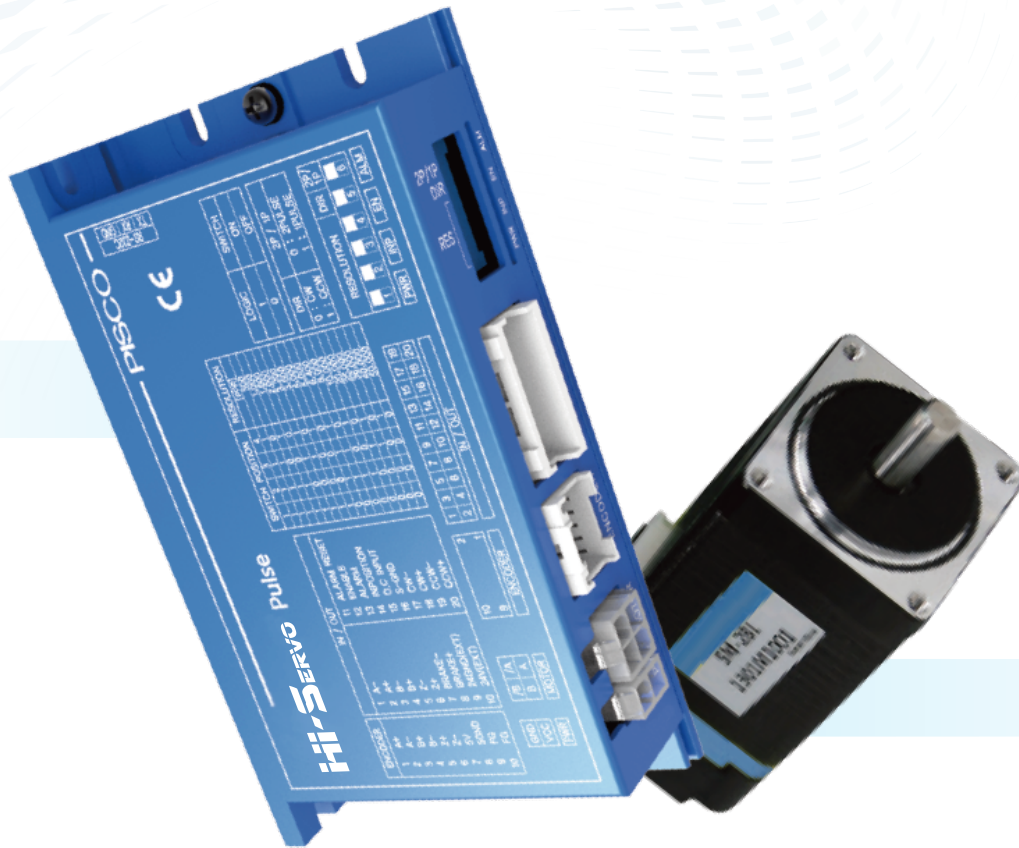


Hi-SERVO Pulse

Stepping Motor Control System Without Step out

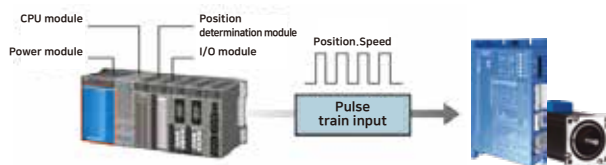


- Completely free from the Concern of Loss of Position
- Perfect Positioning and Completion
- Don't Care what the Phase of Motor is
- Reduce the Moto Temperature and Energy Usage
- Torque Improvement by Run Current Control



1. Pulse train input System

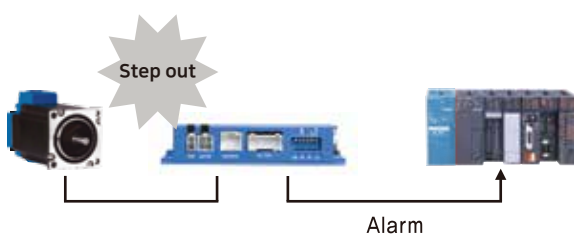
Hi-SERVO motor series is a standalone stepping motor control system that drives the motor by receiving pulse signals from the positioning module(pulse oscillator).



2. No Step Out

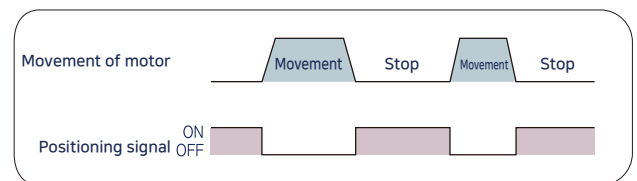
(Alarm signal output when step-out occurs)

Hi-SERVO is a servo system that can prevent step-out by constantly monitoring the current position with an encoder mounted on the motor. If a position error occurs due to external force or overload, the upper controller can report the alarm status, check the operating state of the motor, and take appropriate measures.



3. Position completion signal function

Hi-SERVO is a motor that sends a position completion signal to the upper controller when it stops at the target position, detected by the encoder. This solves the problem of uncertainty in position completion, which is a disadvantage of the open-loop type system.

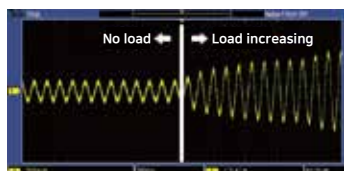
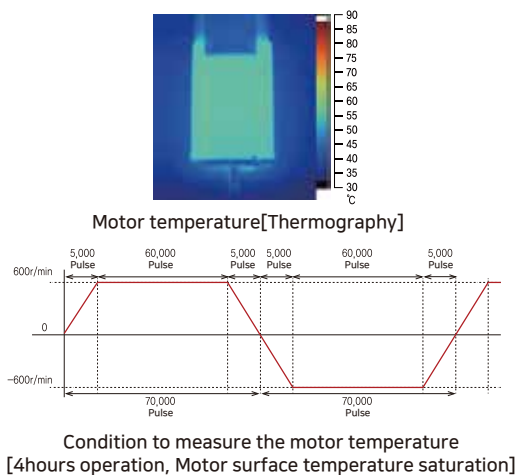


4. High-Precision Control

Hi-SERVO controls position by using high-precision encoder. The position accuracy of Hi-SERVO is determined by the precision of the encoder mounted on the motor, regardless of the type of motor is 2-phase and 5-phase, so it can achieve high-precision position determination compared to the open-loop type drive using 2-phase and 5-phase motors.

5. Low Heat Generation / Energy Savings

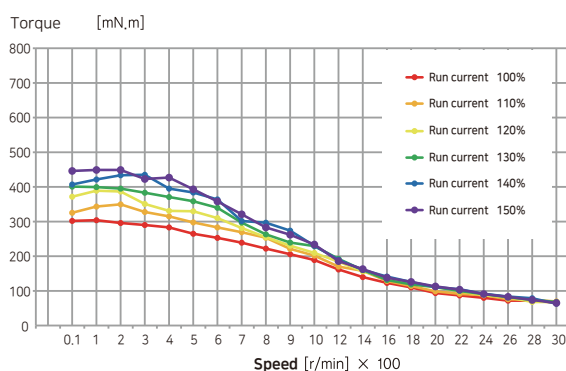
Hi-SERVO automatically controls motor current according to load. Hi-SERVO reduces motor current when motor load is low and increases motor current when load is high. By optimizing the motor current, motor heat can be minimized and energy can be saved.



Example of the Motor Current Control according to load

6. High Torque

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.



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

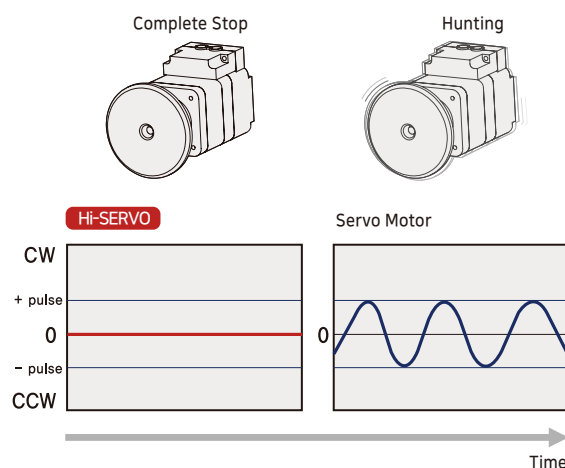
Measured Condition : Drive = HSC-SST-42XL
Motor Voltage = DC24V
Input Voltage = DC24V

9. Variety of Protection Functions

Drive and equipment can be protected by the alarm(1 kinds) of such as motor connection error, encoder connection error and other errors that can be occurred while installation and running the device.

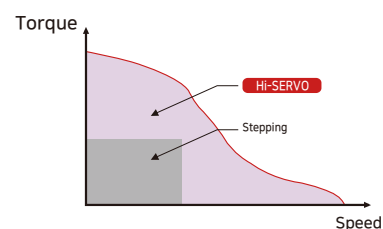
7. No Hunting

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. High Torque / Continuous Operation

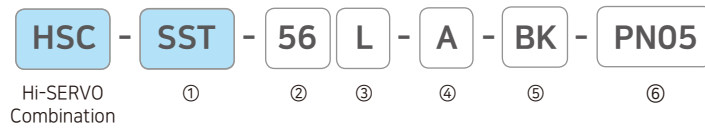
Compared with common step motors and drives, Hi-SERVO motion control systems can maintain a high torque state over relatively long period of time. This means that Hi-SERVO continuously operates without loss of position under 100% of the load. Unlike conventional Microstep drives, Hi-SERVO exploits continuous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



10. Variety of Position Command Unit

Hi-SERVO is a device that can adjust the resolution by dividing the position command according to the purpose.(- Maximum 50,000 pulses/resolution)

Hi-SERVO Pulse



① Communication Type

SST	Pulse
-----	-------

④ Encoder Resolution

A	10,000P/R
D	16,000P/R (※)

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

② Motor Size

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

⑤ Brake

None	Without Brake
BK	Brake

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

③ Motor Length

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

※ Motor length XL is only 42mm Size.

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-SST-28S-D	HS-SM-28S-D	HS-SD-P-28S-D
HSC-SST-28M-D	HS-SM-28M-D	HS-SD-P-28M-D
HSC-SST-28L-D	HS-SM-28L-D	HS-SD-P-28L-D
HSC-SST-35M-A	HS-SM-35M-A	HS-SD-P-35M-A
HSC-SST-35L-A	HS-SM-35L-A	HS-SD-P-35L-A
HSC-SST-42S-A	HS-SM-42S-A	HS-SD-P-42S-A
HSC-SST-42M-A	HS-SM-42M-A	HS-SD-P-42M-A
HSC-SST-42XL-A	HS-SM-42XL-A	HS-SD-P-42XL-A
HSC-SST-56S-A	HS-SM-56S-A	HS-SD-P-56S-A
HSC-SST-56M-A	HS-SM-56M-A	HS-SD-P-56M-A
HSC-SST-56L-A	HS-SM-56L-A	HS-SD-P-56L-A
HSC-SST-60S-A	HS-SM-60S-A	HS-SD-P-60S-A
HSC-SST-60M-A	HS-SM-60M-A	HS-SD-P-60M-A
HSC-SST-60L-A	HS-SM-60L-A	HS-SD-P-60L-A

※ When places an order for Stopper type 28mm,35mm motor, please write 'M' additionally after motor length of unit product number. (ex. HSC-SST-28LM-D)

Combination with Brake

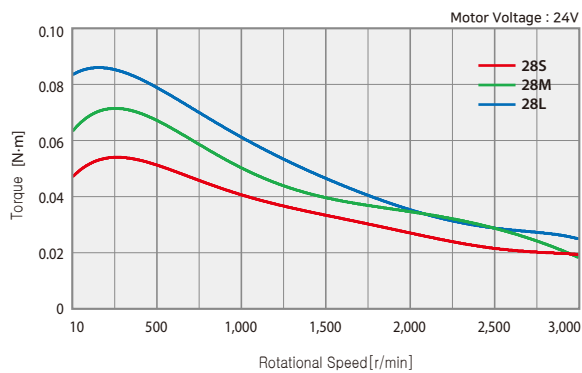
Unit Part Number	Motor Model Number	Drive Model Number
HSC-SST-42S-A-BK	HS-SM-42S-A-BK	HS-SD-P-42S-A
HSC-SST-42M-A-BK	HS-SM-42M-A-BK	HS-SD-P-42M-A
HSC-SST-42XL-A-BK	HS-SM-42XL-A-BK	HS-SD-P-42XL-A
HSC-SST-56S-A-BK	HS-SM-56S-A-BK	HS-SD-P-56S-A
HSC-SST-56M-A-BK	HS-SM-56M-A-BK	HS-SD-P-56M-A
HSC-SST-56L-A-BK	HS-SM-56L-A-BK	HS-SD-P-56L-A
HSC-SST-60S-A-BK	HS-SM-60S-A-BK	HS-SD-P-60S-A
HSC-SST-60M-A-BK	HS-SM-60M-A-BK	HS-SD-P-60M-A
HSC-SST-60L-A-BK	HS-SM-60L-A-BK	HS-SD-P-60L-A

Model		Unit	HS-SM-28 series			HS-SM-35 series	
			28S	28M	28L	35M	35L
Drive Method		-	BI-POLAR				
Number Of Phases		-	2	2	2	2	2
Voltage		VDC	3.75	4.55	6.2	3.8	2.7
Current per Phase		A	0.67	0.67	0.67	0.8	1.0
Resistance per Phase		Ω	5.6	6.8	9.2	4.8	2.7
Inductance per Phase		mH	4.2	4.9	5.7	4.0	4.3
Holding Torque		N·m	0.069	0.098	0.118	0.078	0.137
Rotor Inertia		g·cm ²	9.0	13	18	10	14
Weights		g	110	140	200	120	180
Length(L)		mm	32	45	50	26	36
Distance From End Of Shaft	3mm	N	30	30	30	22	22
	8mm		38	38	38	26	26
	13mm		53	53	53	33	33
	18mm		-	-	-	46	46
Permissible Thrust Load		N	Lower than motor weight				
Insulation Resistance		Mohm	100 MIN.(at 500VDC)				
Insulation Class		-	CLASS B(130℃)				
Operating Temperature		℃	0 to 55				

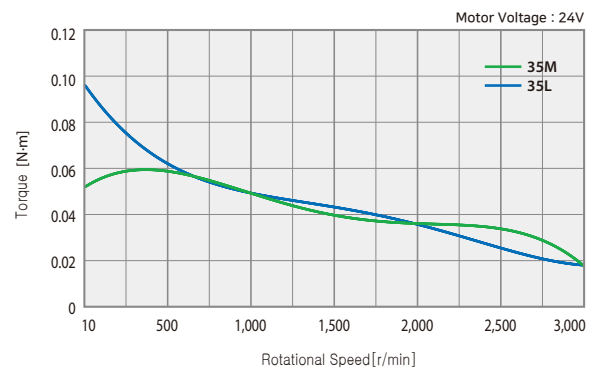
Model		Unit	HS-SM-42 series			HS-SM-56 series			HS-SM-60 series		
			42S	42M	42XL	56S	56M	56L	60S	60M	60L
Drive Method		-	BI-POLAR								
Number Of Phases		-	2	2	2	2	2	2	2	2	2
Voltage		VDC	2.8	2.8	7.2	1.96	2.52	3.16	1.32	1.48	2.2
Current per Phase		A	1.3	1.68	1.2	2.8	2.8	2.8	4.0	4.0	4.0
Resistance per Phase		Ω	2.1	1.65	6.0	0.7	0.9	1.13	0.33	0.37	0.55
Inductance per Phase		mH	2.5	3.2	15.6	1.4	2.5	3.6	0.75	1.1	2.7
Holding Torque		N·m	0.216	0.353	0.650	0.539	1.00	1.72	0.88	1.28	2.40
Rotor Inertia		g·cm ²	35	54	114	120	300	480	240	490	690
Weights		g	220	280	500	470	700	1000	600	1000	1300
Length(L)		mm	33	39	60	41	56	76	47	56	85
Distance From End Of Shaft	3mm	N	22	22	22	52	52	52	70	70	70
	8mm		26	26	26	65	65	65	87	87	87
	13mm		33	33	33	85	85	85	114	114	114
	18mm		46	46	46	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℃)								
Operating Temperature		℃	0 to 55								

Torque Characteristics of Motor

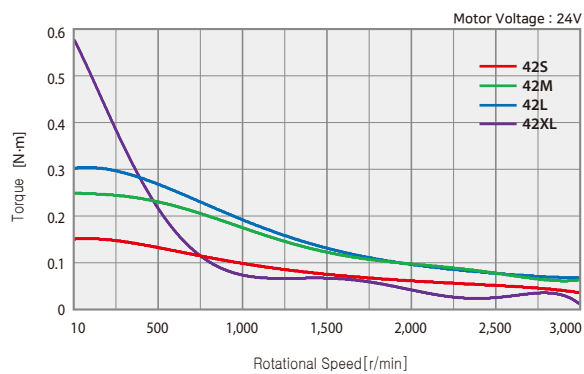
HSC-SST-28series



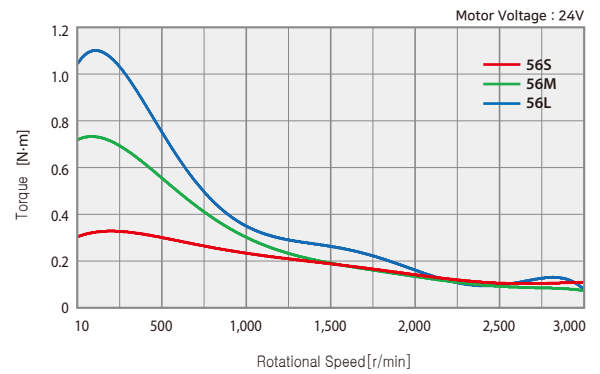
HSC-SST-35series



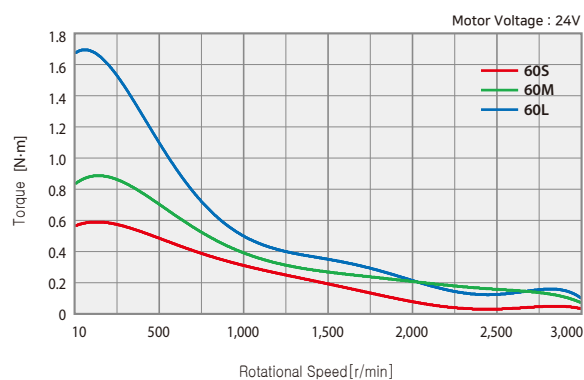
HSC-SST-42series



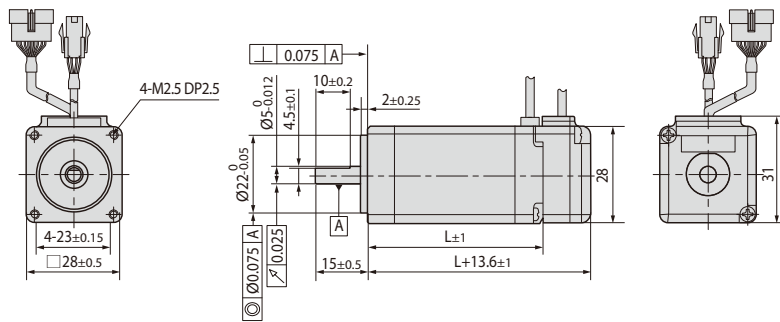
HSC-SST-56series



HSC-SST-60series

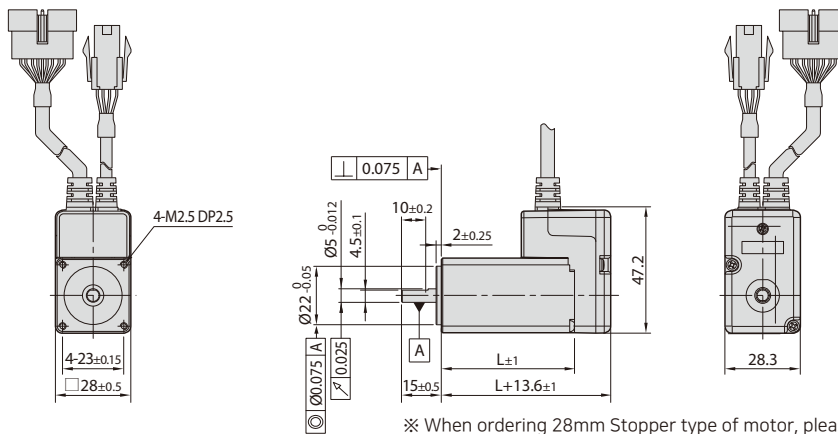


■ Dimensions of Motor[mm]



28_{mm}

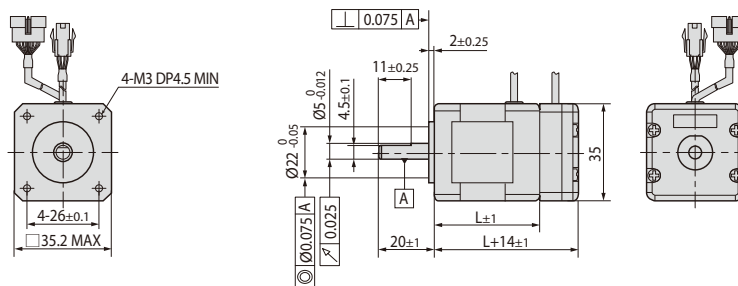
Motor	Length(L)
HS-SM-28S	32
HS-SM-28M	45
HS-SM-28L	50



28_{mm} (Stopper Type)

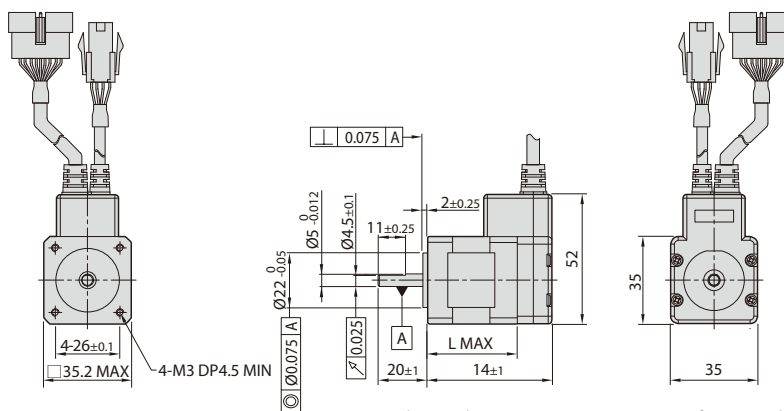
Motor	Length(L)
HS-SM-28SM	32
HS-SM-28MM	45
HS-SM-28LM	50

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



35_{mm}

Motor	Length(L)
HS-SM-35M	26
HS-SM-35L	36

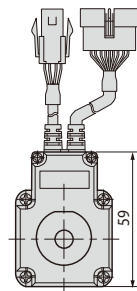
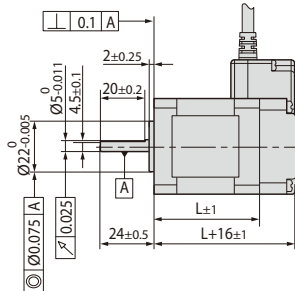
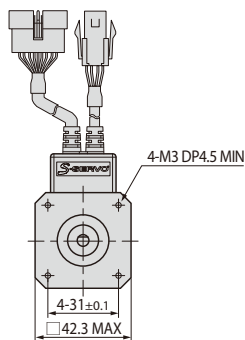


35_{mm} (Stopper Type)

Motor	Length(L)
HS-SM-35MM	26
HS-SM-35LM	36

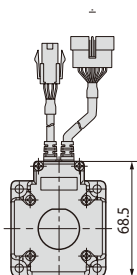
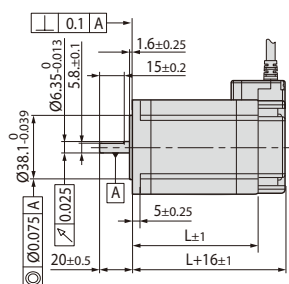
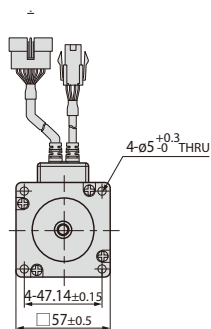
※ When ordering 35mm Stopper type of motor, please add "M" after standard motor model number.

■ Dimensions of Motor[mm]



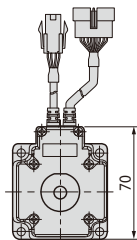
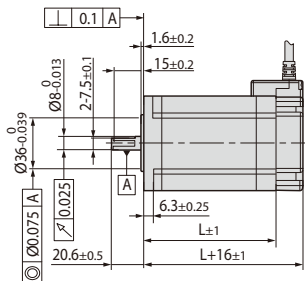
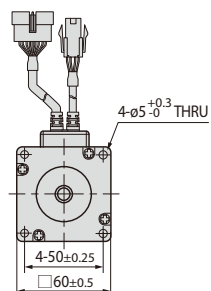
42_{mm}

Motor	Length(L)
HS-SM-42S	33
HS-SM-42M	39
HS-SM-42XL	60



56_{mm}

Motor	Length(L)
HS-SM-56S	41
HS-SM-56M	55
HS-SM-56L	76



60_{mm}

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

Unit Part Number	Moto 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-SST-42S-■-BK	HS-SM-42S-■-BK	Non-excitation run Type	24VDC ±10%	0.2	5	0.2	0.54	22	26	33	46	Must be Lower than Unit's Weight
HSC-SST-42M-■-BK	HS-SM-42M-■-BK						0.60					
HSC-SST-42XL-■-BK	HS-SM-42XL-■-BK						0.83					
HSC-SST-56S-■-BK	HS-SM-56S-■-BK			0.27	6.6	0.7	0.93	52	65	85	123	
HSC-SST-56M-■-BK	HS-SM-56M-■-BK						1.16					
HSC-SST-56L-■-BK	HS-SM-56L-■-BK						1.50					
HSC-SST-60S-■-BK	HS-SM-60S-■-BK						1.14	70	87	114	165	
HSC-SST-60M-■-BK	HS-SM-60M-■-BK						1.30					
HSC-SST-60L-■-BK	HS-SM-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.

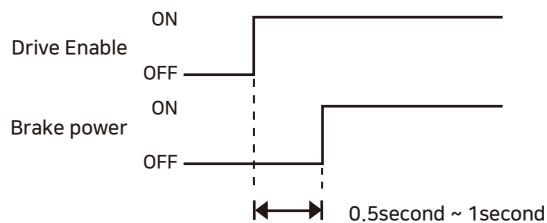
* Brake Operation Timing Chart

Hi-SERVO Pulse control Brake by Drive automatically.

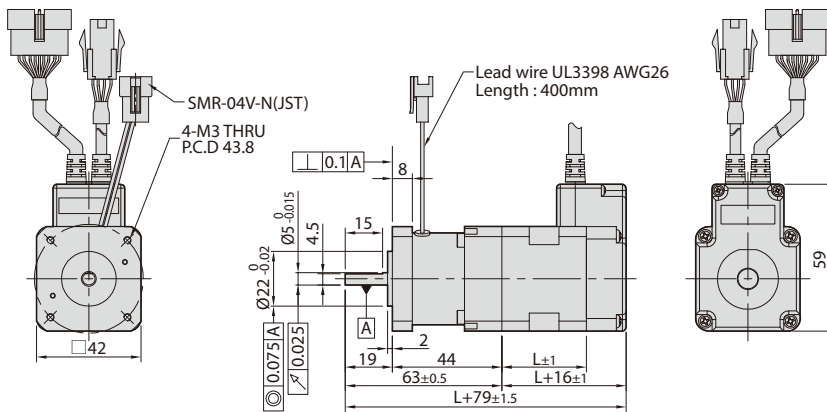
Please refer to below Timing Chart when control Brake from upper controller other than using Hi-SERVO Pulse Brake control.

Otherwise, Drive malfunctioning and loads can be fall down.

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

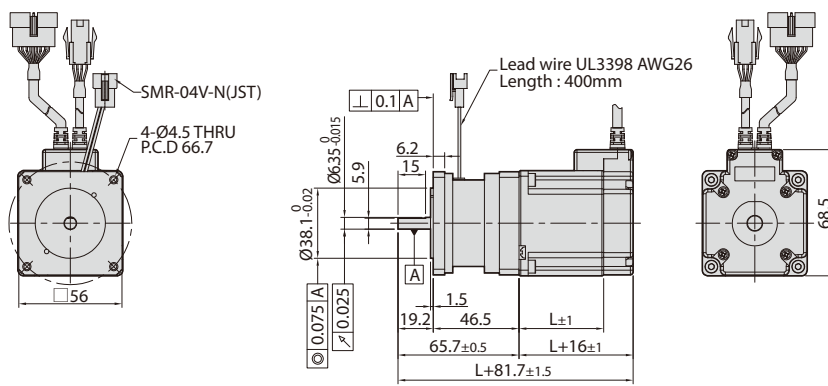


Dimensions of Motor with Brake[mm]



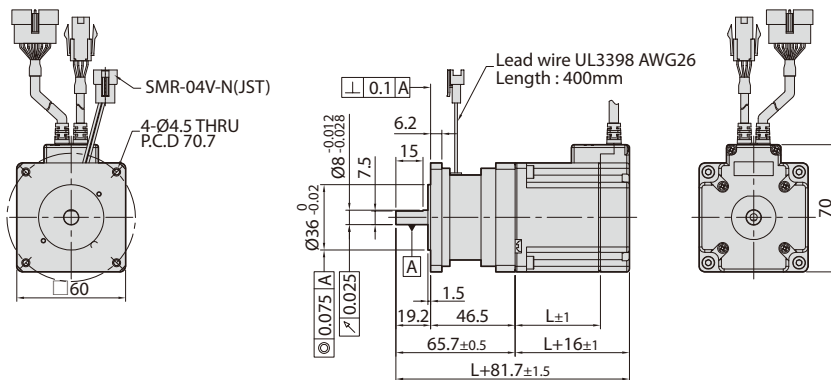
42_{mm}

Motor	Length(L)
HS-SM-42S	33
HS-SM-42M	39
HS-SM-42XL	60



56_{mm}

Motor	Length(L)
HS-SM-56S	41
HS-SM-56M	55
HS-SM-56L	76



60_{mm}

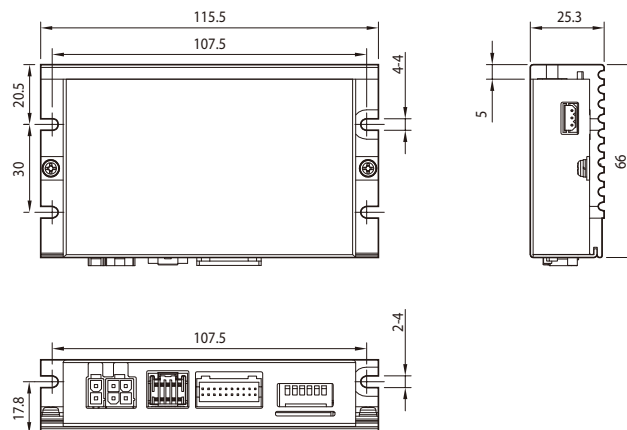
Motor	Length(L)
HS-SM-60S	47
HS-SM-60M	56
HS-SM-60L	85

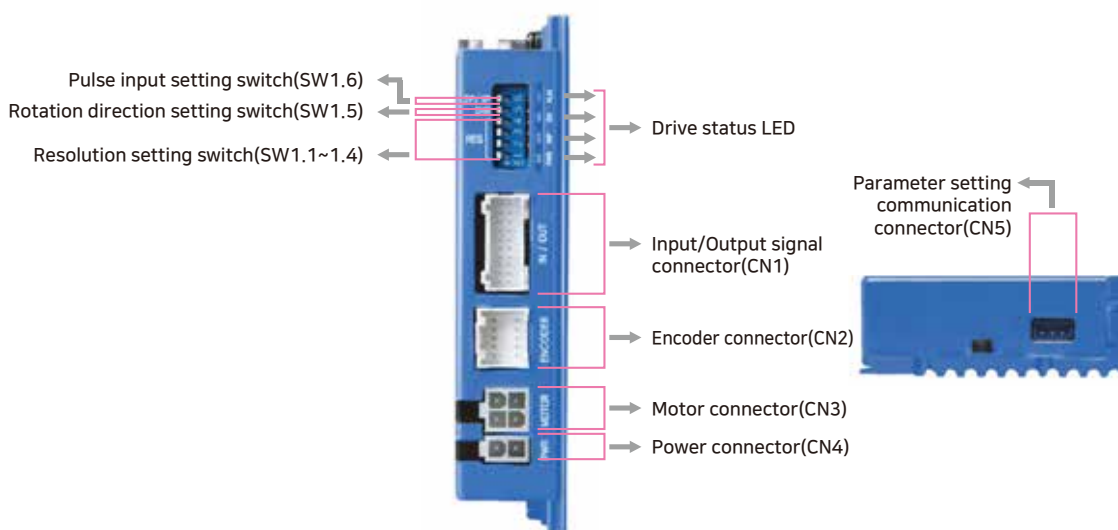
Specification of Drive

Motor Model		HS-SM-28 series		HS-SM-35 series		HS-SM-42 series		HS-SM-56 series		HS-SM-60 series		
Drive Model		HS-SD-P-28 series		HS-SD-P-35 series		HS-SD-P-42 series		HS-SD-P-56 series		HS-SD-P-60 series		
Input Voltage		DC24V±10%										
Control Method		Closed loop control with 32bit MCU										
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 3,200 3,600 4,000 5,000 6,400 8,000									
		10,000	10,000 20,000 25,000 36,000 40,000 50,000									
		15,000										
	(Selectable by DIP Switch)											
	Maximum Frequency	500kHz (Duty 50%)										
	Error Types	Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Tempereature 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)											
Pulse Input Method	1Pulse / 2Pulse (Selectable by DIP Switch)											
Rotation Direction	CW/CCW (Selectable by DIP Switch)											
Speed/Position Control Command	Pulse Train Input											
I/O Signal	Input Signals	Position Command Pulse, Enable, Alarm Reset (Photocoupler Input)										
	Output Signals	In-position, Alarm(Photocoupler Output) Encoder Signal(A+, A-, B+, B-, Z+, Z-, 26C31 Significant Line Drive Output), Brake Signal Output										

※ 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. 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.
EN	Orange	Motor Enable Status	Enable : Lights ON, Disable : Lights OFF
ALM	Red	Alarm Indication	LED blinks when an error occurs.

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

LED Times	Protection	Conditions
1	Over Current Error	The current through power devices in drive exceeds 4.8A
2	Over Speed Error	Motor speed exceeds 3,000r/min
3	Position Tracking Error	Position error value is higher than 180 ° in motor run state.
4	Over Load Error	The motor is continuously operated more than 5 seconds under a load exceeding the max. torque
5	Over Temperature Error	Inside temperature of drive exceeds 85℃
6	Over Regenerated Voltage Error	Back-EMF is higher than 48V
7	Motor Connect Error	The power is ON without connection of the motor cable to drive
8	Encoder Connect	Cable connection error in Encoder connection of drive
10	In-Position Error	After operation is finished, position error more than 1 pulse is continued for more than 3 seconds
12	ROM Error	Error occurs in parameter storage device(ROM)
13	Position Overflow Error	Position error value is higher than 180 ° in motor stop state



Alarm LED flash(e.g.,Position tracking error)

2. Resolution Setting Switch (SW1.1~SW1.4)

Position				Pulse/Revolution	Position				Pulse/Revolution
1	2	3	4		1	2	3	4	
ON	ON	ON	ON	500	OFF	ON	ON	ON	6,400
ON	ON	ON	OFF	1,000	OFF	ON	ON	OFF	8,000
ON	ON	OFF	ON	1,600	OFF	ON	OFF	ON	10,000
ON	ON	OFF	OFF	2,000	OFF	ON	OFF	OFF	20,000
ON	OFF	ON	ON	3,200	OFF	OFF	ON	ON	25,000
ON	OFF	ON	OFF	3,600	OFF	OFF	ON	OFF	36,000
ON	OFF	OFF	ON	4,000	OFF	OFF	OFF	ON	40,000
ON	OFF	OFF	OFF	5,000	OFF	OFF	OFF	OFF	50,000 ^(※1)

※1 : In case of products with an encoder resolution of 16,000 the corresponding pulse/rotation is 16,000.

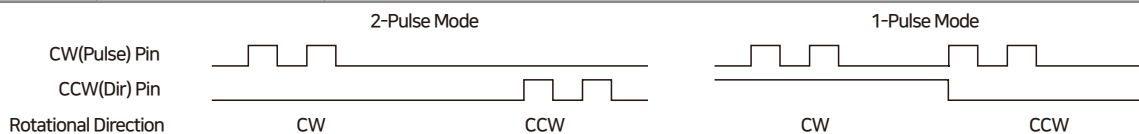
3. Rotation Direction Setting Switch (SW1.5)

Indication	Switch Name	Functions
DIR	Switching Rotational Direction	Based on CW(+Dir signal) input to drive. ON: CCW(- Direction) OFF: CW(+ Direction)



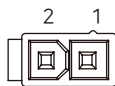
4. Pulse Input Setting Switch(SW1.6)

Indication	Switch Name	Functions
2P/1P	Selecting pulse input mode	Selectable 1-Pulse input mode or 2-Pulse input mode as Pulse input signal. ON: 1-Pulse mode OFF: 2-Pulse mode



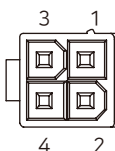
5. Power Connector(CN4)

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



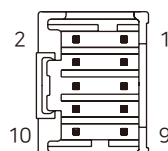
6. Motor Connector(CN3)

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



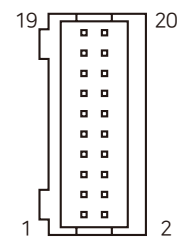
7. Encoder Connector(CN2)

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	----



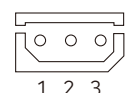
8. Input/Output Signal Connector(CN1)

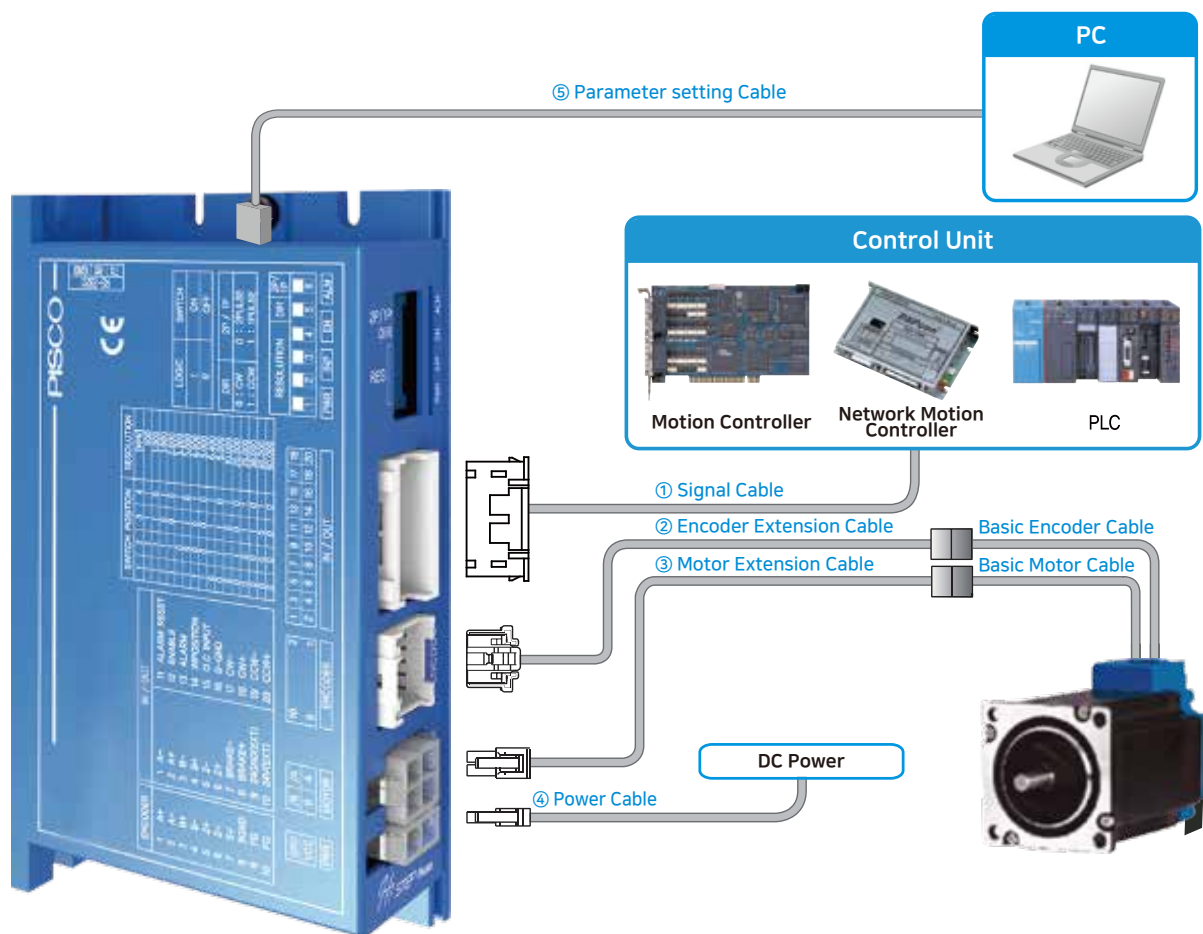
No.	Function	I/O
1	A-	Output
2	A+	Output
3	B-	Output
4	B+	Output
5	Z-	Output
6	Z+	Output
7	BRAKE-	Output
8	BRAKE+	Output
9	EXT_GND	Input
10	EXT_DC24V	Input
11	Alarm Reset	Input
12	Enable	Input
13	Alarm	Output
14	In-Position	Output
15	O.C Input	Input
16	S-GND	Output
17	CW-(Pulse-)	Input
18	CW+(Pulse+)	Input
19	CCW-(Dir-)	Input
20	CCW+(Dir+)	Input



9. Parameter Setting Communication Connector(CN5)

No.	Function	I/O
1	Tx	Output
2	Rx	Input
3	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	
Basic Encoder Cable	0.3m(Basic Length)	Basic cables are attached to motors.
Basic Motor Cable	0.3m(Basic Length)	

1. Accessories

Connectors

These are connector specifications for drive cabling.

Purpose	Item	Part Number	Manufacturer
Power(CN1)	Housing	PAPD-20V-1S	JST
	Terminal	SPH-002T-P0.5L	
Encoder	Drive Side(CN2)	51353-1000 56134-9000	MOLEX
	Encoder Side	SMP-09V-NC SHF-001T-0.8BS	
Motor	Drive Side(CN3)	5557-04R 5556T	MOLEX
	Motor Side	5557-04T 5556T	
Signal(CN4)	Housing Terminal	5557-02R	MOLEX
		5556T	

※ 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 Pulse drive and other input/output devices.

Purpose	Item	Length[m]	Cable Type	Remarks
Drive-I/O Device Connection	HS-CSS2-S-001F	1	Normal Cable	Maximum Length : 20m
	HS-CSS2-S-002F	2		
	HS-CSS2-S-003F	3		
	HS-CSS2-S-005F	5		
	HS-CSS2-S-001M	1	Robot Cable	
	HS-CSS2-S-002M	2		
	HS-CSS2-S-003M	3		
	HS-CSS2-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 Pulse 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 Pulse 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

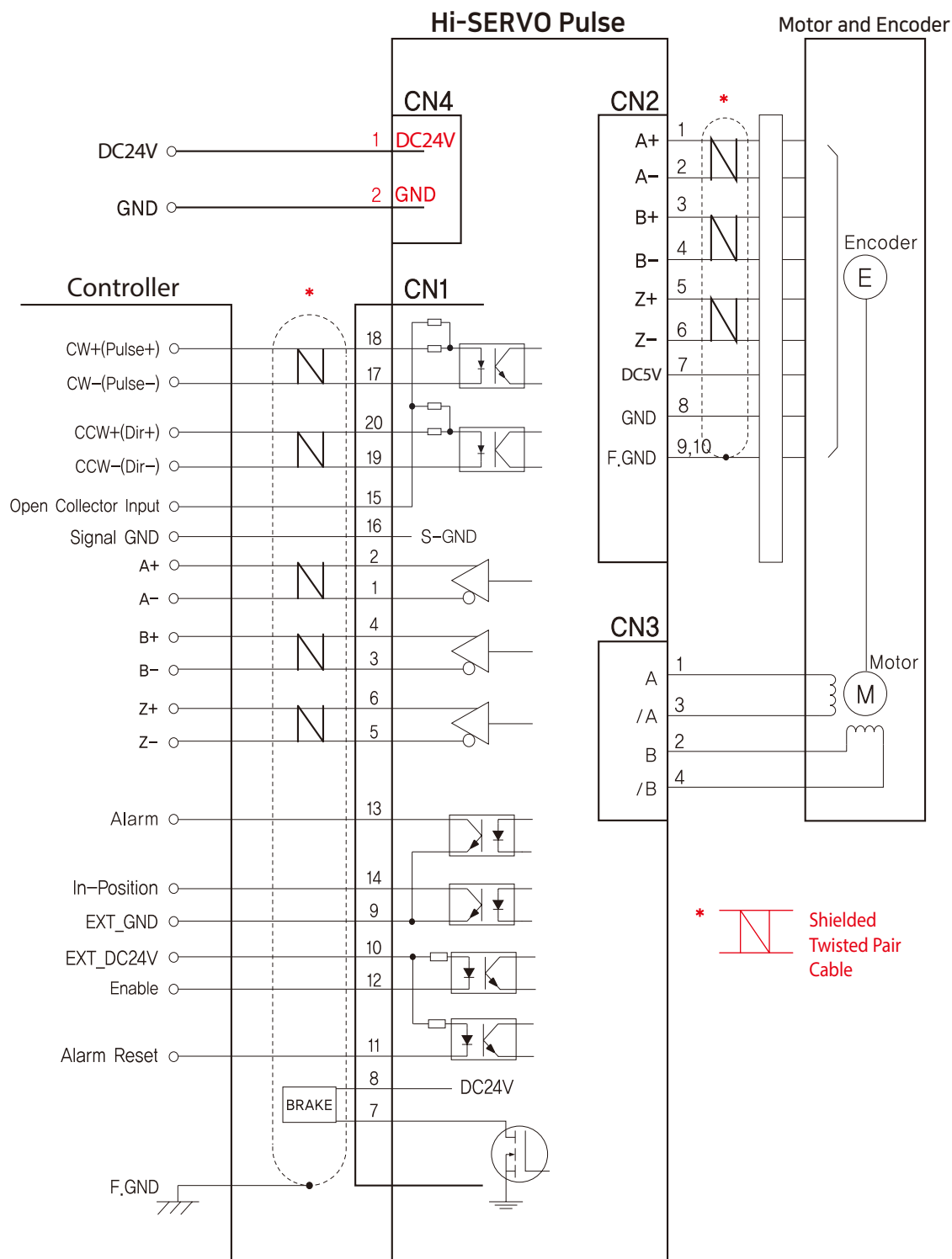
These are the cables to connect Hi-SERVO Pulse drive and the power.

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		

⑤ Parameter Setting Cable

These are the cables to connect Hi-SERVO Pulse drive and computer. This cable is used to change the parameter settings on the drive.

Purpose	Item	Length[m]	Cable Type	Remarks
Drive-Parameter Network Connection	HS-CBTS-C-001F	1	Normal Cable	Maximum Length : 3m
	HS-CBTS-C-002F	2		
	HS-CBTS-C-003F	3		



※ 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.