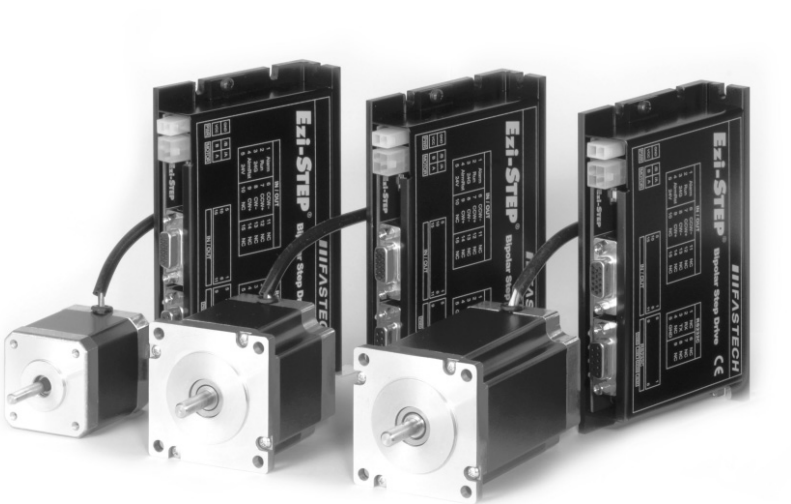
Operating Manual

Ezi-STEP®

Bipolar Step Drive
Unipolar Step Drive



FASTECH

www.fastech.co.kr

Table of Contents

※ Before operating ※

- Thank you for purchasing Ezi-STEP. 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.

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, contact agent or Fastech at the address on the last page of the manual.**
Fastech is not responsible for a product breakdown due to user's dismantling the product, and such a breakdown is not covered by the warranty.

◆ Put the Safety First

☞ **Before installing, operating and repairing the Ezi-STEP, thoroughly read the manual and fully understand the contents.**
Before operating the Ezi-STEP, understand the mechanical characteristics of the Ezi-STEP and related safety information and precautions.

☞ **After reading the manual, keep the manual near the Ezi-STEP so that any user can read the manual whenever needed.**

☞ **This manual divides safety precautions into 「Warning」 and 「Attention」.**

Attention	If the user does not properly handle the product, the user may seriously or slightly injured and damages may occur only in the machine.
Warning	If the 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 Status of the Ezi-STEP.

☞ **Do not install a damaged Ezi-STEP or a Ezi-STEP with a missing part.**
Otherwise, the user may get injured.

◆ Install.

☞ **Carefully move the Ezi-STEP.**
Dropping the product on the user' s foot may cause aninjury.

☞ **Use non-flammable materials such as metal in the place where the Ezi-STEP is to be installed.**
Otherwise, a fire may occur.

☞ **When installing several Ezi-STEP in a sealed place, install a cooling pan to keep the ambient temperature of the Ezi-STEP 55℃ or lower.**
Otherwise, a fire or other kinds of accidents may occur due to overheating.

◆ Connect Cables.

☞ **Before connecting cables, check if input power is off.**
Otherwise, an electric shock or a fire may occur.

☞ **All parameters of the Ezi-STEP were accordingly set in the factory. To change these parameters, read the manual carefully first.**
Otherwise, the machine may get damaged.

☞ **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.

◆ Check and Repair.

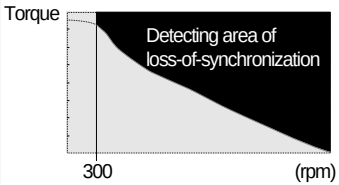
☞ **Stop supplying power to the main circuit and wait for a while before checking or repairing the Ezi-STEP.**
Electricity remaining in the capacitor may cause danger.

☞ **Do not change cabling while power is being supplied.**
Otherwise, the user may get injured or the step drive may get damaged.

☞ **Do not reconstruct the Ezi-STEP.**
Otherwise, an electric shock may occur or the user may get injured.

1 Step-Out Detection (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, the current, and the back-emf signal, the on-borad DSP estimates the current position of a rotor and enables to detect the loss-of-synchronization (so far seemingly impossible task in a conventional stepping motor drive), in turn realizing operation in high-speed region without worrying about loss-of-synchronization*.
* effective only over 300 rpm



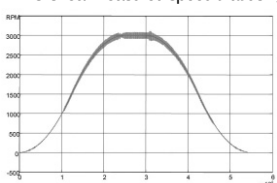
2 Microstep and Filtering (patent pending)

High Precision microstep function and Filtering (Patent pending)
The high-performance DSP resolves the basic resolution of 1.8° up to maximum 0.0072° (1/250 steps). Contrary to a conventional drive, Ezi-STEP adjusts PWM control signal in every 25 usec, which makes it possible to more precise current control and realizes a high-precision microstep operation.

3 Software Damping (patent pending)

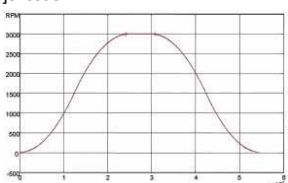
Vibration suppression and High-speed operation (Patent pending)
Ideally the applied currents to a stepping motor are a precise sinusoidal waves. But in practice the magnetic flux nonlinearity of the motor, the lowering of current due to the increase of back emf at high-speed and the lowering of the phase voltage are the sources of motor vibration.
For these practice Ezi-STEP detects these nonlinearity with DSP and adjusts the phase of the current according to the pole position of the motor, drastically suppressing vibration. As reducing the vibration of the motor, it is possible to operate in high-speed regime.

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



Software Damping OFF

Software Damping



Software Damping ON

4 Diverse Output Signal Monitoring

Besides alarming loss-of-synchronization, there are various warning signals depending on the alarm issued. Also, Ezi-STEP provides an easy interface to communicate with an upper controller by issuing RUN/STOP signal.
(The type of alarm issued can be identified by LED indicator)

5 Improve 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 effective operating voltage on a motor from the back emf voltage, in turn enabling a high-speed operation. Also, the software damping algorithm minimizes the vibration and prevents the loss-of-synchronization at high-speed.

3. Model Naming

■ Part Numbering

Ezi-STEP - STB - 42 - S

- S → Length (S : Short , M : Middle, L : Long, XL : Extra Long)
- 42 → Size (42 : 42mm, 56 : 56mm)
- STB → Motor+Drive Unit type (STB : Bipolar, STU : Unipolar)
- Ezi-STEP → Drive Series Type

■ Combination of Ezi-STEP

	Unit	Motor	Drive
Bipolar	Ezi-STEP-STB-42-S	BM-42S	EzStep-BD-42S
	Ezi-STEP-STB-42-M	BM-42M	EzStep-BD-42M
	Ezi-STEP-STB-42-L	BM-42L	EzStep-BD-42L
	Ezi-STEP-STB-56-S	BM-56S	EzStep-BD-56S
	Ezi-STEP-STB-56-M	BM-56M	EzStep-BD-56M
	Ezi-STEP-STB-56-L	BM-56L	EzStep-BD-56L
Unipolar	Ezi-STEP-STU-42-S	UM-42S	EzStep-UD-42S
	Ezi-STEP-STU-42-M	UM-42M	EzStep-UD-42M
	Ezi-STEP-STU-42-L	UM-42L	EzStep-UD-42L
	Ezi-STEP-STU-56-S	UM-56S	EzStep-UD-56S
	Ezi-STEP-STU-56-M	UM-56M	EzStep-UD-56M
	Ezi-STEP-STU-56-L	UM-56L	EzStep-UD-56L

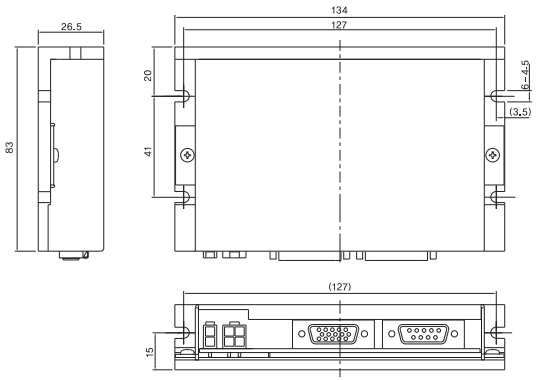
4. Specifications

4.1 Drive Specifications

Type			EzStep-BD-42-S/M/L EzStep-UD-42-S/M/L	EzStep-BD-56-S/M/L EzStep-UD-56-S/M/L
Drive Method			PWM drive with 32bit DSP	
Input Voltage			24 VDC ±10%	
Condition	Temp.	Operate	0 ~ +50℃	
		Reserve	-20 ~ +70 ℃	
	Humidity	Operate	35~85% RH (Non condensing)	
		Reserve	10~90% RH (Non condensing)	
	Vib. Resist.		0.5G	
Function	Resolution(P/R)		500~50,000 (Set by RS232C Communication) ※Default : 10,000	
	Max. Frequency		500 KHz (Duty 50%)	
	Alarm Function		Step-Out, Over-Current, Over-Heat, Over-Voltage, Power,Motor Connection	
	LED Display		Power Status(Green), Alarm Status(Red) CW Rotation(Yellow), CCW Rotation(Orange)	
	STOP Current		10% ~ 100% (Set by RS-232C Communication) 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 RS-232C Communication) 1 Pulse: Pulse / Direction, 2 Pulse: CW / CCW ※Default : 2 Pulse	
	Rotational Dir.		CW / CCW (Set by RS232C Communication) Used when changing the direction of motor rotate. ※Default : CW	
	Speed/Position Commamd		Pulse train input (Photocoupler Input)	
I/O	Input Signals		Photocoupler Input : Motor Free/Alarm Reset	
	Output Signals		Photocoupler Output : Alarm, Run/Stop	

4.2 Drive Dimension (mm)

Ezi-STEP-STB Series
Ezi-STEP-STU Series

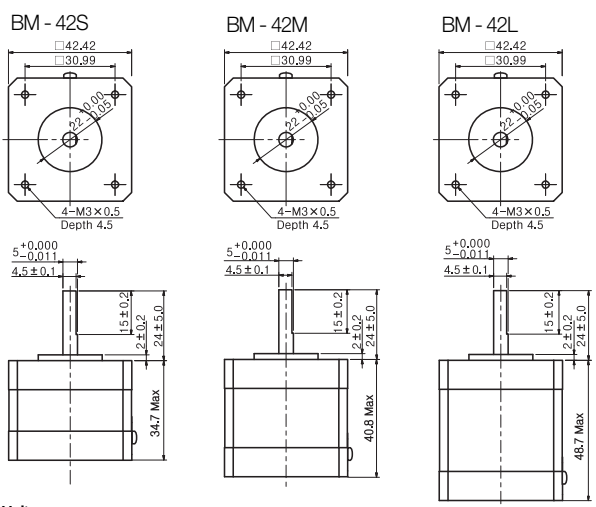


4.3 Motor Specifications

4.3.1 Bipolar Series

4.3.1.1 Bipolar - 42mm

MODEL	UNIT	BM-42S	BM-42M	BM-42L
DRIVE METHOD	----	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES	----	2	2	2
VOLTAGE PER PHASES	V	2.2	2.7	3.0
CURRENT PER PHASES	A	1.5	1.5	1.5
RESISTANCE PER PHASES	ohm	1.47	1.83	2.00
INDUCTANCE PER PHASES	mH	1.81	2.77	3.67
HOLDING TORQUE	N·m	0.27	0.40	0.49
	oz·in	38	57	69
DETENT TORQUE	N·m	0.011	0.014	0.023
	oz·in	1.6	2.0	3.2
ROTOR INERTIA	kg·cm²	$36x10^{-5}$	$54x10^{-5}$	$76x10^{-5}$
	oz·in²	$51x10^{-5}$	$75x10^{-5}$	$106x10^{-5}$
WEIGHTS	kg	0.20	0.26	0.34
	lb	0.45	0.57	0.76
TEMPERATURE CLASS	----	CLASS B (130℃ 266℉)		
INSULATION RESISTANCE	Mohm	100min (at 500VDC)		
DIELECTRIC STRENGTH	Vac	500 (for 50HZ 1min)		
OPERATING TEMPERATURE	℃	0 to 50		
ALLOWABLE TEMPERATURE	℃	70 max		

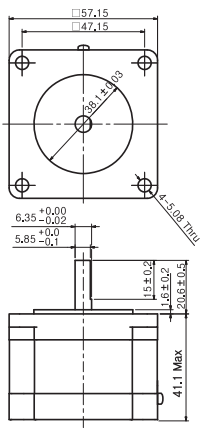


Unit : mm

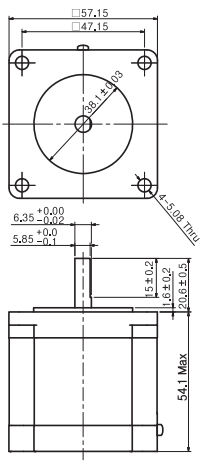
4.3.1.2 Bipolar - 56mm

MODEL	UNIT	MB-56S	MB-56M	MB-56L
DRIVE METHOD	----	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES	----	2	2	2
VOLTAGE PER PHASES	V	1.89	2.28	2.82
CURRENT PER PHASES	A	3.0	3.0	3.0
RESISTANCE PER PHASES	ohm	0.63	0.76	0.94
INDUCTANCE PER PHASES	mH	2.64	3.80	6.30
HOLDING TORQUE	N·m	0.81	1.32	2.49
	oz·in	115	187	352
DETENT TORQUE	N·m	0.07	0.09	0.18
	oz·in	10	13	26
ROTOR INERTIA	kg·cm^2	189x10^{-5}	249x10^{-5}	493x10^{-5}
	oz·in^2	262x10^{-5}	346x10^{-5}	684x10^{-5}
WEIGHTS	kg	0.45	0.65	1.12
	lb	1.00	1.45	2.50
TEMPERATURE CLASS	----	CLASS B (130℃ 266℉)		
INSULATION RESISTANCE	Mohm	100min (at 500VDC)		
DIELECTRIC STRENGTH	Vac	500 (for 50HZ 1min)		
OPERATING TEMPERATURE	℃	0 to 50		
ALLOWABLE TEMPERATURE	℃	70 max		

BM - 56S



BM - 56M



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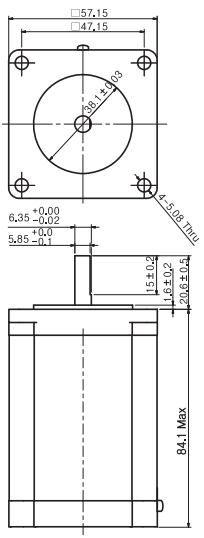


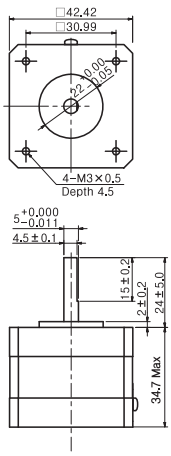
Unit : mm

4.3.2 Unipolar Series

4.3.2.1 Unipolar - 42mm

MODEL	UNIT	UM-42S	UM-42M	UM-42L
DRIVE METHOD	----	UNIPOLAR	UNIPOLAR	UNIPOLAR
NUMBER OF PHASES	----	2	2	2
VOLTAGE PER PHASES	V	2.2	2.7	3.0
CURRENT PER PHASES	A	1.5	1.5	1.5
RESISTANCE PER PHASES	ohm	1.47	1.83	2.00
INDUCTANCE PER PHASES	mH	0.93	1.42	1.91
HOLDING TORQUE	N · m	0.19	0.28	0.35
	oz · in	27	39	49
DETENT TORQUE	N · m	0.011	0.014	0.023
	oz · in	1.6	2.0	3.2
ROTOR INERTIA	kg · cm^2	$36x10^{-5}$	$54x10^{-5}$	$76x10^{-5}$
	oz · in^2	$51x10^{-5}$	$75x10^{-5}$	$106x10^{-5}$
WEIGHTS	kg	0.20	0.26	0.34
	lb	0.45	0.57	0.96
TEMPERATURE CLASS	----	CLASS B (130℃ 266℉)		
INSULATION RESISTANCE	Mohm	100min (at 500VDC)		
DIELECTRIC STRENGTH	Vac	500 (for 50HZ 1min)		
OPERATING TEMPERATURE	℃	0 to 50		
ALLOWABLE TEMPERATURE	℃	70 max		

UM - 42S



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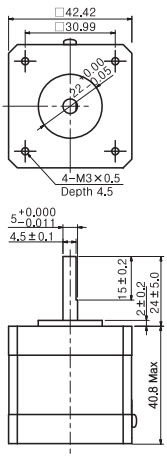

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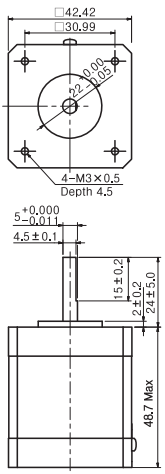
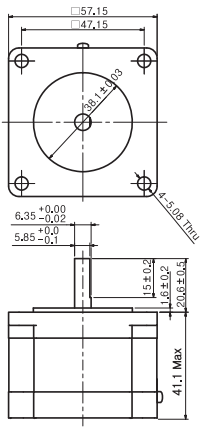


Unit : mm

4.3.2.2 Unipolar - 56mm

MODEL	UNIT	UM-56S	UM-56M	UM-56L
DRIVE METHOD	----	UNIPOLAR	UNIPOLAR	UNIPOLAR
NUMBER OF PHASES	----	2	2	2
VOLTAGE PER PHASES	V	1.89	2.28	2.82
CURRENT PER PHASES	A	3.0	3.0	3.0
RESISTANCE PER PHASES	ohm	0.63	0.76	0.94
INDUCTANCE PER PHASES	mH	1.49	1.80	2.90
HOLDING TORQUE	N·m	0.57	0.93	1.73
	oz·in	81	131	245
DETENT TORQUE	N·m	0.07	0.09	0.18
	oz·in	10	13	26
ROTOR INERTIA	$kg \cdot cm^2$	$189x10^{-5}$	$249x10^{-5}$	$493x10^{-5}$
	$oz \cdot in^2$	$262x10^{-5}$	$346x10^{-5}$	$648x10^{-5}$
WEIGHTS	kg	0.45	0.65	1.12
	lb	1.00	1.45	2.50
TEMPERATURE CLASS	----	CLASS B (130℃ 266℉)		
INSULATION RESISTANCE	Mohm	100min (at 500VDC)		
DIELECTRIC STRENGTH	Vac	500 (for 50HZ 1min)		
OPERATING TEMPERATURE	℃	0 to 50		
ALLOWABLE TEMPERATURE	℃	70 max		

UM - 56S



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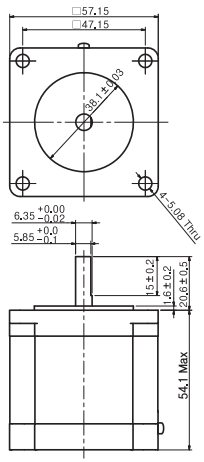

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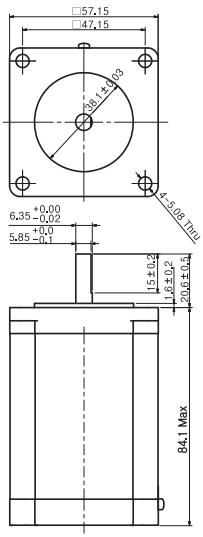
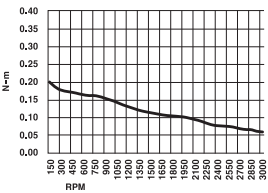


Unit : mm

5. Motor Torque Characteristics

5.1 Bipolar Motor

BM - 42S



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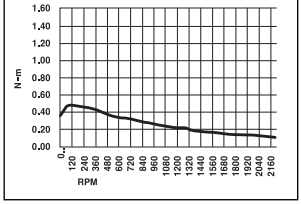

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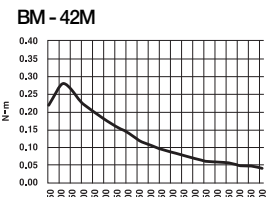

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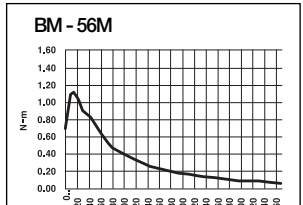

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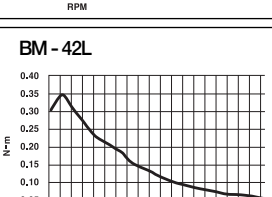

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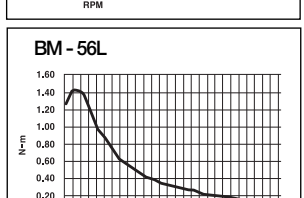

5.2 Unipolar Motor

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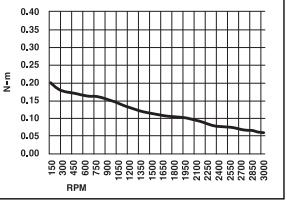

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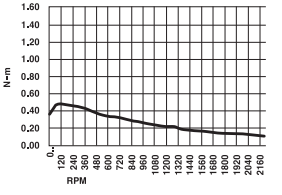

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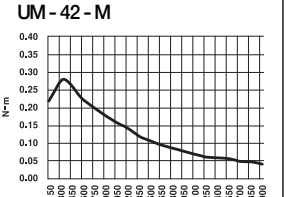

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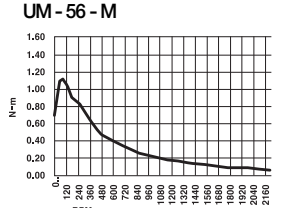

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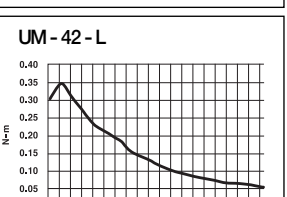

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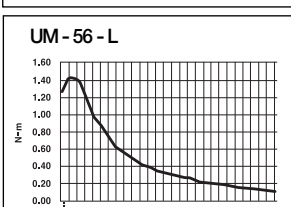
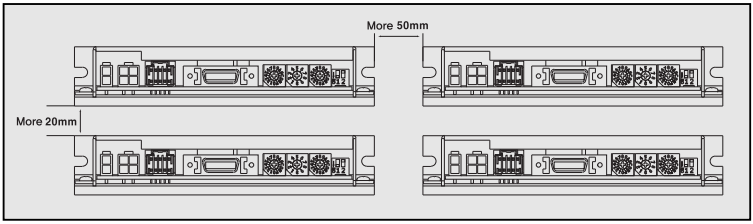


6. Installation and Cabling

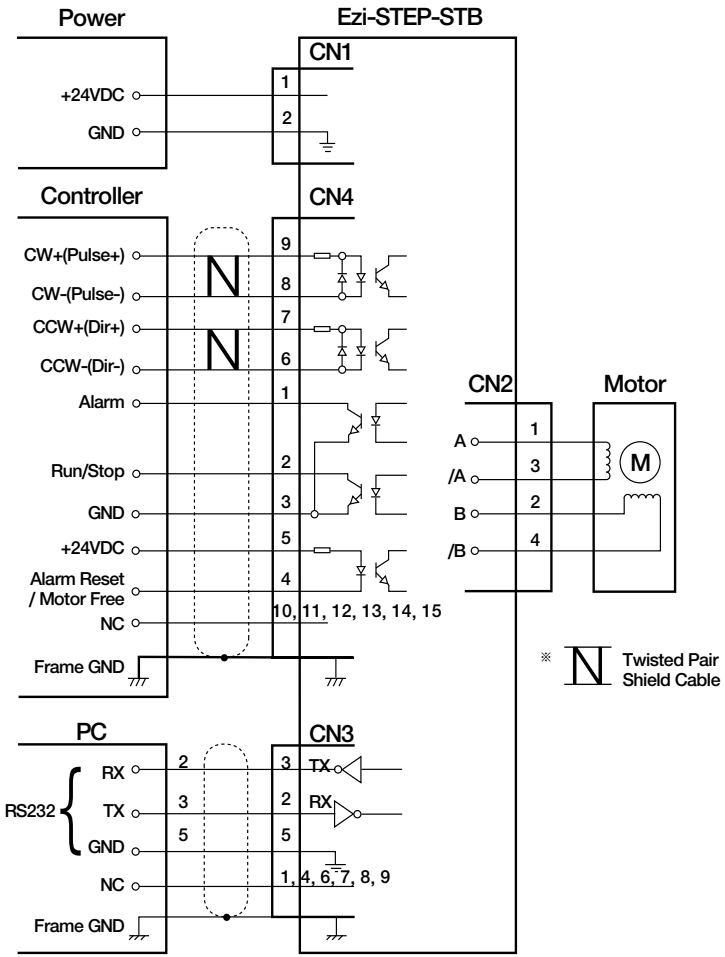
6.1 Notes on Installation

1) Ezi-STEP has been designed for indoor uses.
2) The ambient temperature of the room should be 0℃~50℃.
3) If the temperature of the case is higher than 50℃, radiate heat of the outside to cool down the case.
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.



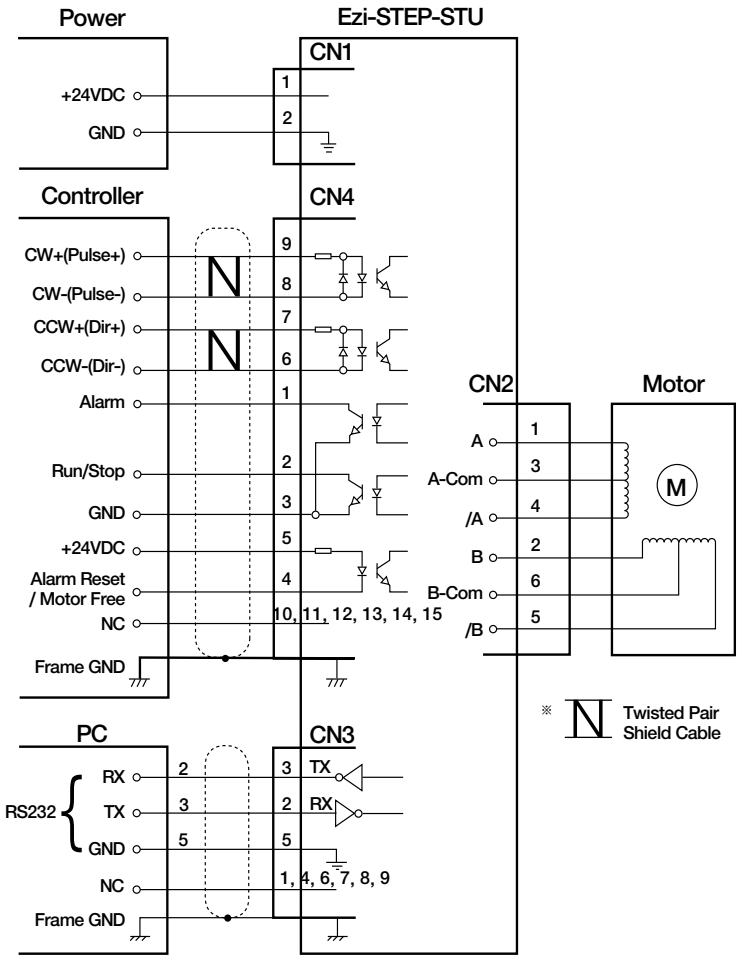
6.2 Connection Diagram

6.2.1 Bipolar Connection



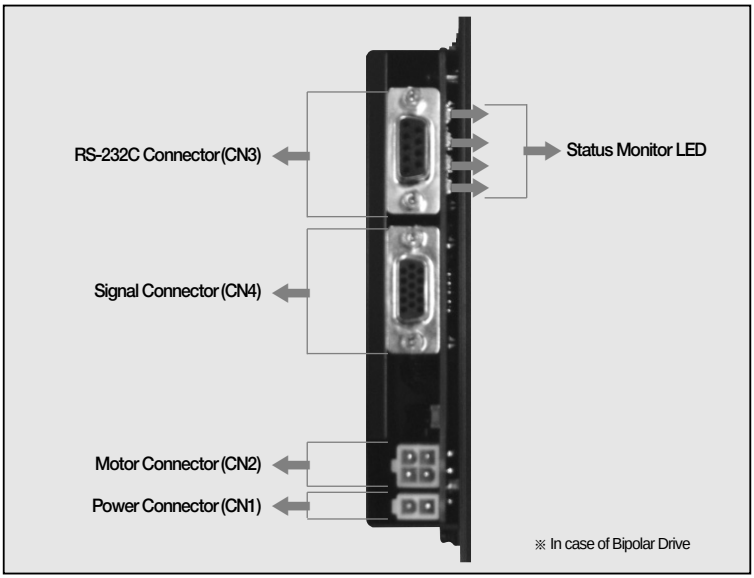
※ Alarm Reset signal line is also used for Motor FREE signal.
(For details, please refer to the section for Control Input/Output signal)

6.2.2 Unipolar Connection



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

7. Setting and Operating



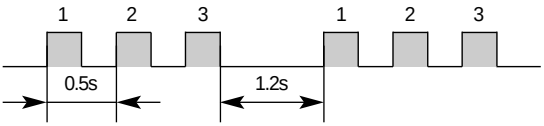
7.1 Status monitor LED

7.1.1 Status LED Function and Condition

Status	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

7.1.2 Protection functions and LED flash times

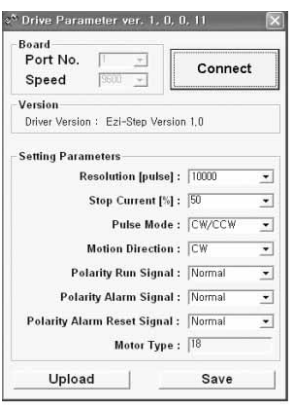
Flash Times	Protection	Conditions
1	Overcurrent	Excessive current flowed into a motor
2	Overspeed	Motor speed exceeded 3000 rpm
3	Out of Synchronization	Abnormally, motor did not followed pulsed inputs
5	Overheat	Internal temperature of a motor drive exceeded 55℃
6	Over regenerative Voltage	Back EMF more than 70V
7	Motor Connection	Power is ON without connection of motor cable to drive
9	Lowpower	Power source voltage is below 20 volts



Alarm LED flash (ex: Synchronization error)

7.2 Setting Up Parameters

RS-232C serial communication port of a computer is used to set up various parameters of the motor drive. The set-up program is supplied with the product on a companion CD. It is recommended to make a copy of the program in any folder on your computer. Then please execute the program, named "Ezi-STEP Setup.exe", from the folder.



Please select an appropriate Prot No. and press

Connect button. Then it will display the various parameter values previously stored in the drive.

Upload : Display the parameter values stored in the drive

Save : Store the parameter values displayed on the screen into the drive

7.2.1 Resolution

Resolution means the number of pulses per one rotation of a motor.
Select a desired resolution by pressing ▼ in Resolution [pulse] : 10000 ▼ button on Ezi-STEP Setup screen. The possible resolution values are 500~50,000.

Press Save button to store the value selected into the drive.
* The default factory setting is 10,000 [Pulses/Revolution].

7.2.2 Stop Current

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. Select a desired Stop Current by pressing ▼ in Stop Current [%] : 50 ▼ button on Ezi-STEP Setup screen. The unit of the selection values is a percentage.

Press Save button to store the value selected into the drive.
* The default factory setting is 50%.

7.2.3 Pulse Mode

As the pulsed inputs, a user can choose One-pulse-mode (Pulse/Dir) or Two-pulse-mode(CW/CCW). Select a desired pulse mode by pressing ▼ in Pulse Mode : Pulse/Dir ▼ button on Ezi-STEP Setup screen.

Press Save button to store the value selected into the drive.
* The default factory setting is Two pulse input mode (CW/CCW).

7.2.4 Rotation Direction

The direction of the motor rotation can be selected either in CW(clockwise) or in CCW(Counter Clockwise). Select a desired rotation direction by pressing ▼ in Motion Direction : CW ▼ button on Ezi-STEP Setup screen.

Press Save button to store the value selected into the drive.
* The default factory setting is CW(clockwise).

7.2.5 Polarity Run Signal

Run/Stop output method can be selected that indicate the motor running status.Select a desired method by pressing in Polarity Run Signal : Normal button on Ezi-STEP Setup screen.

Press Save button to store the value selected into the drive.
* The default factory setting is Normal.

7.2.6 Polarity Alarm Signal

Alarm signal output method can be selected when error happens. Select a desired method by pressing in Polarity Alarm Signal : Normal button on Ezi-STEP Setup screen.

Press Save button to store the value selected into the drive.
* The default factory setting is Normal.

7.2.7 Polarity Alarm Reset Signal

Input methol of Motor Free / Alarm Reset can be selected. Select a desired method by pressing in Polarity Alarm Reset Signal : Normal button on Ezi-STEP Setup screen.

Press Save button to store the value selected into the drive.
* The default factory setting is Normal.

[CAUTION] : When you selet 'Inverse' : It can be 'Motor Free' status when powen is applied to Ezi-STEP during Signal Connector(CN2)is not connected. The power led(green)is flash to show the status of 'Motor Free'.

7.2.8 Motor Type

This parameter can not be changed.

8. Connectors

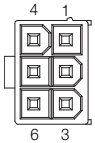
8.1 Power Connector (CN1)

Number	Function	
1	Power Input : 24VDC	
2	Power Input : GND	

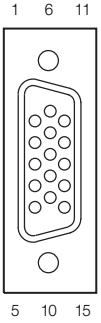
8.2 Motor Connector (CN2)- Bipolar Drive

Number	Function	
1	A	
2	B	
3	/A	
4	/B	

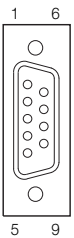
8.3 Motor Connector (CN2)- Unipolar Drive

Number	Function	
1	A	
2	B	
3	A-Com	
4	/A	
5	/B	
6	B-Com	

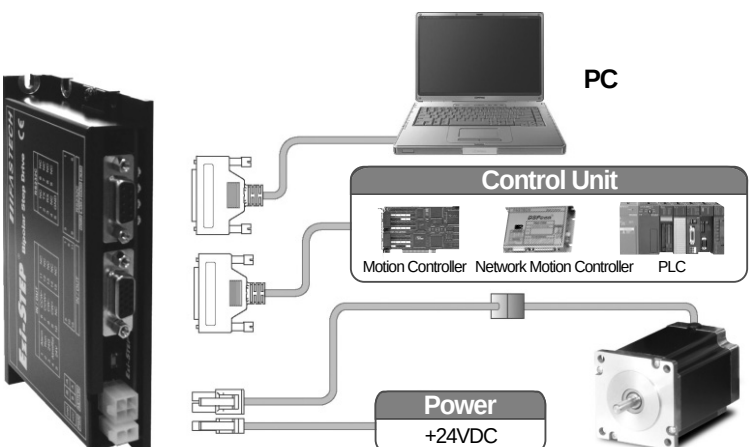
8.4 Signal Connector (CN4)

Number	Function	Input/Output	
1	Alarm	Output	
2	Run/Stop	Output	
3	GND	Input	
4	Alarm Reset	Input	
5	+24VDC	Input	
6	CCW-(Dir-)	Input	
7	CCW+(Dir+)	Input	
8	CW-(Pulse-)	Input	
9	CW+(Pulse+)	Input	
10	NC		
11	NC		
12	NC		
13	NC		
14	NC		
15	NC		

8.5 RS232C (CN3)

Number	Function	Input/Output	
1	NC		
2	RX	Input	
3	TX	Output	
4	NC		
5	GND	Input	
6	NC		
7	NC		
8	NC		
9	NC		

9. External Wiring Diagram



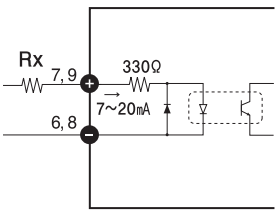
Type	Power Cable	Motor Cable	Signal Cable	RS232C Cable
Standard Length	---	30cm	---	---
Max. Length	2m	20m	20m	15m

※ To extend the Motor Cable more than 30cm, have to order optional Extension Cable,(see Appendix)

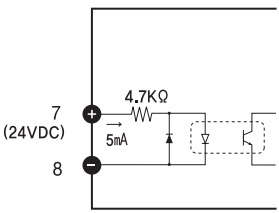
10. Control signal Input/Output Description

10.1 Input signals

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



CW(Pin : 8, 9), CCW(Pin : 6, 7)



Alarm Reset(Pin : 8)

◆ CW, CCW Input

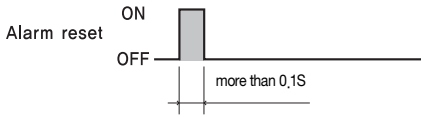
This signal can be used to receive a positioning pulse command from a user-side host motion controller. A user can select 1-pulse input mode or 2-pulse input mode.
The input schematic of CW, CCW is designed for 5V TTL level. When using 5V level as an input signal, the resistor Rx is not used and connect 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 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.

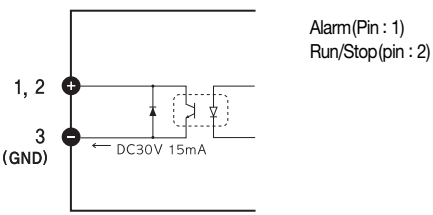


[Caution] If Alarm Reset input signal still remains [ON], motor will be Free state. Keep in mind to change [ON]→ [OFF] state.

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

10.2 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.



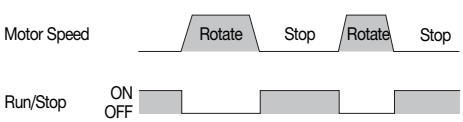
◆ Alarm Output

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.

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

◆ 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

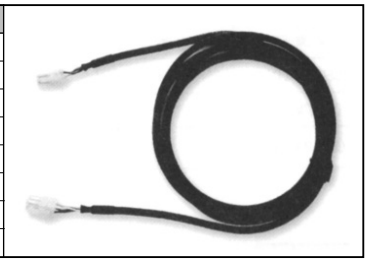
Option

■ Extension cable for Motor

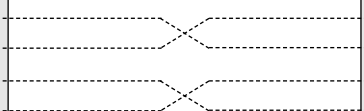
For Extending cable between Motor & Drive

Bipolar Motor Cable

Item	Length
CEM-1M-MD	1m
CEM-2M-MD	2m
CEM-3M-MD	3m
CEM-5M-MD	5m
CEM-7M-MD	7m
CEM-10M-MD	10m
CEM-15M-MD	15m
CEM-20M-MD	20m



Wiring Diagram of Bipolar

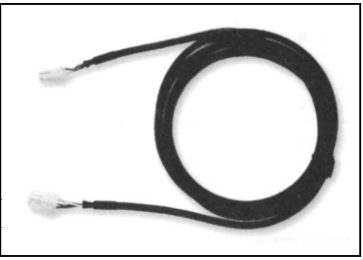
Drive Connector(CN2)		Cabling	Motor Connector	
Diagram	No.		No.	Diagram
	1 2 3 4		1 2 3 4	

Connector of Bipolar

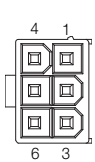
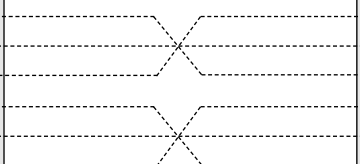
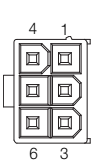
ITEM	Part Number	Maker
Housing	5557-04	MOLEX
Terminal	5556	MOLEX

Unipolar Motor Cable

Item	Length
CEM-1M-MDU	1m
CEM-2M-MDU	2m
CEM-3M-MDU	3m
CEM-5M-MDU	5m
CEM-7M-MDU	7m
CEM-10M-MDU	10m
CEM-15M-MDU	15m
CEM-20M-MDU	20m



Wiring Diagram of Unipolar

Drive Connector(CN2)		Cabling	Motor Connector	
Diagram	No.		No.	Diagram
	1 2 3 4 5 6		1 2 3 4 5 6	

Connector of Unipolar

ITEM	Part Number	Maker
Housing	5557-06	MOLEX
Terminal	5556	MOLEX

■ Connector

Connector specification for cabling to Drive

ITEM		Part Number	Maker
Power(CN1)	Connector Housing Terminal	5557-02 5556	MOLEX MOLEX
BIPOLAR Motor(CN2)	Connector Housing Terminal	5557-04 5556	MOLEX MOLEX
UNIPOLAR Motor(CN2)	Connector Housing Terminal	5557-06 5556	MOLEX MOLEX
Signal(CN4)	D-SUB(15PIN) Connector Backshell	17EHD-015PAA-000 17E-1657-09	AMPHENOL AMPHENOL
RS232C (CN3)	D-SUB(9PIN) Connector Backshell	717SD-ESD9P 17E-1657-09	AMPHENOL AMPHENOL

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