

# M5 Series Servo System

Power Solutions

- ☐ Telecom Power
- ☐ Server Power
- ☐ Electric Power
- ☐ Medical Power
- ☐ Display Power
- ☐ LED Power
- ☐ Laser Power
- ☐ OA Power
- ☐ Flat Panel Power
- ☐ Bi-directional Inverters for Portable Power
- ☐ Solar & BESS & EV Charging Solution

Industry Automation

- ☒ Servo System
- ☐ Control System
- ☐ Elevator Controller
- ☐ Linear Motors
- ☐ IOT Solution
- ☐ Encoder
- ☐ Variable Frequency Drive
- ☐ Internal Gear Pump

New Energy Solutions

- ☐ Multiplexed EV Charging System(OBC & DC-DC)
- ☐ Power Electronic Unit(2-in-1, 3-in-1)
- ☐ E-Compressor
- ☐ TV EDU
- ☐ Motor Control Unit
- ☐ Construction Machinery Controller
- ☐ Intelligent Active Hydraulic Suspension (i-AHS)
- ☐ Railway A/C Controller
- ☐ Railway VFD
- ☐ Light Electric Vehicle Controller
- ☐ Thermal Mgmt. System

Home Appliance Control Solutions

- ☐ Residential A/C Controller
- ☐ Commercial A/C Controller
- ☐ Heat Pump Controller
- ☐ Vehicle A/C Controller
- ☐ Solar A/C Controller
- ☐ Mini Compressor Controller
- ☐ Refrigerator Controller
- ☐ Washer/Dryer Controller
- ☐ Residential Microwave
- ☐ Industrial Microwave
- ☐ Smart Bidet
- ☐ RF Thawing System

Precision Connection

- ☐ FFC
- ☐ FPC
- ☐ Coaxial Cable
- ☐ CCS
- ☐ Litz Wire
- ☐ Peek Wire

SHENZHEN MEGMEET ELECTRICAL CO., LTD.

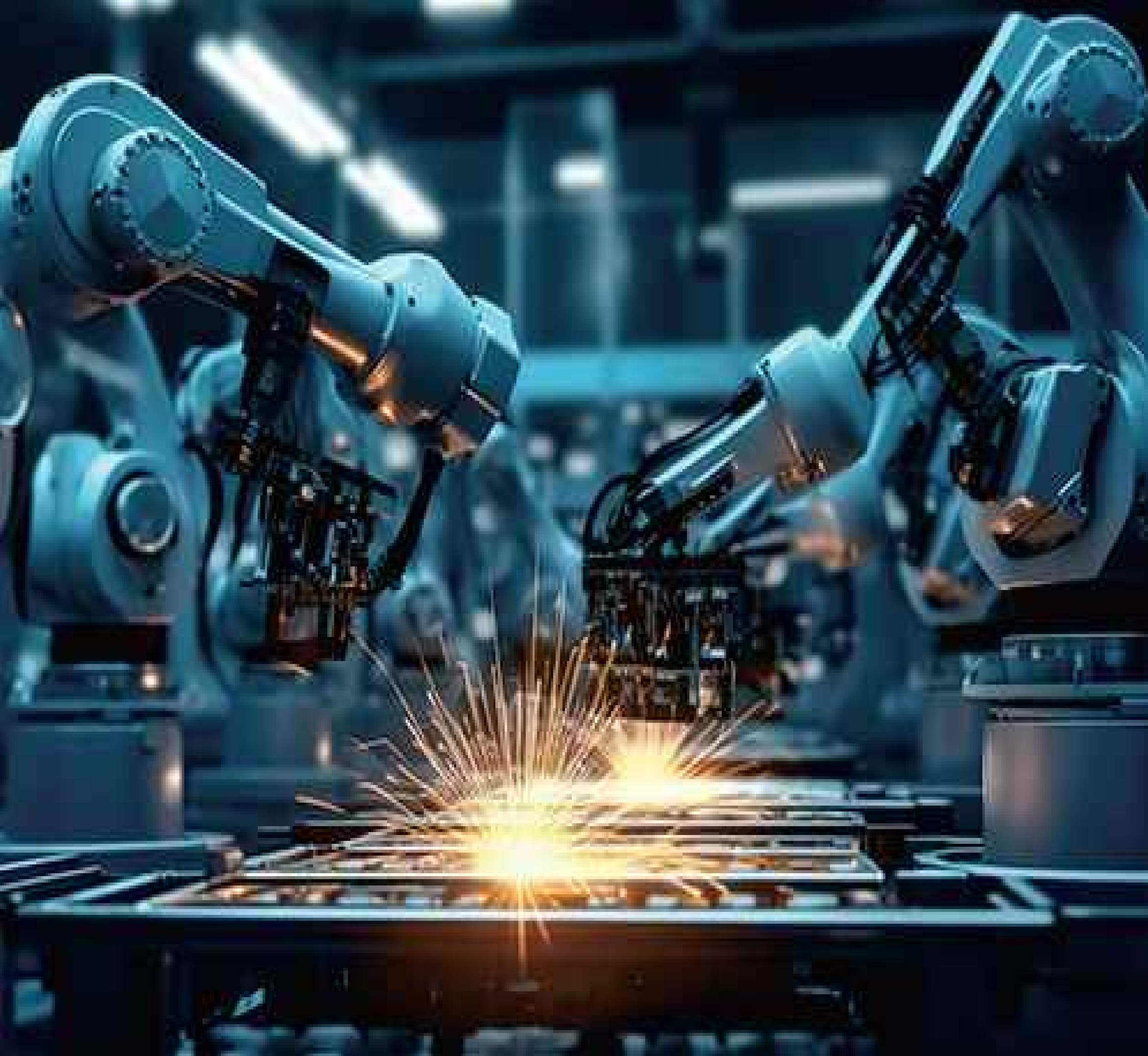
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Version: 202412  
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# Contents

01	About MEGMEET
03	Servo Drive Introduction
05	Important Function
06	Host Computer Software
07	System Overview
08	Servo Drive Model and Electrical Specifications
09	Servo Motor Model and System Configuration
11	Technical Data of Servo Motors
12	M5-P General Specifications
13	M5-N General Specifications
14	M5-N Communication Specifications
15	M5-P Wiring
19	M5-N Wiring
23	Cable Model
25	Servo Drive Dimensions
27	Servo Motor Dimensions
32	Industrial Automation Solutions




# ABOUT MEGMEET

MEGMEET is a comprehensive solution provider for hardware and software R&D, production, sales, and service in the field of electrical automation. With power electronics and automation control at its core, MEGMEET's main businesses include Power Solutions, Industrial Automation, New Energy Solutions, Intelligent Equipment, Home Appliance Control Solutions, and Precision Connection.


MEGMEET has established a robust R&D, manufacturing, marketing, and service platform, with over 7,500 employees worldwide. MEGMEET's global presence includes R&D Centers in China, Germany, and the United States; Manufacturing Centers in Thailand, India, and China; and Regional Offices across North America, Europe, and Asia.

MEGMEET is committed to creating a cleaner living environment for all human beings through more efficient energy utilization and improved manufacturing efficiency. MEGMEET aims to become the world leader in electrical automation and achieve the goal of MEGMEET EVERYWHERE.




2800+

R&D Staff




10

R&D Centers




8

R&D Manufacturing Bases



7500+

Total Employees



1800+

No. of Patents & IP Rights

# R&D CAPABILITY

## Sustainable R&D Investment

R&D Investment


R&D Employees

>2800




Percentage of Total Employees

36%



Percentage of Total Sales


>11%



Patents & Industry Standards

No. of Patents & IP Rights

1800+

 150+ new in 2023

National & International standards

23

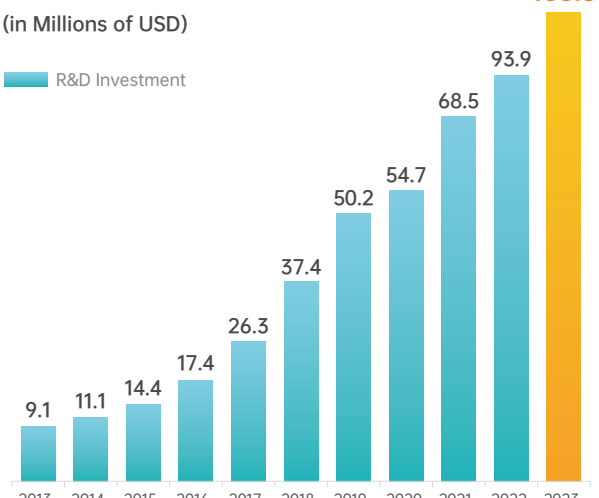
• 5 lead author

Industry Standards Drafted

27

• 16 lead author

R&D Investment (in Millions of USD)




Year	R&D Investment (Millions of USD)
2013	9.1
2014	11.1
2015	14.4
2016	17.4
2017	26.3
2018	37.4
2019	50.2
2020	54.7
2021	68.5
2022	93.9
2023	106.5

Percentage of Total Sales:

Year	Percentage of Total Sales
2013	13.77%
2014	12.13%
2015	11.93%
2016	10.98%
2017	11.81%
2018	10.52%
2019	9.42%
2020	10.90%
2021	11.09%
2022	11.55%
2023	11.41%

## Testing Capabilities & Management System



MEGMEET's testing capabilities and management system have been certified by CNAS, TUV, UL-WTDP, & UL-CTF. MEGMEET's test results are recognized globally.

P01 M5 Series Servo System

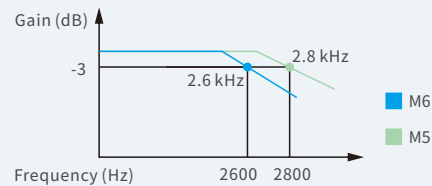
M5 Series Servo System P02

# Introduction

Megmeet's new-generation M5 series servo system is featured with high response, high precision and high synchronization, and equipped with advanced functions such as online inertia identification, gain auto-tuning, vibration suppression, and quadrant compensation. Together with the intelligent Megmeet host controller, M5 is able to meet market requirements for mechanical equipment by high precision, high stability, high efficiency and ease of use.

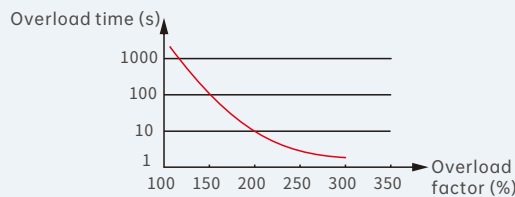
## High response

- Increase from 2.6 kHz to 2.8 kHz
- High current loop and speed loop refresh frequency
- Faster response to commands
- High rigidity



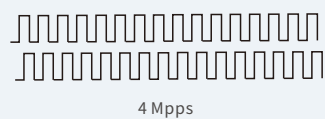
## High overload

Overload capacity up to 3 times



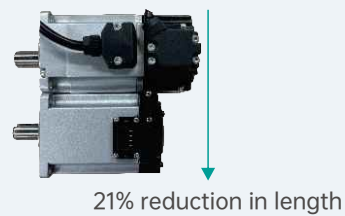
## High bandwidth

- Input and output pulse up to 4 Mpps
- Supports differential and open-collector input
- Three pulse modes: A/B orthogonal, direction + pulse and CW/CCW



## Optimized motor

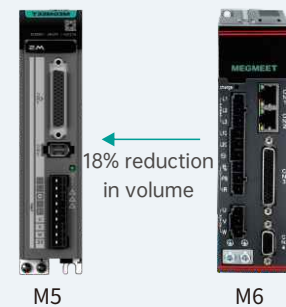
- Smaller size with the same power, lowering mechanical installation requirements
- IP67 as the standard configuration, enhancing protection
- Better shock resistance of encoders
- Motors with various speeds



Power (W)	Motor	Flange	Length	Length (with brake)
400	SPM-SC*0604M*K-L	60	88.8	118.2
	SPM-SC*0604M*K-M	60	112	152.5

## Increased power density of drive

- A solution with innovative design
- Smaller size, more compact structure
- Less installation space required in the electrical cabinet, facilitating installation and maintenance



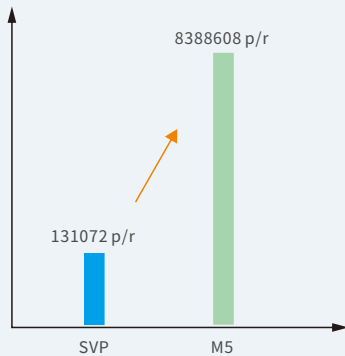
Power (W)	Drive	Dimensions (mm)	Volume (L)
400	M5	151*171*40	1.03
	M6	168.8*162*46	1.26

## High precision encoder

17-bit single-turn or 23-bit multi-turn photoelectric/magnetic absolute encoders as the standard configuration for the entire series

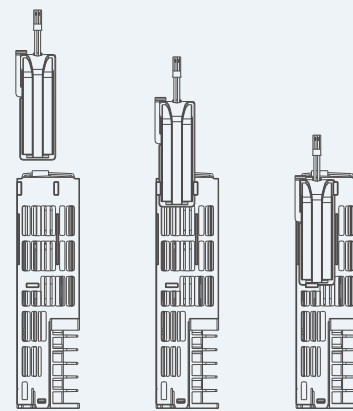
### 23-bit multi-turn absolute encoder

- High resolution, 8388608 p/r, 65536 turns of absolute positions in maximum
- The low-speed torque is more stable and the positioning is more accurate
- The motor still remains in its position after the servo unit is powered off



## Installation of absolute encoder battery

- Easier to install/replace the battery
- Beautiful, neat, and less interference





# Important Function

## Inertia identification

Both offline and online inertia identification can be performed. Through inertia identification, the load inertia ratio can be accurately obtained, which is helpful to complete the commissioning quickly and achieve the best control effect.

## Gain adjustment

- Automatic gain adjustment: By selecting the rigidity level, matching gain parameters are automatically generated to meet the requirements of rapidity and stability.
- Manual gain adjustment: Manually fine-tune the gain to optimize the control effect.
- Speed feedforward: The function is used in the position control mode to reduce position following errors.
- Torque feedforward: In the position control mode, it can reduce the position deviation during acceleration and deceleration; and in the speed control mode, it can reduce the speed deviation when the speed is fixed.
- Multiple gain switchover modes

## Torque disturbance observation

In a non-torque control mode, by detecting and estimating the external disturbance torque received by the system, the torque reference can be compensated to reduce the influence of external disturbance on the servo so as to reduce vibration.

## High-frequency mechanical resonance suppression

Automatically search for high-frequency mechanical resonance frequency points, and reduce the gain at a specific frequency through 4 sets of traps, which can suppress mechanical resonance.

## Low-frequency mechanical resonance suppression

For long-end mechanical loads, the low-frequency resonance suppression function can effectively reduce the end jitter caused by positioning completion or emergency stop.

## Friction compensation

For loads with high friction, such as drive shafts of belts, friction compensation can shorten positioning time and reduce machining errors caused by friction.

## Quadrant compensation

In the application of arc trajectory interpolation with more than 2 axes, quadrant compensation can reduce the arc distortion caused by friction non-linearity (the trajectory protrusion at the alternation of the four quadrants), and increase the accuracy of servo system control and the uniformity of motion.

## STO

Safe Torque Off function to avoid electric shock and mechanical injuries in case of device failure, without the need for an output contactor.

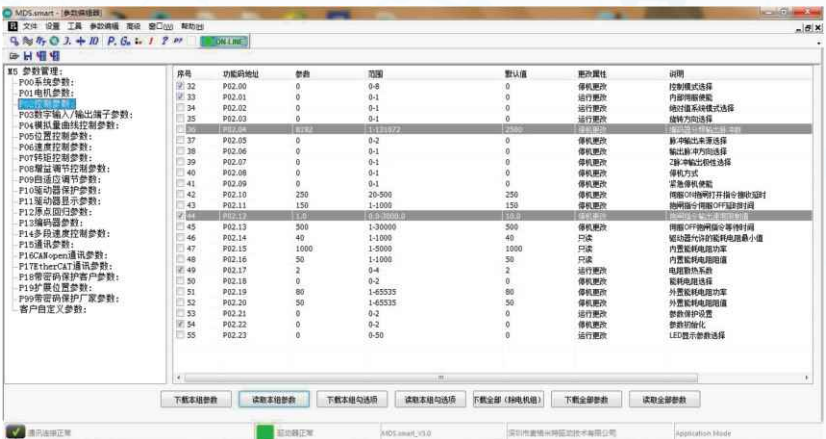
## Touch probe

Two high-speed touch probes.

## Motor cogging torque compensation

Reduce the torque ripple caused by the cogging effect of motor, thus improving the stability of servo system.

# Host Computer Software



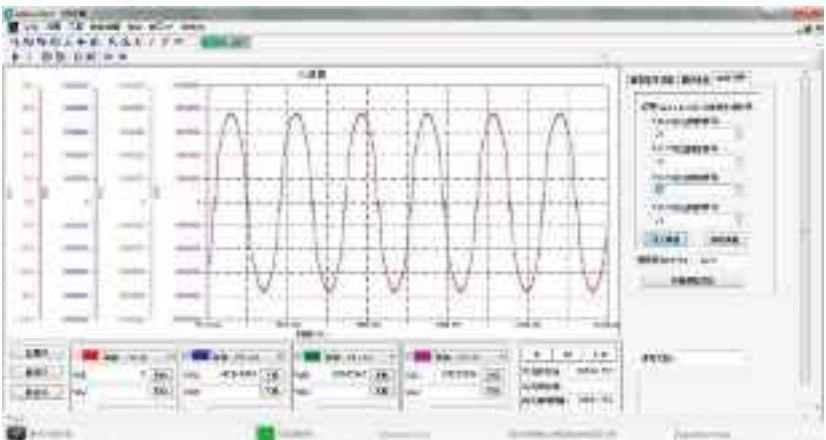
Parameter auto-tuning

Friendly HMI

Shared USB port for firmware upgrade and host computer communication

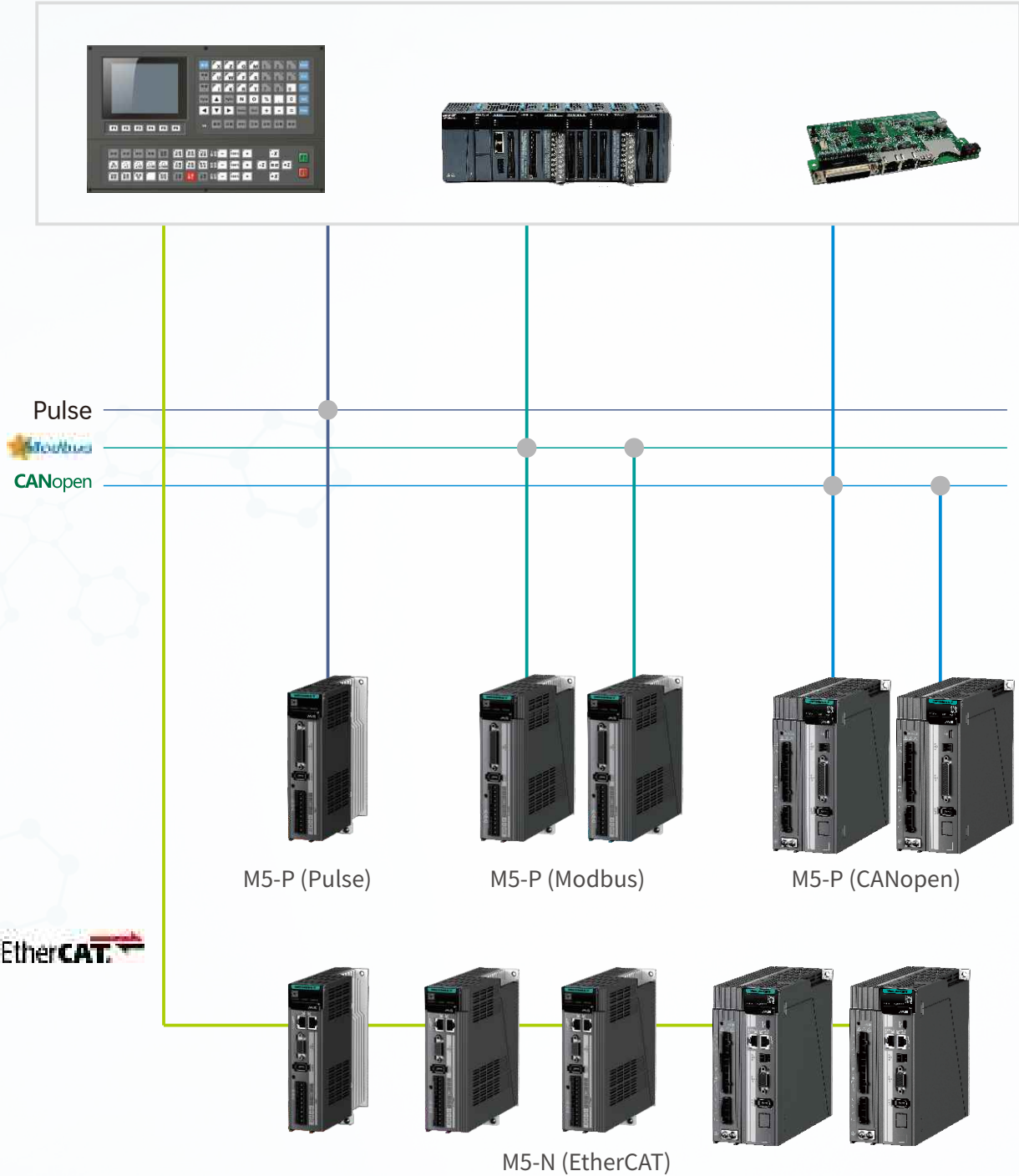
Centralized management: parameter upload & download and firmware upgrade of multiple drives

Innovative power supply, parameter output and fault check through USB  
Blind matching supported for Type-C



- Real-time online data monitoring with 32 bit \* 4-channel real-time oscilloscope display and sampling frequency up to 16 K
- Import and export of 30 s data

# System Overview



# Servo Drive Model

M5 - P S 5R5 A - XX  
1 2 3 4 5 6

1 Product series

M5 series servo

2 Drive type

P: Pulse type

N: EtherCAT

3 Voltage level

S: 220 V

T: 380 V

4 Rated current

220 V		380 V	
1R6: 1.6 A	7R6: 7.6 A	3R5: 3.5 A	8R4: 8.4 A
2R8: 2.8 A	012: 11.6 A	5R4: 5.4 A	012: 11.9 A
5R5: 5.5 A	016: 15.6 A		

5 Structural features

A: Standard version

B: Small size version

6 Software features

Blank: Standard version

CO: CANopen

# Servo Drive Electrical Specifications

Voltage class	220 V					
Model	M5-*S1R6A	M5-*S2R8A	M5-*S5R5A	M5-*S7R6A	M5-*S012A	M5-*S016A
Power rating	200 W	400 W	750 W	1 kW	1.5 kW	2 kW
SIZE	SIZE A		SIZE B		SIZE D	
Phase	Single-phase		Single/Three-phase		Three-phase	
Rated input current (A)	2.3	4.0	7.6/3.7	9.6/5.1	8.0	11.0
Rated output current (A)	1.6	2.8	5.5	7.6	11.6	15.6
Max. output current (A)	5.8	9.3	16.9	20.0	30.0	40.0
Main circuit power	200 to 240V, -10% to +10%, 50/60 Hz					
Control circuit power	/				Single-phase 200 to 240 V, -10% to +10%, 50/60Hz	
Braking resistor	No built-in braking resistor		Built-in braking resistor		Built-in braking resistor	

Voltage class	380 V			
Model	M5-*T3R5A	M5-*T5R4A	M5-*T8R4A	M5-*T012A
Power rating	1 kW	1.5 kW	2 kW	3 kW
SIZE	SIZE D			
Phase	Three-phase			
Rated input current (A)	2.4	3.6	5.5	8.0
Rated output current (A)	3.5	5.4	8.4	11.9
Max. output current (A)	11	14	22	28
Main circuit power	380 to 440 V, -10% to +10%, 50/60 Hz			
Control circuit power	Single-phase 380 to 440 V, -10% to +10%, 50/60 Hz			
Braking resistor	Built-in braking resistor			



# Servo Motor Model

SPM – S C 8 06 02 M A K – ST1 – X  
1 2 3 4 5 6 7 8 9 10 11

1 Product series

SPM series

2 Voltage class

S: 220 V

T: 380 V

3 Rated speed

A: 1000 rpm

D: 1500 rpm

E: 2000 rpm

B: 2500 rpm

C: 3000 rpm

F: 4000 rpm

G: 5000 rpm

4 Encoder type

6: 23-bit multi-turn  
absolute optical encoder

8: 17-bit multi-turn  
absolute magnetic encoder

5 Motor frame

04: 40

06: 60

08: 80

13: 130

18: 180

6 Power

Below 100 W:  
one number and one letter  
A: Power = Number \* 10  
Example: 5A = 5 \* 10 = 50 W

100 W to 9.9 kW:  
two numbers  
Power = Number \* 100  
Example: 02 = 2 \* 100 = 200 W

7 Inertia

M: Medium inertia

8 Whether with brake

A: No

B: Yes

9 Definition

M: With keyway without oil seal

O: Round shaft with oil seal

K: With keyway and oil seal

D: D type shaft with oil seal

10 Motor type

ST1: Straight plug  
standard type

ST4: Straight plug  
economical type

Blank: Lead wire standard type

11 Motor  
design number

Rated speed (rpm)	Max. speed (rpm)	Power (W)	Motor model	Drive model
Straight plug economical motors 60/80 frame Medium inertia Vn = 3000 rpm Vmax = 5000 rpm				
3000	5000	400	SPM-SC*0604M*K-ST4-L	M5-*S2R8A
3000	5000	750	SPM-SC*0807M*K-ST4-L	M5-*S5R5A
Aviation plug standard motors 130 frame Medium inertia Vn = 1500 rpm Vmax = 3000 rpm				
1500	3000	850	SPM-SD*1308M*K-W	M5-*S7R6A
1500	3000	1300	SPM-SD*1313M*K-W	M5-*S012A
Aviation plug standard motors 130 frame Medium inertia Vn = 2000 rpm Vmax = 4000 rpm				
2000	4000	1100	SPM-SE*1311M*K-W	M5-*S7R6A
2000	4000	1700	SPM-SE*1317M*K-W	M5-*S016A
Aviation plug standard motors 130 frame Medium inertia Vn = 3000 rpm Vmax = 5000 rpm				
3000	5000	1700	SPM-SC*1317M*K-W	M5-*S012A
3000	5000	2600	SPM-SC*1326M*K-W	M5-*S016A

## 380 V servo motor configuration

Rated speed (rpm)	Max. speed (rpm)	Power (W)	Motor model	Drive model
Aviation plug standard motors 130 frame Medium inertia Vn = 1500 rpm Vmax = 3000 rpm				
1500	3000	850	SPM-TD*1308M*K-W	M5-*T5R4A
1500	3000	1300	SPM-TD*1313M*K-W	M5-*T8R4A
1500	3000	1800	SPM-TD*1318M*K-W	M5-*T012A
1500	3000	2200	SPM-TD*1322M*K-W	M5-*T012A
Aviation plug standard motors 130 frame Medium inertia Vn=2000rpm Vmax=4000rpm				
2000	4000	1100	SPM-TE*1311M*K-W	M5-*T5R4A
2000	4000	1700	SPM-TE*1317M*K-W	M5-*T8R4A
2000	4000	2400	SPM-TE*1324M*K-W	M5-*T012A
2000	4000	3000	SPM-TE*1330M*K-W	M5-*T012A
Aviation plug standard motors 130 frame Medium inertia Vn=3000rpm Vmax=5000rpm				
3000	5000	1700	SPM-TC*1317M*K-W	M5-*T8R4A
3000	5000	2600	SPM-TC*1326M*K-W	M5-*T012A
3000	5000	3600	SPM-TC*1336M*K-W	M5-*T012A
Aviation plug standard motors 180 frame Medium inertia Vn=1500rpm Vmax=3000rpm				
1500	3000	2900	SPM-TD*1829M*K-W	M5-*T012A

# System Configuration Table

## 220 V servo motor configuration

Rated speed (rpm)	Max. speed (rpm)	Power (W)	Motor model	Drive model
AMP plug standard motors 40/60/80 frame Medium inertia Vn = 3000 rpm Vmax = 6000/5000 rpm				
3000	6000	50	SPM-SC*045AM*K-L	M5-*S1R6A
3000	6000	100	SPM-SC*0401M*K-L	M5-*S1R6A
3000	6000	200	SPM-SC*0602M*K-L	M5-*S1R6A
3000	5000	400	SPM-SC*0604M*K-L	M5-*S2R8A
3000	5000	750	SPM-SC*0807M*K-L	M5-*S5R5A
3000	5000	1000	SPM-SC*0810M*K-L	M5-*S7R6A
Straight plug standard motors 40/60/80 frame Medium inertia Vn = 3000 rpm Vmax = 6000/5000 rpm				
3000	6000	50	SPM-SC*045AM*K-ST1-L	M5-*S1R6A
3000	6000	100	SPM-SC*0401M*K-ST1-L	M5-*S1R6A
3000	6500	200	SPM-SC*0602M*K-ST1-L	M5-*S1R6A
3000	5000	400	SPM-SC*0604M*K-ST1-L	M5-*S2R8A
3000	5000	750	SPM-SC*0807M*K-ST1-L	M5-*S5R5A
3000	5000	1000	SPM-SC*0810M*K-ST1-L	M5-*S7R6A

# Technical Data of Servo Motors

Motor model	Rated voltage (V)	Rated power (W)	Rated speed (rpm)	Max. speed (rpm)	Rated torque (N·m)	Peak torque (N·m)	Rated current (A)	Peak current (A)	Rotor inertia (10 <sup>-4</sup> kg·m <sup>2</sup> )
AMP plug standard motors 40/60/80 frame Medium inertia Vn = 3000 rpm Vmax = 6000/5000 rpm									
SPM-SC*045AM*K-L	220	50	3000	6000	0.16	0.48	0.93	2.88	0.036(0.046)
SPM-SC*0401M*K-L	220	100	3000	6000	0.32	1.11	0.92	3.36	0.062(0.072)
SPM-SC*0602M*K-L	220	200	3000	6000	0.64	2.23	1.5	5.4	0.28(0.3)
SPM-SC*0604M*K-L	220	400	3000	5000	1.27	3.81	2.1	6.5	0.56(0.58)
SPM-SC*0807M*K-L	220	750	3000	5000	2.39	7.17	4.1	13.4	1.5(1.65)
SPM-SC*0810M*K-L	220	1000	3000	5000	3.19	9.56	5.7	17.7	2(2.15)
Straight plug standard motors 40/60/80 frame Medium inertia Vn = 3000 rpm Vmax = 6000/5000 rpm									
SPM-SC*045AM*K-ST1-L	220	50	3000	6000	0.16	0.48	0.93	2.88	0.036(0.046)
SPM-SC*0401M*K-ST1-L	220	100	3000	6000	0.32	1.11	0.92	3.36	0.062(0.072)
SPM-SC*0602M*K-ST1-L	220	200	3000	6000	0.64	2.23	1.5	5.4	0.28(0.3)
SPM-SC*0604M*K-ST1-L	220	400	3000	5000	1.27	3.81	2.1	6.5	0.56(0.58)
SPM-SC*0807M*K-ST1-L	220	750	3000	5000	2.39	7.17	4.1	13.4	1.5(1.65)
SPM-SC*0810M*K-ST1-L	220	1000	3000	5000	3.19	9.56	5.7	17.7	2(2.15)
Straight plug economical motors 60/80 frame Medium inertia Vn = 3000 rpm Vmax = 5000 rpm									
SPM-SC*0604M*K-ST4-L	220	400	3000	5000	1.27	3.81	2.1	6.5	0.56(0.58)
SPM-SC*0807M*K-ST4-L	220	750	3000	5000	2.39	7.17	4.1	13.4	1.5(1.65)
Aviation plug standard motors 130 frame Medium inertia Vn = 1500 rpm Vmax = 3000 rpm									
SPM-SD*1308M*K-W	220	850	1500	3000	5.39	16.17	6.9	20.7	10.9(12.3)
SPM-SD*1313M*K-W	220	1300	1500	3000	8.34	25.2	10.7	32.1	16.9(18.3)
SPM-TD*1308M*K-W	380	850	1500	3000	5.39	16.17	4	12	10.9(12.3)
SPM-TD*1313M*K-W	380	1300	1500	3000	8.34	25.2	6	18	16.9(18.3)
SPM-TD*1318M*K-W	380	1800	1500	3000	11.5	34.5	8.5	34.5	21.4(22.6)
SPM-TD*1322M*K-W	380	2200	1500	3000	14.3	40	10.5	29.4	27.1(28.4)
Aviation plug standard motors 130 frame Medium inertia Vn = 2000 rpm Vmax = 4000 rpm									
SPM-SE*1311M*K-W	220	1100	2000	4000	5.39	16.17	7.5	22.5	10.9(12.3)
SPM-SE*1317M*K-W	220	1700	2000	4000	8.34	25.2	12	36	16.9(18.3)
SPM-TE*1311M*K-W	380	1100	2000	4000	5.39	16.17	4.5	13.5	10.9(12.3)
SPM-TE*1317M*K-W	380	1700	2000	4000	8.34	25.2	6.6	19.8	16.9(18.3)
SPM-TE*1324M*K-W	380	2400	2000	4000	11.5	34.5	9.5	28.5	21.4(22.6)
SPM-TE*1330M*K-W	380	3000	2000	4000	14.3	40	11.5	32.2	27.1(28.4)
Aviation plug standard motors 130 frame Medium inertia Vn = 3000 rpm Vmax = 5000 rpm									
SPM-SC*1317M*K-W	220	1700	3000	5000	5.399	10.78	9.5	19	10.9(12.3)
SPM-SC*1326M*K-W	220	2600	3000	5000	8.34	16.7	14.5	29	16.9(18.3)
SPM-TC*1317M*K-W	380	1700	3000	5000	5.399	10.78	6	12	10.9(12.3)
SPM-TC*1326M*K-W	380	2600	3000	5000	8.34	16.7	9.5	19	16.9(18.3)
SPM-TC*1336M*K-W	380	3600	3000	5000	11.5	23	12	24	21.4(22.6)
Aviation plug standard motors 180 frame Medium inertia Vn=1500rpm Vmax=3000rpm									
SPM-TD*1829M*K-W	380	2900	1500	3000	18.6	55.8	11.9	35.7	63.5(69.5)

Note: The parameters in "()" belong to motors with brakes.

# M5-P General Specifications

Basic specifications	
Main circuit power supply	200 to 240 V, -10% to +10%, 50/60 Hz or 380 to 440 V, -10% to +10%, 50/60 Hz
Control mode	IGBT, PWM control, and sine wave current drive mode
Encoder	Absolute encoder
Interface	
Key	5 keys
LED display	Five 8-segment LEDs
Power indicator	CHARGE indicator
IO	
DI (various functions defined by parameters)	8 general inputs, optocoupler isolation, NPN and PNP inputs available Input voltage range 20 to 30 V, input impedance 3.9 K
DO (various functions defined by parameters)	5 general outputs, optocoupler isolation, NPN and PNP outputs available Maximum operating voltage 30 V, maximum current 100 mA
Communication	
RS485	Modbus communication protocol
USB	Connect the computer and the servo drive for commissioning and relevant tuning
General function	
Auto-adjustment	The host computer issues an action command to run the motor, during which the load moment of inertia ratio is estimated in real time and the rigidity level is automatically set
Switchover of multiple control modes	Position mode; Speed mode; Torque mode; Position/Speed mode switchover; Speed/Torque mode switchover; Position/Torque mode switchover
Pulse frequency division	Arbitrary frequency division
Protection function	Overvoltage, undervoltage, overcurrent, overspeed, stall, overheat, overload, encoder abnormality, input phase loss, and excessive position deviation
High-frequency vibration suppression	4 sets of traps, suppressing the vibration from 100 to 2000 Hz
End vibration suppression	2 sets of filters, suppressing the end low-frequency vibration from 1 Hz to 100 Hz
Homing mode	Multiple homing modes
Reverse clearance compensation	Used to improve the response delay that occurs when the traveling direction of the machine is reversed
Mechanical analyzer	Used to analyze frequency features of the mechanical system through the host computer software
Inertia identification	Offline and online system inertia identification
Torque observer	Load torque observation and compensation
Friction compensation	System friction compensation
Touch probe	Two touch probes
Motor cogging torque compensation	Supported



# M5-N General Specifications

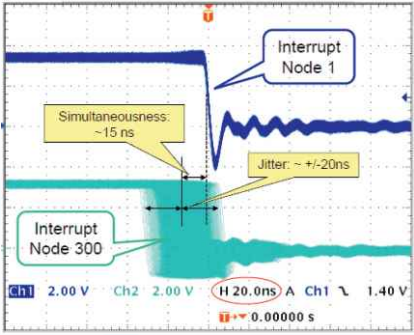
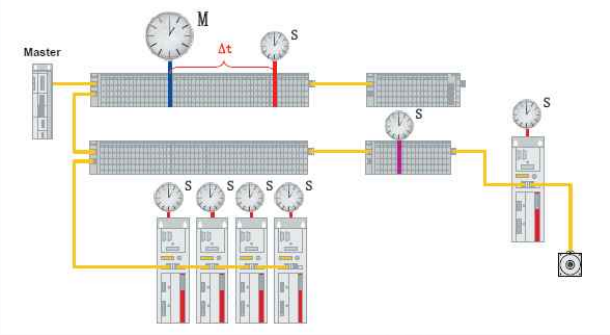
Basic specifications	
Main circuit power supply	200 to 240 V, -10% to +10%, 50/60 Hz or 380 to 440 V, -10% to +10%, 50/60 Hz
Control mode	IGBT, PWM control, and sine wave current drive mode
Encoder	Absolute encoder
Interface	
Key	5 keys
LED display	Five 8-segment LEDs
Power indicator	CHARGE indicator
STO safety function	General safety STO function, optional
IO	
DI (various functions defined by parameters)	5 general inputs, optocoupler isolation, NPN and PNP inputs available Input voltage range 20 to 30 V, input impedance 3.9 K
DO (various functions defined by parameters)	3 general outputs, optocoupler isolation, NPN and PNP outputs available Maximum operating voltage 30 V, maximum current 100 mA
Communication	
EtherCAT	CoE and SoE communication protocols, in compliance with CiA402 profile
USB	Connect the computer and the servo drive for commissioning and relevant tuning
General function	
Auto-adjustment	The host computer issues an action command to run the motor, during which the load moment of inertia ratio is estimated in real time and the rigidity level is automatically set
Switchover of multiple control modes	Position mode; Speed mode; Torque mode; Position/Speed mode switchover; Speed/Torque mode switchover; Position/Torque mode switchover; EtherCAT mode
Protection function	Overvoltage, undervoltage, overcurrent, overspeed, stall, overheat, overload, encoder abnormality, input phase loss, and excessive position deviation
High-frequency vibration suppression	4 sets of traps, suppressing the vibration from 100 to 2000 Hz
End vibration suppression	2 sets of filters, suppressing the end low-frequency vibration from 1 Hz to 100 Hz
Homing mode	Multiple homing modes
Reverse clearance compensation	Used to improve the response delay that occurs when the traveling direction of the machine is reversed
Mechanical analyzer	Used to analyze frequency features of the mechanical system through the host computer software
Inertia identification	Offline and online system inertia identification
Torque observer	Load torque observation and compensation
Friction compensation	System friction compensation
Touch probe function	Two touch probes
Motor cogging torque compensation	Supported

# M5-N Communication Specifications

Communication standard	
IEC 61158 Type12, IEC 61800-7 CiA402 Drive Profile (CoE)	
Physical layer	
Transmission protocol	100 BASE-TX (IEEE 802.3)
Transmission distance	Less than 100 m between two nodes
Interface	CN3 (RJ45): EtherCAT Signal IN CN4 (RJ45): EtherCAT Signal OUT
Cable	Category 5 twisted pair
Application layer	
SDO	SDO request, SDO response
PDO	Mutable PDO mapping
CiA402 Drive Profile	Profile Position Mode
	Profile Velocity Mode
	Profile Torque Mode
	Homing Mode
	Cyclic Synchronous Position Mode
	Cyclic Synchronous Velocity Mode
Sync mode	Cyclic Synchronous Torque Mode
Sync mode	
Distributed Clock (DC) mode	

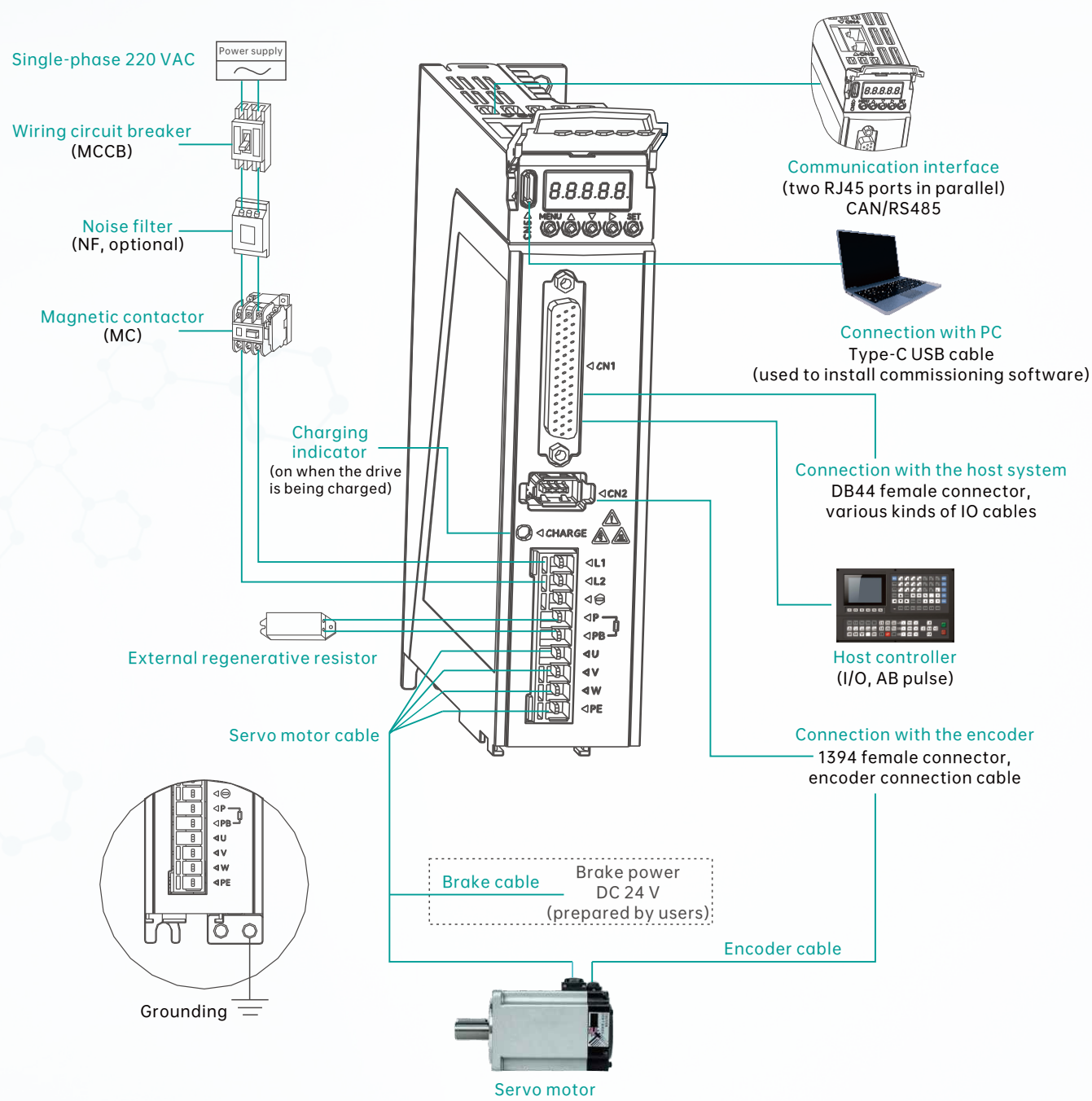
# Network Synchronization

- The EtherCAT network selects the first slave clock as the reference clock, and the clocks of all other devices (including master and slave) are synchronized with this reference clock.
- Through the synchronization signal (SYNC), all EtherCAT devices can use the same system clock to control the synchronous task execution of each device, and realize the synchronization of local tasks of each device with the reference clock.
- The system can achieve a jitter of 20 ns and a synchronization error of 15 ns, even though 300 nodes are between two devices with the cable length up to 120 m.

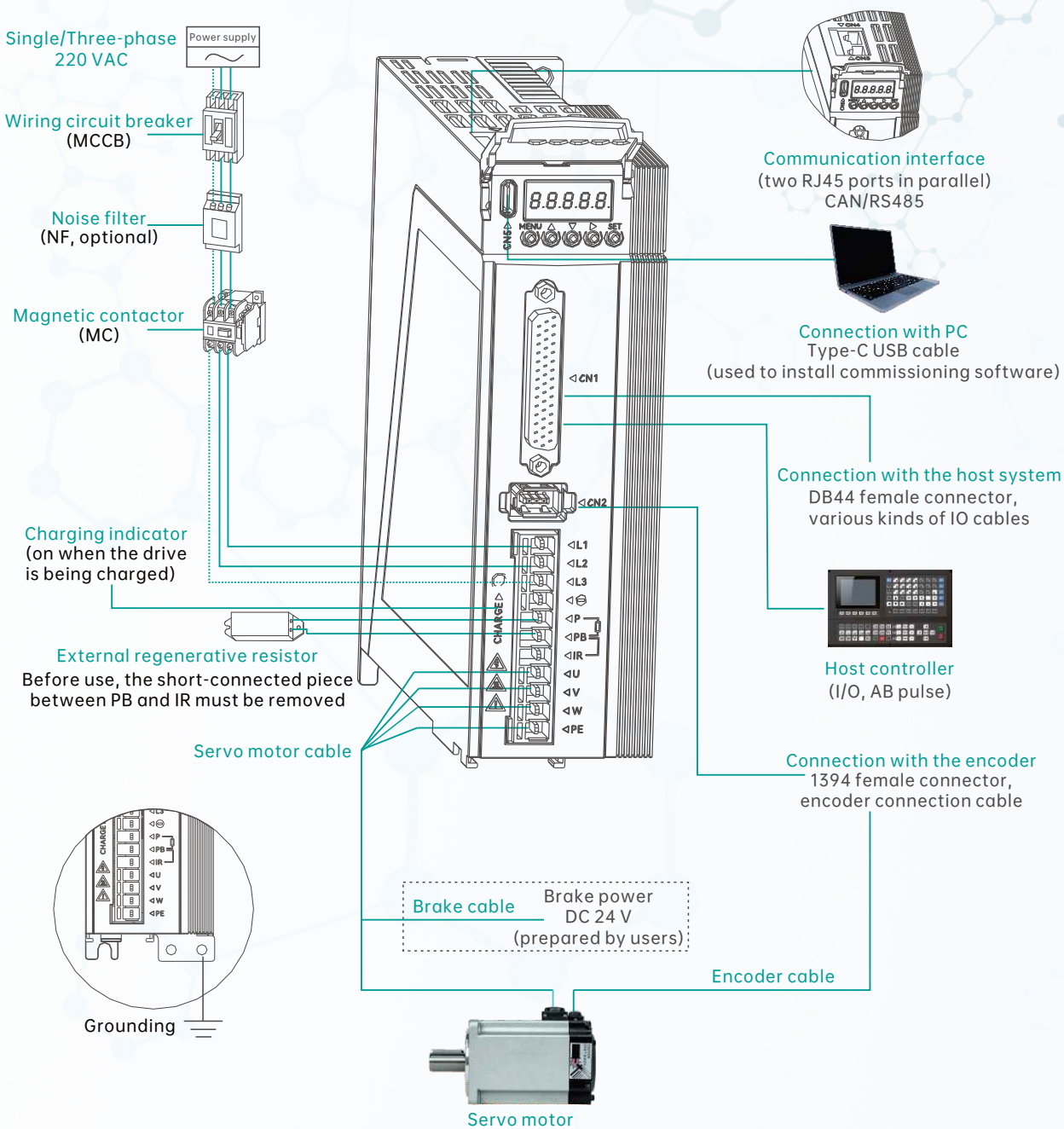


# M5-P Drive Wiring

## ■ SIZE A models connected to peripheral devices



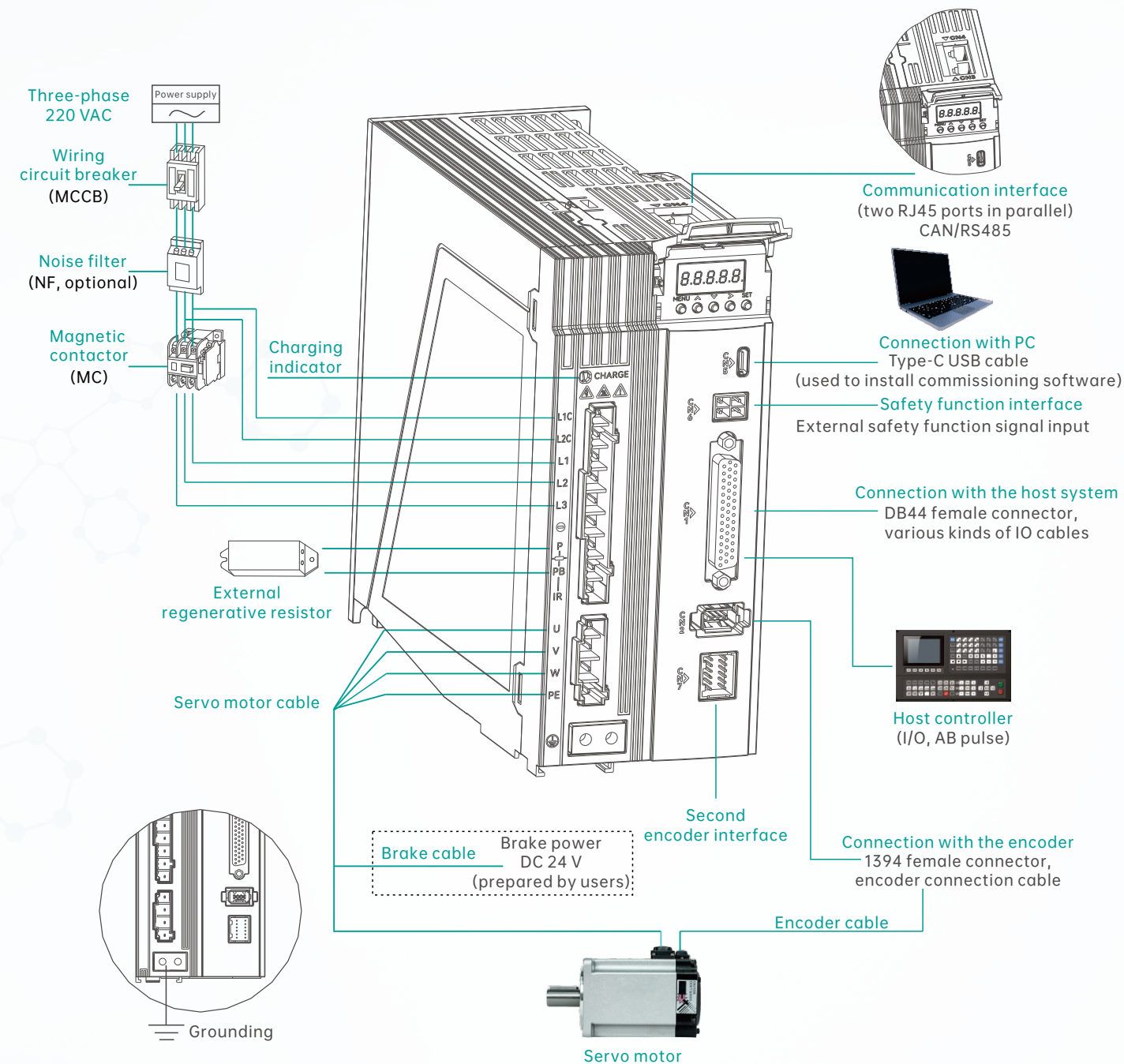
## ■ SIZE B models connected to peripheral devices



Note: This figure shows the wiring with single/three-phase 220 VAC power supply.

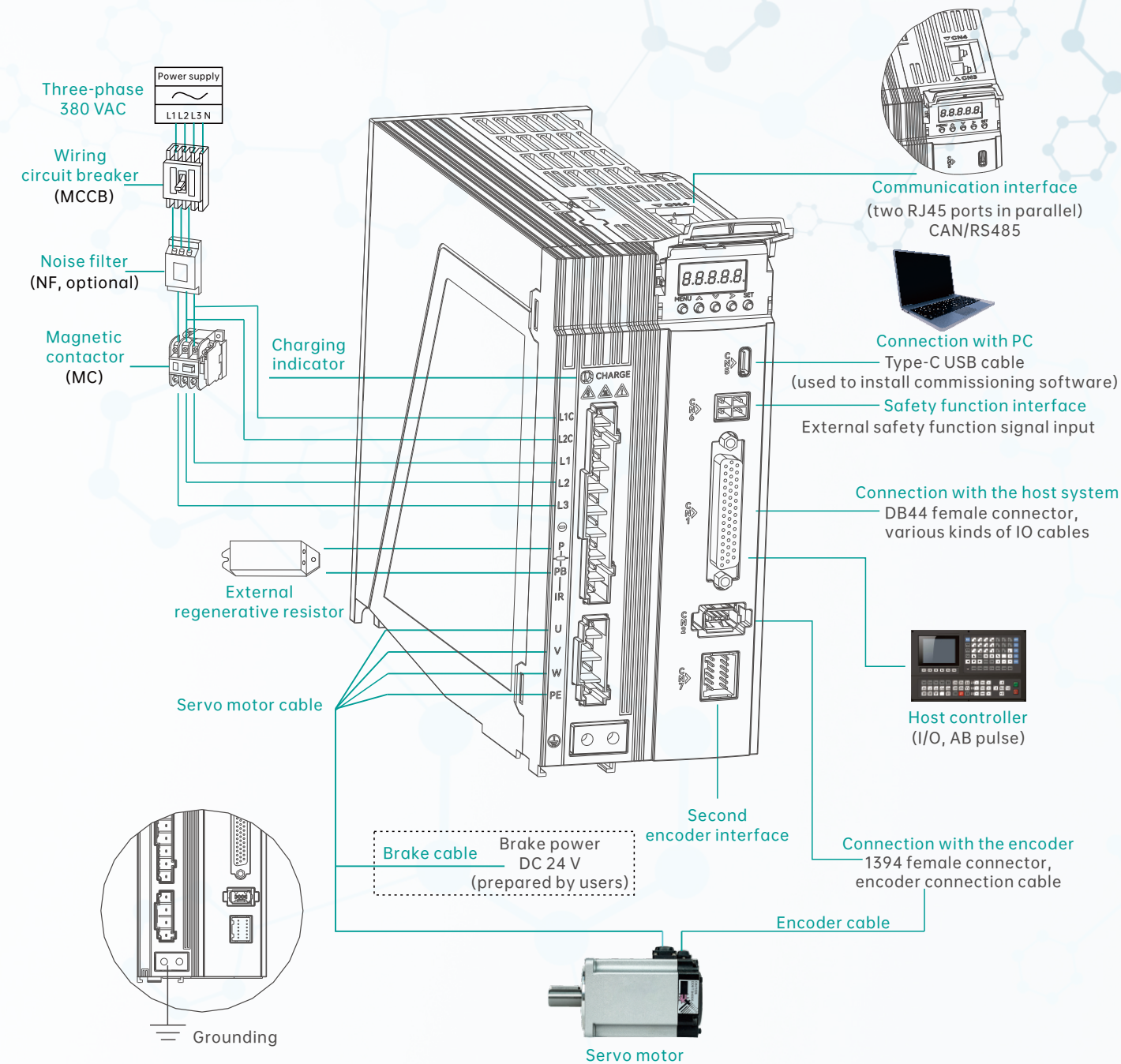


■ SIZE D models connected to peripheral devices



Note: This figure shows the wiring with three-phase 220 VAC power supply.

■ SIZE D models connected to peripheral devices

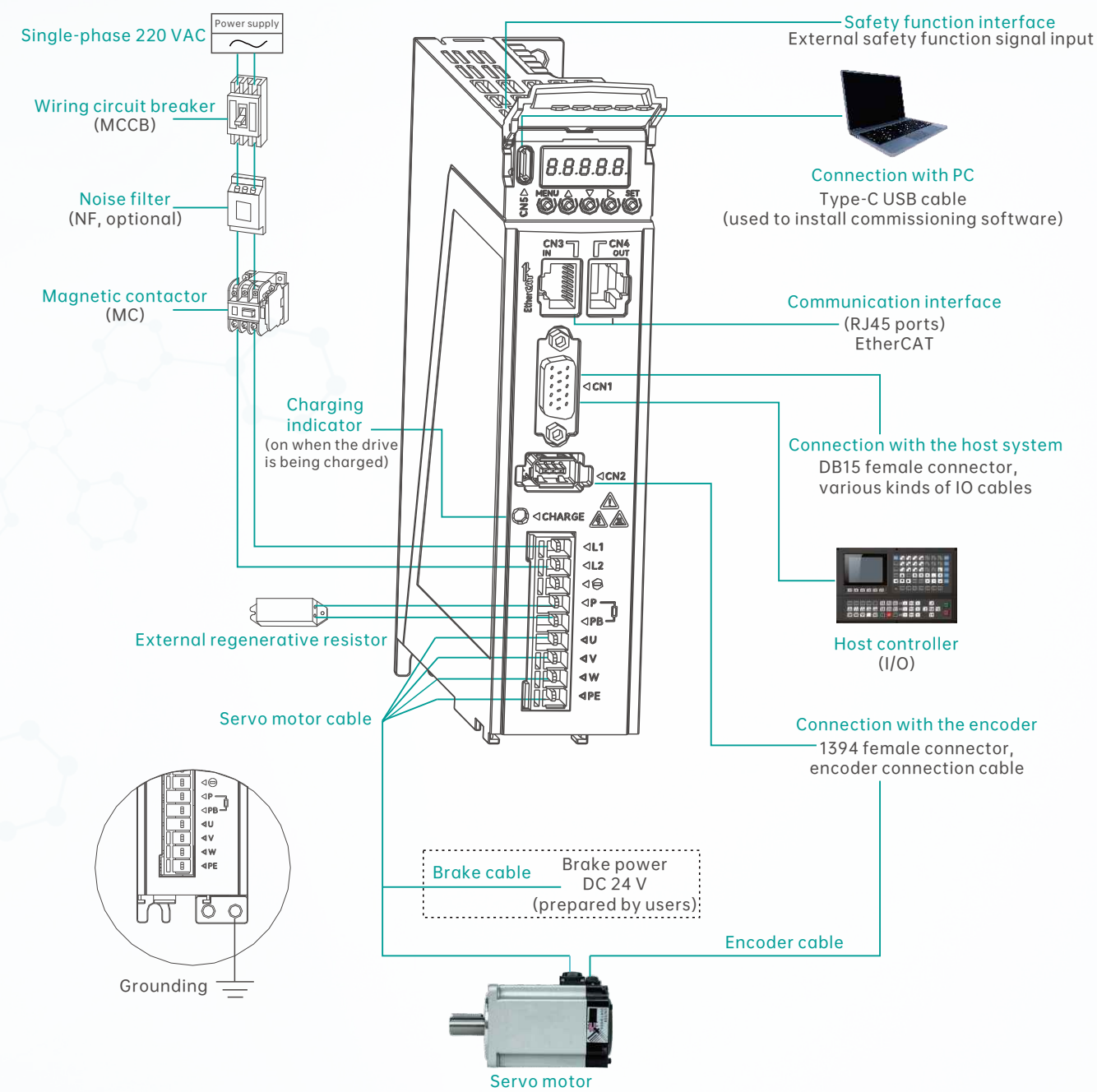


Note: This figure shows the wiring with three-phase 380 VAC power supply.

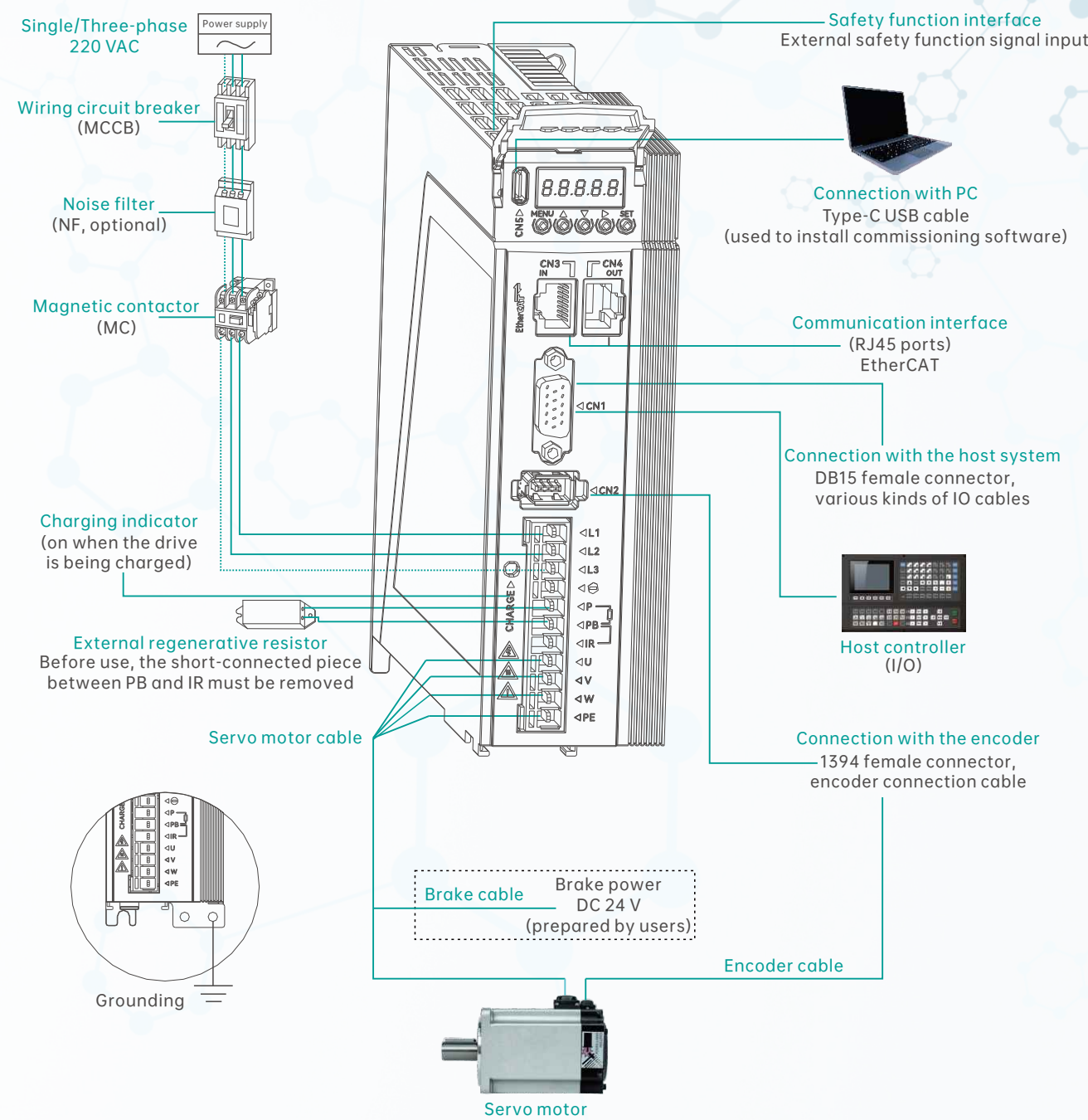


# M5-N Drive Wiring

## SIZE A models connected to peripheral devices



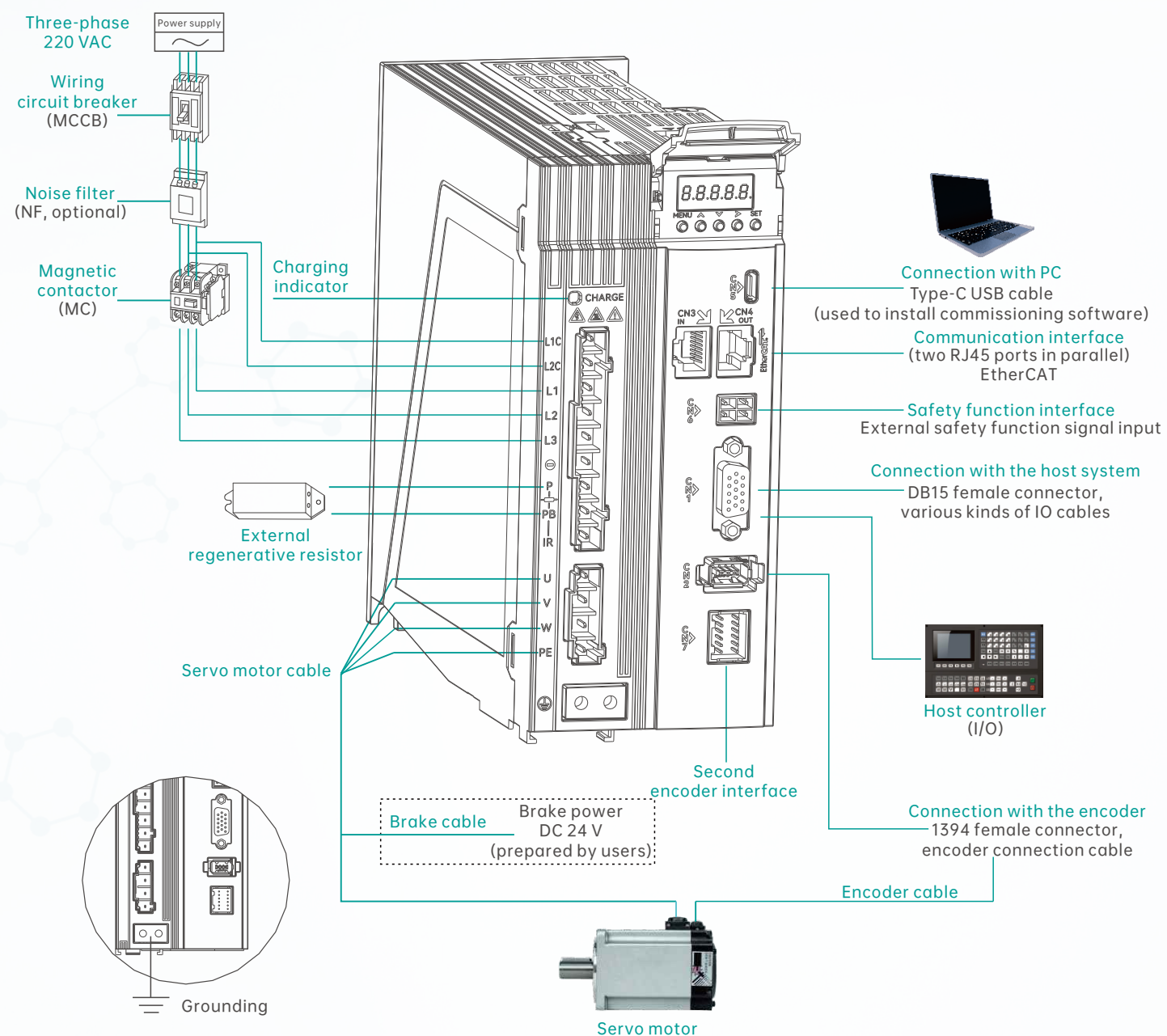
## SIZE B models connected to peripheral devices



Note: This figure shows the wiring with single/three-phase 220 VAC power supply.

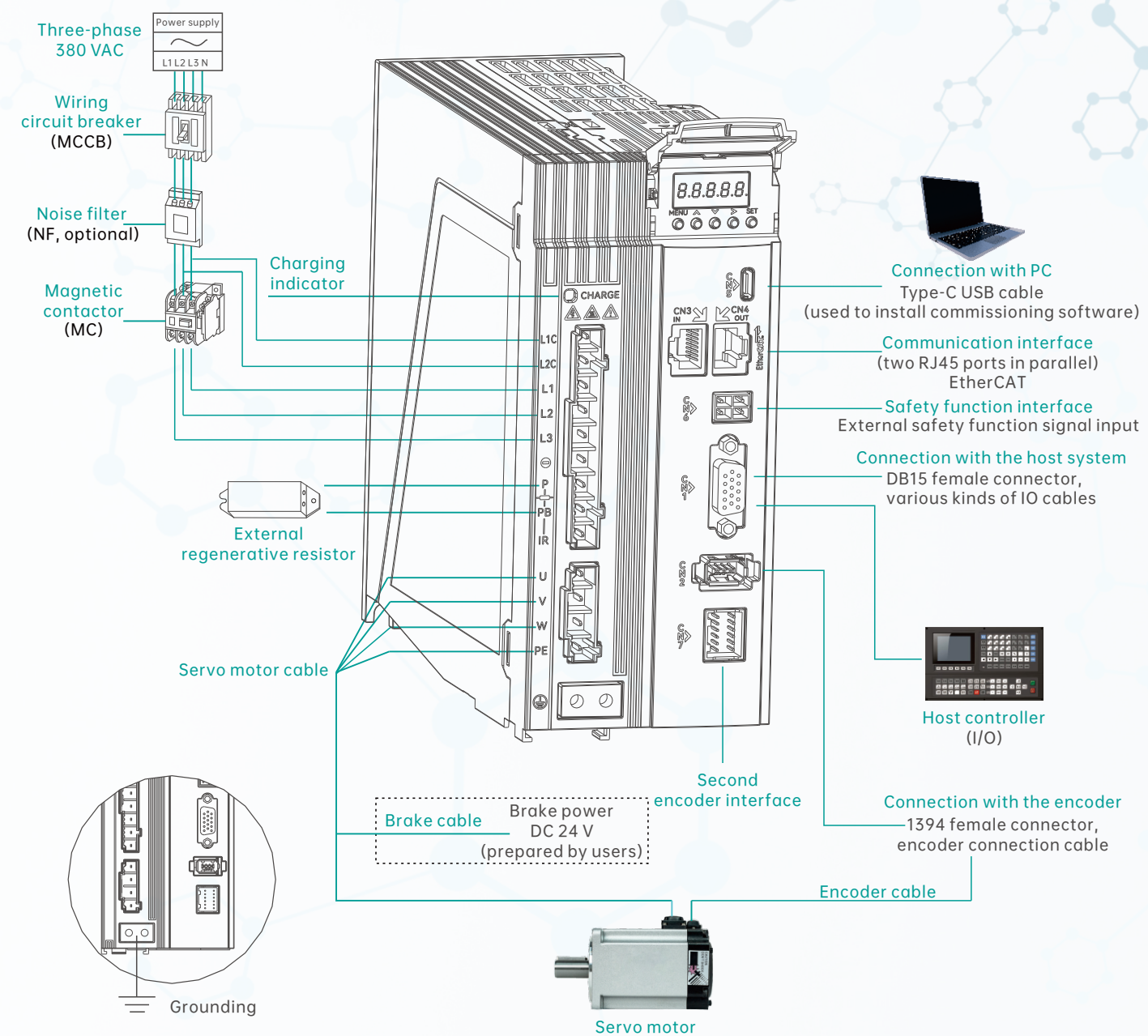


## ■ SIZE D models connected to peripheral devices



Note: This figure shows the wiring with three-phase 220 VAC power supply.

## ■ SIZE D models connected to peripheral devices



Note: This figure shows the wiring with three-phase 380 VAC power supply.

# Cable Model

## Power cable model

SPL – MC04 – M5 – XX – X  
1 2 3 4 5

### 1 Product series

SPL series

### 2 Cable type

MA04: L series AMP plug motor power cable,  
compatible with 40&60&80 frames, cross sectional area 0.75 mm<sup>2</sup>  
MA05: L series straight plug motor power cable,  
compatible with 40&60&80 frames, cross sectional area 0.75 mm<sup>2</sup>  
MC04: W series aviation plug motor power cable,  
compatible with 130 frame, cross sectional area 1.5 mm<sup>2</sup>  
MD04: W series aviation plug motor power cable,  
compatible with 180 frame, cross sectional area 1.5 mm<sup>2</sup>

### 3 Applicable drive

M5: M5 series

### 4 Cable length

03: 3 m  
10: 10 m  
.....

### 5 Flexible cable or not

Blank: Normal cable  
R2: 10 million times flexible cable

## Encoder cable model

SPL – E 0 A – M5 – XX – X  
1 2 3 4 5 6 7

### 1 Product series

SPL series

### 2 Cable type

E: Encoder cable

### 3 Encoder type

0: Absolute encoder

### 4 Plug type

1: AMP plug  
(with battery case)  
5: AMP plug  
(without battery case)  
3: Straight plug  
(with battery case)  
4: Straight plug  
(without battery case)  
A: Aviation plug  
(with battery case)  
B: Aviation plug  
(without battery case)

### 5 Applicable drive

M5: M5 series

### 6 Cable length

03: 3 m  
10: 10 m  
.....

### 7 Flexible cable or not

Blank: Normal cable  
R2: 10 million times flexible cable

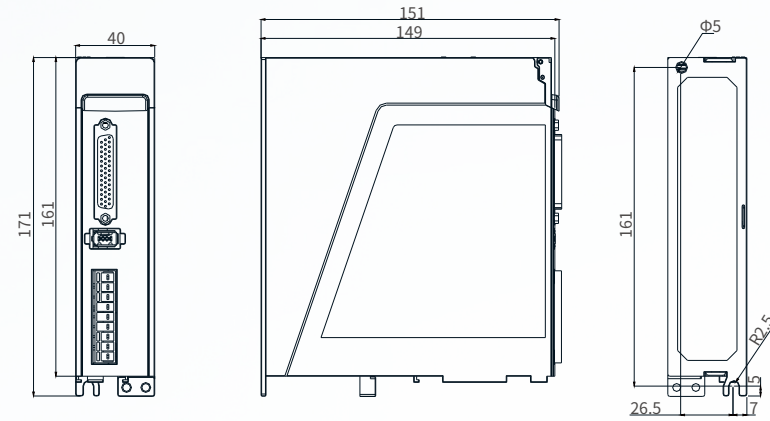
## Combination of motors and cables

Motor model	Power cable (without brake)	Power cable (with brake)	Encoder cable (with battery case)	Encoder cable (without battery case)
AMP plug standard motors 40/60/80 frame Medium inertia Vn = 3000 rpm Vmax = 6000/5000 rpm				
SPM-SC*045AM*K-L	SPL-MA04-M5-XX	SPL-BMA04-M5-XX	SPL-E01-M5-XX	SPL-E05-M5-XX
SPM-SC*0401M*K-L	SPL-MA04-M5-XX	SPL-BMA04-M5-XX	SPL-E01-M5-XX	SPL-E05-M5-XX
SPM-SC*0602M*K-L	SPL-MA04-M5-XX	SPL-BMA04-M5-XX	SPL-E01-M5-XX	SPL-E05-M5-XX
SPM-SC*0604M*K-L	SPL-MA04-M5-XX	SPL-BMA04-M5-XX	SPL-E01-M5-XX	SPL-E05-M5-XX
SPM-SC*0807M*K-L	SPL-MA04-M5-XX	SPL-BMA04-M5-XX	SPL-E01-M5-XX	SPL-E05-M5-XX
SPM-SC*0810M*K-L	SPL-MA04-M5-XX	SPL-BMA04-M5-XX	SPL-E01-M5-XX	SPL-E05-M5-XX
Straight plug standard motors 40/60/80 frame Medium inertia Vn = 3000 rpm Vmax = 6000/5000 rpm				
SPM-SC*045AM*K-ST1-L	SPL-MA05-M5-XX	SPL-BMA05-M5-XX	SPL-E03-M5-XX	SPL-E04-M5-XX
SPM-SC*0401M*K-ST1-L	SPL-MA05-M5-XX	SPL-BMA05-M5-XX	SPL-E03-M5-XX	SPL-E04-M5-XX
SPM-SC*0602M*K-ST1-L	SPL-MA05-M5-XX	SPL-BMA05-M5-XX	SPL-E03-M5-XX	SPL-E04-M5-XX
SPM-SC*0604M*K-ST1-L	SPL-MA05-M5-XX	SPL-BMA05-M5-XX	SPL-E03-M5-XX	SPL-E04-M5-XX
SPM-SC*0807M*K-ST1-L	SPL-MA05-M5-XX	SPL-BMA05-M5-XX	SPL-E03-M5-XX	SPL-E04-M5-XX
SPM-SC*0810M*K-ST1-L	SPL-MA05-M5-XX	SPL-BMA05-M5-XX	SPL-E03-M5-XX	SPL-E04-M5-XX
Straight plug economical motors 60/80 frame Medium inertia Vn = 3000 rpm Vmax = 5000 rpm				
SPM-SC*0604M*K-ST4-L	SPL-MA05-M5-XX	SPL-BMA05-M5-XX	SPL-E03-M5-XX	SPL-E04-M5-XX
SPM-SC*0807M*K-ST4-L	SPL-MA05-M5-XX	SPL-BMA05-M5-XX	SPL-E03-M5-XX	SPL-E04-M5-XX
Aviation plug standard motors 130 frame Medium inertia Vn = 1500 rpm Vmax = 3000 rpm				
SPM-SD*1308M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-SD*1313M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TD*1308M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TD*1313M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TD*1318M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TD*1322M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
Aviation plug standard motors 130 frame Medium inertia Vn = 2000 rpm Vmax = 4000 rpm				
SPM-SE*1311M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-SE*1317M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TE*1311M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TE*1317M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TE*1324M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TE*1330M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
Aviation plug standard motors 130 frame Medium inertia Vn = 3000 rpm Vmax = 5000 rpm				
SPM-SC*1317M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-SC*1326M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TC*1317M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TC*1326M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
SPM-TC*1336M*K-W	SPL-MC04-M5-XX	SPL-BMC04-M5-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX
Aviation plug standard motors 180 frame Medium inertia Vn=1500rpm Vmax=3000rpm				
SPM-TD*1829M*K-W	SPL-MD04-M5-XX	SPL-MD04-M5-XX + SPL-B05-XX	SPL-E0A-M5-XX	SPL-E0B-M5-XX

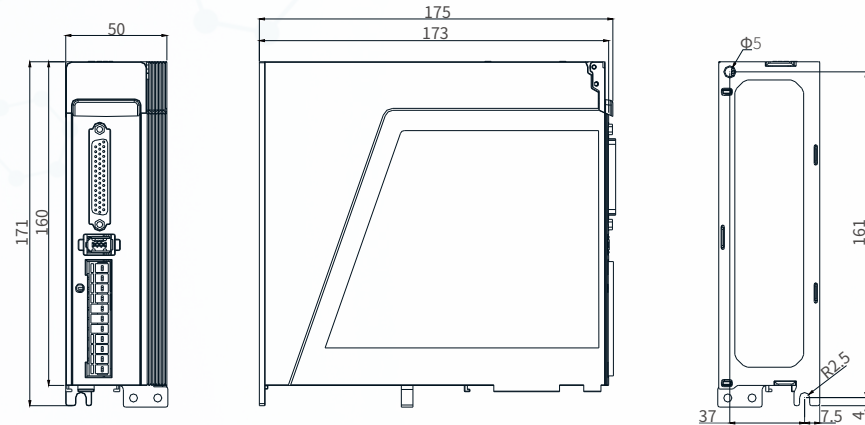


# M5-P Dimensions

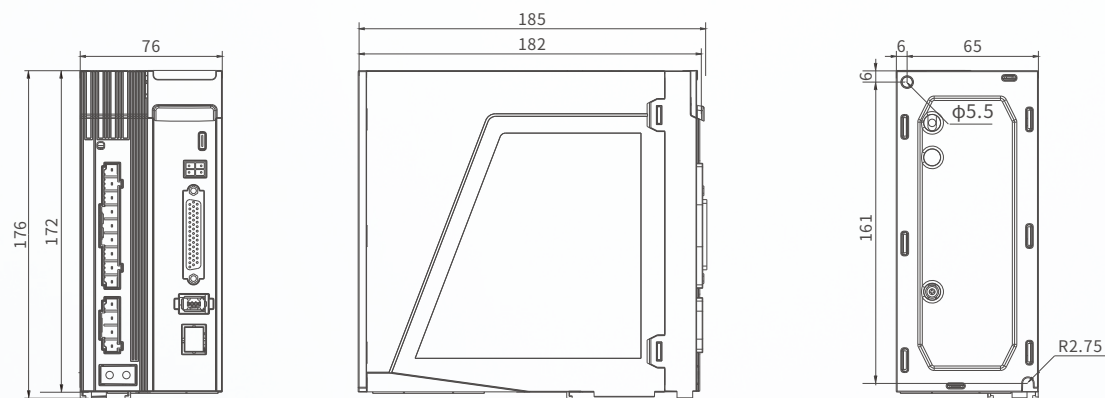
## SIZEA



## SIZEB

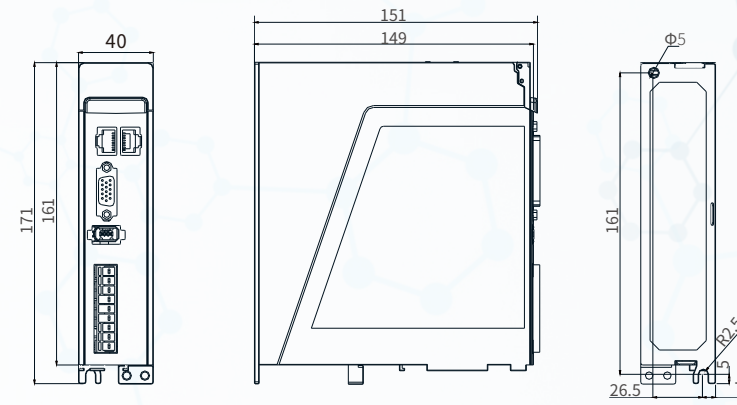


## SIZED

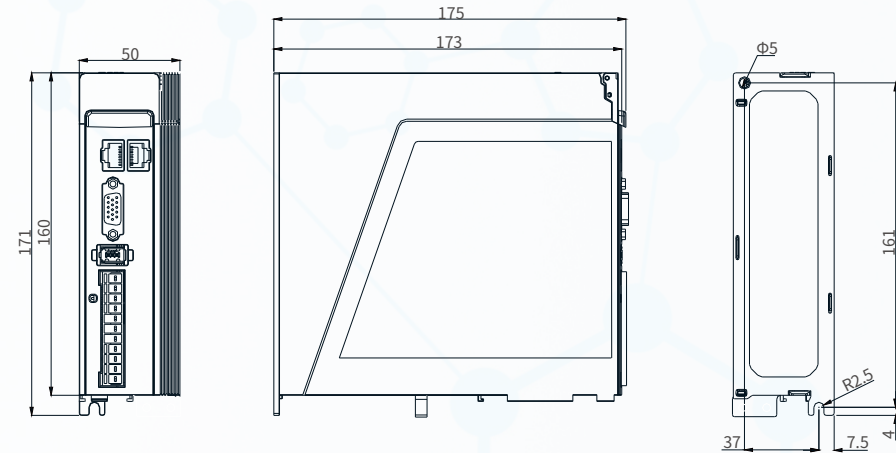


# M5-N Dimensions

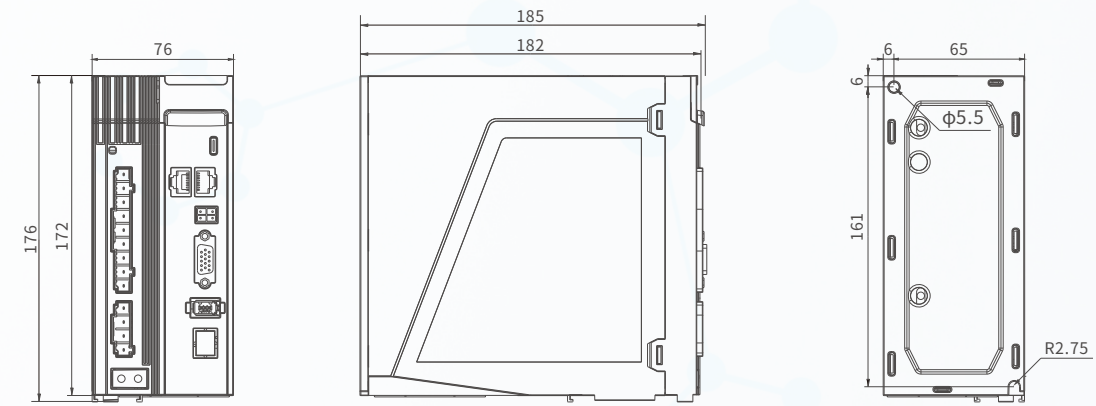
## SIZEA



## SIZEB



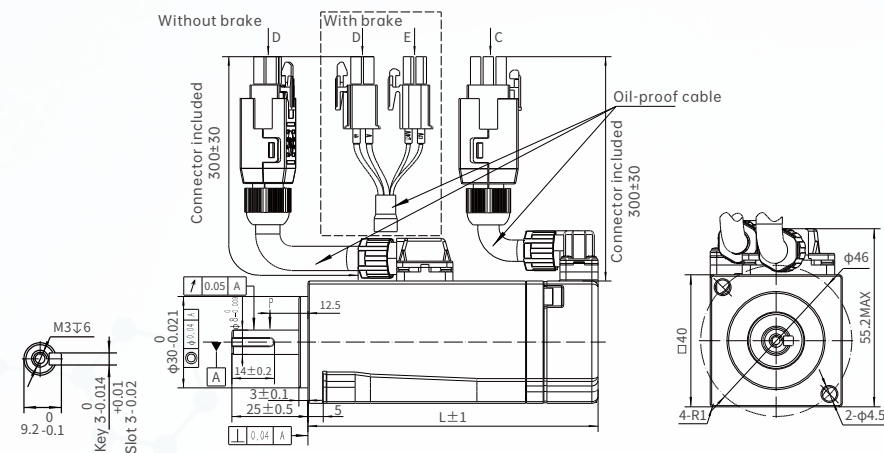
## SIZED



# Servo Motor Dimensions

- L series motors:  
40/60/80 frame, medium inertia, AMP plug, standard type

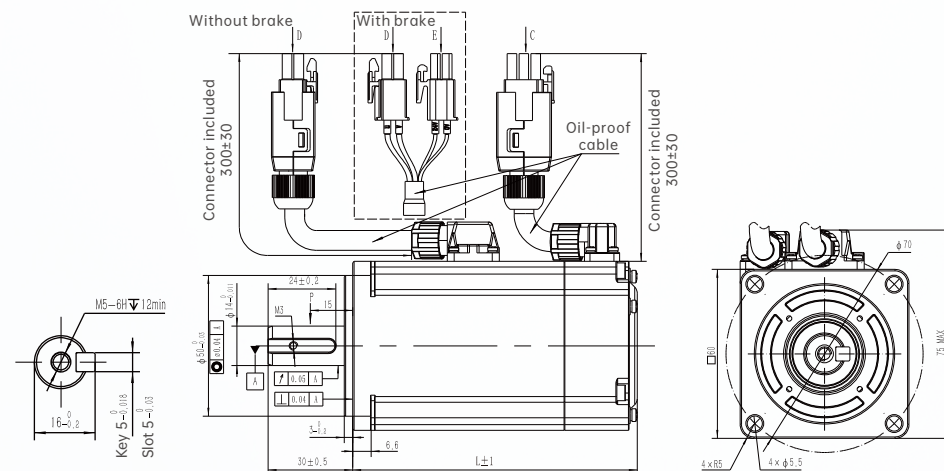
40 frame



Model	L (mm)
SPM-SC*045AM*K-L	56 (84)
SPM-SC*0401M*K-L	67.7 (95)

Note: The parameter in "()" is the value with a brake.

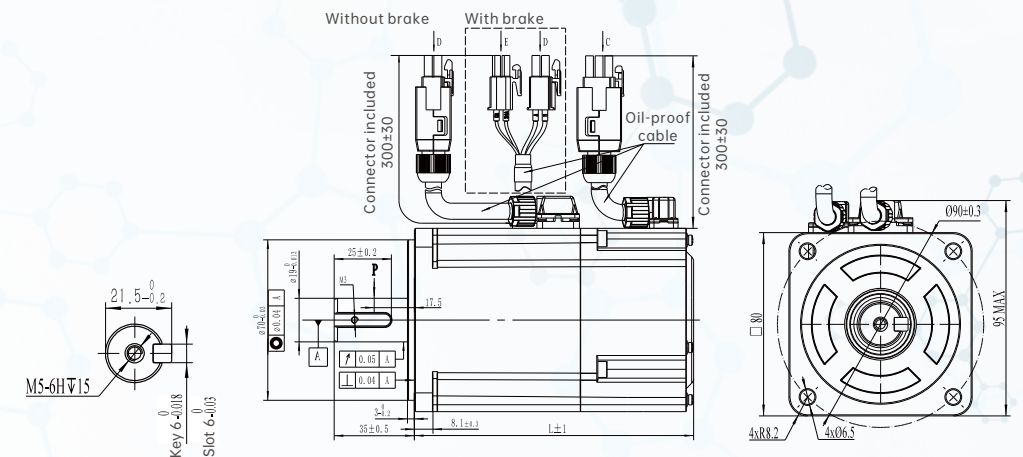
60 frame



Model	L (mm)
SPM-SC*0602M*K-L	71.8 (101.2)
SPM-SC*0604M*K-L	88.8 (118.2)

Note: The parameter in "()" is the value with a brake.

80 frame

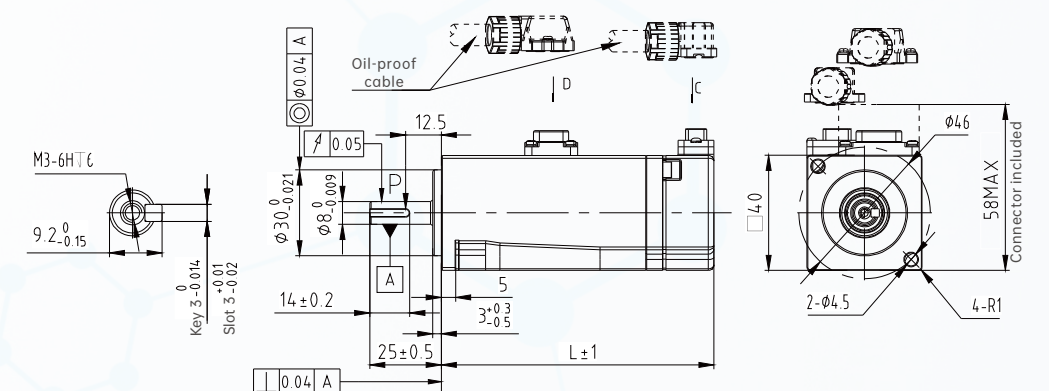


Model	L (mm)
SPM-SC*0807M*K-L	90 (121.9)
SPM-SC*0810M*K-L	103.9 (134.9)

Note: The parameter in "()" is the value with a brake.

- ST1-L series motors:  
40/60/80 frame, medium inertia, straight plug, standard type

40 frame

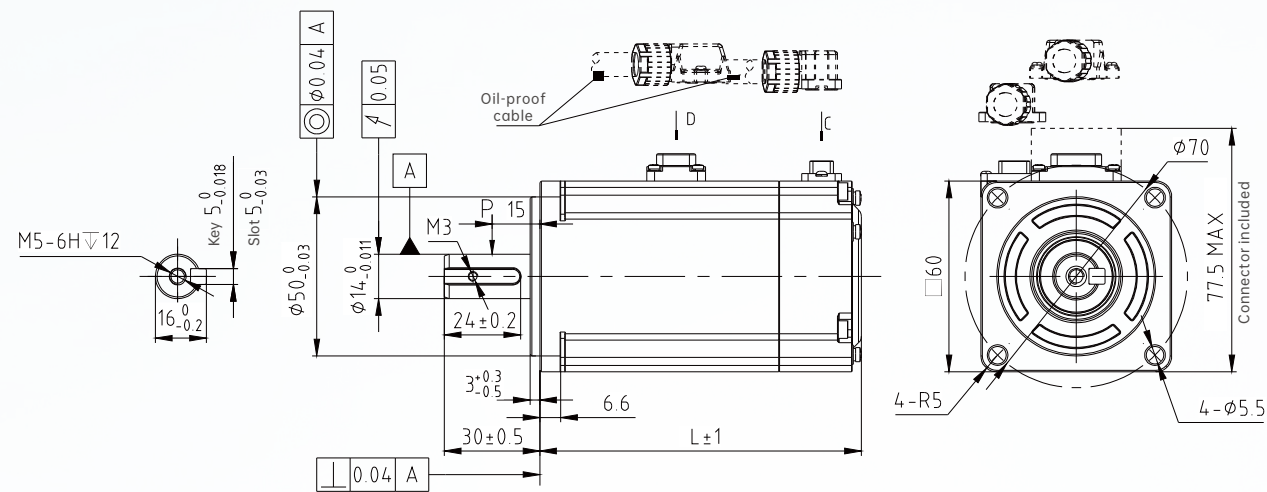


Model	L (mm)
SPM-SC*045AM*K-ST1-L	56 (84)
SPM-SC*0401M*K-ST1-L	67.7 (95)

Note: The parameter in "()" is the value with a brake.



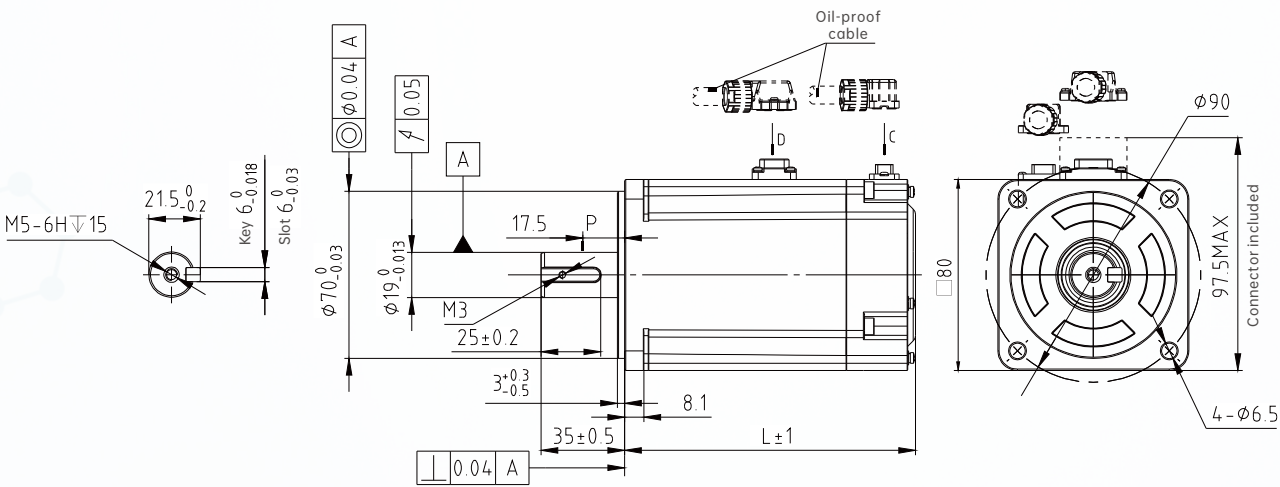
60 frame



Model	L (mm)
SPM-SC*0602M*K-ST1-L	71.8 (101.2)
SPM-SC*0604M*K-ST1-L	88.8 (118.1)

Note: The parameter in “( )” is the value with a brake.

80 frame

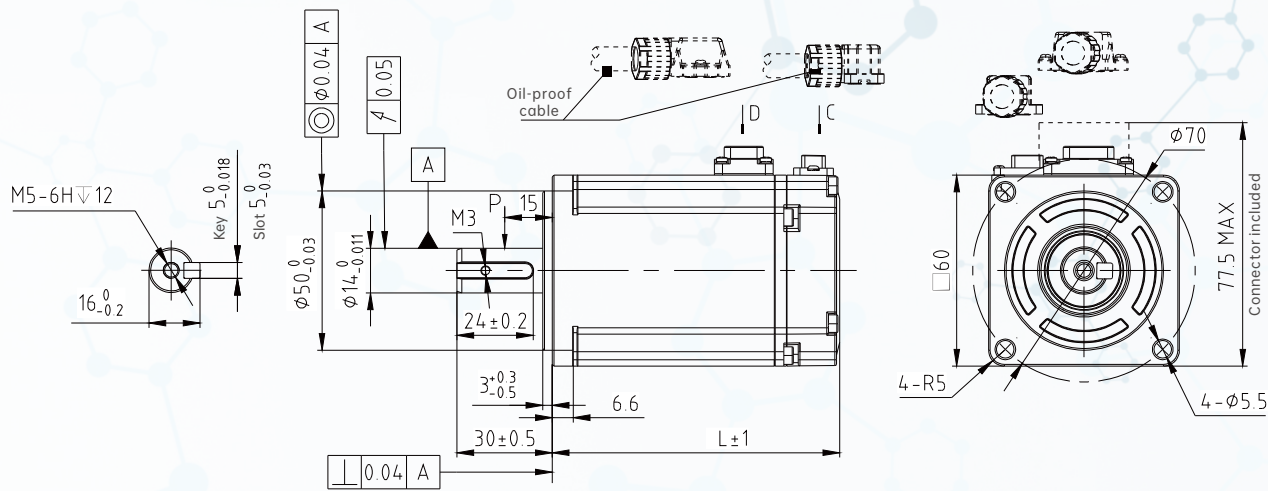


Model	L (mm)
SPM-SC*0807M*K-ST1-L	90 (121.9)
SPM-SC*0810M*K-ST1-L	103.9 (134.9)

Note: The parameter in “( )” is the value with a brake.

ST4-L series motors:  
60/80 frame, medium inertia, straight plug, economical type

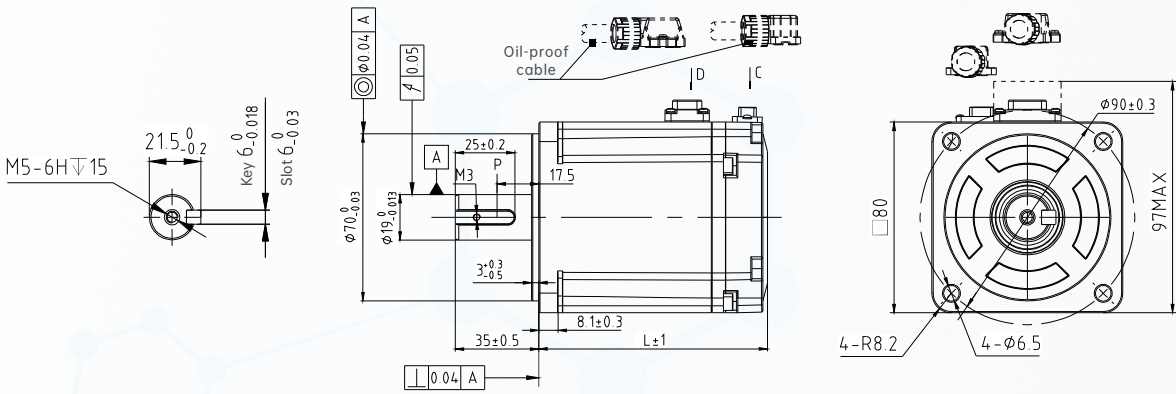
60 frame



Model	L (mm)
SPM-SC*0604M*K-ST4-L	90.1 (119.5)

Note: The parameter in “( )” is the value with a brake.

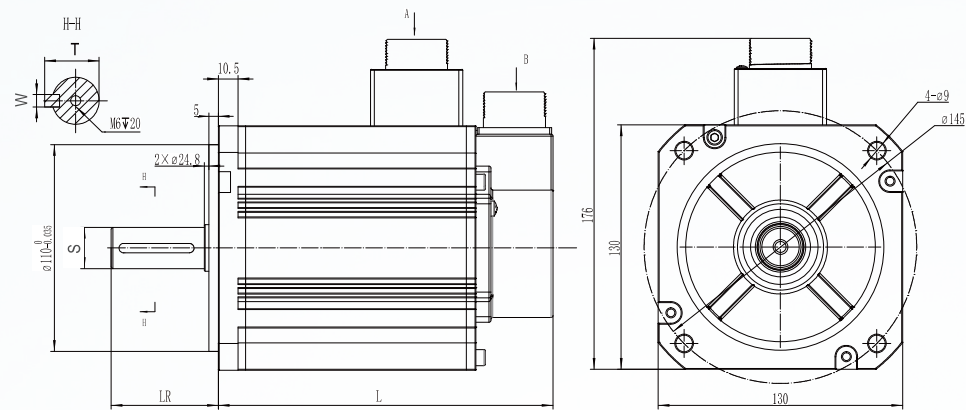
80 frame



Model	L (mm)
SPM-SC*0807M*K-ST4-L	95.7 (126.7)

Note: The parameter in “( )” is the value with a brake.

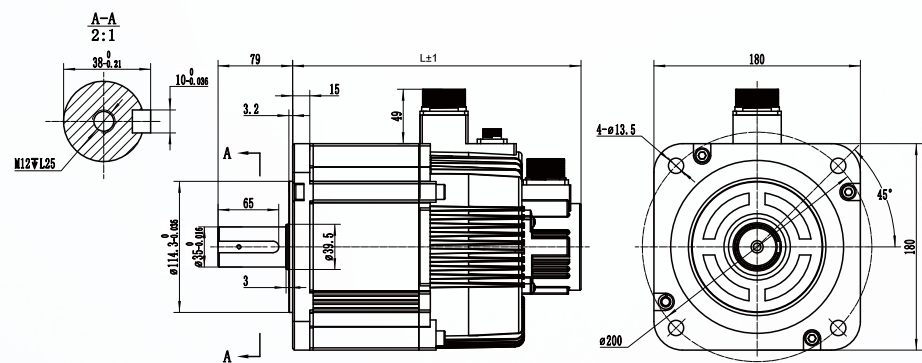
■ W series motors:  
130 frame, medium inertia, aviation plug, standard type



Model	L (mm)
SPM-SD*1308M*K-W	135 (187)
SPM-SD*1313M*K-W	152.5 (204)
SPM-TD*1308M*K-W	135 (187)
SPM-TD*1313M*K-W	152.5 (204)
SPM-TD*1318M*K-W	170 (222)
SPM-TD*1322M*K-W	200 (252)
SPM-SE*1311M*K-W	135 (187)
SPM-SE*1317M*K-W	152.5 (204)
SPM-TE*1311M*K-W	135 (187)
SPM-TE*1317M*K-W	152.5 (204)
SPM-TE*1324M*K-W	170 (222)
SPM-TE*1330M*K-W	200 (252)
SPM-SC*1317M*K-W	135 (187)
SPM-SC*1326M*K-W	152.5 (204)
SPM-TC*1317M*K-W	135 (187)
SPM-TC*1326M*K-W	152.5 (204)
SPM-TC*1336M*K-W	170 (222)

Note: The parameter in "()" is the value with a brake.

■ W series motors:  
180 frame, medium inertia, aviation plug, standard type



Model	L (mm)
SPM-TD*1829M*K-W	205 (252)

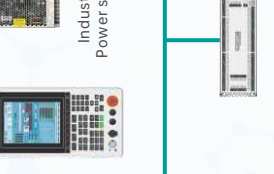
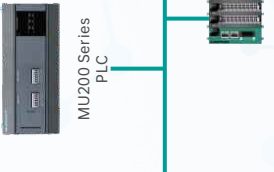
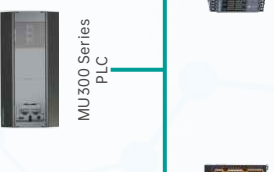
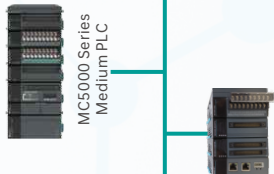
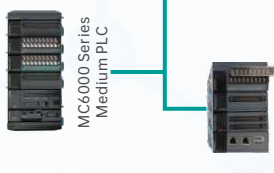
Note: The parameter in "()" is the value with a brake.

Industrial Automation Solutions

Communication  
Layer



Control Layer



Drive Layer



Execution Layer

