

Hi-SERVO Ethernet

Closed Loop Stepping System

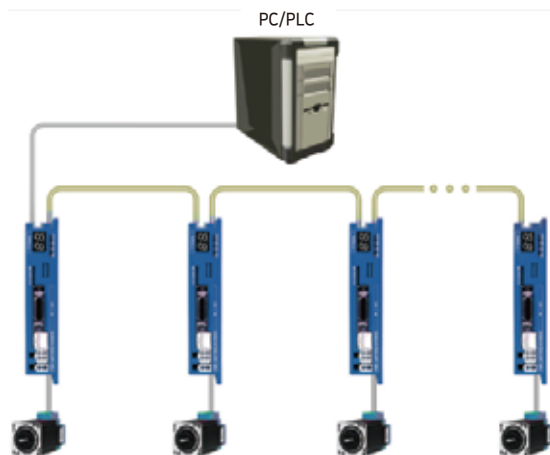


- **Embeded Motion Controller**
- **Ethernet Interface**
- **Position Table**
- **Closed-Loop Stepping System**
- **Tuning Not Required / No Hunting**
- **High Resolution / High Response**
- **Low Heat Generation / High Torque**



1. Network Based Motion Control

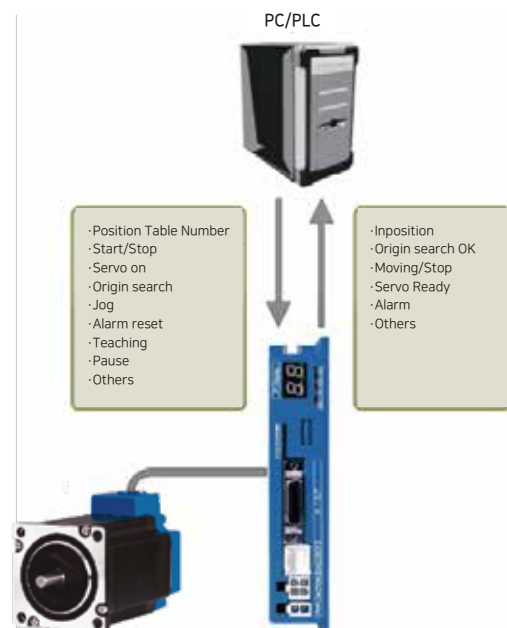
Hi-SERVO Ethernet is a stepping motor control system that supports Ethernet, an open field network based on RS-485. Hi-SERVO Ethernet is a remote device station connected to the Ethernet system. It performs various controls and processes motion and monitoring functions with device commands.



2. PT : Position Table Function

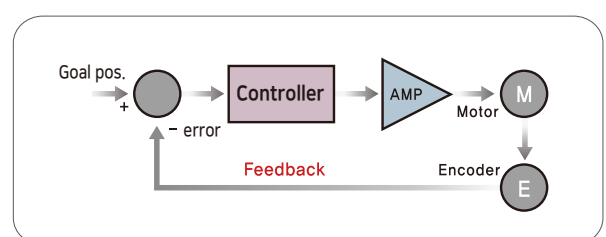
Position Table can be used for motion control by digital input and output signals of host controller. You can operate the motor directly by sending the position table number, start/stop, origin search and other digital input values from a PC.

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.



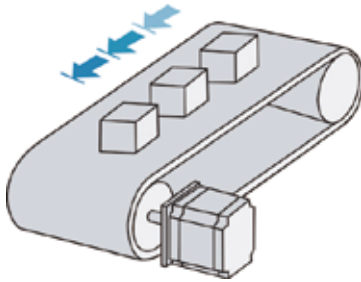
3. Closed-Loop System

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



4. Tuning Not Required

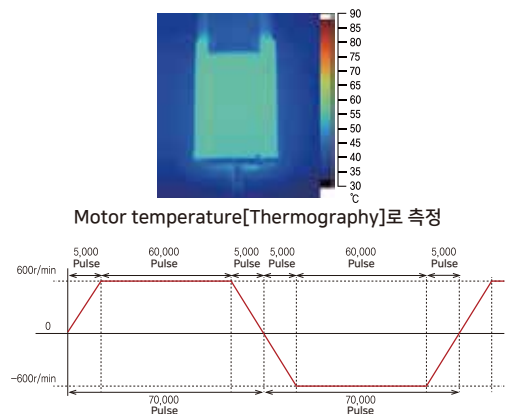
To ensure machine performance, conventional servo systems require the adjustment of its servo's gains as an initial crucial step. Even systems that employ auto-tuning require manual tuning after the system is installed. Hi-SERVO employs the best characteristics of the stepping motor to eliminate the need of tedious gain tuning required for conventional closed-loop servo systems. Hi-SERVO is especially well suited for low-rigidity loads(e.g., a belt and pulley system) thath sometimes require conventional servo systems to use the additional bulky and expensive gearbox.



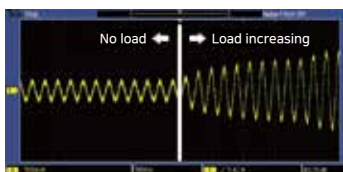
5. Low Heat Generation / Energy Savings

(Motor Current Control according to load)

Hi-SERVO automatically controls motor current according to load. Hi-SERVO 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.



Condition to measure the motor temperature
[4hours operation, Motor surface temperature saturation]

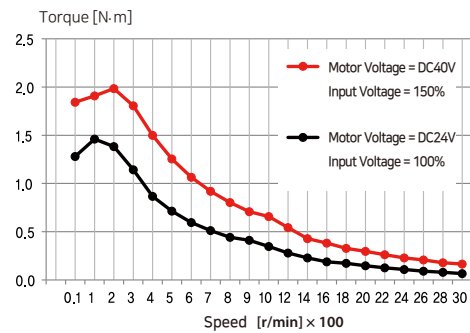


Example of the Motor Current Control according to load

6. High Torque

(Motor Voltage Increasing and Motor Current Setting)

Hi-SERVO 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.

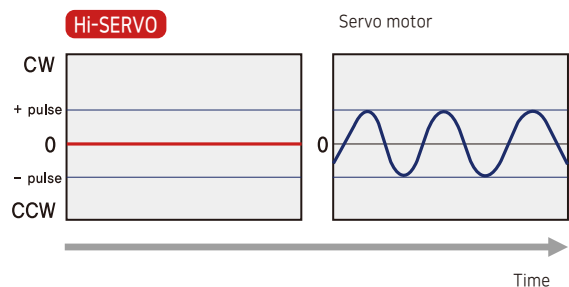
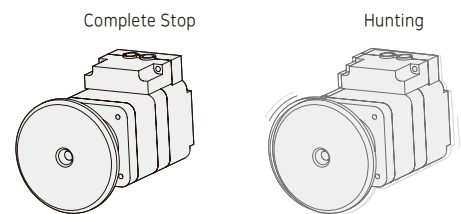


※ The torque at low speed and high speed
is improved about 30%

Measured Condition : Drive = HSC-EEN-56L
Motor Voltage = DC40V
Input Voltage = DC24V

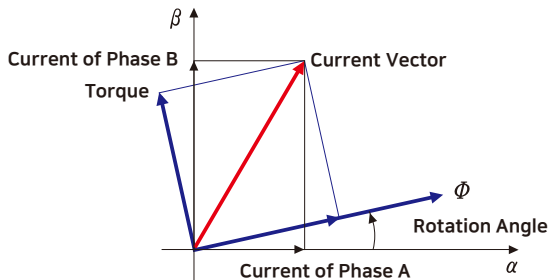
7. No Hunting

Hi-SERVO utilizes the unique characteristics of stepping motors and locks itself into the desired target position, preventing vibration and eliminating Null Hunt which happens to the conventional servo systems. This feature is especially useful in applications such as vision systems in which system oscillation and vibration could be a problem.



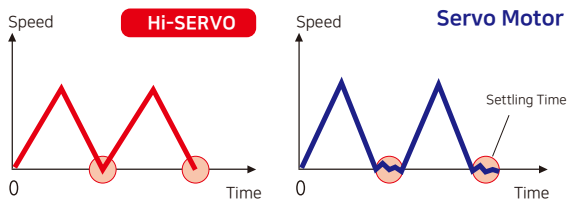
8. Smooth and Accurate Operation

Hi-SERVO 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 MCU (Micro Controller Unit) performs vector control and filtering, producing a smooth rotational control with minimum ripples.



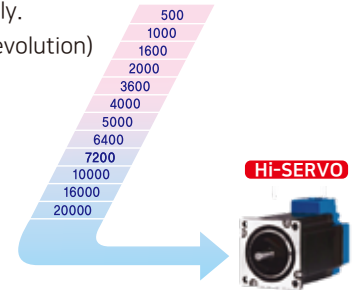
9. High Response

Similar to conventional stepping motors, Hi-SERVO instantly synchronizes with command pulses providing fast positional response. Hi-SERVO is the optimal 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.



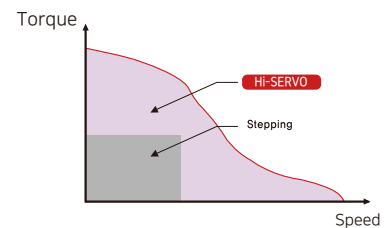
10. High Resolution

The unit of the position command can be divided precisely.
(Max.20,000 pulses/revolution)



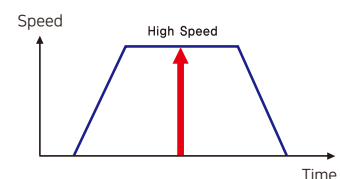
11. High Torque / Continuous Operation

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



12. High Speed

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



■ Advantages over Open-Loop Stepping Systems

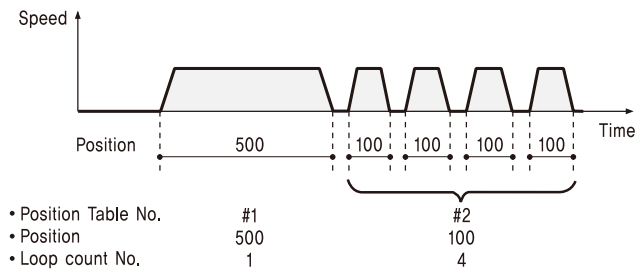
1. Reliable positioning without loss of synchronism.
2. Holding stable position and automatically recovering to the original position even after experiencing positioning error due to external forces, such as mechanical vibration or vertical positional holding.
3. Hi-SERVO utilizes 100% of the full range of rated motor torque, contrary to a conventional open-loop stepping drive 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-dependent current control, open-loop stepping drives 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 MCU.
4. Continuous operation during rapid short-stroke movement due to instantaneous positioning.

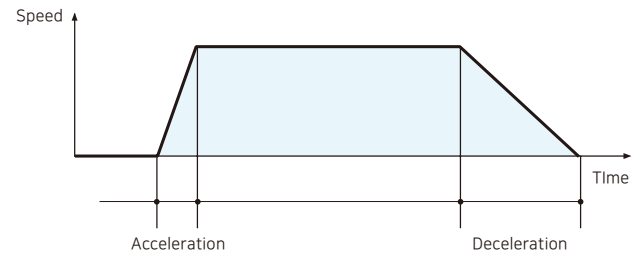
1. Loop Count

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



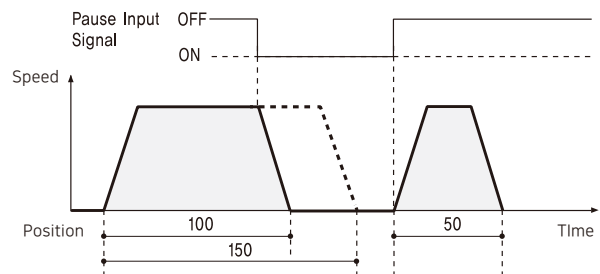
2. Acceleration/Deceleration

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



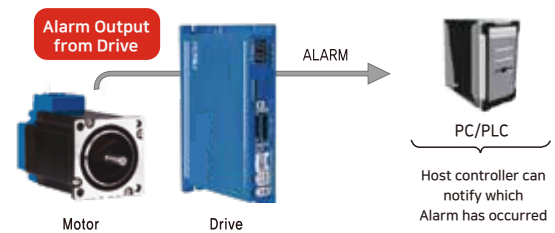
3. Pause

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.



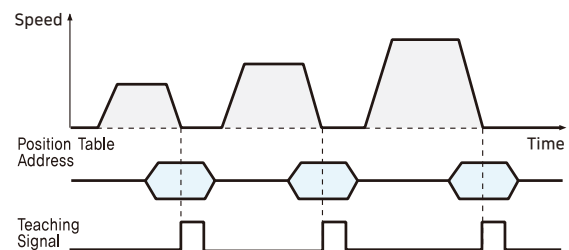
4. Alarm

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



5. Teaching

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

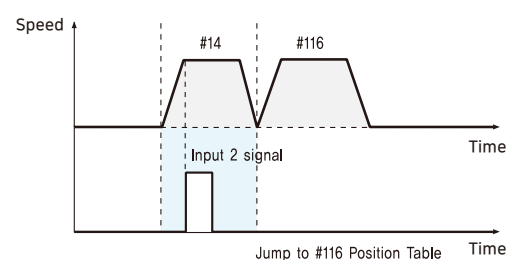
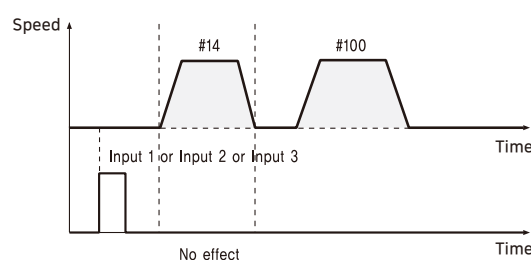


6. Jump

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-SERVO Ethernet



HSC - **EEN** - **56** **L** - **A** - **BK** - **PN10**

Hi-SERVO Combination ① ② ③ ④ ⑤ ⑥

① Communication Type

EEN	Ethernet
-----	----------

② Motor Size

28	28mm
35	35mm
42	42mm
56	56mm
60	60mm

③ Motor Length

S	Small
M	Medium
L	Large
XL	Extra Large (※)

※ Motor length XL is only 42mm Size.

④ Encoder Resolution

A	10,000P/R
D	16,000P/R (※)

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

⑤ Brake

None	Without Brake
BK	Brake

※ If you need a speed reducer, contact your dealer or sales office.

⑥ Gear Ratio

None	Without Gear
PN03	1:3
PN05	1:5
PN08	1:8
PN10	1:10
PN15	1:15
PN25	1:25
PN40	1:40
PN50	1:50

Standard Combination

Unit Part Number	Motor Model Number	Drive Model Number
HSC-EEN-28S-D	HS-EM-28S-D	HS-ED-EN-28S-D
HSC-EEN-28M-D	HS-EM-28M-D	HS-ED-EN-28M-D
HSC-EEN-28L-D	HS-EM-28L-D	HS-ED-EN-28L-D
HSC-EEN-35M-A	HS-EM-35M-A	HS-ED-EN-35M-A
HSC-EEN-35L-A	HS-EM-35L-A	HS-ED-EN-35L-A
HSC-EEN-42S-A	HS-EM-42S-A	HS-ED-EN-42S-A
HSC-EEN-42M-A	HS-EM-42M-A	HS-ED-EN-42M-A
HSC-EEN-42XL-A	HS-EM-42XL-A	HS-ED-EN-42XL-A
HSC-EEN-56S-A	HS-EM-56S-A	HS-ED-EN-56S-A
HSC-EEN-56M-A	HS-EM-56M-A	HS-ED-EN-56M-A
HSC-EEN-56L-A	HS-EM-56L-A	HS-ED-EN-56L-A
HSC-EEN-60S-A	HS-EM-60S-A	HS-ED-EN-60S-A
HSC-EEN-60M-A	HS-EM-60M-A	HS-ED-EN-60M-A
HSC-EEN-60L-A	HS-EM-60L-A	HS-ED-EN-60L-A

Combination with Brake

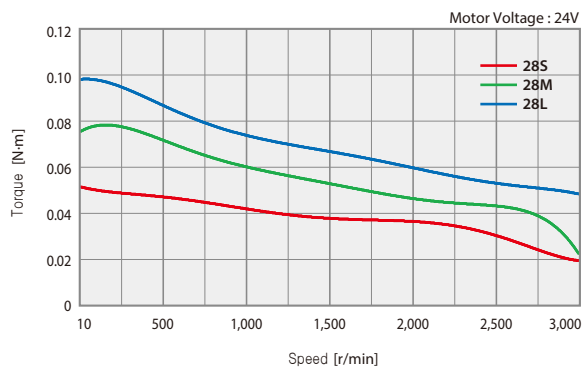
Unit Part Number	Motor Model Number	Drive Model Number
HSC-EEN-42S-A-BK	HS-EM-42S-A-BK	HS-ED-EN-42S-A
HSC-EEN-42M-A-BK	HS-EM-42M-A-BK	HS-ED-EN-42M-A
HSC-EEN-42XL-A-BK	HS-EM-42XL-A-BK	HS-ED-EN-42XL-A
HSC-EEN-56S-A-BK	HS-EM-56S-A-BK	HS-ED-EN-56S-A
HSC-EEN-56M-A-BK	HS-EM-56M-A-BK	HS-ED-EN-56M-A
HSC-EEN-56L-A-BK	HS-EM-56L-A-BK	HS-ED-EN-56L-A
HSC-EEN-60S-A-BK	HS-EM-60S-A-BK	HS-ED-EN-60S-A
HSC-EEN-60M-A-BK	HS-EM-60M-A-BK	HS-ED-EN-60M-A
HSC-EEN-60L-A-BK	HS-EM-60L-A-BK	HS-ED-EN-60L-A

Model			HS-EM-28 series			HS-EM-35 series		HS-EM-42 series			
			Unit	28S	28M	28L	35M	35L	42S	42M	42XL
Input Voltage			-	Bipolar							
Number of phase			-	2 Phase							
Current per Phase			A/Phase	0.95	0.95	0.95	1.5	1.25	1.2	1.2	1.2
Maximum Holding Torque			N·m	0.069	0.098	0.118	0.13	0.23	0.32	0.44	0.65
Rotor Inertia			g·cm ²	9.0	13	18	15	20	35	54	114
Weight			kg	0.147	0.204	0.232	0.194	0.226	0.294	0.357	0.564
Length(L)			mm	32	45	50	32	36	34	40	60
Permissible Radial Load	Distance from end of shaft	3mm	N	30	30	30	22	22	22	22	22
		8mm		38	38	38	26	26	26	26	26
		13mm		53	53	53	33	33	33	33	33
		18mm		-	-	-	46	46	46	46	46
Permissible Axial Load			N	Lower than Motor Unit's Weight							
Insulation resistance			Ω	Min. 100(When measured with a DC500V insulation resistance meter)							
Insulation class			-	CLASS B(130℃)							
Operating temperature			℃	0 ~ 55							

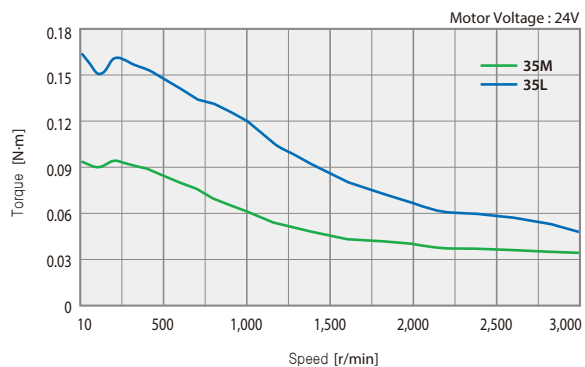
Model			Unit	HS-EM-56 series			HS-EM-60 series		
				56S	56M	56L	60S	60M	60L
Input Voltage			-	Bipolar					
Number of phase			-	2 Phase					
Current per Phase			A/Phase	3.0	3.0	3.0	4.0	4.0	4.0
Maximum Holding Torque			N·m	0.64	1.0	1.5	0.88	1.28	2.4
Rotor Inertia			g·cm ²	180	280	520	240	490	690
Weight			kg	0.608	0.784	1.230	0.693	0.856	1.419
Length(L)			mm	46	55	80	47	56	85
Permissible Radial 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 Axial Load			N	Lower than Motor Unit's Weight					
Insulation resistance			Ω	Min. 100(When measured with a DC500V insulation resistance meter)					
Insulation class			-	CLASS B(130℃)					
Operating temperature			℃	0 ~ 55					

Torque Characteristics of Motor

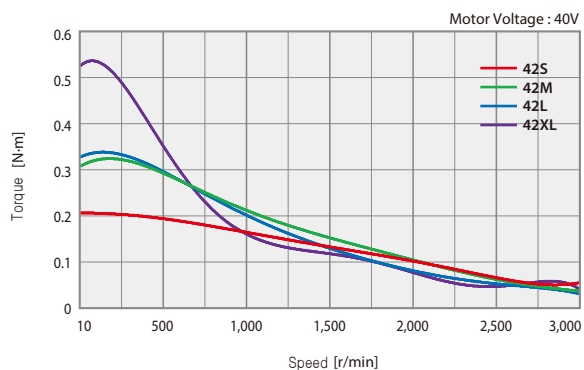
HSC-ECC-28 series



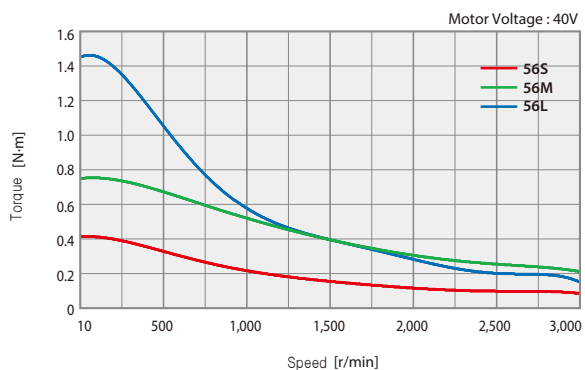
HSC-ECC-35 series



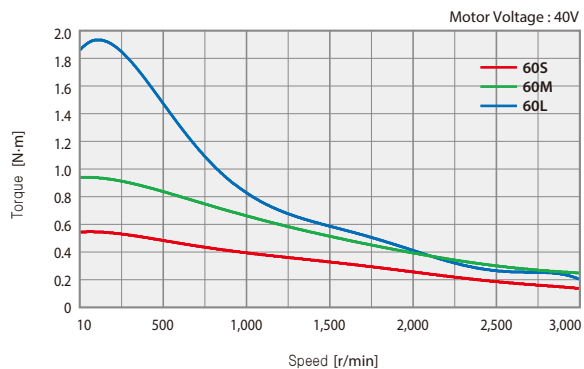
HSC-ECC-42 series



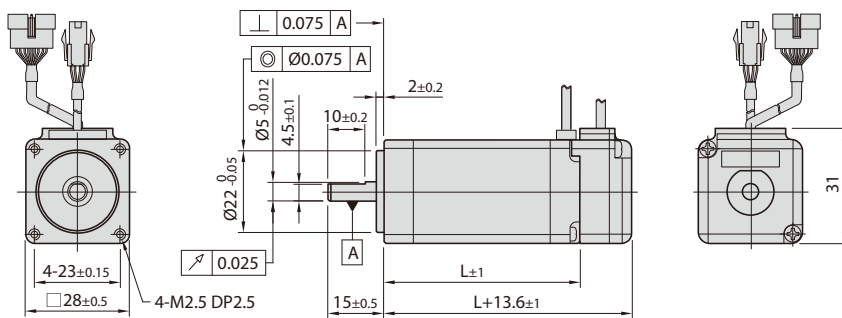
HSC-ECC-56 series



HSC-ECC-60 series

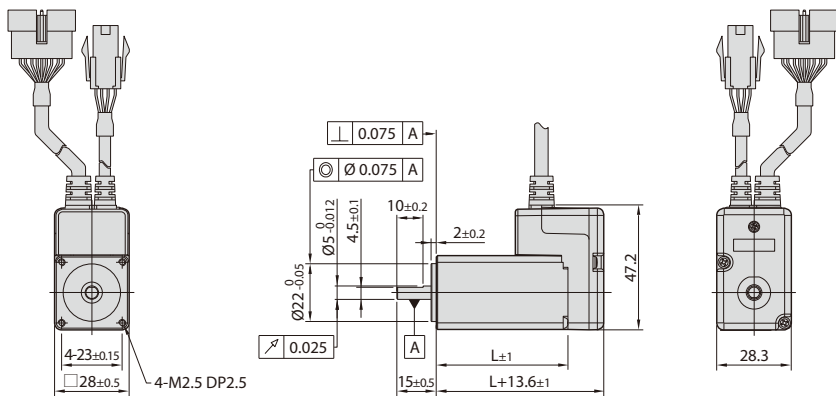


Dimensions of Motor[mm]



28_{mm}

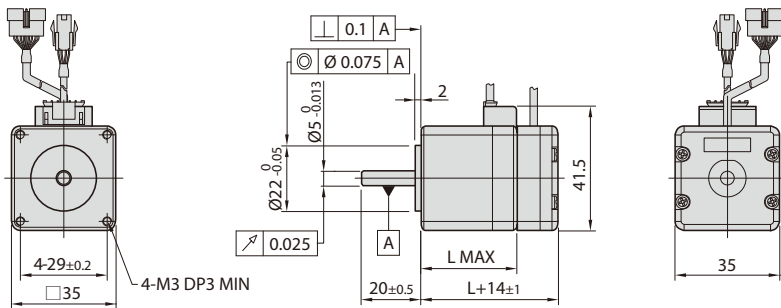
Motor	Length(L)
HS-EM-28S	32
HS-EM-28M	45
HS-EM-28L	50



28_{mm} (Stopper Type)

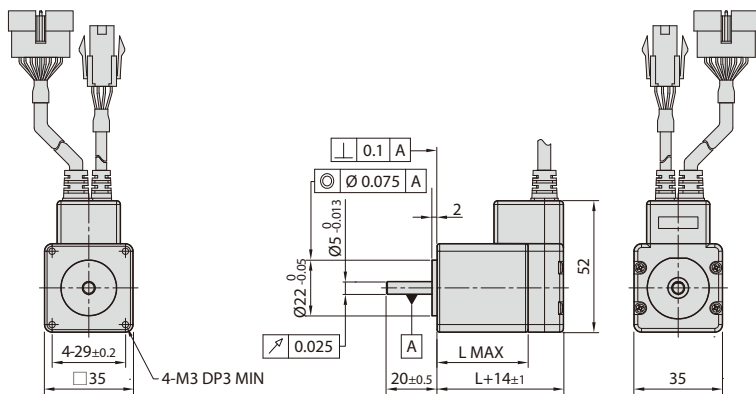
Motor	Length(L)
HS-EM-28SM	32
HS-EM-28MM	45
HS-EM-28LM	50

※ When ordering 28mm Stopper type of motor, please add "M" after standard motor model number.



35_{mm}

Motor	Length(L)
HS-EM-35M	32
HS-EM-35L	36

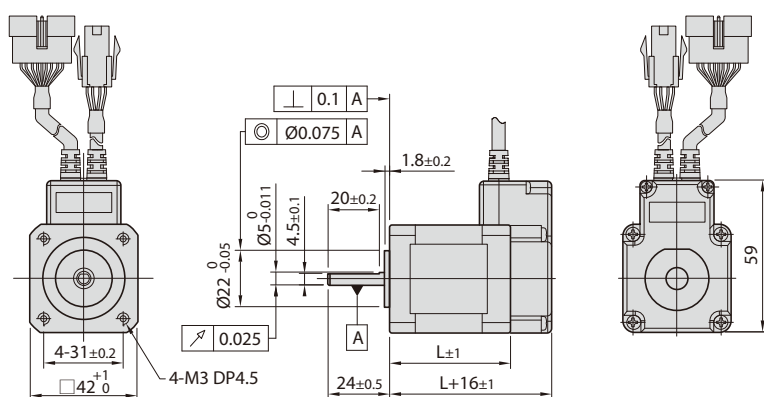


35_{mm} (Stopper Type)

Motor	Length(L)
HS-EM-35MM	32
HS-EM-35LM	36

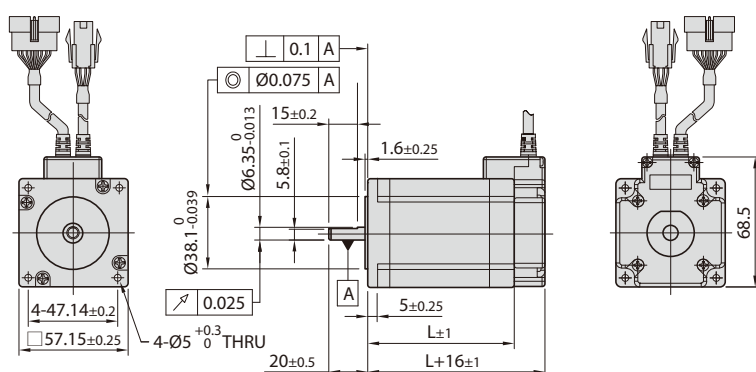
※ When ordering 35mm Stopper type of motor, please add "M" after standard motor model number.

■ Dimensions of Motor[mm]



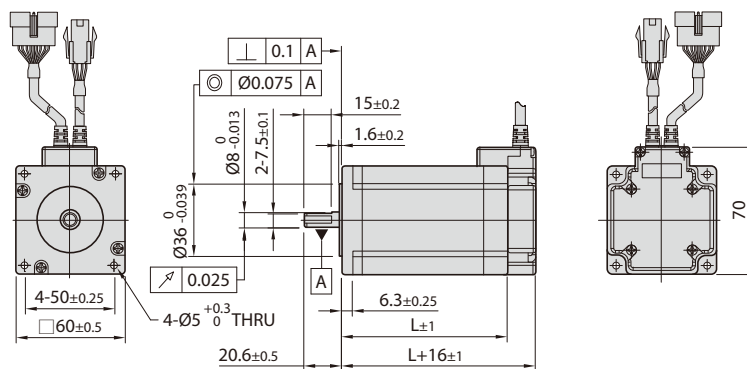
42_{mm}

Motor	Length(L)
HS-EM-42S	34
HS-EM-42M	40
HS-EM-42XL	60



56_{mm}

Motor	Length(L)
HS-EM-56S	46
HS-EM-56M	55
HS-EM-56L	80



60_{mm}

Motor	Length(L)
HS-EM-60S	47
HS-EM-60M	56
HS-EM-60L	85

Unit Part Number	Motor Model Number	Electromagnetic Brake					Motor Unit Weight [kg]	Permissible Radial Load [N]				Permissible Axial Load [N]
		Type	Voltage Input [V]	Rated Current [A]	Power Consumption [W]	Statical Friction Torque [N·m]		Distance from End of Shaft [mm]				
								3	8	13	18	
HSC-EEN-42S-■-BK	HS-EM-42S-■-BK	Non-excitation run Type	24VDC ±10%	0.2	5	0.2	0.55	22	26	33	46	Must be Lower than Unit's Weight
HSC-EEN-42M-■-BK	HS-EM-42M-■-BK						0.62					
HSC-EEN-42XL-■-BK	HS-EM-42XL-■-BK						0.82					
HSC-EEN-56S-■-BK	HS-EM-56S-■-BK		24VDC ±10%	0.27	6.6	0.7	1.03	52	65	85	123	
HSC-EEN-56M-■-BK	HS-EM-56M-■-BK						1.20					
HSC-EEN-56L-■-BK	HS-EM-56L-■-BK						1.65					
HSC-EEN-60S-■-BK	HS-EM-60S-■-BK						1.11	70	87	114	165	
HSC-EEN-60M-■-BK	HS-EM-60M-■-BK						1.30					
HSC-EEN-60L-■-BK	HS-EM-60L-■-BK						1.86					

※ 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.

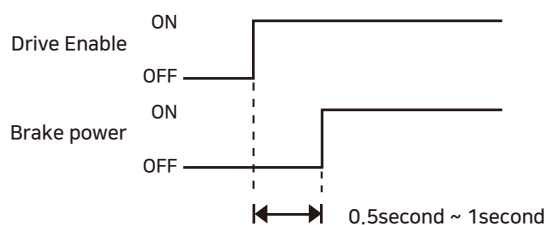
* Brake Operation Timing Chart

Hi-SERVO Ethernet control Brake by Drive automatically.

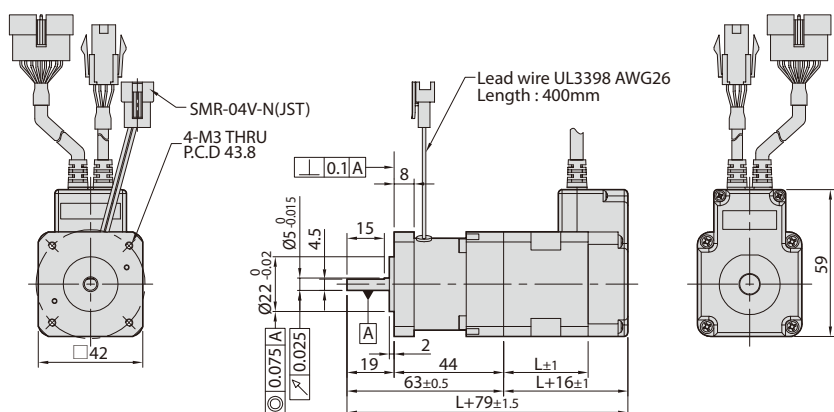
Please refer to below Timing Chart when control Brake from upper controller other than using Hi-SERVO Ethernet Brake control.

Otherwise, Drive malfunctioning and loads can be fall down.

Also, please do not operate Brake while motor operation to prevent damage.

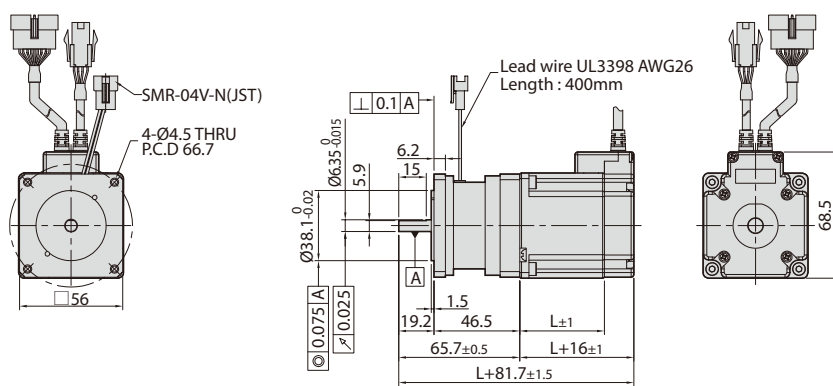


Dimensions of Motor with Brake[mm]



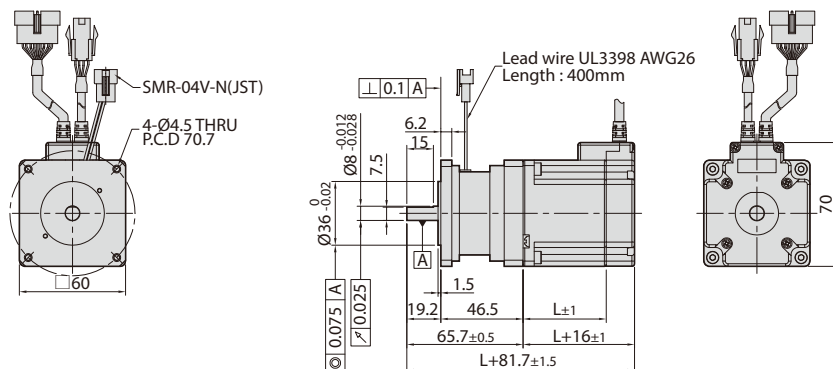
42_{mm}

Motor	Length(L)
HS-EM-42S	34
HS-EM-42M	40
HS-EM-42XL	60



56_{mm}

Motor	Length(L)
HS-EM-56S	46
HS-EM-56M	55
HS-EM-56L	80



60_{mm}

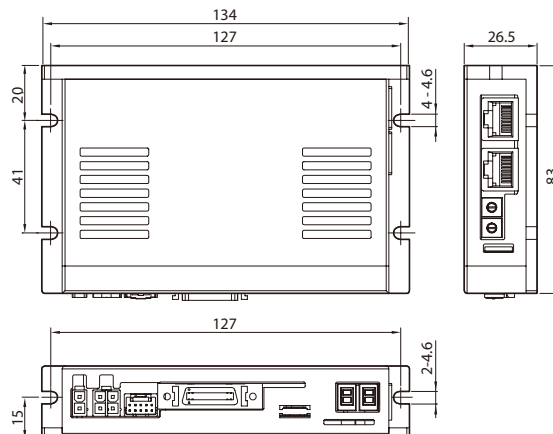
Motor	Length(L)
HS-EM-60S	47
HS-EM-60M	56
HS-EM-60L	85

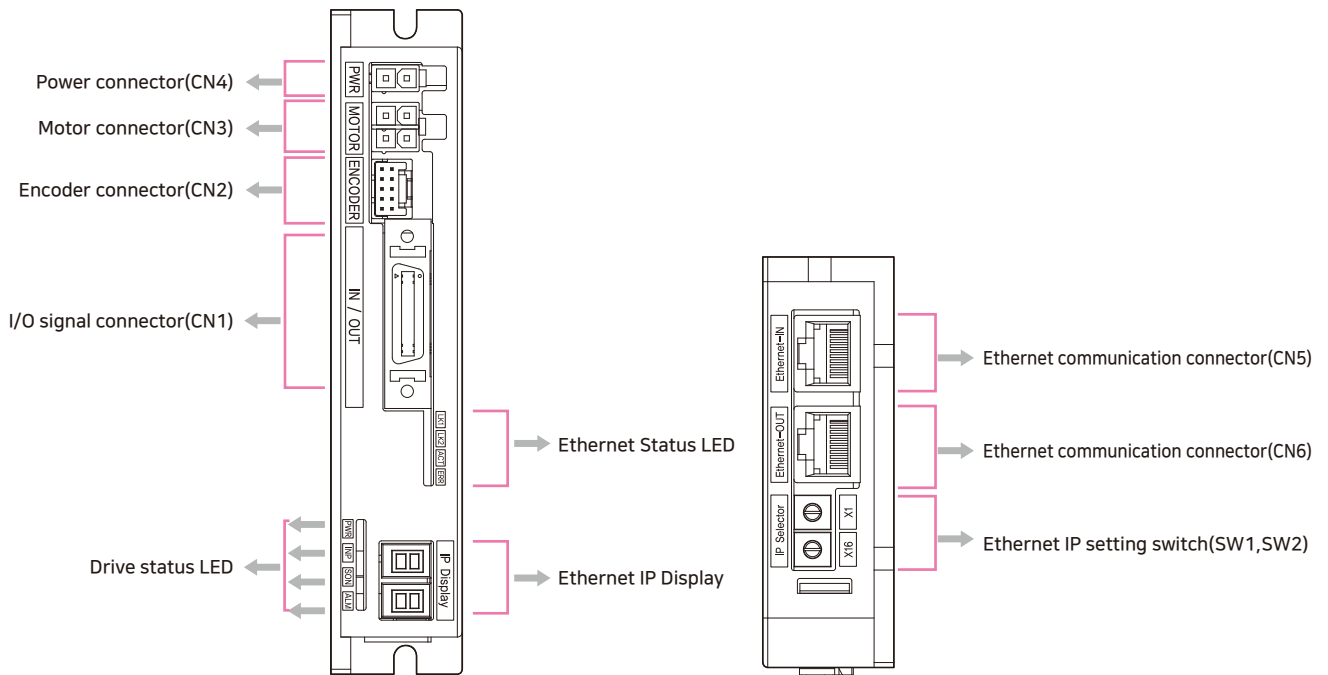
Specification of Drive

Motor Model		HS-EM-28 series		HS-EM-35 series		HS-EM-42 series		HS-EM-56 series				HS-EM-60 series	
Drive Model		HS-ED-EN-28 series		HS-ED-EN-35 series		HS-ED-EN-42 series		HS-ED-EN-56 series				HS-ED-PE-60 series	
Input Voltage		DC24V±10%											
Control Method		Closed loop control with 32bit MCU											
Multi Axis Drive		Maximum 254 axis operating(Selectable IP: 1~254)											
Position Table		256 motion command steps											
Current Consumption		Max. 500mA (Except motor current)											
Operating Condition	Ambient 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	Rotation Speed	0~3,000r/min ^(※1)											
	Resolution	Encoder Resolution[P/R]	Configurable Resolution [P/R]										
		4,000	500	1,000	1,600	2,000	3,600	4,000	5,000	6,400	7,200	10,000	
		10,000	500	1,000	1,600	2,000	3,600	5,000	6,400	7,200	10,000		
		16,000	500	1,000	1,600	2,000	3,600	5,000	6,400	7,200	10,000	16,000	
		20,000	500	1,000	1,600	2,000	3,600	5,000	6,400	7,200	10,000	20,000	
		(Selectable by parameter)											
	Error Types	Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperaure Error, Over Regenerated Voltage Error, Motor Connect Error, Encoder Connect 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 (Set by parameter)											
Position Gain Selection	0~63 (Set by parameter)												
Rotation Direction	CW/CCW (Set by parameter)												
I/O Signal	Input Signals	3 dedicated inputs (LIMIT+, LIMIT-, ORIGIN), 9 programmable inputs (Photocoupler Input)											
	Output Signals	1 programmable outputs, 9 programmable output(Photocoupler Input), 1 Brake output											
Communication Interface		・ Ethernet Standard : 10BASE-T, 100BASE-TX ・ Full-Duplex ・ Dual port Ethernet switch embedded											
Position Control		・ Incremental mode / Absolute mode Data Range : -134,217,728~+134,217,727Pulse ・ Operating speed : Max. 3,000 r/min											
Return to Origin		Origin Sensor, Z phase, ±Limit sensor, Torque											
GUI		User Interface Program within Windows											
Library		Motion Library (DLL) for windows 7/8/10											

※ 1 : Up to the resolution of 10,000P/R, maximum speed can be reached by 3,000r/min and with the resolution more than 10,000P/R, maximum speed shall be reduced accordingly.

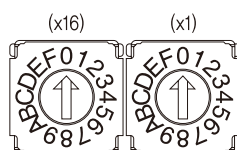
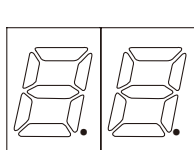
Dimensions of Drive[mm]





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

These switches set the 4th octet of Ethernet IP, and the value is shown in 7-segment LED display. The 1st octet, the 2nd octet, and the 3rd octet are set by GUI. If the switches are set to 255(FF), DHCP function is activated, and IP is automatically set, ignoring the set value. (Please refer to the manual for details.)

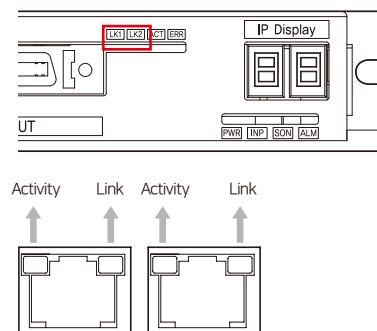


e.g.,) In case of SW2 : 5 and SW1 : 7
 $(5 \times 16) + (7 \times 1) = 87$
 IP is to be set as 192.168.0.87

2. Ethernet Status LED

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

Indication	Color	Status	Description
ERR	Red	OFF	No Error status
		ON	Communication Data Error
Indication	Color	Status	Description
LK1/ LK2	Green	OFF	Link deactivated
		ON	Link activated
Indication	Color	Status	Description
Activity	Yellow	OFF	Stand-by
		Flickering	In operation



3. Drive Status LED

Indication	Color	Function	Description
PWR	Green	Power Input Indication	LED is turned ON when power is applied.
INP	Yellow	Positioning Completion Indication	LED is turned ON when Positioning error reaches within the preset pulse after the positioning is complete.
SON	Orange	Indication	Servo ON : Lights ON, Servo OFF : Lights OFF
ALM	Red	Alarm Indication	LED blinks when an error occurs.

■ List of error types by the number of alarm LED blinking

Times	Error Code ^(※4)	Protection	Conditions
1	E-001	Over Current Error	The current through power devices in drive exceeds the limit. ^(※1)
2	E-002	Over Speed Error	Motor speed exceeds 3,000r/min
3	E-003	Position Tracking Error	Position error value is greater than the reference value while the motor is running. ^(※2)
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	Inside temperature of drive exceeds 85℃
6	E-006	Over Regenerated Voltage Error	Back-EMF is higher than limit value ^(※3)
7	E-007	Motor Connect Error	The power is ON without connection of the motor cable to drive
8	E-008	Encoder Connect	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 greater than the reference value while the motor is stopped. ^(※2)

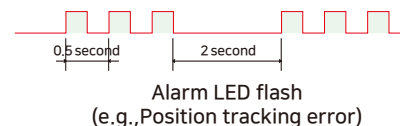
※1. Limit value depends on motor model. (Refer to the Manual)

※2. The default reference value is 180 ° , and it can be changed by parameter.(Refer to the Manual)

※3. Voltage limit of Back-EMP depends on motor model. (Refer to the Manual)

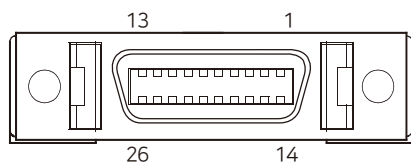
※4. When an alarm occurs, error code is displayed on the 7-segment LED display instead of Ethernet IP.

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



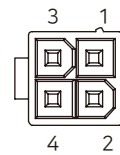
4. I/O Connector(CN1)

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_DC24V	Input



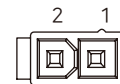
6. Motor Connector(CN3)

No.	Function	I/O
1	A 상 Phase	Output
2	B 상 Phase	Output
3	A̅ 상 Phase	Output
4	B̅ 상 Phase	Output



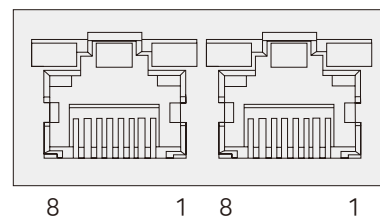
7. Power Connector(CN4)

No.	Function	I/O
1	DC24V	Input
2	GND	Input



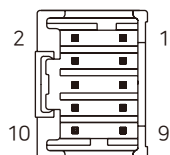
8. Ethernet Communication Connector(CN5, CN6)

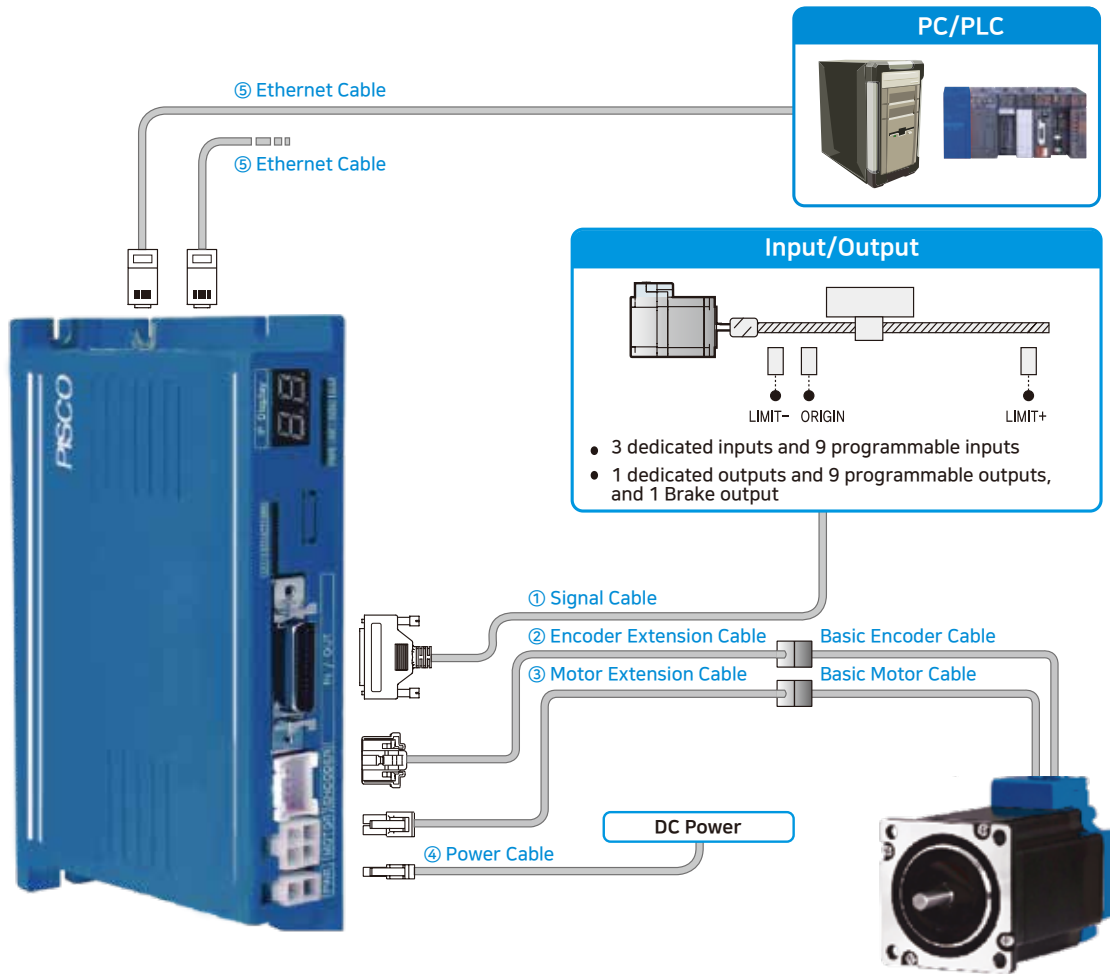
No.	Function	No.	Function
1	TD+	6	RD-
2	TD-	7	----
3	RD+	8	----
4	----	Connector Hood	F.GND
5	----		



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	DC5V	Output
8	GND	Output
9	F.GND	----
10	F.GND	----





Cable	Max. Length	Remarks
① Signal Cable	20m	Options(Sold separately)
② Encoder Extension Cable	20m	
③ Motor Extension Cable	20m	
④ Power Cable	2m	
⑤ Ethernet Cable	100m	Basic cables are attached to motors.
Basic Encoder Cable	0.3m(Basic Length)	
Basic Motor Cable	0.3m(Basic Length)	

1. Accessories

Connectors

These are connector specifications for drive cabling.

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	10126-3000PE	3M
		Connector Cover	10326-52F0-008	

※ The connectors above are supplied with the product. If you are using other parts, please make sure they meet the specifications.

2. Options

① Signal Cable

These are the cables to connect Hi-SERVO Ethernet drive and other input/output devices.

Purpose	Item	Length[m]	Cable Type	Remarks
Drive-I/O Device Connection	HS-CSVR-S-001F	1	Normal Cable	Maximum Length : 20m
	HS-CSVR-S-002F	2		
	HS-CSVR-S-003F	3		
	HS-CSVR-S-005F	5		
	HS-CSVR-S-001M	1	Robot Cable	
	HS-CSVR-S-002M	2		
	HS-CSVR-S-003M	3		
	HS-CSVR-S-005M	5		

※ If you need cables with length(in units of 1m)not listed on the table, please contact PISCO KOREA for more information.

② Encoder Extension Cable

These are the cables to connect Hi-SERVO Ethernet drive and the encoder.

Purpose	Item	Length[m]	Cable Type	Remarks
Drive-Basic Encoder Cable Connection	HS-CSVO-E-001F	1	Normal Cable	Maximum Length : 20m
	HS-CSVO-E-002F	2		
	HS-CSVO-E-003F	3		
	HS-CSVO-E-005F	5		
	HS-CSVO-E-001M	1	Robot Cable	
	HS-CSVO-E-002M	2		
	HS-CSVO-E-003M	3		
	HS-CSVO-E-005M	5		

※ If you need cables with length(in units of 1m)not listed on the table, please contact PISCO KOREA for more information.

③ Motor Extension Cable

These are the cables to connect Hi-SERVO Ethernet drive and the motor.

Purpose	Item	Length[m]	Cable Type	Remarks
Drive-Basic Motor Cable Connection	HS-CSVO-M-001F	1	Normal Cable	Maximum Length : 20m
	HS-CSVO-M-002F	2		
	HS-CSVO-M-003F	3		
	HS-CSVO-M-005F	5		
	HS-CSVO-M-001M	1	Robot Cable	
	HS-CSVO-M-002M	2		
	HS-CSVO-M-003M	3		
	HS-CSVO-M-005M	5		

※ If you need cables with length(in units of 1m)not listed on the table, please contact PISCO KOREA for more information.

④ Drive Power Cable

These are the cables to connect Hi-SERVO Ethernet drive and the power.

Purpose	Item	Length[m]	Cable Type	Remarks
Drive-Power Connection	HS-CSVO-P-001F	1	Normal Cable	Maximum Length : 2m
	HS-CSVO-P-002F	2		
	HS-CSVO-P-001M	1	Robot Cable	
	HS-CSVO-P-002M	2		

※ If you need cables with length(in units of 1m)not listed on the table, please contact PISCO KOREA for more information.

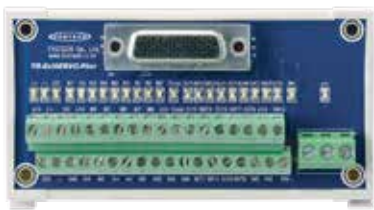
⑤ Cable

Purpose	Item	Length[m]	Remarks
Ethernet Connection	HS-CGNR-EC-001F	1	· STP(Shielded Twisted Pair)Cable · Category 5e or higher · Maximum Length : 100m · Normal Cable
	HS-CGNR-EC-002F	2	
	HS-CGNR-EC-003F	3	
	HS-CGNR-EC-005F	5	

※ If you need cables with length(in units of 1m)not listed on the table, please contact PISCO KOREA for more information.

[Option] TB-Plus Interface Board

This is an interface board to connect Hi-SERVO Pulse drive and I/O signals more conveniently.

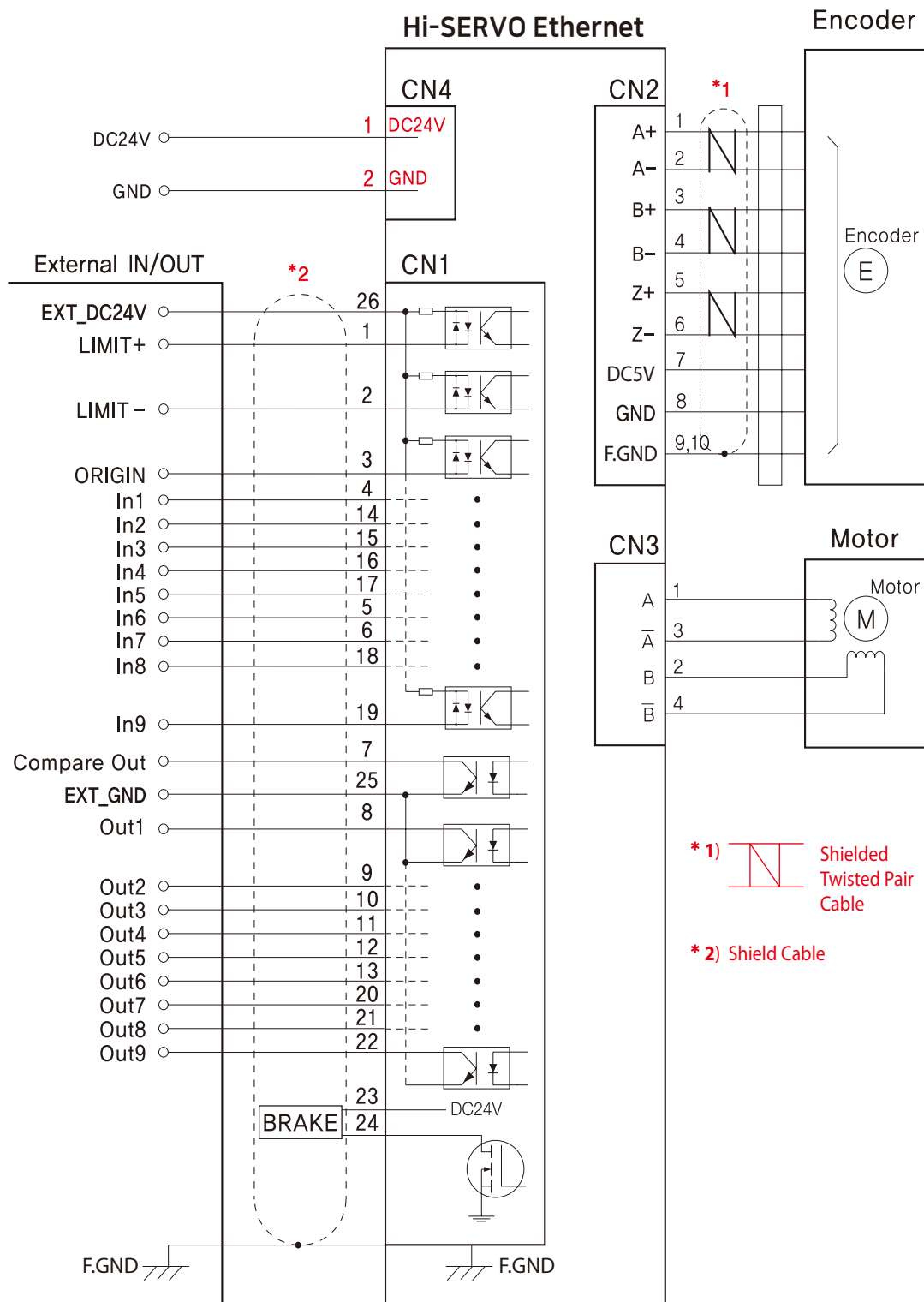
Purpose	Item	Product Image
Drive - I/O signal Connection Board	TB-Plus	

[Option] TB-Plus Interface Cable

There are the cables to connect Hi-SERVO Ethernet and TB-Plus interface board.

Purpose	Item	Length[m]	Cable Type	Remarks
Drive - Interface(TB-Plus) Connection	HS-CIFD-S-001F	1	Normal Cable	Maximum Length : 20m
	HS-CIFD-S-002F	2		
	HS-CIFD-S-003F	3		
	HS-CIFD-S-005F	5		
	HS-CIFD-S-001M	1	Robot Cable	
	HS-CIFD-S-002M	2		
	HS-CIFD-S-003M	3		
	HS-CIFD-S-005M	5		

※ If you need cables with length(in units of 1m)not listed on the table, please contact PISCO KOREA for more information.



※ When connecting I/O cable between controller and drive, please turn off the power of both controller and drive to prevent electric shock or to protect the drive from any damage.

CAUTION

In order to use the products listed in this catalog safely and correctly, be sure to read the instruction manual before using the product.