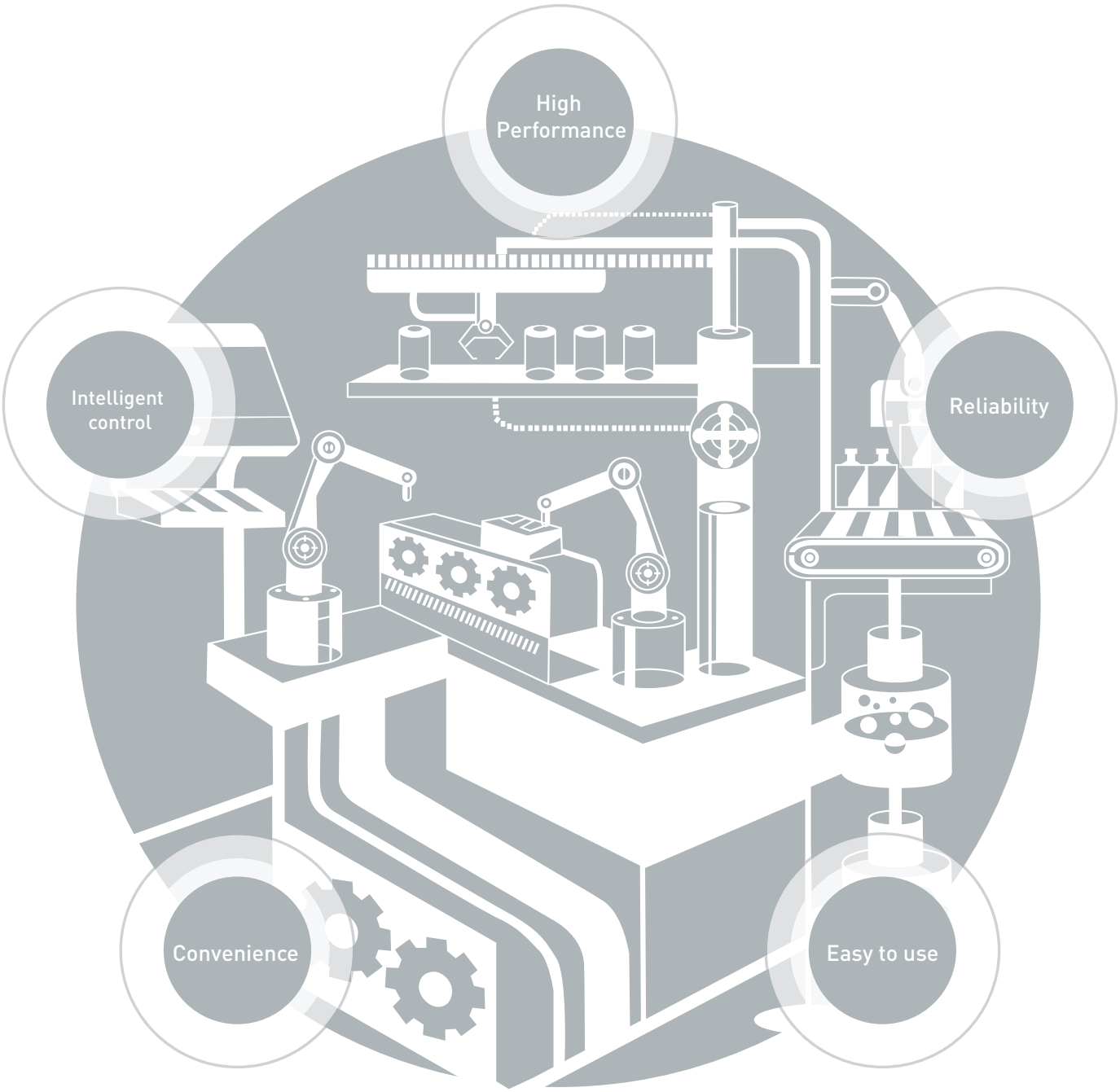
Top 100
Global
Innovator
for 10 years

Xmotion

Servo System

LS


High Performance
Intelligent control
Reliability
Convenience
Easy to use

Xmotion
Servo System

User-oriented Xmotion Servo Systems
complete your optimal solution.

Xmotion Series

Your motion systems visualize the perfect solution though the LS comprehensive product ranges for the optimal drives and applications. Its high-performance vector, precision and speed control are user-friendly and cost effective.

Features

It's Slim

38mm

The Minimized Width
to 38mm!!! (400W)

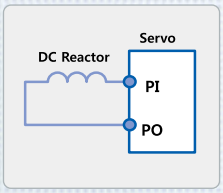
Reliability

Main Capacitor Quality Improved

- Long-life type capacitor applied (2.5 times improvement)

Convenient DC Reactor Installable

- Power connection to DC-link
- Easier wiring and smaller size compared to 3-phase AC reactor
- Connection for DC input (PI, N)



Stable Turn-off Function Based on The Detection of The Control Power Turn-off

Upgraded Protection Function(I)

- Triple protection functions for power module
  : IPM fault, CL detecting, over current detecting with S/W
- Main power mis-wiring detecting function : Selecting 3 phase or single phase, and alarm or warning is available
- Protecting overheating with thermal sensor in the drive and motor
- Alarm code grouping and exclusive output contacts (AL00, AL01, AL02)
- Warning function (digital output, warning output)
  : Mis-wiring of power, low voltage for encoder battery, over speed command, over torque command, over load, mis-matched motor and drive

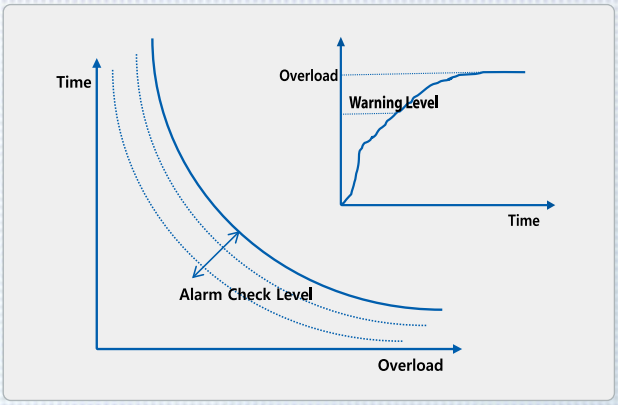
5%

Compared With
Competitor's
Drive Max 5% Slim

Upgraded Protection Function(II)

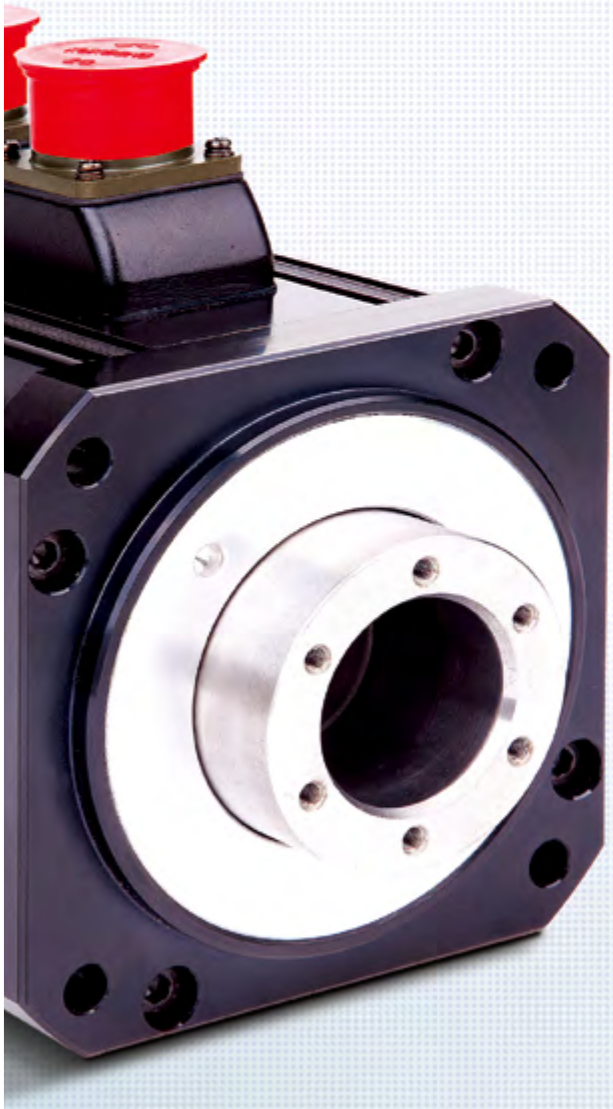
- Detecting function for accumulated over load of regenerative resistor
  : Protect algorithm is provided with embedded resistor characteristic
  : Protection by capacity (P0-11) and resistance (P0-10)
  : Providing de-rating factor for radiant heat
- Available continuous overload capacity setting as followed operating condition
  : Protect with separated overload table at stall & operation
  : Set overload check level (P0-12)
  : Setting warning signal output level is available (P0-13)

CE, RoHS, UL Certificated



Easy to USE

Reliable partner with global standard performance and easy control by user-centric environment



Easy Gain Tuning With Automatic Inertia Estimating Function

- Quick & Accurate Inertia Estimating
- Off-Line Tuning
- Parameter for Estimation (Speed &Distance)

Encoder With Bi-directional High Speed Serial Communication

- Automatic Identification (Motor ID /Encoder pulse)
- BiSS protocol
- Easy wiring (15encoderwires→7encoderwires)andanti-externalnoise

Sufficient Input/Output Contacts and Various Functions

- iX7NH: Digital input contacts: 6, output contacts: 3 / Analog input contacts: 1 and output contacts: 2
- L7NH: Digital input contacts: 8, output contacts: 4 / Analog input contacts: 1 and output contacts: 2
- L7S: Digital input contacts: 10, output contacts: 8 / Analog input contacts: 2 and output contacts: 2
- L7C: Digital input contacts: 10, output contacts: 5 / Analog input contacts: 2 and output contacts: 0
- L7P: Digital input contacts: 16, output contacts: 8 / Analog input contacts: 2 and output contacts: 2
- PEGASUS: Digital input contacts: 4, output contacts: 2 / Analog input contacts: 1 and output contacts: 1
- Flexible assignment of input/output signals by parameters and contact setting based on the input/output contact type (N.O / N.C contacts)

Using the Rotary Switch to Configure the Drive Node Address [iX7NH, L7NH, L7P, PEGASUS]

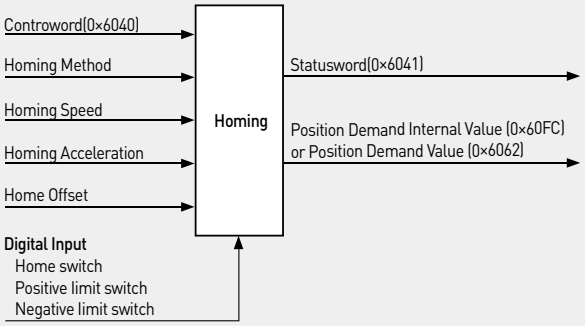
- Using the rotary switch to configure the drive node address conveniently
- iX7NH : 0~99, L7NH : 0~99, L7P : 0~31, PEGASUS : 0~15

Plug-in Type Power Connector

- Expanded to 1 kW - 3.5 kW for improved wiring convenience

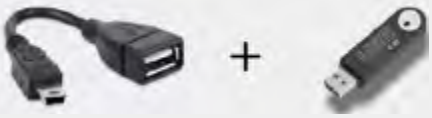
Various Homing Functions [iX7NH, L7NH, L7P, PEGASUS]

- The drive provides the homing function.
- You can specify the speed, acceleration, offset, and homing method.



Easy Firmware Upgrade [iX7NH, L7NH, L7P, PEGASUS]

- Supporting the USB OTG function to allow firmware download with a USB memory
- Useful where space is limited or environmentally unfavorable



Built-in Regenerative Braking Resistance in the Drive

- Drive installed inside to improve user convenience
- Providing the connection for external installation
- Enhanced protection algorithm

Xmotion servo series with high speed, incredible performance, smart and convenience. It's time to check value of Xmotion series

High Performance

Serial Encoder of High Resolution (16 bit - 21 bit)

- Stability improved during precision position control and low-speed operation

Stable Low-speed Properties Based on Precise Speed Measurement

- Stable speed measurement at low speed

Calculation Speed Improved [iX7NH, L7NH, L7P, PEGASUS]

- FPU (Floating Point Unit) for reliable precision calculation
- Maximum16kHz switching frequency for precision current control
- 32 bit operation for increased synchronous command processing rate (MIPS)

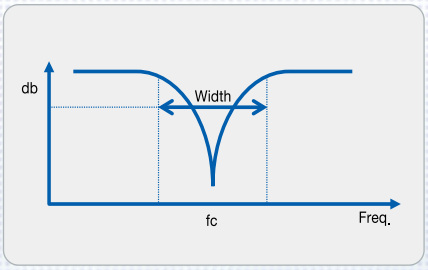
Dedicated PC P Rogram

- L7S : LIVE-I.C.E
  iX7NH, L7NH, L7NHF, L7C, L7P, PEGASUS, PH0X : Drive CM
- PC program for shortened equipment tuning time and debugging
- Monitoring for speed, torque, current feedback, position values and positional error values and alarm occurrence time

Intelligent Control

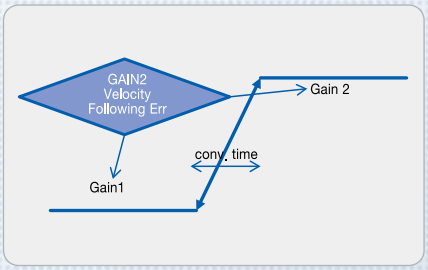
Notch Filter for Resonance Suppression

- 4-step notch filter
- 2-step vibration suppression filter at the load position
- FFT function for real-time frequency analysis



Various Gain Switching Modes for Improved Control Performance

- P/PI auto-switching function to reduce overshooting during acceleration/deceleration
- Various Gain1↔Gain2 switching modes



Various Dynamic Brake Control Modes

- Configuring the operation mode at stop and after stop

Convenience

Providing various functions– backup, network diagnosis, monitoring and built-in functions focused on improving efficiency

High Performance

- High speed, Real-time capability and synchronization mechanism

Cost Effective

- Standard Ethernet Cabling + Connectors, Less implementation efforts for master and slave

Easy to Use

- Versatile topology and diagnostics

L7 Drive With Built-in EtherCAT Interface

- 100BASE-TX(100Mbps) Ethernet based real-time communication
- Support CiA402(IEC61800-7) drive profile
- Interoperability
- Max. 100m between nodes
- Precise synchronization mechanism (1us)
- Freely settable process data length and mapping
- Four status indication LEDs (L/A0, L/A1, RUN, ERR)
- Standard RJ45 connector and cabling(CAT5)
- Support various homing modes
- Support Full-closed control (L7NHF)

Various Operation Modes

- iX7NH, L7NH and PEGASUS: Using the EtherCAT communication to support Cyclic & Profile (P/S/T) modes, EOE, COE, and FOE

Safe Torque Off Function

- Torque-off forced by hardware signals without involvement of the drive CPU and FPGA (ASIC); international standards adopted (IEC61508)

High Speed Position Capture Function

- Touch probe function (PROBE1, PROBE2)

Adjustment Function Linked With XGT Series From LS ELECTRIC

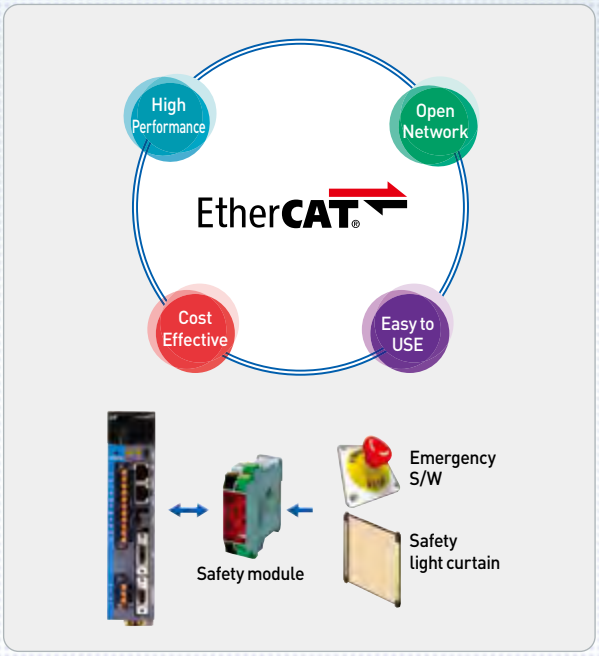
- Inertia detection, position/speed gain manual adjustment, gain switching setup, etc.

Have Conformity of EtherCAT Device

- In-house test using CTT(Conformance Test Tool)

Open Network

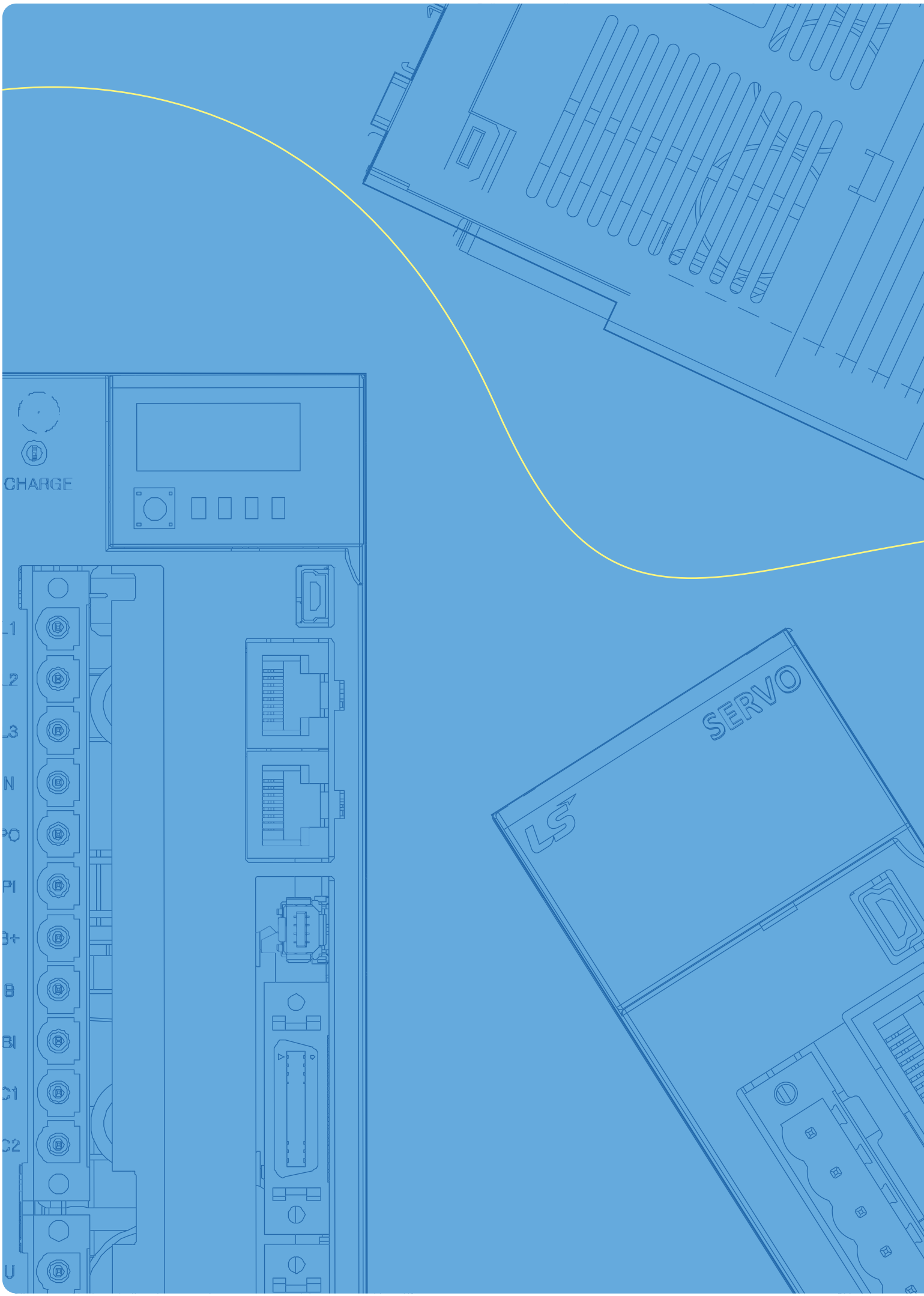
- Over 1600 worldwide members

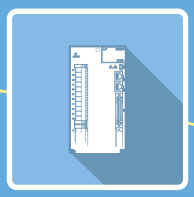


LS ELECTRIC XGT PLC + PN8B

Provide Gain Tuning Tools and Commissioning Packages

- Automatic inertia tuning and PI gains
- Gain conversion setting
- Manual fine gain tuning tool
- Object save and initialization function
- Alarm history function(Recently issued 20 alarm codes)


CHARGE
SERVO
LS



Servo Drive

Contents

iX7NH Series

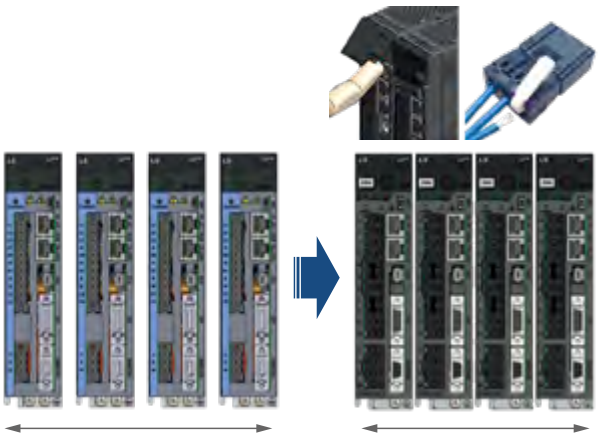
Servo Drive Designation

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

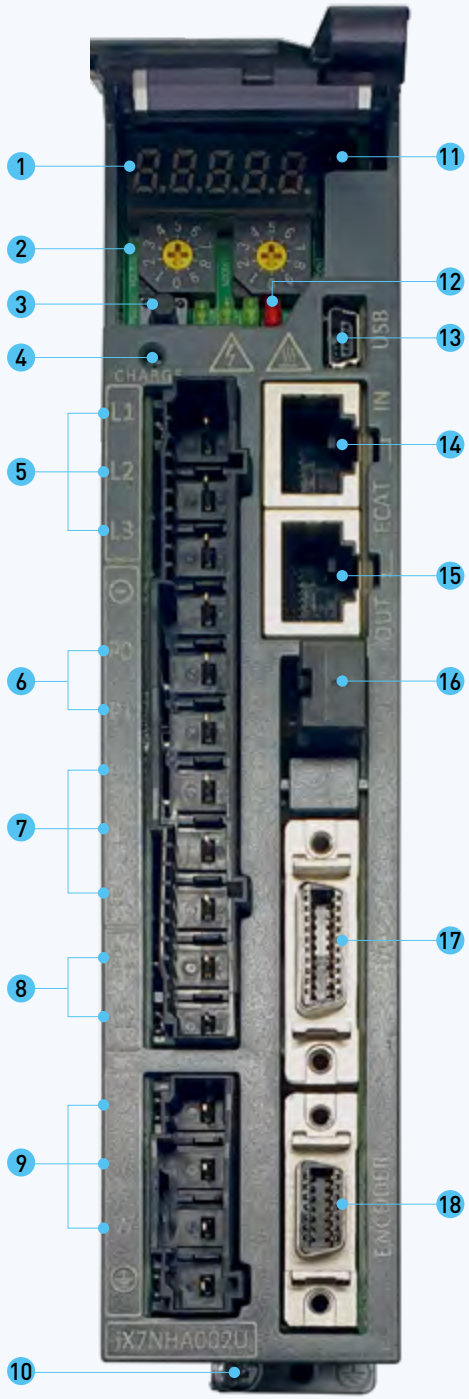
Next Generation EtherCAT Network Command Type iX7NH

Compact & Convenience

- Optimized installation space by highly efficient heat dissipation
  - 100W ~ 1kW Drive
- Minimized drive depth for 100W and 200W drive by development and application of mini heatsink
  - 172.5mm → 145.2mm ; volume reduced by 16%
- Parameter display: easy to open and close
- Spring clamp connector applied for easier wiring



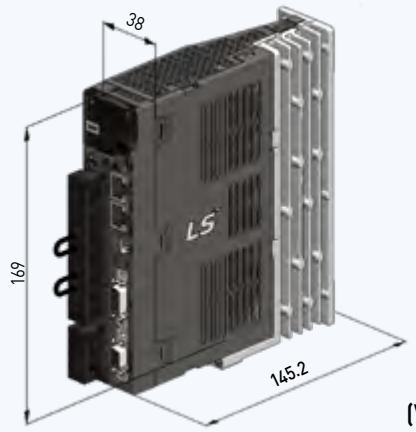
Based on 400W



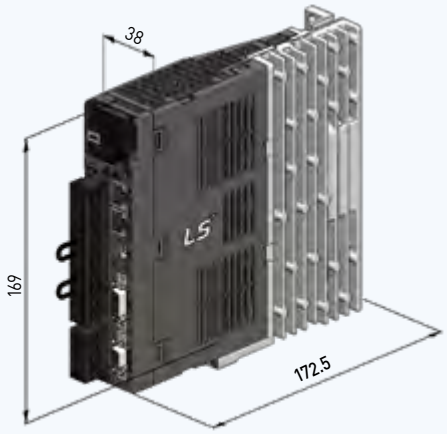
1. Display
2. Charge lamp
3. Node address setting switch
4. OTG Switch
5. Main power connector (L1, L2, L3)
6. DC Reactor connector (PO, PI)
7. Regenerative resistance connector (B+, B, BI)
   - Short-Circuit B, BI terminals when standard type
   - Use B+, B terminals when using external resistor
8. 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)

Identifying the Part

Minimized drive depth for 100W and 200W drive by development and application of mini heatsink



172.5mm → 145.2mm
(Volume reduced by 16% ↓)

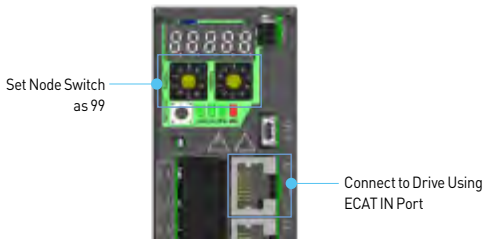


More Variety of Supported Encoders & Enhanced Control Functionalities

- More types of encoders supported on top of high resolution encoder
  - BiSS, Quadrature, Tamagawa, Panasonic, EnDat 2.2, SSI, Nikon and Sinusoidal (Optional)
- Temperature monitoring by encoders supported
- Enhanced disconnection check function of quadrature encode
  - Disconnection check circuit added
  - No dummy wiring needed
- Improved control cycle times
  - Position: 125 μs
  - Speed: 62.5 μs
  - Current: 31.25 μs
- 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
  - Back-up & restoration of drive parameters (drive ↔ USB device)
  - Back-up of drive's alarm history (drive → USB device)
  - Firmware update (drive ← USB device)

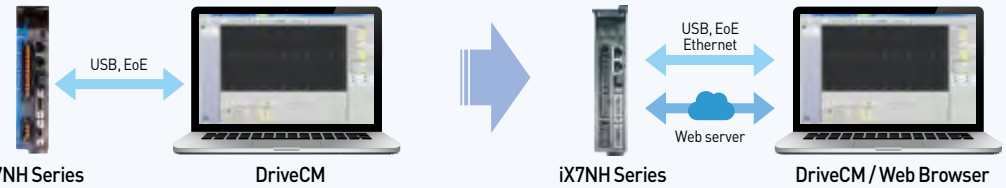
When Using USB OTG

When Using Modbus TCP



Faster Communication Provided in More Diverse Methods

- Fieldbus: EtherCAT & Modbus TCP
- Min. Communication cycle time
- 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



Drive Product Features

iX7NHA Drive

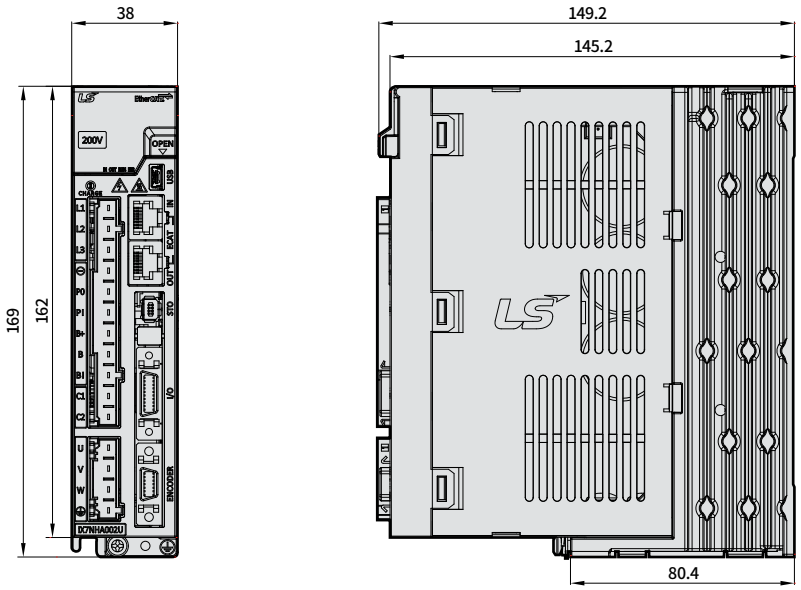
Item \ Part Number		iX7NHA001U	iX7NHA002U	iX7NHA004U	iX7NHA008U	iX7NHA010U	iX7NHA020U	iX7NHA035U
Input Power	Main Power	1-Phase AC100 ~ 120[V], 1-Phase AC200 ~ 240[V], 3-Phase AC200 ~ 240[V], (-15 ~ +10[%]), 50 ~ 60[Hz]			1-Phase AC200 ~ 240[V], 3-Phase AC200 ~ 240[V], (-15 ~ +10[%]), 50 ~ 60[Hz]	3-Phase 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	16.7
Peak Current [A]		4.9	5.95	10.5	18.2	20.25	40.5	50.1
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 & 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)* Automatically 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	Digital Input	Input voltage range: -10 ~ +10[V], Function: analog torque limit (1 channel, unallocable)						
	Digital 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, Parameter setting, Tuning, Parameter copy						
	Communication Standard	Conforming USB 2.0 Full Speed and OTG 2.0 standard						
	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	Default built-in (Except 100W & 200W), external installation possible						
	Display Function	7 segments(5DIGIT)						
	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	Below 80[%]RH / Below 90[%]RH(avoid dew-condensation)						
	Environment	Indoor, avoid corrosive, inflammable gas or liquid						

External Dimensions

*Unit [mm]

iX7NHA001U / iX7NHA002U

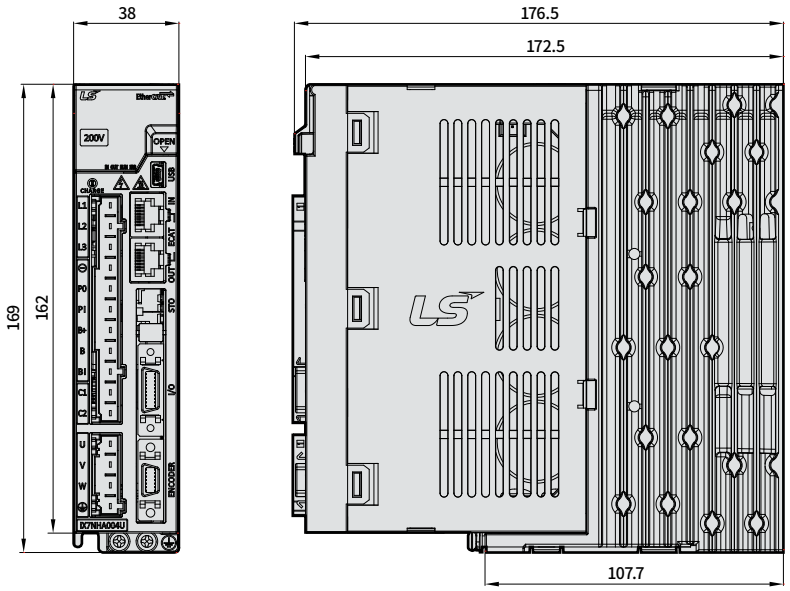
[Weight : 0.8kg]



*Unit [mm]

iX7NHA004U

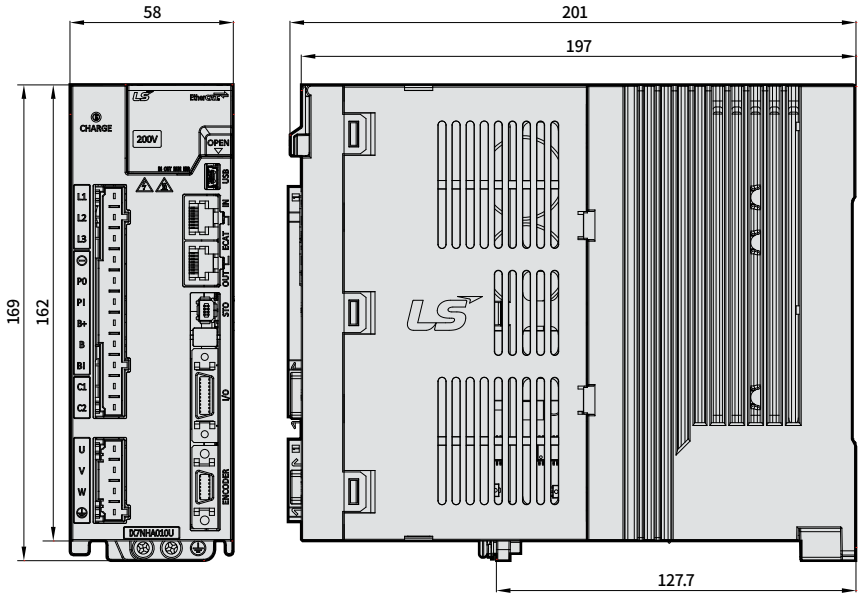
[Weight : 1.0kg]



*Unit [mm]

iX7NHA008U / iX7NHA010U

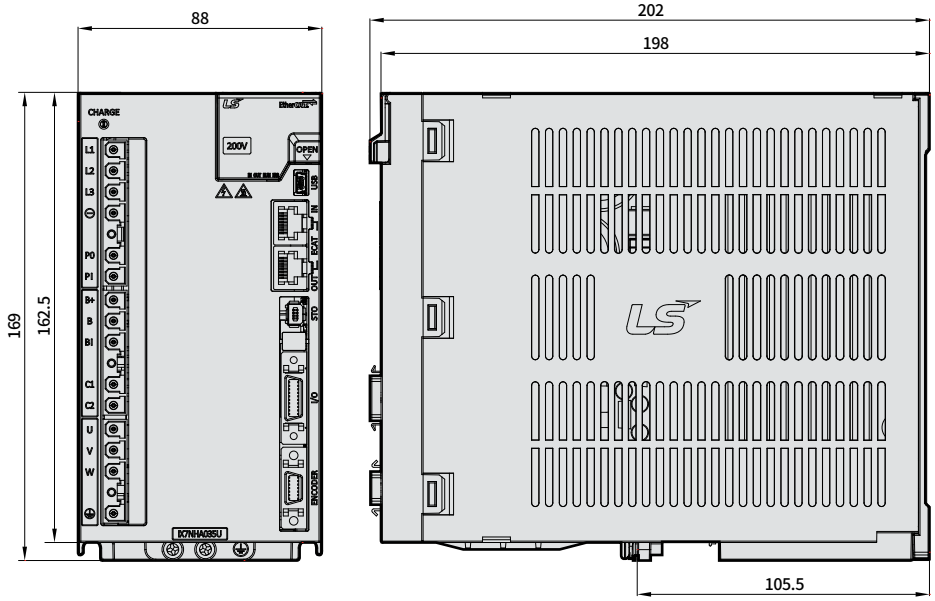
[Weight : 1.6kg
(Fan-Cooling included)]



*Unit [mm]

iX7NHA020U / iX7NHA035U

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



L7NH Series

Servo Drive Designation

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

All-in-One EtherCAT Communication Type L7NH

Real-time Control Through EtherCAT

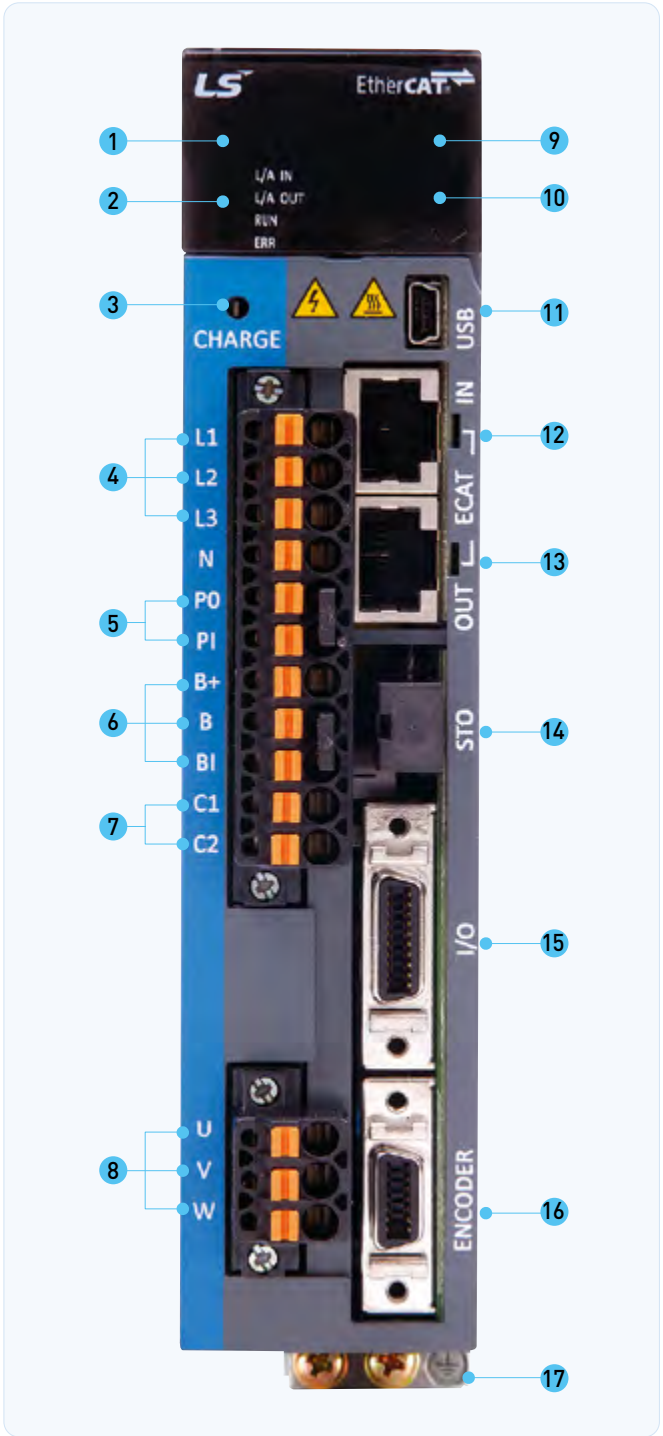
- High speed, Real-time capability and Synchronization mechanism
- Improved EtherCAT communication speed (min. 250us, DC support)
- Supporting CoE, EoE and FoE
- Improved speed response(≒1kHz) frequency

Support Various Motor and Encoder Drive

- Supporting rotary, DD and motor drive (Supporting3rd party motor)
- Quadrature, BiSS-C, Tamagawa serial abs, EnDat 2.2, Resolver

Improved Control Performance

- Improved control bandwidth
- Providing 4-step Notch-filter
- Vibration control by Real-time FET
- Real-time gain tuning function



1. Display
2. State LED
3. Charge lamp
4. Main power connector (L1, L2, L3)
5. DC Reactor connector (P0, PI)
6. Regenerative resistance connector (B+, B, BI)
   - Short-Circuit B, BI terminals when standard type
   - Use B+, 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
12. EtherCAT Communication port(IN)
13. EtherCAT Communication port(OUT)
14. Safety connector(STO)
15. Input/Outputsignal/Connector
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)	By DC mode synchronism. 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 : DC 12[V] ~ DC 24[V] Total 8 input channels (allocable) Above 12 functions 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) Above 11 functions 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 Channels (EDM±)									
USB Communication	Function	Firmware download, Parameter setting, Tuning, Secondary function, Parameter copy									
	Communication Standard	USB 2.0 Full Speed (Applies 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 segments(5DIGIT)									
	Self-setting Function	The [MODE] key changes the content displayed in 7 segments									
	Additional Function	Auto gain tuning function									
	Protection 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(Avoid dew-condensation)									
	Environment	Indoor, Avoid corrosive, inflammable gas or liquid, and electrically conductive dust.									

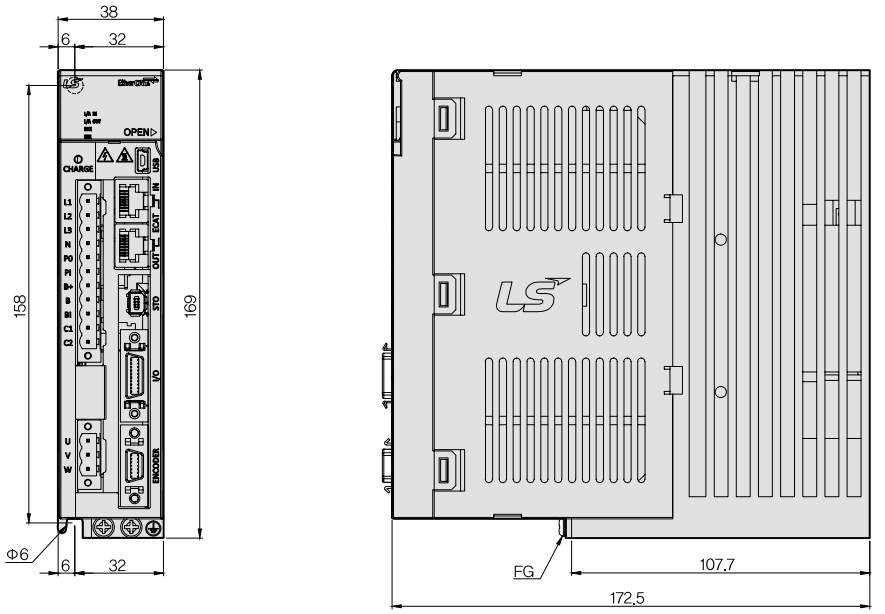
L7NHB Drive

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), 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)	By DC mode synchronism. 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 : DC 12[V] ~ DC 24[V] Total 8 input channels (allocable) Above 12 functions 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) Above 11 functions 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 Channels (EDM±)					
USB Communication	Function	Firmware download, Parameter setting, Tuning, Secondary function, Parameter copy					
	Communication Standard	USB 2.0 Full Speed (applies 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 segments(5DIGIT)					
	Self-setting Function	The [MODE] key changes the content displayed in 7 segments					
	Additional Function	Auto gain tuning function					
	Protection 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(avoid dew-condensation)					
	Environment	Indoor, Avoid corrosive, inflammable gas or liquid, and electrically conductive dust.					

External Dimensions

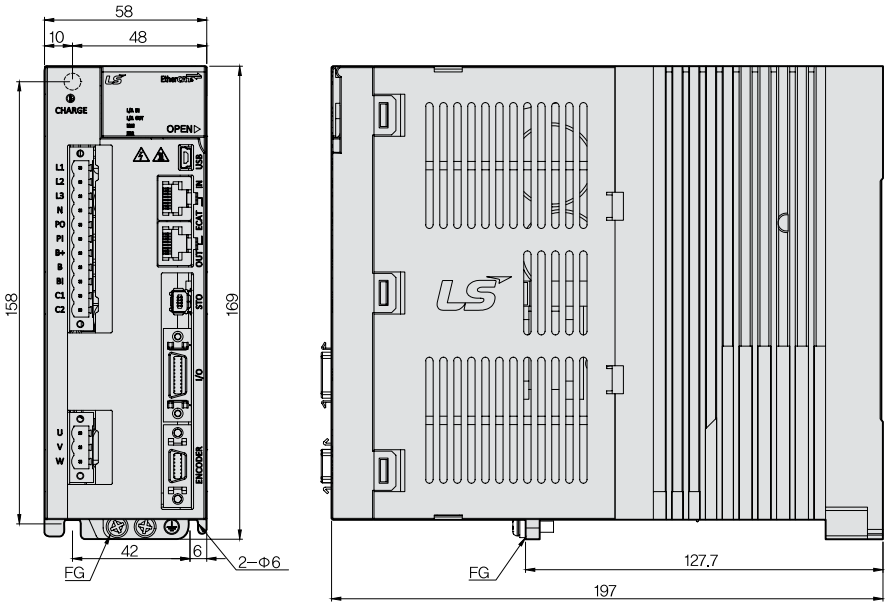
*Unit [mm]

L7NHA001U ~ L7NHA004U
[Weight: 1.0kg]



*Unit [mm]

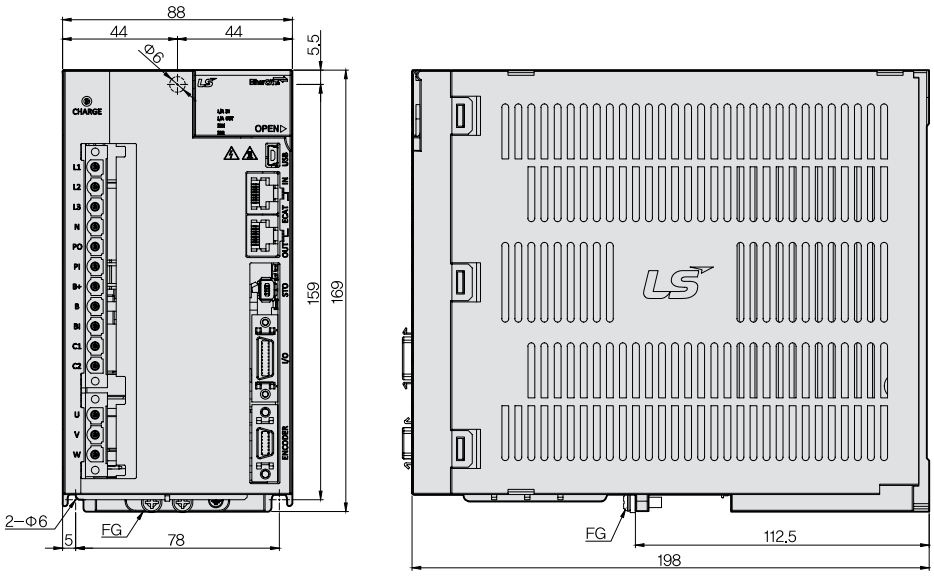
L7NHA008U / L7NHA010U
[Weight: 1.5kg
(Fan-Cooling included)]



*Unit [mm]

L7NHA020U / L7NHA035U

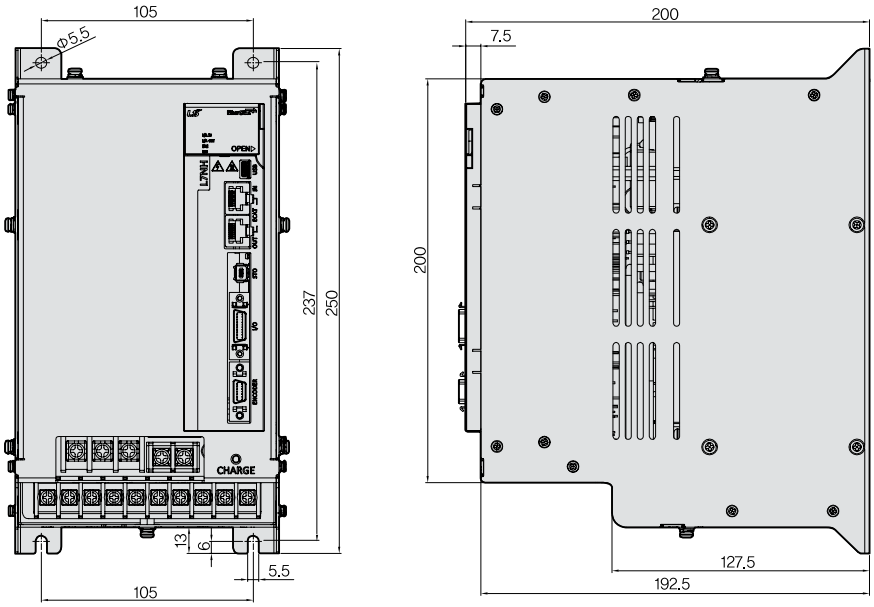
[Weight: 2.5kg
(Fan-Cooling included)]



*Unit [mm]

L7NHA050U

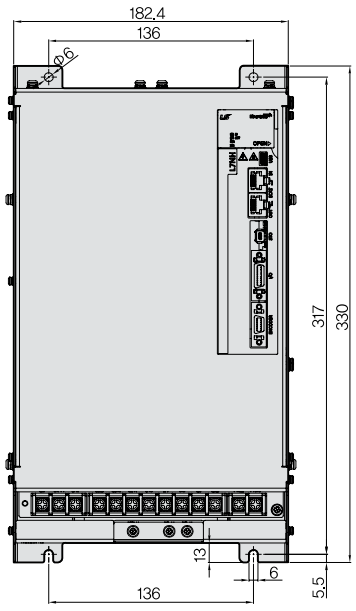
[Weight: 5.5kg
(Fan-Cooling included)]

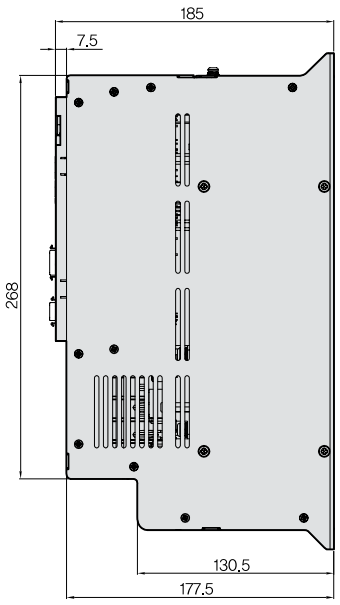


External Dimensions

*Unit [mm]

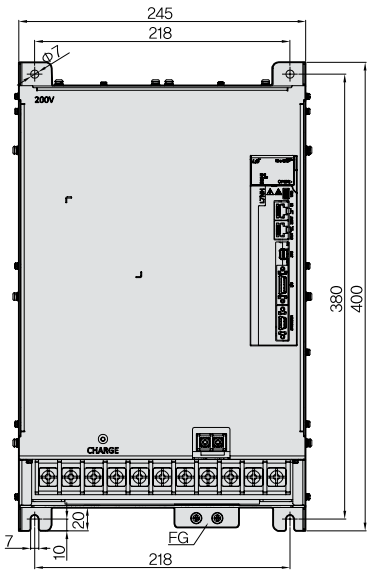
L7NHA075U
[Weight: 8.5kg
(Fan-Cooling included)]

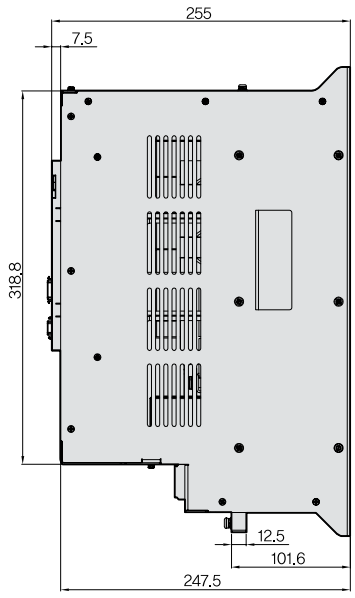




*Unit [mm]

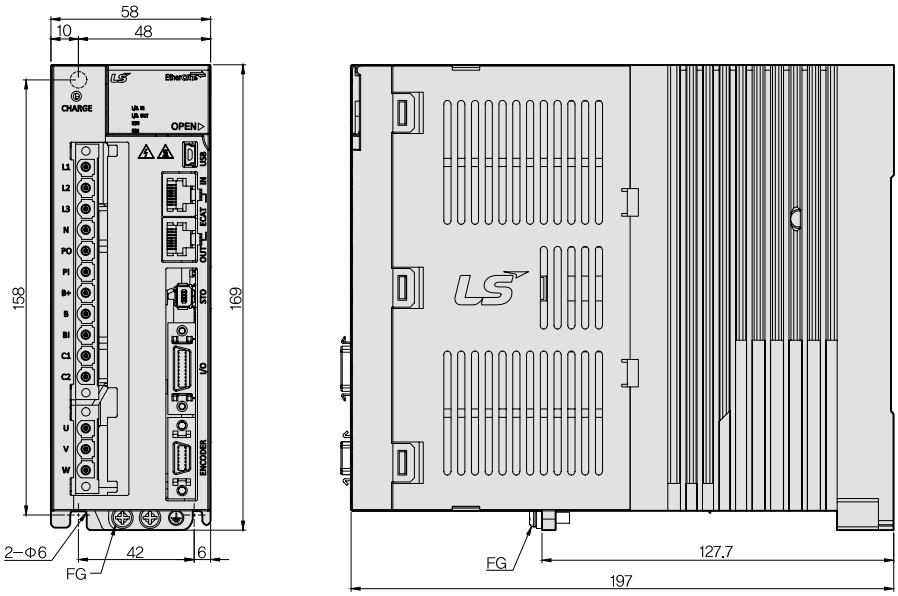
L7NHA150U
[Weight: 16.2kg
(Fan-Cooling included)]





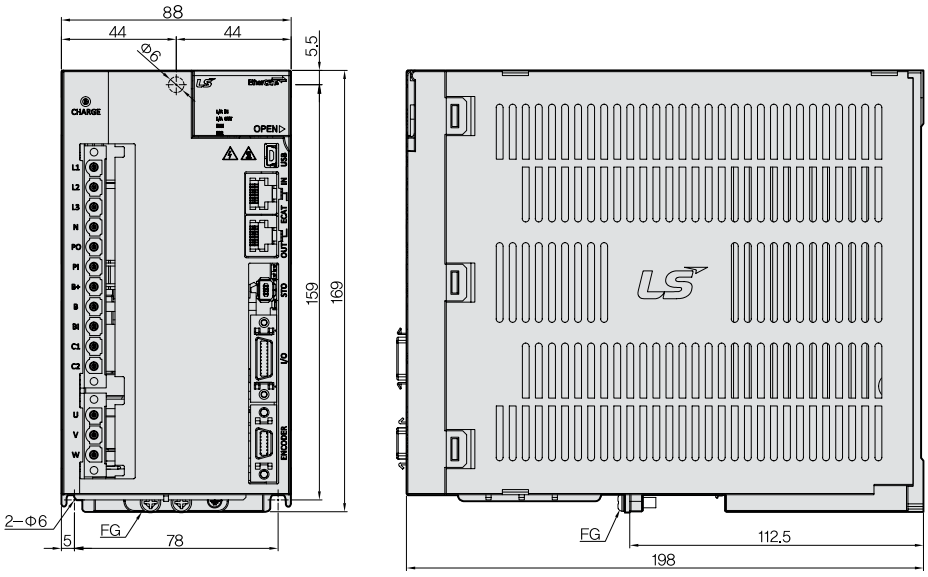
*Unit [mm]

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



*Unit [mm]

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

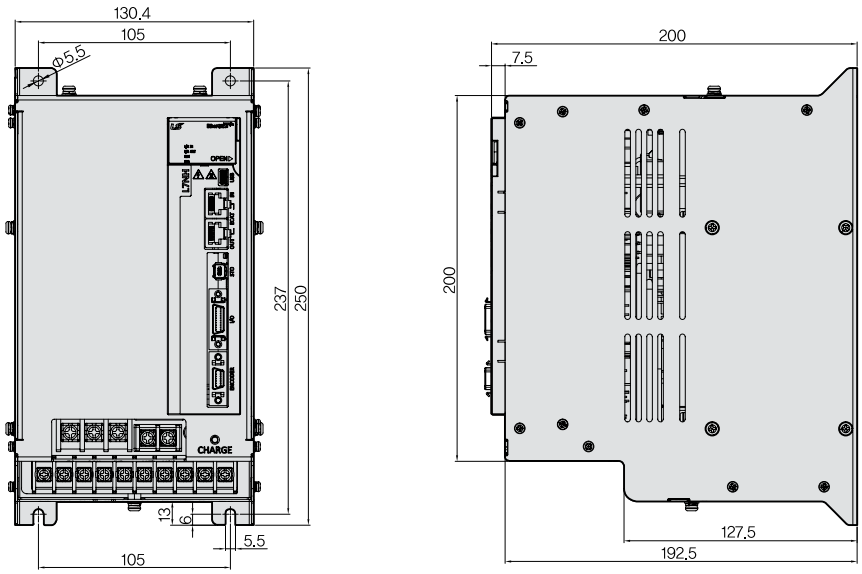


External Dimensions

*Unit [mm]

L7NHB050U

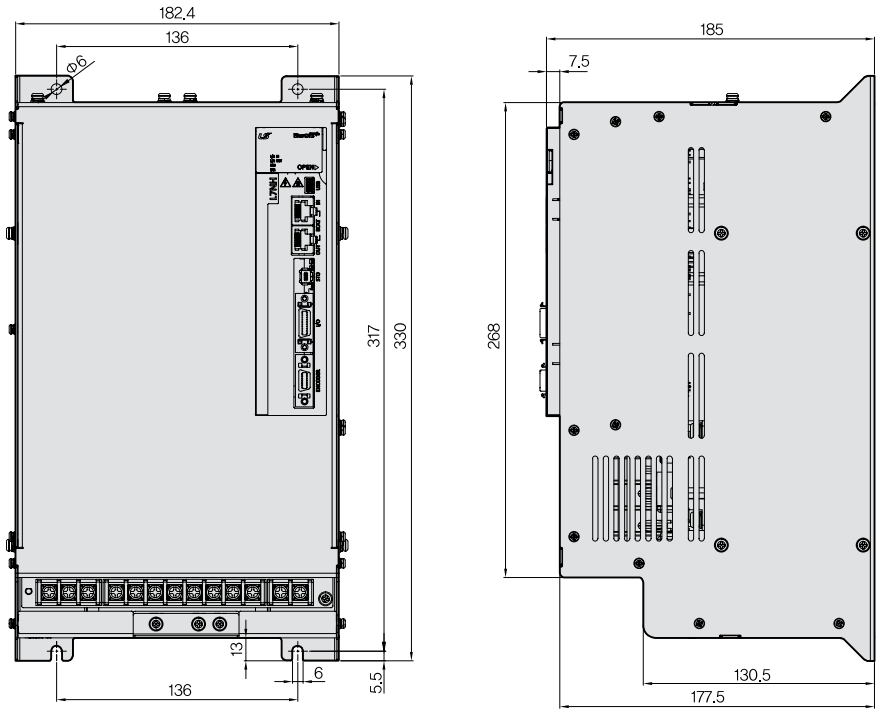
[Weight: 5.5kg
(Fan-Cooling included)]



*Unit [mm]

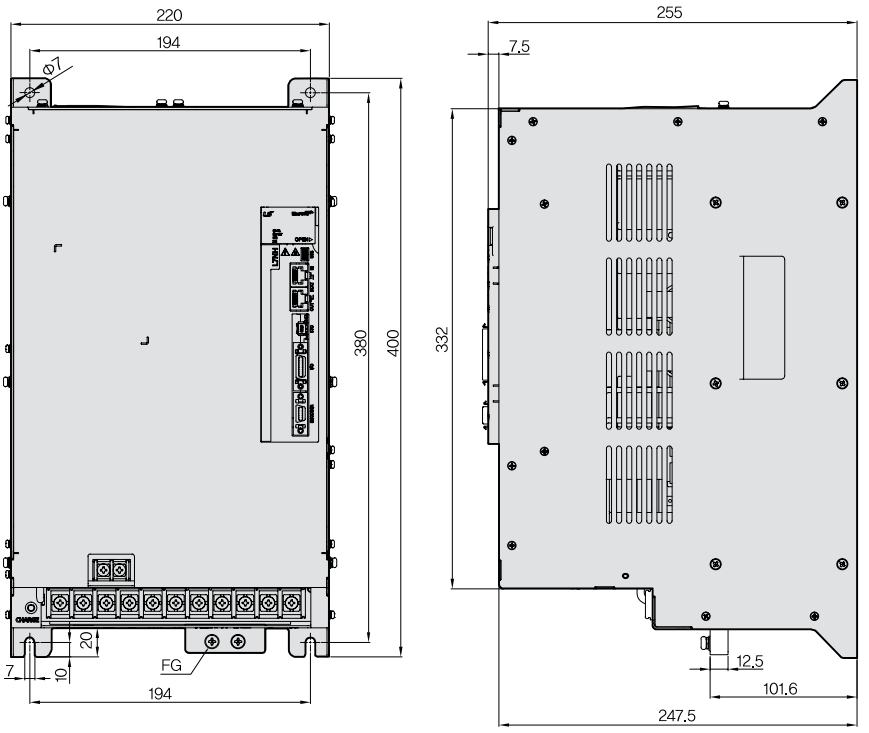
L7NHB075U

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



*Unit [mm]

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



L7NHF Series

Servo Drive Designation

L7	NHF	A	010	U	AA
	Communication	Input Power Supply	Capacity	Encoder Type	Option
	All-in-One Type 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

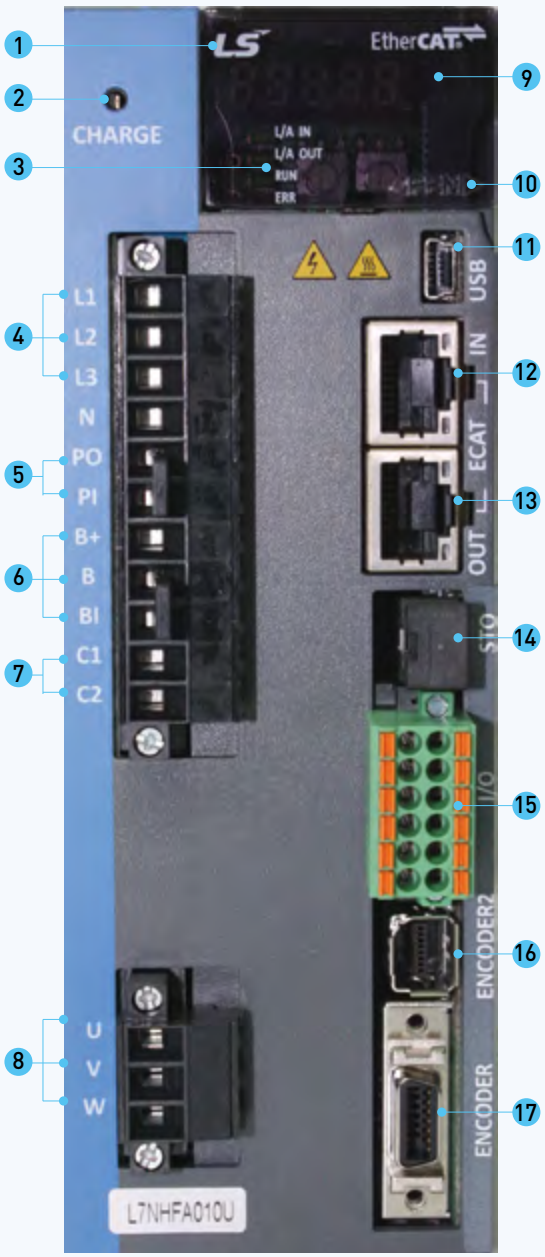
All-in-One EtherCAT, Full-Closed System Control L7NHF

Real-time Control Through EtherCAT

- High speed, Real-time capability and synchronization mechanism
- Supporting CoE, EoE and FoE
- Improved speed response(≒1kHz) frequency
- Improved communication speed byapplying 16bit-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 lamp
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 Ether CAT communication port(IN)
13 Ether CAT communication port(OUT)
14 Safety connector(STO)
15 Input/Outputsignal connector
16 Encoder2 connector(ENCODER2)
17 Encoder connector(ENCODER)

L7NHFA Drive

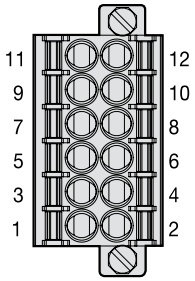
Item \ Type Name		L7NHFA004U	L7NHFA010U	L7NHFA035U	L7NHFA050U	L7NHFA075U
Input Power	Main Power Supply	3 Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]				
	Control Power Supply	Single Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]				
Rated Current[A]		3.0	6.8	16.7	32	39.4
Peak Current[A]		9.0	20.3	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 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)	By DC mode synchronism. 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) Above 15 functions 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 output 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 (STO1, STO2))				
USB Communication	Function	Firmware download, Parameter setting, Tuning, Secondary function, Parameter copy				
	Communication Standard	USB 2.0 Full Speed (Applies 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 segments(5DIGIT)				
	Self-setting Function	The [MODE] key changes the content displayed in 7 segments				
	Additional Function	Auto gain tuning function				
	Protection Function	Overcurrent, overload, overvoltage, insufficient voltage, overspeed, overheat(power module overheat, abnormal drive operation's temp), encoder problem, position tracking problem, current sensing problem				
Operation Environment	Operating Temperature / Storage Temperature	0 ~ 50[°C] ~ -20 ~ 65[°C]				
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Avoid dew-condensation)				
	Environment	Indoor, Avoid corrosive, inflammable gas or liquid, and electrically conductive dust.				

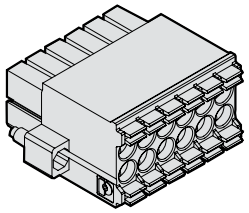
L7NHF Series I/O & Encoder2 PIN MAP

I/O Connector

PIN No.	Signal	PIN No.	Signal
1	DICOM	7	DI6
2	FG	8	DI5
3	D2	9	DO2
4	DI1	10	DO1
5	DI4	11	DOCOM
6	DI5	12	DO3

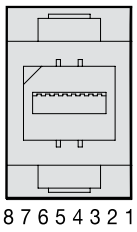
DFMC 1.5 / 6-STF-3.5 (PHOENIX)

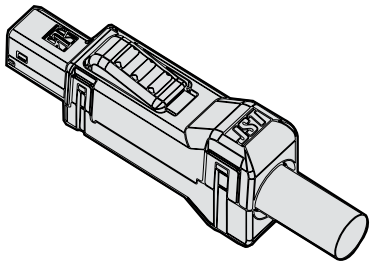




Encoder2 Connector

MUF-PK8K-X (JST)



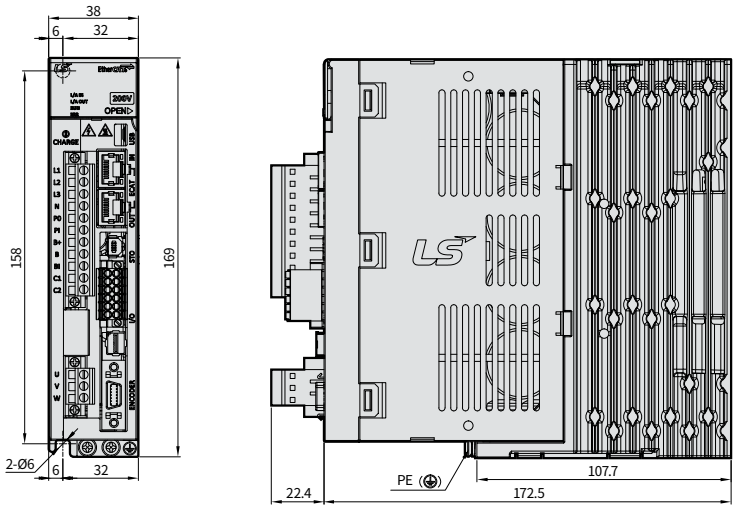


PIN No.	Signal(Quadrature)	Signal(SSI)	PIN No.	Signal(Quadrature)	Signal(SSI)
1	5V	5V	5	B	CLK
2	GND	GND	6	/B	/CLK
3	A	DATA	7	Z	Z
4	/A	/DATA	8	/Z	/Z

External Dimensions

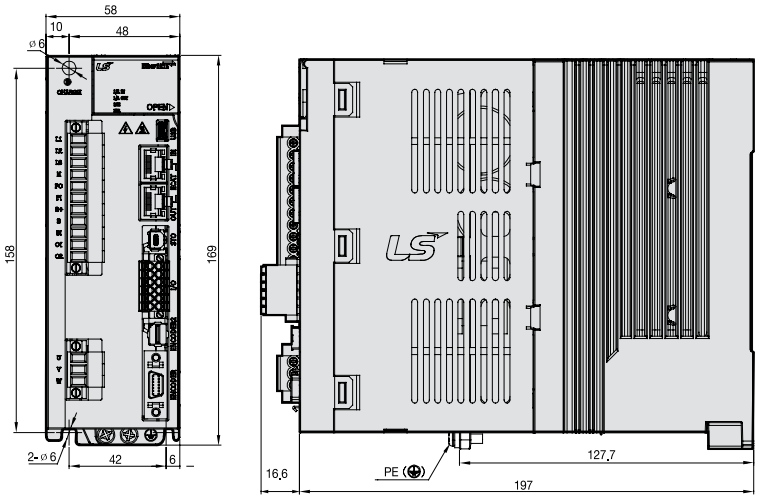
*Unit [mm]

L7NHFA004U
[Weight: 1.0kg]



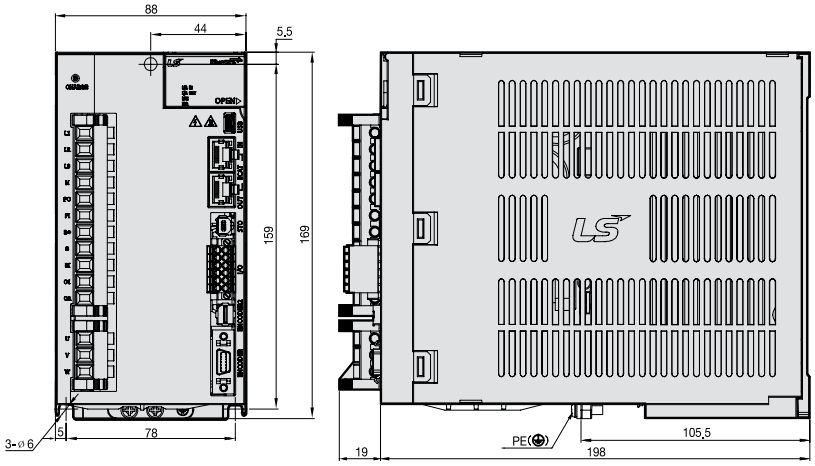
*Unit [mm]

L7NHFA010U
[Weight: 1.5kg
(Fan-Cooling included)]



*Unit [mm]

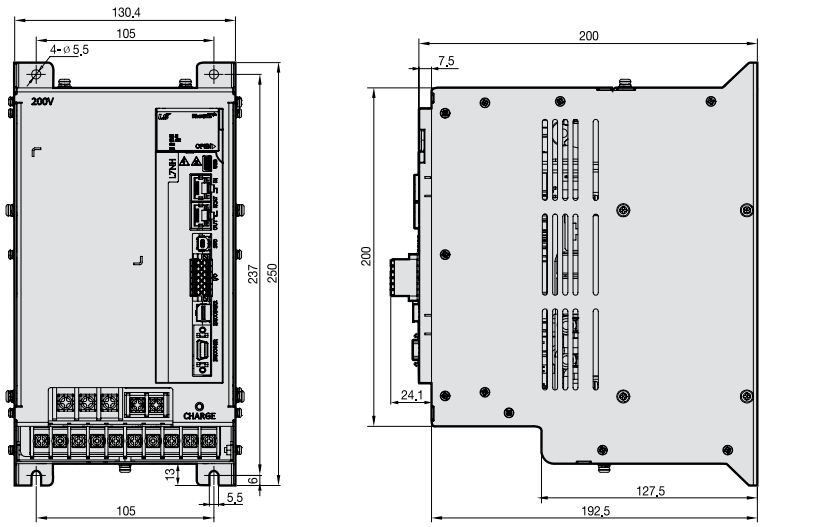
L7NHFA035U
[Weight: 2.5kg
(Fan-Cooling included)]



*Unit [mm]

L7NHFA050U

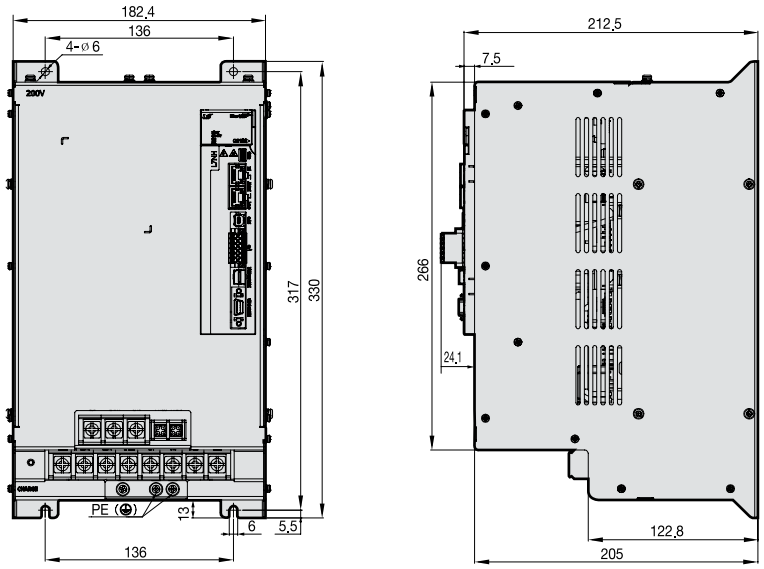
[Weight: 1.5kg
(Fan-Cooling included)]



*Unit [mm]

L7NHFA075U

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



L7S Series

Servo Drive Designation

L7	S	A	004	B	AA
	Communication	Input Power Supply	Capacity	Encoder Type	Option
	Standard I/O Type	A : 200VAC	001 : 100W	A : Incremental	Exclusive Option Code
		B : 400VAC	002 : 200W	B : Serial	
			004 : 400W		
			008 : 750W		
			010 : 1.0kW		
			020 : 2.0kW		
			035 : 3.5kW		
			050 : 5.0kW		
			075 : 7.5kW		
			150 : 15.0kW		

Identifying the Part

Pulse, Analog Command Type L7S

Easy to USE

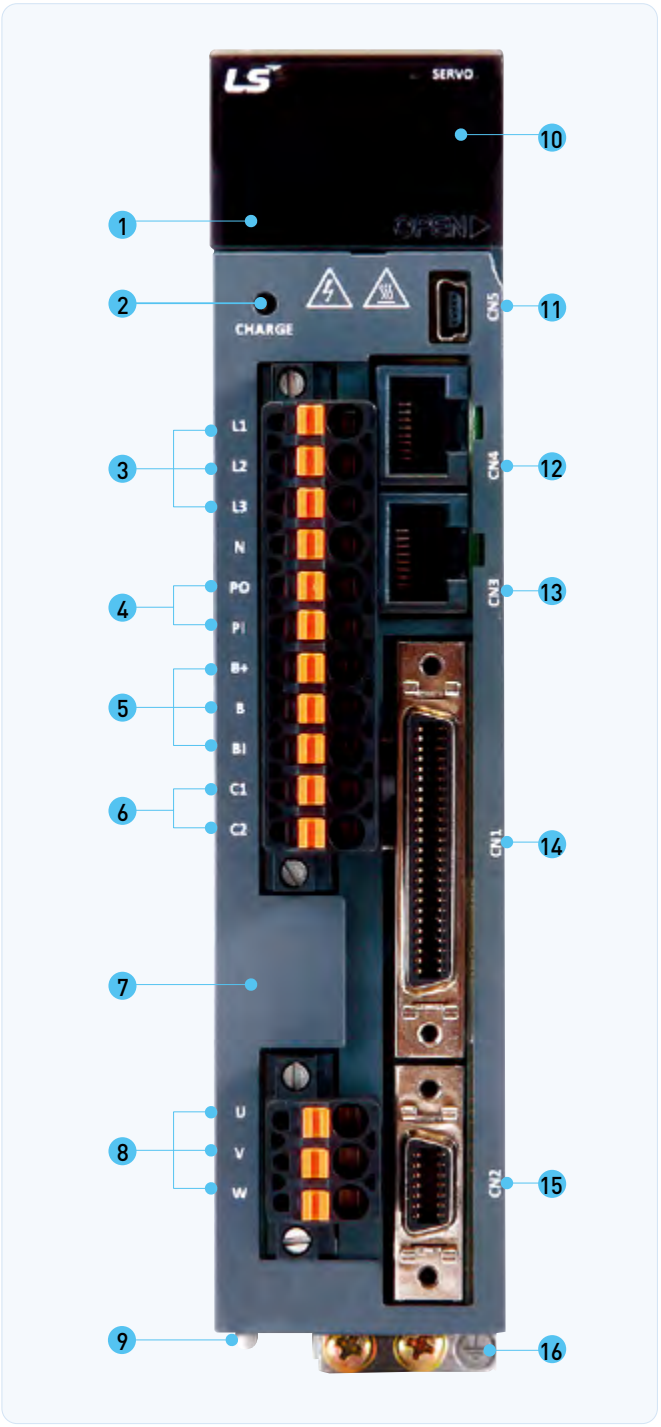
- Easy gain tuning with automatic inertia estimating function
- Easy setting Built-in panel operator
- Many I/O contacts and various functions (Digital input: 10 contacts, Digital output: 8 contacts / Analog input, output: 2 contacts)

Reliability for Protection Function

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

High Response for Precision Control

- High Resolutions Serial type Encoder(19Bit, BiSS)
- Improved Speed Response(≒1Khz) Frequency



1. Operation keys (Mode, Up, Down, Set)
2. Charge lamp
3. Main power connector (L1, L2, L3)
4. DC Reactor connector(PO, PI)
   - Short-Circuit when not used
5. Regenerative resistance connector (B+, B, BI)
   - Short-Circuit B, BI terminals when standard type
   - Use B+, 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.TypeIncremental line driver2,000~10,000[P/R] serial type18Bit (100WCM8only),19bit,20bit(DDmotoronly)									
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[%]orlower[When load changes between oand100%] ±0.1[%]orlower[Temperature25±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		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		Seven segments (5 DIGIT)									
	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(Avoid dew-condensation)									
	Environment		Indoor, Avoid corrosive, inflammable gas or liquid, and electrically conductive dust.									

* L7SA075 and L7SA150 do not support Incremental type

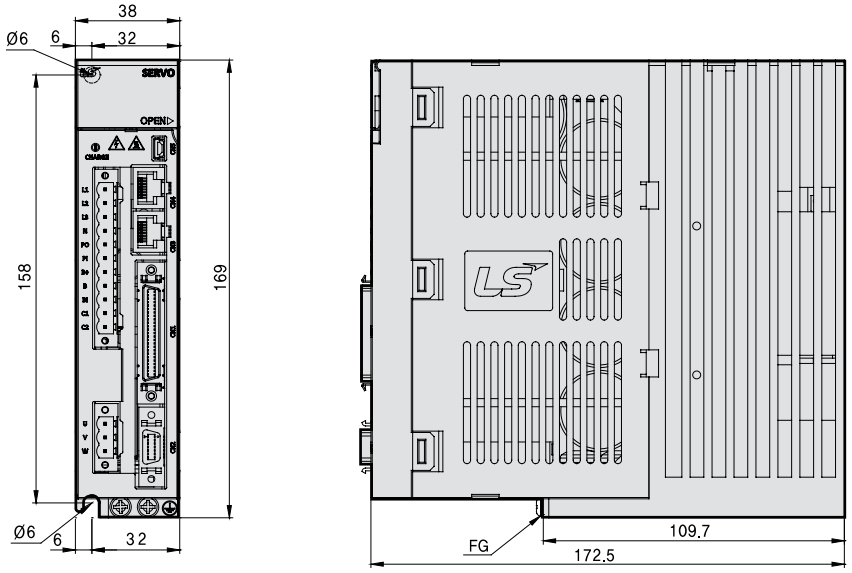
L7SB Drive

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 the 19-bit serial encoder is applied)					
		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		Both default built-in and external installation possible					External installation possible
	Display		Seven segments (5 DIGIT)					
	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 heating, drive temperature error), encoder error, excessive regeneration, sensor error, communication error					
OperationEnvironment	Operating Temperature / Storage Temperature		0 ~ +50[°C] / -20 ~ +70[°C]					
	Operating Humidity / Storage Humidity		Below 80[%]RH / Below 90[%]RH(Avoid dew-condensation)					
	Environment		Indoor, avoid corrosive, inflammable gas or liquid, and electrically conductive dust.					

External Dimensions

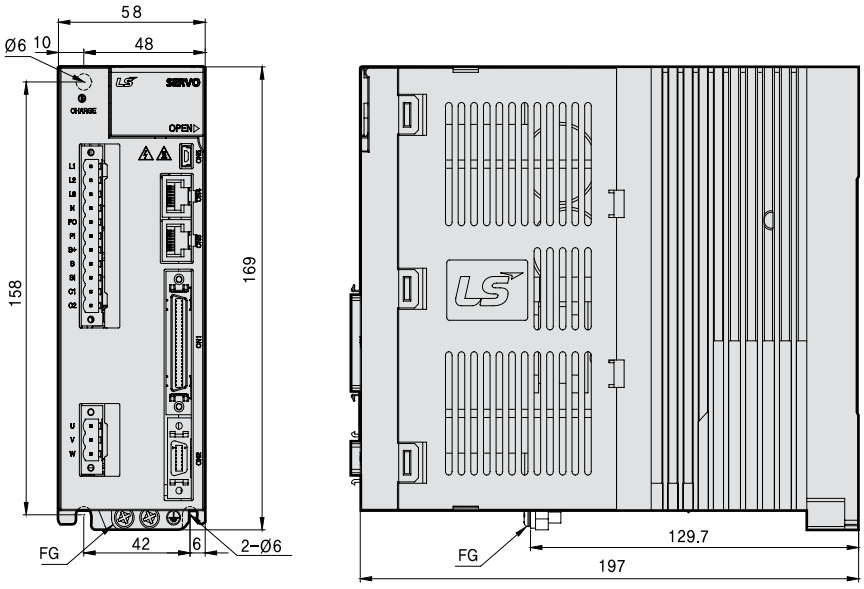
*Unit [mm]

L7SA001□~L7SA004□
[Weight: 1.0kg]



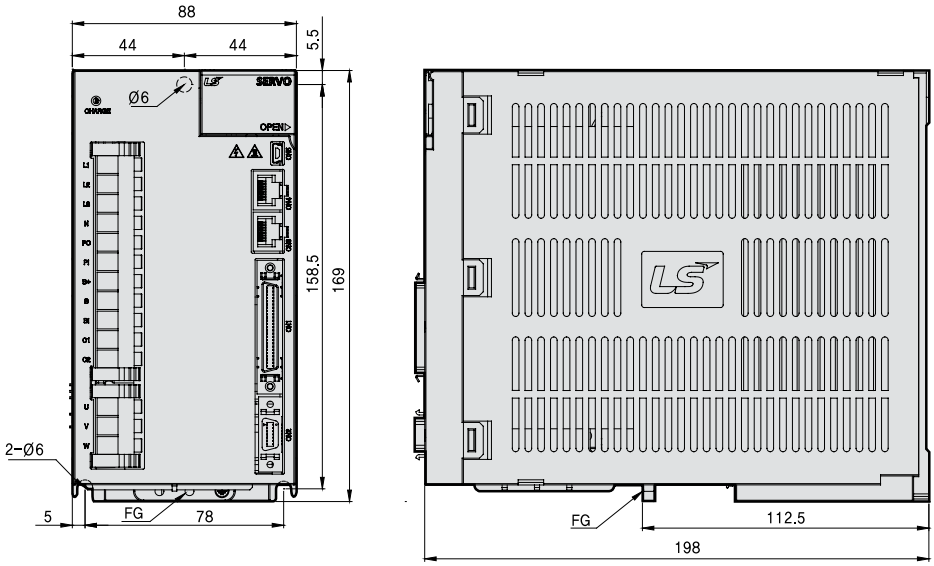
*Unit [mm]

L7SA008□~L7SA010□
[Weight: 1.5kg
(Fan-Cooling included)]



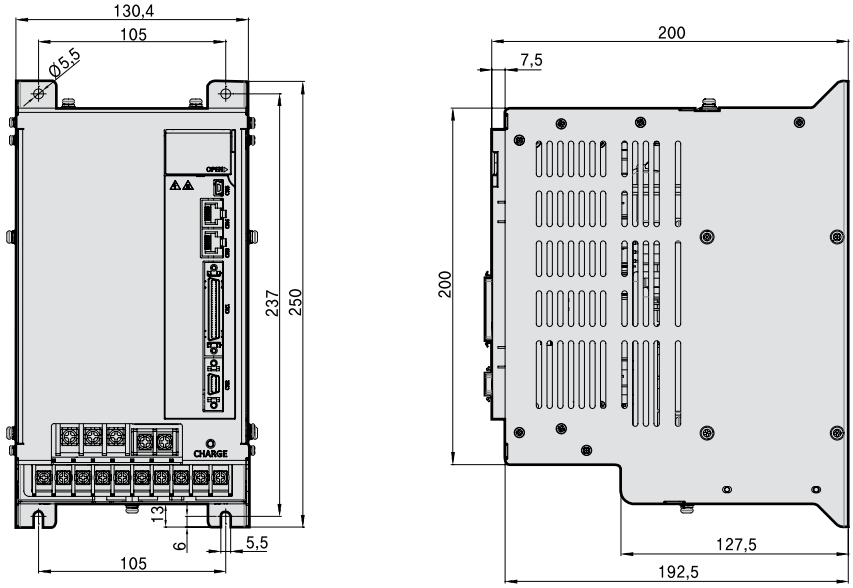
*Unit [mm]

L7SA020□~L7SA035□
[Weight: 2.5kg
(Fan-Cooling included)]



*Unit [mm]

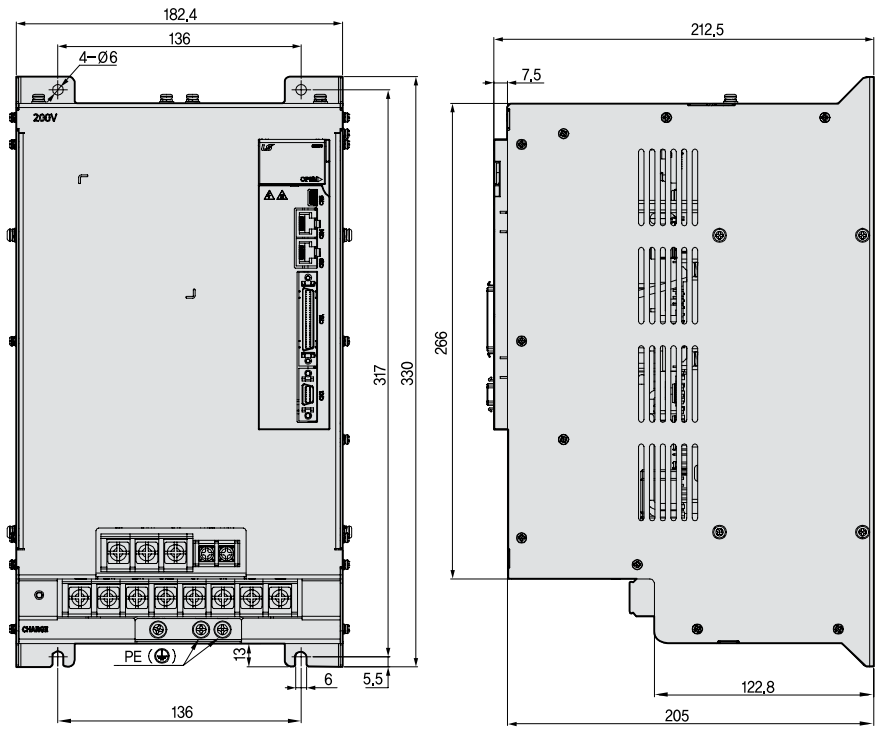
L7SA050□
[Weight: 5.5kg
(Fan-Cooling included)]



External Dimensions

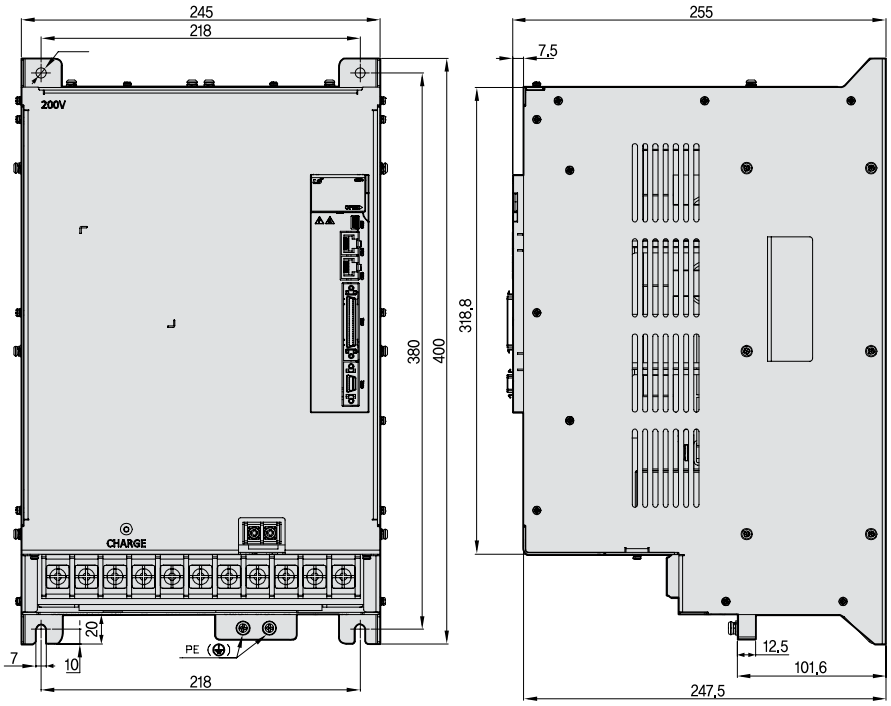
*Unit [mm]

L7SA075B
[Weight: 8.5kg
(Fan-Cooling included)]



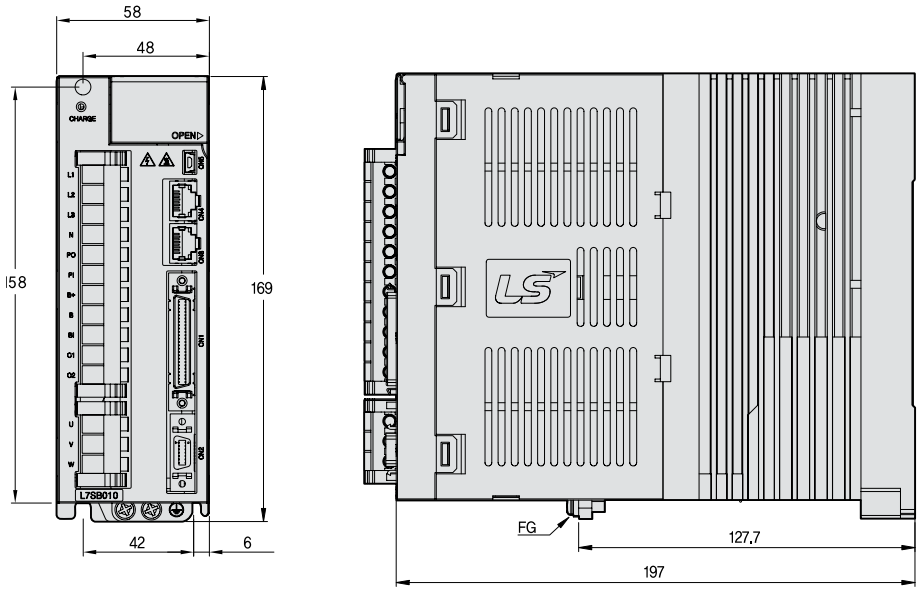
*Unit [mm]

L7SA150B
[Weight: 16.2kg
(Fan-Cooling included)]



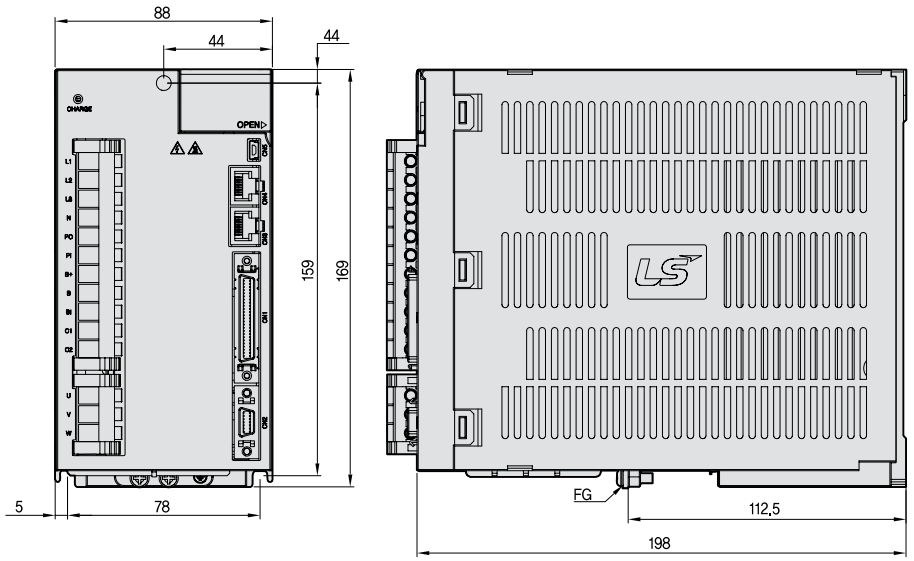
*Unit [mm]

L7SB010B
[Weight: 1.5kg
(Fan-Cooling included)]



*Unit [mm]

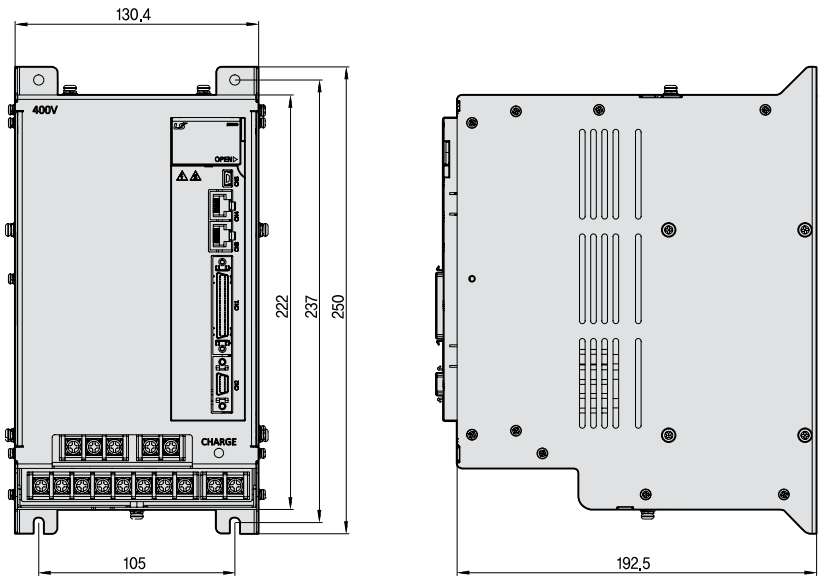
L7SB020B / L7SB035B
[Weight: 2.5kg
(Fan-Cooling included)]



External Dimensions

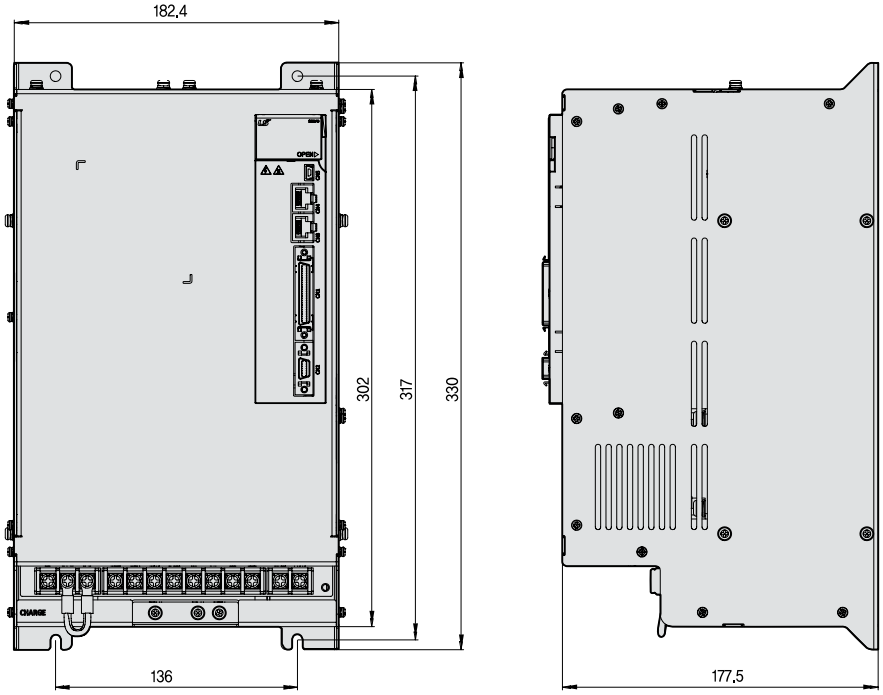
*Unit [mm]

L7SB050B
[Weight: 5.5kg
(Fan-Cooling included)]



*Unit [mm]

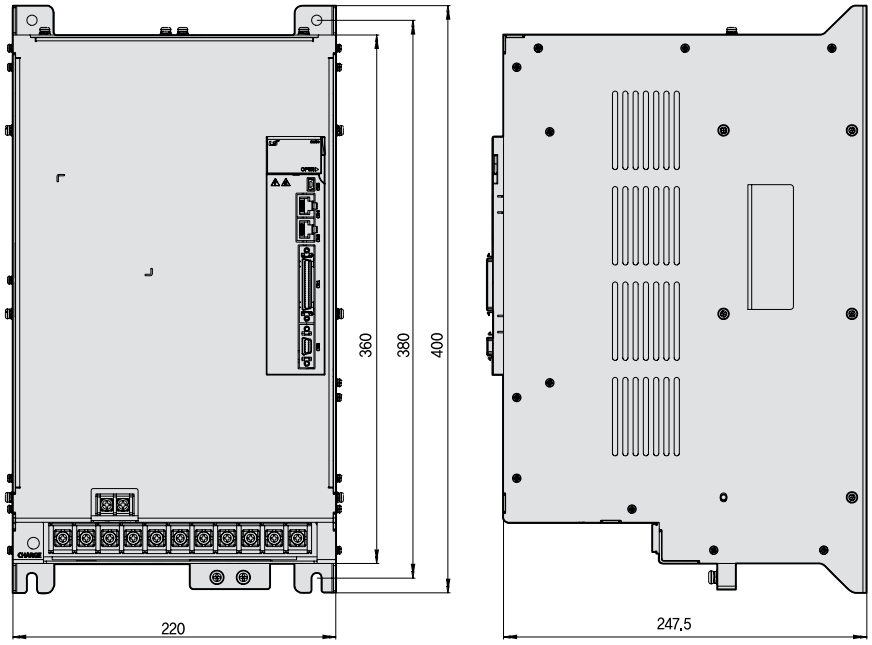
L7SB075B
[Weight: 8.5kg
(Fan-Cooling included)]



*Unit [mm]

L7SB150B

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



L7C Series

Servo Drive Designation

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

Identifying the Part

Pulse, Analog Command Type L7C

Control Power/Main power Unification

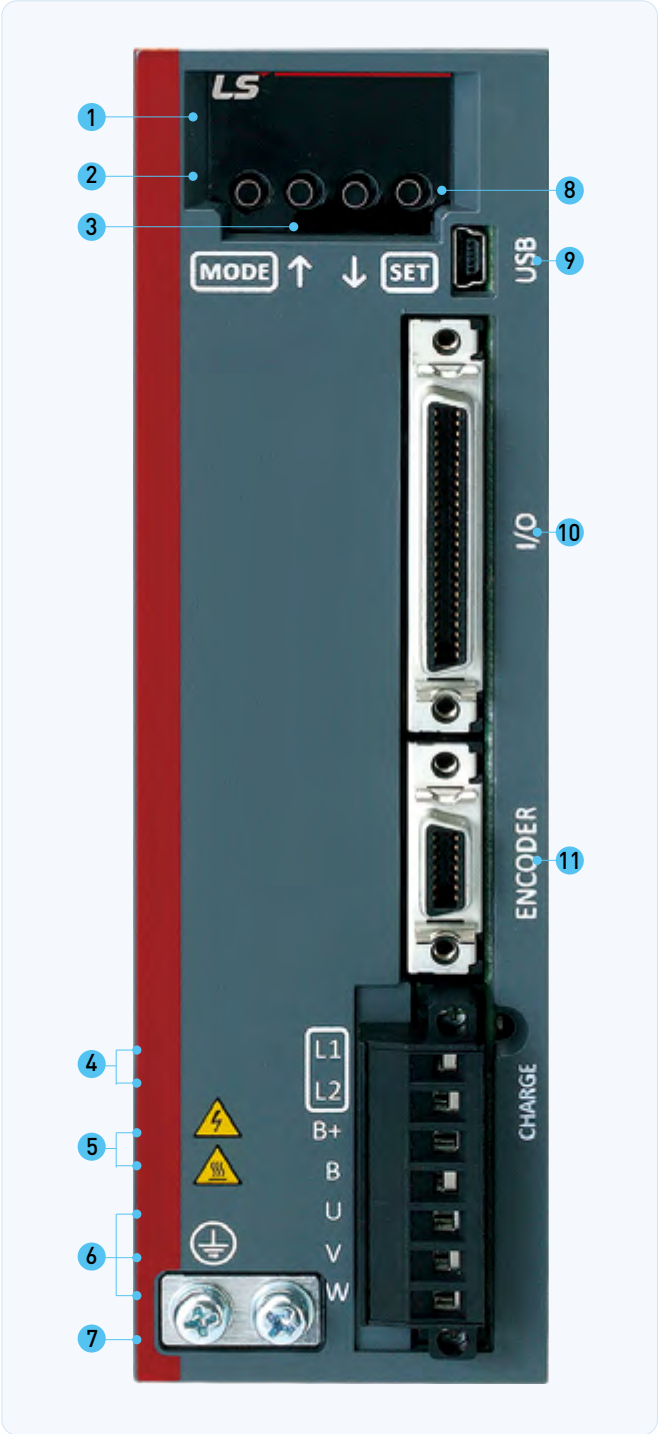
- Unification of power for integrated control board and power board
- 0.1~1kW Drive Line-up for single phase AC220V support

Optimal System Implementation With Competitive Cost Ratio

- Unification of power for integrated control board and power board

Maintain and Improve L7S Specification

- 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)
   - Mounting external resistance (B+, B)
6. Servo motor connecting terminal (U,V,W)
7. Ground
8. Set-up switch
9. USB connector
10. Control signal connector(I/O)
11. Encoder connector(ENCODER)

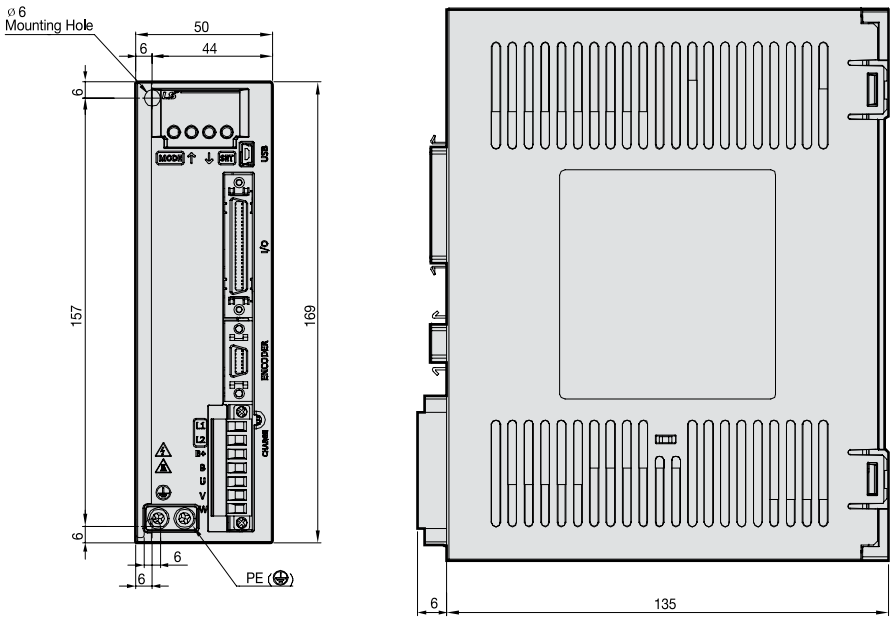
L7C Drive

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	20.3
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 one[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	Specification	ANSI/TIA/EIA-422 standard specifications				
	Protocol	MODBUS-RTU				
	Synchro Method	Asynchronous				
	Power Consumption	100mA				
	Transmission Speed	9,600 / 19,200 / 38,400 / 57,600bps				
	Distance	Maximum 200[m]				
	Terminating Resistance	Connecting the outside connector (CN1 7Pin, 28Pin connection), Built-in 120Ω				
Digital Input / Output	Digital Input	Input voltage range : DC12V ~ DC24V Total 10 input channels (allocable) Total 34 function's input can be used selectively for assignment. (*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 function's input can be used selectively for assignment. (*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 Channel Analog speed input (Command/Overide) ±10V Analog torque input (Command/Limit) ±10V				
USB Communication	Connect	PC				
	Communication Standard	USB 2.0 full speed (Applies standard)				
	Specification	PC, USB 2.0 Full Speed (Applies standard)				
Internal Function	Dynamic Braking	Standard built-in brake (Activated when the servo alarm goes off or when the servo is off),				
	Regenerative Braking	Both default built-in and external installation possible				
	Display Function	7 segments (5DIGIT)				
	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 fail				
Operation Environment	Operating Temperature / Storage Temperature	0~50°C / -20 ~ 65°C				
	Operating Humidity / Storage Humidity	Below80[%]RH / Below 90[%]RH(Avoid dew-condensation)				
	Environment	Indoor, avoid corrosive, inflammable gas or liquid, and electrically conductive dust.				

External Dimensions

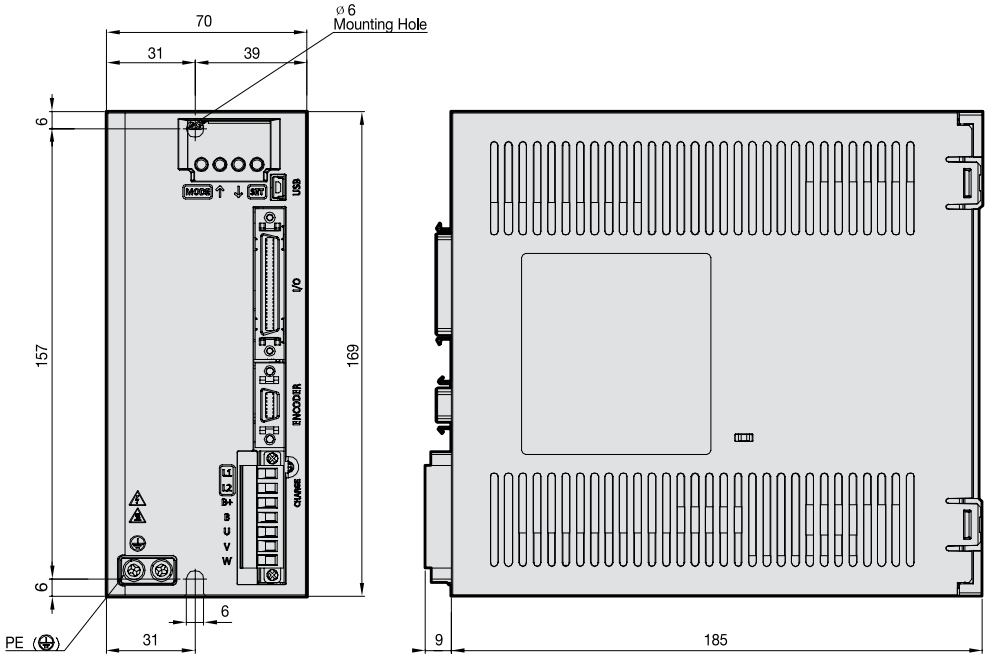
*Unit [mm]

L7CA001U / L7CA002U / L7CA004U
[Weight: 1.0kg]



*Unit [mm]

L7CA008U / L7CA010U
[Weight: 1.5kg]



L7P Series

Servo Drive Designation

L7	P	A	004	U	AA
	Communication	Input Power Supply	Capacity	Encoder Type	Option
	Standard I/O & Index Type	A : 200VAC	001 : 100W	U : Universal	Exclusive Option Code
		B : 400VAC	002 : 200W		
			004 : 400W		
			008 : 750W		
			010 : 1.0kW		
			020 : 2.0kW		
			035 : 3.5kW		
			050 : 5.0kW		
			075 : 7.5kW		
			150 : 15kW		

Identifying the Part

Indexer Function Type L7P

Providing Program Function Built-in Single Axis Position Determination Module

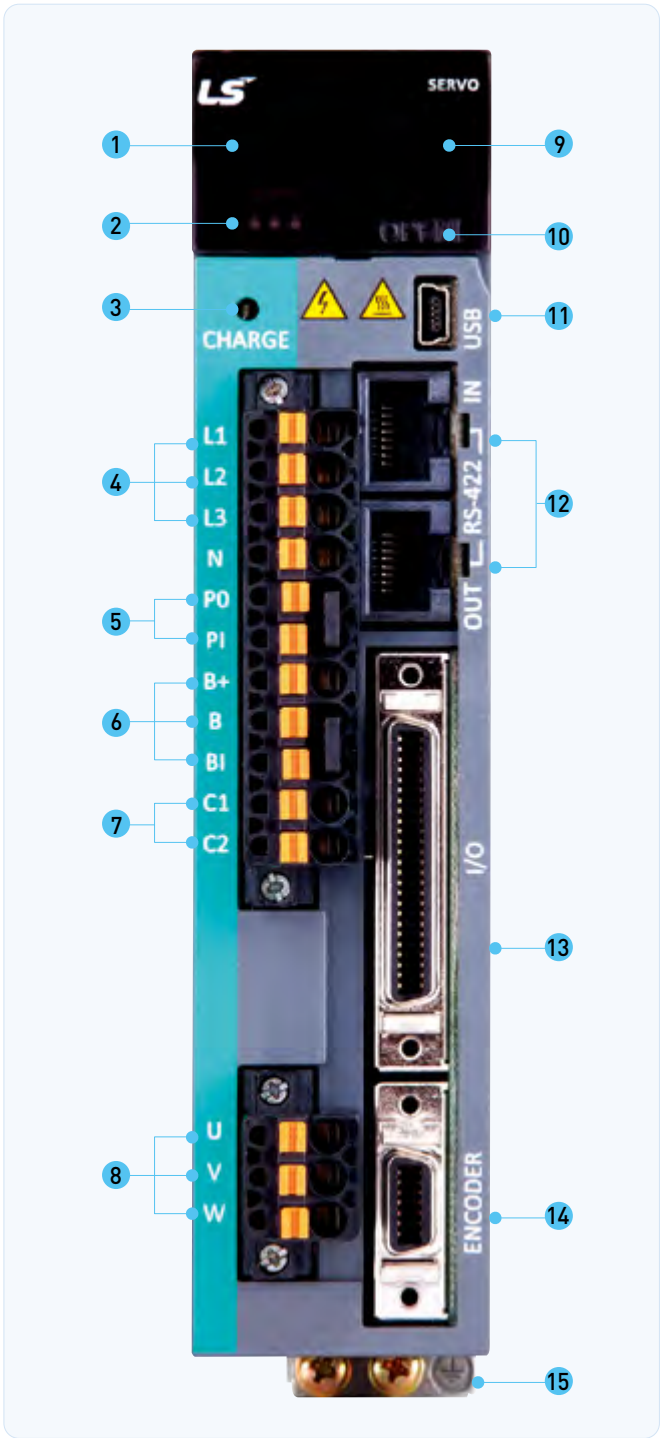
- Supporting position control mode by pulse input
- Position control mode
- Possible to use without upper controller
- Modbus RTU protocol (RS-422)

Support Various Motor and Encoder Drive

- Supporting rotary, DD and motor drive (Supporting3rd party motor)
- Quadrature, BiSS-C

Improved Control Performance

- Improved control bandwidth
- Providing 4-step Notch-filter
- Vibration control by Real-time FET
- Real-time gain tuning function



1. Display
2. Status LED
3. Charge lamp
4. Main power connector (L1, L2, L3)
5. DC Reactor connector(P0, P1) Short-circuit when not used
6. Regenerative resistor connector (B+, B, BI)
   - Short-Circuit B, BI terminals when standard type
   - Use B+, B terminals when using external resistor
7. Control power connector (C1, C2)
8. Motor power connector(U, V, W)
9. Connector for analogue monitor
10. Switch for nodaddress setting
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), 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]									
	Terminating Resistance	Dip S/W(On/Off), Built-In 120Ω									
Input / Output Signal	Digital Input	Input voltage range: DC 12[V] ~ DC 24[V] Total 16 input channel (Allocatable) 32 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, MODE, PAUSE, ABSRQ, JSTART, JDIR, PCLR, AOVR, SPD1/LVSF1, SPD2/ LVSF2, SPD3, PROBE1, PROBE2)									
	Digital Output	Use rating: DC 24[V] ±10%, 120[mA] Total 8 input channel (Allocatable) 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 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	Protection	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(5 DIGIT)									
	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 fail, position following fail, current sensing fail									
Operation Environment	Operating Temperature / Storage Temperature	0 ~ +50[°C] / -20~ +70[°C]									
	Operating Humidity / Storage Humidity	Below80[%]RH / Below 90[%]RH(Avoid dew-condensation)									
	Environment	Indoor, Avoid corrosive, inflammable gas or liquid, and electrically conductive dust.									

L7PB Drive

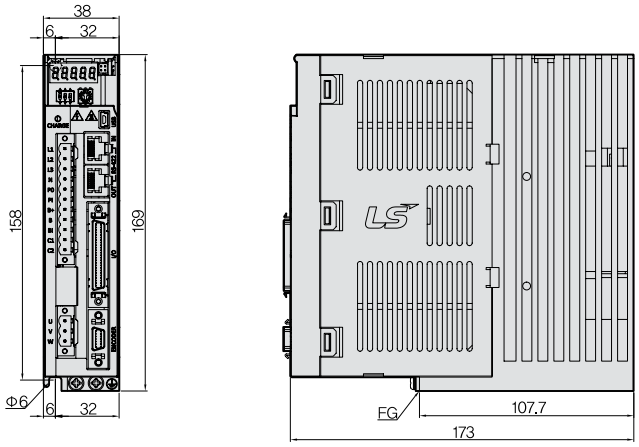
Item \ Type Name		L7PB010U	L7PB020U	L7PB035U	L7PB050U	L7PB075U	L7PB150U
Input Power	Main Power Supply	3 Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]					
	Control Power Supply	Single Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]					
Rated Current[A]		3.7	8.0	10.1	17.5	22.8	39.0
Peak Current[A]		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), 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[%]orlower[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]					
	Terminating Resistance	Dip S/W(On/Off), Built-In 120Ω					
Input / Output Signal	Digital Input	Input voltage range: DC 12[V] ~ DC 24[V] Total 16 input channel (Allocatable) 32 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, 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 (Allocatable) 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 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	Protection	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(5 DIGIT)					
	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 fail, position following fail, current sensing fail					
Operation Environment	Operating Temperature / Storage Temperature	0 ~ +50[°C] / -20~ +70[°C]					
	Operating Humidity / Storage Humidity	Below80[%]RH / Below 90[%]RH(Avoid dew-condensation)					
	Environment	Indoor, Avoid corrosive, inflammable gas or liquid, and electrically conductive dust.					

External Dimensions

*Unit [mm]

L7PA001U ~ L7PA004U

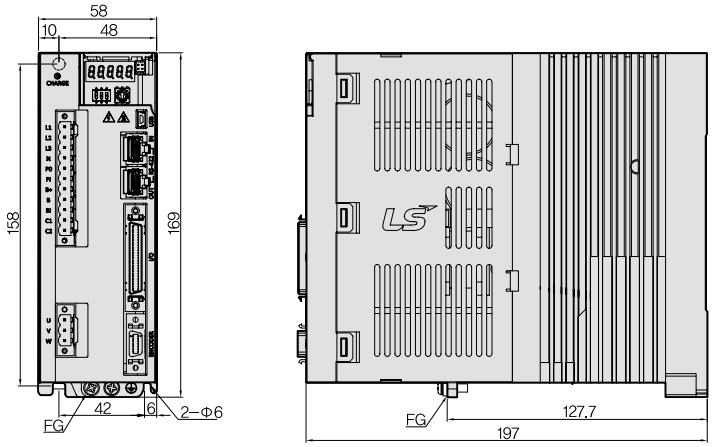
[Weight: 1.0kg]



*Unit [mm]

L7PA008U / L7PA010U

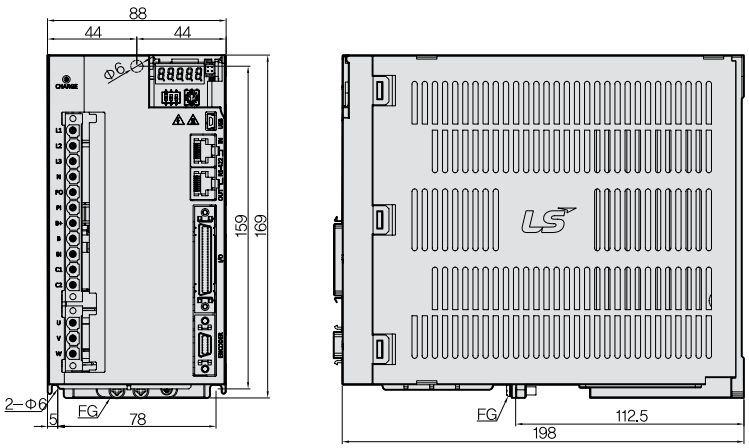
[Weight: 1.5kg
(Fan-Cooling included)]



*Unit [mm]

L7PA020U / L7PA035U

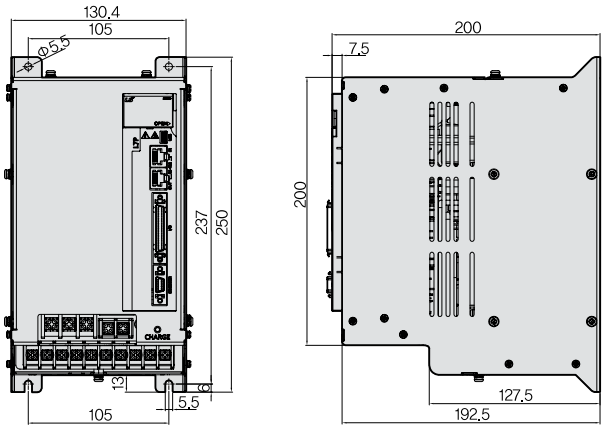
[Weight: 2.5kg
(Fan-Cooling included)]



*Unit [mm]

L7PA050U

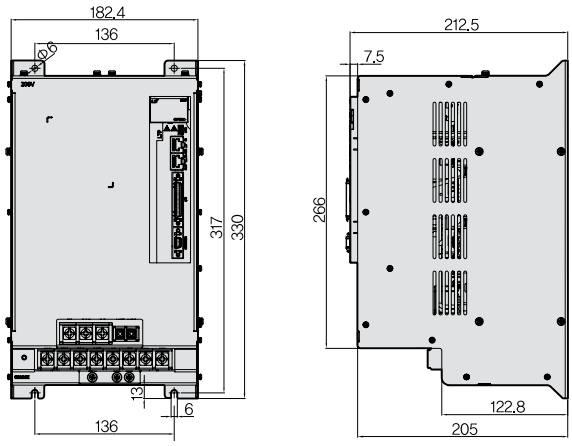
[Weight: 5.5kg
(Fan-Cooling included)]



*Unit [mm]

L7PA075U

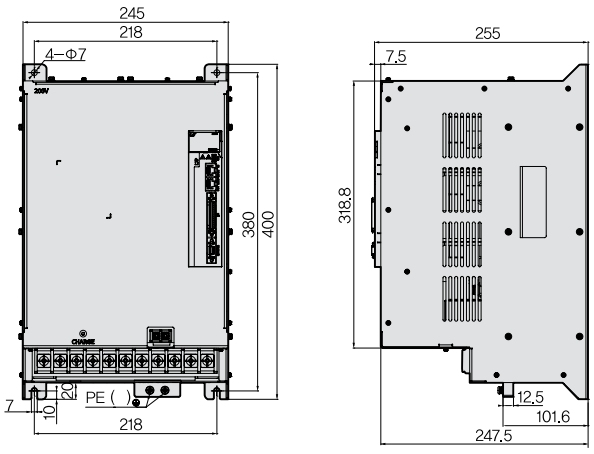
[Weight: 8.5kg
(Fan-Cooling included)]



*Unit [mm]

L7PA150U

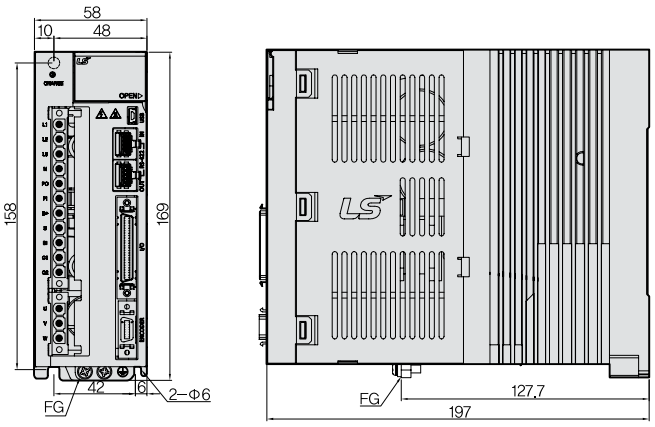
[Weight: 16.2kg
(Fan-Cooling included)]



External Dimensions

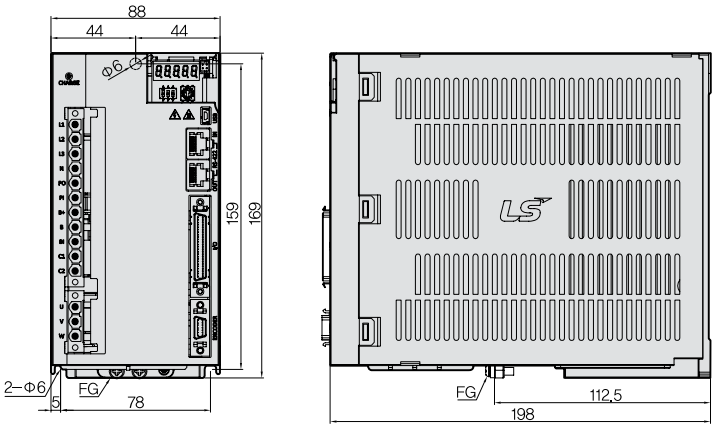
*Unit [mm]

L7PB010U
[Weight: 1.5kg
(Fan-Cooling included)]



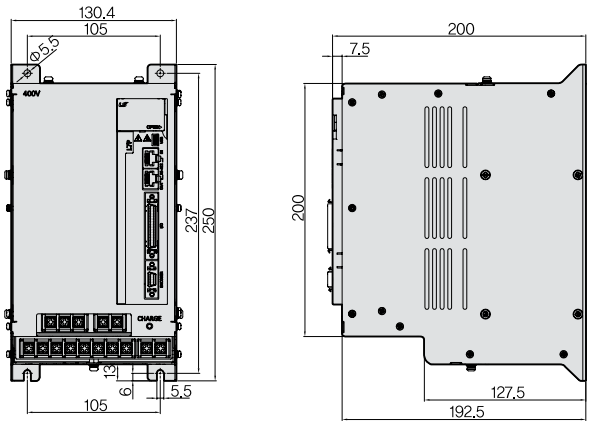
*Unit [mm]

L7PB020U / L7PB035U
[Weight: 2.5kg
(Fan-Cooling included)]



*Unit [mm]

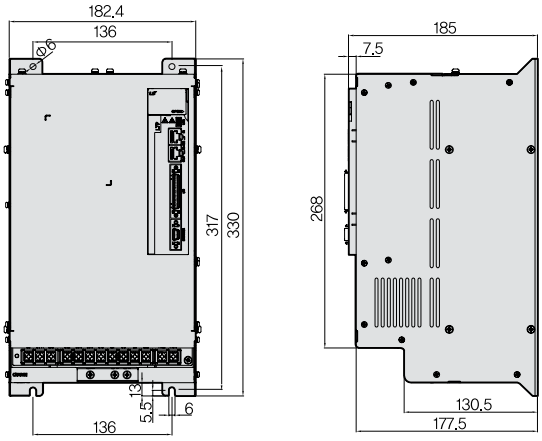
L7PB050U
[Weight: 5.5kg
(Fan-Cooling included)]



*Unit [mm]

L7PB075U

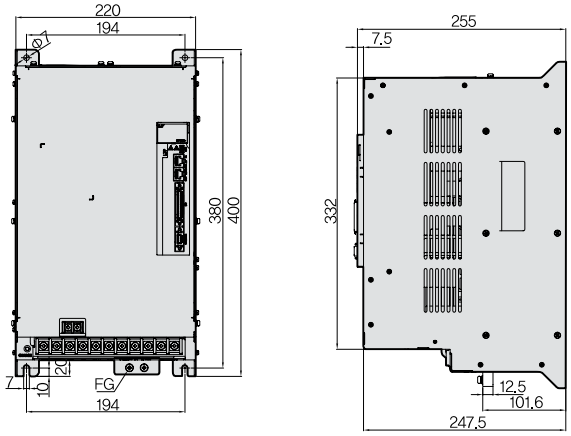
[Weight: 8.5kg
(Fan-Cooling included)]



*Unit [mm]

L7PB150U

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



PEGA Series

Servo Drive Designation

PEGA	–	A	R5	A	–	A	N	–	M	A

Servo Drive
PEGASUS Series

Flange Size
A : 40 Flange
B : 60 Flange

Motor Capacity
R5 : 50[W]
01 : 100[W]
02 : 200[W]
03 : 300[W]

Rated Speed
A : 3000[rpm]

Drive Voltage
A : 48VDC

Communication
N : EtherCAT

Encoder Type
M : Magnetic Encoder

Resolution
A : 12Bit

Integrated Servo System Type PEGA

Enhanced Efficiency Integrated Servo System

- Cost effective from installation by integrated system of motor, encoder cable and drive
- Maximization for useful space 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
- Supporting 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

Xmotion Drive Product Features

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
	Other		To be free from electrostatic noise, strong electrolysis, or radiation.
Performance	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		Conform 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, ect.
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.

Encoder Specification

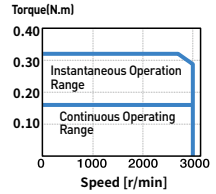
Category	Details
Encoder Type	Magnetic Encoder (12bit)(Singleturn Absolute)

Motor Specification

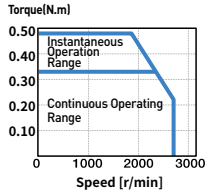
Model		□40 50W (AR5A)	□40 100W (A01A)	□60 100W (B01A)	□60 200W (B02A)	□60 300W (B03A)
Rated Torque	[N·m]	0.16	0.32	0.32	0.64	1.27
	[kgf·cm]	1.62	3.25	3.25	6.50	9.74
Max. Torque	[N·m]	0.32	0.48	0.64	1.27	1.91
	[kgf·cm]	3.24	4.88	6.50	13.0	19.48
Rated Speed	[r/min]	3000	2400	3000	3000	3000
Max Speed	[r/min]	3000	3000	3000	3000	3000
Inertia	[kg·m²X10⁻⁴]	0.0240	0.0450	0.1140	0.1820	0.3210
	[gf·cm·s²]	0.0245	0.0459	0.1163	0.1857	0.3276

Speed-Torque Characteristics

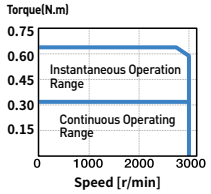
PEGA-AR5A-A



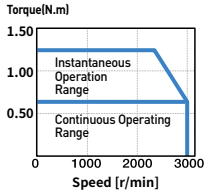
PEGA-A01A-A



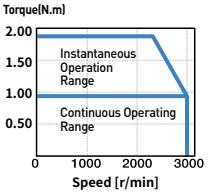
PEGA-B01A-A



PEGA-B02A-A



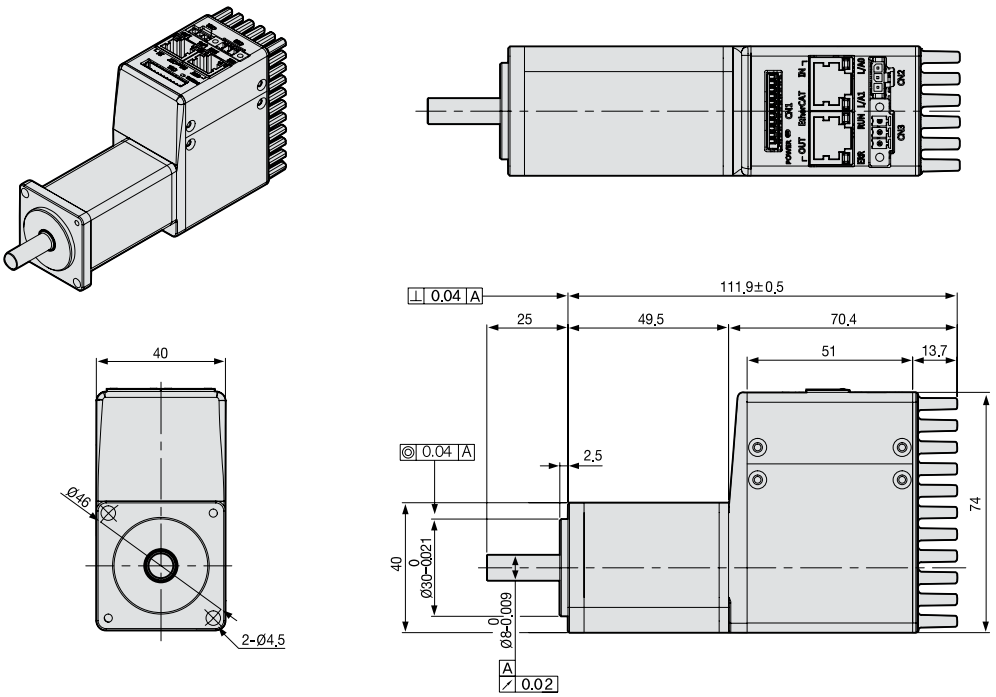
PEGA-B03A-A



External Dimensions

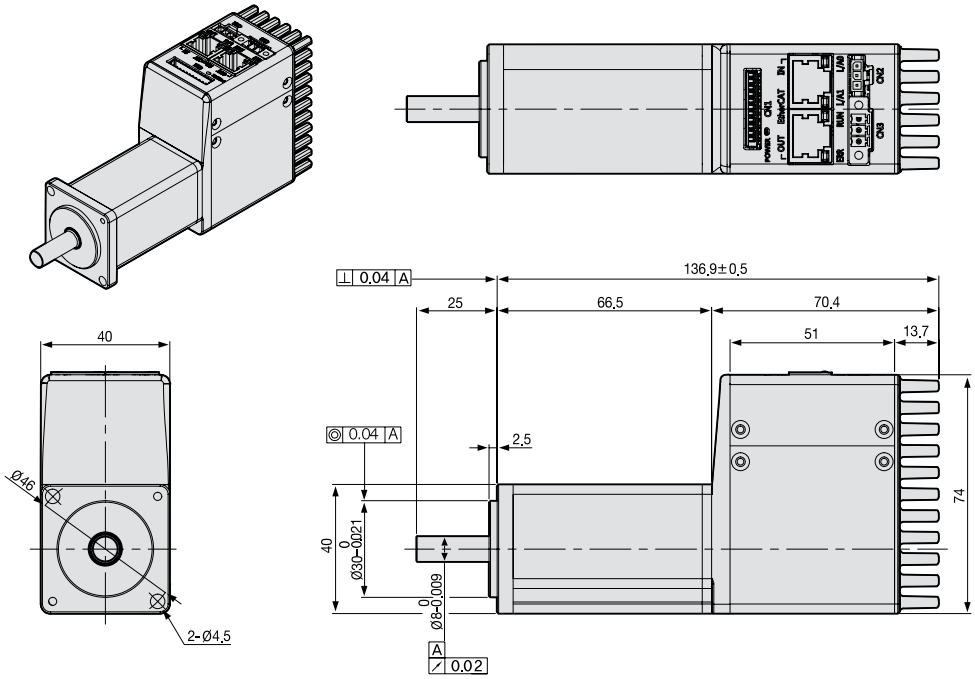
*Unit [mm]

PEGA-AR5A
[Weight: 0.51kg]



*Unit [mm]

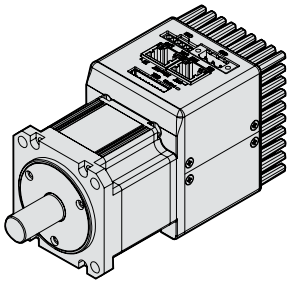
PEGA-A01A
[Weight: 0.63kg]

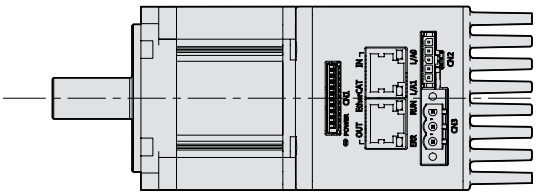


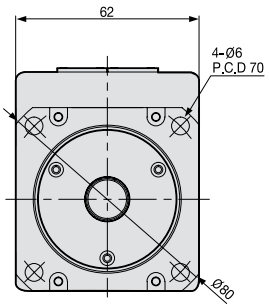
External Dimensions

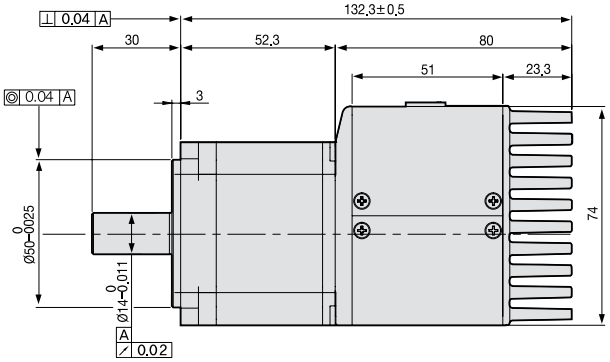
*Unit [mm]

PEGA-B01A
[Weight: 1.07kg]



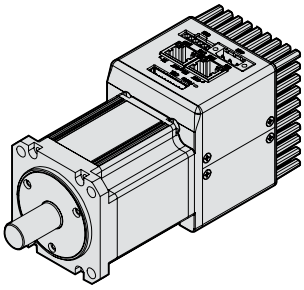


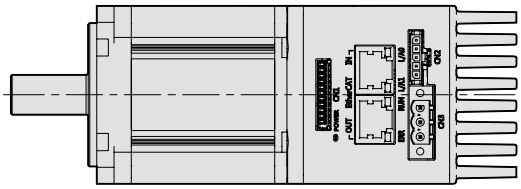


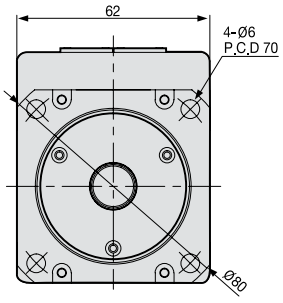


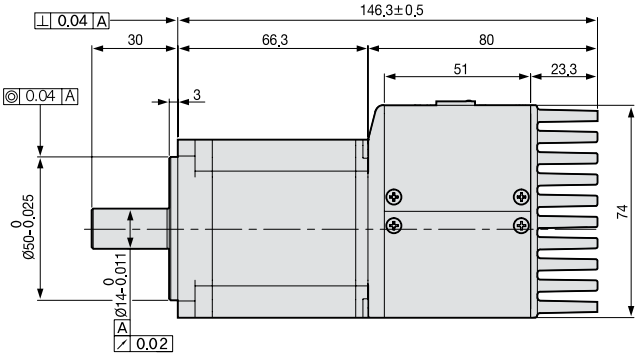
*Unit [mm]

PEGA-B02A
[Weight: 1.30kg]



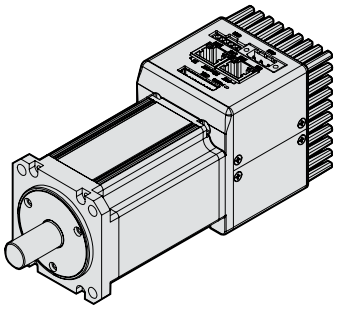


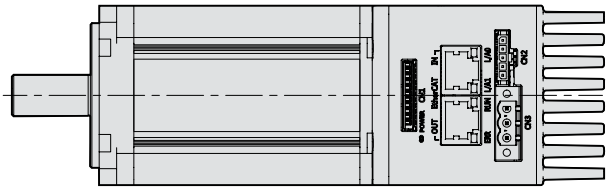


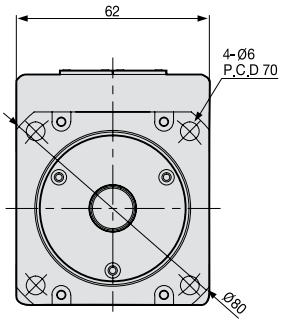


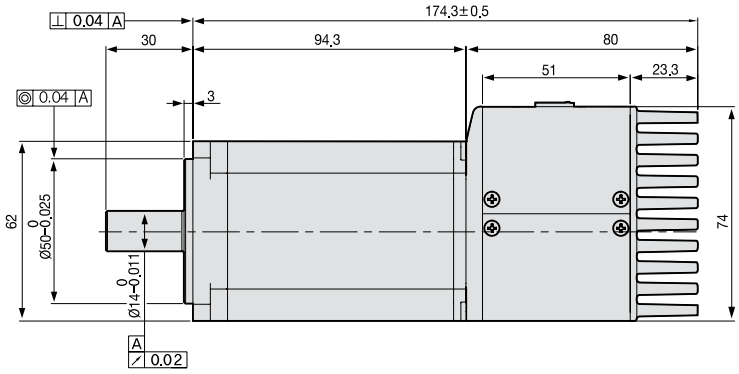
*Unit [mm]

PEGA-B03A
[Weight: 1.79kg]



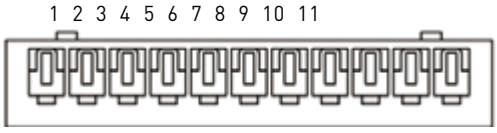






Accessory Kit

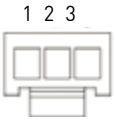
CN1 : I/O Connector



51004-1100(MOLEX)

Pin Numver	Direction	Name	Signals	Descriptions
1	VCC	+24	+24V INPUT	+24V Vcc Input
2	Input	POT	Positive Over-Traverl	Limit Sensor Input
3	Input	NOT	Negative Over Traverl	
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 Graound

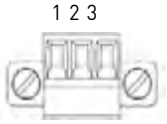
CN2 : Safe Torque Off Connector



43645-3(MOLEX)

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

CN3 : Power Connector



MC_1.5-3-STF-3.5
(PHOENIX CONTACT)

Pin Numver	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

PHOX	–	03	–	080	N	S	–	AA
Model Name		Output Cunent		Input Power Supply	Communication	Encoder Type		Option
PHOENIX 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 Drivev PHOX

Real-time Control Through EtherCAT

- High speed, Real-time capability and synchronization mechanism
- Supports CoE, EoE and FoE
- Improved speed response(≒1kHz) frequency
- Improved communication speed by applying16bit-bus
  - Improved chip communication speed
  - Improved EtherCAT communication speed

Variable Switching Frequency

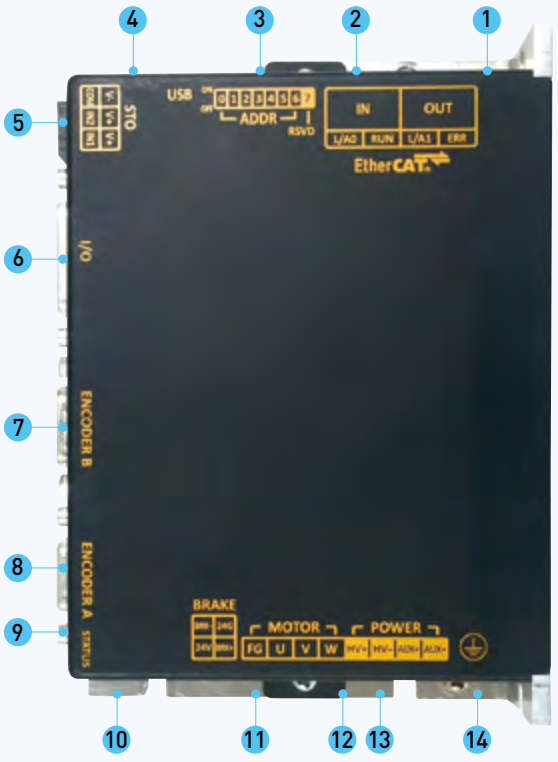
- 16/32/48kHz

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

Progamming Function Including Single-axis Position Module

- Positioning control mode with pulse inputs
- Provides position control through I/O or HMI without the position control module
- Supports the 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. DCReactor connector(PO,PI)
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] Note1)	
	Control Power Supply	DC 24~80[V] Note1)	
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 Note2) Encoder B		*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[temperature25 ±10°C]	
	Torque Control Repetition Accuracy	Within ±1%	
	Input Frequency	4[Mpps], Lind 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)	By DC mode synchronism. 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	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 differential ±10[V](16bit resolution) Setting torque limit value with 1 channel 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	
	Analog Output	Excessive current/voltage/overload/overheating/speed, excessive current limit, low voltage, encoder/position following/current sensing fail	
Operation Environment	Operating Temperature / Storage Temperature	0 ~ 50[°C] / -20 ~ 65 °C	
	Operating Humidity / Storage Humidity	Below 80[%]RH / Below 90[%]RH(Avoid dew-condensation)	
	Environment	Indoor, Avoid corrosive, inflammable gas or liquid, and electrically conductive dust.	

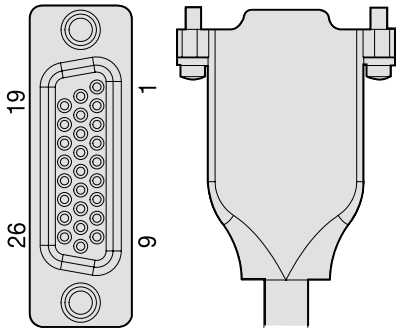
Note1) It is possible to drive with a voltage of less than 48 [V] of DC input power. However, the actual speed may be slower than the command speed and the specifications of the low voltage motor (based on DC 48 [V]) cannot be guaranteed. We recommend using DC 48[V] as the input power if possible.

Note2) Available when full-closed function is applied

PHOX Series I/O and Encoder PIN Map

I/O Connector

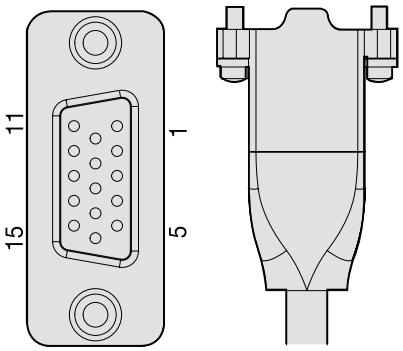
10090769-P264ALF



PIN No.	Signal	PIN No.	Signal	PIN No.	Signal	PIN No.	Signal
1	PF+	8	AMON1	15	DO1	22	/BO
2	PF-	9	AMON2	16	DO2	23	ZO
3	PR+	10	DICOM	17	DO3	24	/ZO
4	PR-	11	DI1	18	18 DO4	25	DOCOM
5	AGND	12	DI2	19	AO	26	AGND
6	AI+	13	DI3	20	/AO		
7	AI+	14	DI4	21	BO		

Encoder A Connector

10090769-P154ALF

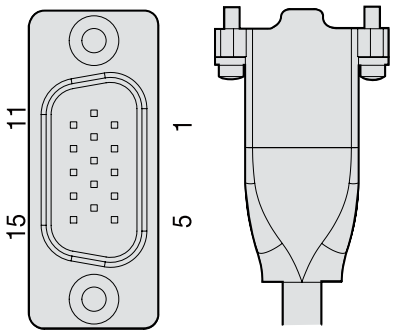


PIN No.	Encoder Quad	BISS	SSI	ENDAT	TAMAGAWA
1	Z+	-	-	-	-
2	Z-	-	-	-	-
3	GND	GND	GND	GND	GND
4	-	-	-	-	-
5	5V	5V	5V	5V	5V
6	GND	GND	GND	GND	GND
7	A-	SL-	DATA-	RC-/DV-	TXD-/RXD-
8	A+	SL+	DATA+	RC+/DV+	TXD-/RXD+
9	HALL U	-	-	-	-
10	*MOT	*MOT	*MOT	*MOT	*MOT
11	B-	MA-	CLK-	CLK-	-
12	B+	MA+	CLK+	CLK+	-
13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

PHOX Series I/O and Encoder PIN Map

Encoder B Connector (Full Closed)

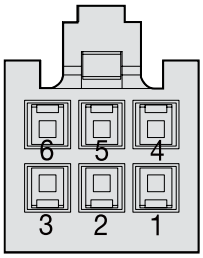
10090770-S154ALF



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

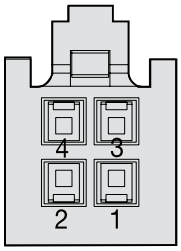
IPD1-03-D-K



PIN No.	Signal	Description
1	COM	Common(24 GND)
2	STO2	Current(Torque) supplied to the motor is cut off during the signal off
3	STO1	Current(Torque) supplied to the motor is cut off during the signal off
4	V-	DC -12V(Bypass bypass)
5	V+	DC -12V(Bypass bypass)
6	V+	DC -12V(Bypass bypass)

BRAKE Connector

IPD1-02-D-K



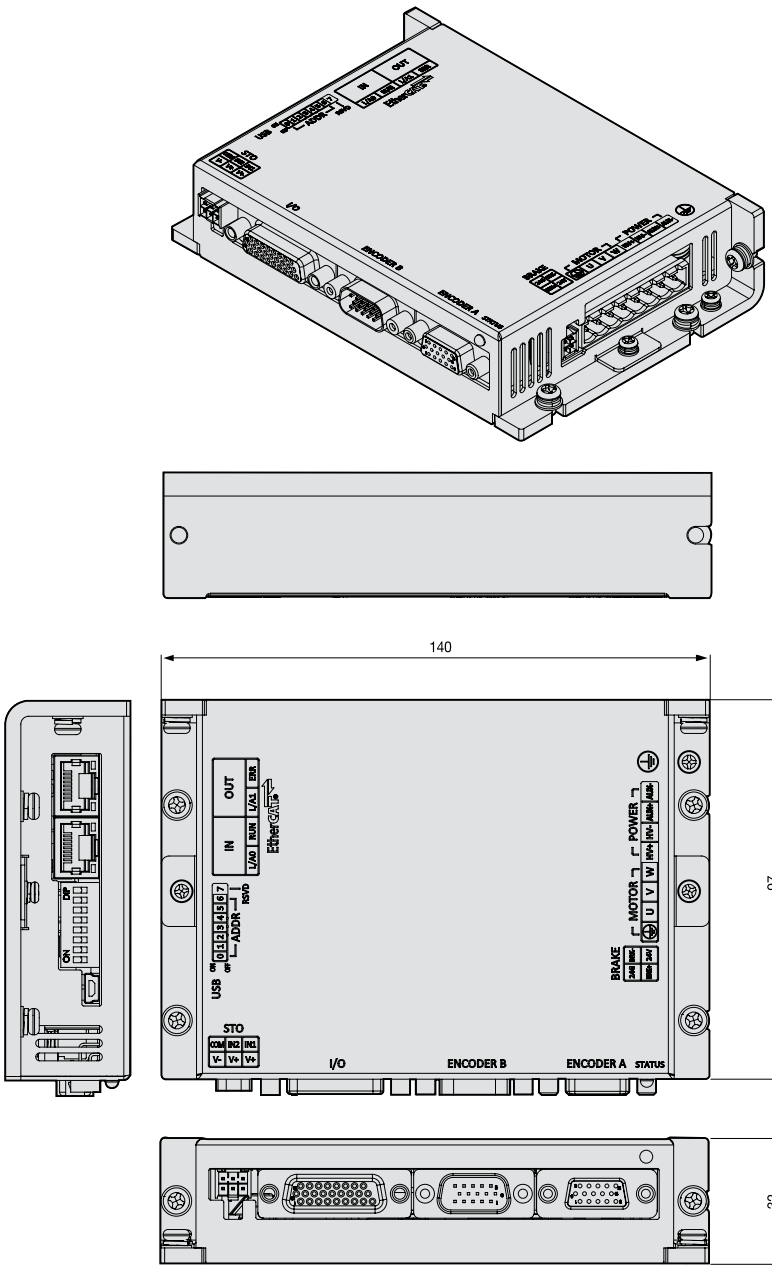
PIN No.	Signal	Description
1	24V	Brake 24V Input
2	BRK+	Brake 24V Output
3	BRK-	Brake (1A)
4	24G	24V Return

External Dimensions

*Unit [mm]

PHOX-03 / PHOX-06

[Weight: 0.43kg]



Servo Motor

Contents

Servo Drive Designation

Servo Drive Designation

APM(C)	–	F	BL	P	04	A	M	K	1

Model Name

- APM : Servo motor (Made in Korea)
- APMC : Servo motor (Made in China)

Model Shaft

- F : Flat shaft

Flange Size

- AL : 40 Flange
- BL : 60 Flange
- CL : 80 Flange
- E : 130 Flange
- F : 180 Flange
- G : 220 Flange

Input Power Supply

- None: 200VAC
- P : 400VAC

Motor Capacity

- R5 : 50[W]
- 01 : 100[W]
- 015 : 150[W]
- 02 : 200[W]
- 03 : 300[W]
- 04 : 400[W]
- 07 : 650[W]
- 08 : 750[W]
- 10 : 1.0[kW]
- 20 : 2.0[kW]
- 35 : 3.5[kW]
- 50 : 5.0[kW]
- 75 : 7.5[kW]
- 110 : 11[kW]
- 150 : 15[kW]

Rated Speed

- A : 3000[rpm]
- D : 2000[rpm]
- G : 1500[rpm]
- M : 1000[rpm]

Encoder Type

- M : 19bit S-tum abs (16bit M-turn abs)
- M8 : 18bit S-tum abs [FAL type] (16bit M-turn abs)
- Y : 17bit S-turn abs (Magnetic)

Shape of Shaft End

- N : Straight
- K : One side round key (Standard)

Oil Seal, Brake Type

- None: None
- 1 : Oil seal attached
- 2 : Brake attached
- 3 : Oil seal, Brake attached

Note1) In case of 40, 60, 80 flange product, you can apply 200V drive only.

Note2) If you apply nonstandard encoder, please contact our office.

Note3) Refer to brake operating voltage

Servo Motor Characteristics(200V)

Motor Specifications [Rated 3000r/min]

Servo Motor (APMC-□□□□)		FALR5A	FAL01A	FAL015A	FBL01A	FBL02A	FBL04A	FCL04A	FCL06A	FCL08A	FCL10A	FCL03D	FCL05D	FCL06D	FCL07D
Applicable Drive		L7□A001		L7□A002	L7□A001	L7□A002	L7□A004		L7□A008		L7□A010	L7□A004	L7□A008		
Flange Size(□)		□40			□60			□80							
Rated Output	[kW]	0.05	0.1	0.15	0.1	0.2	0.4	0.4	0.6	0.75	1	0.3	0.45	0.55	0.65
Rated Torque	[N·m]	0.16	0.32	0.48	0.32	0.64	1.27	1.27	1.91	2.39	3.18	1.43	2.15	2.63	3.1
	[kgf·cm]	1.62	3.25	4.87	3.25	6.49	12.99	12.99	19.49	24.36	32.48	14.62	21.92	26.8	31.67
Max. Instantaneous	[N·m]	0.48	0.96	1.43	0.96	1.91	3.82	3.82	5.73	7.16	9.55	4.3	6.45	7.88	9.31
	[kgf·cm]	4.87	9.74	14.62	9.74	19.48	38.96	38.98	58.47	73.08	97.44	43.85	65.77	80.39	95.01
Rated Current	[A]	0.95	1.25	1.60	0.95	1.45	2.6	2.58	3.81	5.02	5.83	2.5	3.05	3.06	3.83
Max.Current	[A]	2.85	3.75	4.80	2.85	4.35	7.8	7.75	11.42	15.07	17.5	7.51	9.16	9.18	11.5
Rated Speed	[r/min]	3000										2000			
Max. Speed	[r/min]	5000										3000			
Inertia	[kg·m²X10⁻⁴]	0.023	0.042	0.063	0.091	0.147	0.248	0.53	0.897	1.264	1.632	0.53	0.897	1.264	1.63
	[gf·cm·s²]	0.024	0.043	0.065	0.093	0.15	0.253	0.541	0.915	1.29	1.665	0.541	0.915	1.29	1.66
Allowable Load Inertia Ratio		30timesofmotorinertia		20 times of motor inertia				15 times of motor inertia							
Rated Power Rate	[kW/s]	10.55	23.78	36.19	11.09	27.6	27.07	30.6	40.66	45.09	62.08	38.73	51.47	54.56	59.03
Speed/Position Detector	Standard	Serial Multi-Turn Built-in Type(18bit)			Serial Multi-Turn Built-in Type(19bit)										
	Option	×													
Specifications & Features	Structure	Fully closed·Self cooling IP67 Note1]													
	Rated Time	Continuous													
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]													
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)													
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.													
	E/V	Elevation/vibration 49[m/s²](5G)													
Weight	[kg]	0.31	0.45	0.61	0.56	0.74	1.06	1.52	2.14	2.68	3.3	1.26	2.12	2.66	2.78

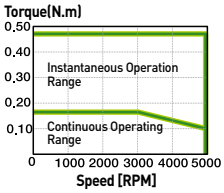
Note1) Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

■ 3 Phase AC200V

■ 3Phase AC230V

APMC-FALR5A



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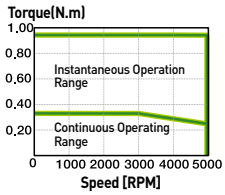

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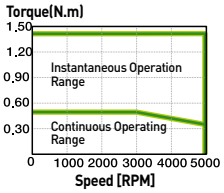

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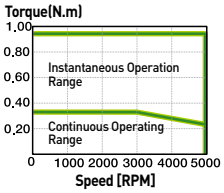

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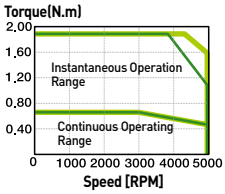

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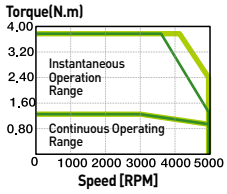

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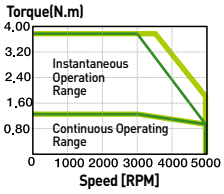

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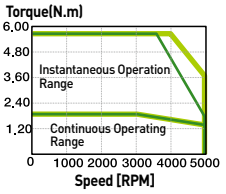

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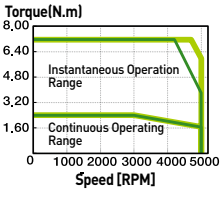

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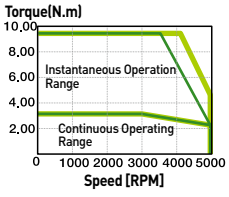

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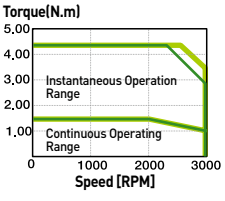

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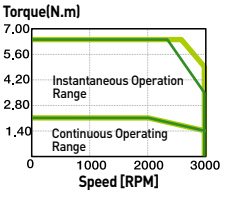

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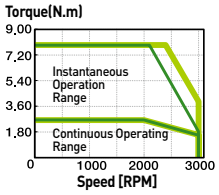

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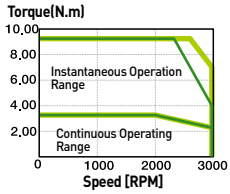


Servo Motor Characteristics(200V)

Motor Specifications [Rated 3000r/min]

Servo Motor (APM-□□□□)		FE09A	FE15A	FE22A	FE30A	FF30A	FF50A
Applicable Drive		L7□A010	L7□A020		L7□A035		L7□A050
Flange Size(□)		□130				□180	
Rated Output	[kW]	0.9	1.5	2.2	3	3	5
Rated Torque	[N·m]	2.86	4.77	7	9.55	9.55	15.91
	[kgf·cm]	29.2	48.7	71.4	97.4	97.4	162.3
Max. Instantaneous	[N·m]	8.59	14.32	21.01	28.65	28.65	47.74
	[kgf·cm]	87.7	146.1	214.3	292.2	292.3	487
Rated Current	[A]	6.45	9.15	13.24	16.09	15.26	26.47
Max.Current	[A]	19.35	27.45	39.72	48.27	45.78	79.41
Rated Speed	[r/min]	3000					
Max. Speed	[r/min]	5000					
Inertia	[kg·m^{2}X10^{-4}]	5.66	10.18	14.62	19.04	27.96	46.56
	[gf·cm·s^2]	5.77	10.39	14.92	19.43	28.53	47.51
Allowable Load Inertia Ratio		10 times of motor inertia				5 times of motor inertia	
Rated Power Rate	[kW/s]	14.47	22.38	33.59	47.85	32.59	54.33
Speed/Position Detector	Standard	Serial Type 19[Bit]					
	Option	×					
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1]					
	Rated Time	Continuous					
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]					
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)					
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.					
	E/V	Elevation/vibration 49[m/s^2](5G)					
Weight	[kg]	5	6.7	8.5	10.1	12.5	17.4

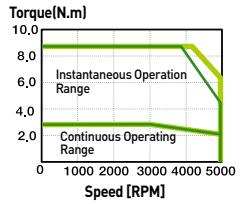
Note1] Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

■ 3 Phase AC200V

■ 3Phase AC230V

APM-FE09A



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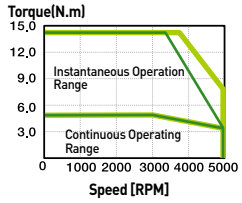

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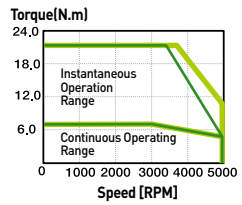
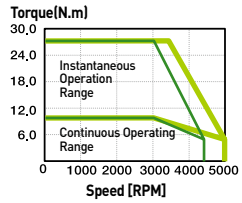
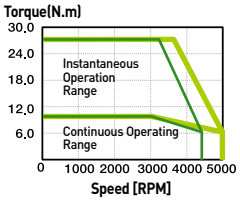


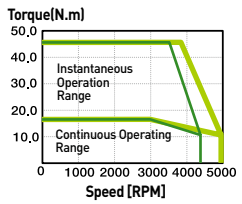
APM-FE30A



APM-FF30A



APM-FF50A



Motor Specifications [Rated 2000r/min]

Servo Motor (APM-□□□□)		FE06D	FE11D	FE16D	FE22D
Applicable Drive		L7□A008	L7□A010	L7□A020	
Flange Size(□)		□130			
Rated Output	[kW]	0.6	1.1	1.6	2.2
Rated Torque	[N·m]	2.86	5.25	7.63	10.5
	[kgf·cm]	29.20	53.6	77.9	107.1
Max. Instantaneous	[N·m]	8.59	15.75	22.92	31.51
	[kgf·cm]	87.7	160.7	233.8	321.4
Rated Current	[A]	4.56	6.47	10.98	12.97
Max.Current	[A]	13.68	19.41	32.94	38.91
Rated Speed	[r/min]	2000			
Max. Speed	[r/min]	3000			
Inertia	[kg·m^{2}X10^{-4}]	5.66	10.18	14.62	19.04
	[gf·cm·s^2]	5.77	10.39	14.92	19.43
Allowable Load Inertia Ratio		10 times of motor inertia			
Rated Power Rate	[kW/s]	14.49	27.08	39.89	57.9
Speed/Position Detector	Standard	Serial Multi-Turn Type(19bit)			
	Option	×			
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1]			
	Rated Time	Continuous			
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]			
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)			
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.			
	E/V	Elevation/vibration 49[m/s^2](5G)			
Weight	[kg]	5	6.7	8.5	10.1

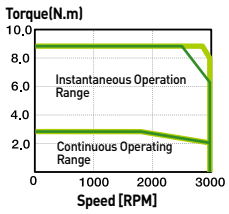
Note1] Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

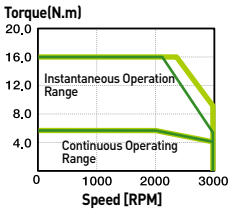
■ 3 Phase AC200V

■ 3Phase AC230V

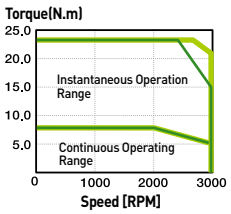
APM-FE06D



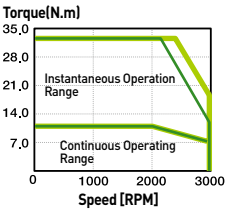
APM-FE11D



APM-FE16D



APM-FE22D



Servo Motor Characteristics(200V)

Motor Specifications [Rated 2000r/min]

Servo Motor (APM-□□□□)		FF22D	FF35D	FF55D	FF75D	FG22D	FG35D	FG55D	FG75D	FG110D
Applicable Drive		L7□A020	L7□A035	L7□A050	L7□A075	L7□A020	L7□A035	L7□A050	L7□A075	L7□A150
Flange Size(□)		□180				□220				
Rated Output	[kW]	2.2	3.5	5.5	7.5	2.2	3.5	5.5	7.5	11
Rated Torque	[N·m]	10.5	16.7	26.25	35.81	10.5	16.71	26.25	35.81	52.52
	[kgf·cm]	107.1	170.4	267.8	365.4	107.1	170.4	267.8	365.4	535.9
Max. Instantaneous	[N·m]	31.5	50.1	78.76	89.53	31.51	50.12	78.76	89.53	157.55
	[kgf·cm]	321.3	511.4	803.4	913.5	321.3	511.3	803.4	913.5	1607.60
Rated Current	[A]	13.07	16.48	28.78	32.95	10.25	14.67	29.74	30.17	51.39
Max.Current	[A]	39.21	49.44	86.34	82.38	30.75	44.01	89.22	75.43	154.17
Rated Speed	[r/min]	2000								
Max. Speed	[r/min]	3000			2500	3000	2700	3000	2500	
Inertia	[kg·m²X10⁻⁴]	27.96	46.56	73.85	106.7	41.13	71.53	117.52	149.4	291.36
	[gf·cm·s²]	28.53	47.51	75.36	108.9	41.97	72.99	120.12	152.45	297.31
Allowable Load Inertia Ratio		5 times of motor inertia								
Rated Power Rate	[kW/s]	39.43	59.89	93.27	120.15	26.78	38.99	58.51	85.83	94.65
Speed/Position Detector	Standard	Serial Type(19bit)								
	Option	×								
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1)								
	Rated Time	Continuous								
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]								
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)								
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.								
	E/V	Elevation/vibration 49[m/s²](5G)								
Weight	[kg]	12.5	17.4	25.12	33.8	15.4	20.2	28.12	33.45	66.2

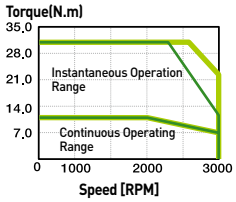
Note1) Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

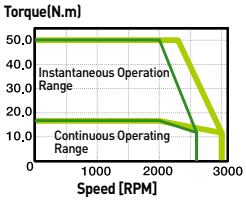
■ 3 Phase AC200V

■ 3Phase AC230V

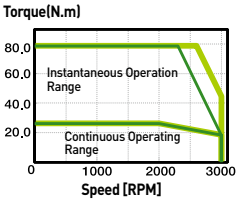
APM-FF22D



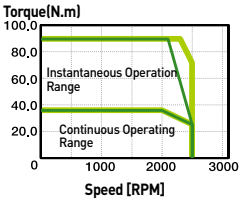
APM-FF35D



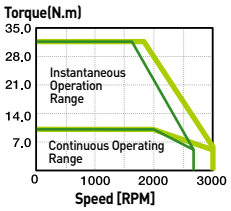
APM-FF55D



APM-FF75D



APM-FG22D



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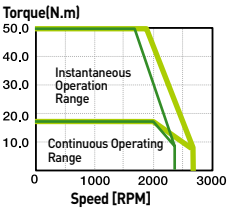

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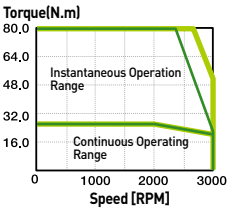

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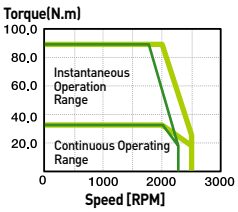
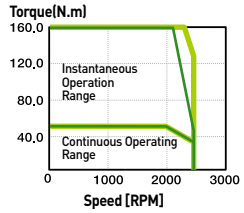


APM-FG110D



Motor Specifications [Rated 1500r/min]

Servo Motor (APM-□□□□)		FE05G	FE09G	FE13G	FE17G	FF20G	FF30G	FF44G	FF60G	FF75G	FG20G	FG30G	FG44G	FG60G	FG85G	FG110G	FG150G
Applicable Drive		L7□A008	L7□A010	L7□A020		L7□A020	L7□A035	L7□A050	L7□A075	L7□A075	L7□A020	L7□A035	L7□A050	L7□A075	L7□A150		
Flange Size(□)		□130				□180					□220						
Rated Output	[kW]	0.45	0.85	1.3	1.7	1.8	2.9	4.4	6	7.5	1.8	2.9	4.4	6	8.5	11	15
Rated Torque	[N·m]	2.86	5.41	8.27	10.82	11.45	18.46	28	38.2	47.7	11.5	18.5	28	38.2	54.11	69.99	95.45
	[kgf·cm]	29.22	55.19	84.41	110.38	116.9	188.3	285.7	389.8	487.2	116.9	188.4	285.8	389.7	552.1	714.2	974
Max. Instantaneous	[N·m]	8.59	16.23	24.82	32.46	34.35	55.38	78.4	95.5	119.3	34.4	55.4	78.4	95.5	162.32	209.97	238.63
	[kgf·cm]	87.66	165.57	253.23	331.14	350.6	564.9	799.6	974.9	1217.3	350.8	565.1	800.24	974.3	1656.30	2142.60	2435
Rated Current	[A]	4.56	6.67	11.9	13.36	12.16	15.98	30.7	35.14	35.26	11.18	16.21	31.72	32.18	52.94	59.3	75.6
Max.Current	[A]	13.68	20.01	35.7	40.08	36.48	47.94	85.96	87.85	88.15	33.54	48.63	88.82	96.54	158.82	177.9	189
Rated Speed	[r/min]	1500															
Max. Speed	[r/min]	3000				3000	2700	3000	2500	2200	2700		3000	2500	2500	2000	2000
Inertia	[kg·m²X10⁻⁴]	5.66	10.18	14.62	19.04	27.96	46.56	73.85	106.7	131.3	14.13	71.53	117.72	149.4	291.36	291.36	424.57
	[gf·cm·s²]	5.77	10.39	14.92	19.43	28.53	47.51	75.36	108.9	134	41.97	72.99	120.12	152.45	297.31	297.31	416.08
Allowable Load Inertia Ratio		10 times of motor inertia				5 times of motor inertia											
Rated Power Rate	[kW/s]	14.49	28.74	46.81	61.46	46.92	73.14	106.15	136.73	173.63	31.91	47.66	66.64	97.63	100.48	168.27	223.44
Speed/Position Detector	Standard	Serial Type 19[bit]															
	Option	×															
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1)															
	Rated Time	Continuous															
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]															
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)															
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.															
	E/V	Elevation/vibration 49[m/s²](5G)															
Weight	[kg]	5.0	6.7	8.5	10.1	12.5	17.4	25.2	33.8	38.5	15.4	20.2	28	33.45	66.2	66.3	92.2

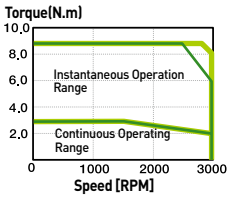
Note1) Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

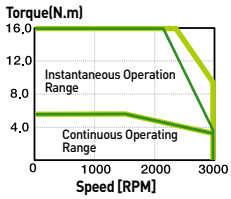
■ 3 Phase AC200V

■ 3Phase AC230V

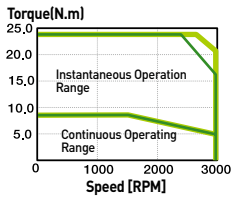
APM-FE05G



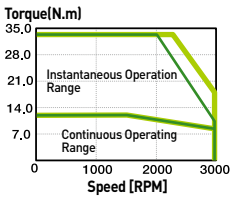
APM-FE09G



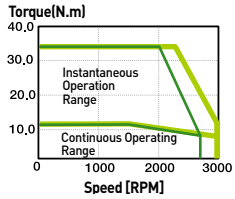
APM-FE13G



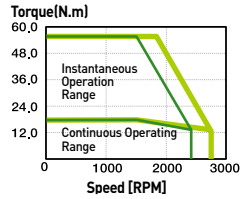
APM-FE17G



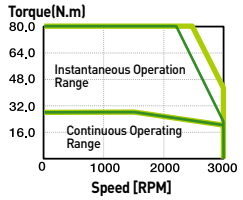
APM-FF20G



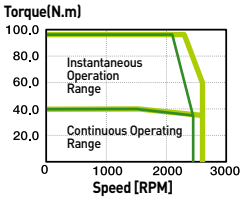
APM-FF30G



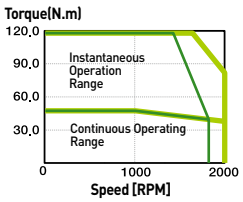
APM-FF44G



APM-FF60G



APM-FF75G



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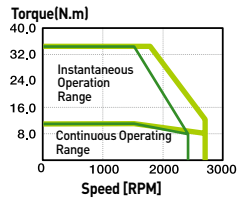
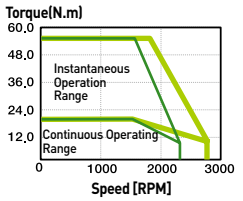


APM-FG30G



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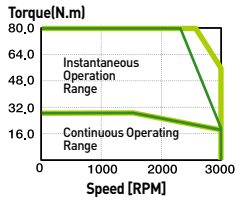
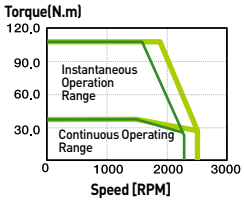
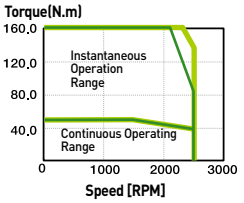


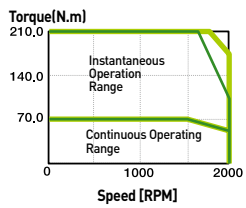
APM-FG60G



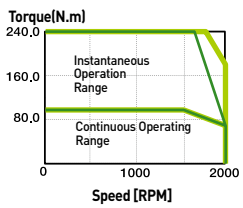
APM-FG85G



APM-FG110G



APM-FG150G



Servo Motor Characteristics(200V)

Motor Specifications [Rated 1000r/min]

Servo Motor (APM-□□□□)		FE03M	FE06M	FE09M	FE12M	FF12M	FF20M	FF30M	FF44M	FG12M	FG20M	FG30M	FG44M	FG60M
Applicable Drive		L7□A004	L7□A008	L7□A010	L7□A020			L7□A035	L7□A050	L7□A020		L7□A035	L7□A050	L7□A075
Flange Size(□)		□130				□180				□220				
Rated Output	[kW]	0.3	0.6	0.9	1.2	1.2	2	3	4.4	1.2	2	3	4.4	6.0
Rated Torque	[N·m]	2.86	5.72	8.59	11.46	11.46	19.09	28.64	42.02	11.5	19.1	28.6	42	57.29
	[kgf·cm]	29.22	58.4	87.7	116.9	116.9	194.8	292.2	428.7	116.9	194.9	292.3	428.7	584.6
Max. Instantaneous	[N·m]	8.59	17.18	25.77	34.22	34.38	57.29	85.94	105.05	34.4	57.3	85.9	126	143.2
	[kgf·cm]	87.66	175.3	262.9	349.1	350.7	584.4	876.6	1071.52	350.8	584.6	876.9	128.61	1432.4
Rated Current	[A]	2.73	4.56	6.18	10.67	11.01	12.96	16.58	30.6	11.28	13.1	15.52	27.26	39.32
Max.Current	[A]	8.19	13.68	18.54	32.01	33.03	38.88	49.74	85.68	33.84	39.3	46.56	81.78	98.30
Rated Speed	[r/min]	1000												
Max. Speed	[r/min]	2000						1700	2000			1600	1900	2000
Inertia	[kg·m²X10⁻⁴]	5.66	10.18	14.62	19.04	27.96	46.56	73.85	106.7	41.13	71.53	117.72	149.4	291.36
	[gf·cm·s²]	5.77	10.39	14.92	19.43	28.53	47.51	75.36	108.9	41.97	72.99	120.12	152.45	297.31
Allowable Load Inertia Ratio		10 times of motor inertia				5 times of motor inertia								
Rated Power Rate	[kW/s]	14.49	32.22	50.48	68.91	46.94	78.27	111.04	165.38	31.91	51	69.7	118.14	112.65
Speed/Position Detector	Standard	Serial Type 19[bit]												
	Option	×												
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1]												
	Rated Time	Continuous												
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]												
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)												
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.												
	E/V	Elevation/vibration 49[m/s²](5G)												
Weight	[kg]	5.0	6.7	8.5	10.1	12.5	17.4	25.2	33.8	15.4	20.2	28	33.5	66.2

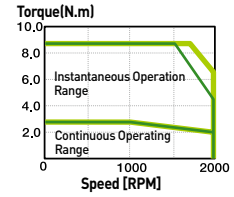
Note1] Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

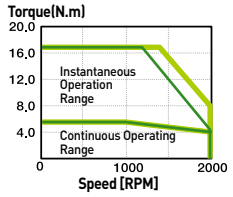
■ 3 Phase AC200V

■ 3Phase AC230V

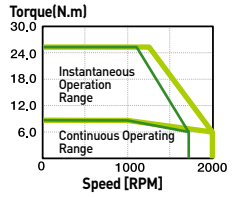
APM-FE03M



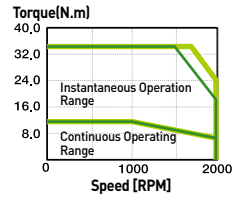
APM-FE06M



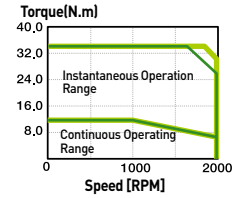
APM-FE09M



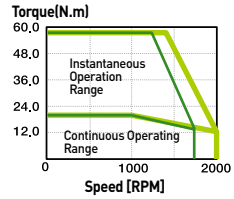
APM-FE12M



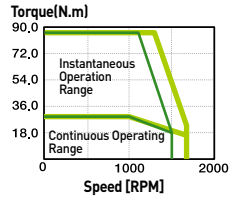
APM-FF12M



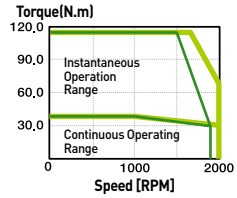
APM-FF20M



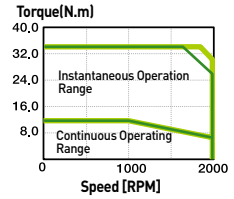
APM-FF30M



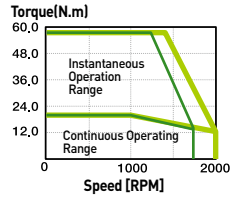
APM-FF44M



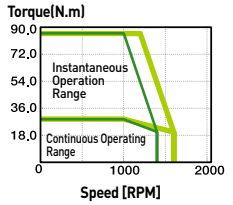
APM-FG12M



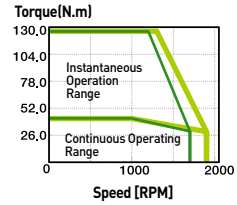
APM-FG20M



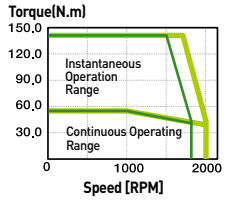
APM-FG30M



APM-FG44M



APM-FG60M



Servo Motor Characteristics(400V)

Motor Specifications [Rated 3000r/min]

Servo Motor (APM-□□□□)		FEP09A	FEP15A	FEP22A	FEP30A	FFP30A	FFP50A
Applicable Drive		L7□B010□	L7□B020□		L7□B035□		L7□B050□
Flange Size(□)		□130				□180	
Rated Output	[kW]	0.9	1.5	2.2	3	3	5
Rated Torque	[N·m]	2.86	4.77	7	9.55	9.55	15.92
	[kgf·cm]	29.23	48.72	71.46	97.44	97.44	162.4
Max. Instantaneous	[N·m]	8.59	14.32	21.01	28.65	28.65	39.79
	[kgf·cm]	87.7	146.16	214.37	292.33	292.33	406.01
Rated Current	[A]	3.47	6.68	7.64	9.94	9.79	16.07
Max.Current	[A]	10.4	20.03	22.92	29.81	29.38	40.18
Rated Speed	[r/min]	3000					
Max. Speed	[r/min]	5000					
Inertia	[kg·m^{2}X10^{-4}]	5.659	10.179	14.619	19.04	27.96	46.56
	[gf·cm·s^2]	5.774	10.387	14.917	19.429	28.531	47.51
Allowable Load Inertia Ratio		10 times of motor inertia				5 times of motor inertia	
Rated Power Rate	[kW/s]	14.5	22.4	33.55	47.89	32.61	54.4
Speed/Position Detector	Standard	Serial Type 19[bit]					
	Option	×					
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1)					
	Rated Time	Continuous					
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]					
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)					
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.					
	E/V	Elevation/vibration 49[m/s^2](5G)					
Weight	[kg]	5.5	7.54	9.68	11.78	12.4	17.7

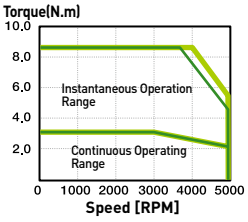
Note1) Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

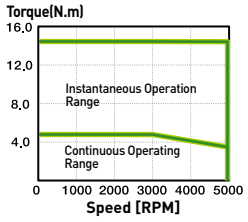
■ 3 Phase AC200V

■ 3Phase AC230V

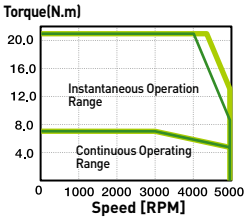
APM-FEP09A



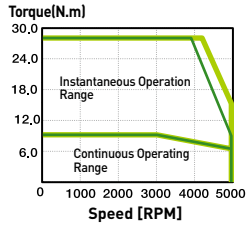
APM-FEP15A



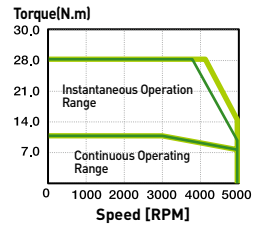
APM-FEP22A



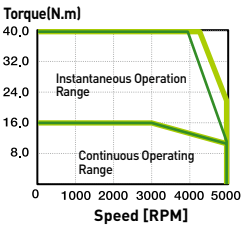
APM-FEP30A



APM-FFP30A



APM-FFP50A



Servo Motor Characteristics(400V)

Motor Specifications [Rated 2000r/min]

Servo Motor (APM-□□□□)		FEP06D	FEP11D	FEP16D	FEP22D	FFP22D	FFP35D	FFP55D	FFP75D	FGP22D	FGP35D	FGP55D	FGP75D	FGP110D
Applicable Drive		L7□B010□		L7□B020□			L7□B035□	L7□B050□	L7□B075□	L7□B020□	L7□B035□	L7□B050□	L7□B075□	L7□B150□
Flange Size(□)		□130				□180					□220			
Rated Output	[kW]	0.6	1.1	1.6	2.2	2.2	3.5	5.5	7.5	2.2	3.5	5.5	7.5	11
Rated Torque	[N·m]	2.86	5.25	7.64	10.5	10.5	16.71	26.26	35.81	10.5	16.71	26.26	35.81	52.52
	[kgf·cm]	29.23	53.59	77.95	107.19	107.19	170.52	267.96	365.41	107.19	170.52	267.96	365.41	535.93
Max. Instantaneous	[N·m]	8.59	15.76	22.92	31.51	31.51	50.13	65.65	89.52	31.51	50.13	65.65	89.52	131.30
	[kgf·cm]	87.7	160.78	233.86	321.56	321.56	511.57	669.84	913.52	321.56	511.57	669.84	913.52	1339.69
Rated Current	[A]	3.28	3.4	4.97	6.80	6.93	9.09	14.70	18.97	7.12	8.73	16.04	19.10	27.41
Max.Current	[A]	9.83	10.19	14.92	20.4	20.8	27.26	36.75	47.42	21.35	26.2	40.1	47.76	68.52
Rated Speed	[r/min]	2000												
Max. Speed	[r/min]	3000					2700		2500	3000	2700	3000	2500	
Inertia	[kg·m²X10⁻⁴]	5.659	10.179	14.619	19.04	27.96	46.56	73.85	106.73	41.13	71.53	117.72	149.4	291.36
	[gf·cm·s²]	5.774	10.387	14.917	19.429	28.531	47.51	75.357	108.908	41.97	72.99	120.12	152.45	297.31
Allowable Load Inertia Ratio		10 times of motor inertia				5 times of motor inertia								
Rated Power Rate	[kW/s]	14.5	27.1	39.92	57.95	39.46	59.98	93.38	120.15	26.83	39.04	58.58	85.83	94.68
Speed/Position Detector	Standard	Serial Type 19[bit]												
	Option	×												
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1]												
	Rated Time	Continuous												
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]												
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)												
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.												
	E/V	Elevation/vibration 49[m/s²](5G)												
Weight	[kg]	5.5	7.54	9.68	11.78	12.4	17.7	26.3	35.6	16.95	21.95	30.8	37.52	66.2

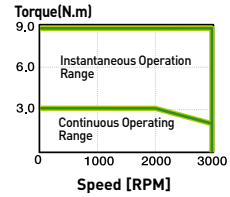
Note1] Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

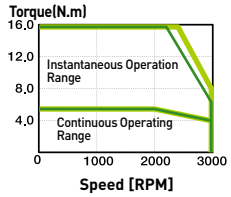
■ 3 Phase AC200V

■ 3Phase AC230V

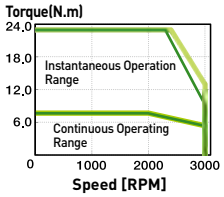
APM-FEP06D



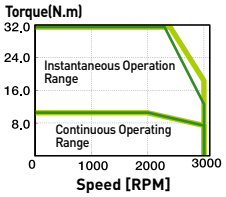
APM-FEP11D



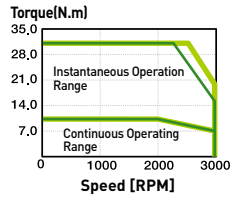
APM-FEP16D



APM-FEP22D



APM-FFP22D



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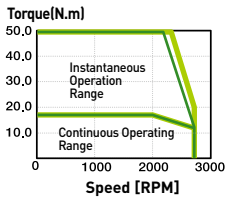
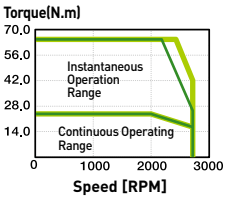
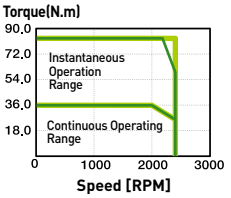


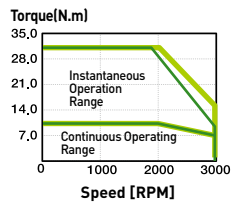
APM-FFP55D



APM-FFP75D



APM-FGP22D



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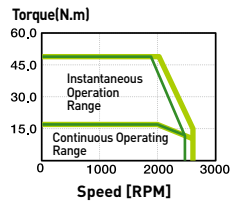

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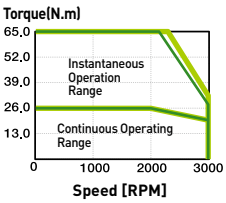

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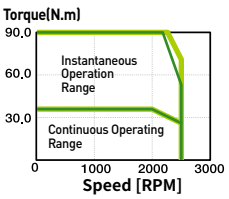
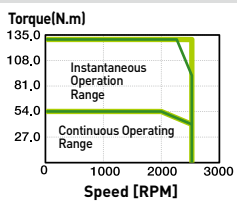


APM-FGP110D



Motor Specifications [Rated 1500r/min]

Servo Motor (APM-□□□□)		FEP05G	FEP09G	FEP13G	FEP17G	FFP20G	FFP30G	FFP44G	FFP60G	FFP75G	FGP20G	FGP30G	FGP44G	FGP60G	FGP85G	FGP110G	FGP150G
Applicable Drive		L7□B010□		L7□B020□			L7□B035□	L7□B050□	L7□B075□		L7□B020□	L7□B035□	L7□B050□	L7□B075□	L7□B150□		
Flange Size(□)		□130				□180					□220						
Rated Output	[kW]	0.45	0.85	1.3	1.7	1.8	2.9	4.4	6	7.5	1.8	2.9	4.4	6	8.5	11	15
Rated Torque	[N·m]	2.86	5.41	8.28	10.82	11.46	18.46	28.01	38.2	47.75	11.46	18.46	28.01	38.2	54.11	70.03	95.49
	[kgf·cm]	29.23	55.22	84.45	110.43	116.93	188.39	285.83	389.77	487.21	116.93	188.39	285.83	389.77	552.17	714.57	974.42
Max. Instantaneous	[N·m]	8.59	16.23	24.83	32.47	34.38	55.39	70.02	95.49	119.37	34.38	55.39	70.03	95.49	135.28	175.07	238.73
	[kgf·cm]	87.7	166.65	253.35	331.3	350.79	565.16	714.48	974.42	1,218.02	350.79	565.16	714.57	974.42	1,380.43	1,786.43	2,436.05
Rated Current	[A]	3.28	3.50	5.39	7.01	7.56	10.04	15.68	20.23	20.01	7.76	9.65	17.11	20.38	28.24	28.02	35.71
Max.Current	[A]	9.83	10.5	16.16	21.02	22.69	30.12	39.20	50.58	50.03	23.29	28.95	46.19	50.95	70.6	70.05	89.25
Rated Speed	[r/min]	1500															
Max. Speed	[r/min]	3000					2700	2700	2500	2200	3000	2700	3000	2500		2000	
Inertia	[kg·m²X10⁻⁴]	5.659	10.179	14.619	19.04	27.96	46.56	73.85	106.73	131.29	41.13	71.53	117.72	149.4	291.36	291.36	385.05
	[gf·cm·s²]	5.774	10.387	14.917	19.429	28.531	47.51	75.357	108.908	133.969	41.97	72.99	120.12	152.45	297.31	297.31	392.91
Allowable Load Inertia Ratio		10 times of motor inertia				5 times of motor inertia											
Rated Power Rate	[kW/s]	14.5	28.77	46.85	61.52	46.96	73.21	106.25	136.7	173.64	25.53	47.65	66.65	97.66	100.5	168.3	236.82
Speed/Position Detector	Standard	Serial Type 19[bit]															
	Option	×															
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1]															
	Rated Time	Continuous															
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]															
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)															
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.															
	E/V	Elevation/vibration 49[m/s²](5G)															
Weight	[kg]	5.5	7.54	9.68	11.78	12.4	17.7	26.3	35.6	39.4	16.95	21.95	30.8	37.52	66.2	66.3	92.2

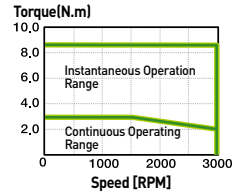
Note1] Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

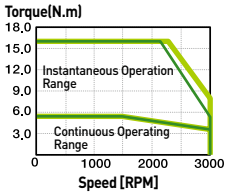
■ 3 Phase AC200V

■ 3Phase AC230V

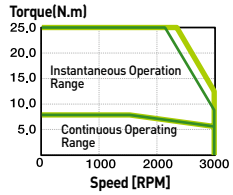
APM-FEP05G



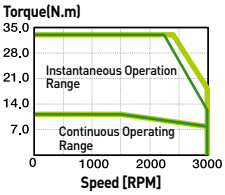
APM-FEP09G



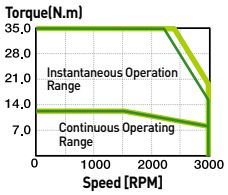
APM-FEP13G



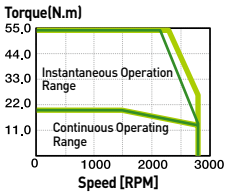
APM-FEP17G



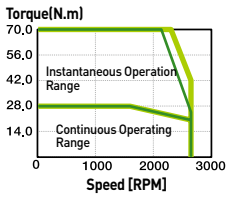
APM-FFP20G



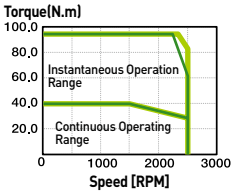
APM-FFP30G



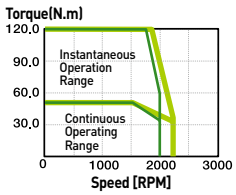
APM-FFP44G



APM-FFP60G



APM-FFP75G



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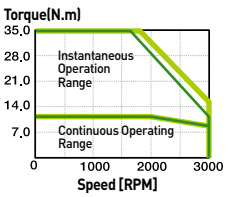

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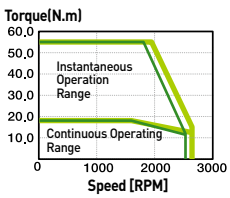

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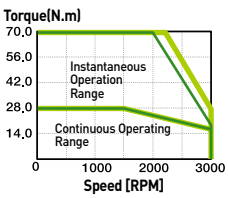
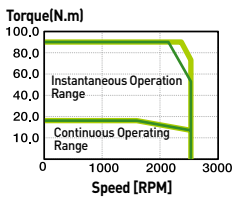
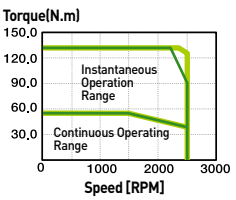


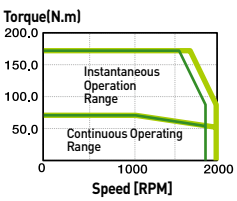
APM-FGP60G



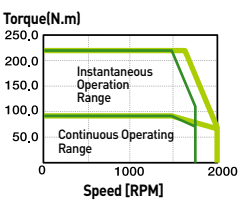
APM-FGP85G



APM-FGP110G



APM-FGP150G



Servo Motor Characteristics(400V)

Motor Specifications [Rated 1000r/min]

Servo Motor (APM-□□□□)		FEP03M	FEP06M	FEP09M	FEP12M	FFP12M	FFP20M	FFP30M	FFP44M	FGP12M	FGP20M	FGP30M	FGP44M	FGP60M
Applicable Drive		L7□B010□			L7□B020□			L7□B035□	L7□B050□	L7□B020□		L7□B035□	L7□B050□	L7□B075□
Flange Size(□)		□130				□180				□220				
Rated Output	[kW]	0.3	0.6	0.9	1.2	1.2	2	3	4.4	1.2	2	3	4.4	6.0
Rated Torque	[N·m]	2.86	5.73	8.59	11.46	11.46	19.1	28.65	42.02	11.46	19.1	28.65	42.02	57.30
	[kgf·cm]	29.23	58.47	87.7	116.93	116.93	194.88	292.33	428.74	116.93	194.88	292.33	428.74	584.65
Max. Instantaneous	[N·m]	8.59	17.19	25.78	34.38	34.38	57.3	71.62	105.05	34.38	57.3	85.94	105.05	143.24
	[kgf·cm]	87.7	175.4	263.09	350.79	350.79	584.65	730.81	1071.85	350.79	584.65	876.98	1071.86	1461.63
Rated Current	[A]	3.28	3.28	3.33	4.87	4.83	7.94	9.97	16.69	4.75	7.88	9.97	17.39	20.23
Max.Current	[A]	9.83	9.83	9.99	14.6	14.5	23.83	29.91	41.73	14.24	23.64	29.91	43.48	49.69
Rated Speed	[r/min]	1000												
Max. Speed	[r/min]	2000						1800	2000			1800	2000	1900
Inertia	[kg·m²X10⁻⁴]	5.659	10.179	14.619	19.04	27.96	46.56	73.85	106.73	41.13	71.53	117.72	149.4	291.36
	[gf·cm·s²]	5.774	10.387	14.917	19.429	28.531	47.51	75.357	108.908	41.969	72.99	120.12	152.45	297.31
Allowable Load Inertia Ratio		10 times of motor inertia				5 times of motor inertia								
Rated Power Rate	[kW/s]	14.5	32.25	50.53	68.97	46.96	78.34	111.13	165.41	31.93	50.99	54.93	118.17	112.64
Speed/Position Detector	Standard	Serial Type 19[bit]												
	Option	×												
Specifications & Features	Structure	Fully closed·Self cooling IP65 Note1]												
	Rated Time	Continuous												
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]												
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)												
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.												
	E/V	Elevation/vibration 49[m/s²](5G)												
Weight	[kg]	5.5	7.54	9.68	11.78	12.4	17.7	26.3	35.6	16.95	21.95	30.8	37.52	66.2

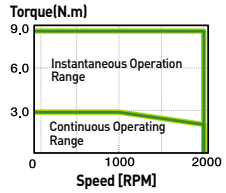
Note1] Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

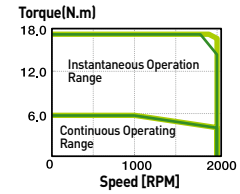
■ 3 Phase AC200V

■ 3Phase AC230V

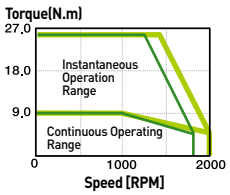
APM-FEP03M



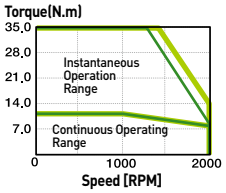
APM-FEP06M



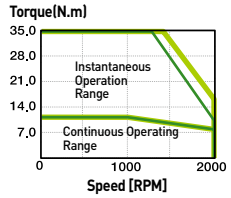
APM-FEP09M



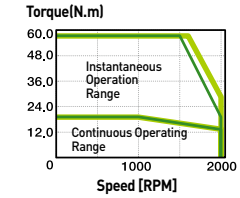
APM-FEP12M



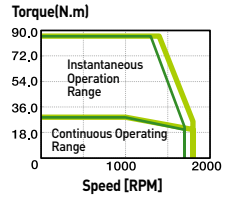
APM-FFP12M



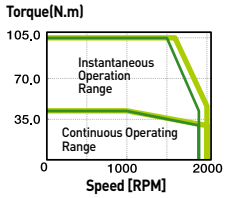
APM-FFP20M



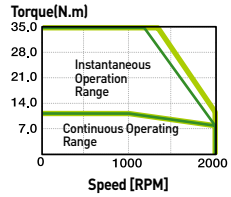
APM-FFP30M



APM-FFP44M



APM-FGP12M



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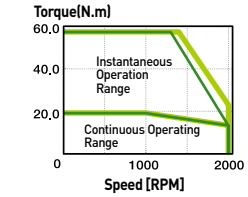

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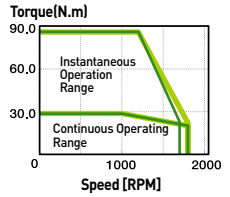

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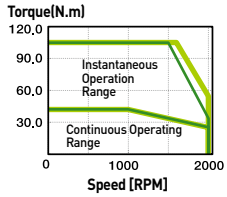
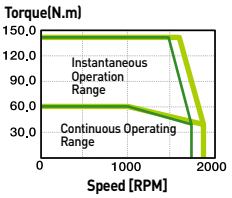


APM-FGP60M



Servo Motor Characteristics(24~80Vdc)

PHOX DC Drive Motor Specification

Servo Motor (APMC-□□□□□□-8)		FAL01A-8	FBL01A-8	FBL02A-8	FBL03A-8
Applicable Drive		PHOX-03		PHOX-06	PHOX-06 Note1]
Flange Size(□)		□40	□60	□60	□60
Rated Output	[kW]	0.1	0.1	0.2	0.3
Rated Torque	[N·m]	0.32	0.32	0.64	0.95
	[kgf·cm]	3.25	3.25	6.49	9.74
Max. Instantaneous	[N·m]	0.96	0.96	1.92	2.54
	[kgf·cm]	9.74	9.74	19.48	25.92
Rated Current	[A]	2.71	2.5	5.54	6.79
Max.Current	[A]	8.13	7.50	16.62	18.0
Rated Speed	[r/min]	3000			
Max. Speed	[r/min]	5000	5000	5000	3000
Inertia	[kg·m²X10⁻⁴]	0.042	0.091	0.147	0.248
	[gf·cm·s²]	0.043	0.093	0.15	0.2353
Allowable Load Inertia Ratio		30 times of motor inertia	20 times of motor inertia		
Rated Power Rate	[kW/s]	24.24	11.13	27.57	36.81
Speed/Position Detector	Standard	Serial Multi-Turn Built-in Type(18bit)	Serial Multi-Turn Built-in Type(19bit)		
	Option	×			
Specifications & Features	Structure	Fullyclosed·SelfcoolingIP67 Note2]			
	Rated Time	Continuous			
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]			
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)			
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.			
	E/V	Elevation/vibration 49[m/s²](5G)			
Weight	[kg]	0.45	0.56	0.74	1.06

Note1] If you need to apply PHOX-06 drive to a motor, please contact us.

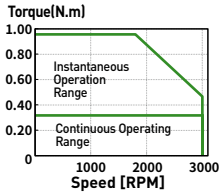
Note2] Exceptforaxispenetration,whenyouattachreducertothemotor,wedon'tguaranteeIPforreducer.Ifyoubendoverspecificationdesignatedincablestandard, it is difficult to guarantee IP marked It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics

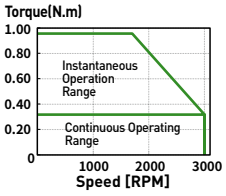
■ 3 Phase AC200V

■ 3Phase AC230V

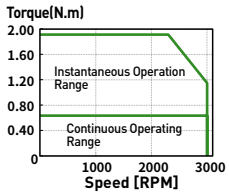
APMC-FAL01A-8



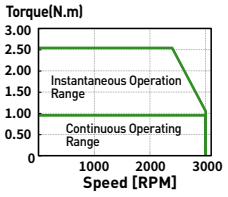
APMC-FBL01A-8



APMC-FBL02A-8



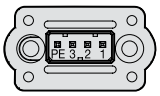
APMC-FBL03A-8

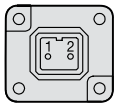


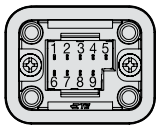
※ The graph above shows the rotational speed-torque characteristics when the drive input power is DC 48[V].

External Dimensions of Servo Motor

FAL Series







Plug Specifications

Power

Pin No.	Signal
1	U
2	V
3	W
PE	Ground

(Power Connector Pin Table)

Brake

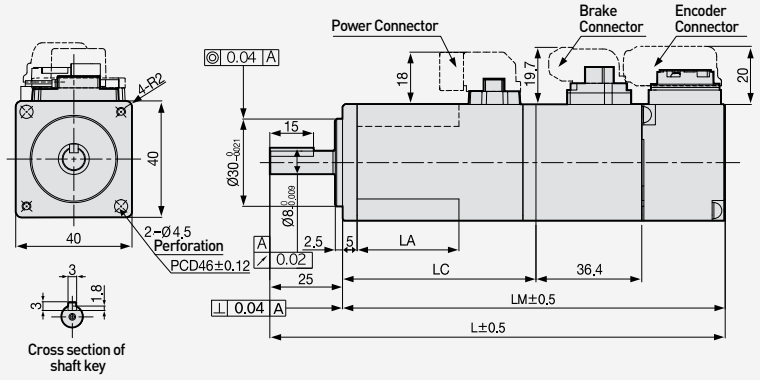
Pin No.	Signal
1	BK+
2	BK-

(Brake Connector Pin Table)

Encoder

Multi Turn (M)	
Pin No.	Signal
1	MA
2	SLO
3	GND_B
4	0V
5	SHIELD
6	$\overline{MA}$
7	$\overline{SLO}$
8	VDD_B
9	+5V

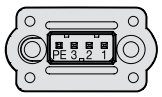
(Encoder Connector Pin Table)

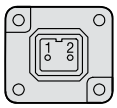


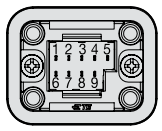
Model	External Dimensions(mm)				Weight(kg)
	L	LM	LC	LA	
FALR5A	103.2(139.6)	78.2(114.6)	49.5	23	0.31(0.66)
FAL01A	120.2(156.6)	95.2(131.6)	66.5	35	0.45(0.80)
FAL015A	140.2	115.2	86.5	35	0.61

Note1) Use DC[24V] for brake input power supply.
Note2) The ( ) is for brake-attached type.
Note3) For external dimensions for oil-sealed type. Please kindly contact us separately.

FBL Series







Plug Specifications

Power

Pin No.	Signal
1	U
2	V
3	W
PE	Ground

(Power Connector Pin Table)

Brake

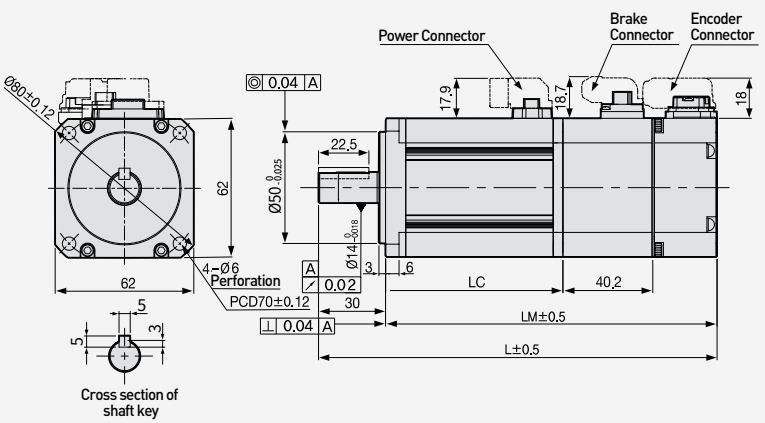
Pin No.	Signal
1	BK+
2	BK-

(Brake Connector Pin Table)

Encoder

Multi Turn (M)	
Pin No.	Signal
1	MA
2	SLO
3	GND_B
4	0V
5	SHIELD
6	$\overline{MA}$
7	$\overline{SLO}$
8	VDD_B
9	+5V

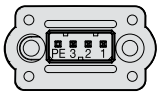
(Encoder Connector Pin Table)

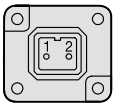


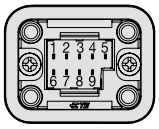
Model	External Dimensions(mm)			Weight(kg)
	L	LM	LC	
FBL01A	107.2(147.2)	77.2(117.2)	48.5(48.3)	0.56(1.3)
FBL02A	118.2(158.2)	88.2(128.2)	59.5(59.3)	0.74(1.48)
FBL04A	138.2(178.2)	108.2(148.2)	79.5(79.3)	1.06(1.8)

Note1) Use DC[24V] for brake input power supply.
Note2) The ( ) is for brake-attached type.
Note3) For external dimensions for oil-sealed type. Please kindly contact us separately.

FCL Series







Plug Specifications

Power

Pin No.	Signal
1	U
2	V
3	W
PE	Ground

(Power Connector Pin Table)

Brake

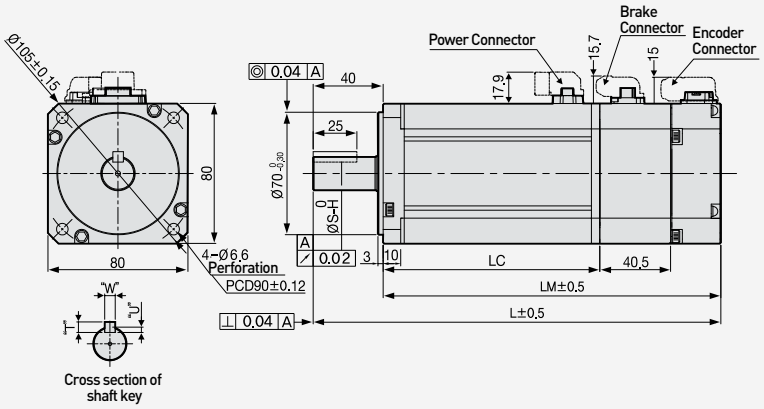
Pin No.	Signal
1	BK+
2	BK-

(Brake Connector Pin Table)

Encoder

Multi Turn (M)	
Pin No.	Signal
1	MA
2	SLO
3	GND_B
4	0V
5	SHIELD
6	$\overline{MA}$
7	$\overline{SLO}$
8	VDD_B
9	+5V

(Encoder Connector Pin Table)

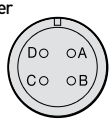


Model	External Dimensions(mm)								Weight(kg)
	L	LM	LC	S	H	T	W	U	
FCL04A, FCL03D	138.7(179.5)	98.7(139.5)	70(69.8)	14	-0.018	5	5	3	1.52(2.32)/1.26(2.06)
FCL06A, FCL05D	156.7(197.5)	116.7(157.5)	88(87.8)	19	-0.021	6	6	3.5	2.14(2.94)/2.12(2.92)
FCL08A, FCL06D	174.7(215.5)	134.7(175.5)	106(105.8)	19	-0.021	6	6	3.5	2.68(3.48)/2.66(3.46)
FCL10A, FCL07D	192.7(233.5)	152.7(193.5)	124(123.8)	19	-0.021	6	6	3.5	3.30(4.10)/2.78(3.58)

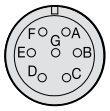
Note1) Use DC[24V] for brake input power supply.
Note2) The ( ) is for brake-attached type.
Note3) For external dimensions for oil-sealed type. Please kindly contact us separately.

FE, FEP Series

Power



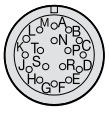
Spec.: MS3102A20-4P (Standard)



Spec.: MS3102A20-15P (Brake-attached type)

Encoder

Serial Type



Spec.: MS3102A20-29P

Plug Specifications

Power

Pin No.	Signal
A	U
B	V
C	W
D	Ground

Pin No.	Signal	Pin No.	Signal
A	U	D	Ground
B	V	E	BK+
C	W	F	BK-

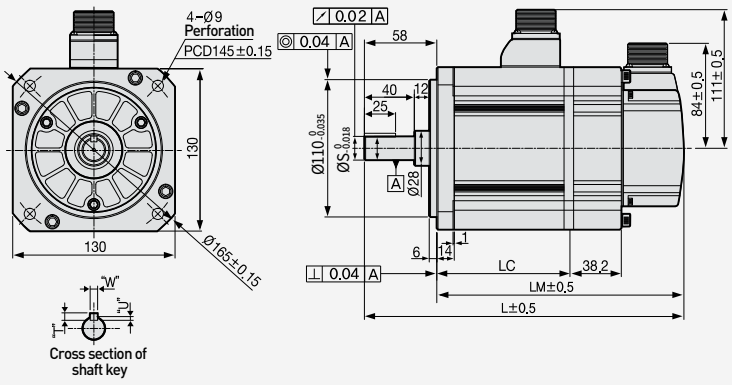
Encoder

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	-	H	+5V
F	-	G	0V
K	-	J	SHIELD
L	-		

(Single Turn Encoder Connector Pin Table)

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	VDD_B	H	+5V
F	GND_B	G	0V
K	-	J	SHIELD
L	-		

(Multi Turn Encoder Connector Pin Table)



Model	External Dimensions(mm)				Key			Weight (kg)
	L	LM	LC	S	T	W	U	
FE09A, FE06D, FE05G, FE03M, FEP09A, FEP06D, FEP05G,FEP03M	197.3(235.3)	139.3(177.3)	89.8(89.6)	19	5	5	3	5.04(6.58)
FE15A, FE11D, FE09G, FE06M, FEP15A, FEP11D, FEP09G, FEP06M	217.3(255.3)	159.3(197.3)	109.8(109.6)	19	5	5	3	6.74(8.28)
FE22A, FE16D, FE13G, FE09M, FEP22A, FEP16D, FEP13G, FEP09M	237.3(275.3)	179.3(217.3)	129.8(129.6)	22	6	6	3.5	8.48(10.02)
FE30A, FE22D, FE17G, FE12M, FEP30A, FEP22D, FEP17G, FEP12M	255.3(293.3)	197.3(235.3)	147.8(147.6)	24	7	8	4	10.05(11.59)

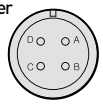
Note1) Use DC[24V] for brake input power supply.
Note2) The ( ) is for brake-attached type.

External Dimensions of Servo Motor

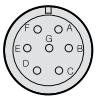
FF, FFP Series

Plug Specifications

Power



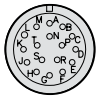
Spec.: MS3102A22-22P
(Standard)



Spec.: MS3102A24-10P
(Brake-attached type)

Encoder

Serial Type



Spec.: MS3102A20-29P

Pin No.	Signal
A	U
B	V
C	W
D	Ground

Pin No.	Signal	Pin No.	Signal
A	U	D	Ground
B	V	E	BK+
C	W	F	BK-

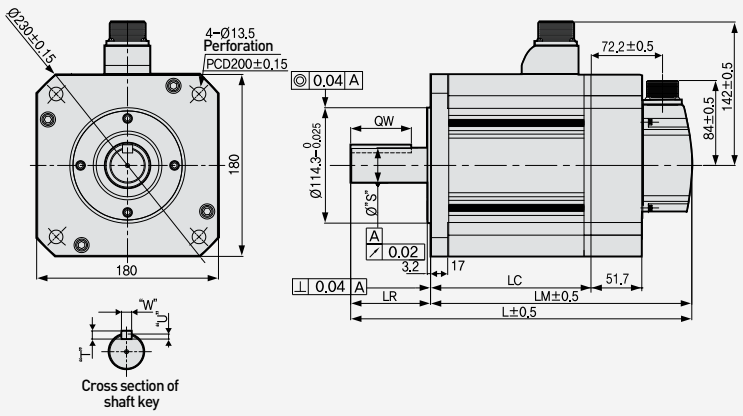
Encoder

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	-	H	+5V
F	-	G	0V
K	-	J	SHIELD
L	-		

(Single Turn Encoder Connector Pin Table)

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	VDD_B	H	+5V
F	GND_B	G	0V
K	-	J	SHIELD
L	-		

(Multi Turn Encoder Connector Pin Table)



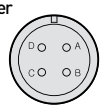
Model	External Dimensions(mm)				Key					Weight (kg)
	L	LM	LC	LR	S	QW	T	W	U	
FF30A, FF22D, FF20G, FF12M, FFP30A, FFP22D, FFP20G, FFP12M	257.5 (308.9)	178.5 (229.9)	129 (128.7)	79	$35^{0.01}_{0}$	60	8	10	5	12.5 (19.7)
FF50A, FF35D, FF30G, FF20M, FFP50A, FFP35D, FFP30G, FFP20M	287.5 (338.9)	208.5 (259.9)	159 (158.7)							17.4 (24.6)
FF55D, FF44G, FF30M FFP55D, FFP44G, FFP30M	331.5 (382.9)	252.5 (303.9)	203 (202.7)							25.2 (32.4)
FF75D, FF60G, FF44M FFP75D, FFP60G, FFP44M	384.5 (435.9)	305.5 (356.9)	256 (255.7)		$42^{0}_{0.016}$			12		33.8 (41.0)
FF75G, FFP75G	439.5	326.5	277	113		96				38.5 (45.7)

Note1) FF30 Morabovemodelshave eyebolts.
Note2) Use DC[24V]for brake input power supply.
Note3) The()is for brake-attached type.
Note4) UseMS3102A32-17 forFF75G Power connector.

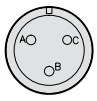
FG, FGP Series

Plug Specifications

Power



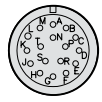
Spec.: MS3102A22-22P
(Standard)



Spec.: MS3102A14-7P
(Brake-attached type)

Encoder

Serial Type



Spec.: MS3102A20-29P

Pin No.	Signal
A	U
B	V
C	W
D	Ground

Pin No.	Signal
A	BK+
B	BK-
C	NC

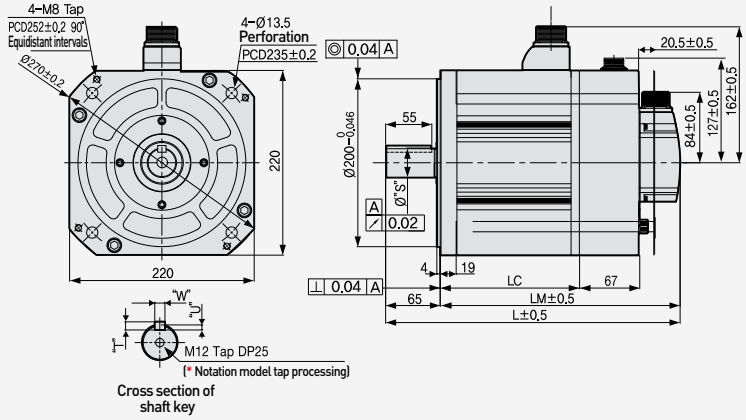
Encoder

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	-	H	+5V
F	-	G	0V
K	-	J	SHIELD
L	-		

(Single Turn Encoder Connector Pin Table)

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	VDD_B	H	+5V
F	GND_B	G	0V
K	-	J	SHIELD
L	-		

(Multi Turn Encoder Connector Pin Table)

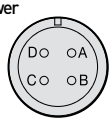


Model	External Dimensions(mm)			Key				Weight (kg)	Power Connector
	L	LM	LC	S	T	W	U		
FG22D, FG20G, FG12M FGP22D, FGP20G, FGP12M	229.5 (295.7)	164.5 (230.7)	115 (114.2)	$35^{0}_{0.01}$	8	10	5	15.42 (29.23)	MS3102A 22-22P
FG35D, FG30G, FG20M FGP35D, FGP30G, FGP20M	250.5 (316.7)	185.5 (251.7)	136 (135.2)					20.22 (34.03)	
FG55D, FG44G, FG30M FGP55D, FGP44G, FGP30M	282.5 (348.7)	217.5 (283.7)	168 (167.2)					28.02 (41.83)	
FG75D, FG60G, FG44M FGP75D, FGP60G, FGP44M	304.5 (370.7)	239.5 (305.7)	190 (189.2)	$42^{0}_{0.016}$		12		33.45 (47.26)	
*FG110D, *FG85G, *FG60M *FGP110D, *FGP85G	418.5 (484.7)	353.5 (305.7)	304 (303.2)	$45^{0}_{0.016}$		10	6	66.2 (82.6)	MS3102A 32-17P

Note1) Incase Of SG, use DC24V ford brake input power supply.
Note2) The ( ) is for brake-attached type

FG(P)110G

Power

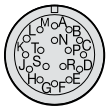


Spec.: MS3102A32-17P

Spec.: MS3102A14-7P
(Brake-attached type)

Encoder

Serial type



Spec.: MS3102A20-29P

Plug Specifications

Power

Pin No.	Signal
A	U
B	V
C	W
D	Ground

Pin No.	Signal
A	BK+
B	BK-
C	NC

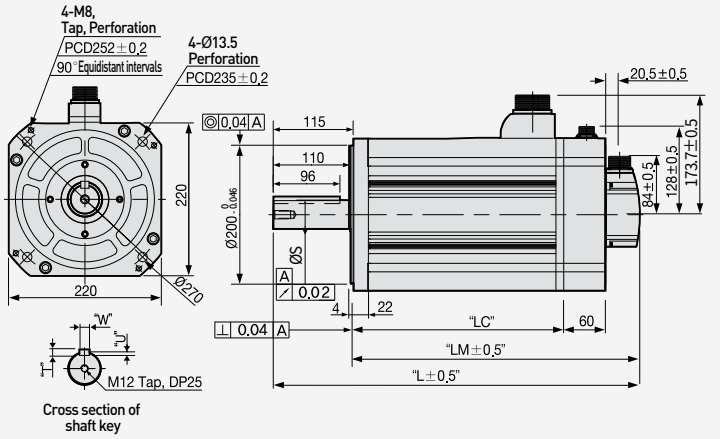
Encoder

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	-	H	+5V
F	-	G	0V
K	-	J	SHIELD
L	-		

(Single Turn Encoder Connector Pin Table)

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	VDD_B	H	+5V
F	GND_B	G	0V
K	-	J	SHIELD
L	-		

(Multi Turn Encoder Connector Pin Table)

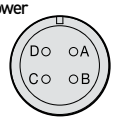


Model	External Dimensions(mm)			Key				Weight (kg)	Power Connector
	L	LM	LC	S	T	W	U		
FG(P)110G	468.5 (527.7)	353.5 (419.7)	304 (303.2)	$42^{0}_{-0.016}$	8	12	5	66.3 (82.7)	MS3102A 32-17P

Note1) Use DC[24V] for brake input power supply.
Note2) The ( ) is for brake-attached type.
Note3) For external dimensions for oil-sealed type. Please kindly contact us separately.

FG(P)150G

Power

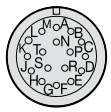


Spec.: MS3102A32-17P

Spec.: MS3102A14-7P
(Brake-attached type)

Encoder

Serial type



Spec.: MS3102A20-29P

Plug Specifications

Power

Pin No.	Signal
A	U
B	V
C	W
D	접지선

Pin No.	Signal
A	BK+
B	BK-
C	NC

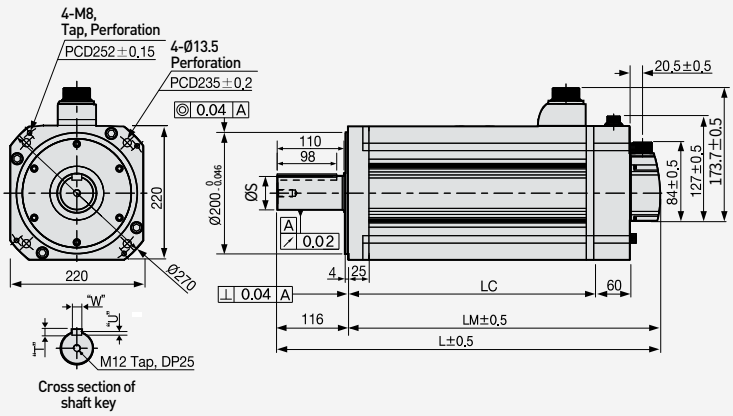
Encoder

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	-	H	+5V
F	-	G	0V
K	-	J	SHIELD
L	-		

(Single Turn Encoder Connector Pin Table)

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	VDD_B	H	+5V
F	GND_B	G	0V
K	-	J	SHIELD
L	-		

(Multi Turn Encoder Connector Pin Table)



Model	External Dimensions(mm)			Key				Weight (kg)	Power Connector
	L	LM	LC	S	T	W	U		
FG(P)150G	574 (630.5)	458 (514.5)	408 (405)	$55^{0}_{-0.016}$	10	16	6	92.2 (108.6)	MS3102A 32-17P

Note1) Use DC[24V] for brake input power supply.
Note2) The ( ) is for brake-attached type.

Servo Motor Characteristics(200V)

Motor Specificationswith Magnetic Absolute Serial Encoder [Rated 3000r/min]

Servo Motor (APMC-□□□□□)		FALR5A	FAL01A	FAL015A[Note1]	FBL01A	FBL02A	FBL04A	FCL04A	FCL06A	FCL08A	FCL10A
Applicable Drive		L7CA001		L7CA002	L7CA001	L7CA002	L7CA004		L7CA008		L7CA010
Flange Size(□)		□40			□60			□80			
Rated Ouatput	[kW]	0.05	0.1	0.15	0.1	0.2	0.4	0.4	0.6	0.75	1
Rated Torque	[N·m]	0.16	0.32	0.48	0.32	0.64	1.27	1.27	1.91	2.39	3.18
	[kgf·cm]	1.62	3.25	4.87	3.25	6.49	12.99	12.99	19.49	24.36	32.48
Max. Instantaneous	[N·m]	0.48	0.96	1.43	0.96	1.91	3.82	3.82	5.73	7.16	9.55
	[kgf·cm]	4.87	9.74	14.62	9.74	19.48	38.96	38.98	58.47	73.08	97.44
Rated Current	[A]	0.95	1.25	1.60	0.95	1.45	2.6	2.58	3.81	5.02	5.83
Max.Current	[A]	2.85	3.75	4.80	2.85	4.35	7.8	7.75	11.42	15.07	17.5
Rated Speed	[r/min]	3000									
Max. Speed	[r/min]	5000									
Inertia	[kg·m^{2}X10^{-4}]	0.023	0.042	0.063	0.091	0.147	0.248	0.53	0.897	1.264	1.632
	[gf·cm·s^2]	0.024	0.043	0.065	0.093	0.15	0.253	0.541	0.915	1.29	1.665
Allowable Load Inertia Ratio		30 times of motor inertia		20 times of motor inertia				15 times of motor inertia			
Rated Power Rate	[kW/s]	10.55	23.78	36.19	11.09	27.6	27.07	30.6	40.66	45.09	62.08
Speed/Position Detector	Standard	Serial Single - Turn Built - in Type (17bit)									
Specifications & Features	Structure	Fully closed·Self cooling IP67									
	Rated Time	Continuous									
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]									
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)									
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.									
	E/V	Elevation/vibration 49[m/s^2] (5G)									
Weight	[kg]	0.31	0.45	0.61	0.56	0.74	1.06	1.52	2.14	2.68	3.3

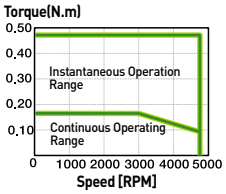
Note1) Brake is not applicable for FAL015A

Speed-Torque Characteristics

■ 3 Phase AC200V

■ 3Phase AC230V

APMC-FALR5A



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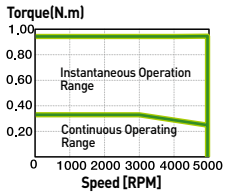

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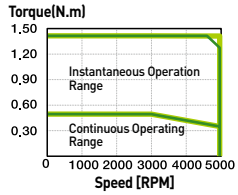

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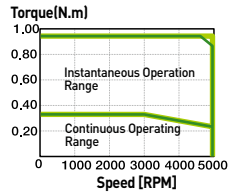

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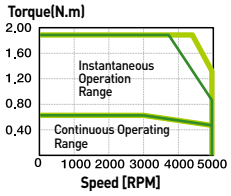

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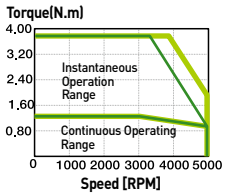

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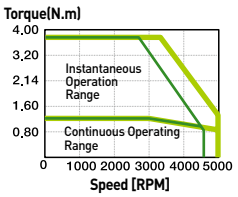

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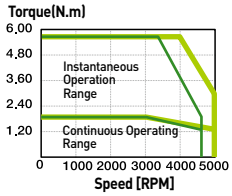

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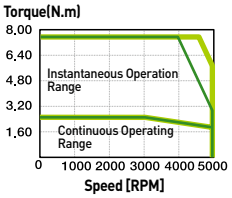
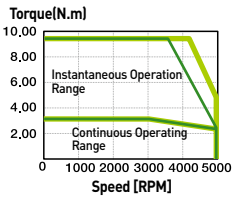


APMC-FCL10A



Motor Specificationswith Magnetic Absolute Serial Encoder [Rated 2000r/min]

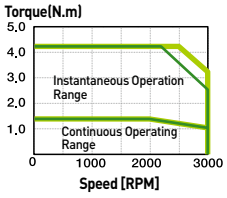
Servo Motor (APMC-□□□□□)		FCL03D	FCL05D	FCL06D	FCL07D
Applicable Drive		L7CA004	L7CA008		
Flange Size(□)		□80			
Rated Ouatput	[kW]	0.3	0.45	0.55	0.65
Rated Torque	[N·m]	1.43	2.15	2.63	3.1
	[kgf·cm]	14.62	21.92	26.8	31.67
Max. Instantaneous	[N·m]	4.3	6.45	7.88	9.31
	[kgf·cm]	43.85	65.77	80.39	95.01
Rated Current	[A]	2.5	3.05	3.06	3.83
Max.Current	[A]	7.51	9.16	9.18	11.5
Rated Speed	[r/min]	2000			
Max. Speed	[r/min]	3000			
Inertia	[kg·m^{2}X10^{-4}]	0.53	0.897	1.264	1.63
	[gf·cm·s^2]	0.541	0.915	1.29	1.66
Allowable Load Inertia Ratio		15 times of motor inertia			
Rated Power Rate	[kW/s]	38.73	51.47	54.56	59.03
Speed/Position Detector	Standard	Serial Single - Turn Built - in Type (17bit)			
Specifications & Features	Structure	Fully closed·Self cooling IP67			
	Rated Time	Continuous			
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]			
	Ambient Humidity	Operating : Below80[%]RH / Storage : Below 90[%]RH(avoid dew-condensation)			
	Atmosphere	Avoid direct sunlight, no corrosive gas, inflammable gas, oil mist, or dust.			
	E/V	Elevation/vibration 49[m/s^2] (5G)			
Weight	[kg]	1.26	2.12	2.66	2.78

Speed-Torque Characteristics

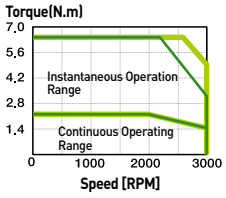
■ 3 Phase AC200V

■ 3Phase AC230V

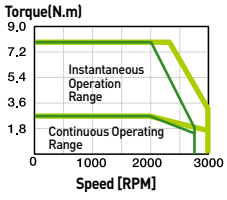
APMC-FCL03D



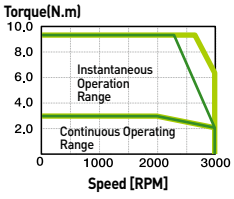
APMC-FCL05D



APMC-FCL06D

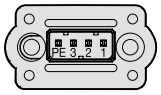


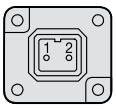
APMC-FCL07D

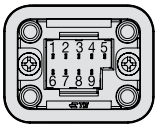


External Dimensions of Servo Motor

FAL Series With Magnetic Absolute Serial Encoder







Plug Specifications

Power

Pin No.	Signal
1	U
2	V
3	W
PE	Ground

(Power Connector Pin Table)

Brake

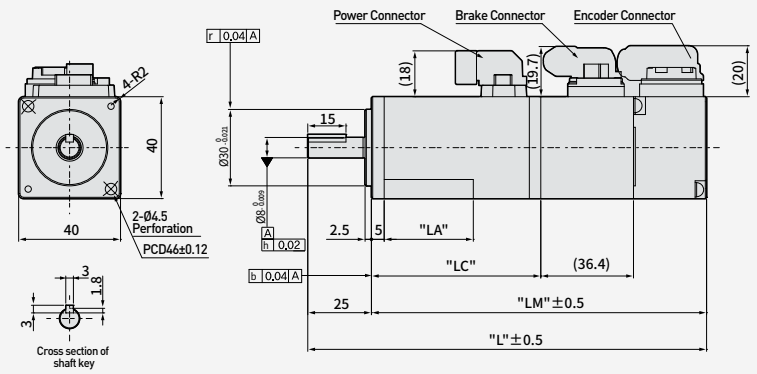
Pin No.	Signal
1	BK+
2	BK-

(Brake Connector Pin Table)

Encoder

Single Turn (N)	
Pin No.	Signal
1	MA
2	SLO
3	-
4	0V
5	SHIELD
6	$\overline{MA}$
7	$\overline{SLO}$
8	-
9	+5V

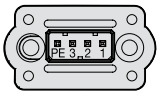
(Encoder Connector Pin Table)

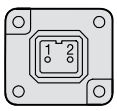


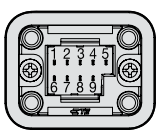
Model	External Dimensions(mm)				Weight (kg)
	L	LM	LC	LA	
FALR5A	103.2(139.6)	78.2(114.6)	49.5	23	0.31(0.66)
FAL01A	120.2(156.6)	95.2(131.6)	66.5	35	0.45(0.80)
FAL015A	140.2	115.2	86.5	35	0.61

Note1] Use DC[24V] for brake input power supply.
Note2] The ( ) is for brake-attached type.
Note3] For external dimensions for oil-sealed type. Please kindly contact us separately.

FBL Series With Magnetic Absolute Serial Encoder







Plug Specifications

Power

Pin No.	Signal
1	U
2	V
3	W
PE	Ground

(Power Connector Pin Table)

Brake

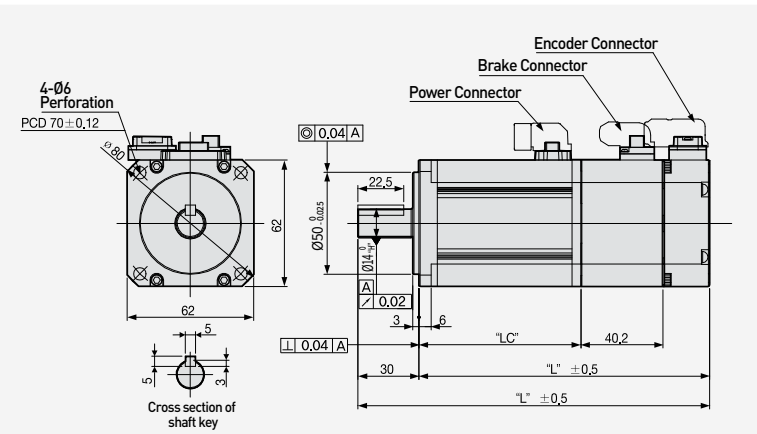
Pin No.	Signal
1	BK+
2	BK-

(Brake Connector Pin Table)

Encoder

Single Turn (N)	
Pin No.	Signal
1	MA
2	SLO
3	-
4	0V
5	SHIELD
6	$\overline{MA}$
7	$\overline{SLO}$
8	-
9	+5V

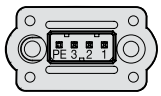
(Encoder Connector Pin Table)

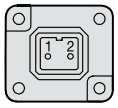


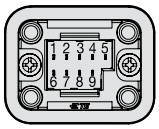
Model	External Dimensions(mm)					Key			Weight (kg)
	L	LM	LC	S	H	T	W	U	
FBL01A	101.2(141.2)	71.2(111.2)	48.5(48.3)	14	-0.018	5	5	3	0.54(1.28)
FBL02A	112.2(152.2)	82.2(122.2)	59.5(59.3)	14	-0.018	5	5	3	0.72(1.46)
FBL04A	132.2(172.2)	102.2(142.2)	79.5(79.3)	14	-0.018	5	5	3	1.04(1.78)

Note1] Use DC[24V] for brake input power supply.
Note2] The ( ) is for brake-attached type.

FCL Series With Magnetic Absolute Serial Encoder







Plug Specifications

Power

Pin No.	Signal
1	U
2	V
3	W
PE	Ground

(Power Connector Pin Table)

Brake

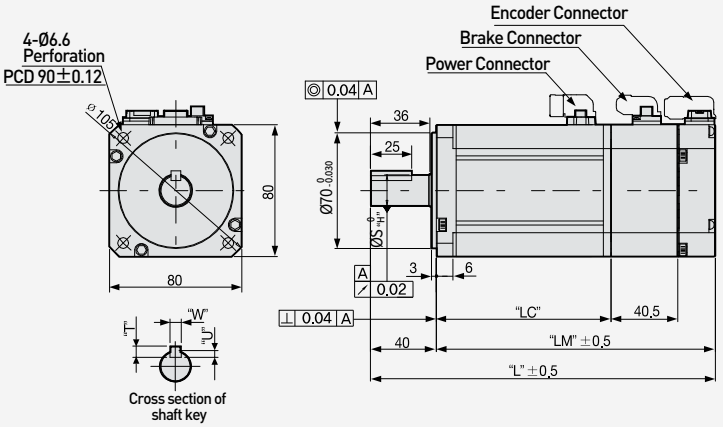
Pin No.	Signal
1	BK+
2	BK-

(Brake Connector Pin Table)

Encoder

Single Turn (N)	
Pin No.	Signal
1	MA
2	SLO
3	-
4	0V
5	SHIELD
6	$\overline{MA}$
7	$\overline{SLO}$
8	-
9	+5V

(Encoder Connector Pin Table)



Model	External Dimensions(mm)								Weight (kg)
	L	LM	LC	S	H	T	W	U	
FCL04A, FCL03D	132.7(173)	92.7(133)	70(69.8)	14	-0.018	5	5	3	1.49(2.29)/1.23(2.03)
FCL06A, FCL05D	150.7(191)	110.7(151)	88(87.8)	19	-0.021	6	6	3.5	2.11(2.91)/2.09(2.89)
FCL08A, FCL06D	168.7(209)	128.7(169)	106(105.8)	19	-0.021	6	6	3.5	2.65(3.45)/2.63(3.43)
FCL10A, FCL07D	186.7(227)	146.7(187)	124(123.8)	19	-0.021	6	6	3.5	3.27(4.03)/2.75(3.55)

Note1) Use DC[24V] for brake input power supply.
Note2) The ( ) is for brake-attached type.

Brake Specification and Heat Sink Specification (Heat Sink)

Brake Specification

Motor Series	FAL	FBL	FCL	FE/FEP	FF/FFP	FG/FGP	FG/FGP110G FG/FGP150G
Perpose	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance
Input Voltage [V]	DC 24V	DC 24V	DC 24V	DC 24V	DC 24V	DC 90V	DC 24V
Static Friction Torque[Nm]	0.32	1.47	3.23	10.4	40	74	120
Capacity [W]	6	6.5	9	19.4	25	32	26
CoilResistance [Ω]	96	67	64	29.6	23	257	18
Rated Current [A]	0.25	0.36	0.38	0.81	1.04	0.35	1.33
Insulation Class	F	F	F	F	F	F	F

Note1) All electromagnetic brakes built-in LS servo motors are of the same specification.

Heat Sink Specification

Classfication	Standard (mm)	Material
AP04 (□40)	250×250×6	Aluminum
AP06 (□60)	250×250×6	
AP08 (□80)	250×250×12	
AP13 (□130)	350×350×20	
AP18 (□180)	550×550×30	
AP22 (□220)	650×650×35	

Note1) The data on the product features is measured when those heat sinks were applied.
※ The through shaft part is not coverd by the IP rating.
※ When the gearbox is attached, the IP rating of the gearbox part is not guaranteed.
※ In case the cables bend beyond the cable specification, the indicated IP rating may not be satisfied.
※ The protection class is satisfied only when a dedicated cable is used.

DD Motor Designation

DD Motor Designation

MDM – D D None 34 D NO H – I

Motor Type
D: DD MOTOR

Input Power Supply
None: 200VAC

Rated Speed
A : 300rpm
D : 200rpm
G : 150rpm
M : 100rpm
S : 50rpm

Shape of Shaft End
H: Hollow Type

External Diameter
B: 135mm
C: 175mm
D: 230mm
E: 290mm
F: 360mm
G: 380mm

Rated Troque
03: 3Nm Output
06: 6Nm Output
09: 9Nm Output
...
60: 60Nm Output
...
A6: 160Nm Output
C3: 330Nm Output

Encoder Type						
	135	175	230	290	360	Remark
No	20Bit					Single Turn Abs. Bisss Communication

Features of Direct-Drive Motor

Using the Own Technologies to Produce Motors, Drives and Encoders Domestically

Optimized for Low-speed, High-torque and High-precision Operation

- Providing Power connection for the connection of DC-Link Terminal
- Compact Size and Easy Wring (Compared with 3 phase AC Reactor)
- Providing Connection for DC Input (PI, N)

Reduced Cogging Torque and Optimized Torque Design

- Optimal ratio of the permanent magnet and coil / slot selected through electromagnetic analysis
- Using multiple permanent magnets to reduce torque ripple and to maximize torque
- Using a permanent magnet of high-energy rare earth elements (Nd-Fe-B)

Using the High-performance Rotary Optical Encoder That Adopts the Biss Protocol

- Resolution of 1,048,576 CPR (20bit Single turn)
- Using our own encoder technology to reduce the cost and shorten the delivery time

Compatible With Our L7 Series AC Servo Drive (3Phase AC 220V)

- Both standard I/O type (serial communication supported) and network type (EtherCAT) applicable

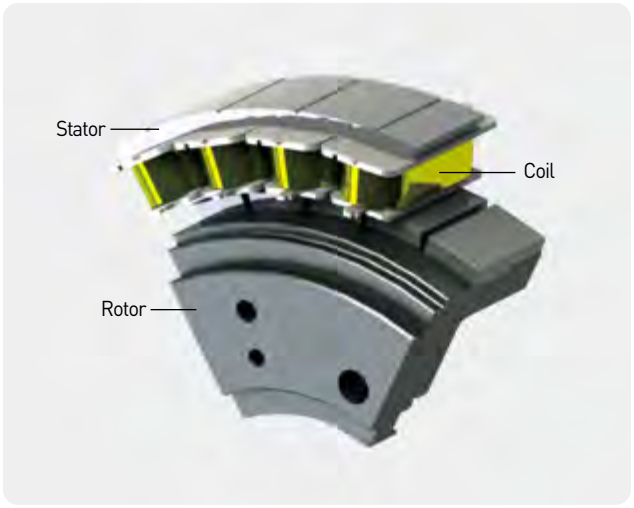
Direct Drive Structure

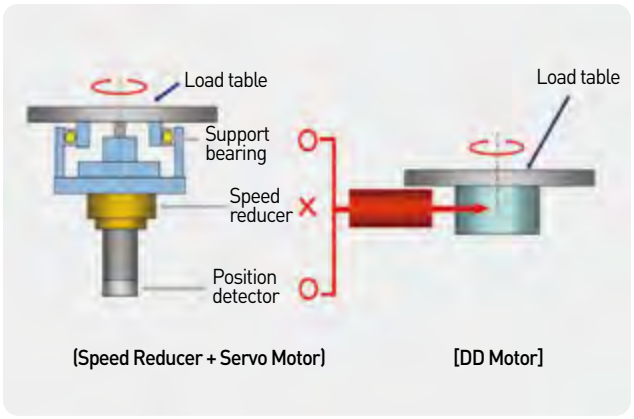
- No backlash impact
- High-precision operation and shortened installation time
- Smooth rotary motion
- Reduced noise

Hollow Type That is Efficient for Wiring and Piping

A Wide Range of Products

- Rated output: 63W-.25kW
- Rated torque: 3.0N.m-160N.m (The instantaneous maximum torque should be 3 times the rated torque)
- Rated speed: 150RPM-200RPM
- Frame diameter: 135mm,175mm,230mm,290mm, and 360mm (13 Models)





Features of Direct-Drive Motor

DD Motor Specifications

Ratings and Specifications

- Insulation class : Class B
- Protection class: IP 40
- Cooling type : Fully enclosed self-cooling
- Vibration class : V15
- Insulation resistance : 500 VDC, 10[MΩ]or higher
- Insulation internal voltage: 1800 VAC, 1 second
- Operating voltage: 200 VAC
- Operating temperature: 0 - 40[℃] / Storage temperature: -10~60[℃]
- Ambient humidity: 20 - 80% RH (no condensation)
- Installation location: Place with no toxic substances, such as corrosiveand combustible gasses, cutting oil, metal dust, grease or direct sunlight

Line-up Table

Rated Torque[Nm]			3	6	9	12	18	22	34	40	60	110	160	330
Maximum Torque[Nm]			9	18	27	36	54	66	102	120	180	330	480	1000
Rated Speed 200[rpm]	Maximum Speed 500[rpm]	Ø135	DB03D	DB06D	DB09D									
		Ø175		DC06D		DC12D								
		Ø230				DD12D								
	Maximum Speed 400[rpm]	Ø175					DC18D							
		Ø230						DD22D	DD34D					
	Maximum Speed 300[rpm]	Ø290							DE40D	DE60D				
Rated Speed 150[rpm]	Maximum Speed 250[rpm]	Ø360									DFA1G	DFA6G		
Rated Speed 50[rpm]	Maximum Speed 100[rpm]	Ø380												DGC3S

Drive Combination Table

MDM Serial Type

Rated Speed (RPM)	Maximum Speed (RPM)	External Diameter of Motor(Ø)	Motor	Drive	Standard Encoders	Encoders Cable (Serial)	Power Cable (Power)
200	500	135	DB03D	L7□A001□	* 20Bit Serial	APCS-E□□□ZS	APCS-PN□□YS
			DB06D	L7□A002□			
			DB09D	L7□A004□			
		175	DC06D	L7□A002□			
			DC12D	L7□A004□			
	400		DC18D	L7□A008□			
	500	230	DD12D	L7□A004□			
	400		DD22D	L7□A008□			
			DD34D	L7□A010□			
	300	290	DE40D	L7□A010□			
			DE60D	L7□A020□			
150	250	360	DFA1G	L7□A020□			APCS-PN□□ZS
			DFA6G	L7□A035□			
50	100	380	DGC3S	L7□A020□			

* : Single-turn Abs. Biss interface

Motor Shape

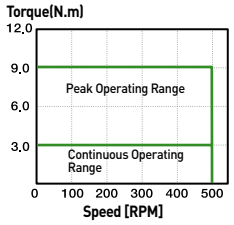
MDM-DB06DN0H-I	MDM-DC12DN0H-I	MDM-DD22DN0H-I	MDM-DE40DN0H-I	MDM-DFA6GN0H-I	MDM-DGC3SN0H-I
					

Specifications and Torque Characteristics

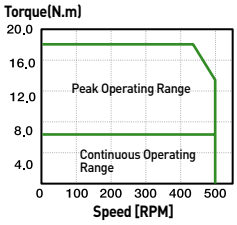
Motor Designation		MDM-DB□□D□□H-I			MDM-DC□□D□□H-I		
		03	06	09	06	12	18
Applicable Drive		L7□A001□	L7□A002□	L7□A004□	L7□A002□	L7□A004□	L7□A008□
Flange Size	mm	Ø135			Ø175		
Rated Output	W	63	126	188	126	251	377
Rated Torque	N·m	3	6	9	6	12	18
Max Torque	N·m	9	18	27	18	36	54
Rated Current	Arms	1.12	1.46	2.63	1.48	2.41	3.0
Max Current	Arms	3.36	4.38	7.89	4.44	7.23	9.0
Rated Speed	rpm	200			200		
Max Speed	rpm	500	500	500	500	500	400
Constant of Torque	N·m/Arms	2.76	4.25	3.57	4.18	5.13	6.12
Inertia	$kg·m^2X10^{-4}$	11.56	18.42	26.02	45.83	70.37	94.91
Allowable Load Inertia Ratio		30 times of motor inertia			15 times of motor inertia		
Power Rate	kW/S	15.68	42.35	70.43	13.18	52.71	118.59
Angular Acceleration	rad/s^2	191.2	141.6	127.7	455.03	323.9	280.3
Positioning Accuracy	arc-sec	±30					
Positioning Repeatability	arc-sec	±1.3					
Axial run-out	mm	0.015					
Radial run-out	mm	0.03					
Allowable Thrust Load	N	1500			3300		
Max. Instantaneous	N-m	40			70		
Encoder Type		20-bit single turn serial encoder (Biss/Absolute)					
Weight(Approx.)	kg	6.3	7.2	9.2	8.7	10.6	12.6
Working Environment	Ambient Temp	Ambient temperature: 0~40[ ] / storage : -20~60[ ]					
	Ambient Humidity	20~80[%] RH(Avoid dew-condensation)					
	Atmosphere	Avoid direct sunlight, No corrosive gas, Inflammable gas, Oil mist, or Dust					

Speed-Torque Characteristics

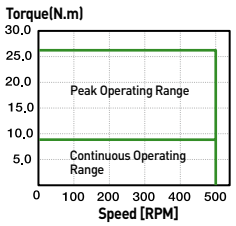
MDM-DB03D



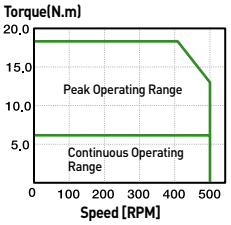
MDM-DB06D



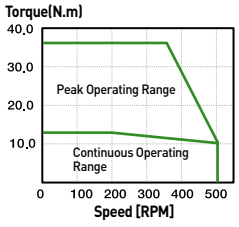
MDM-DB09D



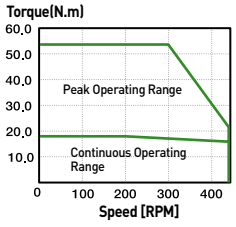
MDM-DC06D



MDM-DC12D



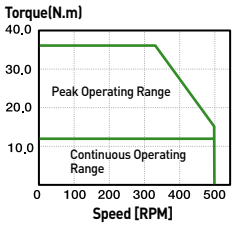
MDM-DC18D



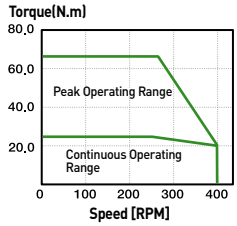
Motor Designation		MDM-DD□□D□□H-I			MDM-DE□□D□□H-I		MDM-DF□□G□□H-I		MDM-DG□□G□□H-I
		12	22	34	40	60	A1	A6	C3
Applicable Drive		L7□A004□	L7□A008□	L7□A010□	L7□A010□	L7□A020□	L7□A020□	L7□A035□	L7□A020□
Flange Size	mm	Ø230			Ø290		Ø360		Ø380
Rated Output	W	251	461	712	838	1,257	1,728	2,513	1,728
Rated Torque	N·m	12	22	34	40	60	110	160	330
Max Torque	N·m	36	66	102	120	180	330	480	1,000
Rated Current	Arms	2.58	3.33	5.72	5.3	8.33	9.48	14.6	12.0
Max Current	Arms	7.74	9.99	17.16	15.9	24.99	28.44	43.8	36.0
Rated Speed	rpm	200			200		150		50
Max Speed	rpm	500	400	400	300	300	250	250	100
Constant of Torque	N·m/Arms	4.8	6.81	6.13	7.77	7.42	11.95	11.29	28.59
Inertia	kg·m^{2}X10^{-4}	94.70	141.10	190.70	427.2	587.9	2507.0	3457.0	6449.0
Allowable Load Inertia Ratio		15 times of motor inertia			3 times of motor inertia				
Power Rate	kW/S	26.6	71.02	140.7	51.36	96.68	85.9	145.4	169.1
Angular Acceleration	rad/s^2	450.9	309.6	241.5	778.35	619.1	1281.13	1101.4	1952.9
Positioning Accuracy	arc-sec	±30							
Positioning Repeatability	arc-sec	±1.3							
Axial run-out	mm	0.015							
Radial run-out	mm	0.03							
Allowable Thrust Load	N	4,000			11,000		15,000		21,000
Max. Instantaneous	N-m	93			250		350		450
Encoder Type		20-bit single turn serial encoder (Biss/Absolute)							
Weight(Approx.)	kg	17.3	19.6	21.9	28.2	35	54	70.3	162
Working Environment	Ambient Temp	Ambient temperature: 0~40[ ] / storage : -20~60[ ]							
	Ambient Humidity	20~80[%] RH(Avoid dew-condensation)							
	Atmosphere	Avoid direct sunlight, No corrosive gas, Inflammable gas, Oil mist, or Dust							

Speed-Torque Characteristics

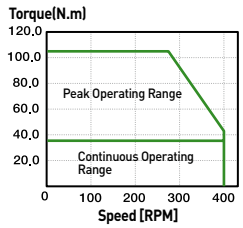
MDM-DD12D



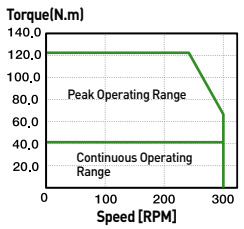
MDM-DD22D



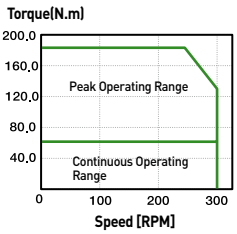
MDM-DD34D



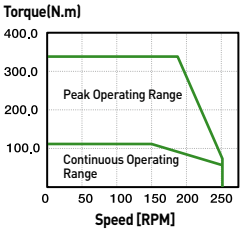
MDM-DE40D



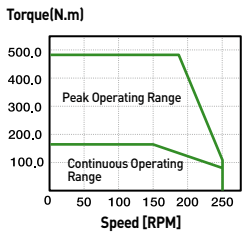
MDM-DE60D



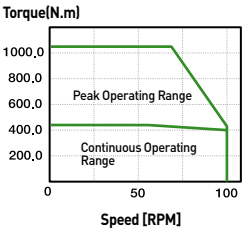
MDM-DFA1G



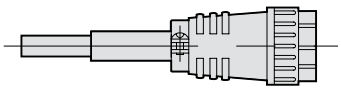
MDM-DFA6G

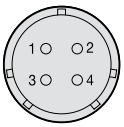


MDM-DGC3S



MDM-DB03D, MDM-DB06D, MDM-DB09D

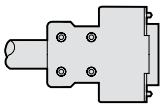


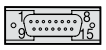


NJC-24-4-PM

Contents		Pin No.
LEAD WIRE	U	1
	V	2
	W	3
Ground		4

(Power Connector Pin Table)

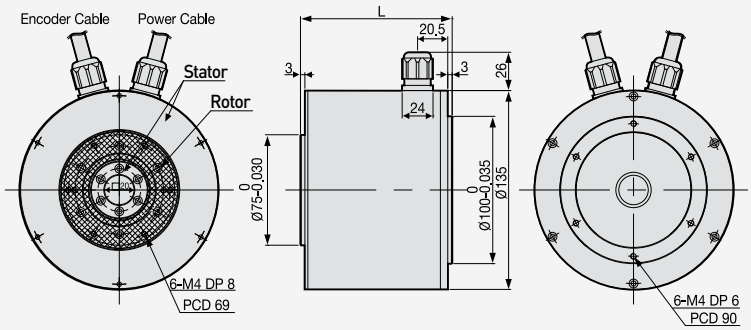




D- Sub Connector (15pin)

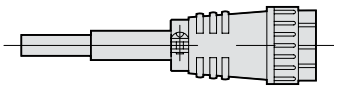
D.D SERVO ENCODER CABLE			
NO.	Encoder Signal	NO.	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	0V	12	-
5	SHIELD	13	-
6	$\overline{MA}$	14	-
7	$\overline{SLO}$	15	-
8	-		

(Encoder Connector Pin Table)



Model	External Dimensions(mm)	Weight (kg)
	L	
MDM-DB03D	78	6.3
MDM-DB06D	100	7.2
MDM-DB09D	124	9.2

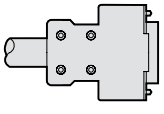
MDM-DC06D, MDM-DC12D, MDM-DC18D

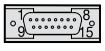


NJC-24-4-PM

Contents		Pin No.
LEAD WIRE	U	1
	V	2
	W	3
Ground		4

(Power Connector Pin Table)

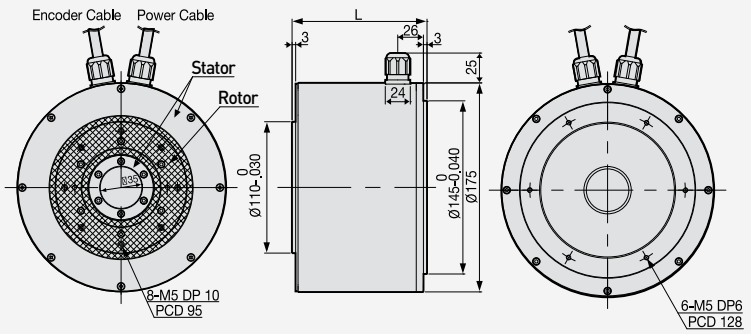




D- Sub Connector (15pin)

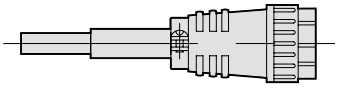
D.D SERVO ENCODER CABLE			
NO.	Encoder Signal	NO.	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	0V	12	-
5	SHIELD	13	-
6	$\overline{MA}$	14	-
7	$\overline{SLO}$	15	-
8	-		

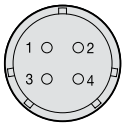
(Encoder Connector Pin Table)



Model	External Dimensions(mm)	Weight (kg)
	L	
MDM-DC06D	77	8.7
MDM-DC12D	95	10.6
MDM-DC18D	113	12.6

MDM-DD12D, MDM-DD22D, MDM-DD34D

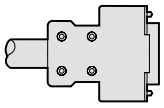


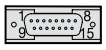


NJC-24-4-PM

Contents		Pin No.
LEAD WIRE	U	1
	V	2
	W	3
Ground		4

(Power Connector Pin Table)

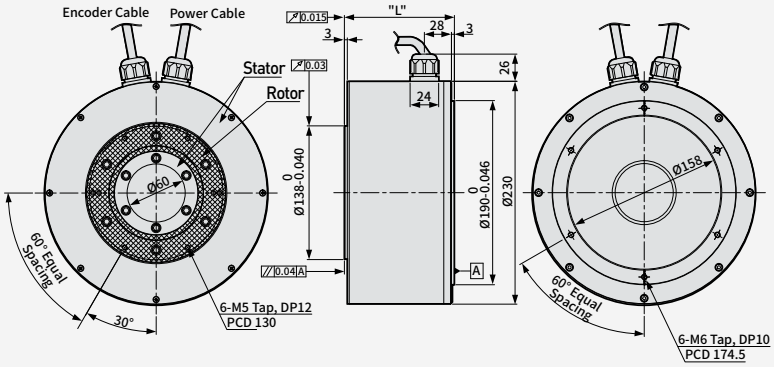




D- Sub Connector (15pin)

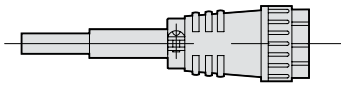
D.D SERVO ENCODER CABLE			
NO.	Encoder Signal	NO.	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	0V	12	-
5	SHIELD	13	-
6	$\overline{MA}$	14	-
7	$\overline{SLO}$	15	-
8	-		

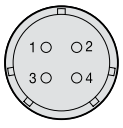
(Encoder Connector Pin Table)



Model	External Dimensions(mm)	Weight (kg)
	L	
MDM-DD12D	82.5	17.3
MDM-DD22D	100.5	19.6
MDM-DD34D	118.5	21.9

MDM-DE40D, MDM-DE60D

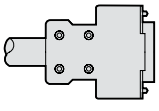


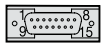


NJC-24-4-PM

Contents		Pin No.
LEAD WIRE	U	1
	V	2
	W	3
Ground		4

(Power Connector Pin Table)

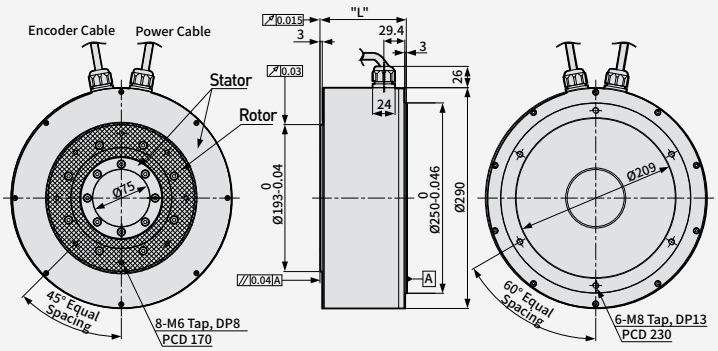




D- Sub Connector (15pin)

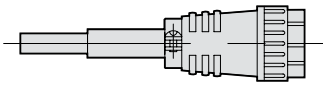
D.D SERVO ENCODER CABLE			
NO.	Encoder Signal	NO.	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	0V	12	-
5	SHIELD	13	-
6	$\overline{MA}$	14	-
7	$\overline{SLO}$	15	-
8	-		

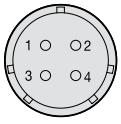
(Encoder Connector Pin Table)



Model	External Dimensions(mm)	Weight (kg)
	L	
MDM-DE40D	95.4	28.2
MDM-DE60D	113.4	35

MDM-DFA1G, MDM-DFA6G

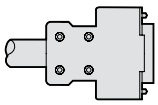


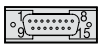


NJC-24-4-PM

Contents		Pin No.
LEAD WIRE	U	1
	V	2
	W	3
Ground		4

(Power Connector Pin Table)

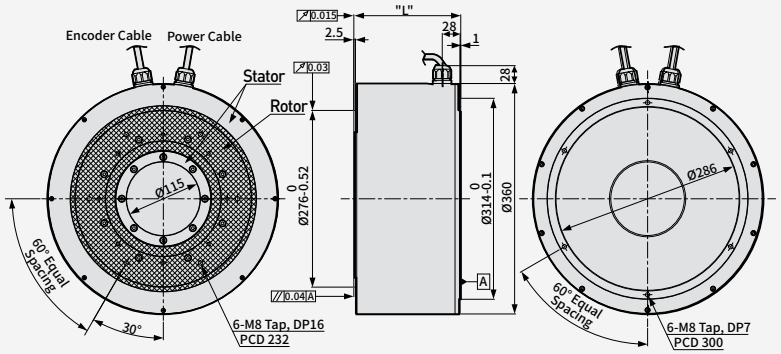




D- Sub Connector (15pin)

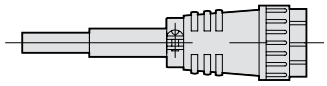
D.D SERVO ENCODER CABLE			
NO.	Encoder Signal	NO.	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	0V	12	-
5	SHIELD	13	-
6	$\overline{MA}$	14	-
7	$\overline{SLO}$	15	-
8	-		

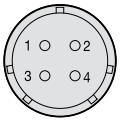
(Encoder Connector Pin Table)



Model	External Dimensions(mm)	Weight (kg)
	L	
MDM-DFA1G	131	54
MDM-DFA6G	167	70.3

MDM-DGC3SN0H

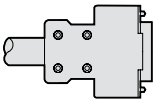


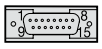


NJC-24-4-PM

Contents		Pin No.
LEAD WIRE	U	1
	V	2
	W	3
Ground		4

(Power Connector Pin Table)

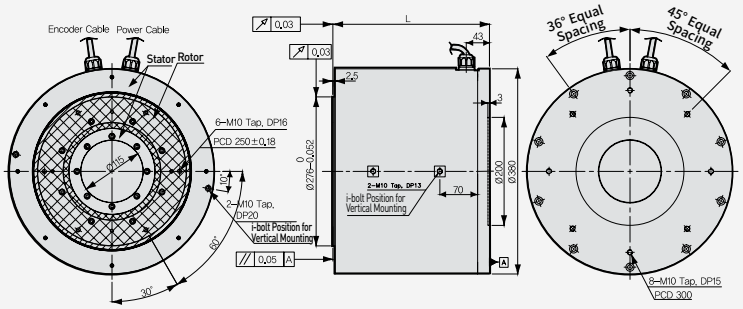




D- Sub Connector (15pin)

D.D SERVO ENCODER CABLE			
NO.	Encoder Signal	NO.	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	0V	12	-
5	SHIELD	13	-
6	$\overline{MA}$	14	-
7	$\overline{SLO}$	15	-
8	-		

(Encoder Connector Pin Table)



Model	External Dimensions(mm)	Weight (kg)
	L	
MDM-DGC3SN0H	290	162

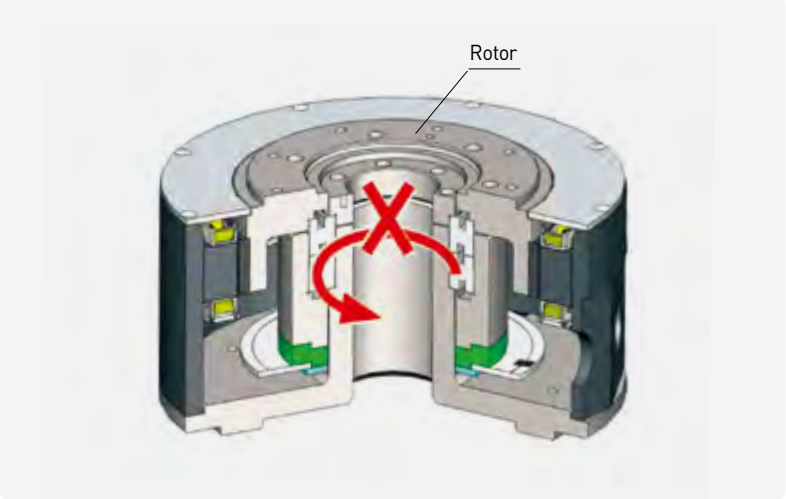
Troubleshooting

If an overcurrent alarm occurs

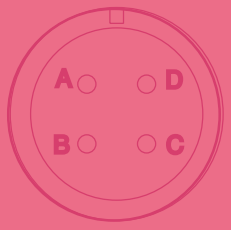
- Please check if the drive output and the encoder are wired properly.
- Please check for equipment collision or restraint.

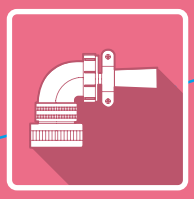
High performance

- Please inspect the input voltage and load condition.
- Please check if the drive output and the encoder are wired properly.
- Please check for equipment collision or restraint.



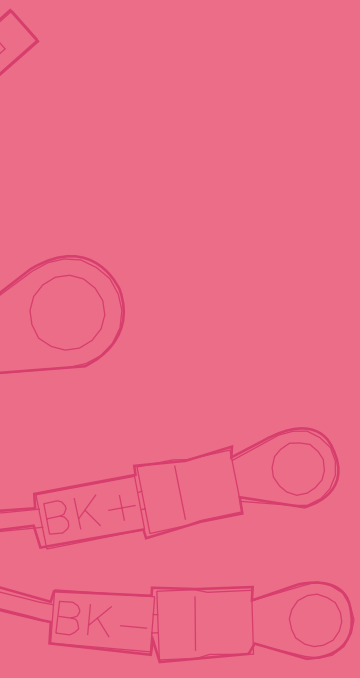

1
2
4
5
7
8
9
U
V
W
FG





Options and Accessories

Contents



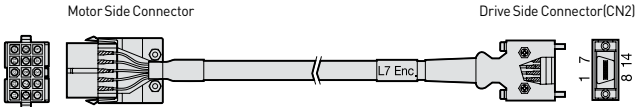
Designation / Servo Motor Option

Designation

APCS	–	E	N	03	□□	–	R
APCS-: iX7NH Series / L7 Series 200V APCF-: L7 Series 400V APC-: L7 Series APCV-: PHOX Series		E: Encoder Cable P: Power Cable B: Brake Cable	N: Non-Moving Type F: Moving Type	01 : 1m 02 : 2m 03 : 3m ... 18 : 18m 19 : 19m 20 : 20m	Motor Spec.		None: Connector Load Direction -'R': Connector Reverse Load Direction

※ 01 ~ 20: 1m ~ 20m C able Length Provided, Cable Length Selection in 1m Increments

Signal Cable

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Signal	H Series Cable (Small Capacity)	APCS-E □□□AS	L7SA□□□A L7NHA□□□U L7PA□□□U L7NHF□□□U	All Models of HB Series	

PIN No.	Encoder Signal	PIN No.	Encoder Signal
A	A	M	V
B	$\overline{A}$	N	$\overline{V}$
C	B	P	W
D	$\overline{B}$	R	$\overline{W}$
E	Z	H	+5V
F	$\overline{Z}$	G	0V
K	U	J	SHIELD
L	$\overline{U}$		

[Motor Side Connector]

PIN No.	Encoder Signal	PIN No.	Encoder Signal
1	W	8	$\overline{Z}$
2	$\overline{W}$	9	Z
3	V	10	$\overline{B}$
4	$\overline{V}$	11	B
5	U	12	$\overline{A}$
6	$\overline{U}$	13	A
7	0V	14	+5V
PLATE		SHIELD	

[Driver Side Connector]

1. Motor Side Connector
- Cap Spec.(15 Position): 172163-1(AMP)
- Socket Spec. : 170361-1(AMP)

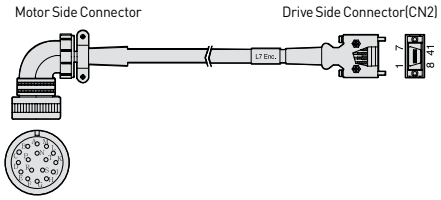
2. Driver Side Connector(CN2)
- Case Spec. : 10314-52A0-008(3M) or SM-14J(Suntone)
- Connector Spec. : 10114-3000VE(3M) or SM-14J(Suntone)

3. Cable Spec. : 7P×0.2SQ or 7P×AWG24

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Signal	H Series Cable (Middle Capacity)	APCS-E□□□BS	L7SA□□□A L7NHA□□□U L7PA□□□U L7NHF□□□U	All Models of HE Series	

PIN No.	Encoder Signal	PIN No.	Encoder Signal
A	A	M	V
B	A	N	V
C	B	P	W
D	B	R	W
E	Z	H	+5V
F	Z	G	0V
K	U	J	SHIELD
L	U		

[Motor Side Connector]

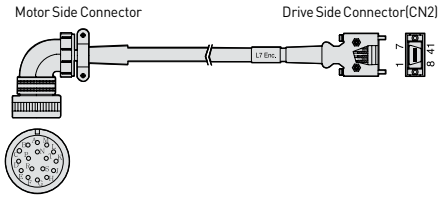
PIN No.	Encoder Signal	PIN번호	Encoder Signal
1	W	8	Z
2	W	9	Z
3	V	10	B
4	V	11	B
5	U	12	A
6	U	13	A
7	0V	14	+5V
PLATE		SHIELD	

[Driver Side Connector]

1. Motor Side Connector(MS : Military Standard)
- Plug Spec.: MS3108A20-29S

2. Driver Side Connector(CN2)
- Case Spec.: 10314-52A0-008(3M) or SM-14J(Suntone)
- Connector Spec.: 10114-3000VE(3M) or SM-14J(Suntone)

3. Cable Spec. : 7P×0.2SQ or 7P×AWG24

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Signal	F Series Motor S-turn Encoder Cable (Middle Capacity)	APCS-E□□□DS	L7S□□□B L7NH□□□□U L7PA□□□U L7NHF□□□U L7CA□□□U	All Models of FE/FEP FF/FFP FG/FGP Series	

PIN No.	Encoder Signal	PIN No.	Encoder Signal
A	MA	M	-
B	$\overline{MA}$	N	-
C	SLO	P	-
D	$\overline{SLO}$	R	-
E	-	H	+5V
F	-	G	0V
K	-	J	SHIELD
L	-		

[Motor Side Connector]

PIN No.	Encoder Signal	PIN No.	Encoder Signal
1	-	8	-
2	-	9	-
3	MA	10	-
4	$\overline{MA}$	11	-
5	SLO	12	-
6	$\overline{SLO}$	13	-
7	0V	14	+5V
PLATE		SHIELD	

[Driver Side Connector]

1. Motor Side Connector(MS : Military Standard)
- Plug Spec.: MS3108A20-29S

2. Driver Side Connector(CN2)
- Case Spec.: 10314-52A0-008(3M) or SM-14J(Suntone)
- Connector Spec.: 10114-3000VE(3M) or SM-14J(Suntone)

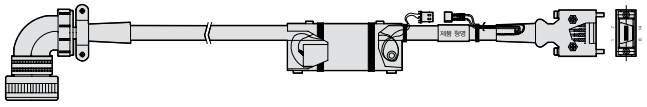
3. Cable Spec. : 3P×0.2SQ or 3P×24AWG

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

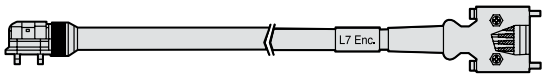
Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Signal Cable

<table>
<tr><th>Type</th><th>Product Type</th><th>Model Name Note1)</th><th>Applicable Drive Note2)</th><th>Applicable Motor</th><th>Specifications</th></tr>
<tr>
<td>For Signal</td>
<td>F Series Motor M-turn Encoder Cable (Middle Capacity)</td>
<td>APCS-E□□□ DS1</td>
<td>L7S□□□B
L7NH□□□□U
L7PA□□□U
L7NHF□□□U</td>
<td>All Models of FE/FEP FF/FFP FG/FGP SERIES Series</td>
<td>
Motor Side Connector — Drive Side Connector(CN2)


MS3108B20-29S
PIN No | Encoder Signal | PIN No | Encoder Signal
A | MA | M | -
B | $\overline{MA}$ | N | -
C | SLO | P | -
D | $\overline{SLO}$ | R | -
E | VOD_B | H | +5V
F | GND_B | G | 0V
K | - | J | SHELD
L | - | |
(Motor Side Connector)

PIN No | Encoder Signal | PIN No | Encoder Signal
1 | - | 8 | -
2 | - | 9 | -
3 | MA | 10 | -
4 | $\overline{MA}$ | 11 | -
5 | SLO | 12 | -
6 | $\overline{SLO}$ | 13 | -
7 | 0V | 14 | +5V
PLATE | | SHIELD |
(Drive Side Connector)

PIN No | Encoder Signal
1 | -
2 | -
(Driver Side Connector)
1. Motor Side Connector(MS: Military Standard)
• Plug Spec.: MS3108A20-29S
2. Drive Side Connector(CN2)
• Case Spec.: 10314-52A0-008(3M) or SM-14J(Suntone)
• Connector Spec.: 10114-3000VE(3M) or SM-14J(Suntone)
3. Cable Spec.: 4P×0.2SQ or 4P×24AWG
4. Battery Connector Spec.: 5267-02A(MOLEX)
</td>
</tr>
<tr>
<td>For Signal</td>
<td>F Series Motor S-turn Encoder Cable (Small Capacity)</td>
<td>APCS-E□□□ ES-□</td>
<td>L7S□□□B
L7NH□□□□U
L7PA□□□U
L7NHF□□□U
L7CA□□□U</td>
<td>All Models of FAL FBL FCL Series</td>
<td>
Motor Side Connector — Drive Side Connector(CN2)



Front Direction

Rear Direction
Tyco Connector (7Circuits)
PIN No | Encoder Signal
1 | MA
2 | SLO
3 | -
4 | 0V
5 | SHIELD
6 | $\overline{MA}$
7 | $\overline{SLO}$
8 | -
9 | +5V
(Motor Side Connector)

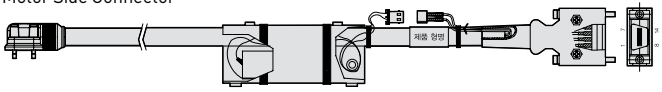
PIN No | Encoder Signal | PIN No | Encoder Signal
1 | - | 8 | -
2 | - | 9 | -
3 | MA | 10 | -
4 | $\overline{MA}$ | 11 | -
5 | SLO | 12 | -
6 | $\overline{SLO}$ | 13 | -
7 | 0V | 14 | +5V
PLATE | | SHIELD |
(Drive Side Connector)
1. Motor Side Connector
• Cap Spec.: 2201825-1(Tyco)
• Socket Spec.: 2174065-4(Tyco)
2. Drive Side Connector(CN2)
• Case Spec.: 10314-52A0-008(3M사) or SM-14J(Suntone)
• Connector Spec.: 10114-3000VE(3M사) or SM-14J(Suntone)
3. Cable Spec.: 3P×0.2SQ or 3P×24AWG
</td>
</tr>
</table>

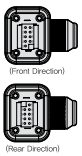
Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.
In case of□ marked product, the connector can draw in a direction of Front(load)/Rear(half load).(Front Type: Nomark, Rear Type: -R)
In case of FAL Type, the connector can draw in a direction of Front.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Signal	F Series Motor M-turn Encoder Cable (Small Capacity)	APCS-E□□□ ES1-□	L7S□□□B L7NH□□□□U L7PA□□□U	All Models of FAL FBL FCL Series	Motor Side Connector / Drive Side Connector(CN2)





PIN No	Encoder Signal
1	MA
2	SLO
3	GND_B
4	0V
5	SHELD
6	$\overline{MA}$
7	$\overline{SLO}$
8	VOD_B
9	+5V

(Motor Side Connector)

PIN No	Encoder Signal	PIN No	Encoder Signal
1	-	8	-
2	-	9	-
3	MA	10	-
4	$\overline{MA}$	11	-
5	SLO	12	-
6	$\overline{SLO}$	13	-
7	0V	14	+5V
PLATE		SHIELD	

(Drive Side Connector)

PIN No	Encoder Signal
1	BATTERY (VDD_B)
2	BATTERY 0V (GND_B)

(Battery Connector)

1. Motor Side Connector
- Cap Spec.: 2201825-1(Tyco)
- Socket Spec.: 2174065-4(Tyco)

2. Drive Side Connector(CN2)
- Case Spec.: 10314-52A0-008(3M) or SM-14J(Suntone)
- Connector Spec.: 10114-3000VE(3M) or SM-14J(Suntone)

3. Cable Spec.: 4P×0.2SQ or 4P×24AWG

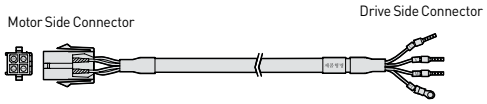
4. Battery Connector Spec.: 5267-02A(MOLEX)

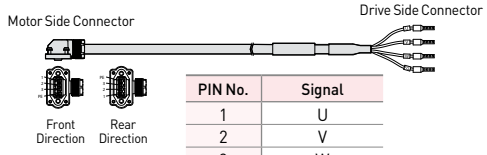
Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.
In case of□ marked product, the connector can draw in a direction of Front(load)/Rear(half load).(Front Type: Nomark, Rear Type: -R)
In case of FAL Type, the connector can draw in a direction of Front.

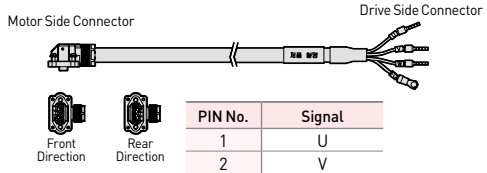
Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Power Cable [200V]

<table>
<tr><th>Type</th><th>Product Type</th><th>Model Name Note1)</th><th>Applicable Drive Note2)</th><th>Applicable Motor</th><th>Specifications</th></tr>
<tr><td>For Power</td><td>H Series Power Cable (Small Capacity)</td><td>APCS-P
□□□GS</td><td>L7SA□□□A
L7NHA□□□U
L7PA□□□U
L7NHF□□□U</td><td>All Models of HB Series</td><td>


<table>
<tr><th>PIN No.</th><th>Signal</th></tr>
<tr><td>1</td><td>U</td></tr>
<tr><td>2</td><td>V</td></tr>
<tr><td>3</td><td>W</td></tr>
<tr><td>4</td><td>Ground</td></tr>
</table>
1. Motor Side Connector
• Cap Spec(4 Position) : 172159-1(AMP)
• Socket Spec.: 170362-1(AMP)
2. Drive Side Connector(U, V, W, FG)
• U, V, W Pin Spec. : 1512
• FG Pin Spec.: 1.5X4(Ring Terminal)
3. Cable Spec.: 4C×0.75SQ or 4C×18AWG
</td></tr>
<tr><td>For Power</td><td>F Series Power Cable (iX7NH)</td><td>APCS-P
□□□LSX</td><td>iX7NHA□□□U</td><td>All Models of iX7NH FAL FBL FCL Series</td><td>


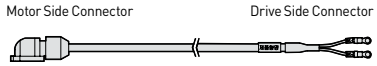
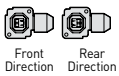
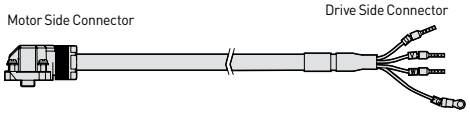
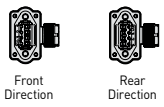
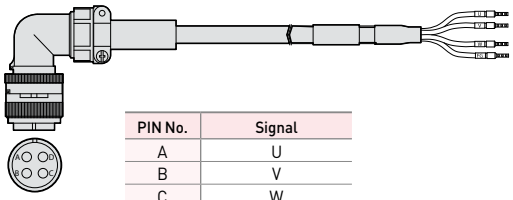
<table>
<tr><th>PIN No.</th><th>Signal</th></tr>
<tr><td>1</td><td>U</td></tr>
<tr><td>2</td><td>V</td></tr>
<tr><td>3</td><td>W</td></tr>
<tr><td>PE</td><td>Ground</td></tr>
</table>
1. Motor Side Connector
• CAP Spec: SM-JN8FT04N(Suntone)
• Socket Spec.: SMS-201(Suntone)
2. Drive Side Connector
• U, V, W Pin Spec.: F1508
• FG Pin Spec.: F1508
3. Cable Spec.: 4Cx0.75SQ or 4Cx18AWG
※ Specifications are subject to change without notice.
</td></tr>
<tr><td>For Power</td><td>F Series (L7C)</td><td>APCS-P
□□□LSC</td><td>L7CA□□□U</td><td>All Models of L7C FAL FBL FCL Series</td><td>


<table>
<tr><th>PIN No.</th><th>Signal</th></tr>
<tr><td>1</td><td>U</td></tr>
<tr><td>2</td><td>V</td></tr>
<tr><td>3</td><td>W</td></tr>
<tr><td>PE</td><td>Ground</td></tr>
</table>
1. Motor Side Connector
• CAP Spec: SM-JN8FT04N
• Socket Spec.: SMS-201
2. Drive Side Connector
• U, V, W Pin Spec.: F1506
• FG Pin Spec.:1.5x4(Ring Terminal)
3. Cable Spec.: 4C×0.75SQ or 4C×18AWG
</td></tr>
</table>

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

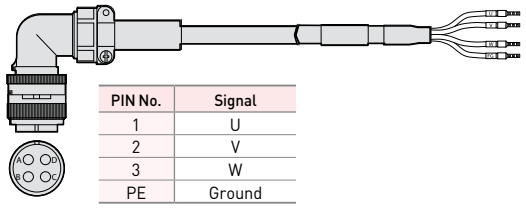
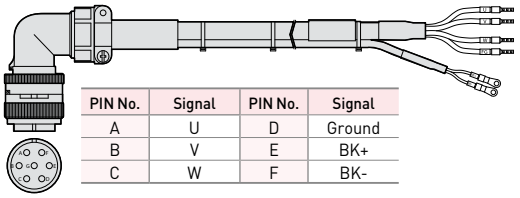
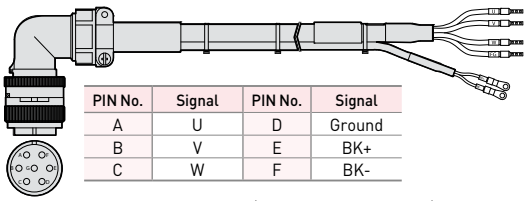
Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Power	Brake Cable for Flat Motor (Small Capacity)	APCS-B □□□ QS-□	L7SA□□□B L7NHA□□□U L7PA□□□U L7NHF□□□U L7CA□□□U	All Models of FAL FBL FCL Series	  PIN No. / Signal: 1 BK+, 2 BK- **1. Motor Side Connector** • Cap Spec: KN5FT02SJ1 • Socket Spec.: ST-KN-S-C1B-3500 **2. Drive Side Connector** • Connecting Terminal Spec. : 1.5×3(Ring Terminal) **3. Cable Spec.: 2C×0.5SQ or 2C×20AWG**
For Power	L Series Power Cable (Small Capacity)	APCS-P □□□ LS-□	L7SA□□□B L7NHA□□□U L7PA□□□U L7NHFA□□□U	All Models of FAL FBL FCL Series	  PIN No. / Signal: 1 U, 2 V, 3 W, PE Ground **1. Motor Side Connector** • Cap Spec: SM-JN8FT04N • Socket Spec.: SMS-201 **2. Drive Side Connector** • U, V, W Pin Spec.: F1512 • FG Pin Spec.: 1.5x4(Ring Terminal) **3. Cable Spec.: 4C×0.75SQ or 4C×18AWG** **4. In Case of FAL Products, Please install Power Cable First Before Connecting Encoder Cable**
For Power	F Series Power Cable (iX7NH)	APCS-P □□□ HSX1	iX7NHA□□□U	All Models of iX7NH FE Series FE09A/ FE15A FE06D/ FE11D FE05G/ FE09G FE03M/ FE06M FEP Series	 PIN No. / Signal: A U, B V, C W, D Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 20-4S **2. Drive Side Connector** • U, V, W Pin Spec.: F1508 • Cable Spec.: 4Cx1.5SQ or 4Cx15AWG • FG Pin Spec.: F1508 ※ Specifications are subject to change without notice.

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.
In case of□ marked product, the connector can draw in a direction of Front(load)/Rear(half load).(Front Type: Nomark, Rear Type: -R)
In case of FAL Type, the connector can draw in a direction of Front.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Power Cable [200V]

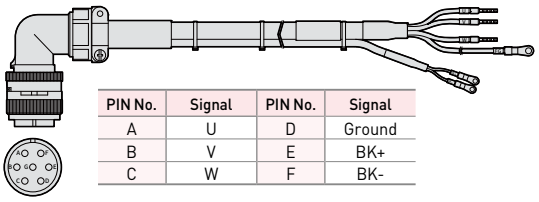
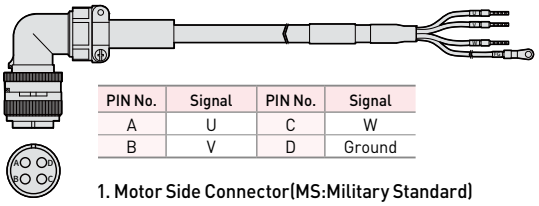
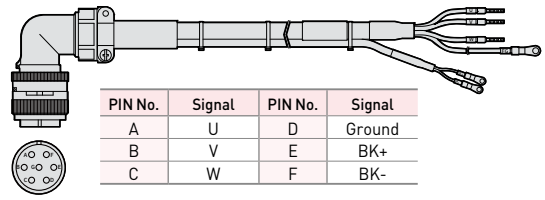
Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Power	Power Cable F Series (iX7NH)	APCS-P □□□HSX	iX7NHA□□□U	iX7NH FE Series FE22A/FE30A FE16D/FE22D FE13G/FE17G FE09M/FE12M	 PIN No. / Signal: 1 U; 2 V; 3 W; PE Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 20-4S **2. Drive Side Connector** • U, V, WPin Spec.: F2508 • Cable Spec.: 4Cx2.5SQ or 4Cx14AWG • FG Pin Spec.: F2508 ※ Specifications are subject to change without notice.
For Power	Power Cable F Series (iX7NH)	APCS-P □□□ NBX1	iX7NHA□□□U	All Models of iX7NH FE Series FE09A/FE15A FE06D/FE11D FE05G/FE09G FE03M/FE06M FEP Series	 PIN No. / Signal / PIN No. / Signal: A U D Ground; B V E BK+; C W F BK- **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 20-15S **2. Drive Side Connector** • U, V, W Pin Spec.: F1508 • Cable Spec.: 4Cx1.5SQ or 4Cx15AWG • FG Pin Spec.: F1508 **3. Brake Power side Connector** • BK Pin Spec.: 1.5x3(Ring Terminal) • Cable Spec.: 2Cx0.75SQ or 2Cx18AWG ※ Specifications are subject to change without notice.
For Power	Power Cable F Series (iX7NH)	APCS-P □□□NBX	iX7NHA□□□U	iX7NH FE Series FE22A/FE30A FE16D/FE22D FE13G/FE17G FE09M/FE12M	 PIN No. / Signal / PIN No. / Signal: A U D Ground; B V E BK+; C W F BK- **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 20-15S **2. Drive Side Connector** • U, V, W Pin Spec.: F2508 • Cable Spec.: 4Cx2.5SQ or 4Cx14AWG • FG Pin Spec.: F2508 **3. Brake Power side Connector** • BK Pin Spec.: 1.5x3(Ring Terminal) • Cable Spec.: 2Cx0.75SQ or 2Cx18AWG ※ Specifications are subject to change without notice.

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Power Cable [Common use for 200V and 400V]

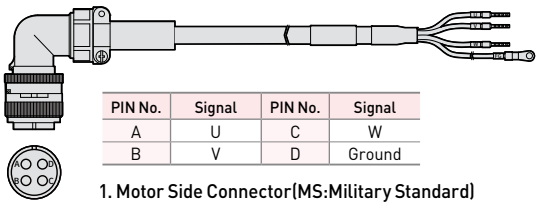
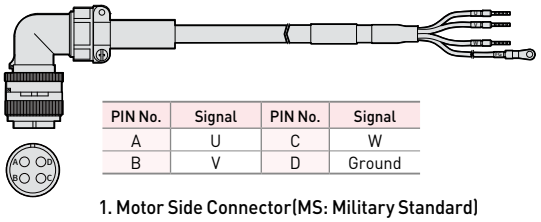
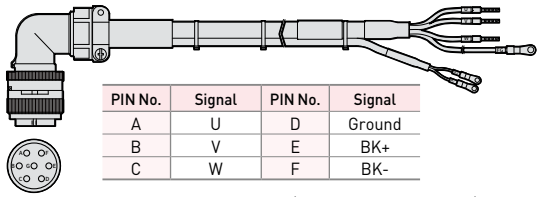
Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Power	Power Cable (Brake Type)	APCS-P □□□NB1	L7S□□□□□ L7NH□□□□U L7NHFA□□□U L7P□□□□U	FE Series FE09A/FE15A FE06D/FE11D FE05G/FE09G FE03M/FE06M All Models of FEP Series	 PIN No. / Signal / PIN No. / Signal A / U / D / Ground B / V / E / BK+ C / W / F / BK- **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 20-15S **2. Drive Side Connector** • U, V, W Pin Spec.: F1512 • Cable Spec.: 4Cx1.5SQ or 4Cx15AWG • FG Pin Spec.: 1.5x4(Ring Terminal) **3. Brake Power side Connector** • BK Pin Spec.: 1.5x3(Ring Terminal) • Cable Spec.: 2Cx0.75SQ or 2Cx18AWG
For Power	Power Cable	APCS-P □□□HS1	L7S□□□□□ L7NH□□□□U L7NHFA□□□U L7P□□□□U	FE Series FE09A/FE15A FE06D/FE11D FE05G/FE09G FE03M/FE06M All Models of FEP Series HE Series HE09A/HE15A	 PIN No. / Signal / PIN No. / Signal A / U / C / W B / V / D / Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 20-4S **2. Drive Side Connector** • U, V, W Pin Spec.: F1512 • Cable Spec.: 4Cx1.5SQ or 4Cx15AWG • FG Pin Spec.: 1.5x4(Ring Terminal)
For Power	Power Cable (Brake Type)	APCS-P □□□NB	L7SA□□□□ L7NHA□□□U L7NHFA□□□U L7PA□□□U	FE Series FE22A/FE30A FE16D/FE22D FE13G/FE17G FE09M/FE12M	 PIN No. / Signal / PIN No. / Signal A / U / D / Ground B / V / E / BK+ C / W / F / BK- **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 20-15S **2. Drive Side Connector** • U, V, W Pin Spec.: F2512 • Cable Spec.: 4Cx2.5SQ or 4Cx14AWG • FG Pin Spec.: 2.5x4(Ring Terminal) **3. Brake Power side Connector** • BK Pin Spec.: 1.5x3(Ring Terminal) • Cable Spec.: 2Cx0.75SQ or 2Cx18AWG

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Power Cable [Common use for 200V and 400V]

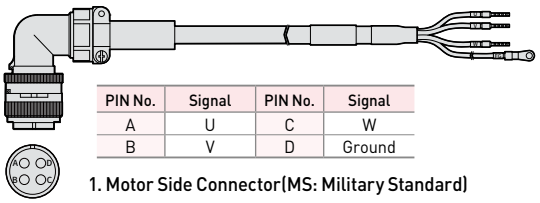
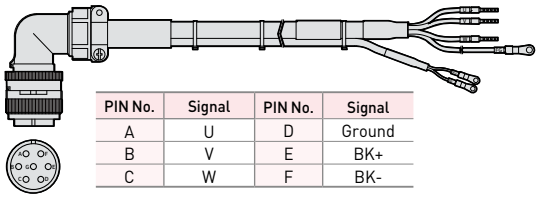
Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Power	Power Cable	APCS-P □□□HS	L7SA□□□□ L7NHA□□□□U L7NHFA□□□U L7PA□□□U	FE Series FE22A/FE30A FE16D/FE22D FE13G/FE17G FE12M/FE09M	 PIN No. / Signal / PIN No. / Signal A / U / C / W B / V / D / Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 20-4S **2. Drive Side Connector** • U, V, WPin Spec.: F2512 • Cable Spec.: 4Cx2.5SQ or 4Cx14AWG • FG Pin Spec.: 2.5x4(Ring Terminal)
For Power	Power Cable	APCS-P □□□IS1	L7S□□□□□ L7NH□□□□U L7NHFA□□□U L7P□□□□U	FF Series FF22D/FF20G FF12M FG Series FG22D/FG20G FG12M FFP Series FFP30A/FFP22D FFP35D/FFP20G FFP30G/FFP12M FFP20M/FP30M FGP Series FGP22D/FGP35D FGP20G/FGP30G FGP12M/FGP20M FGP30M	 PIN No. / Signal / PIN No. / Signal A / U / C / W B / V / D / Ground **1. Motor Side Connector(MS: Military Standard)** • PLUG Spec: MS 3108A 22-22S **2. Drive Side Connector** • U, V, W Pin Spec.: F1512 • Cable Spec.: 4Cx1.5SQ or 4Cx15AWG • FG Pin Spec.: 1.5x4(Ring Terminal)
For Power	Power Cable (Brake Type)	APCS-P □□□PB1	L7S□□□□□ L7NH□□□□U L7NHF□□□□U L7P□□□□U	FF Series FF22D/FF20G FF12M FFP Series FFP30A/FFP22D FFP35D/FFP20G FFP30G/FFP12M FFP20M/FFP30M	 PIN No. / Signal / PIN No. / Signal A / U / D / Ground B / V / E / BK+ C / W / F / BK- **1. Motor Side Connector(MS: Military Standard)** • PLUG Spec: MS 3108A 24-10S **2. Drive Side Connector** • U, V, W Pin Spec.: F1512 • Cable Spec.: 4Cx1.5SQ or 4Cx15AWG • FG Pin Spec.: 1.5x4(Ring Terminal) **3. Brake Power side Connector** • BK Pin Spec.: 1.5x3(Ring Terminal) • Cable Spec.: 2Cx0.75SQ or 2Cx18AWG

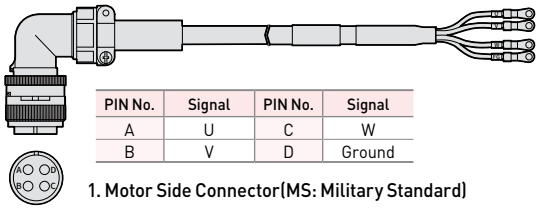
Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

<table>
<tr><th>Type</th><th>Product Type</th><th>Model Name Note1)</th><th>Applicable Drive Note2)</th><th>Applicable Motor</th><th>Specifications</th></tr>
<tr><td>For Power</td><td>Power Cable</td><td>APCS-P
□□□IS</td><td>L7SA□□□□
L7NHA□□□U
L7NHFA□□□U
L7PA□□□U</td><td>FF Series
FF30A/FF35D
FF30G/FF20M
FF30M

FG Series
FG35D/FG30G
FG20M/FG30M</td><td> 
<table>
<tr><th>PIN No.</th><th>Signal</th><th>PIN No.</th><th>Signal</th></tr>
<tr><td>A</td><td>U</td><td>C</td><td>W</td></tr>
<tr><td>B</td><td>V</td><td>D</td><td>Ground</td></tr>
</table>
1. Motor Side Connector(MS: Military Standard)
• PLUG Spec: MS 3108A 22-22S
2. Drive Side Connector
• U, V, W Pin Spec.: F2512
• Cable Spec.: 4Cx2.5SQ or 4Cx14AWG
• FG Pin Spec.: 2.5x4(Ring Terminal)</td></tr>
<tr><td>For Power</td><td>Power Cable (Brake Type)</td><td>APCS-P
□□□PB</td><td>L7SA□□□□
L7NHA□□□U
L7NHFA□□□U
L7PA□□□U</td><td>FF Series
FF30A/FF35D
FF30G/FF20M
FF30M</td><td> 
<table>
<tr><th>PIN No.</th><th>Signal</th><th>PIN No.</th><th>Signal</th></tr>
<tr><td>A</td><td>U</td><td>D</td><td>Ground</td></tr>
<tr><td>B</td><td>V</td><td>E</td><td>BK+</td></tr>
<tr><td>C</td><td>W</td><td>F</td><td>BK-</td></tr>
</table>
1. Motor Side Connector(MS: Military Standard)
• PLUG Spec: MS 3108A 24-10S
2. Drive Side Connector
• U, V, W Pin Spec.: F2512
• Cable Spec.: 4Cx2.5SQ or 4Cx14AWG
• FG Pin Spec.: 2.5x4(Ring Terminal)
3. Brake Power side Connector
• BK Pin Spec.: 1.5x3(Ring Terminal)
• Cable Spec.: 2Cx0.75SQ or 2Cx18AWG</td></tr>
<tr><td>For Power</td><td>Power Cable</td><td>APCS-P
□□□JS1</td><td>L7SB□□□□
L7NHB□□□U
L7PB□□□U</td><td>FFP Series
FFP50A/
FFP55D
FFP75D/
FFP44G
FFP60G/
FFP44M

FGP Series
FGP55D/
FGP75D
FGP44G/
FGP60G
FGP44M</td><td> 
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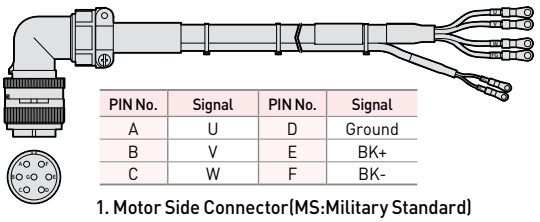
<tr><th>PIN No.</th><th>Signal</th><th>PIN No.</th><th>Signal</th></tr>
<tr><td>A</td><td>U</td><td>C</td><td>W</td></tr>
<tr><td>B</td><td>V</td><td>D</td><td>Ground</td></tr>
</table>
1. Motor Side Connector(MS: Military Standard)
• PLUG Spec: MS 3108A 22-22S
2. Drive Side Connector
• U, V, W Pin Spec.: 4.0x5(Ring Terminal)
• Cable Spec.: 4Cx4.0SQ or 4Cx11AWG
• FG Pin Spec.: 4.0x5(Ring Terminal)</td></tr>
</table>

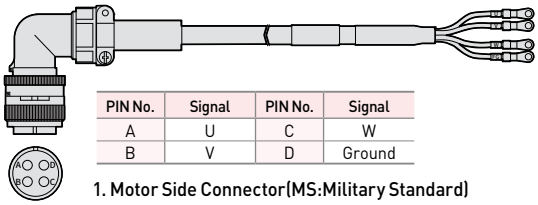
Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Power Cable [Common use for 200V and 400V]

<table>
<tr><th>Type</th><th>Product Type</th><th>Model Name Note1)</th><th>Applicable Drive Note2)</th><th>Applicable Motor</th><th>Specifications</th></tr>
<tr><td>For Power</td><td>Power Cable (Brake Type)</td><td>APCS-P
□□□LB1</td><td>L7SB□□□□
L7NHB□□□U
L7PB□□□U</td><td>FFP Series
FFP50A/
FFP55D
FFP75D/
FFP44G
FFP60G/
FFP44M</td><td> 
<table>
<tr><th>PIN No.</th><th>Signal</th><th>PIN No.</th><th>Signal</th></tr>
<tr><td>A</td><td>U</td><td>D</td><td>Ground</td></tr>
<tr><td>B</td><td>V</td><td>E</td><td>BK+</td></tr>
<tr><td>C</td><td>W</td><td>F</td><td>BK-</td></tr>
</table>
1. Motor Side Connector(MS:Military Standard)
• PLUG Spec: MS 3108A 24-10S
2. Drive Side Connector
• U, V, W Pin Spec.: 4.0x5(Ring Terminal)
• Cable Spec.: 4Cx4.0SQ or 4Cx11AWG
• FG Pin Spec.: 4.0x5(Ring Terminal)
3. Brake Power side Connector
• BK Pin Spec.: 1.5x3(Ring Terminal)
• Cable Spec.: 2Cx0.75SQ or 2Cx18AWG</td></tr>
<tr><td>For Power</td><td>Power Cable</td><td>APCS-P
□□□JS</td><td>L7SA□□□□
L7NHA□□□U
L7NHFA□□□U
L7PA□□□U</td><td>FF Series
FF50A/
FF55D
FF44G/
FF44M

FG Series
FG55D/
FG44G
FG44M</td><td> 
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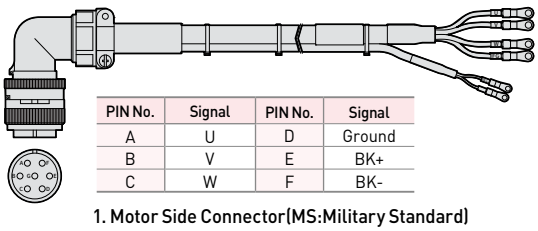
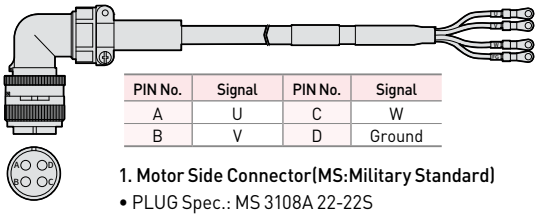
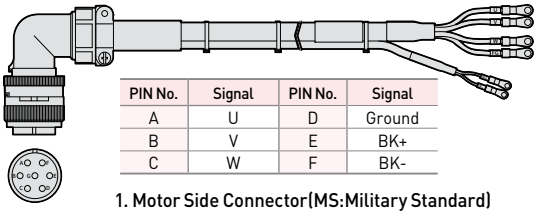
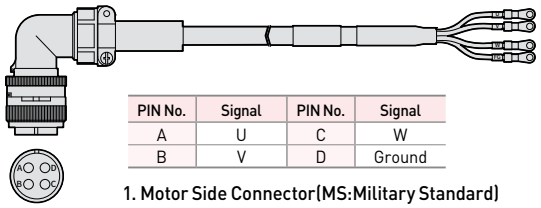
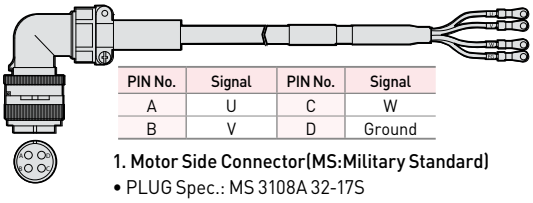
<tr><th>PIN No.</th><th>Signal</th><th>PIN No.</th><th>Signal</th></tr>
<tr><td>A</td><td>U</td><td>C</td><td>W</td></tr>
<tr><td>B</td><td>V</td><td>D</td><td>Ground</td></tr>
</table>
1. Motor Side Connector(MS:Military Standard)
• PLUG Spec: MS 3108A 22-22S
2. Drive Side Connector
• U, V, W Pin Spec.: 6.0x5(Ring Terminal)
• Cable Spec.: 4Cx6.0SQ or 4Cx10AWG
• FG Pin Spec.: 6.0x5(Ring Terminal)</td></tr>
<tr><td>For Power</td><td>Power Cable (Brake Type)</td><td>APCS-P
□□□LB</td><td>L7SA□□□□
L7NHA□□□U
L7NHFA□□□U
L7PA□□□U</td><td>FF Series
FF50A/
FF55D
FF44G/
FF44M</td><td> 
<table>
<tr><th>PIN No.</th><th>Signal</th><th>PIN No.</th><th>Signal</th></tr>
<tr><td>A</td><td>U</td><td>D</td><td>Ground</td></tr>
<tr><td>B</td><td>V</td><td>E</td><td>BK+</td></tr>
<tr><td>C</td><td>W</td><td>F</td><td>BK-</td></tr>
</table>
1. Motor Side Connector(MS:Military Standard)
• PLUG Spec: MS 3108A 24-10S
2. Drive Side Connector
• U, V, W Pin Spec.: 6.0x5(Ring Terminal)
• Cable Spec.: 4Cx6.0SQ or 4Cx10AWG
• FG Pin Spec.: 6.0x5(Ring Terminal)
3. Brake Power Side Connector
• BK Pin Spec.: 1.5x3(Ring Terminal)
• Cable Spec.: 2Cx0.75SQ or 2Cx18AWG</td></tr>
</table>

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

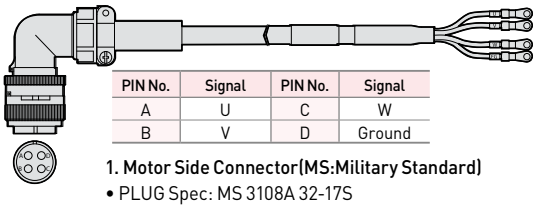
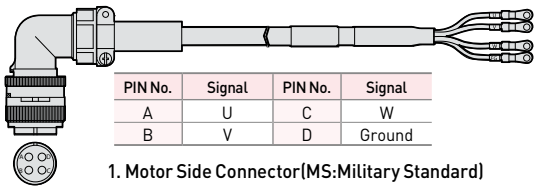
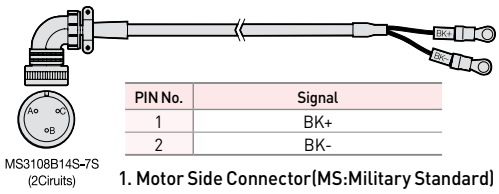
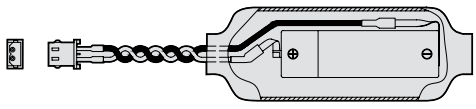
Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Power	Power Cable	APCS-P □□□JS2	L7SA□□□□ L7NHA□□□U L7NHFA□□□U L7PA□□□U	FF Series FF75D/FF60G FG Series FG75D/FG60G	 PIN No. / Signal / PIN No. / Signal A / U / C / W B / V / D / Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec.: MS 3108A 22-22S **2. Drive Side Connector** • U, V, W Pin Spec.: 10.0x5(Ring Terminal) • Cable Spec.: 4Cx10.0SQ or 4Cx8AWG • FG Pin Spec.: 10.0x5(Ring Terminal)
For Power	Power Cable (Brake Type)	APCS-P □□□LB2	L7SA□□□□ L7NHA□□□U L7NHFA□□□U L7PA□□□U	FF Series FF75D/ FF60G	 PIN No. / Signal / PIN No. / Signal A / U / D / Ground B / V / E / BK+ C / W / F / BK- **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec.: MS 3108A 24-10S **2. Drive Side Connector** • U, V, W Pin Spec.: 10.0x5(Ring Terminal) • Cable Spec.: 4Cx10.0SQ or 4Cx8AWG • FG Pin Spec.: 10.0x5(Ring Terminal) **3. Brake Power side Connector** • BK Pin Spec.: 1.5x3(Ring Terminal) • Cable Spec.: 2Cx0.75SQ or 2Cx18AWG
For Power	Power Cable	APCS-P □□□MS1	L7SB□□□□ L7NHB□□□U L7PB□□□U	FFP Series FFP75G FGP Series FGP60M/ FGP110D/ FGP85G/ FGP110G	 PIN No. / Signal / PIN No. / Signal A / U / C / W B / V / D / Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec.: MS 3108A 32-17S **2. Drive Side Connector** • U, V, W Pin Spec.: 6.0x5(Ring Terminal) • Cable Spec.: 4Cx6.0SQ or 4Cx10AWG • FG Pin Spec.: 6.0x5(Ring Terminal)
For Power	Power Cable	APCS-P □□□MS	L7S□□□□□ L7NH□□□□U L7NHF□□□□U L7P□□□□U	FF Series FF75G FG Series FG60M FGP Series FGP150G	 PIN No. / Signal / PIN No. / Signal A / U / C / W B / V / D / Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec.: MS 3108A 32-17S **2. Drive Side Connector** • U, V, W Pin Spec.: 10.0x5(Ring Terminal) • Cable Spec.: 4Cx10.0SQ or 4Cx8AWG • FG Pin Spec.: 10.0x5(Ring Terminal)

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Power Cable [Common use for 200V and 400V]

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Power	Power Cable	APCS-P □□□0S	L7SA□□□□ L7NHA□□□U L7PA□□□U	FG Series FG110D/ FG85G FG110G	 PIN No. / Signal / PIN No. / Signal A / U / C / W B / V / D / Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 32-17S **2. Drive Side Connector** • U, V, W Pin Spec.: 16.0x6(Ring Terminal) • Cable Spec.: 4Cx16.0SQ or 4Cx5AWG • FG Pin Spec.: 16.0x6(Ring Terminal)
For Power	Power Cable	APCS-P □□□VS	L7SA□□□□ L7NHA□□□U L7PA□□□U	FG Series FG150G	 PIN No. / Signal / PIN No. / Signal A / U / C / W B / V / D / Ground **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS 3108A 32-17S **2. Drive Side Connector** • U, V, W Pin Spec.: 25.0x6(Ring Terminal) • Cable Spec.: 4Cx25.0SQ or 4Cx3AWG • FG Pin Spec.: 22.0x6(Ring Terminal)
For Power	Brake Cable	APCS-P □□□SB	L7S□□□□□ L7NH□□□□U L7NHFA□□□U L7P□□□□U	All Model of FG Series	 MS3108B14S-7S (2Ciruits) PIN No. / Signal 1 / BK+ 2 / BK- **1. Motor Side Connector(MS:Military Standard)** • PLUG Spec: MS3108A 14S-7S **2. Drive Side Connector** • Connecting Terminal Spec.: 1.5×3(Ring Terminal) **3. Cable Spec.: 2C×0.75SQ or 2C×18AWG**
Battery For Encoder	Battery Ass'y	APCS-BATT36	All Model of L7 Series	All Model of F Series	 PIN No. / Signal 1 / BK+ 2 / BK- • PLUG Spec: 5264-02(Molex) • PLUG Pin Spec.: 5263PBT(Molex) • Battery Spec: ER6V/3.6V, 2000mAh(TOSHIBA)

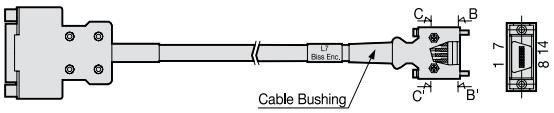
Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

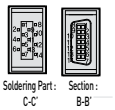
DD Motor Signal Cable

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Signal	L7 Encoder Cable	APCS-E □□□ ZS	L7SA□□□B L7NA□□□B L7NHA□□□U L7PA□□□U	All Model of DD Motor	



D.D SERVO ENCODER CABLE

PIN No.	Encoder Signal	PIN No.	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	0V	12	-
5	SHELD	13	-
6	$\overline{MA}$	14	-
7	$\overline{SLO}$	15	-
8	-		-



PIN No.	Encoder Signal	PIN No.	Encoder Signal
1	-	8	-
2	-	9	-
3	MA	10	-
4	$\overline{MA}$	11	-
5	SLO	12	-
6	$\overline{SLO}$	13	-
7	0V	14	+5V
PLATE		SHIELD	

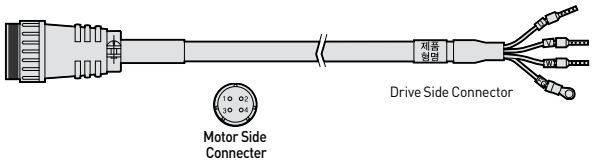
1. Motor Side Connector
- CONNECTOR(D-SUB) : DA-15PF-N(Female)
- CONNECTOR CASE(D-SUB) : SK-15H-1A

2. Drive Side Connector
- CASE Spec: 10314-52A0-008(3M)
- CONNECTOR Spec: 10114-3000VE(3M)

3. Cable Spec.: 3Px0.2SQ or 3Px24AWG

DD Motor Power Cable

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Power	Power Cable	APCS-PN □□□YS	L7SA□□□B L7NHA□□□U L7PA□□□U L7NHF□□□U	DB03D/ DB06D/ DB09D/ DC06D/ DC12D/ DC18D/ DD12D/ DD22D/ DD34D/ DE40D/ DE60D	
For Power	Power Cable	APCS-PN □□□ZS	L7SA□□□B L7NHA□□□U L7PA□□□U L7NHF□□□U	DFA1G/ DFA6G/ DGC3S	

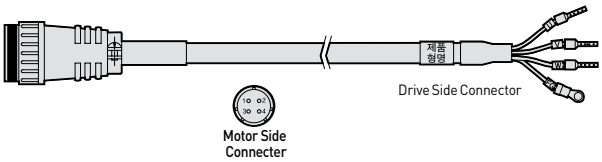


1. Motor Side Connector
- PLUG Spec: NJC-24-4-ADF(Female)

2. Drive Side Connector(U,V,W,FG)
- U, V, W Pin Spec.: 1512
- FG Pin Spec.: 1.5x4(Ring Terminal)

Item	PIN No.	Signal
Motor	1	U
	2	V
	3	W
	4	Ground

3. Cable Spec.: 4C×1.5SQ, LAPP Cable (P/N : 00257001)



1. Motor Side Connector
- PLUG Spec: NJC-24-4-ADF(Female)

2. Drive Side Connector
- U, V, W Pin Spec.: 2512
- FG Pin Spec.: 2.5x4(Ring Terminal)

Item	PIN No.	Signal
Motor	1	U
	2	V
	3	W
	4	Ground

3. Cable Spec.: 4C×2.5SQ, LAPP Cable (P/N : 00257011)

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

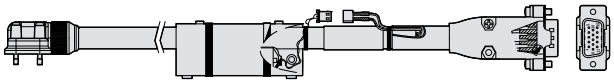
PHOX Series Cable

<table>
<tr><th>Type</th><th>Product Type</th><th>Model Name Note1)</th><th>Applicable Drive Note2)</th><th>Applicable Motor</th><th>Specifications</th></tr>
<tr>
<td>For Signal</td>
<td>Encoder Cable (Single-Turn)</td>
<td>APCV-E
□□□
ES-□</td>
<td>PHOX Series
PHOX-03/
PHOX-06</td>
<td>FAL (Low Voltage) Series (All Models of Low Voltage Motors)

FBL (Low Voltage) Series (All Models of Low Voltage Motors)</td>
<td>


(Front Direction) (Rear Direction)
<table>
<tr><th>PIN No.</th><th>Encoder Signal</th></tr>
<tr><td>1</td><td>MA</td></tr>
<tr><td>2</td><td>SLO</td></tr>
<tr><td>3</td><td>-</td></tr>
<tr><td>4</td><td>0V</td></tr>
<tr><td>5</td><td>SHIELD</td></tr>
<tr><td>6</td><td>$\overline{MA}$</td></tr>
<tr><td>7</td><td>$\overline{SLO}$</td></tr>
<tr><td>8</td><td>-</td></tr>
<tr><td>9</td><td>+5V</td></tr>
</table>
(Motor Connector)

<table>
<tr><th>PIN No.</th><th>Encoder Signal</th><th>PIN No.</th><th>Encoder Signal</th></tr>
<tr><td>1</td><td>-</td><td>9</td><td>-</td></tr>
<tr><td>2</td><td>-</td><td>10</td><td>-</td></tr>
<tr><td>3</td><td>0V</td><td>11</td><td>$\overline{MA}$</td></tr>
<tr><td>4</td><td>-</td><td>12</td><td>MA</td></tr>
<tr><td>5</td><td>5V</td><td>13</td><td>-</td></tr>
<tr><td>6</td><td>-</td><td>14</td><td>-</td></tr>
<tr><td>7</td><td>$\overline{SLO}$</td><td>15</td><td>-</td></tr>
<tr><td>8</td><td>SLO</td><td>Plate</td><td>SHIELD</td></tr>
</table>
(Driver Connector)
1. Motor Side Connector
• CAP Spec: 2201825-1(Tyco)
• SOCKET Spec: 2174065-4(Tyco)
2. Drive Side Connector
• CASE Spec: 5748676-1(Tyco)
• CONNECTOR Spec: 10090769-P154ALF(Amphenol FCI)
3. Cable Spec.: 3Px0.2SQ or 3Px24AWG
</td>
</tr>
<tr>
<td>For Signal</td>
<td>Encoder Cable (Multi-Turn)</td>
<td>APCV-E
□□□
ES1-□</td>
<td>PHOX Series
PHOX-03/
PHOX-06</td>
<td>FAL (Low Voltage) Series (All Models of Low Voltage Motors)

FBL (Low Voltage) Series (All Models of Low Voltage Motors)</td>
<td>


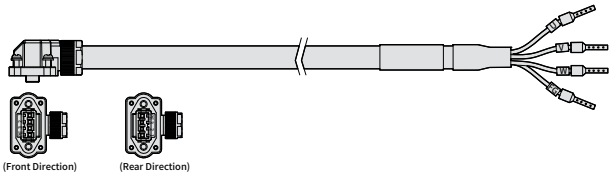
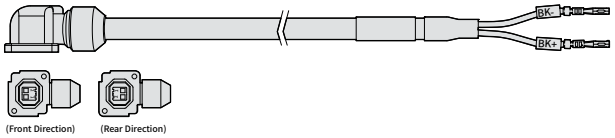
(Front Direction) (Rear Direction)
<table>
<tr><th>PIN No.</th><th>Encoder Signal</th></tr>
<tr><td>1</td><td>BATTERY (VDD_B)</td></tr>
<tr><td>2</td><td>BATTERY 0V (GND_B)</td></tr>
</table>
(Battery Connector)
<table>
<tr><th>PIN No.</th><th>Encoder Signal</th></tr>
<tr><td>1</td><td>MA</td></tr>
<tr><td>2</td><td>SLO</td></tr>
<tr><td>3</td><td>GND_B</td></tr>
<tr><td>4</td><td>0V</td></tr>
<tr><td>5</td><td>SHIELD</td></tr>
<tr><td>6</td><td>$\overline{MA}$</td></tr>
<tr><td>7</td><td>$\overline{SLO}$</td></tr>
<tr><td>8</td><td>VDD_B</td></tr>
<tr><td>9</td><td>+5V</td></tr>
</table>
(Motor Connector)

<table>
<tr><th>PIN No.</th><th>Encoder Signal</th><th>PIN No.</th><th>Encoder Signal</th></tr>
<tr><td>1</td><td>-</td><td>9</td><td>-</td></tr>
<tr><td>2</td><td>-</td><td>10</td><td>-</td></tr>
<tr><td>3</td><td>0V</td><td>11</td><td>$\overline{MA}$</td></tr>
<tr><td>4</td><td>-</td><td>12</td><td>MA</td></tr>
<tr><td>5</td><td>5V</td><td>13</td><td>-</td></tr>
<tr><td>6</td><td>-</td><td>14</td><td>-</td></tr>
<tr><td>7</td><td>$\overline{SLO}$</td><td>15</td><td>-</td></tr>
<tr><td>8</td><td>SLO</td><td>Plate</td><td>SHIELD</td></tr>
</table>
(Driver Connector)
1. Motor Side Connector
• CAP Spec: 2201825-1(Tyco)
• SOCKET Spec: 2174065-4(Tyco)
2. Drive Side Connector
• CASE Spec: 5748676-1(Tyco)
• CONNECTOR Spec: 10090769-P154ALF(Amphenol FCI)
3. Cable Spec.: 4Px0.2SQ or 4Px24AWG
4. BATTERY CONNECTOR Spec: 5267-02A(MOLEX)
</td>
</tr>
</table>

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.
In case of□ marked product, the connector can draw in a direction of Front(load)/Rear(half load).(Front Type: Nomark, Rear Type: -R)
In case of FAL Type, the connector can draw in a direction of Front.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

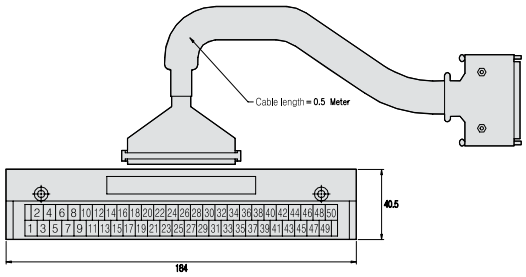
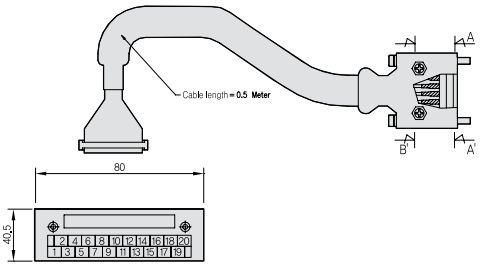
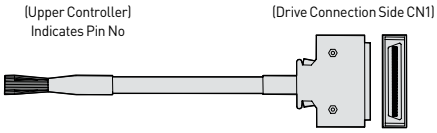
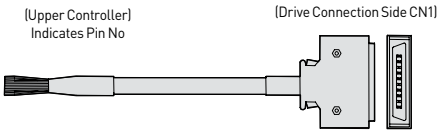
Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Applicable Motor	Specifications
For Power	Power Cable	APCV-P □□□LS -□	PHOX Series PHOX-03/ PHOX-06	FAL (Low Voltage) Series (All Models of Low Voltage Motors) FBL (Low Voltage) Series (All Models of Low Voltage Motors)	 **1. Motor Side Connector** • CAP Spec: SM-JN8FT04N(Suntone) • SOCKET Spec: SMS-201(Suntone) **2. Drive Side Connector** • U, V, W Pin Spec: F1506 • FG Pin Spec: F1506 • Cable Spec.: 4Cx0.75SQ or 4Cx18AWG PIN No. / Signal: 1 U; 2 V; 3 W; PE Ground
For Power	Brake Cable	APCV-B □□□QS	PHOX Series PHOX-03/ PHOX-06	FAL (Low Voltage) Series (All Models of Low Voltage Motors) FBL (Low Voltage) Series (All Models of Low Voltage Motors)	 **1. Motor Side Connector** • CAP Spec: KN5FT02SJ1(JAE) • SOCKET Spec: ST-KN-S-C1B-3500(JAE) **2. Drive Side Connector** • Connecting Terminal Spec.: CC79X-2024-01-X **3. Cable Spec.: 2Cx0.5SQ or 2Cx20AWG** PIN No. / Signal: 1 +; 2 -

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	1	2	3	...	18	19	20
General Cable	N01	N02	N03	...	N18	N19	N20
Robotic Cable	F01	F02	F03	...	F18	F19	F20

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Signal Cable

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Specifications
T/B	CN1 T/B	APC-VSCN1T-□□	L7S□□□□B L7PA□□□U L7CA□□□U	 • VS/S Series CN1 T/B • Available Cable Length: 0.5[m], 1[m], 1.5[m], 2[m], 3[m]
	CN1 T/B	APCS-L7NCN1T-□□	L7NH□□□U	 • L7N의 CN1 T/B • Available Cable Length: 0.5[m], 1[m], 1.5[m], 2[m]
For Signal	CN1 Cable	APC-CN1-□□A	L7S SERIES L7P SERIES L7CA□□□U	 **Drive Side Connection(CN1)** • CASE Spec. : 10350-52A0-008(3M) • CONNECTOR Spec. : 10150-3000VE(3M) • CABLE Spec. : 20276-SB 25P(AWG28)
For Signal	CN1 Cable	APCS-CN1-□□A	L7NH SERIES	 **Drive Side Connection(CN1)** • CASE Spec. : 10320-52A0-008(3M) • CONNECTOR Spec. : 10120-3000VE(3M) • CABLE Spec. : ROW-SB0.1C×20C(AWG28)

Note1) □□□of Mode lName indicates the kind and length of cable. And the declarationis as below.

Cable Length(m)	3	5	10	20
General Cable(N)	N03	N05	N10	N20
Robotic Cable(F)	F03	F05	F10	F20

APC-VSCN1T

Cable Length(m)	0.5	1	1.5	2	3
Declaration	None	01	015	02	03

APCS-L7NCN1T

Cable Length(m)	0.5	1	1.5	2
Declaration	None	01	015	02

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

L7C CN1 Pin Map

L7S/L7C

NO	PIN Function	NO	PIN Function	NO	PIN Function	NO	PIN Function	NO	PIN Function
1	TRQCOM	11	PR+	21	SPD3	31	/BO	41	RDY
2		12	PR-	22	SPD2	32	AO	42	
3		13		23	SPD1	33	/AO	43	ZSPD
4	ZO	14	ALO2	24	GND24	34	+12VA	44	BRAKE
5	/ZO	15	ALO1	25	GND24	35	-12VA	45	INPOS
6		16	ALO0	26		36	SG	46	DIR
7		17	ALMRST	27	SPDCOM	37	GND	47	SVON
8	GND	18	EMG	28	MINIY1	38	ALARM+	48	STOP
9	PF+	19	CWLIM	29	MINIY2	39	ALARM-	49	PULCOM
10	PF-	20	CCWLIM	30	BO	40	RDY+	50	+24V IN

L7P

NO	PIN Function	NO	PIN Function	NO	PIN Function	NO	PIN Function	NO	PIN Function
1	AO	11	+24V IN	21	+24V IN	31	PF+	41	INPOS1+
2	/AO	12	SVON	22	HOME	32	PF-	42	INPOS1-
3	BO	13	POT	23	H-START	33	PR+	43	ORG+
4	/BO	14	NOT	24	ISEL0	34	PR-	44	ORG-
5	ZO	15	A-RST	25	ISEL1	35	ALARM+	45	EOS+
6	/ZO	16	START	26	ISEL2	36	ALARM-	46	EOS-
7	A-TLMT	17	STOP	27	ISEL3	37	RDY+	47	TGON+
8	AGND	18	REGT	28	ISEL4	38	RDY-	48	TGON-
9	A-OVR	19	EMG	29	ISEL5	39	BRAKE+	49	TLMT+
10	AGND	20		30	PULCOM	40	BRAKE-	50	TLMT-

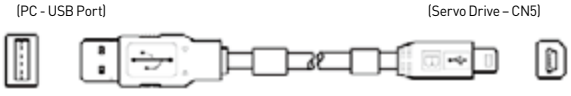
L7NH

NO	PIN Function	NO	PIN Function
1	BRAKE+	11	POT
2	BRAKE-	12	NOT
3	RDY+	13	PCON
4	RDY-	14	GAIN2
5	AGND	15	A-TLMT
6	+24V IN	16	
7	HOME	17	RDY+
8	STOP	18	RDY-
9	PCL	19	ZSPD+
10	NCL	20	ZSPD-

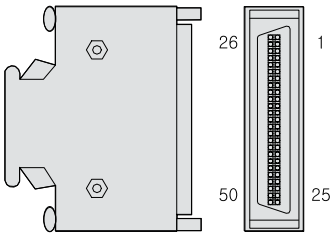
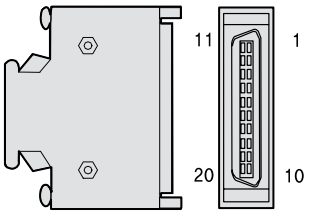
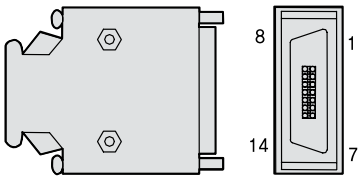
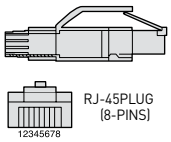
iX7NH

NO	PIN Function	NO	PIN Function
1	BRAKE	11	POT
2	DOCOM	12	NOT
3	ALARM	13	PCON
4	READY	14	GAIN2
5	AGND	15	A-TLMT
6	+24V IN	16	GND
7	HOME	17	ZO
8	STOP	18	/ZO
9	AO	19	BO
10	/AO	20	/BO

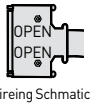
Signal Cable / Connector

Type	Product Type	Model Name	Applicable Drive	Specifications
For Signal	Communication Cable	APC-CN5L7U	All Models of L7 SERIES	 • PC Side Connector : USB A Plug • Drive Side Connector(CN5) : Mini USB 5P Plug • Electric Requirements Spec : Double Shielded, Twisted Pair, EMI-filter attached type (Ex. : KU-AMB518, SANWA) • Only 1.8m length of cable is available to use

Connector

Type	Product Type	Model Name	Applicable Drive Note1)	Specifications
CN	CN1 Connector	APC-CN1NNA	L7S□□□B L7CA□□□U L7PA□□□U	 • CASE Spec. : 10350-52A0-008(3M) • CONNECTOR Spec. : 10150-3000VE(3M)
CN	CN1 Connector	APC-CN2NNA	L7NH□□□U	 • CASE Spec. : 10320-52A0-008(3M) • CONNECTOR Spec. : 10120-3000VE(3M)
CN	CN2 Connector	APC-CN3NNA	All models of L7 Series	 • CASE Spec. : 10314-52A0-008(3M) • CONNECTOR Spec. : 10114-3000VE(3M)
CN	CN3 CN4 EtherCAT Connector	APCS-CN4NNA	L7NH□□□U L7NHF□□□U	 * EtherCAT use only 4 Signal(1, 2, 3, 6)

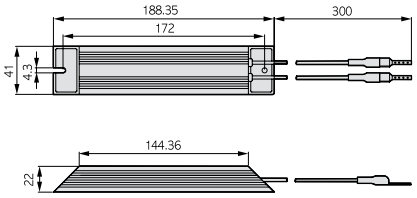
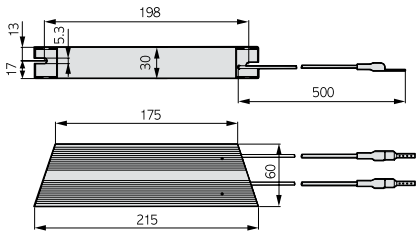
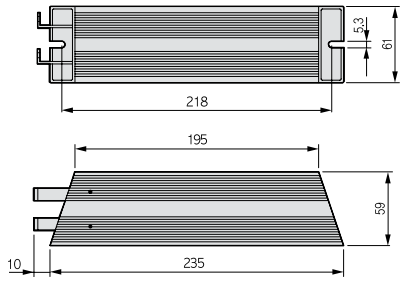
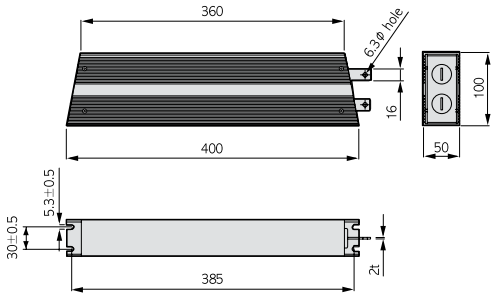
PIN No.	Signal	Line Color
1	TX/RX0 Plus	White/Orange
2	TX/RX0 Minus	Orange
3	TX/RX1 Plus	White/Green
4	TX/RX2 Plus	Blue
5	TX/RX2 Minus	White/Blue
6	TX/RX1 Minus	Green
7	TX/RX3 Plus	White/Brown
8	TX/RX3 Minus	Brown
PLATE		SHILDE

CN	CN6 Connector	APCS-CN6K	L7NH□□□U	 Pin No.  Wireing Schmatic • MINI I/O By-pass Connector : 1971153(TE)

Note1) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

200V Braking Resistor

*Option braking resistors are selectable items for user's need.

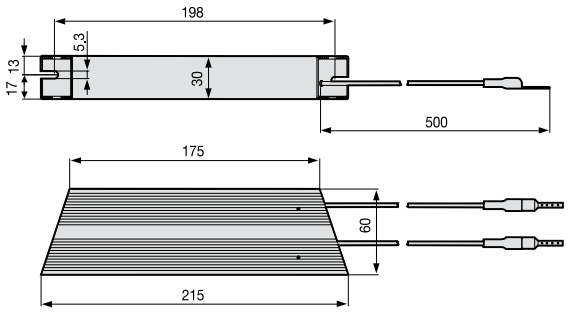
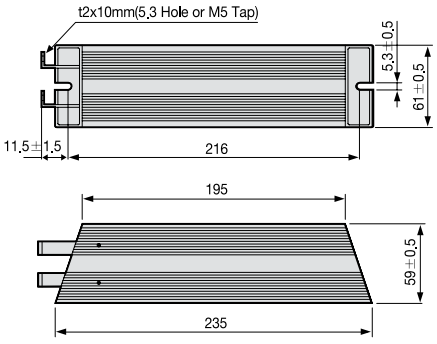
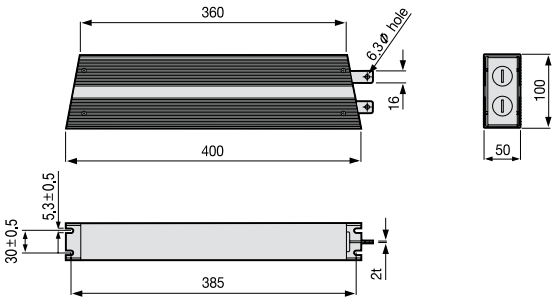
Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Specifications
Resistor	Braking Resistor	APCS-140R50 (50Ω/140W)	L7□A001□ L7□A002□ L7□A004□	 • IRH140-50Ω
Resistor	Braking Resistor	APCS-300R30 (30Ω/300W)	L7□A008□ L7□A010□	 • IRV300-30Ω
Resistor	Braking Resistor	APC-600R30 ×3P(Parallel) (30Ω/600W ×3P(Parallel) =10Ω/1800W)	L7□A020□ L7□A035□	 • IRV600-30Ω • IRV600-28Ω Note) IRV 600W 30Ω and 600W 28Ω have the same external dimensions.
		APC-600R28 ×4P(Parallel) (28Ω/600W ×4P(Parallel) =7Ω/2400W)	L7□A050□ L7□A075□	
Resistor	Braking Resistor	APCS-2000R3R3 (3.3Ω/2000W)	L7□A150□	 • IRM2000-3.3Ω

Note1) 100W~7.5kW has the internal basic braking resistor. If the machine requires short deceleration time frequently, refer to table above and apply the appropriate braking resistor.

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

400V Braking Resistor

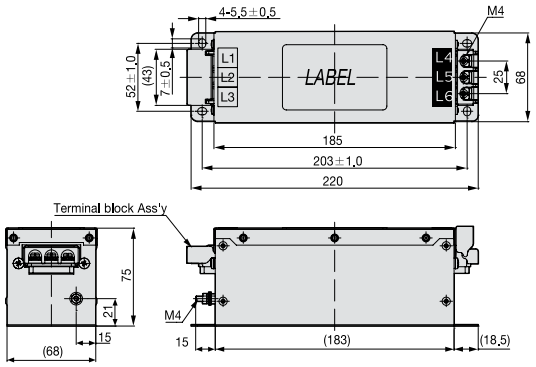
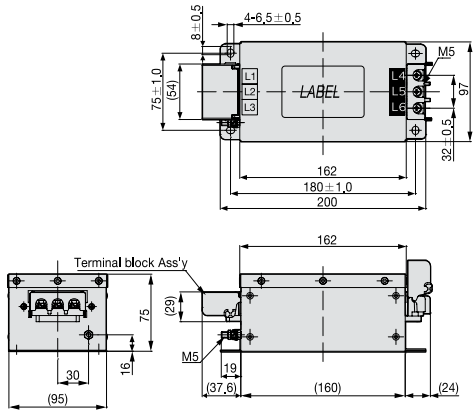
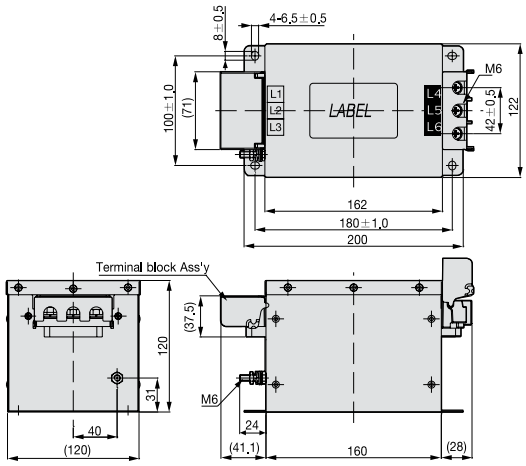
*Option braking resistors are selectable items for user's need.

Type	Product Type	Model Name Note1)	Applicable Drive Note2)	Specifications
Resistor	Braking Resistor	APCS-300R82 (82Ω/300W)	L7□B010□	 • IRV300-82Ω
Resistor	Braking Resistor	APCS-600R75 ×2P(Parallel) (75Ω/600W ×2P(Parallel) =37.5Ω/1200W)	L7□A020□ L7□A035□	 • IRV600-75Ω
Resistor	Braking Resistor	APCS-600R75 ×3P(Parallel) (75Ω/600W ×3P(Parallel) =25Ω/1800W)	L7□A050□ L7□A075□	
Resistor	Braking Resistor	APCS-2000R13R4 (13.4Ω/2000W)	L7□B150□	 • IRM2000-13.4Ω

Note1) 100W~7.5kW has the internal basic braking resistor. If the machine requires short deceleration time frequently, refer to table above and apply the appropriate braking resistor.

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Noise Filter

Type	Product Type	Model Name	Applicable Drive[Note2]	Specifications
Resistor	Noise Filter	APCS-TB6-B010LBEI	L7□A 001□ L7□A 002□ L7□A 004□ L7□A 008□ L7□A 010□ L7□B 010□	
		APCS-TB6-B020NBDC	L7□B 020□ L7□B 035□	
		APCS-TB6-B030NBDC	L7□A 020□ L7□A 035□ L7□B 050□	
		APCS-TB6-B040AS	L7□A 050□ L7□B 075□	
		APCS-TB6-B060LAS	L7□B 150□	

Note2) □□□of model name indicates the capacity of drive. And the declaration is as page 16 / 22 / 32 / 38 / 48 / 52 / 60 / 66page

Application

Contents

Xmotion Motion Module [EtherCAT]

Features

- 32 axes (master) and 4 axes (virtual) control
- EhterCAT CoE supported servo drive
- Communication cycle : 1ms
- Built-in DI/DO 8 points each and EtherCAT I/O 256 points
- Program 2MB
- External encoder input 2ch (line drive)
- Max. transmission distance : 100m

Specifications

Item		XGF-M32E
Communication		EtherCAT (CoE : CANopen over EtherCAT)
Number of Axis	Real	32 axes
	Virtual	4 axes
	I/O	Input/output 8 points each (built-in) EtherCAT I/O connection available
Control Period		1ms, 2ms, 4ms (same as main task period)
Control Unit		Pulse, mm, inch, degree
I/O	Internal	Input 8 points, output 8 points
	External	EtherCAT I/O 4 ea(max. 256 points)
Motion Program	No. of Program	Max. 256 ea
	Capacity	Max. 2Mbyte
	Language	LD(FB), ST
	Position Data	6400 points/all aixs
Control Method		Position, Velocity, Torque(Servo drivers support) control, Synchronous control, Interpolation control
Range of Position/Velocity		± LREAL, 0
Acc. Dec. Process		Trapezoid type, S-type (Setting to specify the Jerk at function block)
Acc. Dec. Time		2,147,483,647ms
Manual Operation		JOG operation
Torque Unit		Rated torque % designation
Encoder Input	Channel	2 channels
	Max. Input	Max. 500Kpps
	Input Method	Line drive input (RS-422A IEC specification) Open collector output type encoder
	Input Type	CW/CCW, Pulse/Dir, Phase A/B
Max. Distance		100m
Communication Cable		Over CAT.5 STP(Shielded Twisted-pair) cable
Error Indication		Indicated by LED
Communication Dtatus Indication		Indicated by LED
Occupied Point I/O		Variable: 16 point, Fixed: 64 point
Communication Physical Layer		100BASE-TX
Consumable Current [mA]		900
Weight [g]		122

Positioning Module [Network Type]

Features

- XGF-PN4B/PN8B : Standard EtherCAT Network Support(Xmotion Servo L7 Series)
- Direct connect with Max.8 servo driver
- 2~8 axis linear interpolation, 2axis circular interpolation, 3axis helical interpolation
- Position, speed, feed control is possible through the various operation
- Parameters, the operation data stored in the FRAM(without Battery)
- CAM for controlling up to eight different types of CAM data

Specifications

Item		XGF-PN4B	XGF-PN8B
Number of Axis		4 axis	8 axis
Interpolation		2~8 axis linear, 2axis circular, 3axis helical interpolation	
Control Method		Position, speed, Speed/position, position/speed position/torque, Feed control	
Setting Unit		pulse, mm, inch, degree	
Positioning Data		Each axis has 400 data items (Operation step number 1~400). It is available to set with software package or programming.	
XG-PM	Port	RS-232C, USB	
	Data	Basic, expansion, manual, servo parameter, operation data, cam data, command information	
	Monitor	Operation, trace, input sort, error information	
Back-up		FRAM(parameter, operation data) no battery	
Positioning	Positioning Method	Absolute/Incremental	
	Position Address range	Absolute / Incremental / Speed/position, position/speed conversion control	
		mm: -214748364.8 ~ 214748364.7(μm) / -214748364.8 ~ 214748364.7(μm) / -214748364.8 ~ 214748364.7(μm)	
		inch: -21474.83648 ~ 21474.83647 / -21474.83648 ~ 21474.83647 / -21474.83648 ~ 21474.83647	
		degree: -21474.83648 ~ 21474.83647 / -21474.83648 ~ 21474.83647 / -21474.83648 ~ 21474.83647	
		pulse: -2147483648 ~ 2147483647 / -2147483648 ~ 2147483647 / -2147483648 ~ 2147483647	
	Position Speed Range	mm: 0.01 ~ 20000000.00(mm/min)	
		inch: 0.001 ~ 2000000.000(inch/min)	
		degree: 0.001 ~ 2000000.000(degree/min)	
		pulse: 1 ~ 20,000,000 (pulse/sec)	
		RPM: 0.1 ~ 100000.0(RPM)	
	Accel/Decel Pattern	Trapezoidal & S-curve acceleration/deceleration	
	Accel/Decel Time	1~2,147,483,647 ms	
Manual		Jog/ MPG/ inching	
Homing Method		Max+Z(Forward), Min+Z(Backward), Near-point+Z(Forward, Backward), Max+near-point+Z(Forward), Min+near-point+Z(Backward), Z(Forward, Backward), near-point(Forward, Backward)	
The Ability to Change Speed		Absolute/Percent	
Torque		Rated torque %	
Absolute Position System		0 (Absolute encoder type servo)	
Encoder Input	Channel	2 Channel	
	Max. Input	Max. 200 Kpps	
	Input Method	line-drive input(RS-422A IEC), open collector output type	
	Type	CW/CCW, Pulse/Dir, Phase A/B	
	Connector	12 Pin connector	
Communication Cycle		800 μs	
Max. Distance		100 m	
Cable		STP(Shielded Twisted-pair) cable	
Error Display		LED	
Operation Display		LED	
Occupied Points of I/O		64points (Fixed type), 16points (Variable type)	
Current Consumption [mA]		500	
Weight [g]		115	

Xmotion Positioning Module [APM]

Features

- Highly reliable position control with LS ELECTRIC ASIC-embedded processor
- Enhanced control with fast control processing speed
- High-speed motor control (Max. pulse output: 1Mbps)
- Circular/linear interpolation, separate/synchronous operation
- Trapezoidal & S-curve acceleration/deceleration
- Easy and quick control through external input (JOG operation included)
- Encoder input support
- High-speed processing of command (4ms)
- Easy to set positioning parameters (Windows)
- Monitoring/Tracking/Simulation
- Available to edit operation parameter data in EXCEL
- Self-diagnosis
- Real-time information and solution for each error

Specifications

Item			Specifications		
			XGF-PO1A, XGF-PD1A	XGF-PO2A, XGF-PD2A	XGF-PO3A, XGF-PD3A
Number of Axis			1 axis	2 axis	3 axis
Interpolation			-	2-axis linear interpolation, 2-axis circular interpolation	2/3-axis linear interpolation, 2-axis circular interpolation
Control Method			Position control, speed control, speed/position control, position/speed control		
Setting Unit			Pulse, mm, inch, degree		
Positioning Data			Each axis has 400 data items (Operation step number 1~400). It is available to set with software package or programming.		
Software Package			Available (Connected with RS-232C Port of CPU module)		
Data Backup			Flash memory (No battery)		
Positioning	Positioning Method		Absolute / relative method		
	Position Speed Range	mm	-214,748,364.8 ~ 214,748,364.7 (μm)		
		Inch	-21,474.83648 ~ 21,474.83647		
		degree	-21,474.83648 ~ 21,474.83647		
		pulse	-21,47483,648 ~ 2,147,483,647		
	Type		XGF-PO□A: Open collector, XGF-PD□A: Line driver		
	Position Speed Range	mm	0.01 ~ 20,000,000.00 (㎜/min)		
		Inch	0.001 ~ 2,0000,00.000 (inch/min)		
		degree	0.001 ~ 2,000,000.000 (degree/min)		
		pulse	XGF-PO□A: 1~200,000 (pulse/sec), XGF-PD□A: 1~1,000,000 (pulse/sec)		
	Accel/Decel Pattern		Trapezoidal & S-curve acceleration/deceleration		
	Accel/Decel Time		1 ~ 65,535ms		
Max. Output Pulse			XGF-PO□A: 200kpps / XGF-PD□A: 1Mpps		
Max. Distance			XGF-PO□A: 2m / XGF-PD□A: 10m		
Max. Encoder Input			200 kpps		
Error Display			LED		
Operation Display			LED		
Connection Connector			40 Pin connector		
Size of Cable			AWG #24		
Occupied Points of I/O			64 points (Fixed type), 16 points (Variable type)		
Current Consumption [mA]			XGF-PO1A: 340	XGF-PO2A: 360	XGF-PO3A: 400
			XGF-PD1A: 510	XGF-PD2A: 790	XGF-PD3A: 860
Weight [g]			120	130	135

Positioning Module [XPM]

Features

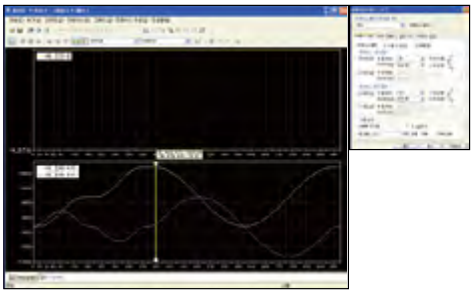
- Max 4Axis, Max pulse output 4Mpps
- Circular/linear/ellipse/helical interpolation
- Asymmetric acceleration and deceleration driving
- FRAM parameter
- XG-PM monitoring, simulation, trace
- CAM profile program

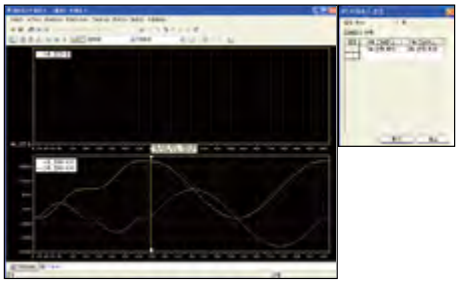
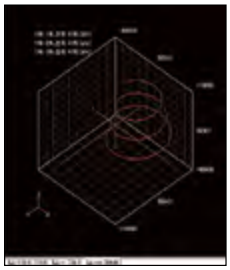
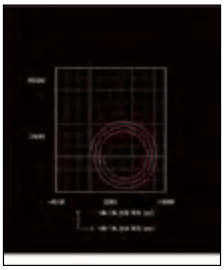
Specifications

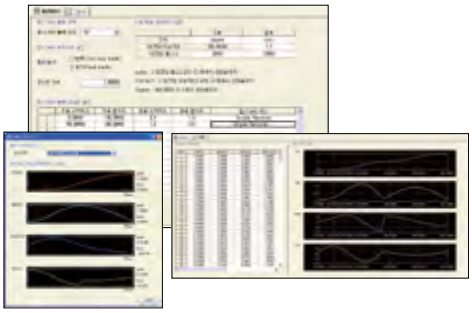
Item			XGF-PO1H XGF-PD1H	XGF-PO2H XGF-PD2H	XGF-PO3H XGF-PD3H	XGF-PO4H XGF-PD4H
Number of axis			1 axis	2 axis	3 axis	4 axis
Interpolation			-	Circular, linear, ellipse	Circular, linear, helical, ellipse	
Control method			Position control, speed control, speed/position control, position/speed control, FEED			
Positioning data			Each axis has 400 data items (Operation step number 1~400). It is available to set with XG-PM or programming.			
Configuration Tool			XG-PM (Connected with USB or RS-232C Port of CPU module)			
Data backup			FRAM(Parameter, Operation data), Flash memory (CAM Data), No battery			
Pulse output			XGF-POxH: Open collector, XGF-PDxH: linedriver			
Positioning	Positioning method		Absolute / Incremental			
	Position address range	mm	-214,748,364.8 ~ 214,748,364.7(㎛)			
		Inch	-21,474.83648 ~ 21,474.83647			
		degree	-21,474.83648 ~ 21,474.83647			
		pulse	-2,147,483,648 ~ 2,147,483,647			
	Position address speed	mm	0.01 ~ 20,000,000.00(㎜/min)			
		inch	0.001 ~ 2,000,000.000(inch/min)			
		degree	0.001 ~ 2,000,000.000(degree/min)			
		pulse	1 ~ 500,000(pulse/sec): Open collector, 1 ~ 4,000,000(pulse/sec): linedriver			
		RPM	0.1 ~ 100,000.0(RPM)			
	Accel/Decel pattern		Trapezoidal & S-curve acceleration/deceleration			
	Accel/Decel time		0 ~ 2,147,483,647ms			
Max. output pulse			Open collector: 500kpps, linedriver: 4Mpps			
Max. distance			Open collector: 5m, linedriver: 10m			
Max. encoder input			500kpps			
Error display			LED			
Size of cable			AWG #24			
Occupied points of I/O			64 points (Fixed type), 16 points (Variable type)			
Connection connector			40Pin		80Pin	
Current consumption (mA)			XGF-PO1H:400	XGF-PO2H:410	XGF-PO3H:420	XGF-PO4H:430
			XGF-PD1H:520	XGF-PD2H:600	XGF-PD3H:850	XGF-PD4H:890
Weight (g)			120		130	

Features

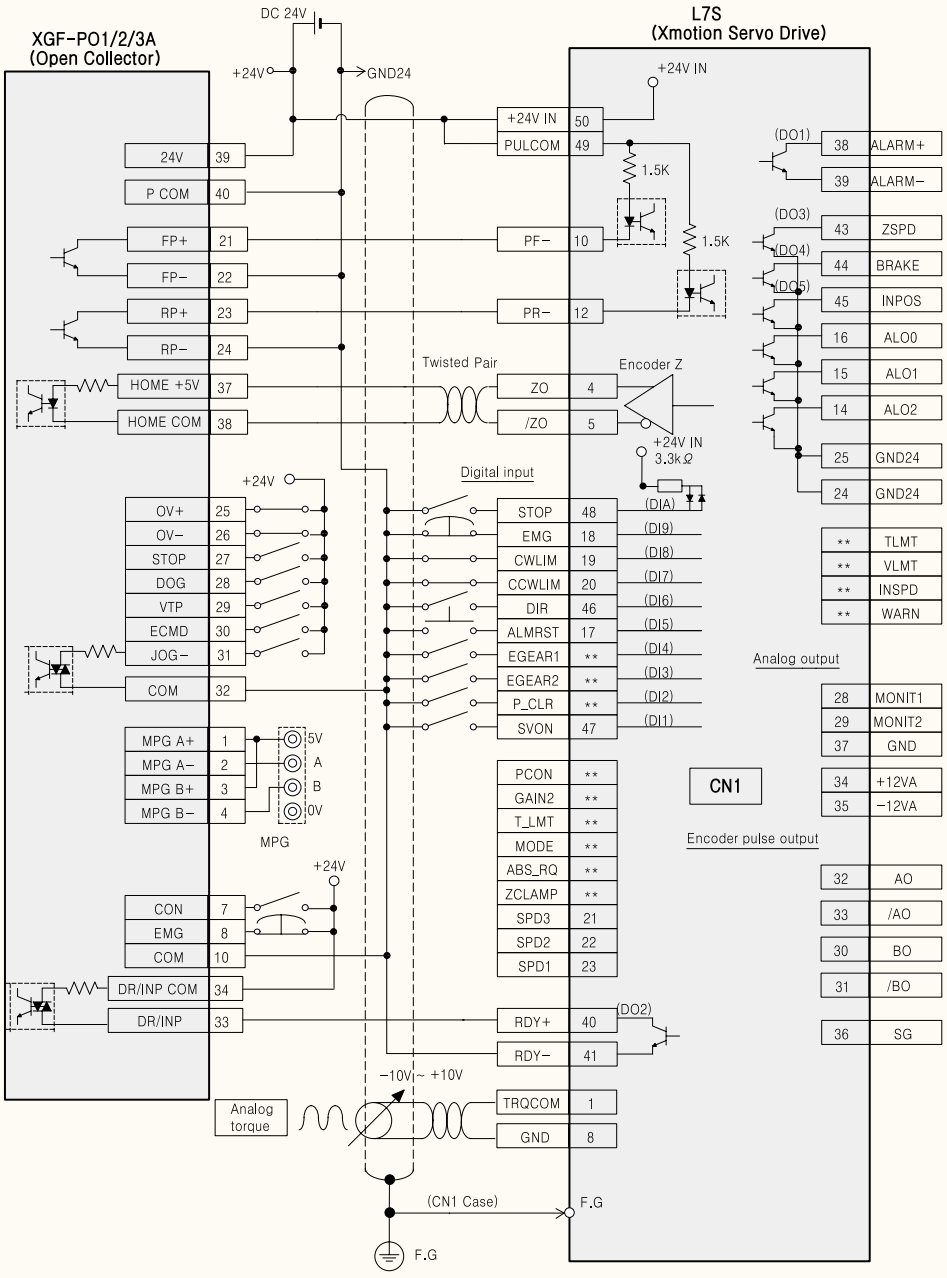
- Configuration tool with updated APM software package
- All models can be used for XGT Positioning & Motion Control Modules
- Simultaneous communications can be accessed with XG5000
- Powerful simulation, trace, monitoring

System View	Data trace(Trend Graph)
	

Data Trace(XY Graph)	XYZ Trend(3D View)	XYZ Monitor(2D View)
		

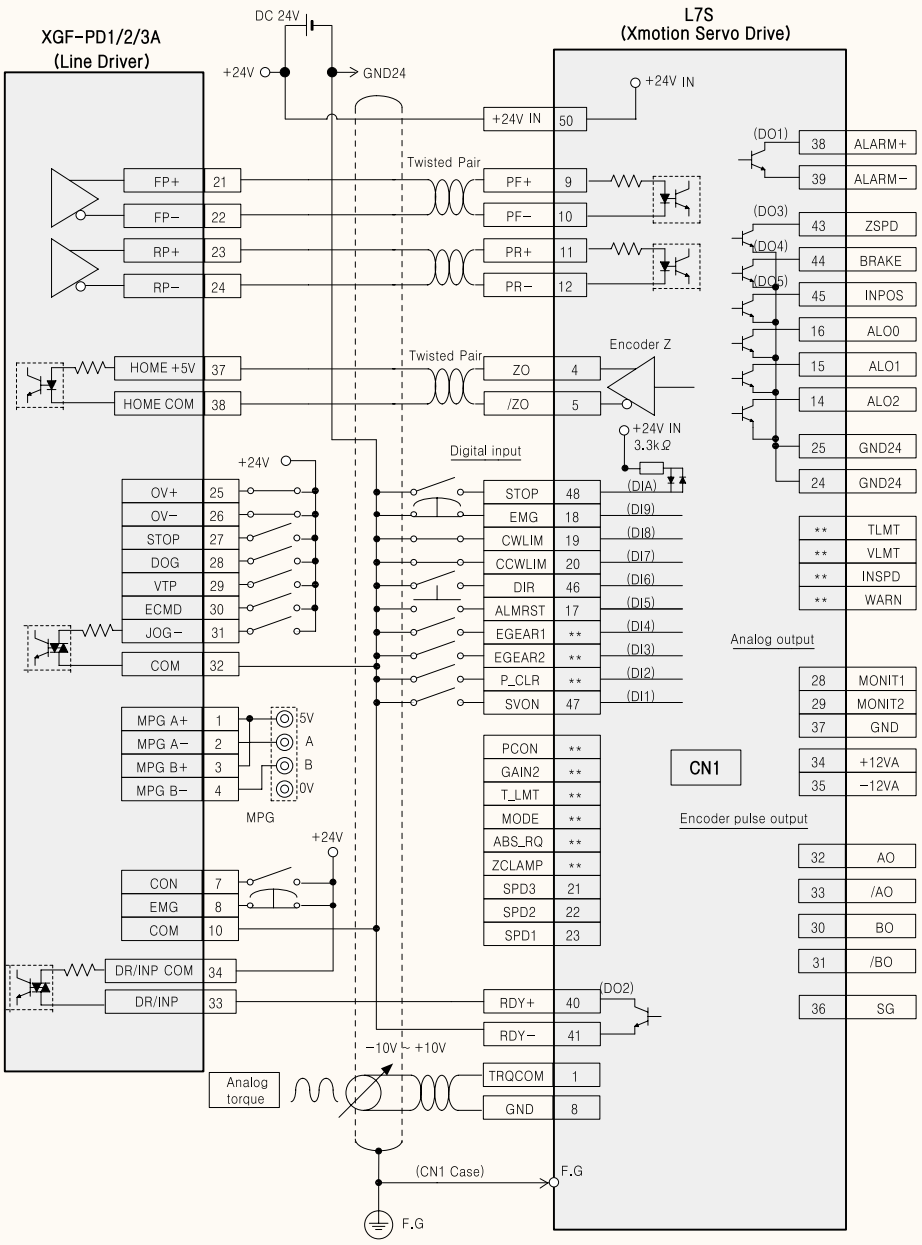
CAM Control Profile	Simulation
	

XGF-PO1/2/3A (Open Collector)



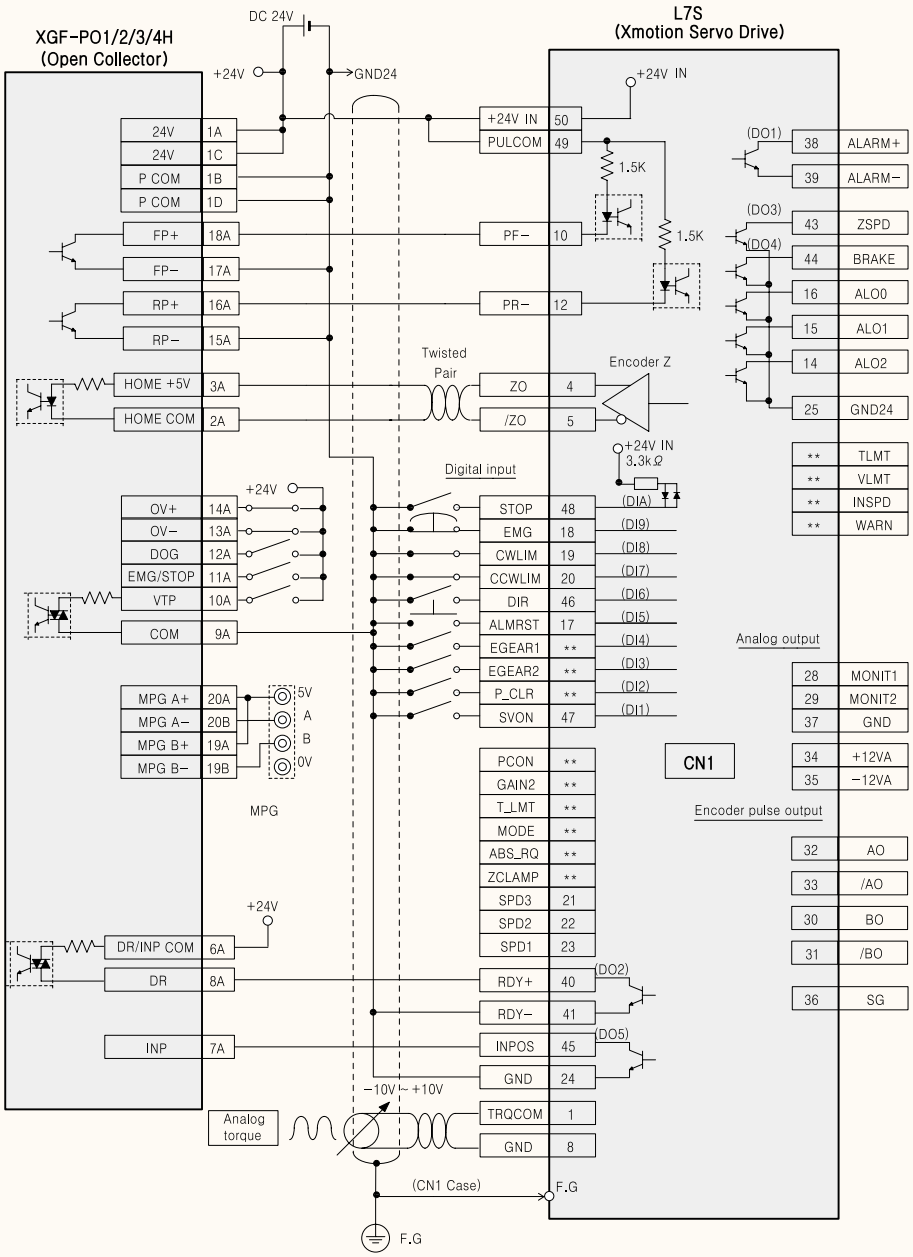
Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
Note2) These are non-allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

XGF-PD1/2/3A (Line Driver)



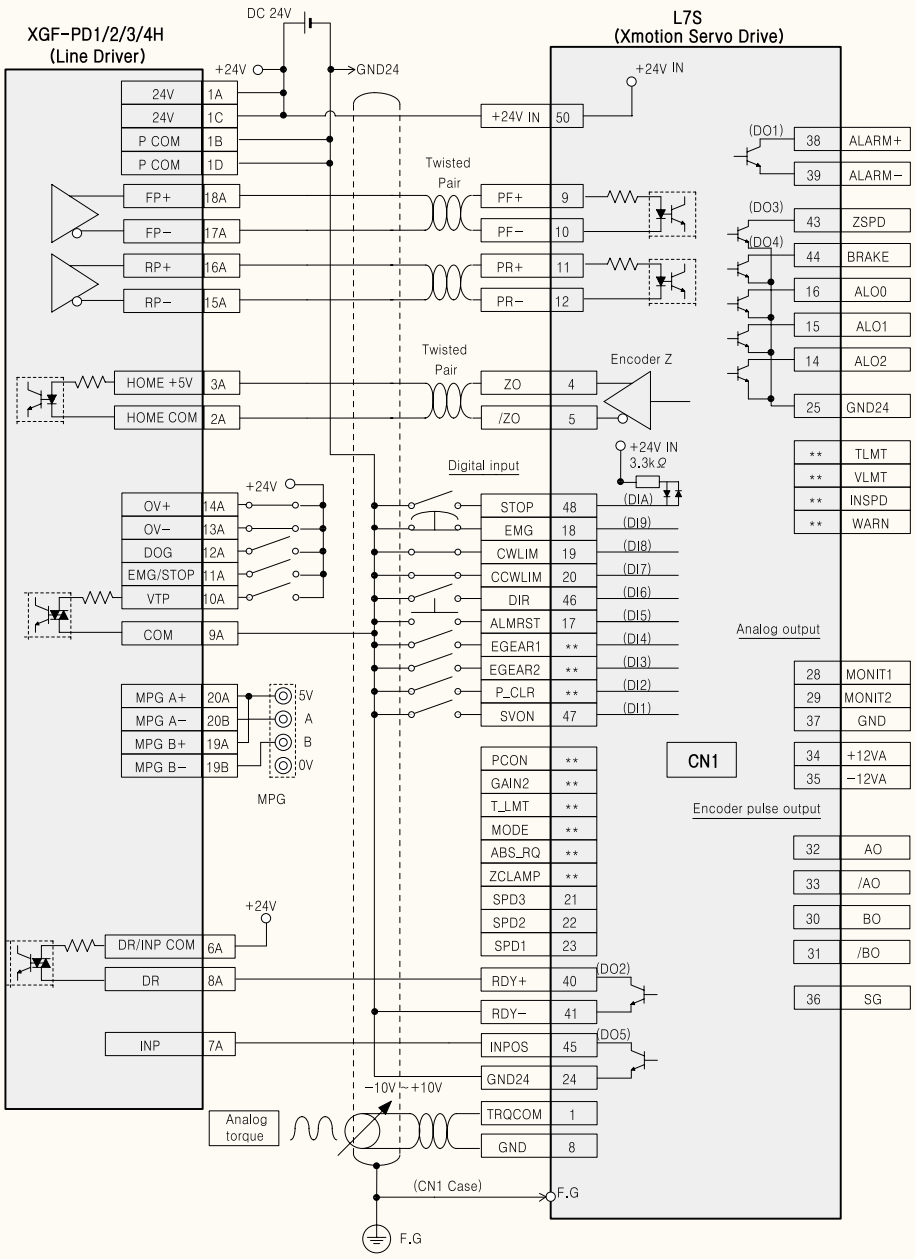
Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
Note2) These are non-allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

XGF-PO1/2/3/4H (Open Collector)



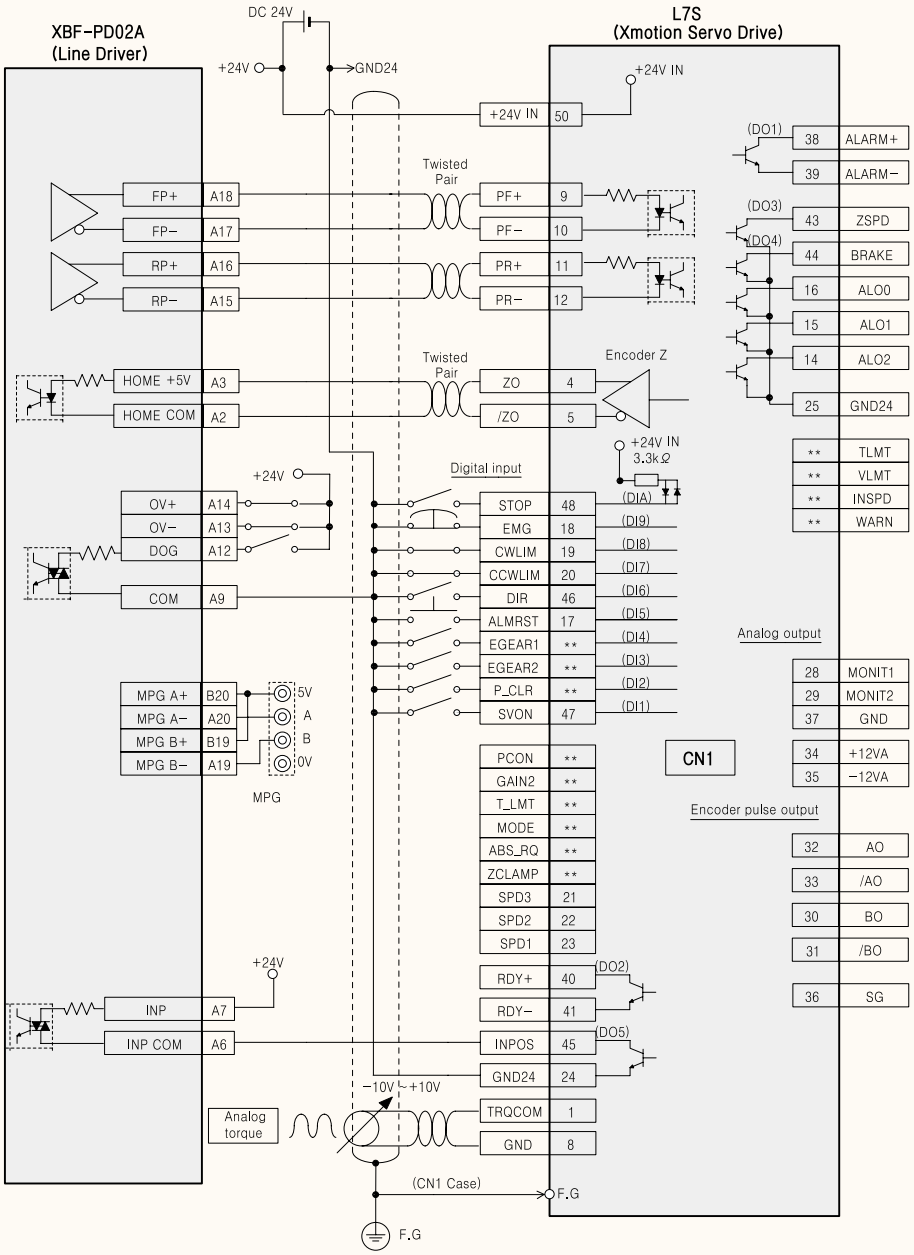
Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
Note2) These are non-allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

XGF-PD1/2/3/4H(Line Driver)



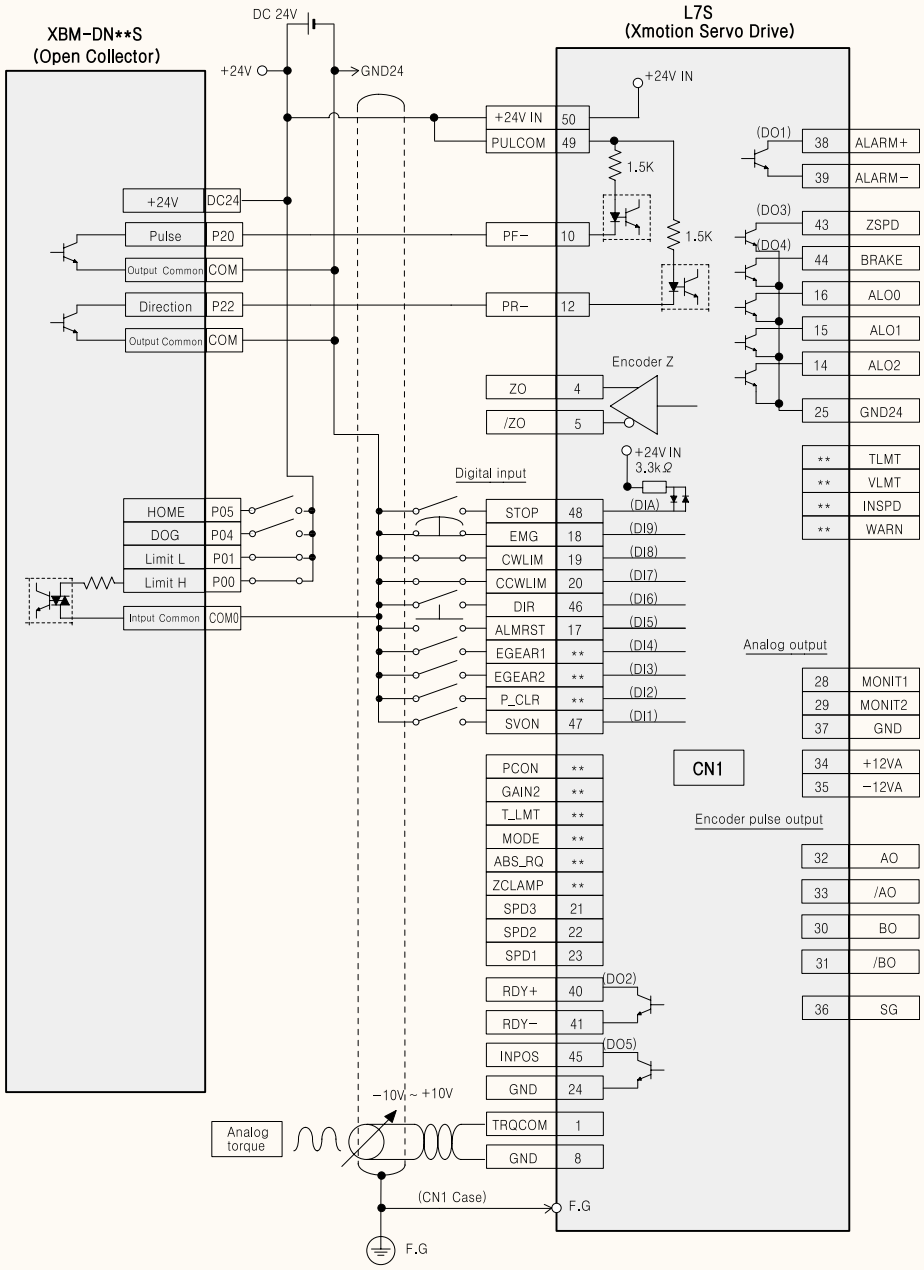
Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
Note2) These are non−allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

XBF-PD02A(Line Driver)



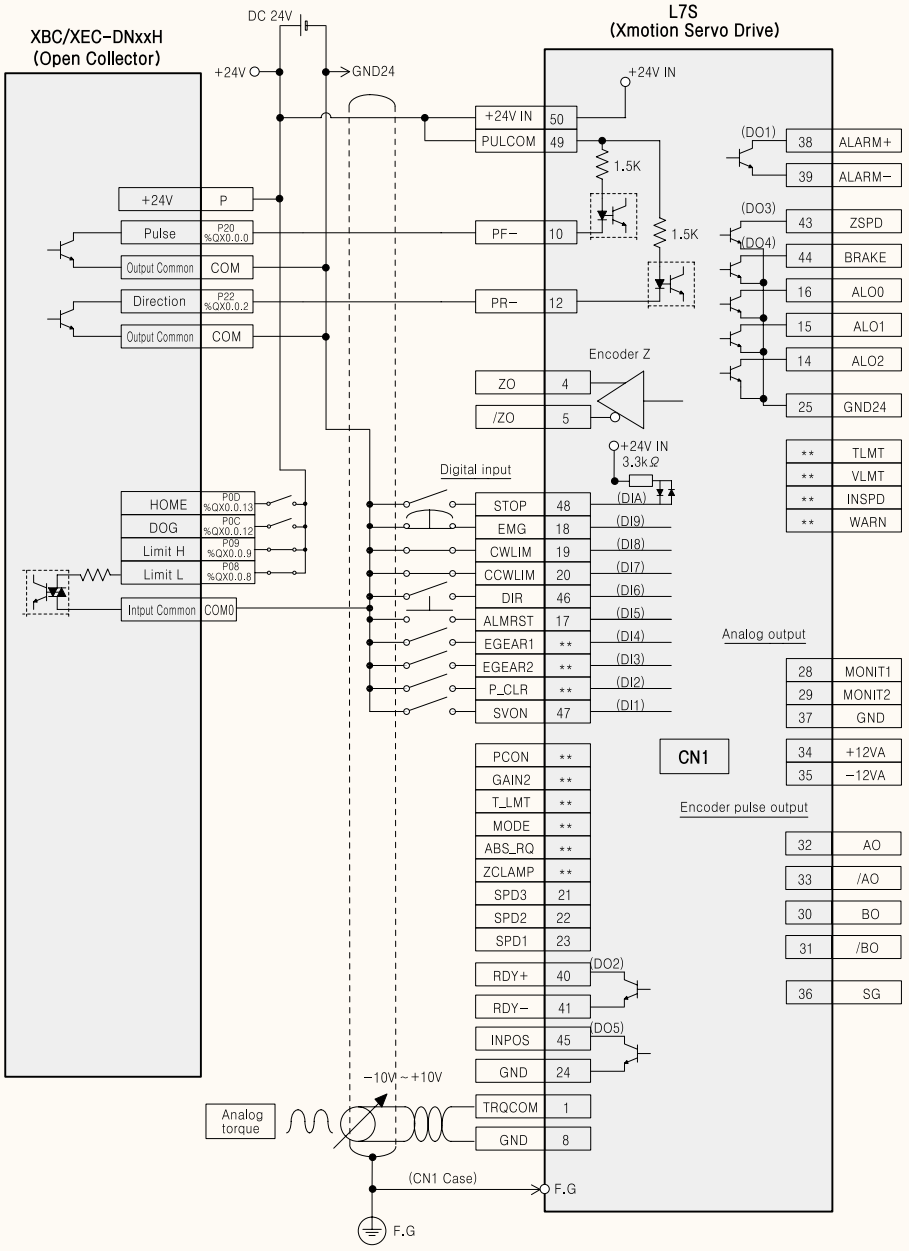
Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
Note2) These are non-allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

XBM-DN**S(Open Collector)



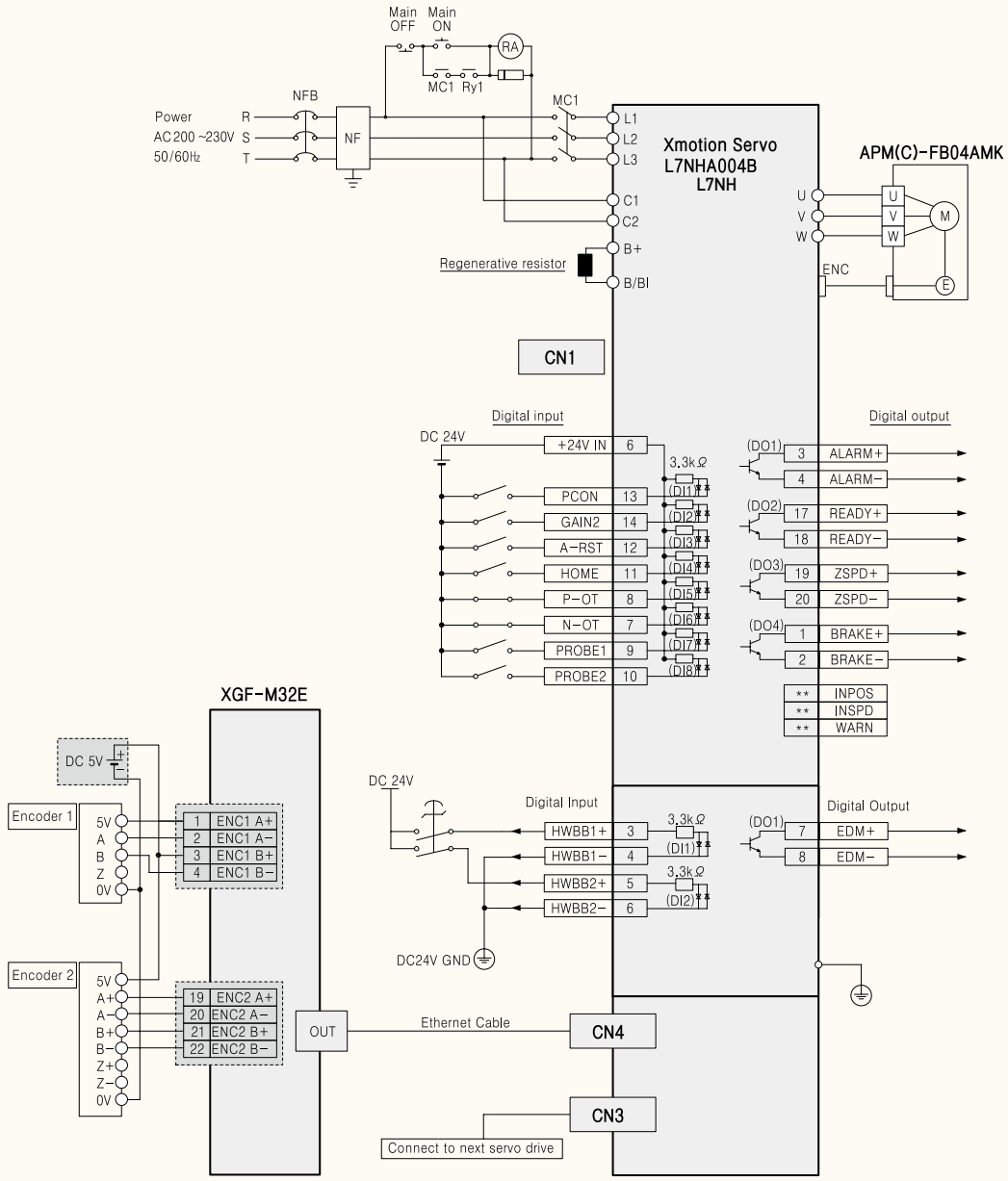
Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
Note2) These are non−allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

XBC/XEC-DN**H(Open Collector)

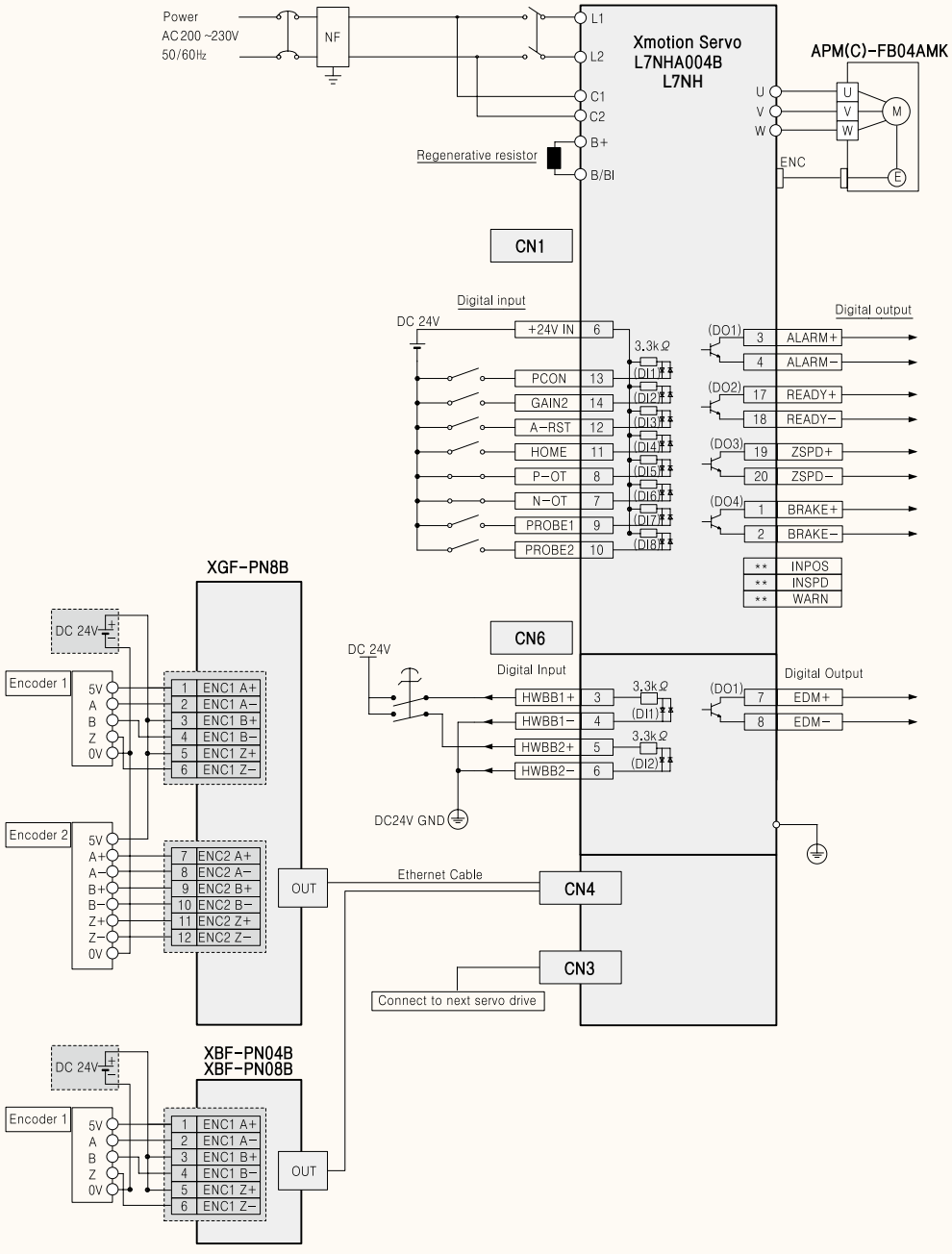


Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
Note2) These are non−allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

XGF-M32E


Main OFF
Main ON
RA
MC1 Ry1
NFB
MC1
Power
AC200~230V
50/60Hz
R
S
T
NF
L1
L2
L3
C1
C2
B+
B/BI
Regenerative resistor
Xmotion Servo
L7NHA004B
L7NH
APM(C)-FB04AMK
U
V
W
M
ENC
E
CN1
Digital input
Digital output
DC 24V
+24V IN 6
PCON 13
GAIN2 14
A-RST 12
HOME 11
P-OT 8
N-OT 7
PROBE1 9
PROBE2 10
3.3kΩ
(DI1)
(DI2)
(DI3)
(DI4)
(DI5)
(DI6)
(DI7)
(DI8)
(DO1) 3 ALARM+
4 ALARM-
(DO2) 17 READY+
18 READY-
(DO3) 19 ZSPD+
20 ZSPD-
(DO4) 1 BRAKE+
2 BRAKE-
** INPOS
** INSPD
** WARN
XGF-M32E
DC 5V
Encoder 1
5V
A
B
Z
0V
1 ENC1 A+
2 ENC1 A-
3 ENC1 B+
4 ENC1 B-
Encoder 2
5V
A+
A-
B+
B-
Z+
Z-
0V
19 ENC2 A+
20 ENC2 A-
21 ENC2 B+
22 ENC2 B-
OUT
DC 24V
Digital Input
Digital Output
HWBB1+ 3
HWBB1- 4
HWBB2+ 5
HWBB2- 6
(DO1) 7 EDM+
8 EDM-
DC24V GND
Ethernet Cable
CN4
CN3
Connect to next servo drive

XGF-PN8B


Power
AC200 ~230V
50/60㎐
NF
L1
L2
C1
C2
B+
B/BI
Regenerative resistor
Xmotion Servo
L7NHA004B
L7NH
APM(C)-FB04AMK
U
V
W
M
ENC
E
CN1
Digital input
DC 24V
+24V IN 6
3.3kΩ
PCON 13 (DI1)
GAIN2 14 (DI2)
A-RST 12 (DI3)
HOME 11 (DI4)
P-OT 8 (DI5)
N-OT 7 (DI6)
PROBE1 9 (DI7)
PROBE2 10 (DI8)
Digital output
(DO1) 3 ALARM+
4 ALARM-
(DO2) 17 READY+
18 READY-
(DO3) 19 ZSPD+
20 ZSPD-
(DO4) 1 BRAKE+
2 BRAKE-
** INPOS
** INSPD
** WARN
XGF-PN8B
DC 24V
Encoder 1
5V
A
B
Z
0V
1 ENC1 A+
2 ENC1 A-
3 ENC1 B+
4 ENC1 B-
5 ENC1 Z+
6 ENC1 Z-
Encoder 2
5V
A+
A-
B+
B-
Z+
Z-
0V
7 ENC2 A+
8 ENC2 A-
9 ENC2 B+
10 ENC2 B-
11 ENC2 Z+
12 ENC2 Z-
OUT
CN6
DC 24V
Digital Input
HWBB1+ 3
HWBB1- 4
HWBB2+ 5
HWBB2- 6
3.3kΩ
(DI1)
3.3kΩ
(DI2)
DC24V GND
Digital Output
(DO1) 7 EDM+
8 EDM-
Ethernet Cable
CN4
CN3
Connect to next servo drive
XBF-PN04B
XBF-PN08B
DC 24V
Encoder 1
5V
A
B
Z
0V
1 ENC1 A+
2 ENC1 A-
3 ENC1 B+
4 ENC1 B-
5 ENC1 Z+
6 ENC1 Z-
OUT

FUTURING SMART ENERGY

We open up a brighter future through
efficient and convenient energy solutions.

Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.
  Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

- According to The WEEE Directive, please do not discard the device with your household waste.

LS ELECTRIC

www.ls-electric.com

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2021. 09

Specifications in this catalog are subject to change without notice due to continuous product development and improvement.