

X-MOTION SERVO SYSTEM

LS



ANIRO

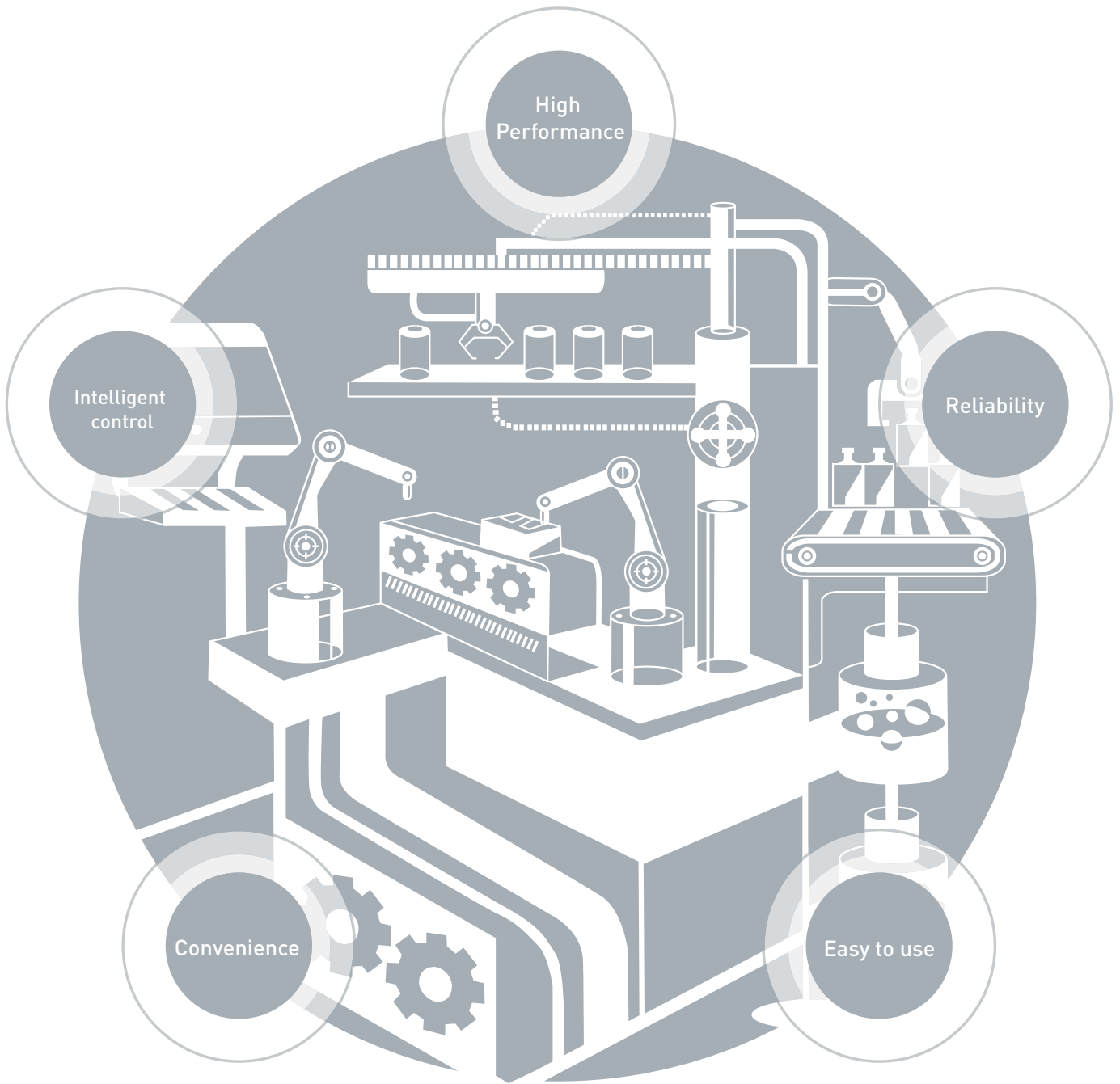
High
Performance

Intelligent
control

Reliability

Convenience

Easy to use



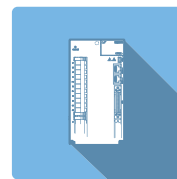
Xmotion

Servo System



Features
4 ~ 13

Features



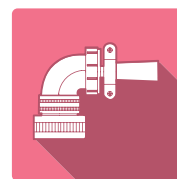
Servo Drive
14 ~ 65

Servo Drive



Servo Motor
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Servo Motor



Options and Accessories
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Options and Accessories



Application
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Application

User-oriented Xmotion Servo Systems complete your optimal solution.



Xmotion Series

Your motion systems visualize the perfect solution through 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.



It's Slim

Compact size with high capacity

Capacity	400W (44% Down Size)			1kW (46% Down Size)			3.5kW (62% Down Size)		
	L7	VS	Competitor	L7	VS	Competitor	L7	VS	Competitor
L [mm]	38	80	40	58	88	60	88	137	90
W [mm]	169	187	168	169	210	168	169	256	168
H [mm]	173	132	170	198	195	195	198	225	195

38 mm

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



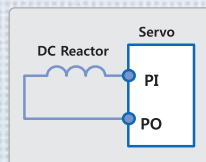
Reliability

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 (II)

- 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

52%

Compared with VS Drive
Max 52% Slim



1kW



3.5kW

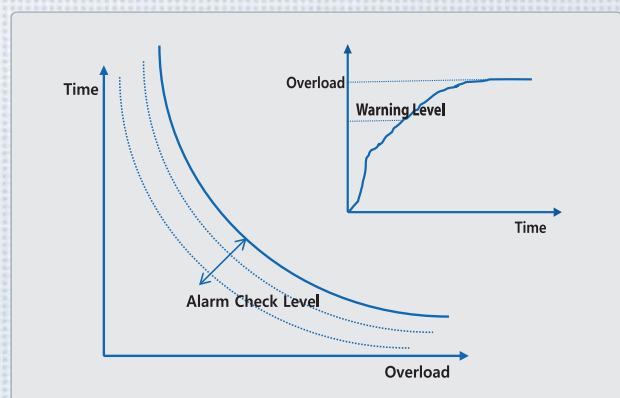
5%

Compared with competitor's Drive
Max 5% Slim

Upgraded protection function (III)

- 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 certificated



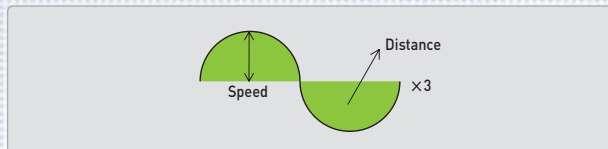
Easy to USE

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 (15 encoder wires → 7 encoder wires) and anti-external noise

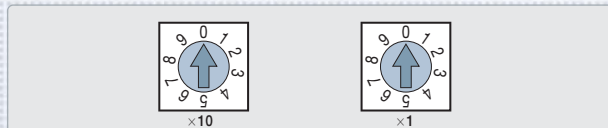


Sufficient input/output contacts and various functions

- L7S: Digital input contacts: 10, output contacts: 8 / Analog input contacts: 2 and output contacts: 2
- L7NH: Digital input contacts: 8, output contacts: 4 / Analog input contacts: 1 and output contacts: 2
- 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 [L7NH, L7P, and PEGASUS]

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



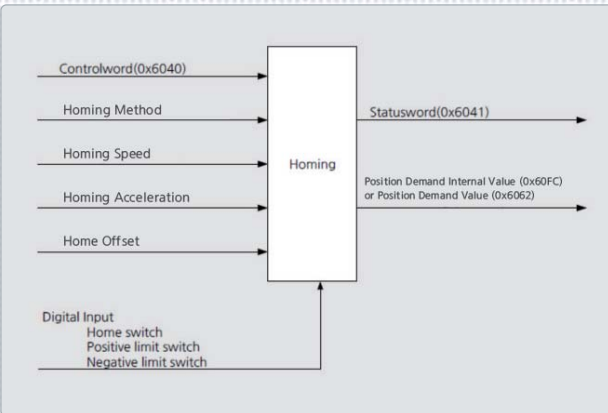
Plug-in type power connector

- Expanded to 100 W - 3.5 kW for improved wiring convenience



Various homing functions [L7NH, L7P, and PEGASUS]

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



Easy firmware upgrade [L7NH, L7P, and PEGASUS]

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



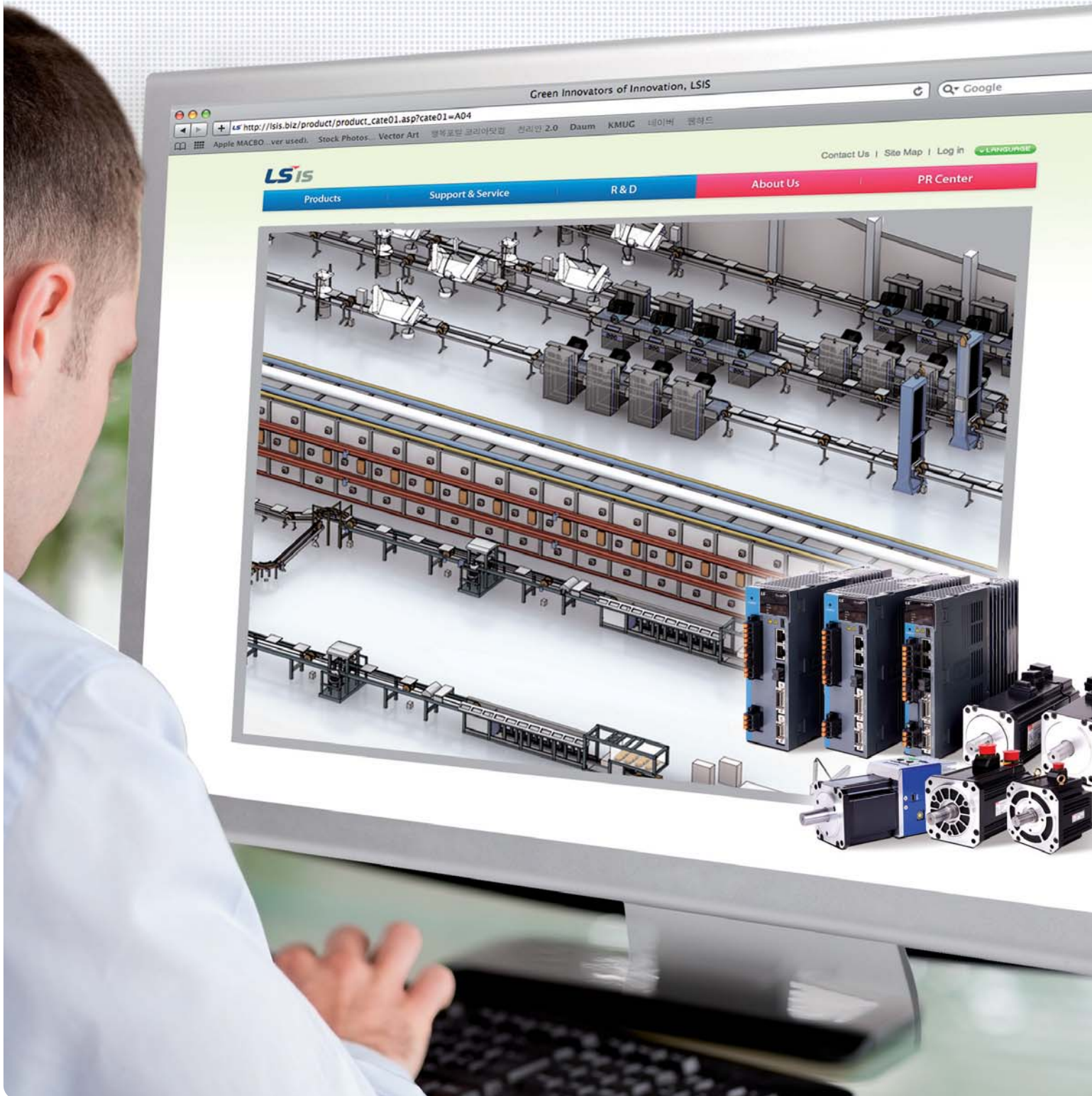
Built-in regenerative braking resistance in the drive

- Drive installed inside to improve user convenience (100 W - 3.5 kW)
- Providing the connection for external installation
- Enhanced protection algorithm



Features

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 [L7NH, L7P, and PEGASUS]

- FPU (Floating Point Unit) for reliable precision calculation
- Maximum 16kHz switching frequency for precision current control
- 32 bit operation for increased synchronous command processing rate (MIPS)

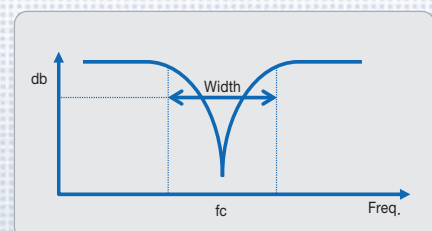
Dedicated PC program

- L7S : LIVE-I.C.E / L7NH, L7P, and PEGASUS: 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

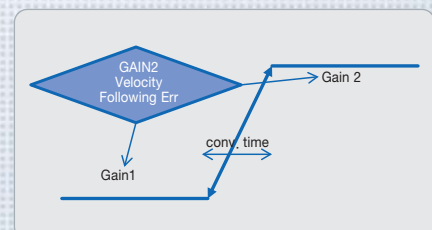
Notch filter for resonance suppression

- 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

Open Network

- Over 1600 worldwide members

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

- 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

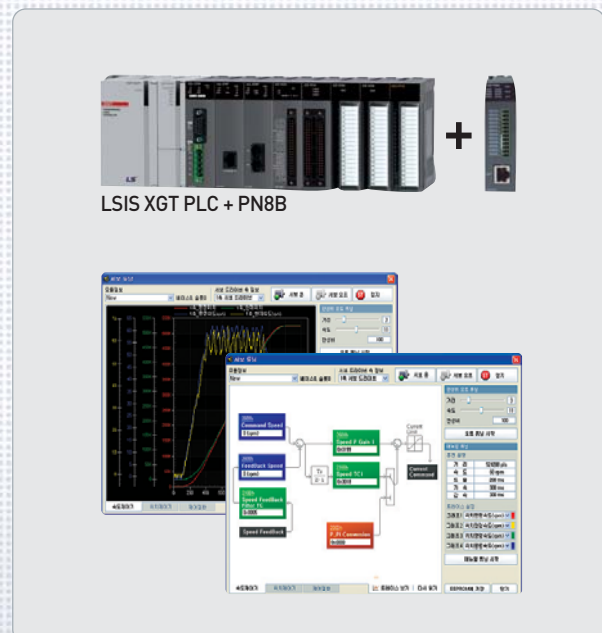
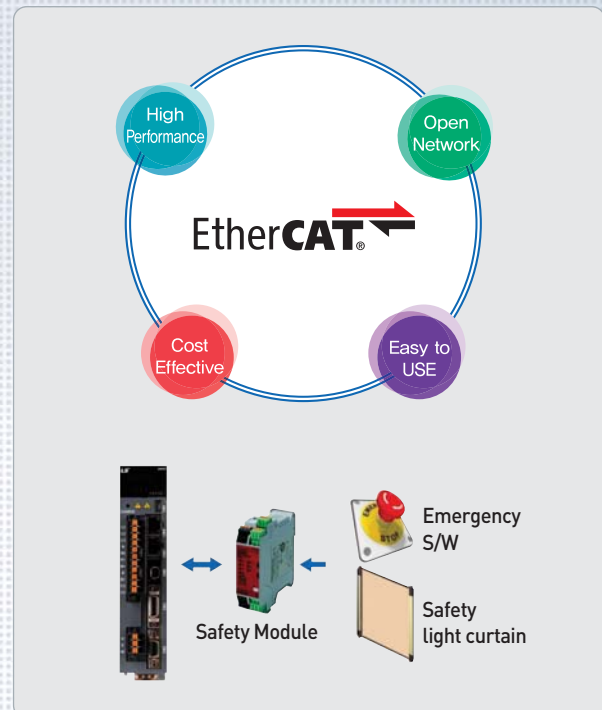
- Touch probe function(PROBE1, PROBE2)

Adjustment function linked with XGT series from LSIS

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

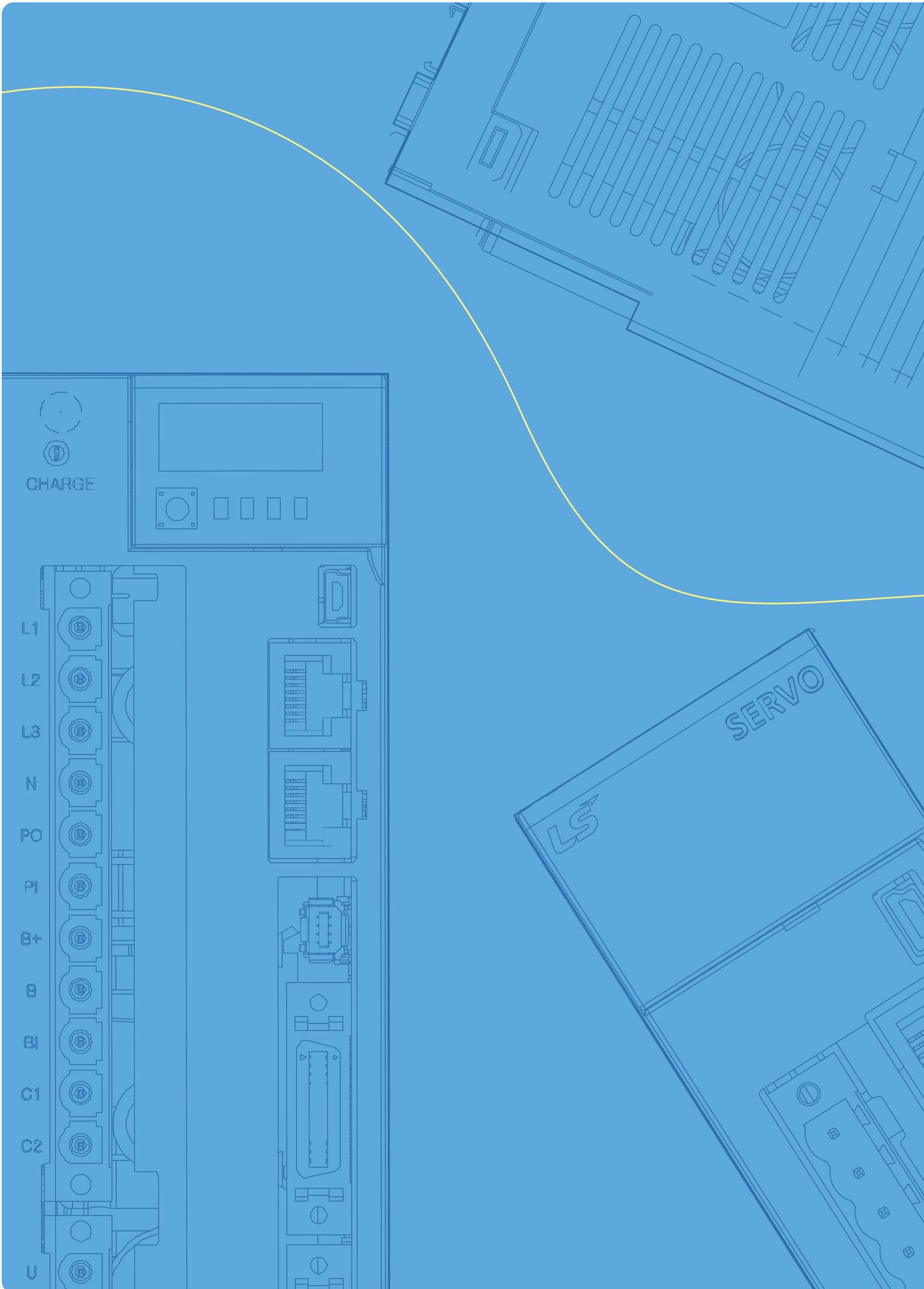
Have conformity of EtherCAT device

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



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

L1

L2

L3

N

PO

PI

B+

B

BI

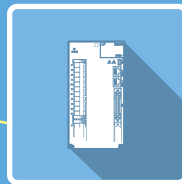
C1

C2

U

SERVO

LS



Servo Drive

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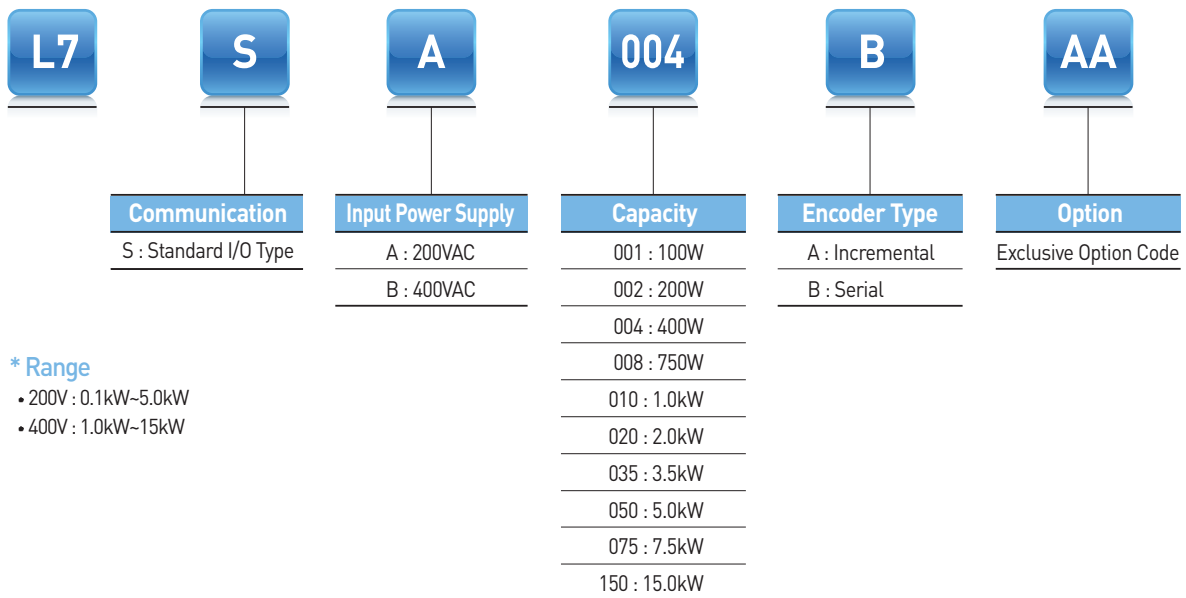
PHOX Series

Low Voltage DC Drive Type ----- 60

L7S Series



Servo Drive Designation



*** Range**

- 200V : 0.1kW-5.0kW
- 400V : 1.0kW-15kW

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]

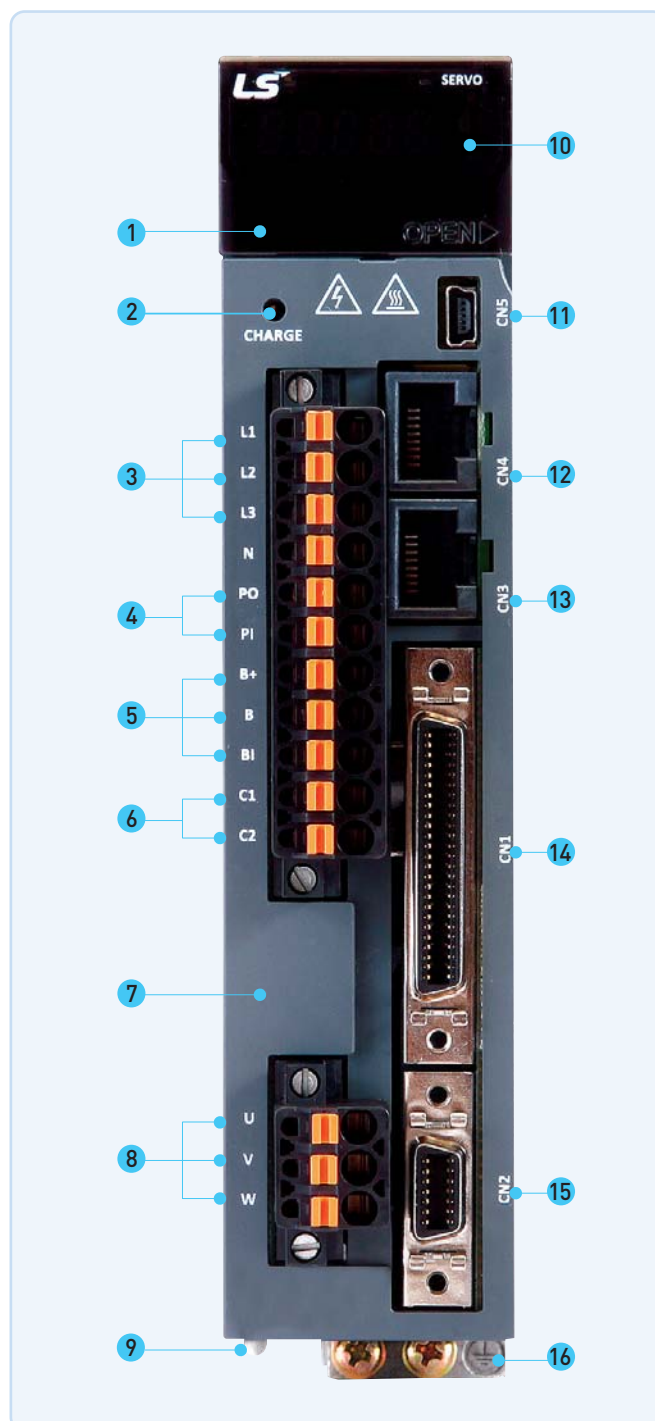
Reliability for Protection Function

- 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	6.75	13.5	16.7	32	39.4	76	
Peak Current[A]			4.2	5.1	9.0	15.6	20.25	40.5	50.1	96	98.5	190	
Encoder Type		Quad. Type Incremental Line Driver 2,000~10,000[P/R] Serial Type 18Bit(100WC M8 only), 19bit, 20bit(DD motor only)											
Control Performance	Speed Control	Speed Control Range	Maximum 1: 5000										
		Frequency Response	Maximum 1 [kHz] or above (When using 19bit Serial Encoder)										
		Speed Command	DC -10 [V]~+10 [V] (Reverse rotation in case of negative voltage)										
		Accel/Decel Time	Straight or S-curve acceleration/deceleration (0-10,000 [ms], possible to be set by one [ms] unit)										
		Speed Variation Ratio	±0.01 [%] or lower [when load changes between 0 and 100%] ±0.1[%] or lower [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	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	Both default built-in and 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.											

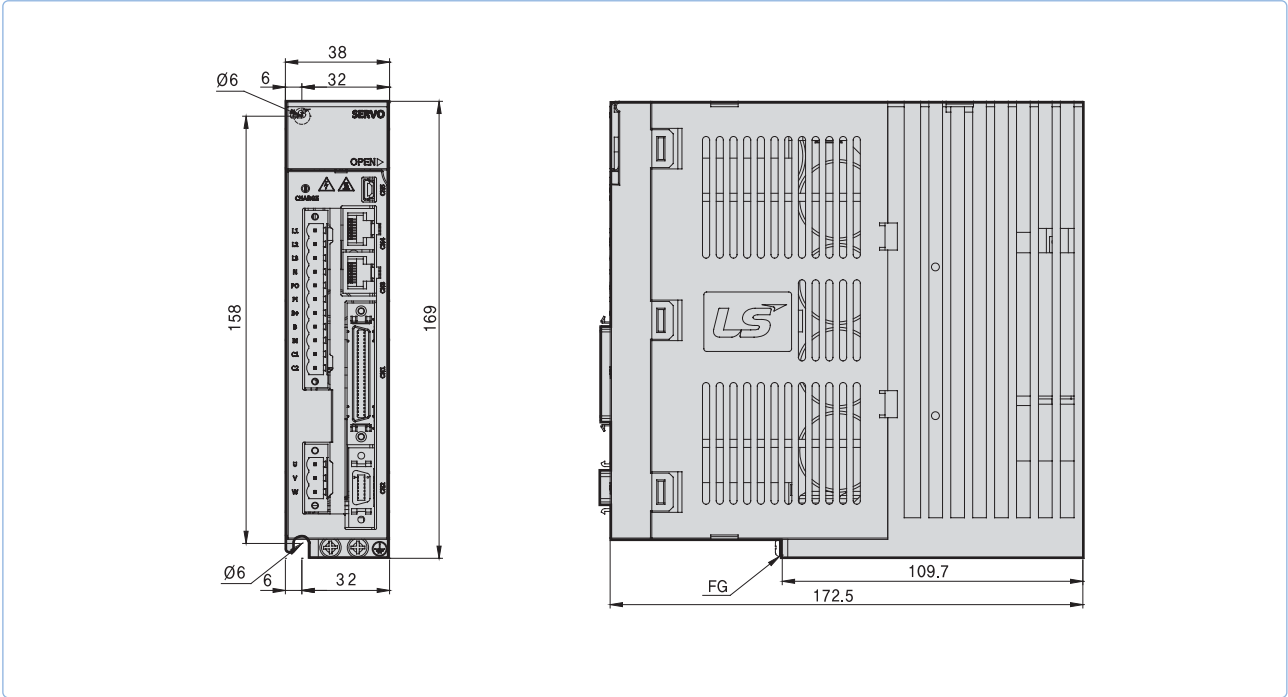
* L7SA075, L7SA150의 경우, Incremental type 지원 안됨

L7SB Drive

Item		Type Name	L7SB010B	XDL-L7SB020B	XDL-L7SB035B	XDL-L7SB050B	XDL-L7SB075B	XDL-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	10.1	17.5	22.8	39	
Peak Current[A]			11.1	24	30.3	52.5	57	97.5	
Encoder Type		Serial 17bit, 19bit, 21bit							
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 0 ~ 10[V]						
		Resolution	12[bit]						
	Analog Output	Output Range	DC 0 ~ 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							
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.							

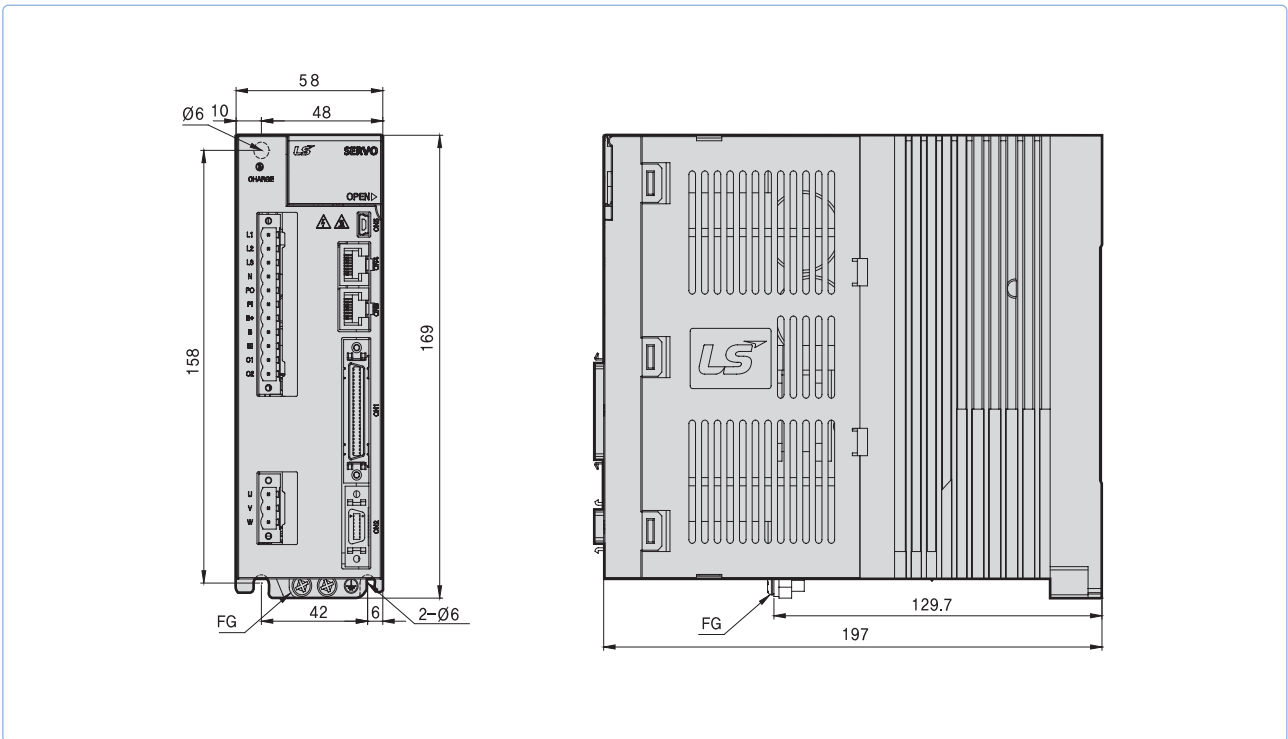
L7SA001□ ~ L7SA004□ [Weight 1.2kg]

*Unit [mm]



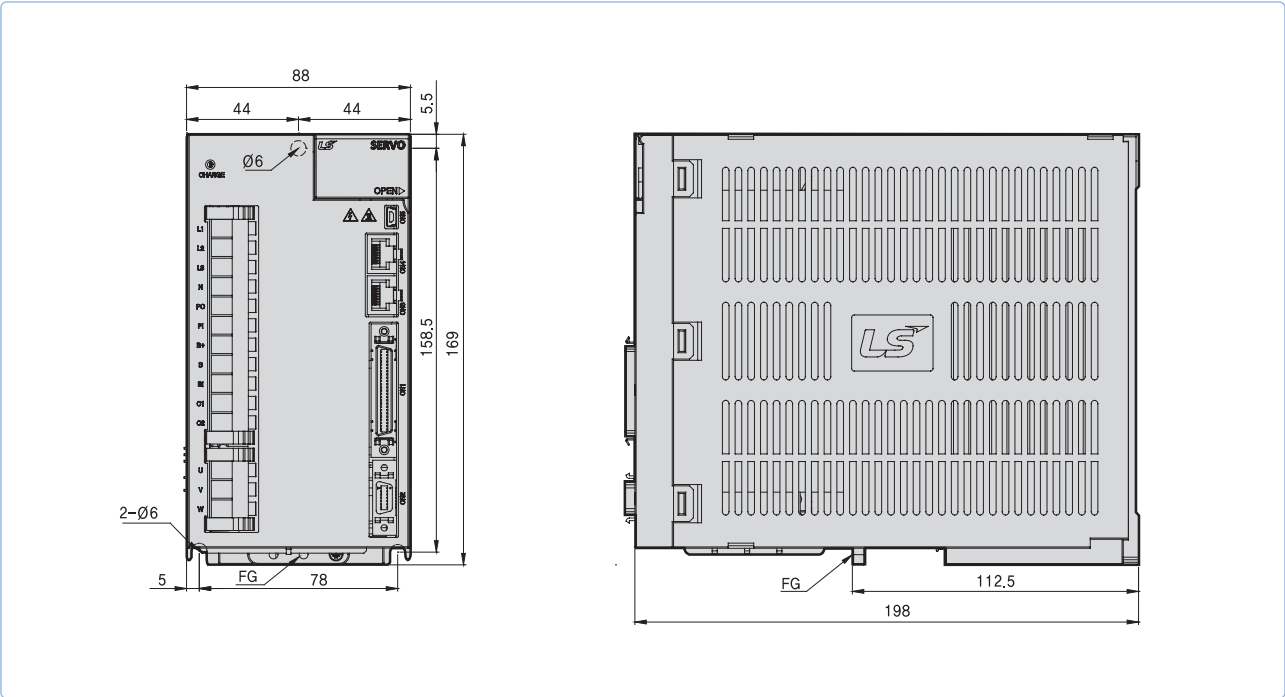
L7SA008□ ~ L7SA010□ [Weight : 1.5kg(Fan-Cooling included)]

*Unit [mm]



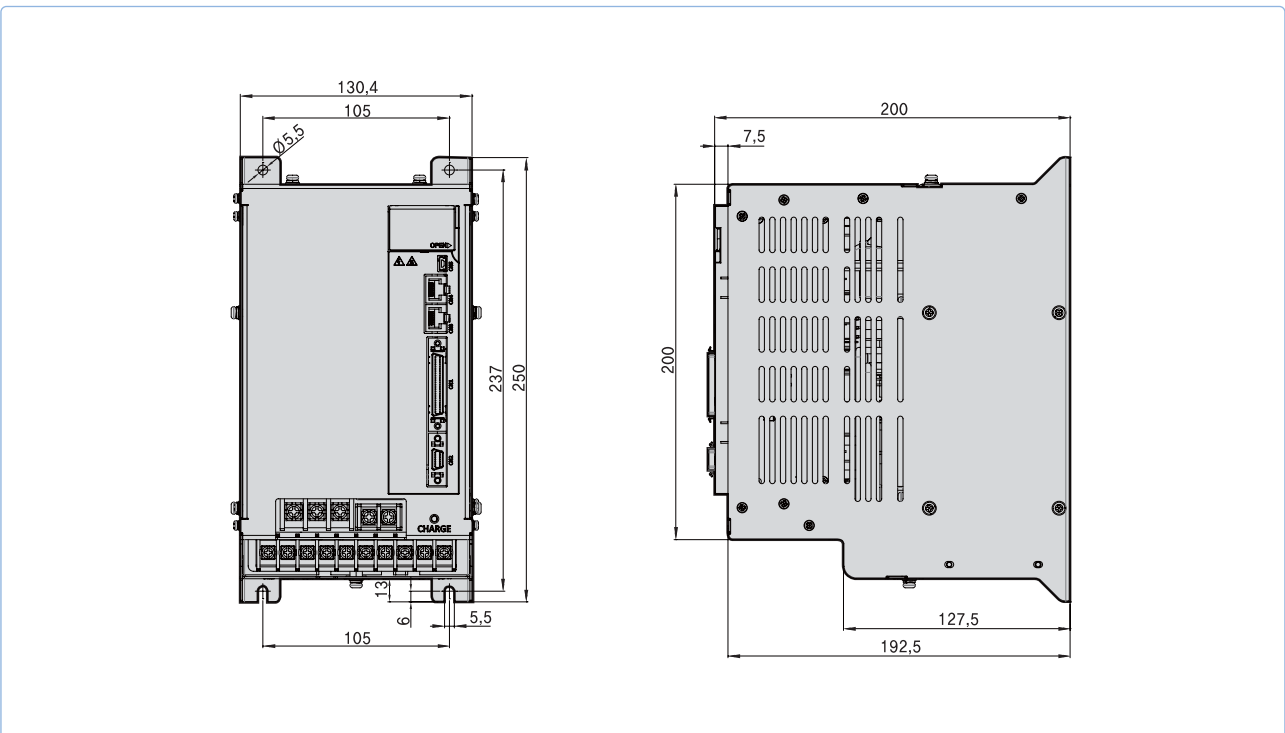
L7SA020 □ ~ L7SA035 □ [Weight : 2.5kg(Fan-Cooling included)]

*Unit [mm]



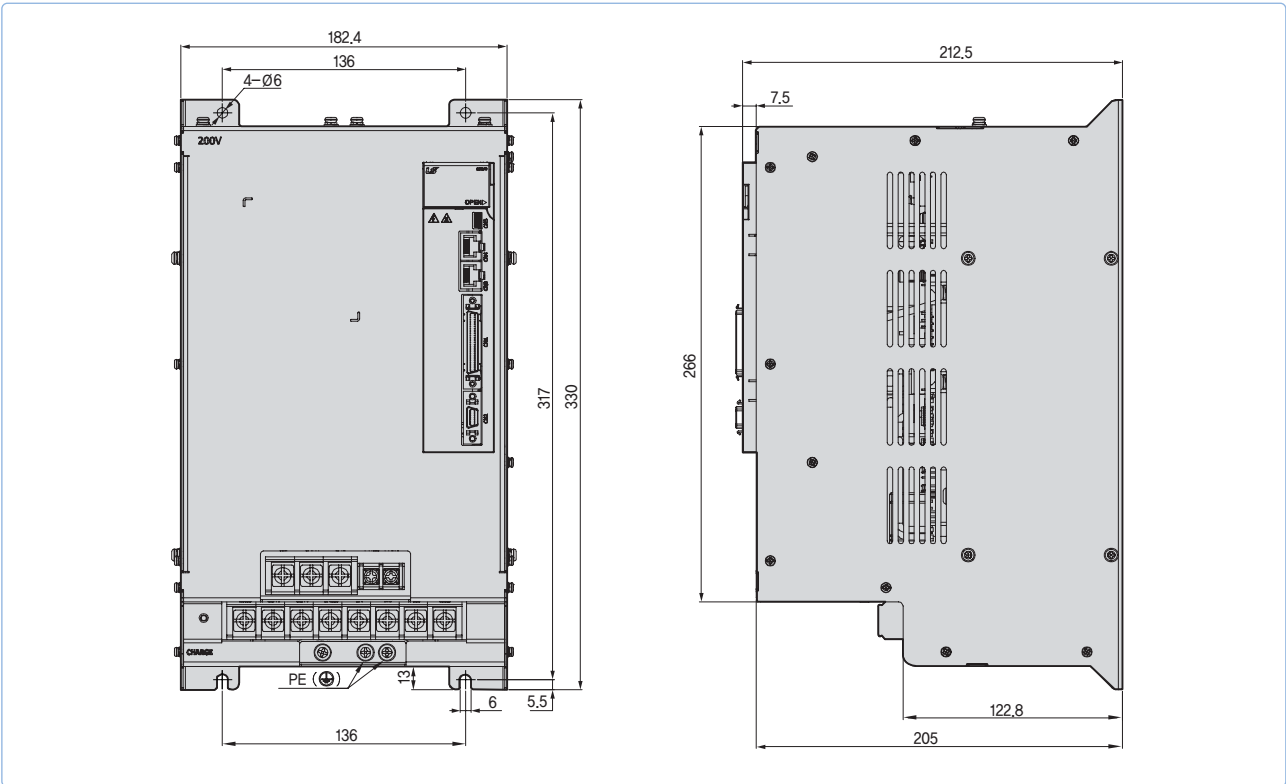
L7SA050 □ [Weight : 5.5kg(Fan-Cooling included)]

*Unit [mm]



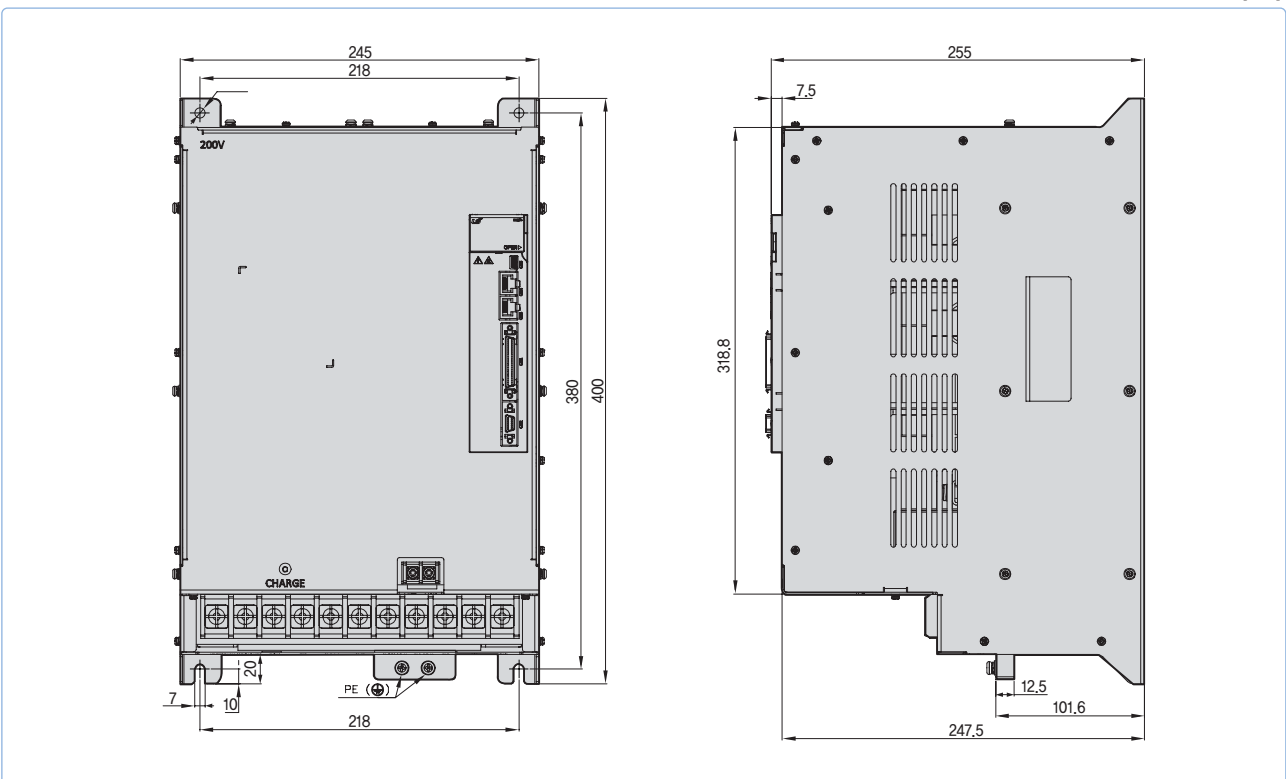
L7SA075B [Weight : 8.5kg(Fan-Cooling included)]

*Unit [mm]



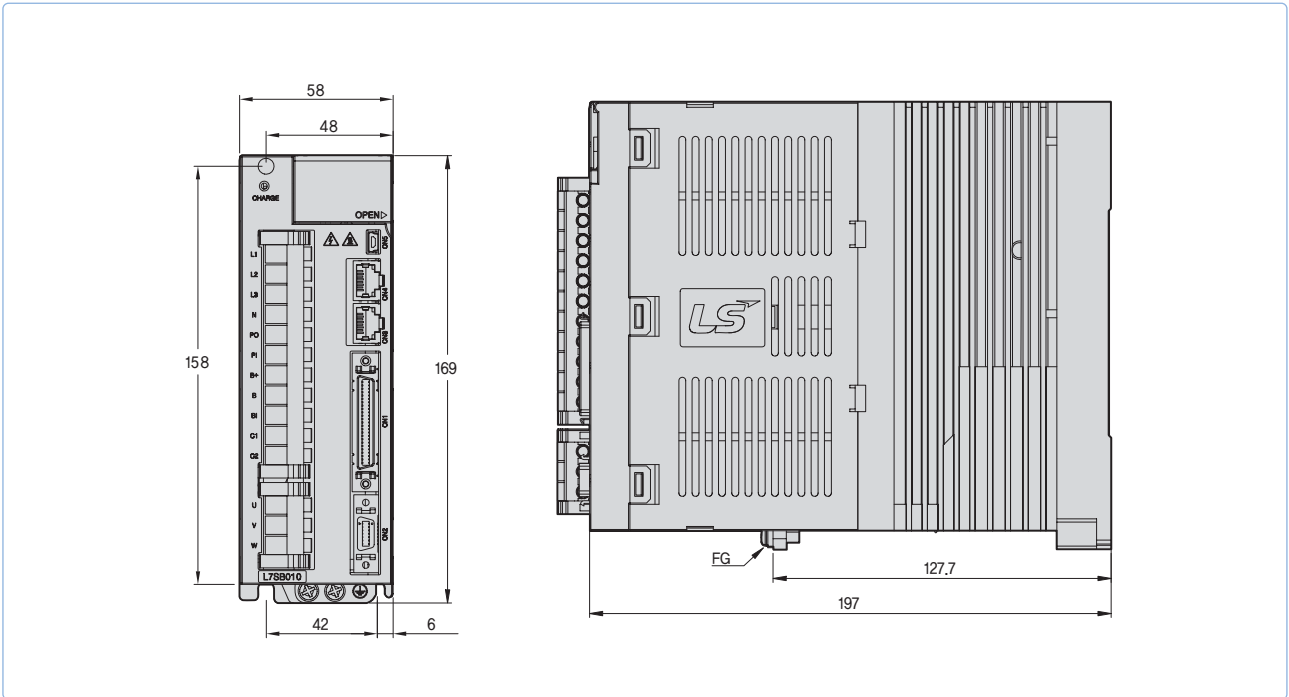
L7SA150B [Weight : 16.2kg(Fan-Cooling included)]

*Unit [mm]



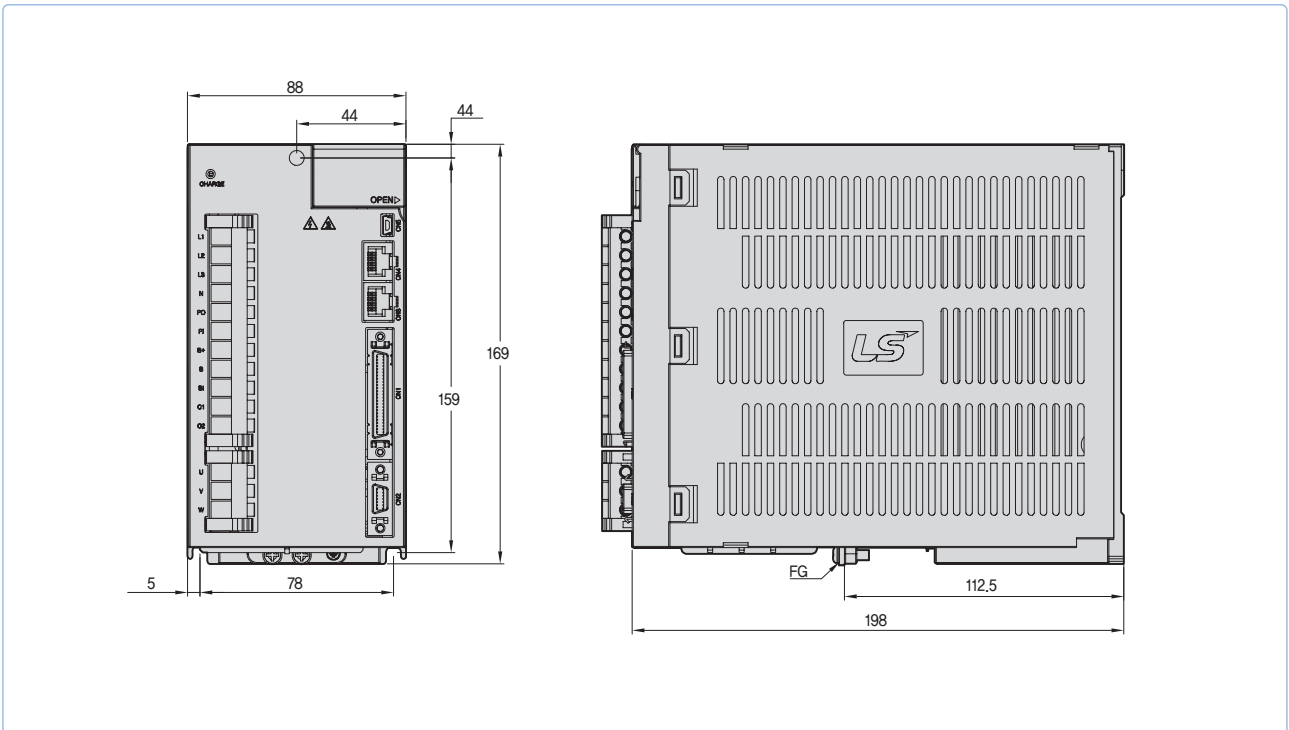
L7SB010B [Weight : 1.5kg(Fan-Cooling included)]

*Unit [mm]



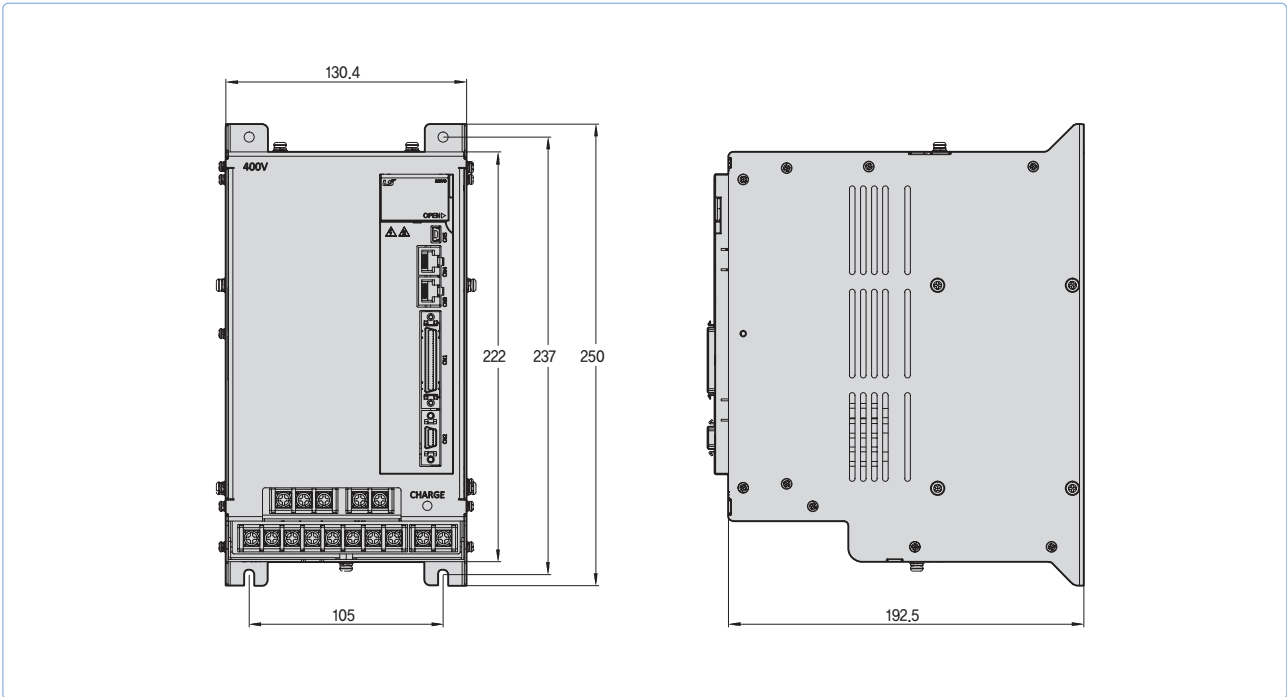
L7SB020B / L7SB035B [Weight : 2.5kg(Fan-Cooling included)]

*Unit [mm]



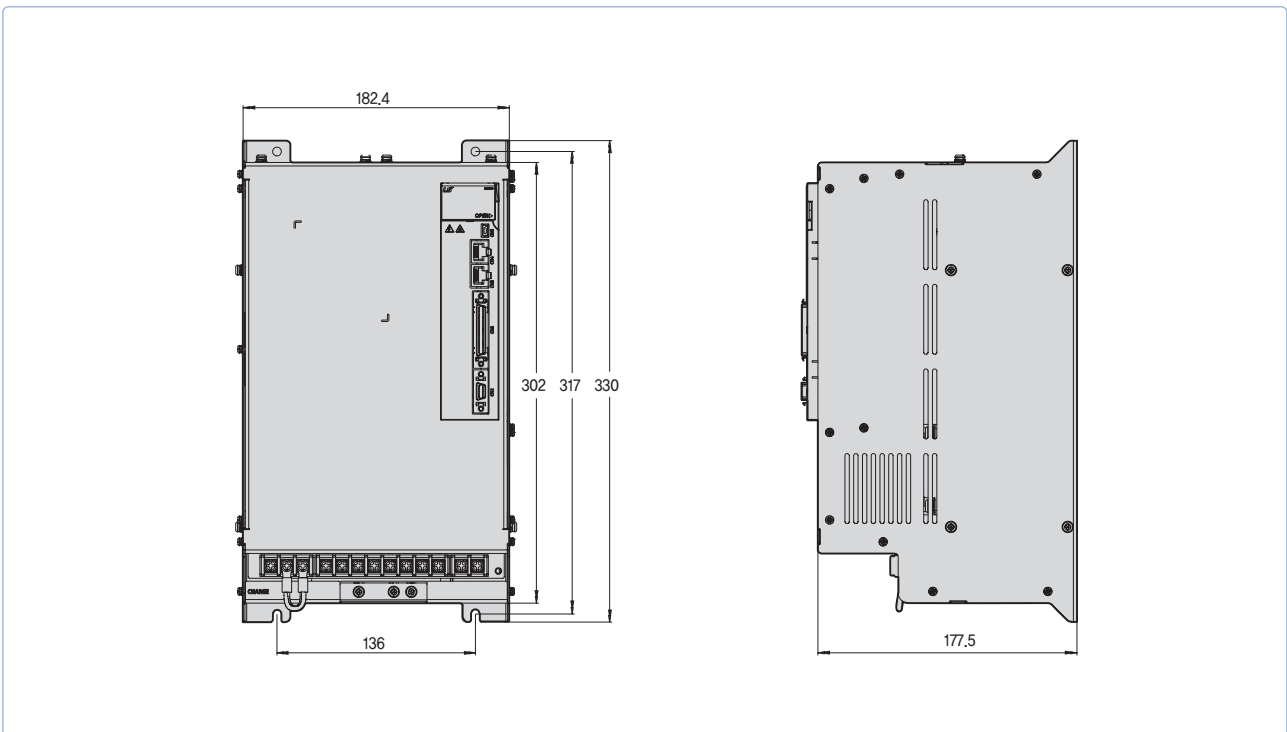
L7SB050B [Weight : 5.5kg(Fan-Cooling included)]

*Unit [mm]



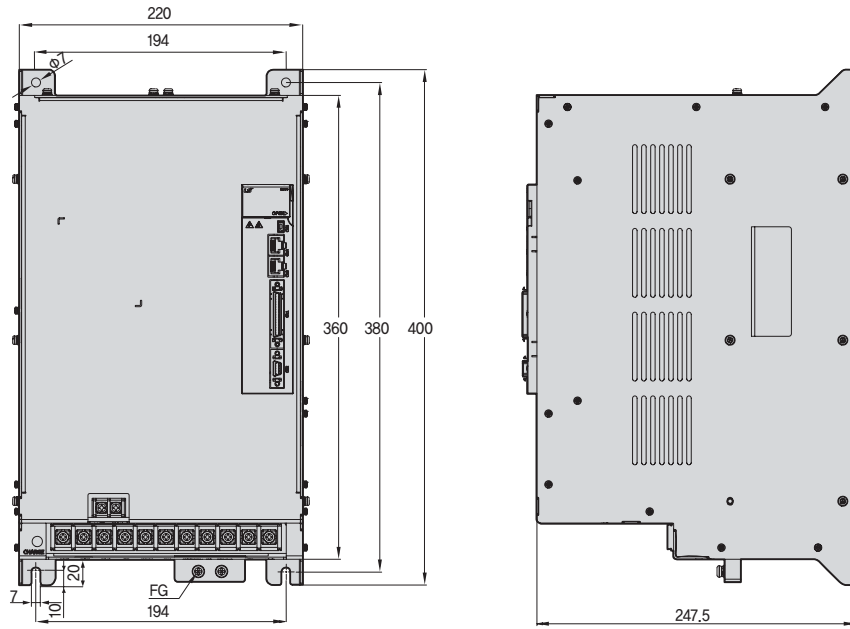
L7SB075B [Weight : 8.5kg(Fan-Cooling included)]

*Unit [mm]



L7SB150B [Weight : 15.5kg(Fan-Cooling included)]

*Unit [mm]



L7NH Series



Servo Drive Designation

L7	NH	A	004	U	AA
	Communication	Input Power Supply	Capacity	Encoder Type	Option
	Network / All-in-One Type	A:200VAC B:400VAC	001:100W 002:200W 004:400W 008:750W 010:1.0kW 020:2.0kW 035:3.5kW 050:5.0kW 075:7.5kW 110:11kW 150:15kW	U:Universal	Exclusive Option Code

*** Range**

- 200V : 0.1kW~3.5kW
- 400V : 1.0kW~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($\approx 1\text{kHz}$) Frequency

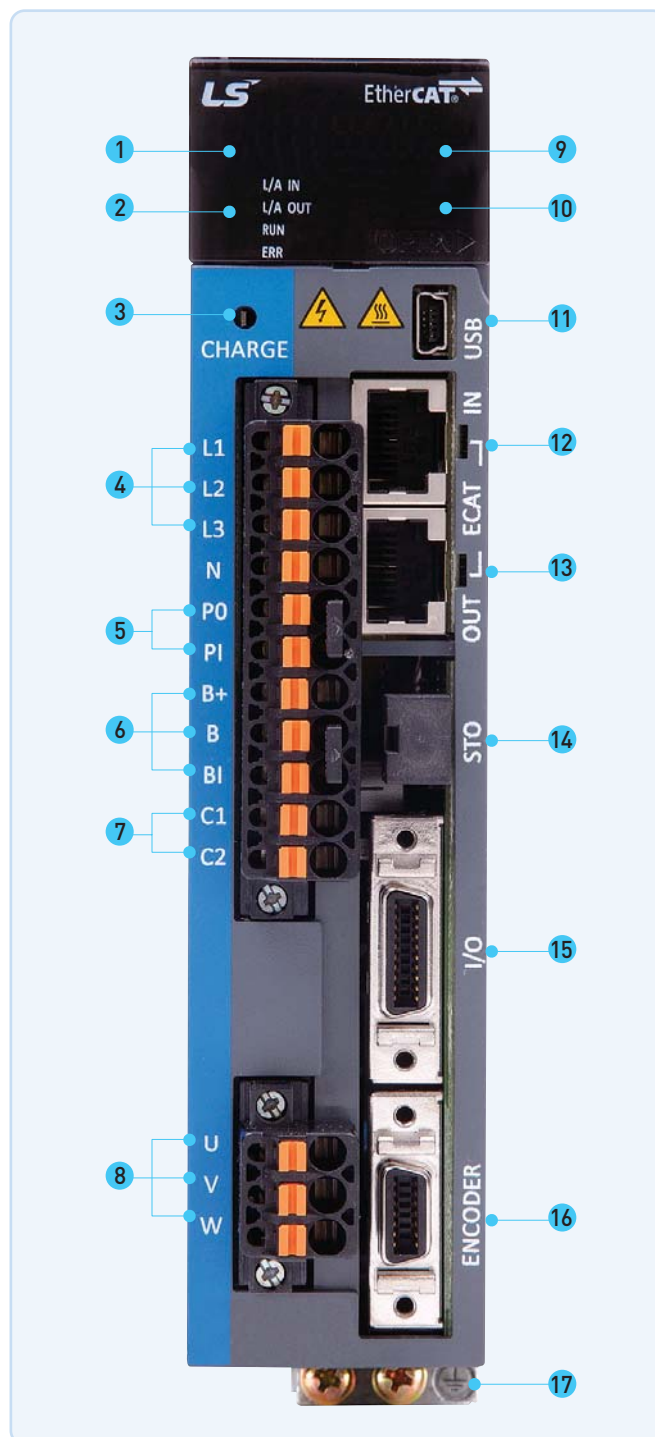
Support various motor and Encoder drive

- Supporting Rotary, DD and Motor drive (supporting 3rd 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 (PO, 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 / Output signal /Connector
- 16 Encoder Connector (ENCODER)
- 17 Ground Terminal



L7NHA Drive

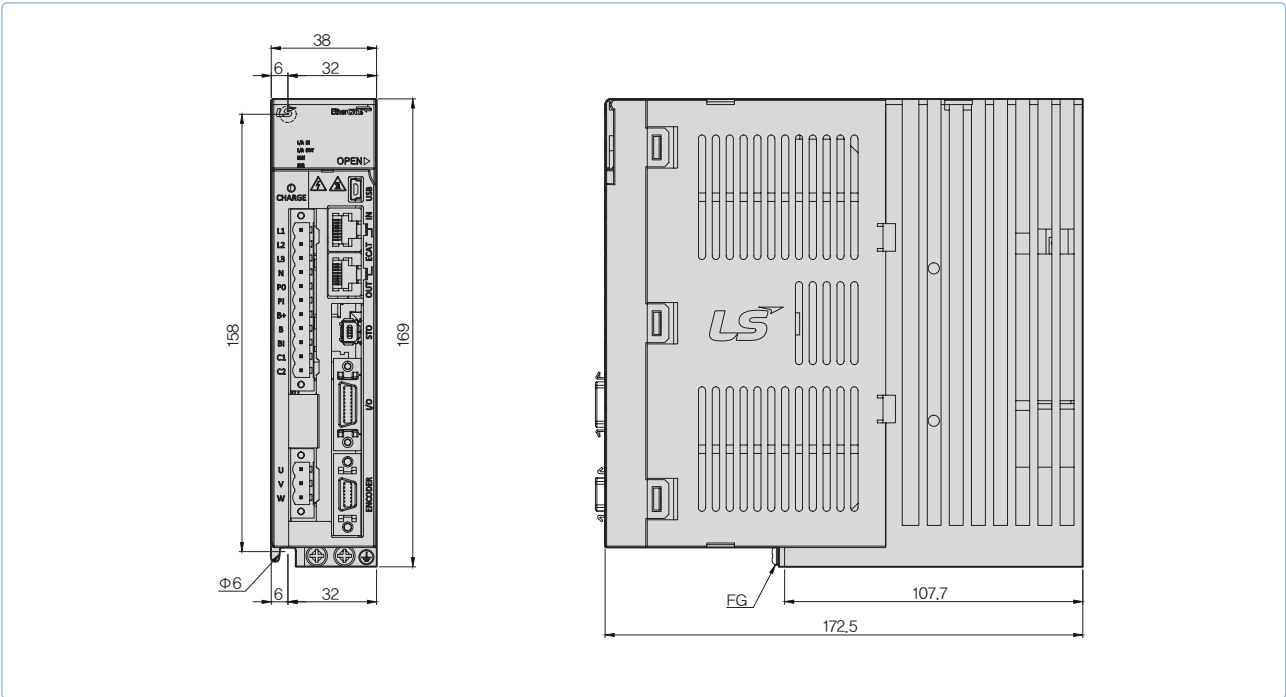
Item		Type Name	L7NHA001U	L7NHA002U	L7NHA004U	L7NHA008U	L7NHA010U	L7NHA020U	L7NHA035U	L7NHA050U	L7NHA075U	L7NHA150U
Input Power	Main Power Supply	3 Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]										
	Control Power Supply	Single Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]										
Rated Current[A]		1.4	1.7	3.0	5.2	6.75	13.5	16.7	32	39.4	76	
Peak Current[A]		4.2	5.1	9.0	15.6	20.25	40.5	50.1	90.88	98.5	190	
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 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	10.1	17.5	22.8	39
Peak Current[A]			11.1	24	30.3	47.25	57	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.						

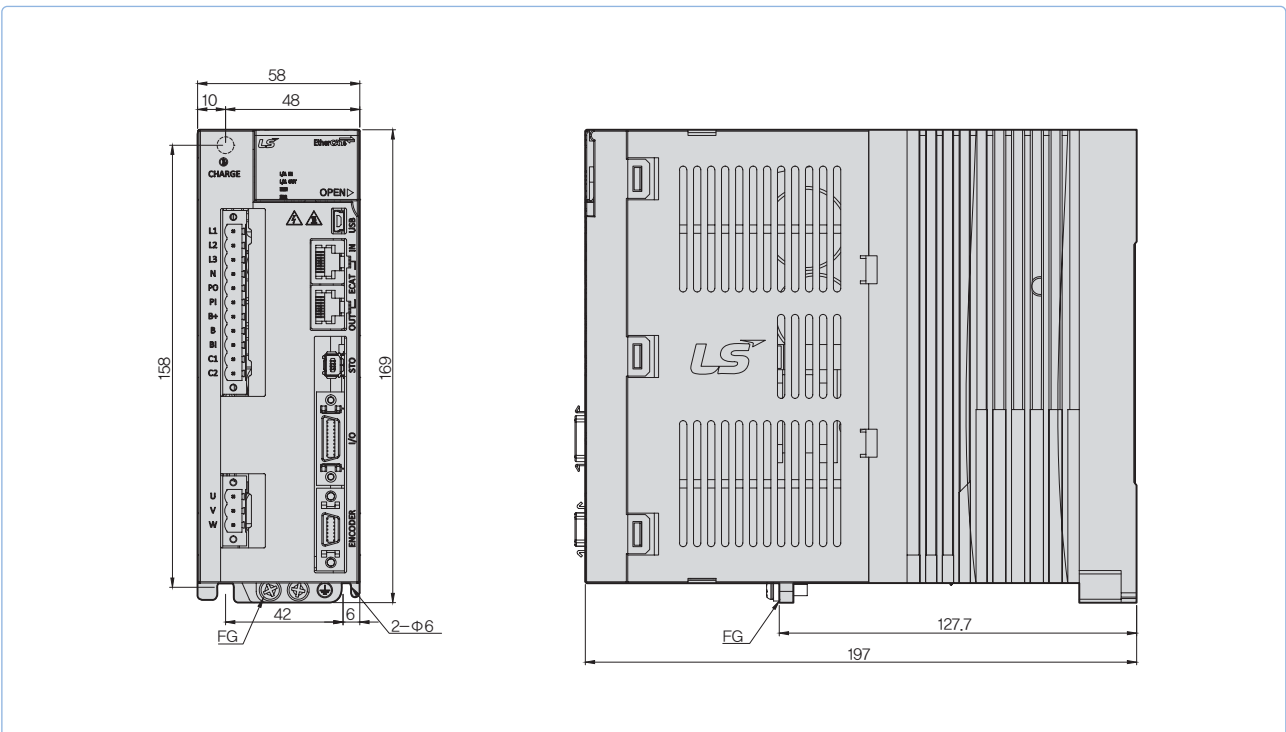
L7NHA001U ~ L7NHA004U [Weight : 1.0kg]

*Unit [mm]



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

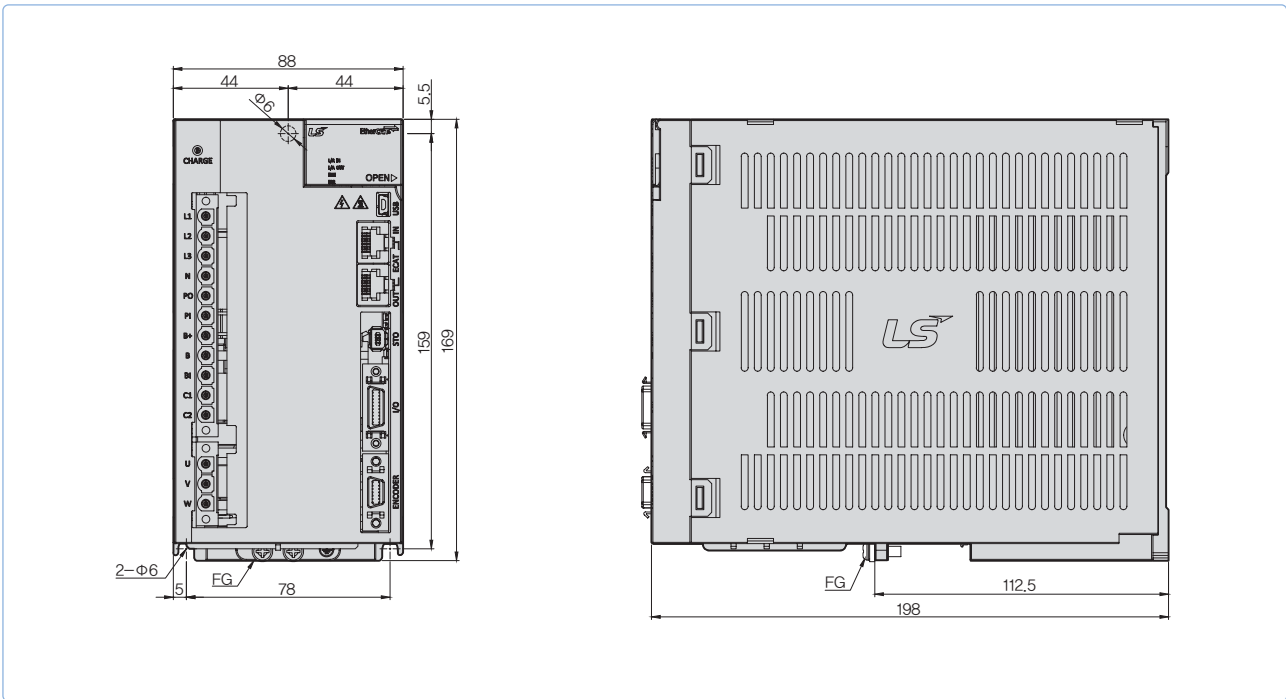
*Unit [mm]



External Dimensions

L7NHA020U / L7NHA035U [Weight : 2.5kg (Fan-Cooling included)]

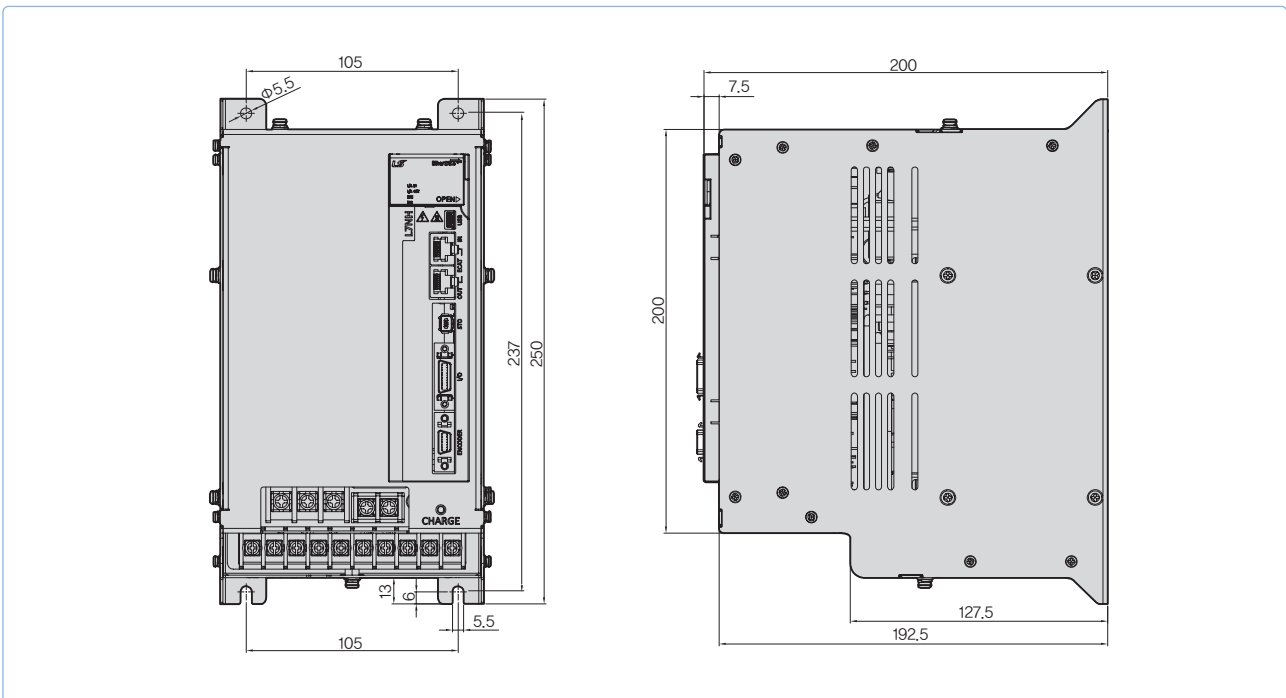
*Unit [mm]



Servo Drive

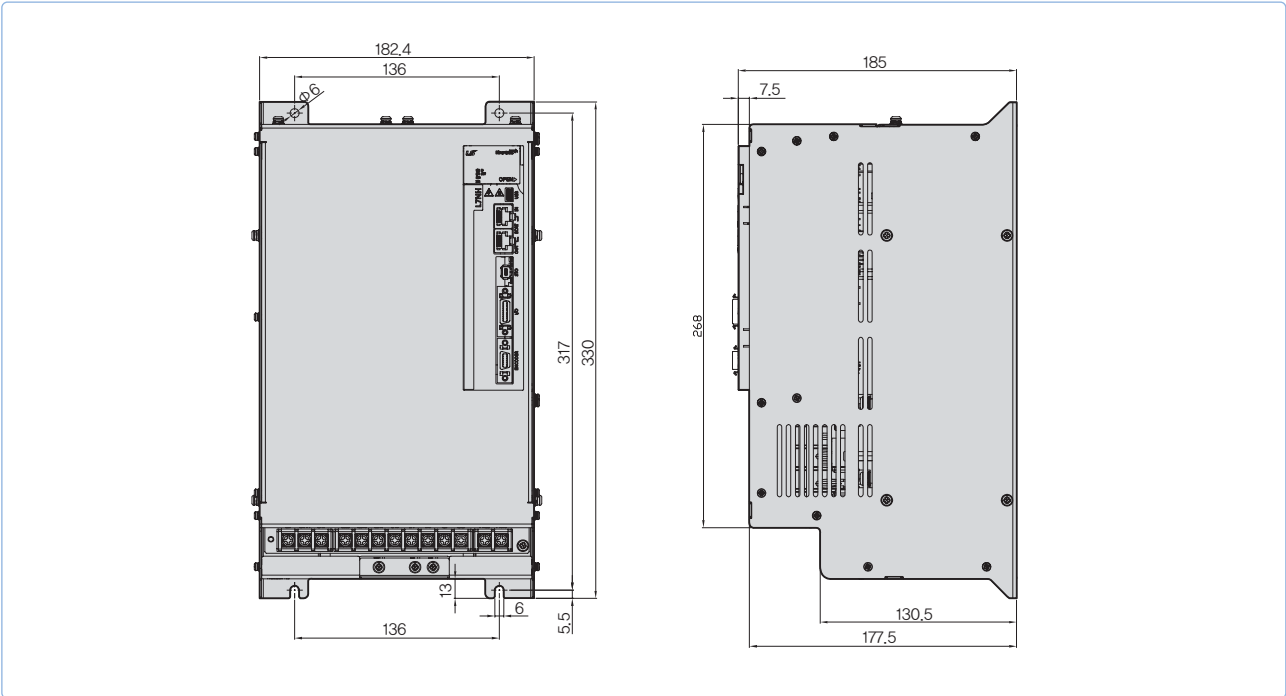
L7NHA050U [Weight : 5.5kg (Fan-Cooling included)]

*Unit [mm]



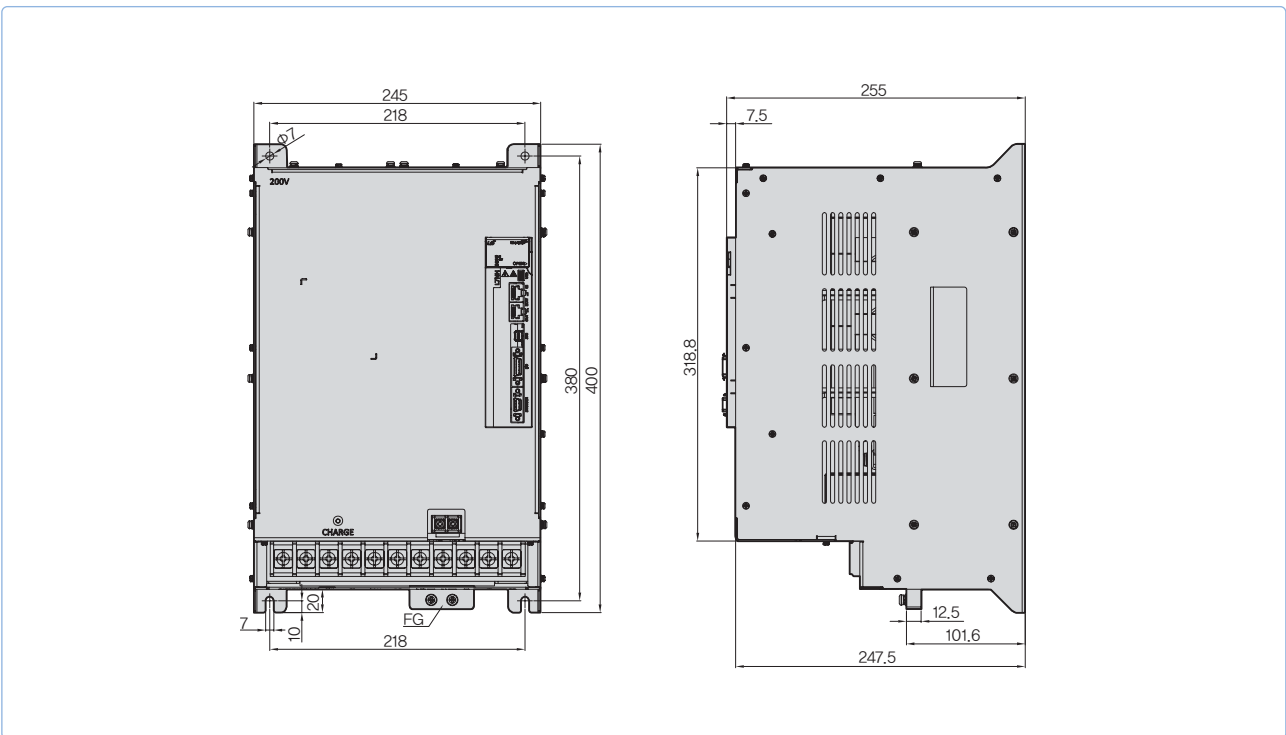
L7NHA075U [Weight : 8.5kg(Fan-Cooling included)]

*Unit [mm]



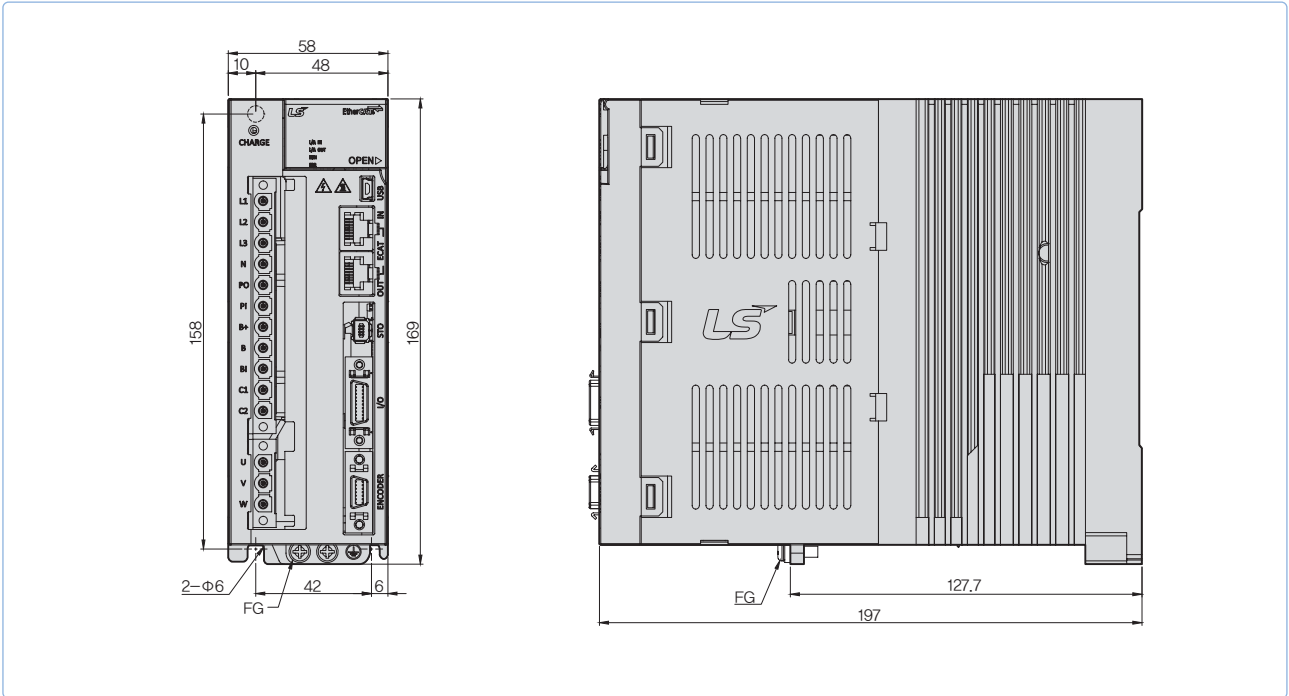
L7NHA150U [Weight : 16.2kg(Fan-Cooling included)]

*Unit [mm]



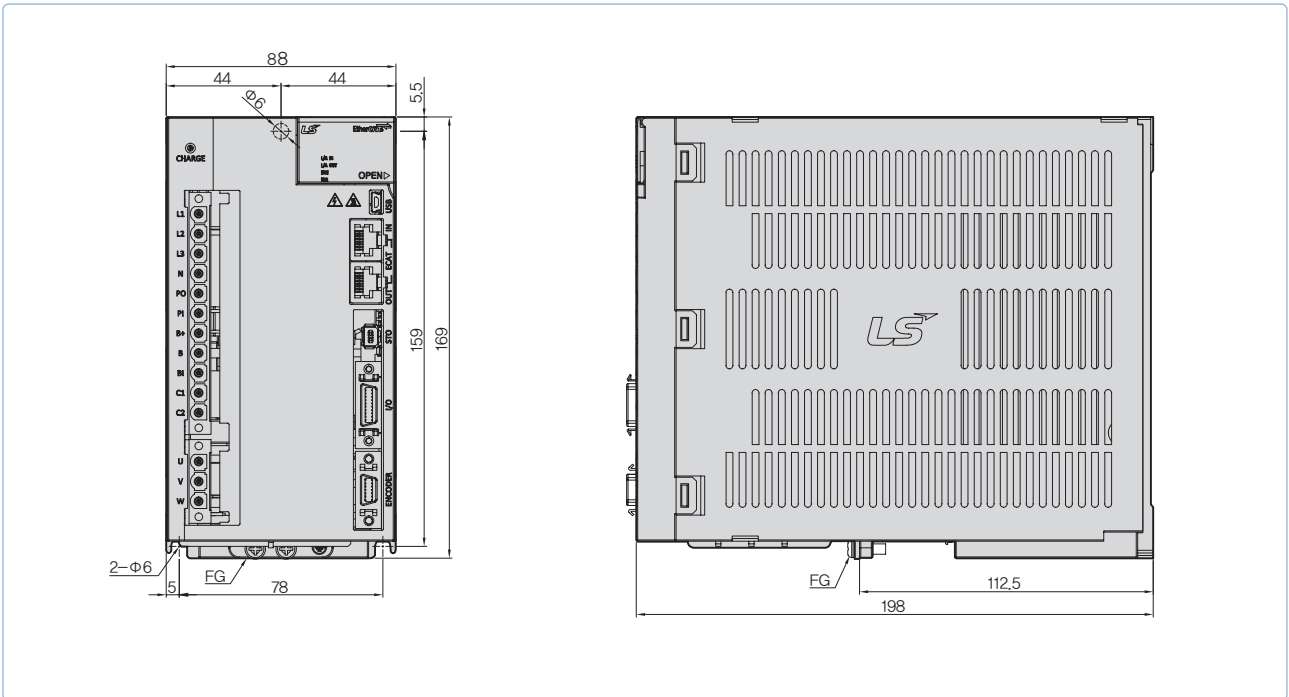
L7NHB010U [Weight : 1.5kg(Fan-Cooling included)]

*Unit [mm]



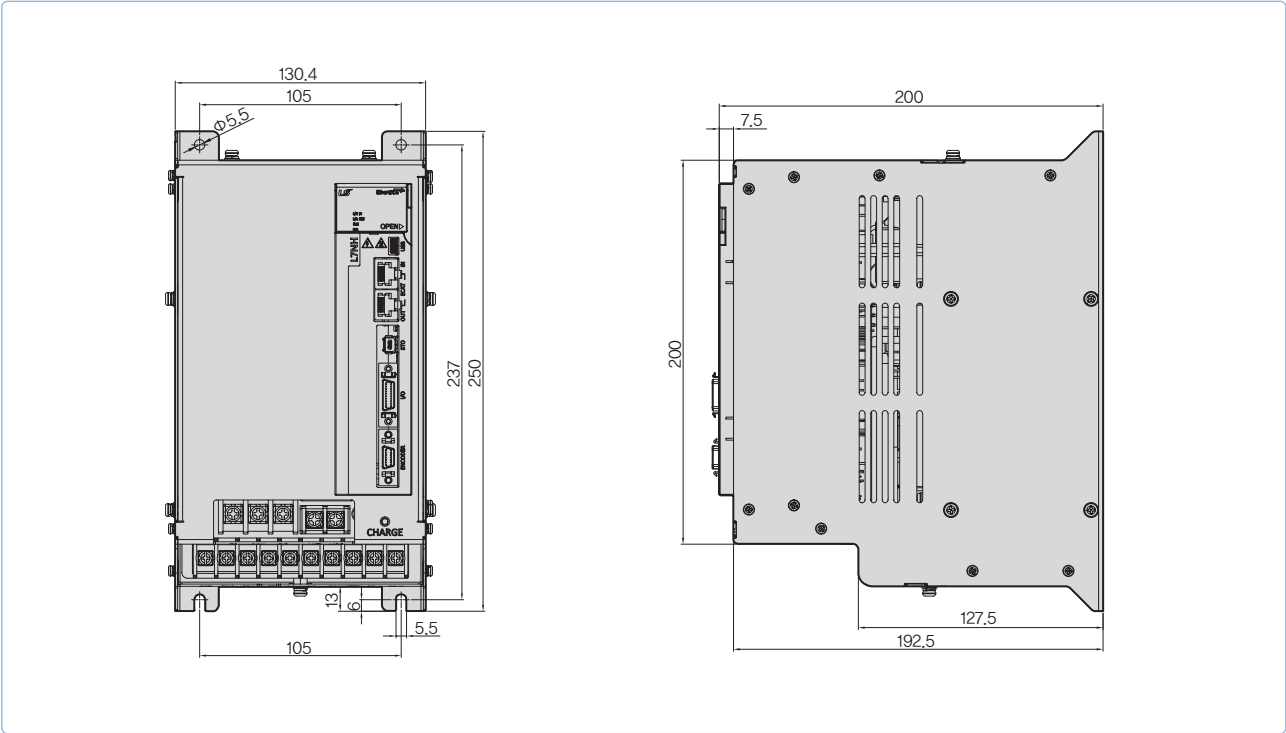
L7NHB020U / L7NHB035U [Weight : 2.5kg(Fan-Cooling included)]

*Unit [mm]



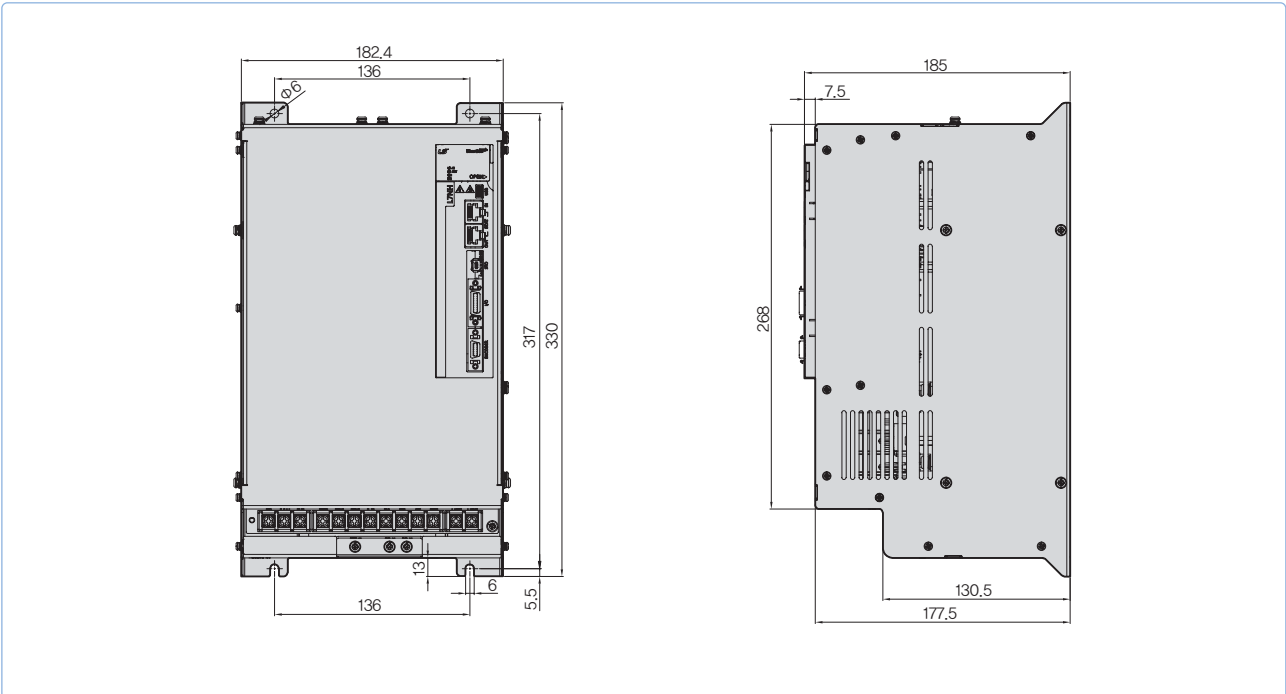
L7NHB050U[Weight : 5.5kg(Fan-Cooling included)]

*Unit [mm]



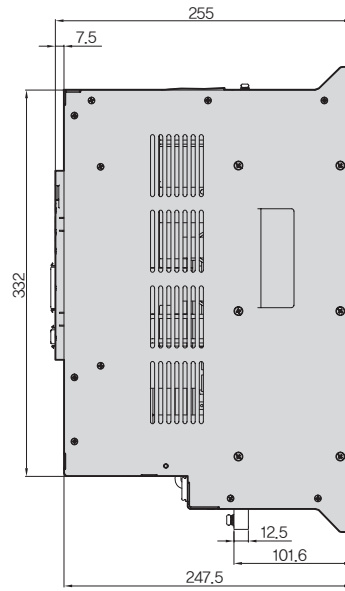
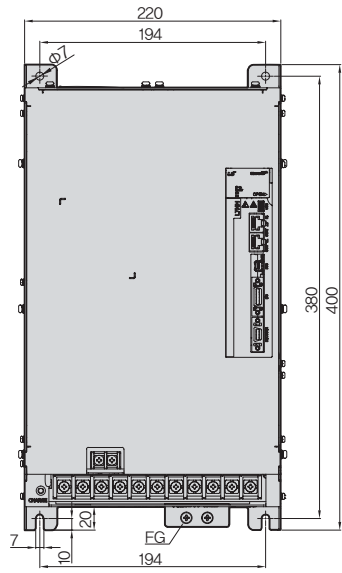
L7NHB075U[Weight : 8.5kg(Fan-Cooling included)]

*Unit [mm]



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

*Unit [mm]



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 B:400VAC	001:100W 002:200W 004:400W 008:750W 010:1.0kW 020:2.0kW 035:3.5kW 050:5.0kW 075:7.5kW 150:15kW	U:Universal	Exclusive Option Code	

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)

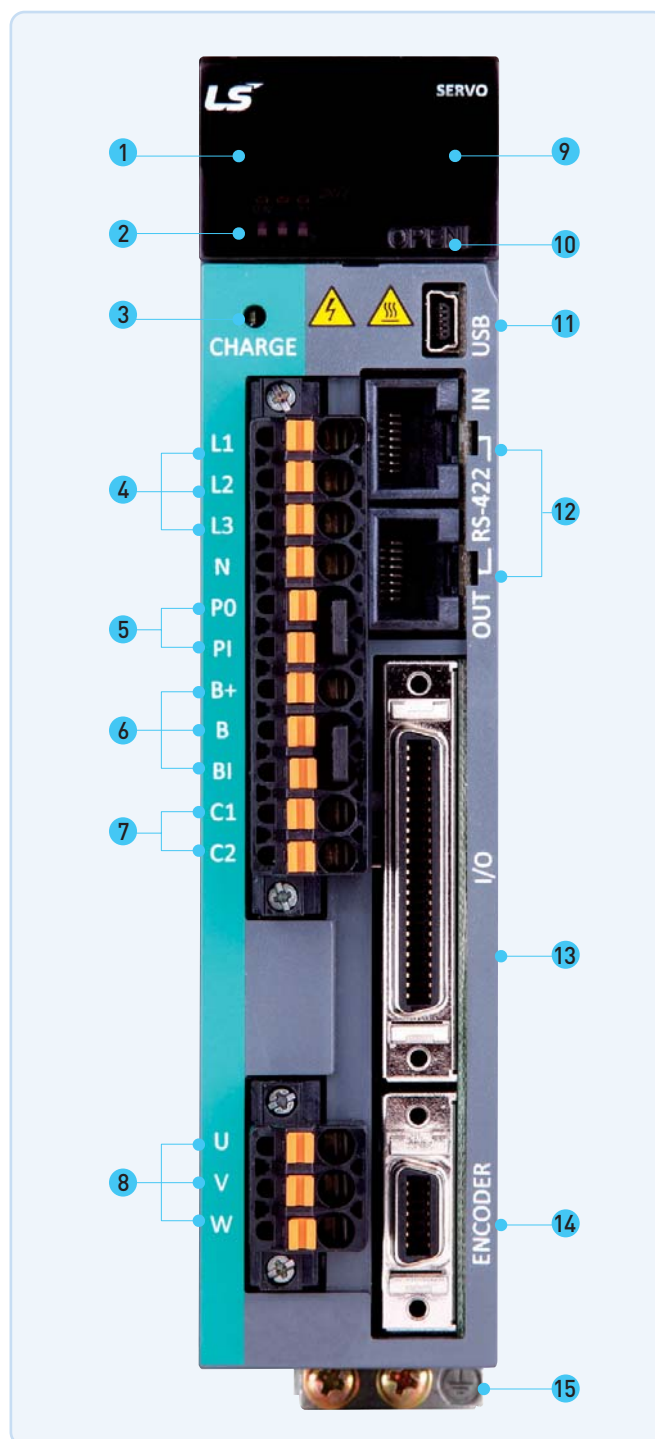
Support various motor and Encoder drive

- Supporting Rotary, DD and Motor drive (supporting 3rd 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 Status LED
- 3 Charge Lamp
- 4 Main Power Connector (L1, L2, L3)
- 5 DC Reactor Connector (PO, PI) 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 nod address 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

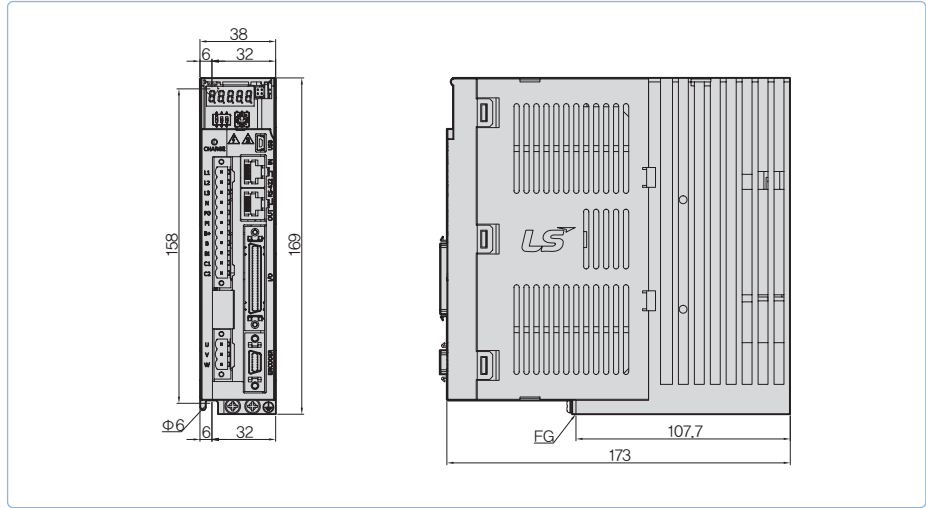
Item		Type Name	L7PA001U	L7PA002U	L7PA004U	L7PA008U	L7PA010U	L7PA020U	L7PA035U	L7PA050U	L7PA075U	L7PA150U
Input Power	Main Power Supply	3 Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]										
	Control Power Supply	Single Phase AC200 ~ 230[V](-15 ~ +10[%]), 50 ~ 60[Hz]										
Rated Current[A]			1.4	1.7	3.0	5.2	6.75	13.5	16.7	32	39.4	76
Peak Current[A]			4.2	5.1	9.0	15.6	20.25	40.5	50.1	90.88	98.5	190
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 [temperature 25 ±10°C]										
	Accel/Decel Time	Straight or S-curve acceleration/deceleration [0~10,000[ms], 0~1,000[ms] Unit configurable]										
	Input Frequency	1[Mpps], line drive / 200[kpps], Open Collector										
	Input Pulse Type	Symbol + Pulse Series, CW+CCW, A/B Phase										
RS422 Communication Specifications	Communication Specifications	ANSI/TIA/EIA-422 Standard Specifications										
	Communication Protocol	MODBUS-RTU										
	Connector	RJ45 x 2										
	Synchro Method	Asynchronous										
	Transmission Speed	9600 /19200/38400/57600 [bps] Can be configured at [0x3002]										
	Transmission Distance	Maximum 200 [m]										
	Power Consumption	100[mA]										
	Terminating Resistance	Dip S/W(On/Off), Built-In 120 Ω										
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, AOV, 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±, *TGO±, *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 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	10.1	17.5	22.8	39
Peak Current[A]			11.1	24	30.3	47.25	57	97.5
Encoder Type		Universal Encoder Feedback 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 [temperature 25 $\pm 10^{\circ}\text{C}$]						
	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 120 Ω						
Input / Output Signal	Digital Input	Input voltage range: DC 12[V] ~ DC 24[V] Total 16 input channel (allocatable) 30 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] $\pm 10\%$, 120[mA] Total 8 input channel (allocatable) 19 function inputs can be selectively allocated (*ALARM \pm , *READY \pm , *BRAKE \pm , *INPOS1 \pm , *ORG \pm , *EOS \pm , *TGON \pm , *TLMT \pm , VLMT \pm , INSPD \pm , ZSPD \pm , WARN \pm , INPOS2 \pm , IOUT0 \pm , IOUT1 \pm , IOUT2 \pm , IOUT3 \pm , IOUT4 \pm , IOUT5 \pm)						
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[$^{\circ}\text{C}$] / -20 ~ 70[$^{\circ}\text{C}$]						
	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.						

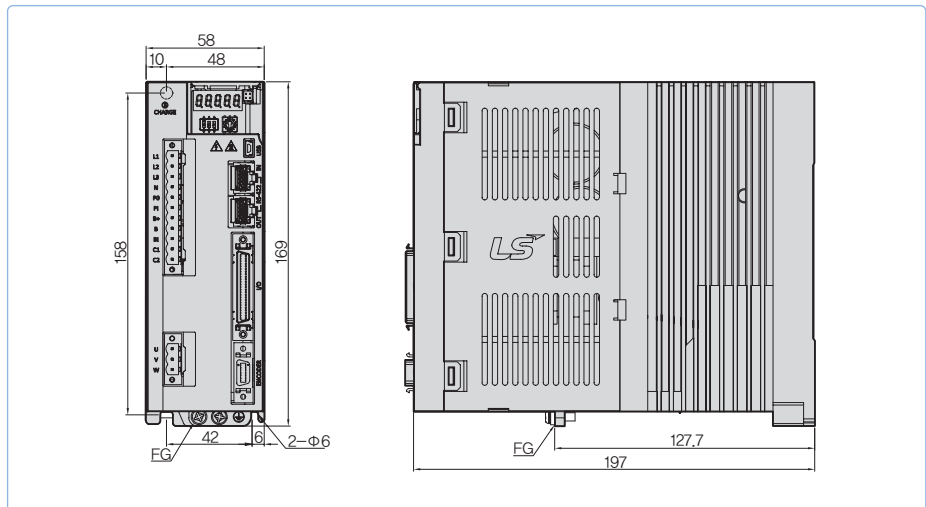
L7PA001U ~ L7PA004U

*Unit [mm]



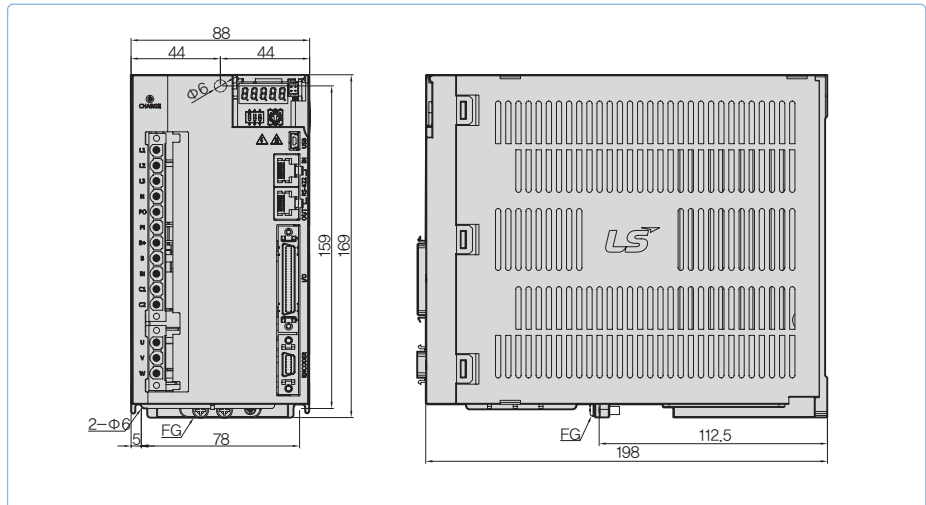
L7PA008U / L7PA010U
[Weight : 1.5kg
(Fan-Cooling included)]

*Unit [mm]



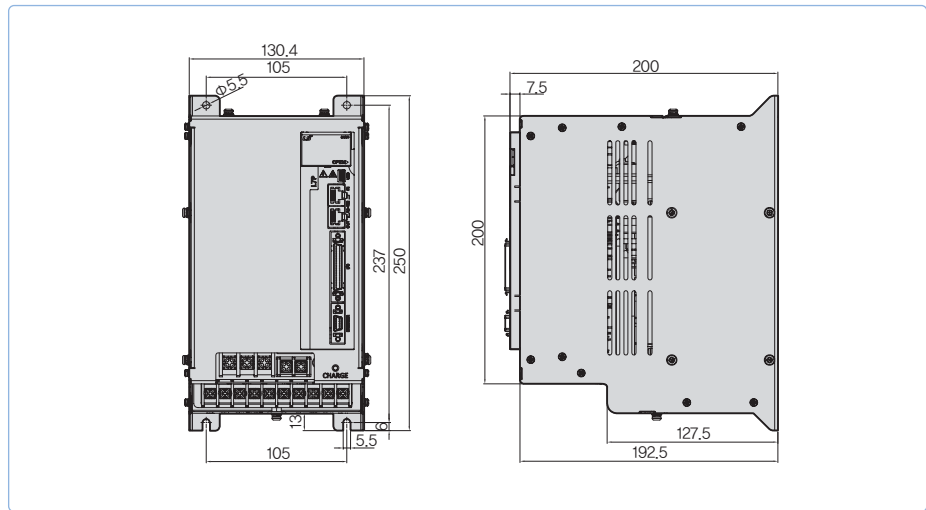
L7PA020U / L7PA035U
[Weight : 2.5kg
(Fan-Cooling included)]

*Unit [mm]



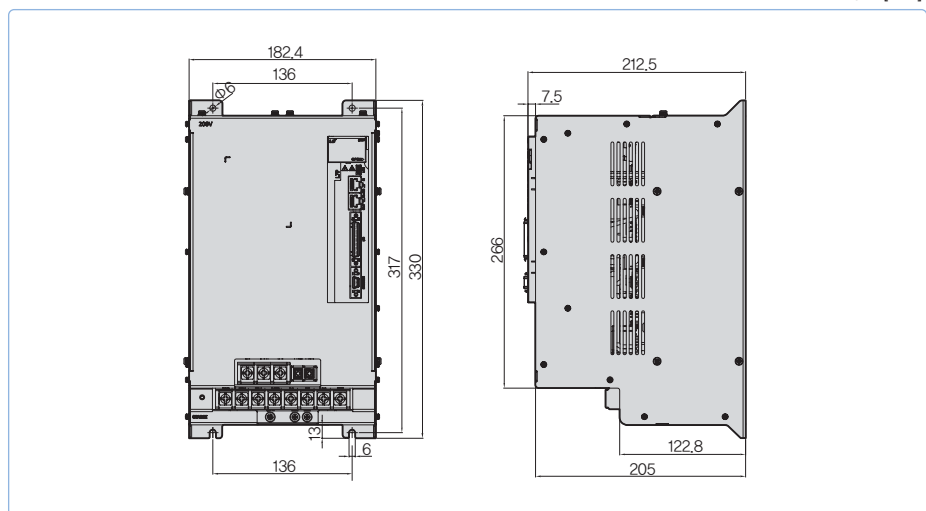
L7PA050U [Weight : 5.5kg
(Fan-Cooling included)]

*Unit [mm]



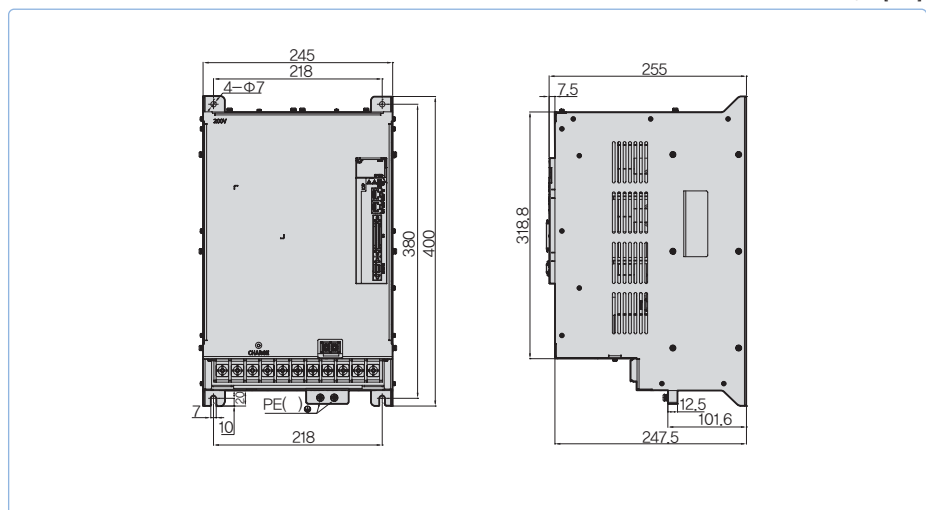
L7PA075U [Weight : 8.5kg
(Fan-Cooling included)]

*Unit [mm]



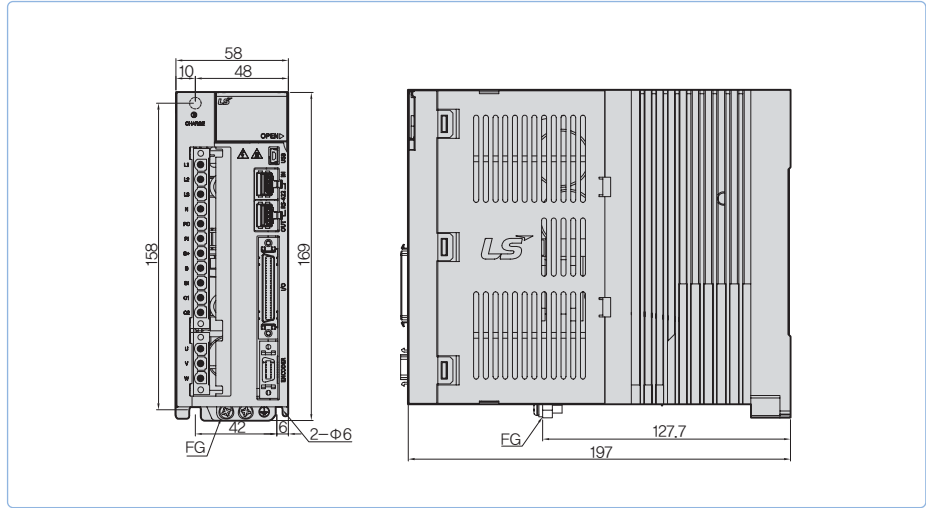
L7PA150U [Weight : 16.2kg
(Fan-Cooling included)]

*Unit [mm]



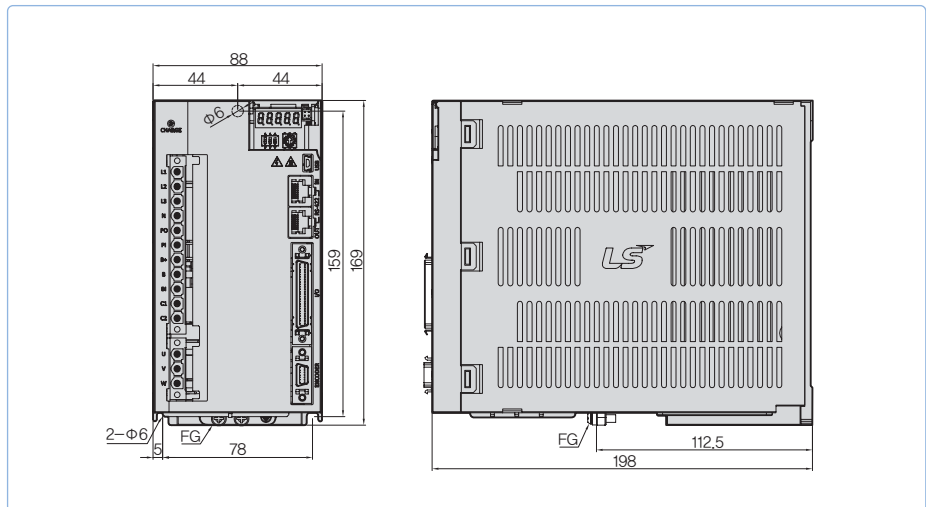
L7PB010U [Weight : 1.5kg
(Fan-Cooling included)]

*Unit [mm]



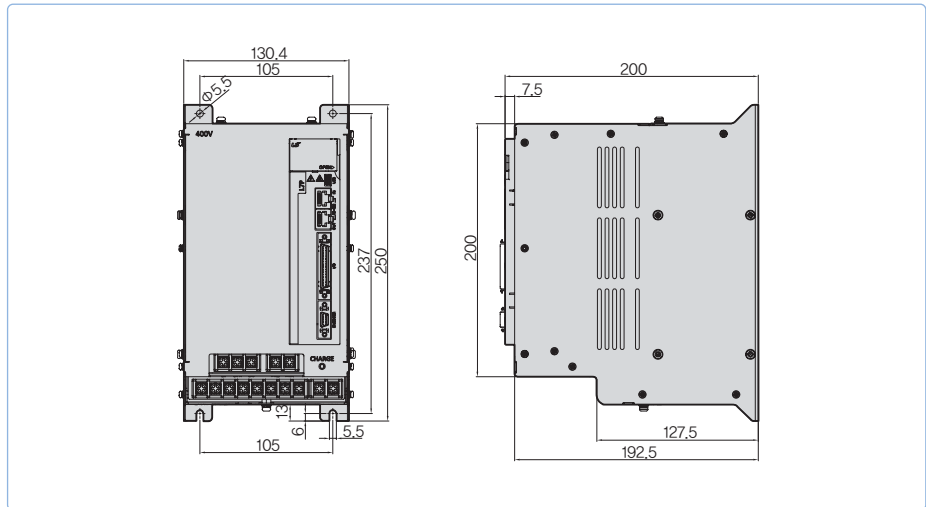
L7PB020U / L7PB035U
[Weight : 2.5kg
(Fan-Cooling included)]

*Unit [mm]



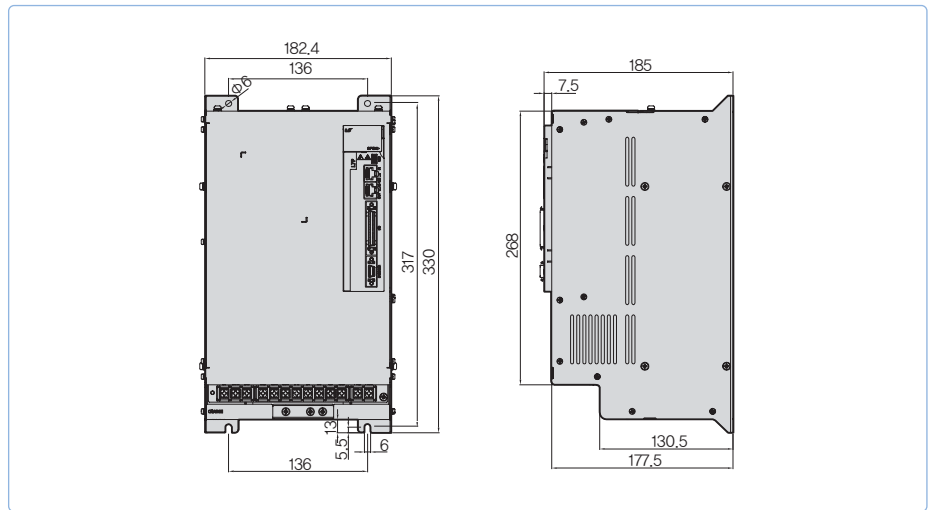
L7PB050U [Weight : 5.5kg
(Fan-Cooling included)]

*Unit [mm]



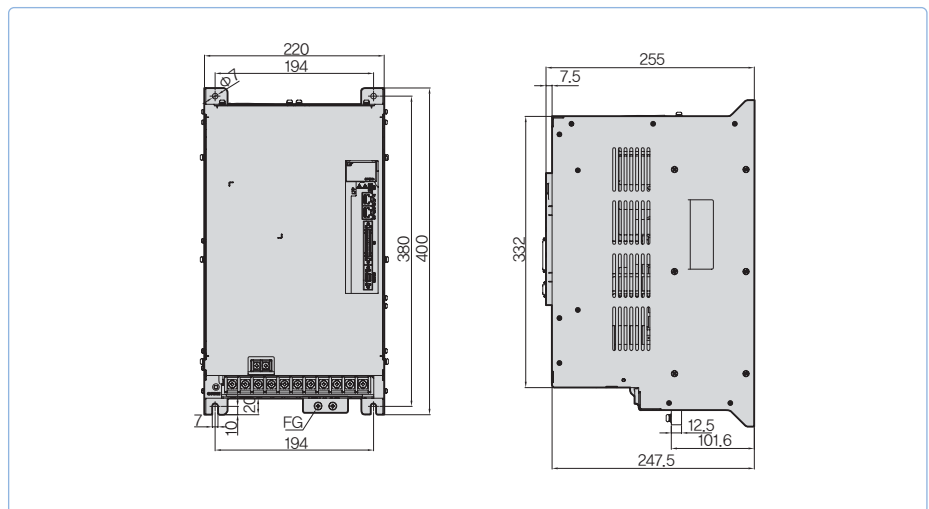
L7PB075U [Weight : 8.5kg
(Fan-Cooling included)]

*Unit [mm]



L7PB150U [Weight : 15.5kg
(Fan-Cooling included)]

*Unit [mm]



L7NHF Series



Servo Drive Designation

L7

NHF

A

010

U

AA

Communication

All-in-One Type
EtherCAT Type+
Full-Closed Type

Input Power Supply

A:200VAC

Capacity

010 : 1kW
035 : 3.5kW
050 : 5kW
075 : 7.5kW

Encoder Type

U:Universal

Option

Exclusive Option Code

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

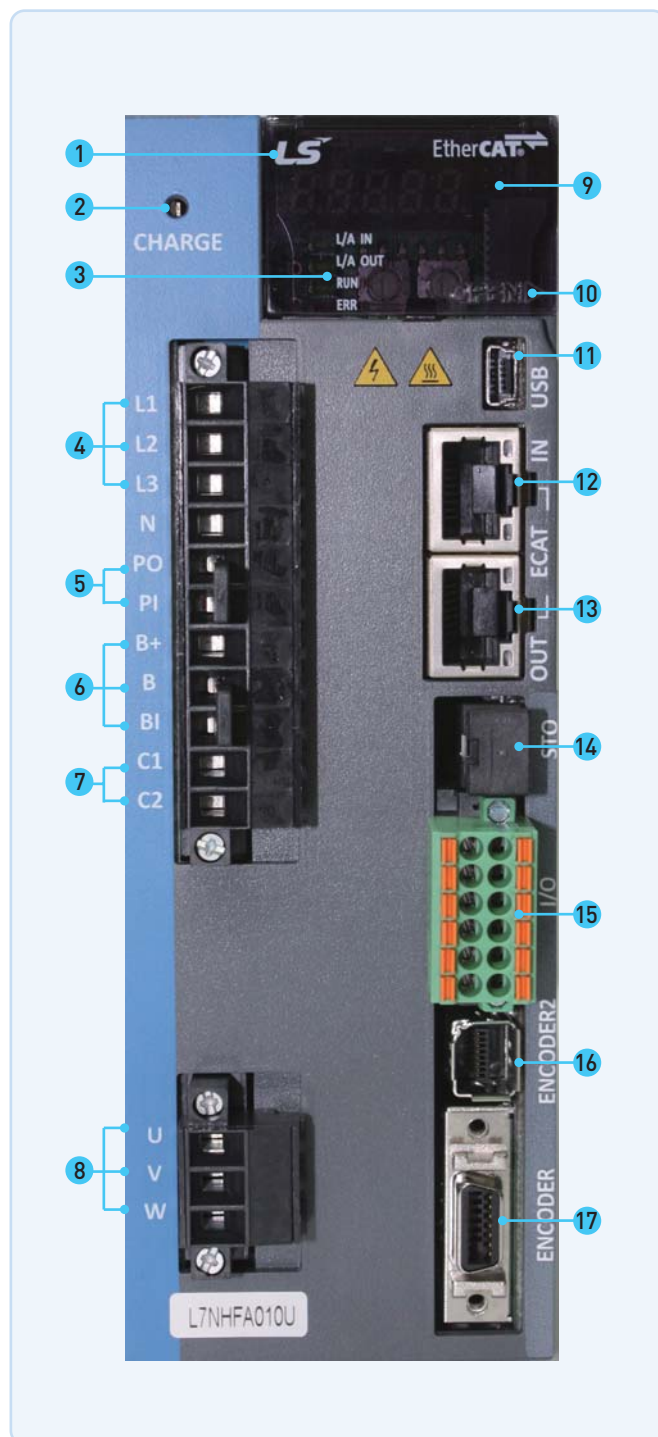
Real-time control through EtherCAT

- High speed, Real-time capability and Synchronization mechanism
- Supporting CoE, EoE and FoE
- Improved Speed Response(≒1kHz) Frequency
- Improved communication speed by applying 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 EtherCAT Communication Port (IN)
- 13 EtherCAT Communication Port (OUT)
- 14 Safety Connector (STO)
- 15 Input / Output signal Connector
- 16 Encoder2 Connector (ENCODER2)
- 17 Encoder Connector (ENCODER)



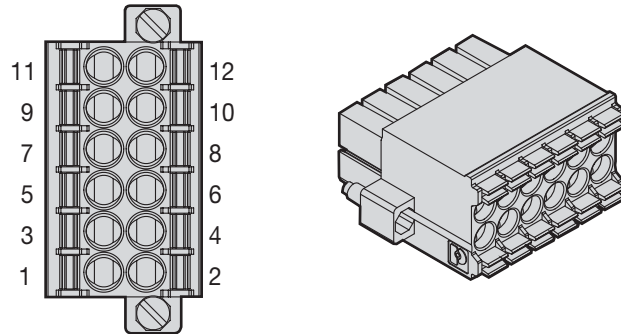
L7NHFA Drive

Item		Type Name	L7NHFA010U	L7NHA020U	L7NHA035U	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]			6.75	16.7	32	39.4
Peak Current[A]			20.25	50.1	90.88	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, Phase A/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		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±, TGO±, 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 ~ 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.			

XDL-L7NHF Series I/O & Encoder2 PIN MAP

I/O Connector

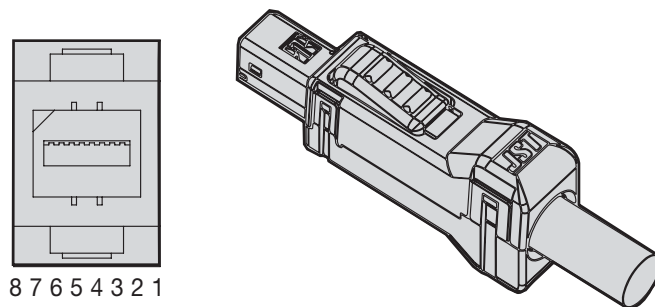
DFMC 1.5/6-STF-3.5 (PHOENIX)



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

Encoder2 Connector

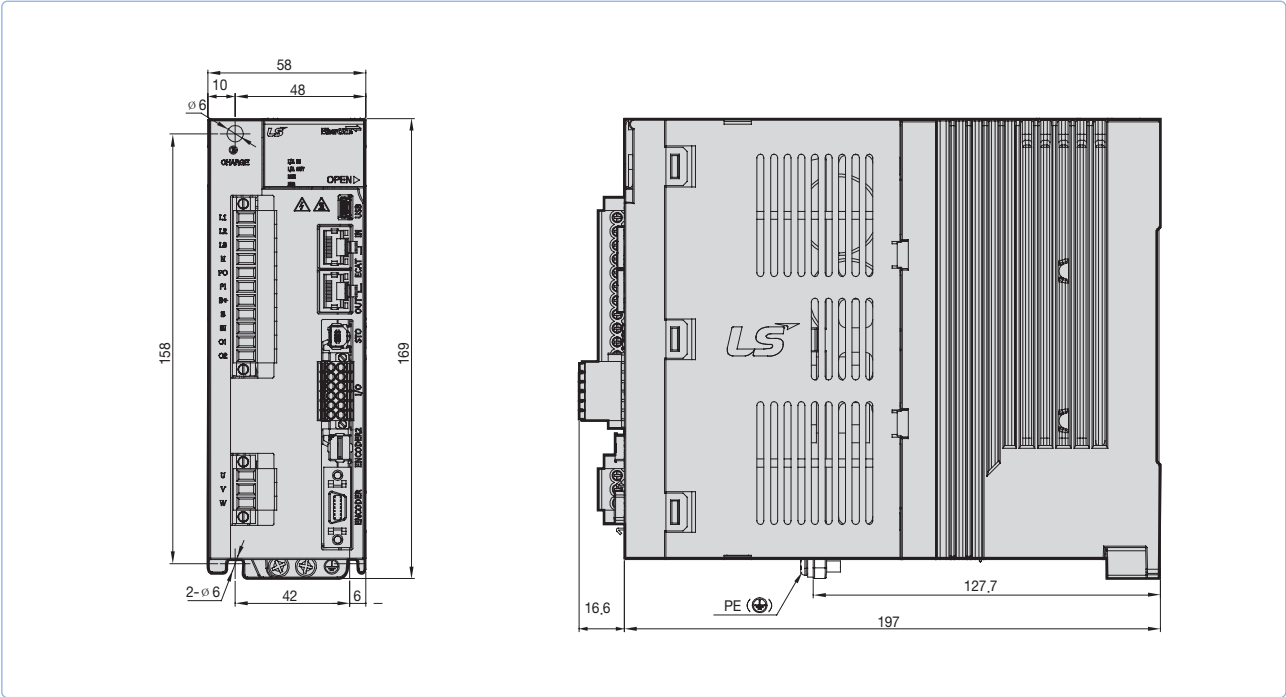
MUF-PK8K-X (JST)



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

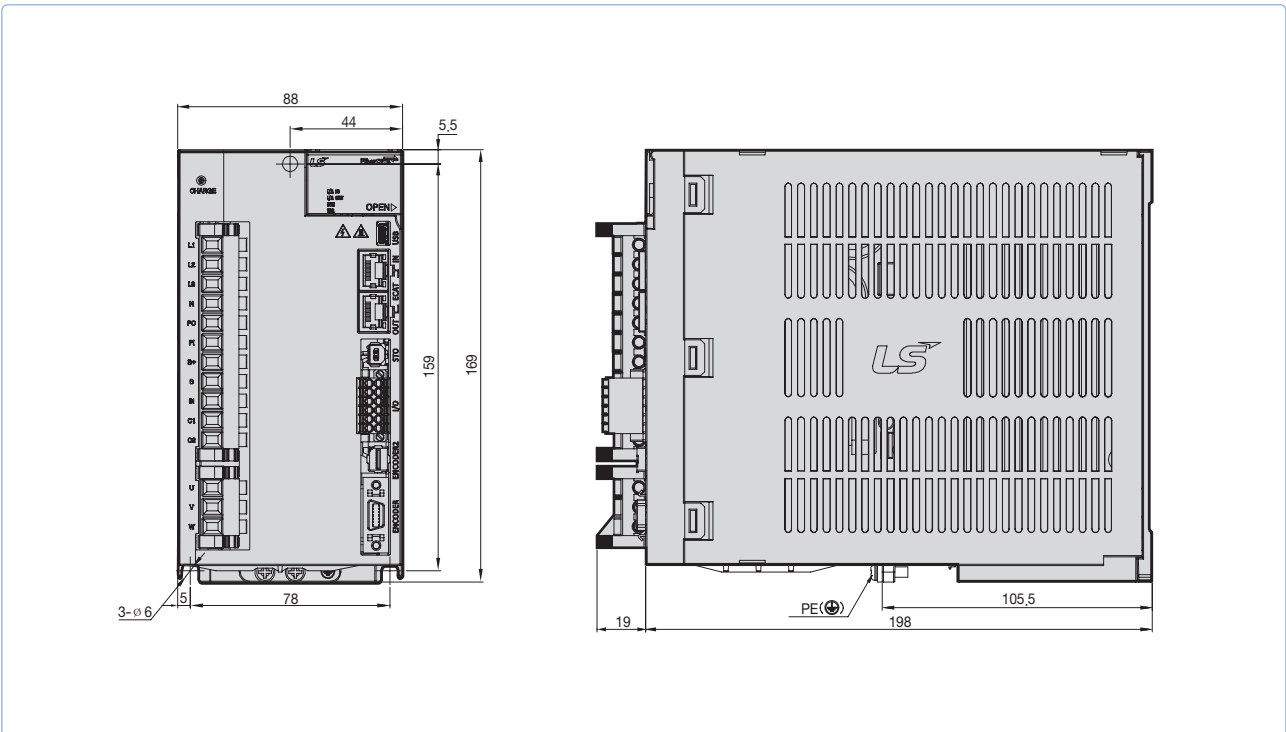
L7NHFA010U [Weight : 1.5kg(Fan-Cooling included)]

*Unit [mm]



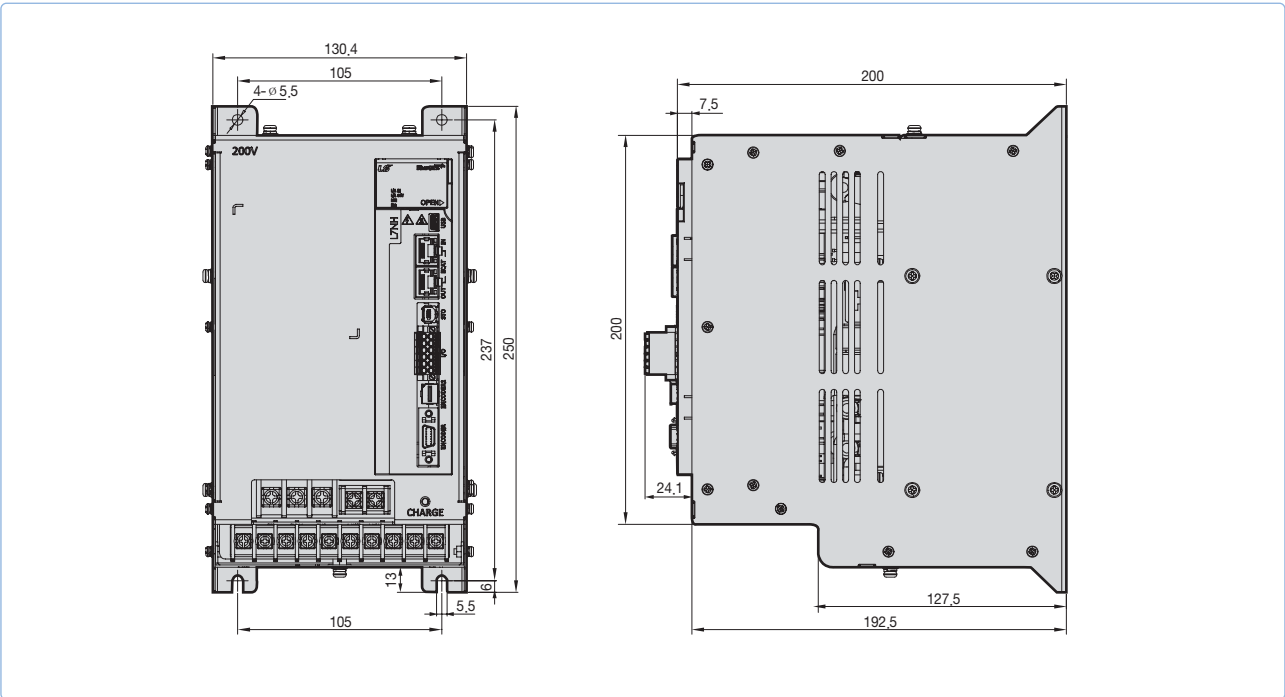
L7NHFA035U [Weight : 2.5kg(Fan-Cooling included)]

*Unit [mm]



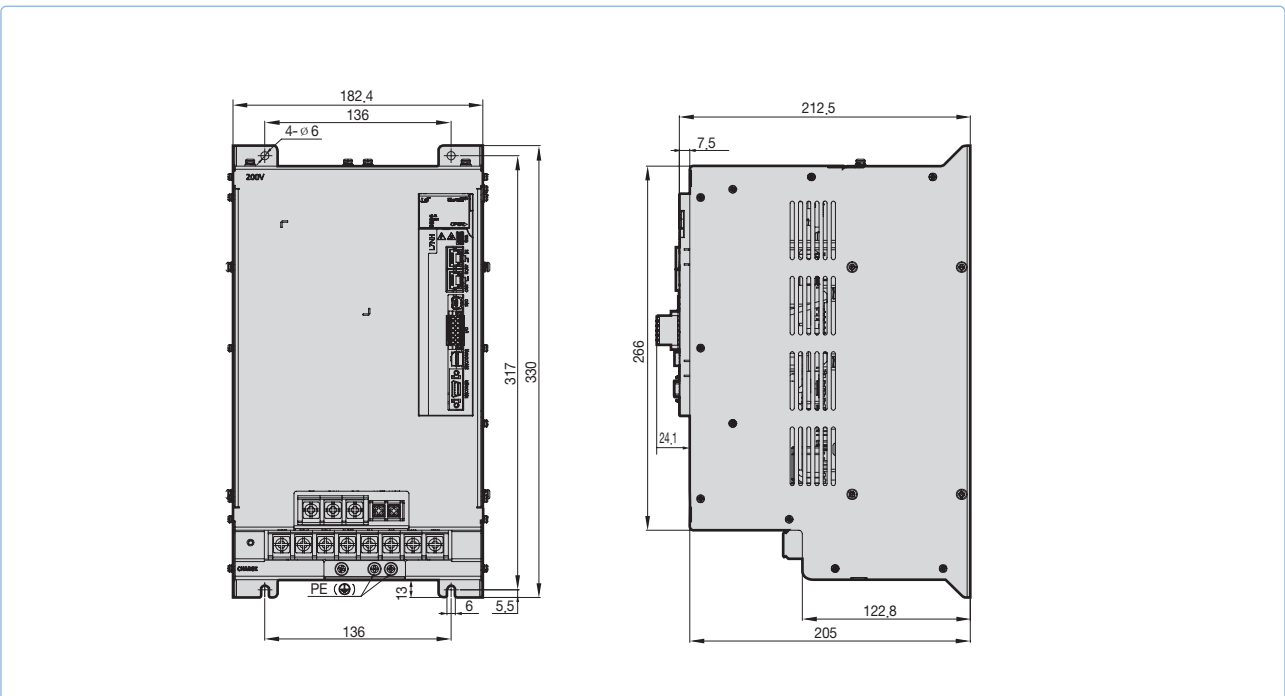
L7NHFA050U [Weight : 1.5kg(Fan-Cooling included)]

*Unit [mm]



L7NHFA150U [Weight : 2.5kg(Fan-Cooling included)]

*Unit [mm]



L7C Series



Servo Drive Designation

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

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)



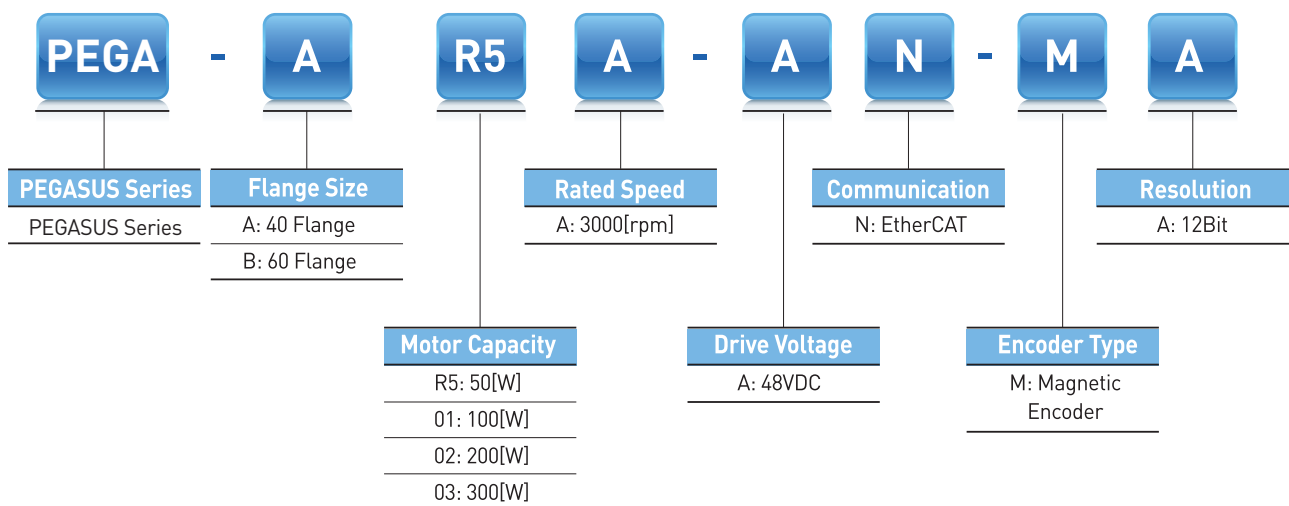
L7C Drive

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	20.25
Encoder type		Quadrature (Incremental), Biss-B, Biss-C (Absolute, Incremental)				
Control performance	Speed Control Range	Maximum 1:5000				
	Frequency Response	Maximum 1[KHz] or above (When using 19Bit Serial Encoder)				
	Speed Variation Ratio	±0.01 [%] or lower [when load changes between 0 and 100%] ±0.1[%] or lower [temperature 25 ±10°C]				
	Accel/Decel Time	Straight or S-curve acceleration/deceleration (0-10,000[ms], possible to be set by one[ms] unit)				
	Input frequency	1[Mpps], line driver / 200[kpps], open collector				
	Input Pulse Type	Symbol + Pulse series, CW+CCW, A/B Phase				
RS-422	Specification	ANSI/TIA/EIA-422 standard specifications				
	Protocol	MODBUS-RTU				
	Synchro Method	Asynchronous				
	Power Consumption	100[mA]				
	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				
EtherCAT Communication Specifications	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, *BREAK, *INPOS1, ORG, EOS, TGON, TLMT, VLMT, INSPD, WARN, INPOS2, IOU0, IOU1, IOU2, IOU3, IOU4, IOU5) * Basic allocation signal				
Analog Output		2 Channel Analog speed input (Command/Override) ±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.				

PEGA Series



Servo Drive Designation



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



Rated Values of Servo Drive

Rated	□40 50W	□40 100W	□60 100W	□60 200W	□60 300W
Continuous output current [Arms]	1.77	2.38	3.62	5	6.8
Maximum output current [Arms]	3.54	3.75	7.24	10	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, PROBE2, 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 and 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

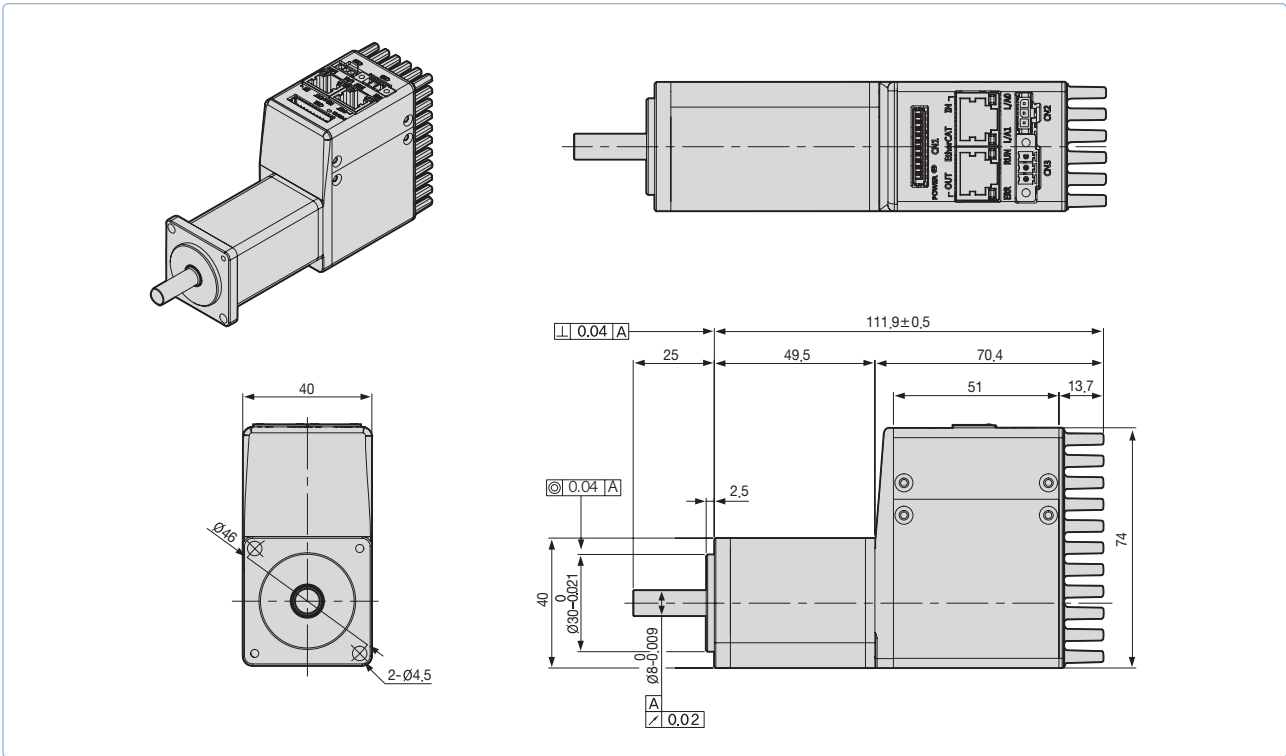
Category	Details
Encoder Type	Magnetic Encoder (12bit)

Motor Specification

Model	Unit	□40 50W	□40 100W	□60 100W	□60 200W	□60 300W
Rated Torque	[Kgf cm]	1.62	3.25	3.25	6.50	9.74
Max. Torque	[Kgf cm]	3.24	4.88	6.50	13.0	19.48
Rated Speed	[rpm]	3000	2400	3000	3000	3000
Max Speed	[rpm]	3000	3000	3000	3000	3000
Inertia	[Kg m ² x 10 ⁻⁴]	0.0240	0.0450	0.114	0.182	0.321

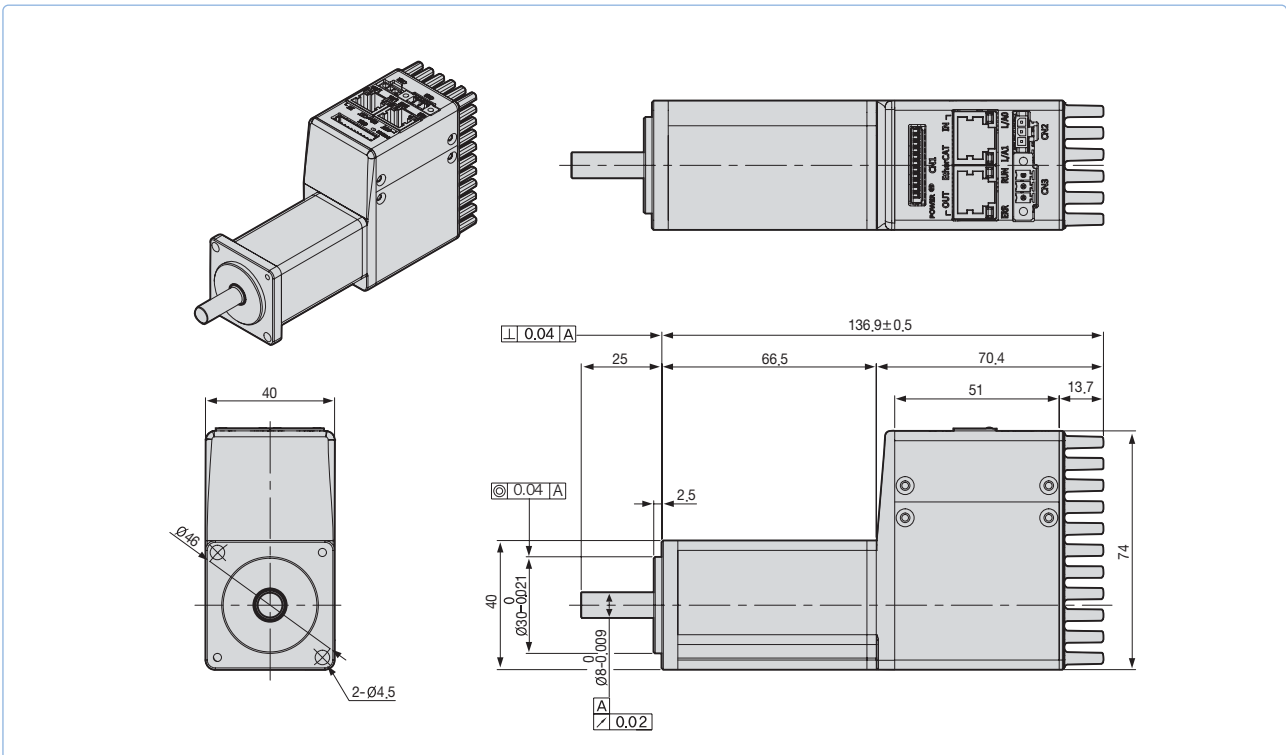
PEGA-AR5A

*Unit [mm]



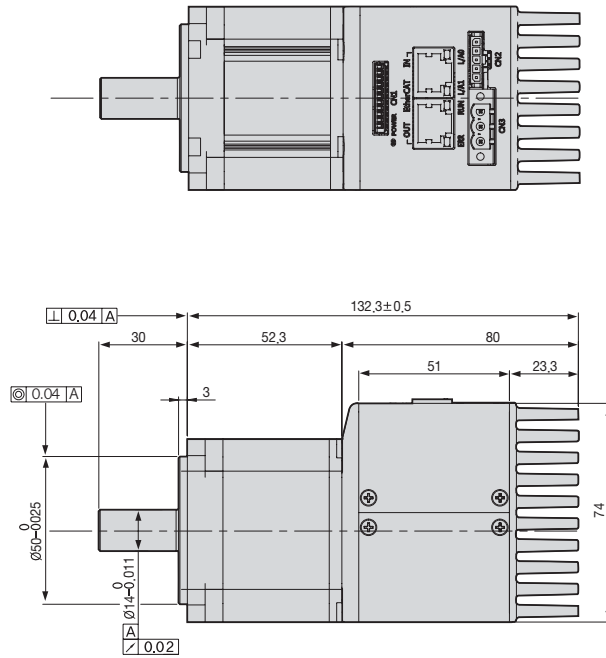
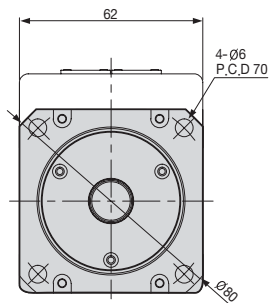
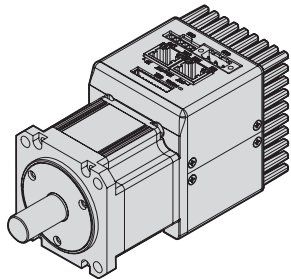
PGEA-A01A

*Unit [mm]



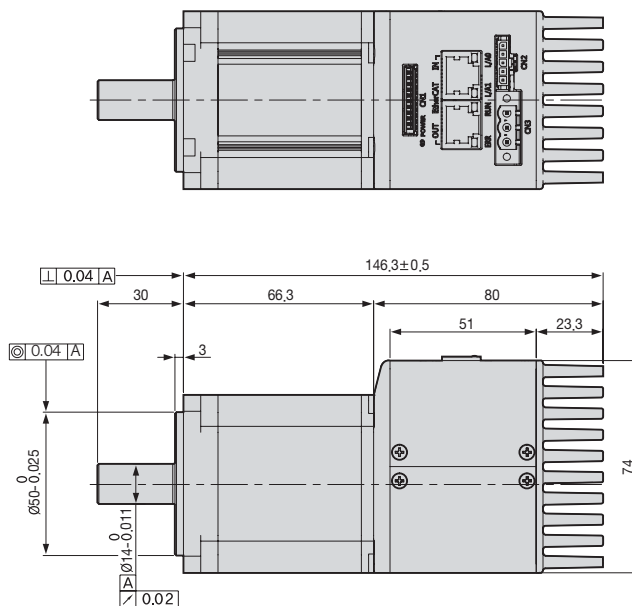
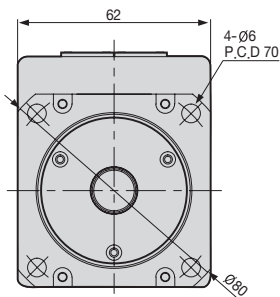
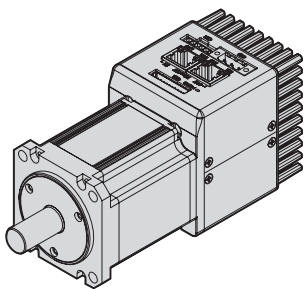
PGEA-B01A

*Unit [mm]



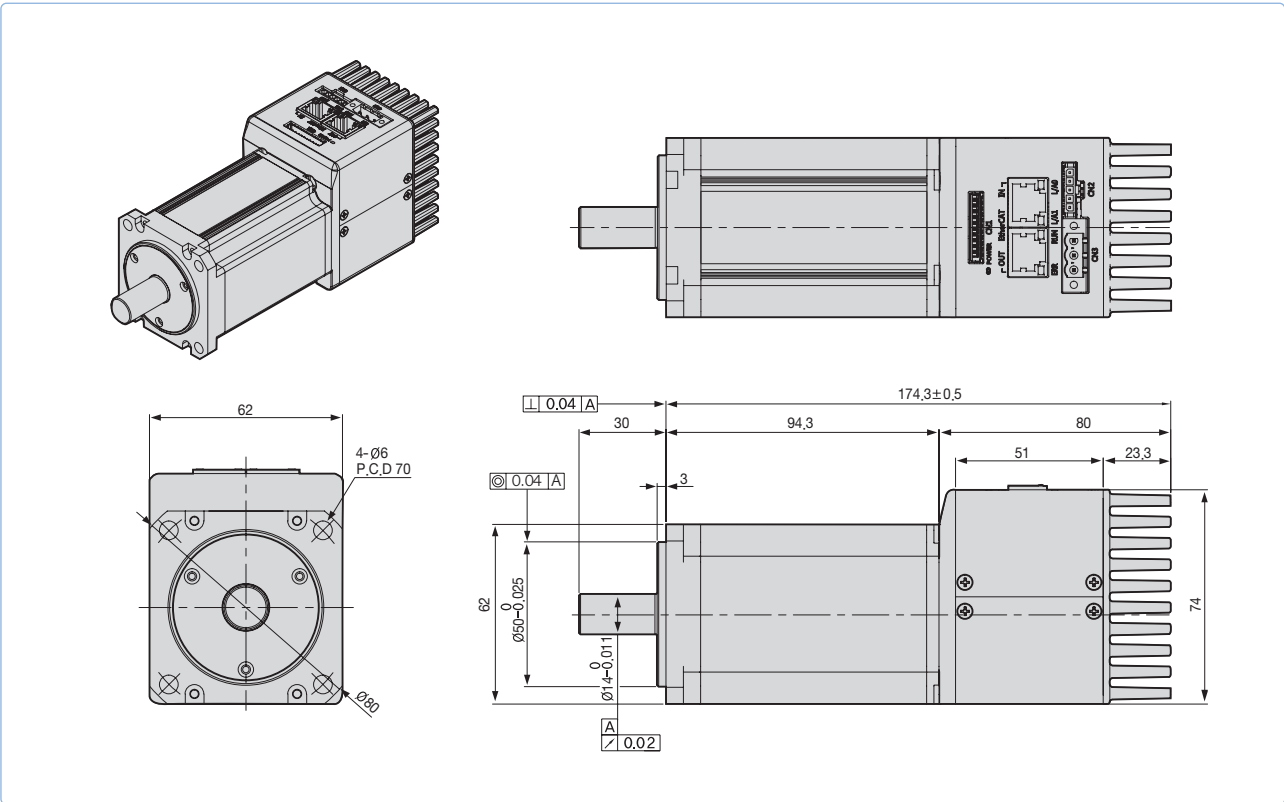
PGEA-B02A

*Unit [mm]



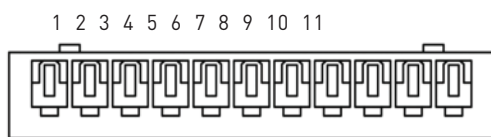
PGEA-B03A

*Unit [mm]



Accessory Kit

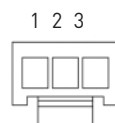
CN1 : I/O Connector



51004-1100(MOLEX)

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

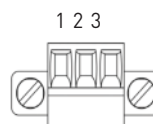
CN2 : Safe Torque Off Connector



43645-3(MOLEX)

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

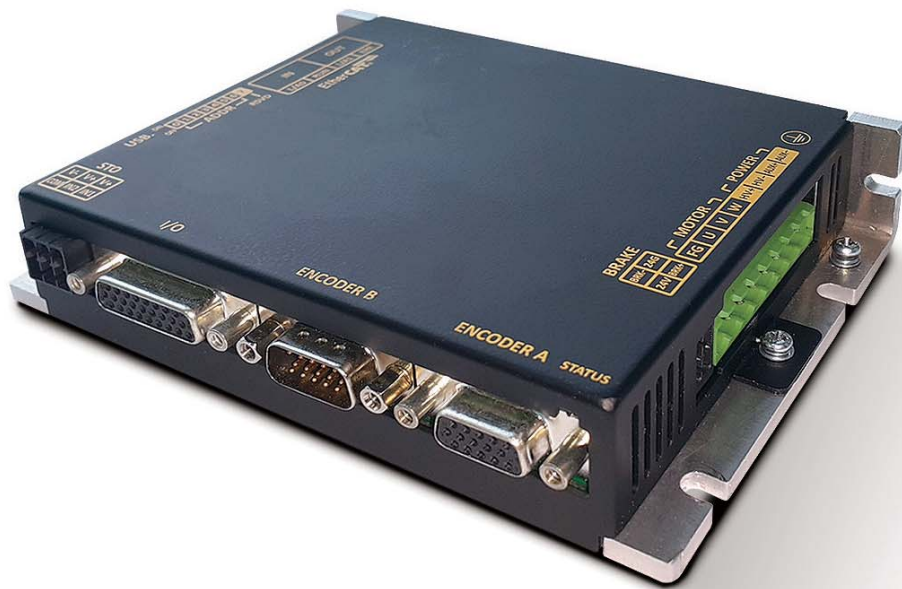
CN3 : Power Connector



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

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

PHOX Series



Servo Drive Designation

PHOX	-	03	080	N	S	AA
Model Name		Output Current	Input Power Supply	Communication	Encoder Type	Option
PHOX Series		03:3A 06:6A	A: 3000[rpm]	N: EtherCAT	S: SIN/COS R: Resolver	Exclusive Option Code

Note1) Additional selection option, on selecting the dual encoder

Low Voltage DC Drive **PHOX**

Real-time control through EtherCAT

- High speed, Real-time capability and Synchronization mechanism
- Supports CoE, EoE and FoE
- Improved Speed Response($\approx 1\text{kHz}$) Frequency
- Improved communication speed by applying 16bit-bus
 - Improved Chip communication speed
 - Improved EtherCAT communication speed

Variable Switching Frequency

- 16 / 32 / 48kHz

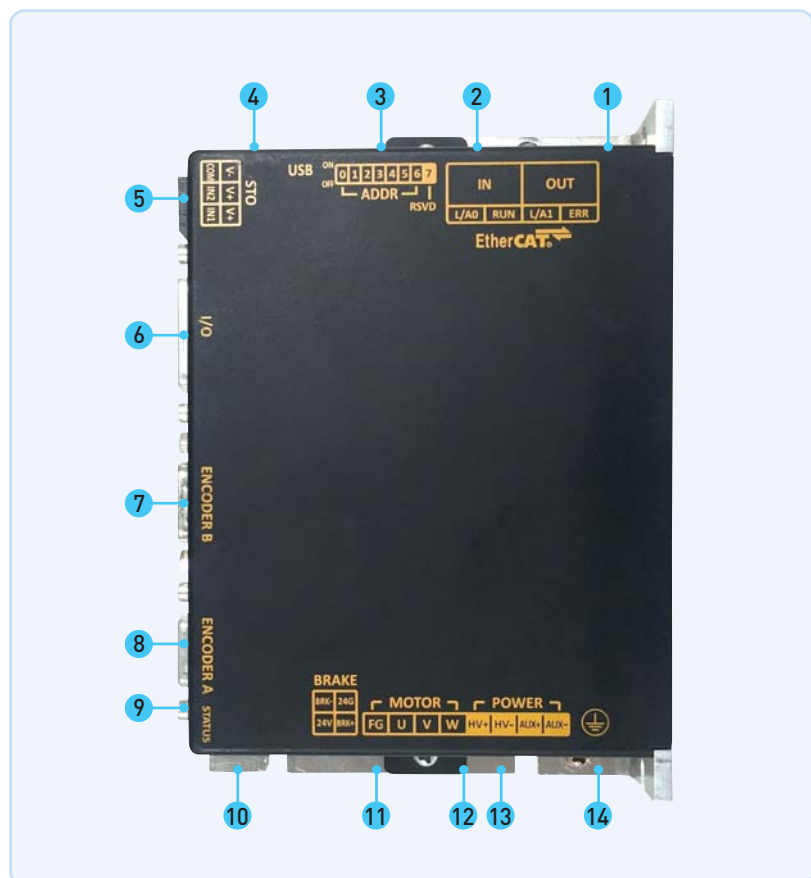
Fully-Closed Loop Control

- Switch among Semi-Closed Loop Control, Fully-Closed Loop Control and Dual Feedback Control
- Fully-Closed Loop Control provides quick response with internal and external encoder position values
- Fully-Closed Loop Control ensures high-precision control during machine operation

Programming 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 DC Reactor Connector (PO, PI)
- ⑫ Master Power Connector (HV+, HV-)
- ⑬ Auxiliary Power Connector (AUX+, AUX-)
- ⑭ Ground

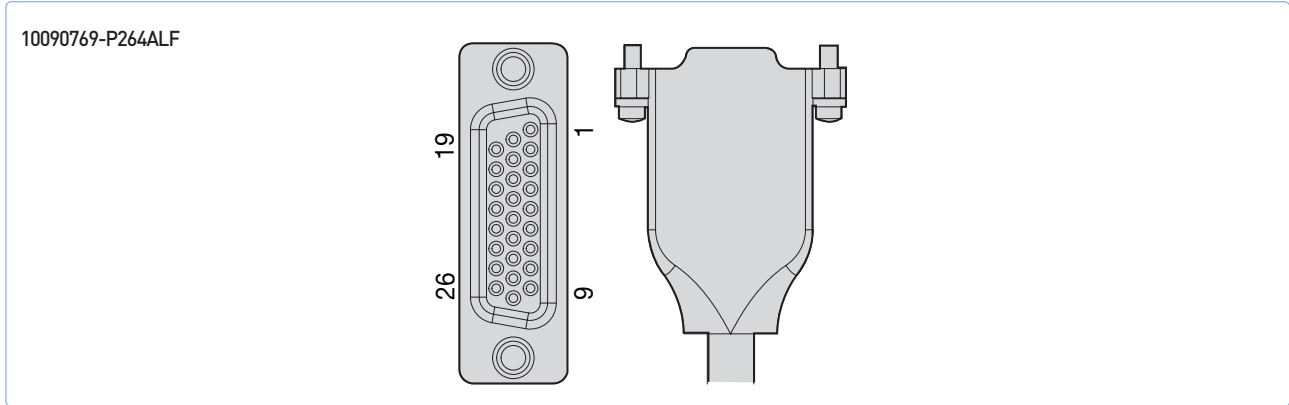


PHOX Series

Item		Type Name	DC 3A	DC 6A
Input Power	Main Power Supply		DC 24~80[V]	
	Control Power Supply		DC 24~80[V]	
Rated Current[A]			3	6
Peak Current[A]			9[A] → 1[sec]	18[A] → 1[sec]
1st Encoder Encoder A			*Quadrature(Max. 10Mpps after X 4) - With and without halls, Differential *Serial Encoder(absolute, incremental) - BiSS(B,C), Endat2.2, Tamagawa Serial, SSI	
2nd Encoder Encoder B			*Quadrature(Max. 10Mpps after X 4) - Without halls, Differential *Serial Encoder(absolute, incremental) - BiSS(B,C), Endat2.2, Tamagawa Serial, SSI *Analog Encoder - Sinusoidal(1Vpp), Analog hall(Sin/Cos) - Resolver(Optional)	
Control Performance	Speed Control Range		Maximum 1: 5000	
	Frequency Response		Maximum 1 [kHz] or above (When using 19bit Serial Encoder)	
	Speed Variation Ratio		±0.01 [%] or lower [when load changes between 0 and 100%] ±0.1[%] or lower [temperature 25 ±10°C]	
	Torque Control Repetition Accuracy		Within ±1%	
	Input Frequency		4[Mpps], Lind Drive	
	Input Pulse Method		Symbol + Pulse series, CW+CCW, Phase A/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, AOV, 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.	

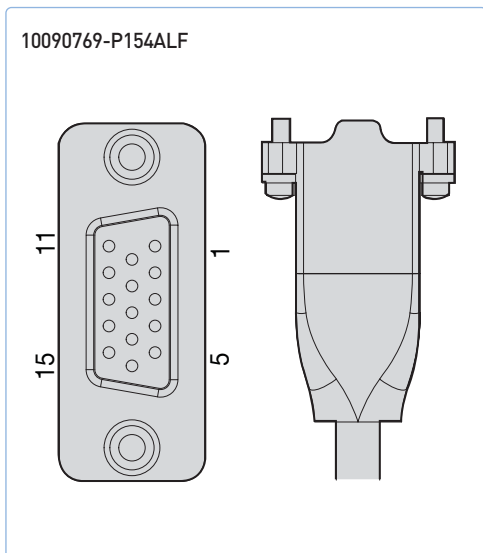
PHOX Series I/O and Encoder PIN Map

I/O Connector



PIN No.	Signal	PIN No.	Signal	PIN No.	Signal	PIN No.	Signal
1	PF+	8	AMON1	15	D01	22	/BO
2	PF-	9	AMON2	16	D02	23	Z0
3	PR+	10	DICOM	17	D03	24	/Z0
4	PR-	11	DI1	18	18 DO4	25	DOCOM
5	AGND	12	DI2	19	A0	26	AGND
6	AI+	13	DI3	20	/A0		
7	AI-	14	DI4	21	B0		

Encoder A Connector

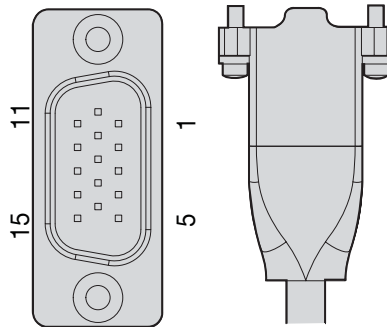


PIN No.	Encoder Quad	BISS	SS	ENDAT	TAMAQAWA
1	Z+	-	-	-	-
2	Z-	-	-	-	-
3	GND	GND	GND	GND	GND
4	N.C	-	-	-	-
5	5V	5V	5V	5V	5V
6	GND	GND	GND	GND	GND
7	A-	SL-	DATA-	RC-/DV-	TXD-/RXD-
8	A+	SL+	DATA+	RC+/DV+	TXD-/RXD+
9	-	-	-	-	-
10	*MOT	*MOT	*MOT	*MOT	*MOT
11	B-	MA-	CLK-	CLK-	-
12	B+	MA+	CLK+	CLK+	-
13	-	-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

PHOX Series I/O and Encoder PIN Map

Encoder B Connector

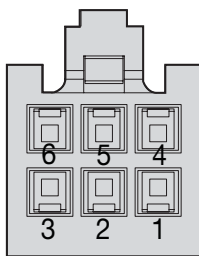
10090770-S154ALF



PIN No.	Encoder Quad	BISS	SS	ENDAT	TAMAQAWA	SIN/COS	RESOLVER
1	Z+	-	-	-	-	-	-
2	Z-	-	-	-	-	-	-
3	GND	GND	GND	GND	GND	GND	GND
4	-	N.C	-	-	-	-	-
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

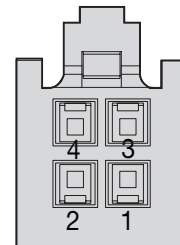
IPD1-03-D-K



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(Wiring Bypass)
5	V+	DC -12V(Wiring Bypass)
6	V+	DC -12V(Wiring Bypass)

BRAKE Connector

IPD1-02-D-K

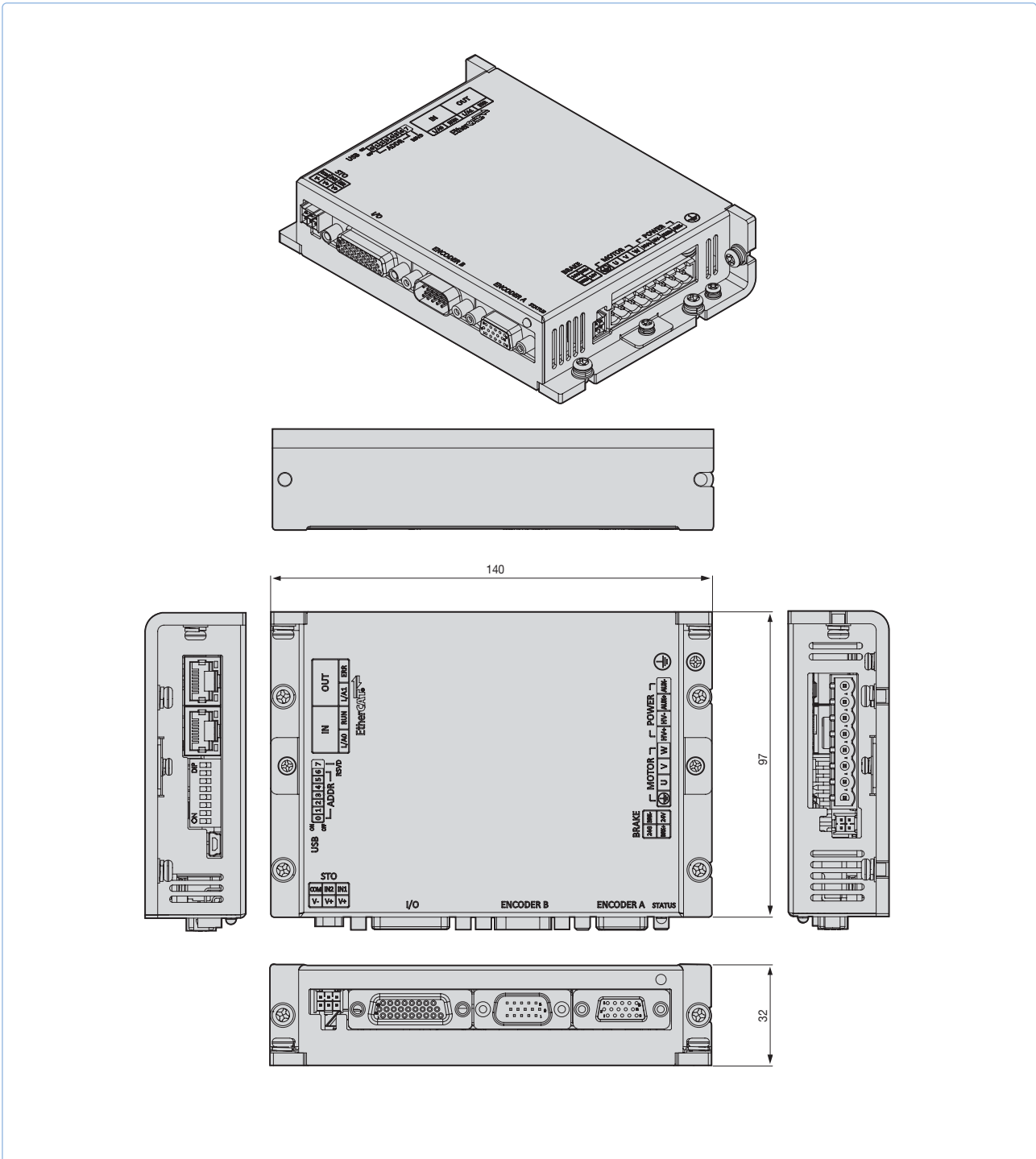


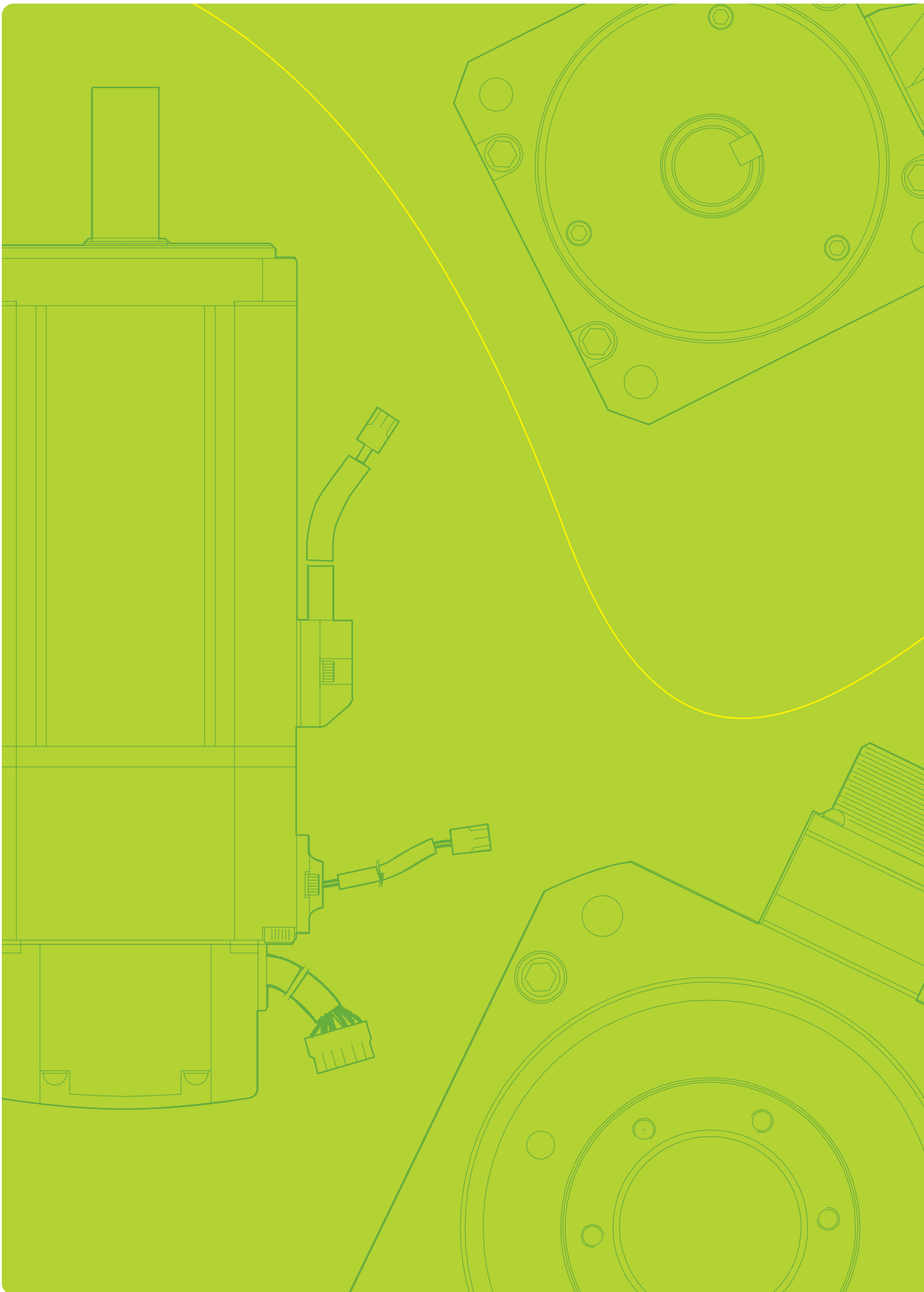
PIN No.	Signal	Description
1	24V	Brake 24V Input
2	BRK+	Brake 24V Output
3	BRK-	Brake (1A)
4	24G	24V Return

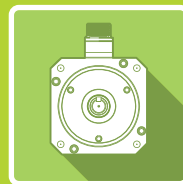
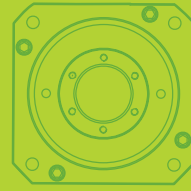
External Dimensions

PHOX Series

*Unit [mm]







Servo Motor

Contents

F Series

Flat Type Rotating Servo Motor ----- 68

F series for L7C

Flat Type Rotating Servo Motor ----- 84

MDM Series

Direct-Drive Motor ----- 90

Servo Motor Designation



APM	F	BL	P	04	A	M	K	1	
Model Name APM : Servo Motor (Made in Korea) APMC : Servo Motor (Made in China)	Flange Size AL : 40 Flange BL : 60 Flange CL : 80 Flange E : 130 Flange F : 180 Flange G : 220 Flange			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]		Encoder Type M : 19bit S-Turn Abs (16bit Turn Abs) M8 : 18bit S-Turn Abs [FAL Type] (16bit M-Turn Abs) Y : 17bit S-Turn Abs (Magnetic)		Oil Seal, Brake Type None : None 1 : Oil Seal Attached 2 : Brake Attached 3 : Oil Seal, Brake Attached Note 1) 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	
Motor Shaft F : Flat Shaft	Input Power Supply None : 200VAC P : 400VAC				Rated Speed A : 3000[rpm] D : 2000[rpm] G : 1500[rpm] M : 1000[rpm]		Shape of Shaft End N : Straight K : One side Round key (Standard)		

Motor Specifications [Rated 3000r/min, 2000r/min]

Servo Motor (APM-□□□□)	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□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	1.73	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	5.28	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 · m ² × 10 ⁻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 · s ²]	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	30 times of motor inertia				20 times of motor inertia				15 times of motor inertia						
Rated Power Rate [kW/s]	10.55	23.78	35.34	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 ^{Note1)}	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 : Below 80[%]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	1.26	2.12	2.66	2.78	

Note1) Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, it is difficult to guarantee IP marked. It can be satisfied protection grade when you use private cable only.

Servo Motor

Speed-Torque Characteristics

- 3 Phase AC200V
- 3 Phase AC230V



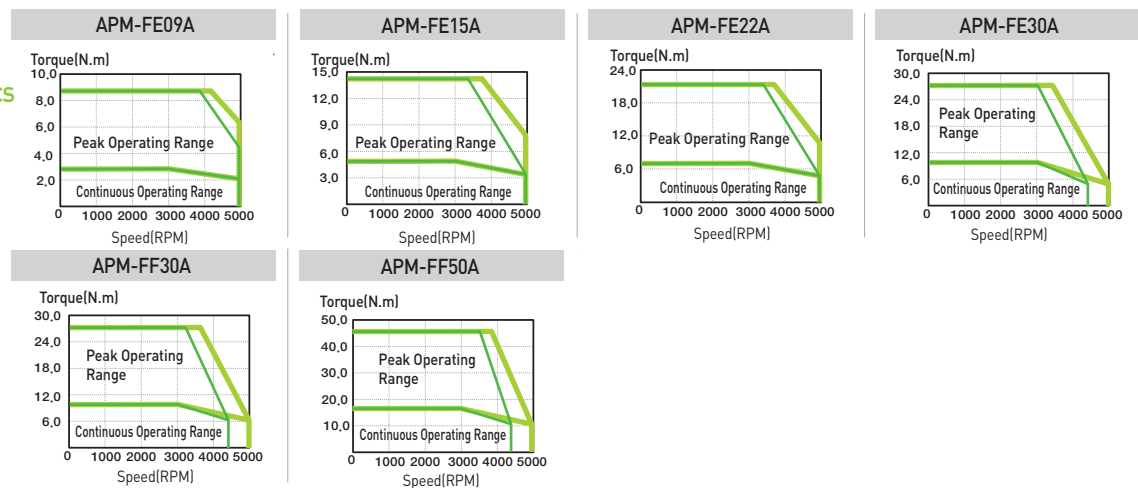
Motor Specifications [Rated 3000r/min]

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 × 10 ⁻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 ^{Note1)}	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 : Below 80[%]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) Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, 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
- 3 Phase AC230V



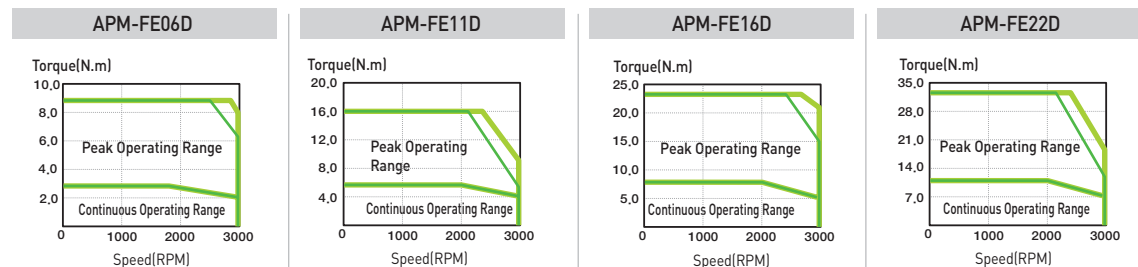
Motor Specifications [Rated 2000r/min]

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
	[N · m]	2.86	5.25	7.63	10.5
Rated Torque	[kgf · cm]	29.20	53.6	77.9	107.1
	[N · m]	8.59	15.75	22.92	31.51
Max. Instantaneous	[kgf · cm]	87.7	160.7	233.8	321.4
	[A]	4.56	6.47	10.98	12.97
Rated Current	[A]	13.68	19.41	32.94	38.91
Max. Current	[A]	2000			
Rated Speed	[r/min]	3000			
Max. Speed	[r/min]	3000			
Inertia	[kg · m ² × 10 ⁻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 ^{Note1)}	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 : Below 80[%]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) Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, 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
- 3 Phase AC230V



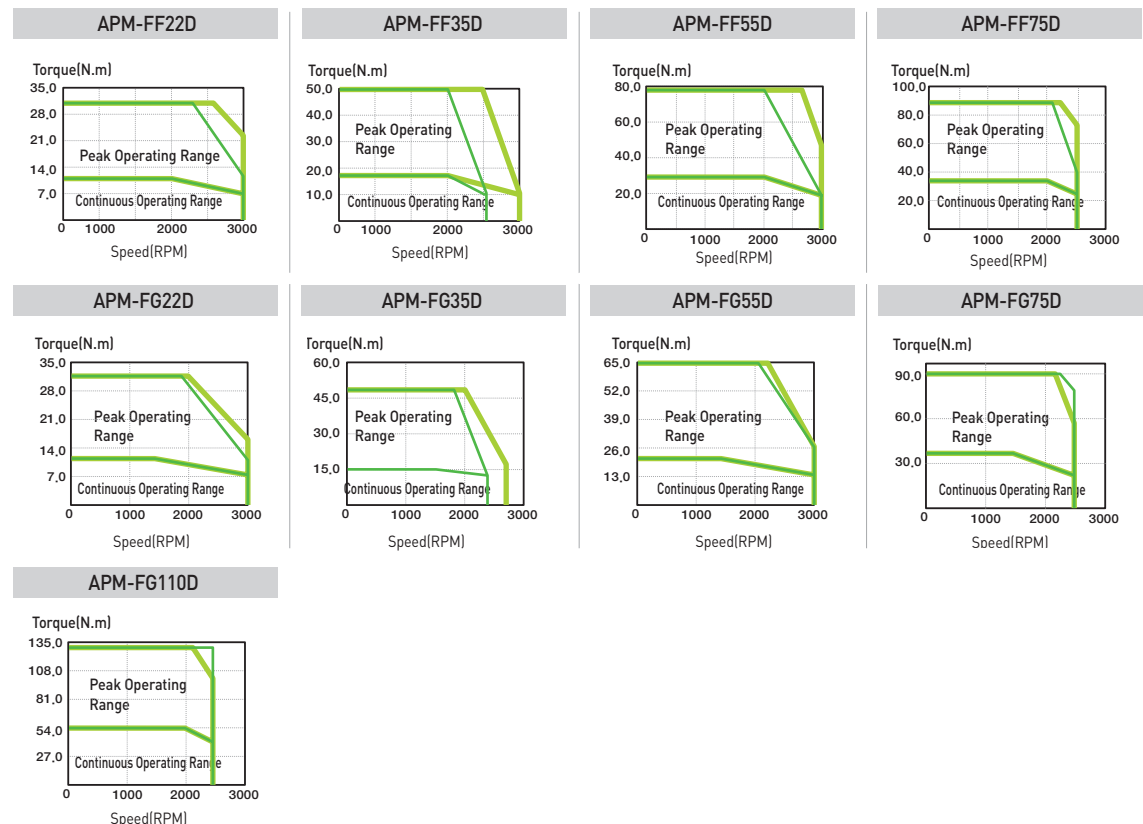
Motor Specifications [Rated 2000r/min]

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
	[N · m]	10.5	16.7	26.25	35.81	10.5	16.71	26.25	35.81	52.52
Rated Torque	[kgf · cm]	107.1	170.4	267.8	365.4	107.1	170.4	267.8	365.4	535.9
	[N · m]	31.5	50.1	78.76	89.53	31.51	50.12	78.76	89.53	157.55
Max. Instantaneous	[kgf · cm]	321.3	511.4	803.4	931.5	321.3	511.3	803.4	913.5	1607.60
	[A]	13.07	16.48	28.78	32.95	10.25	14.67	29.74	30.17	51.39
Rated Current	[A]	39.21	49.44	86.34	88.38	30.75	44.01	89.22	75.43	154.17
Max. Current	[A]	2000								
Rated Speed	[r/min]	3000				2500	3000	2700	3000	2500
Max. Speed	[r/min]	2000								
Inertia	[kg · m ² × 10 ⁻⁴]	27.96	45.56	73.85	106.7	41.13	71.53	117.52	149.4	291.36
	[gf · cm · s ²]	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 <small>Note1)</small>	Serial Type(19bit)								
	Option	×								
Specifications & Features	Structure	Fully closed · Self cooling IP65 <small>Note1)</small>								
	Rated Time	Continuous								
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]								
	Ambient Humidity	Operating : Below 80[%]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]	12.5	17.4	25.12	33.8	15.4	20.2	28.12	33.45	66.2

Note1) Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, 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
- 3 Phase AC230V



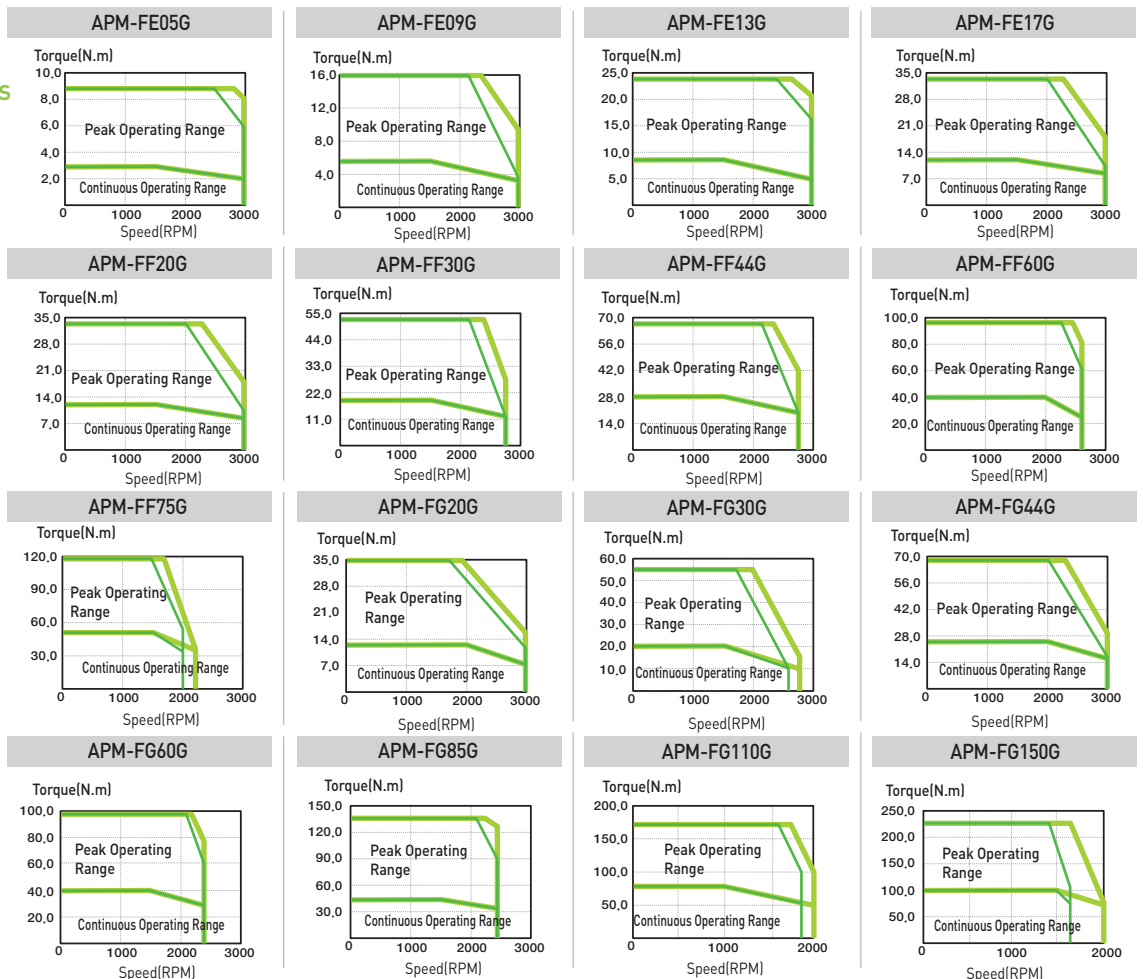
Motor Specifications [Rated1500r/min]

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□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	2000	3000	2700	3000	2500	2500	2000	2000	
Inertia	[kg · m ² ×10 ⁻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 · s ²]	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 ^{Note1)}	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]	5.0	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)} Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, 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
- 3 Phase AC230V



Servo Motor

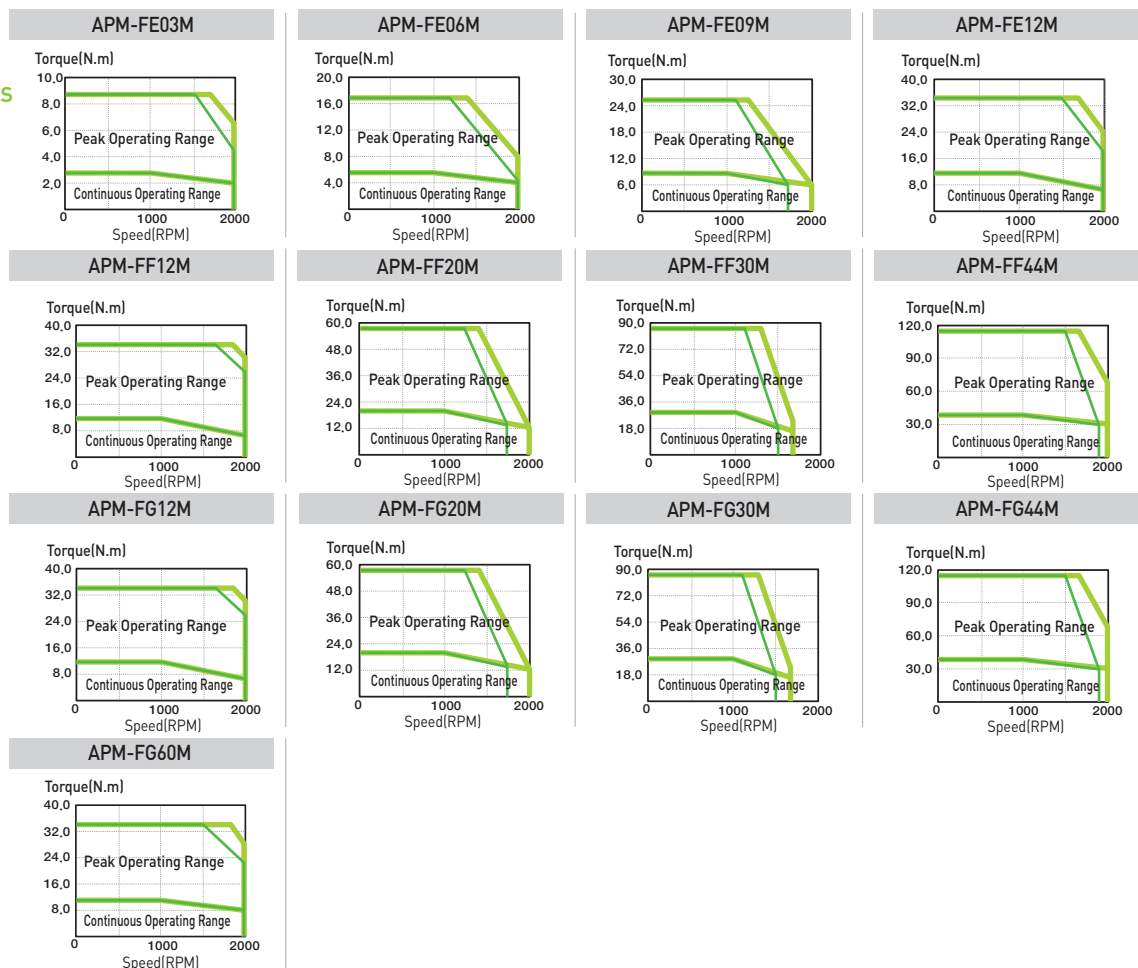
Motor Specifications [Rated 1000r/min]

Servo Motor [APM-□□□□]		FE03M	FE06M	FE09M	FE12M	FF12M	FF20M	FF30M	FF44M	FG12M	FG20M	FG30M	FG44M	FG60M
Applicable Drive		L7□B004	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
	[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
Rated Torque	[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
	[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
Max. Instantaneous	[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
	[A]	2.73	4.56	6.18	10.67	11.1	12.96	16.58	30.6	11.28	13.1	15.52	27.26	39.32
Rated Current	[A]	2.73	4.56	6.18	10.67	11.1	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		1700		2000	
Inertia	[kg · m ² × 10 ⁻⁴]	5.66	10.18	14.62	19.04	27.96	46.56	73.85	106.6	41.13	71.53	117.72	149.4	291.36
	[gf · cm · s ²]	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	32.33	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 <small>Note1)</small>	Serial Type 19[Bit]												
	Option	×												
Specifications & Features	Structure	Fully closed · Self cooling IP65 <small>Note1)</small>												
	Rated Time	Continuous												
	Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]												
	Ambient Humidity	Operating : Below 80[%]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	25.2	33.8	15.4	20.2	28	33.5	66.2

Note1) Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, 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
- 3 Phase AC230V



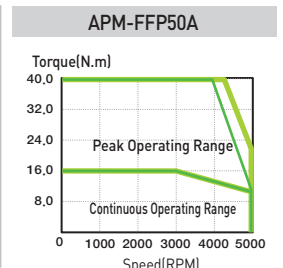
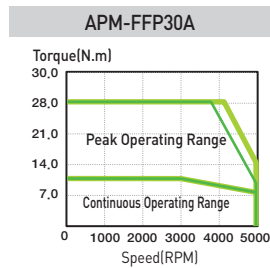
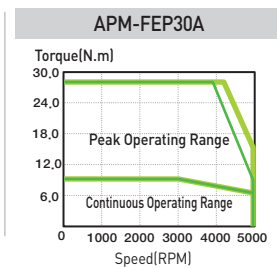
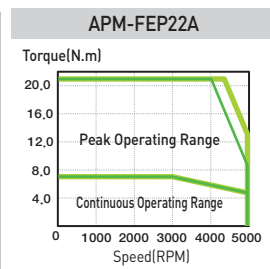
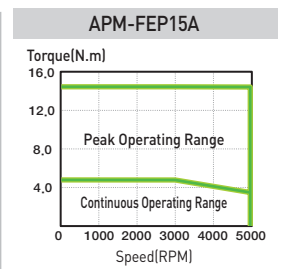
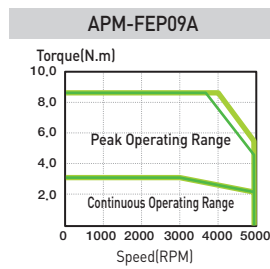
Motor Specifications [Rated 3000r/min]

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
	[N · m]	2.86	4.77	7	9.55	9.55	15.92
Rated Torque	[kgf · cm]	29.33	48.72	71.46	97.44	97.44	162.4
	[N · m]	8.59	14.32	20.01	28.65	28.65	38.79
Max. Instantaneous	[kgf · cm]	87.7	146.16	214.37	292.33	292.33	406.01
	[A]	3.47	6.68	7.64	9.94	9.79	16.07
Rated Current	[A]	10.4	20.03	22.92	29.81	29.38	48.22
Rated Speed	[r/min]	3000					
Max. Speed	[r/min]	5000					
Inertia	[kg · m ² X 10 ⁻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 ^{Note1)}	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 : Below 80[%]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)} Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, 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
- 3 Phase AC230V



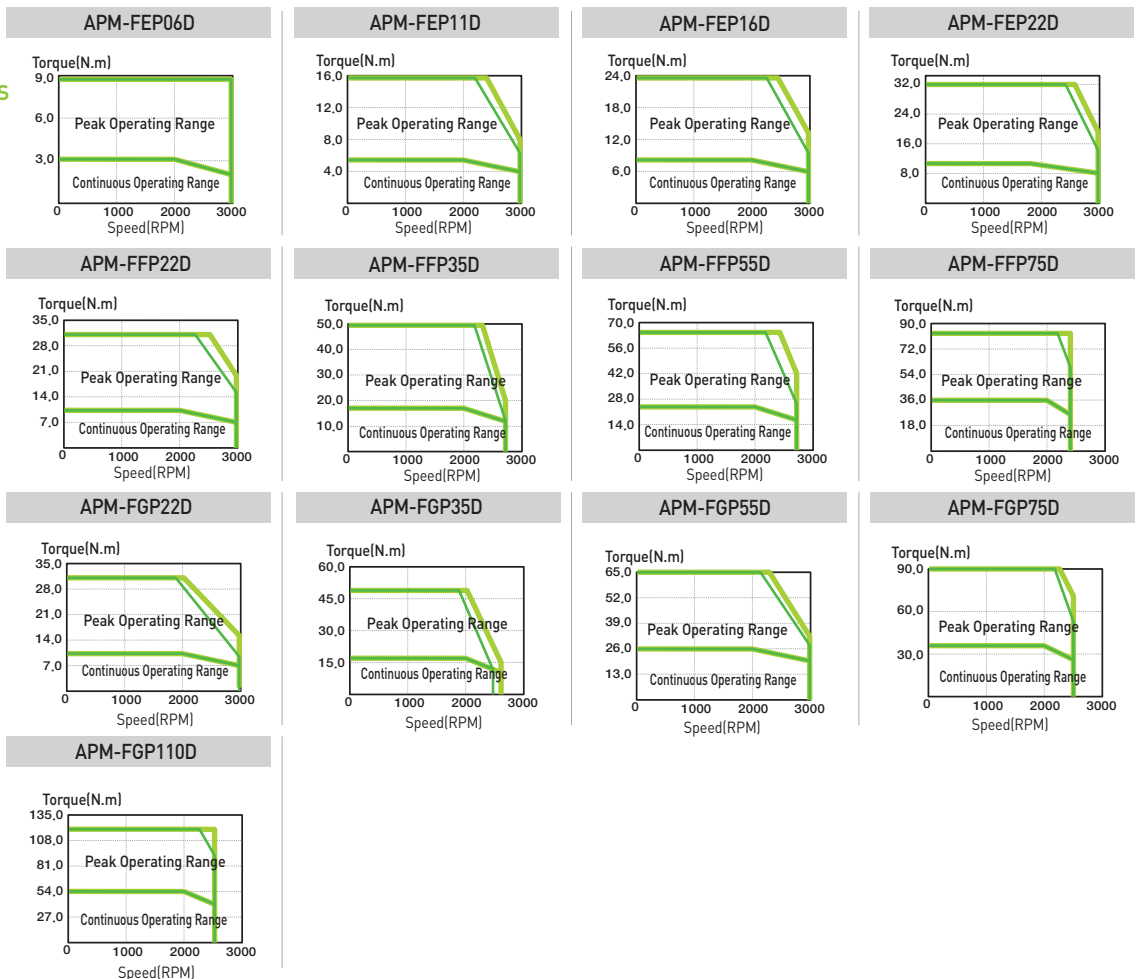
Motor Specifications [Rated 2000r/min]

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	669.91	913.52	321.56	511.57	669.84	913.52	1339.82	
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]	2000				2800		2700	2500	3000	2700	3000	3000	2500	
Inertia	[kg · m ² × 10 ⁻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 · s ²]	5.774	10.387	14.917	19.429	28.531	47.51	75.357	108.908	41.67	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	94.65	
Speed/Position Detector	Standard ^{Note1}	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 : Below 80[%]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	26.3	35.6	16.95	21.95	30.8	37.52	66.2	

Note1 Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, 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
- 3 Phase AC230V



Motor Specifications [Rated 1500r/min]

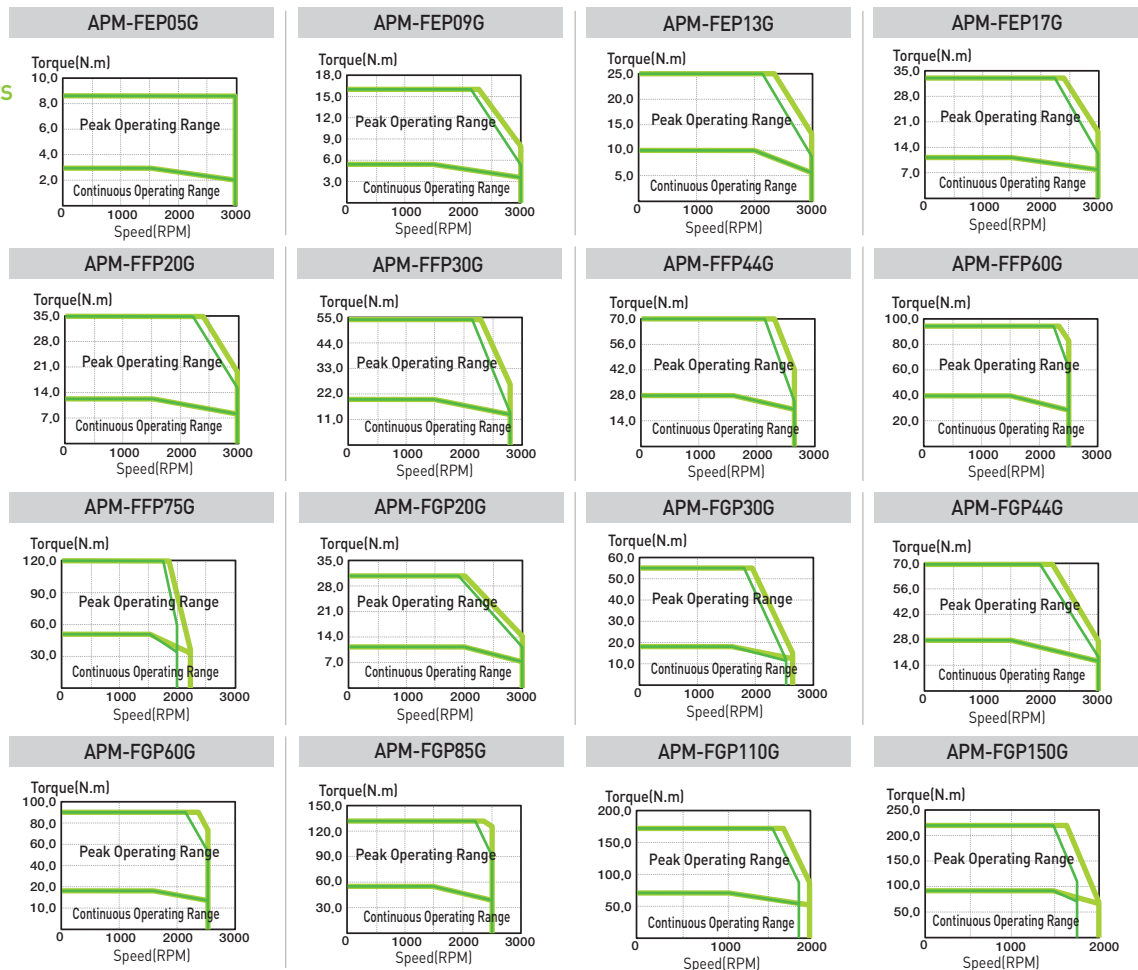
Servo Motor (APM-□□□□)		FEP05G	FEP09G	FEP13G	FEP17G	FFP20G	FFP30G	FFP44G	FFP75G	FGP20G	FGP30G	FGP44G	FGP60G	FGP85G	FGP110G	FGP150G	
Applicable Drive		L7□B010□			L7□B020□			L7□B035□	L7□B050□	L7□B075□		L7□B020□	L7□B035□	L7□B050□	L7□B150□		
Flange Size (□)		□ 130				□ 180				□ 220							
Rated Output	[kW]	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	75.63	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	771.74	974.42	1,380.43	1,786.43	2,436.05
Rated Current	[A]	3.28	3.50	5.39	7.01	7.56	10.14	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				3000		2500		3000		2000	
Inertia	[kg · m ² × 10 ⁻⁴]	5.659	10.179	14.619	19.04	27.96	46.56	73.85	106.73	131.29	51.42	80.35	132.41	172.91	291.36	51.42	424.5
	[gf · cm · s ²]	5.774	10.387	14.917	19.429	28.531	47.51	75.357	108.908	133.969	52.47	81.99	135.11	176.44	297.31	52.47	433.2
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	45.39	61.97	102.08	100.5	168.3	214.8
Speed/Position Detector	Standard ^{Note1)}	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 : Below 80[%]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	26.3	35.6	39.4	16.95	21.95	30.8	37.52	66.2	66.3	92.2

Note1) Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, it is difficult to guarantee IP marked. It can be satisfied protection grade when you use private cable only.

Servo Motor

Speed-Torque Characteristics

- 3 Phase AC200V
- 3 Phase AC230V



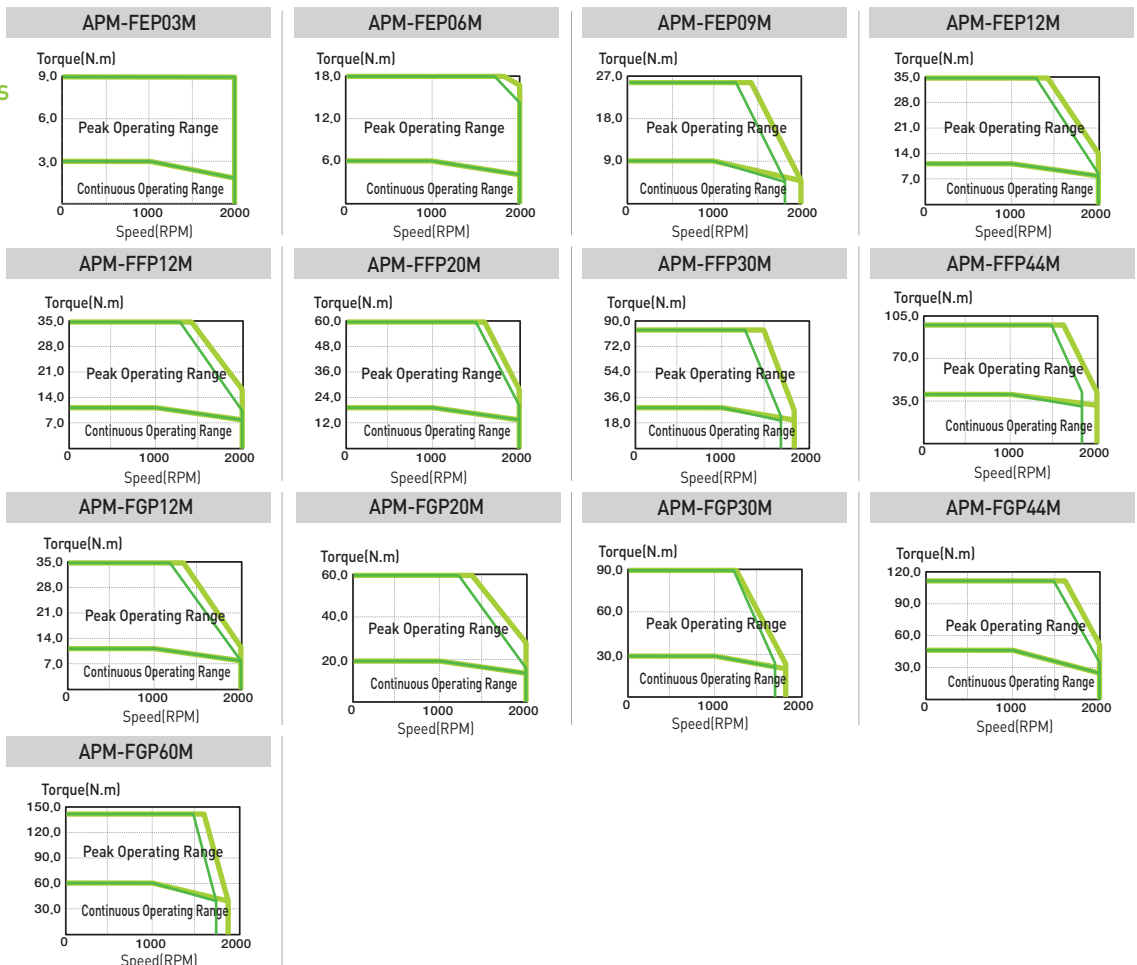
Motor Specifications [Rated 1000r/min]

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]		1800													
Inertia		[kg · m ² × 10 ⁻⁴]	5.659	10.179	14.619	19.04	27.96	46.56	73.85	106.73	51.42	80.35	132.41	172.91	291.36
		[gf · cm · s ²]	5.774	10.387	14.917	19.429	28.531	47.51	75.357	108.908	52.47	81.99	135.11	176.44	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	78.38	111.13	165.41	25.53	45.39	61.97	102.08	112.65	
Speed/Position Detector		Standard <small>Note1</small>	Serial Type 19[Bit]												
		Option	×												
Specifications & Features		Structure	Fully closed · Self cooling IP65 <small>Note1</small>												
		Rated Time	Continuous												
		Ambient Temp	Operating : 0 ~ 40[°C] Storage : -10 ~ 60[°C]												
		Ambient Humidity	Operating : Below 80[%]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	26.3	35.6	16.95	21.95	30.8	37.52	66.2	

Note1) Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, 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
- 3 Phase AC230V

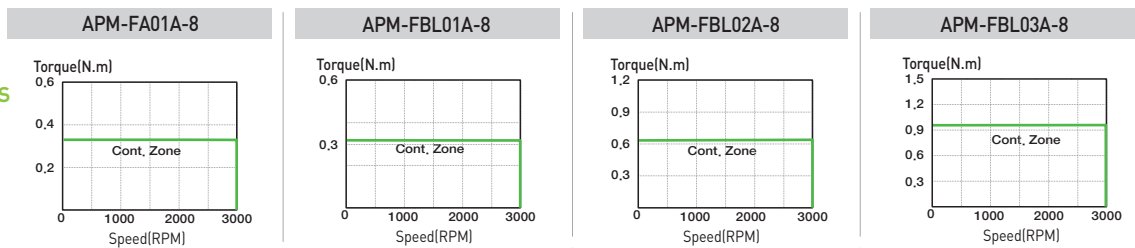


PHOX DC Drive Motor Specification

Servo Motor (APM-□□□□-8)	FAL01A-8	FBL01A-8	FBL02A-8	FBL03A-8
Applicable Drive	PHOX-03		PHOX-06	
Flange Size(□)	□40	□60	□60	□60
Rated Output	[kW]	0.1	0.1	0.2
Rated Torque	[N · m]	0.32	0.32	0.64
	[kgf · cm]	3.25	3.25	6.49
Rated Current	[A]	2.71	2.5	5.54
Rated Speed	[r/min]	3000		
Inertia	[kg · m ² X10 ⁻⁴]	0.42	0.091	0.147
	[gf · cm · s ²]	0.43	0.093	0.15
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
Speed/Position Detector	Standard	Serial Multi-Turn Built-In Type(18bit)		
	Option	X		
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/s ²][5G]		

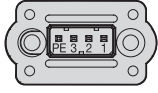
Note1) Except for axis penetration, when you attach reducer to the motor, we don't guarantee IP for reducer. If you bend over specification designated in cable standard, it is difficult to guarantee IP marked. It can be satisfied protection grade when you use private cable only.

Speed-Torque Characteristics



FAL Series

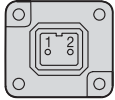
Plug Specifications



Power

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

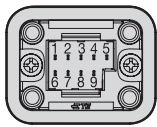
(Power Connector Pin Table)



Brake

Pin No.	Signal
1	BK+
2	BK-

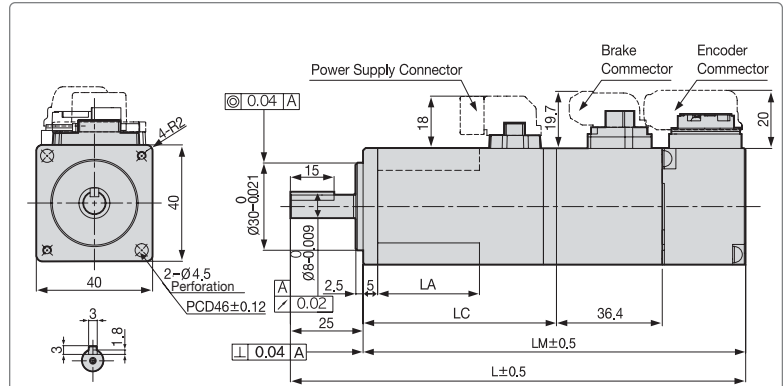
(Brake Connector Pin Table)



Encoder

Multi Turn (M)	
Pin No.	Signal
1	MA
2	SLO
3	-
4	OV
5	SHIELD
6	MA
7	SLO
8	-
9	+5V

(Encoder Connector Pin Table)



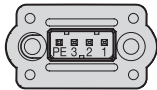
(Cross section of shaft key)

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

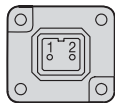
Plug Specifications



Power

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

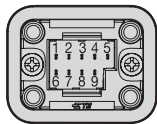
(Power Connector Pin Table)



Brake

Pin No.	Signal
1	BK+
2	BK-

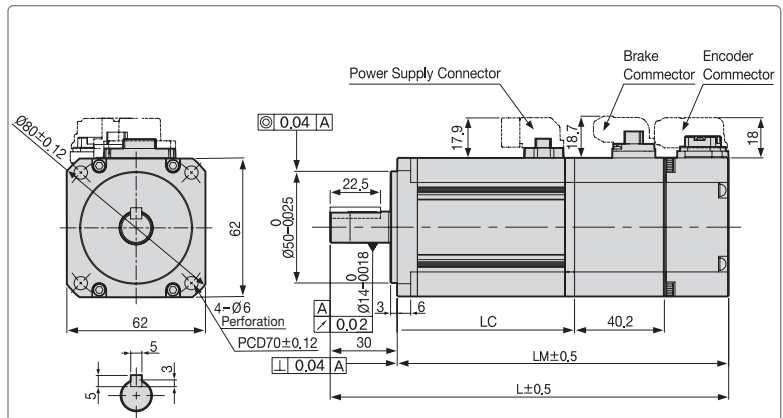
(Brake Connector Pin Table)



Encoder

Multi Turn (M)	
Pin No.	Signal
1	MA
2	SLO
3	GND_B
4	OV
5	SHIELD
6	MA
7	SLO
8	VDD_B
9	+5V

(Encoder Connector Pin Table)



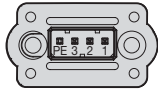
(Cross section of shaft key)

Model	External Dimensions(mm)						Key			Weight (kg)
	L	LM	LC	S	H	T	W	U		
FBL01A	107.2(147.2)	77.2(117.2)	48.5(48.3)	14	-0.018	5	5	3	0.56(1.3)	
FBL02A	118.2(158.2)	88.2(128.2)	59.5(59.3)	14	-0.018	5	5	3	0.74(1.48)	
FBL04A	138.2(178.2)	108.2(148.2)	79.5(79.3)	14	-0.018	5	5	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

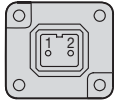
Plug Specifications



Power

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

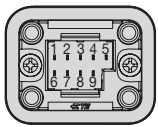
[Power Connector Pin Table]



Brake

Pin No.	Signal
1	BK+
2	BK-

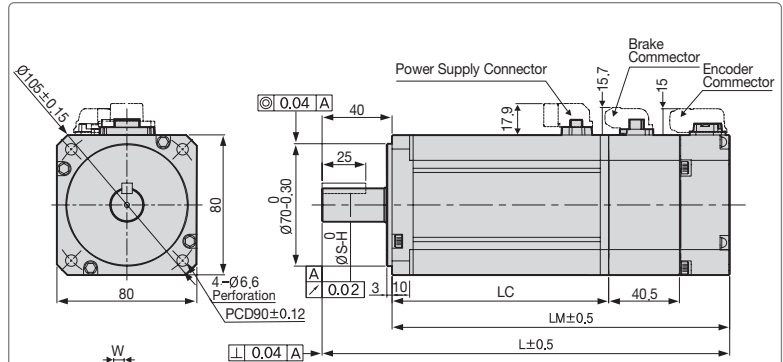
[Brake Connector Pin Table]



Encoder

Multi Turn (M)	
Pin No.	Signal
1	MA
2	SLO
3	GND_B
4	OV
5	SHIELD
6	MA
7	SLO
8	VDD_B
9	+5V

[Encoder Connector Pin Table]



(Cross section of shaft key)

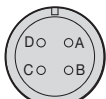
Model	External Dimensions(mm)							Weight(kg)	
	L	LM	LC	S	H	T	W		U
FCL04A, FCL03D	138.7(179.5)	98.7(139.5)	70(69.8)	14	-0.018	5	5	3	1.52(2.32)/1.26(2.06)
FCL06A, FCL05D	156.7(197.5)	116.7(157.5)	88(87.8)	19	-0.021	6	6	3.5	2.14(2.94)/2.12(2.92)
FCL08A, FCL06D	174.7(215.5)	134.7(175.5)	106(105.8)	19	-0.021	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.

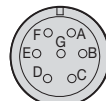
FE, FEP Series

Plug Specifications

[Power]



Spec.: MS3102A20-4P
(Standard)



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

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	BKPin

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

[Single Turn Encoder Connector Pin Table]

[Encoder]

Serial type

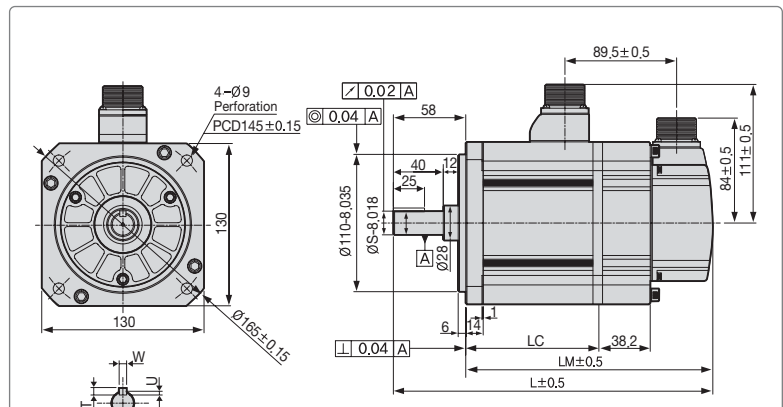


Spec.: MS3102A20-29P

Encoder

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

[Multi Turn Encoder Connector Pin Table]



(Cross section of shaft key)

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.

FF, FFP Series

Plug Specifications

[Power]



Spec.: MS3102A22-22P
(Standard)



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

[Encoder]

Serial type



Spec.: MS3102A20-29P

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

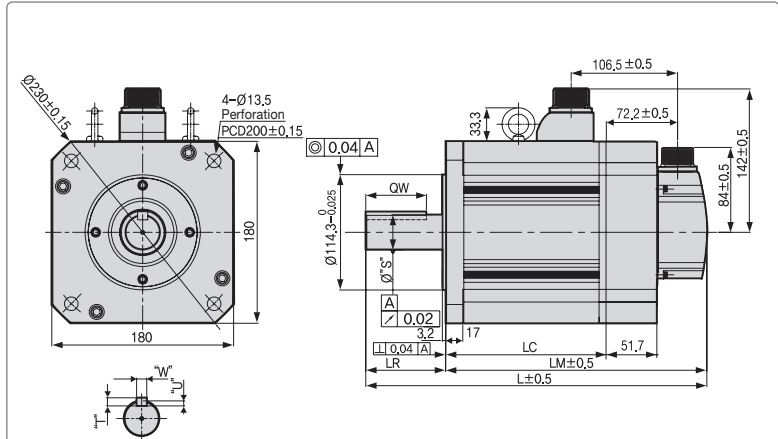
Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	MA	N	-
C	SLO	P	-
D	SLO	R	-
E	-	H	+5V
F	-	G	0V
K	-	J	SHIELD
L	-	-	-

(Single Turn Encoder Connector Pin Table)

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

(Multi Turn Encoder Connector Pin Table)

- Note1) FF30M or above models have eye bolts.
- Note2) Use DC[24V] for brake input power supply.
- Note3) The [] is for brake-attached type.
- Note4) Use MS3102A32-17 for FF75G Power connector.



(Cross section of shaft key)

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)							12.5(19.7)
FF50A, FF35D, FF30G, FF20M FFP50A, FFP35D, FFP30G, FFP20M	287.5(338.9)	208.5(259.9)	159(158.7)		35 ^{+0.01} ₀			10		17.4(24.6)
FF55D, FF44G, FF30M FFP55D, FFP44G, FFP30M	331.5(382.9)	252.5(303.9)	203(202.7)	79		60	8		5	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)

FG, FGP Series

Plug Specifications

[Power]



Spec.: MS3102A22-22P
(Standard)



Spec.: 3102A14-7P
(Brake-attached type)

[Encoder]

Serial type



Spec.: MS3102A20-29P

Power

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

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

Encoder

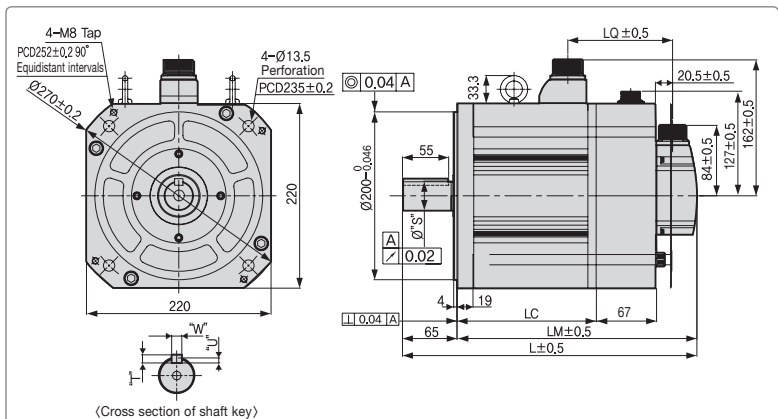
Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	MA	N	-
C	SLO	P	-
D	SLO	R	-
E	-	H	+5V
F	-	G	0V
K	-	J	SHIELD
L	-	-	-

(Single Turn Encoder Connector Pin Table)

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

(Multi Turn Encoder Connector Pin Table)

- Note1) In case of SG, use DC[90V] for brake input power supply. Note2) The [] is for brake-attached type.



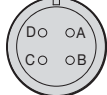
(Cross section of shaft key)

Model	External Dimensions(mm)			Key				Weight(kg)
	L	LM	LC	S	T	W	U	
FG22D, FG20G, FG12M FGP22D, FGP20G, FGP12M	229.5(295.7)	164.5(230.7)	115(114.2)					15.42(29.23)
FG35D, FG30G, FG20M FGP35D, FGP30G, FGP20M	250.5(316.7)	185.5(251.7)	136(135.2)	35 ^{+0.01} ₀	8	10	5	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)

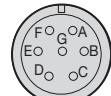
FG(P)110G

Plug Specifications

[Power]



Spec.: MS3102A32-17P



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

[Encoder]

Serial type



Spec.: MS3102A20-29P

Power

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

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

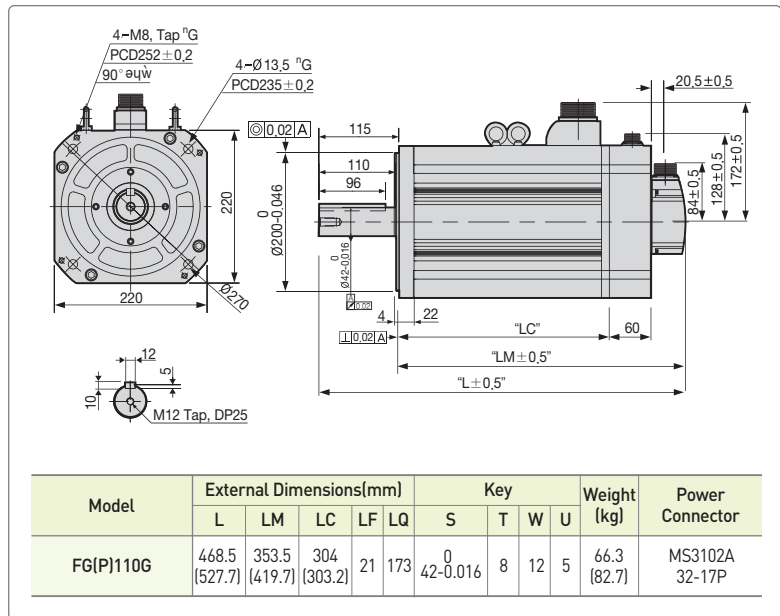
Encoder

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

(Multi Turn Encoder Connector Pin Table)



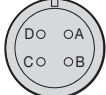
Model	External Dimensions(mm)					Key				Weight (kg)	Power Connector
	L	LM	LC	LF	LQ	S	T	W	U		
FG(P)110G	468.5 (527.7)	353.5 (419.7)	304 (303.2)	21	173	0 42-0.016	8	12	5	66.3 (82.7)	MS3102A 32-17P

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.

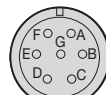
FG(P)150G

Plug Specifications

[Power]



Spec.: MS3102A22-22P
(Standard)
MS3102A32-17P



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

[Encoder]

Serial type



Spec.: MS3102A20-29P

Power

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

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

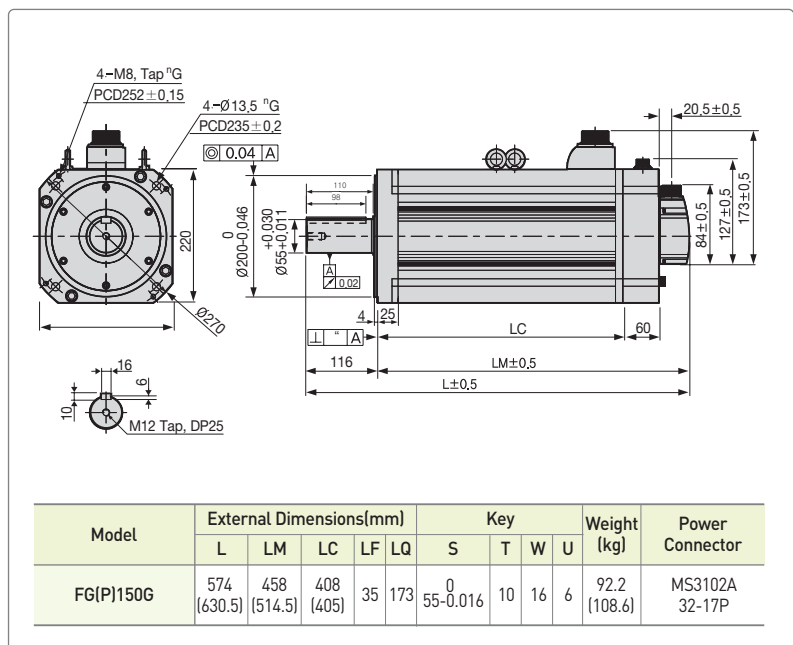
Encoder

Pin No.	Signal	Pin No.	Signal
A	MA	M	-
B	MA	N	-
C	SLO	P	-
D	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	MA	N	-
C	SLO	P	-
D	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	LF	LQ	S	T	W	U		
FG(P)150G	574 (630.5)	458 (514.5)	408 (405)	35	173	0 55-0.016	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.

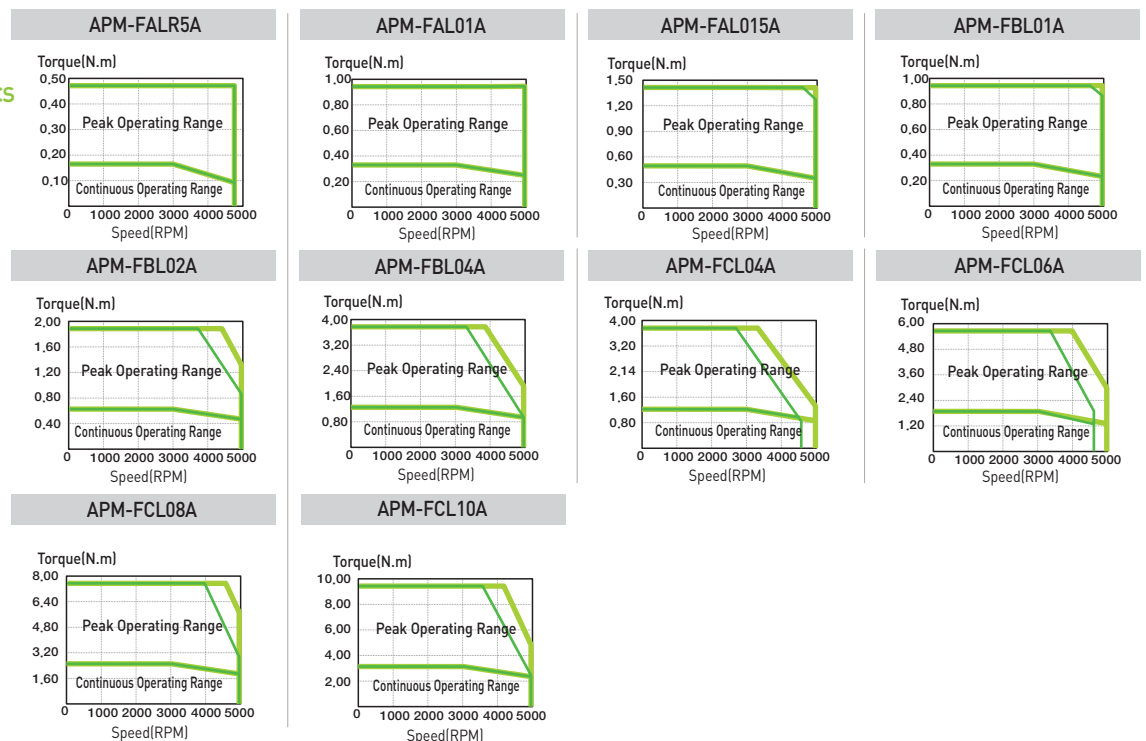
Motor Specifications for L7C [Rated 3000r/min]

Servo Motor (APM-□□□□YK)	FALR5A	FAL01A	FAL015A	FBL01A	FBL02A	FBL04A	FCL04A	FCL06A	FCL08A	FCL10A	
Applicable Drive	L7□A001		L7□A002	L7□A001	L7□A002	L7□A004		L7□A008		L7□A010	
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
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	1.73	0.95	1.45	2.6	2.58	3.81	5.02	5.83
Max. Current	[A]	2.85	3.75	5.28	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 × 10 ⁻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	35.34	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 : Below 80[%]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
- 3 Phase AC230V



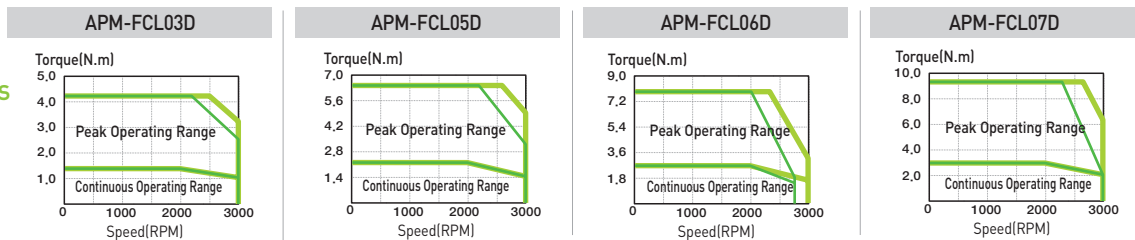
Motor Specifications for L7C [Rated 2000r/min]

Servo Motor (APM-□□□□K)		FCL03D	FCL05D	FCL06D	FCL07D
Applicable Drive		L7CA004	L7CA008		
Flange Size(□)		□80			
Rated Output	[kW]	0.3	0.45	0.55	0.65
	[N · m]	1.43	2.15	2.63	3.1
Rated Torque	[kgf · cm]	14.62	21.92	26.8	31.67
	[N · m]	4.3	6.45	7.88	9.31
Max. Instantaneous	[kgf · cm]	43.85	65.77	80.39	95.01
	[A]	2.5	3.05	3.06	3.83
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), Serial Multi-Turn Built-in Type(19bit)			
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

Note1) Brake is not applicable for FAL015A

Speed-Torque Characteristics

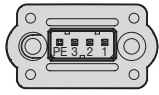
- 3 Phase AC200V
- 3 Phase AC230V



Servo Motor

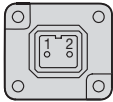
FAL Series for L7C

Plug Specifications



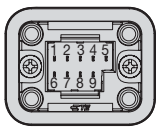
Power	
Pin No.	Signal
1	U
2	V
3	W
PE	Ground

(Power Connector Pin Table)



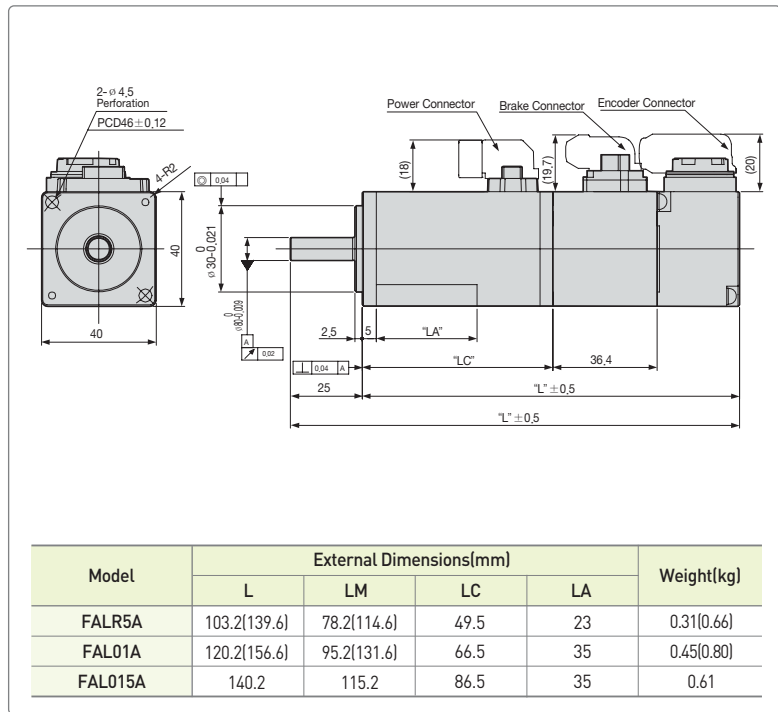
Brake	
Pin No.	Signal
1	BK+
2	BK-

(Brake Connector Pin Table)



Encoder	
Single Turn (N)	
Pin No.	Signal
1	MA
2	SLO
3	-
4	OV
5	SHIELD
6	MA
7	SLO
8	-
9	+5V

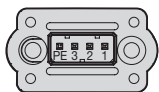
(Encoder Connector Pin Table)



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.

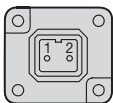
FBL Series for L7C

Plug Specifications



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

(Power Connector Pin Table)



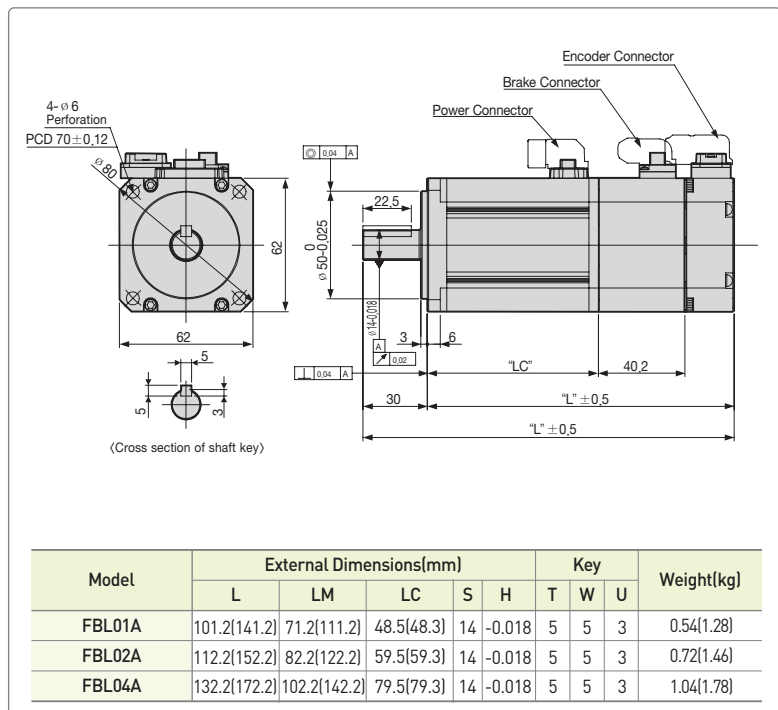
Brake	
Pin No.	Signal
1	BK+
2	BK-

(Brake Connector Pin Table)



Encoder	
Single Turn (N)	
Pin No.	Signal
1	MA
2	SLO
3	-
4	OV
5	SHIELD
6	MA
7	SLO
8	-
9	+5V

(Encoder Connector Pin Table)



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

FCL Series for L7C

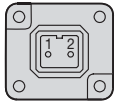
Plug Specifications



Power

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

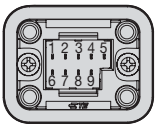
[Power Connector Pin Table]



Brake

Pin No.	Signal
1	BK+
2	BK-

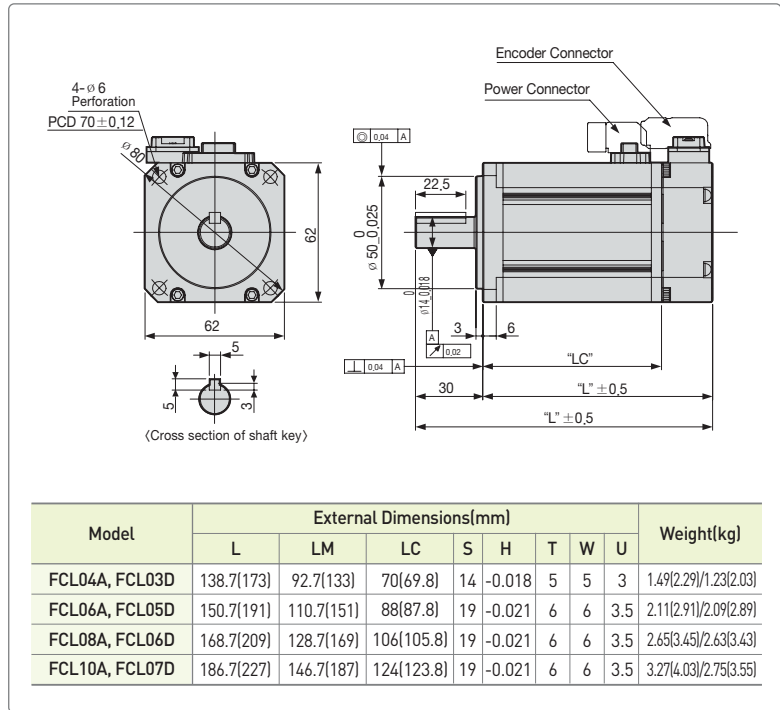
[Brake Connector Pin Table]



Encoder

Single Turn (N)		Multi Turn (M)	
Pin No.	Signal	Pin No.	Signal
1	MA	1	MA
2	SLO	2	SLO
3	-	3	GND_B
4	OV	4	OV
5	SHIELD	5	SHIELD
6	MA	6	MA
7	SLO	7	SLO
8	-	8	VDD_B
9	+5V	9	+5V

[Encoder Connector Pin Table]



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

Brake Specification

Motor Series	FAL	FBL	FCL	FF/FEP	FF/FFP	FG/FGP	FG/FGP110G FG/FGP150G
Purpose	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance	Maintenance
Input Voltage [V]	DC 24V	DC 24V	DC 24V	DC 24V	DC 24V	DC 90V	DC 90V
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
Coil Resistance [Ω]	96	89	64	29.6	23	327	22.2
Rated Current [A]	0.25	0.27	0.38	0.81	1.04	0.28	0.08
Braking Mechanism	Spring Brake	Spring Brake	Spring Brake	Spring Brake	Spring Brake	Spring Brake	Spring Brake
Insulation Class	F	F	F	F	F	F	F

Note 1) All electromagnetic brakes built-in LS servo motors are of the same specification.

Note 2) Electronic brakes are designed for holding a load during a power-off condition. Do not use them to stop motion.

Note 3) The characteristics of the electromagnetic brake are measured at 20 °C.

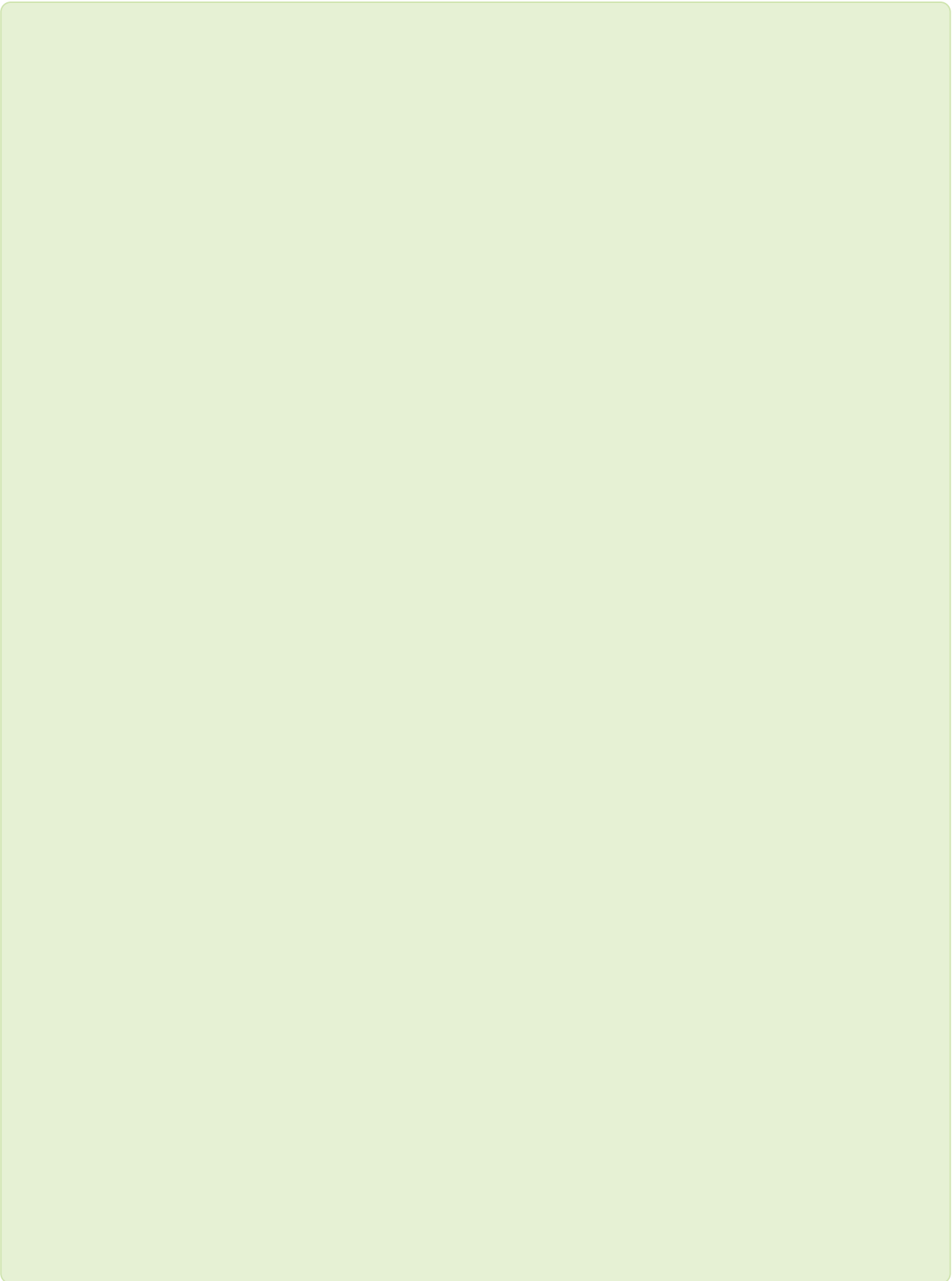
Note 4) Brake specifications are subject to change without notice. Be sure to check the voltage specification marked on the motor.

Note 5) FAL, FBL, FCL, FF, FFP series meet Class UL 2 of brake specifications.

Heat Sink Specification

Classification	Standard (mm)	Material
AP04	250×250×6	Aluminum
AP06	250×250×6	
AP08	250×250×12	
AP13	350×350×20	
AP18	550×550×30	
AP22	650×650×35	

Note 1) The data on the product features is measured when those heat sinks were applied.



DD Motor Designation



MDM - D D None 34 D NO H - I

Motor Type
D : DD MOTOR

Input Power Supply
None : 220VAC

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

Encoder Type						
NO	135	175	230	290	360	Remark Single Turn Abs, Biss communication
	20Bit					

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 Wiring (Compared with 3 phase AC Reactor)
- Providing Connection for DC Input (PI, NI)

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

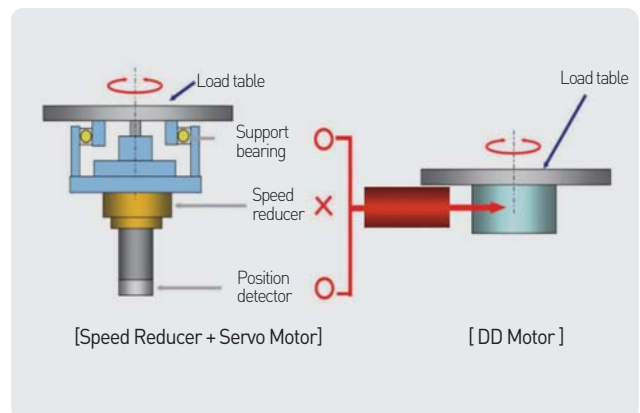
Direct Drive Structure

- 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)




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[M Ω] or higher
- Insulation internal voltage: 1800 VAC, 1 second
- Operating voltage: 200 VAC
- Operating temperature : 0 - 40[°C] / Storage temperature: -10-60[°C]
- Ambient humidity : 20 - 80% RH (no condensation)
- Installation location : Place with no toxic substances, such as corrosive and combustible gasses, cutting oil, metal dust, grease or direct sunlight

Line-up Table

Maximum Torque[Nm]			9	18	27	36	54	66	102	120	180	330	480	
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							
		Ø290								DE40D DE60D				
Rated speed 150[rpm]	Maximum speed 250[rpm]	Ø360									DFA1D DFA6D			

Applicable Drive to Motor

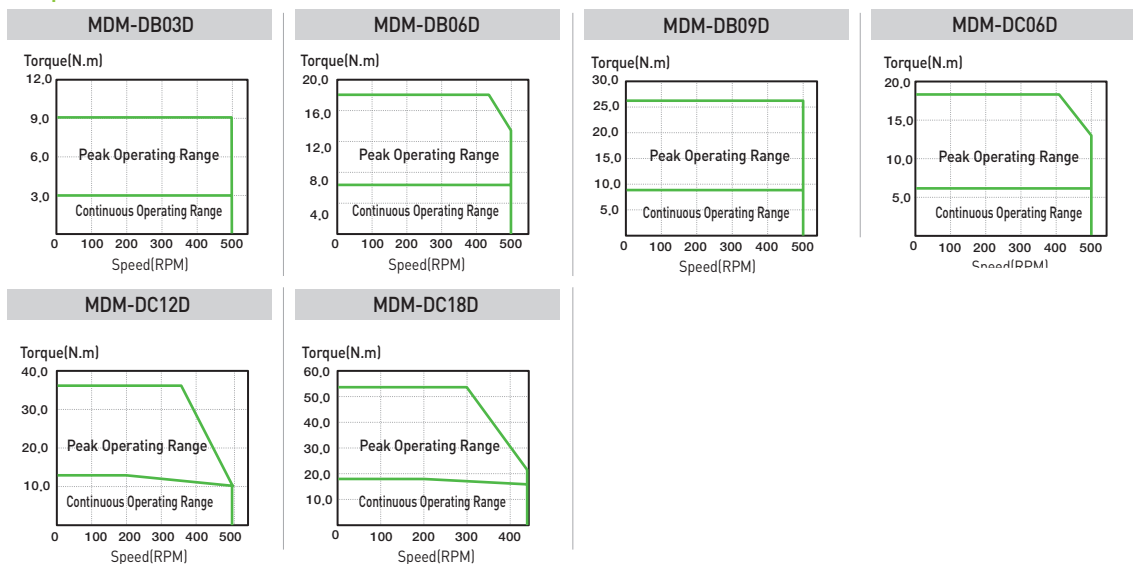
Rated Speed (RPM)	Maximum Speed (RPM)	External Diameter of Motor(∅)	Applicable Motor	Drive	Standard Encoders	Encoders Cable (Serial)	Power Cable (Power)
200	500	135	DB03D	L7□A001 □	* 20Bit Serial	APCS-E □ □□ZS	APCS-PN □ □YS
			DB06D	L7□A002 □			
			DB09D	L7□A004 □			
		175	DC06D	L7□A002 □			
			DC12D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

Appearances of Motor



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	∅135			∅175		
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 ² ×10 ⁻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[°C] / storage : -20~60[°C]					
	Ambient Humidity	20~80[%] RH(avoid dew-condensation)					
	Atmosphere	Avoid direct sunlight, No corrosive gas, Inflammable gas, Oil mist, or Dust					

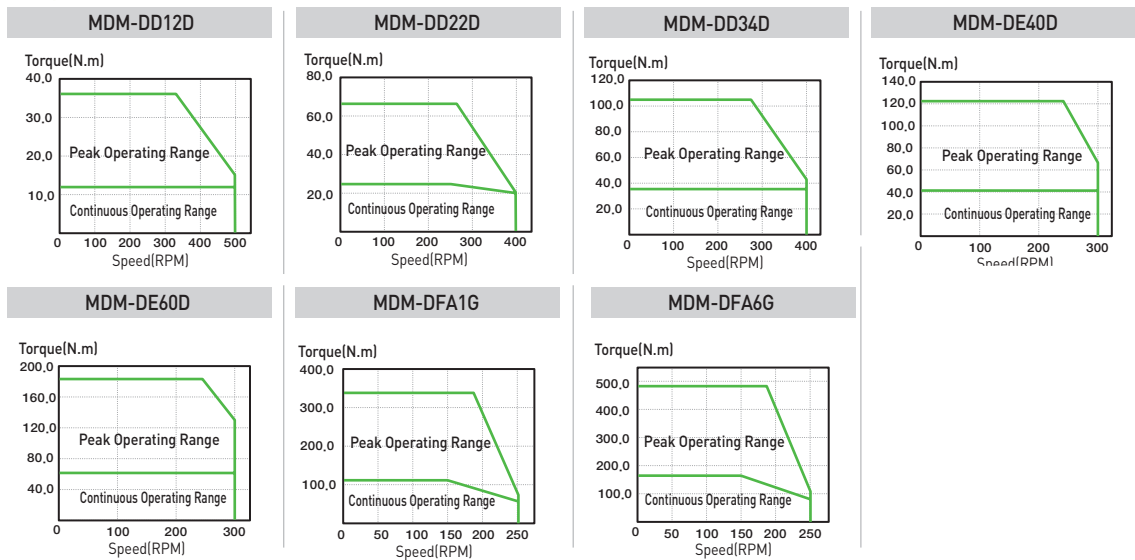
Speed-Torque Characteristics



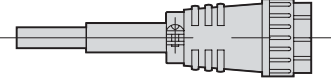
Motor Designation		MDM-DD□□D□□H-I			MDM-DE□□D□□H-I		MDM-DF□□G□□H-I		MDM-DG□□S□□H
		12	22	34	40	60	A1	A6	C3
Applicable Drive		L7□A004□	L7□A008□	L7□A010□	L7□A010□	L7□A020□	L7□A020□	L7□A035□	L7□A020□
Flange Size	mm	∅230			∅290		∅360		∅380
Rated Output	W	251	461	712	838	1,257	1,728	2,513	1,728
Rated Torque	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	-
Inertia	kg-m ² × 10 ⁻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	-
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			1,100		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[°C] / storage : -20~60[°C]							
	Ambient Humidity	20~80[%] RH(avoid dew-condensation)							
	Atmosphere	Avoid direct sunlight, No corrosive gas, Inflammable gas, Oil mist, or Dust							

Servo Motor

Speed-Torque Characteristics



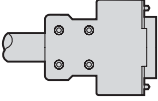
MDM-DB03D, MDM-DB06D, MDM-DB09D



NJC-24-4-PM

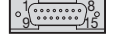
Signal	Pin No.
U	1
V	2
W	3
FG	4

POWER CONNECTOR

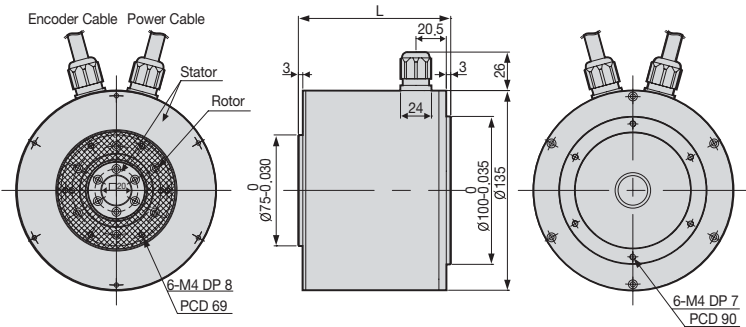


NO	Encoder Signal	NO	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	OV	12	-
5	SHIELD	13	-
6	MA	14	-
7	SLO	15	-
8	-	-	-

ENCODER CONNECTOR



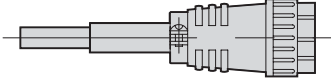
D-Sub Connector (15pin)



Encoder Cable Power Cable
Stator Rotor
6-M4 DP 8 PCD 69
6-M4 DP 7 PCD 90

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

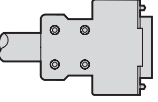
MDM-DC06D, MDM-DC12D, MDM-DC18D



NJC-24-4-PM

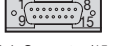
Signal	Pin No.
U	1
V	2
W	3
FG	4

POWER CONNECTOR

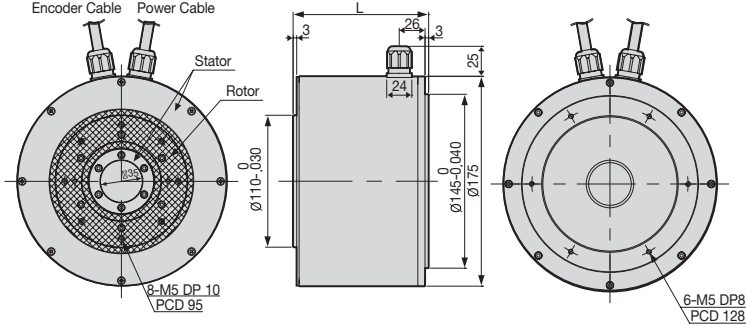


NO	Encoder Signal	NO	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	OV	12	-
5	SHIELD	13	-
6	MA	14	-
7	SLO	15	-
8	-	-	-

ENCODER CONNECTOR



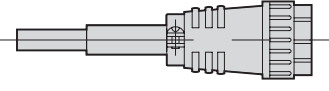
D-Sub Connector (15pin)



Encoder Cable Power Cable
Stator Rotor
8-M5 DP 10 PCD 95
6-M5 DP8 PCD 128

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

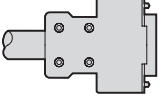
MDM-DD12D, MDM-DD22D, MDM-DD34D



NJC-24-4-PM

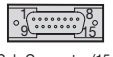
Signal	Pin No.
LEAD U	1
WIRE V	2
W	3
FG	4

POWER CONNECTOR

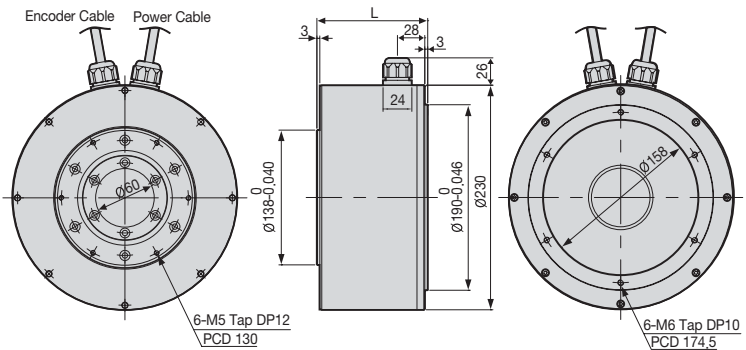


D.D SERVO ENCODER CABLE			
NO	Encoder Signal	NO	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	OV	12	-
5	SHIELD	13	-
6	MA	14	-
7	SLO	15	-
8	-		

ENCODER CONNECTOR

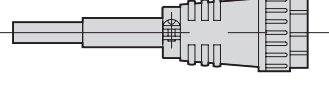


D-Sub Connector (15pin)



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

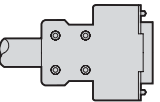
MDM-DE40D, MDM-DE60D



NJC-24-4-PM

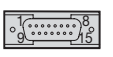
Signal	Pin No.
LEAD U	1
WIRE V	2
W	3
FG	4

POWER CONNECTOR

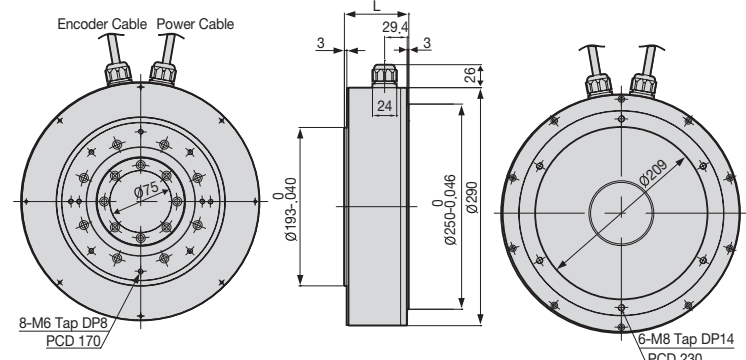


D.D SERVO ENCODER CABLE			
NO	Encoder Signal	NO	Encoder Signal
1	MA	9	+5V
2	SLO	10	-
3	-	11	-
4	OV	12	-
5	SHIELD	13	-
6	MA	14	-
7	SLO	15	-
8	-		

ENCODER CONNECTOR

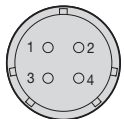


D-Sub Connector (15pin)

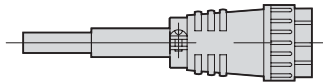


Model Series	External Dimensions(mm)		Weight(kg)
	L		
MDM-DE40D	95.4		28.2
MDM-DE60D	113.4		35

MDM-DFA1G, MDM-DFA6G

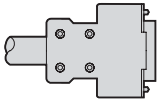


Nanaboshi Electronic
NJC-24-4-PM



Signal	Pin No.	
LEAD U	A	
WIRE V	B	
W	C	
FG	D	

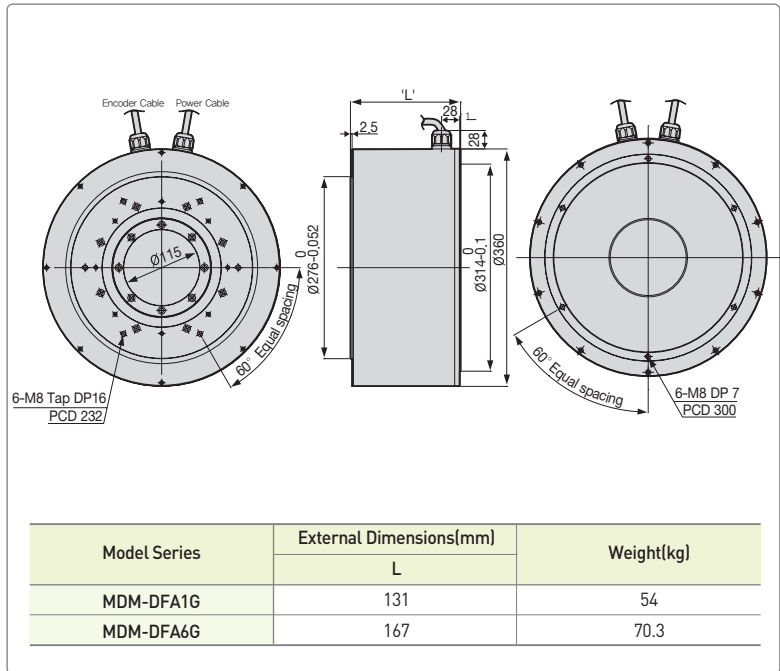
POWER CONNECTOR



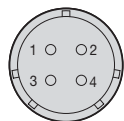
D-Sub Connector (15pin)

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

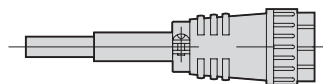
ENCODER CONNECTOR



MDM-DGC3SNOH

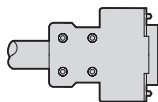


Nanaboshi Electronic
NJC-24-4-PM



Signal	Pin No.	
LEAD U	1	
WIRE V	2	
W	3	
FG	4	

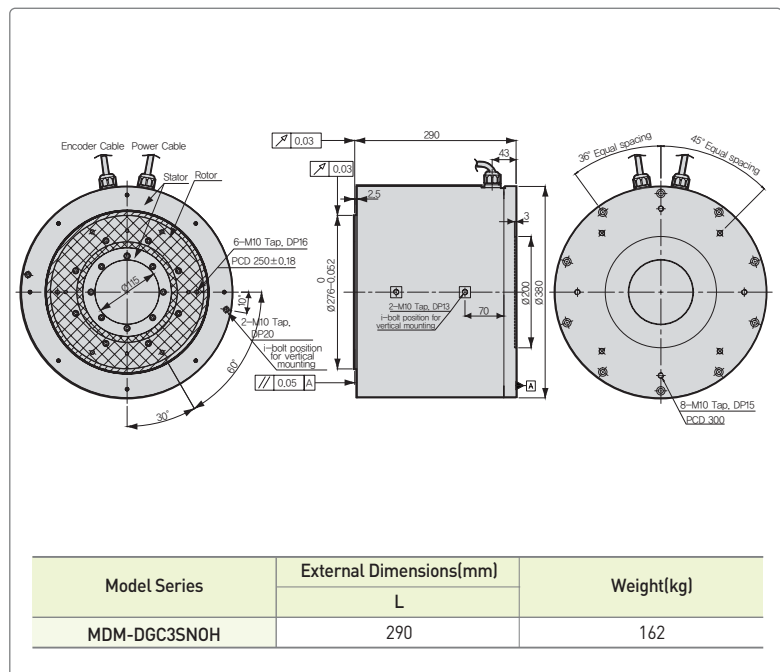
POWER CONNECTOR

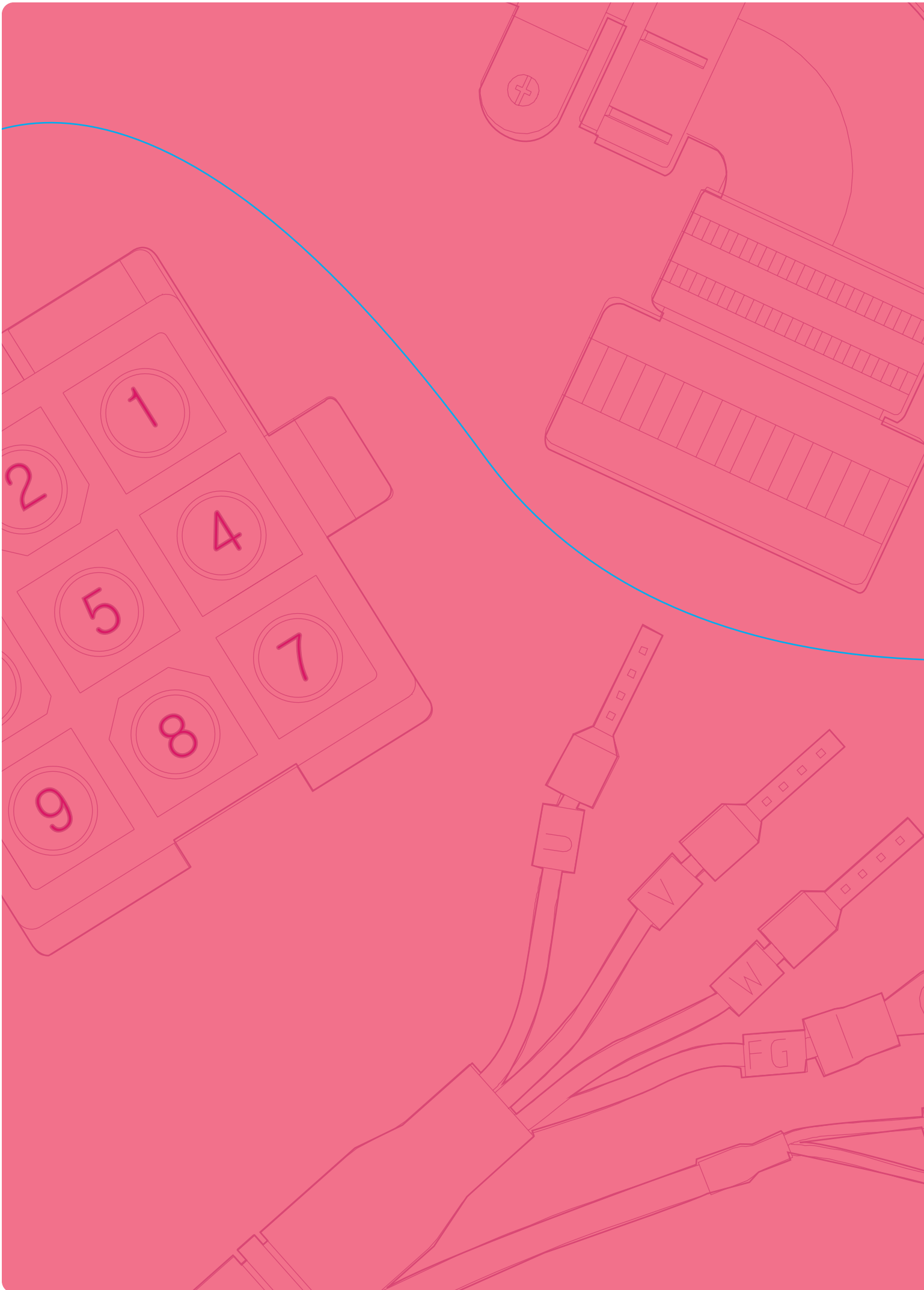


D-Sub Connector (15pin)

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

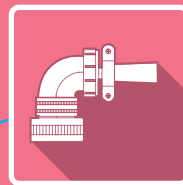
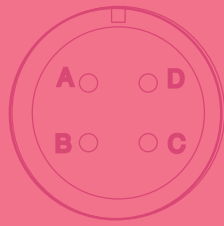
ENCODER CONNECTOR





A

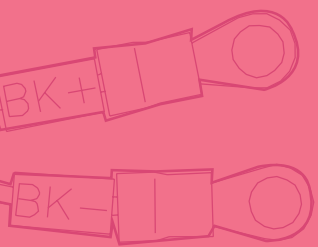
B



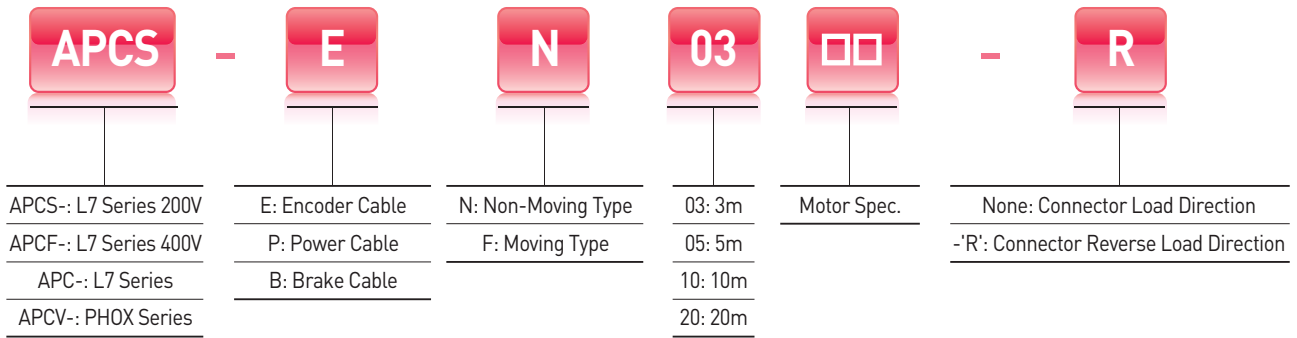
Options and Accessories

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Designation



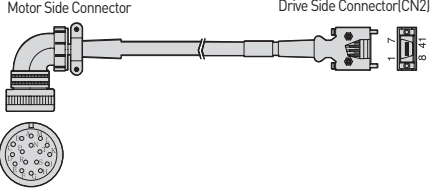
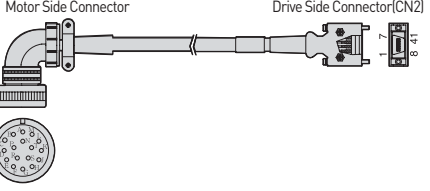
Signal Cable

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 APM(C)-HB Series	<table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>A</td> <td>9</td> <td>V</td> <td>1</td> <td>W</td> <td>8</td> <td>Z̄</td> </tr> <tr> <td>2</td> <td>Ā</td> <td>10</td> <td>V̄</td> <td>2</td> <td>W̄</td> <td>9</td> <td>Z</td> </tr> <tr> <td>3</td> <td>B</td> <td>11</td> <td>W</td> <td>3</td> <td>V</td> <td>10</td> <td>B̄</td> </tr> <tr> <td>4</td> <td>B̄</td> <td>12</td> <td>W̄</td> <td>4</td> <td>V̄</td> <td>11</td> <td>B</td> </tr> <tr> <td>5</td> <td>Z</td> <td>13</td> <td>+5V</td> <td>5</td> <td>U</td> <td>12</td> <td>Ā</td> </tr> <tr> <td>6</td> <td>Z̄</td> <td>14</td> <td>0V</td> <td>6</td> <td>Ū</td> <td>13</td> <td>A</td> </tr> <tr> <td>7</td> <td>U</td> <td>15</td> <td>SHIELD</td> <td>7</td> <td>0V</td> <td>14</td> <td>+5V</td> </tr> <tr> <td>8</td> <td>Ū</td> <td></td> <td></td> <td></td> <td>PLATE</td> <td></td> <td>SHIELD</td> </tr> </tbody> </table> <p>[Motor Side Connector] [Driver Side Connector]</p>	PIN No.	Encoder Signal	PIN No.	Encoder Signal	PIN No.	Encoder Signal	PIN No.	Encoder Signal	1	A	9	V	1	W	8	Z̄	2	Ā	10	V̄	2	W̄	9	Z	3	B	11	W	3	V	10	B̄	4	B̄	12	W̄	4	V̄	11	B	5	Z	13	+5V	5	U	12	Ā	6	Z̄	14	0V	6	Ū	13	A	7	U	15	SHIELD	7	0V	14	+5V	8	Ū				PLATE		SHIELD
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					<p>1. Motor Side Connector</p> <ul style="list-style-type: none"> • Cap Spec.(15 Position) : 172163-1(AMP) • Socket Spec. : 170361-1(AMP) <p>2. Driver Side Connector(CN2)</p> <ul style="list-style-type: none"> • Case Spec. : 10314-52A0-008(3M) or SM-14J(Suntone) • Connector Spec. : 10114-3000VE(3M) or SM-14J(Suntone) <p>3. Cable Spec. : 7P×0.25Q or 7P×AWG24</p>																																																																								

Note1 □□□ of Model Name indicates the kind and length of cable. And the declaration is as below.

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

Note2 □□□ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

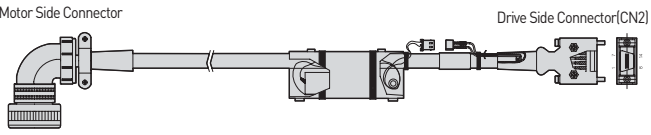
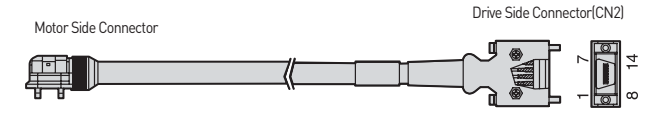
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For Signal	H Series Cable (Middle Capacity)	APCS-E□□□BS	L7SA□□□A L7NH□□□□U L7PA□□□□U L7NH□□□□U	All Models of APM(C)-HE Series	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>A</td> <td>M</td> <td>V</td> <td>1</td> <td>W</td> <td>8</td> <td>Z̄</td> </tr> <tr> <td>B</td> <td>Ā</td> <td>N</td> <td>V̄</td> <td>2</td> <td>W</td> <td>9</td> <td>Z</td> </tr> <tr> <td>C</td> <td>B</td> <td>P</td> <td>W</td> <td>3</td> <td>V</td> <td>10</td> <td>B̄</td> </tr> <tr> <td>D</td> <td>B̄</td> <td>R</td> <td>W̄</td> <td>4</td> <td>V̄</td> <td>11</td> <td>B</td> </tr> <tr> <td>E</td> <td>Z</td> <td>H</td> <td>+5V</td> <td>5</td> <td>U</td> <td>12</td> <td>Ā</td> </tr> <tr> <td>F</td> <td>Z̄</td> <td>G</td> <td>OV</td> <td>6</td> <td>Ū</td> <td>13</td> <td>A</td> </tr> <tr> <td>K</td> <td>U</td> <td>J</td> <td>SHIELD</td> <td>7</td> <td>OV</td> <td>14</td> <td>+5V</td> </tr> <tr> <td>L</td> <td>Ū</td> <td></td> <td></td> <td colspan="2">PLATE</td> <td colspan="2">SHIELD</td> </tr> </tbody> </table> <p>[Motor Side Connector] [Driver Side Connector]</p> <ol style="list-style-type: none"> Motor Side Connector (MS : Military Standard) <ul style="list-style-type: none"> Plug Spec. : MS3108A20-29S Drive Side Connector (CN2) <ul style="list-style-type: none"> Case Spec. : 10314-52A0-008(3M) or SM-14J(Suntone) Connector Spec. : 10114-3000VE(3M) or SM-14J(Suntone) Cable Spec. : 7P×0.25Q or 7P×AWG24 	PIN No.	Encoder Signal	PIN No.	Encoder Signal	PIN No.	Encoder Signal	PIN No.	Encoder Signal	A	A	M	V	1	W	8	Z̄	B	Ā	N	V̄	2	W	9	Z	C	B	P	W	3	V	10	B̄	D	B̄	R	W̄	4	V̄	11	B	E	Z	H	+5V	5	U	12	Ā	F	Z̄	G	OV	6	Ū	13	A	K	U	J	SHIELD	7	OV	14	+5V	L	Ū			PLATE		SHIELD	
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For Signal	F Series Motor S-turn Encoder Cable (Middle Capacity)	APCS-E□□□DS	L7S□□□B L7NH□□□□U L7PA□□□□U L7NH□□□□U L7CA□□□□U	All Models of APM(C)-FE/FEP/FF/FFP/FG/FGP Series	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>MA</td> <td>M</td> <td>-</td> <td>1</td> <td>-</td> <td>8</td> <td>-</td> </tr> <tr> <td>B</td> <td>M̄A</td> <td>N</td> <td>-</td> <td>2</td> <td>-</td> <td>9</td> <td>-</td> </tr> <tr> <td>C</td> <td>SLO</td> <td>P</td> <td>-</td> <td>3</td> <td>MA</td> <td>10</td> <td>-</td> </tr> <tr> <td>D</td> <td>SLŌ</td> <td>R</td> <td>-</td> <td>4</td> <td>M̄A</td> <td>11</td> <td>-</td> </tr> <tr> <td>E</td> <td>-</td> <td>H</td> <td>+5V</td> <td>5</td> <td>SLO</td> <td>12</td> <td>-</td> </tr> <tr> <td>F</td> <td>-</td> <td>G</td> <td>OV</td> <td>6</td> <td>SLŌ</td> <td>13</td> <td>-</td> </tr> <tr> <td>K</td> <td>-</td> <td>J</td> <td>SHIELD</td> <td>7</td> <td>OV</td> <td>14</td> <td>+5V</td> </tr> <tr> <td>L</td> <td>-</td> <td></td> <td></td> <td colspan="2">PLATE</td> <td colspan="2">SHIELD</td> </tr> </tbody> </table> <p>[Motor Side Connector] [Motor Side Connector]</p> <ol style="list-style-type: none"> Motor Side Connector (MS : Military Standard) <ul style="list-style-type: none"> Plug Spec. : MS3108B20-29S Drive Side Connector (CN2) <ul style="list-style-type: none"> Case Spec. : 10314-52A0-008(3M) or SM-14J(Suntone) Connector Spec. : 10114-3000VE(3M) or SM-14J(Suntone) Cable Spec. : 3P×0.25Q or 3P×24AWG 	PIN No.	Encoder Signal	PIN No.	Encoder Signal	PIN No.	Encoder Signal	PIN No.	Encoder Signal	A	MA	M	-	1	-	8	-	B	M̄A	N	-	2	-	9	-	C	SLO	P	-	3	MA	10	-	D	SLŌ	R	-	4	M̄A	11	-	E	-	H	+5V	5	SLO	12	-	F	-	G	OV	6	SLŌ	13	-	K	-	J	SHIELD	7	OV	14	+5V	L	-			PLATE		SHIELD	
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Cable Length(m)	3	5	10	20
General Cable	N03	N05	N10	N20
Robotic Cable	F03	F05	F10	F20

Note2) □□□ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Signal Cable

Type	Product Type	Model Name	Applicable Drive ^[Note3]	Applicable Motor	Specifications																																																																														
For Signal	F Series Motor M-turn Encoder Cable (Middle Capacity)	APCS- E□□□□ DS1 ^[Note1]	L7S□□□B L7NH□□□□U L7PA□□□□U L7NHF□□□□U	All Models of APM(C)-FE/FEP FF/FFP FG/FGP Series	<p>Motor Side Connector</p>  <p>MS3108B20-29S</p> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr><td>A</td><td>MA</td><td>M</td><td>-</td></tr> <tr><td>B</td><td>MA</td><td>N</td><td>-</td></tr> <tr><td>C</td><td>SLO</td><td>P</td><td>-</td></tr> <tr><td>D</td><td>SLO</td><td>R</td><td>-</td></tr> <tr><td>E</td><td>VOD_B</td><td>H</td><td>+5V</td></tr> <tr><td>F</td><td>GND_B</td><td>G</td><td>OV</td></tr> <tr><td>G</td><td>-</td><td>J</td><td>SHIELD</td></tr> <tr><td>L</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table> <p>[Motor Side Connector]</p> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr><td>1</td><td>-</td><td>8</td><td>-</td></tr> <tr><td>2</td><td>-</td><td>9</td><td>-</td></tr> <tr><td>3</td><td>MA</td><td>10</td><td>-</td></tr> <tr><td>4</td><td>MA</td><td>11</td><td>-</td></tr> <tr><td>5</td><td>SLO</td><td>12</td><td>-</td></tr> <tr><td>6</td><td>SLO</td><td>13</td><td>-</td></tr> <tr><td>7</td><td>OV</td><td>14</td><td>+5V</td></tr> <tr><td colspan="2">PLATE</td><td colspan="2">SHIELD</td></tr> </tbody> </table> <p>[Drive Side Connector]</p> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr><td>1</td><td>BATTERY (VDD_B)</td></tr> <tr><td>2</td><td>BATTERY OV (GND_B)</td></tr> </tbody> </table> <p>[Driver Side Connector]</p> <ol style="list-style-type: none"> Motor Side Connector (MS : Military Standard) <ul style="list-style-type: none"> Plug Spec. : MS3108B20-29S Drive Side Connector (CN2) <ul style="list-style-type: none"> Case Spec. : 10314-52A0-008(3M) or SM-14J(Suntone) Connector Spec. : 10114-3000VE(3M) or SM-14J(Suntone) Cable Spec. : 4P×0.25Q or 4P×24AWG Battery Connector Spec. : 5267-02A(MOLEX) 	PIN No.	Encoder Signal	PIN No.	Encoder Signal	A	MA	M	-	B	MA	N	-	C	SLO	P	-	D	SLO	R	-	E	VOD_B	H	+5V	F	GND_B	G	OV	G	-	J	SHIELD	L	-	-	-	PIN No.	Encoder Signal	PIN No.	Encoder Signal	1	-	8	-	2	-	9	-	3	MA	10	-	4	MA	11	-	5	SLO	12	-	6	SLO	13	-	7	OV	14	+5V	PLATE		SHIELD		PIN No.	Encoder Signal	1	BATTERY (VDD_B)	2	BATTERY OV (GND_B)
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For Signal	F Series Motor S-turn Encoder Cable (Small Capacity)	APCS- E□□□□ES- □ ^[Note2]	L7S□□□B L7NH□□□□U L7PA□□□□U L7NHF□□□□U L7CA□□□□U	All Models of APM(C)-FAL FBL FCL Series	<p>Motor Side Connector</p>  <p>Tyco Connector (7Circuits)</p> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr><td>1</td><td>MA</td><td>8</td><td>-</td></tr> <tr><td>2</td><td>SLO</td><td>9</td><td>-</td></tr> <tr><td>3</td><td>-</td><td>10</td><td>-</td></tr> <tr><td>4</td><td>OV</td><td>11</td><td>-</td></tr> <tr><td>5</td><td>SHIELD</td><td>12</td><td>-</td></tr> <tr><td>6</td><td>MA</td><td>13</td><td>-</td></tr> <tr><td>7</td><td>SLO</td><td>14</td><td>+5V</td></tr> <tr><td>8</td><td>-</td><td colspan="2">PLATE</td></tr> <tr><td>9</td><td>+5V</td><td colspan="2">SHIELD</td></tr> </tbody> </table> <p>[Motor Side Connector]</p> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr><td>1</td><td>-</td><td>8</td><td>-</td></tr> <tr><td>2</td><td>-</td><td>9</td><td>-</td></tr> <tr><td>3</td><td>MA</td><td>10</td><td>-</td></tr> <tr><td>4</td><td>MA</td><td>11</td><td>-</td></tr> <tr><td>5</td><td>SLO</td><td>12</td><td>-</td></tr> <tr><td>6</td><td>SLO</td><td>13</td><td>-</td></tr> <tr><td>7</td><td>OV</td><td>14</td><td>+5V</td></tr> <tr><td colspan="2">PLATE</td><td colspan="2">SHIELD</td></tr> </tbody> </table> <p>[Drive Side Connector]</p> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Cap Spec. : 2201825-1(Tyco) Socket Spec. : 2174065-4(Tyco) Drive Side Connector (CN2) <ul style="list-style-type: none"> Case Spec. : 10314-52A0-008(3M) or SM-14J(Suntone) Connector Spec. : 10114-3000VE(3M) or SM-14J(Suntone) Cable Spec. : 3P×0.25Q or 3P×24AWG 	PIN No.	Encoder Signal	PIN No.	Encoder Signal	1	MA	8	-	2	SLO	9	-	3	-	10	-	4	OV	11	-	5	SHIELD	12	-	6	MA	13	-	7	SLO	14	+5V	8	-	PLATE		9	+5V	SHIELD		PIN No.	Encoder Signal	PIN No.	Encoder Signal	1	-	8	-	2	-	9	-	3	MA	10	-	4	MA	11	-	5	SLO	12	-	6	SLO	13	-	7	OV	14	+5V	PLATE		SHIELD			
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Note1) □□□ of Model Name indicates the kind and length of cable. And the declaration is as below.

Note2) In case of □ marked product, the connector can draw in a direction of Front(load) / Rear(half load). (Front Type : No mark, Rear Type : -R)
In case of FAL Type, the connector can draw in a direction of Front.

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

Note3) □□□ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

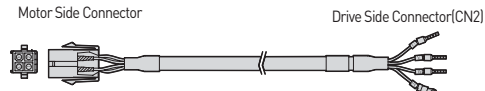
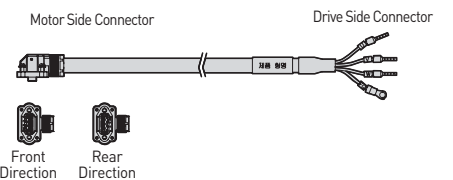
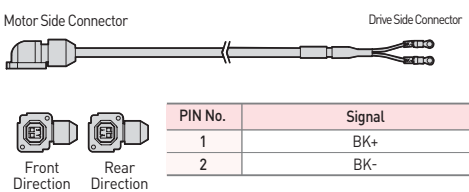
Type	Product Type	Model Name ^(Note1)	Applicable Drive ^(Note2)	Applicable Motor	Specifications																																																													
For Signal	F Series Motor M-turn Encoder Cable (Small Capacity)	APCS-E□□□ ES1-□	L7S□□□B L7NH□□□□U L7PA□□□U	All Models of APM(C)-FAL FBL FCL Series	<p>Motor Side Connector</p> <p>Drive Side Connector(CN2)</p>																																																													
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PIN No.	Encoder Signal	PIN No.	Encoder Signal	PIN No.	Encoder Signal																																																													
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3	GND_B	3	MA	10	-																																																													
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Note1) □ □ □ of Model Name indicates the kind and length of cable. And the declaration is as below.
 In case of □ marked product, the connector can draw in a direction of Front(load) / Rear(half load).(Front Type : No mark, Rear Type : -R)
 In case of FAL Type, the connector can draw in a direction of Front.

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

Note2) □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

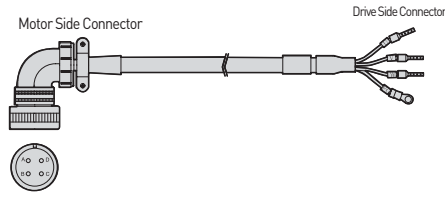
Power Cable [200V]

Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Applicable Motor	Specifications										
For Power	H Series Power Cable (Small Capacity)	APCS-P □□□GS	L7SA□□□A L7NHA□□□U L7PA□□□U L7NH□□□U	All Models of APM(C)-HB Series	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <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> </tbody> </table> <p> 1. Motor Side Connector • Cap Spec.(4 Position) : 172159-1(AMP) • Socket Spec. : 170362-1(AMP) </p> <p> 2. Drive Side Connector(U, V, W, FG) • U, V, W Pin Spec. : 1512 • FG Pin Spec. : 1.54x4(Ring Terminal) </p> <p> 3. Cable Spec. : 4C×0.75SQ or 4C×18AWG </p>	PIN No.	Signal	1	U	2	V	3	W	4	Ground
					PIN No.	Signal									
1	U														
2	V														
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 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <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>FE</td> <td>FG</td> </tr> </tbody> </table> <p> 1. Motor Side Connector • Cap Spec.: SM-JN8FT04N • Socket Spec. : SMS-201 </p> <p> 2. Drive Side Connector • U, V, W Pin Spec. : F1506 • FG Pin Spec. : 1.54x4(Ring Terminal) </p> <p> 3. Cable Spec. : 4C×0.75SQ or 4C×18AWG </p>	PIN No.	Signal	1	U	2	V	3	W	FE	FG					
PIN No.	Signal														
1	U														
2	V														
3	W														
FE	FG														
For Power	Brake Cable for Flat Motor (Small Capacity)	APCS-B □□□QS-□	L7SA□□□B L7NHA□□□U L7PA□□□U L7NH□□□U L7CA□□□U	All Models of APM(C)-FAL FBL FCL Series	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>BK+</td> </tr> <tr> <td>2</td> <td>BK-</td> </tr> </tbody> </table> <p> 1. Motor Side Connector • Plug Spec. : KN5FT02SJ1 • Socket Spec. : ST-KN-S-C1B-3500 </p> <p> 2. Drive Side Connector • Connecting terminal Spec. : 1.5x3(Ring Terminal) </p> <p> 3. Cable Spec. : 2C×0.55SQ or 2C×20AWG </p>	PIN No.	Signal	1	BK+	2	BK-				
					PIN No.	Signal									
1	BK+														
2	BK-														
<p> 1. Motor Side Connector • Cap Spec.: SM-JN8FT04N • Socket Spec. : SMS-201 </p> <p> 2. Drive Side Connector • U, V, W Pin Spec. : F1506 • FG Pin Spec. : 1.54x4(Ring Terminal) </p> <p> 3. Cable Spec. : 4C×0.75SQ or 4C×18AWG </p>															

Note1 □□□ of Model Name indicates the kind and length of cable. And the declaration is as below.
 In case of □□□ marked product, the connector can draw in a direction of Front(load) / Rear(half load).[Front Type : No mark, Rear Type : -R]

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

Note2 □□□ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Applicable Motor	Specifications					
For Power	Power Cable (Middle Capacity)	APCS-P □□□HS	L7SA□□□A L7SA□□□B L7NHA□□□U L7PA□□□U L7NHF□□□U	All Models of FE Series						
					<table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> </tbody> </table> <p> 1. Motor Side Connector • Plug Spec. : MS3108A20-4S 2. Drive Side Connector • FG Pin Spec. : 22x6(Ring Terminal) 3. Cable Spec. : 4C×2.5SQ or 4C×14AWG </p>	PIN No.	Signal	A	U	B
PIN No.	Signal									
A	U									
B	V									
C	W									
D	Ground									

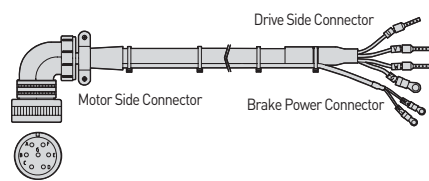
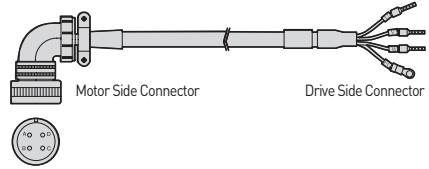
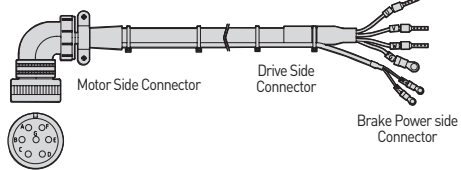
Note1) □ □ □ of Model Name indicates the kind and length of cable. And the declaration is as below.

In case of □ marked product, the connector can draw in a direction of Front(load) / Rear(half load). (Front Type : No mark, Rear Type : -R)

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

Note2) □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Power Cable [200V]

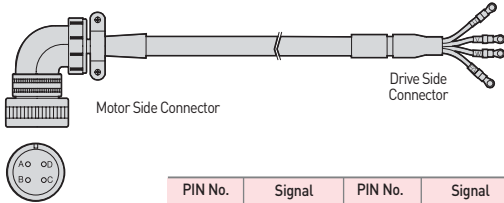
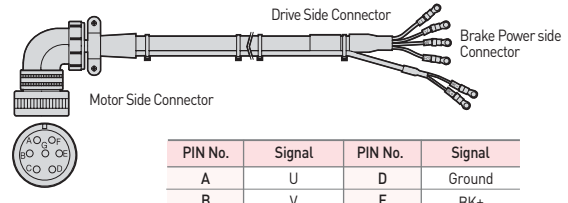
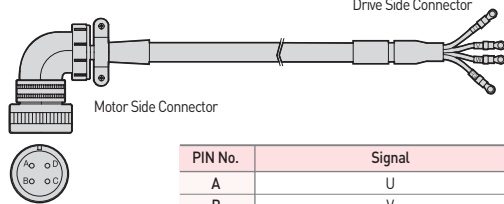
Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Applicable Motor	Specifications																
For Power	Power Cable (Brake Type)	APCS-P □□□ NB	L7SA□□□ A L7SA□□□ B L7NA□□□ B L7NHA□□□ U L7PA□□□ U L7NH□□□ U	All Models of APM(C)-FE Series	 <table border="1" data-bbox="925 622 1388 716"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>1. Motor Side Connector • Plug Spec. : MS3108A20-15S(MS)</p> <p>2. Drive Side Connector • U, V, W Pin Spec. : 2512 • Cable Spec. : 4Cx2.5SQ or 4Cx41AWG • FG Pin Spec. : 2.5x4(Ring Terminal)</p> <p>3. Brake Power side Connector • BK Pin Spec. : 1.5x3(Ring Terminal) • Cable Spec. : 2Cx0.75SQ or 2Cx18AWG</p>	PIN No.	Signal	PIN No.	Signal	A	U	D	Ground	B	V	E	BK+	C	W	F	BK-
PIN No.	Signal	PIN No.	Signal																		
A	U	D	Ground																		
B	V	E	BK+																		
C	W	F	BK-																		
For Power	Power Cable (Middle Capacity)	APCS-P □□□ IS	L7SA□□□ A L7SA□□□ B L7NA□□□ B L7NHA□□□ U L7PA□□□ U L7NH□□□ U	APM(C)- FF30A/FF22D FF35D/FF20G FF30G/FF12M FF20M/FF30M FG22D/FG35D FG20G/FG30G FG12M/FG20M FG30M	 <table border="1" data-bbox="949 1104 1412 1220"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>1. Motor Side Connector • Plug Spec. : MS3108A22-22S(MS)</p> <p>2. Drive Side Connector • U, V, W Pin Spec. : 2512 • FG Pin Spec. : 2.5x4(Ring Terminal)</p> <p>3. Cable Spec. : 4Cx2.5SQ or 4Cx14AWG</p>	PIN No.	Signal	1	U	2	V	3	W	4	Ground						
PIN No.	Signal																				
1	U																				
2	V																				
3	W																				
4	Ground																				
For Power	Power Cable (Brake Type)	APCS-P □□□ PB	L7SA□□□ A L7SA□□□ B L7NA□□□ B L7NHA□□□ U L7PA□□□ U L7NH□□□ U	APM(C)- LF30M/FF30A FF22D/FF35D FF20G/FF30G FF12M/FF20M FF30M	 <table border="1" data-bbox="1268 1601 1436 1769"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> <tr> <td>E</td> <td>BK+</td> </tr> <tr> <td>F</td> <td>BK-</td> </tr> </tbody> </table> <p>1. Motor Side Connector • Plug Spec. : MS3108A24-10S(MS)</p> <p>2. Drive Side Connector • U, V, W Pin Spec. : F2512 • Cable Spec. : 4Cx2.5SQ or 4Cx14AWG • FG Pin Spec. : 2.5x4(Ring Terminal)</p> <p>3. Brake Power side Connector • BK Pin Spec. : 1.5x3(Ring Terminal) • Cable Spec. : 2Cx0.75 S or 2Cx18AWG</p>	PIN No.	Signal	A	U	B	V	C	W	D	Ground	E	BK+	F	BK-		
PIN No.	Signal																				
A	U																				
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D	Ground																				
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Note1) □ □ □ of Model Name indicates the kind and length of cable. And the declaration is as below.

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

Note2) □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Power Cable [200V]

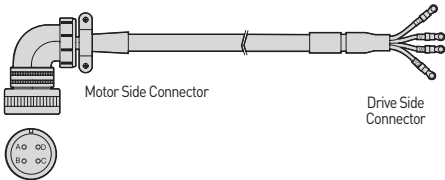
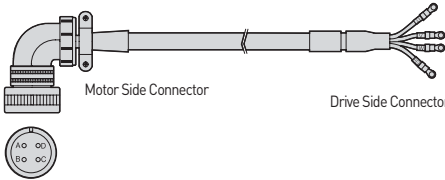
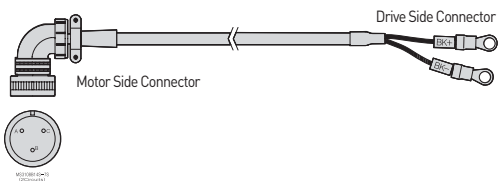
Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Applicable Motor	Specifications																
For Power	Power Cable (Middle Capacity)	APCS-P □□□ JS	L7SA□□□A L7SA□□□B L7NHA□□□U L7PA□□□U L7NH□□□U	APM(C)- FF50A/FF55D FF75D/FF44G FF60G/FF44M FG55D/FG75D FG44G/FG60G FG44M	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <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> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Plug Spec. : MS3108A22-22S(MS) Drive Side Connector <ul style="list-style-type: none"> Connecting terminal Spec. : 6.0x5(Ring Terminal) Brake Power Side Connector <ul style="list-style-type: none"> Cable Spec. : 4Cx6.0SQ or 4Cx10AWG 	PIN No.	Signal	PIN No.	Signal	A	U	C	W	B	V	D	Ground				
PIN No.	Signal	PIN No.	Signal																		
A	U	C	W																		
B	V	D	Ground																		
For Power	Power Cable (Brake Type)	APCS-P □□□ LB	L7SA□□□A L7SA□□□B L7NHA□□□U L7PA□□□U L7NH□□□U	APM(C)- FF50A FF50D/FF75D FF44G/FF60G FF40M	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <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> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Plug Spec. : MS3108A24-10S Drive Side Connector <ul style="list-style-type: none"> Connecting terminal Spec. : 6x5(Ring Terminal) 4Cx6.0SQ or 4Cx10AWG Brake Power side Connector <ul style="list-style-type: none"> Connecting terminal Spec. : 1.5x3(Ring Terminal) Cable Spec. : 2Cx0.75SQ or 2Cx18AWG 	PIN No.	Signal	PIN No.	Signal	A	U	D	Ground	B	V	E	BK+	C	W	F	BK-
PIN No.	Signal	PIN No.	Signal																		
A	U	D	Ground																		
B	V	E	BK+																		
C	W	F	BK-																		
For Power	Power Cable (Middle Capacity)	APCS-P □□□ MS	L7SA□□□A L7SA□□□B L7NHA□□□U L7PA□□□U L7NH□□□U	APM(C)- FG60M/FF75G	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Plug Spec.: MS3108A32-17S Drive Side Connector <ul style="list-style-type: none"> Connecting terminal Spec.: 10x5(Ring Terminal) Cable Spec: 4Cx6.0SQ or 4Cx10AWG 	PIN No.	Signal	A	U	B	V	C	W	D	Ground						
PIN No.	Signal																				
A	U																				
B	V																				
C	W																				
D	Ground																				

Note1) □□□ of Model Name indicates the kind and length of cable. And the declaration is as below.

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

Note2) □□□ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Power Cable [200V]

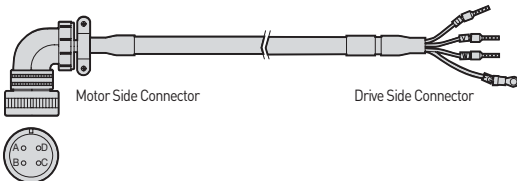
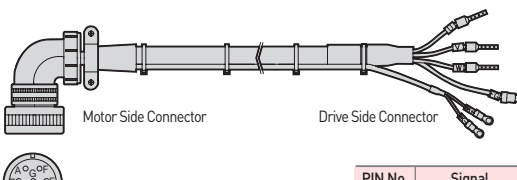
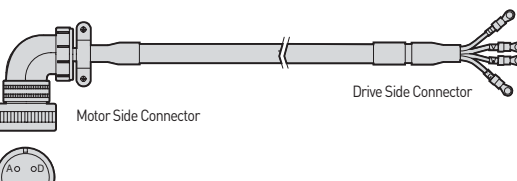
Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Applicable Motor	Specifications										
For Power	Power Cable (Middle Capacity)	APCS-PF □□□S	L7NHA□□□U L7PA□□□U	APM(C)-FG85G/ FG110D /FG110G	 <p>Motor Side Connector</p> <p>Drive Side Connector</p> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> </tbody> </table> <p> 1. Motor Side Connector • Plug Spec. : MS3108A 32-17S 2. Drive Side Connector • Connecting Terminal Spec. : 14x6(Ring Terminal) 3. Cable Spec. : 4Cx165SQ or 4Cx5AWG </p>	PIN No.	Signal	A	U	B	V	C	W	D	Ground
					PIN No.	Signal									
A	U														
B	V														
C	W														
D	Ground														
 <p>Motor Side Connector</p> <p>Drive Side Connector</p> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> </tbody> </table> <p> 1. Motor Side Connector • Plug Spec. : MS3108A 32-17S 2. Drive Side Connector • Connecting Terminal Spec. : 14x6(Ring Terminal) 3. Cable Spec. : 4Cx255SQ or 4Cx3AWG </p>	PIN No.	Signal	A	U	B	V	C	W	D	Ground					
PIN No.	Signal														
A	U														
B	V														
C	W														
D	Ground														
For Power	Brake Cable	APCS-P □□□SB	L7SA□□□A L7SA□□□B L7NHA□□□U L7PA□□□U L7NH□□□U	All Models of APM(C) - FG Series	 <p>Motor Side Connector</p> <p>Drive Side Connector</p> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>BK+</td> <td>B</td> <td>BK-</td> </tr> </tbody> </table> <p> 1. Motor Side Connector • Plug Spec. : MS3108A 14S-7S(MS) 2. Drive Side Connector • Connecting terminal Spec. : 1.5x3(Ring Terminal) 3. Cable Spec. : 2Cx0.75SQ or 2Cx18AWG </p>	PIN No.	Signal	PIN No.	Signal	A	BK+	B	BK-		
PIN No.	Signal	PIN No.	Signal												
A	BK+	B	BK-												

Note1) □ □ □ of Model Name indicates the kind and length of cable. And the declaration is as below.
 In case of 400V products, you can use Robotic Cable only.

Cable Length(m)	3	5	10	20
General Cable(N)	F03	F05	F10	F20

Note2) □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Power Cable [400V]

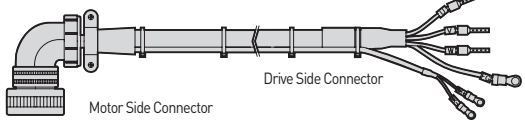

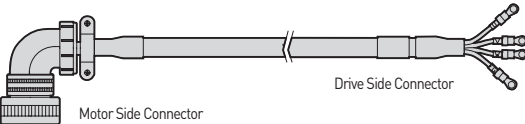

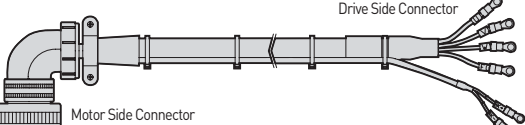

Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Applicable Motor	Specifications														
For Power	Power Cable	APCS-P □□□ HS	L7SB□□□ B L7NHB□□□ U L7PB□□□ U	All Models of APM(C)-FEP Series	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <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> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Plug Spec. : MS3108A 20-4S Drive Side Connector(U,V,W,FG) <ul style="list-style-type: none"> U, V, W Pin Spec. : 1512(Ferrule) FG Pin Spec. : 1.5x4(Ring Terminal) Cable Spec: 4Cx1.5SQ or 4Cx15AWG 	PIN No.	Signal	PIN No.	Signal	A	U	C	W	B	V	D	Ground		
PIN No.	Signal	PIN No.	Signal																
A	U	C	W																
B	V	D	Ground																
For Power	Power Cable (Brake Type)	APCS-P □□□ NB	L7SB□□□ B L7NHB□□□ U L7PB□□□ U	All Models of APM(C)-FEP Series	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> <tr> <td>E</td> <td>BK+</td> </tr> <tr> <td>F</td> <td>BK-</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Plug Spec. : MS3108A 20-15S Drive Side Connector (U,V,W,FG) <ul style="list-style-type: none"> U, V, W Pin Spec. : 1512(Ferrule) FG Pin Spec. : 1.5 x 4(Ring Terminal) Power Cable Spec. : 4Cx1.5SQ or 4Cx15AWG Brake Power side Connector <ul style="list-style-type: none"> Connecting terminal Spec. : 1.5 x 3(Ring Terminal) Brake Cable Spec. : 2Cx0.75SQ or 2Cx19AWG 	PIN No.	Signal	A	U	B	V	C	W	D	Ground	E	BK+	F	BK-
PIN No.	Signal																		
A	U																		
B	V																		
C	W																		
D	Ground																		
E	BK+																		
F	BK-																		
For Power	Power Cable	APCS-P □□□ IS	L7SB□□□ B L7NHB□□□ U L7PB□□□ U	APM(C)-FFP30A/ FFP22D/ FFP35D/ FFP20G/ FFP30G/ FFP12M/ FFP20M/ FGP22D/ FGP35D/ FGP20G/ FGP30G/ FGP12M/ FGP20M	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Plug Spec. : MS3108A 22-22S(MS) Drive Side Connector (U,V,W,FG) <ul style="list-style-type: none"> U, V, W Pin Spec : 2512(Ferrule) FG Pin Spec. : 2.5x4 (Ring Terminal) Cable Spec. : 4Cx2.5SQ or 4Cx14AWG 	PIN No.	Signal	A	U	B	V	C	W	D	Ground				
PIN No.	Signal																		
A	U																		
B	V																		
C	W																		
D	Ground																		

Note1) □ □ □ of Model Name indicates the kind and length of cable. And the declaration is as below.
In case of 400V products, you can use Robotic Cable only.

Cable Length(m)	3	5	10	20
Robotic Cable(F)	F03	F05	F10	F20

Note2) □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Power Cable [400V]

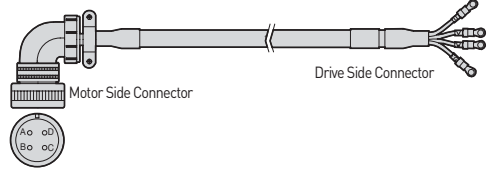
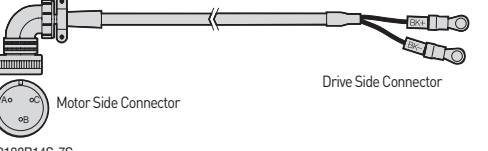
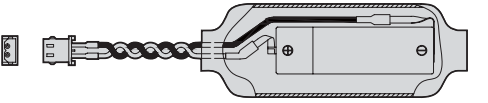
Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Applicable Motor	Specifications														
For Power	Power Cable (Brake Type)	APCS-P □□□ PB	L7SB□□□ B L7NHB□□□ U L7PB□□□ U	APM(C)- FFP30A/ FFP22D/ FFP35D/ FFP20G/ FFP30G/ FFP12M/ FFP20M	 <p>Motor Side Connector</p> <p>Drive Side Connector</p>  <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> <tr> <td>E</td> <td>BK+</td> </tr> <tr> <td>F</td> <td>BK-</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector • Plug Spec. : MS3108A 24-10S(MS) Drive Side Connector • U, V, W Pin Spec. : 1512 • FG Pin Spec. : 1.5 x 3(Ring Terminal) Power Cable Spec. : 4Cx1.55Q or 4Cx15AWG Brake Power side Connector • Connecting terminal Spec. : 1.5 x 3(Ring Terminal) Brake Cable Spec. : 2Cx0.755Q or 2Cx18AWG 	PIN No.	Signal	A	U	B	V	C	W	D	Ground	E	BK+	F	BK-
PIN No.	Signal																		
A	U																		
B	V																		
C	W																		
D	Ground																		
E	BK+																		
F	BK-																		
For Power	Power Cable (Middle Capacity)	APCS-P □□□ JS	L7SB□□□ B L7NHB□□□ U L7PB□□□ U	APM(C)- FFP50A/ FFP55D/ FFP75D/ FFP44G/ FFP60G/ FFP30M/ FFP44M/ FGP55D/ FGP75D/ FGP44G/ FGP60G/ FGP30M/ FGP44M	 <p>Motor Side Connector</p> <p>Drive Side Connector</p>  <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector • Plug Spec. : MS3108A 22-22S(MS) Drive Side Connector (U,V,W,FG) • U, V, W Pin Spec. : 4.0x 5(Ring Terminal) Cable Spec. : 4Cx4.05Q or 4Cx11AWG 	PIN No.	Signal	A	U	B	V	C	W	D	Ground				
PIN No.	Signal																		
A	U																		
B	V																		
C	W																		
D	Ground																		
For Power	Power Cable (Brake Type)	APCS-P □□□ LB	L7SB□□□ B L7NHB□□□ U L7PB□□□ U	APM(C)- FFP50A/ FFP55D/ FFP75D/ FFP44G/ FFP60G/ FFP30M/ FFP44M	 <p>Motor Side Connector</p> <p>Drive Side Connector</p>  <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>U</td> </tr> <tr> <td>B</td> <td>V</td> </tr> <tr> <td>C</td> <td>W</td> </tr> <tr> <td>D</td> <td>Ground</td> </tr> <tr> <td>E</td> <td>BK+</td> </tr> <tr> <td>F</td> <td>BK-</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector • Plug Spec. : MS3108A 24-10S(MS) Drive Side Connector • U, V, W Pin Spec. : 4.0X5(Ring Terminal) Power Cable Spec. : 4Cx4.05Q or 4Cx11AWG Brake Power side Connector • Connecting terminal Spec. : 1.5 x 3(Ring Terminal) Brake Cable Spec. : 2Cx0.755Q or 2Cx18AWG 	PIN No.	Signal	A	U	B	V	C	W	D	Ground	E	BK+	F	BK-
PIN No.	Signal																		
A	U																		
B	V																		
C	W																		
D	Ground																		
E	BK+																		
F	BK-																		

Note1) □ □ □ of Model Name indicates the kind and length of cable. And the declaration is as below.
In case of 400V products, you can use Robotic Cable only.

Cable Length(m)	3	5	10	20
Robotic Cable(F)	F03	F05	F10	F20

Note2) □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Power Cable [400V]

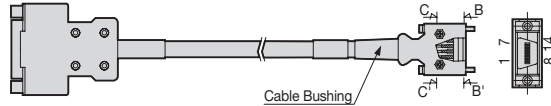

Type	Product Type	Model Name ^(Note1)	Applicable Drive ^(Note2)	Applicable Motor	Specifications												
For Power	Power Cable (Middle Capacity)	APCS-P □□□ MS	L7SB□□□ B L7NHB□□□ U L7PB□□□ U	APM(C)- FFP75G/ FGP110D/ FGP85G/ FGP110G/ FGP150G/ FGP60M/	 <table border="1" data-bbox="976 577 1444 649"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <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> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Plug Spec. : MS3108A 32-17S(MS) Drive Side Connector(U,V,W,FG) <ul style="list-style-type: none"> U, V, W Pin Spec. : 10x5(Ring Terminal) Cable Spec: 4Cx10SQ or 4Cx7AWG 	PIN No.	Signal	PIN No.	Signal	A	U	C	W	B	V	D	Ground
PIN No.	Signal	PIN No.	Signal														
A	U	C	W														
B	V	D	Ground														
For Power	Brake Cable (same with 200V)	APCS-P □□□ SB	L7SB□□□ B L7NHB□□□ U L7PB□□□ U	All Model of APM(C)-FGP Series	 <p>MS3108B14S-7S (2Circuits)</p> <table border="1" data-bbox="1273 1048 1444 1120"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>BK+</td> </tr> <tr> <td>2</td> <td>BK-</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Motor Side Connector <ul style="list-style-type: none"> Plug Spec. : MS3108B 14-7S(MS) Brake Power side Connector <ul style="list-style-type: none"> Connecting terminal Spec. : 1.5x3(Ring Terminal) Cable Spec. : 2Cx0.75SQ or 2Cx19AWG 	PIN No.	Signal	1	BK+	2	BK-						
PIN No.	Signal																
1	BK+																
2	BK-																
Battery For Encoder	Battery Ass'y	APCS-BATT36	All Model of L7 Series	All Model of APM(C)- F Series	 <table border="1" data-bbox="1088 1572 1444 1644"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> <th>Color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+</td> <td>Red</td> </tr> <tr> <td>2</td> <td>-</td> <td>Black</td> </tr> </tbody> </table> <ol style="list-style-type: none"> Plug Spec. : 5264-02 (Molex) Plug Pin Spec. : 5263PBT (Molex) Battery Spec. : ER6V/3.6V, 2000mAh (TOSHIBA) 	PIN No.	Signal	Color	1	+	Red	2	-	Black			
PIN No.	Signal	Color															
1	+	Red															
2	-	Black															

Note1) □ □ □ of Model Name indicates the kind and length of cable. And the declaration is as below.
In case of 400V products, you can use Robotic Cable only.

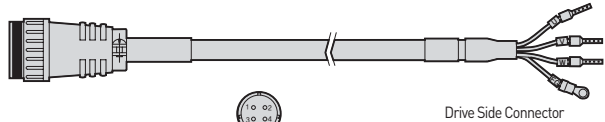
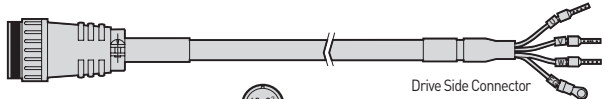
Cable Length(m)	3	5	10	20
General Cable(N)	N03	N05	N10	N20
Robotic Cable(F)	F03	F05	F10	F20

Note2) □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/26/34/48.

DD Motor Signal Cable

Type	Product Type	Model Name ^(Note1)	Applicable Drive ^(Note2)	Specifications	Specifications																																																																			
For Signal	L7 Encoder Cable	APCS-E □□□ZS	L7SA□□□B L7NA□□□B L7NHA□□□U L7PA□□□U	All Models of DD Motor	 <p style="text-align: center;">Cable Bushing</p>																																																																			
					<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p>D-sub(15pin/female)</p> <table border="1"> <caption>D.D SERVO ENCODER CABLE</caption> <thead> <tr> <th>NO</th> <th>Encoder Signal</th> <th>NO</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr><td>1</td><td>MA</td><td>9</td><td>+5V</td></tr> <tr><td>2</td><td>SLO</td><td>10</td><td>-</td></tr> <tr><td>3</td><td>GND_B</td><td>11</td><td>-</td></tr> <tr><td>4</td><td>OV</td><td>12</td><td>-</td></tr> <tr><td>5</td><td>SHELD</td><td>13</td><td>-</td></tr> <tr><td>6</td><td>MA</td><td>14</td><td>-</td></tr> <tr><td>7</td><td>SLO</td><td>15</td><td>-</td></tr> <tr><td>8</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table> <p>[Encoder Connector]</p> </div> <div style="width: 45%;"> <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Encoder Signal</th> <th>PIN No.</th> <th>Encoder Signal</th> </tr> </thead> <tbody> <tr><td>1</td><td>-</td><td>8</td><td>-</td></tr> <tr><td>2</td><td>-</td><td>9</td><td>-</td></tr> <tr><td>3</td><td>MA</td><td>10</td><td>-</td></tr> <tr><td>4</td><td>MA</td><td>11</td><td>-</td></tr> <tr><td>5</td><td>SLO</td><td>12</td><td>-</td></tr> <tr><td>6</td><td>SLO</td><td>13</td><td>-</td></tr> <tr><td>7</td><td>OV</td><td>14</td><td>+5V</td></tr> <tr><td colspan="2">PLATE</td><td colspan="2">SHIELD</td></tr> </tbody> </table> <p>[Driver Connector]</p> </div> </div>	NO	Encoder Signal	NO	Encoder Signal	1	MA	9	+5V	2	SLO	10	-	3	GND_B	11	-	4	OV	12	-	5	SHELD	13	-	6	MA	14	-	7	SLO	15	-	8	-	-	-	PIN No.	Encoder Signal	PIN No.	Encoder Signal	1	-	8	-	2	-	9	-	3	MA	10	-	4	MA	11	-	5	SLO	12	-	6	SLO	13	-	7	OV	14
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DD Motor Power Cable

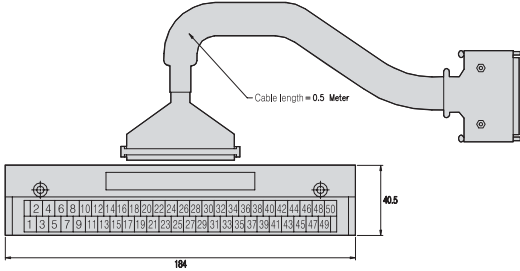
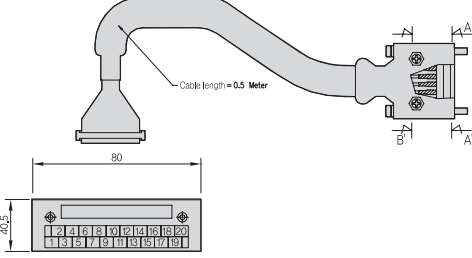
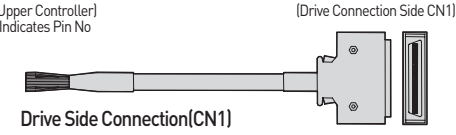
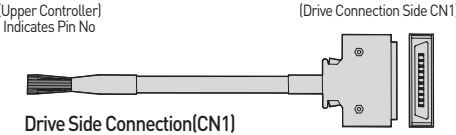
Type	Product Type	Model Name ^(Note1)	Applicable Drive ^(Note2)	Specifications	Specifications																	
For Power	Power Cable	APCS-PN □□□YS	L7SA□□□B L7NHA□□□U L7PA□□□U L7NHF□□□U	DB03D/ DB06D/ DB09D/ DC06D/ DC12D/ DC18D/ DD12D/ DD22D/ DD34D/ DE40D/ DE60D	 <p style="text-align: center;">Drive Side Connector</p> <p style="text-align: center;">Nanaboshi Electronic NJC-24-4-ADF(Female) (Motor side connector)</p> <table border="1"> <thead> <tr> <th>Item</th> <th>Signal</th> <th>PIN No.</th> <th>Line Color</th> </tr> </thead> <tbody> <tr><td rowspan="4">Motor</td><td>U</td><td>1</td><td>Red</td></tr> <tr><td>V</td><td>2</td><td>White</td></tr> <tr><td>W</td><td>3</td><td>Black</td></tr> <tr><td>Ground</td><td>4</td><td>Green</td></tr> </tbody> </table> <p>1. Motor Side Connector</p> <ul style="list-style-type: none"> Plug Spec. : NJC-24-4-ADF(Female) <p>2. Drive Side Connector</p> <ul style="list-style-type: none"> U, V, W Pin Spec. : UA-F2012(Seoil) FG Spec. : 1.5×4 <p>3. Cable Spec. : 4Cx1.5SQ, LAPP Cable(P/N : 00257001)</p>	Item	Signal	PIN No.	Line Color	Motor	U	1	Red	V	2	White	W	3	Black	Ground	4	Green
					Item	Signal	PIN No.	Line Color														
Motor	U	1	Red																			
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For Power	Power Cable	APCS-PN □□□ZS	L7SA□□□B L7NHA□□□U L7PA□□□U L7NHF□□□U	DFA1G/ DFA6G	 <p style="text-align: center;">Drive Side Connector</p> <p style="text-align: center;">Nanaboshi Electronic NJC-24-4-ADF(Female) (Motor side connector)</p> <table border="1"> <thead> <tr> <th>Item</th> <th>Signal</th> <th>PIN No.</th> <th>Line Color</th> </tr> </thead> <tbody> <tr><td rowspan="4">Motor</td><td>U</td><td>1</td><td>Red</td></tr> <tr><td>V</td><td>2</td><td>White</td></tr> <tr><td>W</td><td>3</td><td>Black</td></tr> <tr><td>Ground</td><td>4</td><td>Green</td></tr> </tbody> </table> <p>1. Motor Side Connector</p> <ul style="list-style-type: none"> PLUG Spec. : NJC-24-4-ADF(Female) <p>2. Drive Side Connector</p> <ul style="list-style-type: none"> U, V, W Pin Spec. : UA-F2012(Seoil) FG Spec. : 2.5×4 <p>3. Cable Spec. : 4Cx2.5SQ, LAPP Cable(P/N : 00257011)</p>	Item	Signal	PIN No.	Line Color	Motor	U	1	Red	V	2	White	W	3	Black	Ground	4	Green
					Item	Signal	PIN No.	Line Color														
Motor	U	1	Red																			
	V	2	White																			
	W	3	Black																			
	Ground	4	Green																			

Note1) □□□ of Model Name indicates the kind and length of cable. And the declaration is as below.

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

Note2) □□□ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Signal Cable

Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Specifications
T/B	CN1 T/B	APCS-VSCN1T-□□	L7S□□□□B L7PA□□□□U L7CA□□□□U	 <ul style="list-style-type: none"> • Extended CN1 T/B for VS/L7S • Available Cable Length : 0.5[m], 1[m], 1.5[m], 2[m], 3[m]
	CN1 T/B	APCS-L7NCN1T-□□	L7NH□□□□U	 <ul style="list-style-type: none"> • Extended CN1 T/B for L7N • 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	 <p>(Upper Controller) Indicates Pin No</p> <p>(Drive Connection Side CN1)</p> <p>Drive Side Connection(CN1)</p> <ul style="list-style-type: none"> • Case Spec. : 10320-52A0-008(3M) • Connector Spec. : 10150-3000VE(3M) • Cable Spec. : 20276-SB 25P(AWG28)
For Signal	CN1 Cable	APCS-CN1-□□A	L7NH Series	 <p>(Upper Controller) Indicates Pin No</p> <p>(Drive Connection Side CN1)</p> <p>Drive Side Connection(CN1)</p> <ul style="list-style-type: none"> • Case Spec. : 10320-52A0-008(3M) • Connector Spec. : 10120-3000VE(3M) • Cable Spec. : ROW-SB0.1C×20C(AWG28)

Note1) □ □ □ of Model Name indicates the kind and length of cable. And the declaration is 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	3
Declaration	None	01	015	02	03

Note2) □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

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	A0	42	
3		13		23	SPD1	33	/A0	43	ZSPD
4	ZO	14	ALO2	24	GND24	34	+12VA	44	BRAKE
5	/ZO	15	ALO1	25	GND24	35	-12VA	45	INPOS
6		16	AL00	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	A0	11	+24V IN	21	+24V IN	31	PF+	41	INPOS1+
2	/A0	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-

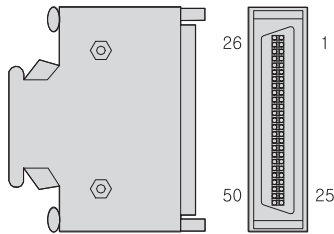
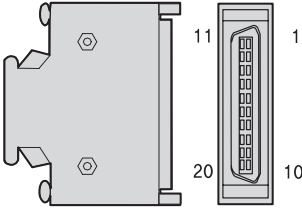
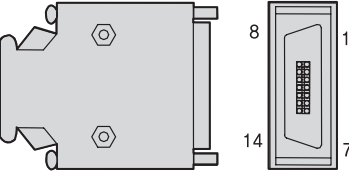
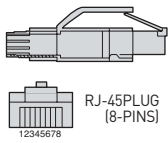


L7NH

NO	PIN Function	NO	PIN Function
1	BREAK+	11	POT
2	BREAK-	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-

Signal Cable / Connector

Type	Product Type	Model Name	Applicable Drive	Specifications
For Signal	Communication Cable	APC-CN5L7U	All Models of L7 Series	<div style="text-align: center;"> <p>(PC - USB Port) (Servo Drive - CN5)</p> </div> <ul style="list-style-type: none"> • 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

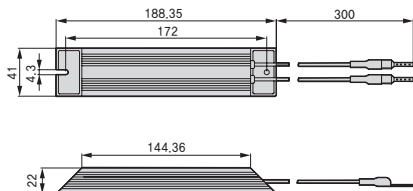
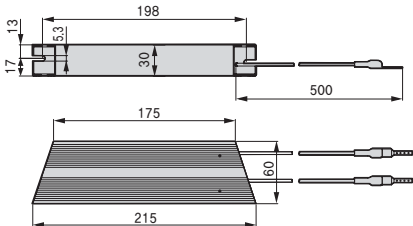
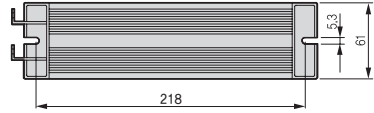
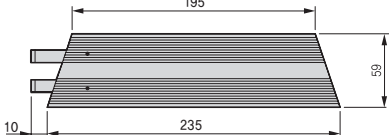
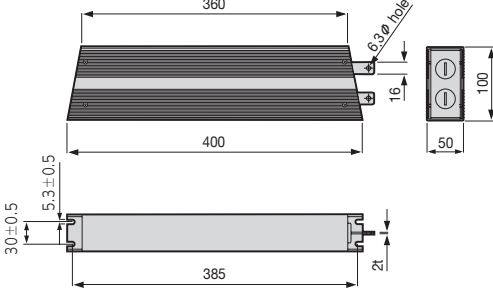
Type	Product Type	Model Name ^[Note1]	Applicable Drive ^[Note2]	Specifications																														
CN	CN1 Connector	APC-CN1NNA	L7S □ □ □ B L7NH □ □ □ U L7CA □ □ □ U	 <ul style="list-style-type: none"> • CASE Spec. : 10350-52A0-008(3M) • CONNECTOR Spec.: 10150-3000VE(3M) 																														
CN	CN1 Connector	APC-CN2NNA	L7NH □ □ □ U	 <ul style="list-style-type: none"> • Case Spec. : 10320-52A0-008(3M) • Connector Spec. : 10120-3000VE(3M) 																														
CN	CN2 Connector	APC-CN3NNA	All models of L7 Series	 <ul style="list-style-type: none"> • Case Spec. : 10314-52A0-008(3M) • Connector Spec. : 10114-3000VE(3M) 																														
CN	CN3 CN4 EtherCAT Connector	APCS-CN4NNA	L7NH □ □ □ U L7NHF □ □ □ U	 <table border="1"> <thead> <tr> <th>PIN No.</th> <th>Signal</th> <th>Line Color</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TX/RX0 Plus</td> <td>White/Orange</td> </tr> <tr> <td>2</td> <td>TX/RX0 Minus</td> <td>Orange</td> </tr> <tr> <td>3</td> <td>TX/RX1 Plus</td> <td>White/Green</td> </tr> <tr> <td>4</td> <td>TX/RX2 Plus</td> <td>Blue</td> </tr> <tr> <td>5</td> <td>TX/RX2 Minus</td> <td>White/Blue</td> </tr> <tr> <td>6</td> <td>TX/RX1 Minus</td> <td>Green</td> </tr> <tr> <td>7</td> <td>TX/RX3 Plus</td> <td>White/Brown</td> </tr> <tr> <td>8</td> <td>TX/RX3 Minus</td> <td>Brown</td> </tr> <tr> <td colspan="2">Plate</td> <td>SHILDE</td> </tr> </tbody> </table> <p>Note EtherCAT use only 4 Signal(1, 2, 3, 6)</p>	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
PIN No.	Signal	Line Color																																
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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	 <p>Pin No. </p> <p>Wiring Schematic</p> <ul style="list-style-type: none"> • MINI I/O By-pass Connector : 1971153(TE) 																														

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/ 26/ 36/ 44/ 50.

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 □	 <p>• IRH 140W 50Ω</p>
Resistor	Braking Resistor	APCS-300R30 30Ω/300W	L7 □ A008 □ L7 □ A010 □	 <p>• IRV 300W 30Ω</p>
Resistor	Braking Resistor	APC-600R30 15Ω/1200W (30Ω/600*2P)	L7 □ A020 □	  <p>IRV 600W 30Ω * L7 □ A020 □ - 2pcs(Parallel Connection) L7 □ A030 □ - 3pcs(Parallel Connection)</p> <p>IRV 600W 28Ω * L7 □ A050 □ - 4pcs(Parallel Connection) * L7 □ A075 □ - 4pcs(Parallel Connection)</p> <p>Note) IRV 600W 30Ω and 600W 28Ω have the same external dimensions.</p>
		APC-600R28 10Ω/1800W (30Ω/600*3P)	L7 □ A035 □	
		APC-600R28 7Ω/2400W (28Ω/600*4P)	L7 □ A050 □ L7 □ A075 □	
Resistor	Braking Resistor	APCS-2000R3.3 3.3Ω/2000W	L7 □ A150 □	 <p>IRM2000-3.3Ω</p>

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/ 26/ 36/ 44/ 50.

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□	<p>IRV300-82Ω</p>
Resistor	Braking Resistor	APCS-600R140 70Ω /1200W (140Ω / 600W ×2P)	L7□B020□ L7□B035□	<p>IRV600-140Ω</p>
Resistor	Braking Resistor	APCS-600R75 25Ω /800W (75Ω / 600W ×3P)	L7□B075□	<p>IRV600-75Ω</p>
Resistor	Braking Resistor	APCS-2000R13.4 13.4Ω /2000W	L7□B150□	<p>IRM2000-13.4Ω</p>

^{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.

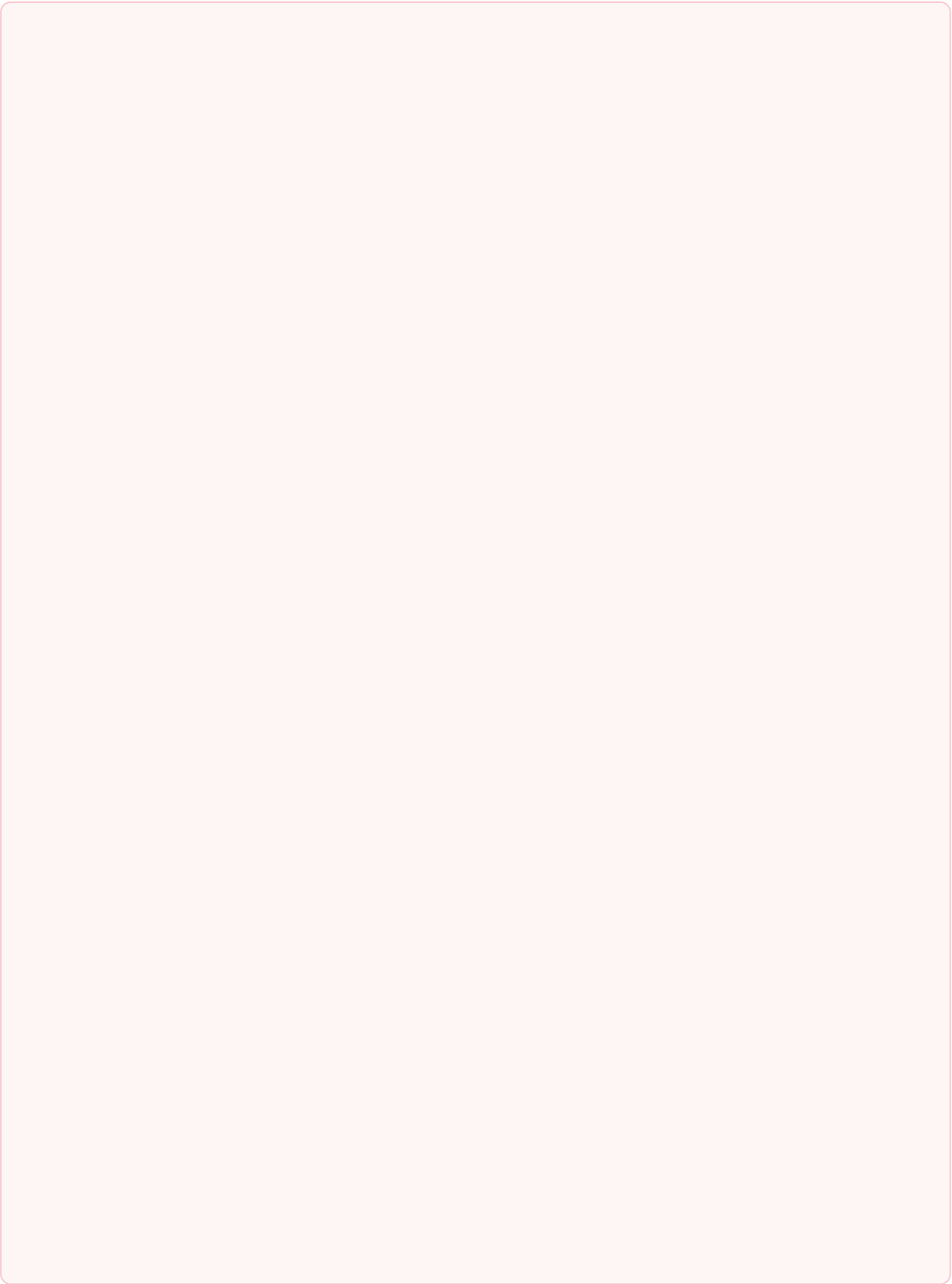
^{Note2} □ □ □ of model name indicates the capacity of drive. And the declaration is as page 16/ 26/ 36/ 44/ 50.

Noise Filter

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

Type	Product Type	Model Name ^(Note1)	Applicable Drive	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□	

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.







Application

Contents

Motion Module [EtherCAT] -----	124
Positioning Module(EtherCAT) -----	125
Positioning Module [APM] -----	126
Positioning Module [XPM] -----	127
XG-PM-----	128
Positioning Module/External Device Interface--	129

Features

- 32 axes (master) and 4 axes (virtual) control
- EtherCAT 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	4axes
	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 status 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

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
	Position speed range	pulse	-2147483648 ~ 2147483647	-2147483648 ~ 2147483647	-2147483648 ~ 2147483647
		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			

Features

- Highly reliable position control with LSIS 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	2	3	
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 (mm/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	

* XGF-PO□O: Open Collector type, □: Number of axis
XGF-PD□D: Line Drive type, □: Number of axis

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

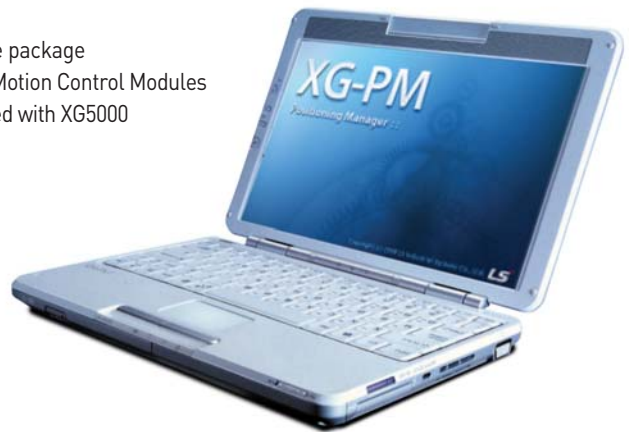


Specifications

Item	XGF-P01H XGF-PD1H	XGF-P02H XGF-PD2H	XGF-P03H XGF-PD3H	XGF-P04H 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: line driver			
Positioning	Positioning method	Absolute / Incremental		
	Position address 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	-2,147,483,648 ~ 2,147,483,647	
	Position address speed	mm	0.01 ~ 20,000,000.00(mm/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): line driver		
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, line driver: 4Mpps			
Max. distance	Open collector: 5m, line driver: 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-P01H:400	XGF-P02H:410	XGF-P03H:420	XGF-P04H:430
	XGF-PD1H:520	XGF-PD2H:600	XGF-PD3H:850	XGF-PD4H:890
Weight (g)	120		130	

Features

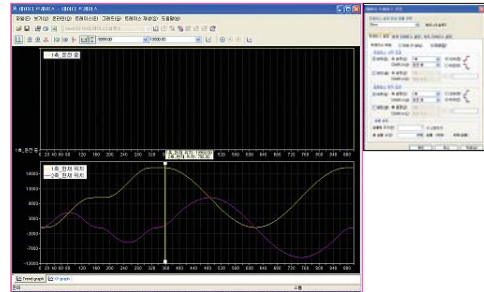
- Configuration tool with updated APM software package
- All models can be used for XGT Positioning & Motion Control Modules
- Simultaneous communications can be accessed with XG5000
- Powerful simulation, trace, monitoring



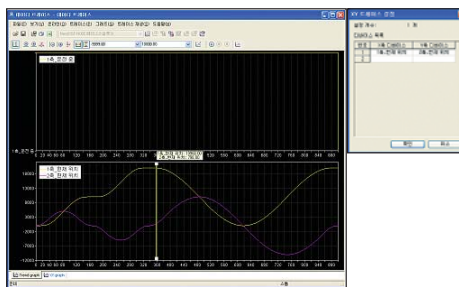
System View



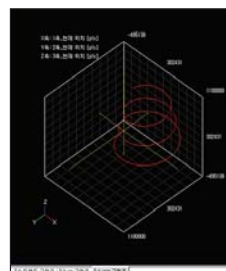
Data trace(trend graph)



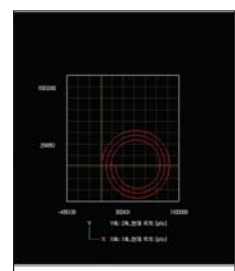
Data trace(XY graph)



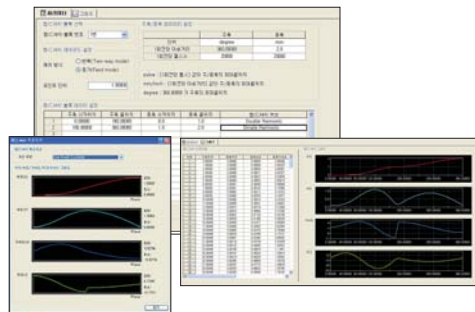
XYZ trend(3D View)



XYZ monitor(2D View)



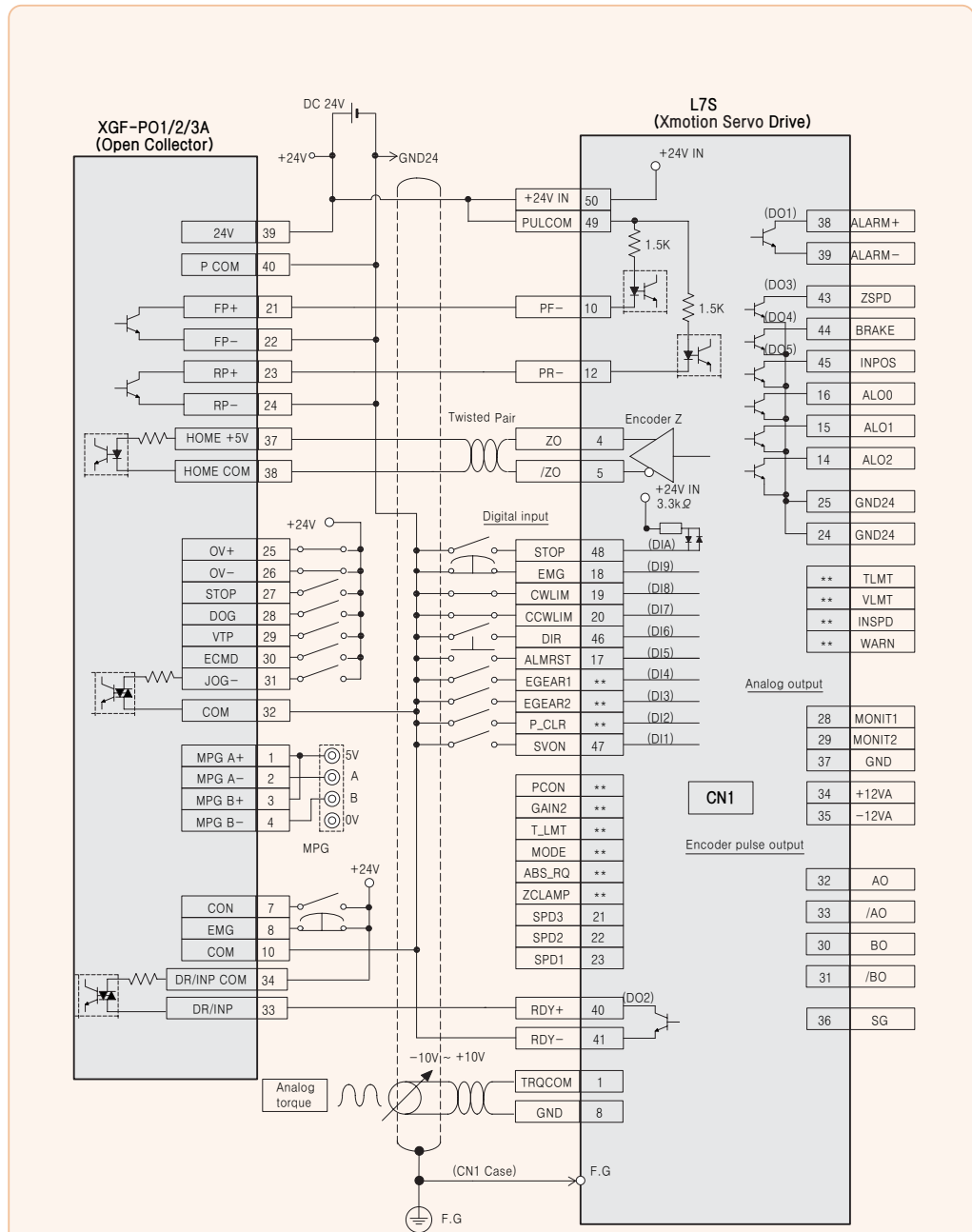
CAM control profile



Simulation

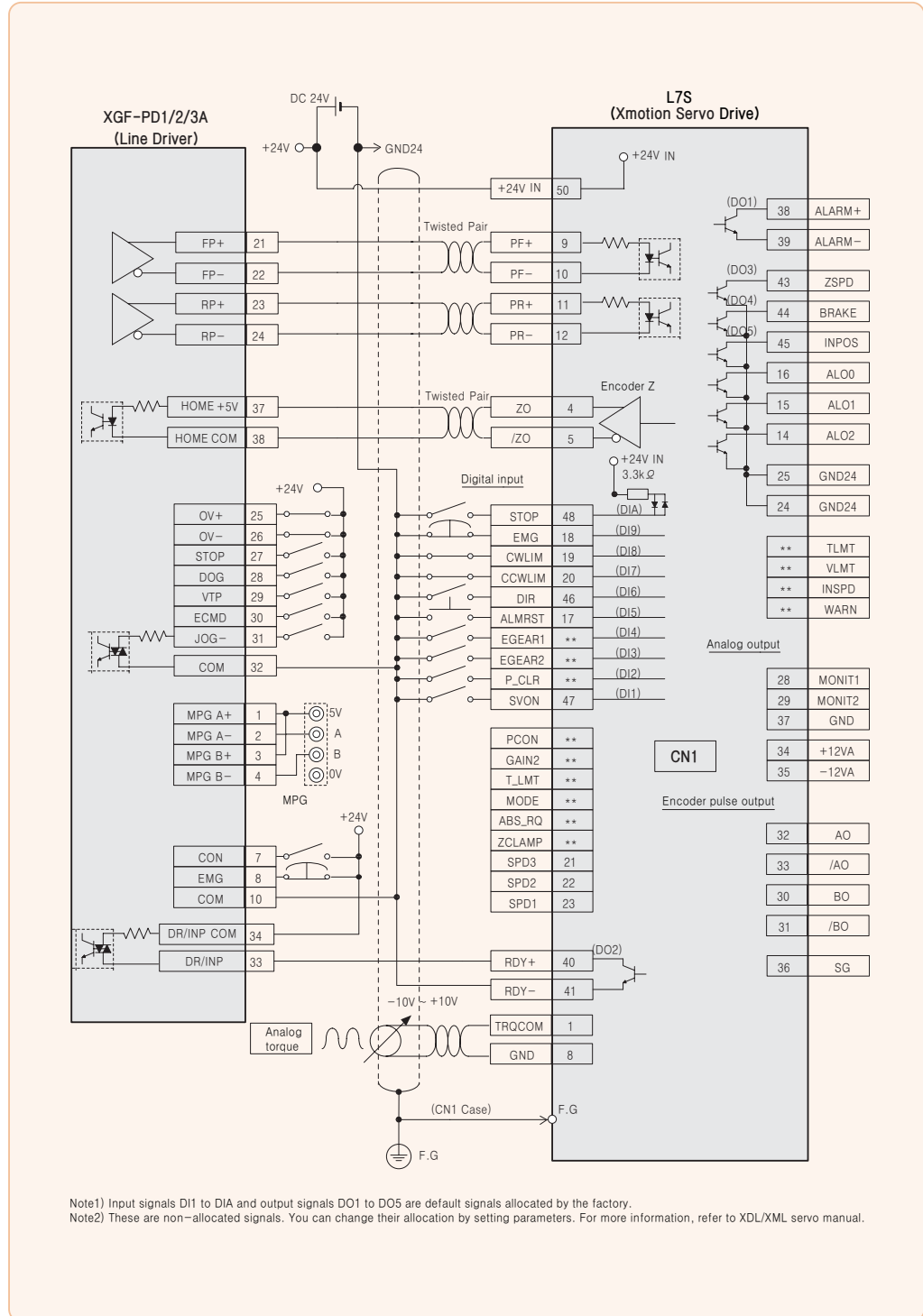


XGF-PO1/2/3A (Open Collector)

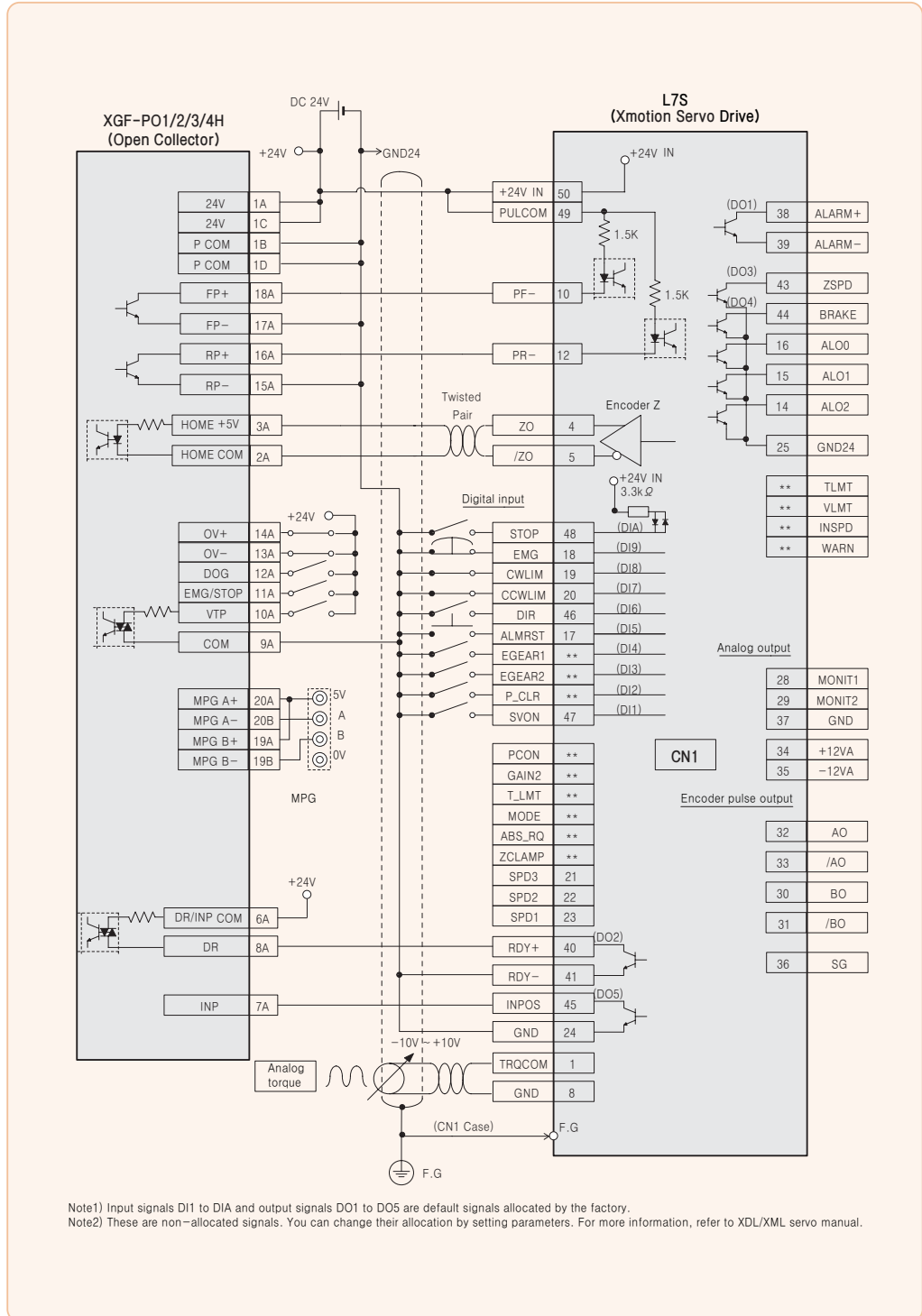


Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
 Note2) These are non-allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

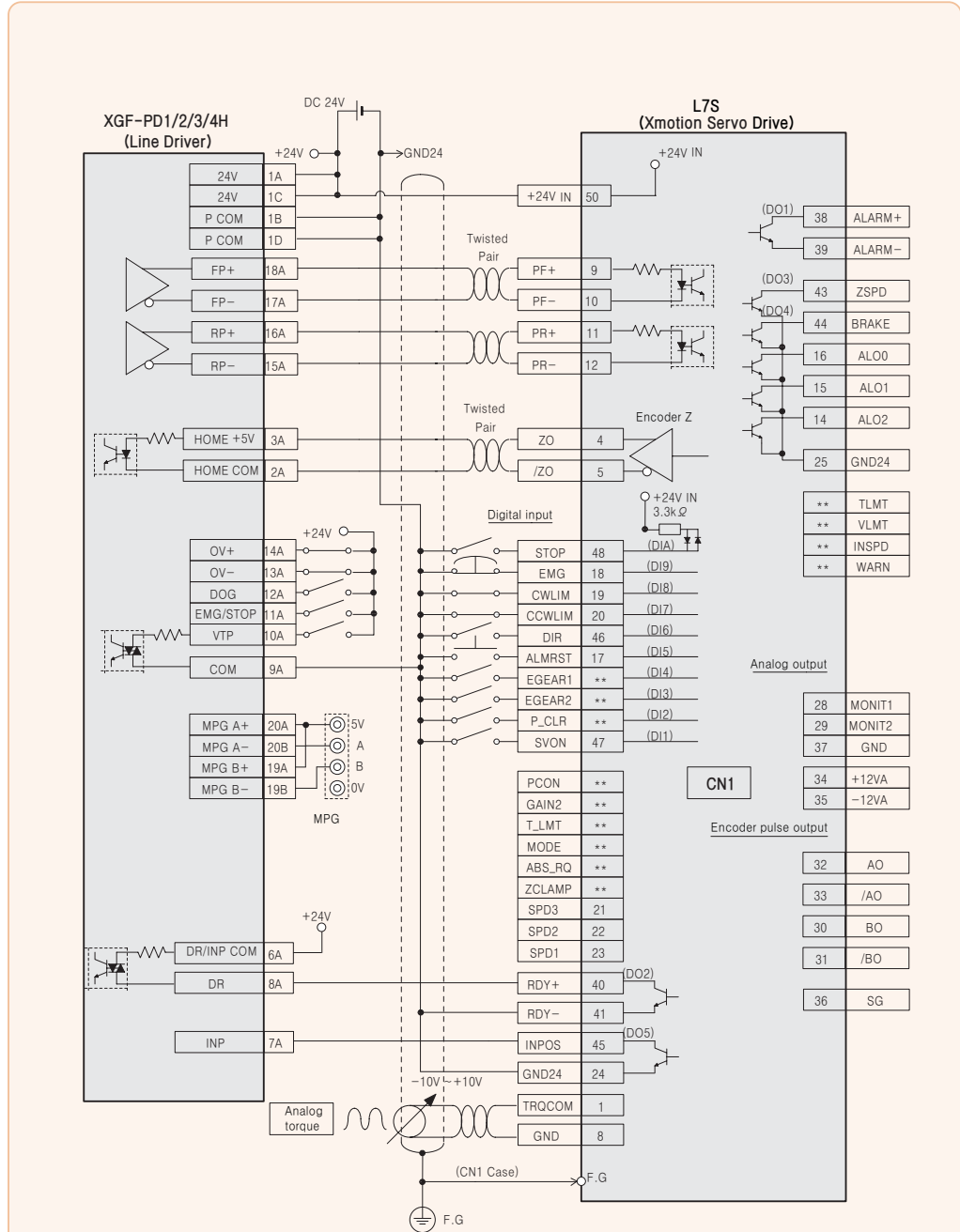
XGF-PD1/2/3A (Line Driver)



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

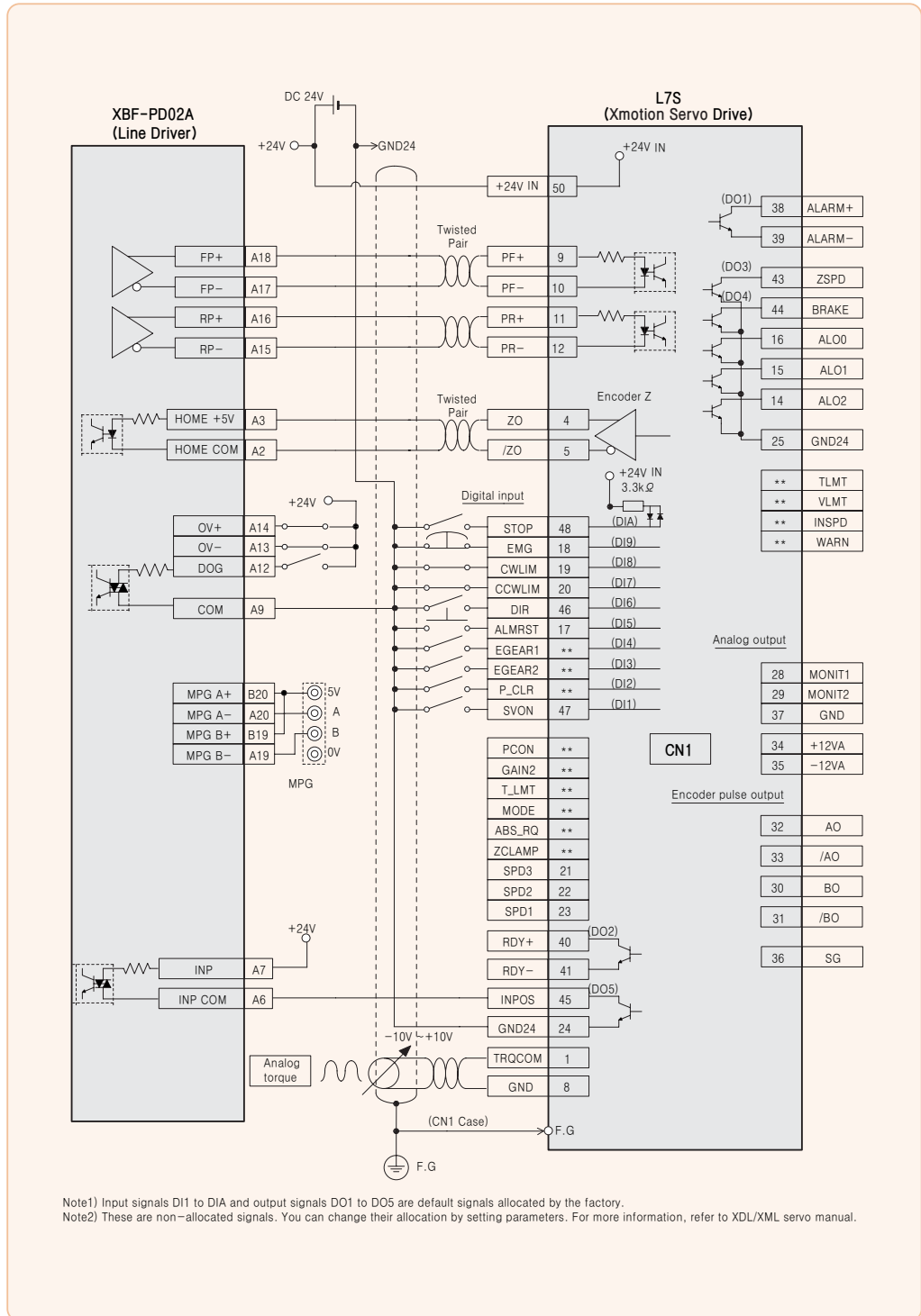


XGF-PD1/2/3/4H (Line Driver)

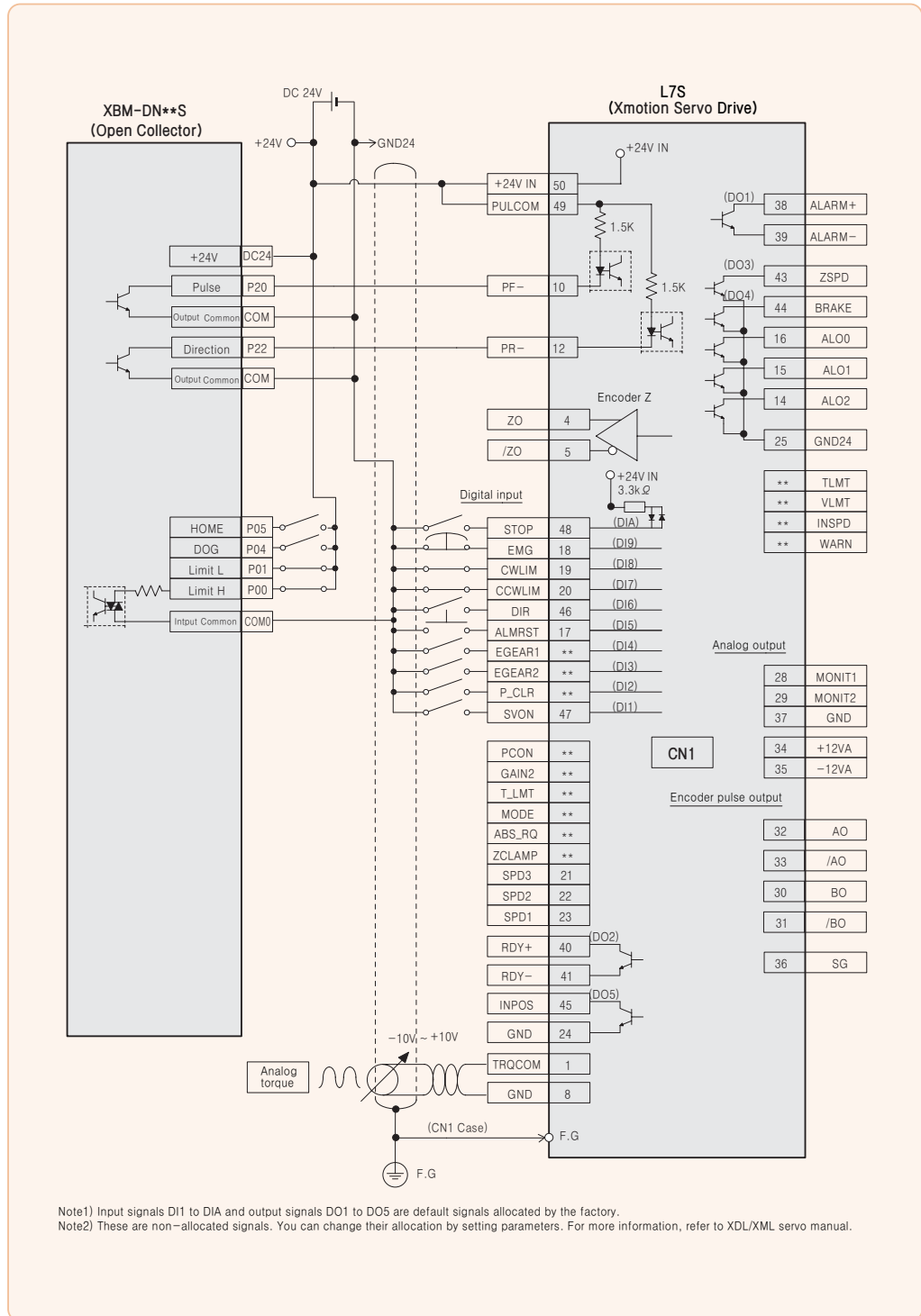


Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
 Note2) These are non-allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

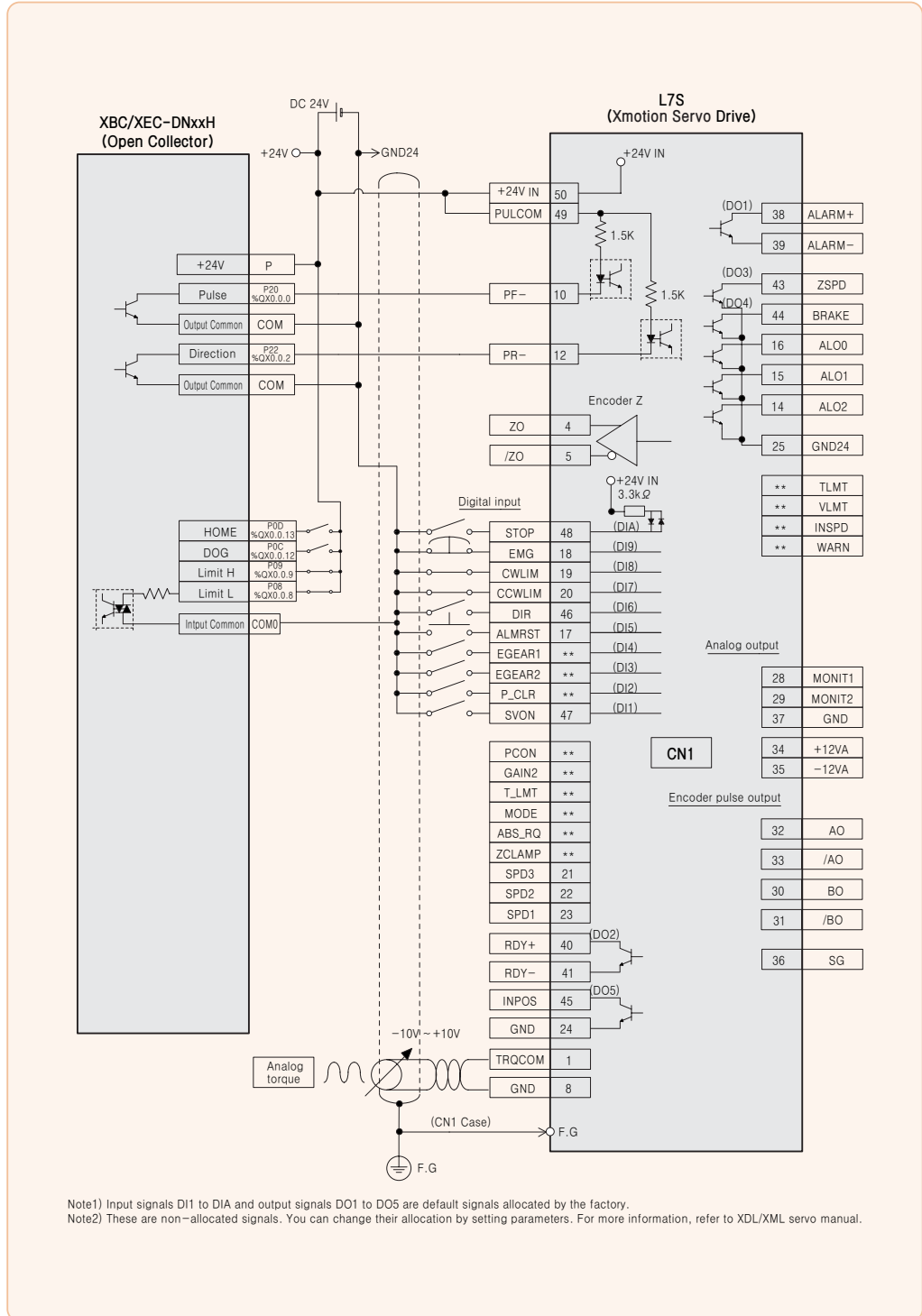
XBF-PD02A(Line Driver)



XBM-DNS(Open Collector)**

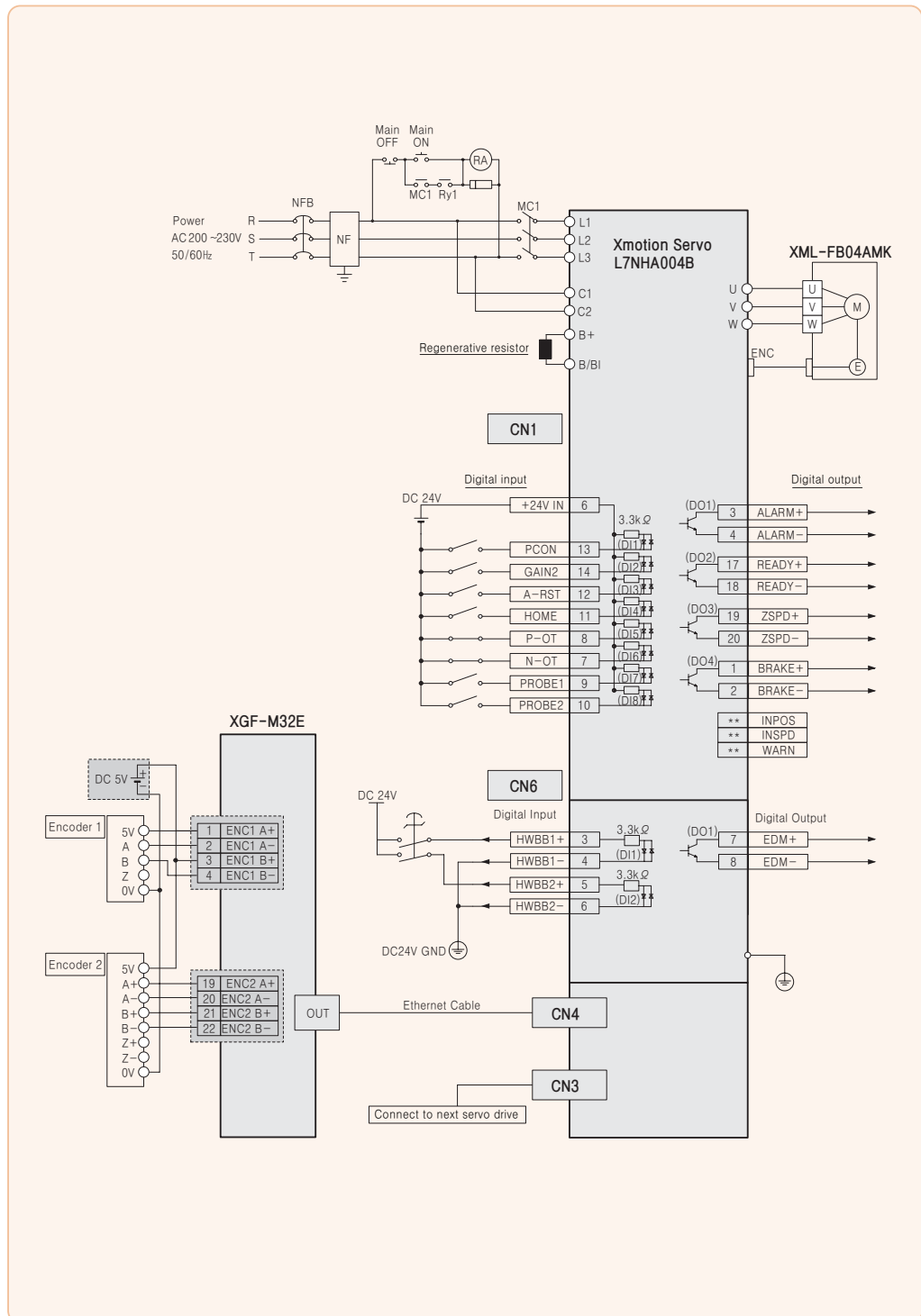


XBC/XEC-DN**H(Open Collector)

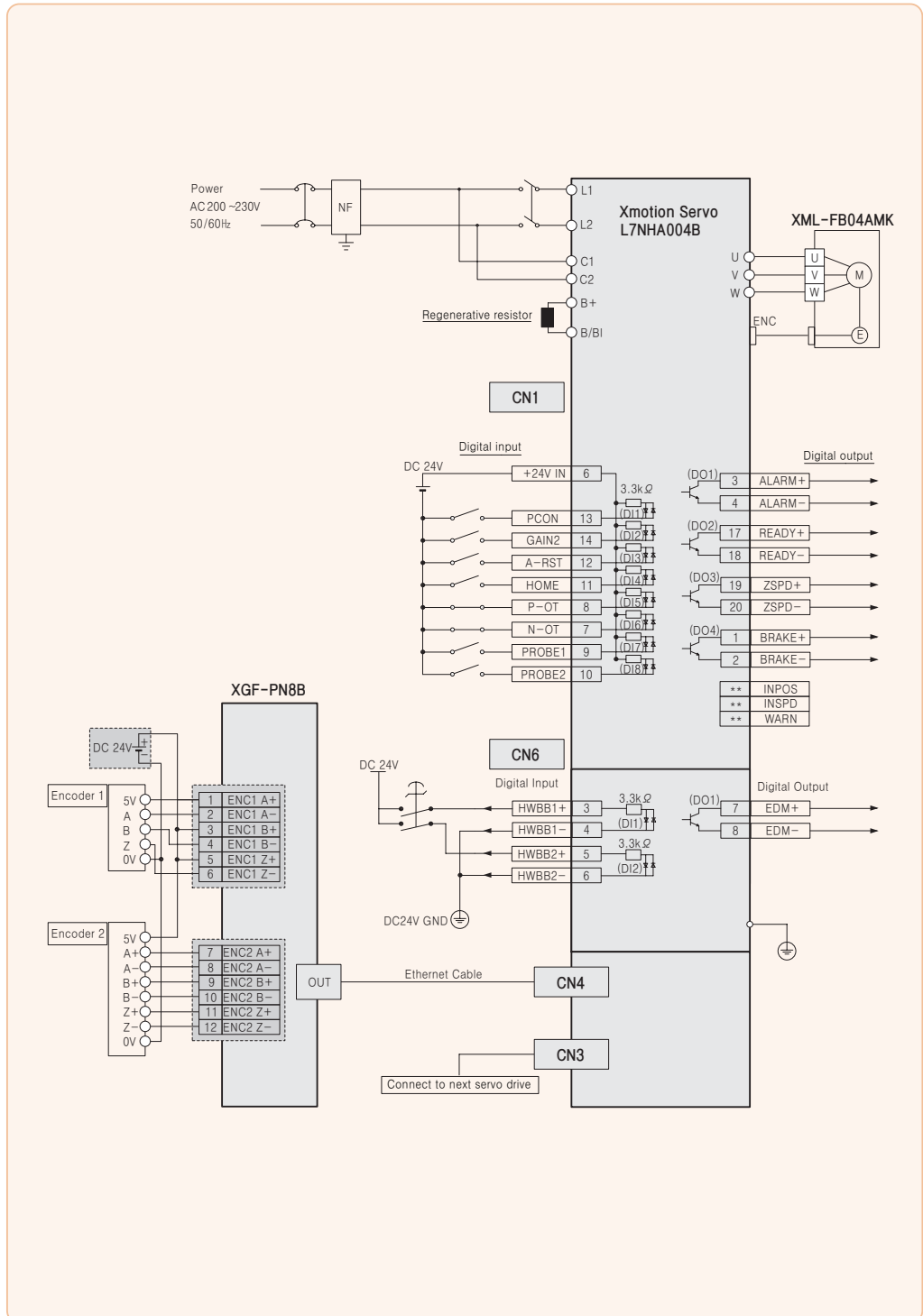


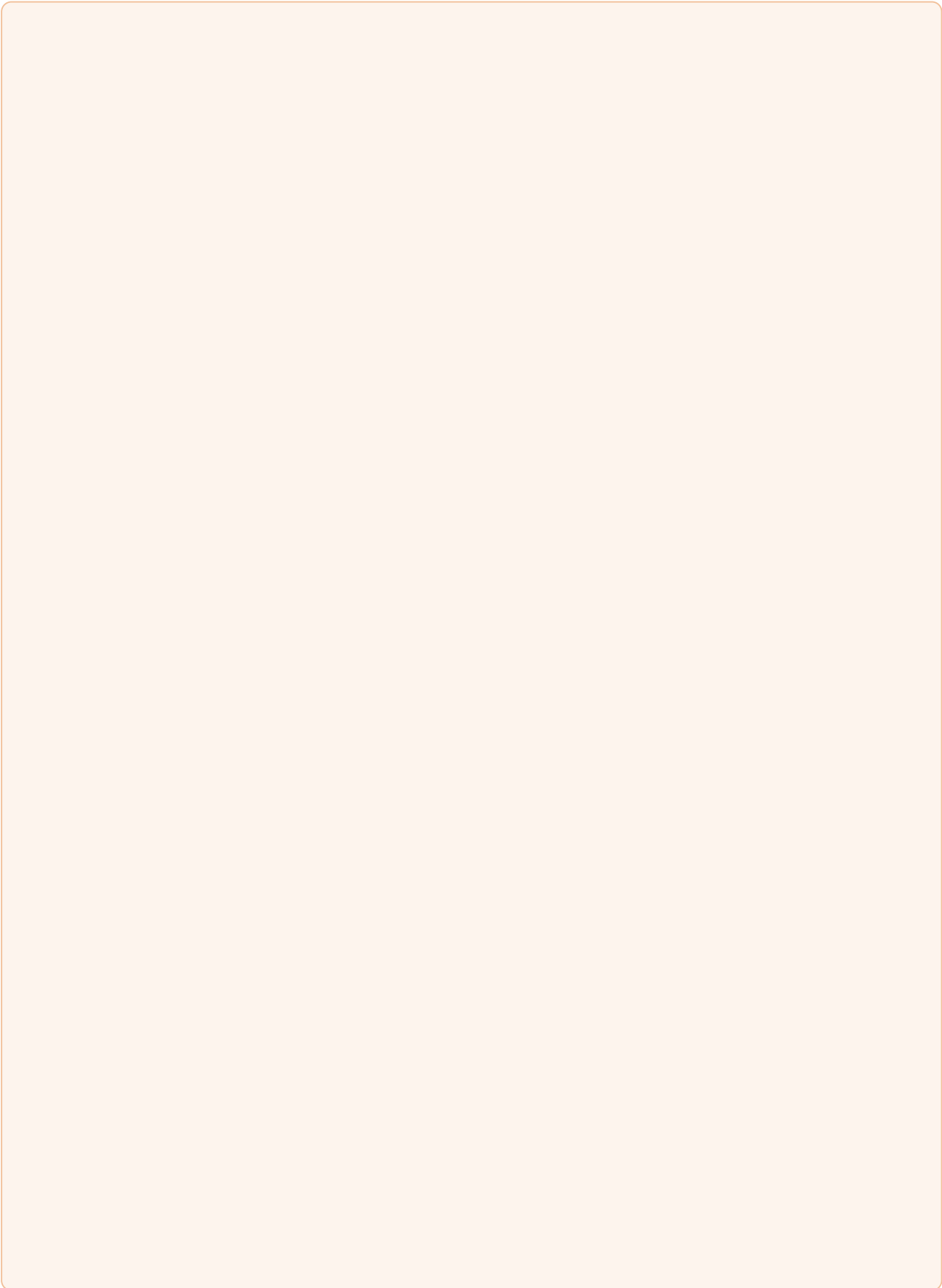
Note1) Input signals DI1 to DIA and output signals DO1 to DO5 are default signals allocated by the factory.
 Note2) These are non-allocated signals. You can change their allocation by setting parameters. For more information, refer to XDL/XML servo manual.

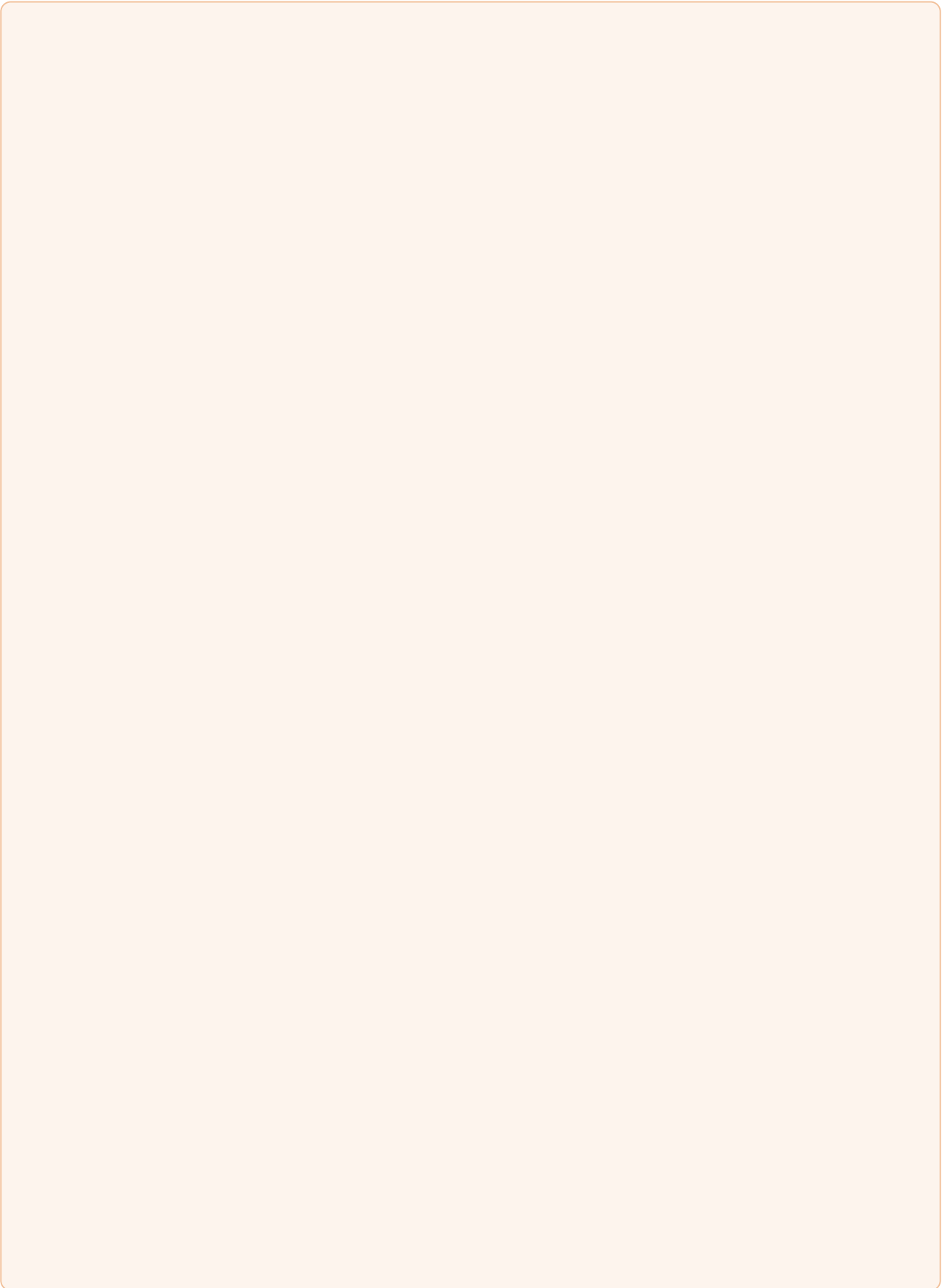
XGF-M32E



XGF-PN8B









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.