



# FL20 Series

Parker Servo Drives & Motors for Film Line

Power Range 220V 0.2kW ~ 4.5kW  
380V 1.5kW ~ 37kW



ENGINEERING YOUR SUCCESS.



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## Parker Servo Drives & Motors – FL20 series

### **FL20 Servo Drive**

Drive overview .....	5
Technical characteristics .....	6
Drive component .....	7
Terminal details .....	8
Wiring diagram .....	10
Typical main circuit wiring .....	12
Ordering code - Drive .....	13
Drive dimensions .....	14

### **Servo Motor**

Servo motor overview .....	18
Ordering code - Motor .....	19
Technical characteristics .....	20
Motor dimensions .....	23
Accessories .....	30

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Milan, Italy



Littlehampton, UK



Filderstadt, Germany



Dijon, France

# FL20 series Servo Drives for Film Line Applications

## Overview

### Description

FL20 Series Servo Drives is a high performance drive particularly suitable for Film Line and similar applications. It has a 1.2kHz frequency response with a full closed loop functionality. The feedback options are incremental encoder, absolute encoder and resolver.

The FL20 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.



### Features

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

### Faster

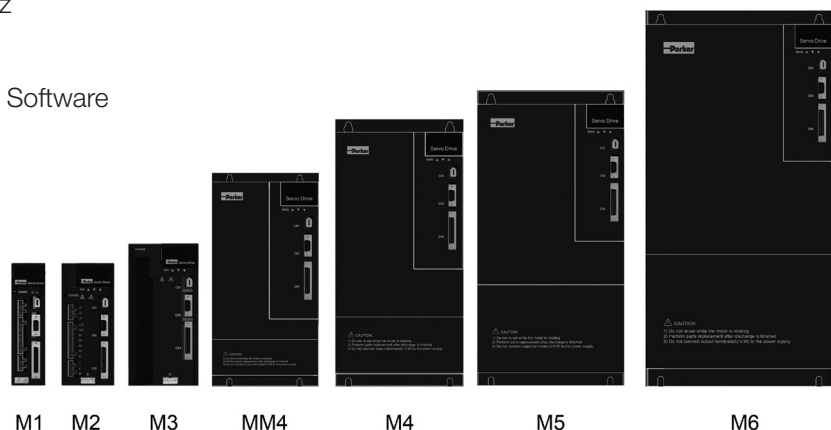
- Frequency response 1.2kHz
- Dual-core processors
- 17-bit absolute encoder

### Powerful

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

### Technical Characteristics

FL20 Servo drive	
Supply voltage	220 VAC ±10% Single / Three Phase 380 VAC ±10% Three Phas
Power range	Single Phase 220V 0.2kW ~ 1.8kW Three Phase 220V 0.2kW ~ 4.5kW Three Phase 380V 1.5kW ~ 37kW
Frequency response	PMSM : 1.2kHz
Operating temperature	-10 °C ~ 40 °C
Humidity	Below 90%
Altitude	1000m or below
Vibration	Below 0.5G (4.9 m/s <sup>2</sup> )
IP rating	IP20

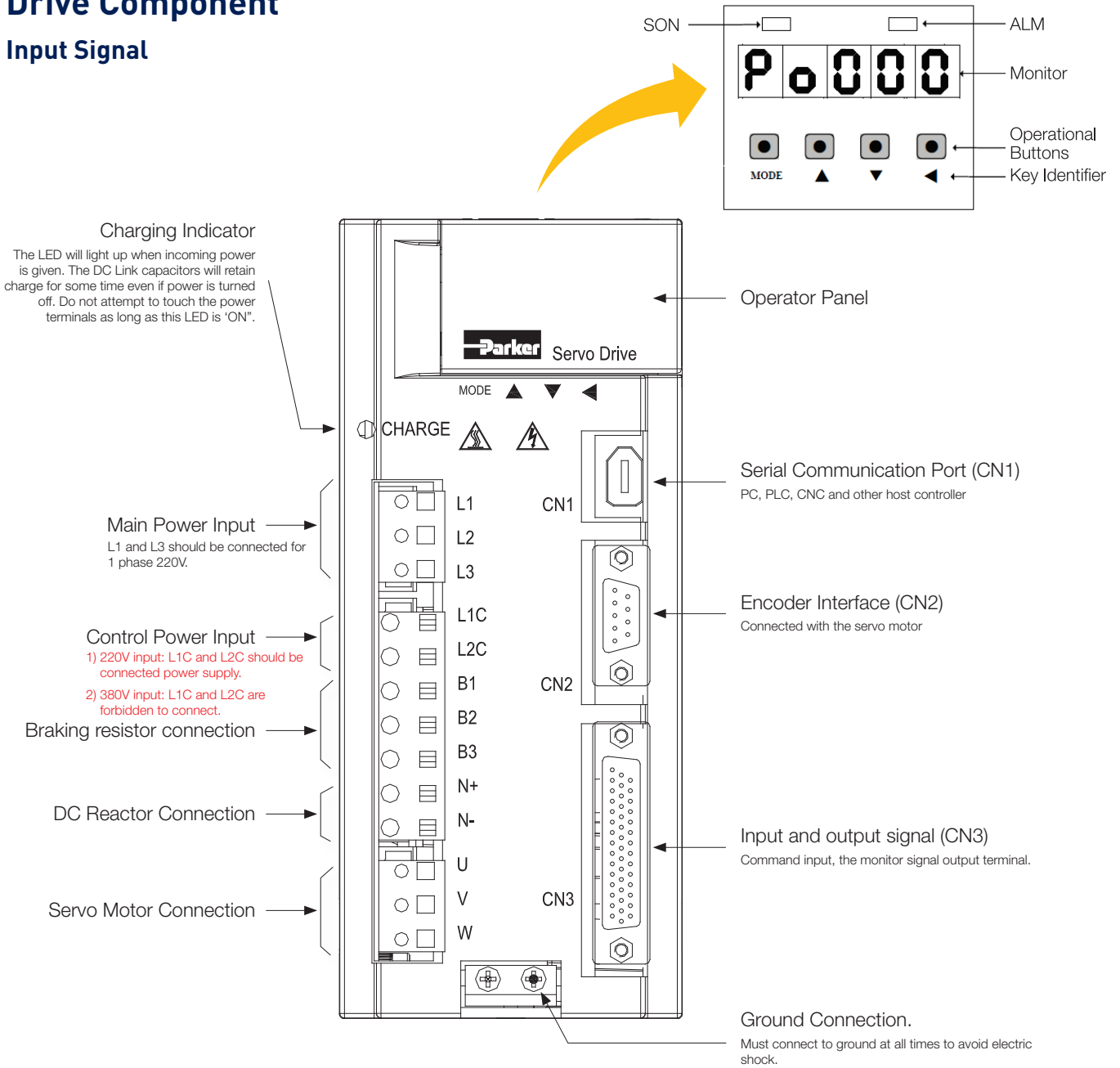


# Technical Characteristics

## Servo Drive Specifications

Input power		220VAC ±10% 1Phase/3Phase 50/60Hz 380VAC ±10% 3Phase 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 13) Frame size M1, MM4, M4, M5, M6: without built-in resistor (External resistor need to order separately)
Control	Control method	PMSM
	Frequency response	PMSM: 1.2kHz
	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, Reverse run prohibited, Emergency stop, Forward torque limit, Reverse torque limit, Internal speed selection, Internal position triggered, Searching triggered, Zero speed clamp, etc.
	Encoder	1) 17 bit absolute encoder 2) Incremental encoder 1024 lines, 2500 lines, 6000 lines 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.
	Encoder signal	1) Open collector output encoder Z phase 2) Encoder A, B phase signal is frequency division output. Z phase has no frequency-division output. 3) Z pulse time expansion 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) RS485 / 232 interface is connected PC, to set control parameters and monitoring 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, Overload, Overcurrent, Encoder error, Over-speed, Abnormal pulse control command, Emergency stop, Servo overheat, Input power phase loss, Regenerative braking error, Over-position, Battery alarm, etc.
Applicable load inertia		Lower than 5 times of servo motor inertia

## Drive Component Input Signal



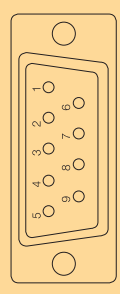
## Terminal Details CN1 Terminal Definition

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

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

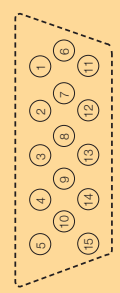
## Terminal Details

### CN2 Terminal Definition



Pin No.	Definition
1	NC
2	VCC
3	PS
4	/PS
5	GND
6	
7	NC
8	NC
9	NC
Case	Shield

Figure: Absolute CN2 terminal definition.  
(from the wire side to drive side look)

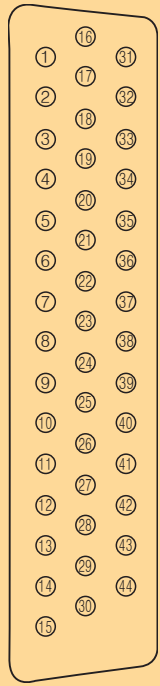


Terminal No.	Symbol	Definition
CN2-1	V	Encoder V-phase input
CN2-2	U	Encoder U-phase input
CN2-3	Z	Encoder Z-phase input
CN2-4	B	Encoder B-phase input
CN2-5	A	Encoder A-phase input
CN2-6	/V	Encoder /V-phase input
CN2-7	/U	Encoder /U-phase input
CN2-8	/Z	Encoder /Z-phase input
CN2-9	/B	Encoder /B-phase 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 output
CN2-14	GND	Ground output
CN2-15	-	-
	HOUSING	Shield

Figure: Incremental CN2 terminal definition.  
(from the wire side to drive side view)

### CN3 Terminal Definition

#### Input Signal



Signal Category	Terminal No.	Symbol	Name	Input	Definition	
Programmable Input Terminals	CN3-18	DI1	Digital input 1	Switching signal	NOTE: DI1~DI8 are digital input terminals, input mode is ON/OFF signal	
	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	Analog speed command input to AGND to power ground	
	CN3-25	AS2+	Analog speed command input	Analog signal		
Position	CN3-44	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.	
	CN3-15	/PULS				
Location	CN3-12	SIGN	Pulse command input (5V)	Differential signal or Open Collector	This signal can only accept 5V quad differential pulse signal, while the reference terminal must be connected to together with CN3-24	
	CN3-27	/SIGN				
	CN3-28	PL1		Pulse direction input (24V)		Differential signal or Open Collector
	CN3-43	PL2		Pulse command input (24V)		Differential signal or Open Collector
	CN3-4	HPULS+	High-speed input pulse command			
	CN3-3	HPULS-				
	CN3-5	HSIGN+	High-speed pulse direction command	Differential signal		
	CN3-6	HSIGN-				



## CN3 Terminal Definition

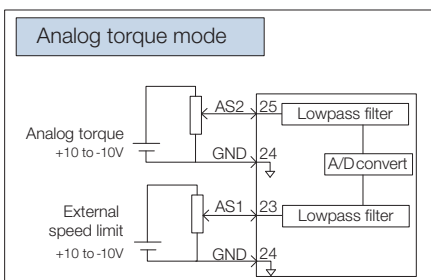
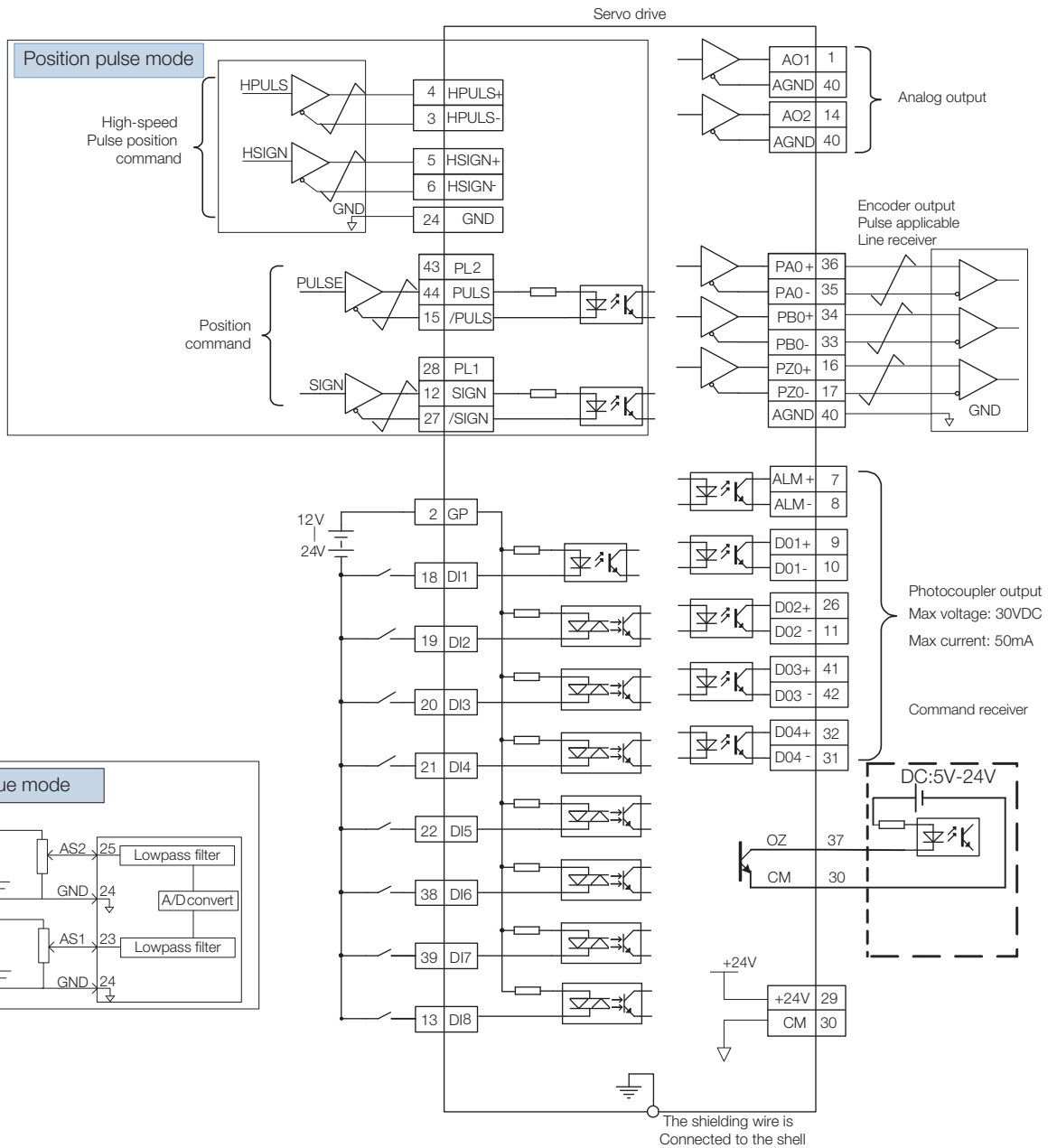
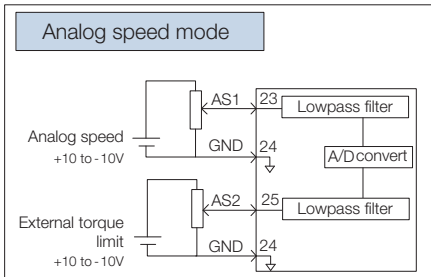
### Output Signal

	Signal Category	Terminal No.	Symbol	Name	Output	Definition
	Programmable Output Terminals	CN3-9 CN3-10	DO1+ DO1-	Digital output 1	Switching signal	
		CN3-26 CN3-11	DO2+ DO2-	Digital output 2		
		CN3-41 CN3-42	DO3+ DO3-	Digital output 3		
		CN3-32 CN3-31	DO4+ DO4-	Digital output 4		
		CN3-7 CN3-8	ALM+ ALM-	Servo alarm output		
	Pulse output terminal	CN3-37	OZ	Encoder ZRN signal output	Open collector	Encoder ZRN signal open collector 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		0,10mA

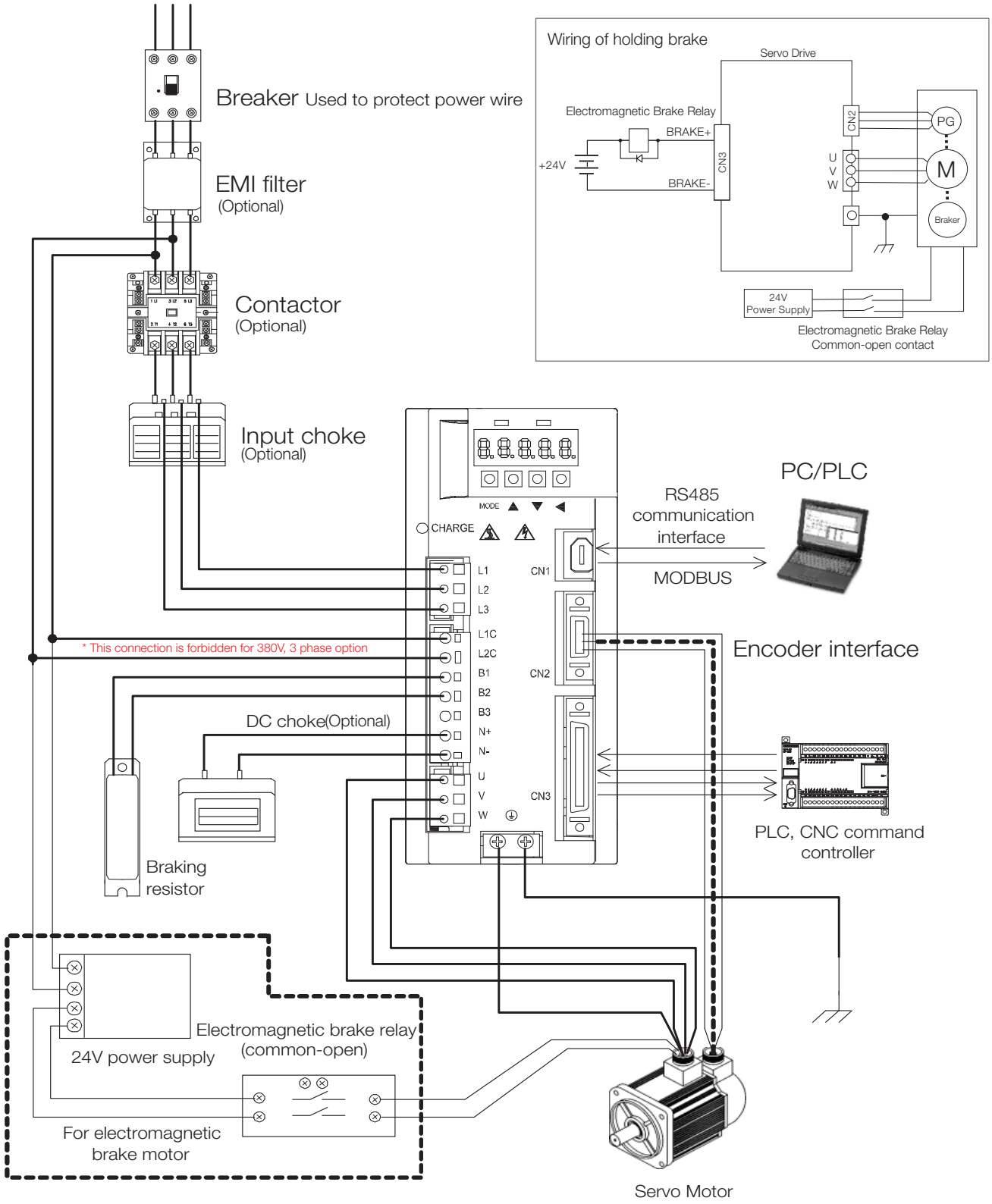
### Other Signal

Signal	Terminal No.	Symbol	Name	Output	Definition
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

# Wiring diagram

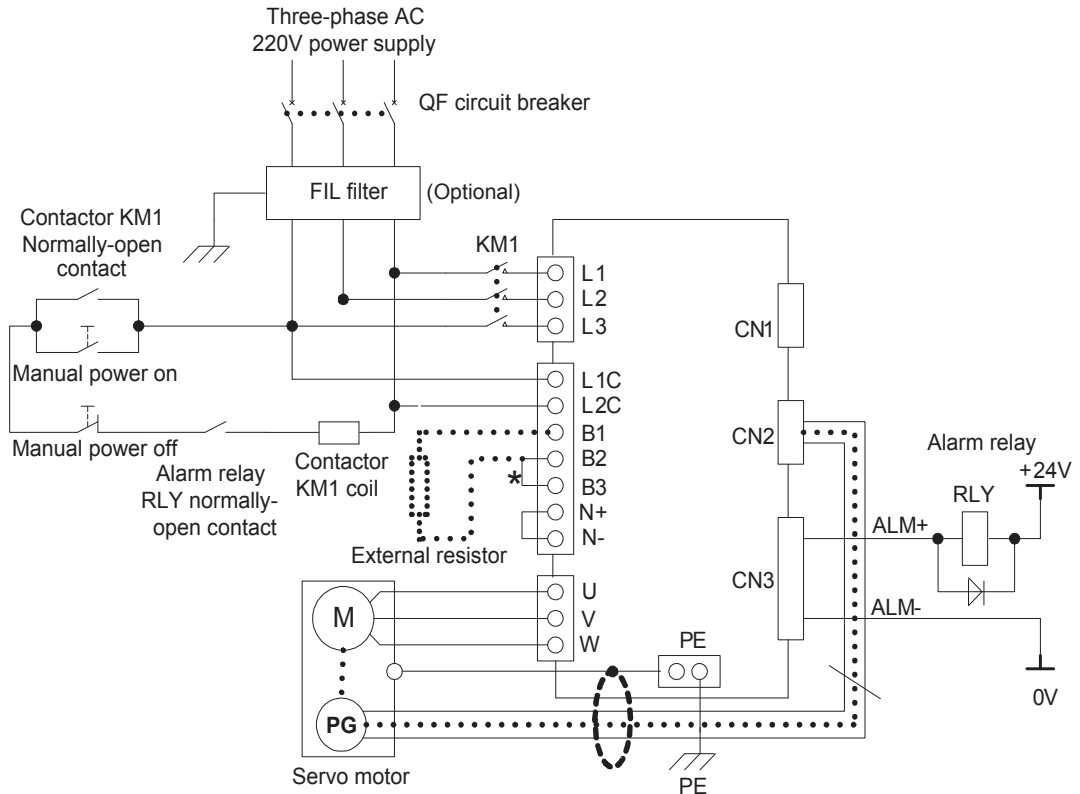


3 phase AC power  
(1 phase 220V, only L1 and L3 should be connected.)



# Typical main circuit wiring

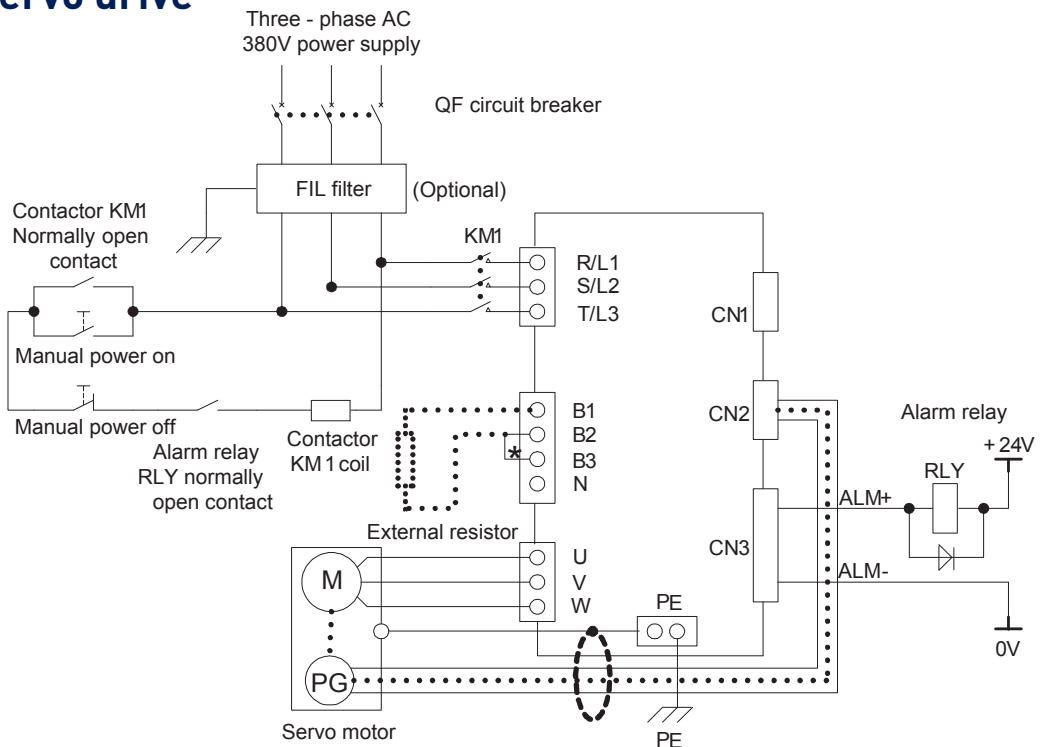
## For 220V servo drive



**Note)**

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

## For 380V servo drive



**Note)**

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

# Ordering Code

## Drive

	1		2		3		4	5	6
Order example	FL20	-	S	152	T3	M2	F11	D7	B3

1	<b>Device Family</b>
FL20	Servo Drive for Film line Application

2	<b>Function</b>
S	PM Servo Control

3	<b>Power Rating, Voltage and Frame Size</b>
220V 1phase	

201 S2 M1	0.2kW, M1 Frame
401 S2 M1	0.4kW, M1 Frame
751 S2 M1	0.75kW, M1 Frame
102 S2 M2	1kW, M2 Frame
122 S2 M2	1.2kW, M2 Frame
182 S2 M2	1.8kW, M2 Frame

220V 3phase	
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201 T2 M1	0.2kW, M1 Frame
401 T2 M1	0.4kW, M1 Frame
751 T2 M1	0.75kW, M1 Frame
102 T2 M2	1kW, M2 Frame
122 T2 M2	1.2kW, M2 Frame
182 T2 M2	1.8kW, M2 Frame
302 T2 M3	3kW, M3 Frame
452 T2 M3	4.5kW, M3 Frame

380V 3phase	
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152 T3 M2	1.5kW, M2 Frame
202 T3 M3	2kW, M3 Frame
302 T3 M3	3kW, M3 Frame
452 T3 M3	4kW, M3 Frame
552 T3 M3	5.5kW, M3 Frame
752 T3 MM4	7.5kW, MM4 Frame
113 T3 MM4	11kW, MM4 Frame
153 T3 M4	15kW, M4 Frame
183 T3 M5	18kW, M5 Frame
223 T3 M5	22kW, M5 Frame
303 T3 M6	30kW, M6 Frame
373 T3 M6	37kW, M6 Frame

4	<b>Communication</b>
F11	Communication (Modbus, External EtherCAT, External CANopen)

**Note)**

- EtherCAT and CANopen card should be ordered separately. Please see below or contact to Parker Engineers.

5	<b>Encoder Type</b>
D2	Resolver
D5	Incremental Encoder
D7	Absolute Encoder

6	<b>Brake Unit</b>
B1	Built in Brake Unit
B3	Built in Brake Unit + Dynamic Brake

**Note)**

- For build in and external resistors details please see "Brake resistor" note or product manual.

Frame	Size (WxHxD)	Supported Brake type
M1	48x175x195	B3(no braking resistor)
M2	75x175x195	B1, B3
M3	100x203x218	B1, B3
M3(5.5kW)	100x203x218	B1
MM4	150x336x203	B1(no braking resistor)
M4	185x380x225	B1(no braking resistor)
M5	210x420x234	B1(no braking resistor)
M6	270x498x234	B1(no braking resistor)

**Note)**

- Specification subject to change without notice.



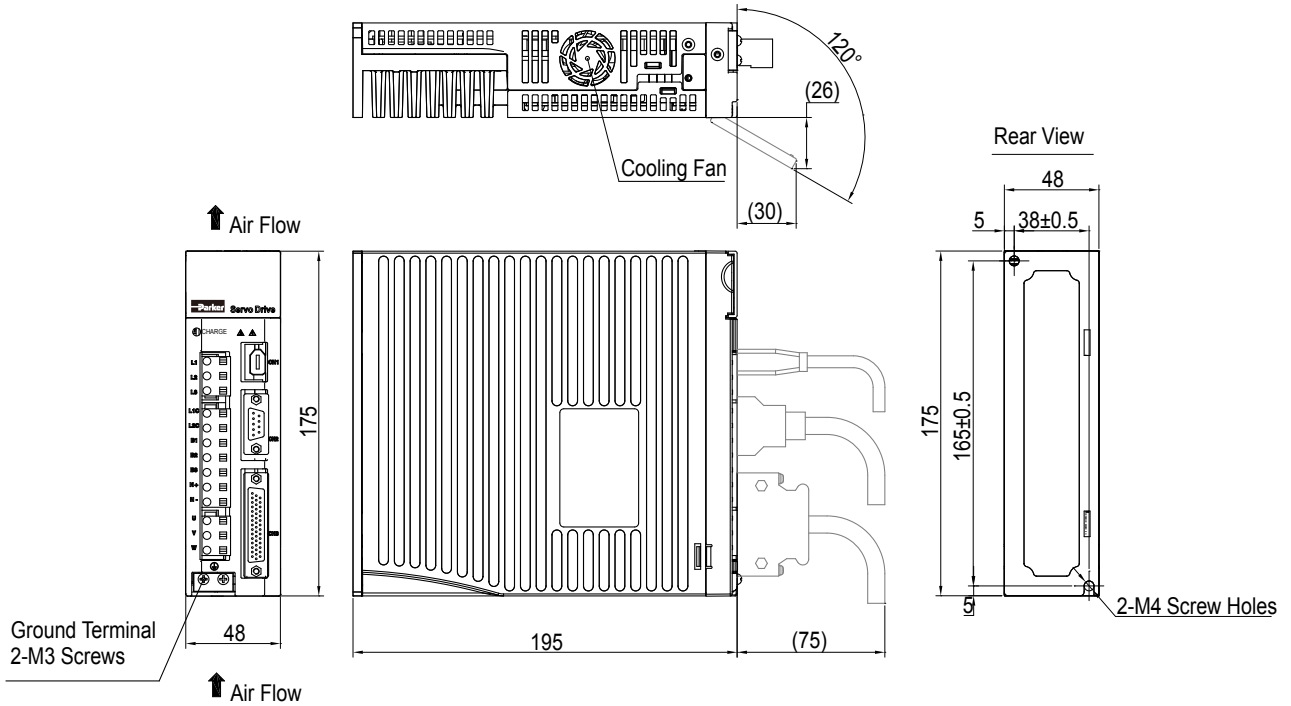
EtherCAT, CANopen communication cards

### Optional Communication Card

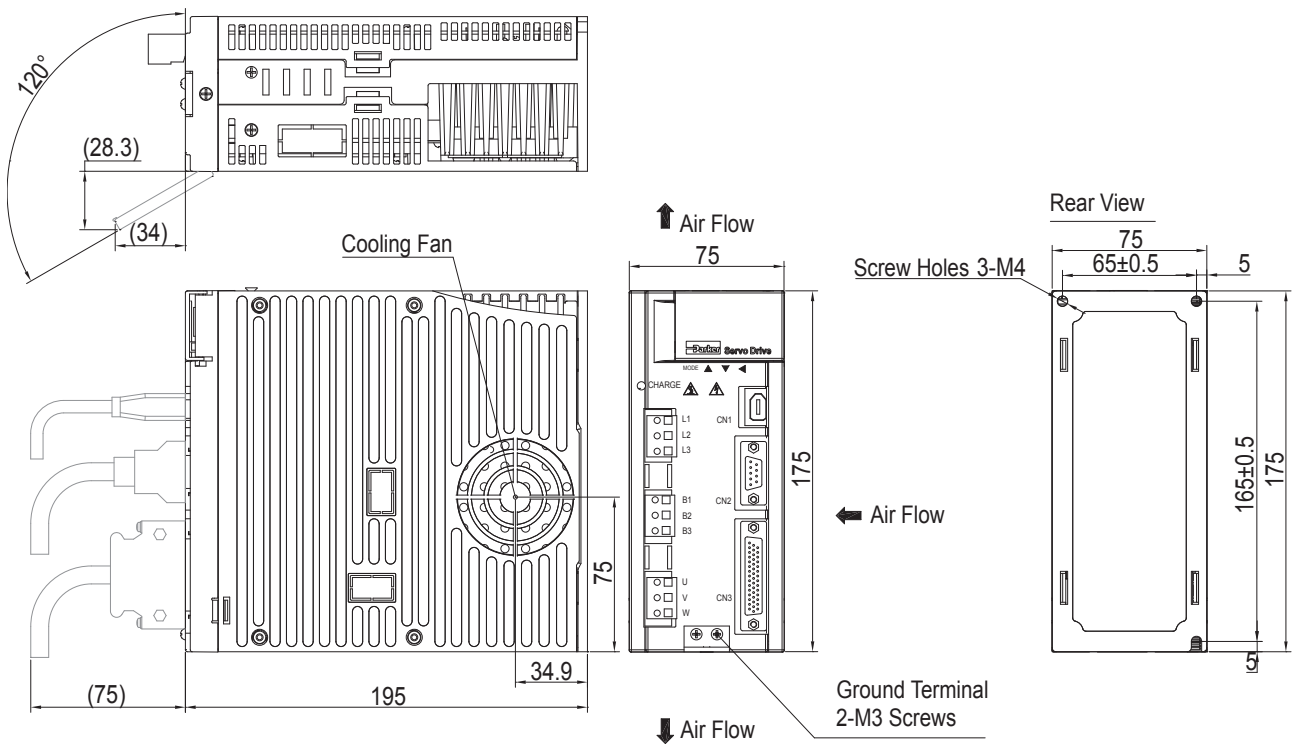
Item	Description
20S-0006	EtherCAT Communication Card
20S-0007	CANopen Communication Card

# Drive Dimensions

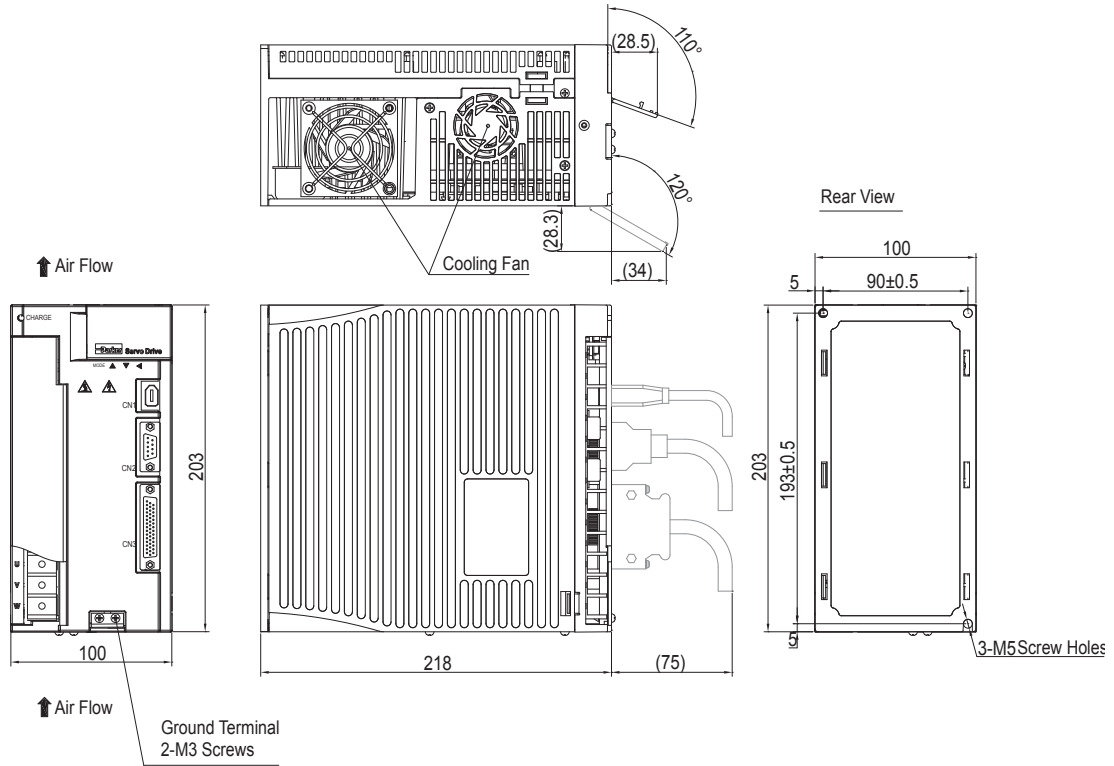
## M1 Frame dimensions



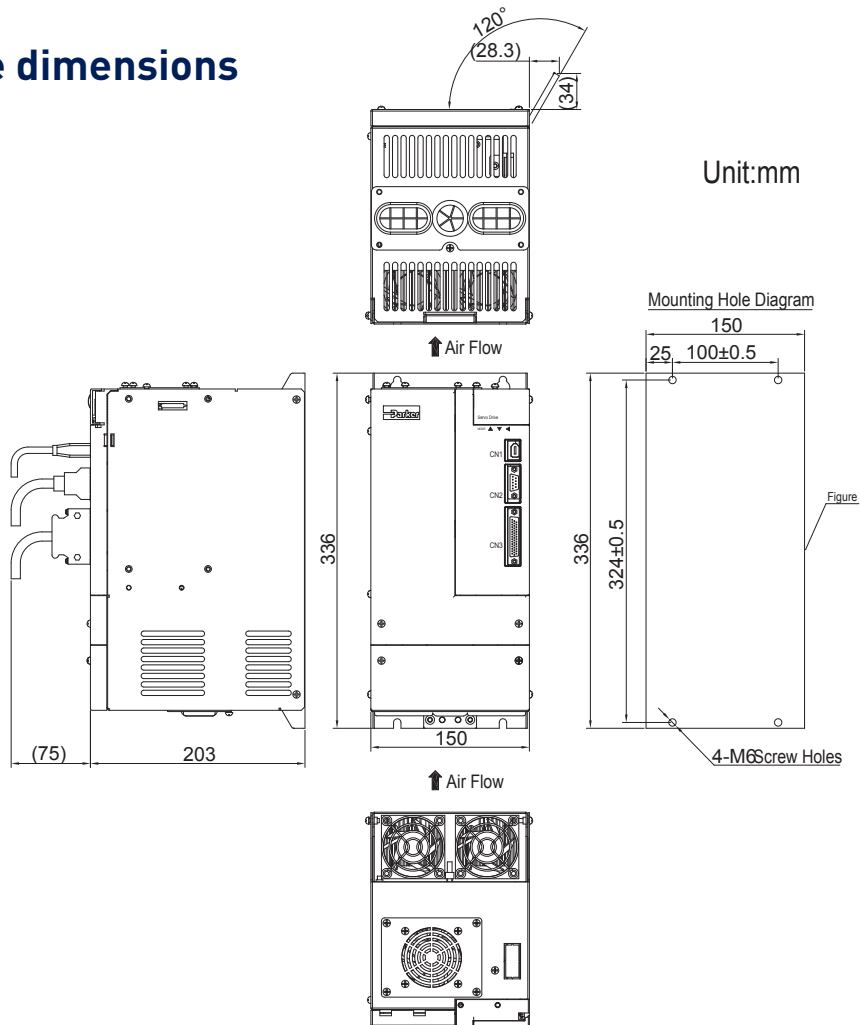
## M2 Frame dimensions



## M3 Frame dimensions

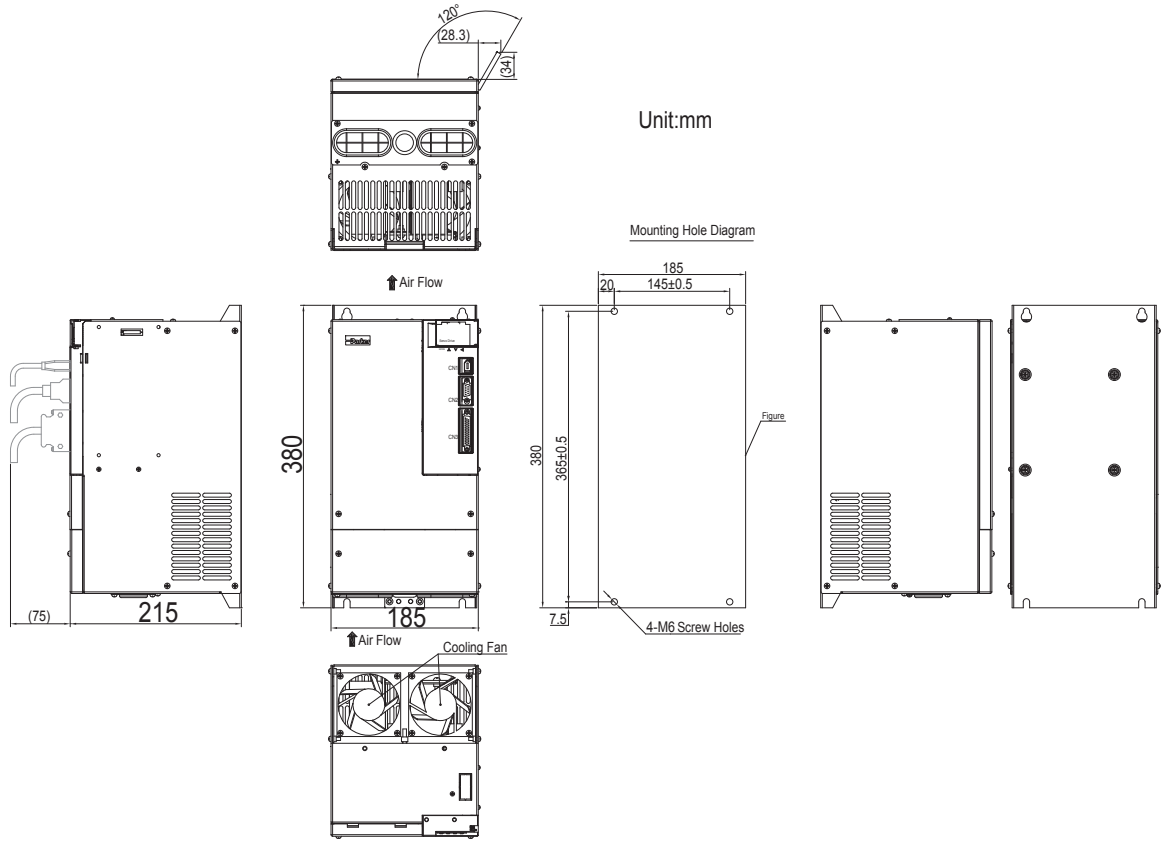


## MM4 Frame dimensions

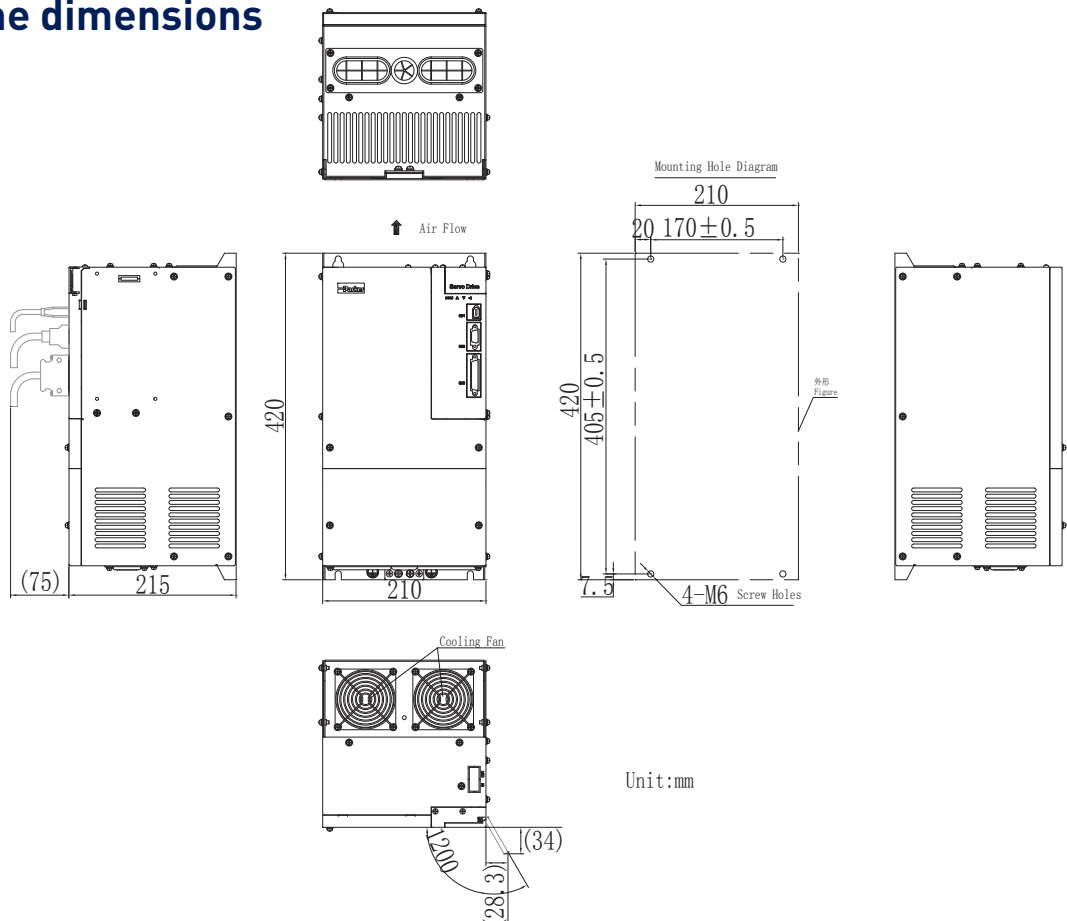


# Drive Dimensions

## M4 Frame dimensions

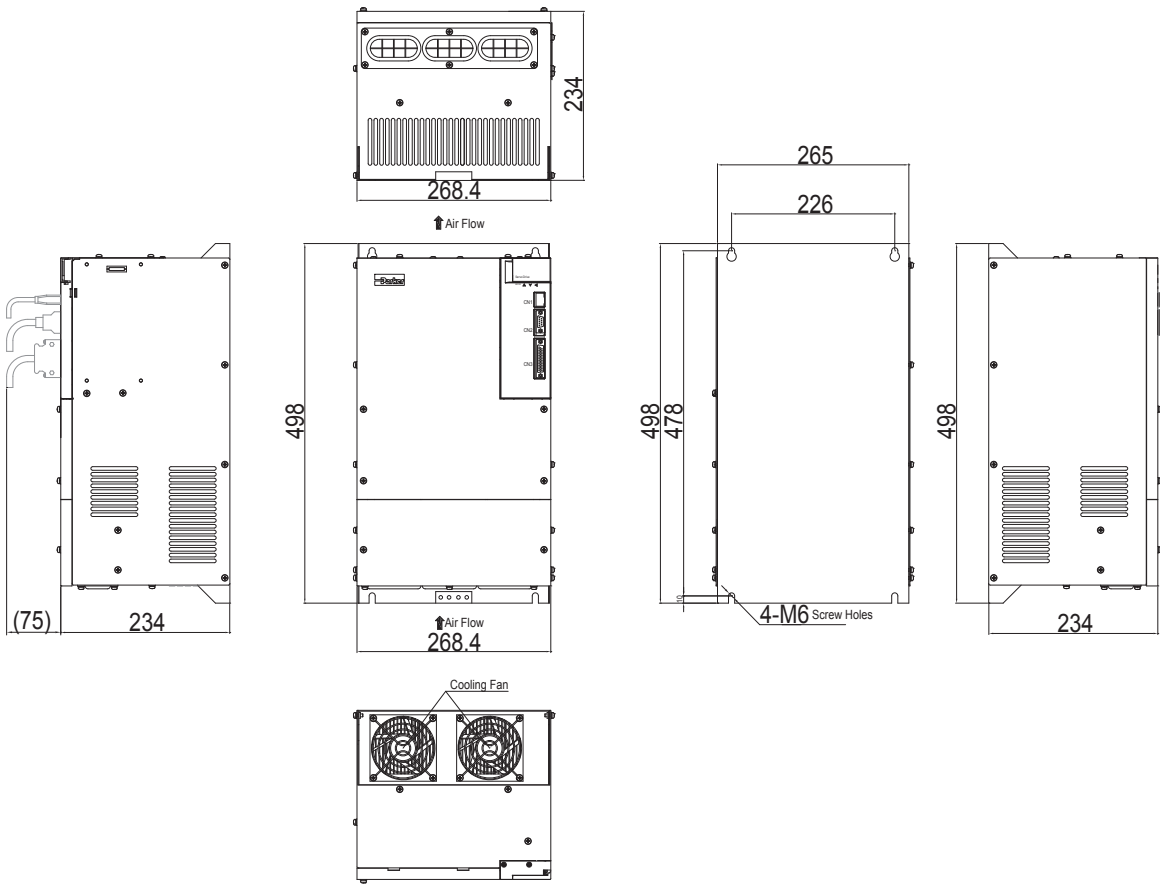


## M5 Frame dimensions





# M6 Frame dimensions

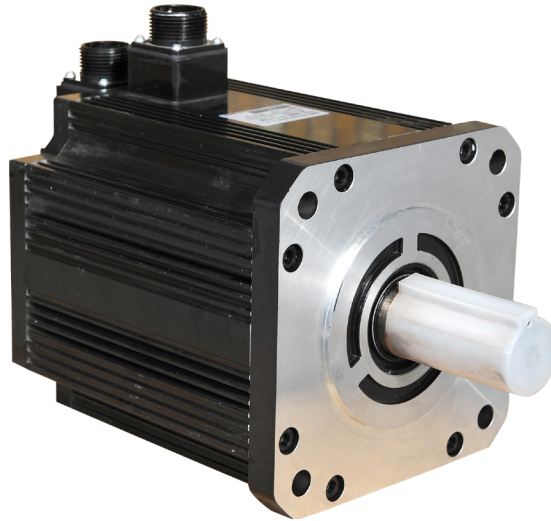


# Servo motor


## Overview

### Description

Servo motor is the latest development of a high-performance motor to meet the customer's requirement and the needs of actual market; supports wiring flexible, cost-effective standard AC servo position system.



### Servo motor nameplate

	<b>Parker</b> Parker Hannifin Corporation		
Motor Model	TYPE : FMMA-102F67ED		
Rated Torque	$M_n = 5 \text{ Nm}$	$I_n = 5 \text{ A}$	Rated Current
BEMF	$K_E = 68\text{V}/1000\text{r}/\text{min}$		
Rated Speed	$n_N/n_{\text{max}} = 2000/2300\text{r}/\text{min}$		Max. Speed
Installation Mode	IMB5 IP65 TH.CI .B		Insulation Grade IP Grade
Product No.	 MA102F67EDM74211009038		

<b>FM17-0110R6EEDFL</b>		
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.CI .F IP54	No.:	
Magnetic Field Angle :		Production Date :
<b>Parker</b> AC permanent magnetic synchronous servo motor		

# Ordering Code

## Servo Motor (for Servo Drive < 7.5kw)

	1	2		3	4	5	6	7	8
Order example	FM	SA	-	201	F	6	7	B	C

<b>1 Device Family</b>	FM	FM Series
<b>2 Rated Speed</b>	SA	3000 rpm
	MA	2000 rpm
	MB	1500 rpm
	LA	1000 rpm
<b>3 Rated Power</b>	201	0.2kW
	401	0.4kW
	501	0.5kW
	751	0.75kW
	102	1kW
	....	....
<b>4 Encoder Type</b>	F	Incremental encoder
	S	Absolute encoder
	R	Resolver
<b>5 Bus Voltage</b>	3	380V
	6	600V
<b>6 Flange Size</b>	2	60 Flange
	3	80 Flange
	5	110 Flange
	7	130 Flange
	A	180 Flange
<b>7 Optional</b>	B	With brake, without fan
	E	Without brake and fan
	J	With fan, without brake
	K	With brake and fan.
<b>8 Shaft Type</b>	C	Smooth shaft with C hole
	D	Keyway shaft with C hole

## Servo Motor (for Servo Drive ≥7.5kw)

	1	2		3	4	5	6	7	8
Order example	FM	SA	-	201	F	6	7	B	C

<b>1 Device Family</b>	FM	FM Series
<b>2 Rated Speed</b>	15	1500 rpm
	17	1700 rpm
	20	2000 rpm
<b>3 Rated Power</b>	0070	7kW
	0075	7.5kW
	0110	11kW
	0180	18kW
	0240	24kW
	0330	33kW
	....	....
<b>4 Encoder Type</b>	F	Incremental encoder
	S	Absolute encoder
	R	Resolver
<b>5 Bus Voltage</b>	6	600V
<b>6 Flange Size</b>	E	200 Flange
	F	266 Flange
<b>7 Optional</b>	E	Without Brake
<b>8 Shaft Type</b>	C	Smooth Shaft
	D	Keyway Shaft
<b>9 Cooling Mode</b>	F	Air Cooling Fan
	N	Without cooling fan
<b>10 Optional</b>	S,L...	Design Code

### Note)

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

# Technical Characteristics

## Servo Motor Specifications (220V – Incremental, Absolute Encoder and Resolver)

Motor type	Part Number (with incremental)	Rated speed	Rated power	Rated torque	Rated current	Adaptable servo drive	
		r/min	kW	Nm	A	1-phase 220V	3-phase 220V
FMSA	FMSA-201F32ED	3000	0.2	0.64	1.2	FL20-S201S2M1	FL20-S201T2M1
	FMSA-401F32ED	3000	0.4	1.27	2.8	FL20-S401S2M1	FL20-S401T2M1
	FMSA-751F33ED	3000	0.75	2.39	3.5	FL20-S751S2M1	FL20-S751T2M1
	FMSA-102F33ED	3000	1	3.5	4.5	FL20-S102S2M2	FL20-S102T2M2
	FMSA-122F35ED	3000	1.2	4	5	FL20-S182S2M2	FL20-S182T2M2
	FMSA-152F37ED	3000	1.5	5	7.5		
	FMSA-182F35ED	3000	1.8	6	8	—	FL20-S302T2M3
	FMSA-232F37ED	3000	2.3	7.7	10		
	FMSA-302F37ED	3000	3	10	15.5		
FMMA	FMMA-801F35ED	2000	0.8	4	3.5	FL20-S102S2M2	FL20-S102T2M2
	FMMA-851F37ED	2000	0.85	4	4		
	FMMA-102F37ED	2000	1	5	5	FL20-S122S2M2	FL20-S122T2M2
	FMMA-122F35ED	2000	1.2	6	5		
	FMMA-132F37ED	2000	1.3	6	6	FL20-S182S2M2	FL20-S182T2M2
	FMMA-152F37ED	2000	1.5	7.7	7.5		
	FMMA-202F37ED	2000	2	10	10	—	FL20-S302T2M3
	FMMA-312F37ED	2000	3.1	15	14	—	FL20-S452T2M3
	FMMA-352F3AED	2000	3.5	17.2	16	—	
FMMB	FMMB-122F37ED	1500	1.2	7.7	5	FL20-S122S2M2	FL20-S122T2M2
	FMMB-152F37ED	1500	1.5	10	6	FL20-S182S2M2	FL20-S182T2M2
	FMMB-232F37ED	1500	2.3	14.6	10	—	FL20-S302T2M3
	FMMB-272F3AED	1500	2.7	17.2	11	—	FL20-S302T2M3
	FMMB-302F3AED	1500	3	19	12	—	
	FMMB-432F3AED	1500	4.3	27	16	—	FL20-S452T2M3
FMLA	FMLA-102F37ED	1000	1	10	4.5	FL20-S102S2M2	FL20-S102T2M2
	FMLA-152F37ED	1000	1.5	14.3	7	FL20-S182S2M2	FL20-S182T2M2
	FMLA-292F3AED	1000	2.9	27	12	—	FL20-S302T2M3
	FMLA-372F3AED	1000	3.7	35	16	—	FL20-S452T2M3

### 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, optional protection rating of IP64, IP66.
- The matched servo drive and motor can work with the most situation. But for some special situation, please contact to Parker sales team.

### Servo Motor Specifications (380V – Incremental, Absolute Encoder and Resolver)

Motor type	Part Number (with incremental)	Rated speed	Rated power	Rated torque	Rated current	Adaptable servo drive
		r/min	KW	Nm	A	3-phase 380V
FMSA	FMSA-751F63ED	3000	0.75	2.39	2	FL20-S152T3M2
	FMSA-102F63ED	3000	1	3.5	3	
	FMSA-122F65ED	3000	1.2	4	4	FL20-S202T3M3
	FMSA-152F67ED	3000	1.5	5	5	
	FMSA-182F65ED	3000	1.8	6	6	
	FMSA-232F67ED	3000	2.3	7.7	7	FL20-S302T3M3
	FMSA-302F67ED	3000	3	10	8	
FMMA	FMMA-801F65ED	2000	0.8	4	2.5	FL20-S152T3M2
	FMMA-851F67ED	2000	0.85	4	3	
	FMMA-102F67ED	2000	1	5	3	
	FMMA-122F65ED	2000	1.2	6	3.5	
	FMMA-132F67ED	2000	1.3	6	3.5	
	FMMA-152F67ED	2000	1.5	7.7	4.5	FL20-S202T3M3
	FMMA-202F67ED	2000	2	10	5.5	
	FMMA-312F67ED	2000	3.1	15	9	FL20-S452T3M3
	FMMA-352F6AED	2000	3.5	17.2	8	
	FMMA-452F6AED	2000	4.5	21.5	10	
	FMMA-602F6AED	2000	6	27	14	FL20-S752T3MM4
	FMMA-802F6AED	2000	8	35	18	
	FMMA-103F6AED	2000	10	48	24	
FMMB	FMMB-122F67ED	1500	1.2	7.7	4	FL20-S152T3M2
	FMMB-152F67ED	1500	1.5	10	4	
	FMMB-232F67ED	1500	2.3	14.6	6	FL20-S202T3M3
	FMMB-232F67ED	1500	3	14.6	7.5	
	FMMB-272F6AED	1500	2.7	17.2	8	FL20-S302T3M3
	FMMB-302F6AED	1500	3	19	8	
	FMMB-432F6AED	1500	4.3	27	10	
	FMMB-552F6AED	1500	5.5	35	12.5	FL20-S552T3M3
FMMB-752F6AED	1500	7.5	48	17	FL20-S752T3MM4	
FMLA	FMLA-102F67ED	1000	1	10	3	FL20-S152T3M2
	FMLA-292F6AED	1000	2.9	27	7	FL20-S302T3M3
	FMLA-372F6AED	1000	3.7	35	9	FL20-S452T3M3

#### 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, optional protection rating of IP64, IP66.
- The matched servo drive and motor can work with the most situation. But for some special situation, please contact to Parker sales team.

### Servo Motor Specifications (380V – Incremental, Absolute Encoder and Resolver)

Motor type	Part Number (with incremental)	Rated speed	Rated power	Rated torque	Rated current	Adaptable servo drive
		r/min	kW	Nm	A	3-phase 380V
FM15	FM15-0082F6EEDFL	1500	8.2	52	16.6	FL20-S752T3MM4
	FM15-0100F6EEDFL	1500	10	64	20.7	FL20-S113T3MM4
	FM15-0124F6EEDFL	1500	12	80	24.7	
	FM15-0160F6EEDFL	1500	16	102	33.5	FL20-S183T3M5
	FM15-0180F6EEDFL	1500	18	118	40	
	FM15-0210F6EEDFL	1500	21	135	43.2	FL20-S223T3M5
	FM15-0240F6EEDFL	1500	24	152	46.7	FL20-S303T3M6
	FM15-0290F6EEDFL	1500	29	185	57.5	
	FM15-0350F6EEDFL	1500	35	225	71.7	FL20-S373T3M6
FM17	FM17-0075F6EEDFL	1700	7.5	42	13.7	FL20-S752T3MM4
	FM17-0092F6EEDFL	1700	9.2	52	18	FL20-S113T3MM4
	FM17-0110F6EEDFL	1700	11	64	23	
	FM17-0140F6EEDFL	1700	14	80	29.2	FL20-S153T3M4
	FM17-0180F6EEDFL	1700	18	102	38.5	FL20-S183T3M5
	FM17-0210F6EEDFL	1700	21	118	45	FL20-S223T3M5
	FM17-0240F6EEDFL	1700	24	135	48.5	FL20-S303T3M6
	FM17-0270F6EEDFL	1700	27	152	57.5	
	FM17-0330F6EEDFL	1700	33	185	68	FL20-S373T3M6
FM20	FM20-0070F6EEDFL	2000	7	33.6	14.8	FL20-S752T3MM4
	FM20-0100F6EEDFL	2000	10	52	22	FL20-S113T3MM4
	FM20-0140F6EEDFL	2000	14	64	30	FL20-S153T3M4
	FM20-0180F6EEDFL	2000	18	80	37	FL20-S183T3M5
	FM20-0220F6EEDFL	2000	22	102	43	FL20-S223T3M5
	FM20-0250F6EEDFL	2000	25	118	49	FL20-S303T3M6
	FM20-0280F6EEDFL	2000	28	135	56.9	
	FM20-0300F6EEDFL	2000	30	152	67	FL20-S373T3M6
	FM20-0360F6EEDFL	2000	36	185	74	
	FM20-0071F6EEDNL	2000	7.1	34	14.5	FL20-S752T3MM4
	FM20-0094F6EEDNL	2000	9.4	45	18.8	
	FM20-0117F6EEDNL	2000	11.7	56	24.4	FL20-S113T3MM4
	FM20-0140F6EEDNL	2000	14	67	28.6	FL20-S153T3M4

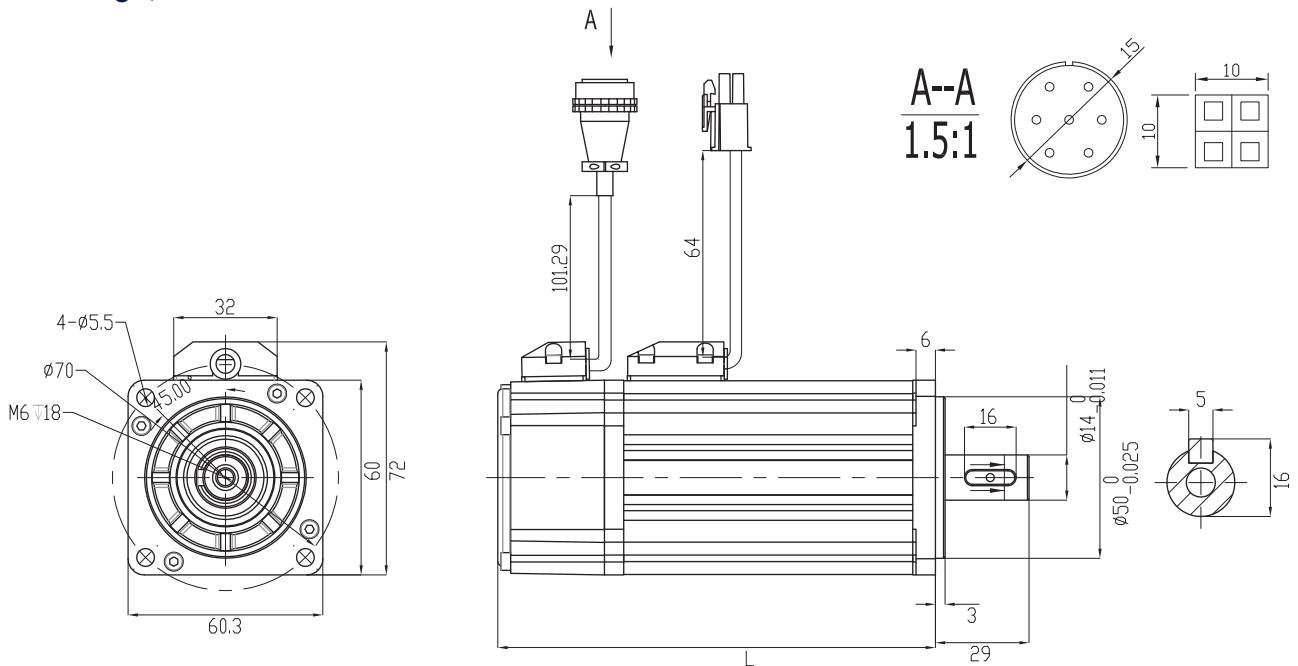
#### Note)

- These part numbers are based on Incremental Encoder Type.
- On behalf of the motor shaft extension brake category, please refer to [naming rules servo motor] in this manual.
- The matched servo drive and motor can work with the most situation. But for some special situation, please contact to Parker sales team.

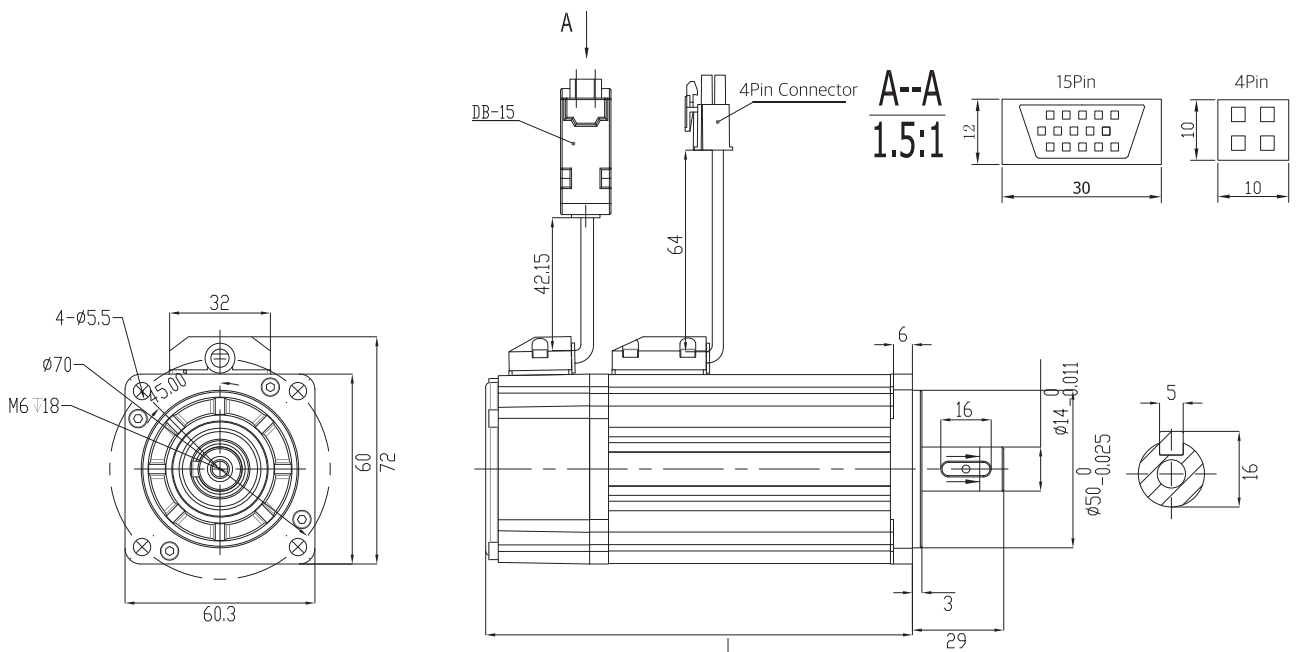
# Motor Dimensions

## Servo motor

### 60 Flange, Absolute Motor



### 60 Flange, Incremental Motor

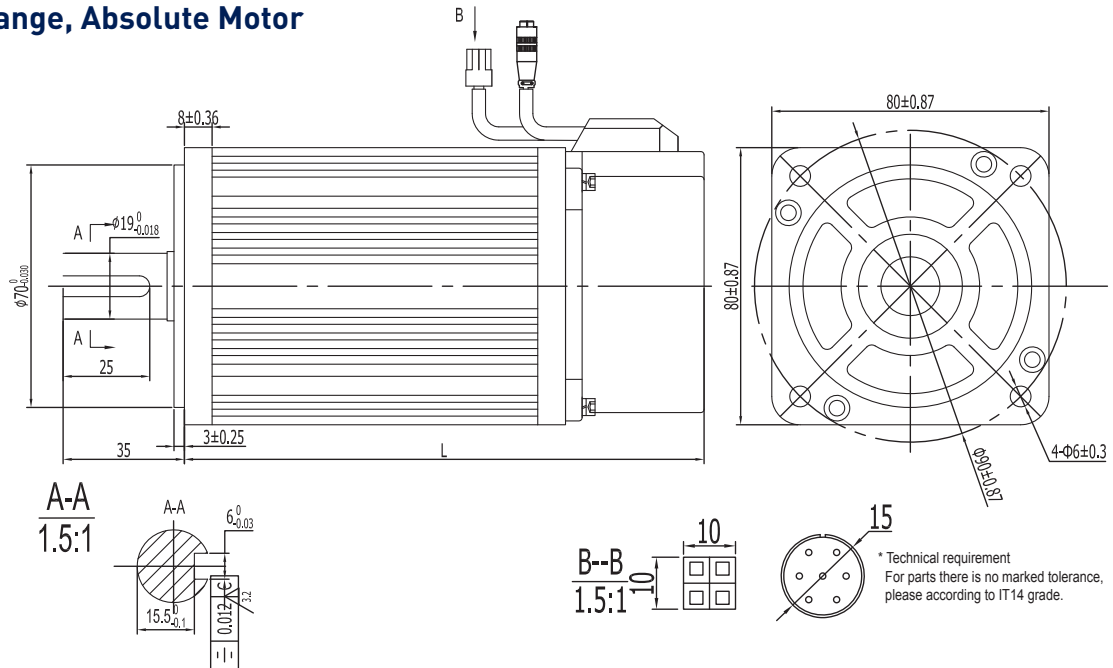


Model	L(mm)	L(mm) with brake	Weight(kg)	Remark
FMSA-201F/S32***	108	146	1.2	The screw hole size is M4 x 20
FMSA-401F/S32***	136	174	1.6	

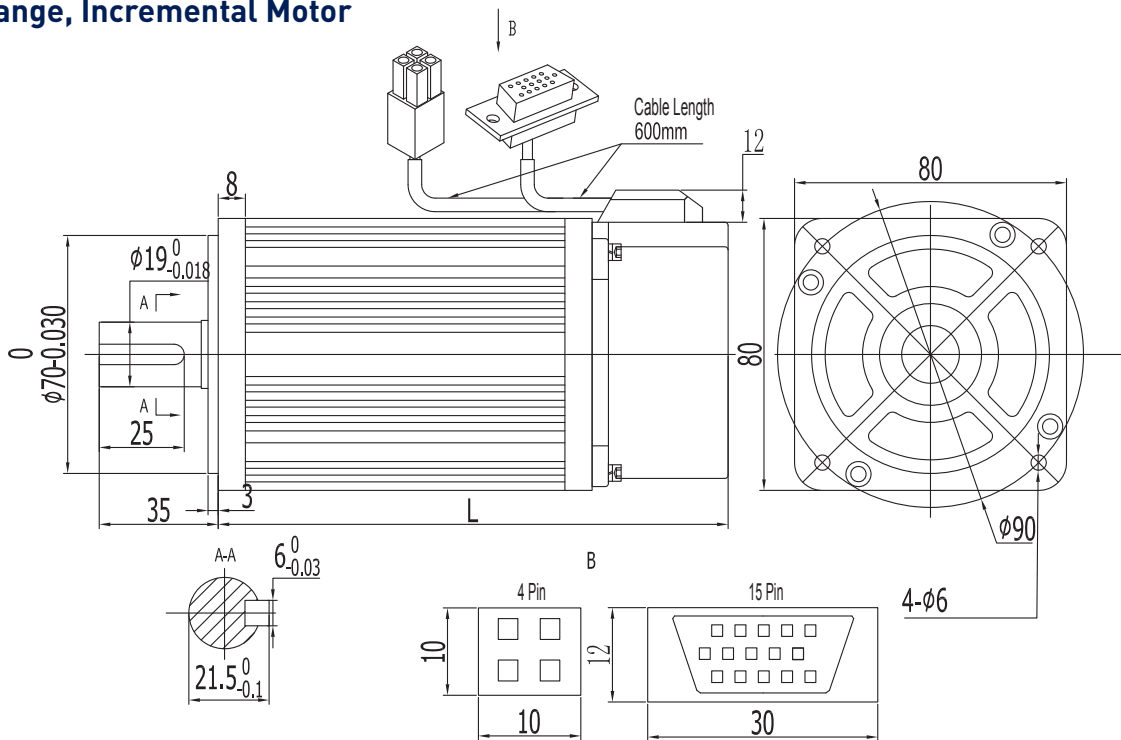
# Motor Dimensions

## Servo motor

### 80 Flange, Absolute Motor



### 80 Flange, Incremental Motor



Model	L(mm)	L(mm) with brake	Weight(kg)	Remark
FMSA-751**3***	156	205	2.8	The screw hole size is M5 x 22
FMSA-102**3***	183	233	3.8	
FMSB-102*33***				

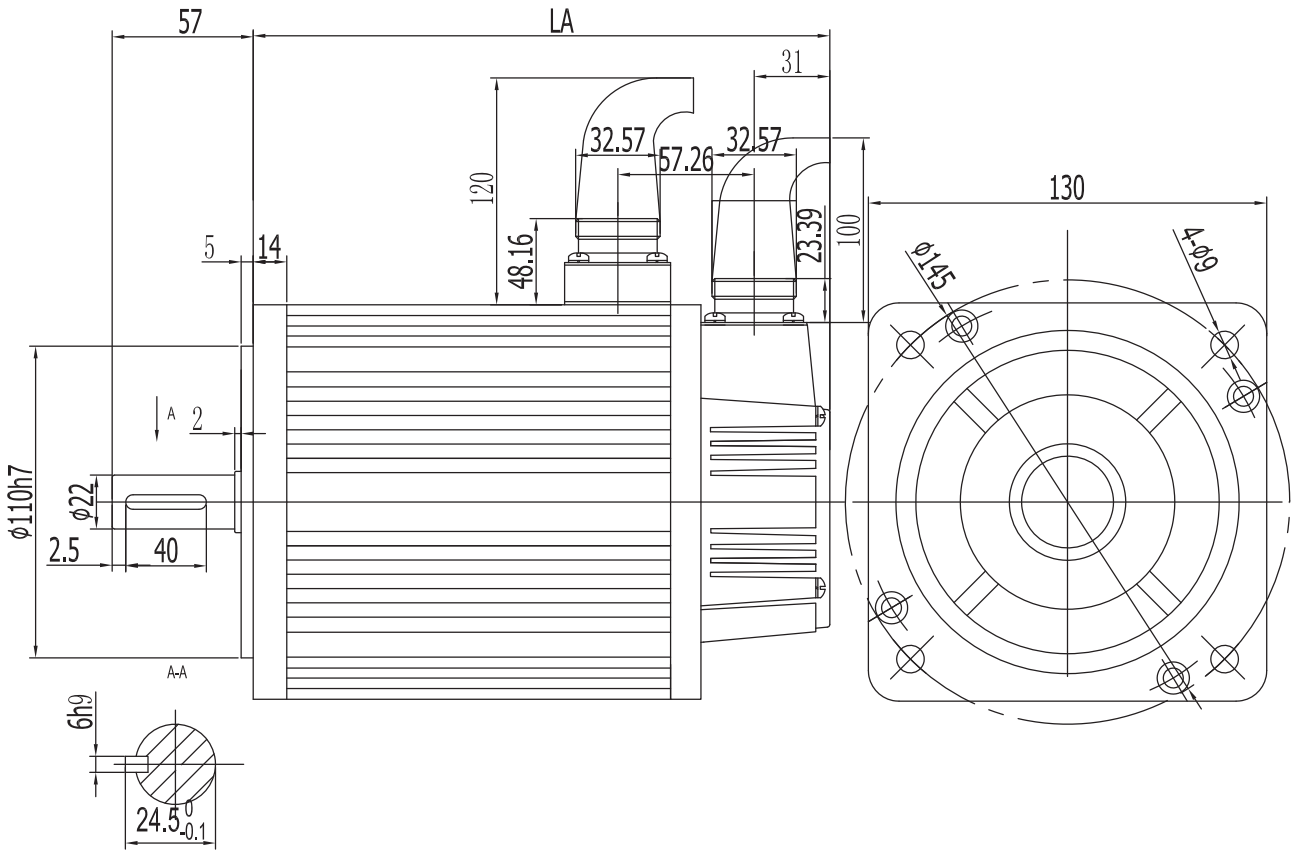




# Motor Dimensions

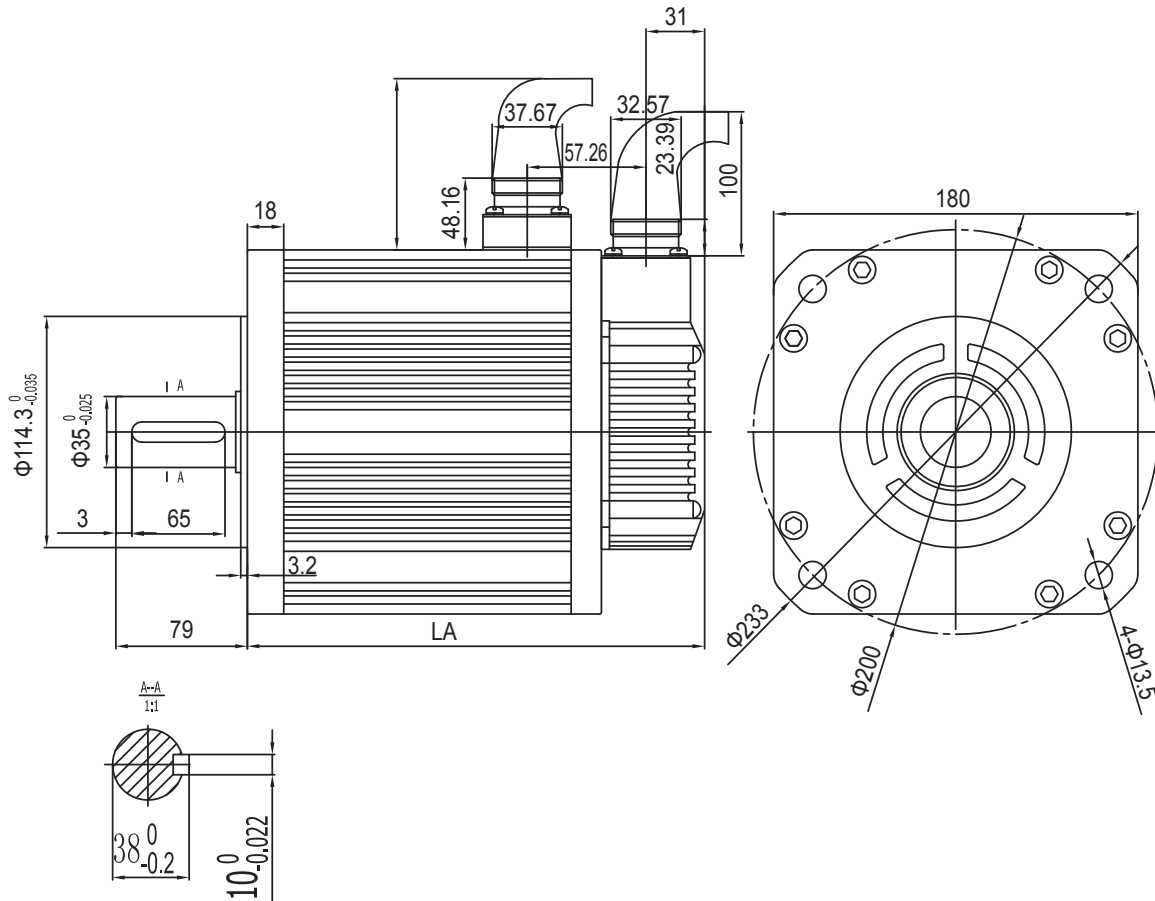
## Servo motor

### 130 Flange Motor



Model	LA(mm)	LA(mm) with brake	Weight(kg)	Remark
FMMA-851**7***	173	228	7	The screw hole size is M6 x 25.
FMSA-152**7***				
FMMA-102**7***				
FMMA-132**7***	181	236	7.7	
FMSA-232**7***	194	249	8	
FMMA-152**7***				
FMMB-122**7***				
FMSA-302**7***	217	270	10	
FMMA-202**7***				
FMMB-152**7***				
FMLA-102**7***	246	297	12	
FMMA-312**7***				
FMLA-152*37***				
FMMB-232**7***				
FMMB-302*67***				

## 180 Flange Motor

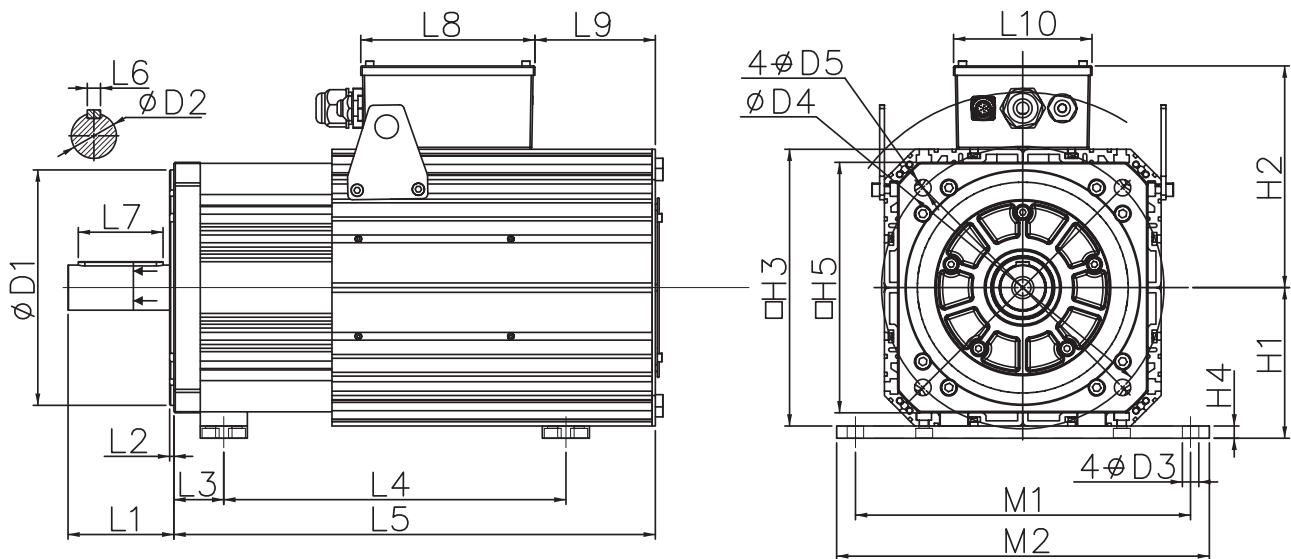


Model	LA(mm)	LA(mm) with brake	Weight(kg)	Remark
FMMA-352**A***	218	283	18	The screw hole size is M10 x 45.
FMMB-272**A***				
FMMA-452**A***	238	300	20	
FMMB-302**A***				
FMMA-602*6A***	250	319	23	
FMMB-432**A***				
FMLA-292**A***				
FMMA-802*6A***	288	349	29	
FMMB-552**A***				
FMLA-372**A***				
FMMA-103*6A***	338	403	36	
FMMB-752**A***				

# Motor Dimensions

## Servo motor

### FM15, FM17, FM20 series, Air-cooling



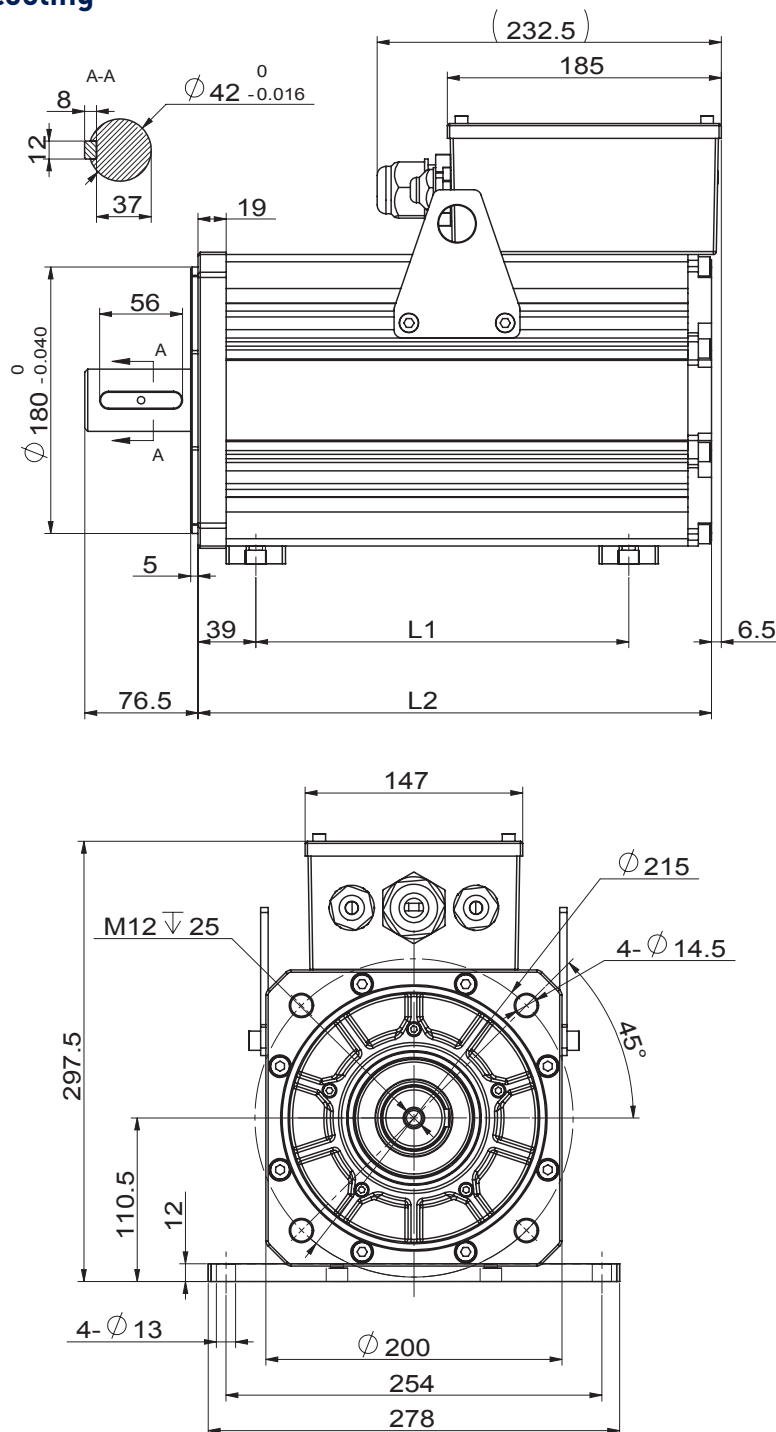
Stand spigot	D1	D2	D3	D4	D5	L1	L2	L3	L6	L7	L8	L9	L10	H1	H2	H3	H4	H5	M1	M2
E	180	42	14	215	14.5	77	5	39	12	56	185	75.5	147	124	200	224	12	200	254	278
F	250	48	18	300	17.5	112	4.5	53	14	90	185	128	147	160	236	294	13	266	356	390

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
Stand spigot	E	E	E	E	E	E	E	E	E	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	685.5	707.5	756.5

### Note)

- Servomotor cooling fan need additional 220V power supply.

## FM20 series Self-cooling

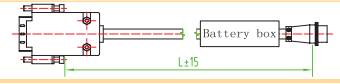

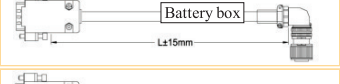





Model	Motor rated torque Nm ( $\Delta T=100^{\circ}\text{C}$ )	Motor rated torque Nm ( $\Delta T=65^{\circ}\text{C}$ )	L1(mm)	L2(mm)
FM20-0057F6EEDN	42	34	210	305
FM20-0086F6EEDN	56	45	252	347
FM20-0114F6EEDN	70	56	294	389
FM20-0143F6EEDN	84	67	336	431

# Accessories

## Encoder Cable

\* Absolute Encoder Cable (Maximum length : 30m)

Item	Part No	Cable length(m)	Cable Assembly
Absolute encoder cable (for ≤80 flange Servo motor)	DB9-4BS02-** (with battery)	**	
	DB9-4GS02-**	**	
Absolute encoder cable (for 110, 130, 180 flange Servo motor)	DB9-4BS03-** (with battery)	**	
	DB9-4GS03-**	**	
Absolute encoder cable (for >180 flange Servo motors)	DB9-4BS01-** (with battery)	**	
	DB9-4GS01-**	**	

### Note)

Battery placed near motor. If you need the battery near the inverter, please contact Parker sales team for correct part number.

\* Incremental Encoder Cable (Maximum length : 30m)

Item	Part No	Cable length(m)	Cable Assembly
Incremental encoder cable (for ≤80 flange Servo motor)	DB15-15GP02-**	**	
Incremental encoder cable (for 110, 130, 180 flange Servo motor)	DB15-15GP01-**	**	
Incremental encoder cable (for >180 flange Servo motors)	DB15-15GP03-**	**	

\* Resolver feedback cable (Maximum length : 30m)

Item	Part No	Cable length(m)	Cable Assembly
Resolver feedback cable (for ≤80 flange Servo motor)	DB9-8GR03-**	**	
Resolver feedback cable (for 110, 130, 180 flange Servo motor)	DB9-8GR01-**	**	
Resolver feedback cable (for >180 flange Servo motors)	DB9-8GR02-**	**	

## Control Cable

\* Control cable (Maximum length : 30m)

Item	Part No	Cable length(m)	Cable Assembly
Position mode	DB44-15PC-**	**	
Analog speed / Torque mode	DB44-15AI-**	**	

\* Brake cable (Maximum length : 30m)

Item	Part No	Cable length(m)	Cable Assembly
Brake cable (for ≤180 flange Servo motor)	HK3-2BR-**	**	

## Power Cable

\* Resolver feedback cable (Maximum length : 30m)

Item	Part No	Cable length(M)	Cable Assembly
Power cable (for ≤80 flange Servo motor)	DB4-4PO-**	**	
Power cable (for 110, 130 flange Servo motor)	HK4A-4PO-**	**	
Power cable (for 180 flange Servo motor)	HK4B-4PO-**	**	
Power cable (for >180 flange Servo motor)	ZL4-4PO-**	**	

# Accessories

## Power Cable

(Servo motor power line form L- Plug power line (for 800W of Servo motors), Maximum length : 30m)

### [ 220V Servo Motor Power cable for ≤ 180 Frame ]

Base speed(RPM)	Power(kW)	FM Servo motors	Power cable (** : Cable length(m))	
3,000	0.2	FMSA-201*32ED	DB4-4PO-**-0.75	
	0.4	FMSA-401*32ED		
	0.75	FMSA-751*33ED		
		1	FMSA-102*33ED	DB4-4PO-**-1.5
		1.2	FMSA-122*35ED	HK4A-4PO-**-1.5
		1.5	FMSA-152*37ED	
		1.8	FMSA-182*35ED	
		2.3	FMSA-232*37ED	HK4A-4PO-**-2.5
		3	FMSA-302*37ED	HK4A-4PO-**-4.0
2,000	0.8	FMMA-801*35ED	HK4A-4PO-**-1.0	
	0.85	FMMA-851*37ED	HK4A-4PO-**-1.5	
		1	FMMA-102*37ED	HK4A-4PO-**-1.0
		1.2	FMMA-122*35ED	
		1.3	FMMA-132*37ED	HK4A-4PO-**-1.5
		1.5	FMMA-152*37ED	
		2	FMMA-202*37ED	HK4A-4PO-**-2.5
		3.1	FMMA-312*37ED	HK4A-4PO-**-4.0
		3.5	FMMA-352*3AED	
1,500	1.2	FMMB-122*37ED	HK4A-4PO-**-1.5	
	1.5	FMMB-152*37ED		
		2.3	FMMB-232*37ED	HK4A-4PO-**-2.5
		2.7	FMMB-272*3AED	HK4B-4PO-**-2.5
		3	FMMB-302*3AED	
		4.3	FMMB-432*3AED	HK4B-4PO-**-4.0
1,000	1	FMLA-102*37ED	HK4A-4PO-**-1.0	
	1.5	FMLA-152*37ED	HK4A-4PO-**-1.5	
	2.9	FMLA-292*3AED	HK4B-4PO-**-2.5	
	3.7	FMLA-372*3AED	HK4B-4PO-**-4.0	

### Note)

- HK4A cable is suitable for flange below 180 with aviation plug.
- HK4B is suitable for 180 flange with aviation plug.
- The unit of length is m.



**[ 380V Servo Motor Power cable for ≤ 180 Frame ]**

Base speed(RPM)	Power(kW)	FM Servo motors	Power cable (**: Cable length(m))
3,000	0.75	FMSA-751*63ED	DB4-4PO-**-0.75
	1	FMSA-102*63ED	
	1.2	FMSA-122*65ED	HK4A-4PO-**-0.75
	1.5	FMSA-152*67ED	HK4A-4PO-**-1.0
	1.8	FMSA-182*65ED	HK4A-4PO-**-1.5
	2.3	FMSA-232*67ED	
	3	FMSA-302*67ED	
2,000	0.8	FMMA-801*65ED	HK4A-4PO-**-0.75
	0.85	FMMA-851*67ED	
	1	FMMA-102*67ED	
	1.2	FMMA-122*65ED	
	1.3	FMMA-132*67ED	HK4A-4PO-**-1.0
	1.5	FMMA-152*67ED	
	2	FMMA-202*67ED	HK4A-4PO-**-1.5
	3.1	FMMA-312*67ED	HK4A-4PO-**-2.5
	3.5	FMMA-352*6AED	HK4B-4PO-**-2.5
	4.5	FMMA-452*6AED	
	6	FMMA-602*6AED	HK4B-4PO-**-4.0
	8	FMMA-802*6AED	HK4B-4PO-**-6.0
	10	FMMA-103*6AED	
1,500	1.2	FMMB-122*67ED	HK4A-4PO-**-0.75
	1.5	FMMB-152*67ED	
	2.3	FMMB-232*67ED	HK4A-4PO-**-1.0
	3	FMMB-302*67ED	HK4A-4PO-**-1.5
	2.7	FMMB-272*6AED	HK4A-4PO-**-1.5
	3	FMMB-302*6AED	HK4A-4PO-**-1.5
	4.3	FMMB-432*6AED	HK4A-4PO-**-2.5
	5.5	FMMB-552*6AED	
	7.5	FMMB-752*6AED	HK4B-4PO-**-4.0
1,000	1	FMLA-102*67ED	HK4A-4PO-**-0.75
	2.9	FMLA-292*6AED	HK4A-4PO-**-1.5
	3.7	FMLA-372*6AED	HK4B-4PO-**-2.5

**Note)**

- HK4A cable is suitable for flange below 180 with aviation plug.
- HK4B is suitable for 180 flange with aviation plug.
- The unit of length is m.

# Accessories

## Power Cable

(Servo motor power line form L- Plug power line (for 800W of Servo motors), Maximum length : 30m)

### [ 380V Servo Motor Power cable for >180Frame ]

Base Speed (RPM)	Power (kW)	FMLA-372*6AED	Power Cable (* * : Cable length(m))
1,500	8.2	FM15-0082*6EEDFL	ZL4-4PO-**-6.0
	10	FM15-0100*6EEDFL	
	12	FM15-0124*6EEDFL	
	16	FM15-0160*6EEDFL	
	18	FM15-0180*6EEDFL	ZL4-4PO-**-10.0
	21	FM15-0210*6EEDFL	ZL4-4PO-**-16.0
	24	FM15-0240*6EEDFL	
	29	FM15-0290*6EEDFL	
35	FM15-0350*6EEDFL		
1,700	7.5	FM17-0075*6EEDFL	ZL4-4PO-**-4.0
	9.2	FM17-0092*6EEDFL	ZL4-4PO-**-6.0
	11	FM17-0110*6EEDFL	
	14	FM17-0140*6EEDFL	
	18	FM17-0180*6EEDFL	ZL4-4PO-**-10.0
	21	FM17-0210*6EEDFL	ZL4-4PO-**-16.0
	24	FM17-0240*6EEDFL	
	27	FM17-0270*6EEDFL	
33	FM17-0330*6EEDFL		
2,000	7	FM20-0070*6EEDFL	ZL4-4PO-**-4.0
	10	FM20-0100*6EEDFL	ZL4-4PO-**-6.0
	14	FM20-0140*6EEDFL	ZL4-4PO-**-10.0
	18	FM20-0180*6EEDFL	
	22	FM20-0220*6EEDFL	ZL4-4PO-**-16.0
	25	FM20-0250*6EEDFL	
	28	FM20-0280*6EEDFL	
	30	FM20-0300*6EEDFL	
36	FM20-0360*6EEDFL	ZL4-4PO-**-25.0	

**Note)** The unit of length is m.

## Braking Resistor

- Built-in braking resistor and min resistor value of external braking resistor for 220V servo.

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	25Ω	40Ω/400 W
M3	100W/20Ω	15Ω	15Ω/1000 W

- Built-in braking resistor and min resistor value of external braking resistor for 380V servo.

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
MM4/M4	—	40Ω	40Ω/1000W
M5	—	40Ω	40Ω/1000W
M6	—	30Ω	30Ω/2200W



# Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 00800 27 27 5374



## Aerospace

### Key Markets

Aftermarket services  
Commercial transports  
Engines  
General & business aviation  
Helicopters  
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Regional transports  
Unmanned aerial vehicles

### Key Products

Control systems & actuation products  
Engine systems & components  
Fluid conveyance systems & components  
Fluid metering, delivery & atomization devices  
Fuel systems & components  
Fuel tank inerting systems  
Hydraulic systems & components  
Thermal management  
Wheels & brakes



## Climate Control

### Key Markets

Agriculture  
Air conditioning  
Construction Machinery  
Food & beverage  
Industrial machinery  
Life sciences  
Oil & gas  
Precision cooling  
Process  
Refrigeration  
Transportation

### Key Products

Accumulators  
Advanced actuators  
CO<sub>2</sub> controls  
Electronic controllers  
Filter driers  
Hand shut-off valves  
Heat exchangers  
Hose & fittings  
Pressure regulating valves  
Refrigerant distributors  
Safety relief valves  
Smart pumps  
Solenoid valves  
Thermostatic expansion valves



## Electromechanical

### Key Markets

Aerospace  
Factory automation  
Life science & medical  
Machine tools  
Packaging machinery  
Paper machinery  
Plastics machinery & converting  
Primary metals  
Semiconductor & electronics  
Textile  
Wire & cable

### Key Products

AC/DC drives & systems  
Electric actuators, gantry robots & slides  
Electrohydraulic actuation systems  
Electromechanical actuation systems  
Human machine interface  
Linear motors  
Stepper motors, servo motors, drives & controls  
Structural extrusions



## Filtration

### Key Markets

Aerospace  
Food & beverage  
Industrial plant & equipment  
Life sciences  
Marine  
Mobile equipment  
Oil & gas  
Power generation & renewable energy  
Process  
Transportation  
Water Purification

### Key Products

Analytical gas generators  
Compressed air filters & dryers  
Engine air, coolant, fuel & oil filtration systems  
Fluid condition monitoring systems  
Hydraulic & lubrication filters  
Hydrogen, nitrogen & zero air generators  
Instrumentation filters  
Membrane & fiber filters  
Microfiltration  
Sterile air filtration  
Water desalination & purification filters & systems



## Fluid & Gas Handling

### Key Markets

Aerial lift  
Agriculture  
Bulk chemical handling  
Construction machinery  
Food & beverage  
Fuel & gas delivery  
Industrial machinery  
Life sciences  
Marine  
Mining  
Mobile  
Oil & gas  
Renewable energy  
Transportation

### Key Products

Check valves  
Connectors for low pressure fluid conveyance  
Deep sea umbilicals  
Diagnostic equipment  
Hose couplings  
Industrial hose  
Mooring systems & power cables  
PTFE hose & tubing  
Quick couplings  
Rubber & thermoplastic hose  
Tube fittings & adapters  
Tubing & plastic fittings



## Hydraulics

### Key Markets

Aerial lift  
Agriculture  
Alternative energy  
Construction machinery  
Forestry  
Industrial machinery  
Machine tools  
Marine  
Material handling  
Mining  
Oil & gas  
Power generation  
Refuse vehicles  
Renewable energy  
Truck hydraulics  
Turf equipment

### Key Products

Accumulators  
Cartridge valves  
Electrohydraulic actuators  
Human machine interfaces  
Hybrid drives  
Hydraulic cylinders  
Hydraulic motors & pumps  
Hydraulic systems  
Hydraulic valves & controls  
Hydrostatic steering  
Integrated hydraulic circuits  
Power take-offs  
Power units  
Rotary actuators  
Sensors



## Pneumatics

### Key Markets

Aerospace  
Conveyor & material handling  
Factory automation  
Life science & medical  
Machine tools  
Packaging machinery  
Transportation & automotive

### Key Products

Air preparation  
Brass fittings & valves  
Manifolds  
Pneumatic accessories  
Pneumatic actuators & grippers  
Pneumatic valves & controls  
Quick disconnects  
Rotary actuators  
Rubber & thermoplastic hose & couplings  
Structural extrusions  
Thermoplastic tubing & fittings  
Vacuum generators, cups & sensors



## Process Control

### Key Markets

Alternative fuels  
Biopharmaceuticals  
Chemical & refining  
Food & beverage  
Marine & shipbuilding  
Medical & dental  
Microelectronics  
Nuclear Power  
Offshore oil exploration  
Oil & gas  
Pharmaceuticals  
Power generation  
Pulp & paper  
Steel  
Water/wastewater

### Key Products

Analytical Instruments  
Analytical sample conditioning products & systems  
Chemical injection fittings & valves  
Fluoropolymer chemical delivery fittings, valves & pumps  
High purity gas delivery fittings, valves, regulators & digital flow controllers  
Industrial mass flow meters/ controllers  
Permanent no-weld tube fittings  
Precision industrial regulators & flow controllers  
Process control double block & bleeds  
Process control fittings, valves, regulators & manifold valves



## Sealing & Shielding

### Key Markets

Aerospace  
Chemical processing  
Consumer  
Fluid power  
General industrial  
Information technology  
Life sciences  
Microelectronics  
Military  
Oil & gas  
Power generation  
Renewable energy  
Telecommunications  
Transportation

### Key Products

Dynamic seals  
Elastomeric o-rings  
Electro-medical instrument design & assembly  
EMI shielding  
Extruded & precision-cut, fabricated elastomeric seals  
High temperature metal seals  
Homogeneous & inserted elastomeric shapes  
Medical device fabrication & assembly  
Metal & plastic retained composite seals  
Shielded optical windows  
Silicone tubing & extrusions  
Thermal management  
Vibration dampening

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