Reliable & Smart™

CSD7 Series

High Performance & Powerful Servo Drives for General Purpose

EtherCAT

Provide two Kinds of Models
- EtherCAT Network type
- Pulse/Analog commend type

RS Reliable & Smart Automation

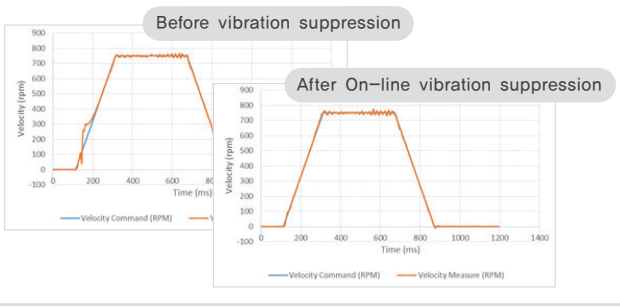
CSD7 Series

CSD7 Series is a Servo Drive that has been developed based on the technical skills through 30 years' experience, and represents Korean servo drive. It provides Smaller, stronger and more comfortable functions for our customers' systems.

Offering improved basic functions

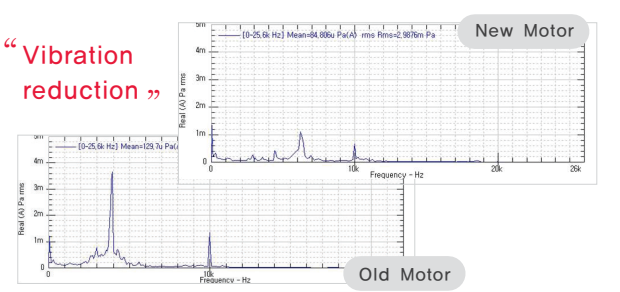
- Enhanced velocity response through improved current & velocity controller
  – Velocity bandwidth of 2KHz [1)]
- Real time vibration suppression
- 3rd Party Linear Motor support [2)]
- Offering index function in basic model
- Supporting 2 channels of high-speed Registration input
- Full Closed Loop Control [2)]

1) Results of our evaluation.
2) 3rd Party Linear Motor and Full Closed Loop control will be released in 2015.



Provide high resolution motor with 23bit Encoder

- CSD7 Series has a 23bit Encoder, so its motion profile is high-resolution and smooth with fast positioning time. Vibration/noise has been improved as well for system stability.

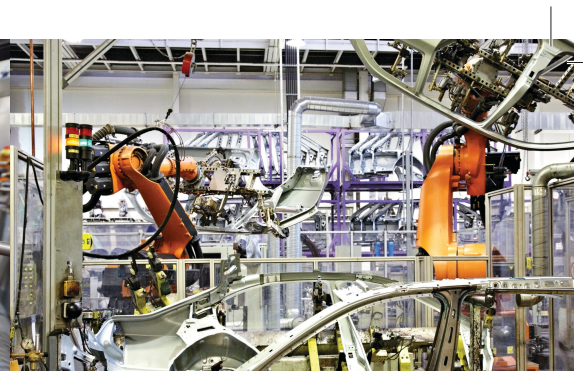


EtherCAT

Smallest footprint, built-in Power, Servo Drive with high precision controlling

CSD7 Series

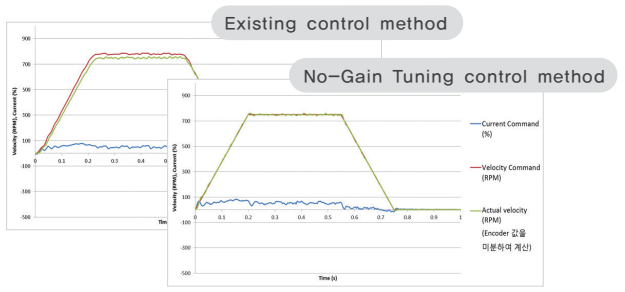
- EtherCAT Network type
- Pulse/Analog commend type



Reliable & Smart · Global brand with the highest quality and performance.

Offering No-Gain Tuning Function

- CSD7 does not require a gain tuning while offering a stable system control and the best control. This would be shortened set up time, and reduced maintenance costs.



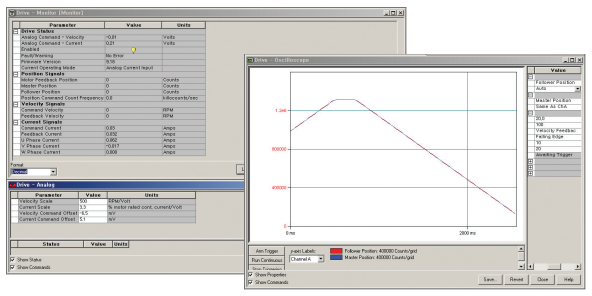
A design considering safety and environment

- CSD7 Series has acquired safety requirements such as STO (Safe Torque Off) [2], CE, NRTL/C to consider safety of our customers. It is also very environmental friendly due to RoHS compliance.

2) STO function will be provided in 2015.

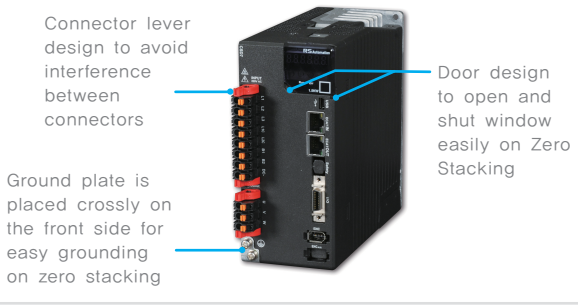
More comfortable and refined RSWare

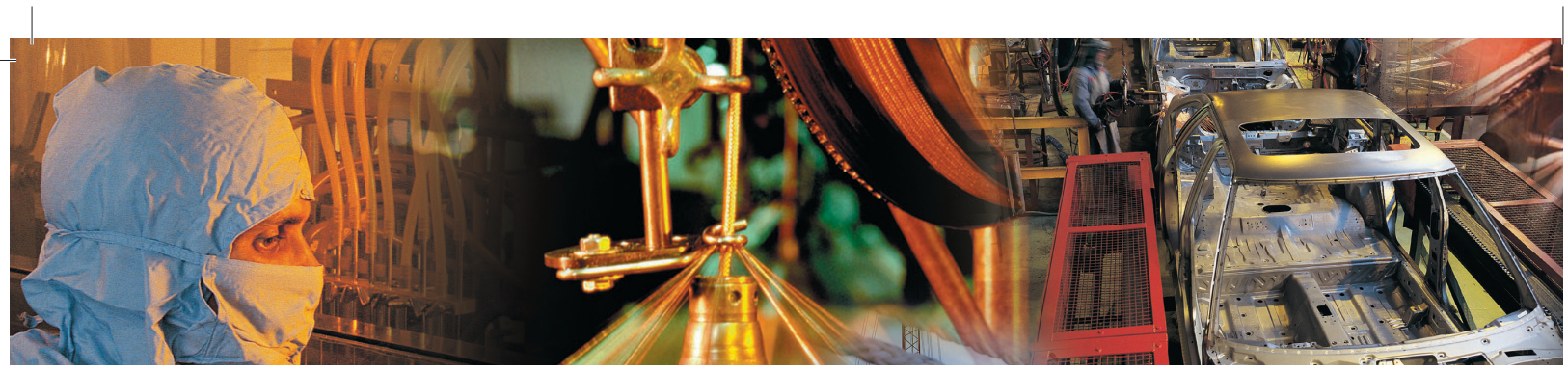
- It now fits for precise tuning with improved oscilloscope function, easy to verify control status, and quick to analyze system. It is now able to run Network products and Pulse/Analog products on the same program.



Supports close installing between products

- Smaller product does not always mean smaller system for customers. CSD7 features a perfect zero stacking considering its wiring and usage.





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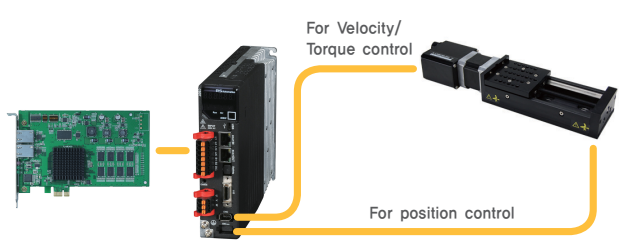
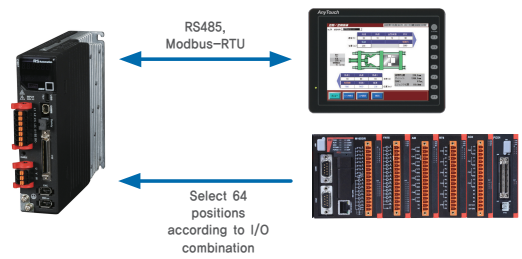
Full Closed Loop Control

- It is now possible to reduce mechanical position error because rotary motor is used for speed/torque control and linear scale is used for position control.



Offering Index as basic function

- You can compose a system without complicated external upper controller through simple programming of Index function. For example, it is possible to run servo drive with a few I/O choice or serial communication, which can also reduce the costs a lot for system composition.
  - Trapezoid, S Curve, High speed position registration
  - Absolute position, Relative position
  - 64 point Index
  - Homing function



Offers EtherNet-based real time motion network

- We offer EtherCAT CoE for protocol, and CiA402 function for drive profile.
  - You can access to all of master controllers that offer EtherCAT CoE and CiA402 Profile.
- Real time motion control with communication speed of 100Mbps.
- Applied RJ45 format Connector, used STP Cable higher than Cat 5e, maximum distance of 100m between nodes.

CSD7 Series Product Composition

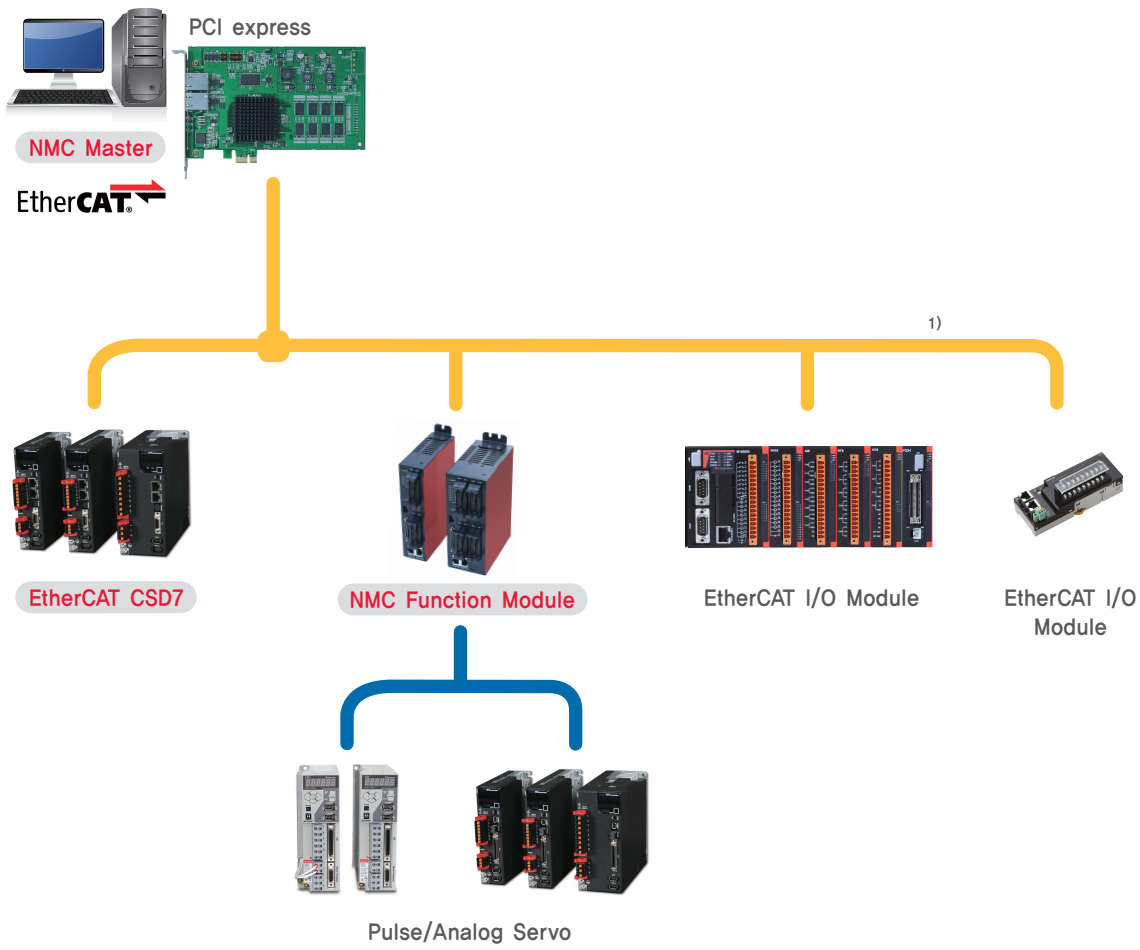
There are two types of CSD7 series. (Pulse/Analog model, EtherCAT model)

■ Pulse/Analog model

■ EtherCAT model

EtherCAT-based real time motion control

You can compose a real time EtherNet-based system at a lowest cost using various EtherCAT products, so that we offer EtherCAT solution together with NMC Series, PC-based master. Choose from a wide range of choices not only including Pulse/Analog servo drive, but also networks.



• 1) Max distance between nodes is 100m.

Drive and Motor Selection

■ Servo Drive Model Code Format

C S D 7 _ 0 1 B X F 1

Drive Series
CSD7 Series

Rated Output(W)	
01	100W
02	200W
04	400W
08	800W
10	1kW
15	1.5kW

Input Voltage(Vac)	
B	220V

Drive Type	
X	Pulse / Analog
N	EtherCAT

Option	
Blank	Standard Model
F	Advanced Model

Designing Order	
1	Ver.1

■ Servo Motor Model Code Format

C S M T – 0 1 B U 1 A N T 3

Motor Type
CSMT Series
CSMR Series

Rated Output(W)	
A5	50W
01	100W
02	200W
04	400W
06	600W
08	800W

Input Voltage(Vac)	
B	AC 220V

Encoder Type	
R	17bit Incremental
Q	17bit Absolute
U	17bit Inc/Abs 공용
T	23bit Inc/Abs 공용

Designing Order	
1	Ver.1

Option	
NT	None
BT	Brake
ST	Oil Seal
TT	Oil Seal, Brake

Motor Shaft Specification	
3	Key Type

■ Available Motor Series

Motor Series / Items		Rated Output(W)	Rated Speed/ Max. Speed rpm/min	Motor Type	Encoder		Protection Degree	Inertia
					17bit serial Abs./Inc	23bit serial Abs./Inc		
CSMT		50W~800W	3000/5000	Cylinder	O	O	IP 65	Ultra low inertia
CSMR		100W~400W	3000/5000	Pan Cake	O	O	IP 65	Low inertia

[Notice]

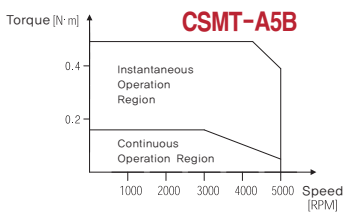
· For more information, please find our website.
  * Korean : www.rsautomation.co.kr
  * English : www.rsautomation.biz

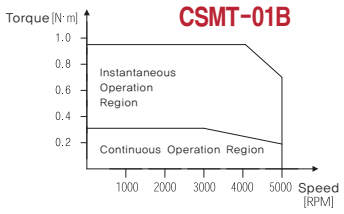
CSMT Motor

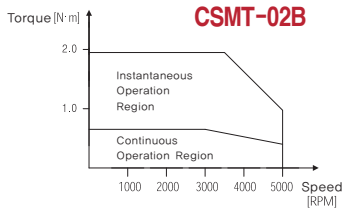
■ Basic Specifications

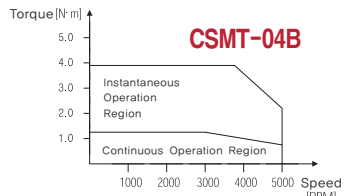
Item / Output	Unit of Measure	CSMT–					
		A5B	01B	02B	04B	06B	08B
Flange Size	mm	40	40	60	60	80	80
Rated Output	W	50	100	200	400	600	800
Rated Speed	r/min	3000					
Max. Speed	r/min	5000					
Rated Torque	N · m	0.16	0.32	0.64	1.27	1.91	2.39
	kgf · cm	1.62	3.25	6.5	13	19.5	24.4
Max. Instantaneous Torque	N · m	0.48	0.95	1.91	3.82	5.73	7.16
	kgf · cm	4.9	9.7	19.5	39	58.5	73
Rated Current	A(rms)	0.6	1.1	1.7	3.3	4.4	5
Max. Instantaneous Current	A(rms)	1.6	3	5.0	9.7	12.9	14.5
Rotator Inertia	gf · cm · sec^2	0.02	0.03	0.18	0.34	1	1.1
	x10^{-4}kg · m^2	0.02	0.03	0.18	0.34	0.98	1.08
Rotator Inertia (Brake)	gf · cm · sec131	0.05	0.06	0.28	0.44	1.24	1.34
	x10^{-4}kg · m131	0.05	0.06	0.28	0.44	1.22	1.32
Electrical Time Constant	ms	0.9	0.6	0.9	0.6	0.6	
Mechanical Time Constant	ms	1.1	1.6	3.2	3.8	6	4.8
Power Rating	kW/s	12.9	34.5	23	48.7	37.3	51.3
Shaft Friction Torque	kgf · cm MAX	0.2		0.4		0.8	
Shaft Direction Torque	mm MAX	0.2					
Allowable Thrust Shaft Load	kgf MAX	4	4	7	7	10	
Allowable Radial Shaft Load	kgf MAX	8		20		35	
Color	–	Black					
Mass	Kg	0.4	0.5	0.9	1.3	2.2	2.5
Voltage Specifications	VAC	220					

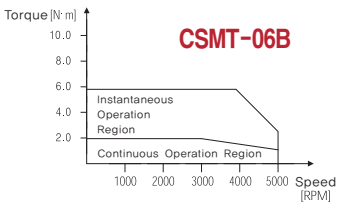
■ Torque–Speed Curves

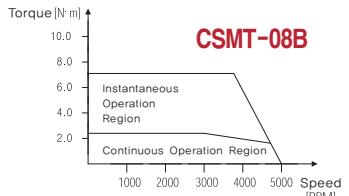








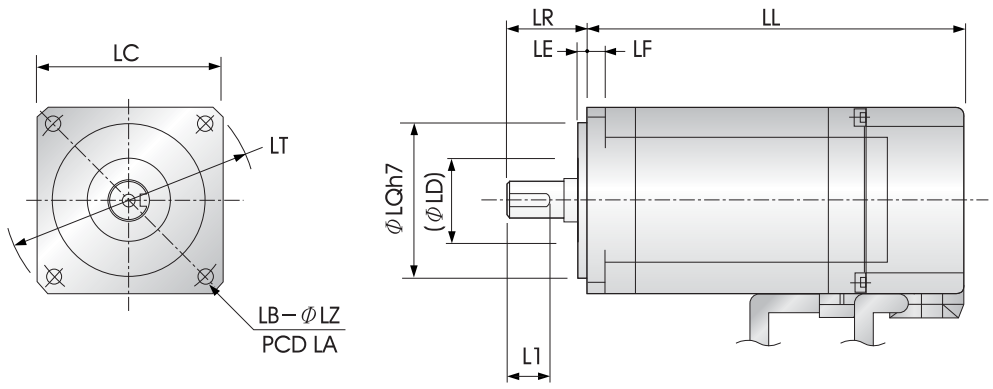




[Notice]

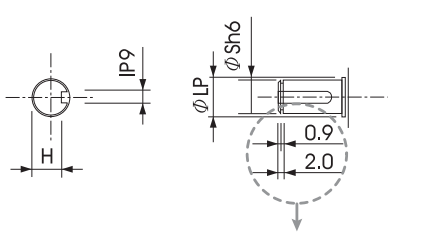
1. If you want to use a motor under the rated torque, you need to attach a aluminum heat sink (100W : 200 x 200 x 12mm, 200W and over : 305 x 305x 12mm) to the motor. Ambient temperature should be 40℃ at this time.
2. Each value is a value obtained by combining it to the Servo drive.

■ CSMT Motor – External Dimension



Motor / Item	Dimension														
	LL		LR	LE	LF	LH	LQ	LD	L1	L3	LC	LT	LB	LZ	LA
	With Motor Brake	Without Motor Brake													
CSMT–A5B	95.1	59.5	25	2.5	5	4.5	30	20	17	20	40	55	2	4.5	46
CSMT–01B	109.1	73.5													
CSMT–02B	110.7	76.1	30	3	6	7	50	27	18	22	60	80	4	5.5	70
CSMT–04B	132.7	98.1													
CSMT–06B	136.3	99.7	35	3	8	7	70	34	23	27	80	105	4	6.6	90
CSMT–08B	145.3	108.7													

■ CSMT Motor – Shaft Dimension



※ Only valid for 100W or under

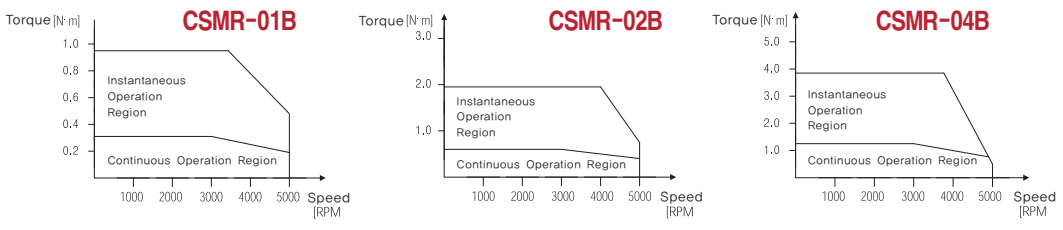
Motor / Item	Dimension			
	LP	S	H	I
CSMT–A5B	86.5	4	5.5	70
CSMT–01B				
CSMT–02B	14	12	9.5	4
CSMT–04B				
CSMT–06B	19.8	16	13	5
CSMT–08B				

CSMR Motor

■ Basic Specifications

Item / Output	Unit of Measure	CSMR–		
		01B	02B	04B
Flange Size	mm	60	80	80
Rated Output	W	100	200	400
Rated Speed	r/min	3000		
Max. Speed	r/min	5000		
Rated Torque	N · m	0.318	0.64	1.27
	kgf · cm	3.25	6.5	13
Max. Instantaneous Torque	N · m	0.95	1.91	3.82
	kgf · cm	9.7	19.5	39
Rated Current	A(rms)	0.9	1.5	2.7
Max. Instantaneous Current	A(rms)	2.5	4.2	7.8
Rotator Inertia	gf · cm · sec^2	0.09	0.3	0.57
	$x10^{-4}kg \cdot m^2$	0.09	0.3	0.56
Rotator Inertia (Brake)	gf · cm · sec131	0.19	0.53	0.8
	$x10^{-4}$kg · m131	0.19	0.53	0.79
Electrical Time Constant	ms	1.2	1	0.6
Mechanical Time Constant	ms	2.5	3.2	4.8
Power Rating	kW/s	11.5	13.8	29.1
Shaft Friction Torque	kgf · cm MAX	0.2	0.6	0.6
Shaft Direction Torque	mm MAX	0.2	0.2	0.2
Allowable Thrust Shaft Load	kgf MAX	4	7	7
Allowable Radial Shaft Load	kgf MAX	8	20	20
Color	–	Black		
Mass	Kg	0.6	1.1	1.6
Voltage Specifications	VAC	220		

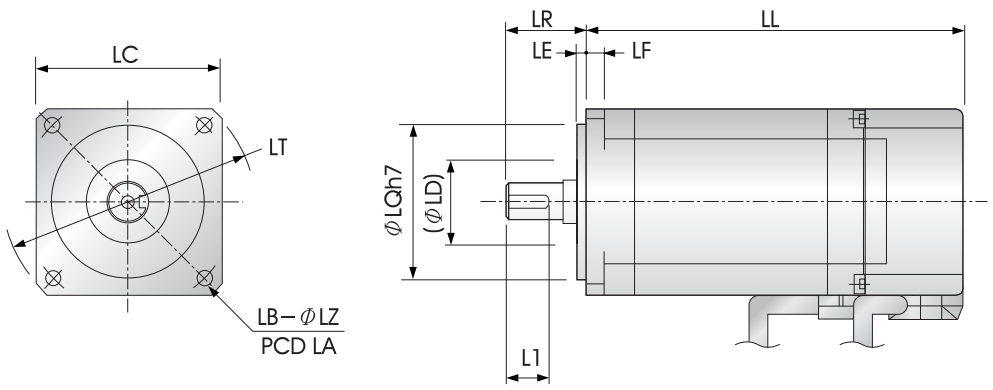
■ Torque-Speed Curves



[Notice]

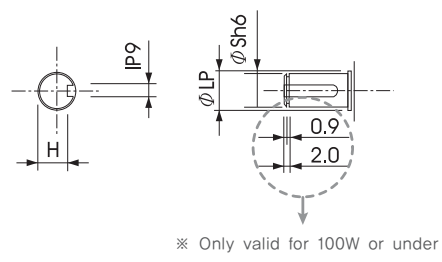
1. If you want to use a motor under the rated torque, you need to attach a 305x305x12mm aluminum heat sink to the motor. Ambient temperature should be 40℃ at this time.
2. Each value is a value obtained by combining it to the Servo drive.

■ CSMR Motor – External Dimension



Motor / Item	Dimension														
	LL		LR	LE	LF	LH	LQ	LD	L1	L3	LC	LT	LB	LZ	LA
	With Motor Brake	Without Motor Brake													
CSMR–01B	86.5	62.5	30	3	6	7	50	27	18	22	60	80	4	5.5	70
CSMR–02B	95.3	64.3	30	3	8	7	70	27	18	22	80	105	4	6.6	90
CSMR–04B	107.3	76.3													

■ CSMR Motor – Shaft Dimension



※ Only valid for 100W or under

Motor / Item	Dimension			
	LP	S	H	I
CSMR–01B	86.5	4	5.5	70
CSMR–02B				
CSMR–04B				

CSD7 Series Specifications

■ Pulse/Analog Model

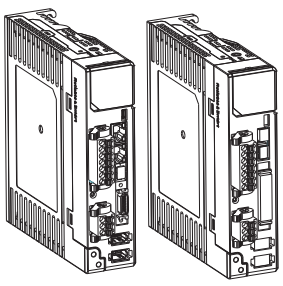
Item / Catalog No.		01BX1	02BX1	04BX1	08BX1	10BX1	15BX1
Output	Rated Current [Arms]	1.1	1.8	3.3	6.2	8.0	11.0
Main Power Supply		Single-Phase AC 200 ~ 230V, 10% ~ -15%, 50/60Hz			3-Phase AC 200 ~ 230V, 10%~-15%, 50/60Hz. Single-Phase can be used to 800W drive by changing parameter.		
Control Power supply		Single-Phase AC 200 ~ 230V, 10% ~ -15%, 50/60Hz					
Control Method		SVPWM control using IPM					
Encoder		17Bit Serial Absolute/Incremental, 23Bit Serial Absolute/Incremental, 21Bit Biss					
Regenerative resister		-	-	30W internal resister	100W internal resister		
Dynamic Brake		Supplying Internal Circuit that makes two phase (U,W) short					
Serial Communication	USB	Connect to PC to use serial communication. RSWare (PC Software) should be used through this port.					
	RS-485	It provides operating 32-axes and editing parameters through 1:N Multi-drop connection.					
Environment	Ambient temperature/ Humidity for Operation	0℃ ~ 50℃ / 90% RH or below (Non-condensing)					
	Ambient temperature/ Humidity for Storage	-20℃ ~ 85℃ / 90% RH or below (Non-condensing)					
	Vibration/Impact Resistance	Vibration 2G, Impact 15G or below (1G = 9.8m/s^2, Gravity acceleration)					
	Altitude	Max. 1000m above sea level					
I/O Interface	Encoder Output	Encoder A-B-Z pulse output(Line driver), Division Ratio : N/M (N,M ≤ 32768), Absolute data can be sent to upper controller as serial data.					
	Digital Input	Allocable 8 points, Fixed 1 point (Emergency Stop) - Input detection time : 6~8ms High speed allocable 2 points(Position registration) - Input detection time : 5us or under					
	Digital Output	Allocable 6 points, Fixed 2 points(Encoder Z-pulse, Servo alarm)					
Built-in Operator		Six-7segment LED for display, four-button for parameter setting					
Protective function		Over current, Motor Overload, Drive Overload, Regenerative Overload, Overvoltage, Low voltage, Overspeed, Overheat, CPU failure, Encoder failure, Communication disruption, IPM failure, Abnormal motor speed setting, Over position error, Input phase loss, Abnormal motor cabling, etc					
Position Control	Pulse types for Position command	CCW+CW pulse train, Sign+Pulse train, A+B pulse train (90 ° phase difference between A and B)					
	Input command types	Line Drive (5V), Open Collector (Both 24Vdc, 5Vdc are available. But in case of using 5Vdc, you need to use external resistor.)					
	Max. input frequency	4Mpps (Line Drive), 250Kpps (Open Collector)					
	Electrical gear ratio	Provide 3 sets of parameters for electrical gear ratio					
	Feedforward compensation	0 ~ 100% (Setting resolution: 1%)					
	Feedforward compensation	21bit Biss serial encoder, RSA 17/23bit serial encoder are available.					
Velocity Control	Command types	1. Analog signal command from external device 2. Digital command set in internal memory					
	Control range	External analog signal command(1:2000), Internal digital command(1:5000)					
	Velocity change rate (Rated)	Input voltage change (200 ~230Vac, +10%, -15%): 0%, External Load change (0 ~ 100%): ±0.01% Max, Ambient temperature change (25° C±25° C): ±0.1%					
	Acceleration/Deceleration setting range	0 ~ 60sec					
	Analog velocity command setting	DC 0V ~ ± 10V (Initial value is set as 6V at rated speed)					
Torque Control	Command types	Analog signal command from external device					
	Analog torque command setting	DC 0V ~ ± 10V (Initial value is set as 3V at rated torque)					
Safety	Function	STO (Safe Torque Off, IEC / EN 61800-5-2), Additional connector is provided					
	Safety standard	IEC / EN 61508 SIL2, EN ISO 13849-1 PL d					
Certificate	CE standard	LVD: EN61800-5-1:2007, EMC: N61800-3:2004+A1:2012					
	NRTL/C standard	UL 508C					
Cooling method		Fan cooling					
Installation	Mounting method	Base Mounted (Standard), Rack Mounted (Need optional mechanical parts)					
	Zero stacking	It can be mounted with no space installing between products					

■ Network Model

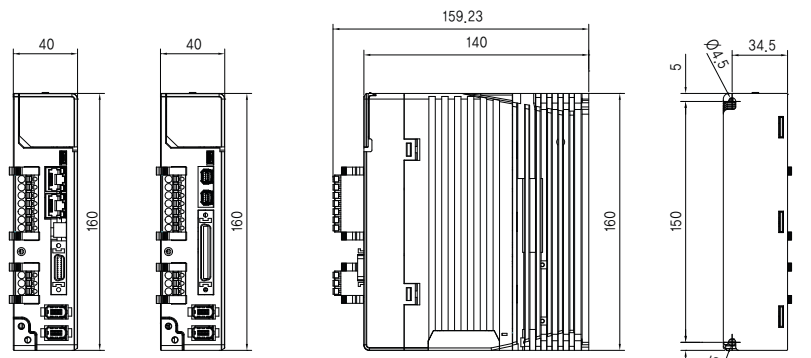
Item / Catalog No.		01BX1	02BX1	04BX1	08BX1	10BX1	15BX1
Motion Network	Communication Protocol	EtherCAT CoE is used for the protocol, and CiA402 is used for drive profile.					
	Communication Speed	100Mbps					
	Network Requirement	RJ45 Connector, Twisted Pair Cable (CAT 5E or above, STP), Max. 100m between nodes					
	Node setting	Node is set by parameter and displayed on 7-segment LED.					
Serial Communication	USB	Connect to PC to use serial communication. RSWare (PC Software) should be used through this port.					
I/O Interface	Encoder Output	Encoder A-B-Z pulse output(Line driver), Division Ratio : N/M (N,M ≤ 32768)					
	Digital Input	Allocable 4 points, Fixed 1 point (Emergency Stop) - Input detection time : 6~8ms High speed allocable 2 points (Position registration) - Input detection time : 5us or under					
	Digital Output	Allocable 3 points					
Built-in Operator		1. Six 7-segment for display, 2. Four-button for parameter setting, 3. Two LED for indicating EtherCAT communicatin status.					

Dimensions

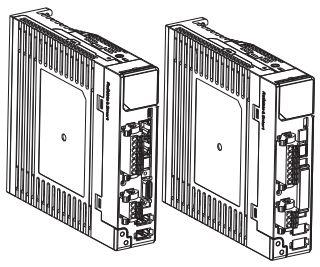
■ 100W – 200W



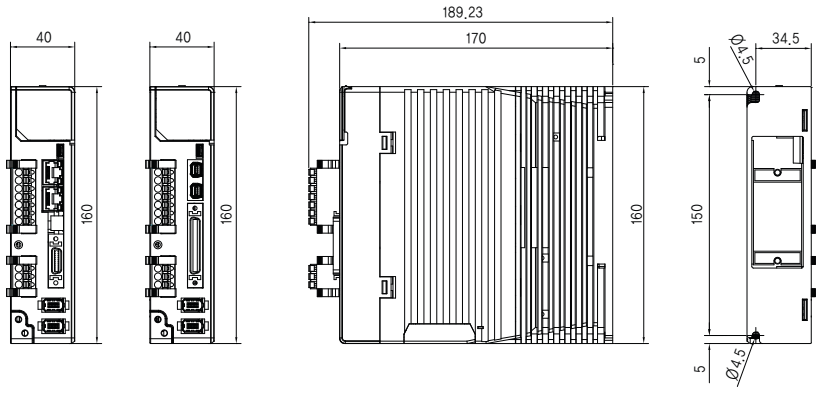
Height	Width	Depth
160 mm	40 mm	140 mm



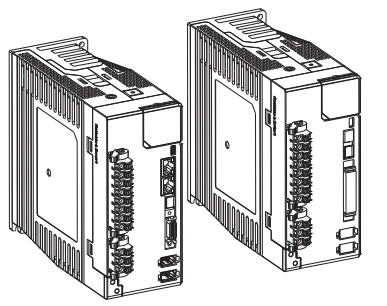
■ 400W



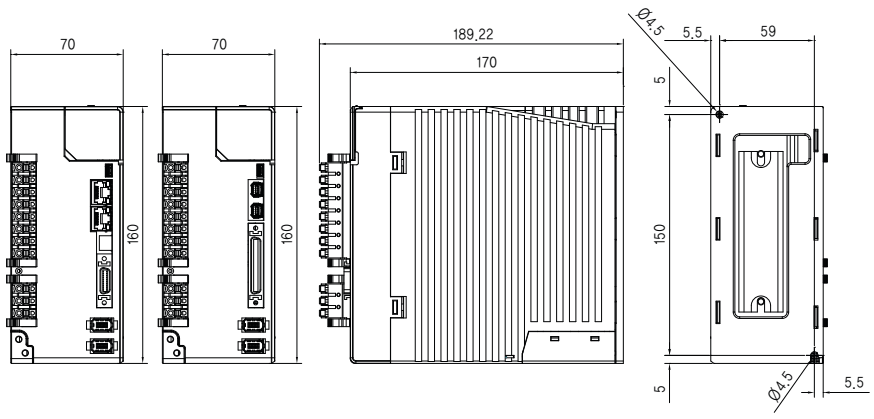
Height	Width	Depth
160 mm	40 mm	170 mm



■ 800W – 1.5KW



Height	Width	Depth
160 mm	70 mm	170 mm

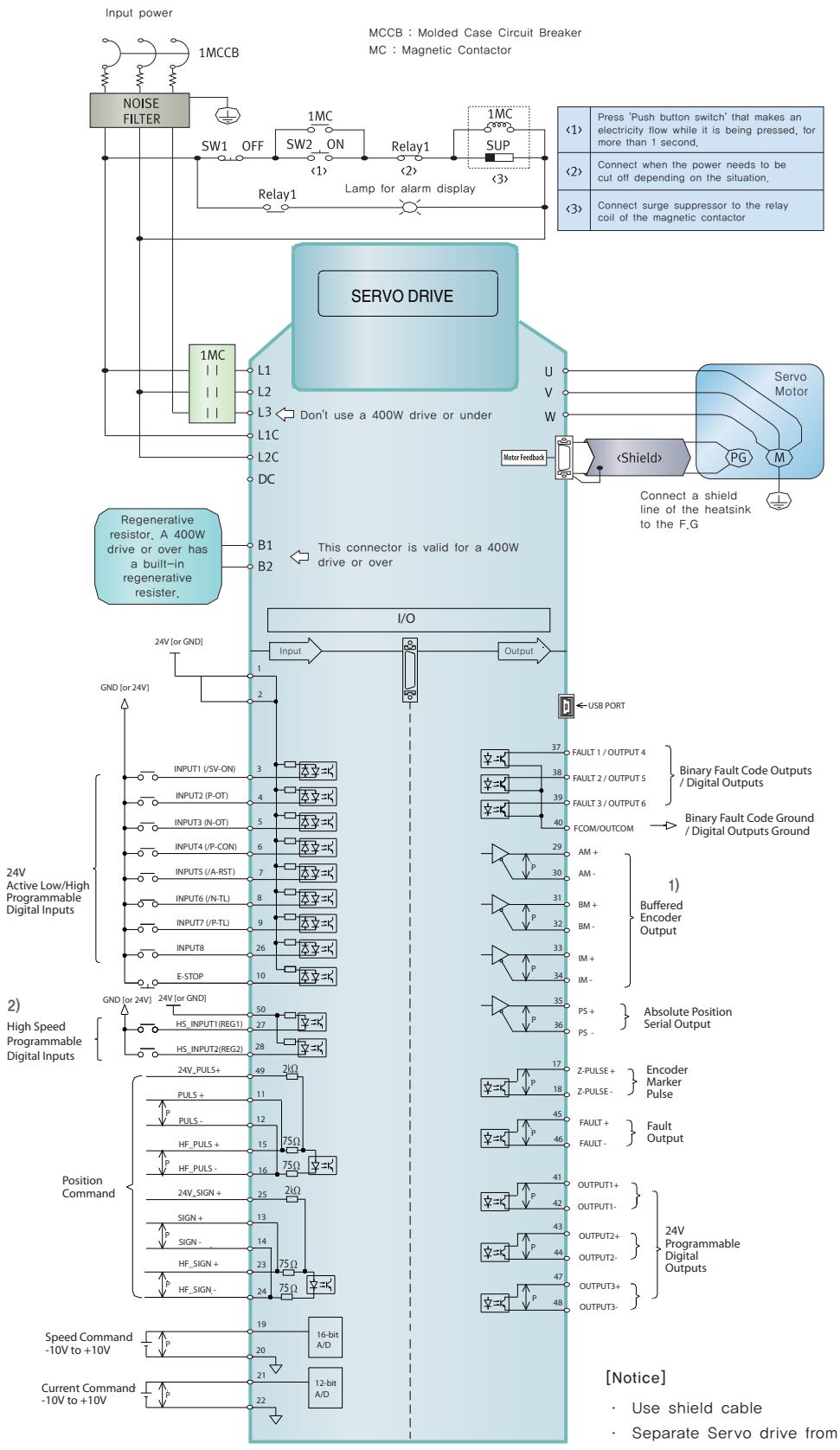


[Notice]

· The CAD data of the above dimensions are available to download from our company website (http://www.rsautomation.co.kr or http://www.rsautomatin.biz)

Wiring Diagram (1)

■ Pulse / Analog Model



‹1›	Press 'Push button switch' that makes an electricity flow while it is being pressed, for more than 1 second.
‹2›	Connect when the power needs to be cut off depending on the situation.
‹3›	Connect surge suppressor to the relay coil of the magnetic contactor

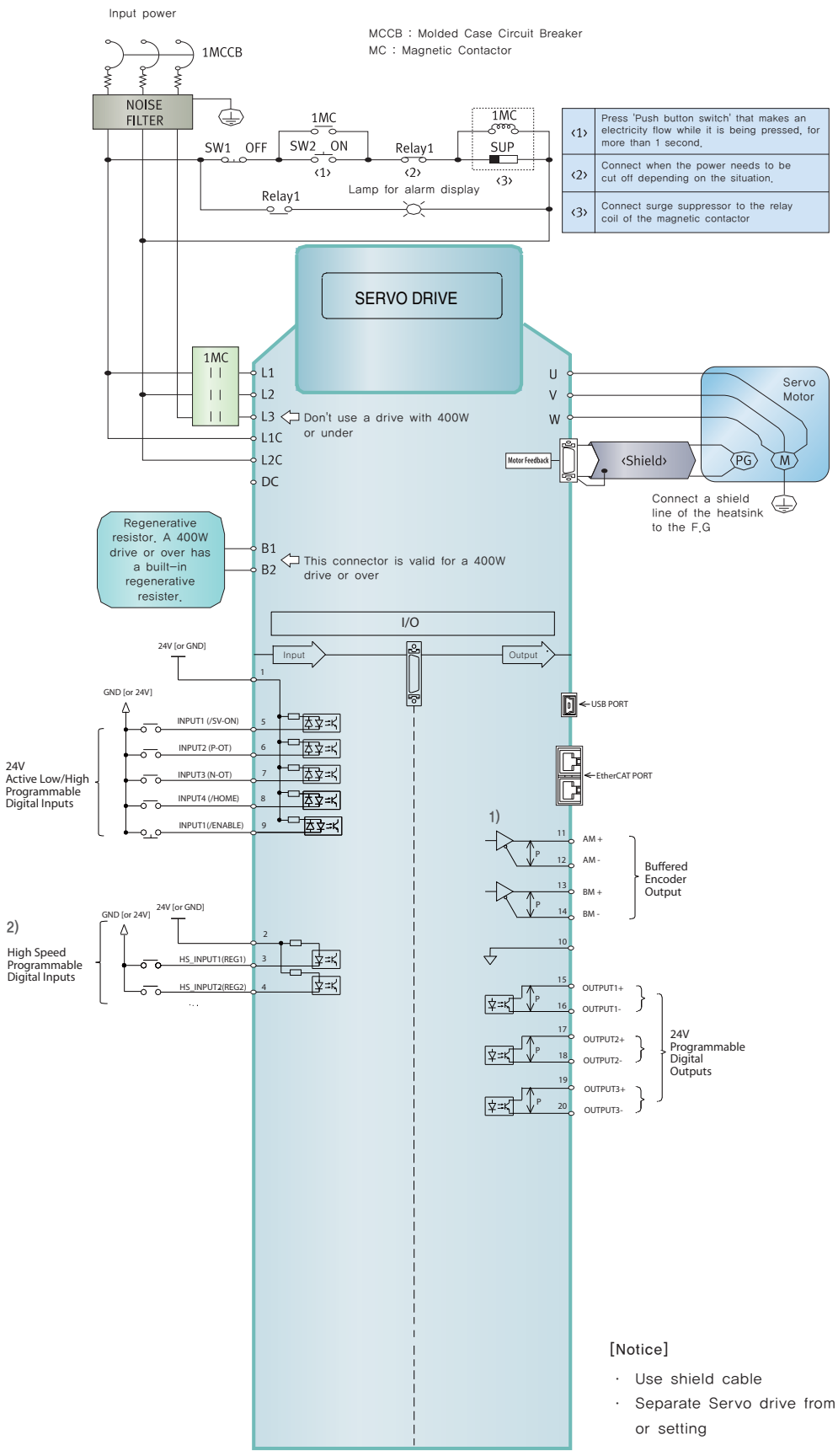
[Notice]

- Use shield cable
- Separate Servo drive from noise source when installing or setting

- 1) Every ↕P represents a twisted pair of the wire.
- 2) HS_INPUT1 and HS_INPUT2 are for high speed input that can read position data less than 3us after signal input.

Wiring Diagram (2)

■ EtherCAT Model



‹1›	Press 'Push button switch' that makes an electricity flow while it is being pressed, for more than 1 second.
‹2›	Connect when the power needs to be cut off depending on the situation.
‹3›	Connect surge suppressor to the relay coil of the magnetic contactor

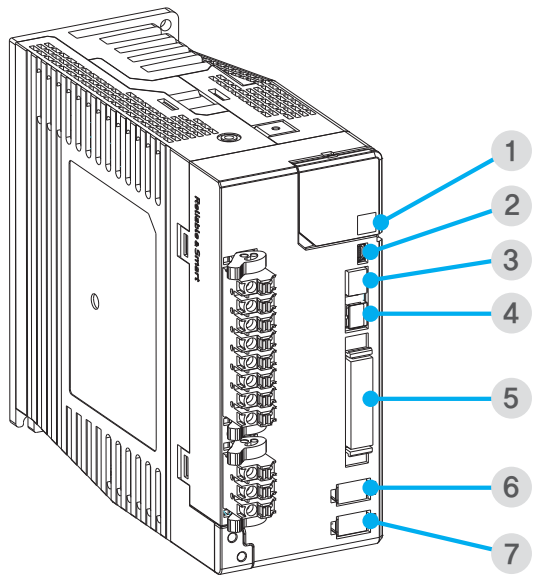
[Notice]

- Use shield cable
- Separate Servo drive from noise source when installing or setting

- 1) Every ↕P represents a twisted pair of the wire.
- 2) HS_INPUT1 and HS_INPUT2 are for high speed input that can read position data less than 3us after signal input.

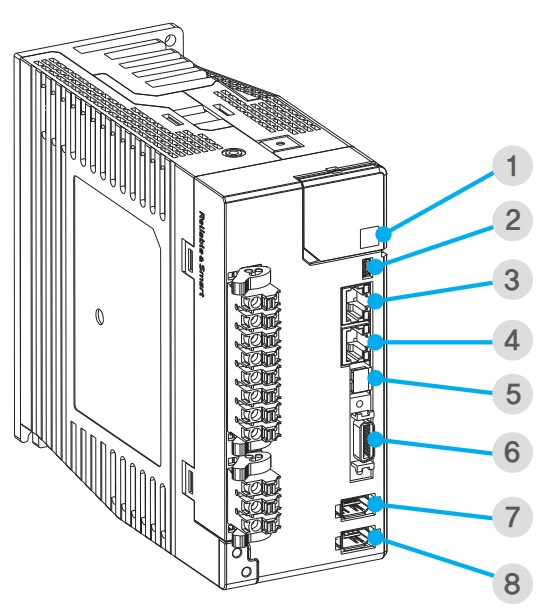
Product Composition

■ Pulse / Analog Model



N0.	Item	Function
1	Built-in Operator	It consists of six 7-segment and four push button. It provide some functions such as parameter setting, status display, monitoring various values, mode change.
2	USB	Connect to the RSWare, PC software
3	COMM	Connect to the Modbus-RTU(RS-485)
4	Safety	Safety function (STO) switch
5	I/O	This 50 pin connector is for interface with external device. The functions are Command input, System Input/Output, User Input/Output, alarm output, Encoder output. For more detail, refer to the wiring diagram.
6	ENC	Encoder signal is fed into this connector. (17bit serial encoder, 23bit serial encoder, 21bit Biss encoder)
7	ENC^{AUX}	This is for Full closed control which is aimed at adjusting mechanical position error. Linear scale signal is fed into this connector.

■ EtherCAT Model



N0.	Item	Function
1	Built-in Operator	It consists of six 7-segment, four push button and two LED. It provide some functions such as parameter setting, status display, monitoring various values, mode change, communication status.
2	USB	Connect to the RSWare, PC software
3	ECAT IN	EtherCAT signal Input/Output
4	ECAT OUT	EtherCAT signal Input/Output
5	Safety	Safety function (STO) switch
6	I/O	This 20 pin connector is for interface with external device. The functions are System Input/Output, User Input/Output, alarm output, Encoder output. For more detail, refer to the wiring diagram.
7	ENC	Encoder signal is fed into this connector. (17bit serial encoder, 23bit serial encoder, 21bit Biss encoder)
8	ENC^{AUX}	This is for Full closed control which is aimed at adjusting mechanical position error. Linear scale signal is fed into this connector.

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