

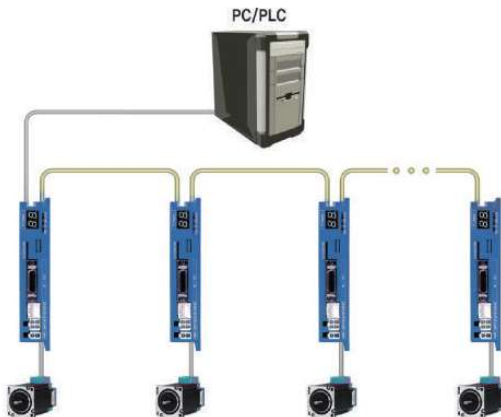


- ✓ Embedded Controller
- ✓ EtherNet Interface
- ✓ Position Table
- ✓ Closed Loop System
- ✓ No Gain Tuning / No Hunting
- ✓ High Resolution / Fast Response
- ✓ Heat Reduction / Torque Improvement



## 1. Network Based Motion Control

A maximum of 254 axes can be operated from a PC through Ethernet communications. And daisy-chain connection is available thru internally equipped Ethernet HUB. All of the Motion conditions are set through the network and saved in Flash ROM as a parameter. Motion Library(DLL) is provided for programming under Windows XP/7/8/10.



## 2. Position Table Function

Position Table can be used for motion control by digital input and output signals of host controller.

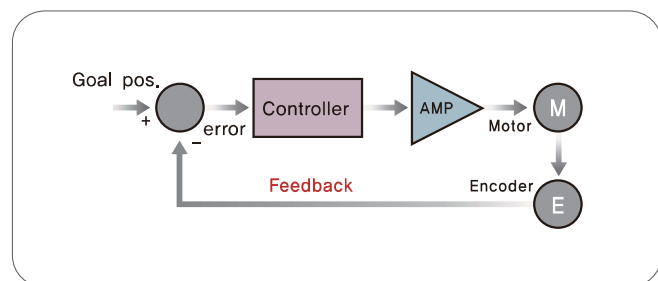
You can operate the motor directly by sending the position table number, start/stop, origin search and other digital input values from a PC.

The PC can monitor the In-Position, origin search, moving/stop, servo ready and other digital output signals from a drive. A maximum of 256 positioning points can be set from PC.



## 3. Closed Loop System

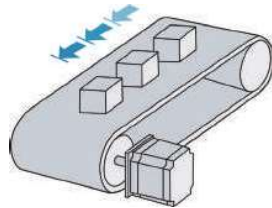
Hi STEP is an innovative closed loop stepping system that utilizes a high-resolution motor mounted encoder constantly to monitor the current position. The encoder feedback allows the Hi STEP to update the current position every 50 micro seconds. It allows the Hi STEP drive to compensate for the loss of position, ensuring accurate positioning. For example, due to a sudden load change, a conventional stepper motor and drive could lose a step but Hi STEP automatically correct the position by encoder feedback.



## 4. No Gain Tuning

To ensure machine performance, smoothness, positional error and low servo noise, Conventional servo systems require the adjustment of its servo's gains as an initial crucial step. Even systems that employ auto-tuning require manual tuning after the system is installed, especially if more than one axis are interdependent. Hi STEP employs the best characteristics of stepper, closed loop motion controls and algorithms to eliminate the need of tedious gain tuning required for conventional closed loop servo systems. This means that Hi STEP is optimized for the application and ready to work right out of the box. The Hi STEP system employs the unique characteristics of the closed loop stepping motor control, eliminating these cumbersome steps and giving the engineer a high performance servo system without wasting setup time. Hi STEP is especially well suited for low stiffness loads (for example, a belt and pulley system) that sometime require conventional servo systems to inertia match with the additional expensive

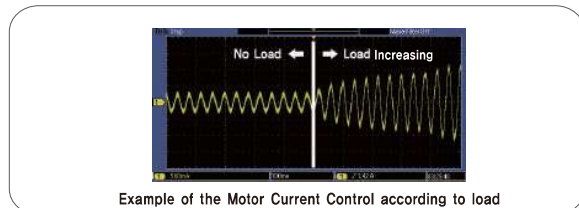
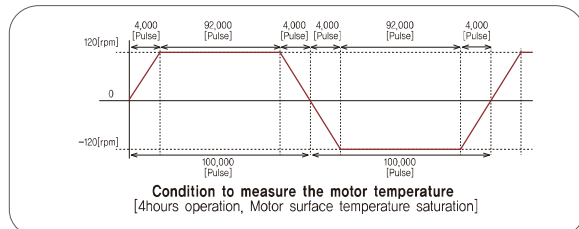
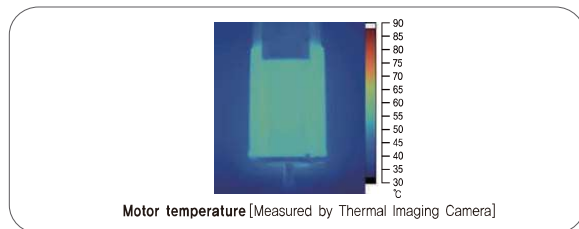
and bulky gearbox, exceptionally, even under heavy loads and high speeds.



## 5. Heat Reduction / Energy Saving

(Motor Current Control according to load)

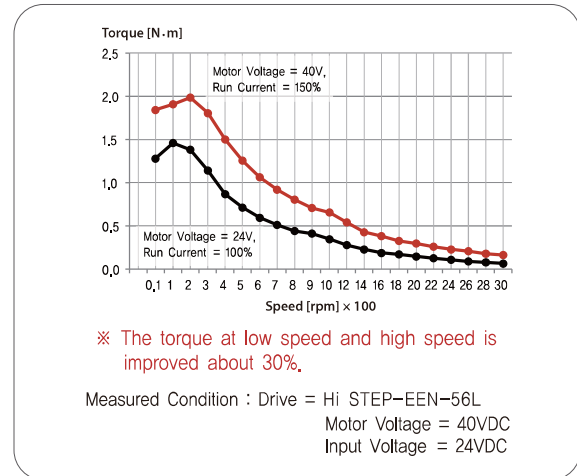
Hi STEP automatically controls motor current according to load. Hi STEP reduces motor current when motor load is low, and increases motor current when load is high. By optimizing the motor current, motor heat can be minimized and energy can be saved.



## 6. Torque Improvement

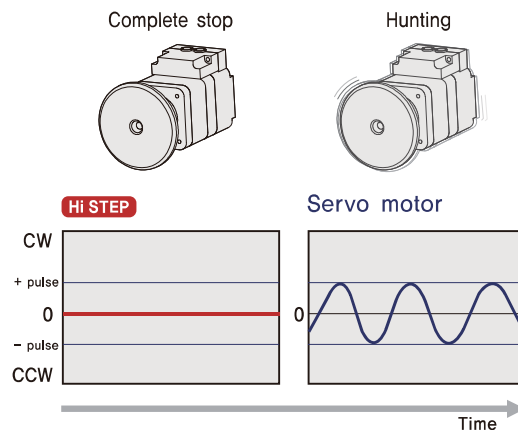
(Motor Voltage Increasing and Motor Current Setting)

Hi STEP boosts the voltage supplied to the motor by internal DC-DC Converter. The torque at the high speed is increased. In addition, it is possible to set the Run Current up to 150%, whereby the torque at low speed is increased. Torque can be improved by about 30% over the entire speed range.



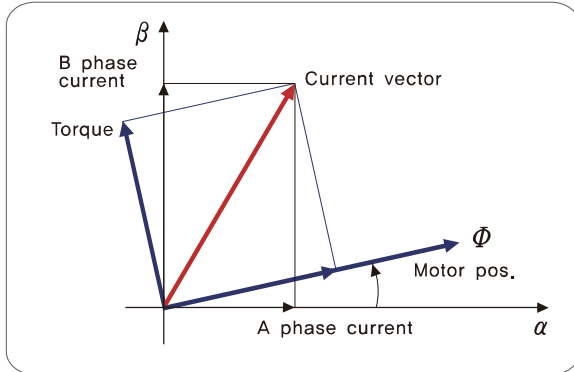
## 7. No Hunting

Traditional servo motor drives overshoot their position and try to correct by overshooting the opposite direction, especially in high gain applications. This is called null hunt and is especially prevalent in systems that the break away or static friction is significantly higher than the running friction. The cure is lowering the gain, which affects accuracy or using Hi STEP Motion Control System. Hi STEP utilizes the unique characteristics of stepping motors and locks itself into the desired target position, eliminating Null Hunt. This feature is especially useful in applications such as nanotech manufacturing, semiconductor fabrication, vision systems and ink jet printing in which system oscillation and vibration could be a problem.



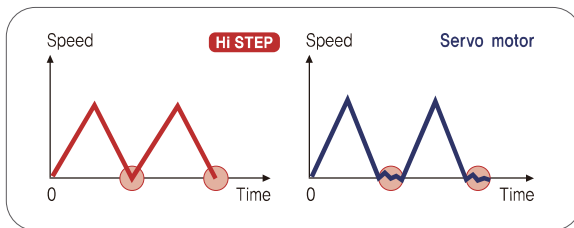
## 8. Smooth and Accurate

Hi STEP is a high-precision servo drive, using a high-resolution encoder with 20,000 pulses/revolution. Unlike a conventional Microstep drive, the on-board high performance ARM (Advanced RISC Machine) performs vector control and filtering, producing a smooth rotational control with minimum ripples



## 9. Fast Response

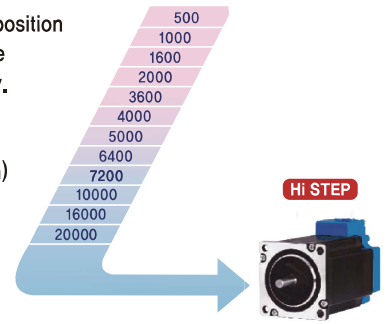
Similar to conventional stepping motors, Hi STEP instantly synchronizes with command pulses providing fast positional response. Hi STEP is the optimum choice when zero-speed stability and rapid motions within a short distance are required. Traditional servo motor systems have a natural delay called settling time between the command input signals and the resultant motion because of the constant monitoring of the current position.



## 10. High Resolution

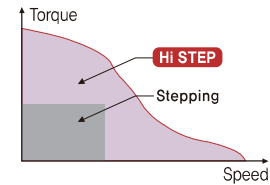
The unit of the position command can be divided precisely.

(Max. 20,000 pulses/revolution)



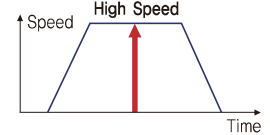
## 11. High Torque

Compared with common step motors and drives, Hi STEP motion control systems can maintain a high torque state over relatively long period of time. This means that Hi STEP continuously operates without loss of position under 100% of the load. Unlike conventional Microstep drives, Hi STEP exploits continuous high torque operation during high speed motion due to its innovative optimum current phase control.



## 12. High Speed

The Hi STEP operates well at high speed without the loss of synchronism or positioning error. Hi STEP's ability of continuous current position monitoring enables the stepping motor to generate high torque, even under a 100% load condition.



## Advantages over Open-Loop Control Stepping Drive

1. Reliable positioning without loss of synchronism,
2. Holding stable position and automatically recovering to the original position even after experiencing positioning error due to external forces, such as mechanical vibration or vertical positional holding.
3. Hi STEP utilizes 100% of the full range of rated motor torque, contrary to a conventional open-loop stepping driver that can use up to 50% of the rated motor torque due to the loss of synchronism,
4. Capability to operate at high speed due to load-dependant current control, open-loop stepping drivers use a constant current control at all speed ranges without considering load variations.

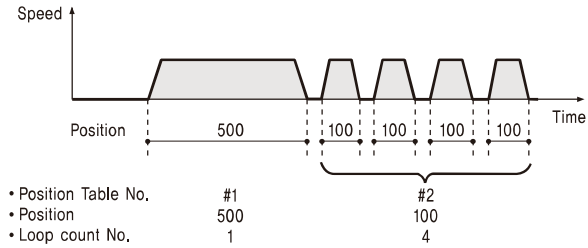
## Advantages over Servo Motor Controller

1. No gain tuning. (Automatic gain adjustment in response to a load change)
2. Maintains the stable holding position without oscillation after completion of positioning.
3. Fast positioning due to the independent control by on-board ARM.
4. Continuous operation during rapid short-stroke movement due to instantaneous positioning.

# Features of Motion Controller

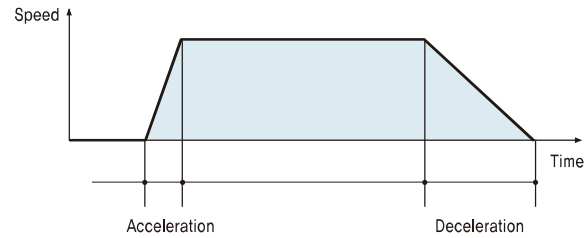
## 1. Loop Count

This function allows positioning repeatedly according to the Loop Count Number.



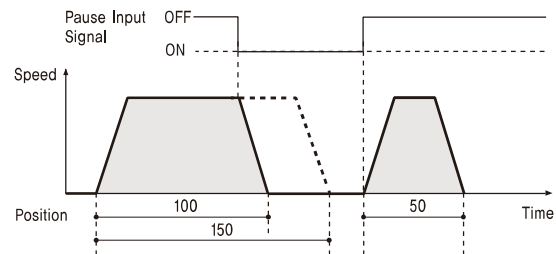
## 2. Acceleration/Deceleration

For quick acceleration and gradual deceleration, you can set each acceleration and deceleration time separately.



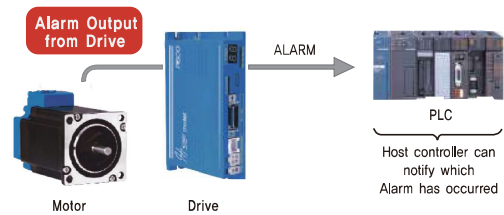
## 3. Pause

You can pause the motion upon the input of an external signal. When Pause signal change to OFF, the motor will restart to original target position.



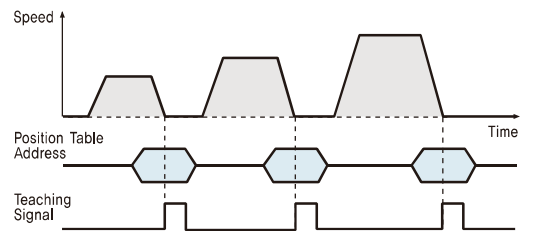
## 4. Alarm

The number of LED flashing time and information displayed on the 7-Segment indicates which Alarm has occurred.



## 5. Teaching

Teaching signal is used to memorize current Position data into the selected Position Table item.

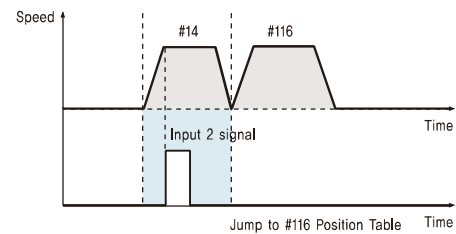
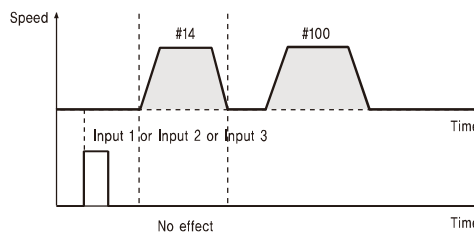


## 6. Jump

Within one Position Table, you can select various Position Table numbers that you want to jump. With three external input signal during movement, the next jump Position Table number can be select.

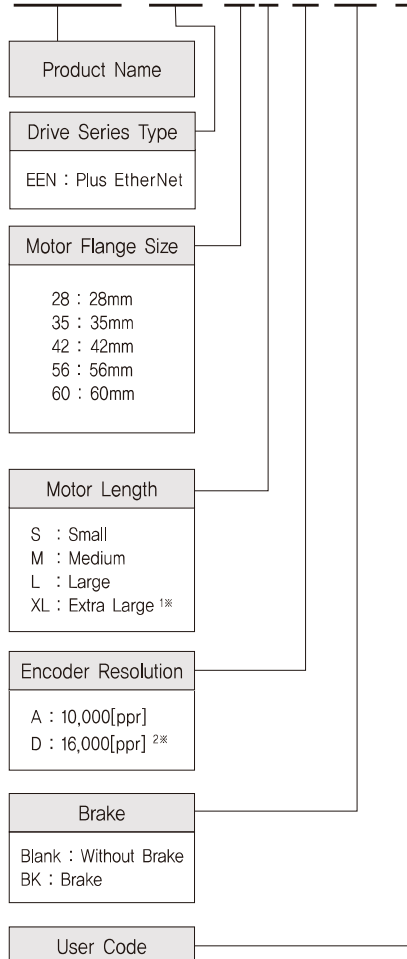
■ Position Table #14

Position	---	Next	---	Input 1	Input 2	Input 3	---
10000		100		115	116	117	



## Hi STEP Ethernet Part Numbering

### HiSTEP-EEN-42S-A-BK-□



1※ : Motor length XL only 42mm size

2※ : Encoder Resolution 16,000[ppr] only respond 28mm size

## Standard Combination

Unit Part Number	Motor Model Number	Drive Model Number
HISTEP-EEN-28S-D	Hi-EM-28S-D	Hi-ED-PE-28S-D
HISTEP-EEN-28M-D	Hi-EM-28M-D	Hi-ED-PE-28M-D
HISTEP-EEN-28L-D	Hi-EM-28L-D	Hi-ED-PE-28L-D
HISTEP-EEN-35M-A	Hi-EM-35M-A	Hi-ED-PE-35M-A
HISTEP-EEN-35L-A	Hi-EM-35L-A	Hi-ED-PE-35L-A
HISTEP-EEN-42S-A	Hi-EM-42S-A	Hi-ED-PE-42S-A
HISTEP-EEN-42M-A	Hi-EM-42M-A	Hi-ED-PE-42M-A
HISTEP-EEN-42XL-A	Hi-EM-42XL-A	Hi-ED-PE-42XL-A
HISTEP-EEN-56S-A	Hi-EM-56S-A	Hi-ED-PE-56S-A
HISTEP-EEN-56M-A	Hi-EM-56M-A	Hi-ED-PE-56M-A
HISTEP-EEN-56L-A	Hi-EM-56L-A	Hi-ED-PE-56L-A
HISTEP-EEN-60S-A	Hi-EM-60S-A	Hi-ED-PE-60S-A
HISTEP-EEN-60M-A	Hi-EM-60M-A	Hi-ED-PE-60M-A
HISTEP-EEN-60L-A	Hi-EM-60L-A	Hi-ED-PE-60L-A

## Combination with Brake

Unit Part Number	Motor Model Number	Drive Model Number
HISTEP-EEN-42S-A-BK	Hi-EM-42S-A-BK	Hi-ED-PE-42S-A
HISTEP-EEN-42M-A-BK	Hi-EM-42M-A-BK	Hi-ED-PE-42M-A
HISTEP-EEN-42XL-A-BK	Hi-EM-42XL-A-BK	Hi-ED-PE-42XL-A
HISTEP-EEN-56S-A-BK	Hi-EM-56S-A-BK	Hi-ED-PE-56S-A
HISTEP-EEN-56M-A-BK	Hi-EM-56M-A-BK	Hi-ED-PE-56M-A
HISTEP-EEN-56L-A-BK	Hi-EM-56L-A-BK	Hi-ED-PE-56L-A
HISTEP-EEN-60S-A-BK	Hi-EM-60S-A-BK	Hi-ED-PE-60S-A
HISTEP-EEN-60M-A-BK	Hi-EM-60M-A-BK	Hi-ED-PE-60M-A
HISTEP-EEN-60L-A-BK	Hi-EM-60L-A-BK	Hi-ED-PE-60L-A

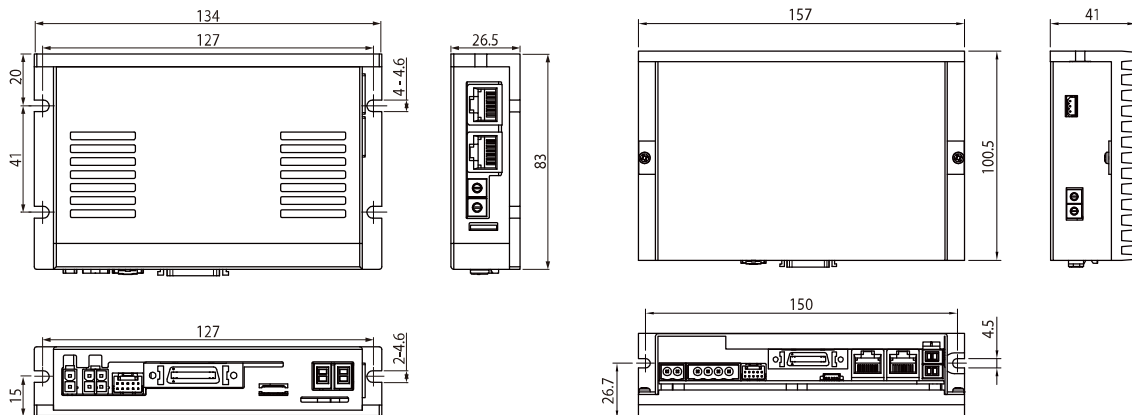
## Specifications of Drive

Motor Model	Hi-EM-28 series	Hi-EM-35 series	Hi-EM-42 series	Hi-EM-56 series	Hi-EM-60 series
Driver Model	Hi-ED-PE-28 series	Hi-ED-PE-35 series	Hi-ED-PE-42 series	Hi-ED-PE-56 series	Hi-ED-PE-60 series
Input Voltage	24VDC $\pm 10\%$				
Control Method	Closed loop control with 32bit MCU				
Multi Axes Drive	Maximum 254 axis operating (Selectable IP: 1~254)				
Position Table	256 motion command steps (Speed, External start, Jump, Loop, Wait and PT finish etc.)				
Current Consumption	Max 500mA (Except motor current)				
Operating Condition	Ambient Temperature	<ul style="list-style-type: none"> <li>In Use: 0~50°C</li> <li>In Storage: -20~70°C</li> </ul>			
	Humidity	<ul style="list-style-type: none"> <li>In Use: 35~85% RH (Non-Condensing)</li> <li>In Storage: 10~90% RH (Non-Condensing)</li> </ul>			
	Vib. Resist.	0,5g			
Function	Rotation Speed	0~3,000 [rpm] *1			
	Resolution [ppr]	4,000/Rev, Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 4,000 10,000/Rev, Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 16,000/Rev, Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 16,000 20,000/Rev, Encoder model: 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 20,000 (Selectable by parameter) *2			
	Protection Functions	Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperature Error, Over Regenerated Voltage Error, Motor Connect Error, Encoder Connect Error, Motor Voltage Error, In-Position Error, ROM Error, Position Overflow Error			
	LED Display	Power status, In-Position status, Servo On status, Alarm status			
	In-Position Selection	0~63 (Selectable by parameter)			
	Position Gain Selection	0~63 (Selectable by parameter)			
	Rotational Direction	CW/CCW (Selectable by parameter)			
	I/O Signal	Input Signals	3 dedicated inputs (LIMIT+, LIMIT-, ORIGIN), 9 programmable inputs (Photocoupler)		
Output Signals		1 dedicated output (Compare Out), 9 programmable outputs (Photocoupler), Brake			
Communication Interface	EtherNet communication, Dual port EtherNet switch embeded, Communication speed: 10/100 Base - T/TX Full-Duplex				
Position Control	<ul style="list-style-type: none"> <li>Incremental mode / Absolute mode Data Range: -134,217,728 to +134,217,727 [pulse]</li> <li>Operating speed: Max, 3,000 [rpm]</li> </ul>				
Return to Origin	Origin Sensor, Z phase, $\pm$ Limit sensor, Torque				
GUI	User Interface Program within Windows				
Library	Motion Library (DLL) for windows XP/7/8/10				

\*1 : Up to the resolution of 10,000[ppr], maximum speed can be reached by 3,000[rpm] and with the resolution more than 10,000[ppr], maximum speed shall be reduced accordingly.

\*2 : When selected resolution is more than encoder resolution, motor shall be operated by microstep between pulses.

## Dimensions of Drive [mm]



## Specifications of Moter

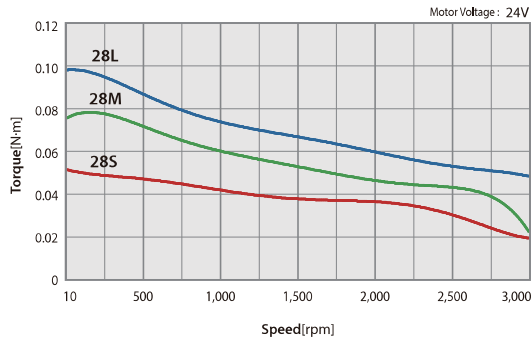
MODEL	UNIT	Hi-EM-28 series			Hi-EM-35 series		Hi-EM-42 series		
		28S	28M	28L	35M	35L	42S	42M	42XL
DRIVE METHOD	-	BI-POLAR							
NUMBER OF PHASES	-	2	2	2	2	2	2	2	2
VOLTAGE	VDC	3,0	3,0	3,0	2,88	4,59	3,36	4,32	7,2
CURRENT per PHASE	A	0,95	0,95	0,95	0,6	0,85	1,2	1,2	1,2
RESISTANCE per PHASE	Ohm	3,2	3,2	3,2	4,8	5,4	2,8	3,6	6,0
INDUCTANCE per PHASE	mH	2,0	2,7	3,2	6,1	6,5	5,4	7,2	15,6
HOLDING TORQUE	N·m	0,069	0,098	0,118	0,05	0,176	0,32	0,44	0,65
ROTOR INERTIA	g·cm <sup>2</sup>	9,0	13	18	8	11	35	54	114
WEIGHTS	g	110	140	200	120	200	250	280	500
LENGTH(L)	mm	32	45	50	26	38	34	40	60
PERMISSIBLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	30	30	30	22	22	22	22
	8mm		38	38	38	26	26	26	26
	13mm		53	53	53	33	33	33	33
	18mm		-	-	-	46	46	46	46
PERMISSIBLE THRUST LOAD	N	Lower than motor weight							
INSULATION RESISTANCE	Mohm	100 MIN.(at 500VDC)							
INSULATION CLASS	-	CLASS B(130°C)							
OPERATING TEMPERATURE	°C	0 to 55							

MODEL	UNIT	Hi-EM-56 series			Hi-EM-60 series			
		56S	56M	56L	60S	60M	60L	
DRIVE METHOD	-	BI-POLAR						
NUMBER OF PHASES	-	2	2	2	2	2	2	
VOLTAGE	VDC	1,56	1,62	2,64	1,32	1,48	2,2	
CURRENT per PHASE	A	3,0	3,0	3,0	4,0	4,0	4,0	
RESISTANCE per PHASE	Ohm	0,52	0,54	0,88	0,33	0,37	0,55	
INDUCTANCE per PHASE	mH	1,2	2,0	4,0	0,75	1,1	2,7	
HOLDING TORQUE	N·m	0,64	1,0	1,5	0,88	1,28	2,4	
ROTOR INERTIA	g·cm <sup>2</sup>	180	280	520	240	490	690	
WEIGHTS	g	500	720	1150	600	1000	1300	
LENGTH(L)	mm	46	55	80	47	56	85	
PERMISSIBLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	52	52	52	70	70	70
	8mm		65	65	65	87	87	87
	13mm		85	85	85	114	114	114
	18mm		123	123	123	165	165	165
PERMISSIBLE THRUST LOAD	N	Lower than motor weight						
INSULATION RESISTANCE	Mohm	100 MIN.(at 500VDC)						
INSULATION CLASS	-	CLASS B(130°C)						
OPERATING TEMPERATURE	°C	0 to 55						

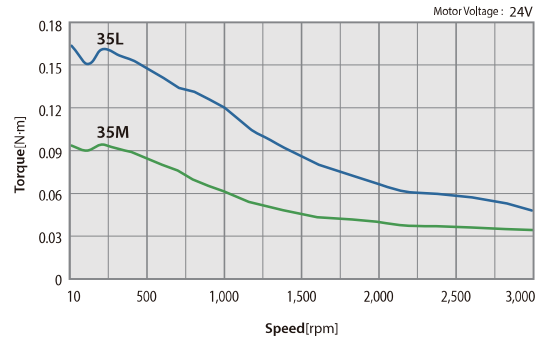


# Torque Characteristics of Motor

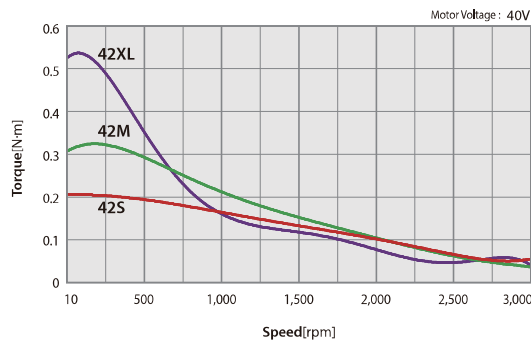
## HiSTEP-EEN-28 series



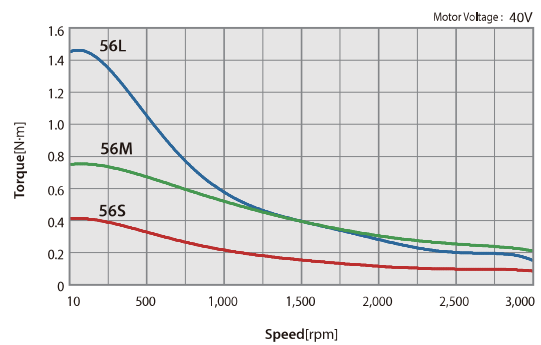
## HiSTEP-EEN-35 series



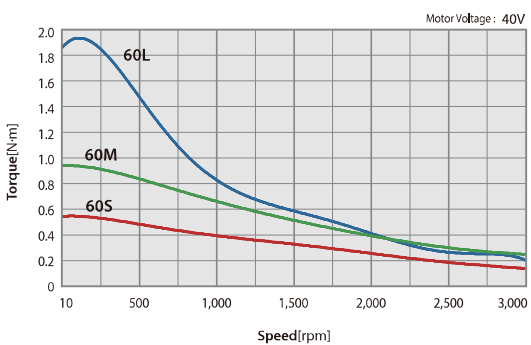
## HiSTEP-EEN-42 series



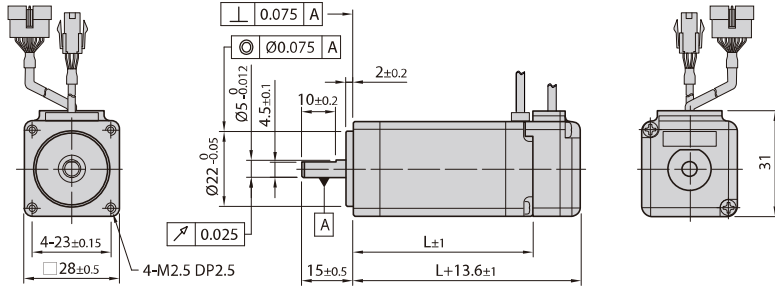
## HiSTEP-EEN-56 series



## HiSTEP-EEN-60 series

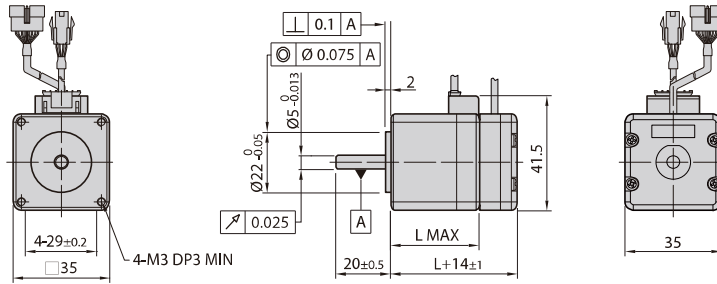


## Dimensions of Motor [mm]



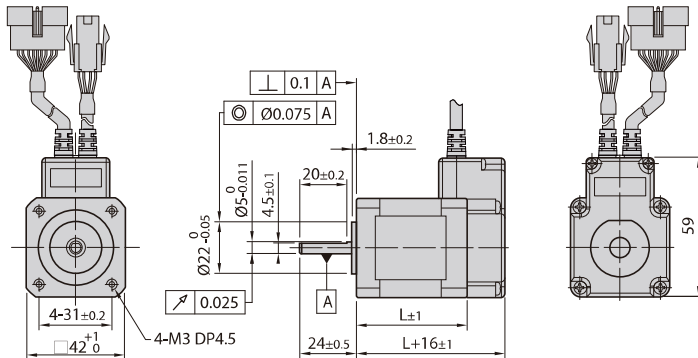
### 28mm

Model name	Length(L)
Hi-EM-28S	32
Hi-EM-28M	45
Hi-EM-28L	50



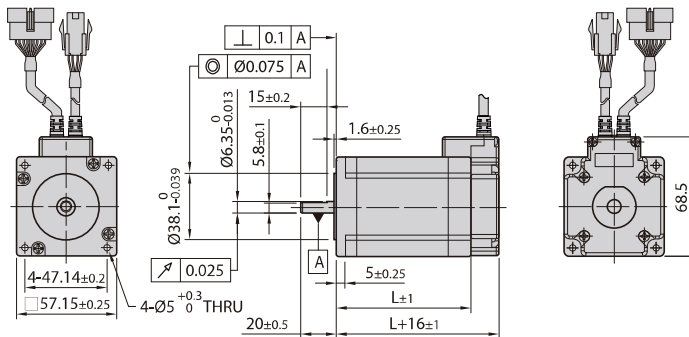
### 35mm

Model name	Length(L)
Hi-EM-35M	32
Hi-EM-35L	36



### 42mm

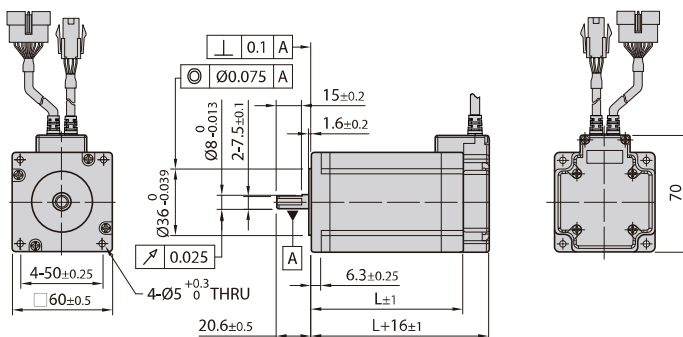
Model name	Length(L)
Hi-EM-42S	34
Hi-EM-42M	40
Hi-EM-42XL	60



### 56mm

Model name	Length(L)
Hi-EM-56S	46
Hi-EM-56M	55
Hi-EM-56L	80

※ There are 2 kinds size of front shaft diameter for Hi-EM-56 series as Ø6,35 and Ø8,0.



### 60mm

Model name	Length(L)
Hi-EM-60S	47
Hi-EM-60M	56
Hi-EM-60L	85

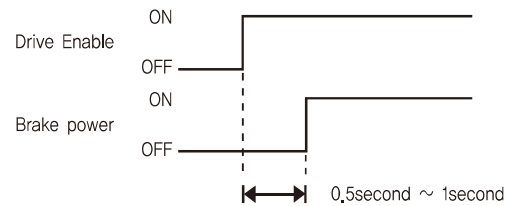
## Specifications of Motor with Brake

Unit Part Number	Motor Model Number	Electronic Brake					Motor Unit Weight [g]	Permitted Overhung Load [N]				Permitted Thrust Load [N]
		Type	Voltage Input [V]	Rated Current [A]	Power Consumption [W]	Statical Friction Torque [N·m]		Length from Motor Point [mm]				
								3	8	13	18	
HiSTEP-EEN-42S-■-BK	Hi-EM-42S-■-BK	Non-excitation run Type	24VDC ±10%	0,2	5	0,2	510	22	26	33	46	Must be Lower than Unit's Weight
HiSTEP-EEN-42M-■-BK	Hi-EM-42M-■-BK						570					
HiSTEP-EEN-42XL-■-BK	Hi-EM-42XL-■-BK						770					
HiSTEP-EEN-56S-■-BK	Hi-EM-56S-■-BK			1030	52	65	85	123				
HiSTEP-EEN-56M-■-BK	Hi-EM-56M-■-BK			1190								
HiSTEP-EEN-56L-■-BK	Hi-EM-56L-■-BK			1630								
HiSTEP-EEN-60S-■-BK	Hi-EM-60S-■-BK			1150	70	87	114	165				
HiSTEP-EEN-60M-■-BK	Hi-EM-60M-■-BK			1350								
HiSTEP-EEN-60L-■-BK	Hi-EM-60L-■-BK			1960								

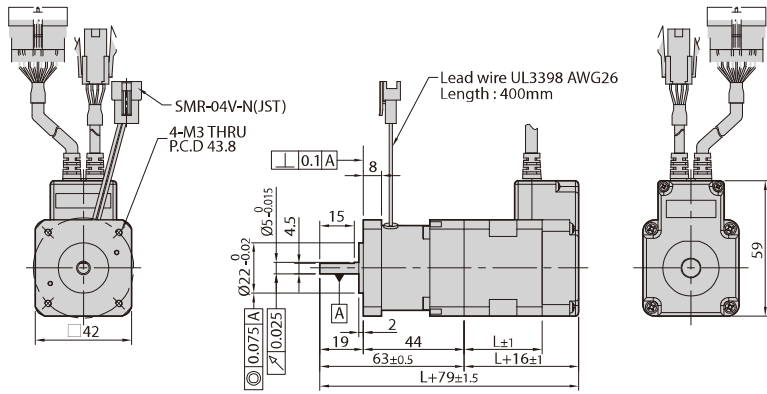
- \* The code of encoder resolution will be marked in "■"
- \* Electronic Brake cannot be used for braking, Position hold purpose only when power OFF.
- \* The weight means Motor Unit Weight including Motor and Electronic Brake.
- \* Motor Model Number is combined model name of Motor and Brake.
- \* Motor specification and torque characteristic are same as Standard Motor.

### \* Brake Operation Timing Chart

Hi STEP EtherNet controls Brake by Drive automatically.  
Please refer to below Timing Chart when Brake is controlled by the upper controller other than using Hi STEP EtherNet Brake control. Otherwise, Drive malfunctioning and loads can be fall down.  
Also, please do not operate Brake while motor operation to prevent damage.

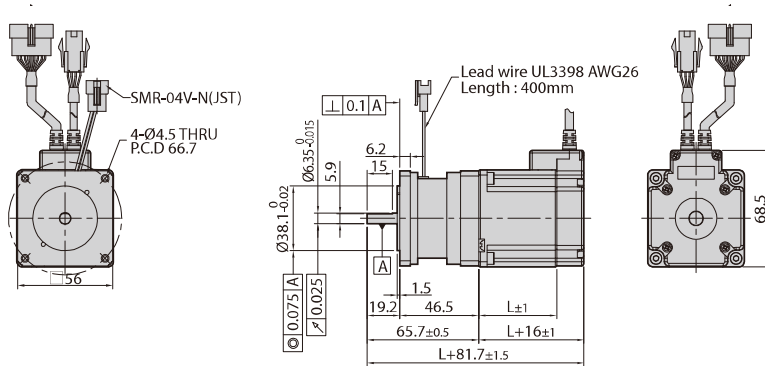


## Dimensions of Motor With Brake [mm]



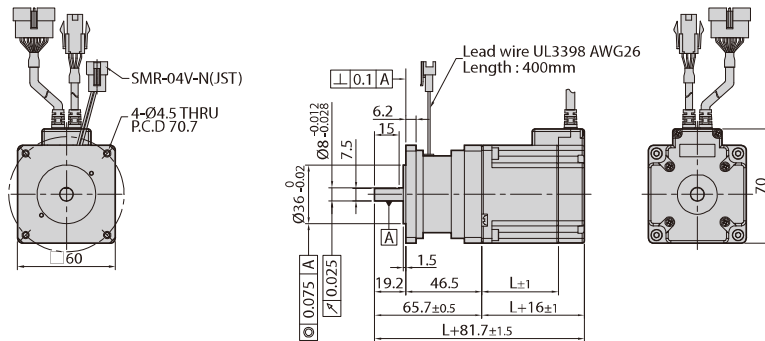
# 42mm

Model Name	Length(L)	Weight(kg)
Hi-EM-42S	34	0,51
Hi-EM-42M	40	0,57
Hi-EM-42XL	60	0,77



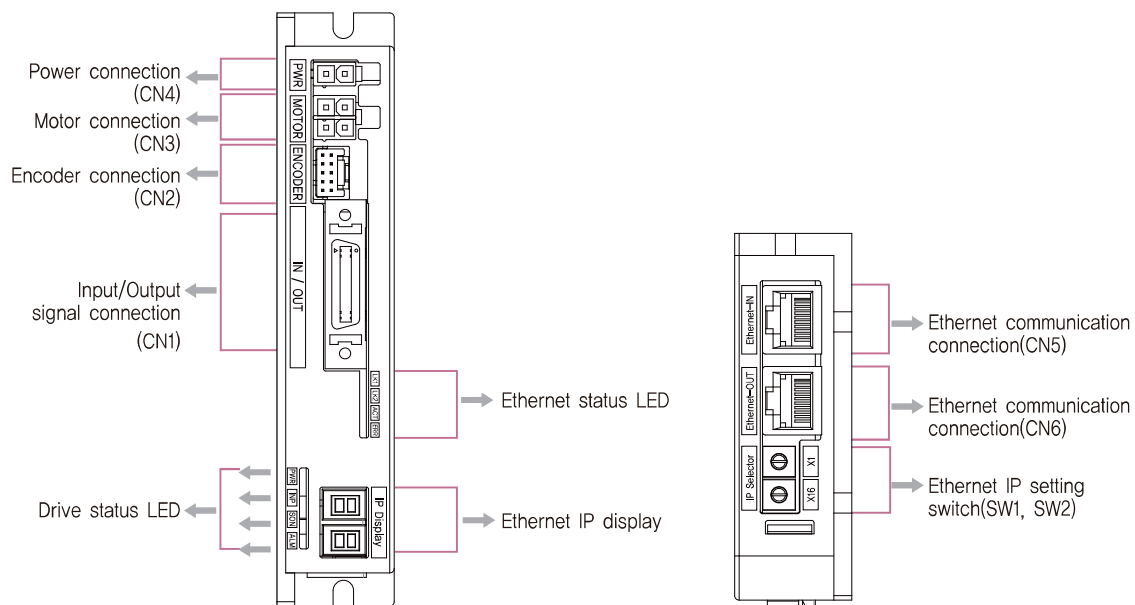
# 56mm

Model Name	Length(L)	Weight(kg)
Hi-EM-56S	46	1,03
Hi-EM-56M	55	1,19
Hi-EM-56L	80	1,63



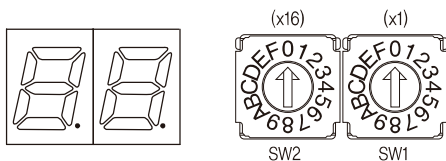
# 60mm

Model Name	Length(L)	Weight(kg)
Hi-EM-60S	47	1,15
Hi-EM-60M	56	1,35
Hi-EM-60L	85	1,96



## 1. Ethernet IP Display and Setting Switch(SW1, SW2)

It is to be set from 1 to 254. Please set the IP not to overlap each other.  
 (Basic set up is "192.168.0.xxx" and xxx is to be set by switch)



Ex) In case of SW1 : 7 and SW2 : 5  
 $(5 \times 16) + (7 \times 1) = 87$   
 IP is to be set as 192.168.0.87

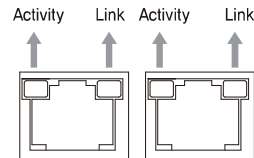
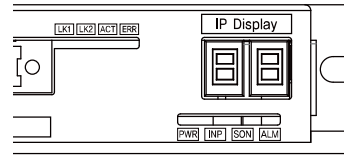
## 2. Ethernet Status LED

LED indicates communication status of EtherNet. Link/Activity LED exists on each port of Ethernet.

Name	Color	Status	Explanation
Error	Red	OFF	No Error status
		ON	Local Error

Name	Color	Status	Explanation
LK1 / LK2	Green	OFF	Link deactivated
		ON	Link activated

Name	Color	Status	Explanation
Activity	Yellow	OFF	No operating
		Flickering	Operating



## 3. Drive Status LED

Indication	Color	Function	ON/OFF Condition
PWR	Green	Power input indication	LED is turned ON when power is applied
INP	Yellow	Complete Positioning Motion	Lights On when Positioning error reaches within the preset pulse selected by parameter
SON	Orange	Servo On / Off Indication	Servo On: Lights On, Servo Off: Lights Off
ALM	Red	Alarm indication	Flash when protection function is activated

### ■ Protection functions and LED flash times

Times	Error Code <sup>*4</sup>	Protection	Conditions
1	E-001	Over Current Error	The current through power devices in drive exceeds 4.8A <sup>*1</sup>
2	E-002	Over Speed Error	Motor speed exceeds 3,000 [rpm]
3	E-003	Position Tracking Error	Position error value is higher than 180° in motor run state <sup>*2</sup>
4	E-004	Over Load Error	The motor is continuously operated more than 5 seconds under a load exceeding the max. torque
5	E-005	Over Temperature Error	Temperature of inside of drive exceed 85°C
6	E-006	Over Regenerated Voltage Error	Back-EMF is higher than limit value <sup>*3</sup>
7	E-007	Motor Connect Error	The power is ON without connection of the motor cable to drive
8	E-008	Encoder Connect Error	Cable connection error in Encoder connection of drive
10	E-010	In-Position Error	After operation is finished, position error more than 1 pulse is continued for more than 3 seconds
12	E-012	ROM Error	Error occurs in parameter storage device(ROM)
15	E-015	Position Overflow Error	Position error value is higher than 180° in motor stop state <sup>*2</sup>



Alarm LED flash  
(Ex, Position tracking error)

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

\*2 : Default value can be changed by parameter, (Refer to the Manual)

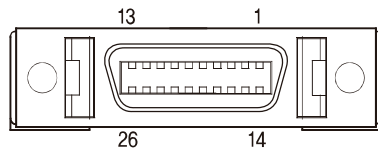
\*3 : Voltage limit of Back-EMF depends on motor model, (Refer to the Manual)

\*4 : When an alarm occurs, error code is displayed on the 7-segment instead of EtherNet IP.

※ Please refer to user Manual for the details of protection functions,

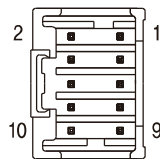
#### 4. Input/Output Signal Connector(CN1)

NO.	Function	I/O
1	LIMIT+	Input
2	LIMIT-	Input
3	ORIGIN	Input
4	Digital In1	Input
5	Digital In6	Input
6	Digital In7	Input
7	Compare Out	Output
8	Digital Out1	Output
9	Digital Out2	Output
10	Digital Out3	Output
11	Digital Out4	Output
12	Digital Out5	Output
13	Digital Out6	Output
14	Digital In2	Input
15	Digital In3	Input
16	Digital In4	Input
17	Digital In5	Input
18	Digital In8	Input
19	Digital In9	Input
20	Digital Out7	Output
21	Digital Out8	Output
22	Digital Out9	Output
23	BRAKE+	Output
24	BRAKE-	Output
25	EXT_GND	Input
26	EXT_24VDC	Input



#### 5. Encoder Connector(CN2)

NO.	Function	I/O
1	A+	Input
2	A-	Input
3	B+	Input
4	B-	Input
5	Z+	Input
6	Z-	Input
7	5VDC	Output
8	GND	Output
9	F.GND	-----
10	F.GND	-----

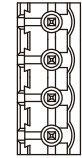


#### 6. Motor Connector(CN3)

NO.	Function	I/O
1	A Phase	Output
2	B Phase	Output
3	/A Phase	Output
4	/B Phase	Output

NO.	Function	I/O
1	/B Phase	Output
2	B Phase	Output
3	/A Phase	Output
4	A Phase	Output

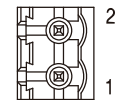


#### 7. Power Connector(CN4)

NO.	Function	I/O
1	24VDC	Input
2	GND	Input

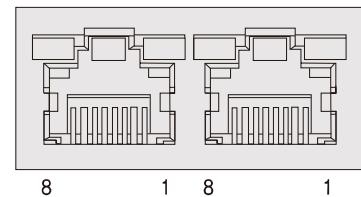
  

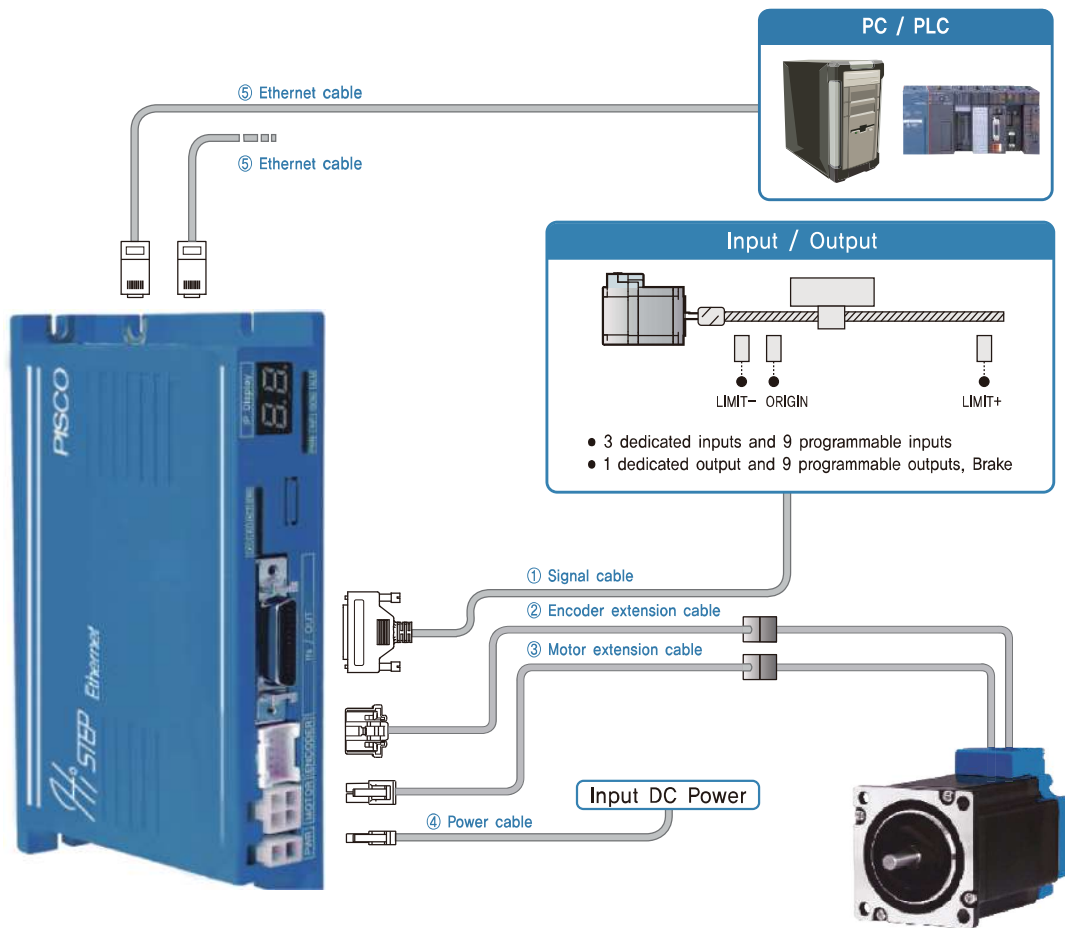
NO.	Function	I/O
1	GND	Input
2	40~70VDC	Input



#### 8. EtherNet Communication Connector(CN5, CN6)

NO.	Function	NO.	Function
1	TD+	6	RD-
2	TD-	7	-----
3	RD+	8	-----
4	-----	Connection hood	F_GND
5	-----		





Type	Signal Cable	Encoder Cable	Motor Cable	Power Cable	EtherNet Cable
Length supplied	–	30cm	30cm	–	–
Max. Length	20m	20m	20m	2m	100m

## 1. Options

### ① Signal Cable

Available to connect between Input/Output signals and Hi STEP EtherNet

Item	Length [m]	Remark
CSVR–S–□□□F	□□□	Normal Cable
CSVR–S–□□□M	□□□	Robot Cable

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

### ② Encoder Extension Cable

Available to extended connection between Encoder and Hi STEP EtherNet

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

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



### ③ Motor Extension Cable

Available to extended connection between motor and Hi STEP EtherNet.

Item	Length [m]	Remark
CSV0-M-□□□F	□□□	Normal Cable
CSV0-M-□□□M	□□□	Robot Cable

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

### ④ Power Cable

Available to connect between Power and Hi STEP EtherNet.

Item	Length [m]	Remark
CSV0-P-□□□F	□□□	Normal Cable
CSV0-P-□□□M	□□□	Robot Cable

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

### ⑤ Ethernet Cable

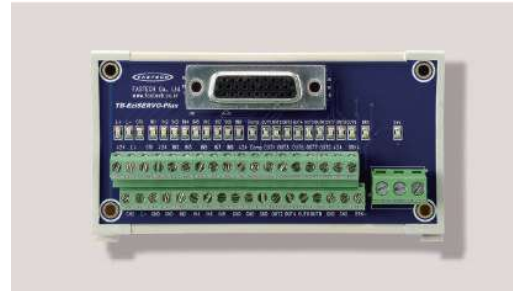
STP(Shielded twisted pair) cable of category 5e or higher.

Item	Length [m]	Remark
CGNR-EC-□□□F	□□□	Normal Cable

□ is for Cable Length. The unit is 1m and Max. 100m length.

### ⑥ TB-Plus(Interface Board)

Available to connect more conveniently between Input/Output signal and Hi STEP EtherNet.



### ⑦ Interface Cable for TB-Plus

Available to Connect between TB-Plus Interface Board and Hi STEP EtherNet.

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

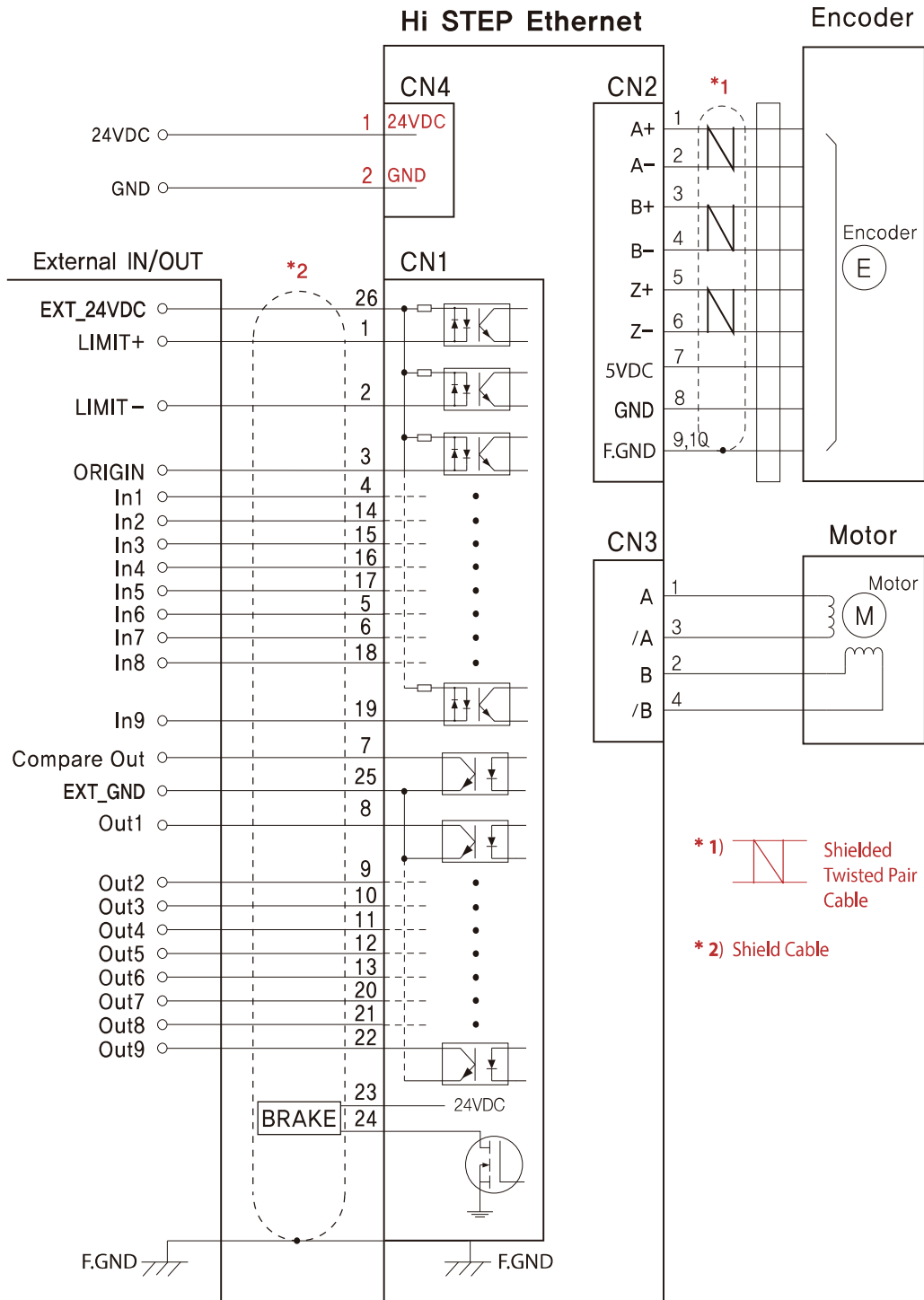
□ is for Cable Length. The unit is 1m and Max. 20m length.

## 2. Connector Specifications

Connector specifications for cabling to drive.

Purpose		Item	Part Number	Manufacturer
Power (CN4)		Housing Terminal	5557-02R 5556T	MOLEX
Motor	Drive Side (CN3)	Housing Terminal	5557-04R 5556T	MOLEX
	Motor Side	Housing Terminal	5557-04R 5556T	MOLEX
Encoder	Drive Side (CN2)	Housing Terminal	51353-1000 56134-9000	MOLEX
	Encoder Side	Housing Terminal	SMP-09V-NC SHF-001T-0,8BS	JST
Signal (CN1)		Connector Backshell	10126-3000PE 10326-52F0-008	3M

※ Above connector is the most suitable product for the drive applied. Another equivalent connector can be used.



**CAUTION**

Please refer to the Manual when connects motor extension cable. Careful connection will be required to protect the drive from any damages.

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