

# Servo Drive

## Contents

### iX7NH Series

Next Generation EtherCAT Network Command Type ..... 16

### L7NH Series

All-in-One EtherCAT Communication Type ..... 22

### L7NHF Series

EtherCAT Communication + Full Closed Type ..... 32

### L7S Series

Standard Pulse and Analog Command Type ..... 38

### L7C Series

Economical Pulse and Analog Command Type ..... 48

### L7P Series

Standard Pulse and Indexer Type ..... 52

### PEGA Series

Integrated Drive-Motor EtherCAT Type ..... 60

### PHOX Series

Low Voltage DC Drive Type ..... 66

## iX7NH Series



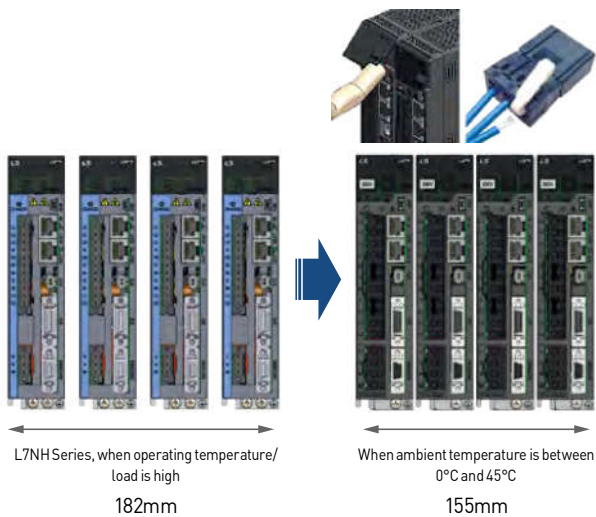
### Servo Drive Designation

<b>iX7</b>	<b>NH</b>	<b>A</b>	<b>004</b>	<b>U</b>	<b>AA</b>
	<b>Communication</b>	<b>Input Power Supply</b>	<b>Capacity</b>	<b>Encoder Type</b>	<b>Option</b>
	Network Type	A : 200VAC	001 : 100W 002 : 200W 004 : 400W 008 : 750W 010 : 1.0kW 020 : 2.0kW 035 : 3.5kW	U : Universal	Exclusive Option Code

## Next Generation EtherCAT Network Command Type **iX7NH**

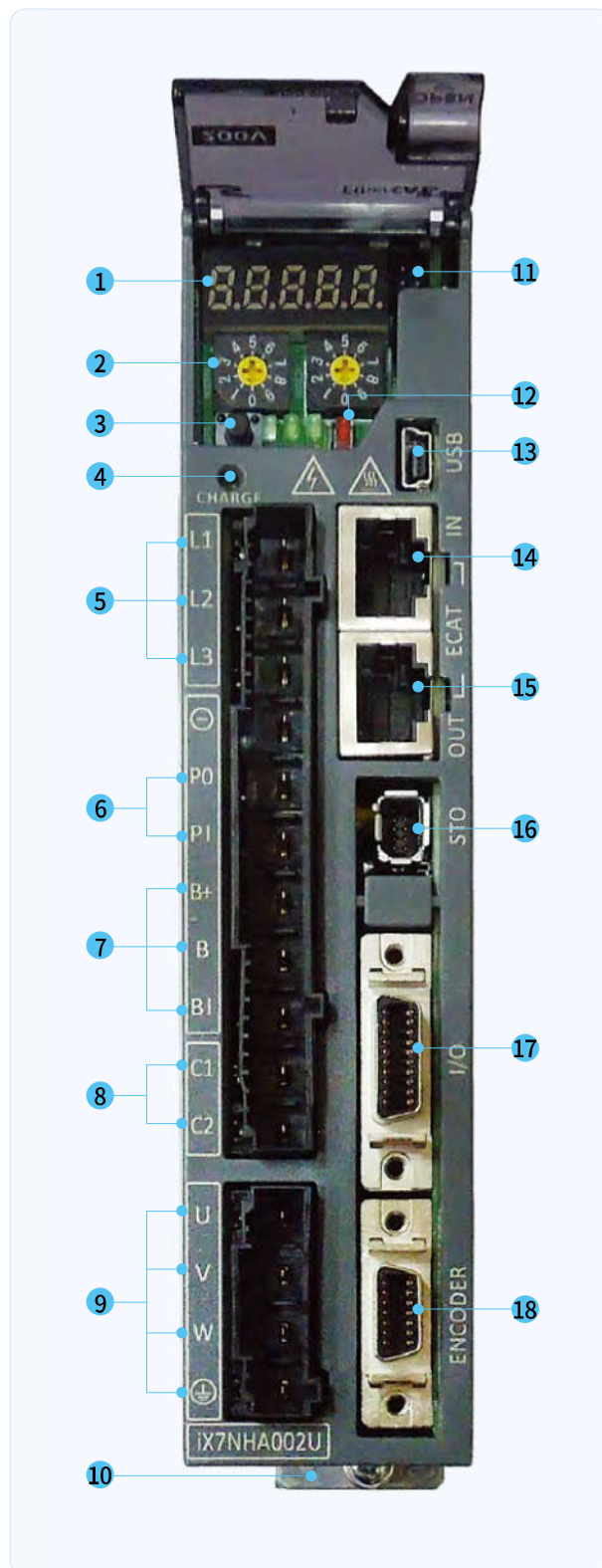
### Compact & Convenience

- Zero-stack installation space achieved through highly efficient heat dissipation
  - 100W ~ 1kW Drive
- Minimized drive depth for 100W and 200W drives through development and application of smaller heat sinks
  - 172.5mm → 145.2mm ; volume reduced by 16%
- Easy-to-open parameter display cover
- Spring clamp connector applied for easier wiring

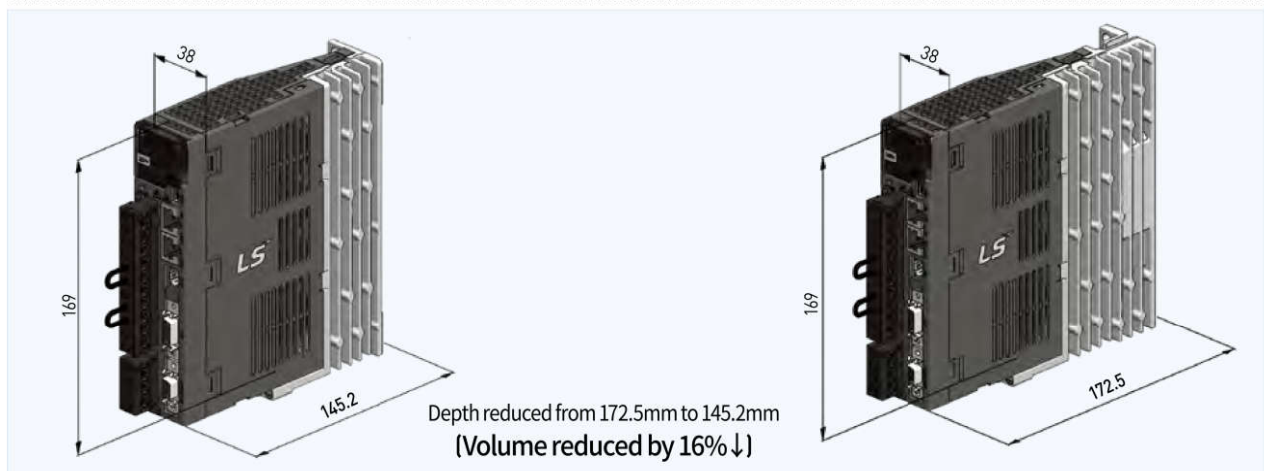


[Small-capacity Model Shown]

- 1 Display
- 2 Node address configuration switch
- 3 OTG switch
- 4 Charge indicator
- 5 Main power connector (L1, L2, L3)
- 6 DC Reactor connector (P0, PI)
- 7 Regenerative resistance connector (B+, B, BI)
  - Short-circuit B and BI terminals when using standard type
  - Use B+ and B terminals when using external resistor
- 8 Control power connector (C1, C2)
- 9 Servo motor connecting terminal (U,V,W)
- 10 Ground terminal
- 11 Connector for analog monitor
- 12 State LED
- 13 USB Connector(USB)
- 14 EtherCAT communication port(IN)
- 15 EtherCAT communication port(OUT)
- 16 Safety connector(STO)
- 17 Input/Output signal connector(I/O)
- 18 Encoder connector(ENCODER)

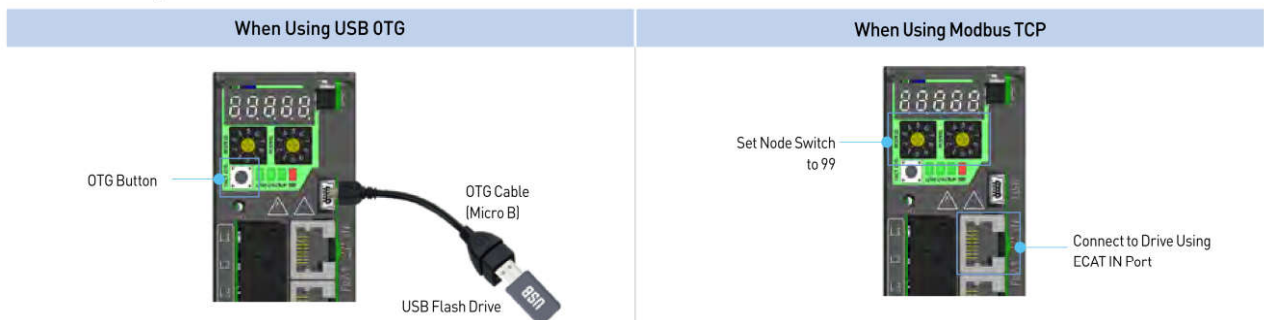


## Minimized drive depth for 100W and 200W drives through development and application of smaller heat sinks



## Enhanced Encoder Support & Improved Control Functionalities

- More types of encoders supported on top of high resolution encoder
  - BiSS, Quadrature, Tamagawa, Panasonic, EnDat 2.2, SSI, Nikon and Sinusoidal (Optional)
- Supports temperature monitoring through encoders
- Enhanced disconnection check function of quadrature encode
  - Disconnection check circuit added
  - No dummy wiring needed
- Improved control cycle
  - Position: 125  $\mu$ s
  - Speed: 62.5  $\mu$ s
  - Current: 31.25  $\mu$ s
- Enhanced alarm trace function
  - Capable of saving up to 4 maximum channels such as alarm code & alarm occurrence time/date
- Enhanced USB OTG(On-The-Go) function
  - Drive parameter backup on USB thumb drives (Drive → USB flash drive)
  - Drive parameter restoration from USB thumb drives (Drive ← USB flash drive)
  - Drive alarm history backup (Drive → USB flash drive)
  - Firmware update (Drive ← USB flash drive)
  - Added buttons for user convenience



## Faster Communication Provided in More Diverse Methods

- Fieldbus Supported: EtherCAT & Modbus TCP
- Min. Communication Cycle Time: 0.125ms
- Advanced EtherCAT functionality
  - Minimum communication cycle time improved to 0.125 ms from 0.250 ms
  - FoE function supported
- Built-in web server function
  - With web server embedded in servo drive, no drive CM (Configuration software) is needed other than web browser environment
  - Enhanced remote commissioning function through Ethernet connection



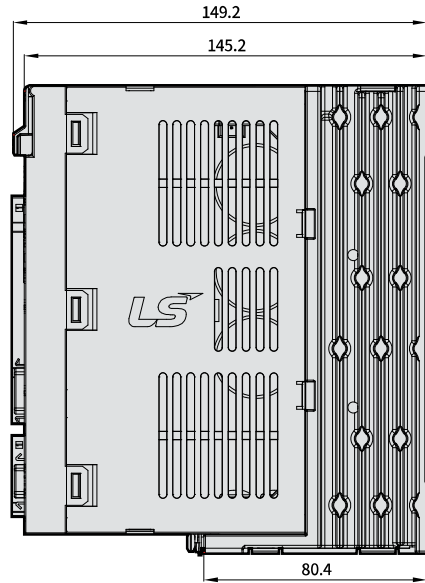
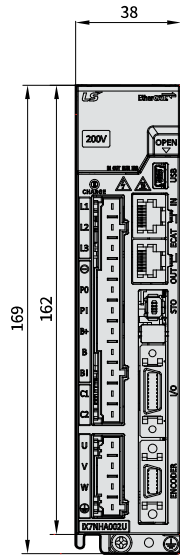


## iX7NHA Drive

Item		Part Number	iX7NHA001U	iX7NHA002U	iX7NHA004U	iX7NHA008U	iX7NHA010U	iX7NHA020U	iX7NHA035U
Input Power	Main Power		1-Phase AC100 ~ 120[V], 1-Phase AC200 ~ 240[V], 3-Phase AC200 ~ 240[V], [-15 ~ +10[%]], 50 ~ 60[Hz]			1-Phase AC200 ~ 240[V], 3-Phase AC200 ~ 240[V], [-15 ~ +10[%]], 50 ~ 60[Hz]	3-Phase AC200 ~ 240[V], [-15 ~ +10[%]], 50 ~ 60[Hz]		
	Control Power		1-Phase AC100 ~ 120[V] 1-Phase AC200 ~ 240[V] [-15 ~ +10[10%]], 50 ~ 60[Hz]			1-Phase AC200 ~ 240[V] [-15 ~ +10[10%]], 50 ~ 60[Hz]			
Rated Current [A]			1.4	1.7	3.0	5.2	6.75	13.5	16.0
Peak Current [A]			4.9	5.95	10.5	18.2	20.25	40.5	48.0
Encoder Type			Quadrature (Incremental) , BiSS-B, BiSS-C(Absolute, Incremental) Tamagawa Serial(Absolute, Incremental), EnDat 2.2, Sinusoidal, Analog Hall, SSI, Nikon, Panasonic						
Control Performance	Speed Control Range		Max. 1 : 5000						
	Speed Variation Ratio		±0.01[%] or less (Load variation 0~100[%]), ±0.1[%] or less (temperature: 25±10[°C])						
	Torque Control Repetition Accuracy		±1[%] or less						
EtherCAT Specification	Communication Standard		FoE (Firmware download) EoE (Parameter setting by UDP, Tuning, Secondary function, Parameter copy) CoE (IEC 61158 Type12, IEC 61800-7 CiA 402 Drive profile)						
	Physical Layer		100BASE-TX(IEEE802.3)						
	Connector		RJ45 x 2						
	Communication Distance		Distance between nodes 100[m] or less						
	DC (Distributed Clock)		Synchronization by DC(Distributed Clock) mode. Minimum DC cycle: 125[us]						
	LED Display		Link Act IN, Link Act OUT, RUN, ERR						
	CiA 402 Drive Profile		Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Cyclic Synchronous Position Mode Cyclic Synchronous Velocity Mode, Cyclic Synchronous Torque Mode, Homing Mode						
Digital Input, Digital Output	Digital Input		Input Voltage range: DC 12[V] ~ DC 24[V] / Total 6 input channels (allocable) Inputs of total 15 functions are selectively allocable (*POT, *NOT, *HOME, *STOP, *PCON, *GAIN2, P_CL, N_CL, PROBE1, PROBE2, EMG, A_RST, SV_ON, LVSF1, LVSF2) Note) *: Fundamentally allocated signals						
	Digital Output		Service rating: DC 24[V] ±10%, 120[ma] total 3 channels (allocable) Total 11 outputs are selectively allocable (*BRAKE, *ALARM, *READY, ZSPD, INPOS, TLMT, VLMT, INPOS2, INSPD, WARN, TGON) Note)* Automatically allocated signals						
Encoder Decimation Output			Differential Line Driver 3 channels AO, /AO, BO, /BO, ZO, /ZO up to 6.5 [Mpps] on 4x interpolation						
Analog Input & Output	Analog Input		Input voltage range: -10 ~ +10[V], Function: analog torque limit (1 channel, unallocable)						
	Analog Output		Total 2 channels (Allocable): able to selectively allocate total 25 types of output						
Safety Function			2 Input Channels(STO1 and STO2), 1 Output Channel(EDM)						
USB Communication	Function		Firmware download, tuning, test drive, monitoring, parameter duplication						
	Communication Standard		Complies with USB 2.0 Full Speed and OTG 2.0 standards						
	Accessible Device		PC or USB Storage device						
Embedded Function	Dynamic Braking		Standard built-in brake (Activated when the servo alarm goes off or when the servo is off).						
	Regenerative Braking		Built-in by default (100W & 200W excluded)						
	Display Function		7-segment display (5 digits)						
	Self-setting Function		Drive node address setting is possible using rotary switch						
	Additional Function		Gain tuning, alarm history, jog operation, home searching						
	Protection Function		Overcurrent, overload, overheat, overvoltage, insufficient voltage, overspeed, abnormal state of encoder, position following error, current detecting error						
Operation Environment	Operating Temperature / Storage Temperature		0 ~ +50[°C] / -20 ~ +65[°C]						
	Operating Humidity / Storage Humidity		Under 80[%]RH / Under 90[%]RH (noncondensing)						
	Environment		Keep indoors. Avoid corrosive / flammable gas or liquid.						

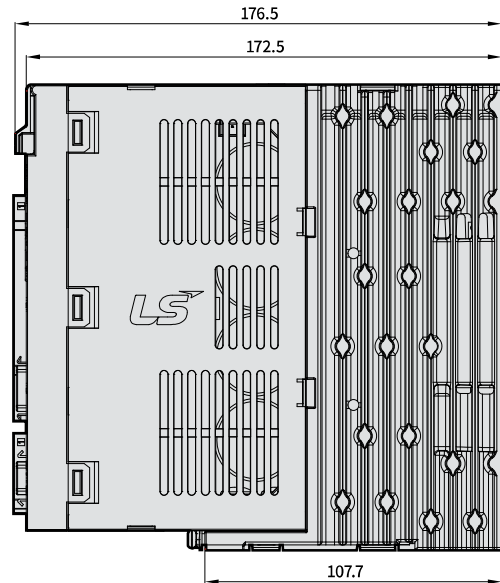
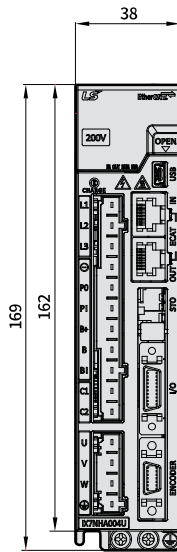
\*Unit [mm]

**iX7NHA001U / iX7NHA002U**  
[Weight : 0.8kg]



\*Unit [mm]

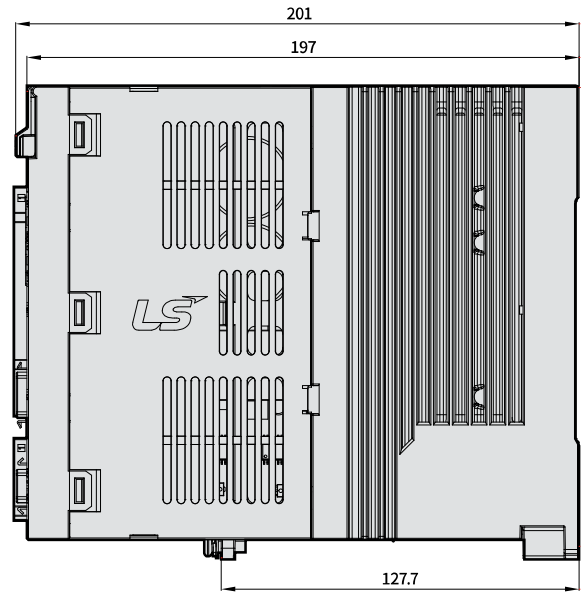
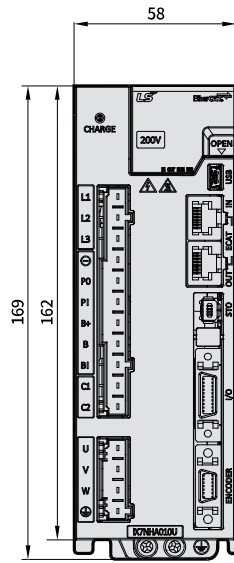
**iX7NHA004U**  
[Weight : 1.0kg]



\*Unit [mm]

**iX7NHA008U / iX7NHA010U**

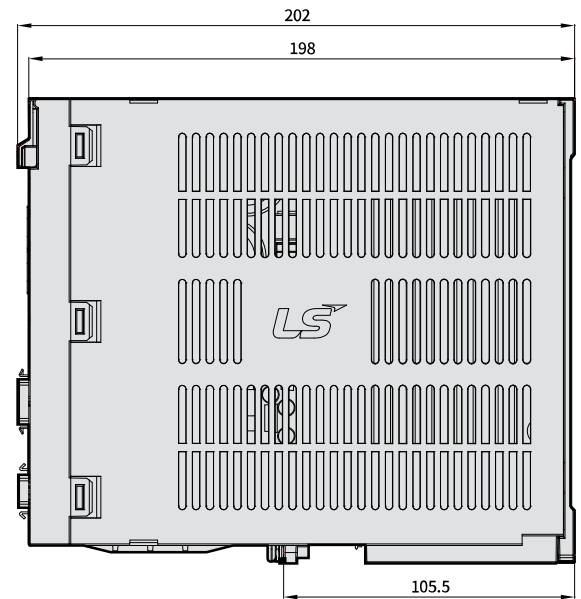
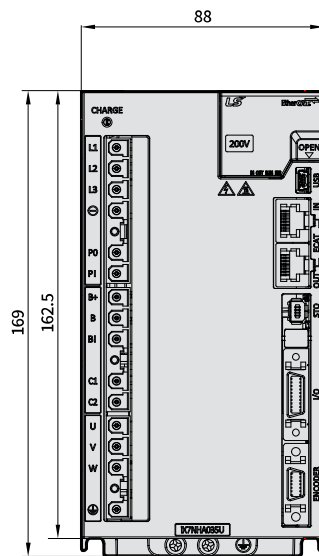
[Weight : 1.6kg  
[Fan-Cooling included]]



\*Unit [mm]

**iX7NHA020U / iX7NHA035U**

[Weight : 2.4kg  
[Fan-Cooling included]]





## L7NH Series



### Servo Drive Designation

<b>L7</b>	<b>NH</b>	<b>A</b>	<b>004</b>	<b>U</b>	<b>AA</b>
<b>Communication</b>	<b>Input Power Supply</b>	<b>Capacity</b>	<b>Encoder Type</b>	<b>Option</b>	
Network Type	A : 200VAC B : 400VAC	001 : 100W 002 : 200W 004 : 400W 008 : 750W 010 : 1.0kW 020 : 2.0kW 035 : 3.5kW 050 : 5.0kW 075 : 7.5kW 150 : 15kW	U : Universal	Exclusive Option Code	

## EtherCAT Communication Type **L7NH**

### Real-time Control Through EtherCAT

- High speed, Real-time capability and Synchronization mechanism
- Improved EtherCAT communication speed (min. 250µs, DC support)
- Supports CoE, EoE and FoE
- Improved frequency response(≈1kHz)

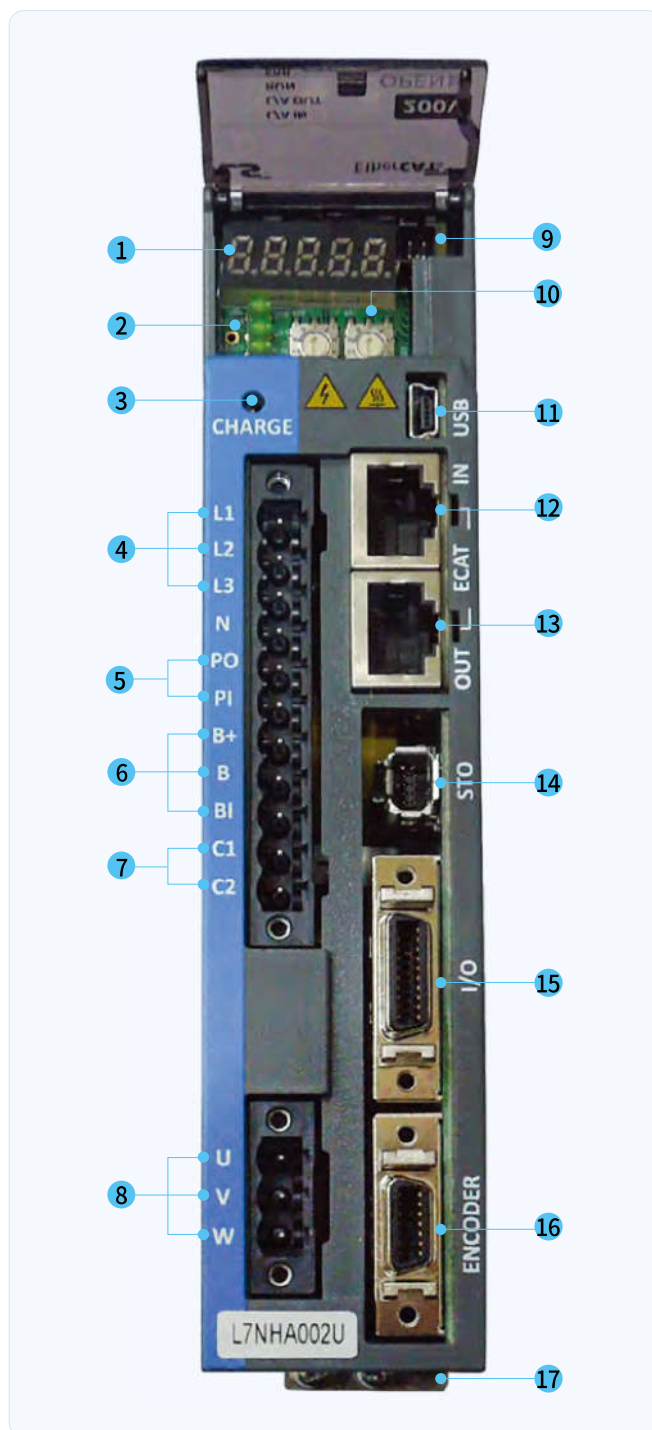
### Compatible with Various Motors and Encoders

- Operates with rotary, DD and linear motors (3rd-party motors supported)
- Quadrature, BiSS-C, Tamagawa serial abs, EnDat 2.2, Panasonic serial abs, Sinusoidal

### Improved Control Performance

- Improved control bandwidth
- 4-step notch filter provided
- Vibration control by Real-time FET
- Real-time gain tuning function

- 1 Display
- 2 State LED
- 3 Charge indicator
- 4 Main power connector (L1, L2, L3)
- 5 DC Reactor connector (PO, PI)
  - Short-circuit when not in use
- 6 Regenerative resistance connector (B+, B, BI)
  - Short-circuit B and BI terminals when using standard type
  - Use B+ and B terminals when using external resistor
- 7 Control power connector (C1, C2)
- 8 Servo motor connecting terminal (U,V,W)
- 9 Connector for analog monitor
- 10 Node address setting switch
- 11 USB connector (USB)
- 12 EtherCAT Communication port(IN)
- 13 EtherCAT Communication port(OUT)
- 14 Safety connector(STO)
- 15 Control signal connector (I/O)
- 16 Encoder connector(ENCODER)
- 17 Ground terminal



## L7NHA Drive

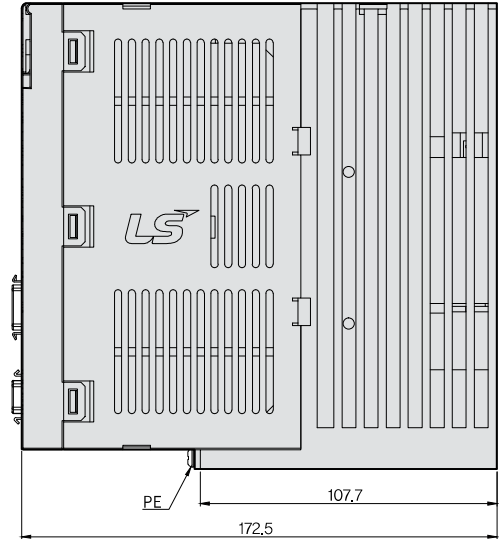
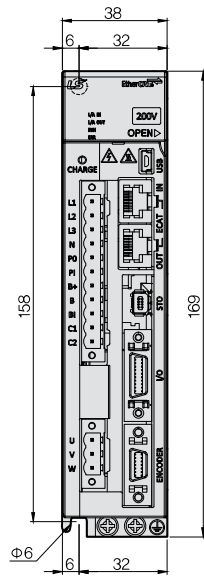
Item	Type Name	L7NHA001U	L7NHA002U	L7NHA004U	L7NHA008U	L7NHA010U	L7NHA020U	L7NHA035U	L7NHA050U	L7NHA075U	L7NHA150U	
Input Power	Main Power Supply	3 Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]										
	Control Power Supply	Single Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]										
Rated Current[A]		1.4	1.7	3.0	5.2	6.8	13.5	16.7	32.0	39.4	76.0	
Peak Current[A]		4.2	5.1	9.0	15.6	20.3	40.5	50.1	90.9	98.5	190.0	
Encoder Type		Quadrature(Incremental), BiSS-B, BiSS-C(Absolute, Incremental) Tamagawa Serial(Absolute, Incremental), EnDat 2.2 Sinusoidal, Analog Hall										
Control Performance	Speed Control Range	Maximum 1:5000										
	Frequency Response	Maximum 1[kHz] or above(When the 19-bit Serial Encoder is applied)										
	Speed Variation Ratio	±0.01[%] or lower(When the load changes between 0 and 100%) ±0.1[%] or less(Temperature of 25°C[±10])										
	Torque Control Repetition Accuracy	Within ±1%										
EtherCAT Communication Specifications	Communication Standard	FoE (Firmware download) EoE (Parameter setting by UDP, Tuning, Secondary function, Parameter copy) CoE (IEC 61158 Type12, IEC 61800-7 CIA 402 Drive profile)										
	Physical Layer	100BASE-TX(IEEE802.3)										
	Connector	RJ45 x 2										
	Communication distance	Within connection between nodes 100[m]										
	DC(Distributed Clock)	Synchronization through DC mode, minimum DC cycle 250[μs]										
	LED Display	LinkAct IN, LinkAct OUT, RUN, ERR										
	Cia402 Drive Profile	Profile Position Mode, Profile Velocity Mode, Profile Torque Mode Cyclic Synchronous Position Mode, Cyclic Synchronous Velocity Mode Cyclic Synchronous Torque Mode, Homing Mode										
Digital Input, Output	Digital Input	Input Voltage range : DC 12[V] ~ DC 24[V] Total 8 input channels (allocable) Total 12 functions (below) can be used selectively for assignment. (*POT, *NOT, *HOME, *STOP, *PCON, *GAIN2, *P_CL, *N_CL, PROBE1, PROBE2, EMG, A_RST)										
	Digital Output	Service rating: DC 24[V] ±10%, 120[mA] Total 4 input channels (allocable) Total 11 functions (below) can be used selectively for assignment. (*BRAKE±, *ALARM±, *READY±, *ZSPD±, INPOS±, TLMT±, VLMT±, INSPD±, WARN±, TGON±, INPOS±)										
Safety Function		2 Input Channels (STO1, STO2), 1 Output Channel (EDM±)										
USB Communication	Function	Firmware download, Parameter setting, Tuning, Secondary function, Parameter copy										
	Communication Standard	Complies with USB 2.0 Full Speed standard										
	Connect	PC or USB storing medium										
Internal Function	Dynamic Braking	Standard built-in brake (Activated when the servo alarm goes off or when the servo is off).										
	Regenerative Braking	Default built-in(excluding 15kW), external installation possible										
	Display Function	7-segment display (5 digits)										
	Self-setting Function	Drive node address customizable with rotary switch										
	Additional Function	Gain adjustment, alarm history, JOG operation, home search										
	Protection Function	Overcurrent, overload, excessive current restriction, overheat, overvoltage, undervoltage, overspeed, encoder problem, location sensor problem, current sensor problem										
Operation Environment	Operating Temperature / Storage Temperature	0 ~ +50[°C] / -20~ +70[°C]										
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Noncondensing)										
	Environment	Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.										

## L7NHB Drive

Item	Type Name	L7NHB010U	L7NHB020U	L7NHB035U	L7NHB050U	L7NHB075U	L7NHB150U
Input Power	Main Power Supply	3 Phase AC 380 ~ 480[V](-15 ~ 10[%]), 50 ~ 60[Hz]					
	Control Power Supply	Single Phase AC 380 ~ 480[V](-15 ~ 10[%]), 50 ~ 60[Hz]					
Rated Current[A]		3.7	8.0	10.1	17.5	22.8	39.0
Peak Current[A]		11.1	24.0	30.3	47.3	57.0	97.5
Encoder Type		Quadrature(incremental), BiSS-B, BiSS-C(absolute, incremental), Tamagawa Serial(absolute, incremental), Panasonic Serial(absolute), EnDat 2.2, Sinusoidal, Analog Hall					
Control Performance	Speed Control Range	Maximum 1: 5000					
	Frequency Response	Maximum 1[kHz] or above(When the 19-bit Serial Encoder is applied)					
	Speed Variation Ratio	±0.01[%] or lower(When the load changes between 0 and 100%) ±0.1[%] or less(Temperature of 25°C±10)					
	Torque Control Repetition Accuracy	Within ±1%					
EtherCAT Communication Specifications	Communication Standard	FoE (Firmware download) EoE (parameter setting through UDP, tuning, auxiliary functions, parameter copy), Tuning, Secondary function, Parameter copy) CoE (IEC 61158 Type12, IEC 61800-7 CIA 402 Drive profile)					
	Physical Layer	100BASE-TX(IEEE802.3)					
	Connector	RJ45 x 2					
	Communication distance	Within connection between nodes 100[m]					
	DC(Distributed Clock)	Synchronization through DC mode, minimum DC cycle 250[μs]					
	LED Display	LinkAct IN, LinkAct OUT, RUN, ERR					
	Cia402 Drive Profile	Profile Position Mode, Profile Velocity Mode Profile Torque Mode, Cyclic Synchronous Position Mode Cyclic Synchronous Velocity Mode, Cyclic Synchronous Torque Mode, Homing Mode					
Digital Input, Output	Digital Input	Input Voltage range : DC 12[V] ~ DC 24[V] Total 8 input channels (allocable) Total 12 functions (below) can be used selectively for assignment. (*POT, *NOT, *HOME, *STOP, *PCON, *GAIN2, *P_CL, *N_CL, PROBE1, PROBE2, EMG, A_RST)					
	Digital Output	Service rating: DC 24[V] ±10%, 120[mA] Total 4 input channels (allocable) Total 11 functions (below) can be used selectively for assignment. (*BRAKE±, *ALARM±, *READY±, *ZSPD±, INPOS±, TLMT±, VLMT±, INSPD±, WARN±, TGO±, INPOS±)					
Safety Function		2 Input Channels (ST01, ST02), 1 Output Channel (EDM±)					
USB Communication	Function	Firmware download, Parameter setting, Tuning, Secondary function, Parameter copy					
	Communication Standard	Complies with USB 2.0 Full Speed standard					
	Connect	PC or USB storing medium					
Internal Function	Dynamic Braking	Standard built-in brake (activated when the servo alarm goes off or when the servo is off).					
	Regenerative Braking	Default built-in(excluding 15kW), external installation possible					
	Display Function	7-segment display (5 digits)					
	Self-setting Function	Drive node address customizable with rotary switch					
	Additional Function	Gain adjustment, alarm history, JOG operation, home search					
	Protection Function	Overcurrent, overload, excessive current restriction, overheat, overvoltage, undervoltage, overspeed, encoder problem, location sensor problem, current sensor problem					
Operation Environment	Operating Temperature / Storage Temperature	0 ~ +50[°C] / -20 ~ +70[°C]					
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Noncondensing)					
	Environment	Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.					

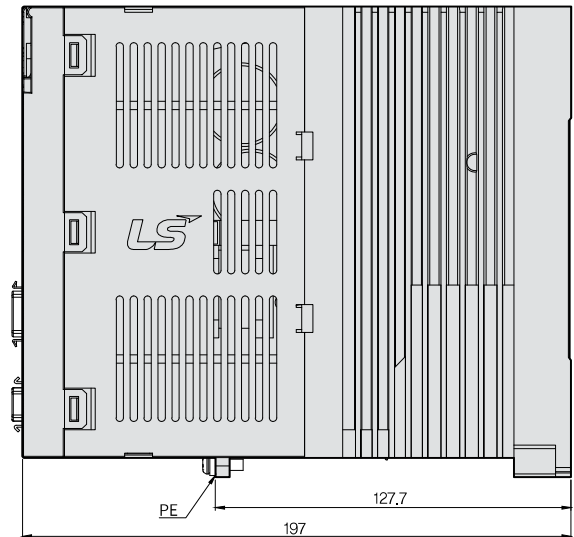
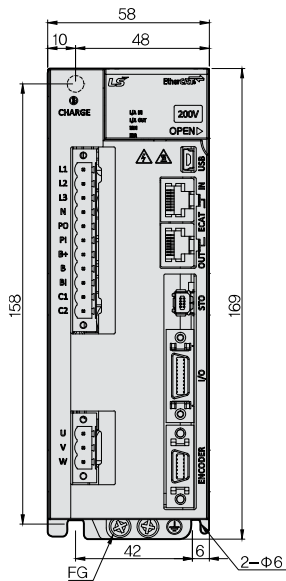
\*Unit [mm]

**L7NHA001U ~ L7NHA004U**  
[Weight: 1.0kg]



\*Unit [mm]

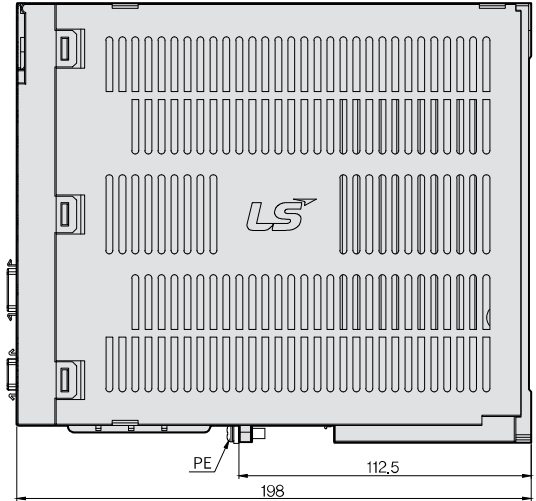
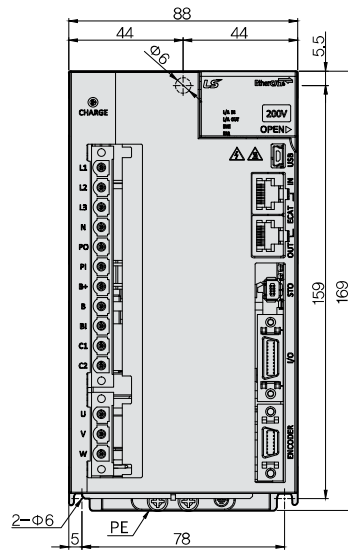
**L7NHA008U / L7NHA010U**  
[Weight: 1.5kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7NHA020U / L7NHA035U**

[Weight: 2.5kg  
[Fan-Cooling included]]

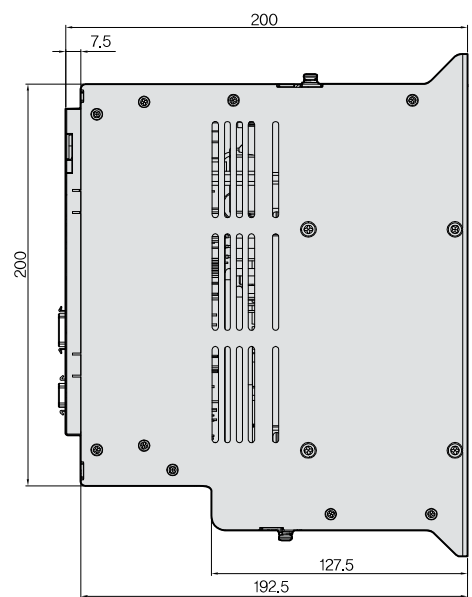
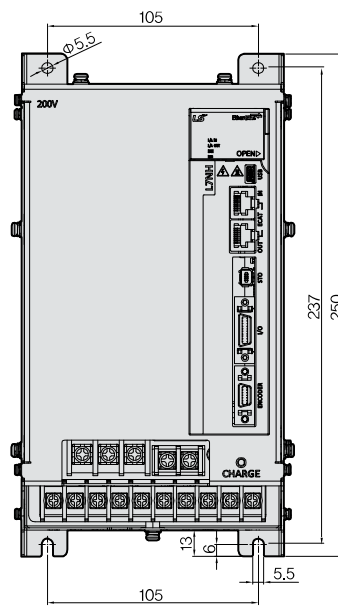


Servo Drive

\*Unit [mm]

**L7NHA050U**

[Weight: 5.5kg  
[Fan-Cooling included]]

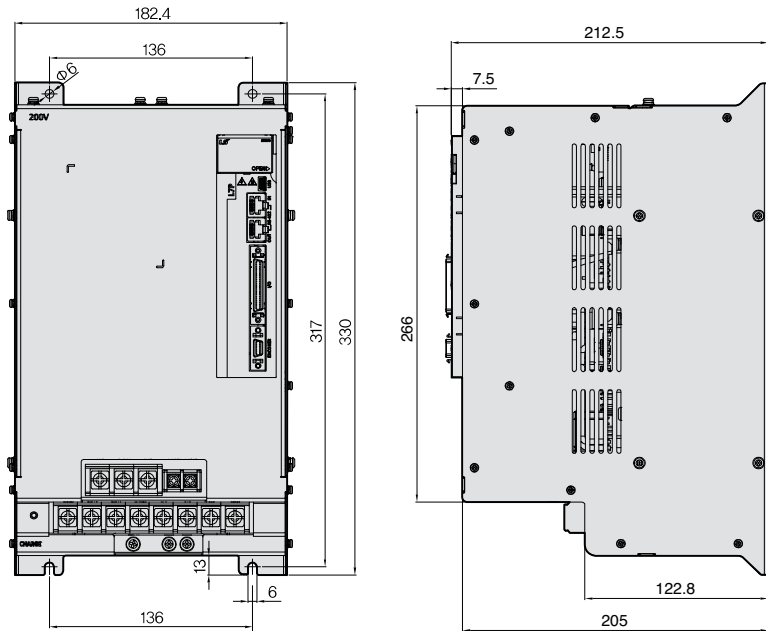




\*Unit [mm]

## L7NHA075U

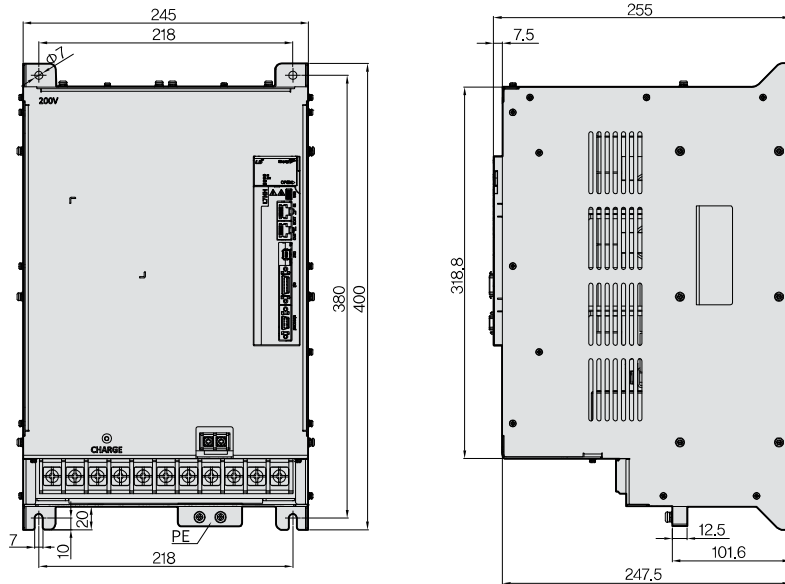
[Weight: 8.5kg  
[Fan-Cooling included]]



\*Unit [mm]

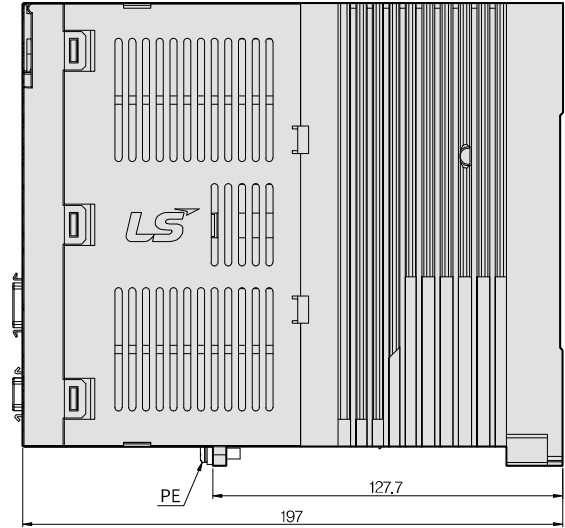
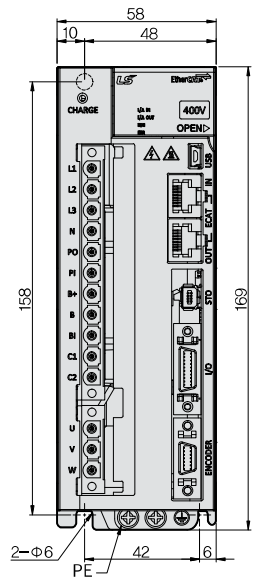
## L7NHA150U

[Weight: 16.2kg  
[Fan-Cooling included]]



\*Unit [mm]

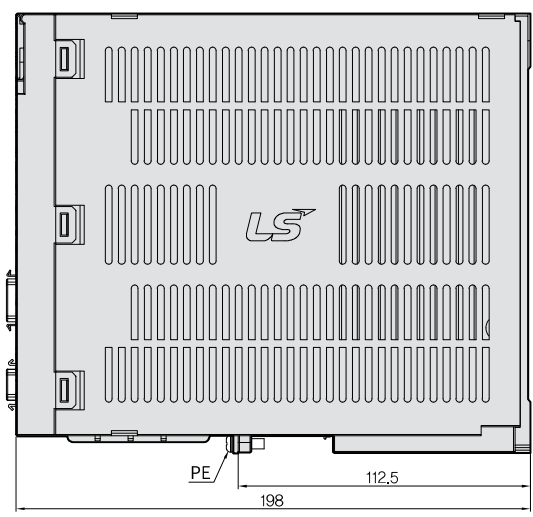
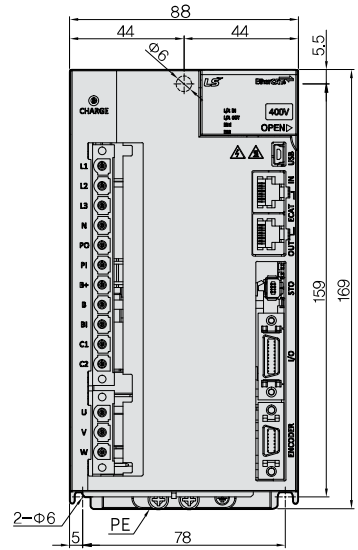
**L7NHB010U**  
 [Weight: 1.5kg  
 (Fan-Cooling included)]



Servo Drive

\*Unit [mm]

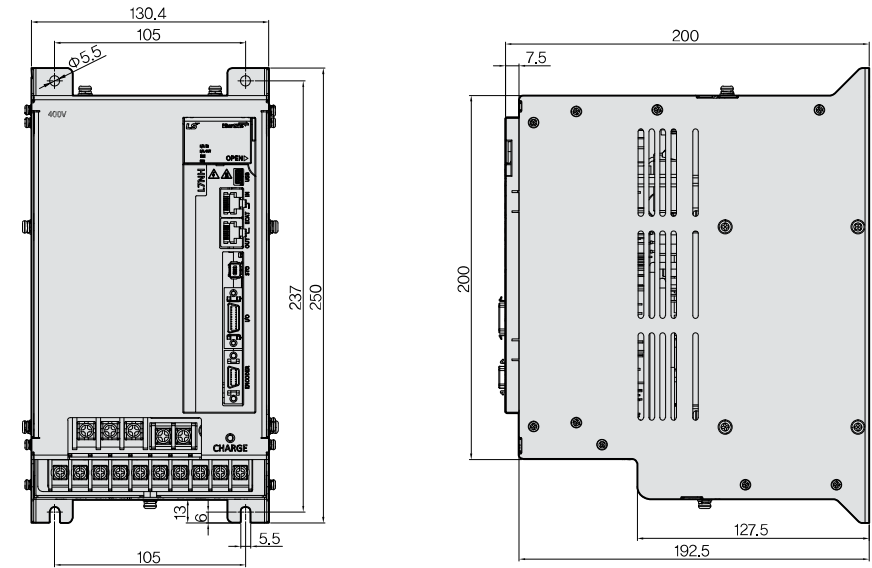
**L7NHB020U / L7NHB035U**  
 [Weight: 2.5kg  
 (Fan-Cooling included)]



\*Unit [mm]

## L7NHB050U

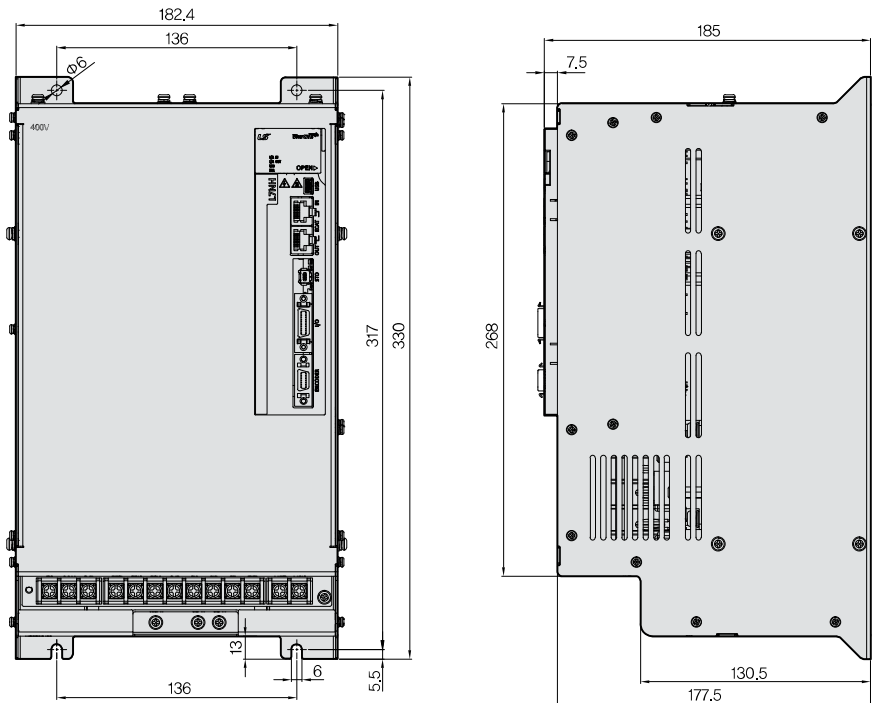
[Weight: 5.5kg  
[Fan-Cooling included]]



\*Unit [mm]

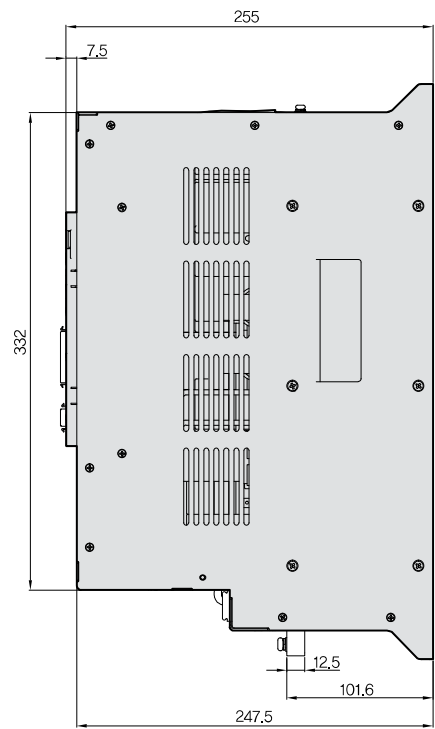
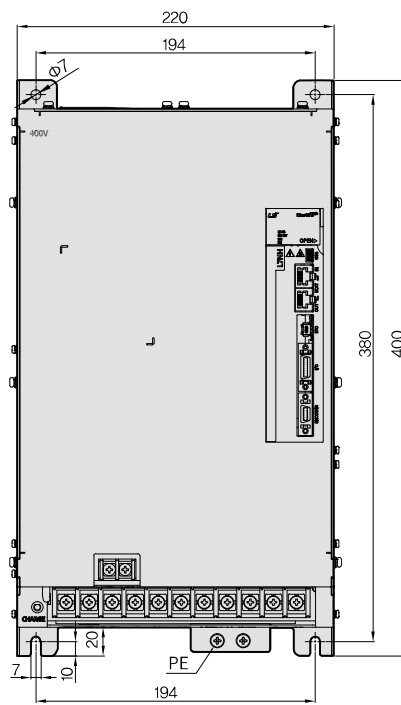
## L7NHB075U

[Weight: 8.5kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7NHB150U**  
[Weight: 15.5kg  
(Fan-Cooling included)]



## L7NHF Series



### Servo Drive Designation

<b>L7</b>	<b>NHF</b>	<b>A</b>	<b>010</b>	<b>U</b>	<b>AA</b>
<b>Communication</b>	<b>Input Power Supply</b>	<b>Capacity</b>	<b>Encoder Type</b>	<b>Option</b>	
EtherCAT Type+ Full-Closed Type	A : 200VAC	004 : 400W 010 : 1.0kW 035 : 3.5kW 050 : 5.0kW 075 : 7.5kW	U : Universal	Exclusive Option Code	

## All-in-One EtherCAT, Full-Closed System Control L7NHF

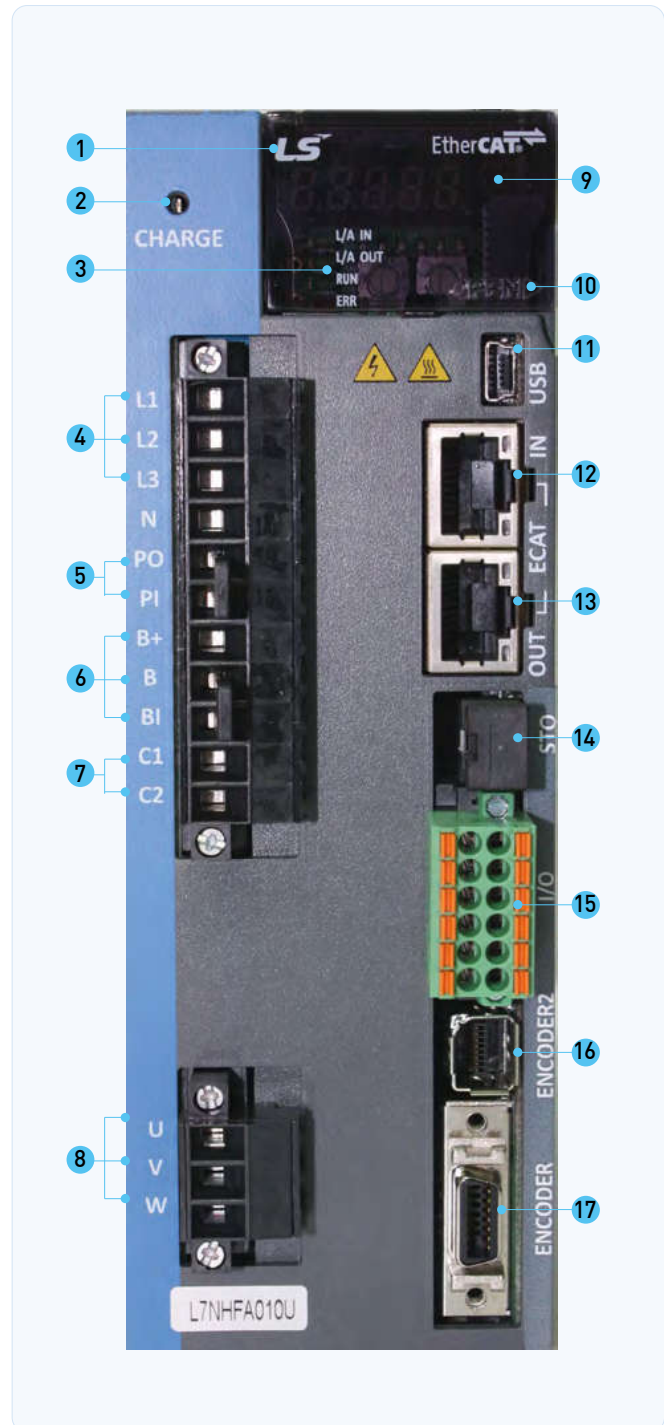
### Real-time Control Through EtherCAT

- High speed, Real-time capability and synchronization mechanism
- Supports CoE, EoE and FoE
- Improved speed response( $\approx 1\text{kHz}$ ) frequency
- Improved communication speed through 16-bit bus
  - Improved chip communication speed
  - Improved EtherCAT communication speed

### Fully-closed Loop Control

- Switch among Semi-closed loop control, Fully-closed loop control and dual feedback control
- Fully-closed loop control provides quick response with internal and external encoder position values
- Fully-closed loop control ensures high-precision control during machine operation

- 1 Display
- 2 Charge Indicator
- 3 Status LED
- 4 Main power connector (L1, L2, L3)
- 5 DC Reactor connector (PO, PI)
- 6 Regenerative resistance connector (B+, B, BI)
- 7 Control power connector (C1, C2)
- 8 Servo motor connecting terminal (U,V,W)
- 9 Connector for analog monitor
- 10 Switch for node address setting
- 11 USB Connector
- 12 EtherCAT communication port (ECAT IN)
- 13 EtherCAT communication port (ECATOUT)
- 14 Safety connector(STO)
- 15 Input / output signal connector (I/O)
- 16 Encoder2 connector(ENCODER2)
- 17 Encoder connector(ENCODER)





## L7NHFA Drive

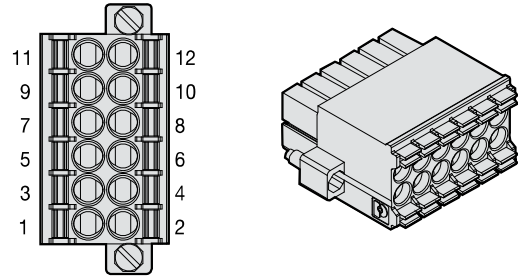
Item	Type Name	L7NHFA004U	L7NHFA010U	L7NHFA035U	L7NHFA050U	L7NHFA075U
Input Power	Main Power Supply	3 Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]				
	Control Power Supply	Single Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]				
Rated Current[A]		3.0	6.8	16.7	32	39.4
Peak Current[A]		9.0	20.3	50.1	90.9	98.5
1st Encoder Encoder A		Quadrature (Incremental), BiSS-B, BiSS-C (Absolute, Incremental) Tamagawa Serial (Absolute, Incremental), EnDat 2.2, Sinusoidal, Analog Hall				
2nd Encoder Encoder B		Quadrature (Incremental), SSI Sinusoidal, Analog Hall (Analog to BiSS converter)				
Control Performance	Speed Control Range	Maximum 1: 5000				
	Frequency Response	Maximum 1[kHz] or above(When the 19-bit Serial Encoder is applied)				
	Speed Variation Ratio	±0.01[%] or lower(When the load changes between 0 and 100%) ±0.1[%] or less(Temperature of 25°C±10)				
	Torque Control Repetition Accuracy	Within ±1%				
	Input Frequency	4[Mpps], Lind Drive				
	Input Pulse Method	Symbol+Pulse series,CW+CCW,PhaseA/B				
Communication Specifications	Communication Standard	FoE (Firmware download) EoE (parameter setting through UDP, tuning, auxiliary functions, parameter copy) CoE (IEC 61158 Type12, IEC 61800-7 CIA 402 Drive profile)				
	Physical Layer	100BASE-TX (IEEE802.3)				
	Connector	RJ45 x 2				
	Communication distance	Within connection between nodes 100[m]				
	DC(Distributed Clock)	Synchronization through DC mode, minimum DC cycle 250[us]				
	LED Display	LinkAct IN, LinkAct OUT, RUN, ERR				
Cia402 Drive Profile	Profile Position Mode, Profile Velocity Mode. Profile Torque Mode, Cyclic Synchronous Position Mode Cyclic Synchronous Velocity Mode, Cyclic Synchronous Torque Mode, Homing Mode					
Digital Input, Output	Digital Input	Input Voltage range : DC12[V] ~ DC 24[V] Total 6 input channels(allocable) Total 15 functions (below) can be used selectively for assignment. (*POT, *NOT, *HOME, *STOP, *PCON, *GAIN2, *P_CL, *N_CL, PROBE1, PROBE2, EMG, A_RST, SV_ON, LVSF, LVSF2) * Default signal				
	Digital Output	Total 3 input channels (Allocable) Total 11 functions (below) can be used selectively for assignment. (*BRAKE±, *ALARM±, *READY±, *ZSPD±, INPOS±, TLMT±, VLMT±, INSPD±, WARN±, TGON±, INPOS2±) * Default signal				
	Analog Output	Total 2 channels (Allocable) Total 25 output can be used selectively for assignment.				
Safety Function		2 Input Channels (ST01, ST02)				
USB Communication	Function	Firmware download, Parameter setting, Tuning, Secondary function, Parameter copy				
	Communication Standard	Complies with USB 2.0 Full Speed standard				
	Connect	PC or USB storing medium				
Internal Function	Dynamic Braking	Standard built-in brake (activated when the servo alarm goes off or when the servo is off).				
	Regenerative Braking	Default built-in(excluding 15kW), external installation possible				
	Display Function	7-segment display (5 digits)				
	Self-setting Function	Drive node address customizable with rotary switch				
	Additional Function	Gain adjustment, alarm history, JOG operation, home search				
	Protection Function	Overcurrent, overload, excessive current restriction, overheat, overvoltage, undervoltage, overspeed, encoder problem, location sensor problem, current sensor problem				
Operation Environment	Operating Temperature / Storage Temperature	0 ~ 50[°C] ~ -20 ~ 65[°C]				
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Noncondensing)				
	Environment	Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.				

### L7NHF Series I/O & Encoder2 PIN MAP

#### I/O Connector

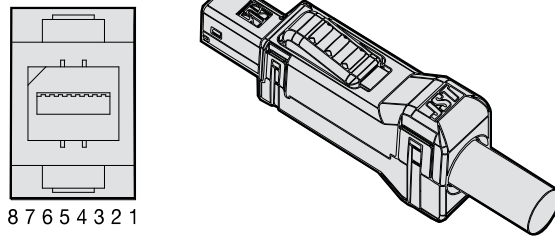
PIN No.	Signal	PIN No.	Signal
1	DICOM	7	DI6
2	FG	8	DI5
3	D2	9	D02
4	DI1	10	D01
5	DI4	11	DOCOM
6	DI5	12	D03

DFMC 1.5/6-STF-3.5 (PHOENIX)



#### Encoder2 Connector

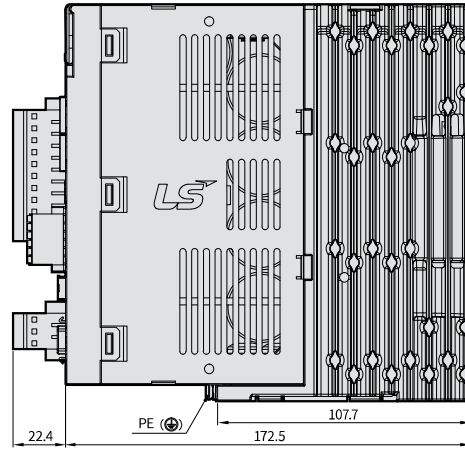
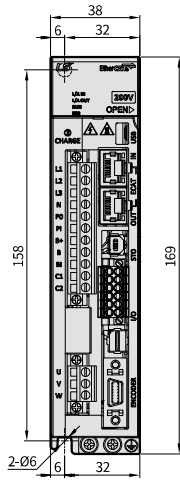
MUF-PK8K-X (JST)



PIN No.	Signal(Quadrature)	Signal(SSI)	PIN No.	Signal(Quadrature)	Signal(SSI)
1	5V	5V	5	B	CLK
2	GND	GND	6	/B	/CLK
3	A	DATA	7	Z	Z
4	/A	/DATA	8	/Z	/Z

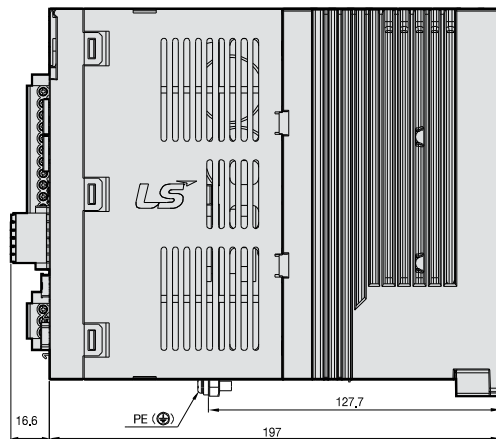
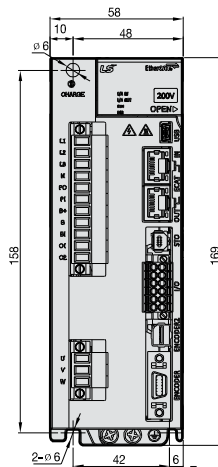
\*Unit [mm]

**L7NHFA004U**  
[Weight: 1.0kg]



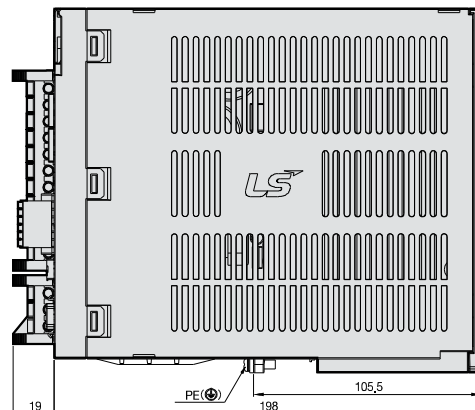
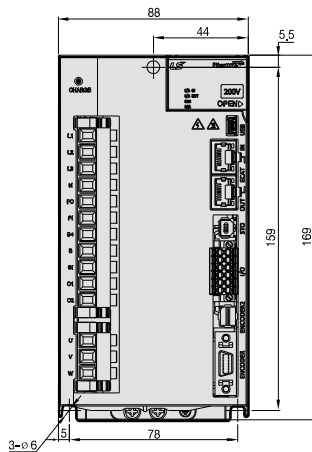
\*Unit [mm]

**L7NHFA010U**  
[Weight: 1.5kg  
[Fan-Cooling included]]



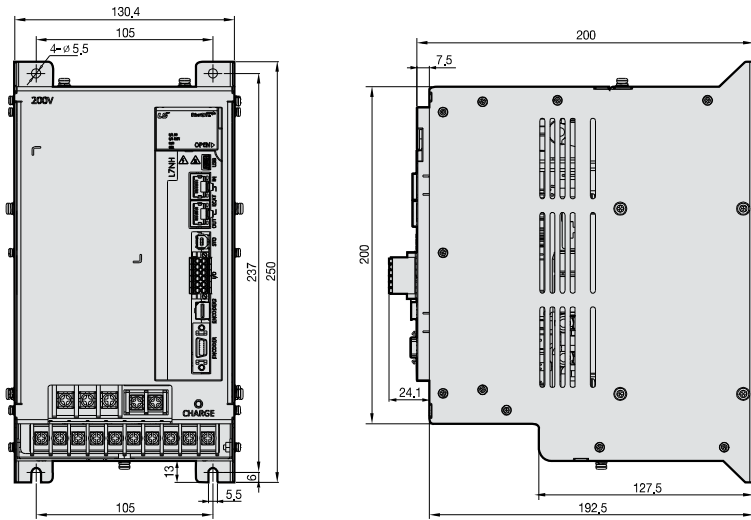
\*Unit [mm]

**L7NHFA035U**  
[Weight: 2.5kg  
[Fan-Cooling included]]



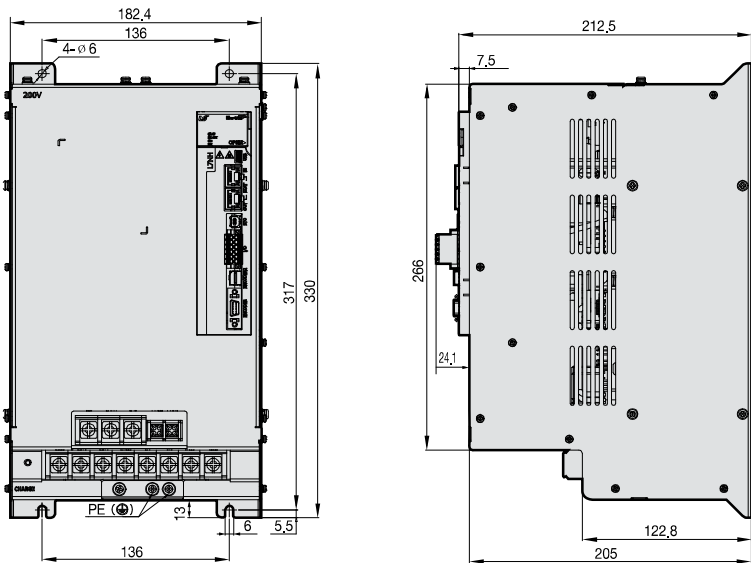
\*Unit [mm]

**L7NHFA050U**  
 [Weight: 1.5kg  
 (Fan-Cooling included)]



\*Unit [mm]

**L7NHFA075U**  
 [Weight: 2.5kg  
 (Fan-Cooling included)]



## L7S Series



### Servo Drive Designation

L7	S	A	004	B	AA
<b>Communication</b>	<b>Input Power Supply</b>	<b>Capacity (A: 200VAC)</b>	<b>Capacity (B: 400VAC)</b>	<b>Encoder Type</b>	<b>Option</b>
Standard I/O Type	A : 200VAC B : 400VAC	001 : 100W 002 : 200W 004 : 400W 008 : 750W 010 : 1.0kW 020 : 20kW 035 : 3.5kW 050 : 5.0kW 075 : 7.5kW 150 : 15kW	010 : 1.0kW 020 : 20kW 035 : 3.5kW 050 : 5.0kW 075 : 7.5kW 150 : 15kW	A : Incremental B : Serial	Exclusive Option Code

## Standard Pulse and Analog Command Type **L7S**

### Easy to USE

- Easy gain tuning with automatic inertia estimating function
- Easy setting Built-in panel operator
- Many I/O contacts and various functions (Digital input: 10 contacts, Digital output: 8 contacts / Analog input, output: 2 contacts)

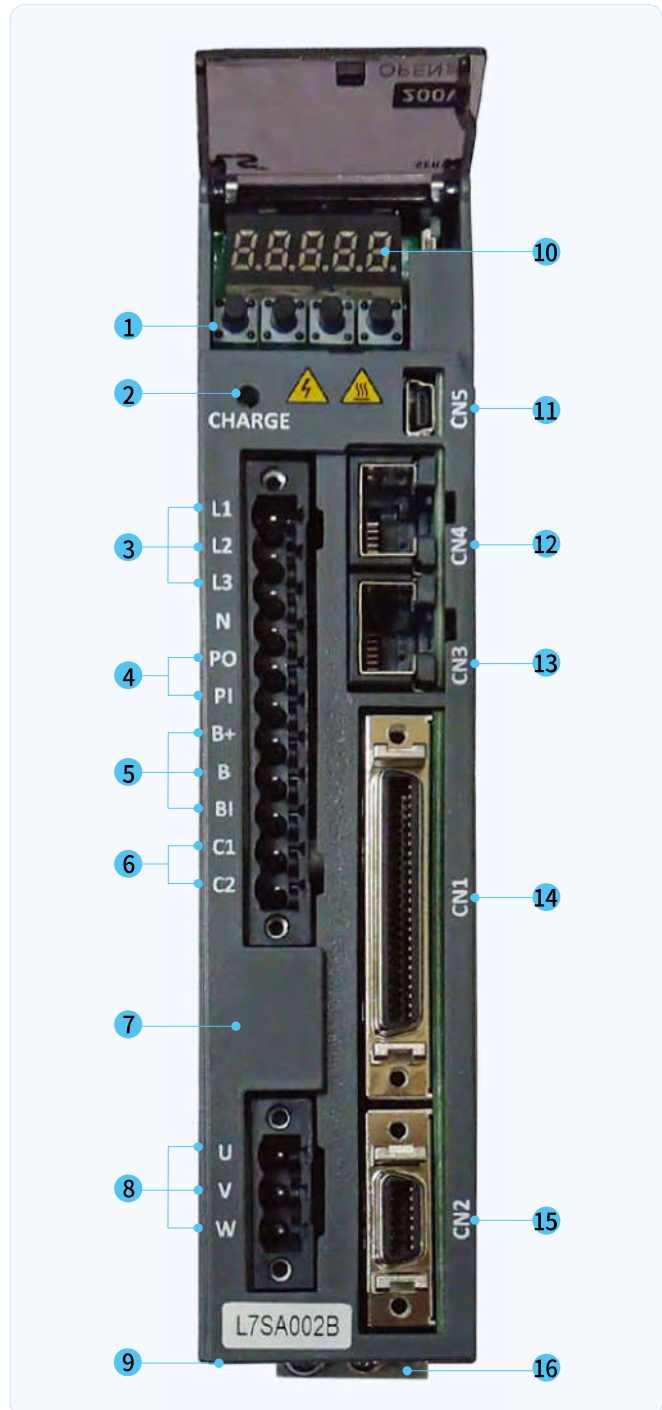
### Reliability for Protection Function

- CE, RoHS Certificated
- Drive Protection Function and Warn Function

### High Response for Precise Control

- High-resolution serial type Serial type Encoder (19Bit, BiSS)
- Improved speed response frequency ( $\approx 1\text{kHz}$ )

- 1 Operation keys (Mode, Up, Down, Set)
- 2 Charge indicator
- 3 Main power connector (L1, L2, L3)
- 4 DC Reactor connector (PO, PI)
  - Short-circuit when not in use
- 5 Regenerative resistance connector (B+, B, BI)
  - Short-circuit B and BI terminals when using standard type
  - Use B+ and B terminals when using external resistor
- 6 Control power connector (C1, C2)
- 7 Front cover
- 8 Motor power cable connector (U, V, W)
- 9 Heat sink
- 10 Display
- 11 CN5: USB Connector
- 12 CN4: RS-422 communication connector
- 13 CN3: RS-422 communication connector
- 14 CN1: Control signal connector
- 15 CN2: Encoder signal connector
- 16 Ground





## L7SA Drive

Item	Type Name	L7SA001□	L7SA002□	L7SA004□	L7SA008□	L7SA010□	L7SA020□	L7SA035□	L7SA050□	L7SA075B	L7SA150B	
Input Power	Main Power Supply	3 Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]										
	Control Power Supply	Single Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]										
Rated Current[A]		1.4	1.7	3.0	5.2	6.8	13.5	16.7	32.0	39.4	76.0	
Peak Current[A]		4.2	5.1	9.0	15.6	20.3	40.5	50.1	96.0	98.5	190.0	
Encoder Type		Quad. type incremental line drive 2,000~10,000[P/R], Serial 18bit 100W (for M8 only), 19Bit, 20Bit (for DD motor only)										
Control Performance	Speed Control	Speed Control Range	Maximum 1: 5000									
		Frequency Response	Maximum 1 [kHz] or above (when using 19bit serial encoder)									
		Speed Command	DC -10 [V]~+10 [V] (Reverse rotation in case of negative voltage)									
		Accel/Decel Time	Straight or S-curve acceleration/deceleration (0-10,000 [ms], possible to be set by one [ms] unit)									
		Speed Variation Ratio	±0.01[%] or lower (when load changes between 0 and 100%), ±0.1[%] or lower									
	Position Control	Input Frequency	1[Mpps], Line driver / 200[kpps], Open Collector									
		Input Pulse Type	Symbol + Pulse series, CW+CCW, A/B Phase									
		Electric Gear Ratio	Four digital gear ratios can be set, selected and tuned.									
	Torque Control	Torque Command	DC-10~+10 [V] (Reverse direction torque in case of negative voltage)									
		Speed Limit	DC 0~10 [V], internal speed command within ±1[%]									
Input/Output Signal	Analog Input	Input Range	DC -10 ~ +10[V]									
		Resolution	12[bit]									
	Analog Output	Output Range	DC -10 ~ +10[V]									
		Resolution	12[bit]									
	Digital Input		Total 10 Input channels(Assignment available) SVON, SPD1, SPD2, SPD3, ALMRST, DIR, CCWLIM, CWLIM, EMG, STOP, EGEAR1, EGEAR2, PCON, GAIN2, P_CLR, T_LMT, MODE, ABS_RQ, ZCLAMP Above 19 functions can be used selectively for assignment. Signal can be set as positive logic or negative logic									
	Digital Output		Total 5 Channels(Assignment available), 3 Channels(Set as alarm code) ALARM, READY, ZSPD, BRAKE, INPOS, TLMT, VLMT, INSPD, WARN Above 9 outputs can be used selectively for assignment. Signal can be set as positive logic or negative logic									
	Communication	RS-422	Accessible to PC software and the RS422 server									
		USB	Status monitoring, JOG operation, parameter upload/download are available with PC Software									
	Encoder		Serial BiSS encoder and quadrature encoder supported									
	Encoder Output Type		Random pre-scale output through FPGA (Maximum 6.4 Mpps)									
Built-in functions	Dynamic Braking		Standard built-in (Activated when the servo alarm goes off or when the servo is off)									
	Regenerative Braking		Default built-in(excluding 15kW), external installation possible									
	Display		7-segment display (5 digits)									
	Self-setting Function		Loader (SET, MODE, UP, and [DOWN] keys)									
	Additional Function		Auto gain tuning, phase Z detection, manual JOG operation, program JOG operation, automatic analog input calibration									
Protective Function		Overcurrent, overload, overvoltage, insufficient voltage, main power input problem, control power input problem, overspeed, motor cable, overheat(power module overheat, abnormal drive operation's temp), encoder problem, over-regenerative, sensor problem, communication problem										
Operation Environment	Operating Temperature / Storage Temperature		0 ~ +50[°C] / -20 ~ +70[°C]									
	Operating Humidity / Storage Humidity		Below 80[%]RH / Below 90[%]RH(Noncondensing)									
	Environment		Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.									

\* L7SA075 and L7SA150 do not support Incremental type

## L7SB Drive

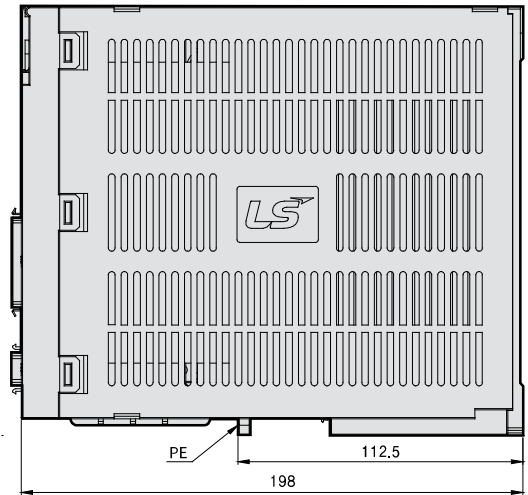
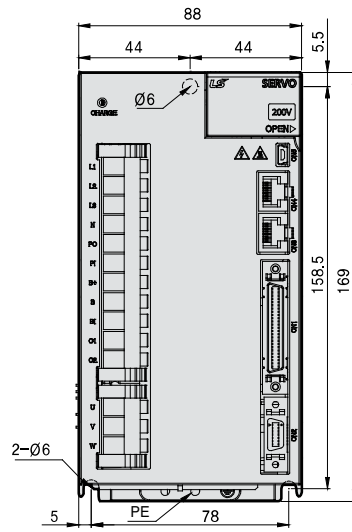
Item	Type Name	L7SB010B	L7SB020B	L7SB035B	L7SB050B	L7SB075B	L7SB150B	
Input Power	Main Power Supply	3 Phase AC380 ~ 480[V](-15 ~ +10[%]), 50 ~ 60[Hz]						
	Control Power Supply	Single Phase AC380 ~ 480[V](-15 ~ +10[%]), 50 ~ 60[Hz]						
Rated Current[A]		3.7	8.0	10.1	17.5	22.8	39.0	
Peak Current[A]		11.1	24.0	30.3	52.5	57.0	97.5	
Encoder Type		19Bit						
Control Performance	Speed Control	Speed Control Range	Maximum 1: 5000					
		Frequency Response	Maximum 1 [kHz] or above (when using 19bit serial encoder)					
		Speed Command	DC -10 [V]~+10 [V] (Reverse rotation in case of negative voltage)					
		Accel/Decel Time	Straight or S-curve acceleration/deceleration (0-10,000 [ms], possible to be set by one [ms] unit)					
		Speed Variation Ratio	±0.01 [%] or lower [When load changes between 0 and 100%], ±0.1[%] or lower [Temperature 25 ±10°C]					
	Position Control	Input Frequency	1[Mpps], Line driver / 200[kpps], Open collector					
		Input Pulse Type	Symbol + pulse series, CW+CCW, A/B phase					
		Electric Gear Ratio	Four digital gear ratios can be set, selected and tuned.					
	Torque Control	Torque Command	DC-10~+10 [V] (Reverse direction torque in case of negative voltage)					
		Speed Limit	DC 0~10 [V], internal speed command within ±1[%]					
Repetition accuracy		Within ±1[%]						
Input/Output Signal	Analog Input	Input Range	DC -10 ~ +10[V]					
		Resolution	12[bit]					
	Analog Output	Output Range	DC -10 ~ +10[V]					
		Resolution	12[bit]					
	Digital Input	A total of 10 input channels (Allocable) SVON, SPD1, SPD2, SPD3, ALMRST, DIR, CCWLIM, CWLIM, EMG, STOP, EGEAR1, EGEAR2, PCON, GAIN2, P_CLR, T_LMT, MODE, ABS_RQ, ZCLAMP You can selectively allocate a total of 19 functions. You can set the positive/negative logic of the selected signal.						
	Digital Output	A total of 5 channels (Allocable), 3 channels (Fixed with alarm codes) ALARM, READY, ZSPD, BRAKE, INPOS, TLMT, VLMT, INSPD, WARN You can selectively allocate a total of nine kinds of output. You can set the positive/negative logic of the selected signal.						
Communication	RS-422	Accessible to PC software and the RS422 server						
	USB	Status monitoring through PC software, JOG operation, and parameter uploading/downloading are possible.						
Encoder		Serial BiSS encoder and quadrature encoder supported						
Encoder Output Type		Random pre-scale output through FPGA (Maximum 6.4 Mpps)						
Built-in functions	Dynamic Braking	Standard built-in (Activated when the servo alarm goes off or when the servo is off)						
	Regenerative Braking	Default built-in (excluding 15kW), external installation possible						
	Display	7-segment display (5 digits)						
	Self-setting Function	Loader [SET, MODE, UP, and [DOWN] keys]						
	Additional Function	Auto gain tuning, phase Z detection, manual JOG operation, program JOG operation, automatic analog input calibration						
Protective Function	Overcurrent, overload, overvoltage, voltage lack, main power input error, control power input error, overspeed, motor cable, heating error (power module overheat, drive temperature error), encoder error, excessive regeneration, sensor error, communication error							
Operation Environment	Operating Temperature / Storage Temperature	0 ~ +50[°C] / -20 ~ +70[°C]						
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Noncondensing)						
	Environment	Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.						



\*Unit [mm]

**L7SA020□~L7SA035□**

[Weight: 2.5kg  
[Fan-Cooling included]]

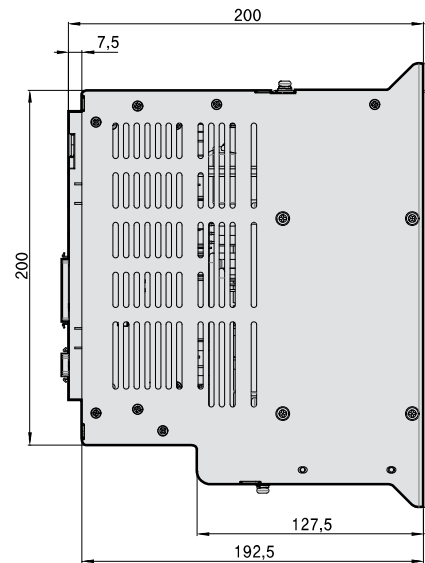
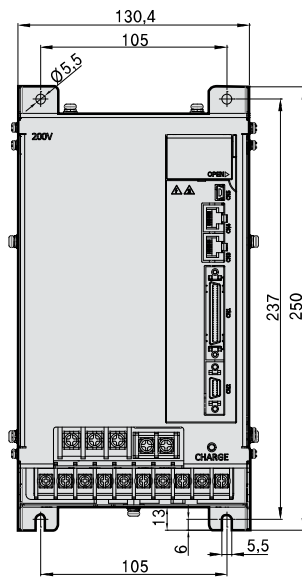


Servo Drive

\*Unit [mm]

**L7SA050□**

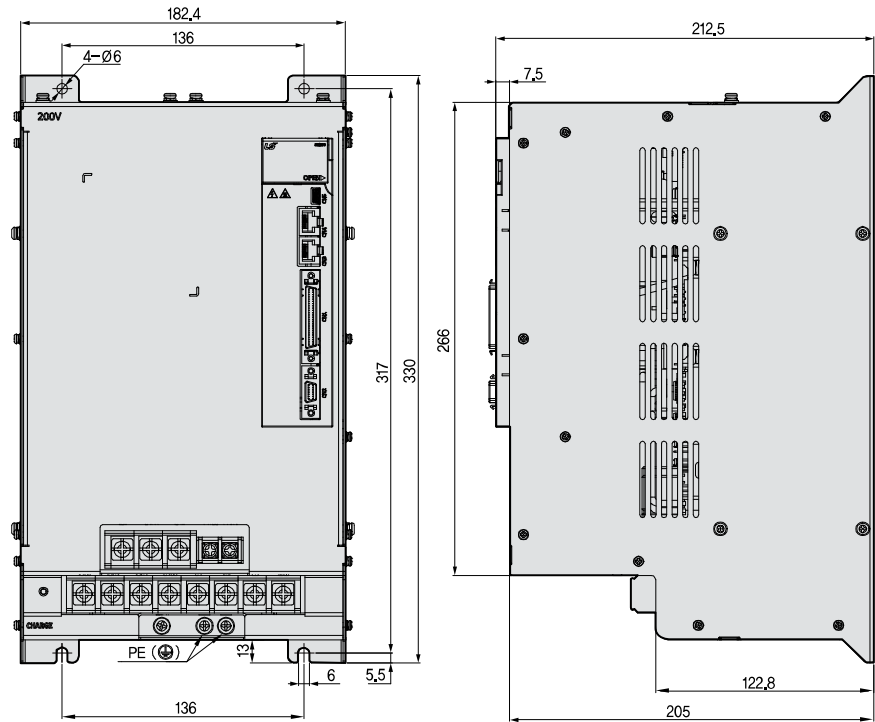
[Weight: 5.5kg  
[Fan-Cooling included]]



\*Unit [mm]

## L7SA075B

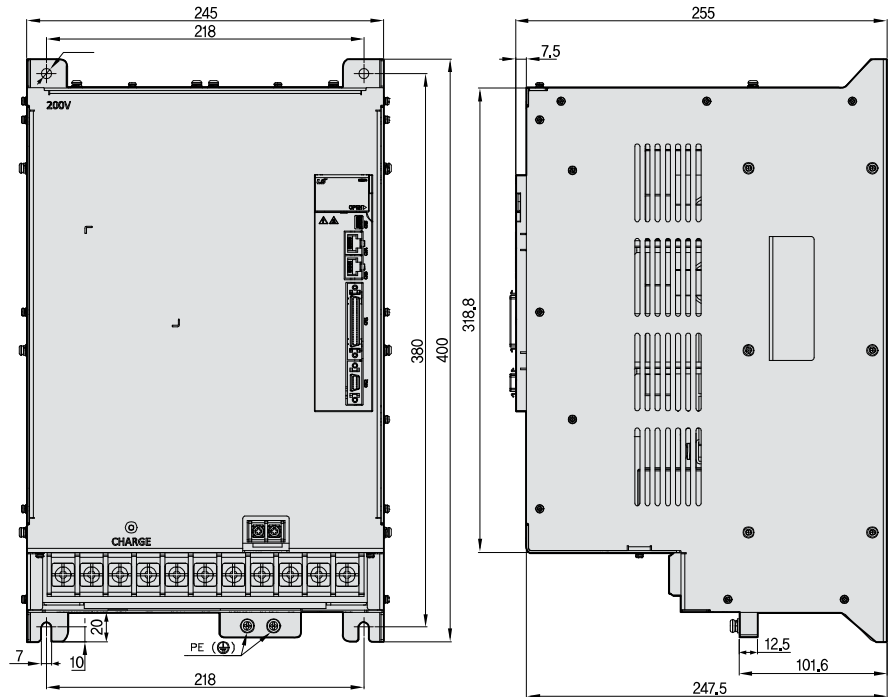
[Weight: 8.5kg  
[Fan-Cooling included]]



\*Unit [mm]

## L7SA150B

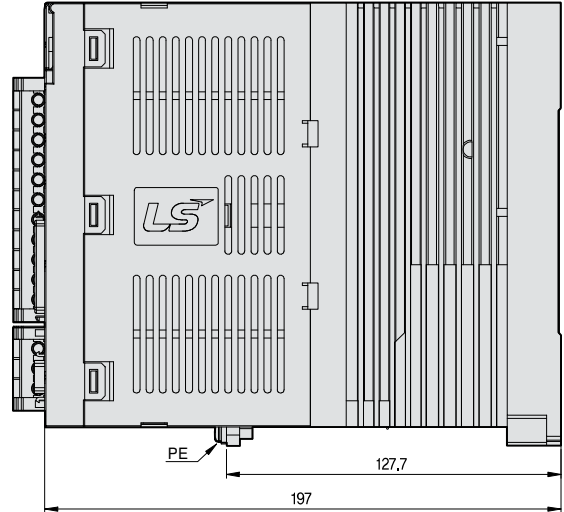
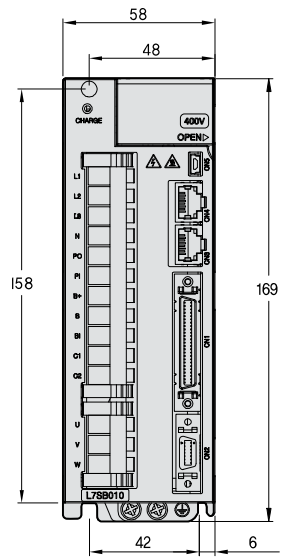
[Weight: 16.2kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7SB010B**

[Weight: 1.5kg  
[Fan-Cooling included]]

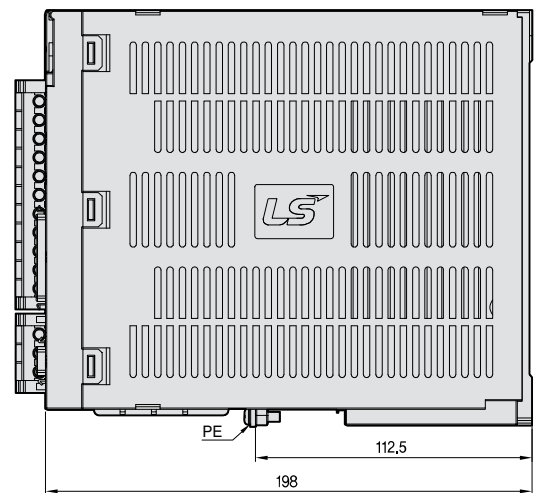
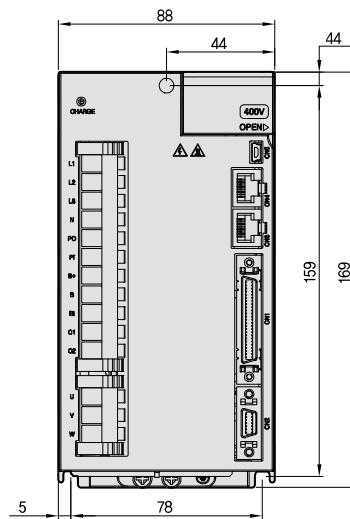


Servo Drive

\*Unit [mm]

**L7SB020B / L7SB035B**

[Weight: 2.5kg  
[Fan-Cooling included]]

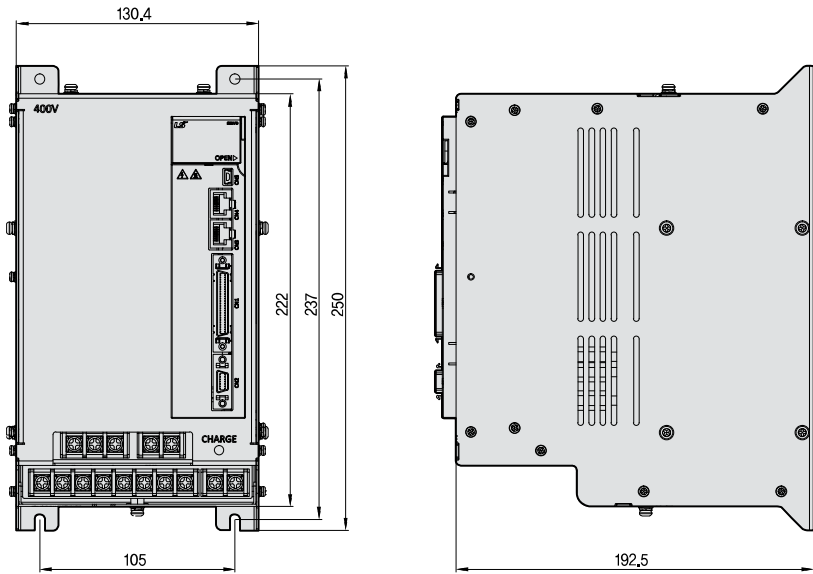




\*Unit [mm]

## L7SB050B

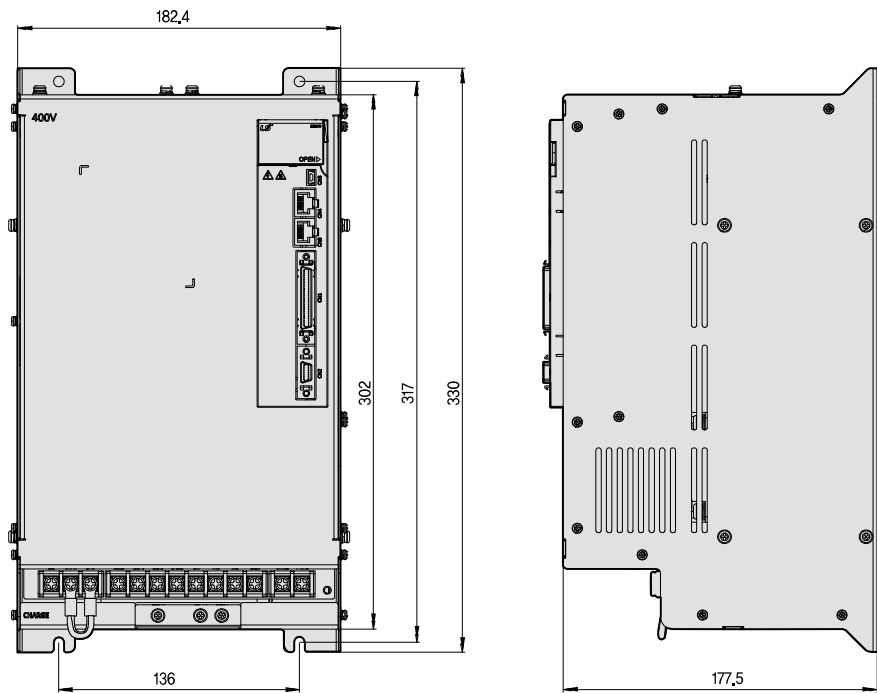
[Weight: 5.5kg  
[Fan-Cooling included]]



\*Unit [mm]

## L7SB075B

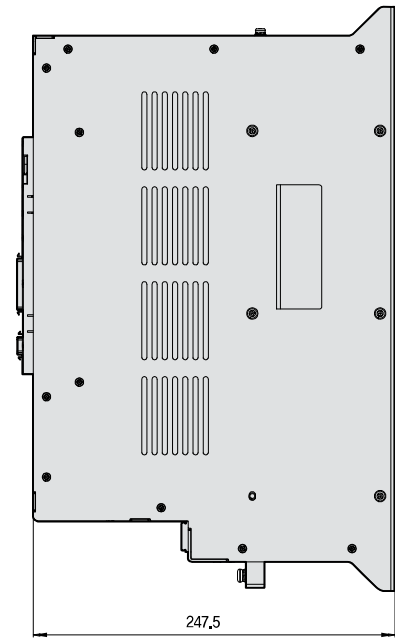
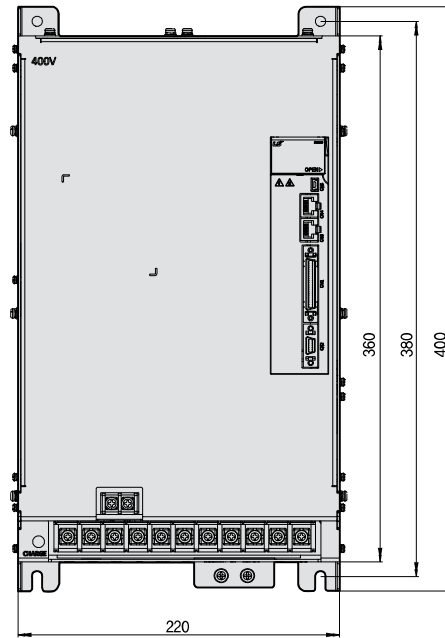
[Weight: 8.5kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7SB150B**

[Weight: 15.5kg  
[Fan-Cooling included]]



## L7C Series



### Servo Drive Designation

<b>L7</b>	<b>C</b>	<b>A</b>	<b>010</b>	<b>U</b>	<b>AA</b>
	<b>Communication</b>	<b>Input Power Supply</b>	<b>Capacity</b>	<b>Encoder Type</b>	<b>Option</b>
	Economical I/O Type	A : 200VAC	001 : 100W 002 : 200W 004 : 400W 008 : 750W 010 : 1.0kW	U : Universal	Exclusive Option Code

## Economical Pulse and Analog Command Type **L7C**

### Control Power/Main Power Unification

- Unified power supply with integrated control and power board
- Diverse product line supporting single-phase AC220, with capacities ranging from 0.1 to 1kW

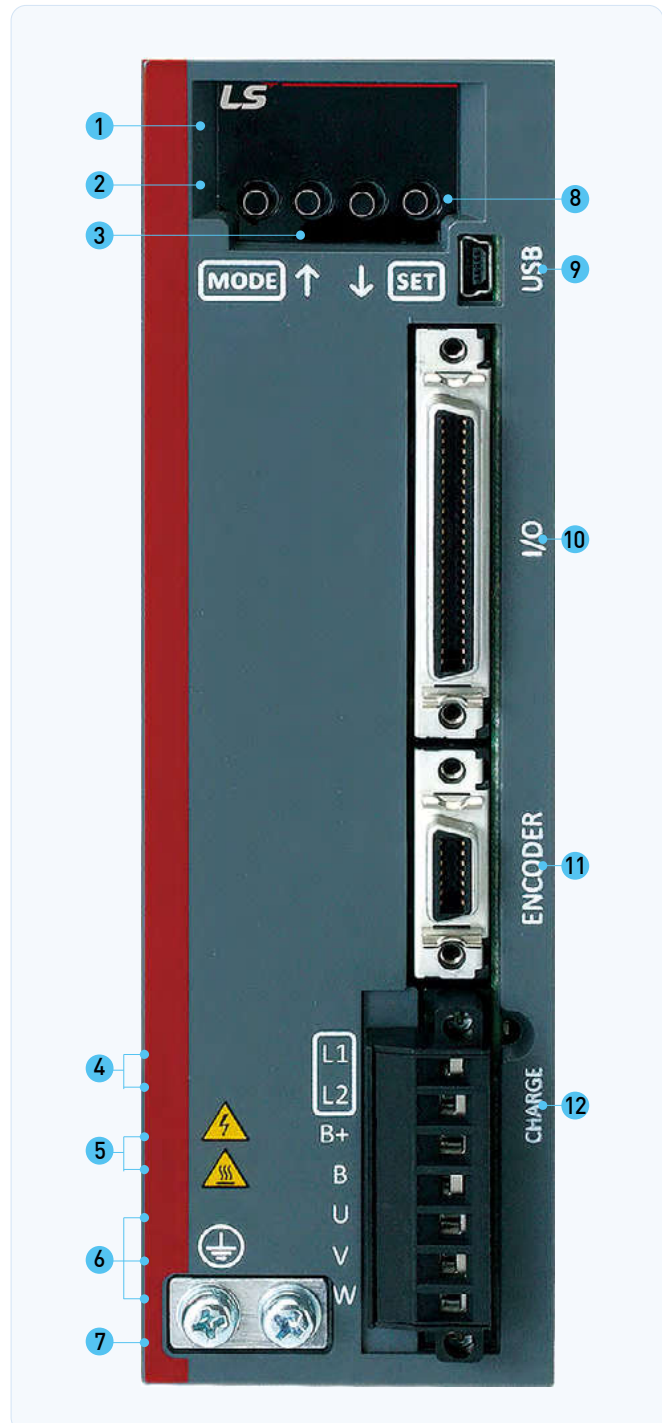
### Optimal Systems with Affordable Cost

- No FPGA used by the optimized MCU operation

### Maintains L7S compatibility and specifications

- Compatibility with existing L7S I/O pin map
- Maintain current control cycle (10kHz), speed/position control cycle (5kHz)
- Added operation mode (indexing mode) and improved memory (1MB)

- 1 Display
- 2 Mode switch
- 3 Operation switch(Up/down)
- 4 Main power terminal (L1, L2)
- 5 Regenerative resistance terminal (B+, B)  
- Mount external resistors to ports B+ and B
- 6 Servo motor power connectors (U, V, W)
- 7 Ground
- 8 Set-up switch
- 9 USB connector
- 10 Control signal connector(I/O)
- 11 Encoder connector(ENCODER)
- 12 Charge indicator



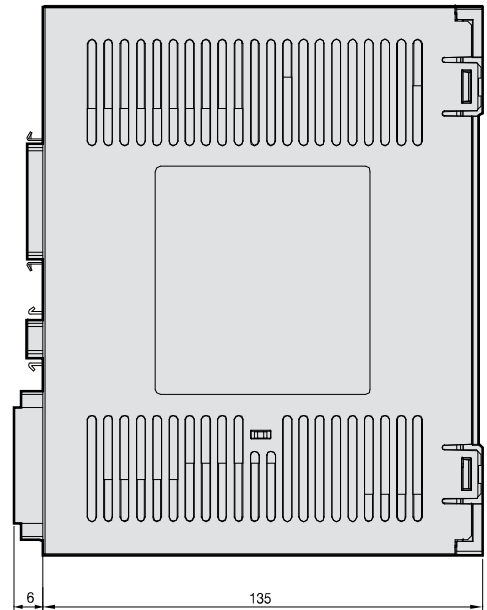
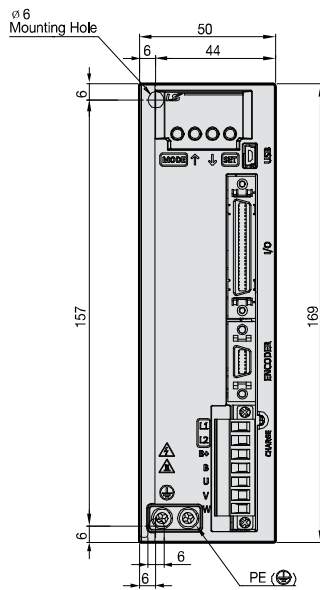
## L7C Drive

Item	Type Name	L7CA001U	L7CA002U	L7CA004U	L7CA008U	L7CA010U
Input Power		Single phase AC200 ~ 230[V] (-15~+10%), 50~60[Hz]				
Rated Current[A]		1.4	1.7	3.0	5.2	6.75
Peak Current[A]		4.2	5.1	9.0	15.6	20.25
Encoder Type		Quadrature (Incremental), Biss-B, Biss-C (Absolute, Incremental)				
Control Performance	Speed Control Range	Maximum 1:5000				
	Frequency Response	Maximum 1[KHz] or above (When using 19Bit Serial Encoder)				
	Speed Variation Ratio	±0.01 [%] or lower [when load changes between 0 and 100%] ±0.1[%] or lower [Temperature 25±10°C]				
	Accel/Decel Time	Straight or S-curve acceleration/deceleration [0-10,000[ms], possible to be set by 0-1,000[ms] unit]				
	Input frequency	1[Mpps], line driver / 200[kpps], open collector				
	Input Pulse Type	Symbol + Pulse series, CW+CCW, A/B Phase				
Communication Specifications	Standards	ANSI/TIA/EIA-422 standard specifications				
	Protocol	MODBUS-RTU				
	Synchro Method	Asynchronous				
	Power Consumption	100mA or less				
	Transmission Speed	9,600 / 19,200 / 38,400 / 57,600bps				
	Distance	Maximum 200[m]				
	Terminating Resistance	External connection (CN1 7Pin, 28Pin connection), Built-in 120Ω				
Digital Input, Output	Digital Input	Input voltage range : DC12V – DC24V Total 10 input channels (allocable) Total 34 input functions allocable (*SV_ON, *SPD/LVSF1, *SPD2/LVSF2, *SPD3, *A-RST, *JDIR, *POT, *NOT, *EMG, *STOP, START, REGT, HOME, HSTART, ISEL0, ISEL1, ISEL2, ISEL3, ISEL4, ISEL5, PCON, GAIN2, P_CL, N_CL, MODE, PAUSE, ABSRQ, JSTART, PCLR, AOVR, INHIBIT, EGEAR1, EGEAR2, ABS_RESET) * Basic allocation signal				
	Digital Output	Service rating : DC24V ±10%, 120mA 5 of 8 input channels are allocable, 3 channels are fixed with AL00, AL01, AL02 Total 19 output functions allocable (*ALARM, *READY, *ZSPD, *BRAKE, *INPOS1, ORG, EOS, TGON, TLMT, VLMT, INSPD, WARN, INPOS2, IOUT0, IOUT1, IOUT2, IOUT3, IOUT4, IOUT5) * Basic allocation signal				
Analog Output		2 Channels Analog speed input (Command/Override) ±10V Analog torque input (Command/Limit) ±10V				
USB Communication	Connect	PC				
	Communication Standard	Complies with USB 2.0 Full Speed standard				
	Specification	PC, complies with USB 2.0 Full Speed standard				
Internal Function	Dynamic Braking	Standard built-in brake (Activated when the servo alarm goes off or when the servo is off),				
	Regenerative Braking	External installation possible (optional)				
	Display Function	7-segment display (5 digits)				
	Additional Function	Gain tuning, alarm history, JOG operation, origin search				
	Protection Function	Excessive current/voltage/overload/overheating/speed, excessive current limit, low voltage, encoder/position following/current sensing failure				
Operation Environment	Operating Temperature / Storage Temperature	0~50°C / -20 ~ 65°C				
	Operating Humidity / Storage Humidity	Below80[%]RH / Below 90[%]RH(Noncondensing)				
	Environment	Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.				

# External Dimensions

\*Unit [mm]

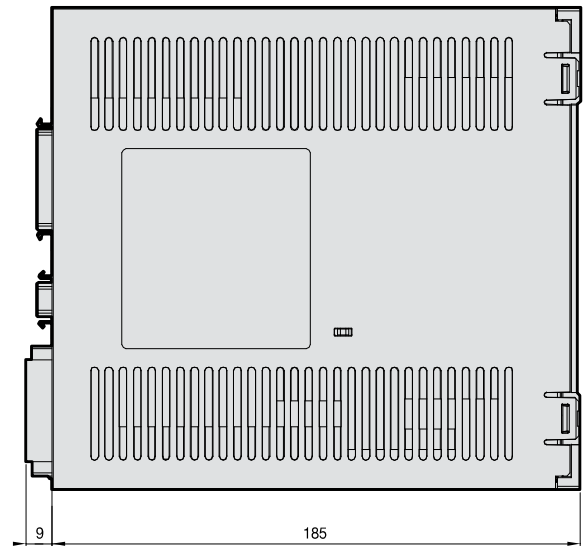
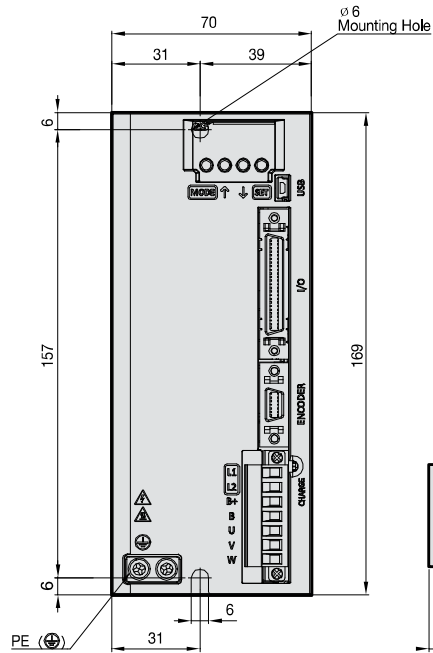
**L7CA001U / L7CA002U /  
L7CA004U**  
[Weight: 1.0kg]



Servo Drive

\*Unit [mm]

**L7CA008U / L7CA010U**  
[Weight: 1.5kg]



## L7P Series



### Servo Drive Designation

<b>L7</b>	<b>P</b>	<b>A</b>	<b>004</b>	<b>U</b>	<b>AA</b>	
	<b>Communication</b>	<b>Input Power Supply</b>	<b>Capacity (A: 200VAC)</b>	<b>Capacity (B: 400VAC)</b>	<b>Encoder Type</b>	<b>Option</b>
	Standard I/O & Index Type	A : 200VAC B : 400VAC	001 : 100W 002 : 200W 004 : 400W 008 : 750W 010 : 1.0kW 020 : 20kW 035 : 3.5kW 050 : 5.0kW 075 : 7.5kW 150 : 15kW	010 : 1.0kW 020 : 20kW 035 : 3.5kW 050 : 5.0kW 075 : 7.5kW 150 : 15kW	U : Universal	Exclusive Option Code

## Standard Pulse and Indexer Type **L7P**

### Provides Program Function with Built-in Single Axis Position Determination Module

- Supports position control mode through pulse input
- Provides position control through I/O or HMI without position control module
- Drive operable by itself
- Modbus RTU protocol (RS-422)

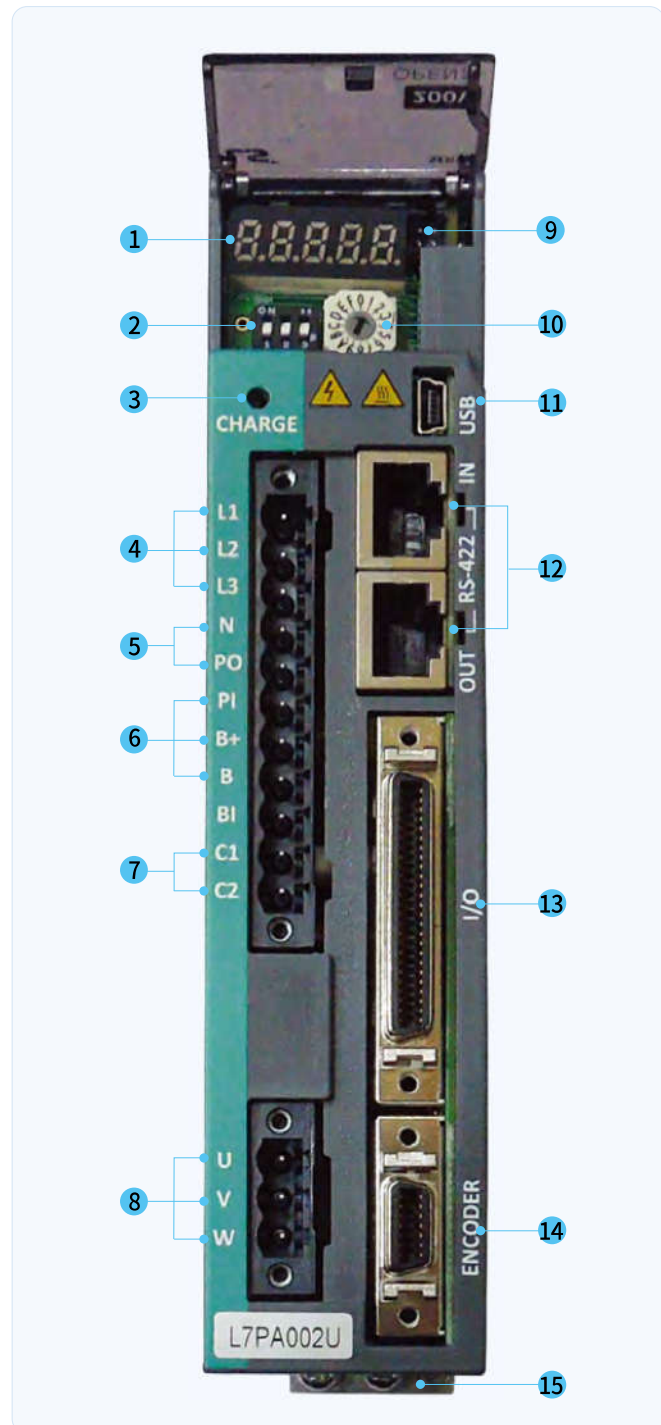
### Compatible with Various Motors and Encoders

- Operates with rotary, DD and linear motors (Supporting 3rd party motor)
- Quadrature, BiSS-C, Tamagawa serial abs, Endat 2.2, Panasonic serial abs, Sinusoidal

### Improved Control Performance

- Improved control bandwidth
- 4-step notch filter provided
- Vibration control by Real-time FET
- Real-time gain tuning function

- 1 Display
- 2 Terminating resistance switch
- 3 Charge indicator
- 4 Main power connector (L1, L2, L3)
- 5 DC reactor connector (PO, PO), short-circuit when not in use
- 6 Regenerative resistor connector (B+, B, BI)
  - Short-circuit B and BI terminals when using standard type
  - Use B+ and B terminals when using external resistor
- 7 Control power connector (C1, C2)
- 8 Servo motor power connector (U, V, W)
- 9 Connector for analogue monitor
- 10 Node address switch
- 11 USB connector (USB)
- 12 RS-422 communication connector (CN3, CN4)
- 13 Control signal connector (I/O)
- 14 Encoder connector (ENCODER)
- 15 Ground





## L7PA Drive

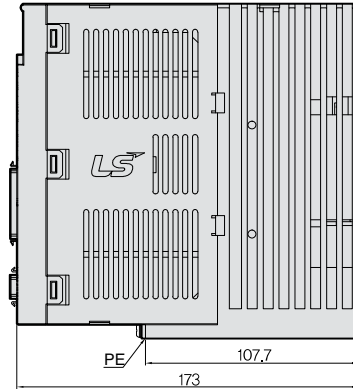
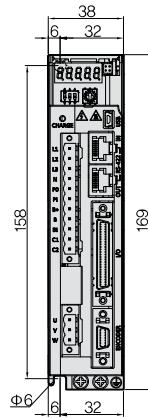
Item	Type Name	L7PA001U	L7PA002U	L7PA004U	L7PA008U	L7PA010U	L7PA020U	L7PA035U	L7PA050U	L7PA075U	L7PA150U
Input Power	Main Power Supply	3 Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]									
	Control Power Supply	Single Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]									
Rated Current[A]		1.4	1.7	3.0	5.2	6.8	13.5	16.7	32.0	39.4	76.0
Peak Current[A]		4.2	5.1	9.0	15.6	20.3	40.5	50.1	90.9	98.5	190.0
Encoder Type		Quadrature(Incremental), BiSS-B, BiSS-C(Absolute, Incremental), Tamagawa Serial(Absolute, Incremental), Panasonic Serial(Absolute), EnDat 2.2, Sinusoidal, Analog Hall									
Control Performance	Speed Control Range	Maximum 1: 5000									
	Frequency Response	Maximum 1 [kHz] or above (When using 19bit Serial Encoder)									
	Speed Variation Ratio	±0.01 [%] or lower [when load changes between 0 and 100%] ±0.1[%] or lower[Temperature25 ±10°C]									
	Accel/Decel Time	Straight or S-curve acceleration/deceleration (0~10,000[ms], 0~1,000[ms] Unit configurable)									
	Input Frequency	1[Mpps], line drive / 200[kpps], Open collector									
	Input Pulse Type	Symbol + Pulse series, CW+CCW, A/B Phase									
RS422 Communication Specifications	Communication Specifications	ANSI/TIA/EIA-422 Standard specifications									
	Communication Protocol	MODBUS-RTU									
	Connector	RJ45 x 2									
	Synchro Method	Asynchronous									
	Transmission Speed	9600 / 19200 / 38400 / 57600 [bps], Can be configured at [0x3002]									
	Transmission Distance	Maximum 200 [m]									
	Power Consumption	100[mA] or less									
	Terminating Resistance	Dip S/W(On/Off), Built-In 120Ω									
Digital Input, Output	Digital Input	Input voltage range: DC 12[V] ~ DC 24[V], total 16 input channel (allocable), 33 function inputs can be selectively allocated (*SV_ON, *POT, *NOT, *A-RST, *START, *STOP, *REGT, *EMG, *HOME, *HSTART, *ISEL0, *ISEL1, *ISEL2, *ISEL3, *ISEL4, *ISEL5, PCON, GAIN2, P_CL, N_CL, PROBE1, PROBE2, PAUSE, ABSRQ, JSTART, JDIR, PCLR, SPD1/ LVSF1, SPD2/ LVSF2, SPD3, AOV, INHIBIT, MODE)									
	Digital Output	Use rating: DC 24[V] ±10%, 120[mA], total 8 input channel (allocable) 19 function inputs can be selectively allocated (*ALARM±, *READY±, *BRAKE±, *INPOS1±, *ORG±, *EOS±, *TGON±, *TLMT±, VLMT±, INSPD±, ZSPD±, WARN±, INPOS2±, IOUT0±, IOUT1±, IOUT2±, IOUT3±, IOUT4±, IOUT5±)									
Analog Input / Output	Analog Input	Total 2 channels (allocable) analog speed override input(-10[V] ~ +10[V]) analog torque command input(-10[V] ~ +10[V])									
	Analog Output	Total 2 channels 15 function inputs can be selectively allocated									
USB Communication	Functions	Firmware download, parameter setting, tuning, auxiliary function, parameter copy									
	Communication Specifications	Complies with USB 2.0 Full speed specifications									
	Connection Device	PC or USB storage media									
Built-in Functions	Dynamic Braking	Standard built-in(inactivated by servo alarm or servo OFF)									
	Regenerative Braking	Default built-in(Excluding 15kW), external installation possible									
	Display	7-segment display (5 digits)									
	Self-setting Function	Drive node address can be set using rotary switch									
	Additional Function	Gain tuning, alarm history, JOG operation, origin search									
	Protective Function	Excessive current, overload, excessive current limit, overheating, excessive voltage, low voltage, excessive speed, encoder failure, position following failure, current sensing failure									
Operation Environment	Operating Temperature / Storage Temperature	0 ~ +50[°C] / -20 ~ +70[°C]									
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Noncondensing)									
	Environment	Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.									

## L7PB Drive

Item	Type Name	L7PB010U	L7PB020U	L7PB035U	L7PB050U	L7PB075U	L7PB150U
Input Power	Main Power Supply	3 Phase AC380 ~ 480[V](-15 ~ +10[%]), 50 ~ 60[Hz]					
	Control Power Supply	Single Phase AC380 ~ 480[V](-15 ~ +10[%]), 50 ~ 60[Hz]					
Rated Current[A]		3.7	8.0	10.1	17.5	22.8	39.0
Peak Current[A]		11.1	24.0	30.3	47.3	57.0	97.5
Encoder Type		Quadrature(Incremental), BiSS-B, BiSS-C(Absolute, Incremental), Tamagawa Serial(Absolute, Incremental), Panasonic Serial(Absolute), EnDat 2.2, Sinusoidal, Analog Hall					
Control Performance	Speed Control Range	Maximum 1: 5000					
	Frequency Response	Maximum 1 [kHz] or above (When using 19bit Serial Encoder)					
	Speed Variation Ratio	±0.01 [%] or lower [when load changes between 0 and 100%] ±0.1[%] or lower [temperature 25 ±10°C]					
	Accel/Decel Time	Straight or S-curve acceleration/deceleration [0~10,000[ms], 0~1,000[ms] Unit configurable]					
	Input Frequency	1[Mpps], line drive / 200[kpps], Open collector					
	Input Pulse Type	Symbol + Pulse Series, CW+CCW, A/B Phase					
RS422 Communication Specifications	Communication Specifications	ANSI/TIA/EIA-422 Standard specifications					
	Communication Protocol	MODBUS-RTU					
	Connector	RJ45 x 2					
	Synchro Method	Asynchronous					
	Transmission Speed	9600 / 19200 / 38400 / 57600 [bps], Can be configured at [0x3002]					
	Transmission Distance	Maximum 200 [m]					
	Power Consumption	100[mA]					
	Terminating Resistance	Dip S/W(On/Off), Built-In 120Ω					
Digital Input, Output	Digital Input	Input voltage range: DC 12[V] ~ DC 24[V], total 16 input channel (allocable), 30 function inputs can be selectively allocated [*SV_ON, *POT, *NOT, *A-RST, *START, *STOP, *REGT, *EMG, *HOME, *HSTART, *ISELO, *ISEL1, *ISEL2, *ISEL3, *ISEL4, *ISEL5, PCON, GAIN2, P_CL, N_CL, PAUSE, ABSRQ, JSTART, JDIR, PCLR, SPD1/LVSF1, SPD2/LVSF2, SPD3, AOVr, MODE]					
	Digital Output	Use rating: DC 24[V] ±10%, 120[mA], total 8 input channel (allocable) 19 function inputs can be selectively allocated [*ALARM±, *READY±, *BRAKE±, *INPOS1±, *ORG±, *EOS±, *TGON±, *TLMT±, VLMT±, INSPD±, ZSPD±, WARN±, INPOS2±, IOU0±, IOU1±, IOU2± IOU3±, IOU4±, IOU5±]					
Analog Input/output	Analog Input	Total 2 channels Analog speed override input (command / override) -10[V] ~ +10[V], Analog torque command input (command / limit) -10[V] ~ +10[V]					
	Analog Output	Total 2 channels (allocable) 15 function inputs can be selectively allocated					
USB Communication	Functions	Firmware download, parameter setting, tuning, auxiliary function, parameter copy					
	Communication Specifications	Complies with USB 2.0 Full speed specifications					
	Connection Device	PC or USB storage media					
Built-in Functions	Dynamic Braking	Standard built-in(Activated by servo alarm or servo OFF)					
	Regenerative Braking	Default built-in(Excluding 15kW), external installation possible					
	Display	7-segment display (5 digits)					
	Self-setting Function	Drive node address can be set using rotary switch					
	Additional Function	Gain tuning, alarm history, JOG operation, origin search					
Protective Function	Excessive current, overload, excessive current limit, overheating, excessive voltage, low voltage, excessive speed, encoder failure, position following failure, current sensing failure						
Operation Environment	Operating Temperature / Storage Temperature	0 ~ +50[°C] / -20 ~ +70[°C]					
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Noncondensing)					
	Environment	Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.					

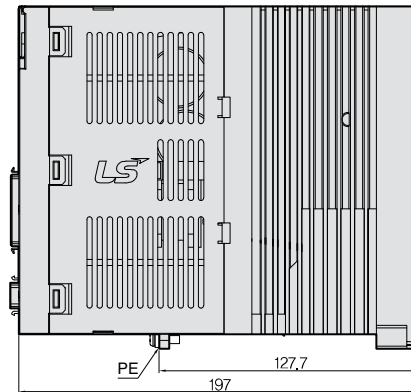
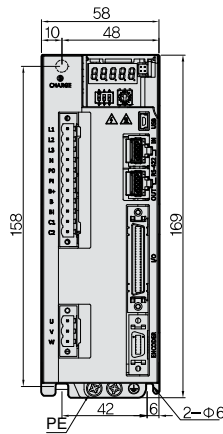
\*Unit [mm]

**L7PA001U ~ L7PA004U**  
[Weight: 1.0kg]



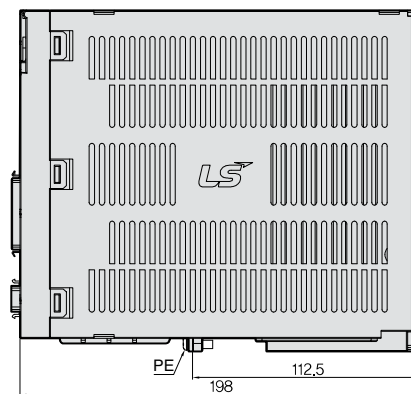
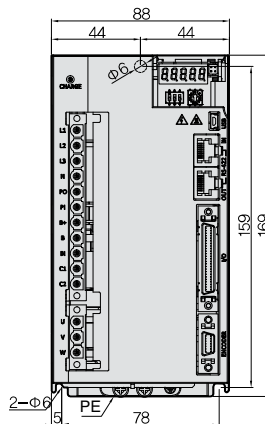
\*Unit [mm]

**L7PA008U / L7PA010U**  
[Weight: 1.5kg  
[Fan-Cooling included]]



\*Unit [mm]

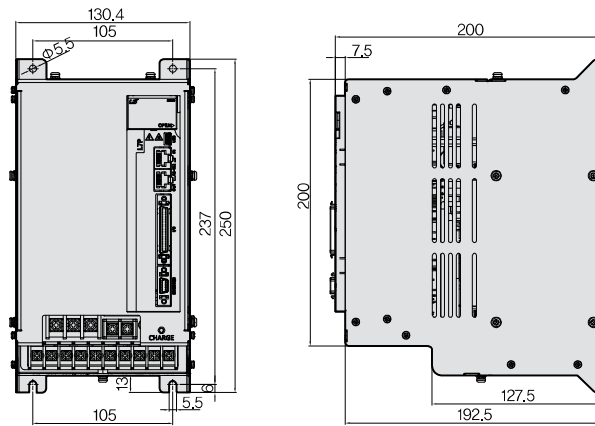
**L7PA020U / L7PA035U**  
[Weight: 2.5kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7PA050U**

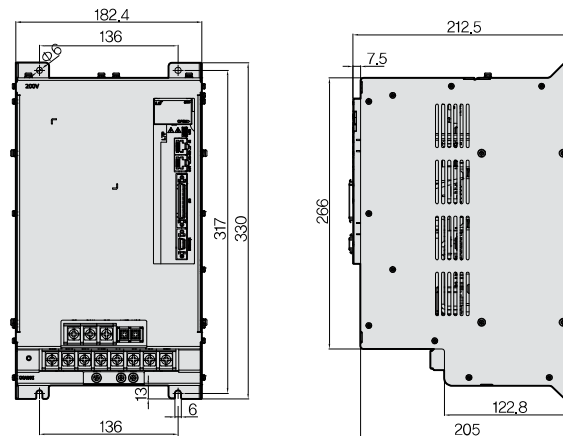
[Weight: 5.5kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7PA075U**

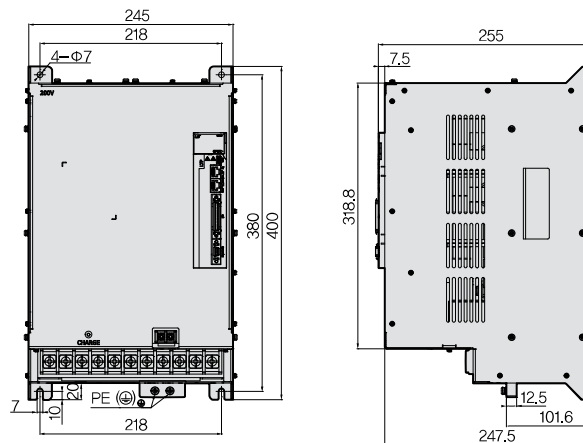
[Weight: 8.5kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7PA150U**

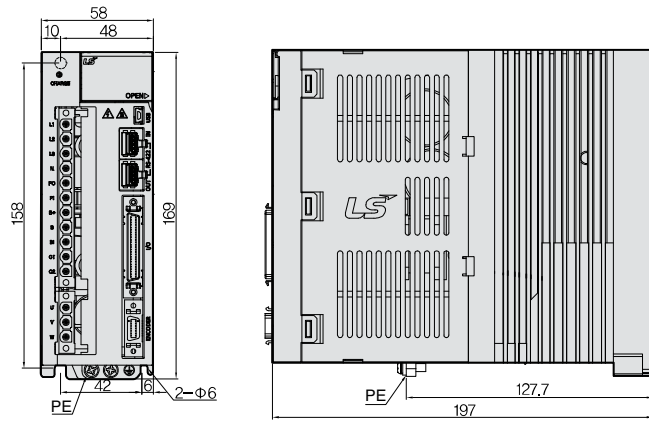
[Weight: 16.2kg  
[Fan-Cooling included]]



\*Unit [mm]

## L7PB010U

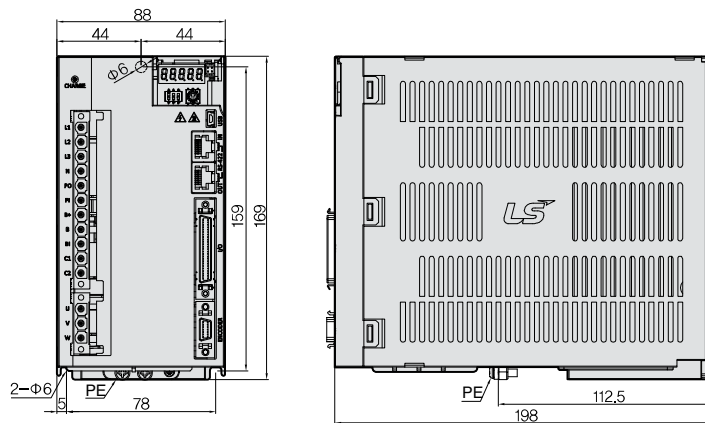
[Weight: 1.5kg  
[Fan-Cooling included]]



\*Unit [mm]

## L7PB020U / L7PB035U

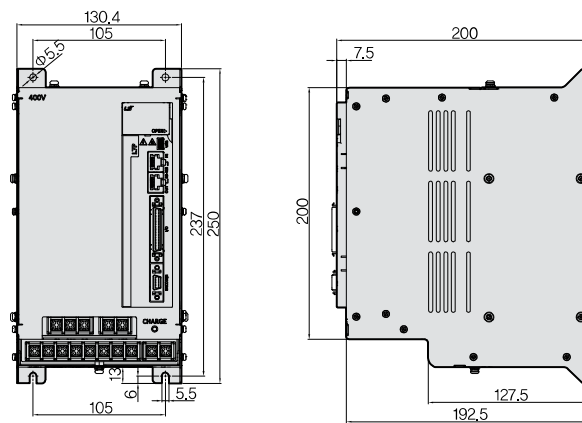
[Weight: 2.5kg  
[Fan-Cooling included]]



\*Unit [mm]

## L7PB050U

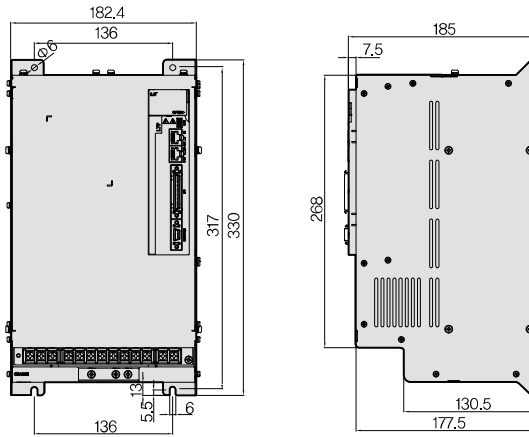
[Weight: 5.5kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7PB075U**

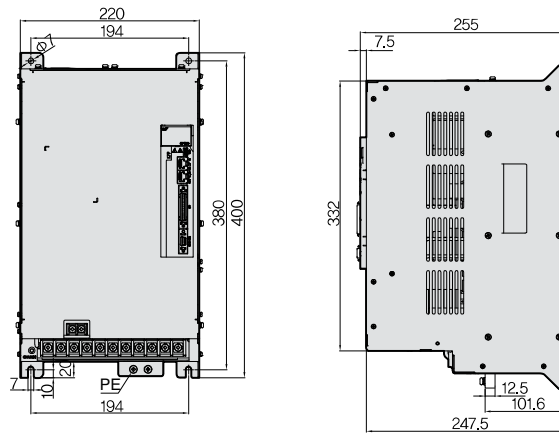
[Weight: 8.5kg  
[Fan-Cooling included]]



\*Unit [mm]

**L7PB150U**

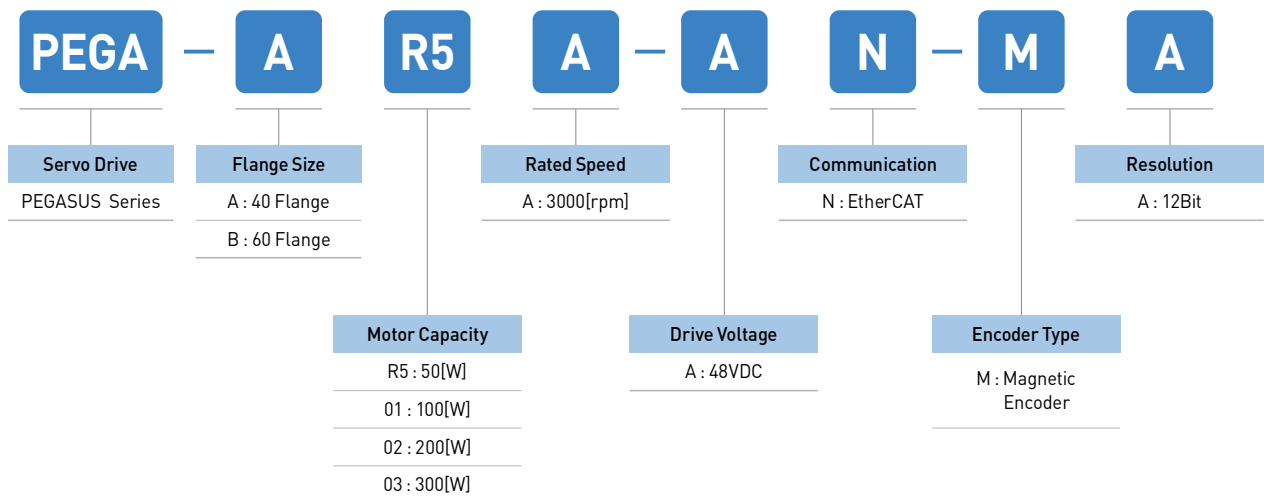
[Weight: 15.5kg  
[Fan-Cooling included]]



## PEGA Series



### Servo Drive Designation



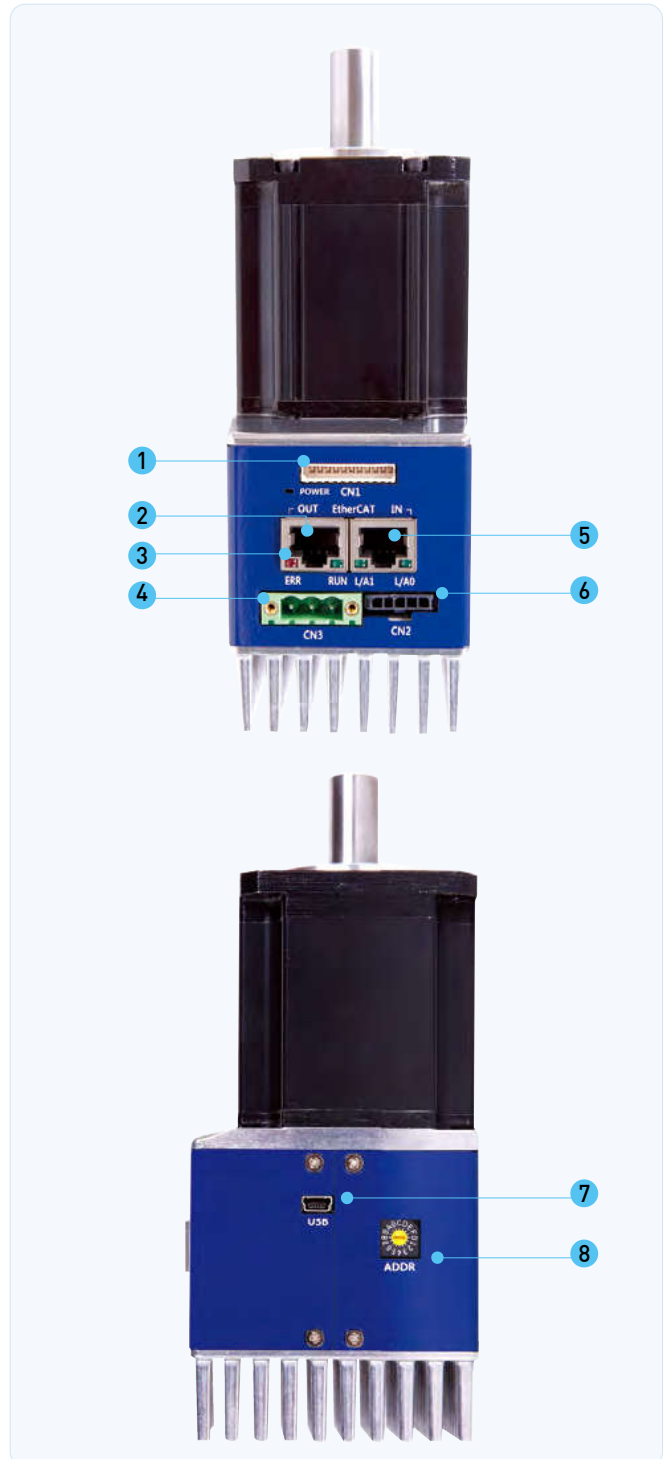
## Integrated Drive-Motor EtherCAT Type PEGA

### Enhanced Efficiency Through Integration of Motor and Drive

- Cost effective from installation by integrated system of motor, encoder cable and drive
- Highly efficient space usage when installed at limited and small space
- High effectiveness for application of multi axis because there is no limitation for space of installation

### Real-time Control Through EtherCAT

- High speed, Real-time capability and synchronization mechanism
- Improved EtherCAT communication speed (min. 250µs, supports DC)
- Supports CoE, EoE and FoE



- 1 Input / Output signal connector (CN1)
  - This connector is for sequence input / Output signals
- 2 EtherCAT Communication output port (OUT)
- 3 Status LED
  - It indicates the current state of EtherCAT Communication
- 4 Power connector (CN3)
- 5 EtherCAT Communication input port (IN)
- 6 Safety connector (CN2)
  - This connector connects safety devices
- 7 USB Connector (CN5, Mini B type)
  - This connector is to communicate with a PC
- 8 Node address setting switch
  - This switch is to set the node address of the drive
  - You can set the node addresses from 0 to 15



## Rated Values of Servo Drive

Rated	□40 50W (AR5A)	□40 100W (A01A)	□60 100W (B01A)	□60 200W (B02A)	□60 300W (B03A)
Continuous Output Current [Arms]	1.8	2.4	3.6	5.0	6.8
Maximum Output Current [Arms]	3.5	3.8	7.2	10.0	13.6
Input Voltage	DC 48V ~ DC 60V				

## Basic Specifications

Category		Details	
Use Conditions	Control Method	PWM controlled sine wave current driving method	
	Operating Temperature/Storage Temperature	0~+40[°C] / -20~ +60[°C]	
	Operating Humidity/Storage Humidity	Below 80% RH / Below 90% RH (no freeze or condensation)	
	Vibration-/Impact-resistance	TBD	
	Degree of Protection/Degree of Pollution	TBD	
	Altitude	1000m or lower	
Performance	Other	To be free from electrostatic noise, strong electric current, or radiation.	
	Speed Variation	Load Variation	At 0 to 100% load: ± 3% [at rated speed]
		Voltage Variation	Rated voltage ±10%: 0% [at rated speed]
Temperature Variation		25°C: ±0.1% or less [at rated speed]	
Input/Output Signal	Input Signal	Input voltage range: DC 12 V - DC 30 V The 4-channel input signal can be assigned to 12 functions: POT, NOT, HOME, STOP, PCON, GAIN2, PCL, NCL, PROBE1, PROB2, EMG, and ARST.	
	Output Signal	Rated voltage and current: DC 24 V ±10%, 120[mA] The 2-channel output signal can be assigned to 11 functions: BRAKE, ALARM, RDY, ZSPD, INPOS1, TLMT, VLMT, INSPD, WARN, TGON, and INPOS2.	
Analog Monitor		Number of channels: 1, Output voltage range: ±4V, Angular resolution: 12 bits, Stabilization time: 15 us	
USB Communication	Connecting Device	PC or USB storage medium	
	Communication Standard	Conforms to the USB 2.0 Full Speed Standard.	
	Function	Firmware download, parameter setting, adjustment, auxiliary functions, and parameter copy function.	
Dynamic Brake (Three-phase Short-circuit)		Activates when servo alarm, servo OFF, or Emergency stop (POT, NOT and EMG) is input.	
Protection Functions		Overcurrent, overload, current limit, overheat, overvoltage, undervoltage, overspeed, encoder error, position follow error, etc.	
Auxiliary Functions		Gain adjustment, alarm history, JOG drive, programmed JOG drive, etc.	
Safety Functions	Input	STO1, STO2	
	Compatible Standard	TBD	

## EtherCAT Communication Specification

Category		Details
Communication Standard	FoE	Firmware download
	EoE	Parameter setting, adjustment, auxiliary functions, and parameter copy through UDP.
	CoE	IEC 61158 Type12, IEC 61800-7 CiA 402 drive profile
Physical Layer		100BASE-TX(IEEE802.3)
Connector		RJ45 x 2
Distance		Within 100 m between nodes
DC (Distributed Clock)		Sync by DC mode
LED Display		• L/A0(Link/Act IN) • L/A1(Link/Act OUT) • RUN • ERR
CiA402 Drive Profile		Supports CSP, CSV, CST, PP, PV, PT, and HM Modes.

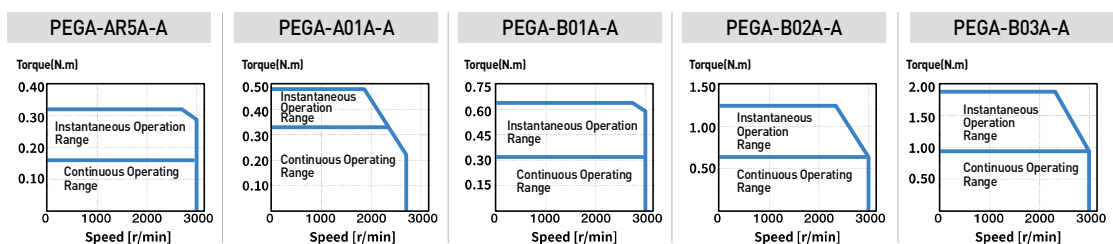
## Internal Encoder Specification

Category	Details
Encoder Type	Magnetic Encoder [12bit][Singlereturn Absolute]

## Internal Motor Specification

Model		□40 50W (AR5A)	□40 100W (A01A)	□60 100W (B01A)	□60 200W (B02A)	□60 300W (B03A)
Rated Torque	[N·m]	0.16	0.32	0.32	0.64	1.27
	[kgf·cm]	1.62	3.25	3.25	6.50	9.74
Max. Torque	[N·m]	0.32	0.48	0.64	1.27	1.91
	[kgf·cm]	3.24	4.88	6.50	13.0	19.48
Rated Speed	[r/min]	3000	2400	3000	3000	3000
Max Speed	[r/min]	3000	3000	3000	3000	3000
Inertia	[kg·m <sup>2</sup> ×10 <sup>-4</sup> ]	0.0240	0.0450	0.1140	0.1820	0.3210
	[gf·cm·s <sup>2</sup> ]	0.0245	0.0459	0.1163	0.1857	0.3276

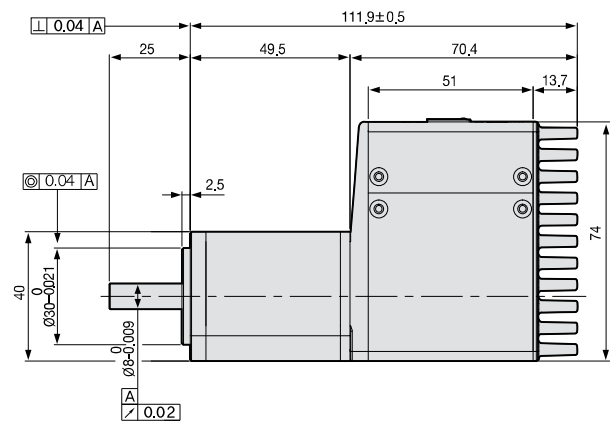
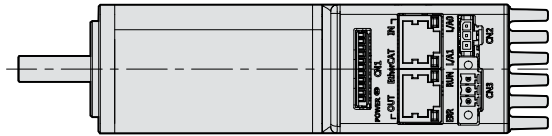
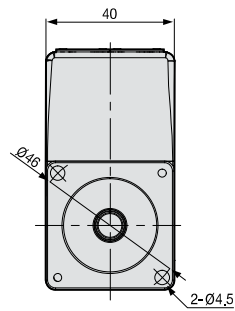
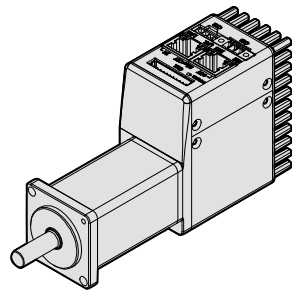
## Speed-Torque Characteristics



# External Dimensions

\*Unit [mm]

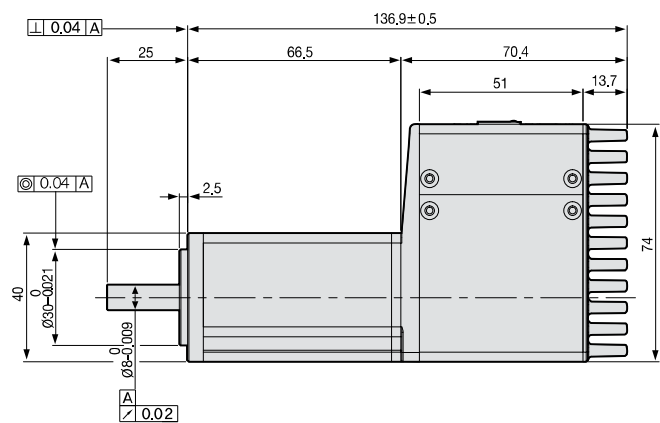
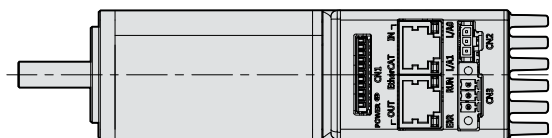
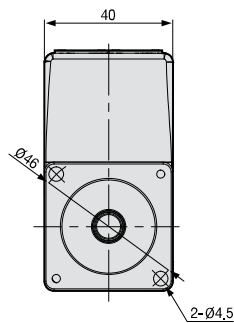
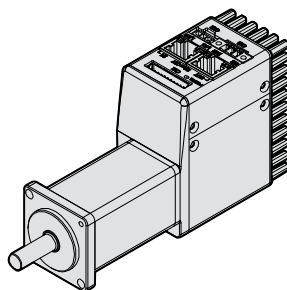
**PEGA-AR5A**  
[Weight: 0.51kg]



Servo Drive

\*Unit [mm]

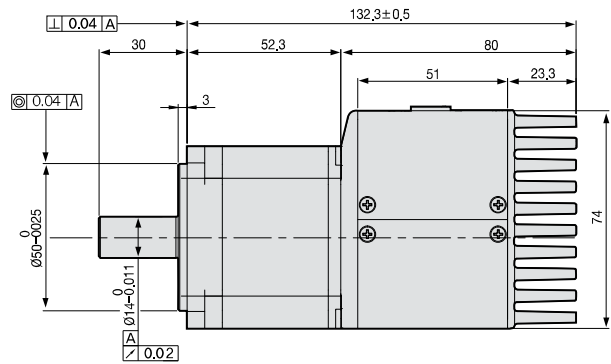
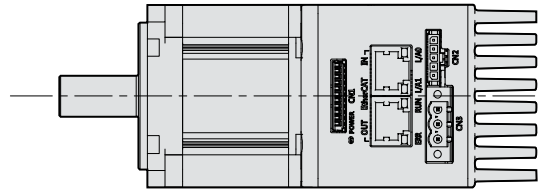
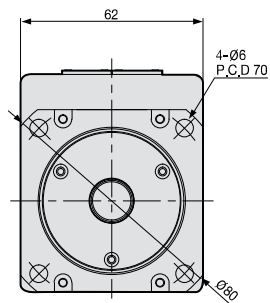
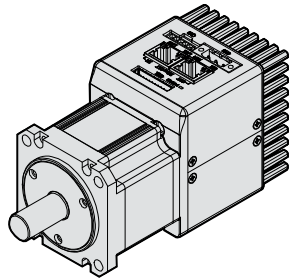
**PEGA-A01A**  
[Weight: 0.63kg]



\*Unit [mm]

## PEGA-B01A

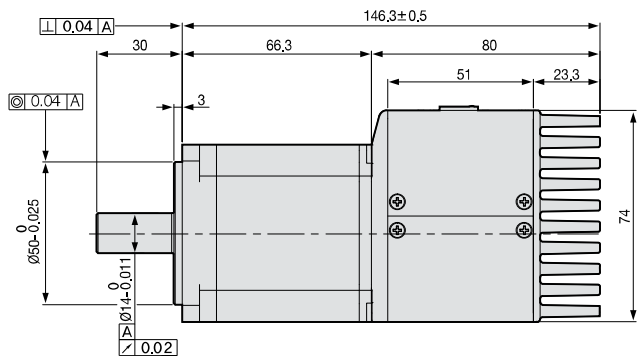
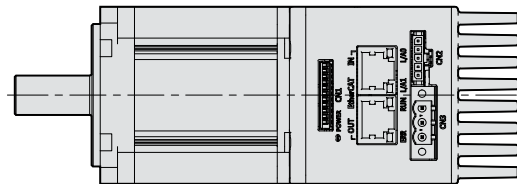
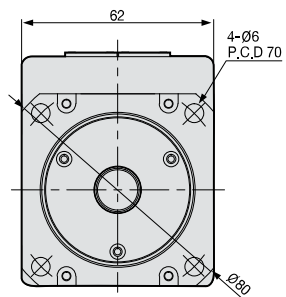
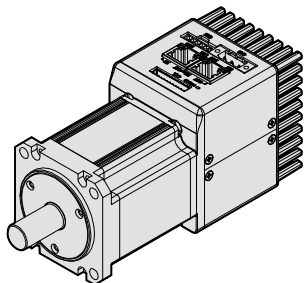
[Weight: 1.07kg]



\*Unit [mm]

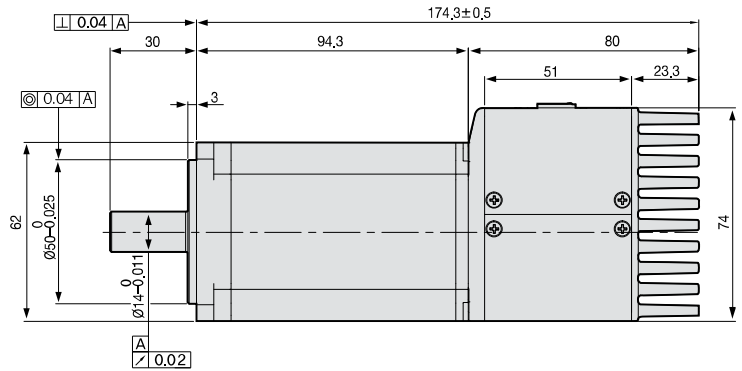
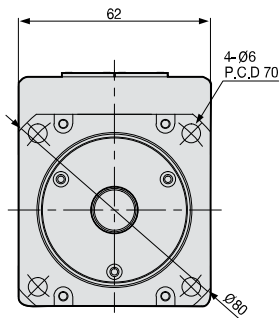
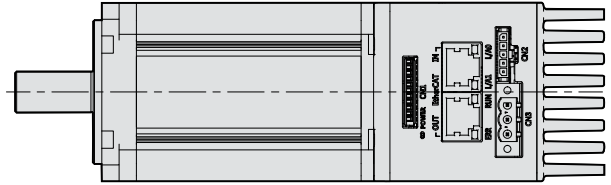
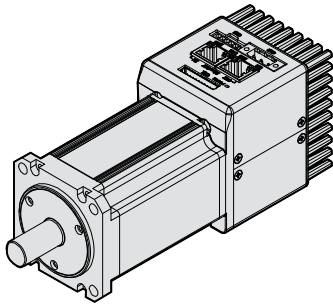
## PEGA-B02A

[Weight: 1.30kg]



\*Unit [mm]

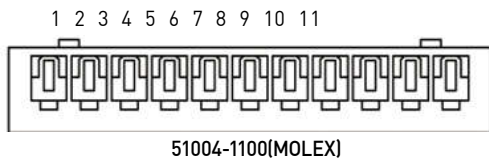
**PEGA-B03A**  
[Weight: 1.79kg]



Servo Drive

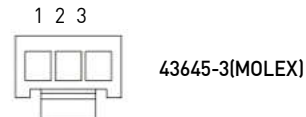
**Accessory Kit**

**CN1 : I/O Connector**



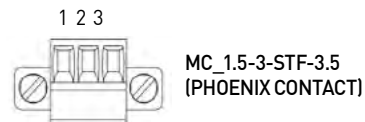
Pin Number	Direction	Name	Signals	Descriptions
1	VCC	+24	+24V INPUT	+24V Vcc Input
2	Input	POT	Positive Over-Travel	Limit Sensor Input
3	Input	NOT	Negative Over Travel	
4	Input	HOME	Home Sensor	Home Sensor Input for Homing
5	Input	STOP	Stop Input	Stop Command Input
6	Output	BRAKE+	BRAKE	Output Brake Control Signal
7	Output	BRAKE-		
8	Output	ALARM+	Alarm Output	Servo Alarm Output
9	Output	ALARM-		
10	Output	MONITOR1	Analog Monitor	Analog Monitor Output(0V~5V)
11	GND	AGND	AGND(0V)	Analog Signal Ground

**CN2 : Safe Torque Off Connector**



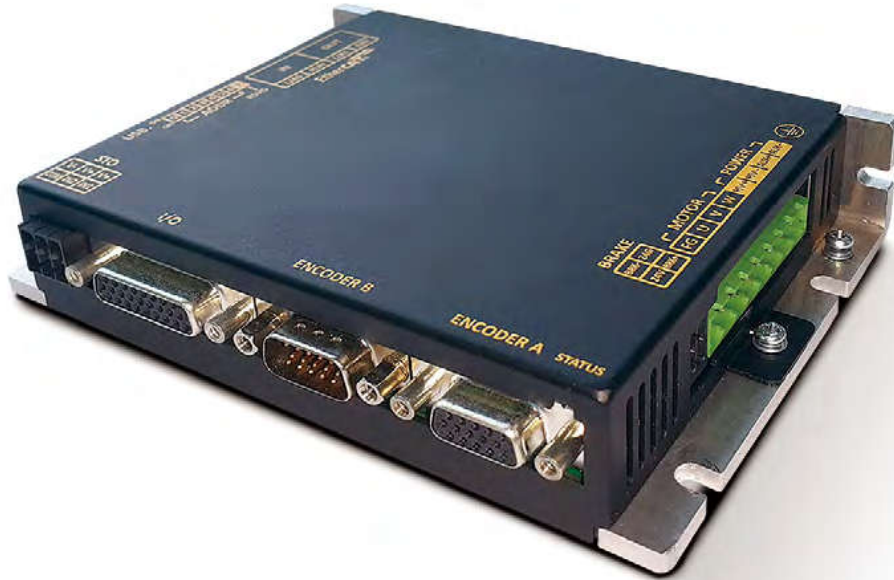
Pin Number	Name	Descriptions
1	HWBB1	Safe Torque Off(STO) input signals
2	HWBB2	
3	COMMON	DC 24V GND

**CN3 : Power Connector**



Pin Number	Name	Descriptions
1	FG	Frame Ground
2	N(DC 0V)	DC 0V GND
3	VCC(DC 48V)	DC 48V input

## PHOX Series



### Servo Drive Designation

<b>PHOX</b>	—	<b>03</b>	—	<b>080</b>	—	<b>N</b>	—	<b>S</b>	—	<b>AA</b>
<b>Model Name</b>		<b>Output Current</b>		<b>Maximum Power Input</b>		<b>Communication</b>		<b>Encoder Type</b>		<b>Option</b>
PHOX Series		03 : 3A 06 : 6A		080 : 80VAC		N : EtherCAT		S : SIN/COS R : Resolver		Exclusive Option Code

Note1) Additional selection option, on selecting the dual encoder

## Low Voltage DC Drive Type PHOX

### Real-time Control Through EtherCAT

- High speed, Real-time capability and synchronization mechanism
- Supports CoE, EoE and FoE
- Improved frequency response( $\approx 1\text{kHz}$ )
- Improved communication speed by applying 16bit-bus
  - Improved chip communication speed
  - Improved EtherCAT communication speed

### Variable Switching Frequency

- 16/32/48kHz

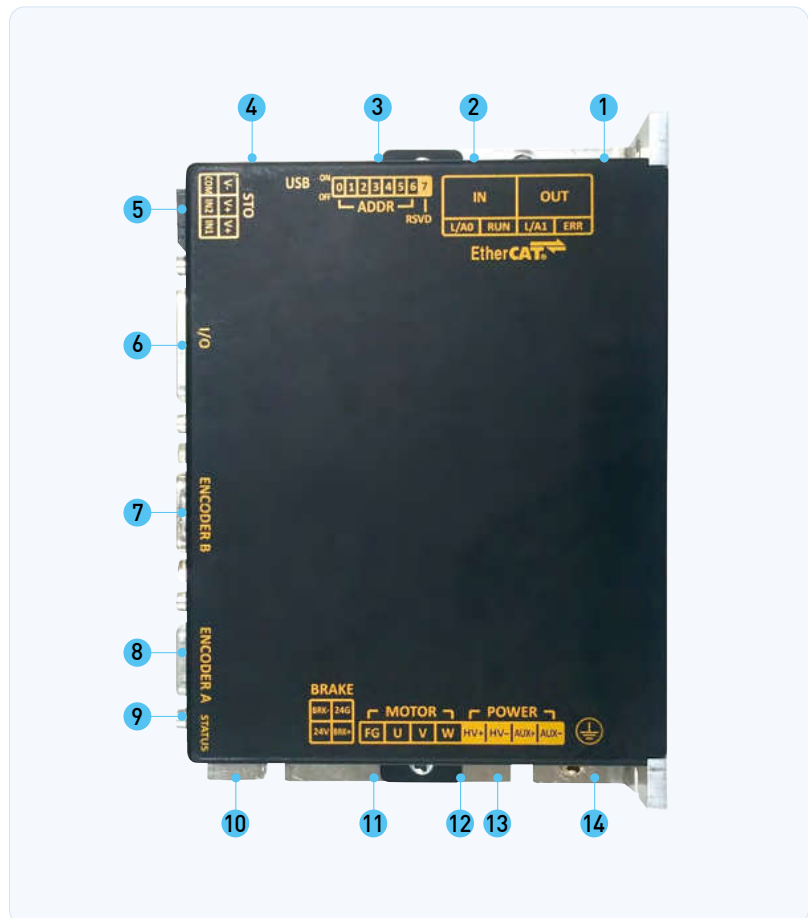
### Fully-closed Loop Control

- Switch among Semi-closed loop control, Fully-closed loop control and dual feedback control
- Fully-closed loop control provides quick response with internal and external encoder position values
- Fully-closed loop control ensures high-precision control during machine operation

### Progammig Function Including Single-axis Position Module

- Positioning control mode with pulse inputs
- Provides position control through I/O or HMI without position control module
- Supports indexing mode

- 1 EtherCAT Out
- 2 EtherCAT In
- 3 Switch for node address setting
- 4 Mini B USB
- 5 STO Connector
- 6 IO Connector
- 7 Encoder B connector
- 8 Encoder A connector
- 9 Status LED
- 10 Brake connector
- 11 Motor power connector
- 12 Master power connector(HV+,HV-)
- 13 Auxiliary power connector(AUX+,AUX-)
- 14 Ground



## PHOX Series

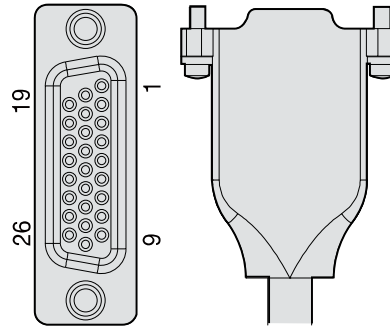
Item	Type Name	PHOX-03	PHOX-06
Input Power	Main Power Supply	DC 24~80[V] <sup>Note1</sup>	
	Control Power Supply	DC 24~80[V] <sup>Note1</sup>	
Rated Current[A]		3	6
Peak Current[A]		9[A] > 1[sec]	18[A] > 1[sec]
1st Encoder Encoder A		*Quadrature(Max. 10Mpps after X 4) - With and without halls, Differential *Serial Encoder(absolute, incremental) - BiSS(B,C), Endat2.2, Tamagawa Serial, SSI	
2nd Encoder Encoder B <sup>Note2</sup>		*Quadrature(Max. 10Mpps after X 4) - Without halls, Differential *Serial Encoder(absolute, incremental) - BiSS(B,C), Endat2.2, Tamagawa Serial, SSI *Analog Encoder - Sinusoidal(1Vpp), Analog hall(Sin/Cos) - Resolver(Optional)	
Control Performance	Speed Control Range	Maximum 1: 5000	
	Frequency Response	Maximum 1 [kHz] or above (When using 19bit Serial Encoder)	
	Speed Variation Ratio	±0.01 [%] or lower [when load changes between 0 and 100%] ±0.1[%] or lower [temperature 25 ±10°C]	
	Accel / Decel Time	Within ±1%	
	Input Frequency	4[Mpps], line drive	
	Input Pulse Method	Symbol+Pulse series, CW+CCW, PhaseA/B	
EtherCAT Communication Specifications	Communication Standard	FoE (Firmware download) EoE (Parameter setting by UDP, Tuning, Secondary function, Parameter copy) CoE (IEC 61158 Type12, IEC 61800-7 CIA 402 Drive profile)	
	Physical Layer	100BASE-TX(IEEE802.3)	
	Connector	RJ45 x 2	
	Communication distance	Within connection between nodes 100[m]	
	DC(Distributed Clock)	Synchronization by DC mode, minimum DC cycle: 250[μs]	
	LED Display	LinkAct IN, LinkAct OUT, RUN, ERR	
	Cia402 Drive Profile	Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Cyclic Synchronous Position Mode Cyclic Synchronous Velocity Mode, Cyclic Synchronous Torque Mode, Homing Mode	
Digital Input, Output	Digital Input	Total 4 input channels(Allocable) Total 33 functions can be used selectively for assignment (*POT, *NOT, *HOME, *STOP, PCON, GAIN2, P_CL, N_CL, PROBE1P, ROBE2, EMG, A_RST, SV_ON, START, PAUSE, REGT, HSTART, ISEL0-5, ABS_RQ, JSTART, JDIR, PCLR, AOVR, INHIB, SPD1, SPD2, SPD3, MODE)	
	Digital Output	Total 4 input channels(Allocable) Total 33 functions can be used selectively for assignment (*BRAKE, *ALARM, *READY, *ZSPD, INPOS1, INPOS2, TLMT, VLMT, INSPD, WARN, TGON, ORG, EOS, IOUT0, IOUT1, IOUT2 IOUT3, IOUT4, IOUT5)	
Analog Input / Output	Analog Input	Input voltage range: ±10[V] differential Single channel, torque limit value adjustable through analog voltage	
	Analog Output	Total 2 channels(allocable) Total 15 outputs can be used selectively for assignment	
Safety Function		2 input channels(STO1, STO2)	
Encoder Output Type		AO(+/-), BO(+/-), ZO(+/-) (Line drive output max. 6.4Mpps)	
USB Communication	Function	Firmware download, parameter setting, tuning, auxiliary function, parameter copy	
	Communication Standard	Complies with USB 2.0 Full speed specifications	
	Connect	PC or USB storage media	
Internal Function	Self-setting Function	Drive node address can be set using dip switch	
	Additional Function	Gain tuning, alarm history, JOG operation, origin search	
	Protective Function	Overcurrent, overload, excessive current limit, overheat, overvoltage, undervoltage, overspeed, encoder error, position following error, current sensing error	
Operation Environment	Operating Temperature / Storage Temperature	0 - 50[°C] / -20 ~ 65 °C	
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Noncondensing)	
	Environment	Keep indoors. Avoid corrosive / flammable gas or liquid, and electrically conductive dust.	

<sup>Note1</sup> It is possible to drive with a voltage of less than 48 [V] of DC input power. However, the actual speed may be slower than the command speed and the specifications of the low voltage motor [based on DC 48 [V]] cannot be guaranteed. We recommend using DC 48[V] as the input power if possible.

<sup>Note2</sup> Available when full-closed function is applied

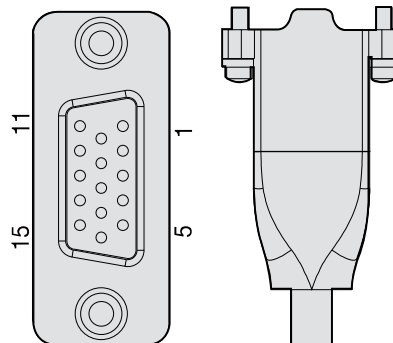
**PHOX Series I/O and Encoder PIN Map**

**I/O Connector**  
10090769-P264ALF



PIN No.	Signal	PIN No.	Signal	PIN No.	Signal	PIN No.	Signal
1	PF+	8	AMON1	15	D01	22	/B0
2	PF-	9	AMON2	16	D02	23	Z0
3	PR+	10	DICOM	17	D03	24	/Z0
4	PR-	11	DI1	18	18 D04	25	DOCOM
5	AGND	12	DI2	19	A0	26	AGND
6	AI+	13	DI3	20	/A0		
7	AI+	14	DI4	21	B0		

**Encoder A Connector**  
10090769-P154ALF



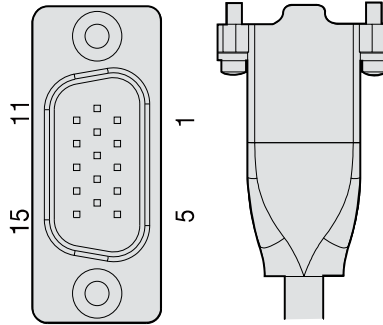
PIN No.	Encoder				
	Quad	BISS	SSI	ENDAT	TAMAGAWA
1	Z+	-	-	-	-
2	Z-	-	-	-	-
3	GND	GND	GND	GND	GND
4	-	-	-	-	-
5	5V	5V	5V	5V	5V
6	GND	GND	GND	GND	GND
7	A-	SL-	DATA-	RC-/DV-	TXD-/RXD-
8	A+	SL+	DATA+	RC+/DV+	TXD-/RXD+
9	HALL U	-	-	-	-
10	*MOT	*MOT	*MOT	*MOT	*MOT
11	B-	MA-	CLK-	CLK-	-
12	B+	MA+	CLK+	CLK+	-
13	HALL V	-	-	-	-
14	HALL W	-	-	-	-
15	-	-	-	-	-



## PHOX Series I/O and Encoder PIN Map

### Encoder B Connector (Full Closed)

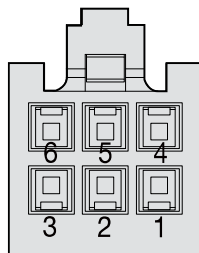
10090770-S154ALF



PIN No.	Encoder						
	Quad	BISS	SSI	ENDAT	TAMAGAWA	SIN/COS	RESOLVER
1	Z+	-	-	-	-	-	-
2	Z-	-	-	-	-	-	-
3	GND	GND	GND	GND	GND	GND	GND
4	-	-	-	-	-	SIN+	SIN+
5	5V	5V	5V	5V	5V	5V	5V
6	-	-	-	-	-	REF-	EXT-
7	A-	SL-	DATA-	RC-/DV-	TXD-/RXD-	-	-
8	A+	SL+	DATA+	RC+/DV+	TXD+/RXD+	-	-
9	-	-	-	-	-	SIN-	SIN-
10	*MOT	*MOT	*MOT	*MOT	*MOT	*MOT	*MOT
11	B-	MA-	CLK-	CLK-	-	-	-
12	B+	MA+	CLK+	CLK+	-	-	-
13	-	-	-	-	-	REF+	EXT+
14	-	-	-	-	-	COS-	COS-
15	-	-	-	-	-	COS+	COS+

### STO Connector

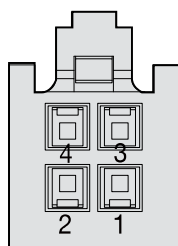
IPD1-03-D-K



PIN No.	Signal	Description
1	COM	Common(24 GND)
2	STO2	Cuts off current(torque) applied to motor when signal is off
3	STO1	Cuts off current(torque) applied to motor when signal is off
4	V-	DC -12V(bypass)
5	V+	DC -12V(bypass)
6	V+	DC -12V(bypass)

### BRAKE Connector

IPD1-02-D-K

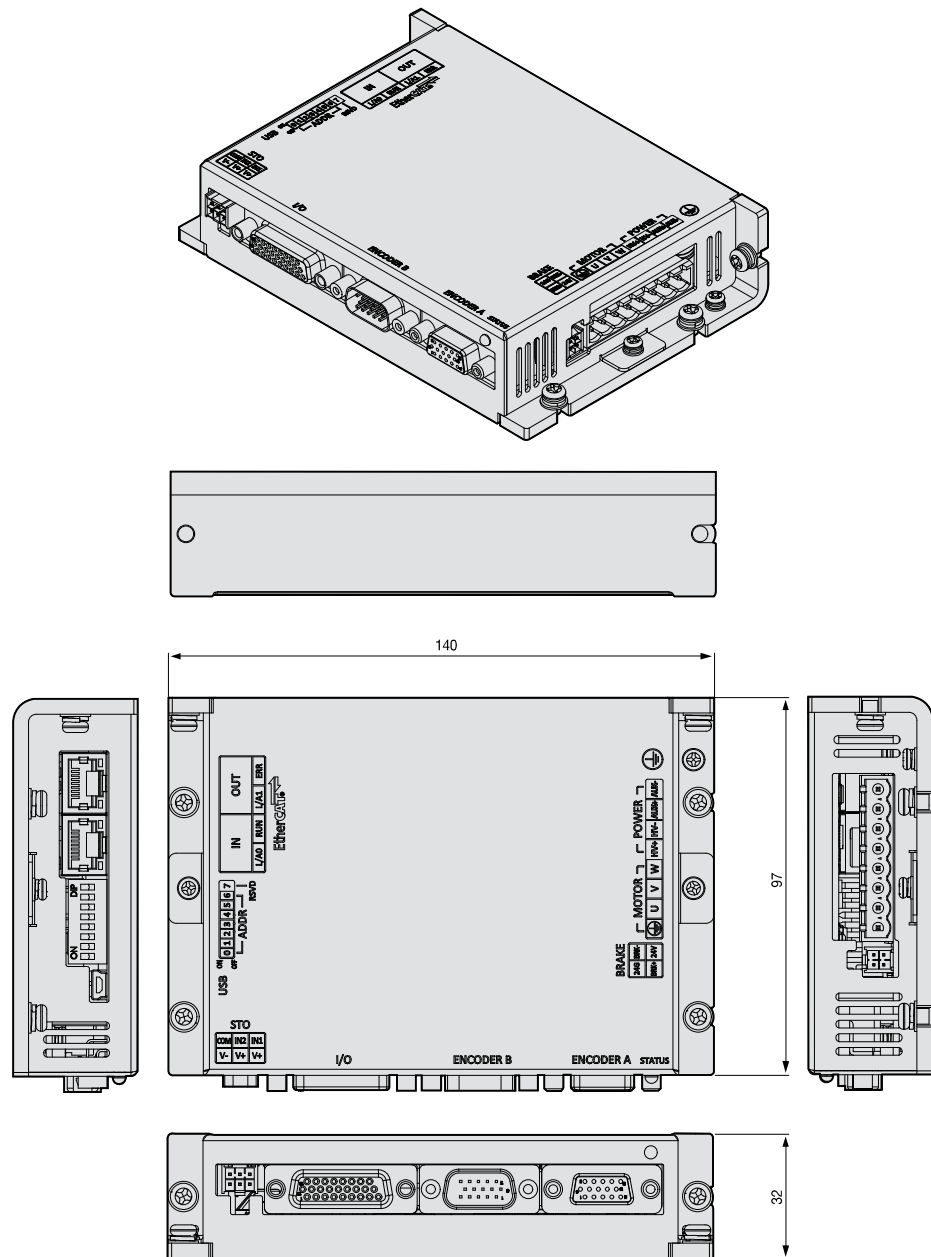


PIN No.	Signal	Description
1	24V	Brake 24V Input
2	BRK+	Brake 24V Output
3	BRK-	Brake (1A)
4	24G	24V Return

# External Dimensions

\*Unit [mm]

PHOX-03 / PHOX-06  
[Weight: 0.43kg]



## iX7NHA

Rated Speed (rpm)	Maximum Speed (rpm)	Flange	Motor	iX7 Drive	Encoder Cable		iX7 Power Cable	iX7 Power + Brake	Brake
					Serial	Absolute			
3,000	5,000	□40	FALR5A	iX7NHA001U	APCS-E□□□ES-□	APCS-E□□□ES-□1	APCS-P□□□LSX	-	APCS-B□□□QS-□
		□40	FAL01A	iX7NHA001U					
		□40	FAL015A	iX7NHA004U					
		□60	FBL01A	iX7NHA001U					
		□60	FBL02A	iX7NHA002U					
		□60	FBL04A	iX7NHA004U					
		□80	FCL04A	iX7NHA004U					
		□80	FCL06A	iX7NHA008U					
		□80	FCL08A	iX7NHA008U					
		□80	FCL10A	iX7NHA010U					
	□130	FE09A	iX7NHA010U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□HSX1	APCS-P□□□NBX1	-	
	□130	FE15A	iX7NHA020U			APCS-P□□□HSX	APCS-P□□□NBX		
	□130	FE22A	iX7NHA020U						
	□130	FE30A	iX7NHA035U						
2,000	3,000	□130	FE06D	iX7NHA008U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□HSX1	APCS-P□□□NBX1	-
		□130	FE11D	iX7NHA010U					
		□130	FE16D	iX7NHA020U			APCS-P□□□HSX	APCS-P□□□NBX	
		□130	FE22D	iX7NHA020U					
1,500	3,000	□130	FE05G	iX7NHA008U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□HSX1	APCS-P□□□NBX1	-
		□130	FE09G	iX7NHA010U					
		□130	FE13G	iX7NHA020U			APCS-P□□□HSX	APCS-P□□□NBX	
		□130	FE17G	iX7NHA020U					
1,000	2,000	□130	FE03M	iX7NHA004U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□HSX1	APCS-P□□□NBX1	-
		□130	FE06M	iX7NHA008U					
		□130	FE09M	iX7NHA010U			APCS-P□□□HSX	APCS-P□□□NBX	
		□130	FE12M	iX7NHA020U					

## iX7NHA DD Motor

Rated Speed (rpm)	Maximum Speed (rpm)	External Diameter Of Motor(Φ)	Motor	Drive	Encoder Cable		iX7 Power Cable	iX7 Power + Brake Cable	Brake	
					Serial	Absolute				
200	500	135Φ	DB03D	iX7NHA001U	APCS-E□□□ZS	-	APCS-P□□□YSX	-	-	
			DB06D	iX7NHA002U						
			DB09D	iX7NHA004U						
		175Φ	DC06D	iX7NHA002U						
			DC12D	iX7NHA004U						
			DC18D	iX7NHA008U						
	400	230Φ	DD12D	iX7NHA004U						
	500		DD22D	iX7NHA008U						
	400		DD34D	iX7NHA010U						
	150	250	360Φ	DE40D						iX7NHA010U
				DE60D						iX7NHA020U
			380Φ	DFA1G						iX7NHA020U
DFA6G				iX7NHA035U						
50	100	DGC3S	iX7NHA020U							
200	500	135Φ	DFB03D	iX7NHA001U	APCS-E□□□ZS1	-	APCS-P□□□YSX1	-	-	
		175Φ	DFC06D	iX7NHA002U						
		230Φ	DFD12D	iX7NHA004U						

## L7NHA

Rated Speed (rpm)	Maximum Speed (rpm)	Flange	Motor	Drive	Encoder Cable		Power	Power + Brake	Brake						
					Serial	Absolute									
3,000	5,000	□40	FALR5A	L7NHA001U	APCS-E□□□ES-□	APCS-E□□□ES-□1	APCS-P□□□LS-□	-	APCS-B□□□QS-□						
		□40	FAL01A	L7NHA001U											
		□40	FAL015A	L7NHA004U											
		□60	FBL01A	L7NHA001U											
		□60	FBL02A	L7NHA002U											
		□60	FBL04A	L7NHA004U											
		□80	FCL04A	L7NHA004U											
		□80	FCL06A	L7NHA008U											
		□80	FCL08A	L7NHA008U											
		□80	FCL10A	L7NHA010U											
	□130	FE09A	L7NHA010U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□HS1	APCS-P□□□NB1	-							
	□130	FE15A	L7NHA020U			APCS-P□□□HS	APCS-P□□□NB								
	□130	FE22A	L7NHA020U			APCS-P□□□IS	APCS-P□□□PB								
	□130	FE30A	L7NHA035U			APCS-P□□□JS	APCS-P□□□LB								
□180	FF30A	L7NHA035U	APCS-E□□□ES-□	APCS-E□□□ES-□1	APCS-P□□□LS-□	-	APCS-B□□□QS-□								
□180	FF50A	L7NHA050U													
□80	FCL03D	L7NHA004U													
□80	FCL05D	L7NHA008U													
□80	FCL06D	L7NHA008U													
□80	FCL07D	L7NHA008U													
2,000	3,000	□130						FE06D	L7NHA008U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□HS1	APCS-P□□□NB1	-	
		□130						FE11D	L7NHA010U			APCS-P□□□HS	APCS-P□□□NB		
		□130						FE16D	L7NHA020U			APCS-P□□□IS1	APCS-P□□□PB1		
		□130						FE22D	L7NHA020U			APCS-P□□□IS	APCS-P□□□PB		
		□180						FF22D	L7NHA020U			APCS-P□□□JS	APCS-P□□□LB		
		□180						FF35D	L7NHA035U			APCS-P□□□JS2	APCS-P□□□LB2		
		□180						FF55D	L7NHA050U			APCS-P□□□IS1	-		APCS-P□□□SB
		□220						FG22D	L7NHA020U			APCS-P□□□IS			
	2,500	3,000	□220	FG35D	L7NHA035U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□JS	-	APCS-P□□□SB					
			□220	FG55D	L7NHA050U			APCS-P□□□JS2							
		2,500	□220	FG75D	L7NHA075U			APCS-P□□□O0S	-		APCS-P□□□SB				
			□220	FG110D	L7NHA150U			APCS-P□□□VS							
	1,500	3,000	□130	FE05G	L7NHA008U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□HS1	APCS-P□□□NB1	-					
			□130	FE09G	L7NHA010U			APCS-P□□□HS	APCS-P□□□NB						
□130			FE13G	L7NHA020U	APCS-P□□□IS1			APCS-P□□□PB1							
□130			FE17G	L7NHA020U	APCS-P□□□IS			APCS-P□□□PB							
□180			FF20G	L7NHA020U	APCS-P□□□JS			APCS-P□□□LB							
2,700		□180	FF30G	L7NHA035U	APCS-P□□□JS2			APCS-P□□□LB2	-	APCS-P□□□SB					
3,000		□180	FF44G	L7NHA050U	APCS-P□□□MS			-			APCS-P□□□SB				
2,500		2,000	□180	FF75G	L7NHA075U				APCS-P□□□IS1	-		APCS-P□□□SB			
			□220	FG20G	L7NHA020U			APCS-P□□□IS							
		2,700	□220	FG30G	L7NHA035U			APCS-P□□□JS	-	APCS-P□□□SB					
			□220	FG44G	L7NHA050U			APCS-P□□□JS2							
2,000		2,500	□220	FG60G	L7NHA075U			APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□O0S	-	APCS-P□□□SB			
			□220	FG85G	L7NHA150U					APCS-P□□□VS					
			□220	FG110G	L7NHA150U					APCS-P□□□O0S					
	2,000	2,000	□220	FG150G	L7NHA150U	APCS-E□□□□DS	APCS-E□□□□DS1			APCS-P□□□HS1	APCS-P□□□NB1		-		
			□130	FE06M	L7NHA008U					APCS-P□□□HS	APCS-P□□□NB				
			□130	FE09M	L7NHA010U					APCS-P□□□IS1	APCS-P□□□PB1				
1,000	2,000	□130	FE12M	L7NHA020U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□IS	APCS-P□□□PB	-						
		□180	FF20M	L7NHA020U			APCS-P□□□JS	APCS-P□□□LB							
		□180	FF20M	L7NHA020U			APCS-P□□□IS1	-		APCS-P□□□SB					
		□180	FF20M	L7NHA020U			APCS-P□□□O0S								
	1,700	1,700	□180	FF30M			L7NHA035U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□IS	APCS-P□□□PB	-			
			□180	FF44M			L7NHA050U			APCS-P□□□JS	APCS-P□□□LB				
		2,000	□220	FG12M			L7NHA020U			APCS-P□□□IS1	-		APCS-P□□□SB		
			□220	FG20M			L7NHA020U			APCS-P□□□O0S					
2,000	1,700	□220	FG30M	L7NHA035U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□IS	-	APCS-P□□□SB						
		□220	FG44M	L7NHA050U			APCS-P□□□JS								
2,000	2,000	□220	FG60M	L7NHA075U	APCS-E□□□□DS	APCS-E□□□□DS1	APCS-P□□□MS	-	APCS-P□□□SB						
		□220	FG60M	L7NHA075U			APCS-P□□□O0S								

## L7NHA DD Motor

Rated Speed (rpm)	Maximum Speed (rpm)	External Diameter Of Motor(Φ)	Motor	Drive	Encoder Cable		Power	Power + Brake	Brake
					Serial	Absolute			
200	500	135Φ	DB03D	L7NHA001U	APCS-E□□□ZS	-	APCS-PN□□□YS	-	-
			DB06D	L7NHA002U					
			DB09D	L7NHA004U					
		175Φ	DC06D	L7NHA002U					
			DC12D	L7NHA004U					
			DC18D	L7NHA008U					
	400	230Φ	DD12D	L7NHA004U					
			DD22D	L7NHA008U					
			DD34D	L7NHA010U					
	300	290Φ	DE40D	L7NHA010U					
			DE60D	L7NHA020U					
	150	250	360Φ	DFA1G					
DFA6G				L7NHA035U					
50	100	380Φ	DGC3S	L7NHA020U					
200	500	135Φ	DFB03D	L7NHA001U	APCS-E□□□ZS1	-	APCS-PN□□□YS1	-	-
		175Φ	DFC06D	L7NHA002U					
		230Φ	DFD12D	L7NHA004U					

## L7NHB

Rated Speed (rpm)	Maximum Speed (rpm)	Flange	Motor	Drive	Encoder Cable		Power	Power + Brake	Brake
					Serial	Absolute			
3,000	5,000	□130	FEP09A	L7NHB010U	APCS-E□□□DS	APCS-E□□□DS1	APCS-P□□□HS1	APCS-P□□□NB1	-
		□130	FEP15A	L7NHB020U					
		□130	FEP22A	L7NHB035U					
		□130	FEP30A	L7NHB035U					
		□180	FFP30A	L7NHB035U					
		□180	FFP50A	L7NHB050U					
2,000	3,000	□130	FEP06D	L7NHB010U					
		□130	FEP11D	L7NHB010U					
		□130	FEP16D	L7NHB020U					
		□130	FEP22D	L7NHB020U					
		□180	FFP22D	L7NHB020U					
		□180	FFP35D	L7NHB035U					
	2,500	3,000	□180	FFP55D			L7NHB050U		
			□180	FFP75D			L7NHB075U		
			□220	FGP22D			L7NHB020U		
			□220	FGP35D			L7NHB035U		
			□220	FGP55D			L7NHB050U		
			□220	FGP75D			L7NHB075U		
1,500	3,000	□130	FEP05G	L7NHB010U					
		□130	FEP09G	L7NHB010U					
		□130	FEP13G	L7NHB020U					
		□130	FEP17G	L7NHB020U					
	2,700	3,000	□180	FFP20G	L7NHB020U				
			□180	FFP30G	L7NHB035U				
			□180	FFP44G	L7NHB050U				
			□180	FFP60G	L7NHB075U				
			□180	FFP75G	L7NHB075U				
			□220	FGP20G	L7NHB020U				
			□220	FGP30G	L7NHB035U				
			□220	FGP44G	L7NHB050U				
			□220	FGP60G	L7NHB075U				
			□220	FGP85G	L7NHB150U				
2,000	2,000	□220	FGP110G	L7NHB150U					
		□220	FGP150G	L7NHB150U					
1,000	2,000	□130	FEP03M	L7NHB010U					
		□130	FEP06M	L7NHB010U					
		□130	FEP09M	L7NHB010U					
		□130	FEP12M	L7NHB020U					
		□180	FFP12M	L7NHB020U					
		□180	FFP20M	L7NHB020U					
	1,700	2,000	□180	FFP30M	L7NHB035U				
			□180	FFP44M	L7NHB050U				
			□220	FGP12M	L7NHB020U				
			□220	FGP20M	L7NHB020U				
			□220	FGP30M	L7NHB050U				
			□220	FGP44M	L7NHB050U				
2,000	2,000	□220	FGP60M	L7NHB150U					
		□220	FGP60M	L7NHB150U					

L7CA

Rated Speed (rpm)	Maximum Speed (rpm)	Flange	Motor	Drive	Encoder Cable		Power	Power + Brake	Brake
					Serial	Absolute			
3,000	5,000	□40	FALR5A	L7CA001U	APCS-E □□□ES	APCS-E □□□ES1	APCS- P□□□LSC	-	APCS-B□□□QS
		□40	FAL01A	L7CA001U					
		□40	FAL015A	L7CA002U					
		□60	FBL01A	L7CA001U					
		□60	FBL02A	L7CA002U					
		□60	FBL04A	L7CA004U					
		□80	FCL04A	L7CA004U					
		□80	FCL06A	L7CA008U					
		□80	FCL08A	L7CA008U					
		□80	FCL10A	L7CA010U					
2,000	2,500	□80	FCL03D	L7CA004U					
		□80	FCL05D	L7CA008U					
		□80	FCL06D	L7CA008U					
		□80	FCL07D	L7CA008U					

Servo Drive