



FL20 Series

Parker Servo Drives & Motors for Film Line

Power Range 220V 0.1kW ~ 7.5kW

380/400V 1kW ~ 75kW



ENGINEERING YOUR SUCCESS.



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Parker Servo Drives & Motors – FL20 series

FL20 Servo Drive

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Parker Hannifin

The global leader in motion and control technologies

Global Product Design

Parker Hannifin has more than 40 years experience in the design and manufacturing of drives, controls, motors and mechanical products. With dedicated global product development teams, Parker draws on industry-leading technological leadership and experience from engineering teams in Europe, North America and Asia.

Local Application Expertise

Parker has local engineering resources committed to adapting and applying our current products and technologies to best fit our customers' needs.

Manufacturing to Meet Our Customers' Needs

Parker is committed to meeting the increasing service demands that our customers require to succeed in the global industrial market. Parker's manufacturing teams seek continuous improvement through the implementation of lean manufacturing methods throughout the process. We measure ourselves on meeting our customers' expectations of quality and delivery, not just our own. In order to meet these expectations, Parker operates and continues to invest in our manufacturing facilities in Europe, North America and Asia.

Electromechanical Worldwide Manufacturing Locations

Europe

Offenburg, Germany
Filderstadt, Germany
Ambacht, Netherlands
Evreux, France
Longvic, France
Cinisello, Italy

Asia

Shanghai, China
Jangan, Korea

North America

Rohnert Park, California
Irwin, Pennsylvania
NewUlms, Minnesota



Offenburg, Germany



Rohnert Park, California



Ambacht, Netherlands



Longvic, France



Jangan, Korea

FL20 series Servo Drives for Film Line Applications

Overview

Description

FL20-SA Series Servo Drives is a high performance drive particularly suitable for Film Line and similar applications. It has a 3.0kHz frequency response with a full closed loop functionality. The feedback options are incremental encoder, absolute encoder and resolver.

The FL20-SA has in-built RS485/232 port for PC monitoring. It also has CANopen and EtherCAT communication as options. The Parker PAC controller with its EtherCAT communication can be used as a complete solution for applications that need a controller as well as servo drives and motors.

FL20-CA is the in built EtherCAT version of the FL20-SA. The I/Os are optimized as most of the commands would be through the EtherCAT communication.



Features

- Flexibility
- Full closed loop control or multi-position control
- Interrupted position control
- Gantry synchronization
- Gain switching

Faster

- Frequency response 3.0kHz
- Dual-core processors
- 23-bit absolute encoder

Powerful

- Built-in PLC Function
- Pulse command Frequency up to 4Mhz
- Modbus RS485/RS232, CANopen, EtherCAT
- RS485/232 interface connected to PC Software

Technical Characteristics

FL20 Servo drive	
Supply voltage	220 VAC(-15% ~ +10%) Single / Three Phase 380/400 VAC ±10% Three Phase
Power range	Single Phase 220V 0.1kW ~ 1.8kW Three Phase 220V 0.1kW ~ 7.5kW Three Phase 380V 1kW ~ 75kW
Frequency response	PMSM : 3.0kHz
Operating temperature	-10°C ~ +40°C
Humidity	Below 90%
Altitude	1000m or below
Vibration	Below 0.5G (4.9 m/s ²)
IP rating	IP20

Technical Characteristics

FL20-SA Servo Drive Specifications

Input power		S2 / T2 : 220VAC (-15% ~ +10%) 50/60Hz T3 : 380/400VAC (±10%) 50/60Hz
Control mode		PT : Position pulse mode PR : Internal register position mode SZ : Analogue speed mode SR : Internal register speed mode TZ : Analog torque mode TR : Internal register torque mode
Braking		Built-in braking unit or dynamic brake (refer to page 17) Frame size M1, ML3, MM4, M4, M5, M6, M7, M8: without built-in resistor (External resistor need to order separately)
Control	Control method	PMSM motor
	Frequency response	3.0kHz
	Speed accuracy	± 0.01% (load fluctuation 0~100%)
	Speed fluctuation	PMSM : ± 0.01% (VC, load fluctuation 0~100%)
	Speed ratio	1 : 10000
	Input pulse frequency	1) 500kHz (line drive) ; 200kHz (Open collector) 2) 4MHz (Pulse command frequency / line drive)
Input	Control input	Servo on, Alarm reset, Pulse clear, Pulse prohibited, Forward run prohibited, Reverse run prohibited, Emergency stop, Forward torque limit, Reverse torque limit, Internal speed selection, Internal position triggered, Home searching triggered, Zero speed clamp, etc
	Speed feedback	1) 23bit absolute encoder 2) 23bit incremental encoder 3) Resolver
Output	Control output	Servo ready, Servo alarm activated, At position completed, At speed reached, Electromagnetic brake control, Rotation detection, At speed limit, Homing completed, At torque limit, and so on
	Encoder signal	1) Encoder Z phase open-collector output 2) Encoder A, B phase signal is frequency division output. Z phase has no frequency-division output. 3) Z pulse time extend capability
Position control	Input mode	1) A phase + B phase 2) Forward pulse + Reverse pulse 3) Pulse + Direction 4) Internal register
	Electronic gear	$0.01 \leq B / A \leq 100$ (Setting 2 electronic gears)
Analog signal control		-10V ~ +10V analog speed signal input
Analog torque control		-10V ~ +10V analog torque signal input
Accel / Deceleration		Accel / deceleration time 1 ~ 30000ms (0 ← → rated speed)
Communication		1) Modbus RS485/232 interface is connected controller 2) CANopen, EtherCAT (Optional communication card should be selected and purchased)
Parameter setting	Keypad	The parameters are set by keypad, which is displayed by 5 LED
	PC software	RS485 interface can set parameters by PC software
Monitoring		Output current, PN voltage, Motor speed, Motor feedback pulse, Motor feedback rotation, Given pulse, Given pulse error, Given speed, Given torque, analog speed reference, Analog torque reference, etc.
Protection		Over voltage, Under voltage, Over load, Over current, Encoder error, Over speed, Abnormal pulse control command, Emergency stop, Servo over heat, Input power phase loss, Regenerative braking error, Over-position, Battery alarm, etc
Applicable load inertia		Lower than 5 times of servo motor inertia

Technical Characteristics

FL20-CA Servo Drive Specifications

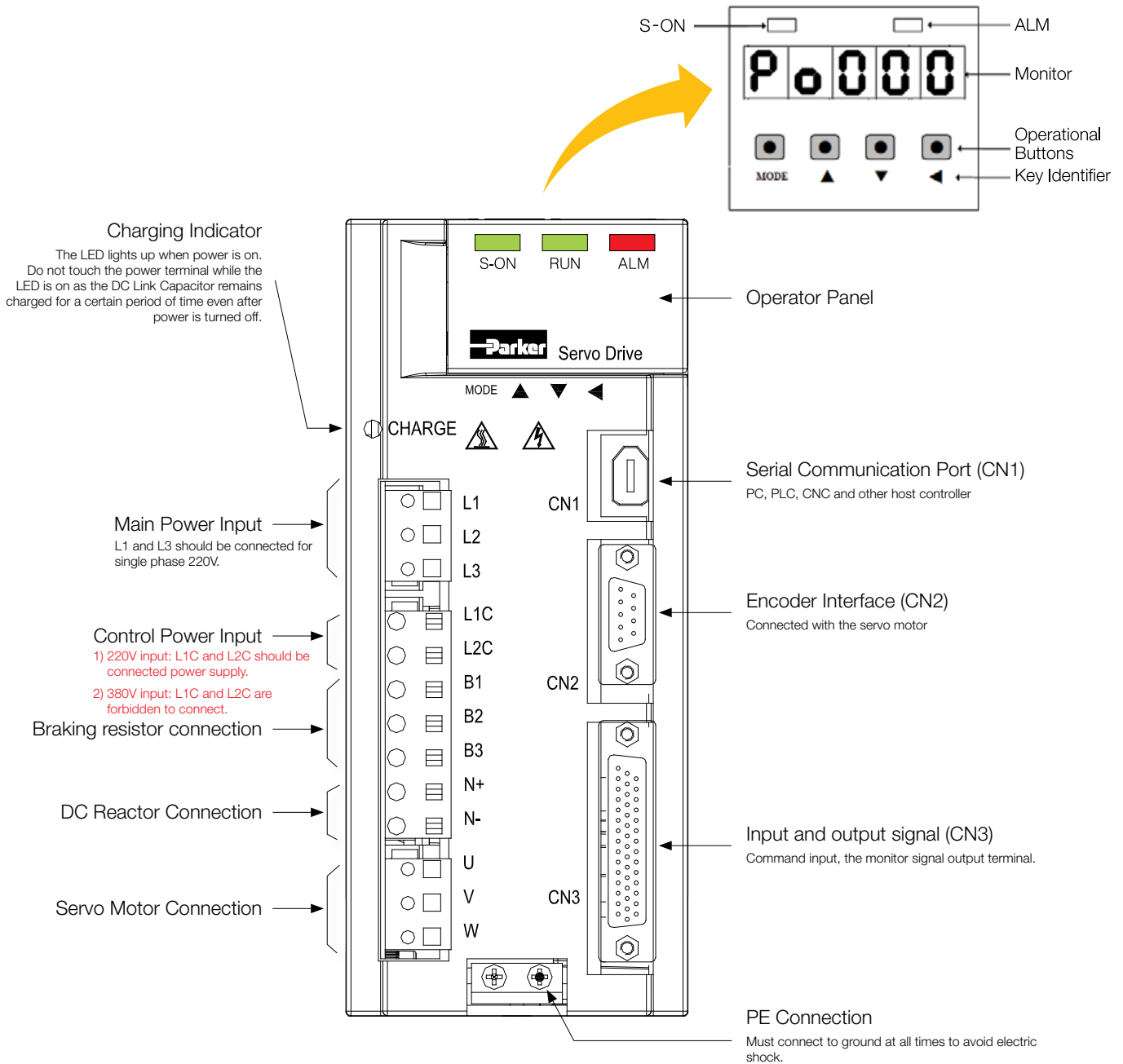
Input power		S2 / T2 : 220VAC (-15% ~ +10%) 50/60Hz T3 : 380/400VAC (±10%) 50/60Hz
Control mode	EtherCAT	1. Profile position control mode (PP) 2. Profile velocity mode (PV) 3. Profile torque mode (PT) 4. Homing mode (HM) 5. Cycle synchronous position mode (CSP) 6. Cycle synchronous velocity mode (CSV) 7. Cycle synchronous torque mode (CST)
	CANopen	1. Profile position control mode (PP) 2. Profile velocity mode (PV) 3. Profile torque mode (PT) 4. Homing mode (HM) 5. Interpolated position mode (IP)
Braking		Built-in braking unit or dynamic brake (refer to page 18) Frame size M1, ML3, M4, M5, M6, M7, M8 without built-in resistor (External resistor need to order separately)
Control feature	Control type	PMSM motor
	Response frequency	3.0KHz
	Baud rate	±0.01% (load 0~100%)
	Speed fluctuation	PMSM: ±0.01% (VC, load fluctuation 0 to 100%)
	Speed ratio	1: 10000
EtherCAT specification	Communication protocol	EtherCAT protocol
	Support service	CoE (PDO, SDO)
	Synchronous method	DC distributed clock
	Physical layer	100BASE-TX
	Transmission speed	100 Mbit/s (100Base-TX)
	Duplex mode	Full duplex
	Transmission media	CAT5E class and above shielded cable
	Transmission distance	The distance between 2 nodes <100M (good surroundings and cables)
	Slave station	Max 65535 (lower than 100 in practical use)
	Synchronization jitter	<1us
	Minimum communication cycle	500us
CANopen specification	Communication protocol	CANopen protocol
	CAN-ID	11bit-CAN2.0A(Standard frame)
	Synchronous method	Software
	Baud rate	500Kbit(Default) 1Mbit/s, 800Kbit/s, 250Kbit/s, 125Kbit/s, 100Kbit/s, 50Kbit/s, 20Kbit/s
	Frame length	0~8 bytes
	Application layer frame type	Data frame, remote frame
	Terminal matching resistance	120Ω
	Maximum number of sites	63
	Supported sub-protocols	CiA-301 V4.02 CANopen application layer and communication protocol CiA Draft Standard Proposal 402 V2.0 drive and motion control sub-protocol
	Transmission media	CAT5E class and above shielded cable.
Transmission distance	The distance between 2 nodes < 100M (good surroundings and cables)	

Technical Characteristics

FL20-CA Servo Drive Specifications(Continued)

Input signal	Control input	Servo enabled, Alarm reset, Command pulse clear, Command pulse prohibited, Forward prohibited, Reverse prohibited, Forward torque limit, Reverse torque limit, Internal speed selection, Internal position triggered, Origin/mechanical origin searching triggered, Zero speed clamp, probe, etc
	Speed feedback	1) 23bit absolute encoder 2) 23bit incremental encoder 3) Resolver
Output signal	Control output	Servo ready, Servo alarm, Positioning reach, Speed reach, Electromagnetic brake output, Rotation detection, Speed limit, Homing completed, Torque limit, etc
	Encoder signal frequency dividing output	1. Encoder Z phases open-collector output 2. Phase -A, -B: frequency-division differential output (not isolated, any frequency-division ratio) Phase-Z is not frequency-division output 3. Z pulse time extended function
Position control	Input mode	EtherCAT communication set / internal register / high-speed pulse input
	Electronic gear ratio	1. $0.01 \leq B / A \leq 100$ 2. Support 2 groups of electronic gear, which can be selected or switchover by users
Acceleration / Deceleration		The setting range of accel/decel time is 1~30,000ms (from 0 accelerated to rated speed)
Communication		1. Modbus RS485 2. EtherCAT
Parameter setting	Keypad	Use 4 keys to set parameter, which is displayed by 5 LEDs
	PC	RS485 / RS232
Monitor function		Output current, PN voltage, Motor speed, Motor feedback pulse, Motor feedback revolution, Given pulse, Given pulse error, Given speed, Given torque, etc
Protection function		Main circuit over voltage, Under voltage, Over load, Over current, Encoder error, Overspeed, Abnormal pulse control command, Emergency stop, Servo overheat, Main-circuit power phase-loss, Regeneration brake error, Position, Over position control, Lithium battery alarm, Sync. loss, Network initialization failure, Sync. cycle setting error, Sync. cycle excessive error, etc
Applicable load inertia		Lower than 5 times of servo motor inertia

Drive Component FL20 Series



Identifier	Name	Function
S-ON	Indicator (Green)	Indicating that Servo is on.(Light on when servo on)
ALM	Indicator (Red)	Indicating that malfunction occurs.(Light on when faulty occurs)
RUN	S Advanced Type	S Advanced Type state machine indicator
	EtherCAT	EtherCAT state machine indicator

Terminal Details

Description : CN1 Terminal

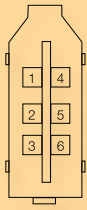
	Terminal No.	Symbol	Definition
	CN1-1	VCC	5V Power supply
	CN1-2	RS232-RXD	RS232 Receiving end
	CN1-3	B-	Differential Output -
	CN1-4	GND	Reference terminal
	CN1-5	RS232-TXD	RS232 tranFLission side
	CN1-6	A+	Differential output +

Figure: CN1 terminal definition (From the wire side to drive side view)

Description : CN2 Terminal

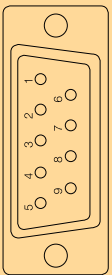
	Absolute Encoder			Resolver Feedback		
	Terminal No.	Name	Definition	Terminal No.	Name	Definition
	CN2- 1	NC	No connection	CN2- 1	RE2	Resolver signal stimulus
	CN2- 2	VCC	+5V power	CN2- 2	VCC	Power of motor temperature sensor
	CN2- 3	PS	PG serial signal	CN2- 3	KTY	Signal of motor temperature sensor
	CN2- 4	/PS	PG serial signal	CN2- 4	NC	No connection
	CN2- 5	GND	Grounding	CN2- 5	RE1	Resolver signal stimulus
	CN2- 6			CN2- 6	COS-	Resolver differential signal
	CN2- 7	NC	No connection	CN2- 7	COS+	Resolver differential signal
	CN2- 8	NC	No connection	CN2- 8	SIN-	Resolver differential signal
CN2- 9	NC	No connection	CN2- 9	SIN+	Resolver differential signal	

Figure: From the wire side to drive side look

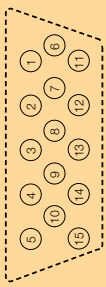
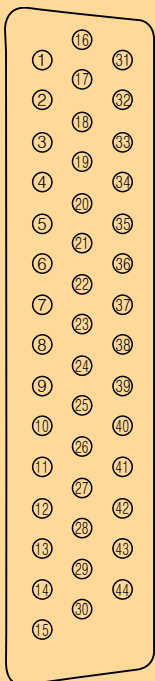
	Incremental Encoder		
	Terminal No.	Name	Definition
	CN2- 1	V	Encoder V phase input
	CN2- 2	U	Encoder U phase input
	CN2- 3	Z	Encoder Z phase input
	CN2- 4	B	Encoder B phase input
	CN2- 5	A	Encoder A phase input
	CN2- 6	/V	Encoder /V phase input
	CN2- 7	/U	Encoder /U phase input
	CN2- 8	/Z	Encoder /Z phase input
	CN2- 9	/B	Encoder /B phase input
	CN2-10	/A	Encoder /A phase input
	CN2-11	/W	Encoder /W phase input
	CN2-12	W	Encoder W phase input
	CN2-13	VCC	+5V power
CN2-14	GND	Grounding	
CN2-15	---	---	

Figure: From the wire side to drive side look

Terminal Details

Description : FL20-SA Type CN3 Terminal

Signal Category	Terminal No.	Name	Definition	Input	Remark	
Programmable Input Terminals	CN3-18	DI1	Digital input 1	Switching signal	NOTE: DI1~DI8 are digital input terminals, input mode is ON/OFF signal. DI input pulse frequency range is 0~3KHz	
	CN3-19	DI2	Digital input 2			
	CN3-20	DI3	Digital input 3			
	CN3-21	DI4	Digital input 4			
	CN3-22	DI5	Digital input 5			
	CN3-38	DI6	Digital input 6			
	CN3-39	DI7	Digital input 7			
	CN3-13	DI8	Digital input 8			
Analog Input	CN3-23	AS1+	Analog speed command input	Analog signal	Analog speed command input to AGND to power ground	
	CN3-25	AS2+	Analog speed command input	Analog signal		
Position	CN3-44 CN3-15	PULS /PULS	Pulse command input (5V)	Differential signal or Open Collector	Receive instructions in the form of: 1. Difference 2. Open collector It can only receive 5V command input.	
	CN3-12 CN3-27	SIGN /SIGN	Pulse command input (5V)	Differential signal or Open Collector		
Location	CN3-28	PL1	Pulse direction input (24V)	Differential signal or Open Collector	1. Pulse + direction 2. A, B-phase quadrature pulses	
	CN3-43	PL2	Pulse command input (24V)	Differential signal or Open Collector		
	CN3-4	HPULS+	High-speed input pulse command	Differential signal	This signal can only accept 5V quad differential pulse signal, while the reference terminal must be connected to together with CN3-24	
	CN3-3	HPULS-				
CN3-5	HSIGN+	High-speed pulse direction command	Differential signal			
CN3-6	HSIGN-					
Signal Category	Terminal No.	Name	Definition	Output	Remark	
Programmable Output Terminals	CN3-9	DO1+	Digital output 1	Switching signal	-	
	CN3-10	DO1-				
	CN3-26	DO2+	Digital output 2			
	CN3-11	DO2-				
	CN3-41	DO3+	Digital output 3			
	CN3-42	DO3-				
	CN3-32	DO4+	Digital output 4			
CN3-31	DO4-					
Pulse output terminal	CN3-7	ALM+	Servo alarm output	Open collector	When the servo drive motion detection alarm occurs Encoder ZRN signal open collector output	
	CN3-8	ALM-				
	CN3-37	OZ	Encoder ZRN signal output			
	CN3-34	PB0+	Encoder B-phase pulse output			Differential signal
	CN3-33	PB0-				
	CN3-36	PA0+	Encoder A-phase pulse output			
CN3-35	PA0-					
CN3-16	PZ0+	Encoder Z-phase pulse output				
CN3-17	PZ0-					
Analog output terminal	CN3-1	AO1	Analog output 1	Monitoring	0~10V	
	CN3-14	AO2	Analog output 2			

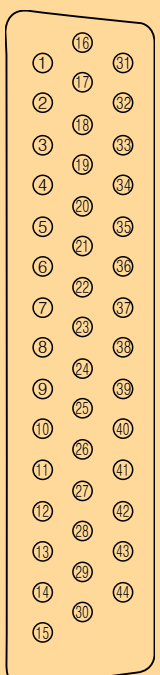


Other Signal

Signal	Terminal No.	Name	Definition	Output	Remark
DC 24V	CN3-29	+24V	+ 24V Output	+ 24V Output	24V power supply, 100mA(Max)
24V GND	CN3-30	CM	24V Ground	24V Ground	Alarm code output ground; Internal 24V power supply ground
Input Common	CN3-2	GP	Input Common	Common	Programmable input to common terminal
AI GND	CN3-24 CN3-40	AGND	Analog Input Ground	Analog Input Ground	Analog speed command, analog torque command and analog monitor Input ground

Terminal Details

Description : FL20-CA Type CN3 Terminal

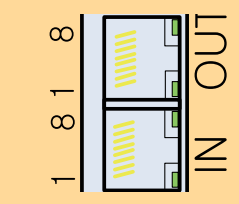


Signal Category	Terminal No.	Name	Definition	Input	Remark		
Programmable Input Terminals	CN3-18	DI1	Digital input 1	Switching signal	NOTE: DI1~DI8 are digital input terminals, input mode is ON/OFF signal. DI input pulse frequency range is 0~3KHz		
	CN3-19	DI2	Digital input 2				
	CN3-20	DI3	Digital input 3				
	CN3-21	DI4	Digital input 4				
	CN3-22	DI5	Digital input 5				
	CN3-38	DI6	Digital input 6				
	CN3-39	DI7	Digital input 7				
	CN3-13	DI8	Digital input 8				
Location	CN3-4 CN3-3	HPULS+ HPULS-	High-speed input pulse command	Differential signal	This signal can only accept 5V quad differential pulse signal, while the reference terminal must be connected to together with CN3-24		
	CN3-5 CN3-6	HSIGN+ HSIGN-	High-speed pulse direction command				
Signal Category	Terminal No.	Name	Definition	Output	Remark		
Programmable Output Terminals	CN3-9	DO1+	Digital output 1	Switching signal			
	CN3-10	DO1-					
	CN3-26	DO2+	Digital output 2				
	CN3-11	DO2-					
	CN3-41	DO3+	Digital output 3				
	CN3-42	DO3-					
	CN3-32	DO4+	Digital output 4				
	CN3-31	DO4-					
Pulse output terminal	CN3-7 CN3-8	ALM+ ALM-	Servo alarm output	Open collector	When the servo drive motion detection alarm occurs		
	CN3-37	OZ	Encoder ZRN signal output				
	CN3-34 CN3-33	PB0+ PB0-	Encoder B-phase pulse output			Differential signal	Encoder B-phase pulse output
	CN3-36 CN3-35	PA0+ PA0-	Encoder A-phase pulse output				Encoder A-phase pulse output
	CN3-16 CN3-17	PZ0+ PZ0-	Encoder Z-phase pulse output				Encoder Z-phase pulse output
Analog output terminal	CN3-1	AO1	Analog output 1	Monitoring	0~10V		
	CN3-14	AO2	Analog output 2				

Other Signal

Signal	Terminal No.	Name	Definitino	Output	Remark
DC 24V	CN3-29	+24V	+ 24V Output	+ 24V Output	24V power supply, 100mA(Max)
24V GND	CN3-30	CM	24V Ground	24V Ground	Alarm code output ground; Internal 24V power supply ground
Input Common	CN3-2	GP	Input Common	Common	Programmable input to common terminal
AI GND	CN3-24 CN3-40	AGND	Analog Input Ground	Analog Input Ground	Analog speed command, analog torque command and analog monitor Input ground

Communication Port(FL20-CA Type)

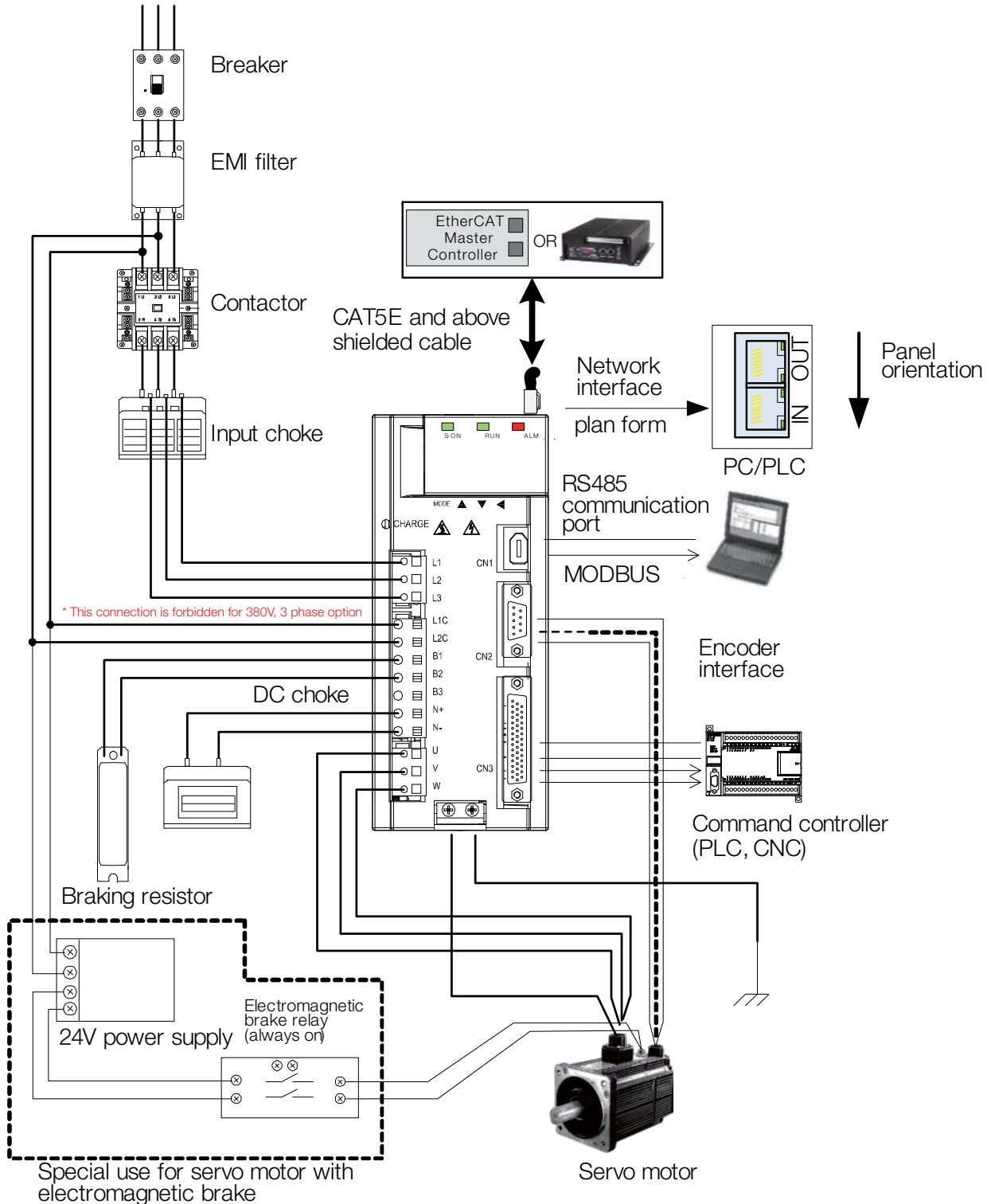


Pin	Definition	Description
1	TX+	Data send+
2	TX-	Data send-
3	RX+	Data receive+
4	Reserved	Reserved
5	Reserved	Reserved
6	RX-	Data receive-
7	Reserved	Reserved
8	Reserved	Reserved

Wiring Diagram

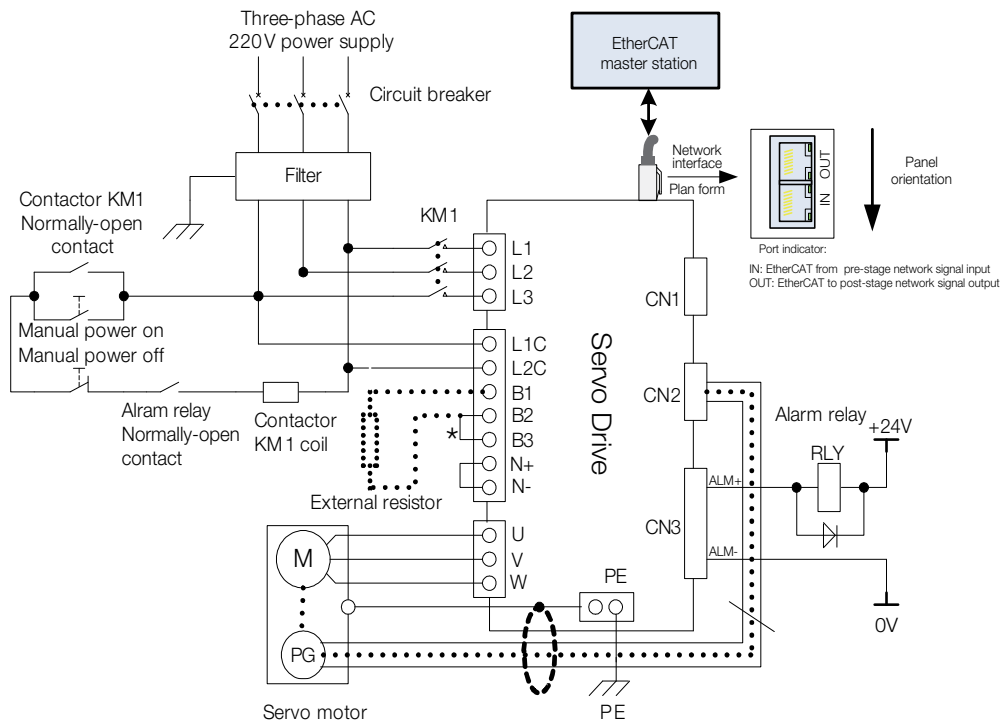
Connection to Peripheral Devices

Three-phase AC power supply
(Single phase 220V, connect only L1 and L3)



Wiring Diagram

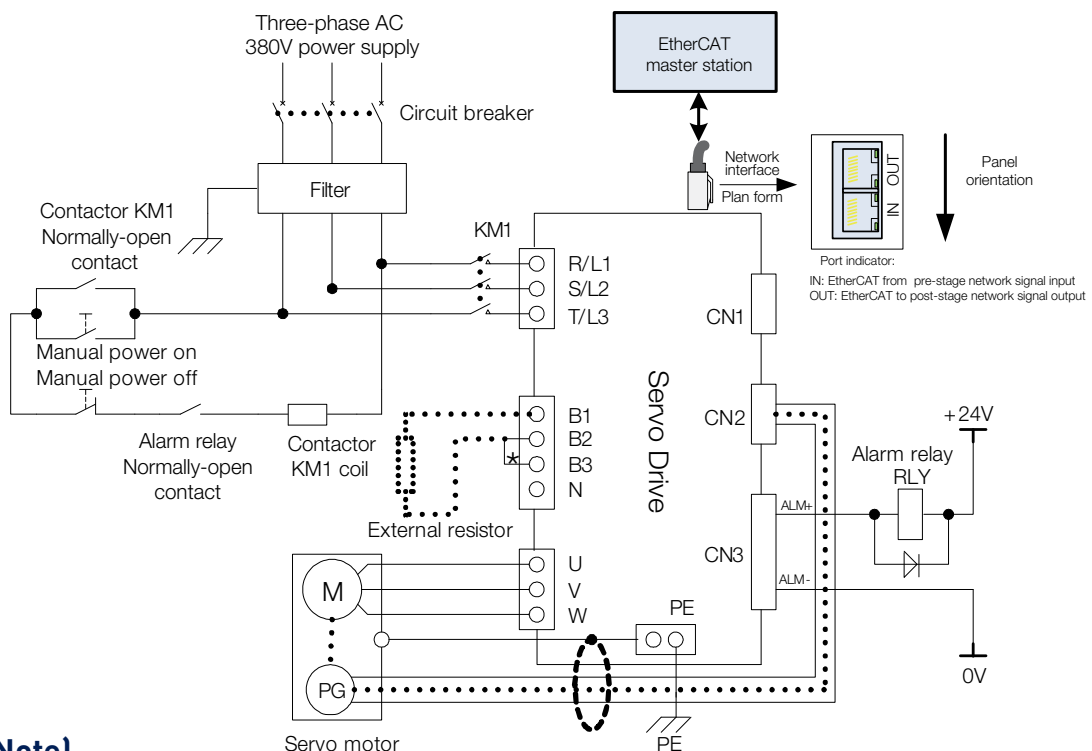
220VAC Servo Drive



Note]

For 220V input servo drive, L1C and L2C should be connected to power supply.
For 220V single phase connect to L1 and L3.

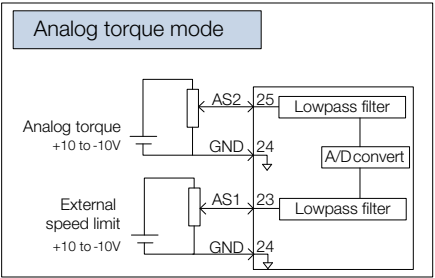
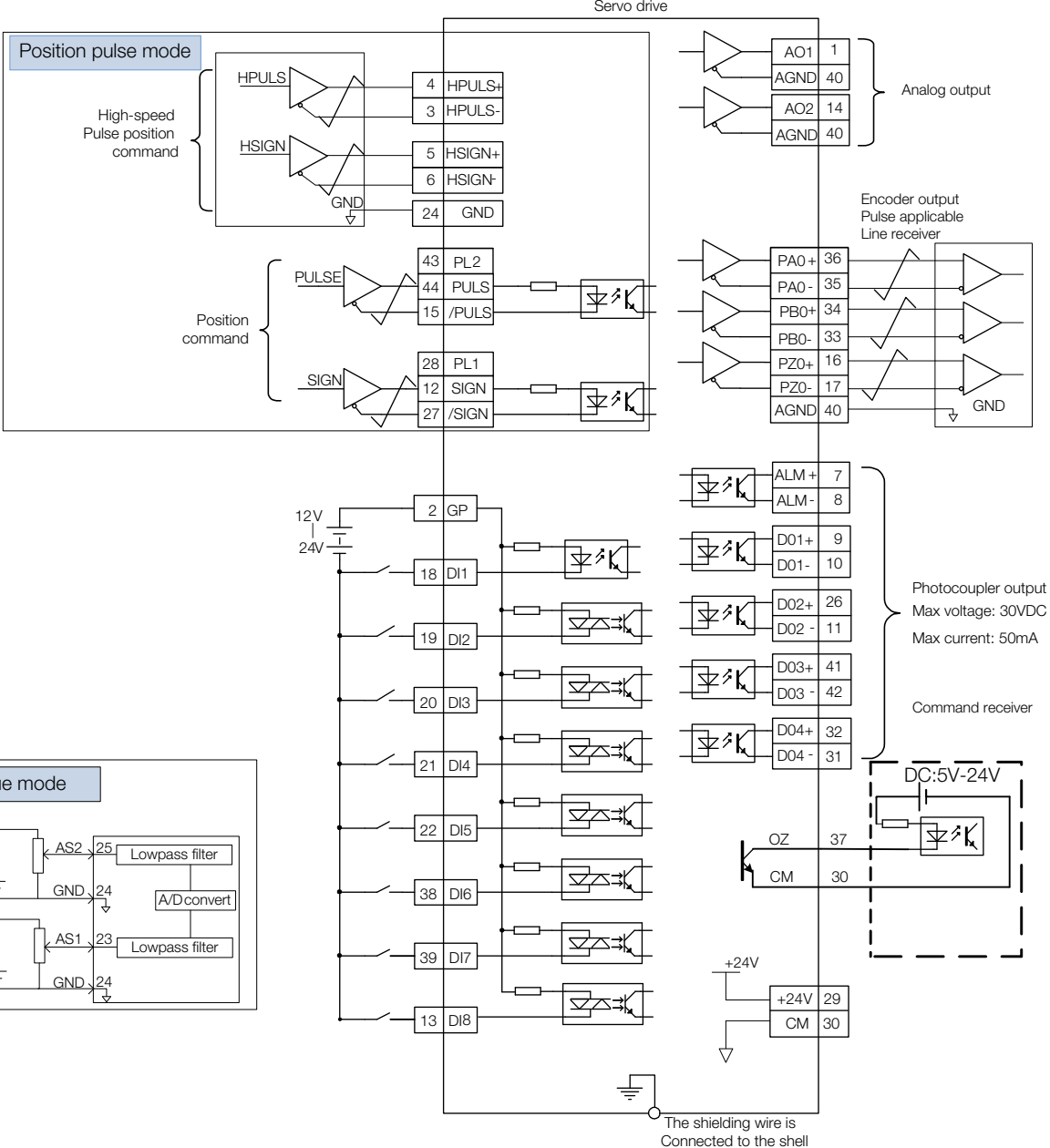
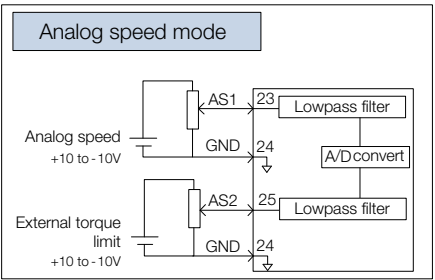
380VAC Servo Drive



Note]

For 380V input servo drive, L1C and L2C are forbidden to connect

Control terminal connection



Ordering Code

FL20-SA Series Drive

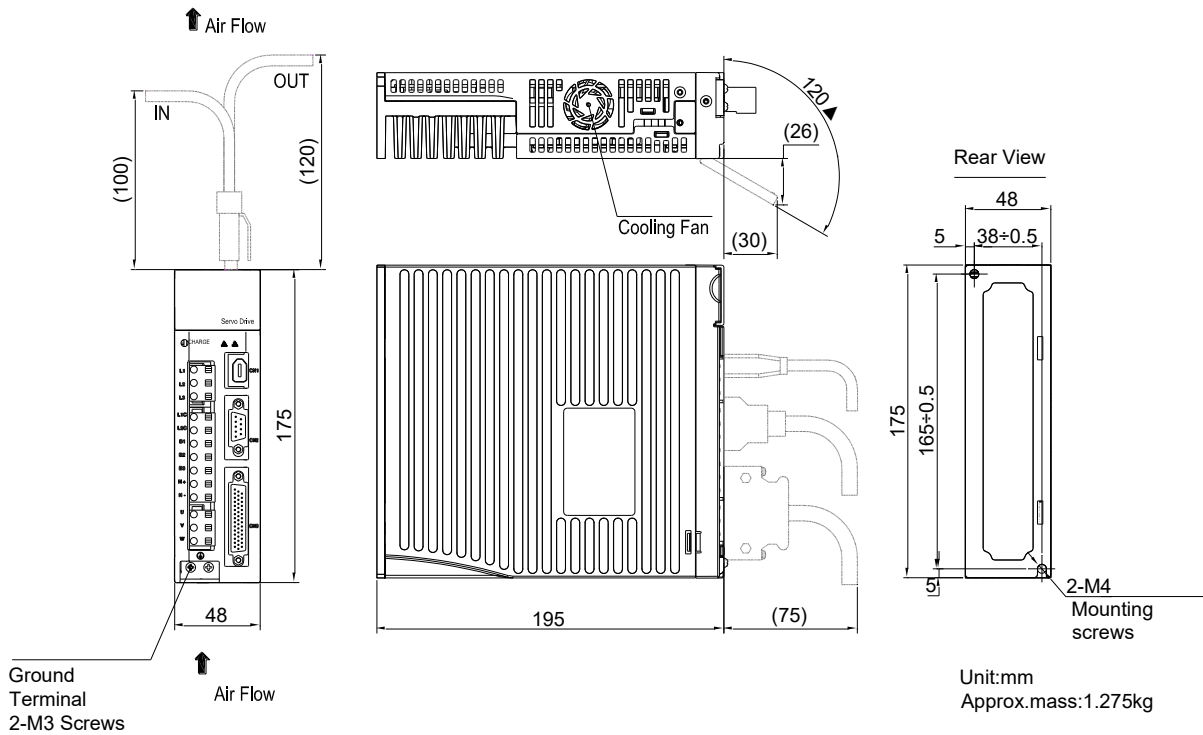
	1		2		3		4	5	6
Order example	FL20	-	SA	152	T3	M2	F0	D20	B3

1 Device Family	FL20	Servo Drive for Film line Application	183 T3 M5	18kW / 38A / M5 Frame
2 Function	SA	S Advanced Type	223 T3 M5	22kW / 44A / M5 Frame
3 Power Rating, Voltage and Frame Size			303 T3 M6	30kW / 60A / M6 Frame
220V 1phase			373 T3 M6	37kW / 75A / M6 Frame
101 S2 M1	0.1kW / 1.2A / M1 Frame		453 T3 M7	45kW / 90A / M7 Frame
201 S2 M1	0.2kW / 1.5A / M1 Frame		553 T3 M8	55kW / 110A / M8 Frame
401 S2 M1	0.4kW / 2.8A / M1 Frame		753 T3 M8	75kW / 150A / M8 Frame
751 S2 M1	0.75kW / 3.5A / M1 Frame		4 Communication	
102 S2 M2	1kW / 4.5A / M2 Frame		F0	Modbus RS485
122 S2 M2	1.2kW / 6A / M2 Frame		5 Encoder Type	
182 S2 M2	1.8kW / 8A / M2 Frame		D20	Resolver
220V 3phase			D52	4-core 23-bit Incremental Encoder
101 T2 M1	0.1kW / 1.2A / M1 Frame		D71	4-core 23-bit Absolute Encoder
201 T2 M1	0.2kW / 1.5A / M1 Frame		6 Brake Unit	
401 T2 M1	0.4kW / 2.8A / M1 Frame		B1	Energy consumption braking with built-in resistor
751 T2 M1	0.75kW / 3.5A / M1 Frame		B3	Energy consumption braking and dynamic braking
102 T2 M2	1kW / 4.5A / M2 Frame		B6	Energy consumption braking without built-in resistor
122 T2 M2	1.2kW / 6A / M2 Frame		Note)	
182 T2 M2	1.8kW / 8A / M2 Frame		- For build in and external resistors details please see "Brake resistor" note or product manual.	
302 T2 M3	3kW / 12A / M3 Frame			
452 T2 M3	4.5kW / 17A / M3 Frame			
380V 3phase				
102 T3 M2	1.0kW / 3A / M2 Frame			
152 T3 M2	1.5kW / 3.5A / M2 Frame			
202 T3 M2	2kW / 6A / M2 Frame			
302 T3 M2	3kW / 8A / M2 Frame			
202 T3 M3	2kW / 6A / M3 Frame			
302 T3 M3	3kW / 8A / M3 Frame			
452 T3 M3	4.5kW / 10A / M3 Frame			
552 T3 M3	5.5kW / 12A / M3 Frame			
752 T3 ML3	7.5kW / 20A / ML3 Frame			
113 T3 ML3	11kW / 23A / ML3 Frame			
752 T3 MM4	7.5kW / 20A / MM4 Frame			
113 T3 MM4	11kW / 23A / MM4 Frame			
153 T3 M4	15kW / 32A / M4 Frame			

Drive Dimensions

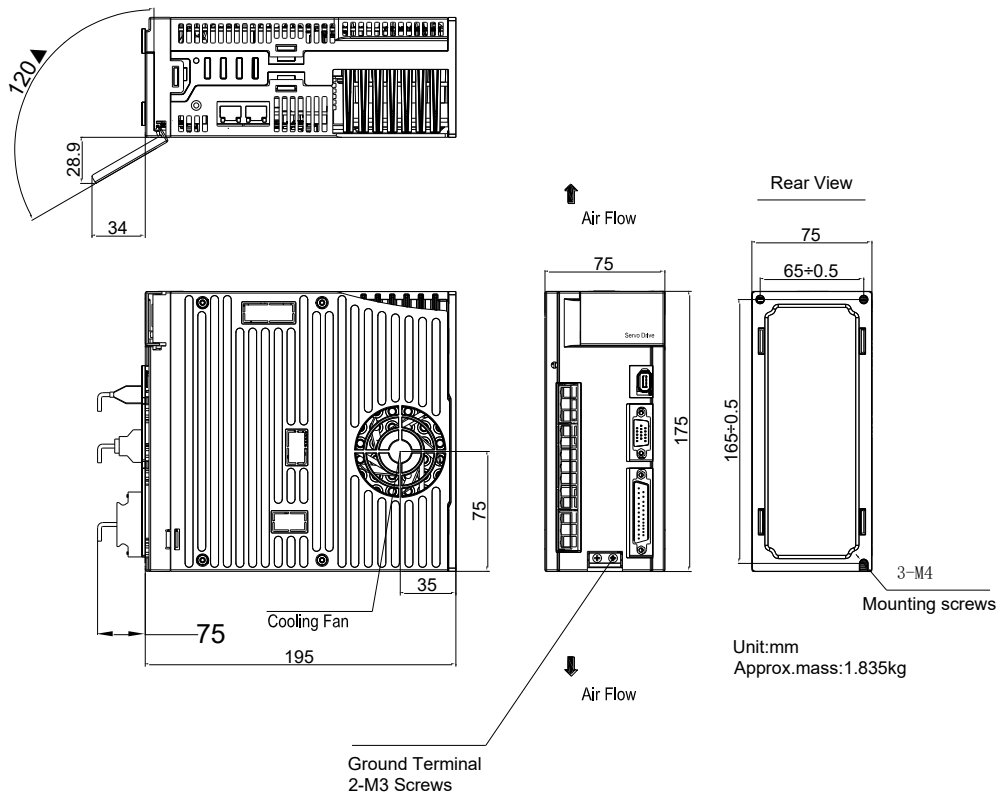
M1 Frame dimensions

Unit: mm



M2 Frame dimensions

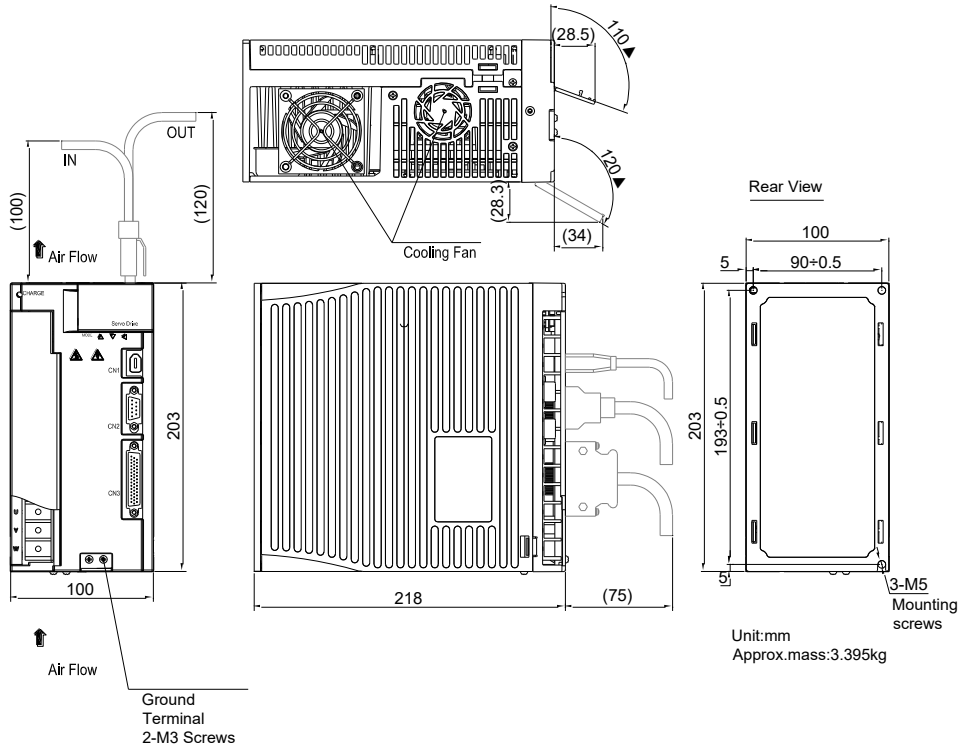
Unit: mm



Drive Dimensions

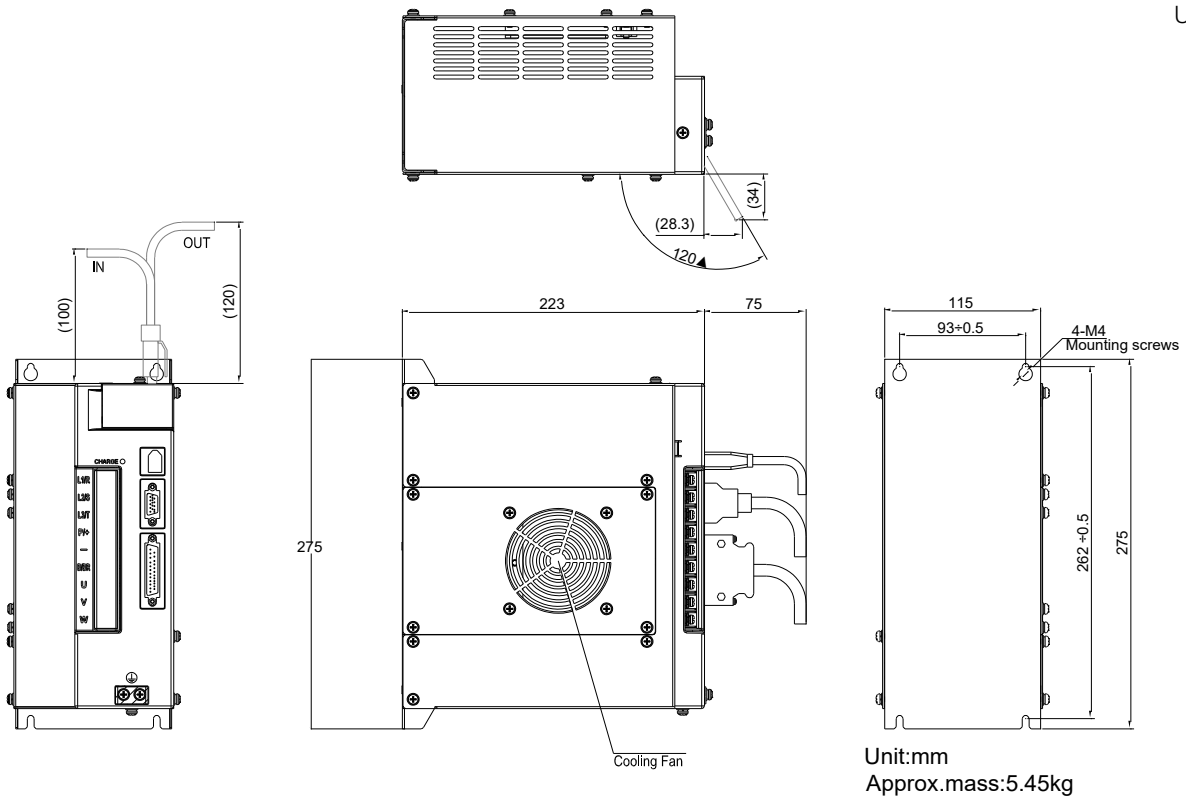
M3 Frame dimensions

Unit: mm



ML3 Frame dimensions

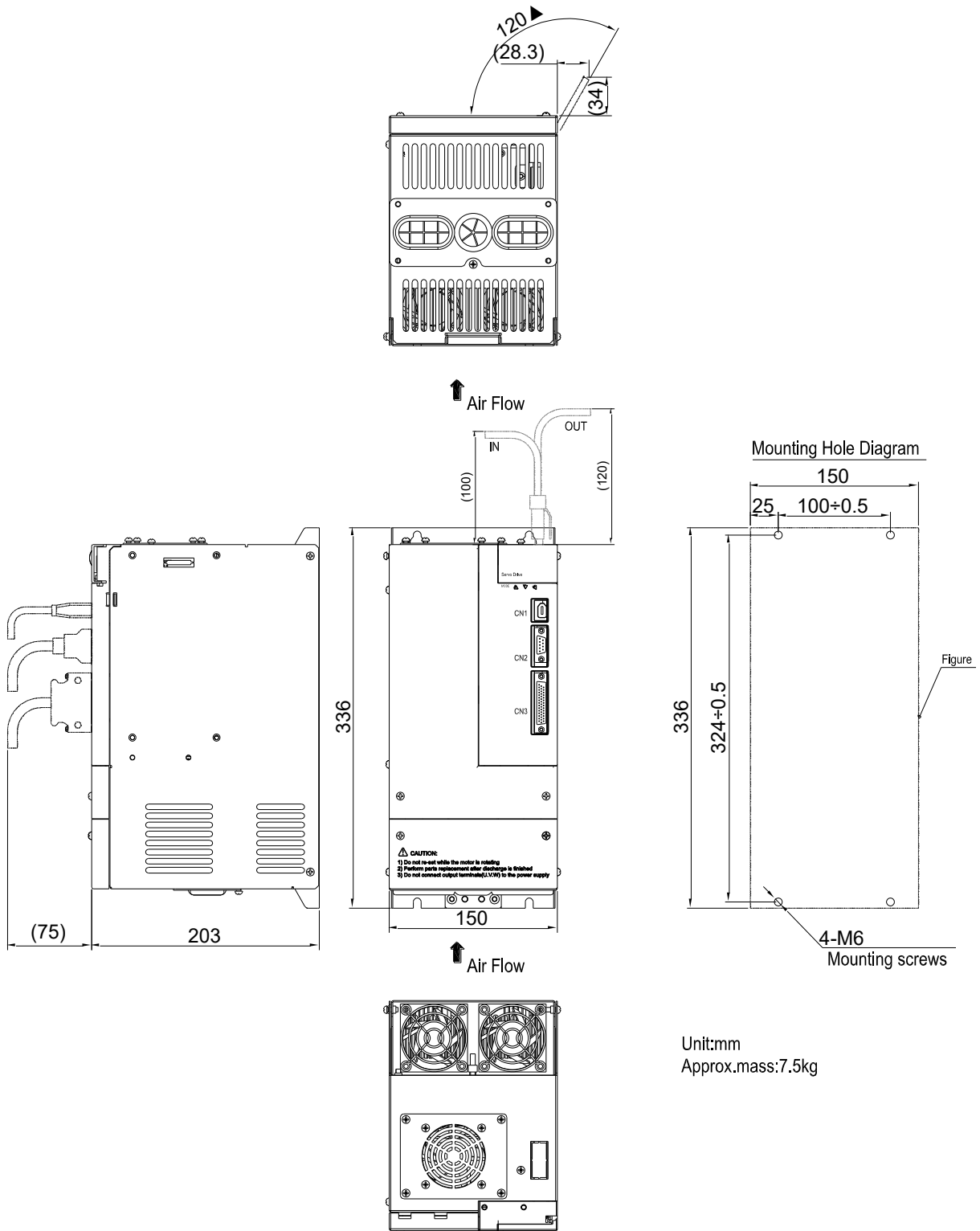
Unit: mm



Drive Dimensions

MM4 Frame dimensions

Unit: mm

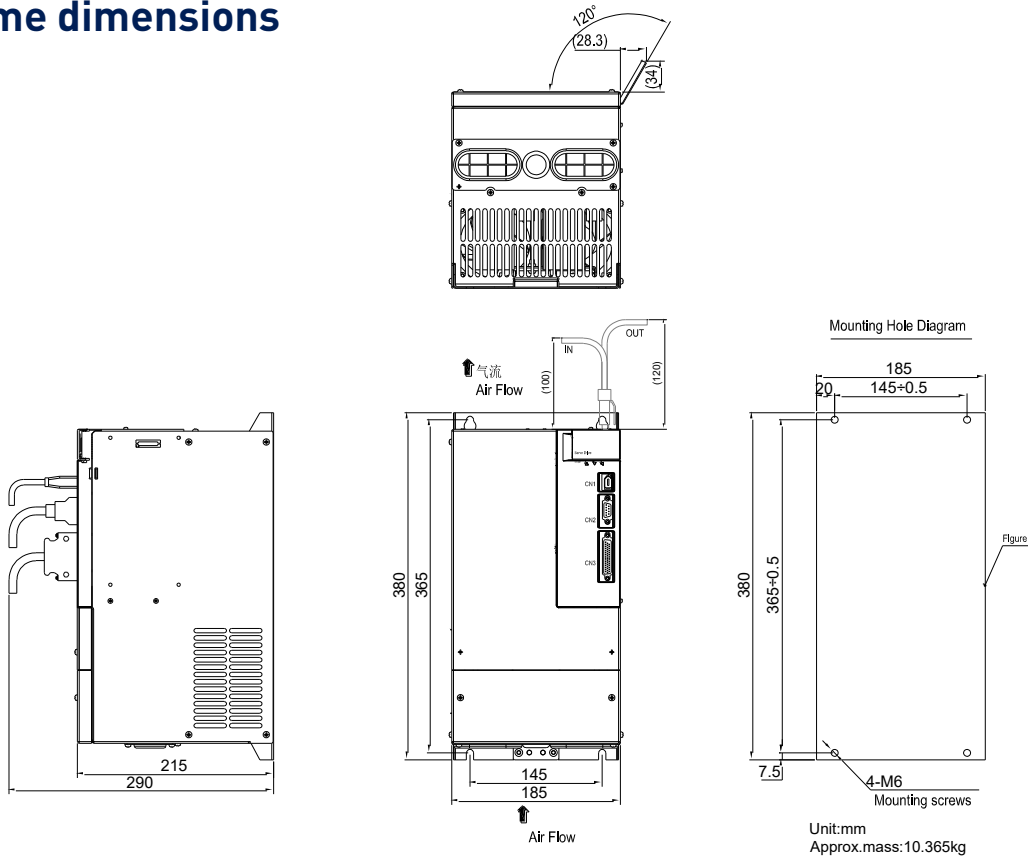


Unit:mm
 Approx.mass:7.5kg

Drive Dimensions

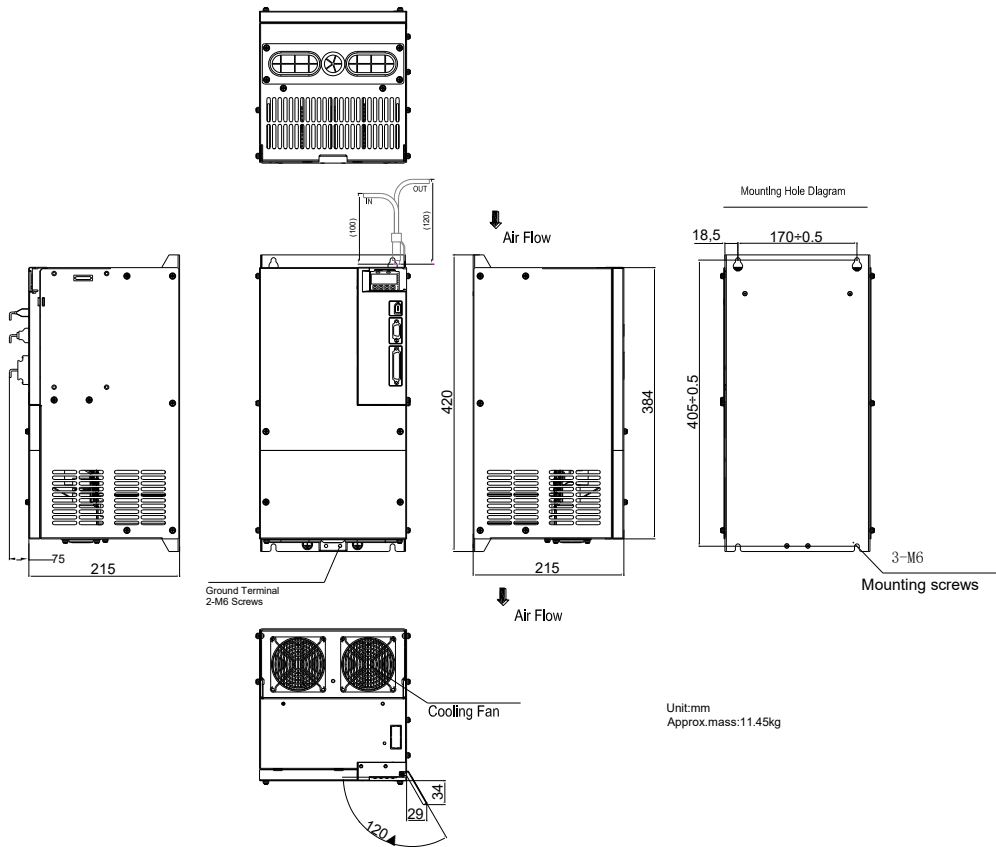
M4 Frame dimensions

Unit: mm



M5 Frame dimensions

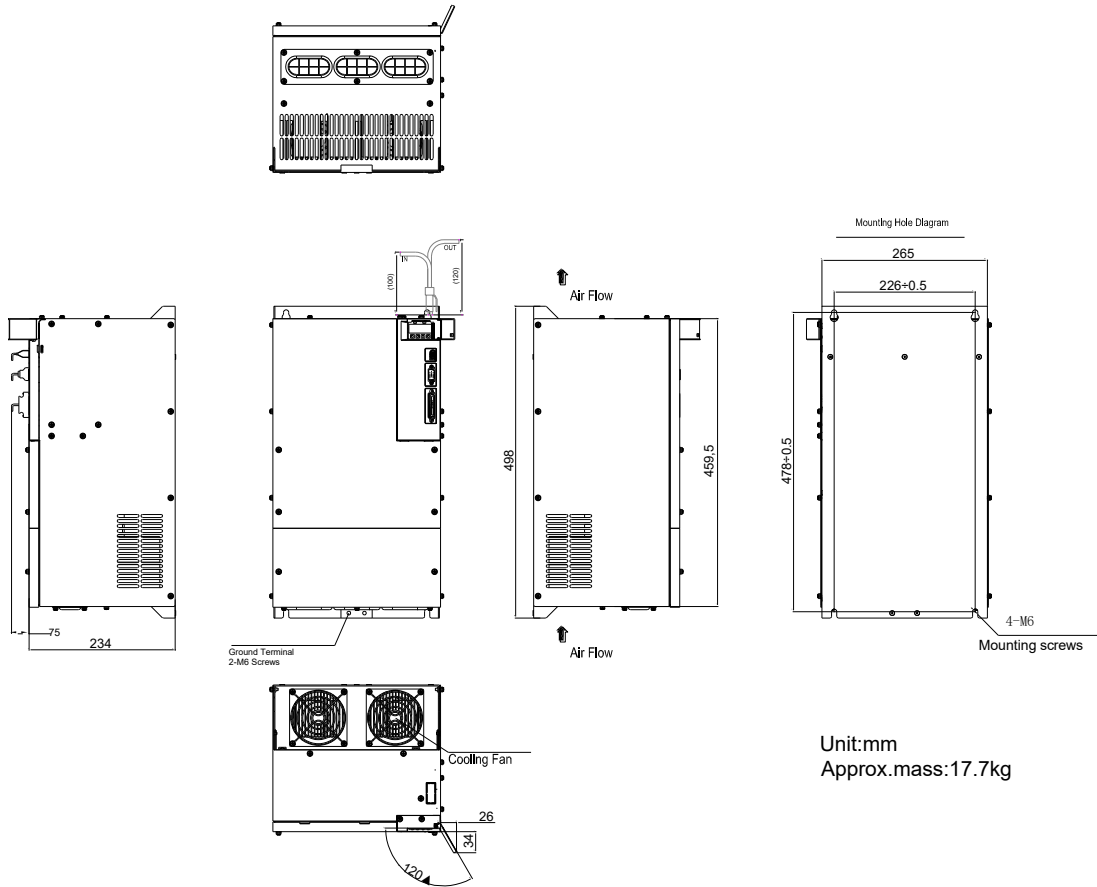
Unit: mm



Drive Dimensions

M6 Frame dimensions

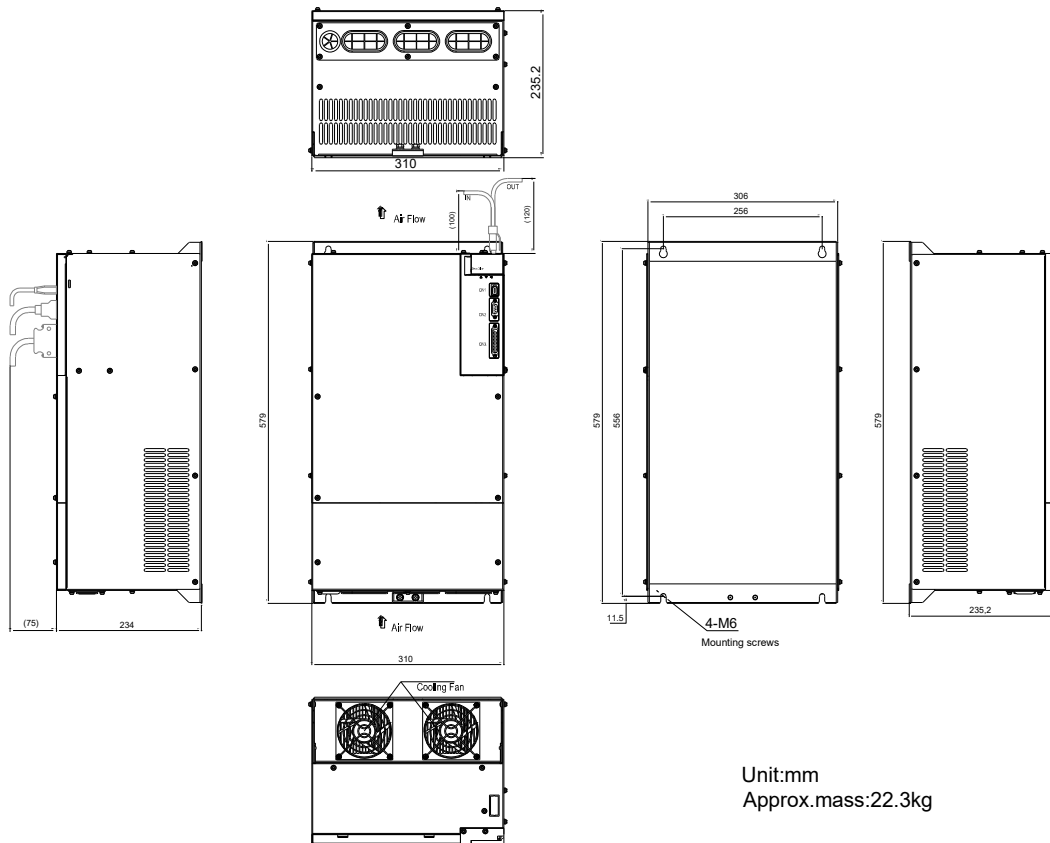
Unit: mm



Unit:mm
 Approx.mass:17.7kg

M7 Frame dimensions

Unit: mm

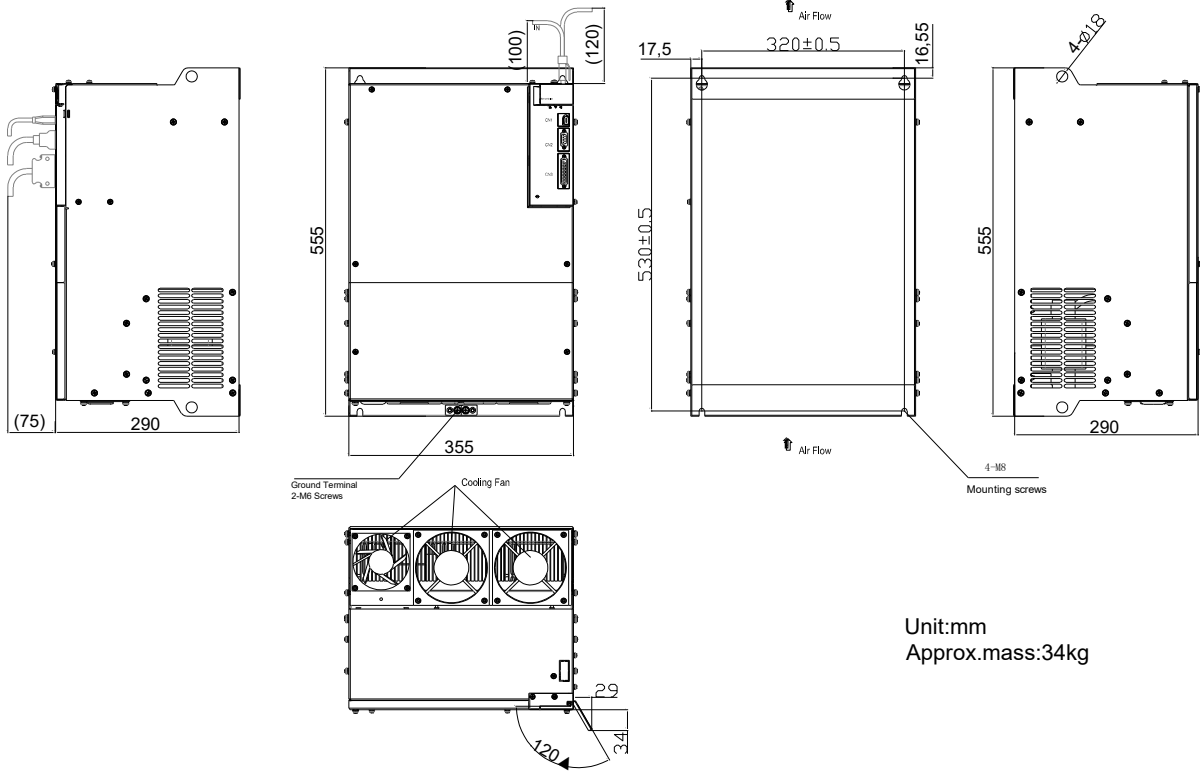


Unit:mm
 Approx.mass:22.3kg

Drive Dimensions

M8 Frame dimensions

Unit: mm



Unit:mm
Approx.mass:34kg

Servo motor


Overview


Description

The servo motor is a high-performance motor that meets customer requirements, supports position control, and provides easy and efficient system performance with easy wiring connections.



Servo motor nameplate

	Parker Hannifin Corporation www.parker.com	
TYPE:		
$M_N =$	$N \cdot m$	$I_N =$ A $K_e =$ V/ r/min
$n/n_{max} =$	/	r/min
IMB5	IP	TH.CI.B
BAR CODE		
Made In China		

FM17-0110R6EEDFL		
Rated Power : 11 kW	Rated voltage : 380 V	Rated Torque : 64 N·M
Speed : 1700 r/min	Rated Current : 23 A	Fan Voltage: 220 V
TH. Cl .F IP54	No. :	
Magnetic Field Angle :	Production Date :	
 AC permanent magnetic synchronous servo motor		

Ordering Code

Servo Motor (For 180 Flange and less)

	1	2		3	4	5	6	7	8
Order example	FM	SA	-	102	F	6	3	B	D

1 Device Family	FM	FM Series
2 Rated Speed	SA	3000 rpm
	MA	2000 rpm
	MB	1500 rpm
	LA	1000 rpm
3 Rated Power	201	0.2kW
	401	0.4kW
	751	0.75kW
	102	1kW

4 Feedback Type	R	Resolver
	H	4-core 23-bit Incremental encoder
	T	4-core 23-bit Absolute encoder
5 DC Bus Voltage	3	300V
	6	600V
6 Flange Size	2	60 Flange
	3	80 Flange
	5	110 Flange
	7	130 Flange
	A	180 Flange
7 Optional	B	With brake, without fan
	E	Without brake and fan
8 Shaft Type	C	Smooth shaft with C hole
	D	Keyway shaft with C hole

Servo Motor (For 180 and 250 spigot motor)

	1		2	3	4	5	6	7	8	9	10
Order example	FM	-	17	0110	R	6	E	E	D	F	L

1 Device Family	FM	FM Series
2 Rated Speed	15	1500 rpm
	17	1700 rpm
	20	2000 rpm
3 Rated Power	0070	7kW
	0075	7.5kW
	0110	11kW
	0180	18kW
	0240	24kW
	0330	33kW

4 Feedback Type	R	Resolver
	H	4-core 23-bit Incremental encoder
	T	4-core 23-bit Absolute encoder
5 DC Bus Voltage	6	600V
6 Flange Size	E	180 Spigot
	F	250 Spigot
7 Optional	E	Without Brake
8 Shaft Type	C	Smooth Shaft
	D	Keyway Shaft
9 Cooling Mode	F	Air Cooling Fan
	N	Without cooling fan
10 Optional	S, L...	Design Code

Note)

The servo motors are used for both 220VAC and 380VAC.

Technical Characteristics

Servo Motor Specifications (220VAC - Incremental Encoder, Absolute Encoder, Resolver)

Motor type	Part Number (with incremental)	Rated speed	Rated power	Rated torque	Rated current	Adaptable servo drive	
		r/min	kW	Nm	A	Single-phase 220V	Three-phase 220V
FMSA	FMSA-201H32ED	3000	0.2	0.64	1.2	FL20-SA(CA)201S2M1	FL20-SA(CA)201T2M1
	FMSA-401H32ED	3000	0.4	1.27	2.8	FL20-SA(CA)401S2M1	FL20-SA(CA)401T2M1
	FMSA-751H33ED	3000	0.75	2.39	3.5	FL20-SA(CA)751S2M1	FL20-SA(CA)751T2M1
	FMSA-102H33ED	3000	1	3.5	4.5	FL20-SA(CA)102S2M2	FL20-SA(CA)102T2M2
	FMSA-122H35ED	3000	1.2	4	5	FL20-SA(CA)182S2M2	FL20-SA(CA)182T2M2
	FMSA-152H37ED	3000	1.5	5	7.5		
	FMSA-182H35ED	3000	1.8	6	8	—	FL20-SA(CA)302T2M3
	FMSA-232H37ED	3000	2.3	7.7	10		
	FMSA-302H37ED	3000	3	10	15.5		
FMMA	FMMA-801H35ED	2000	0.8	4	3.5	FL20-SA(CA)102S2M2	FL20-SA(CA)102T2M2
	FMMA-851H37ED	2000	0.85	4	4		
	FMMA-102H37ED	2000	1	5	5	FL20-SA(CA)122S2M2	FL20-SA(CA)122T2M2
	FMMA-122H35ED	2000	1.2	6	5		
	FMMA-132H37ED	2000	1.3	6	6	FL20-SA(CA)182S2M2	FL20-SA(CA)182T2M2
	FMMA-152H37ED	2000	1.5	7.7	7.5		
	FMMA-202H37ED	2000	2	10	10	—	FL20-SA(CA)302T2M3
	FMMA-312H37ED	2000	3.1	15	14	—	FL20-SA(CA)452T2M3
	FMMA-352H3AED	2000	3.5	17.2	16	—	
FMMA	FMMB-122H37ED	1500	1.2	7.7	5	FL20-SA(CA)122S2M2	FL20-SA(CA)122T2M2
	FMMB-152H37ED	1500	1.5	10	6	FL20-SA(CA)182S2M2	FL20-SA(CA)182T2M2
	FMMB-232H37ED	1500	2.3	14.6	10	—	FL20-SA(CA)302T2M3
	FMMB-302H3AED	1500	3	19	12	—	
	FMMB-432H3AED	1500	4.3	27	16	—	FL20-SA(CA)452T2M3
FMLA	FMLA-102H37ED	1000	1	10	4.5	FL20-SA(CA)102S2M2	FL20-SA(CA)102T2M2
	FMLA-152H37ED	1000	1.5	14.3	7	FL20-SA(CA)182S2M2	FL20-SA(CA)182T2M2
	FMLA-292H3AED	1000	2.9	27	12	—	FL20-SA(CA)302T2M3
	FMLA-372H3AED	1000	3.7	35	16	—	FL20-SA(CA)452T2M3

Note)

- These part numbers are based on Incremental Encoder Type.
- Three-phase AC servo motor type permanent magnet synchronous motor, natural cooling, protection class IP65.
- The matched servo drive and motor can work with the most situation. But for some special situation, please contact to Parker sales team.

Technical Characteristics

Servo Motor Specifications (380VAC - Incremental Encoder, Absolute Encoder, Resolver)

Motor type	Part Number (with incremental)	Rated speed	Rated power	Rated torque	Rated current	Adaptable servo drive
		r/min	kW	Nm	A	Three-phase 380V
FMSA	FMSA-751H63ED	3000	0,75	2,39	2	FL20-SA(CA)102T3M2
	FMSA-102H63ED	3000	1	3,5	3	
	FMSA-122H65ED	3000	1,2	4	4	FL20-SA(CA)202T3M3
	FMSA-152H67ED	3000	1,5	5	5	
	FMSA-182H65ED	3000	1,8	6	6	
	FMSA-232H67ED	3000	2,3	7,7	7	FL20-SA(CA)302T3M3
	FMSA-302H67ED	3000	3	10	8	
FMMA	FMMA-801H65ED	2000	0,8	4	2,5	FL20-SA(CA)102T3M2
	FMMA-851H67ED	2000	0,85	4	3	
	FMMA-102H67ED	2000	1	5	3	
	FMMA-122H65ED	2000	1,2	6	3,5	FL20-SA(CA)152T3M2
	FMMA-132H67ED	2000	1,3	6	3,5	
	FMMA-152H67ED	2000	1,5	7,7	4,5	
	FMMA-202H67ED	2000	2	10	5,5	FL20-SA(CA)202T3M3
	FMMA-312H67ED	2000	3,1	15	9	FL20-SA(CA)452T3M3
	FMMA-352H6AED	2000	3,5	17,2	8	
	FMMA-452H6AED	2000	4,5	21,5	10	
	FMMA-602H6AED	2000	6	27	14	FL20-SA(CA)752T3MM4
	FMMA-752H6AED	2000	8	35	18	
FMMA-103H6AED	2000	10	48	24		
FMMA	FMMB-122H67ED	1500	1,2	7,7	4	FL20-SA(CA)152T3M3
	FMMB-152H67ED	1500	1,5	10	4	FL20-SA(CA)202T3M3
	FMMB-232H67ED	1500	2,3	14,6	6	
	FMMB-232H67ED	1500	3	14,6	7,5	FL20-SA(CA)302T3M3
	FMMB-272H6AED	1500	2,7	17,2	8	
	FMMB-302H6AED	1500	3	19	8	
	FMMB-432H6AED	1500	4,3	27	10	FL20-SA(CA)452T3M3
	FMMB-552H6AED	1500	5,5	35	12,5	FL20-SA(CA)552T3M3
FMMB-752H6AED	1500	7,5	48	17	FL20-SA(CA)752T3MM4	
FMLA	FMLA-102H67ED	1000	1	10	3	FL20-SA(CA)152T3M2
	FMLA-292H6AED	1000	2,9	27	7	FL20-SA(CA)302T3M3
	FMLA-372H6AED	1000	3,7	35	9	FL20-SA(CA)452T3M3

Note)

- These part numbers are based on Incremental Encoder Type.
- Three-phase AC servo motor type permanent magnet synchronous motor, natural cooling, protection class IP65.
- The matched servo drive and motor can work with the most situation. But for some special situation, please contact to Parker sales team.

Technical Characteristics

Servo Motor Specifications (380VAC - Incremental Encoder, Absolute Encoder, Resolver)

Motor type	Part Number (with incremental)	Rated speed	Rated power	Rated torque	Rated current	Adaptable servo drive
		r/min	kW	Nm	A	Three-phase 380V
FM15	FM15-0082H6EEDFL	1500	8.2	52	16.6	FL20-SA(CA)752T3MM4
	FM15-0100H6EEDFL	1500	10	64	20.7	FL20-SA(CA)113T3MM4
	FM15-0124H6EEDFL	1500	12	80	24.7	FL20-SA(CA)153T3M4
	FM15-0160H6EEDFL	1500	16	102	33.5	FL20-SA(CA)183T3M5
	FM15-0180H6EEDFL	1500	18	118	40	FL20-SA(CA)223T3M5
	FM15-0210H6EEDFL	1500	21	135	43.2	
	FM15-0240H6EEDFL	1500	24	152	46.7	FL20-SA(CA)303T3M6
	FM15-0290H6FEDFL	1500	29	185	57.5	
	FM15-0400H6FEDFL	1500	40	255	79	FL20-SA(CA)A453T3M7
	FM15-0420H6FEDFL	1500	42	270	91	
	FM15-0540H6FEDFL	1500	54	342.4	110.7	FL20-SA(CA)A553T3M8
	FM15-0610H6FEDFL	1500	61	385.2	138.3	FL20-SA(CA)A753T3M8
FM17	FM17-0075H6EEDFL	1700	7.5	42	13.7	FL20-SA(CA)752T3MM4
	FM17-0092H6EEDFL	1700	9.2	52	18	FL20-SA(CA)113T3MM4
	FM17-0110H6EEDFL	1700	11	64	23	
	FM17-0140H6EEDFL	1700	14	80	29.2	FL20-SA(CA)153T3M4
	FM17-0180H6EEDFL	1700	18	102	38.5	FL20-SA(CA)183T3M5
	FM17-0210H6EEDFL	1700	21	118	45	FL20-SA(CA)223T3M5
	FM17-0240H6EEDFL	1700	24	135	48.5	FL20-SA(CA)303T3M6
	FM17-0270H6EEDFL	1700	27	152	57.5	
	FM17-0400H6FEDFL	1700	40	225	81.4	FL20-SA(CA)A453T3M7
	FM17-0450H6FEDFL	1700	45	255	94	FL20-SA(CA)A553T3M8
	FM17-0480H6FEDFL	1700	48	270	98	
	FM17-0550H6FEDFL	1700	55	307	110	FL20-SA(CA)A753T3M8
	FM17-0610H6FEDFL	1700	61	342.4	138.4	
	FM17-0690H6FEDFL	1700	69	385.2	138.4	FL20-SA(CA)A753T3M8
FM20	FM20-0070H6EEDFL	2000	7	33.6	14.8	FL20-SA(CA)752T3MM4
	FM20-0100H6EEDFL	2000	10	52	22	FL20-SA(CA)113T3MM4
	FM20-0140H6EEDFL	2000	14	64	30	FL20-SA(CA)153T3M4
	FM20-0180H6EEDFL	2000	18	80	37	FL20-SA(CA)183T3M5
	FM20-0220H6EEDFL	2000	22	102	43	FL20-SA(CA)223T3M5
	FM20-0250H6EEDFL	2000	25	118	49	FL20-SA(CA)303T3M6
	FM20-0280H6EEDFL	2000	28	135	56.9	
	FM20-0300H6EEDFL	2000	30	152	67	FL20-SA(CA)373T3M6
	FM20-0360H6FEDFL	2000	36	185	74	
	FM20-0071H6EEDNL	2000	7.1	34	14.5	FL20-SA(CA)752T3MM4
	FM20-0094H6EEDNL	2000	9.4	45	18.8	
	FM20-0117H6EEDNL	2000	11.7	56	24.4	FL20-SA(CA)153T3M4
	FM20-0450H6FEDFL	2000	45	215	92.7	FL20-SA(CA)A553T3M8
	FM20-0540H6FEDFL	2000	54	258	111	
	FM20-0640H6FEDFL	2000	64	307	125.7	FL20-SA(CA)A753T3M8
	FM20-0720H6FEDFL	2000	72	342.4	138.3	

Note)

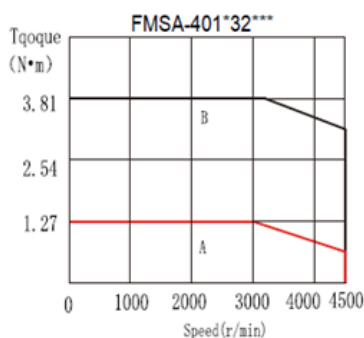
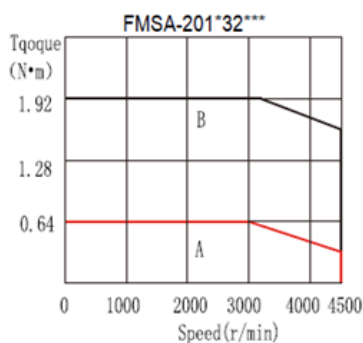
- These part numbers are based on Incremental Encoder Type.
- Three-phase AC servo motor type permanent magnet synchronous motor, natural cooling, protection class IP65.
- The matched servo drive and motor can work with the most situation. But for some special situation, please contact to Parker sales team.

Motor T-N curve

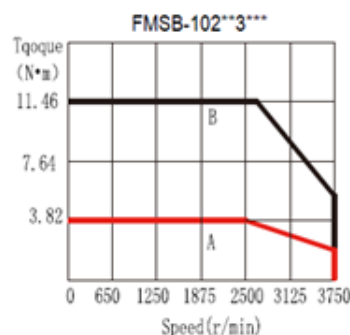
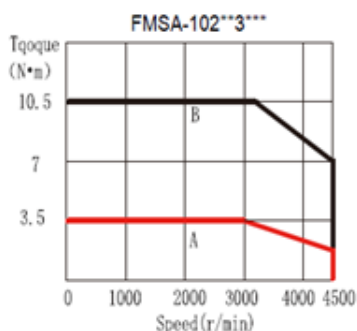
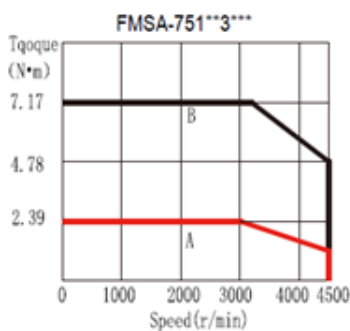
Note :

1. For the test, install a 60/80 flange servo motor on a 260mm×260mm×28mm (W×D×H) Castiron flange and a 10/130/180 flange on a 360mm×360mm×38mm Castiron flange.
2. Select the servo drive of the appropriate specification and enter the rated voltage into the drive.
3. Continuous use area(A) and Short-term use area(B) are affected by drive input voltage and the length of the power cable. Low drive input voltage or too long power cable reduces usage.
4. Continuous use area (A) is tested under the above test conditions and rated working conditions. The motor temperature rise may be higher due to installation method, contact area with equipment or working environment. Depending on the operating conditions, the temperature rise of the motor is affected.

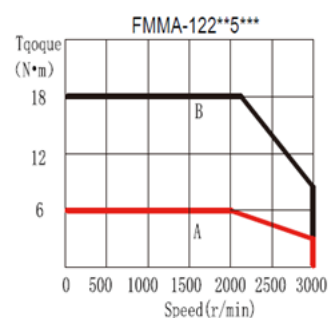
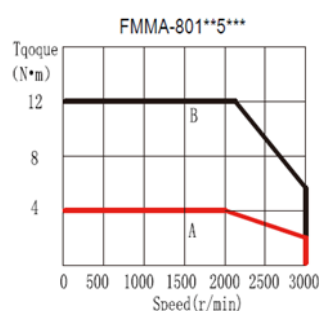
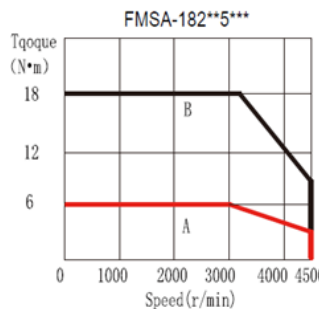
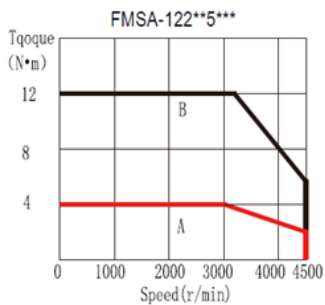
60 Flange motor T-N curve



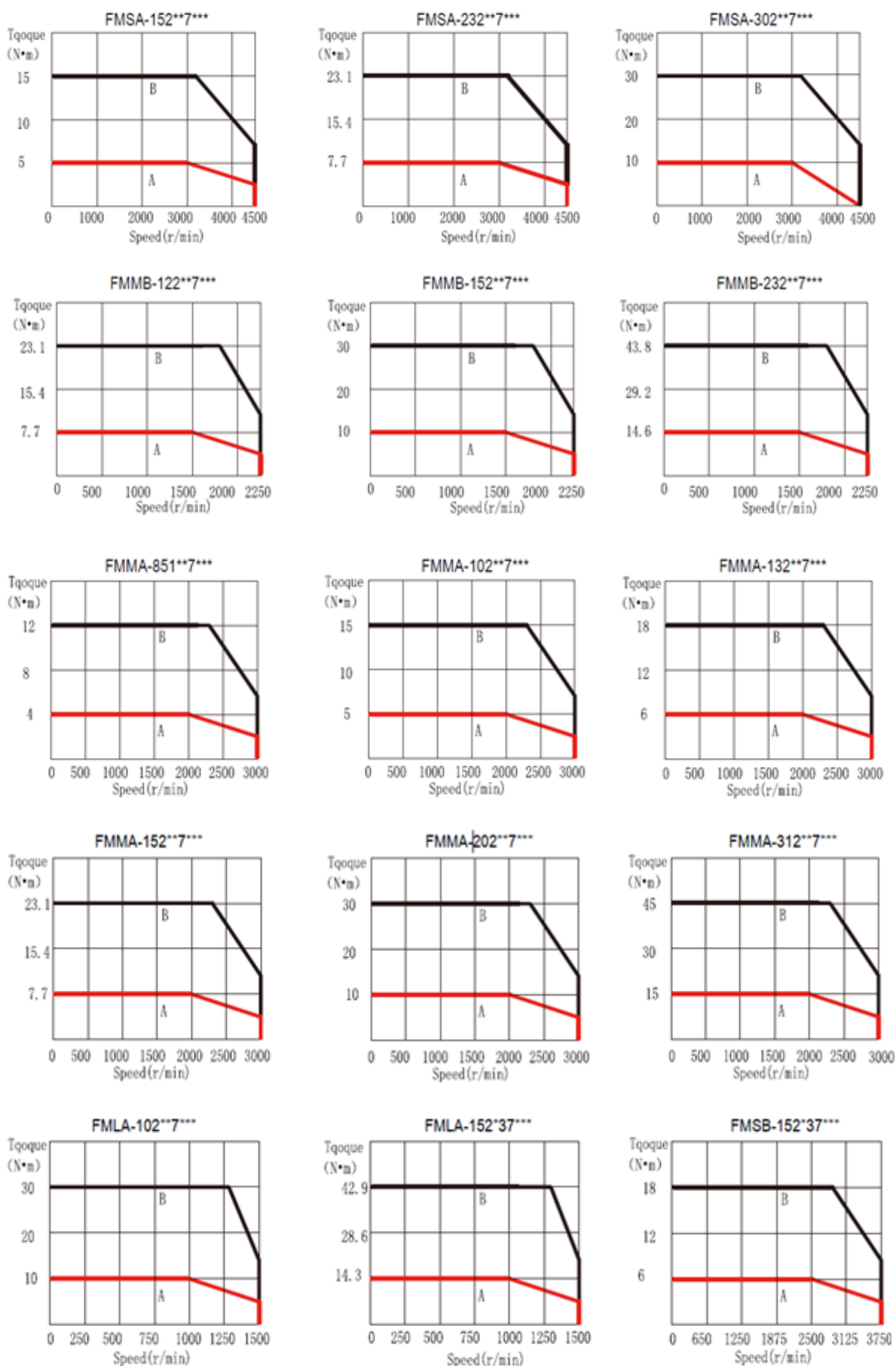
80 Flange motor T-N curve



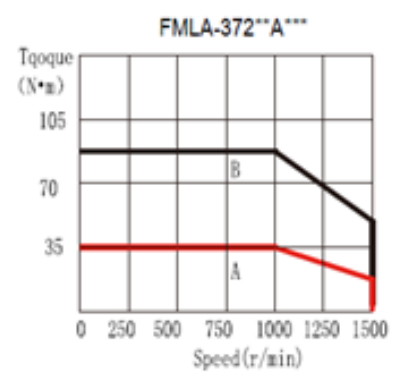
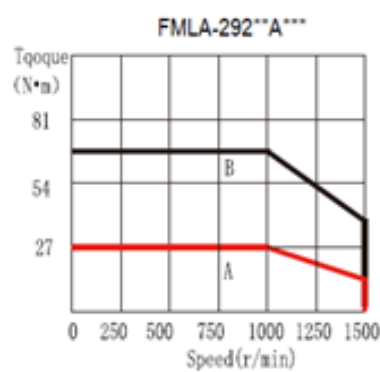
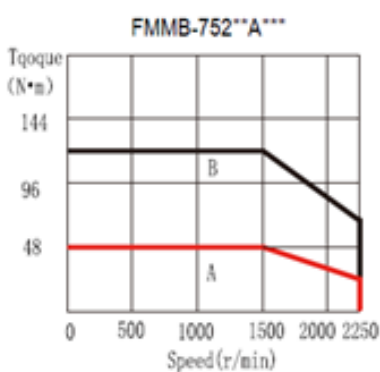
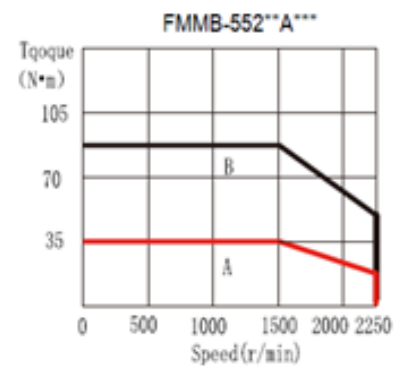
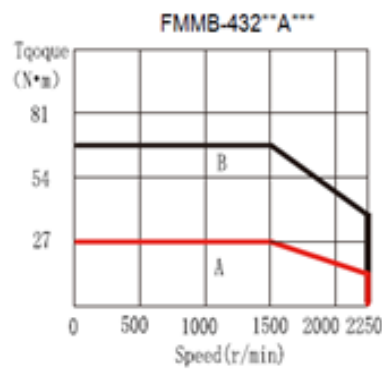
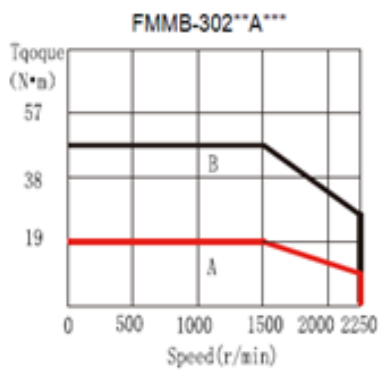
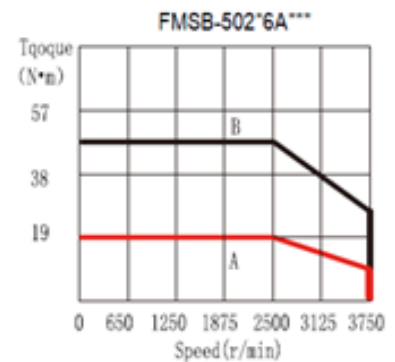
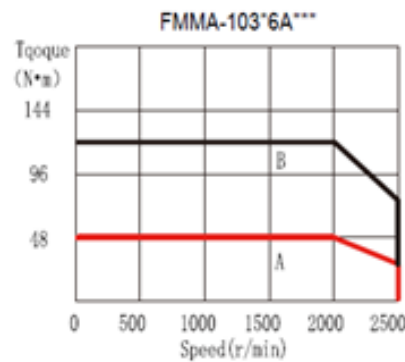
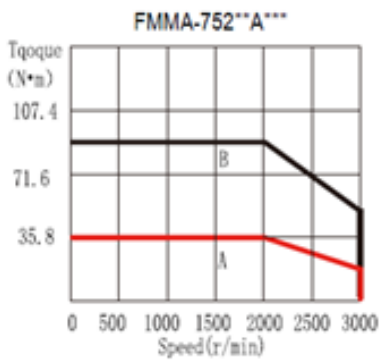
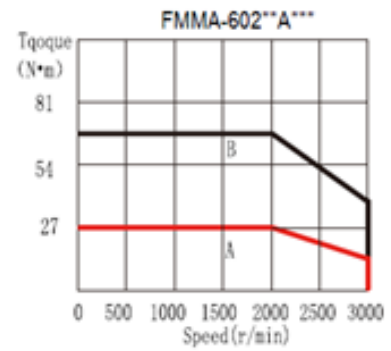
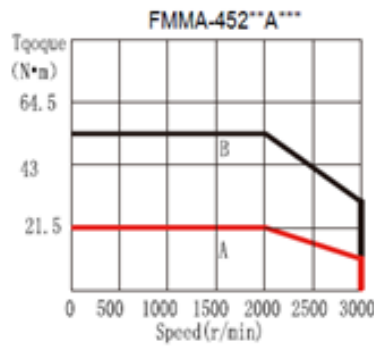
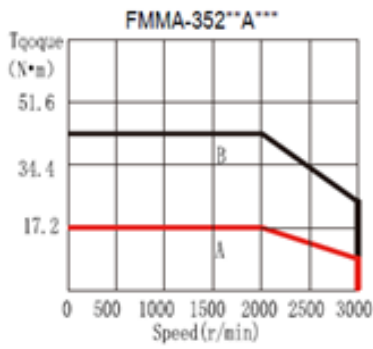
110 Flange motor T-N curve



130 Flange motor T-N curve



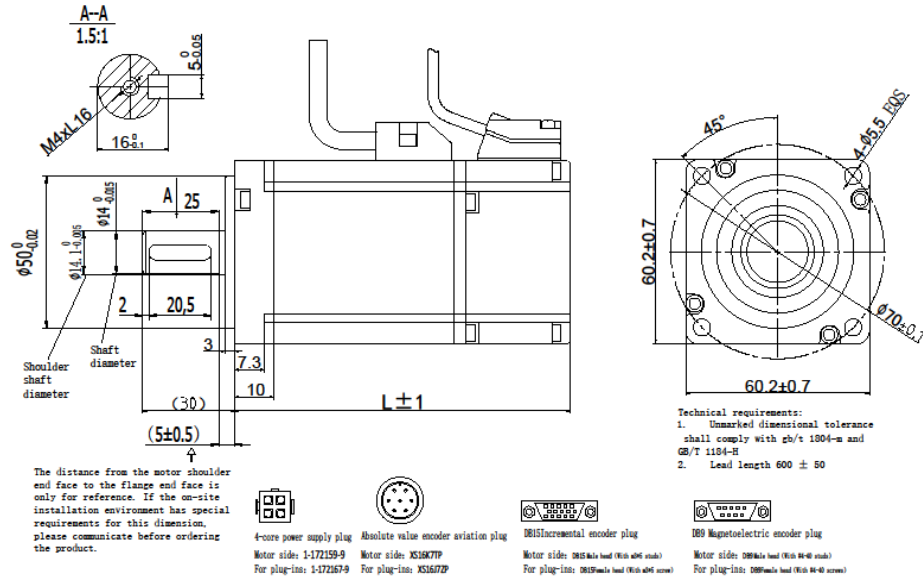
180 Flange motor T-N curve



Motor Dimensions

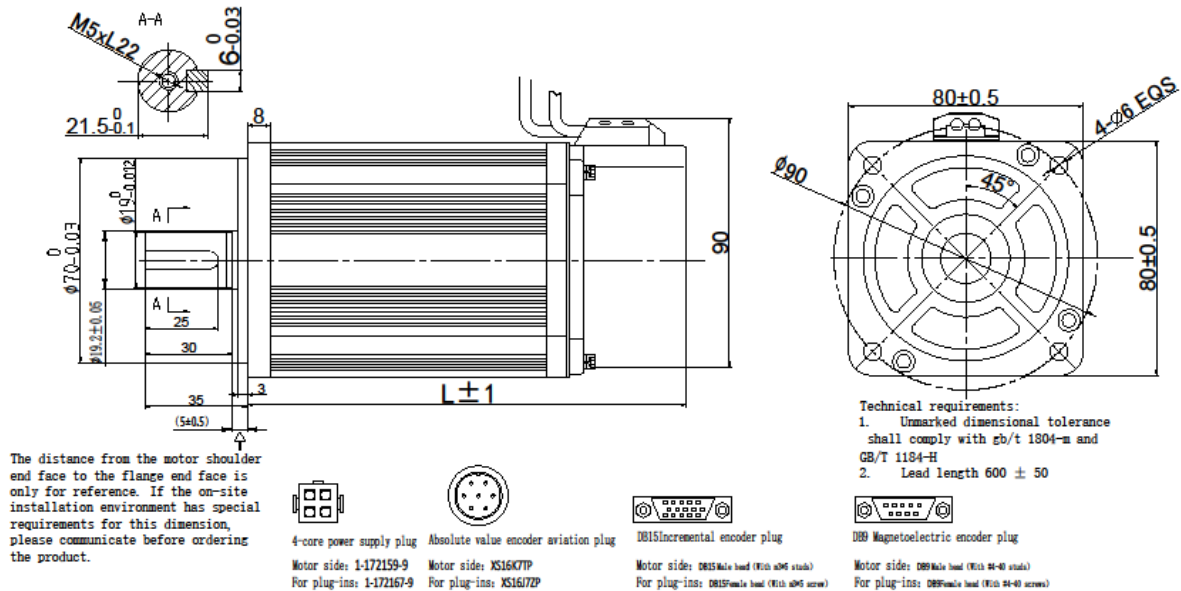
Servo motor

60 Flange servo motor



Model	L(mm)	L(mm) with brake	Weight without brake Kg	Weight with brake Kg	Remark
FMSA-201*32***	116	157	1.16	1.56	Screw hole size at shaft extension end : M4 x 16
FMSA-401*32***	141	182	1.6	2.1	

80 Flange servo motor

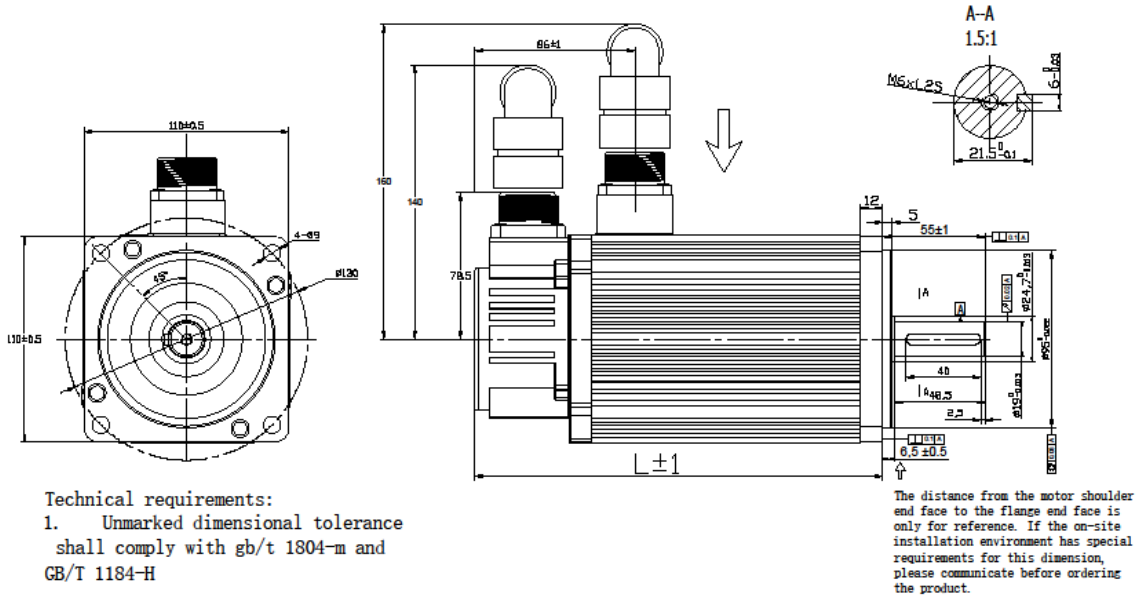


Model	L(mm)	L(mm) with brake	Weight without brake Kg	Weight with brake Kg	Remark
FMSA-751**3***	151	191	2.9	3.6	Screw hole size at shaft extension end : M5 x 22
FMSA-102**3***	179	219	3.9	4.6	
FMSB-102**3***	191	231	4.1	4.8	

Motor Dimensions

Servo motor

110 Flange servo motor



Model	L(mm)	L(mm) with brake	Weight without brake Kg	Weight with brake Kg	Remark
FMSA-122**5***	189	243	6	7.9	Screw hole size at shaft extension end : M6 x 25
FMMA-801**5***					
FMSA-182**5***	219	273	7.9	9.8	
FMMA-122**5***					

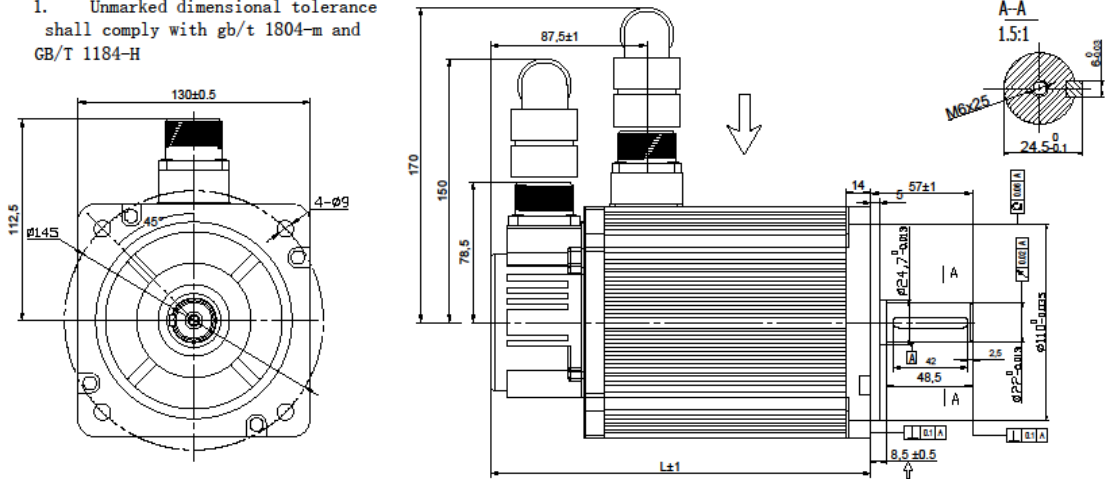
Motor Dimensions

Servo motor

130 Flange servo motor

Technical requirements:

1. Unmarked dimensional tolerance shall comply with gb/t 1804-m and GB/T 1184-H



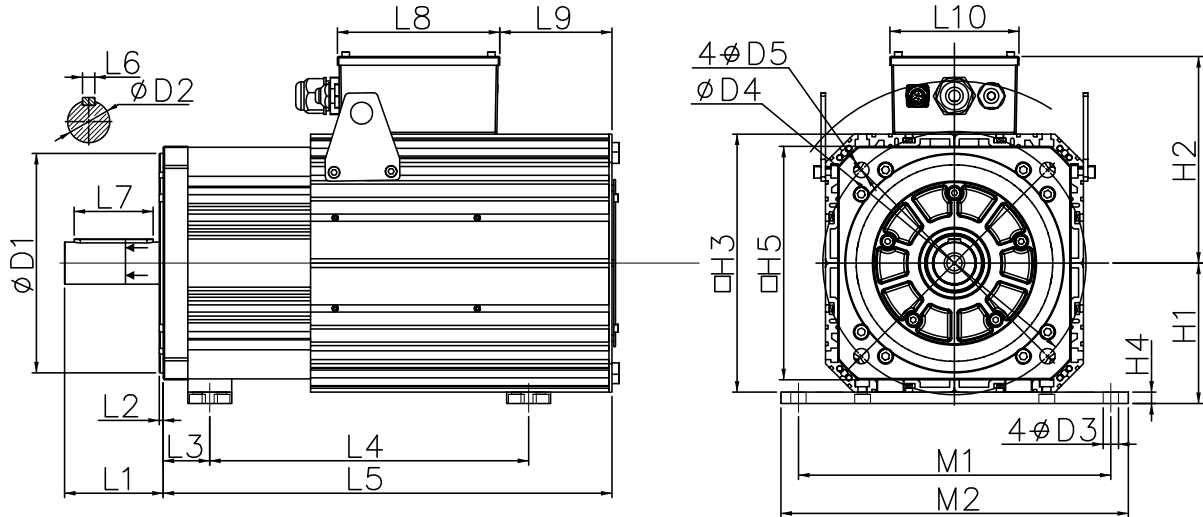
The distance from the motor shoulder end face to the flange end face is only for reference. If the on-site installation environment has special requirements for this dimension, please communicate before ordering the product.

Model	L(mm)	L(mm) with brake	Weight without brake Kg	Weight with brake Kg	Remark
FMMA-851**7***	166	217	6.2	8.75	Screw hole size at shaft extension end : M6 x 25
FMLA-152**7***	171	222	6.6	9.15	
FMMA-102**7***					
FMMA-132**7***	179	230	11.7	9.95	
FMLA-232**7***	192	243	8.3	10.85	
FMMA-152**7***					
FMMA-122**7***					
FMLA-302**7***	209	260	9.8	12.35	
FMMA-202**7***	213	264	10.2	12.75	
FMMA-152**7***					
FMLA-102**7***	231	282	11.7	14.25	
FMMA-312**7***					
FMLA-152*37***					
FMMA-232**7***	241	292	12.2	14.75	

Motor Dimensions

Servo motor

FM15, FM17, FM20 series, Air-cooling



Stand spigot	D1	D2	D3	D4	D5	L1	L2	L3	L6	L7	L8	L9	L10	H1	H2	H3	H4	H5	M1	M2
E	180	42	14	215	14.5	77	5	39	12	56	185	75.5	147	124	200	224	12	200	254	278
F	250	48	18	300	17.5	112.5	4.5	53	14	90	185	128	147	160	240	294	13	266	356	396

Motor rated torque Nm $\Delta T=100^{\circ}\text{C}$	46	68	84	96	130	147	160	196	220	275	330	380	428	481
Motor rated torque Nm $\Delta T=65^{\circ}\text{C}$	42	52	64	80	102	118	135	152	185	225	270	307	324	385
Base front edge	E	E	E	E	E	E	E	E	F	F	F	F	F	F
L4 (mm)	267	285	312	354	396	436	478	520	317	370	423	476	529	583
L5 (mm)	345	397	429	471	513	555	597	619	511.5	560.5	609.5	658.5	707.5	756.5

Note)

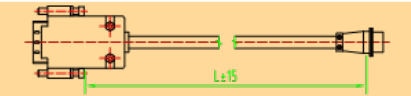
- 1-phase 220VAC power supply of 50 /60 Hz is usable for servomotor fan.
- Green terminal definition: K-220VAC, L-220VAC, M-PE.

Accessories & Options

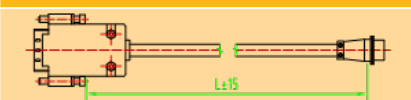
Feedback Cable

• Incremental/Absolute Encoder Cable


Encoder cable with I Aviation Plug (Only servo motors with base number E, F)

Item	Part No	Cable length(m)	Cable Assembly
Encoder cable	DB9-4B(G)S01-*M-0.2	<20M	
	DB9-4B(G)S01-*M-0.5	≥20M	

Encoder Cable with Round Plug (Applicable to 80 Flange and Servo Motors and Below)

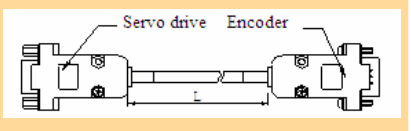
Item	Part No	Cable length(m)	Cable Assembly
Encoder cable	DB9-4B(G)S02-*M-0.2	<20M	
	DB9-4B(G)S02-*M-0.5	≥20M	

Encoder Cable with L Aviation Plug (Only 110, 130 and 180 Flange Servo Motors)


Item	Part No	Cable length(m)	Cable Assembly
Encoder cable	DB9-4B(G)S03-*M-0.2	<20M	
	DB9-4B(G)S03-*M-0.5	≥20M	

• Resolver Cable

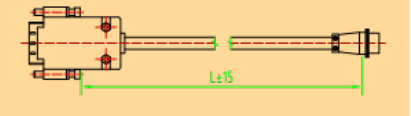
Resolver Cable with DB Plug (Applicable to 80 Flange and Servo Motor and below)

Item	Part No	Cable length(m)	Cable Assembly
Resolver cable	DB9-8GR03-*M-0.2	<20M	
	DB9-10GR03-*M-0.2	≥20M	

Resolver Cable with L Aviation Plug (Applicable to 110, 130 and 180 Flange Servo Motors)

Item	Part No	Cable length(m)	Cable Assembly
Resolver cable	DB9-8GR01-*M-0.2	<20M	
	DB9-10GR01-*M-0.2	≥20M	

Resolver cable with I Aviation Plug (Only servo motors with base numbers E, F)

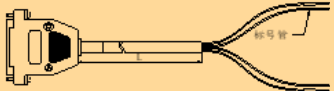
Item	Part No	Cable length(m)	Cable Assembly
Resolver cable	DB9-8GR02-*M-0.2	<20M	
	DB9-10GR02-*M-0.2	≥20M	

Note) If the cable length is longer than 20m, custom-made is required.

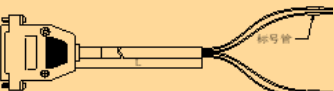
Accessories & Options

Control cable

- Control cable for Analog speed and Torque mode

Item	Part No	Cable length(m)	Cable Assembly
Control cable	DB44-15AI-*M-0.2	Optional	

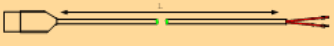
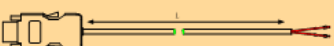
- Control cable in Position mode

Item	Part No	Cable length(m)	Cable Assembly
Control cable	DB44-15PC-*M-0.2	Optional	

- Control cable pin number and cable color

DB44-15PC-*M-0.2			DB44-15AI-*M-0.2		
Code	Definition	Colour	Code	Definition	Colour
7	ALM+	Yellow and black	7	ALM+	Yellow and black
8	ALM-	Yellow	8	ALM-	Yellow
9	D01+	Green and black	9	D01+	Green and black
10	D01-	Green	10	D01-	Green
2	GP	Blue	2	GP	Blue
18	DI1	Orange	18	DI1	Brown
19	DI2	Orange and black	19	DI2	Brown and black
20	DI3	White	20	DI3	Orange
44	PULS	Grey and black	21	DI4	Orange and black
15	/PULS	Grey	22	DI5	Grey
43	PL2	Brown and black	23	AS1	Grey and black
12	SIGN	Red and black	25	AS2	Red and black
27	/SIGN	Red	24	GND	White
28	PL1	Brown	38	DI6	Red

- Communication cable

Item	Part No	Cable length(m)	Cable Assembly
Communication cable	1394-2TR-*M-0.2	Optional	
	1394-2DK-*M-0.2	Optional	

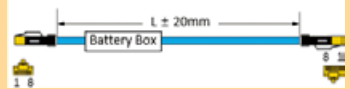
- Brake cable

Item	Part No	Cable length(m)
Brake cable	HK3-2BR-*M -0.75	Optional
	DB2-2BR-*M -0.75	Optional

Accessories & Options

Communication cable

- EtherCAT cable (Maximum length : 30m)

Item	Part No	Cable length(m)	Cable Assembly
Communication Cable for built-in Ethercat	SC-ECT-**-M-C	**	

Power cable

Servo Motor L-Plug Power Cable (800W Servo Motor), Maximum Length: 20m

- If the cable length is longer than 20m, custom-made is required.

[220VAC Servo Motor Power Cable]

Motor model	Servo drive model		Power cable model	
FMS series 3000r/min	FMSA-201*32***	FL20-SA(CA)201S2M1	FL20- S A(CA)201T2M1	DB4-4PO-*M-0.75-S
	FMSA-401*32***	FL20-SA(CA)751S2M1	FL20- S A(CA)751T2M1	
	FMSA-751*33***			
	FMSA-102*33***	FL20-SA(CA)102S2M2	FL20- S A(CA)102T2M2	DB4-4PO-*M-1.0-S
	FMSA-122*35***	FL20-SA(CA)122S2M2	FL20- S A(CA)122T2M2	HK4A-4PO-*M-1.0-S
	FMSA-152*37***	FL20-SA(CA)182S2M2	FL20- S A(CA)182T2M2	HK4A-4PO-*M-1.5-S
	FMSA-182*35***			
	FMSA-232*37***	—	FL20- S A(CA)302T2M3	HK4A-4PO-*M-2.5
	FMSA-302*37***	—	FL20- S A(CA)452T2M3	HK4A-4PO-*M-4.0
FMS series 2500r/min	FMSB-102*33***	FL20-SA(CA)102S2M2	FL20-SA(CA)102T2M2	DB4-4PO-*M-1.0-S
FMM series 2000r/min	FMMA-801*35***	FL20-SA(CA)102S2M2	FL20-SA(CA)102T2M2	HK4A-4PO-*M-1.0-S
	FMMA-851*37***			HK4A-4PO-*M-1.0-S
	FMMA-122*35***	FL20-SA(CA)122S2M2	FL20-SA(CA)122T2M2	HK4A-4PO-*M-1.0-S
	FMMA-102*37***			
	FMMA-132*37***	FL20-SA(CA)182S2M2	FL20-SA(CA)182T2M2	HK4A-4PO-*M-1.5-S
	FMMA-152*37***			
	FMMA-202*37***	—	FL20-SA(CA)302T2M3	HK4A-4PO-*M-2.5
	FMMA-352*3A***	—	FL20-SA(CA)452T2M3	HK4B-4PO-*M-4.0
	FMMA-452*3A***	—	FL20-SA(CA)552T2M4	HK4B-4PO-*M-4.0
FMM series 1500r/min	FMMB-122*37***	FL20-SA(CA)122S2M2	FL20-SA(CA)122T2M2	HK4A-4PO-*M-1.0-S
	FMMB-152*37***	FL20-SA(CA)182S2M2	FL20-SA(CA)182T2M2	HK4A-4PO-*M-1.0-S
	FMMB-232*37***	—	FL20-SA(CA)302T2M3	HK4A-4PO-*M-2.5
	FMMB-302*3A***	—	FL20-SA(CA)452T2M3	HK4B-4PO-*M-2.5
	FMMB-432*3A***	—	FL20-SA(CA)452T2M3	HK4B-4PO-*M-4.0
	FMMB-552*3A***	—	FL20-SA(CA)552T2M4	HK4B-4PO-*M-6.0
FML series 1000r/min	FMLA-102*37***	FL20-SA(CA)102S2M2	FL20-SA(CA)102T2M2	HK4A-4PO-*M-1.0-S
	FMLA-152*37***	FL20-SA(CA)182S2M2	FL20-SA(CA)182T2M2	HK4A-4PO-*M-1.5-S
	FMLA-292*3A***	—	FL20-SA(CA)302T2M3	HK4B-4PO-*M-2.5
	FMLA-372*3A***	—	FL20-SA(CA)452T2M3	HK4B-4PO-*M-4.0

Note)

- HK4A cable is suitable for Aviation Plugs with 180 flange or less.
- HK4B cable is suitable for Aviation Plug with 180 flange.
- The unit of length is m.

Accessories & Options

Communication cable

[380VAC Servo Motor Power cable]

Motor model	Servo drive model	Power cable model	
FMS series 3000r/min	FMSA-751*63***	FL20-SA(CA)102T3M2	DB4-4PO--*M-0.75-S
	FMSA-102*63***		
	FMSA-122*65***	FL20-SA(CA)202T3M2	HK4A-4PO--*M-0.75-S
	FMSA-152*67***		HK4A-4PO--*M-1.0-S
	FMSA-182*65***		HK4A-4PO--*M-1.5-S
	FMSA-232*67***	FL20-SA(CA)302T3M2	HK4A-4PO--*M-1.5-S
	FMSA-302*67***	FL20-SA(CA)452T3M3	HK4A-4PO--*M-1.5
FMM series 2000r/min	FMMA-801*65***	FL20-SA(CA)102T3M2	HK4A-4PO--*M-0.75-S
	FMMA-851*67***		
	FMMA-102*67***		
	FMMA-122*65***	FL20-SA(CA)152T3M2	HK4A-4PO--*M-1.0-S
	FMMA-132*67***		
	FMMA-152*67***	FL20-SA(CA)202T3M2	HK4A-4PO--*M-1.5-S
	FMMA-202*67***		
	FMMA-312*67***	FL20-SA(CA)452T3M3	HK4A-4PO--*M-2.5
	FMMA-352*6A***		HK4B-4PO--*M-1.5
	FMMA-452*6A***		HK4B-4PO--*M-2.5
	FMMA-602*6A***	FL20-SA(CA)752T3ML3	HK4B-4PO--*M-4.0
	FMMA-752*6A***		
	FMMA-103*6A***	FL20-SA(CA)153T3M4	HK4B-4PO--*M-6.0
FMM series 1500r/min	FMMB-122*67***	FL20-SA(CA)202T3M2	HK4A-4PO--*M-0.75-S
	FMMB-152*67***		
	FMMB-232*67***	FL20-SA(CA)302T3M2	HK4A-4PO--*M-1.0-S
	FMMB-302*6A***		HK4B-4PO--*M-1.5-S
	FMMB-432*6A***		HK4B-4PO--*M-2.5
	FMMB-552*6A***	FL20-SA(CA)552T3M3	HK4B-4PO--*M-4.0
	FMMB-752*6A***	FL20-SA(CA)752T3ML3	
	FM15-0100*6EE*FL	FL20-SA(CA)113T3ML3	ZL4-4PO--*M-6.0
	FM15-0124*6EE*FL	FL20-SA(CA)153T3M4	ZL4-4PO--*M-6.0
	FM15-0160*6EE*FL	FL20-SA(CA)183T3M5	ZL4-4PO--*M-10.0
	FM15-0180*6EE*FL		ZL4-4PO--*M-10.0
	FM15-0210*6EE*FL	FL20-SA(CA)223T3M5	ZL4-4PO--*M-16.0
	FM15-0240*6EE*FL	FL20-SA(CA)303T3M6	ZL4-4PO--*M-16.0
	FM15-0290*6FE*FL	FL20-SA(CA)303T3M6	ZL4-4PO--*M-16.0
	FM15-0350*6FE*FL	FL20-SA(CA)373T3M6	ZL4-4PO--*M-25.0
	FM15-0400*6FE*FL	FL20-SA(CA)453T3M7	ZL4-4PO--*M-25.0
	FM15-0420*6FE*FL	FL20-SA(CA)453T3M7	ZL4-4PO--*M-25.0
	FM15-0480*6FE*FL	FL20-SA(CA)553T3M8	ZL4-4PO--*M-25.0
	FM15-0540*6FE*FL	FL20-SA(CA)553T3M8	ZL4-4PO--*M-25.0
	FM15-0610*6FE*FL	FL20-SA(CA)753T3M8	ZL4-4PO--*M-35.0
	FM15-0840*6FEDFN	FL20-SA(CA)903T3M9	ZL4-4PO--*M-35.0

Note)

- HK4A cable is suitable for Aviation Plugs with 180 flange or less.
- HK4B cable is suitable for Aviation Plug with 180 flange.
- The unit of length is m.
- If the cable length is longer than 20m, custom-made is required.

Accessories & Options

Power cable

Servo Motor L-Plug Power Cable (800W Servo Motor), Maximum Length: 20m

[380VAC Servo Motor Power cable]

Motor model	Servo drive model	Power cable model	
FML series 1000r/min	FMLA-372*6A***	FL20-SA(CA)452T3M3	HK4B-4PO--*M-2,5
	FMLA-102*67***	FL20-SA(CA)102T3M2	HK4A-4PO--*M-0,75-S
	FMLA-292*6A***	FL20-SA(CA)302T3M2	HK4B-4PO--*M-1,5-S
FMM series 1700r/min	FM17-0092*6EE*FL	FL20-SA(CA)113T3ML3	ZL4-4PO--*M-6,0
	FM17-0110*6EE*FL		ZL4-4PO--*M-6,0
	FM17-0140*6EE*FL	FL20-SA(CA)153T3M4	ZL4-4PO--*M-6,0
	FM17-0180*6EE*FL	FL20-SA(CA)183T3M5	ZL4-4PO--*M-10,0
	FM17-0210*6EE*FL	FL20-SA(CA)223T3M5	ZL4-4PO--*M-16,0
	FM17-0240*6EE*FL	FL20-SA(CA)303T3M6	ZL4-4PO--*M-16,0
	FM17-0270*6EE*FL		ZL4-4PO--*M-16,0
	FM17-0330*6FE*FL	FL20-SA(CA)373T3M6	ZL4-4PO--*M-25,0
	FM17-0400*6FE*FL	FL20-SA(CA)453T3M7	ZL4-4PO--*M-25,0
	FM17-0450*6FE*FL	FL20-SA(CA)553T3M8	ZL4-4PO--*M-25,0
	FM17-0480*6FE*FL	FL20-SA(CA)553T3M8	ZL4-4PO--*M-25,0
	FM17-0550*6FE*FL	FL20-SA(CA)553T3M8	ZL4-4PO--*M-25,0
	FM17-0610*6FE*FL	FL20-SA(CA)753T3M8	ZL4-4PO--*M-35,0
	FM17-0690*6FE*FL	FL20-SA(CA)753T3M8	ZL4-4PO--*M-35,0
FMM series 2000r/min	FM20-0100*6EE*FL	FL20-SA(CA)113T3ML3	ZL4-4PO--*M-6,0
	FM20-0140*6EE*FL	FL20-SA(CA)153T3M4	ZL4-4PO--*M-6,0
	FM20-0180*6EE*FL	FL20-SA(CA)183T3M5	ZL4-4PO--*M-10,0
	FM20-0220*6EE*FL	FL20-SA(CA)223T3M5	ZL4-4PO--*M-16,0
	FM20-0250*6EE*FL	FL20-SA(CA)303T3M6	ZL4-4PO--*M-16,0
	FM20-0280*6EE*FL		ZL4-4PO--*M-16,0
	FM20-0300*6EE*FL	FL20-SA(CA)373T3M6	ZL4-4PO--*M-16,0
	FM20-0360*6FE*FL		ZL4-4PO--*M-25,0
	FM20-0450*6FE*FL	FL20-SA(CA)553T3M8	ZL4-4PO--*M-25,0
	FM20-0540*6FE*FL	FL20-SA(CA)553T3M8	ZL4-4PO--*M-25,0
	FM20-0640*6FE*FL	FL20-SA(CA)753T3M8	ZL4-4PO--*M-35,0
	FM20-0720*6FE*FL	FL20-SA(CA)753T3M8	ZL4-4PO--*M-35,0

Note)

- The unit of length is m.
- If the cable length is longer than 20m, custom-made is required.

Accessories & Options

Brake resistor

- For 220VAC servo drive
Minimum resistance value of external braking resistor and specifications of built-in braking resistor

Drive Frame	Built-in resistor value and power	Min. resistor value of external braking resistor	Spec. of external braking resistor
M1	—	40Ω	60Ω/200 W
M2	50W/50Ω	15Ω	40Ω/400 W
M3	100W/20Ω	10Ω	15Ω/1000 W
M4	260W/15Ω	10Ω	15Ω/2000 W

- For 380VAC Servo Drive
Minimum resistance value of external braking resistor and specifications of built-in braking resistor

Drive Frame	Built-in resistor value and power	Min. resistor value of external braking resistor	Spec. of external braking resistor
M2	50W/50Ω	50Ω	50Ω/1000W
M3	100W/60Ω	50Ω	50Ω/1000W
ML3/MM4/M4	—	20Ω	40Ω/1000W
M5	—	10Ω	20Ω/1000W
M6	—	20Ω	20Ω/2200W
M7	—	15Ω	15Ω/4000W
M8	—	12Ω	12Ω/6000W



Parker Korea Co., Ltd

Motion System Division Korea

23, Jangan-gong-dan 1gil, Jangan-myeon, Hwaseong-si,
Gyeonggi-do, 18579, Korea

Tel : 82 31 359 0700 FAX : 82 31 359 0800

msdk.korea.technicalsupport@support.parker.com

www.parker.com