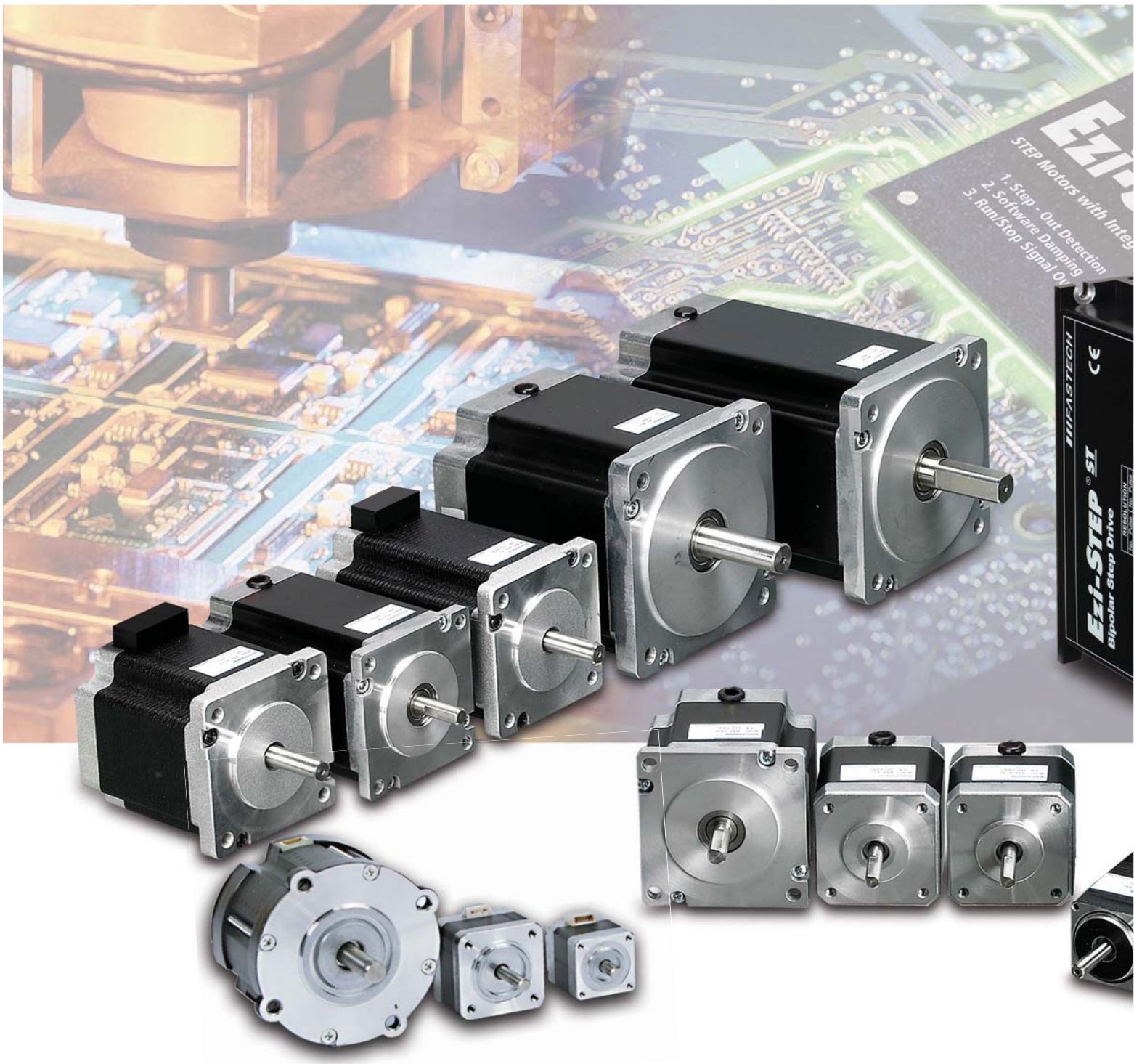
Ezi-STEP®

Micro Stepping System

- Micro Stepping
- Sensorless Stall Detection
- Software Damping
- Run / Stop Signal Output

ST

FASTECH



FASTECH

Ezi-STEP® ST

Micro Stepping System

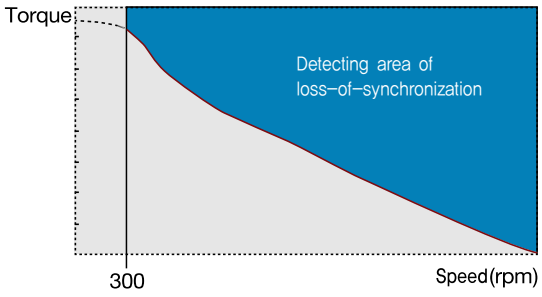
● Ezi-STEP Characteristics

Ezi-STEP® is a micro stepping system that incorporates a motor and DSP (Digital Signal Processor) equipped drive that is integrated seamlessly together as a system. This makes it possible to incorporate many functions compared with a conventional stepping motors and drives, such as sensorless detection of loss of synchronization, smooth control over the whole velocity range, higher torque operation and no vibration at the low speed range.
Ezi-STEP®' s on-board high-performance digital signal processor and proprietary algorithms allow the Ezi-STEP® to operate a high speeds with unmatched precision. The unique position estimation algorithm instantaneously detects out-of-synchronization based on the rotor position of the stepping motor, which is not an easy task in a conventional stepping motor and drives (effective only over 300 rpm.)
Utilizing a software damping and filtering algorithms, high speed operation is realized by the exciting angle control of a step-angle. The resolution of Ezi-STEP® can be selected from basic 1.8° up to 0.0072° (1/250). In addition, Ezi-STEP® generates various signals including sensorless stall detection, alarm and running signal. Ezi-STEP® is an economical ideal drive for vision systems, nanotech, packaging, semiconductor, pick and place, automation, laboratory testing, wood working and wherever smooth, quiet, precise, high torque operation is a requirement!

1 Sensorless Stall Detection

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

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

High precision Microstep function and Filtering (Patent pending)

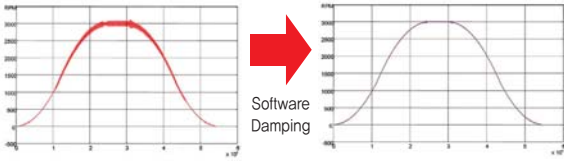
The high-performance DSP operates at step resolutions of 1.8° up to maximum 0.0072° (1/250 steps) and Ezi-STEP® adjusts PWM control signal in every 25μ sec, which makes it possible for more precise current control, resulting in high-precision Microstep operation.

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® 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.

● Part Numvering

Ezi-STEP-MNB-42S-□

- Drive Series Type
- Drive Type
  - MN : Mini
  - MP : Mini Power
  - HP : High Power
- Motor Type
  - B : Bipolar
  - U : Unipolar
- Motor Size
  - 20 : 20mm
  - 25 : 25mm
  - 28 : 28mm
  - 35 : 35mm
  - 42 : 42mm
  - 56 : 56mm
  - 60 : 60mm
  - 71 : 71mm
  - 86 : 86mm
- Motor Length
  - S : Single
  - M : Middle
  - L : Large
  - XL: Extra Large
- User Code

● Combination List

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-25S	BM-25S	EzStep-MNB-25S
Ezi-STEP-MNB-25M	BM-25M	EzStep-MNB-25M
Ezi-STEP-MNB-25L	BM-25L	EzStep-MNB-25L
Ezi-STEP-MNB-28S	BM-28S	EzStep-MNB-28S
Ezi-STEP-MNB-28M	BM-28M	EzStep-MNB-28M
Ezi-STEP-MNB-28L	BM-28L	EzStep-MNB-28L
Ezi-STEP-MNB-35S	BM-35S	EzStep-MNB-35S
Ezi-STEP-MNB-35M	BM-35M	EzStep-MNB-35M
Ezi-STEP-MNB-35L	BM-35L	EzStep-MNB-35L
Ezi-STEP-MNB-35XL	BM-35XL	EzStep-MNB-35XL
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

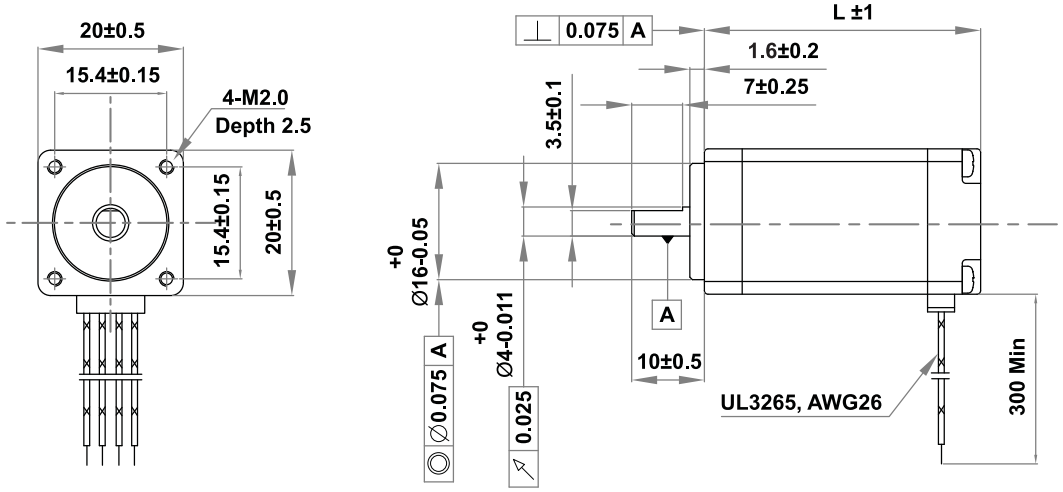
Unit part Number	Motor Model Number	Drive Model Number
Ezi-STEP-MPB-42S	BM-42S	EzStep-MPB-42S
Ezi-STEP-MPB-42M	BM-42M	EzStep-MPB-42M
Ezi-STEP-MPB-42L	BM-42L	EzStep-MPB-42L
Ezi-STEP-MPB-42XL	BM-42XL	EzStep-MPB-42XL
Ezi-STEP-MPB-56S	BM-56S	EzStep-MPB-56S
Ezi-STEP-MPB-56M	BM-56M	EzStep-MPB-56M
Ezi-STEP-MPB-56L	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
Ezi-STEP-MPB-71M	BM-71M	EzStep-MPB-71M
Ezi-STEP-MPB-71L	BM-71L	EzStep-MPB-71L

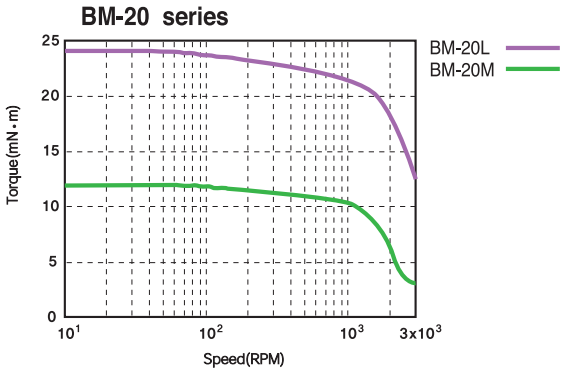
Unit part Number	Motor Model Number	Drive Model Number
Ezi-STEP-HPB-86M	BM-86M	EzStep-HPB-86M
Ezi-STEP-HPB-86L	BM-86L	EzStep-HPB-86L
Ezi-STEP-HPB-86XL	BM-86XL	EzStep-HPB-86XL

● 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	0.013	0.025
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	

● Motor Dimension [mm] and Torque Characteristics





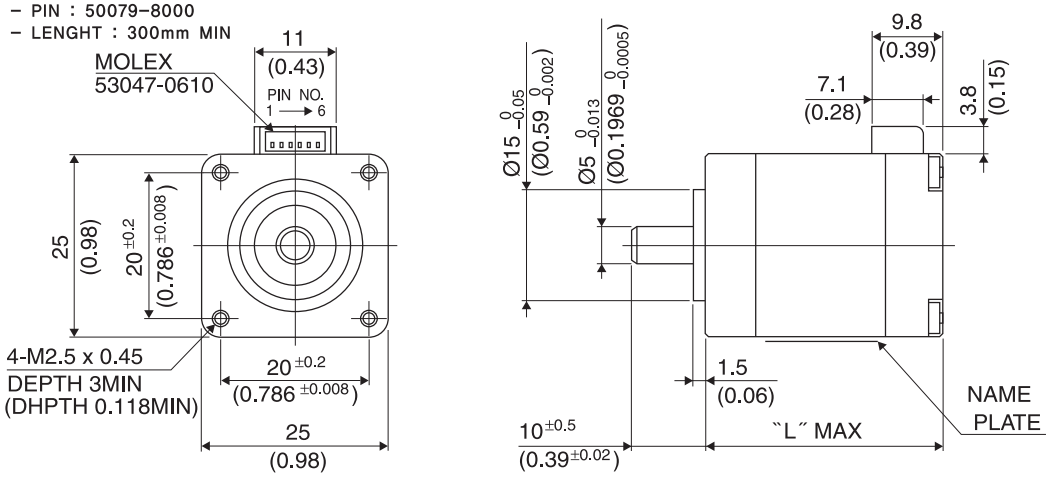
※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

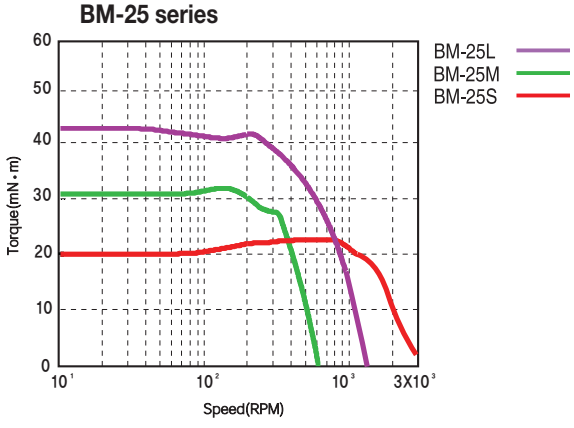
● Motor Specifications

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 · ㎠	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℃)		
OPERATING TEMPERATURE		℃	0 to 55		

● Motor Dimension [mm] and Torque Characteristics

- LEAD WIRE
  - HOUSING : 51021-0600
  - PIN : 50079-8000
  - LENGHT : 300mm MIN



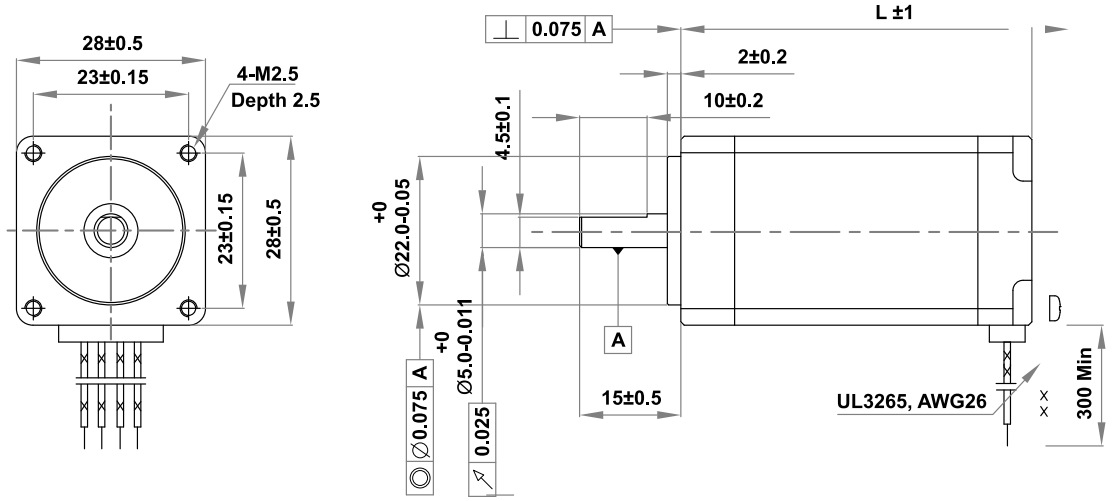


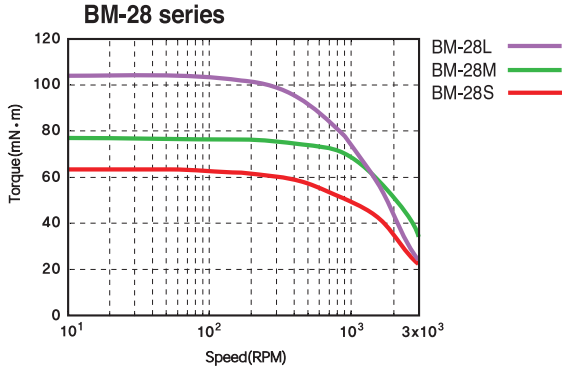
※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

● 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	0.065	0.08	0.11
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
	18mm		84	84	84
ALLOWABLE THRUST LOAD		N	Lower than motor weight		
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)		
INSULATION CLASS		-----	CLASS B (130℃)		
OPERATING TEMPERATURE		℃	0 to 55		

● Motor Dimension [mm] and Torque Characteristics



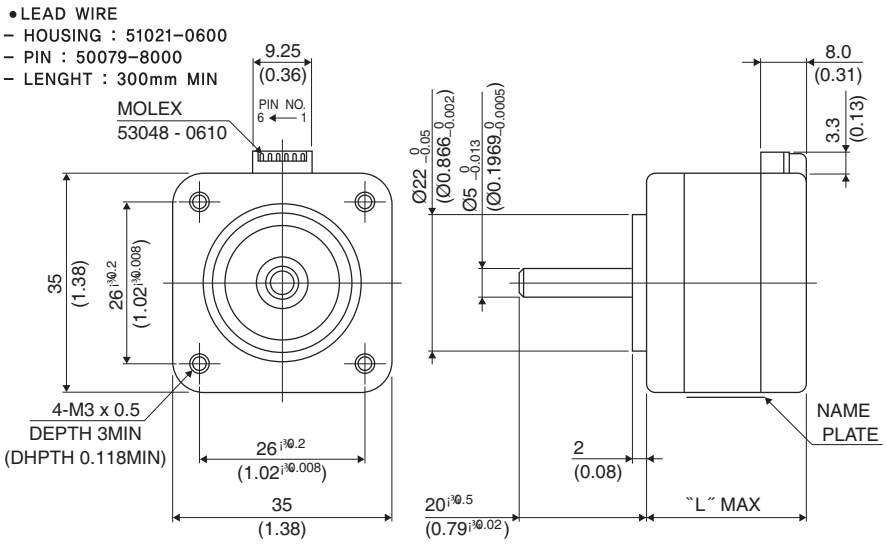


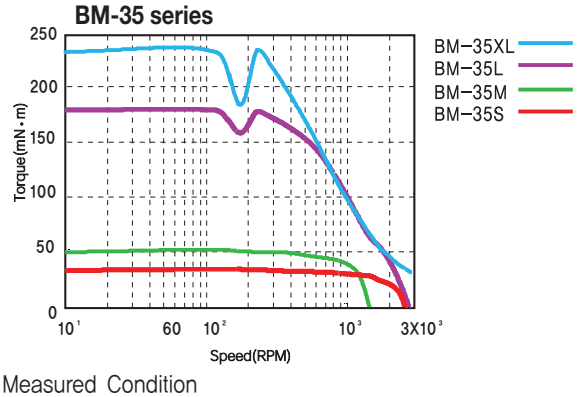
※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

● 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 · ㎠	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℃)			
OPERATING TEMPERATURE		℃	0 to 55			

● Motor Dimension [mm] and Torque Characteristics



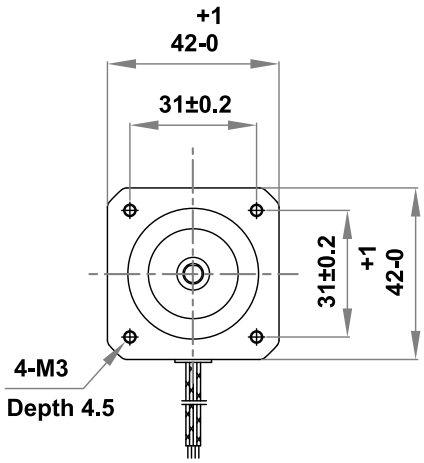


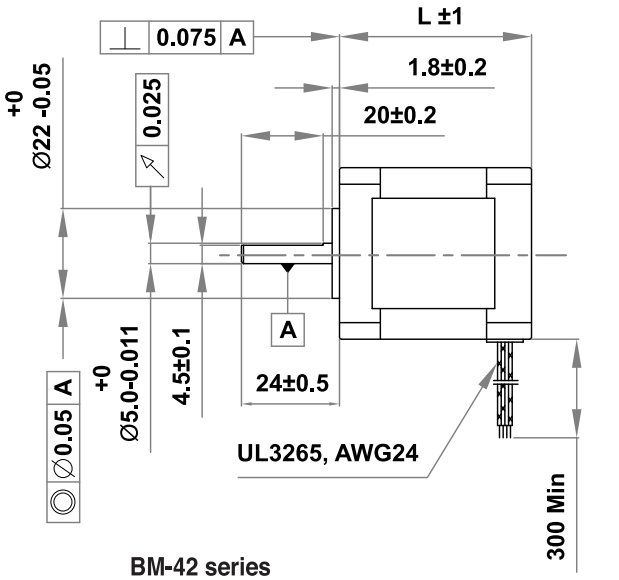
※Measured Condition
Motor Voltage = 24VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

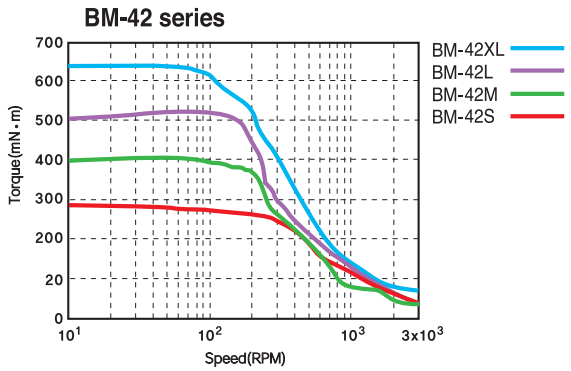
● Motor Specifications

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	0.65
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			

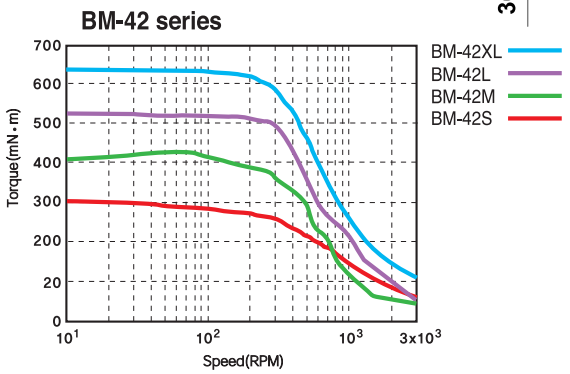
● Motor Dimension [mm] and Torque Characteristics







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

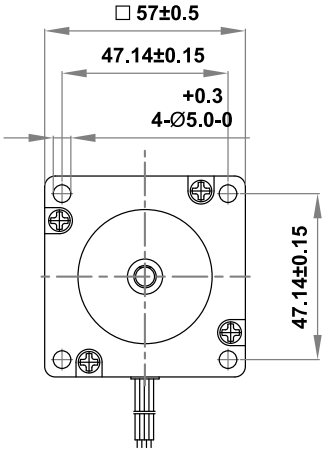


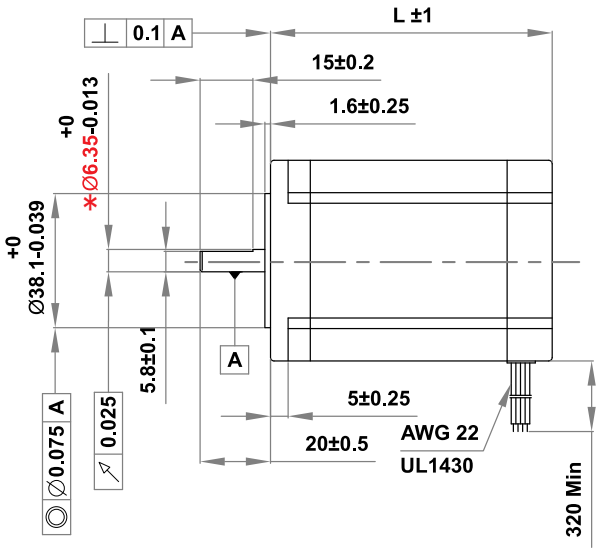
※Measured Condition
Motor Voltage = 40VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

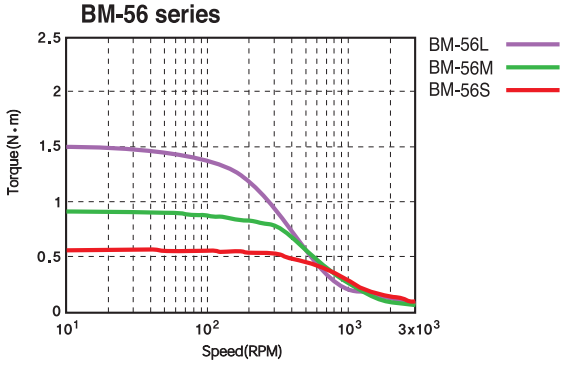
● Motor Specifications

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		

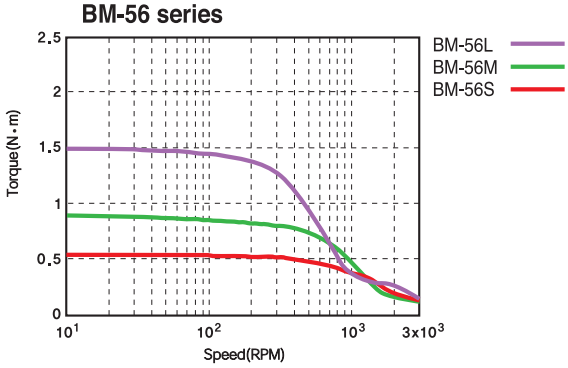
● Motor Dimension [mm] and Torque Characteristics







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



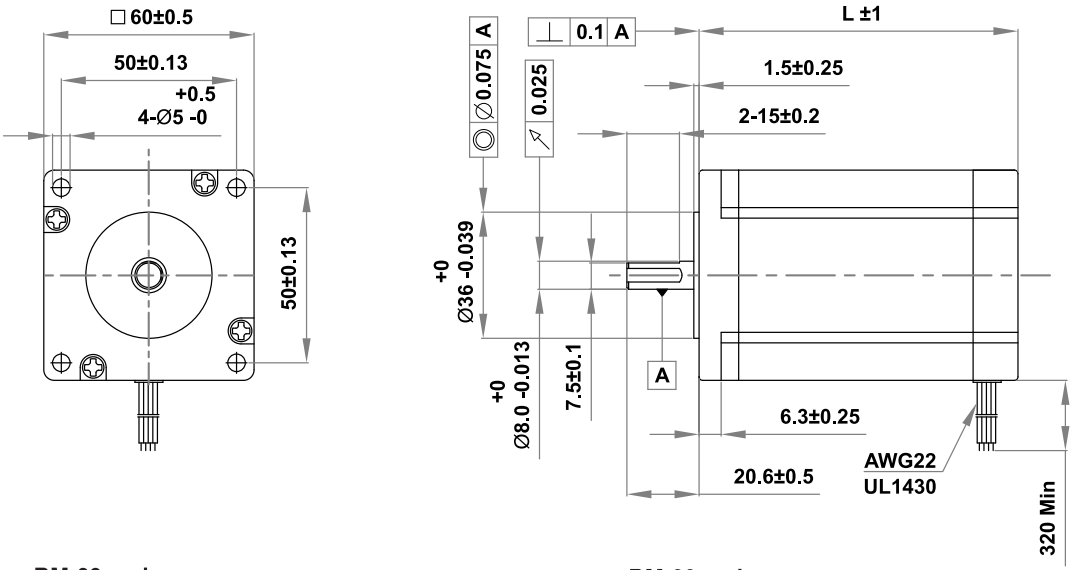
※Measured Condition
Motor Voltage = 40VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

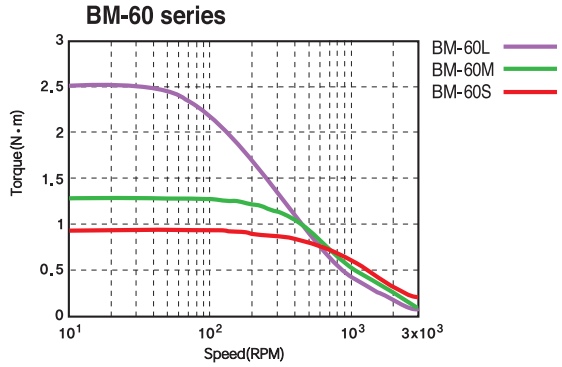
* : There are 2 kinds size of front shaft diameter for BM-56 series as Φ6.35 and Φ8.0.

● Motor Specifications

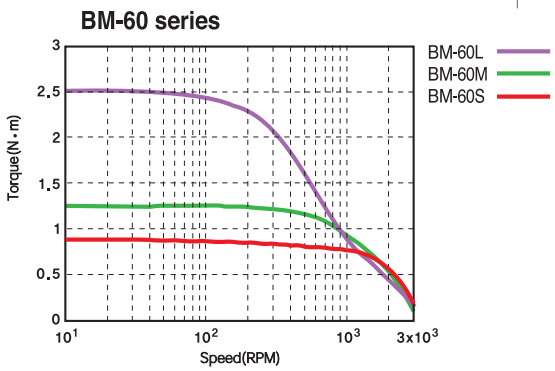
M O D E L		UNIT	BM-60S	BM-60M	BM-60L
DRIVE METHOD		-----	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		-----	2	2	2
VOLTAGE		VDC	1.52	1.56	2.6
CURRENT per PHASE		A	4	4	4
RESISTANCE per PHASE		Ohm	0.38	0.39	0.65
INDUCTANCE per PHASE		mH	0.64	1.2	2.4
HOLDING TORQUE		N · m	0.88	1.28	2.4
ROTOR INERTIA		g · ㎠	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℃)		
OPERATING TEMPERATURE		℃	0 to 55		

● Motor Dimension [mm] and Torque Characteristics





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

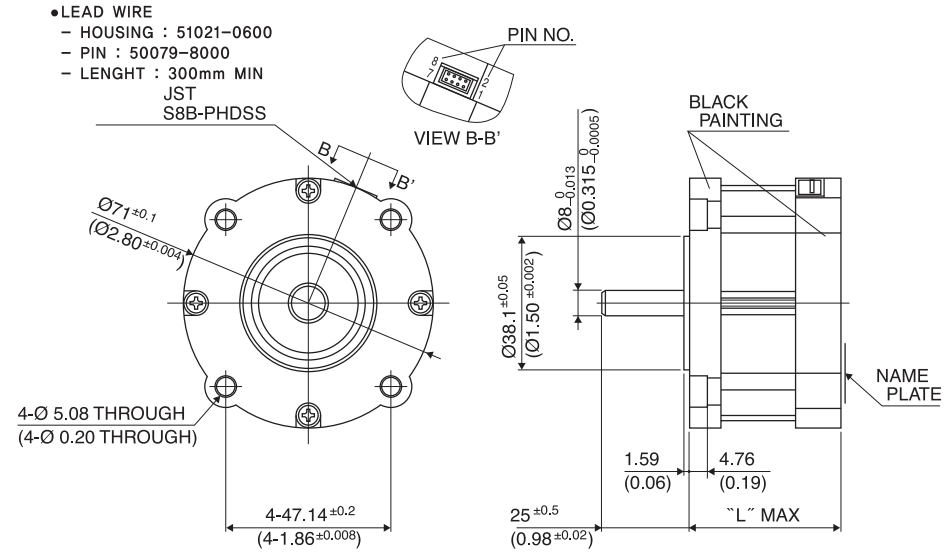


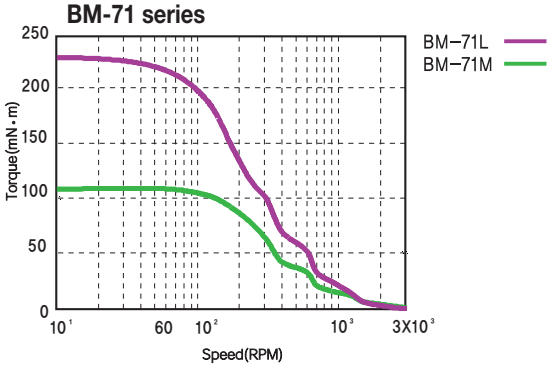
※Measured Condition
Motor Voltage = 40VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

● Motor Specifications

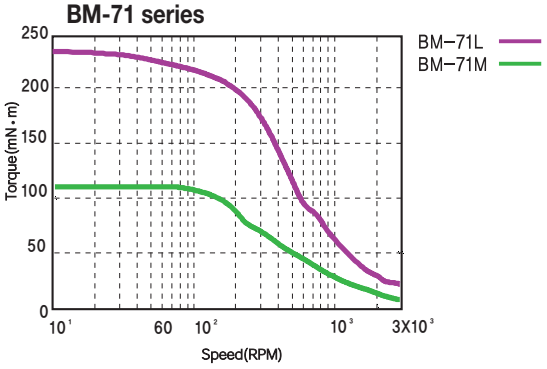
M O D E L		UNIT	BM-71M	BM-71L
DRIVE METHOD		----	BI-POLAR	BI-POLAR
NUMBER OF PHASES		----	2	2
VOLTAGE		VDC	4.68	4.4
CURRENT per PHASE		A	1.3	2.2
RESISTANCE per PHASE		Ohm	3.6	2
INDUCTANCE per PHASE		mH	11	8.3
HOLDING TORQUE		N · m	1.1	2.1
ROTOR INERTIA		g · ㎠	330	660
WEIGHTS		Kg	820	1390
LENGTH (L)		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℃)	
OPERATING TEMPERATURE		℃	0 to 55	

● Motor Dimension [mm] and Torque Characteristics





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



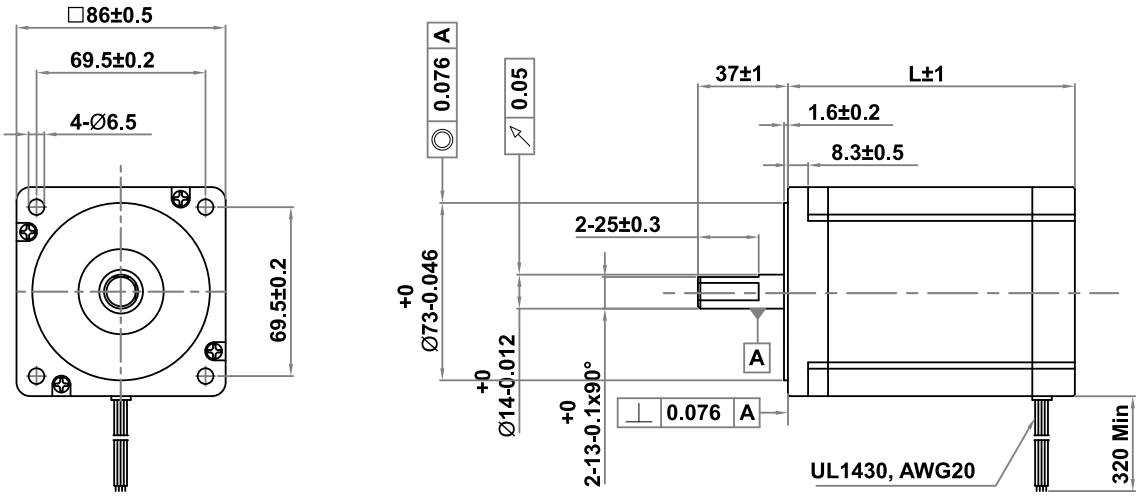
※Measured Condition
Motor Voltage = 40VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

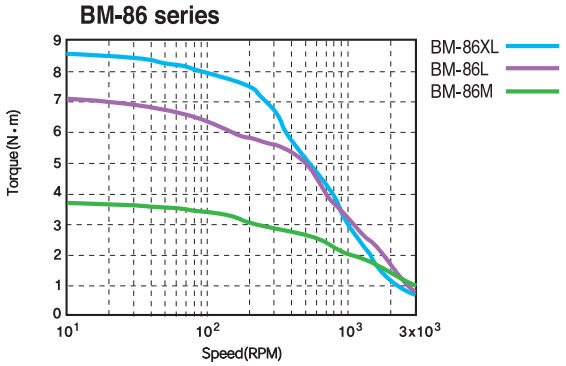
* 56mm and 71mm stepper's mounting position is same which can be cross-compatible for mounting

● Motor Specifications

M O D E L		UNIT	BM-86M	BM-86L	BM-86XL
DRIVE METHOD		-----	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		-----	2	2	2
VOLTAGE		VDC	2.4	3.6	4.38
CURRENT per PHASE		A	6	6	6
RESISTANCE per PHASE		Ohm	0.4	0.6	0.73
INDUCTANCE per PHASE		mH	3.5	6.5	8.68
HOLDING TORQUE		N · m	4.0	7.5	9.0
ROTOR INERTIA		g · ㎠	1400	2700	4000
WEIGHTS		Kg	2.4	3.9	5.4
LENGTH (L)		mm	79	117	155
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	270	270	270
	8mm		300	300	300
	13mm		350	350	350
	18mm		400	400	400
ALLOWABLE THRUST LOAD		N	Lower than motor weight		
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)		
INSULATION CLASS		-----	CLASS B (130℃)		
OPERATING TEMPERATURE		℃	0 to 55		

● Motor Dimension [mm] and Torque Characteristics



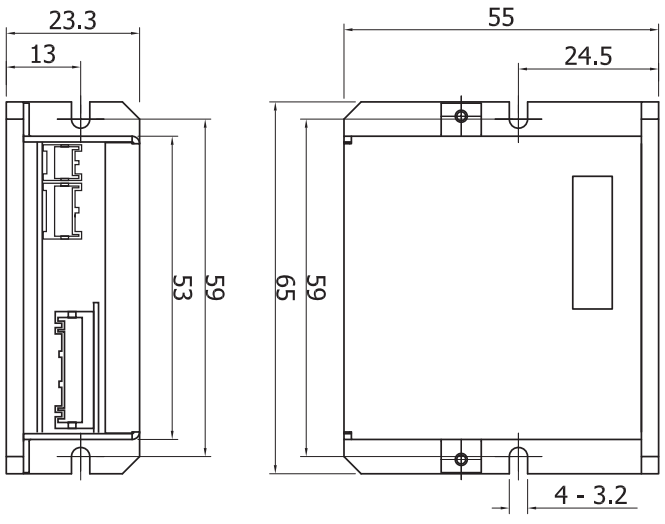


※Measured Condition
Motor Voltage = 70VDC
Motor Current = Rated Current(Refer to Motor Specification)
Drive = Ezi-STEP

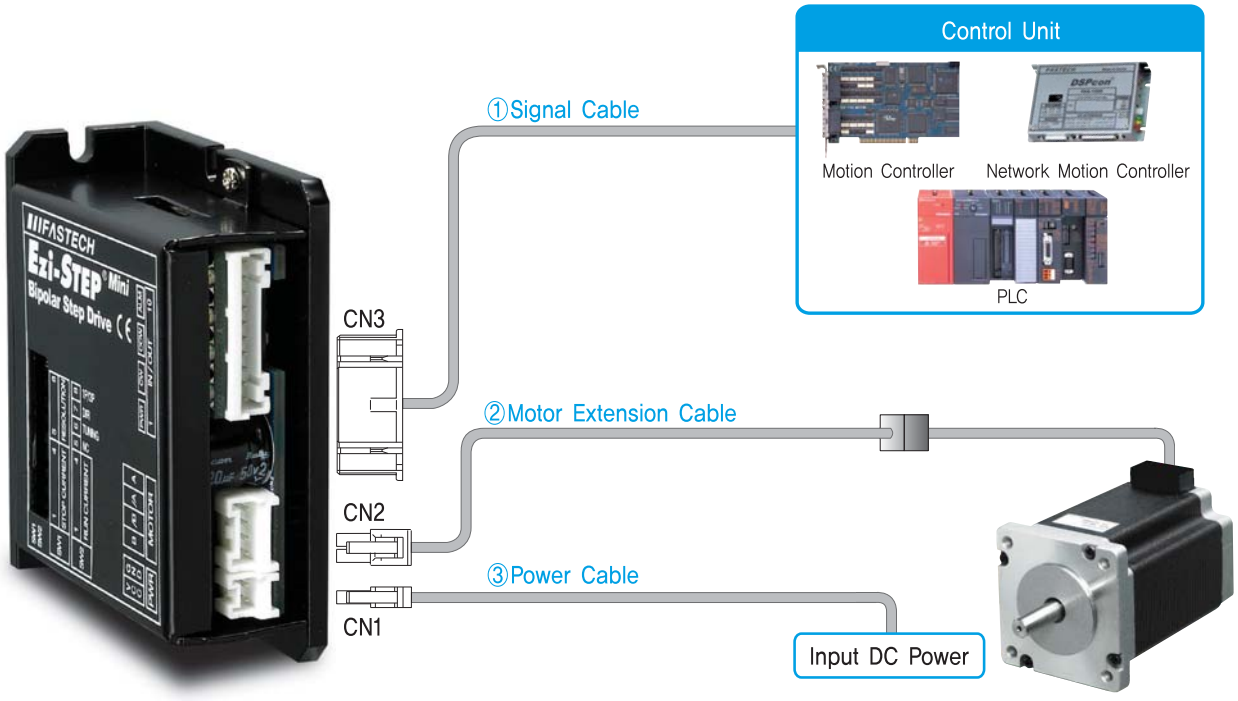
● Drive Specifications [MNB Series]

Motor		BM-20 Series	BM-25 Series	BM-28 Series	BM-35 Series	BM-42 Series
Drive		EzStep-MNB-20 Series	EzStep-MNB-25 Series	EzStep-MNB-28 Series	EzStep-MNB-35 Series	EzStep-MNB-42 Series
Input Voltage		24VDC±10%				
Drive Method		Bipolar PWM drive with 32bit DSP				
Curren		Max : 500mA(Except motor current)				
Operating condition	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	Resolution(P/R)	500, 1000, 1600, 2000, 3200, 3600, 40000, 50000, 6400, 8000, 10000, 20000, 25000, 36000, 40000, 50000 (Set by DIP Switch) *Default : 10000				
	Maximum Frequency	500KHz (Duty 50%)				
	Protection Function	Over current Over speed, Step out, Over temperature, Over regenerated voltage, Motor connect error, Low input voltage, System error, ROM error, High input voltage (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 Dir.	CW / CCW (Set by DIP Switch) Used when changing the direction of motor rotate. *Default : CW				
	Speed/Position Command	Pulse train input (Photocoupler Input)				
I/O	Input Signals	Motor Free / Alarm Reset (Photocoupler Input)				
	Output Signals	Alarm, Run/Stop (Photocoupler Output)				

● Drive Size [mm]



● Setting and Operating [MNB Series]



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

1. Cable 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..

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.

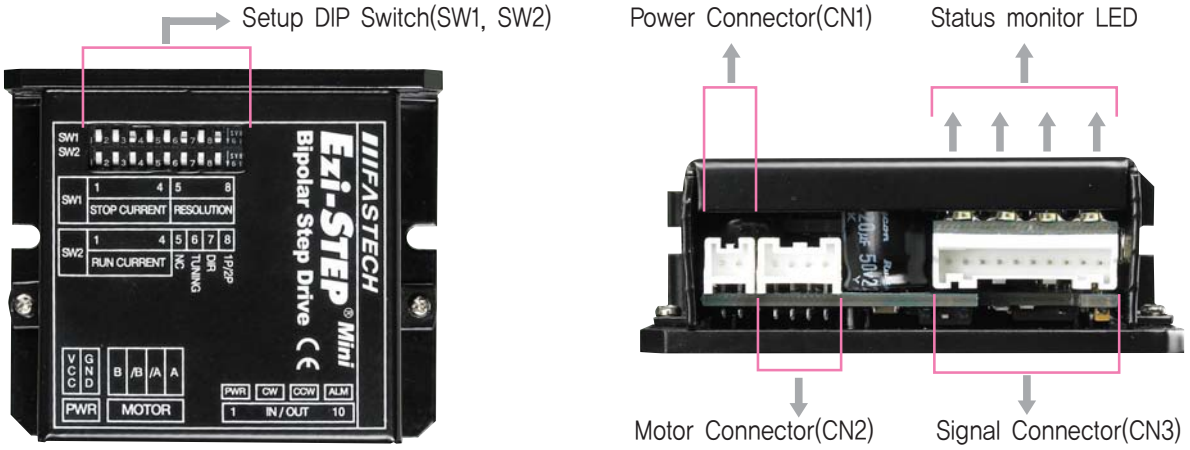
③Power Cable

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.

● Setting and Operating [MNB Series]



1. Status monitor LED

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 (Iden-tifiable 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

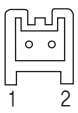
◆ Protection functions and LED flash times

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)

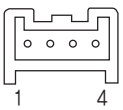
2. Power Connector(CN1)

NO.	Function
1	24VDC ±10%
2	GND



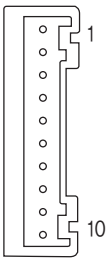
3. Motor Connector(CN2)

NO.	Function
1	B
2	/B
3	/A
4	A



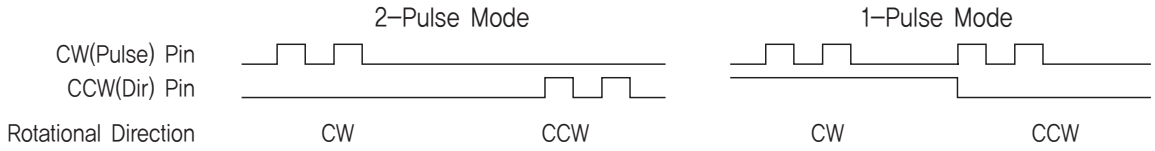
4. Signal Connector(CN3)

NO.	Function	Input/ Output
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	Frame Ground	-----



5. 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. 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).

7. 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

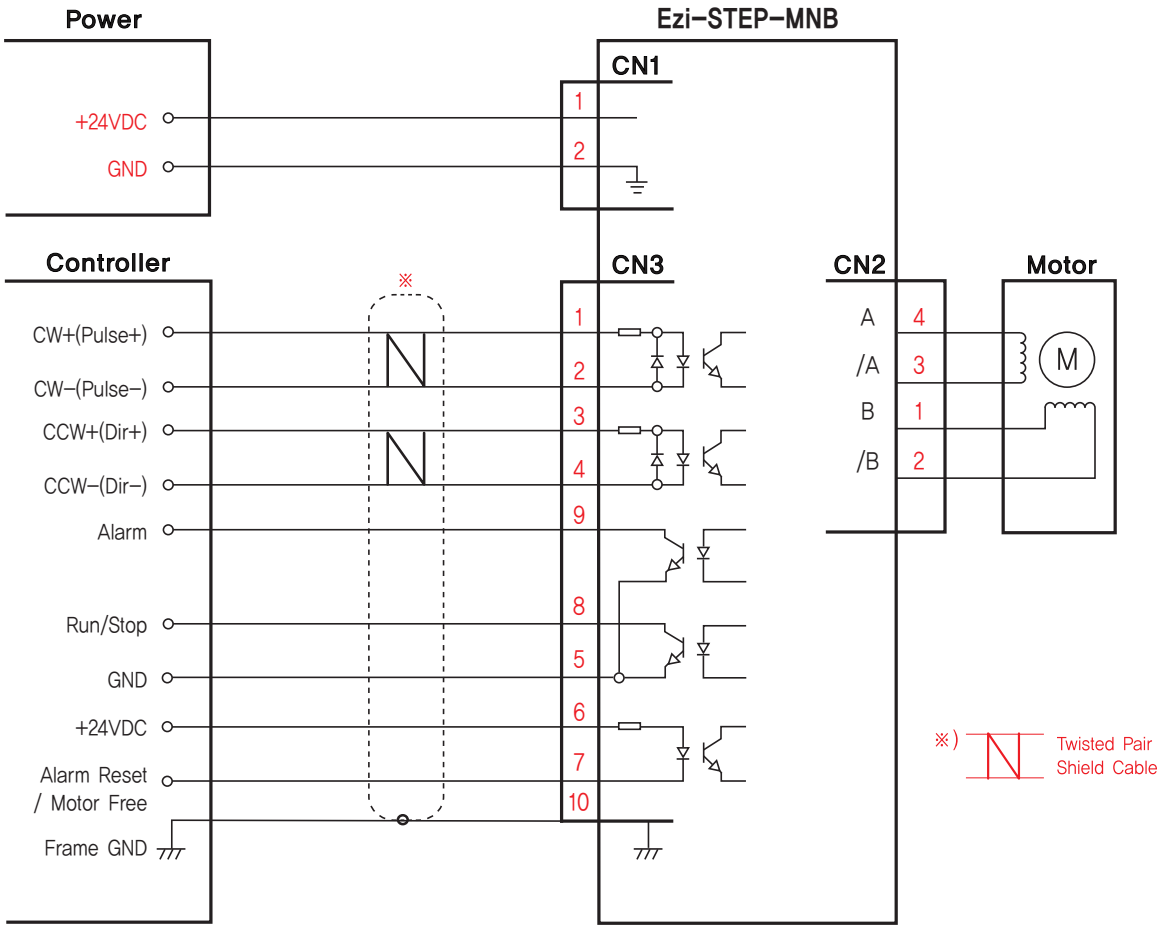
8. Stop Current Selection(SW1.1~SW1.4)

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

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%.

● External Wiring Diagram [MNB Series]

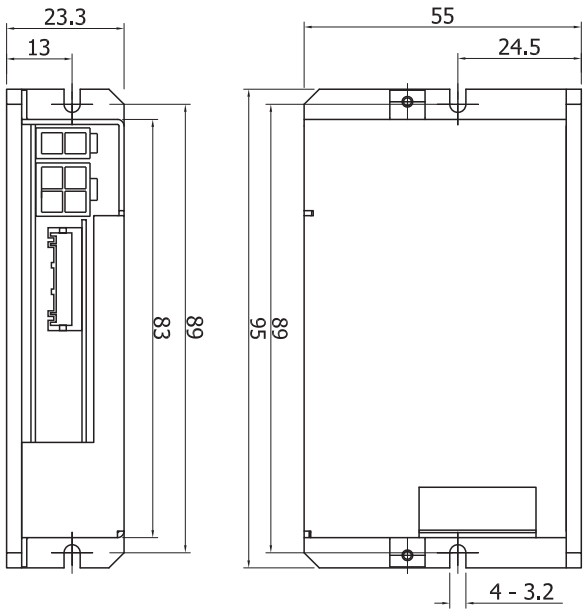


*Alarm Reset Signal line is also used for Motor FREE signal.
(For details, please refer to the section for Control Input/Output signal)

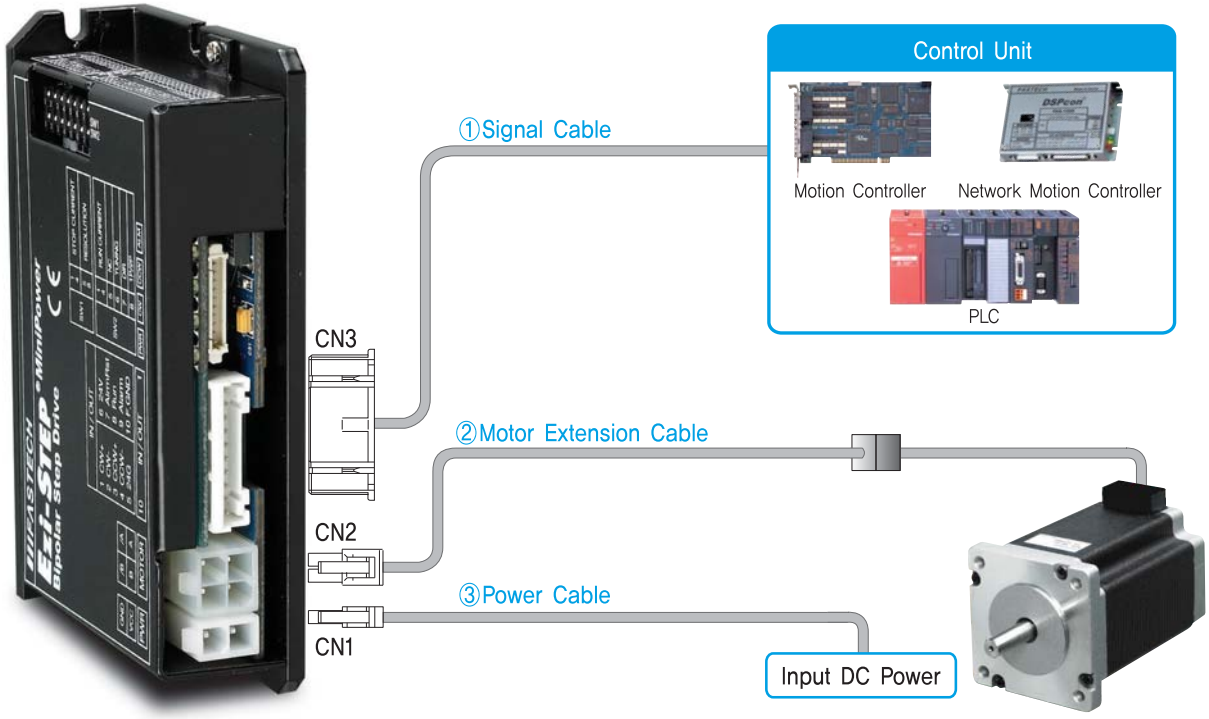
● Drive Specifications [MPB Series]

Motor		BM-42 Series	BM-56 Series	BM-60 Series	BM-71 Series
Drive		EzStep-MPB-42 Series	EzStep-MPB-56 Series	EzStep-MPB-60 Series	EzStep-MPB-71 Series
Input Voltage		24VDC±10%			
Drive Method		Bipolar PWM drive with 32bit DSP			
Curren		Max : 500mA(Except motor current)			
Operating condition	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	Resolution(P/R)	500, 1000, 1600, 2000, 3200, 3600, 40000, 50000, 6400, 8000, 10000, 20000, 25000, 36000, 40000, 50000 (Set by DIP Switch) *Default : 10000			
	Maximum Frequency	500KHz (Duty 50%)			
	Protection Function	Over current Over speed, Step out, Over temperature, Over regener-ated voltage, Motor connect error, Low input voltage, System error, ROM error, High input voltage (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 Dir.	CW / CCW (Set by DIP Switch) Used when changing the direction of motor rotate. *Default : CW			
	Speed/Position Command	Pulse train input (Photocoupler Input)			
	Input Signals	Motor Free / Alarm Reset (Photocoupler Input)			
	Output Signals	Alarm, Run/Stop (Photocoupler Output)			

● Drive Size [mm]



● Setting and Operating [MPB Series]



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

1. Cable 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.

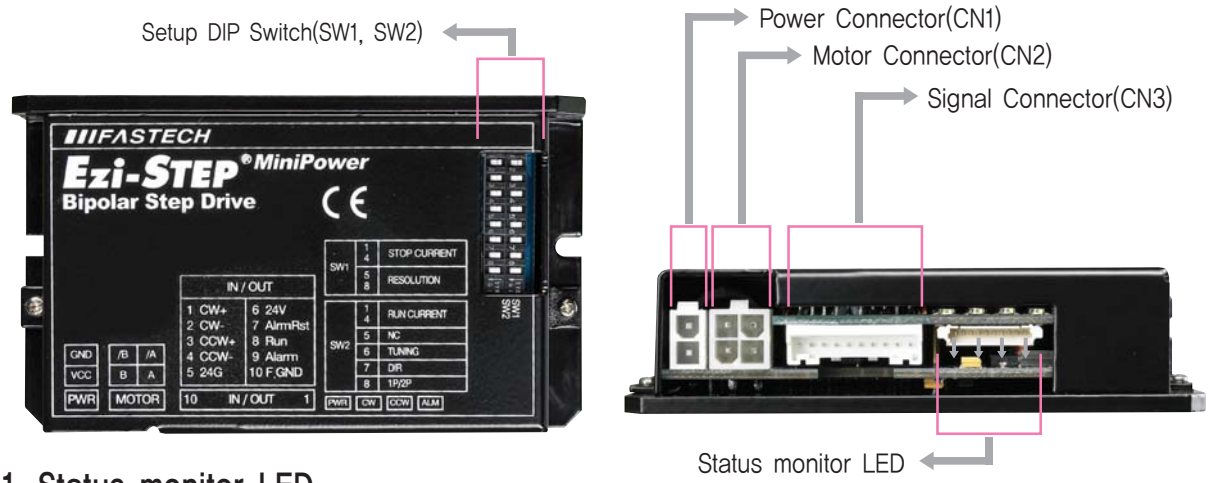
②Motor Extension Cable

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.

● Setting and Operating [MPB Series]



1. Status monitor LED

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

◆ 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)

2. Stop Current Selection(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 overheart 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

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

4. Rotational direction selection switch (SW2.7)

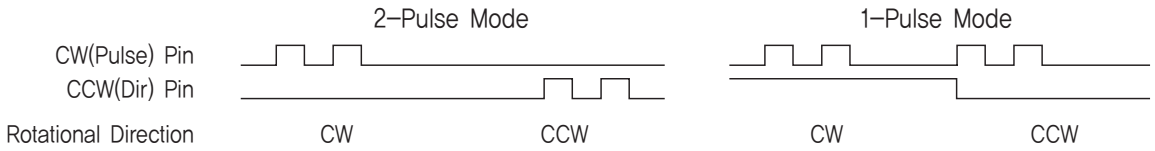
Indication	Switch Name	Functions
DIR	Rotational Direction Select Switch	Based on CW(+Dir signal) input to drive. 1 : CCW(−Direction) 0 : CW(−Direction) ※The default factory setting is CW(clockwise).

Direction selection switch : 1
CCW Dir.

Direction selection switch : 0
CW Dir.

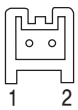
5. Pulse input selection switch (SW2.8)

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



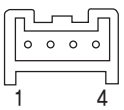
6. Power Connector(CN1)

NO.	Function
1	24VDC ±10%
2	GND



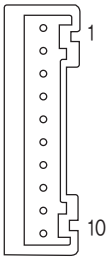
7. Motor Connector(CN2)

NO.	Function
1	B
2	/B
3	/A
4	A

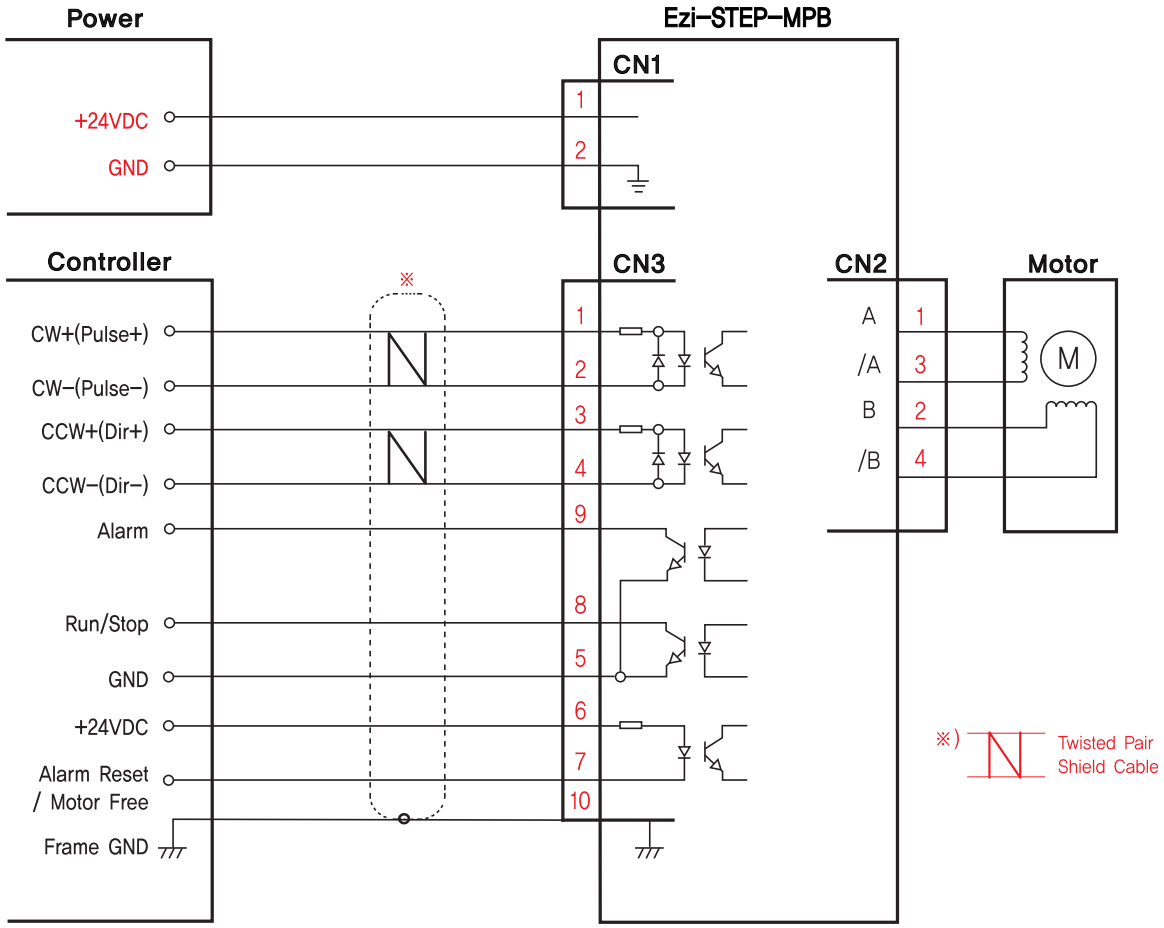


8. Signal Connector(CN3)

NO.	Function	Input/ Output
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	----



● External Wiring Diagram [MPB Series]

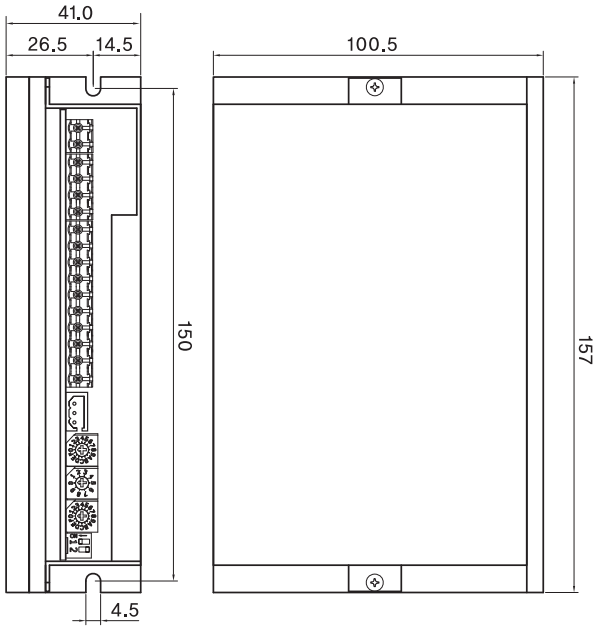


*Alarm Reset Signal line is also used for Motor FREE signal.
(For details, please refer to the section for Control Input/Output signal)

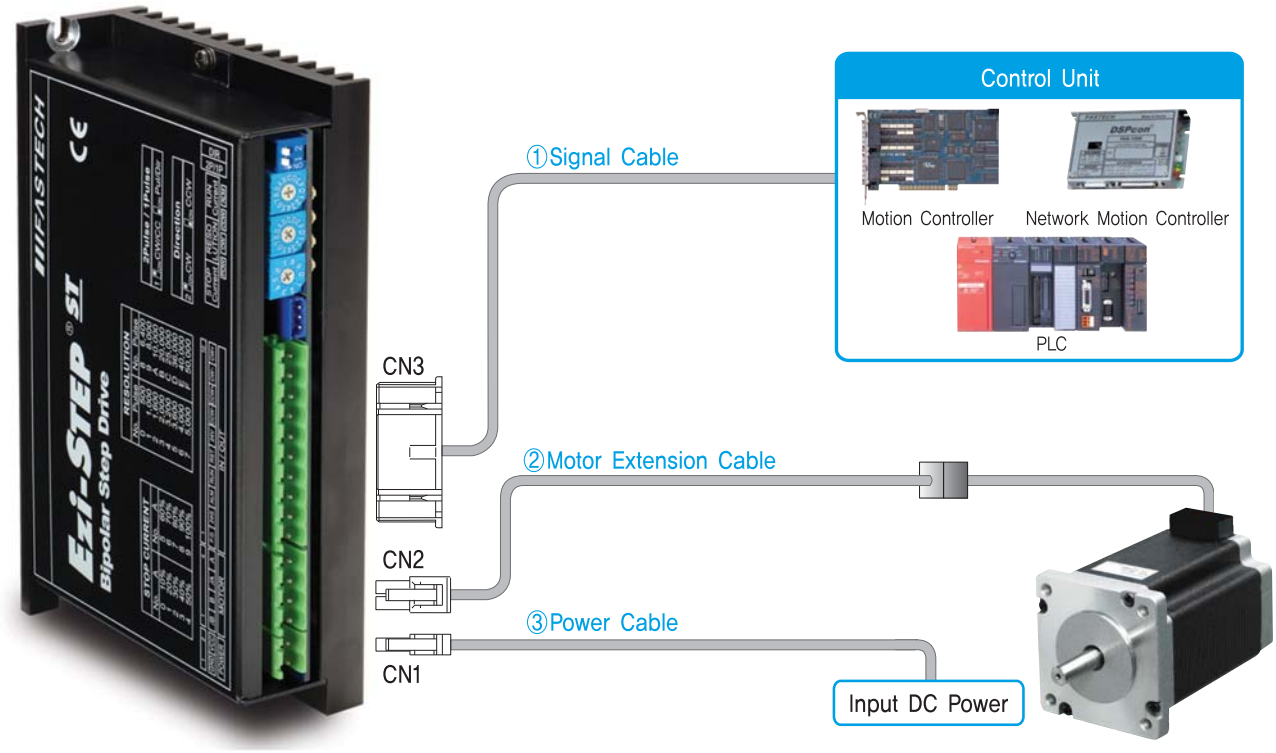
● Drive Specifications [HPB Series]

Motor		BM-86 Series
Drive		EzStep-HPB-86 Series
Input Voltage		40~70VDC
Drive Method		Bipolar PWM drive with 32bit DSP
Curren		Max : 500mA(Except motor current)
Operating condition	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	Resolution(P/R)	500, 1000, 1600, 2000, 3200, 3600, 40000, 50000, 6400, 8000, 10000, 20000, 25000, 36000, 40000, 50000 (Set by DIP Switch) *Default : 10000
	Maximum Frequency	500KHz (Duty 50%)
	Protection Function	Over current Over speed, Step out, Over temperature, Over regenerated voltage, Motor connect error, Low input voltage, System error, ROM error, High input voltage (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 Dir.	CW / CCW (Set by DIP Switch) Used when changing the direction of motor rotate. *Default : CW
	Speed/Position Command	Pulse train input (Photocoupler Input)
	Input Signals	Motor Free / Alarm Reset (Photocoupler Input)
	Output Signals	Alarm, Run/Stop (Photocoupler Output)

● Drive Size [mm]



● Setting and Operating [HPB Series]



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

1. Cable Option

①Signal Cable

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

Item	Length[m]	Remark
CHPB-S-□□□F	□□□	Normal Cable
CHPB-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-HPB.

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

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

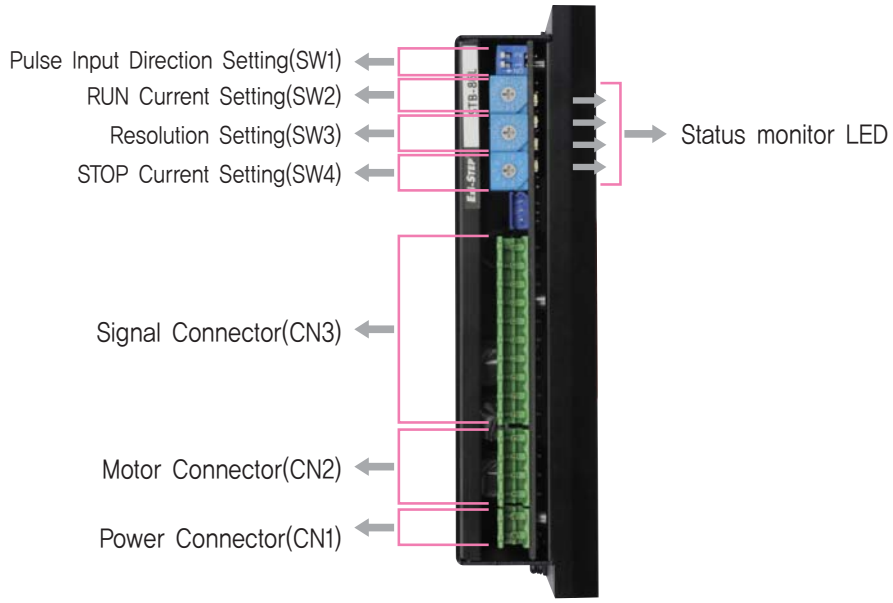
②Motor Extension Cable

Available to connect between motor and Ezi-STEP-HPB.

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

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

● Setting and Operating [HPB Series]



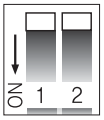
1. Status monitor LED

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 (Iden-tifiable 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

◆ Protection functions and LED flash times

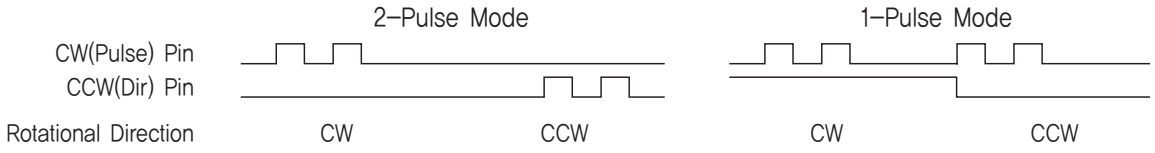
Times	Protection	Conditions
1	Over current	Excessive current flowed into a motor
2	Over speed	Motor speed exceeded 3000 rpm
3	Step out	Abnormally motor do not followed pulsed input
5	Over temperature	Internal temperature of a motor drive exceeded 55℃
6	Over regenerative voltage	Back EMF more than 50V
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)



2. Pulse input selection switch(SW1.1)

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



3. Rotational direction selection switch(SW1.2)

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.

4. RUN Current Selection(SW2)

SW2 do not used in Ezi-STEP-HPB

5. Resolution Selection(SW3)

The number of pulse per revolution.

Position	Pulse/Revolution	Position	Pulse/Revolution
0	500	8	6,400
1	1,000	9	8,000
2	1,600	A	10,000
3	2,000	B	20,000
4	3,200	C	25,000
5	3,600	D	36,000
6	4,000	E	40,000
7	5,000	F	50,000

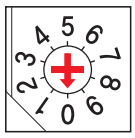
※The default factory setting is 10,000

2. Stop Current Selection(SW4)

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 uder long time idling. The unit of the selection value is a percentage.

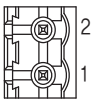
Position	STOP Current (%)	Position	STOP Current (%)
0	10	5	60
1	20	6	70
2	30	7	80
3	40	8	90
4	50	9	100

※The default factory setting is 50%



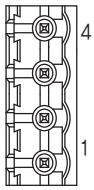
7. Power Connector(CN1)

NO.	Function
1	GND
2	40~70 VDC



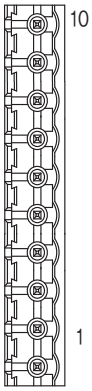
8. Motor Connector(CN2)

NO.	Function
1	/B
2	B
3	/A
4	A

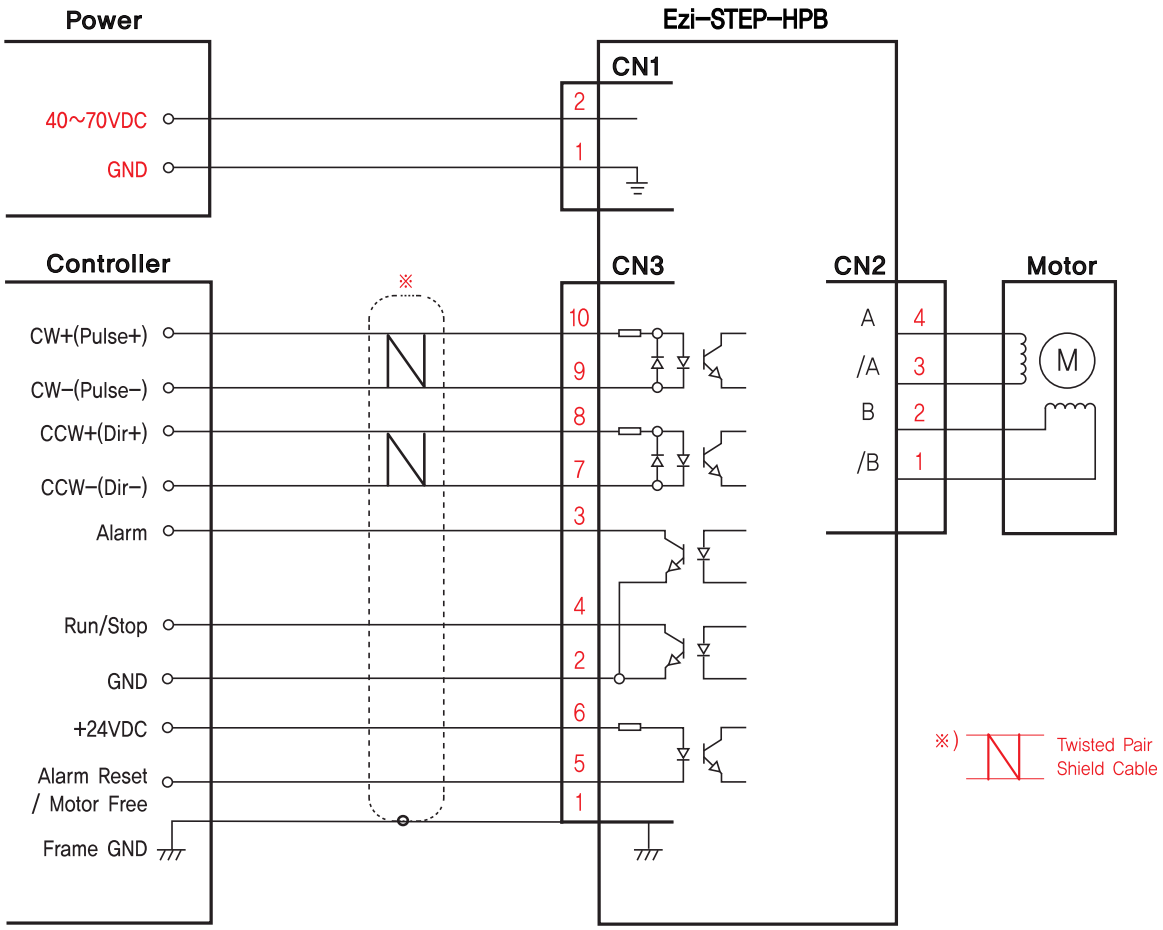


9. Signal Connector(CN3)

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



● External Wiring Diagram [HPB Series]

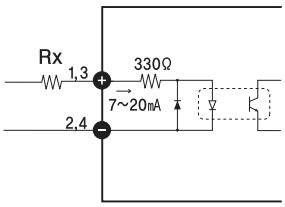


*Alarm Reset Signal line is also used for Motor FREE signal.
(For details, please refer to the section for Control Input/Output signal)

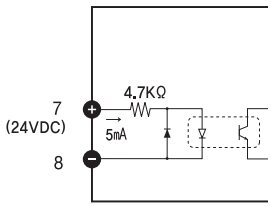
● Control signal input/output Description

1 Input Signals

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(Pin:1,2), CCW(Pin:3,4)



Alarm Reset(Pin:8)

◆ CW, CCW Input

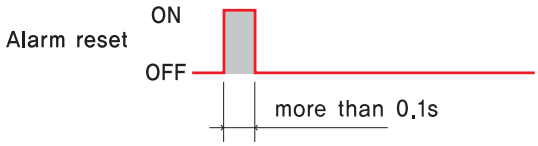
This signal can be used to receive a positioning pulse command from a user-side host motion controller. A user can select 1-pulse input mode of 2-pulse input mode.
The input schematic of CW, CCW is designed for 5V TTL level. When using 5V level as an input signal, the resistor Rx is used and connect 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.

◆ 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. It operates reversely compare to Normal mode, when you set Inverse mode.

◆ Alarm Reset Input

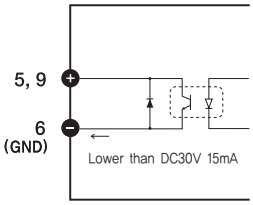
When a protection mode has been activated, a signal to this Alarm Reset input cancels the Alarm output. By setting the alarm reset input signal [ON], cancel Alarm output.
Before cancel the Alarm output, have to remove the source of alarm.



[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.

2 Output Signals

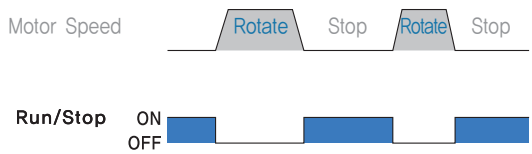
As the output signal from the drive, there are the photocoupler outputs(Alarm, Run/Stop). The signal status operate as [ON : conduction], [OFF : Non-conduction] of photocoupler not as the voltage level of signal.



Alarm(Pin: 5)
Run/Stop(Pin: 9)

◆ 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.



It operates reversely compare to Normal mode, when you set Inverse mode.

◆ 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.

MEMO

MEMO

FASTECH Ezi-STEP

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