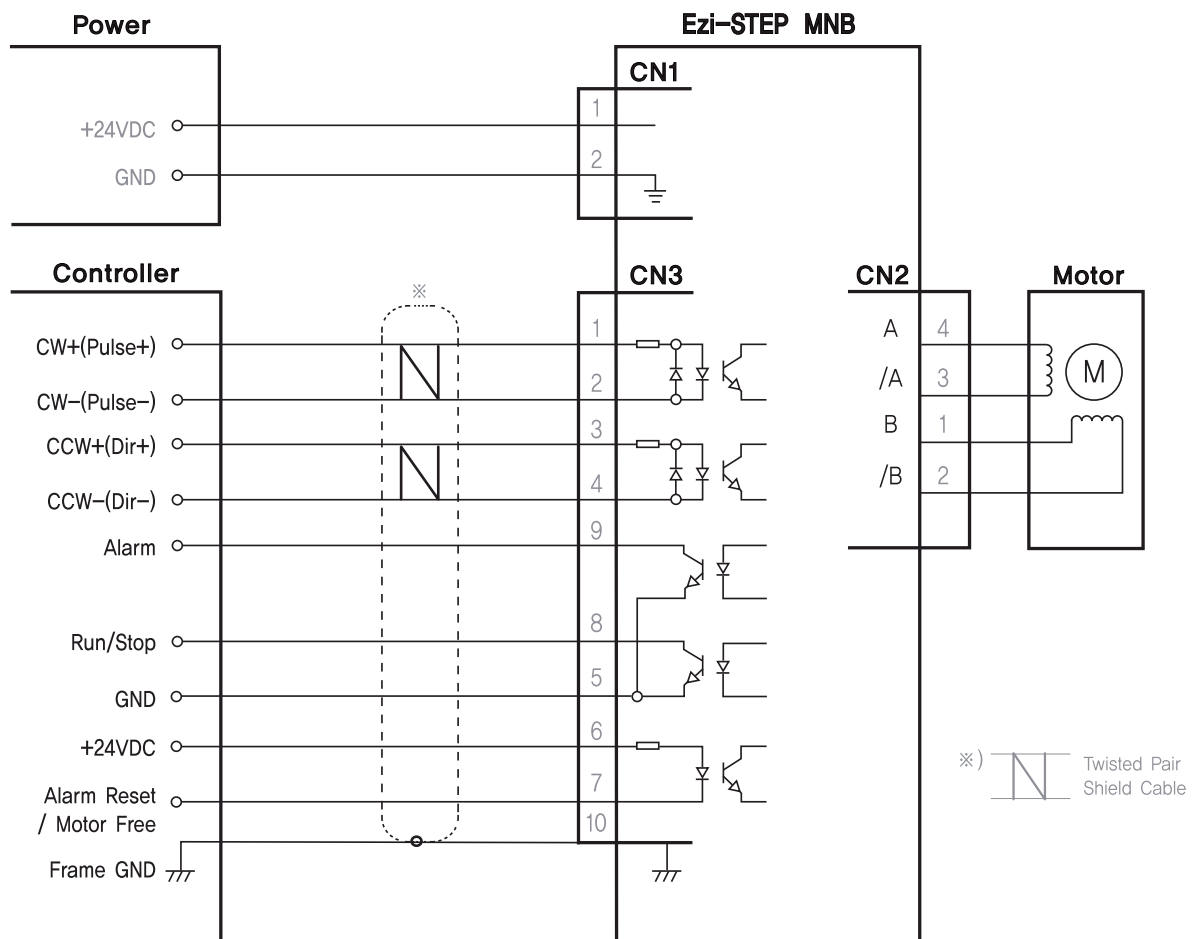
## 5. Installation and Cabling

### 5.1 Notes on Installation

- 1) Ezi-STEP is designed for indoor use only.
- 2) The ambient temperature of the room should be 0°C~50°C.
- 3) If the temperature of the product case is higher than 50°C, radiate heat of the outside to cool down.
- 4) Do not install Ezi-STEP under direct rays, near magnetic or radioactive objects.

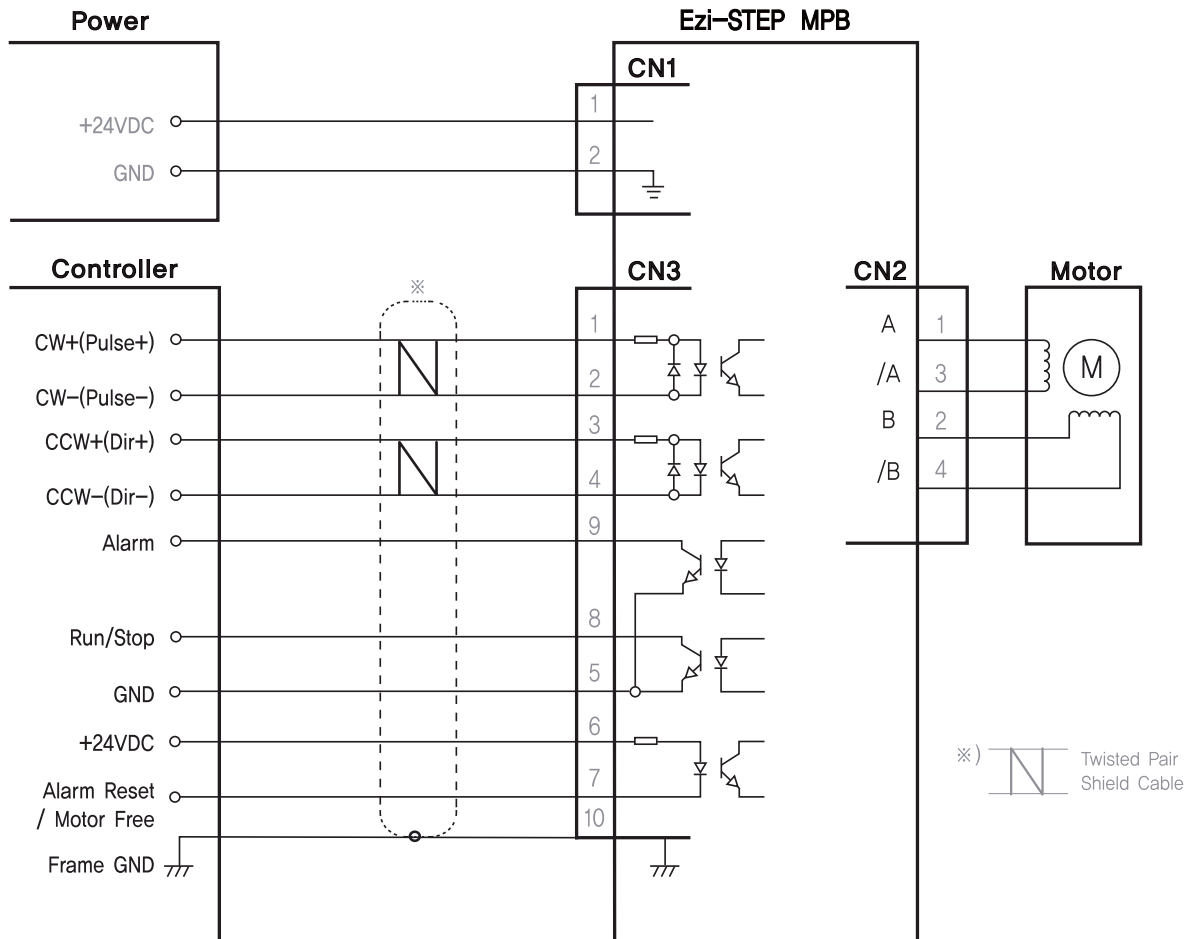
### 5.2 Connection Diagram

#### 5.2.1 MNB Series



\*Alarm Rest signal line is also used for Motor FREE signal.  
(For details, please refer to the section for Control Input/Output signal)

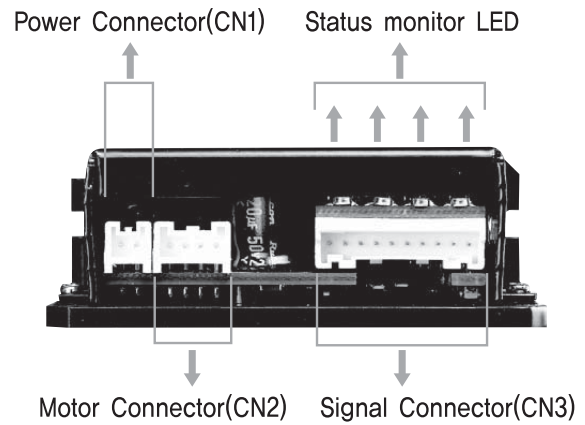
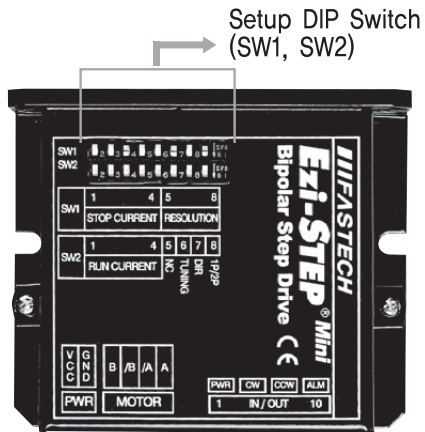
## 5.2.2 MPB Series



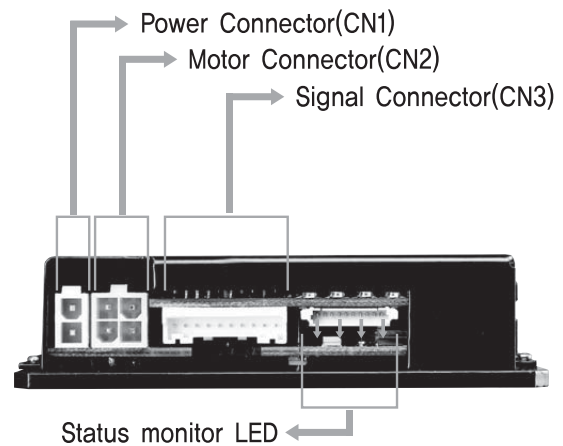
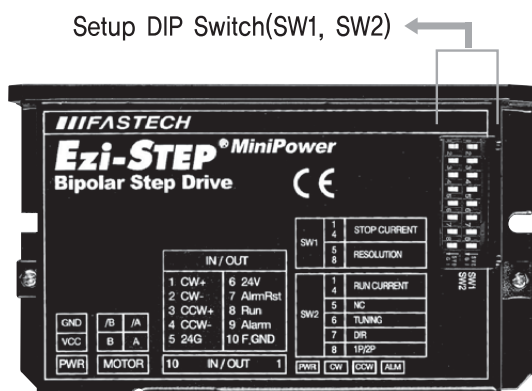
\*Alarm Rest signal line is also used for Motor FREE signal.  
 (For details, please refer to the section for Control Input/Output signal)

## 6. Setting and Operation

### ◆ MNB Series



### ◆ MPB Series



## 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
ALM	Red	Alarm Indication	Flash when protection function is activated (Identifiable which protection mode is activated by counting the LED flash times)
CW	Yellow	Motor Rotation Indication	Lights when motor rotate CW direction
CCW	Orange	Motor Rotation Indication	Lights when motor rotate CCW direction

### 6.1.2 Protection functions and LED flash times

Times	Protection	Conditions
1	Over Current Error	Excessive current flowed into a motor
2	Over Speed Error	Motor speed exceeded 3,000rpm
3	Step Out Error	Abnormally motor do not followed pulsed input
5	Over Temperature Error	Internal temperature of a motor drive exceeded 55°C
6	Over Regenerative Voltage Error	Back-EMF is more high limit value *MNB : 50V, MPB : 70V
7	Motor Connect Error	Power is ON without connection of motor cable to drive
9	Motor Voltage Error	Motor voltage is less than low limit value *MNB : 20V, MPB : 36V
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: Step out)



## 6.2. Stop Current Selection Switch (SW1.1~SW1.4)

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

Switch Position(SW1)				STOP Current(%)	Switch Position(SW1)				STOP Current(%)
4	3	2	1		4	3	2	1	
1	1	1	1	10	0	1	1	1	90
1	1	1	0	20	0	1	1	0	100
1	1	0	1	30	0	1	0	1	10
1	1	0	0	40	0	1	0	0	10
1	0	1	1	50	0	0	1	1	10
1	0	1	0	60	0	0	1	0	10
1	0	0	1	70	0	0	0	1	10
1	0	0	0	80	0	0	0	0	10

※The default factory setting is 50%.

## 6.3 Resolution Selection Switch(SW1.5~SW1.8)

The number of pulse per revolution.

Switch Position(SW1)				Pulse/ Revolution	Switch Position(SW1)				Pulse/ Revolution
8	7	6	5		8	7	6	5	
1	1	1	1	500	0	1	1	1	6,400
1	1	1	0	1,000	0	1	1	0	8,000
1	1	0	1	1,600	0	1	0	1	10,000
1	1	0	0	2,000	0	1	0	0	20,000
1	0	1	1	3,200	0	0	1	1	25,000
1	0	1	0	3,600	0	0	1	0	36,000
1	0	0	1	4,000	0	0	0	1	40,000
1	0	0	0	5,000	0	0	0	0	50,000

※The default factory setting is 10,000

## 6.4 Tuning Selection Switch(SW2.6)

Tuning is used for optimization of motor rotation of Ezi-STEP drive. After the drive and motor installed, the Ezi-STEP will be optimized by installed condition with Tuning. This function can be done only one time after installation. This function have to be done one more time when installation or cabling is changed.

-Tuning method is as follows.

1. Turn 'ON' the power.
2. Set Tuning switch(SW2.6) to '1' .
3. Set Tuning switch to '0' after 2 seconds elapsed.

- ※Attention : Do not Tuning during motion.
- ※It's normal for 'BEEP' sound during Tuning.
- ※Tuning must be done without load.

## 6.5 Rotational Direction Selection Switch(SW2.7)

Indication	Switch Name	Functions
DIR	Rotational Direction Select Switch	Based on CW(+Dir signal) input to drive. 1 : CCW(-Direction) 0 : CW(-Direction) ※The default factory setting is CW(Clockwise).

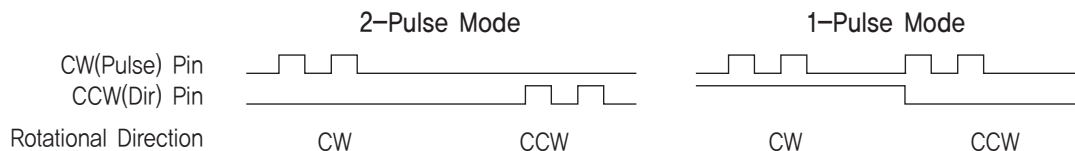
Direction selection switch :  
1  
CCW Dir.



Direction selection switch :  
0  
CW Dir.

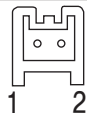
## 6.6 Pulse Input Selection Switch(SW2.8)

Indication	Switch Name	Functions
1P/2P	Pulse Input Mode Select Switch	Selectable 1-Pulse input mode of 2-Pulse input mode as pulse input signal, 1 : 1-Pulse mode 0 : 2-Pulse mode ※The default factory setting is 2-Pulse mode




## 6.7 Power Connector(CN1)

### 6.7.1 MNB Series

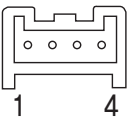
NO.	Function	Pin Layout
1	Input Power : 24VDC $\pm$ 10%	
2	Input Power : GND	

### 6.7.2 MPB Series

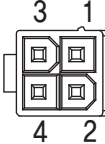
NO.	Function	Pin Layout
1	Input Power : 24VDC $\pm$ 10%	
2	Input Power : GND	

## 6.8 Motor Connector(CN2)


### 6.8.1 MNB Series

NO.	Function	Pin Layout
1	B Phase	
2	/B Phase	
3	/A Phase	
4	A Phase	

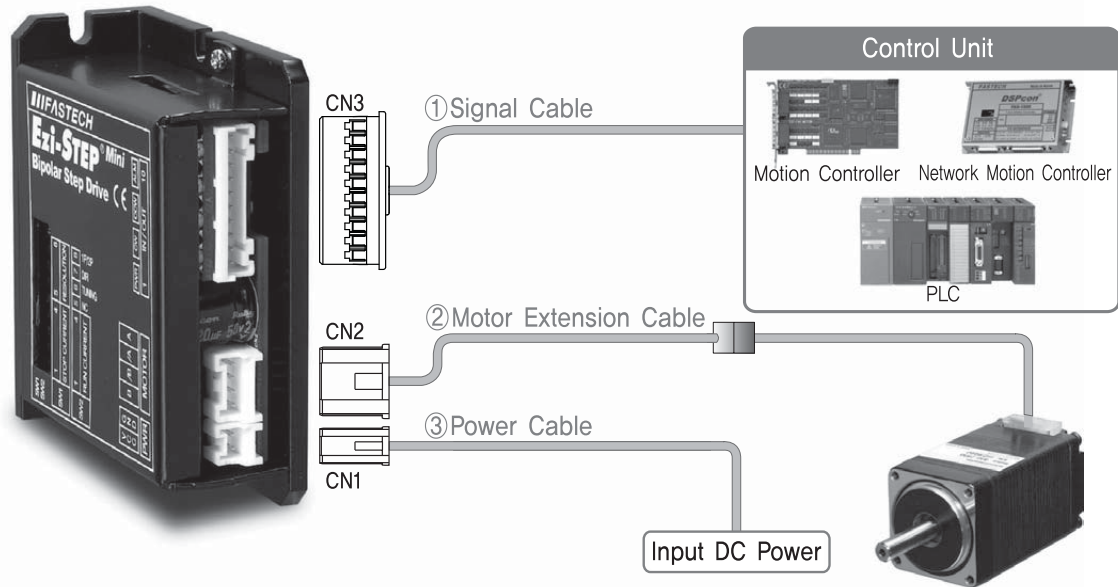
### 6.8.2 MPB Series

NO.	Function	Pin Layout
1	A Phase	
2	B Phase	
3	/A Phase	
4	/B Phase	

### 6.9 Signal Connector(CN3)

NO.	Function	Input/Output	Pin Layout
1	CW+(PULSE+)	Input	
2	CW-(PULSE-)	Input	
3	CCW+(DIR+)	Input	
4	CCW-(DIR-)	Input	
5	GND	Input	
6	+24VDC	Input	
7	ALARM RESET	Input	
8	RUN/STOP	Output	
9	ALARM	Output	
10	F. GND	-----	

## 7. System Configuration [MNB Series]



Type	Power Cable	Motor Cable	Signal Cable
Standard Length	—	30m	—
Max. Length	2m	20m	20m

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

### 7.1 Option

#### ①Signal Cable

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

Item	Length[m]	Remark
CMNB-S-□□□F	□□□	Normal Cable
CMNB-S-□□□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 MNB.

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.

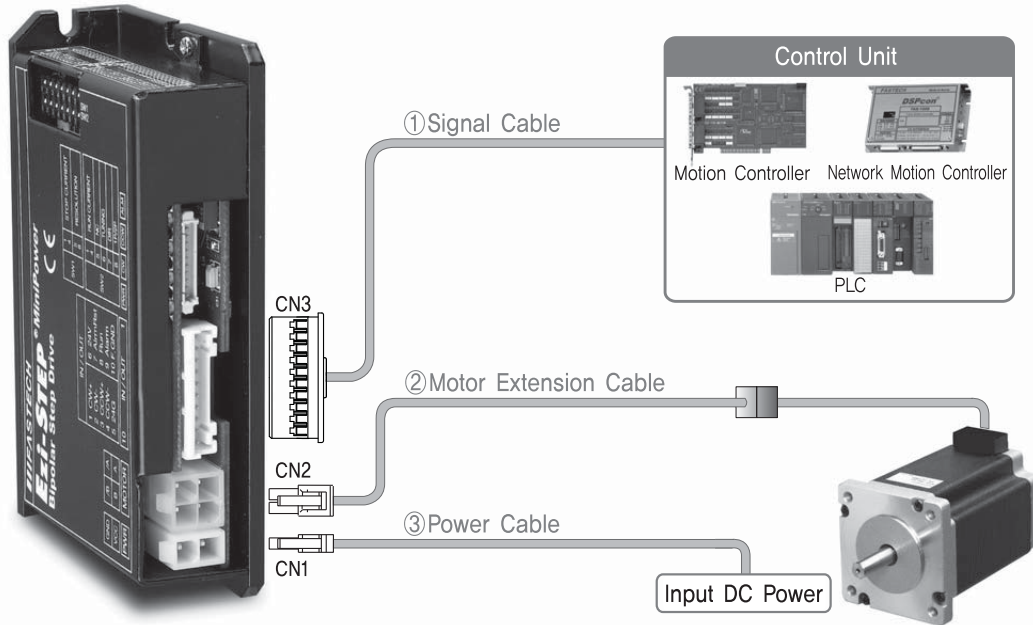
#### ②Motor Extension Cable

Available to connect between motor and Ezi-STEP MNB.

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.

## 8. System Configuration [MPB Series]



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

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

### 8.1 Option

#### ①Signal Cable

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

Item	Length[m]	Remark
CMNB-S-□□□F	□□□	Normal Cable
CMNB-S-□□□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 MPB.

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

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

#### ②Motor Extension Cable

Available to connect between motor and Ezi-STEP MPB.

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

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

## 9. Control signal Input/Output Description

### 9.1 Input Signal

Input signals 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

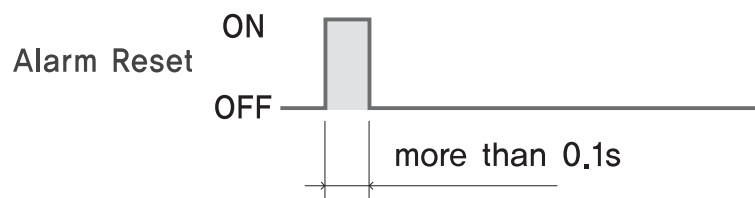
This signal can be used to receive a positioning pulse command from a user-side host motion controller. A user can select 1-pulse input mode or 2-pulse input mode. The input schematic of CW, CCW is designed for 5V TTL level. When using 5V level as an input signal, the resistor Rx is used and connect to the drive directly. When the level of input signal 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 680ohm and in 24V case, 1.8Kohm is suitable for Rx value.

#### ◆ Motor Free Input

This input can be used only to adjust the position by manually moving the motor shaft from the load-side. By setting the signal [ON], the drive cuts off the power supply to the motor. Then, one can manually adjust output position. When setting the signal back to [OFF], the drive resumes the power supply to the motor and recovers the holding torque. When driving a motor, one needs to set the signal [OFF]. In normal operations set the signal [OFF] or disconnect a wire to the signal.

#### ◆ Alarm Reset Input

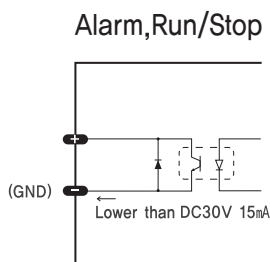
When a protection mode has been activated, a signal to this Alarm Reset input cancels the Alarm output. By setting the alarm reset input signal [ON], cancel Alarm output. Before cancel the Alarm output, have to remove the source of alarm.



**[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.

## 9.2 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.

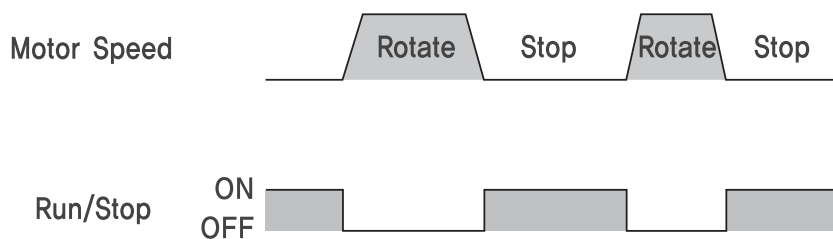


### ◆ Alarm Output

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 needs to detect this signal and stop sending a motor driving command. When the drive detects an abnormal operation such as overload or 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.

### ◆ Run/Stop Output

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



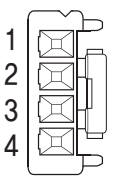
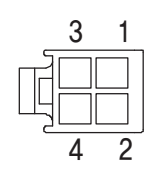


# Appendix

## ▪ Extension cable for Motor (MNB Series)

For cable extension between Motor and Drive.

### WIRING DIAGRAM

Drive Connector		Cabling	Motor Connector	
Pin Layout	Number		Number	Pin Layout
	1 2 3 4	----- 2 ----- 4 ----- 3 ----- 1	2 4 3 1	

### CONNECTOR

ITEM		Part Number	Maker
Power Connector (CN1)	Connector Housing	PAP-02V-S	JST
	Terminal	SPHD-002T-P0,5	JST
Motor Connector	Drive Side (CN2)	Connector Housing	JST
	Terminal	SPHD-002T-P0,5	JST
Motor Connector	Motor Side	Connector Housing	MOLEX
	Terminal	5557-04R 5556T	MOLEX
Signal Connector (CN3)		Connector Housing	JST
		Terminal	SPHD-002T-P0,5

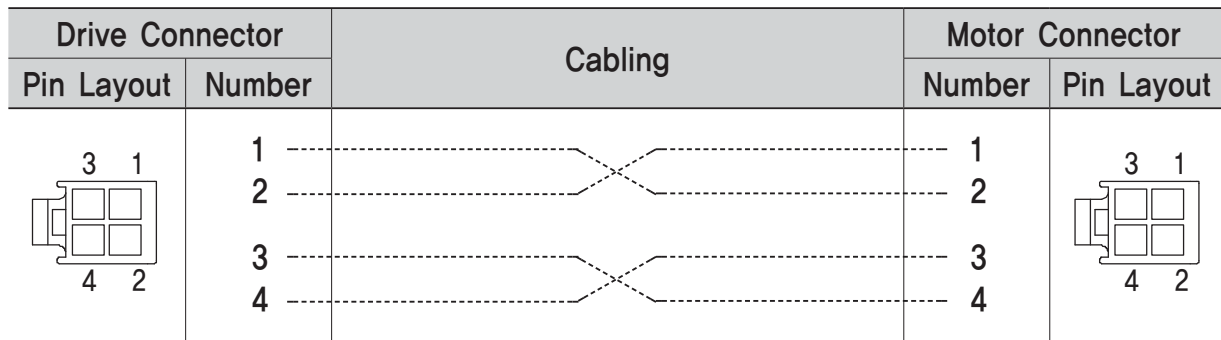
※These connectors are serviced together with Ezi-STEP except when purchasing cables as an option.

※Above connector is the most suitable product for Ezi-STEP. Another equivalent connector can be used.

## ■ Extension cable for Motor (MPB Series)

For cable extension between Motor and Drive.

### WIRING DIAGRAM



### CONNECTOR

ITEM		Part Number	Maker
Power Connector (CN1)	Connector Housing	5557-02R	MOLEX
	Terminal	5556T	MOLEX
Motor Connector (CN2)	Connector Housing	5557-04R	MOLEX
	Terminal	5556T	MOLEX
Signal Connector (CN3)	Connector Housing	PAP-10V-S	JST
	Terminal	SPHD-002T-P0,5	JST

※These connectors are serviced together with Ezi-STEP except when purchasing cables as an option.

※Above connector is the most suitable product for Ezi-STEP. Another equivalent connector can be used.

**MEMO**



*Fast, Accurate, Smooth Motion*

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

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