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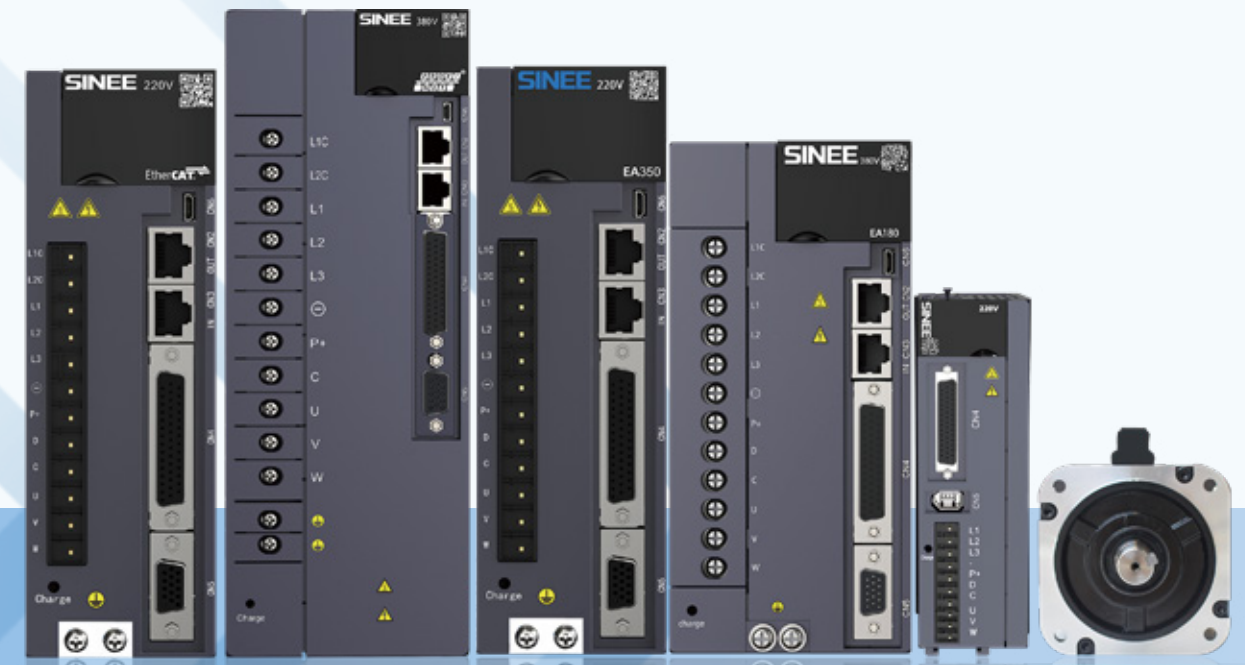
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# Servo Selection Guide

Automated production and life

Shenzhen Sine Electric Co.,Ltd



High integration



Compacted size



Perfect protection



Stable and reliable



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# SINEE

Since SINEE establishment in 2003, SINEE (Shenzhen Sine Electric Co., Ltd.) has been focusing on the R&D, production and sales of motor drive and control systems in the field of industrial automation. With the mission of “automated production and life”, SINEE provides the most valuable products and services for users. In 2021, SINEE was listed on the Science and Technology Innovation Board of the Shanghai Stock Exchange (stock code: 688395). At present, SINEE has R&D, production and service bases in Shenzhen, Wuhan, Suzhou and Wuxi.

## Automated production and life

SINEE has established key core technology platforms such as high-performance variable frequency vector control technology, high-precision servo drive technology, embedded computer control technology, and power electronic application technology. SINEE mainly provides inverters, integrated units, servo system products and system solutions.



### Vision

Automated production and life



### Operations

Motor drive and control system solution provider



### Customers

Mechanical equipment manufacturer, electronic control system integrator and distributor



### Competitiveness

Industry market solution and customization



# Introduction of servo drive product line

## Input device controller



Motion controller



HMI



PLC

## servo drive



EA350  
Analog pulse type



EA190  
Pulse type



EA196  
Pulse type



EA190E  
EtherCAT type



EA300E  
EtherCAT type



EA180C  
CANopen type



EA180P  
PROFINET type

# EA350 series servo drive

- 1P input 220 V~240V 0.05~0.4KW
- 1P or 3P input 220 V~240V 0.75~ 1KW
- 3P input 220 V~240V 1.5KW
- 3P input 340V~460V 1.5~ 29KW

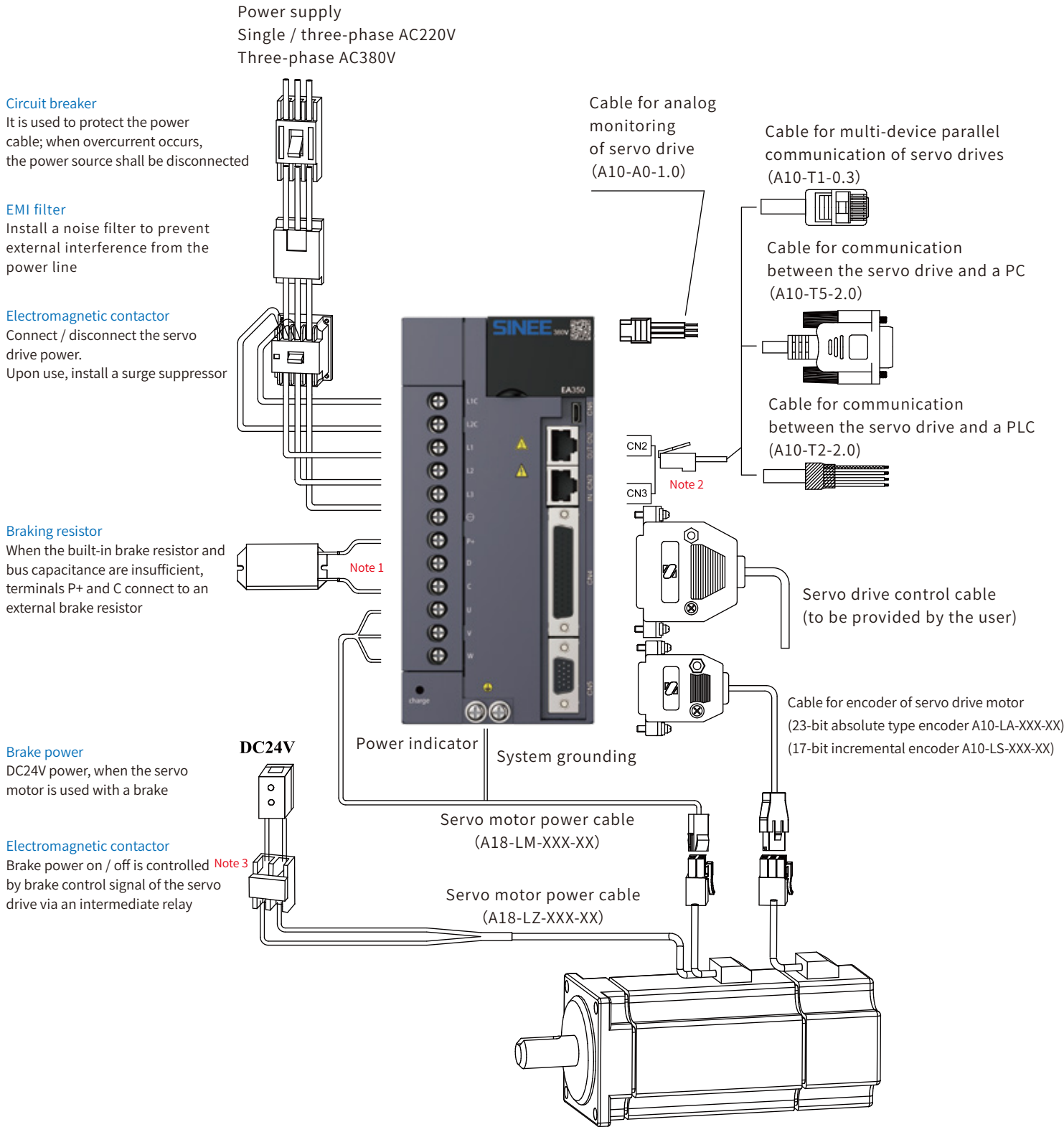
-  High performance
-  High electromagnetic compatibility
-  Multi-functional and expansible







Connection between EA350 analog pulse type servo drive and peripheral device





Terminal description of EA350 analog pulse type servo drive

Main circuit terminal

| Terminal marking | Terminal name                                        |
|------------------|------------------------------------------------------|
| L1C、L2C          | Control power input terminal                         |
| L1、L2、L3         | AC power input terminal of main circuit              |
| P+、D、C           | Connecting terminal for an external braking resistor |
| P+、 $\ominus$    | Common DC bus terminal                               |
| U、V、W            | Servo motor connecting terminal                      |
| PE               | Grounding                                            |

CN1 analog monitoring terminal

| Pin number | Signal name | Function                                              |
|------------|-------------|-------------------------------------------------------|
| 1          | AO1         | Output voltage 0 V ~ 10 V, Maximum output current 1mA |
| 2          | AO2         |                                                       |
| 3          | GND         | Common ground of analog output signal                 |
| 4          | Reserved    | Cannot be connected with any signal line              |

CN6 USB

According to USB 2.0 specification

CN2 and CN3 communication terminals

| Pin number | Signal name | Function                              |
|------------|-------------|---------------------------------------|
| 1          | RS485+      | Positive terminal of RS485 signal     |
| 2          | RS485-      | Negative terminal of RS485 signal     |
| 3          | GND         | Communication signal reference ground |
| 4          | RS232-RXD   | RS232 signal receiving side           |
| 5          | RS232-TXD   | RS232 signal sending side             |

CN4 control terminal

|                           | Signal name | Pin number | Default function                                                                                   |
|---------------------------|-------------|------------|----------------------------------------------------------------------------------------------------|
| Digital input             | DI1         | 5          | S-ON                                                                                               |
|                           | DI2         | 20         | ALM-RST                                                                                            |
|                           | DI3         | 4          | P-CLR                                                                                              |
|                           | DI4         | 19         | P-OT                                                                                               |
|                           | DI5         | 3          | N-OT                                                                                               |
|                           | DI6         | 18         | INHIBIT                                                                                            |
|                           | DI7         | 2          | ORGP                                                                                               |
|                           | DI8         | 17         | SHOM                                                                                               |
| Power supply              | COM+        | 21         | DI input common positive terminal                                                                  |
|                           | +24V        | 25/40      | Internal 24 V power source, with the voltage range of +20 V ~ 26 V, maximum output current 200 mA. |
|                           | COM         | 7/22/36    |                                                                                                    |
|                           | +10V        | 44         |                                                                                                    |
| Digital output            | GND         | 29         | +10V power, maximum output of 5mA.                                                                 |
|                           | DO1         | 8          | S-RDY+                                                                                             |
|                           | DO1-        | 37         | S-RDY-                                                                                             |
|                           | DO2         | 23         | BK+                                                                                                |
|                           | DO2-        | 38         | BK-                                                                                                |
|                           | DO3         | 9          | COIN+                                                                                              |
|                           | DO3-        | 39         | COIN-                                                                                              |
|                           | DO4         | 24         | ALM                                                                                                |
| Frequency division output | DO4-        | 10         | ALM-                                                                                               |
|                           | PA+         | 28         | A pulse frequency division output +                                                                |
|                           | PA-         | 13         | A pulse frequency division output -                                                                |
|                           | PB+         | 12         | B pulse frequency division output +                                                                |
|                           | PB-         | 27         | B pulse frequency division output -                                                                |
|                           | PZ+         | 11         | Z pulse frequency division output +                                                                |
|                           | PZ-         | 26         | Z pulse frequency division output -                                                                |
|                           | OCA         | 43         | ABZ pulse open-collector output (NPN)<br>Maximum allowable input current with GND of 40 mA         |
| Analog                    | OCB         | 42         |                                                                                                    |
|                           | OCZ         | 35         |                                                                                                    |
|                           | GND         | 29         |                                                                                                    |
| Position command          | AI1         | 15         | Analog input signal, 16-bit resolution, maximum allowable input voltage: $\pm 12V$ .               |
|                           | AI2         | 30         |                                                                                                    |
|                           | GND         | 29         | Analog input signal ground                                                                         |
|                           | PULHIP      | 1          | Positive terminal when 24V power source is used for position pulse                                 |
|                           | PULSE+      | 33         | Position pulse command +                                                                           |
|                           | PULSE-      | 34         | Position pulse command -                                                                           |

CN5 encoder terminal

| Pin number | Signal name |
|------------|-------------|
| 1          | SD+         |
| 3          | SD-         |
| 5          | +5V         |
| 10         | GND         |
| Housing    | PE          |





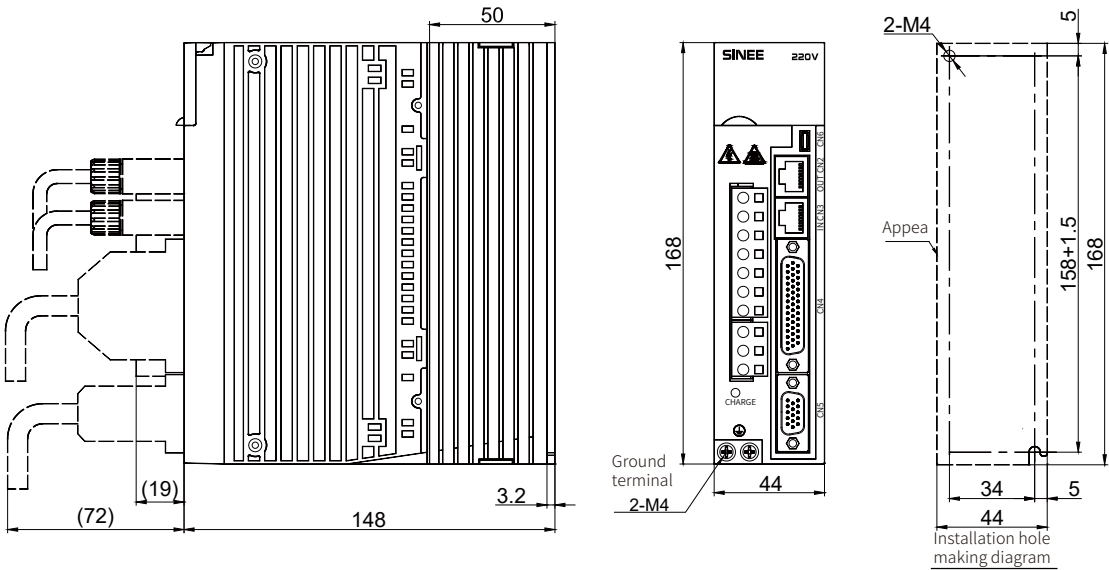
Model description of EA350 series analog pulse type servo drive

EA 350 X - 6R2 - 2 B - XX  
① ② ③ ④ ⑤ ⑥ ⑦

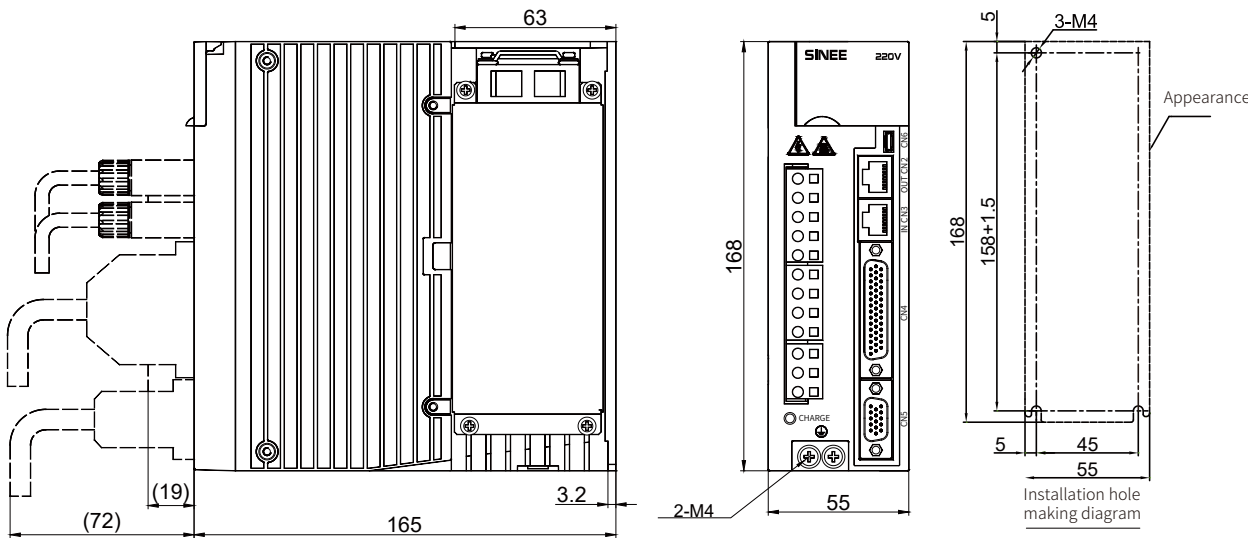
|                                                         |                                                                                                                       |                                              |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| ①Product<br>Servo drive                                 | ④Rated output current<br>0R9-0.9A<br>062-62A                                                                          | ⑥Encoder type<br>B: 17/23-bit serial encoder |
| ②series<br>350 series                                   |                                                                                                                       |                                              |
| ③Null:standard<br>A: 16-bit high-precision analog input | ⑤Rated voltage of power supply<br>1. Single-phase AC220 V<br>2.Single / three-phase AC220 V<br>3. Three-phase AC380 V | ⑦Non-standard specification                  |



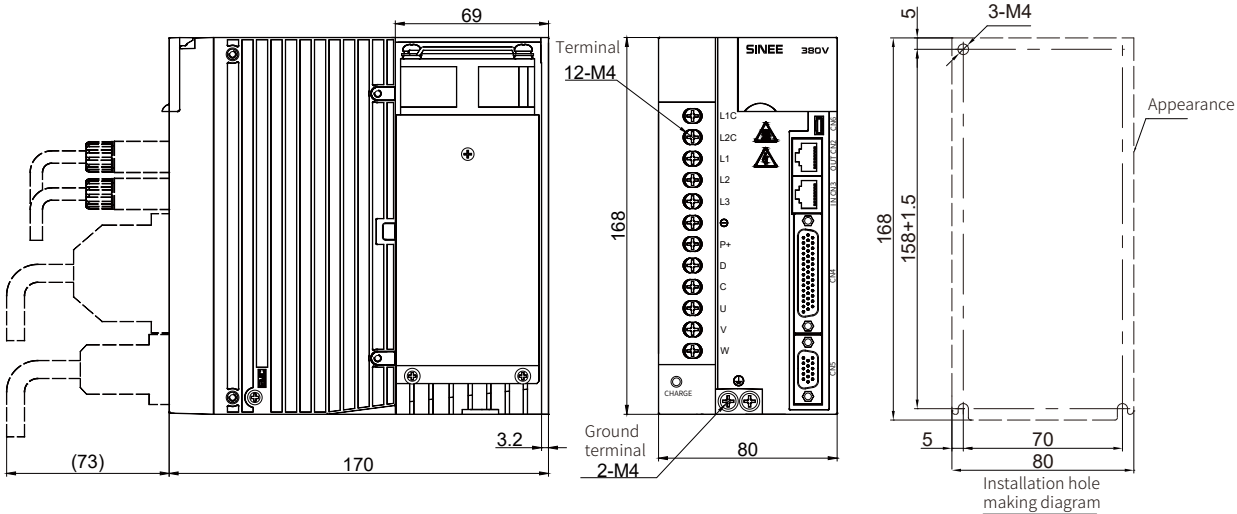
Dimension diagram of EA350 series analog pulse type servo drive



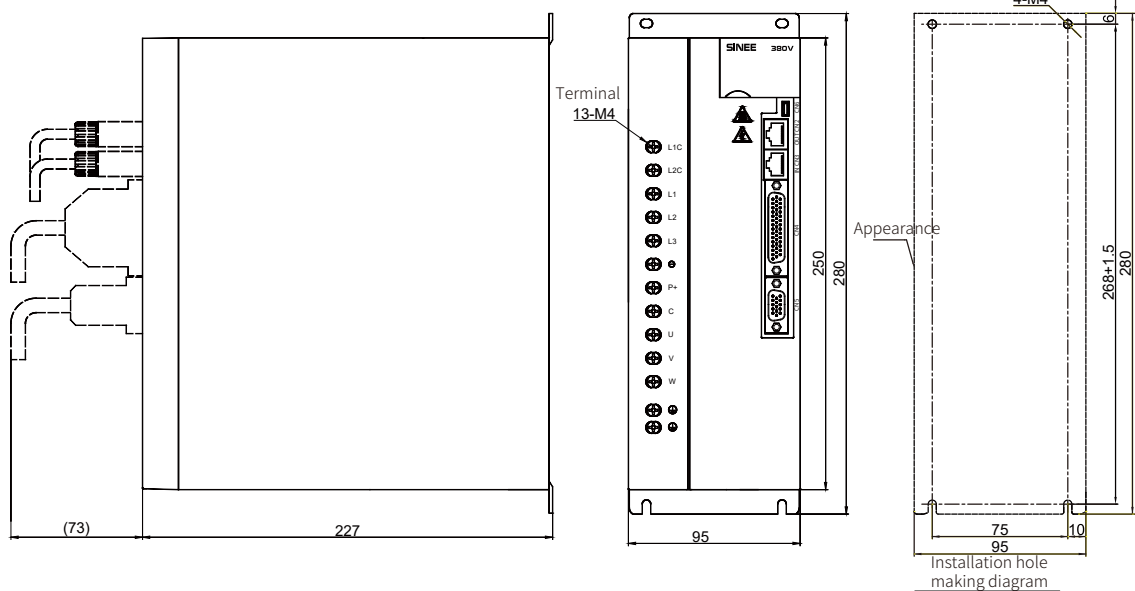
EA350□-0R9-1B EA350□-1R6-1B EA350□-2R5-1B



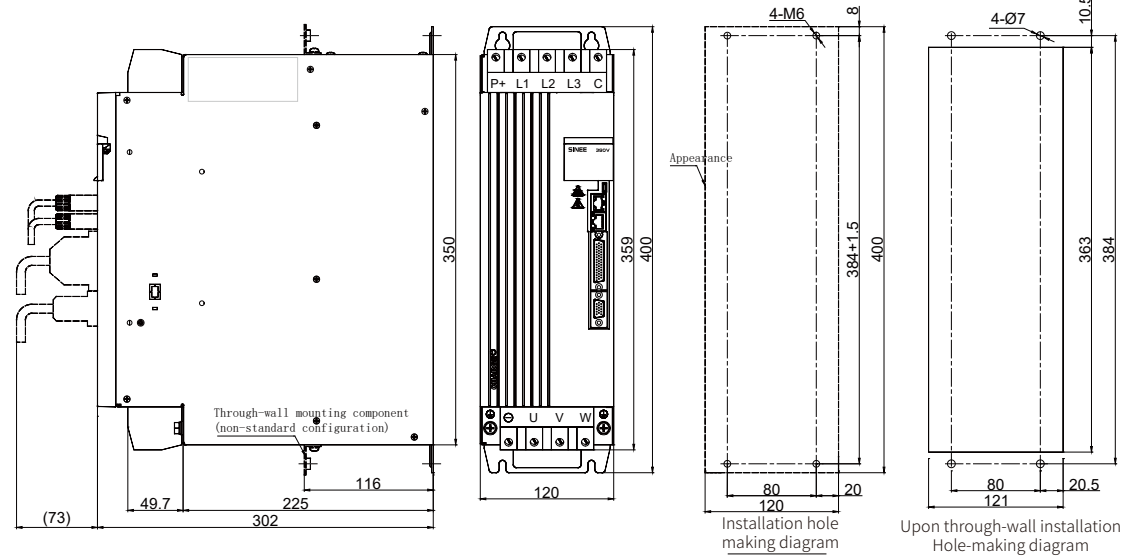
EA350□-4R8-2B EA350□-6R2-2B



EA350□-5R6-3B EA350□-8R5-3B EA350□-013-3B EA350□-011-2B



EA350□-017-3B EA350□-022-3B EA350□-028-3B



EA350□-038-3B EA350□-052-3B EA350□-062-3B





### Specification of EA350 series analog pulse type servo drive

|                              |                               |                                                                                                                                                                                          |                                                                                        |
|------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Operating conditions         | Temperature                   | Working temperature 0~40° , storage temperature -20° ~85°                                                                                                                                |                                                                                        |
|                              | Humidity                      | Working / storage: ≤ 90% RH (without dew condensation)                                                                                                                                   |                                                                                        |
|                              | Altitude                      | ≤ 1,000 m                                                                                                                                                                                |                                                                                        |
|                              | Vibration                     | ≤ 4.9 m/s <sup>2</sup> , 10~60 Hz (no operation at the point of resonance is permitted)                                                                                                  |                                                                                        |
| Cooling method               |                               | Fan cooling                                                                                                                                                                              |                                                                                        |
| Control method               |                               | SVPWM, vector control                                                                                                                                                                    |                                                                                        |
| Six control modes            |                               | Speed control, position control, torque control, speed / position control, torque / speed control, position / torque control                                                             |                                                                                        |
| Front panel                  |                               | 5 keys, 5-digit LED                                                                                                                                                                      |                                                                                        |
| Regenerative brake           |                               | Built-in brake unit (a built-in brake resistor is provided in partial specifications), which can have an external resistor connected                                                     |                                                                                        |
| Feedback mode                |                               | RS485 serial communication encoder, RA-CODER or FA-FORMAT protocol (non-standard version of FA-FOR-MAT is supported)                                                                     |                                                                                        |
| Digital input/output         | Input                         | Pulse disable, forward drive disable, reverse drive disable, forward inch, backward inch                                                                                                 |                                                                                        |
|                              | Output                        | Servo ready, brake output, motor rotation output, zero-speed signal, speed approach, speed reached, position approach, torque limit, rotating speed limit, warning output, alarm output. |                                                                                        |
| Protective Function Software | Hardware                      | Over-voltage, under-voltage, over-speed, overheat, overload, over-speed, encoder alarm, and so on.                                                                                       |                                                                                        |
|                              | Software                      | Excessively large position error, EEPROM fault, and so on.                                                                                                                               |                                                                                        |
| Alarm data tracking function |                               | Record 4 groups of historical alarms and relevant data                                                                                                                                   |                                                                                        |
| Communication function       |                               | Modbus RTU                                                                                                                                                                               |                                                                                        |
| Encoder signal output        | Signal type                   | A, B, Z differential outputs, Z signal open-collector output; Z signal width can be set. A/B/Z pulse open-collector output (NPN)                                                         |                                                                                        |
|                              | Resolution                    | Any frequency division can be programmed and output before or after frequency quadruplication                                                                                            |                                                                                        |
| Position control mode        | Maximum input pulse frequency | Differential input mode: 500 Kpps                                                                                                                                                        |                                                                                        |
|                              | Pulse command mode            | Open-collector input mode: 200 Kpps                                                                                                                                                      |                                                                                        |
|                              |                               | Pulse + direction, A and B-phase orthogonal pulse, CW/CCW                                                                                                                                |                                                                                        |
|                              | Command control mode          | External pulse command, multi-segment position command                                                                                                                                   |                                                                                        |
|                              | Command smoothing mode        | Low-pass filtering, FIR filter, trapezoid-shaped smoothing of multi-segment position command                                                                                             |                                                                                        |
| Speed control mode           | Electronic gear ratio         | Electronic gear ratio: N/M multiples (0.001 < N/M < 64000 = N: 1~2 <sup>30</sup> , M: 1~230                                                                                              |                                                                                        |
|                              | Position accuracy             | ±1 pulse command                                                                                                                                                                         |                                                                                        |
|                              | Command control mode          | External analog command, digital speed command, multistage speed command, inching command                                                                                                |                                                                                        |
|                              | Command smoothing mode        | Low-pass filtering, smooth S curve                                                                                                                                                       |                                                                                        |
|                              | Analog command input          | Voltage range                                                                                                                                                                            | -10 V ~ 10 V                                                                           |
|                              |                               | Input impedance                                                                                                                                                                          | 10 KΩ                                                                                  |
|                              |                               | Time constant                                                                                                                                                                            | 200 μs                                                                                 |
|                              | Torque limit                  | Digital setting or external analog limit                                                                                                                                                 |                                                                                        |
|                              | Speed regulation ratio        | 1:5000 (23-bit encoder)                                                                                                                                                                  | Minimal speed/rated rotating speed of continuous stable operation under the rated load |
|                              | Bandwidth                     | 3,000 Hz (23-bit encoder)                                                                                                                                                                |                                                                                        |
| Torque control mode          | Speed fluctuation ratio       | Load fluctuation (0 ~100%)                                                                                                                                                               | Maximum 0.1%                                                                           |
|                              |                               | Supply voltage change ±10%                                                                                                                                                               | Maximum 0.1%                                                                           |
|                              |                               | Ambient temperature (0 ~ 50° C)                                                                                                                                                          | Maximum 0.1%                                                                           |
|                              |                               | For a 23-bit encoder, when the speed command is the rated rotating speed, (rotating speed without load - rotating speed with full load)/rated rotating speed.                            |                                                                                        |
|                              | Command control mode          | External analog command, digital torque command                                                                                                                                          |                                                                                        |
|                              | Command smoothing mode        | Low-pass filtering                                                                                                                                                                       |                                                                                        |
|                              | Analog command input          | Voltage range                                                                                                                                                                            | -10 V ~ 10 V                                                                           |
|                              |                               | Input impedance                                                                                                                                                                          | 10 KΩ                                                                                  |
|                              |                               | Time constant                                                                                                                                                                            | 200 μs                                                                                 |
|                              | Speed limit                   | Digital setting or external analog limit                                                                                                                                                 |                                                                                        |
|                              | Accuracy                      | ±1% (current repetition accuracy)                                                                                                                                                        |                                                                                        |



### EA350 series servo motor and drive matching table

| Servo drive |                                                                                       |                                              |                                    | Motor                                                                                 |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|---------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EA350       | Model                                                                                 | Supply voltage                               | Motor                              | Power wattage                                                                         | Adaptable motor model |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| SIZE A      |    | EA350-0R9-1B<br>EA350-1R6-1B<br>EA350-2R5-1B | Single-phase AC220V                |    | 50W 100W 200W 400W    | SES04-005-30-2FAY <input type="checkbox"/><br>SES04-0R1-30-2FAY <input type="checkbox"/><br>SES06-0R2-30-2FBY <input type="checkbox"/><br>SES06-0R4-30-2FBY <input type="checkbox"/>                                                                                                                                                                                                                                                                                     |
|             |    | EA350-4R8-2B<br>EA350-6R2-2B                 | Single-phase or three-phase AC220V |    | 750W 1000W            | SES08-0R7-30-2FBY <input type="checkbox"/><br>SES08-1R0-30-2FBY <input type="checkbox"/><br>SES13-1R0-20-2FBY <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                   |
| SIZE B      |   | EA350-5R6-3B<br>EA350-8R5-3B<br>EA350-013-3B | Three-phase AC380V                 |    | 850W 1.3KW 1.7KW      | SES13-0R8-15-3FBY <input type="checkbox"/><br>SES13-1R3-15-3FBY <input type="checkbox"/><br>SES13-1R7-30-3FBY <input type="checkbox"/><br>SES13-1R1-20-3FBY <input type="checkbox"/><br>SES13-1R7-20-3FBY <input type="checkbox"/><br>SES13-2R6-30-3FBY <input type="checkbox"/><br>SES13-1R8-15-3FBY <input type="checkbox"/><br>SES13-2R4-20-3FBY <input type="checkbox"/><br>SES13-3R6-30-3FBY <input type="checkbox"/><br>SES18-2R9-15-3FBY <input type="checkbox"/> |
|             |  | EA350-011-2B                                 | Three-phase AC220V                 |  | 0.8KW 1.1KW 1.7KW     | SES13-1R1-20-2FBY <input type="checkbox"/><br>SES13-0R8-15-2FBY <input type="checkbox"/><br>SES13-1R7-30-2FBY <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                   |
| SIZE C      |  | EA350-017-3B<br>EA350-022-3B<br>EA350-028-3B | Three-phase AC380V                 |  | 4.4KW 5.5KW 7.5KW     | SES18-4R4-15-3FBY <input type="checkbox"/><br>SES18-5R5-15-3FBY <input type="checkbox"/><br>SES18-7R5-15-3FBY <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                   |
|             |  | EA350-038-3B<br>EA350-052-3B<br>EA350-062-3B | Three-phase AC380 V                |  | 11KW 13KW 15KW        | SEC20-011-15-3FBY <input type="checkbox"/><br>SEC20-011-20-3FBY <input type="checkbox"/><br>SEC20-013-15-3FBY <input type="checkbox"/><br>SEC20-015-15-3FBY <input type="checkbox"/><br>SEC23-011-15-3FBY <input type="checkbox"/>                                                                                                                                                                                                                                       |
| SIZE D      |  | EA350-038-3B<br>EA350-052-3B<br>EA350-062-3B | Three-phase AC380 V                |  | 15KW/18W/22KW/29KW    | SEC23-015-15-3FBY <input type="checkbox"/><br>SEC23-018-15-3FBY <input type="checkbox"/><br>SEC23-022-15-3FBY <input type="checkbox"/><br>SEC23-029-15-3FBY <input type="checkbox"/>                                                                                                                                                                                                                                                                                     |
|             |                                                                                       |                                              |                                    |                                                                                       |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

F: 23bit Multi-turn optical encoder



### EA350 series servo motor, drive and cable matching table

| Motor specification/model                  | Adaptable Drive model | Encoder cable                                                            | Motor cable                                                                                                                                           |                                                                                               |
|--------------------------------------------|-----------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| SES04-005-30-2FAY <input type="checkbox"/> | EA350-0R9-1B          | A10-LS-A000-m<br>(without battery)<br>A10-LA-A000-m<br>(without battery) | A18-LM-A007-m<br>(motor power cable)<br>A10-LZ-A005-m<br>(brake cable for motor<br>with a brake)                                                      |                                                                                               |
| SES04-0R1-30-2FAY <input type="checkbox"/> | EA350-1R6-1B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES06-0R2-30-2FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES06-0R4-30-2FBY <input type="checkbox"/> | EA350-2R5-1B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES08-0R7-30-2FBY <input type="checkbox"/> | EA350-4R8-2B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES08-1R0-30-2FBY <input type="checkbox"/> | EA350-6R2-2B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-1R1-20-2FBY <input type="checkbox"/> | EA350-6R2-2B          | A18-LS-H400-m<br>(without battery)<br>A18-LA-H400-m<br>(without battery) | A18-LM-M415-m<br>(motor power cable)<br>A18-LZ-H405-m<br>(Brake line)                                                                                 |                                                                                               |
| SES13-0R8-15-2FBY <input type="checkbox"/> | EA350-011-2B          |                                                                          | A18-LM-M420-m<br>(motor power cable)<br>A18-LZ-H405-m<br>(brake cable for motor with a brake)                                                         |                                                                                               |
| SES13-1R7-30-2FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-0R8-15-3FBY <input type="checkbox"/> | EA350-5R6-3B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-1R1-20-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-1R7-30-3FBY <input type="checkbox"/> | EA350-5R6-3B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-1R3-15-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-1R8-15-3FBY <input type="checkbox"/> | EA350-8R5-3B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-1R7-20-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-2R6-30-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES18-2R3-15-3FBY <input type="checkbox"/> | EA350-013-3B          |                                                                          | Without brake:<br>A18-LM-M525-m<br>(motor power cable)<br>With brake:<br>A10-LM-M220-m<br>(motor power cable)<br>A18-LZ-H405-m<br>(motor power cable) |                                                                                               |
| SES13-2R4-20-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES13-3R6-30-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES18-2R9-15-3FBY <input type="checkbox"/> | EA350-013-3B          |                                                                          |                                                                                                                                                       | A10-LM-M240-m<br>(motor power cable)<br>A18-LZ-H405-m<br>(brake cable for motor with a brake) |
| SES18-3R6-20-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SES18-4R4-15-3FBY <input type="checkbox"/> | EA350-017-3B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES18-5R5-15-3FBY <input type="checkbox"/> | EA350-022-3B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SES18-7R5-15-3FBY <input type="checkbox"/> | EA350-028-3B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC20-011-20-3FBY <input type="checkbox"/> | EA350-028-3B          | A10-LS-H100-m<br>(without battery)<br>A10-LA-H100-m<br>(with battery)    | Not provided                                                                                                                                          |                                                                                               |
| SEC20-011-15-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC20-015-20-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC20-013-15-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC20-015-15-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC23-011-15-3FBY <input type="checkbox"/> | EA350-038-3B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC23-015-15-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC23-018-15-3FBY <input type="checkbox"/> |                       |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC23-022-15-3FBY <input type="checkbox"/> | EA350-052-3B          |                                                                          |                                                                                                                                                       |                                                                                               |
| SEC23-029-15-3FBY <input type="checkbox"/> | EA350-062-3B          |                                                                          |                                                                                                                                                       |                                                                                               |

**Note:** Type A10/A18-LA encoder cable must be selected and used if the absolute position should be memorized upon power off, and Type A10/A18-LS encoder cable may be selected and used if the absolute position should be memorized without power off.

# EA190 series servo drive

1P input 220 V~240V 0.05~0.4KW  
1P or 3P input 220 V~240V 0.75~ 1KW



High-speed response



Intelligent control



High-precision positioning



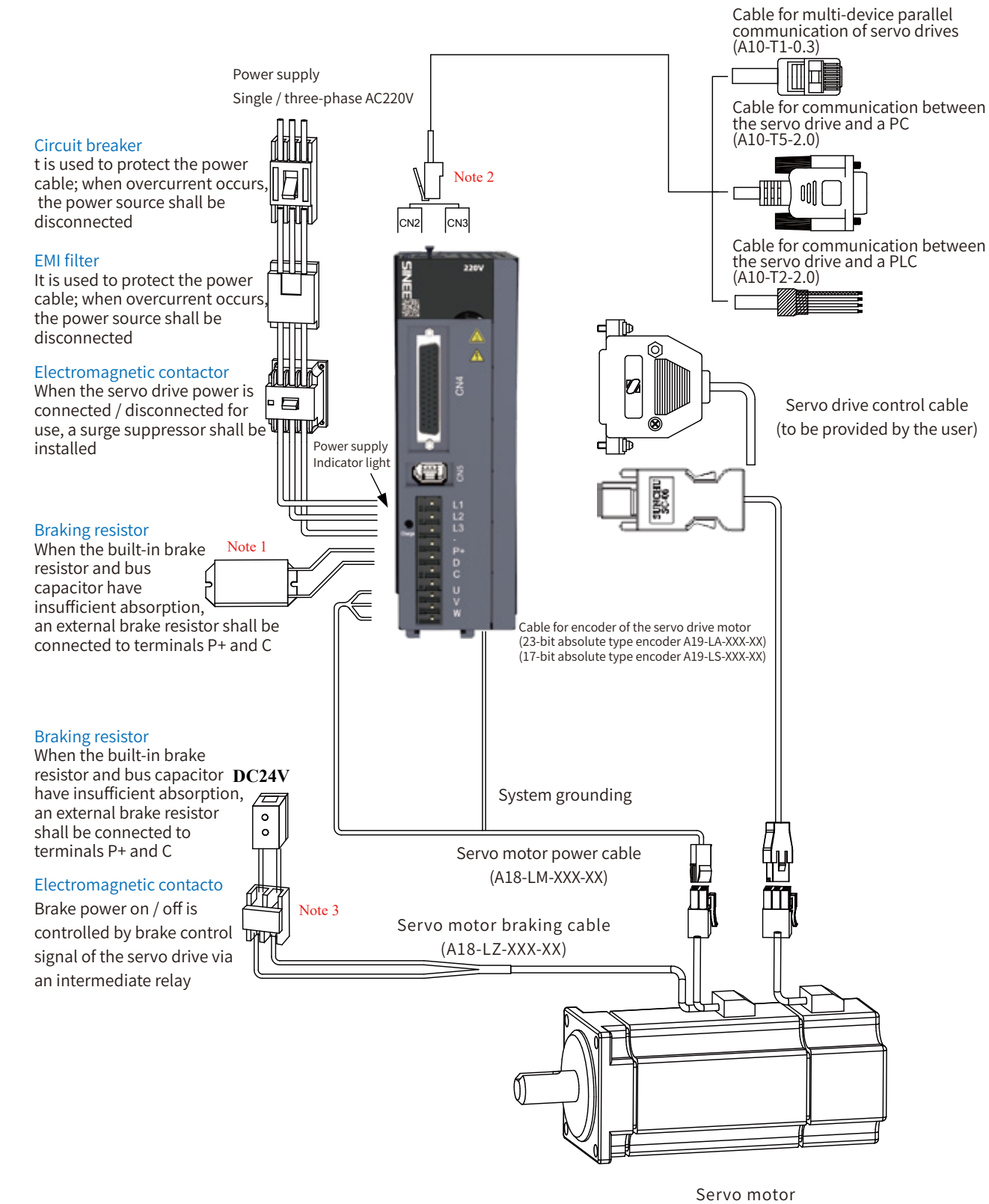
Stable and reliable







## Connection between EA190 pulse type servo drive and peripheral device





## Terminal description of EA190 pulse type servo drive

### Main circuit terminal

| Terminal marking | Terminal name                                        |
|------------------|------------------------------------------------------|
| L1、L2、L3         | AC power input terminal                              |
| P+、D、C           | Connecting terminal for an external braking resistor |
| P+、 $\Theta$     | Common DC bus terminal                               |
| U、V、W            | Servo motor connecting terminal                      |
| PE               | Grounding                                            |

### CN2 and CN3 communication terminals

| Pin number | Signal name | Function                                                                                                                                                                                    |
|------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1          | RS485+      | RS485 communication port                                                                                                                                                                    |
| 2          | RS485-      |                                                                                                                                                                                             |
| 3          | GND         | RS485/RS232 communication reference ground                                                                                                                                                  |
| 4          | RS232-RXD   | The transmitting terminal of RS232 connects to the receiving terminal of the upper computer.<br>The receiving terminal of RS232 connects to the transmitting terminal of the upper computer |
| 5          | RS232-TXD   |                                                                                                                                                                                             |

### CN6 USB communication terminal

### CN4 control terminal

|                           | Signal name | Pin number | Function description                                                                                                                                      |
|---------------------------|-------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Digital input port        | DI1         | 5          | Digital input, default function No. 1                                                                                                                     |
|                           | DI2         | 20         | Digital input, default function No. 2                                                                                                                     |
|                           | DI3         | 4          | Digital input, default function No. 13                                                                                                                    |
|                           | DI4         | 19         | Digital input, default function No. 14                                                                                                                    |
|                           | DI5         | 3          | Digital input, default function No. 3                                                                                                                     |
|                           | DI6         | 18         | Digital input, default function No. 12                                                                                                                    |
|                           | DI7         | 2          | Digital input, default function No. 20                                                                                                                    |
|                           | DI8         | 17         | Digital input, default function No. 21                                                                                                                    |
| Power supply              | COM+        | 21         | Digital input common positive terminal                                                                                                                    |
|                           | COM         | 7/22/36    | Internal 24V power source, with the voltage range of +20V ~ 26V<br>Maximum output current 100mA<br>Internal 24V power ground; digital input common ground |
| Digital output            | DO1         | 8          | Digital output, default function No. 1                                                                                                                    |
|                           | DO1-        | 37         |                                                                                                                                                           |
|                           | DO2         | 23         | Digital output, default function No. 2                                                                                                                    |
|                           | DO2-        | 38         |                                                                                                                                                           |
|                           | DO3         | 9          | Digital output, default function No. 8                                                                                                                    |
|                           | DO3-        | 39         |                                                                                                                                                           |
| Position pulse out/in     | DO4         | 24         | Digital output, fixed function No. 12                                                                                                                     |
|                           | DO4-        | 10         |                                                                                                                                                           |
|                           | DO5         | 41         | Digital output, with ground COM. Default function No. 0                                                                                                   |
|                           | PULHIP      | 1          |                                                                                                                                                           |
|                           | PULSE+      | 33         | Position pulse command +                                                                                                                                  |
|                           | PULSE-      | 34         | Position pulse command -                                                                                                                                  |
| Frequency division output | PULHIS      | 16         | Positive terminal when 24V power source is used for command pulse                                                                                         |
|                           | SIGN+       | 31         | Position direction command +                                                                                                                              |
|                           | SIGN-       | 32         | Position direction command -                                                                                                                              |
|                           | PA+         | 28         | Differential frequency division output of pulse A, maximum allowable current 20mA                                                                         |
|                           | PA-         | 13         |                                                                                                                                                           |
|                           | PB+         | 12         | Differential frequency division output of pulse B, maximum allowable current 20mA                                                                         |
|                           | PB-         | 27         |                                                                                                                                                           |
|                           | PZ+         | 11         | Differential frequency division output of pulse B, maximum allowable current 20mA                                                                         |
|                           | PZ-         | 26         |                                                                                                                                                           |
|                           | OCZ         | 35         | Z pulse open-collector output, maximum allowable current 40mA                                                                                             |
|                           | GND         | 29         | A pulse open-collector output, maximum allowable current 40mA                                                                                             |
|                           | OCA         | 43         |                                                                                                                                                           |
|                           | OCB         | 42         | B pulse open-collector output, maximum allowable current 40mA                                                                                             |

### CN5 encoder terminal

| Pin number | Signal name |
|------------|-------------|
| 1          | +5V         |
| 2          | GND         |
| 3          | +5V         |
| 4          | GND         |
| 5          | SD+         |
| 6          | SD-         |
| Housing    | PE          |

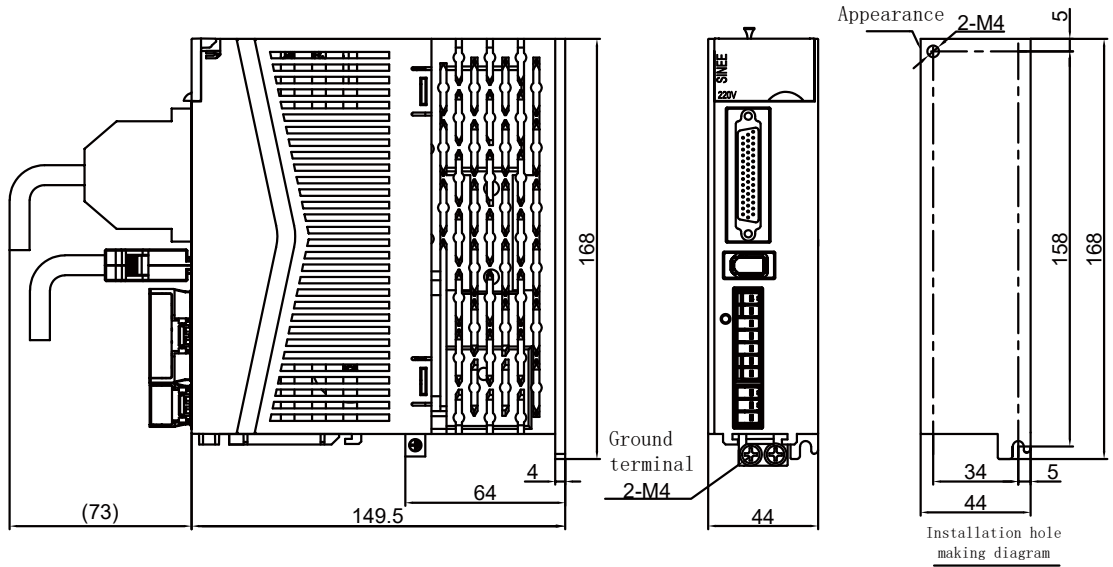
Model description of EA190 pulse type servo drive

EA 190 X - 6R2 - 2 B - XX

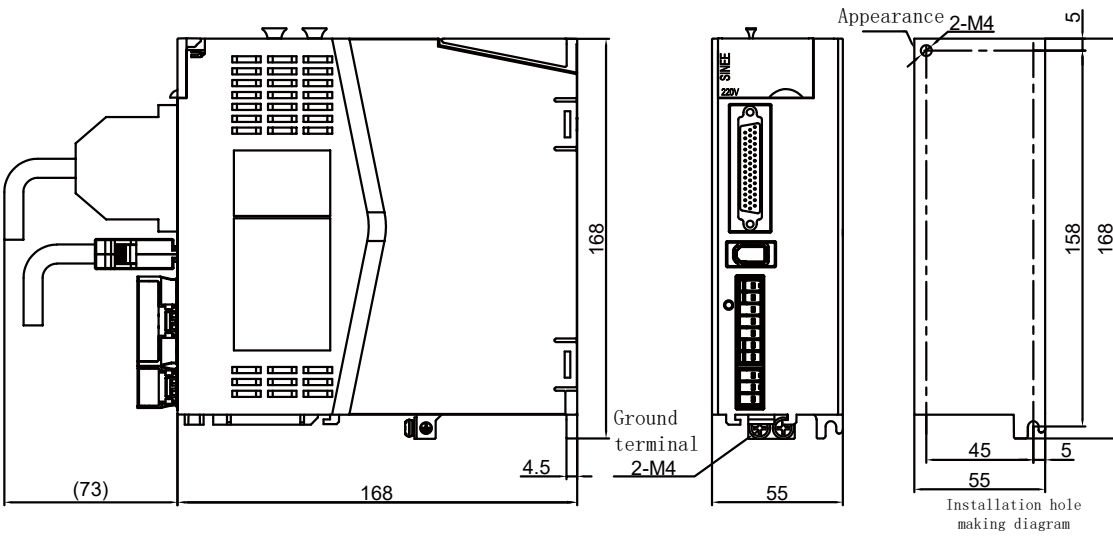
① ② ③ ④ ⑤ ⑥ ⑦

|                         |                                                                                      |                                                |
|-------------------------|--------------------------------------------------------------------------------------|------------------------------------------------|
| ①Product<br>Servo drive | ④Rated output current<br>0R9-0.9A<br>6R2-6.2A                                        | ⑥ Encoder type<br>B: Serial communication type |
| ②Series<br>190 series   |                                                                                      |                                                |
| ③Null:Pulse type        | ⑤Power voltage specification<br>1.Single-phase 220 V<br>2.Single / three-phase 220 V | ⑦Special specifications                        |

Dimension diagram of EA190 pulse type servo drive



EA190□-0R9-1B EA190□-1R6-1B EA190□-2R5-1B



EA190□-4R8-2B EA190□-6R2-2B

Specification of EA190 pulse type servo drive

|                                   |                               |                                                                                                                                     |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|-----------------------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating conditions              | Temperature                   | Working temperature 0~40° , storage temperature -20° ~85°                                                                           |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Humidity                      | Working/storage: ≤ 90% RH (without dew condensation)                                                                                |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Altitude                      | ≤ 1,000 m                                                                                                                           |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Vibration                     | ≤ 4.9 m/s <sup>2</sup> , 10~60 Hz (no operation at the point of resonance is permitted)                                             |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Cooling method                    |                               | Fan cooling                                                                                                                         |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Control method                    |                               | SVPWM, vector control                                                                                                               |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Six control modes                 |                               | Speed control, position control, torque control, speed / position control, torque / speed control, position / torque control        |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Front panel                       |                               | 5 keys, 5-digit LED                                                                                                                 |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Regenerative brake                |                               | Built-in brake unit and resistor; an external braking resistor can be connected                                                     |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Feedback mode                     |                               | Support 17-bit incremental / 23-bit absolute encoder                                                                                |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Digital input / output            |                               | Input                                                                                                                               | Servo start, alarm resetting, position pulse deviation counter clearing, speed command direction selection, position / speed multi-segment switching, internal command trigger, control mode switching, pulse disable, forward drive disable, reverse drive disable, forward jog, backward jog |                                                                                                                                                                 |
|                                   |                               | Output                                                                                                                              | Servo ready, brake output, motor rotation output, zero-speed signal, speed approach, speed reached, position approach, torque limit, rotating speed limit, warning output, alarm output.                                                                                                       |                                                                                                                                                                 |
| Protective Function               |                               | Hardware                                                                                                                            | Over-voltage, under-voltage, over-speed, overheat, overload, over-speed, encoder alarm, and so on.                                                                                                                                                                                             |                                                                                                                                                                 |
|                                   |                               | Software                                                                                                                            | Excessively large position error, EEPROM fault, and so on.                                                                                                                                                                                                                                     |                                                                                                                                                                 |
| Alarm data tracking function      |                               | Record 4 groups of historical alarms and relevant data                                                                              |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Communication function            |                               | Modbus RTU                                                                                                                          |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Encoder signal output resolution  | Signal type                   | A, B, Z differential outputs, Z signal open-collector output; Z signal width can be set.<br>A/B/Z Pulse open collector output (NPN) |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Resolution                    | Any frequency division can be programmed and output before or after frequency quadruplication                                       |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Position control mode             | Maximum input pulse frequency | Differential input mode: 500 Kpps<br>Open-collector input mode: 200 Kpps                                                            |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Pulse command mode            | Pulse + symbol, A and B-phase orthogonal pulse, CW/CCW                                                                              |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Command control mode          | External pulse command, multi-segment position command                                                                              |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Command smoothing mode        | Low-pass filtering, FIR filter, trapezoid-shaped smoothing of multi-segment position command                                        |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Electronic gear ratio         | Electronic gear ratio: N/M multiples (0.001 < N/M < 64000 = N: 1~2 <sup>30</sup> , M: 1 ~ 2 <sup>30</sup> )                         |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Position accuracy             | ±1 pulse command                                                                                                                    |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Speed control mode                | Command control mode          | digital speed command, multistage speed command, inching command                                                                    |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Command smoothing mode        | Low-pass filtering, smooth S curve                                                                                                  |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Torque limit                  | Digital setting limit                                                                                                               |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Speed regulation ratio        | 1:5000 (23-bit encoder)                                                                                                             |                                                                                                                                                                                                                                                                                                | Minimal speed/rated rotating speed of continuous stable operation under the rated load                                                                          |
|                                   | Bandwidth                     | No less than 800 Hz (in case of a 23-bit encoder)                                                                                   |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Speed regulation ratio        | Load fluctuation (0 ~100%)                                                                                                          | Maximum 0.1%                                                                                                                                                                                                                                                                                   | For a 23-bit encoder, when the speed command is the rated rotating speed, (rotating speed without load - rotating speed with full load) / rated rotating speed. |
|                                   |                               | Power voltage change ±10%                                                                                                           | Maximum 0.1%                                                                                                                                                                                                                                                                                   |                                                                                                                                                                 |
| Environment temperature (0~50°C ) |                               | Maximum 0.1%                                                                                                                        |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
| Torque control mode               | Command control mode          | digital torque command                                                                                                              |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Command smoothing mode        | Low-pass filtering                                                                                                                  |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Speed limit                   | Digital setting limit                                                                                                               |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |
|                                   | Accuracy                      | ±3% (current repetition accuracy)                                                                                                   |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                 |





EA190 series servo motor and drive matching table

| Servo drive |                                                                                   |                                                       | Motor                                                                                                                                                                  |                    |                                                                                                                                  |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------|
| EA190       | Model                                                                             | Supply voltage                                        | Motor                                                                                                                                                                  | Power wattage      | Adaptable motor model                                                                                                            |
| SIZE A      |  | EA190 □ -0R9-1B<br>EA190 □ -1R6-1B<br>EA190 □ -2R5-1B | <br> | 50W 100W 200W 400W | SES04-005-30-2HAY □<br>SES04-0R1-30-2HAY □<br>SES06-0R2-30-2HBY □<br>SES06-0R4-30-2HBY □                                         |
|             |                                                                                   |                                                       |                                                                                                                                                                        |                    |                                                                                                                                  |
| SIZE B      |  | EA190 □ -4R8-2B<br>EA190 □ -6R2-2B                    |                                                                                       | 750W 1000W         | SES08-0R7-30-2HBY□<br>SES08-1R0-30-2HBY□<br>SER13-1R0-10-2HBY□<br>SER13-1R0-20-2HBY□<br>SER13-1R0-30-2HBY□<br>SES13-1R1-20-2HBY□ |

H: 17bit Single-turn magnetic encoder



EA190 series servo motor and drive matching table

| Motor specification / model | Adaptable Drive model | Encoder cable                                                         | Motor cable                                                                                   |
|-----------------------------|-----------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| SES04-005-30-2HAY □         | EA190□-0R9-1B         | A19-LS-A000-m<br>(without battery)<br>A19-LA-A000-m<br>(with battery) | A18-LM-A007-m<br>(motor power cable)<br>A18-LZ-A005-m<br>(brake cable for motor with a brake) |
| SES04-0R1-30-2HAY □         | EA190□-1R6-1B         |                                                                       |                                                                                               |
| SES06-0R2-30-2HBY □         |                       |                                                                       |                                                                                               |
| SES06-0R4-30-2HBY □         | EA190□-2R5-1B         |                                                                       |                                                                                               |
| SES08-0R7-30-2HBY □         | EA190□-4R8-2B         |                                                                       |                                                                                               |
| SES08-1R0-30-2HBY □         | EA190□-6R2-2B         | A19-LS-H100-m<br>(without battery)<br>A19-LA-H100-m<br>(with battery) | Without brake:<br>A18-LM-H115-m<br>With brake:<br>A18-LB-H115-m                               |
| SER13-1R0-10-2HBY □         |                       |                                                                       |                                                                                               |
| SER13-1R0-20-2HBY □         |                       |                                                                       |                                                                                               |
| SER13-1R0-30-2HBY □         |                       |                                                                       |                                                                                               |

# Intelligent logistics



## Industrial demand

Rapid development of e-commerce and cold chain logistics in China brings new opportunities for the express delivery industry. The large delivery volume has expedited construction of sorting centers for express delivery of goods, while small modular sorting equipment and systems of high flexibility and performance-cost ratio have become a focus of fast delivery enterprises. “To accomplish each delivery” is the uppermost pursuit of delivery services. Accurate sorting is obviously a core procedure of delivery. Sorting error will not only cause inconvenience to customers, but also impair confidence of goods sellers and express delivery enterprises. Reliable intelligent sorting systems are helping distribution centers of express delivery enterprises realize “intelligent sorting, fast transfer and less people-dependent operation” of parcels.

## Highlights of the scheme

- Accurate location with a precise high-speed response controller
- Frequency division output, subject to closed-loop configuration control
- Smooth acceleration and deceleration; fast and stable parcel loading
- High sorting efficiency, with single-machine sorting speed of 6-8 K/h

## Scheme composition

EA196、EA190 series servo motor  
EtherCAT bus communication  
Customized motor cable

# EA196 series servo drive

1P input 220 V~240V 0.4~0.75KW



High-speed response



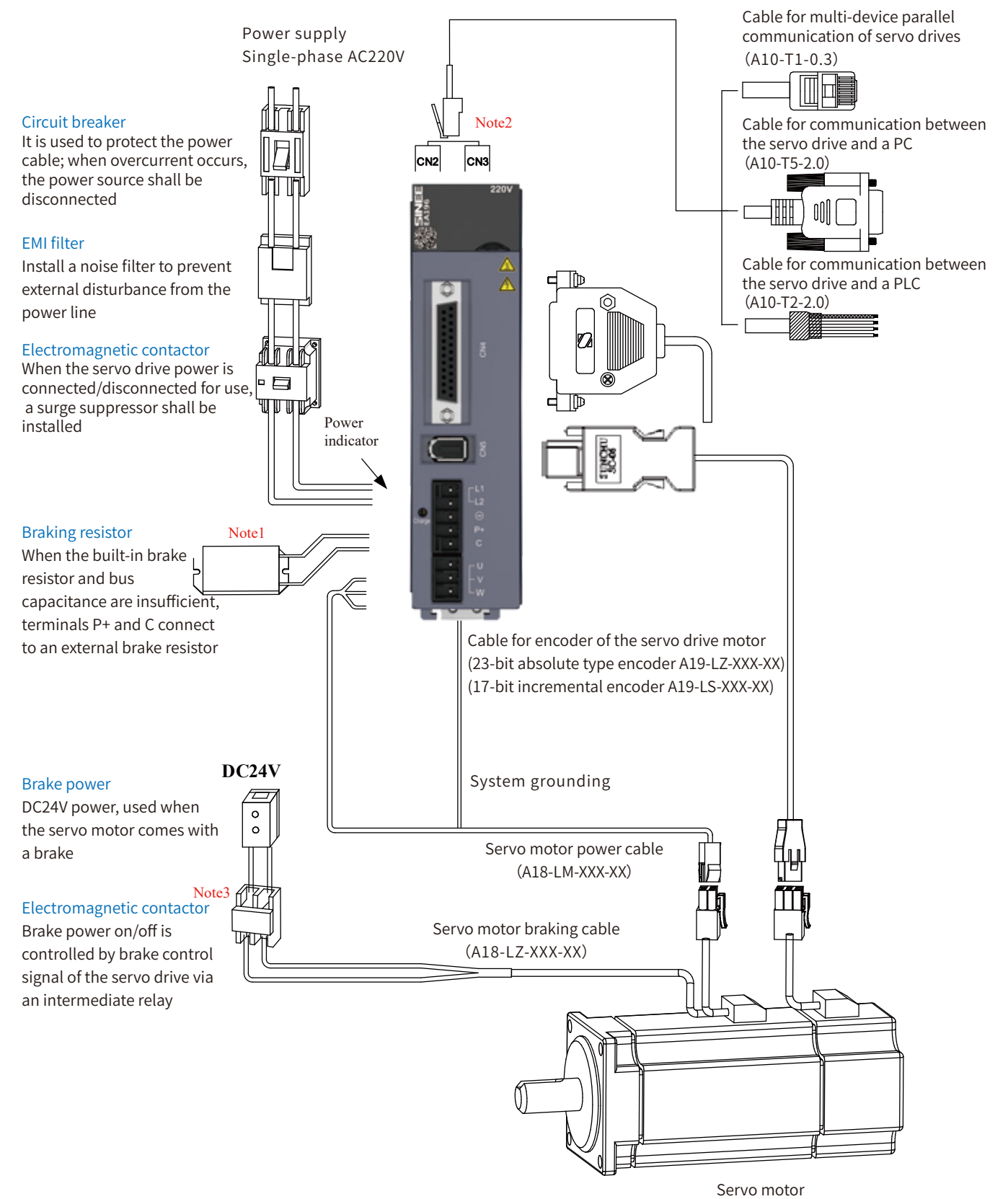
High-precision positioning



Easy to use



## Connection between EA196 pulse type servo drive and peripheral device



**Note 1:** When an external brake resistor is used, it is required to remove the short-circuiting piece between P+ and D, and correctly set the brake resistor parameter on the Drive

**Note 2:** CN2 and CN3 are two RJ45 sockets with identically defined internal pins

**Note 3:** It is strongly recommended that the servo motor brake is defined by the servo drive as the DO terminal of the BK function for control. The DO terminal of the servo drive shall have its load capacity used only for driving an intermediate relay other than an electromagnetic contactor.





Terminal description of EA196 pulse type servo drive

Main circuit terminal

| Terminal marking | Terminal name                                        |
|------------------|------------------------------------------------------|
| L1、 L2           | AC power input terminal                              |
| P+、 D、 C         | Connecting terminal for an external braking resistor |
| P+、 $\Theta$     | Common DC bus terminal                               |
| U、 V、 W          | Servo motor connecting terminal                      |
| PE               | Grounding                                            |

CN2 and CN3 communication terminals

| Pin number | Signal name | Function                                                                                    |
|------------|-------------|---------------------------------------------------------------------------------------------|
| 1          | RS485+      | RS485 communication port                                                                    |
| 2          | RS485-      |                                                                                             |
| 3          | GND         | RS485/RS232 communication reference ground                                                  |
| 4          | RS232-RXD   | The transmitting terminal of RS232 connects to the receiving terminal of the upper computer |
| 5          | RS232-TXD   | The receiving terminal of RS232 connects to the transmitting terminal of the upper computer |

CN6 USB communication terminal

CN4 control terminal

|                      | Signal name | Pin number | Function description                                                            |
|----------------------|-------------|------------|---------------------------------------------------------------------------------|
| Digital input port   | DI1         | 18         | Digital input, default function No. 1                                           |
|                      | DI2         | 6          | Digital input, default function No. 2                                           |
|                      | DI3         | 4          | Digital input, default function No. 13                                          |
|                      | DI4         | 17         | Digital input, default function No. 14                                          |
|                      | DI5         | 5          | Digital input, default function No. 3                                           |
|                      | COM+        | 19         | Digital input common positive terminal                                          |
| Power supply         | +24V        | 7          | Internal 24V power source, voltage range +20V~26V, maximum output current 100mA |
|                      | COM         | 16         | Internal 24V power ground; digital input common ground                          |
| Digital output       | DO1+        | 8          | Digital output, default function No. 1                                          |
|                      | DO1-        | 20         |                                                                                 |
|                      | DO2+        | 21         | Digital output, default function No. 2                                          |
|                      | DO2-        | 9          |                                                                                 |
|                      | DO3+        | 22         | Digital output, default function No. 12                                         |
|                      | DO3-        | 10         |                                                                                 |
| Position pulse input | PULHIP      | 1          | Positive terminal when 24V power source is used for command pulse               |
|                      | PULSE+      | 15         | Position pulse command +                                                        |
|                      | PULSE-      | 3          | Position pulse command -                                                        |
|                      | SIGN+       | 14         | Position direction command +                                                    |
|                      | SIGN-       | 2          | Position direction command -                                                    |

CN5 encoder terminal

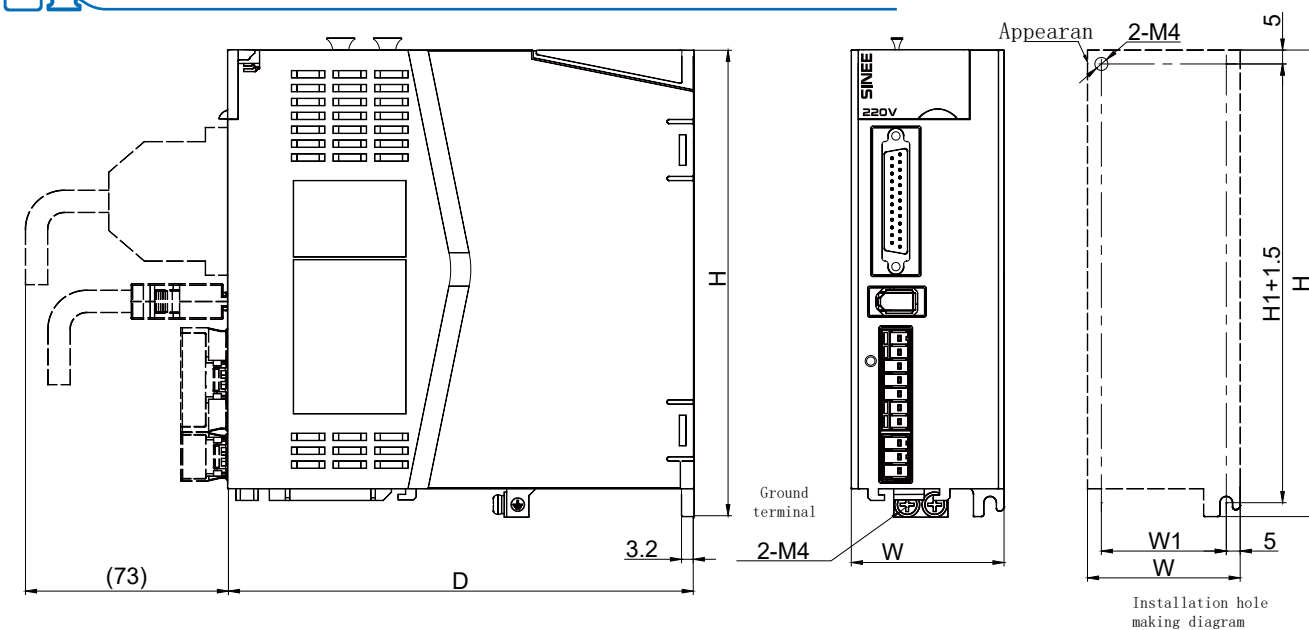
| Pin number | Signal name |
|------------|-------------|
| 1          | +5V         |
| 2          | GND         |
| 3          | +5V         |
| 4          | GND         |
| 5          | SD+         |
| 6          | SD-         |
| Housing    | PE          |



Specification of EA196 pulse type servo drive

|                              |                               |                                                                                                                                                                                                                                                                                                |                                                                                        |
|------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Operating conditions         | Temperature                   | Working temperature 0~40° , storage temperature -20° ~85°                                                                                                                                                                                                                                      |                                                                                        |
|                              | Humidity                      | Working/storage: ≤ 90%RH (without dew condensation)                                                                                                                                                                                                                                            |                                                                                        |
|                              | Altitude                      | ≤ 1000m                                                                                                                                                                                                                                                                                        |                                                                                        |
|                              | Vibration                     | ≤ 4.9m/s <sup>2</sup> , 10~60Hz (no operation at the point of resonance is permitted)                                                                                                                                                                                                          |                                                                                        |
| Cooling method               |                               | Fan cooling                                                                                                                                                                                                                                                                                    |                                                                                        |
| Control method               |                               | SVPWM, vector control                                                                                                                                                                                                                                                                          |                                                                                        |
| Six control modes            |                               | Speed control, position control, torque control, speed/position control, torque/speed control, position/torque control                                                                                                                                                                         |                                                                                        |
| Front panel                  |                               | 5 keys, 5-digit LED                                                                                                                                                                                                                                                                            |                                                                                        |
| Regenerative brake           |                               | Built-in brake unit and resistor; an external braking resistor can be connected                                                                                                                                                                                                                |                                                                                        |
| Feedback mode                |                               | 17-bit incremental/23-bit absolute encoder                                                                                                                                                                                                                                                     |                                                                                        |
| Digital input/output         | Input                         | Servo start, alarm resetting, position pulse deviation counter clearing, speed command direction selection, position/speed multi-segment switching, internal command trigger, control Mode switching, pulse disable, forward drive disable, reverse drive disable, forward inch, backward inch |                                                                                        |
|                              | Output                        | Servo ready, brake output, motor rotation output, zero-speed signal, speed approach, speed reached, position approach, torque limit, rotating speed limit, warning output, alarm output.                                                                                                       |                                                                                        |
| Protective Function          | Hardware                      | Over-voltage, under-voltage, over-speed, overheat, overload, over-speed, encoder alarm, and so on.                                                                                                                                                                                             |                                                                                        |
|                              | Software                      | Excessively large position error, EEPROM fault, and so on.                                                                                                                                                                                                                                     |                                                                                        |
| Alarm data tracking function |                               | Record 4 groups of historical alarms and relevant data                                                                                                                                                                                                                                         |                                                                                        |
| Communication function       |                               | Modbus RTU                                                                                                                                                                                                                                                                                     |                                                                                        |
| Position control mode        | Maximum input pulse frequency | Differential input mode: 500Kpps<br>Open-collector input mode: 200Kpps                                                                                                                                                                                                                         |                                                                                        |
|                              | Pulse command mode            | Pulse + symbol, A and B-phase orthogonal pulse                                                                                                                                                                                                                                                 |                                                                                        |
|                              | Command control mode          | External pulse command, multi-segment position command                                                                                                                                                                                                                                         |                                                                                        |
|                              | Command smoothing mode        | Low-pass filtering, FIR filter, trapezoid-shaped smoothing of multi-segment position command                                                                                                                                                                                                   |                                                                                        |
|                              | Electronic gear ratio         | Electronic gear ratio: N/M multiples (0.001< N/M< 64000 = N: 1~2 <sup>30</sup> , M: 1~2 <sup>30</sup> )                                                                                                                                                                                        |                                                                                        |
|                              | Position accuracy             | ±1 pulse command                                                                                                                                                                                                                                                                               |                                                                                        |
| Speed control mode           | Command control mode          | External pulse, digital speed command, multistage speed command, inching command                                                                                                                                                                                                               |                                                                                        |
|                              | Command smoothing mode        | Low-pass filtering, smooth S curve                                                                                                                                                                                                                                                             |                                                                                        |
|                              | Torque limit                  | Digital setting limit                                                                                                                                                                                                                                                                          |                                                                                        |
|                              | Speed regulation ratio        | 1:5000 (23-bit encoder)                                                                                                                                                                                                                                                                        | Minimal speed/rated rotating speed of continuous stable operation under the rated load |
|                              | Bandwidth                     | No less than 400Hz (23-bit encoder)                                                                                                                                                                                                                                                            |                                                                                        |
|                              | Speed fluctuation ratio       | Load fluctuation (0~100%)                                                                                                                                                                                                                                                                      | Maximum 0.1%                                                                           |
|                              |                               | Supply voltage change ±10%                                                                                                                                                                                                                                                                     | Maximum 0.1%                                                                           |
| Torque control mode          | Command control mode          | Digital torque command                                                                                                                                                                                                                                                                         |                                                                                        |
|                              | Command smoothing mode        | Low-pass filtering                                                                                                                                                                                                                                                                             |                                                                                        |
|                              | Speed limit                   | Digital setting limit                                                                                                                                                                                                                                                                          |                                                                                        |
|                              | Accuracy                      | ±3% (current repetition accuracy)                                                                                                                                                                                                                                                              |                                                                                        |

## Dimension of EA196 pulse type servo drive



## EA196 series servo motor and drive matching table

| Servo drive |                                                                                     |               |                     | Motor                                                                               |           |                                                                                          |
|-------------|-------------------------------------------------------------------------------------|---------------|---------------------|-------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------|
| EA196       |                                                                                     | Model         | Supply voltage      | Motor                                                                               | Power     | Adaptable motor model                                                                    |
| SIZE A      |  | EA196 -2R5-1B | Single-phase AC220V |  | 200W 400W | SES06-0R2-30-2HBY <input type="checkbox"/><br>SES06-0R4-30-2HBY <input type="checkbox"/> |
| SIZE B      |  | EA196 -4R8-1B | Single-phase AC220V |  | 750W      | SES08-0R7-30-2HBY <input type="checkbox"/>                                               |



## EA196 series servo motor and drive matching table

| Motor specification/model | Adaptable Drive model | Encoder cable                                                         | Motor cable                                                                                   |
|---------------------------|-----------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| SES06-0R2-30-2HBY □       | EA190□-2R5-1B         | A19-LS-A000-m<br>(without battery)<br>A19-LA-A000-m<br>(with battery) | A18-LM-A007-m<br>(motor power cable)<br>A18-LZ-A005-m<br>(brake cable for motor with a brake) |
| SES06-0R4-30-2HBY □       |                       |                                                                       |                                                                                               |
| SES08-0R7-30-2HBY □       | EA190□-4R8-2B         |                                                                       |                                                                                               |

## Printing & packaging

## Front-edge paper feeder

© **Industrial demand**

- It is the core demand of front-edge paper feeding device to make several groups of rubber axes of feed roller coordinate with paper feeding at a certain time sequence according to the real-time position of the printing roller and meet the required precision of the customer after paper feeding.

### © Highlights of the scheme

- Motion controller scheme: 350 high-performance servo drive + ultra-low inertia motor + motion controller, with high speed and high accuracy of paper feeding, simple commissioning and convenient maintenance.

© **Adaptable motor model**

- Motion controller scheme: 350 high-performance servo drive + ultra-low inertia motor + motion controller, with high speed and high accuracy of paper feeding, simple commissioning and convenient maintenance.





# EA180C/P servo drive

1P input 220 V~240V 0.05~0.4KW

1P or 3P input 220 V~240V 0.75~ 1KW

3P input 220 V~240V 1.5KW

3P input 340V~460V 1.5~ 29KW



High-speed response



Bus control



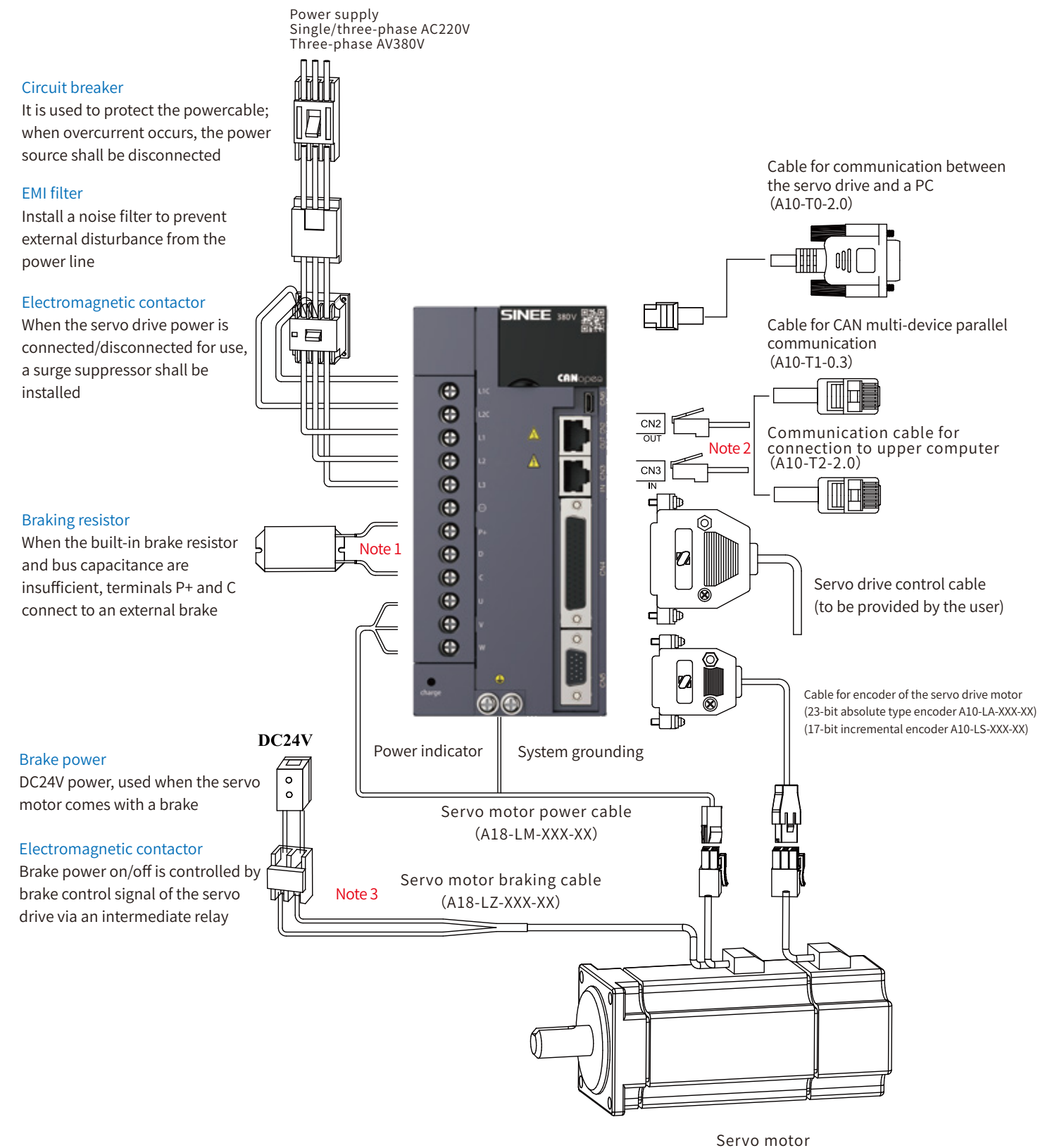
High-precision positioning



Easy to use



## Connection between EA180 CANopen bus servo drive and peripheral device





## Terminal description of EA180 CANOpen servo drive

### Main circuit terminal

| Terminal marking | Terminal name                                        |
|------------------|------------------------------------------------------|
| L1C、L2C          | Control power input terminal                         |
| L1、L2、L3         | AC power input terminal of main circuit              |
| P+、D、C           | Connecting terminal for an external braking resistor |
| P+、 $\ominus$    | Common DC bus terminal                               |
| U、V、W            | Servo motor connecting terminal                      |
| PE               | Grounding                                            |

### CN1 analog monitoring terminal

| Pin number | Signal name | Function                                            |
|------------|-------------|-----------------------------------------------------|
| 1          | AO1         | Output voltage 0V ~ 10V, maximum output current 1mA |
| 2          | AO2         |                                                     |
| 3          | GND         | Common ground of analog output signal               |
| 4          | Reserved    | Cannot be connected with any signal line            |

### CN6 USB communication terminal

According to USB 2.0 specification

### CN2 and CN3 communication terminals

| Pin number | Signal name | Function                              |
|------------|-------------|---------------------------------------|
| 1          | RS485+      | Positive terminal of RS485 signal     |
| 2          | RS485-      | Negative terminal of RS485 signal     |
| 3          | GND         | Communication signal reference ground |
| 4          | RS232-RXD   | RS232 signal receiving side           |
| 5          | RS232-TXD   | RS232 signal sending side             |
| 6          | GND         | Communication signal reference ground |
| 7          | CANH        | CAN communication reference ground    |
| 8          | CANL        | Negative terminal of CAN signal       |

### CN4 control terminal

| Signal name               |      | Pin number | Default function                                                                          |  |
|---------------------------|------|------------|-------------------------------------------------------------------------------------------|--|
| Digital input port        | DI1  | 5          | S-ON<br>Servo on                                                                          |  |
|                           | DI2  | 20         | ALM-RST<br>Alarm fault resetting                                                          |  |
|                           | DI3  | 4          | P-CLR<br>Pulse deviation counter clearing                                                 |  |
|                           | DI4  | 19         | P-OT<br>Inhibit forward drive                                                             |  |
|                           | DI5  | 3          | N-OT<br>Inhibit reverse drive                                                             |  |
|                           | DI6  | 18         | INHIBIT<br>Pulse inhibited                                                                |  |
|                           | DI7  | 2          | ORPG<br>Homing detection signal                                                           |  |
|                           | DI8  | 17         | SHOM<br>Homing enable                                                                     |  |
|                           | COM+ | 21         | DI input common positive terminal                                                         |  |
| Power supply              | +24V | 25/40      | Internal 24V power source, voltage range +20V~26V, maximum output current 200mA           |  |
|                           | COM  | 7/22/36    |                                                                                           |  |
|                           | +10V | 44         | +10V power, maximum output of 10mA                                                        |  |
| Digital output            | DO1  | 8          | S-RDY+<br>The servo is ready and can be connected when S-ON signal status can be received |  |
|                           | DO1- | 37         | S-RDY-                                                                                    |  |
|                           | DO2  | 23         | BK+<br>Brake control signal                                                               |  |
|                           | DO2- | 38         | BK-                                                                                       |  |
|                           | DO3  | 9          | COIN+<br>“Position reached” signal                                                        |  |
|                           | DO3- | 39         | COIN-                                                                                     |  |
|                           | DO4  | 24         | ALM+<br>Connected upon occurrence of a fault                                              |  |
|                           | DO4- | 10         | ALM-                                                                                      |  |
|                           | DO5  | 41         | Disabled<br>No function predefined                                                        |  |
| Frequency division output | PA+  | 28         | A pulse frequency division output +<br>Maximum current 20mA                               |  |
|                           | PA-  | 13         | A pulse frequency division output -                                                       |  |
|                           | PB+  | 12         | B pulse frequency division output +<br>Maximum current 20mA                               |  |
|                           | PB-  | 27         | B pulse frequency division output -                                                       |  |
|                           | PZ+  | 11         | Z pulse frequency division output +<br>Maximum current 20mA                               |  |
|                           | PZ-  | 26         | Z pulse frequency division output -                                                       |  |
|                           | OCZ  | 35         | Z pulse open-collector output, maximum allowable current 40mA.                            |  |
| GND                       | 29   |            |                                                                                           |  |

### CN5 encoder terminal

| Pin number | Signal name |
|------------|-------------|
| 1          | SD+         |
| 3          | SD-         |
| 5          | +5V         |
| 10         | GND         |
| Housing    | PE          |



## Terminal description of EA180 PROFINET bus servo drive

### CN1 RS232 communication terminal

| Pin number | Signal name | Function                                    |
|------------|-------------|---------------------------------------------|
| 1          | RS232-TXD   | RS232 signal sending side                   |
| 2          | RS232-RXD   | RS232 signal receiving side                 |
| 3          | GND         | RS232 communication signal reference ground |
| 4          | Reserved    | Cannot be connected with any signal line    |

### CN2 and CN3 PROFINET communication terminals

| CN3 PRFINET Port1 |             | CN2 PRFINET Port2 |             |
|-------------------|-------------|-------------------|-------------|
| Pin number        | Signal name | Pin number        | Signal name |
| 1                 | TD+         | 1                 | TD+         |
| 2                 | TD-         | 2                 | TD-         |
| 3                 | RD+         | 3                 | RD+         |
| 4                 |             | 4                 |             |
| 5                 |             | 5                 |             |
| 6                 | RD-         | 6                 | RD-         |
| 7                 |             | 7                 |             |
| 8                 |             | 8                 |             |

### CN4 control terminal

|                    | Signal name | Pin number | Default function                                                                |                                                                                 |
|--------------------|-------------|------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Digital input port | DI1         | 5          | P-OT                                                                            | Inhibit forward drive                                                           |
|                    | DI2         | 20         | N-OT                                                                            | Inhibit reverse drive                                                           |
|                    | DI3         | 4          | ORPG                                                                            | Homing detection signal                                                         |
|                    | DI4         | 19         | ALM-RST                                                                         | Alarm fault resetting                                                           |
| Power supply       | COM+        | 21         | Digital input common positive terminal (12~24V)                                 |                                                                                 |
|                    | +24V        | 25/40      | Internal 24V power source, voltage range +20V~26V, maximum output current 200mA |                                                                                 |
|                    | COM         | 7/22/36    | Internal 24V power ground; common negative terminal of digital input            |                                                                                 |
| Digital output     | DO1         | 8          | S-RDY+                                                                          | The servo is ready and can be connected when S-ON signal status can be received |
|                    | DO1-        | 37         | S-RDY-                                                                          |                                                                                 |
|                    | DO2         | 23         | BK+                                                                             | Brake control signal                                                            |
|                    | DO2-        | 38         | BK-                                                                             |                                                                                 |
|                    | DO3         | 9          | COIN+                                                                           | “Position reached” signal                                                       |
|                    | DO3-        | 39         | COIN-                                                                           |                                                                                 |
|                    | DO4         | 24         | ALM+                                                                            | Connected upon occurrence of a fault                                            |
|                    | DO4-        | 10         | ALM-                                                                            |                                                                                 |

### Main circuit terminal

| Terminal marking | Terminal name                                        |
|------------------|------------------------------------------------------|
| L1C、L2C          | Control power input terminal                         |
| L1、L2、L3         | AC power input terminal of main circuit              |
| P+、D、C           | Connecting terminal for an external braking resistor |
| P+、 $\ominus$    | Common DC bus terminal                               |
| U、V、W            | Servo motor connecting terminal                      |
| PE               | Grounding                                            |

### CN5 encoder terminal

| Pin number | Signal name |
|------------|-------------|
| 1          | SD+         |
| 3          | SD-         |
| 5          | +5V         |
| 10         | GND         |
| Housing    | PE          |

**Note:** For connection between EA180P PROFINET bus servo drive and peripheral device, use connection between EA300EETHERCAT bus servo drive and peripheral device for reference.



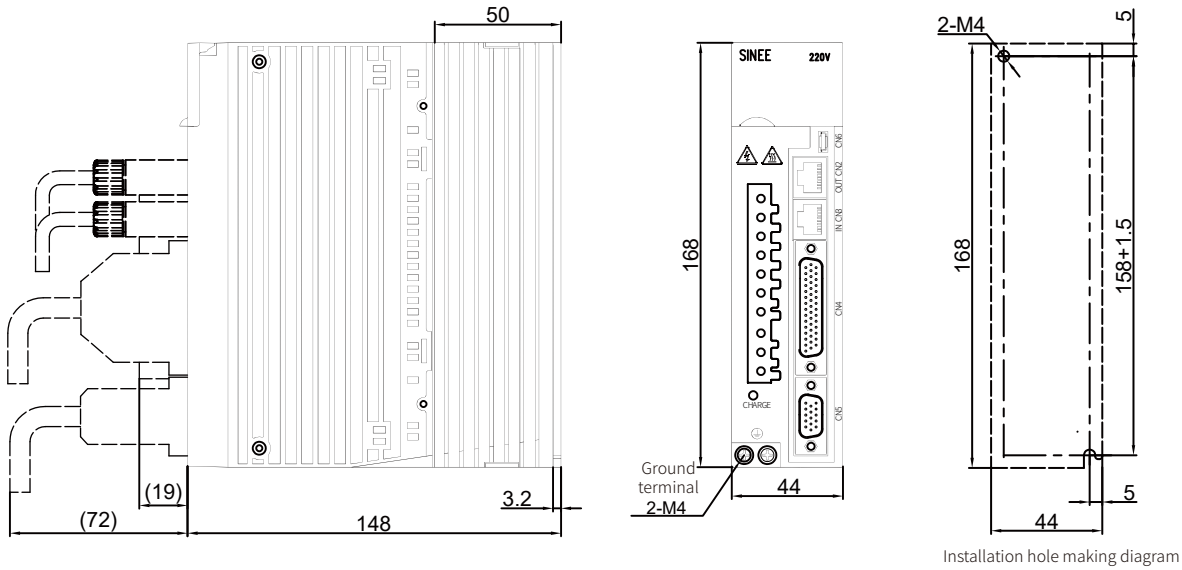
Model description of Series EA180C/P servo drive

EA 180 C - 6R2 - 2 B - XX

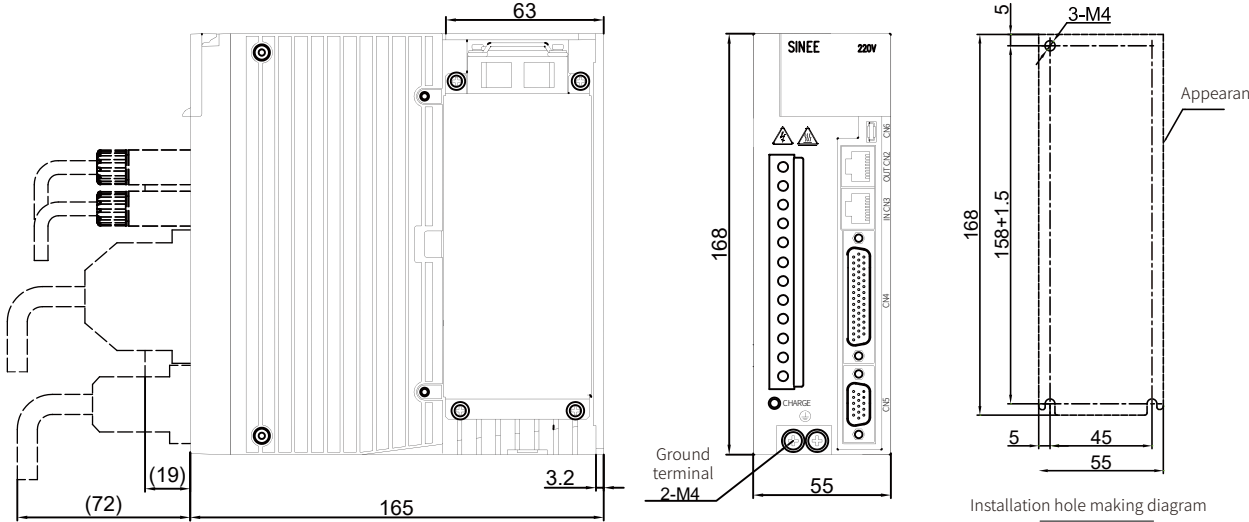
|                                     |                                                                                                            |                                               |
|-------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| ① Product<br>Servo drive            | ④ Rated output current<br>0R9-0.9A<br>028-28A                                                              | ⑥ Encoder type<br>B: 17/23-bit serial encoder |
| ② Series<br>180 series              |                                                                                                            |                                               |
| ③ C: CANOpen bus<br>P: PROFINET bus | ⑤ Power voltage specification<br>1. Single-phase 220V<br>2. Single/three-phase 220V<br>3. Three-phase 380V | ⑦ Non-standard specification                  |

| Supply voltage                   | Drive model      | Rated motor power (kW) | Rated current (A) | Maximum current (A) | Structure | Adaptive motor encoder         |
|----------------------------------|------------------|------------------------|-------------------|---------------------|-----------|--------------------------------|
| Single-phase 220V                | EA180 □ -0R9-1 □ | 0.05                   | 0.9               | 3.15                | SIZE A    | □ -B: 17/23-bit serial encoder |
|                                  | EA180 □ -1R6-1 □ | 0.02                   | 1.6               | 5.6                 |           |                                |
|                                  | EA180 □ -2R5-1 □ | 0.4                    | 2.5               | 9.0                 |           |                                |
| Single-phase or three-phase 220V | EA180 □ -4R8-2 □ | 0.75                   | 4.8               | 14.4                | SIZE B    |                                |
|                                  | EA180 □ -6R2-2 □ | 1                      | 6.2               | 18.6                |           |                                |
| Three-phase 220V                 | EA180 □ -011-2 □ | 1.5                    | 11                | 30                  | SIZE C    |                                |
| Three-phase 380V                 | EA180 □ -5R6-3 □ | 1.5                    | 5.6               | 15                  |           |                                |
|                                  | EA180 □ -8R5-3 □ | 2                      | 8.5               | 20                  |           |                                |
|                                  | EA180 □ -013-3 □ | 3                      | 13                | 30                  |           |                                |
|                                  | EA180 □ -017-3 □ | 4.4                    | 17                | 42.5                | SIZE D    |                                |
|                                  | EA180 □ -022-3 □ | 5.5                    | 22                | 55                  |           |                                |
|                                  | EA180 □ -028-3 □ | 7.5                    | 28                | 70                  |           |                                |

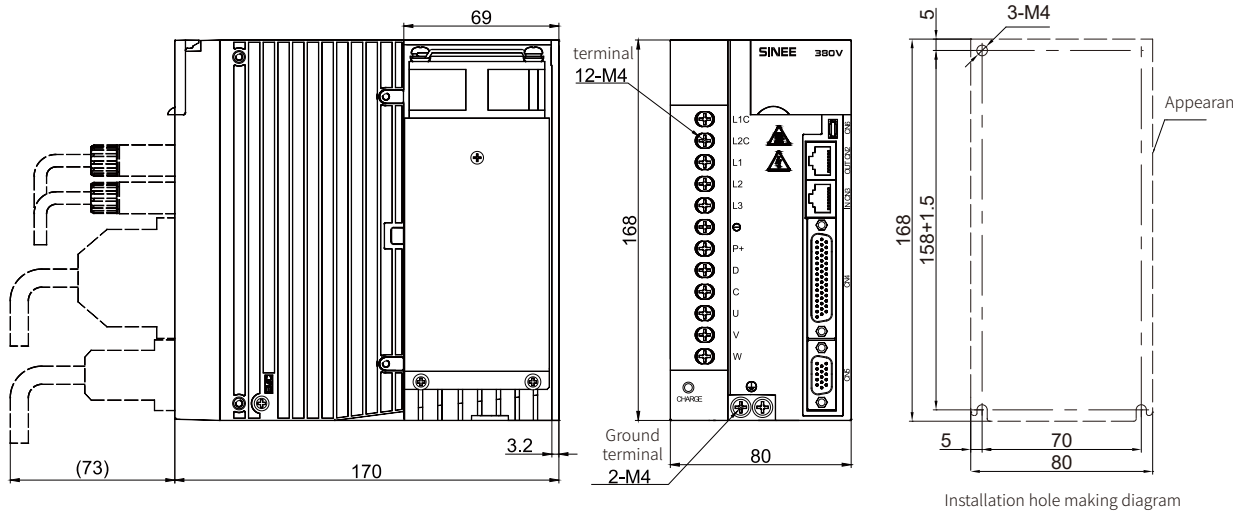
Dimension diagram of Series EA180C/P servo drive



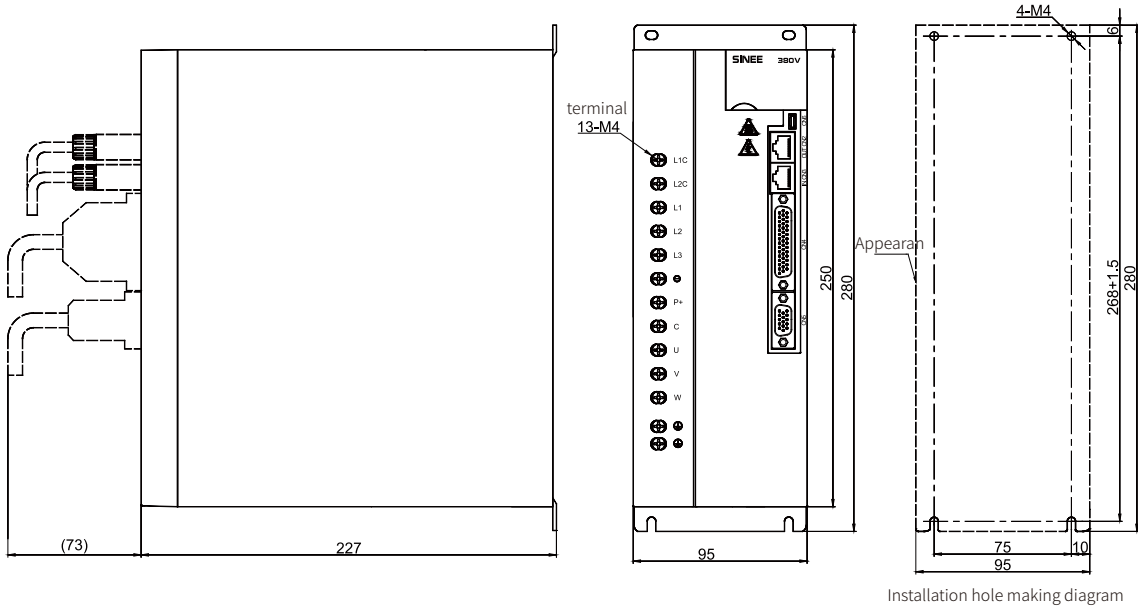
EA180□-0R9-1□ EA180□-1R6-1□ EA180□-2R5-1□



EA180□-4R8-2□ EA180□-6R2-2□



EA180□-5R6-3□ EA180□-8R5-3□ EA180□-013-3□ EA180□-011-2□



EA180□-017-3□ EA180□-022-3□ EA180□-028-3□



Technical specification of Series EA180C/P bus servo drive

EA180C CANopen and EA180P PROFINET bus servo drive

| Item                |                           |                                |                         | Specification                                                                                                          |                                                                                        |  |
|---------------------|---------------------------|--------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--|
| Basic specification | Control method            |                                |                         | IGBT PWM control sine-wave current drive                                                                               |                                                                                        |  |
|                     | Feedback                  |                                |                         | 17-bit incremental/encoder, 23-bit absolute encoder                                                                    |                                                                                        |  |
|                     | Six control modes         |                                |                         | Speed control, position control, torque control, speed/position control, torque/speed control, position/torque control |                                                                                        |  |
|                     | Front panel               |                                |                         | 5 keys, 5-digit LED                                                                                                    |                                                                                        |  |
|                     | Regenerative brake        |                                |                         | Built-in brake unit and resistor; an external braking resistor can be connected                                        |                                                                                        |  |
|                     | Use conditions            | Environment temperature        |                         | Working temperature 0~40° , storage temperature -20° ~85°                                                              |                                                                                        |  |
|                     |                           | Ambient humidity               |                         | Working/storage: ≤ 90%RH (without dew condensation)                                                                    |                                                                                        |  |
|                     |                           | Altitude                       |                         | ≤ 1,000m                                                                                                               |                                                                                        |  |
|                     |                           | Anti-vibration impact strength |                         | Vibration: ≤ 4.9m/s <sup>2</sup> (no operation at the point of resonance is permitted), impact: ≤ 19.6m/s <sup>2</sup> |                                                                                        |  |
|                     |                           | Protection level               |                         | IP10                                                                                                                   |                                                                                        |  |
| Pollution level     |                           | 2 level                        |                         |                                                                                                                        |                                                                                        |  |
| Cooling method      |                           |                                | Fan cooling             |                                                                                                                        |                                                                                        |  |
| Performance         | Speed-torque control mode | Speed fluctuation ratio        | Load fluctuation        | 0~100 load: Maximum 0.3%                                                                                               | Based on 23bit encoder, at rated speed                                                 |  |
|                     |                           |                                | Supply voltage change   | At rated voltage ± 10%: Maximum 0.3%                                                                                   |                                                                                        |  |
|                     |                           |                                | Environment temperature | 0~50°C : Maximum 0.3%                                                                                                  |                                                                                        |  |
|                     |                           | Speed regulation ratio         |                         | 1:5000 (17bit and 23bit encoder)                                                                                       | Minimal speed/rated rotating speed of continuous stable operation under the rated load |  |
|                     |                           | Frequency bandwidth            |                         | 1.2kHz (23-bit encoder)                                                                                                |                                                                                        |  |
|                     |                           | Torque control accuracy        |                         | ±3% current repetition accuracy                                                                                        |                                                                                        |  |
|                     |                           | Soft start time setting        |                         | 0~30s (acceleration and deceleration can be set respectively)                                                          |                                                                                        |  |
|                     | Position control mode     | Feedforward compensation       |                         | Resolution 0~100% (set resolution 1%)                                                                                  |                                                                                        |  |
|                     |                           | Positioning completion width   |                         | 1~655,335 instruction units (set resolution to 1 instruction unit)                                                     |                                                                                        |  |
|                     |                           | Min setting time               |                         | 5ms (no load, from rated speed to positioning completion)                                                              |                                                                                        |  |

EA180 CANopen and EA180P PROFINET bus servo drive

| Item   |                        |                                 |                                    | Specification                                                                                                                                                                                           |  |
|--------|------------------------|---------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| EA180C | Input/output signal    | Digital input port              | Variable signal distribution       | 8 DI<br>Fault reset, position pulse deviation counter clearing, pulse disable, forward drive disable, reverse drive disable, second torque limit, forward inch, backward inch, others                   |  |
|        |                        | Digital output                  | Variable signal frequency division | 4 DO<br>Servo ready, brake output, motor rotation output, zero-speed signal, speed approach, speed reached, position approach, torque limit, rotating speed limit, warning output, fault output, others |  |
|        | Built-in function      |                                 |                                    | Slow down and stop when P-OT and N-OT are valid                                                                                                                                                         |  |
|        |                        | LED display                     |                                    | 5-digit LED display: Main circuit CHARGE                                                                                                                                                                |  |
|        |                        | Protective Function             |                                    | Over-voltage, under-voltage, over-current, over-speed, IGBT overheat, overload, encoder exception, excessive position error, EEPROM fault, abnormal communication, others                               |  |
|        |                        | Others                          |                                    | Two-stage gain switching, automatic gain adjustment, 4 groups of alarm record, JOG operation                                                                                                            |  |
| EA180P | Input/output signal    | Digital input port              | Function allocation available      | Fault reset, forward drive disable, reverse drive disable, forward inch, backward inch, electronic gear ratio switching etc.                                                                            |  |
|        |                        | Digital output                  | Function allocation available      | Servo ready, brake output, motor rotation output, zero-speed signal, torque limit, rotating speed limit, warning output, fault output etc.                                                              |  |
|        | Built-in function      | Over-travel prevention function |                                    | Stopped immediately when P-OT and N-OT are activated.                                                                                                                                                   |  |
|        |                        | Electronic gear ratio           |                                    | 1.0 ≤ B/A ≤ 64000.0                                                                                                                                                                                     |  |
|        |                        | Protective Function             |                                    | Over-voltage, under-voltage, over-speed, overheat, overload, over-speed, over-temperature, encoder fault, braking resistor overload fault, EEPROM fault, abnormal communication etc.                    |  |
|        |                        | Alarm data tracking function    |                                    | Record 4 groups of historical alarms and relevant data                                                                                                                                                  |  |
| EA180C | Communication function | RS232 communication             |                                    | Status display, user parameter setting, monitoring display, alarm tracking display, JOG operation and automatic adjustment operation, speed instruction signal etc.                                     |  |
|        |                        | Communication mode              |                                    | RS232, RS485, CANopen                                                                                                                                                                                   |  |
|        |                        | CANopen bus control             |                                    | Synchronizing cycle: 1ms or its integral multiple<br>The following running modes are supported:<br>Profile Position; Profile Velocity Mode<br>Profile Torque Mode; Homing Mode                          |  |



EA180C/P series servo motor, drive and cable matching table

| Servo drive |                                                                                       |                                                    |                                    | Motor                                                                                 |                    |                                                                                                                                                               |
|-------------|---------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EA180       |                                                                                       | Model                                              | Supply voltage                     | Motor                                                                                 | Power              | Adaptable motor model                                                                                                                                         |
| SIZE A      |    | EA180□-0R9-1 □<br>EA180□-1R6-1 □<br>EA180□-2R5-1 □ | Single-phase AC220V                |    | 50W 100W 200W 400W | SES04-005-30-2FAY □<br>SES04-0R1-30-2FAY □<br>SES06-0R2-30-2FBY □<br>SES06-0R4-30-2FBY □                                                                      |
| SIZE B      |    | EA180□-4R8-2 □<br>EA180□-6R2-2 □                   | Single-phase or three-phase AC220V |    | 750W 1000W         | SES08-0R7-30-2FBY □<br>SER13-1R0-10-2FBY □<br>SER13-1R0-20-2FBY □<br>SER13-1R0-30-2FBY □                                                                      |
| SIZE C      |  | EA180□-5R6-3 □<br>EA180□-8R5-3 □<br>EA180□-013-3 □ | Three-phase AC380V                 |   | 850W 1.3kW 1.8kW   | SES13-0R8-15-3FBY □<br>SES13-1R3-15-3FBY □<br>SES13-1R8-15-3FBY □                                                                                             |
|             |                                                                                       |                                                    |                                    |  | 2.9kW              |                                                                                                                                                               |
|             |                                                                                       |                                                    |                                    |  | 1.5kW 2kW 3kW      | SER13-1R5-10-3FBY □<br>SER13-1R5-20-3FBY □<br>SER13-1R5-30-3FBY □<br>SER13-2R0-20-3FBY □<br>SER13-2R0-30-3FBY □<br>SER13-3R0-20-3FBY □<br>SER13-3R0-30-3FBY □ |
| SIZE D      |  | EA180□-011-2 □                                     | Three-phase AC220V                 |  | 1.5kW              | SER13-1R5-10-2FBY □<br>SER13-1R5-20-2FBY □<br>SER13-1R5-30-2FBY □                                                                                             |
| SIZE E      |  | EA180□-017-3 □<br>EA180□-022-3 □<br>EA180□-028-3 □ | Three-phase AV380V                 |  | 4.4kW 5.5kW 7.5kW  | SES18-4R4-15-3FBY □<br>SES18-5R5-15-3FBY □<br>SES18-7R5-15-3FBY □                                                                                             |





EA180C/P series servo motor, drive and cable matching table

| Motor specification/model                  | Adaptable Drive model                  | Encoder cable                                                         | Motor cable                                                                                                     |
|--------------------------------------------|----------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| SER13-1R0-10-2FBY <input type="checkbox"/> | EA180 <input type="checkbox"/> -6R2-2B | A10-LS-H100-m<br>(without battery)<br>A10-LA-H100-m<br>(with battery) | A18-LM-H115-m<br>(Power cable for motor without brake)<br>A18-LB-H115-m<br>(Power cable for motor with a brake) |
| SER13-1R0-20-2FBY <input type="checkbox"/> |                                        |                                                                       |                                                                                                                 |
| SER13-1R0-30-2FBY <input type="checkbox"/> |                                        |                                                                       |                                                                                                                 |
| SER13-1R5-10-2FBY <input type="checkbox"/> | EA180 <input type="checkbox"/> -011-2B |                                                                       |                                                                                                                 |
| SER13-1R5-20-2FBY <input type="checkbox"/> |                                        |                                                                       |                                                                                                                 |
| SER13-1R5-30-2FBY <input type="checkbox"/> |                                        |                                                                       |                                                                                                                 |
| SER13-1R5-10-3FBY <input type="checkbox"/> | EA180 <input type="checkbox"/> -5R6-3B |                                                                       | A18-LM-H120-m<br>(Power cable for motor without brake)<br>A18-LB-H120-m<br>(Power cable for motor with a brake) |
| SER13-1R5-20-3FBY <input type="checkbox"/> |                                        |                                                                       |                                                                                                                 |
| SER13-1R5-30-3FBY <input type="checkbox"/> |                                        |                                                                       |                                                                                                                 |
| SER13-2R0-20-3FBY <input type="checkbox"/> | EA180 <input type="checkbox"/> -8R5-3B |                                                                       |                                                                                                                 |
| SER13-2R0-30-3FBY <input type="checkbox"/> |                                        |                                                                       |                                                                                                                 |
| SER13-3R0-20-3FBY <input type="checkbox"/> | EA180 <input type="checkbox"/> -013-3B |                                                                       |                                                                                                                 |
| SER13-3R0-30-3FBY <input type="checkbox"/> |                                        |                                                                       |                                                                                                                 |

Note: When the encoder is used, A10-LA-xxxx-m encoder cable must be selected and used if the absolute position should be memorized upon power off, and A10-LS-xxxx-x encoder cable may be selected and used if the absolute position should be memorized without power off.

| Motor specification/model | Adaptable Drive model | Encoder cable                                                         | Motor cable                                                                                                                                                      |
|---------------------------|-----------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SES04-005-30-2FAY □       | EA180 □ -0R9-1B       | A10-LS-A000-m<br>(without battery)<br>A10-LA-A000-m<br>(with battery) | A18-LM-A007-m<br>(motor power cable)<br>A10-LZ-A005-m<br>(brake cable for motor with a brake)                                                                    |
| SES04-0R1-30-2FAY □       | EA180 □ -1R6-1B       |                                                                       |                                                                                                                                                                  |
| SES06-0R2-30-2FBY □       |                       |                                                                       |                                                                                                                                                                  |
| SES06-0R4-30-2FBY □       | EA180 □ -2R5-1B       |                                                                       |                                                                                                                                                                  |
| SES08-0R7-30-2FBY □       | EA180 □ -4R8-2B       |                                                                       |                                                                                                                                                                  |
| SES08-1R0-30-2FBY □       | EA180 □ -6R2-2B       |                                                                       |                                                                                                                                                                  |
| SES13-0R8-15-2FBY □       | EA180 □ -011-2B       | A18-LS-H400-m<br>(without battery)<br>A18-LA-H400-m<br>(with battery) | A18-LM-M420-m<br>(motor power cable)<br>A18-LZ-H405-m<br>(brake cable for motor with a brake)                                                                    |
| SES13-0R8-15-3FBY □       | EA180 □ -5R6-3B       |                                                                       |                                                                                                                                                                  |
| SES13-1R3-15-3FBY □       |                       |                                                                       |                                                                                                                                                                  |
| SES13-1R8-15-3FBY □       | EA180 □ -8R5-3B       |                                                                       |                                                                                                                                                                  |
| SES18-2R9-15-3FBY □       | EA180 □ -013-3B       |                                                                       | Without brake: A18-LM-M525-m<br>(motor power cable)<br>With brake: A10-LM-M220-m<br>(motor power cable)<br>A18-LZ-H405-m<br>(brake cable for motor with a brake) |
| SES18-3R6-20-3FBY □       |                       |                                                                       |                                                                                                                                                                  |
| SES18-4R0-30-3FBY □       |                       |                                                                       |                                                                                                                                                                  |
| SES18-4R4-15-3FBY □       | EA180 □ -017-3B       |                                                                       | A10-LM-M240-m<br>(motor power cable)<br>A18-LZ-H405-m<br>(brake cable for motor with a brake)                                                                    |
| SES18-5R5-15-3FBY □       | EA180 □ -022-3B       |                                                                       |                                                                                                                                                                  |
| SES18-7R5-15-3FBY □       | EA180 □ -028-3B       |                                                                       |                                                                                                                                                                  |

# EA300E servo drive

- 1P input 220 V~240V 0.05~0.4KW
- 1P or 3P input 220 V~240V 0.75~ 1KW
- 3P input 220 V~240V 1.5KW
- 3P input 340V~460V 1.5~ 29KW



High-speed response



Bus control



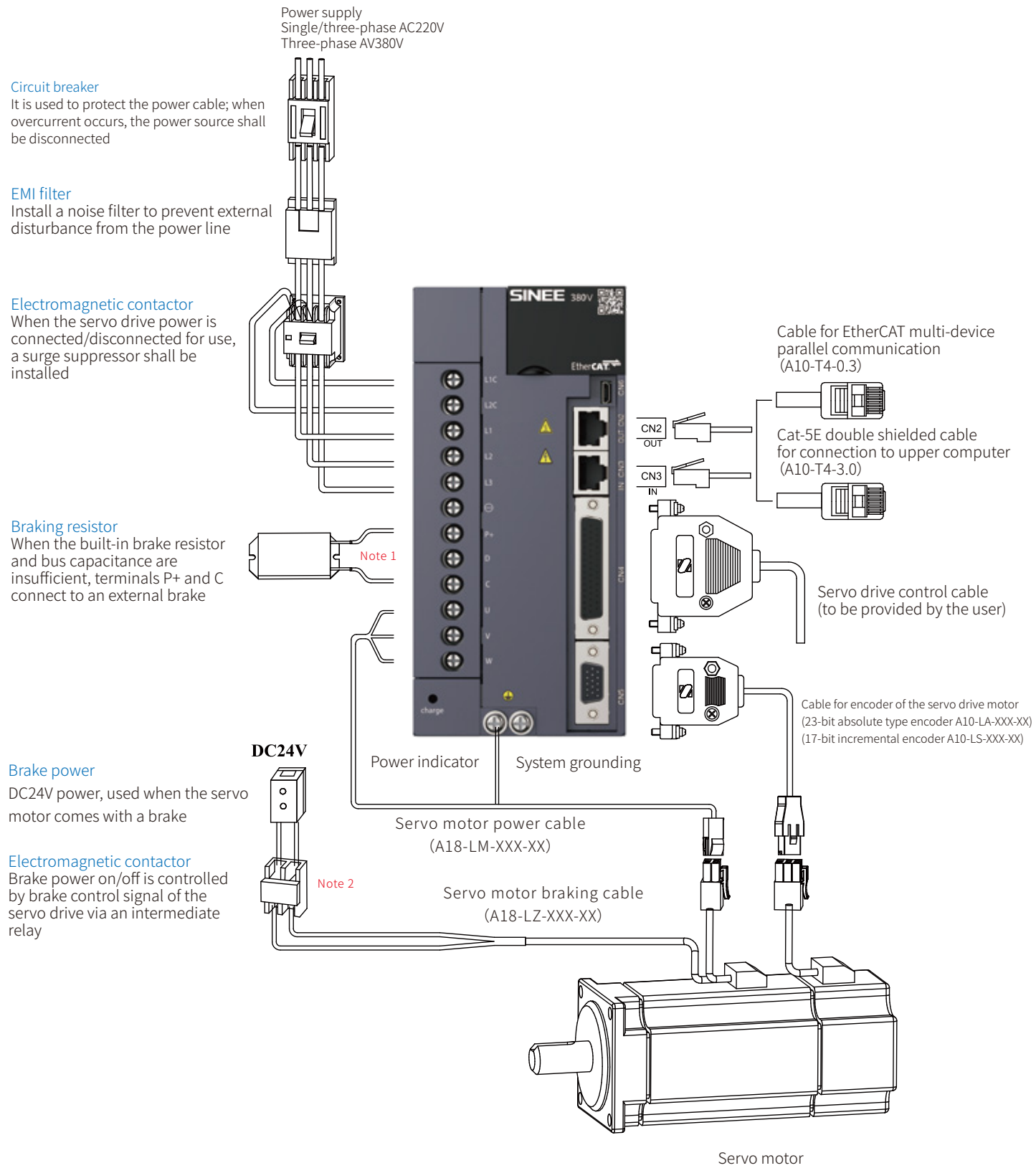
High-precision positioning



Easy to use



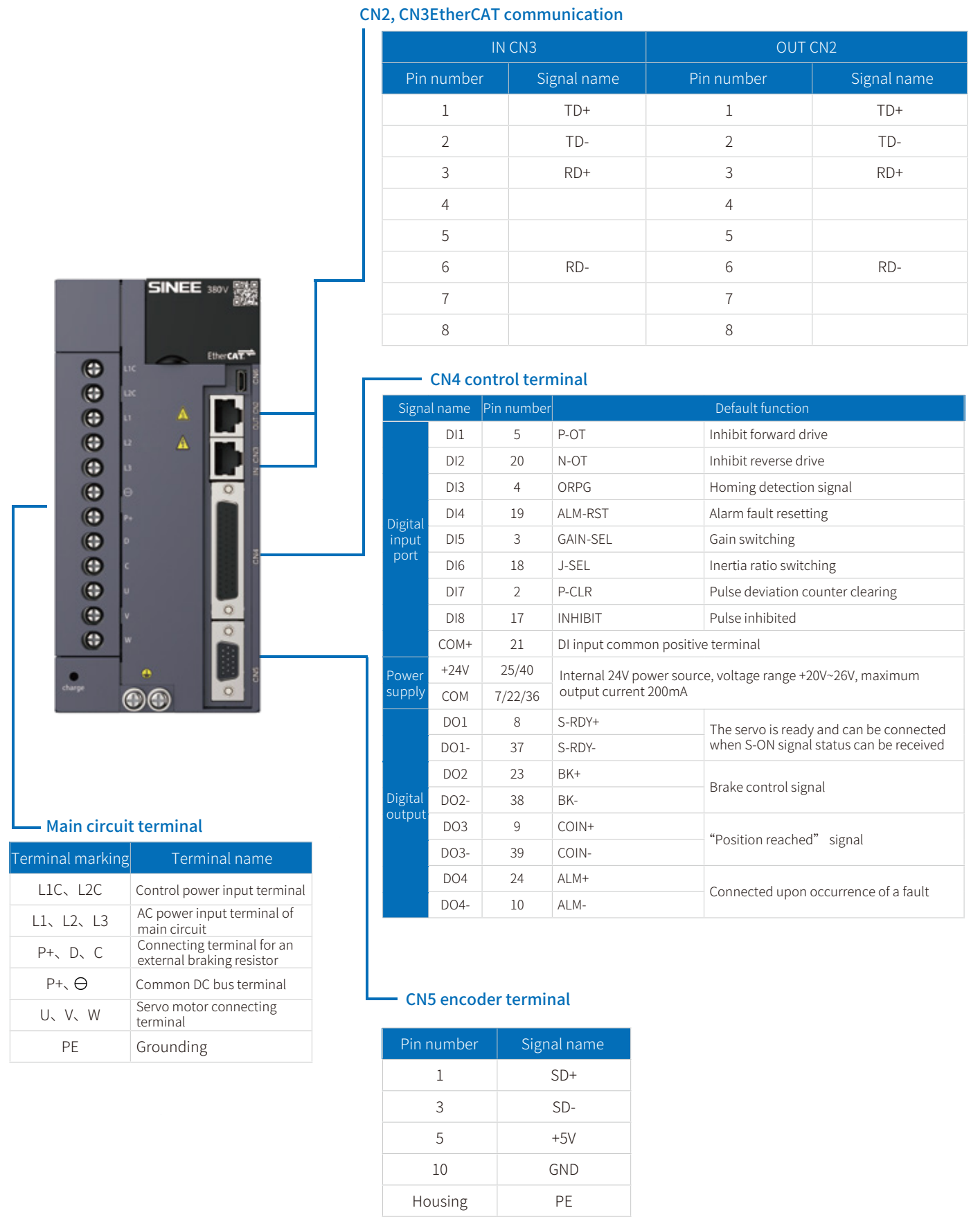
## Connection between EA300 EtherCAT bus servo drive and peripheral device



**Note 1:** When an external brake resistor is used, it is required to remove the short-circuiting piece between P+ and D, and correctly set the brake resistor parameter on the Drive

**Note 2:** It is strongly recommended that the servo motor brake is defined by the servo drive as the DO terminal of the BK function for control. The DO terminal of the servo drive shall have its load capacity used only for driving an intermediate relay other than an electromagnetic contactor.

## Terminal description of EA300 Ether CAT bus servo drive







Specification of EA300 EtherCAT bus servo drive

|                              |                                      |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                               |                                                                    |
|------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Basic specification          | Control method                       |                                                                                                                                                                                                                                                                                                                         | IGBT: PWM control, sine-wave current drive type.<br>220V, 380V; single phase or three phase full-wave rectifier                                                                                                               |                                                                    |
|                              | Encoder feedback                     |                                                                                                                                                                                                                                                                                                                         | 17bit serial incremental encoder, 23bit serial absolute encoder                                                                                                                                                               |                                                                    |
|                              | Front panel                          |                                                                                                                                                                                                                                                                                                                         | 5 keys, 5-digit LED display, main power CHARGE                                                                                                                                                                                |                                                                    |
|                              | Regenerative brake                   |                                                                                                                                                                                                                                                                                                                         | Can be basically built-in and externally installed                                                                                                                                                                            |                                                                    |
|                              | Use conditions                       | Environment temperature                                                                                                                                                                                                                                                                                                 | Working temperature 0~40°                                                                                                                                                                                                     |                                                                    |
|                              |                                      | Ambient humidity                                                                                                                                                                                                                                                                                                        | Working/storage: ≤ 90%RH (without dew condensation)                                                                                                                                                                           |                                                                    |
|                              |                                      | Anti-vibration/ impact strength                                                                                                                                                                                                                                                                                         | 4.9m/s <sup>2</sup> /19.6m/s <sup>2</sup>                                                                                                                                                                                     |                                                                    |
|                              |                                      | Protection level                                                                                                                                                                                                                                                                                                        | IP10                                                                                                                                                                                                                          |                                                                    |
|                              |                                      | Pollution level                                                                                                                                                                                                                                                                                                         | 2 level                                                                                                                                                                                                                       |                                                                    |
|                              |                                      | Altitude                                                                                                                                                                                                                                                                                                                | Less than 1,000m                                                                                                                                                                                                              |                                                                    |
| EtherCAT slave specification | Cooling method                       |                                                                                                                                                                                                                                                                                                                         | Fan cooling                                                                                                                                                                                                                   |                                                                    |
|                              | EtherCAT basic specification         | Communication protocol                                                                                                                                                                                                                                                                                                  | EtherCAT protocol                                                                                                                                                                                                             |                                                                    |
|                              |                                      | Support services                                                                                                                                                                                                                                                                                                        | CoE(PDO, SDO)                                                                                                                                                                                                                 |                                                                    |
|                              |                                      | Instruction synchronization cycle                                                                                                                                                                                                                                                                                       | 1ms or its integral multiple                                                                                                                                                                                                  |                                                                    |
|                              |                                      | Synchronization method                                                                                                                                                                                                                                                                                                  | DC- distributed clock                                                                                                                                                                                                         |                                                                    |
|                              |                                      | Physical layer                                                                                                                                                                                                                                                                                                          | 100BASE-TX                                                                                                                                                                                                                    |                                                                    |
|                              |                                      | Baud rate                                                                                                                                                                                                                                                                                                               | 100Mbit/s                                                                                                                                                                                                                     |                                                                    |
|                              |                                      | Duplex mode                                                                                                                                                                                                                                                                                                             | Full duplex                                                                                                                                                                                                                   |                                                                    |
|                              |                                      | Topological structure                                                                                                                                                                                                                                                                                                   | Linear                                                                                                                                                                                                                        |                                                                    |
|                              |                                      | Transmission medium                                                                                                                                                                                                                                                                                                     | Shielded Cat-5E or better network cable                                                                                                                                                                                       |                                                                    |
|                              |                                      | Transmission distance                                                                                                                                                                                                                                                                                                   | Less than 50m between two nodes                                                                                                                                                                                               |                                                                    |
|                              |                                      | Quantity of slave stations                                                                                                                                                                                                                                                                                              | No more than 100                                                                                                                                                                                                              |                                                                    |
|                              |                                      | EtherCAT frame length                                                                                                                                                                                                                                                                                                   | 44~1,498 bytes                                                                                                                                                                                                                |                                                                    |
|                              |                                      | Process data                                                                                                                                                                                                                                                                                                            | 44~1,498 bytes                                                                                                                                                                                                                |                                                                    |
|                              |                                      | Communication BER (bit error rate)                                                                                                                                                                                                                                                                                      | 1/1000000000                                                                                                                                                                                                                  |                                                                    |
|                              | EtherCAT configuration unit          | FMMU unit                                                                                                                                                                                                                                                                                                               | 4                                                                                                                                                                                                                             |                                                                    |
|                              |                                      | Storage synchronization management unit                                                                                                                                                                                                                                                                                 | 4                                                                                                                                                                                                                             |                                                                    |
|                              |                                      | Process data RAM                                                                                                                                                                                                                                                                                                        | 4K                                                                                                                                                                                                                            |                                                                    |
|                              |                                      | Distributed clock                                                                                                                                                                                                                                                                                                       | 64 digits                                                                                                                                                                                                                     |                                                                    |
|                              |                                      | EEPROM capacity                                                                                                                                                                                                                                                                                                         | 16K                                                                                                                                                                                                                           |                                                                    |
|                              | Support running mode CIA402          |                                                                                                                                                                                                                                                                                                                         | Profile Position Mode<br>Profile Velocity Mode<br>Profile Torque Mode<br>Interpolation Position Mode<br>Cyclic Synchronous Position Mode<br>Cyclic Synchronous Velocity Mode<br>Cyclic Synchronous Torque Mode<br>Homing Mode |                                                                    |
| Performance                  | Speed-torque control mode            | Speed fluctuation ratio                                                                                                                                                                                                                                                                                                 | Load fluctuation                                                                                                                                                                                                              | At 0~100% load: Maximum 0.3%                                       |
|                              |                                      |                                                                                                                                                                                                                                                                                                                         | Supply voltage change                                                                                                                                                                                                         | At rated voltage ± 10%: Maximum 0.3%                               |
|                              |                                      |                                                                                                                                                                                                                                                                                                                         | Environment temperature                                                                                                                                                                                                       | 0~50°C : Maximum 0.3%                                              |
|                              |                                      | Speed regulation ratio                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                               | 1:5000                                                             |
|                              |                                      | Frequency bandwidth                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                               | 1.0KHz (17bit and 23bit encoder)                                   |
|                              | Position control mode                | Torque control accuracy                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                               | ±3% (current repetition accuracy)                                  |
|                              |                                      | Soft start time setting                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                               | 0~30s (acceleration and deceleration can be set respectively)      |
|                              |                                      | Feedforward compensation                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                               | Resolution 0~100% (set resolution 1%)                              |
|                              |                                      | Positioning completion width                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                               | 1~655,335 instruction units (set resolution to 1 instruction unit) |
|                              |                                      | Min setting time                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                               | 5ms (no load, from rated speed to positioning completion)          |
| Input/ output signal         | Digital input signal                 | Function allocation available<br>Servo enable, alarm resetting, pulse deviation counter clearing, speed command direction selection, position/speed multi-segment switching, internal command trigger, control mode switching, pulse disable, forward drive disable, reverse drive disable, forward inch, backward inch |                                                                                                                                                                                                                               |                                                                    |
|                              | Digital output signal                | Function allocation available<br>Servo ready, brake output, motor rotation output, zero-speed signal, speed approach, speed reached, position approach, torque limit, rotating speed limit, warning output, alarm output                                                                                                |                                                                                                                                                                                                                               |                                                                    |
| Built-in function            | Over-travel (OT) prevention function |                                                                                                                                                                                                                                                                                                                         | Stopped immediately when P-OT and N-OT are activated.                                                                                                                                                                         |                                                                    |
|                              | Electronic gear ratio                |                                                                                                                                                                                                                                                                                                                         | 1.0 ≤ B/A ≤ 64000.0                                                                                                                                                                                                           |                                                                    |
|                              | Protective Function                  |                                                                                                                                                                                                                                                                                                                         | Over-voltage, under-voltage, over-speed, overheat, overload, over-speed, over-temperature, encoder alarm, braking resistor overload alarm, excessive position error, EEPROM alarm, abnormal communication etc.                |                                                                    |
|                              | RS232 communication                  |                                                                                                                                                                                                                                                                                                                         | Status display, user parameter setting, monitoring display, alarm tracking display, JOG operation and automatic tuning operation, speed, torque instruction signal etc.                                                       |                                                                    |
|                              | Others                               |                                                                                                                                                                                                                                                                                                                         | Gain adjustment, alarm record, JOG operation                                                                                                                                                                                  |                                                                    |



EA300E series servo motor, drive and cable matching table

| Servo drive |  |                                                 | Motor                              |       |                               |
|-------------|--|-------------------------------------------------|------------------------------------|-------|-------------------------------|
| EA300E      |  | Model                                           | Supply voltage                     | Motor | Power                         |
| SIZE A      |  | EA300E-0R9-1B<br>EA300E-1R6-1B<br>EA300E-2R5-1B | Single-phase AC220V                |       | 50W 100W 200W 400W            |
|             |  |                                                 |                                    |       |                               |
| SIZE B      |  | EA300E-4R8-2B<br>EA300E-6R2-2B                  | Single-phase or three-phase AC220V |       | 750W 1000W                    |
|             |  |                                                 |                                    |       |                               |
| SIZE C      |  | EA300E-5R6-3B<br>EA300E-8R5-3B<br>EA300E-013-3B | Three-phase AC380V                 |       | 850W 1.3kW 1.7kW              |
|             |  |                                                 |                                    |       | 1.8kW 2.4kW 2.6kW 2.9kW 3.6kW |
| SIZE C      |  | EA300E-011-2B                                   | Three-phase AC220V                 |       | 0.8kW 1.1kW 1.7kW             |
|             |  |                                                 |                                    |       |                               |
| SIZE D      |  | EA300E-017-3B<br>EA300E-022-3B<br>EA300E-028-3B | Three-phase AC380V                 |       | 4.4kW 5.5kW 7.5kW             |
|             |  |                                                 |                                    |       | 11kW 13kW 15kW                |
| SIZE E      |  | EA300E-038-3B<br>EA300E-052-3B<br>EA300E-062-3B | Three-phase AC380V                 |       | 15kW 18kW 22kW 29kW           |
|             |  |                                                 |                                    |       |                               |

# EA190E servo drive

1P input 220 V~240V 0.05~0.4KW

1P or 3P input 220 V~240V 0.75~1KW



Stable and reliable



Bus control



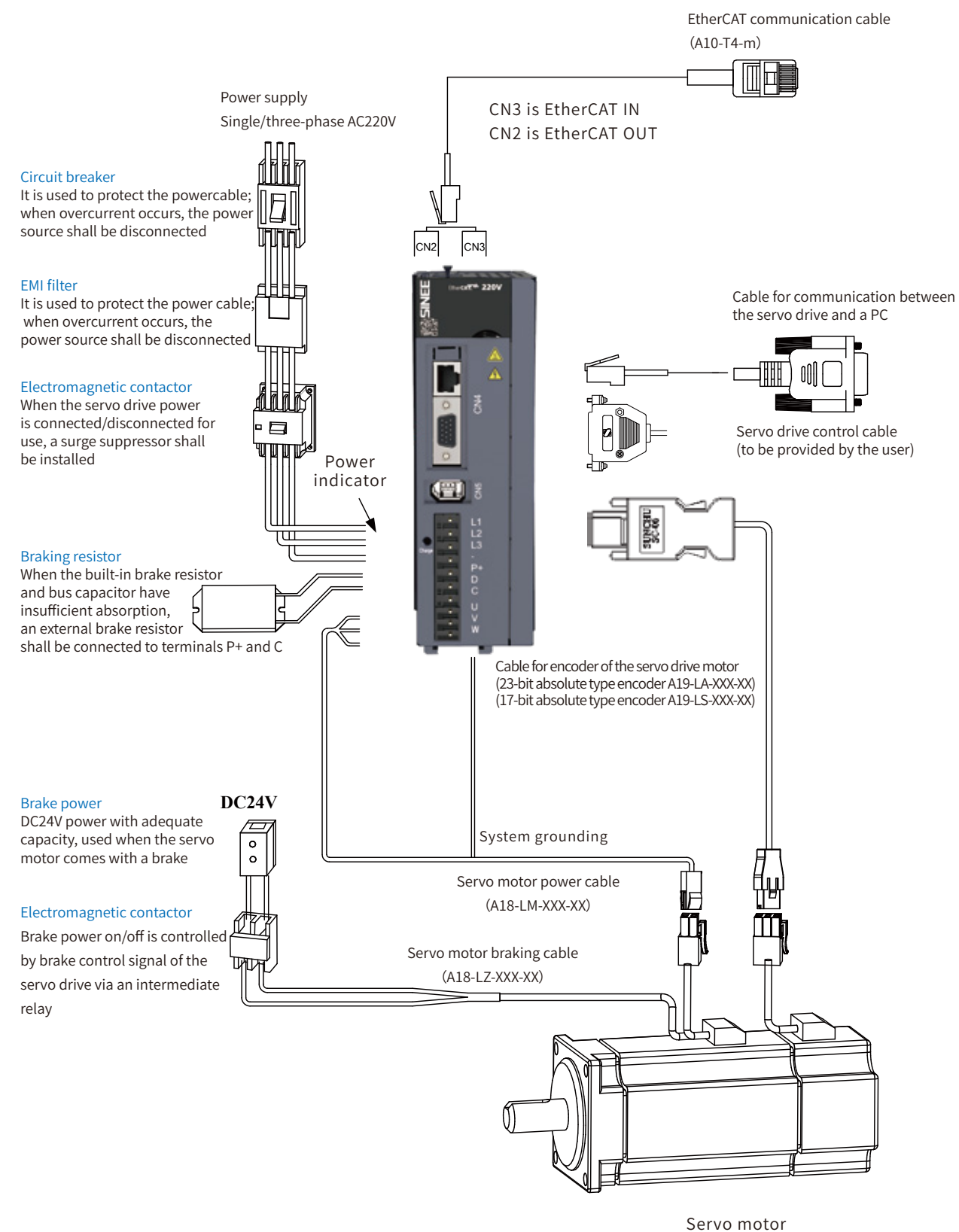
High-precision positioning



Easy to use



## Connection between Series EA190E bus servo drive and peripheral device





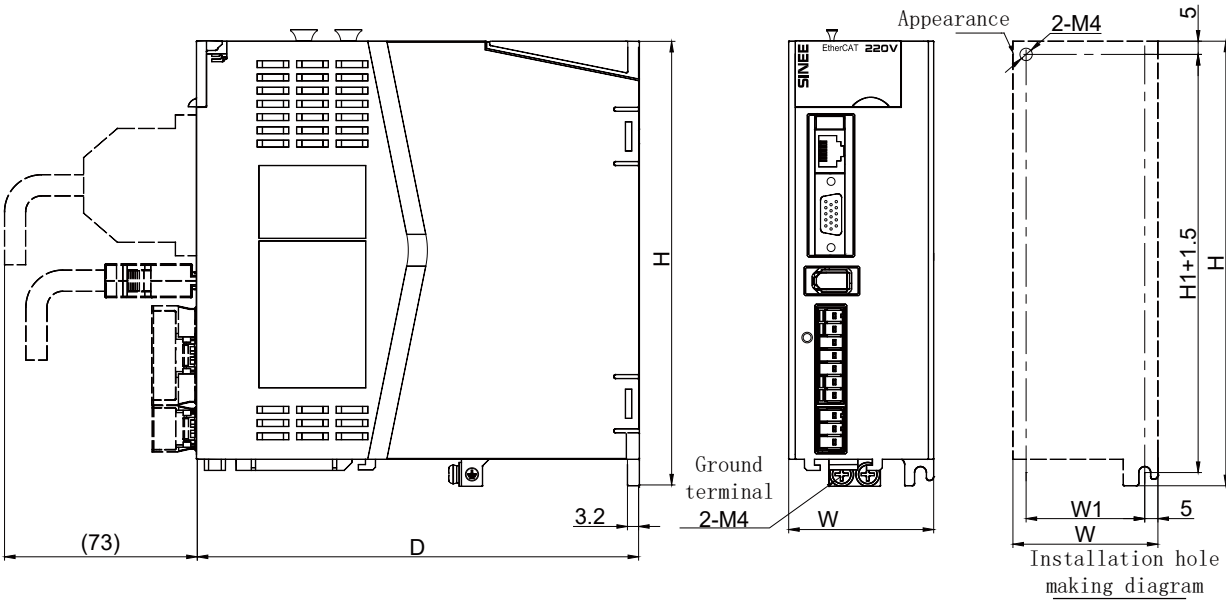
Model description of EA190E bus servo drive

EA 190 X - 6R2 - 2 B - XX  
① ② ③ ④ ⑤ ⑥ ⑦

|                                            |                                                                                    |                                               |
|--------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------|
| ①Product<br>Servo drive                    | ④Rated output current<br>0R9-0.9A<br>6R2-6.2A                                      | ⑥ Encoder type<br>B: 17/23-bit serial encoder |
| ② Series<br>190 series                     |                                                                                    |                                               |
| ③ Null: Pulse type<br>E: EtherCAT bus type | ⑤Power voltage specification<br>1. Single-phase 220V<br>2. Single/three-phase 220V | ⑦ Special specifications                      |



Dimension diagram of EA190E bus servo drive



| Model                                           | D   | H   | W  | W1 | H1  |
|-------------------------------------------------|-----|-----|----|----|-----|
| EA190E-0R9-1B<br>EA190E-1R6-1B<br>EA190E-2R5-1B | 150 | 168 | 44 | 34 | 158 |
| EA190E-4R8-2B<br>EA190E-6R2-2B                  | 168 | 168 | 55 | 45 | 158 |



Specification of Series EA190E bus servo drive

|                                      |                               |                                         |                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                               |
|--------------------------------------|-------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic specification                  | Control method                |                                         | IGBT: PWM control, sine-wave current drive type                                                                                                                                                                                                                         |                                                                                                                                                                                                                               |
|                                      | Front panel                   |                                         | 5 keys, 5-digit LED display, main power CHARGE                                                                                                                                                                                                                          |                                                                                                                                                                                                                               |
|                                      | Regenerative brake            |                                         | Can be basically built-in and externally installed                                                                                                                                                                                                                      |                                                                                                                                                                                                                               |
|                                      | Use conditions                | Environment temperature                 | Working temperature 0~40°                                                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
|                                      |                               | Ambient humidity                        | Working/storage: ≤ 90%RH (without dew condensation)                                                                                                                                                                                                                     |                                                                                                                                                                                                                               |
|                                      |                               | Anti-vibration/ impact strength         | 4.9m/s <sup>2</sup> /19.6m/s <sup>2</sup>                                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
|                                      |                               | Protection level                        | IP20                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                               |
|                                      |                               | Pollution level                         | 2 level                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                               |
|                                      | Altitude                      | Less than 1,000m                        |                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                               |
|                                      | Cooling method                |                                         | Natural (specifications 0R9, 1R6, 2R5)/ fan cooling (specifications 4R8, 6R2)                                                                                                                                                                                           |                                                                                                                                                                                                                               |
| EtherCAT slave specification         | EtherCAT basic specification  | Communication protocol                  | EtherCAT protocol                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                               |
|                                      |                               | Support services                        | CoE(PDO, SDO)                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                               |
|                                      |                               | Instruction synchronization cycle       | 1ms or its integral multiple                                                                                                                                                                                                                                            |                                                                                                                                                                                                                               |
|                                      |                               | Synchronization method                  | DC- distributed clock                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                               |
|                                      |                               | Physical layer                          | 100BASE-TX                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                               |
|                                      |                               | Baud rate                               | 100Mbit/s                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
|                                      |                               | Duplex mode                             | Full duplex                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                               |
|                                      |                               | Topological structure                   | Linear                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                               |
|                                      |                               | Transmission medium                     | Shielded Cat-5E or better network cable                                                                                                                                                                                                                                 |                                                                                                                                                                                                                               |
|                                      |                               | Transmission distance                   | Less than 50m between two nodes                                                                                                                                                                                                                                         |                                                                                                                                                                                                                               |
|                                      |                               | Quantity of slave stations              | No more than 100                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                               |
|                                      |                               | EtherCAT frame length                   | 44~1,498 bytes                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                               |
|                                      |                               | Process data                            | 44~1,498 bytes                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                               |
|                                      |                               | Communication BER (bit error rate)      | 1/1000000000                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                               |
|                                      | EtherCAT configuration unit   | FMMU unit                               | 4                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                               |
|                                      |                               | Storage synchronization management unit | 4                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                               |
|                                      |                               | Process data RAM                        | 4K                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                               |
|                                      |                               | Distributed clock                       | 64 digits                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
|                                      |                               | EEPROM capacity                         | 16K                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                               |
|                                      |                               | Support running mode CIA402             |                                                                                                                                                                                                                                                                         | Profile Position Mode<br>Profile Velocity Mode<br>Profile Torque Mode<br>Interpolation Position Mode<br>Cyclic Synchronous Position Mode<br>Cyclic Synchronous Velocity Mode<br>Cyclic Synchronous Torque Mode<br>Homing Mode |
| Speed-torque control mode            | Speed fluctuation ratio       | Load fluctuation                        | At 0~100% load: Maximum 0.3%                                                                                                                                                                                                                                            | At rated speed                                                                                                                                                                                                                |
|                                      |                               | Supply voltage change                   | At rated voltage ± 10%: Maximum 0.3%                                                                                                                                                                                                                                    |                                                                                                                                                                                                                               |
|                                      |                               | Environment temperature                 | 0~50°C : Maximum 0.3%                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                               |
|                                      | Speed regulation ratio        |                                         | 1:5000                                                                                                                                                                                                                                                                  | Minimal speed/rated rotating speed of continuous stable operation under the rated load                                                                                                                                        |
|                                      | Frequency bandwidth           |                                         | 1.0KHz (17bit and 23bit encoder)                                                                                                                                                                                                                                        |                                                                                                                                                                                                                               |
|                                      | Torque control accuracy       |                                         | ±3% (current repetition accuracy)                                                                                                                                                                                                                                       |                                                                                                                                                                                                                               |
|                                      | Soft start time setting       |                                         | 0~30s (acceleration and deceleration can be set respectively)                                                                                                                                                                                                           |                                                                                                                                                                                                                               |
| Position control mode                | Feedforward compensation      |                                         | Resolution 0~100% (set resolution 1%)                                                                                                                                                                                                                                   |                                                                                                                                                                                                                               |
|                                      | Positioning completion width  |                                         | 1~655,335 instruction units (set resolution to 1 instruction unit)                                                                                                                                                                                                      |                                                                                                                                                                                                                               |
|                                      | Min setting time              |                                         | 5ms (no load, from rated speed to positioning completion)                                                                                                                                                                                                               |                                                                                                                                                                                                                               |
| Digital input signal                 | Function allocation available |                                         | Servo enable, alarm resetting, pulse deviation counter clearing, speed command direction selection, position/speed multi-segment switching, internal command trigger, control mode switching, forward drive disable, reverse drive disable, forward inch, backward inch |                                                                                                                                                                                                                               |
| Digital output signal                | Function allocation available |                                         | Servo ready, brake output, motor rotation output, zero-speed signal, speed approach, speed reached, position approach, torque limit, rotating speed limit, warning output, alarm output                                                                                 |                                                                                                                                                                                                                               |
| Over-travel (OT) prevention function |                               |                                         | Stopped immediately when P-OT and N-OT are activated.                                                                                                                                                                                                                   |                                                                                                                                                                                                                               |
| Electronic gear ratio                |                               |                                         | 1.0 ≤ B/A ≤ 64000.0                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                               |
| Protective Function                  |                               |                                         | Over-voltage, under-voltage, over-speed, overheat, overload, over-speed, over-temperature, encoder alarm, braking resistor overload alarm, excessive position error, EEPROM alarm, abnormal communication etc.                                                          |                                                                                                                                                                                                                               |
| RS232 communication                  |                               |                                         | Status display, user parameter setting, monitoring display, alarm tracking display, JOG operation and automatic tuning operation, speed, torque instruction signal etc.                                                                                                 |                                                                                                                                                                                                                               |
| Others                               |                               |                                         | Gain adjustment, alarm record, JOG operation                                                                                                                                                                                                                            |                                                                                                                                                                                                                               |





EA190E series servo motor and drive matching table

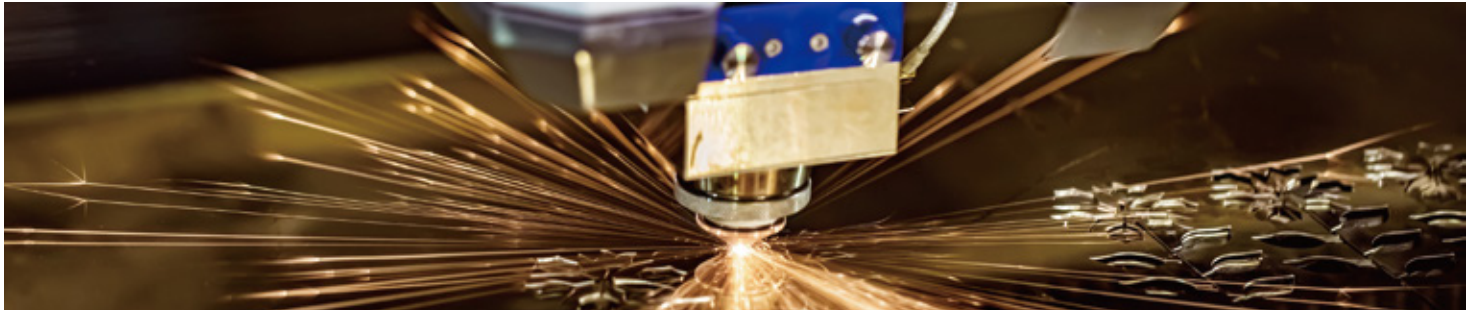
| Servo drive |                                                                                   |                                                 | Motor                                                                                                                                                                                         |                       |                                                                                                                                  |
|-------------|-----------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------|
| EA190       | Model                                                                             | Supply voltage                                  | Motor                                                                                                                                                                                         | Power                 | Adaptable motor model                                                                                                            |
| SIZE A      |  | EA190E-0R9-1B<br>EA190E-1R6-1B<br>EA190E-2R5-1B | Single-phase AC220V<br><br> | 50W 100W 200W<br>400W | SES04-005-30-2HAY □<br>SES04-0R1-30-2HAY □<br>SES06-0R2-30-2HBY □<br>SES06-0R4-30-2HBY □                                         |
|             |                                                                                   |                                                 |                                                                                                                                                                                               |                       |                                                                                                                                  |
| SIZE B      |  | EA190E-4R8-2B<br>EA190E-6R2-2B                  | Single-phase or three-phase AC220V<br>                                                                       | 750W 1000W            | SES08-0R7-30-2HBY□<br>SES08-1R0-30-2HBY□<br>SER13-1R0-10-2HBY□<br>SER13-1R0-20-2HBY□<br>SER13-1R0-30-2HBY□<br>SES13-1R1-20-2HBY□ |



EA190E series servo motor and drive matching table

| Motor specification/model | Adaptable driver model | Encoder cable                                                         | Motor cable                                                                                   |
|---------------------------|------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| SES04-005-30-2HAY □       | EA190□-0R9-1B          | A19-LS-A000-m<br>(without battery)<br>A19-LA-A000-m<br>(with battery) | A18-LM-A007-m<br>(motor power cable)<br>A18-LZ-A005-m<br>(brake cable for motor with a brake) |
| SES04-0R1-30-2HAY □       | EA190□-1R6-1B          |                                                                       |                                                                                               |
| SES06-0R2-30-2HBY □       |                        |                                                                       |                                                                                               |
| SES06-0R4-30-2HBY □       | EA190□-2R5-1B          |                                                                       |                                                                                               |
| SES08-0R7-30-2HBY □       | EA190□-4R8-2B          |                                                                       |                                                                                               |
| SES08-1R0-30-2HBY □       | EA190□-6R2-2B          | A19-LS-H100-m<br>(without battery)<br>A19-LA-H100-m<br>(with battery) | Without brake:<br>A18-LM-H115-m<br>With brake:<br>A18-LB-H115-m                               |
| SER13-1R0-10-2HBY □       |                        |                                                                       |                                                                                               |
| SER13-1R0-20-2HBY □       |                        |                                                                       |                                                                                               |
| SER13-1R0-30-2HBY □       |                        |                                                                       |                                                                                               |





### Model description of SER/SES series servo motor

SES 08 - 0R7-30-2 F B Y 1 -XX  
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

| ① series                              | ②flange size of the motor                                | ③ rated output power of the motor  |
|---------------------------------------|----------------------------------------------------------|------------------------------------|
| SER: Standard servo motor             | 04: 40mm                                                 | 005: 50W                           |
| SES: High-performance servo motor     | 06: 60mm                                                 | 0R1: 100W                          |
|                                       | 08: 80mm                                                 | 0R2: 200W                          |
| ④rated speed of the motor             | 09: 86mm                                                 | 0R4: 400W                          |
| 10: 1000rpm                           | 11: 110mm                                                | 0R7: 750W                          |
| 15: 1500rpm                           | 13: 130mm                                                | 1R0: 1000W                         |
| 20: 2000rpm                           | 18: 180mm                                                | 1R5: 1500W                         |
| 25: 2500rpm                           | 20: 200mm                                                | 2R0: 2000W                         |
| 30: 3000rpm                           |                                                          | 3R0: 3000W                         |
|                                       | ⑦inertia type                                            | 4R4: 4400W                         |
|                                       | A: Low inertia                                           | 5R5: 5500W                         |
|                                       | B: Medium inertia                                        | 7R5: 7500W                         |
|                                       | C: High inertia                                          |                                    |
| ⑤voltage level                        |                                                          | ⑨optional accessory                |
| 2: 220V                               |                                                          | Null: No optional accessory        |
| 3: 380V                               |                                                          | 1: With holding brake (DC24V)      |
| ⑥ encoder type                        | ⑧bit Shaft end                                           | 2: With oil seal                   |
| A:2500ppr incremental encoder         | X:Optical axis, without key slot <sup>*1</sup>           | 3: With holding brake and oil seal |
| B:17bit incremental encode            | Y:Y: With U-shaped key slot and screw hole <sup>*2</sup> | 4: With fans                       |
| H:17bitincremental magnetic encoder   | Z:With double-circular key slot and screw hole           | 5: With brake and fans             |
| F:23bit absolute type encoder         |                                                          |                                    |
| K:17bitabsolute type magnetic encoder |                                                          | ⑩ special specification            |

**Note 1:** Generally not provided. Can be used as optical axis when the key is taken off.

**Note 2:** Partial varieties can be of double-circular key slots; except for motors with flange 130, the key width and height are the same with the U-shaped key slots.

**Note 3:** Random combination of various elements above is not available.

### Common features of SER/SES series servo motors

|                                       |                                                                                    |
|---------------------------------------|------------------------------------------------------------------------------------|
| Motor insulation level                | FClass                                                                             |
| Withstand voltage of insulation       | 1500V 60s                                                                          |
| Insulation resistance                 | DC500V, above 10MΩ                                                                 |
| Thermal resistance level of the motor | B                                                                                  |
| Protection level                      | Fully-closed self-cooling type, IP65 (except for the shaft running-through part)   |
| Service environment                   | Ambient temperature 0-40°, RH 20%~80% (without dew condensation)                   |
| Installation method                   | Flange installation                                                                |
| Rotation direction                    | Rotate counterclockwise (CCW) under a forward command if viewed from the load side |

### Holding brake specification

| Motor flange size | Rated torque of motor | Rated voltage | Static friction torque | Rated power | Closing voltage | Release voltage | Set the closing action time | Set the release action time |
|-------------------|-----------------------|---------------|------------------------|-------------|-----------------|-----------------|-----------------------------|-----------------------------|
| mm                | Nm                    | VDC           | Nm                     | W           | VDC             | VDC             | ms                          | ms                          |
| 40                | 0.32 ≤                | 24            | 0.35                   | 3.5         | 22              | 1.5             | 63                          | 55                          |
| 60                | 0.64~1.27             |               | 2                      | 6.3         |                 |                 |                             |                             |
| 80                | 1.3~3.5               |               | 4                      | 10.4        |                 |                 | 87                          | 72                          |
| 86                | 3.2~3.5               |               | 4                      | 10.4        |                 |                 |                             |                             |
| 110               | 2~6                   |               | 10                     | 11.6        |                 |                 |                             |                             |
| 130               | 3.2~15                |               | 20                     | 19.5        |                 |                 | 110                         | 95                          |
| 180               | 17~35                 |               | 44                     | 25          |                 |                 | 140                         | 120                         |
| 180               | ≥ 36                  |               | 74                     | 45          |                 |                 | 152                         | 130                         |
| 200               | 35~95.5               |               | 120                    | 95          |                 |                 | 165                         | 140                         |
| 230               | 70~184                |               | 200                    | 120         |                 |                 | 230                         | 180                         |

1: The holding brake is used to keep the motor locked after stop, and cannot be used for braking.

2: A 24V power source shall be provided by the user for the holding brake, and it is prohibited to connect the holding brake to the 24V power in the servo drive. The 24V power source shall have a capacity that is at least 1.5 times the rated power of the holding brake (excluding capacity of any 24V power source for other devices).

3: The action time of the holding brake may differ for different circuits. The time provided above is only for reference, and the actual time depends on the physical product.

4: Static friction torque refers to the static friction torque provided by the brake when the motor is static; if there is external impact, keeping the motor static cannot be assured.

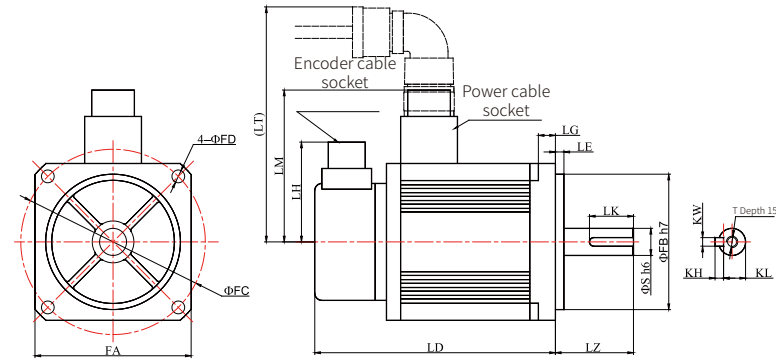






## Installation dimension of SER series servo motor

- Dimensions of SER series servo motors with flanges 110 and 130

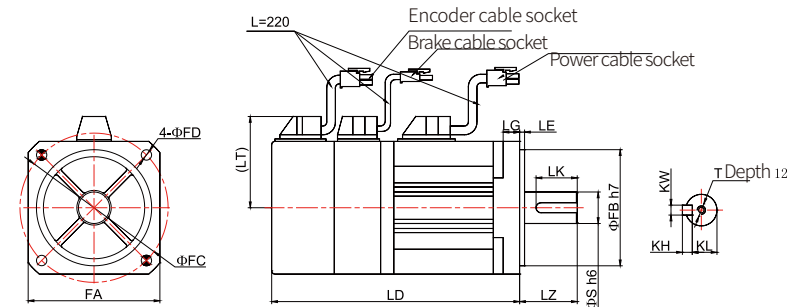


| Motor specification/model | LD (mm)       | FA (mm) | FB (mm) | FC (mm) | FD (mm) | LZ (mm) | LK (mm) | LE (mm) | LG (mm) | LH (mm) | LM (mm) | LT (mm) | S (mm) | KL (mm) | KH (mm) | KW (mm) | T (mm) | Weight (kg)   | Cable connector model                                                                                    |
|---------------------------|---------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|--------|---------------|----------------------------------------------------------------------------------------------------------|
| SER11-1R0-20-2 □ B □ □    | 205.5 (260.5) | 110     | 95      | 130     | 9       | 55      | 31      | 6       | 9       | -       | 107     | 176     | 19     | 15.5    | 6       | 6       | M6     | 6.42 (7.88)   | Without brake: Aviation plug YD28K4T<br>With brake: Aviation plug YD28K7T<br><br>Aviation plug YD28K15TS |
| SER11-1R2-30-2 □ B □ □    | 185.5 (240.5) | 110     | 95      | 130     | 9       | 55      | 31      | 6       | 9       | -       | 107     | 176     | 19     | 15.5    | 6       | 6       | M6     | 5.46 (6.92)   |                                                                                                          |
| SER11-1R8-30-2 □ B □ □    | 218.5 (273.5) | 110     | 95      | 130     | 9       | 55      | 31      | 6       | 9       | -       | 107     | 176     | 19     | 15.5    | 6       | 6       | M6     | 7.26 (8.72)   |                                                                                                          |
| SER13-1R0-10-2 □ B □ □    | 215 (270)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 10.12 (11.67) |                                                                                                          |
| SER13-1R0-20-2 □ B □ □    | 165 (220)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 6.41 (7.94)   |                                                                                                          |
| SER13-1R0-30-2 □ B □ □    | 150 (205)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 5.31 (6.89)   |                                                                                                          |
| SER13-1R5-10- □ □ B □ □   | 265 (320)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 13.82 (15.40) |                                                                                                          |
| SER13-1R5-20- □ □ B □ □   | 185 (240)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 7.89 (9.43)   |                                                                                                          |
| SER13-1R5-30- □ □ B □ □   | 165 (220)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 6.40 (7.96)   |                                                                                                          |
| SER13-2R0-20-3 □ B □ □    | 215 (270)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 10.12 (11.67) |                                                                                                          |
| SER13-2R0-30-3 □ B □ □    | 185 (240)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 7.85 (9.47)   |                                                                                                          |
| SER13-3R0-20-3 □ B □ □    | 265 (320)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 13.81 (15.34) |                                                                                                          |
| SER13-3R0-30-3 □ B □ □    | 215 (270)     | 130     | 110     | 145     | 9       | 58      | 45      | 6       | 12      | -       | 117     | 186     | 22     | 18      | 7       | 8       | M6     | 10.12 (11.67) |                                                                                                          |



## Installation dimension of SES series servo motor

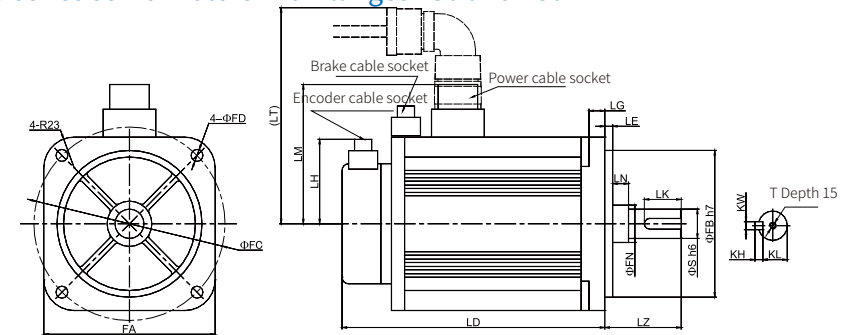
- Dimensions of SES series servo motors with flanges 40, 60 and 80



| Motor specification/model | LD (mm)       | FA (mm) | FB (mm) | FC (mm) | FD (mm) | LZ (mm) | LK (mm) | LE (mm) | LG (mm) | LT (mm) | S (mm) | KL (mm) | KH (mm) | KW (mm) | T (mm) | Weight (kg) | Cable connector model                                                                                          |
|---------------------------|---------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|--------|-------------|----------------------------------------------------------------------------------------------------------------|
| SES04-005-30-2 □ AY □     | 85 (119.5)    | 40      | 30      | 46      | 4.5     | 25.5    | 14      | 3       | 8       | 37      | 8      | 6.3     | 3       | 3       | M3     | 0.4 (0.6)   | Power side: 172159-1<br>Brake side: 172157-1<br>Reed: 170362-1<br><br>Encoder side: 172161-1<br>Reed: 170361-1 |
| SES04-0R1-30-2 □ AY □     | 100 (133.5)   | 40      | 30      | 46      | 4.5     | 25.5    | 14      | 3       | 8       | 37      | 8      | 6.3     | 3       | 3       | M3     | 0.47 (0.67) |                                                                                                                |
| SES06-0R2-30-2 □ BY □     | 93.7 (120.2)  | 60      | 50      | 70      | 4.5     | 30      | 20      | 3       | 8       | 48      | 14     | 8.5     | 4       | 4       | M5     | 1.01 (1.4)  |                                                                                                                |
| SES06-0R4-30-2 □ BY □     | 110.7 (137.2) | 60      | 50      | 70      | 4.5     | 30      | 25      | 3       | 8       | 48      | 14     | 11      | 5       | 5       | M5     | 1.37 (1.78) |                                                                                                                |
| SES08-0R7-30-2 □ BY □     | 122.4 (150.6) | 80      | 70      | 90      | 6.3     | 35      | 25      | 3       | 10      | 58      | 19     | 15.5    | 6       | 6       | M5     | 2.4 (2.8)   |                                                                                                                |
| SES08-1R0-30-2 □ BY □     | 136.4 (164.6) | 80      | 70      | 90      | 6.3     | 35      | 25      | 3       | 10      | 58      | 19     | 15.5    | 6       | 6       | M5     | 3.0 (3.4)   |                                                                                                                |

**Note:** An SES04 motor has two installation holes at the two shadowed locations as shown in the figure

- Dimensions of SES series servo motors with flanges 130 and 180

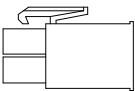
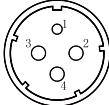
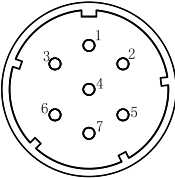
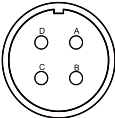


| Motor specification/model | LD (mm)       | FA (mm) | FB (mm) | FC (mm) | FD (mm) | LZ (mm) | LK (mm) | LE (mm) | LG (mm) | LH (mm) | LM (mm) | LT (mm) | LN (mm) | FN (mm) | S (mm) | KL (mm) | KH (mm) | KW (mm) | T (mm) | Weight (kg) | Cable connector model                                    |
|---------------------------|---------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|--------|-------------|----------------------------------------------------------|
| SES13-0R8-15-3FBY □       | 150.9 (183.4) | 130     | 110     | 145     | 9       | 58      | 27.5    | 6       | 12      | 63.3    | 105     | 230     | 12      | 28      | 19     | 16      | 5       | 5       | M5     | 5.83 (17.8) | Power side: MS3108A18-10S<br>Brake side: SM10-SP25-S-T-V |
| SES13-1R7-30-3FBY □       | 166.9 (199.4) | 130     | 110     | 145     | 9       | 58      | 28      | 6       | 12      | 63.3    | 105     | 230     | 12      | 28      | 22     | 18.5    | 6       | 6       | M5     | 7.25 (9.3)  |                                                          |
| SES13-1R3-15-3FBY □       | 166.9 (199.4) | 130     | 110     | 145     | 9       | 58      | 28      | 6       | 12      | 63.3    | 105     | 230     | 12      | 28      | 22     | 18.5    | 6       | 6       | M5     | 7.25 (9.3)  |                                                          |
| SES13-2R6-30-3FBY □       | 184.9 (217.4) | 130     | 110     | 145     | 9       | 58      | 29      | 6       | 12      | 63.3    | 105     | 230     | 12      | 28      | 24     | 20      | 8       | 8       | M5     | 8.8 (10.8)  |                                                          |
| SES18-2R9-15-3FBY □       | 173.3 (231)   | 180     | 114.3   | 200     | 13.5    | 79      | 65      | 3.2     | 18      | 63.3    | 135.5   | 230     | 0       | 35      | 35     | 30      | 8       | 10      | M12    | 13 (19.5)   | Power side: MS3108A22-20S<br>Brake side: SM10-SP25-S-T-V |
| SES18-3R6-20-3FBY □       | 197.3 (324)   | 180     | 114.3   | 200     | 13.5    | 79      | 65      | 3.2     | 18      | 63.3    | 135.5   | 230     | 0       | 35      | 35     | 30      | 8       | 10      | M12    | 17.5 (24)   |                                                          |
| SES18-4R4-15-3FBY □       | 197.3 (324)   | 180     | 114.3   | 200     | 13.5    | 79      | 65      | 3.2     | 18      | 63.3    | 135.5   | 230     | 0       | 35      | 35     | 30      | 8       | 10      | M12    | 17.5 (24)   |                                                          |
| SES18-5R5-15-3FBY □       | 236.3 (278)   | 180     | 114.3   | 200     | 13.5    | 113     | 96      | 3.2     | 18      | 114.3   | 145.5   | 230     | 0       | 42      | 42     | 37      | 10      | 12      | M16    | 22 (27.8)   |                                                          |
| SES18-7R5-15-3FBY □       | 282.3 (324)   | 180     | 114.3   | 200     | 13.5    | 113     | 96      | 3.2     | 18      | 114.3   | 145.5   | 230     | 0       | 42      | 42     | 37      | 10      | 12      | M16    | 29.5 (35)   | Encoder side: SM10-SP10S-M1-T-V                          |

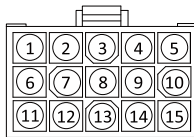
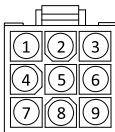
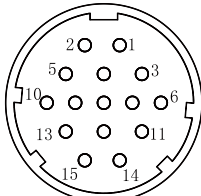
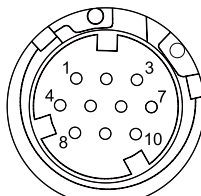




Pin distribution of the motor-side power terminal

| Connector type                                                  | Pin distribution                                                                   |                                                                                   | Pin number | Function definition |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------|---------------------|
| TE 172159-1                                                     |   |  | 1          | U                   |
|                                                                 |                                                                                    |                                                                                   | 2          | V                   |
|                                                                 |                                                                                    |                                                                                   | 3          | W                   |
|                                                                 |                                                                                    |                                                                                   | 4          | PE                  |
| YD28K4TS<br>The diameter of contact pairs is 3*φ3.5mm +1*φ2.5mm |   |                                                                                   | 1          | PE                  |
|                                                                 |                                                                                    |                                                                                   | 2          | U                   |
|                                                                 |                                                                                    |                                                                                   | 3          | V                   |
|                                                                 |                                                                                    |                                                                                   | 4          | W                   |
| The diameter of YD28K7TS contact pairs is 7*φ2.5mm              |   |                                                                                   | 1          | PE                  |
|                                                                 |                                                                                    |                                                                                   | 2          | U                   |
|                                                                 |                                                                                    |                                                                                   | 3          | V                   |
|                                                                 |                                                                                    |                                                                                   | 4          | W                   |
|                                                                 |                                                                                    |                                                                                   | 5          | 24V (brake)         |
|                                                                 |                                                                                    |                                                                                   | 6          | 0V (brake)          |
|                                                                 |                                                                                    |                                                                                   | 7          | Null                |
| MS3105A18-10S<br>MS3108A22-22S<br>MS3105A32-17S                 |  |                                                                                   | A          | U                   |
|                                                                 |                                                                                    |                                                                                   | B          | V                   |
|                                                                 |                                                                                    |                                                                                   | C          | W                   |
|                                                                 |                                                                                    |                                                                                   | D          | PE                  |

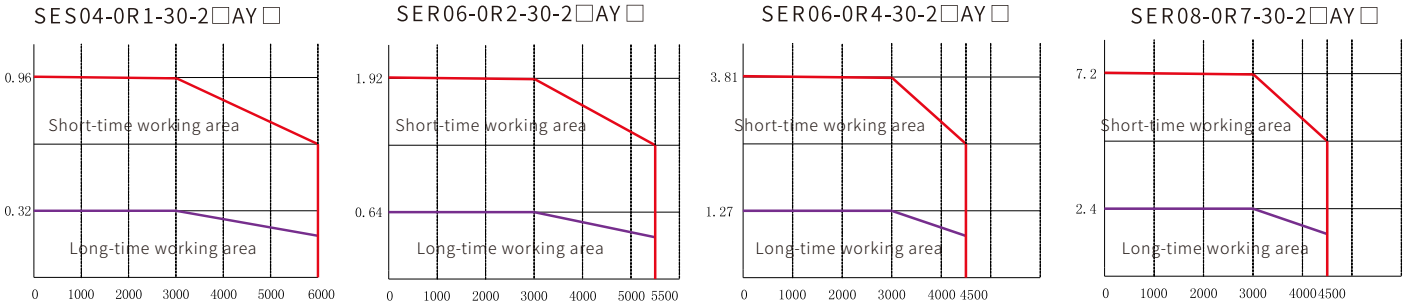
• Pin distribution of the motor-side encoder terminal

|                             | TE 172163-1                                                                         |            |        |            | TE 172161-1                                                                         |            | YD28K15TS                                                                            |            |            |            | CM10-SP10S-MD                                                                         |  |
|-----------------------------|-------------------------------------------------------------------------------------|------------|--------|------------|-------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------|------------|------------|------------|---------------------------------------------------------------------------------------|--|
| Connector type              |  |            |        |            |  |            |  |            |            |            |  |  |
| 2500ppr incremental encoder | Signal                                                                              | Pin number | Signal | Pin number |                                                                                     | Signal     | Pin number                                                                           | Signal     | Pin number |            |                                                                                       |  |
|                             | A+                                                                                  | 9          | V+     | 10         |                                                                                     | A+         | 4                                                                                    | V+         | 11         |            |                                                                                       |  |
|                             | A-                                                                                  | 13         | V-     | 12         |                                                                                     | A-         | 7                                                                                    | V-         | 14         |            |                                                                                       |  |
|                             | B+                                                                                  | 4          | W+     | 11         |                                                                                     | B+         | 5                                                                                    | W+         | 12         |            |                                                                                       |  |
|                             | B-                                                                                  | 14         | W-     | 15         |                                                                                     | B-         | 8                                                                                    | W-         | 15         |            |                                                                                       |  |
|                             | Z+                                                                                  | 7          | +5V    | 2          |                                                                                     | Z+         | 6                                                                                    | +5V        | 2          |            |                                                                                       |  |
|                             | Z-                                                                                  | 5          | GND    | 3          |                                                                                     | Z-         | 9                                                                                    | GND        | 3          |            |                                                                                       |  |
|                             | U+                                                                                  | 6          | PE     | 1          |                                                                                     | U+         | 10                                                                                   | PE         | 1          |            |                                                                                       |  |
|                             | U-                                                                                  | 8          |        |            | U-                                                                                  | 13         |                                                                                      |            |            |            |                                                                                       |  |
| 17/23-bit encoder           |                                                                                     |            |        |            | Signal                                                                              | Pin number | Signal                                                                               | Pin number | Signal     | Pin number |                                                                                       |  |
|                             |                                                                                     |            |        |            | +5V                                                                                 | 1          | +5V                                                                                  | 2          | +5V        |            | 4                                                                                     |  |
|                             |                                                                                     |            |        |            | GND                                                                                 | 2          | GND                                                                                  | 3          | GND        |            | 9                                                                                     |  |
|                             |                                                                                     |            |        |            | SD+                                                                                 | 5          | SD+                                                                                  | 4          | SD+        |            | 1                                                                                     |  |
|                             |                                                                                     |            |        |            | SD-                                                                                 | 6          | SD-                                                                                  | 7          | SD-        |            | 2                                                                                     |  |
|                             |                                                                                     |            |        |            | VD+                                                                                 | 3          | VD+                                                                                  | 14         | VD+        |            | 6                                                                                     |  |
|                             |                                                                                     |            |        |            | VD-                                                                                 | 4          | VD-                                                                                  | 15         | VD-        |            | 5                                                                                     |  |
|                             |                                                                                     |            |        | PE         | 9                                                                                   | PE         | 1                                                                                    | PE         |            | 10         |                                                                                       |  |

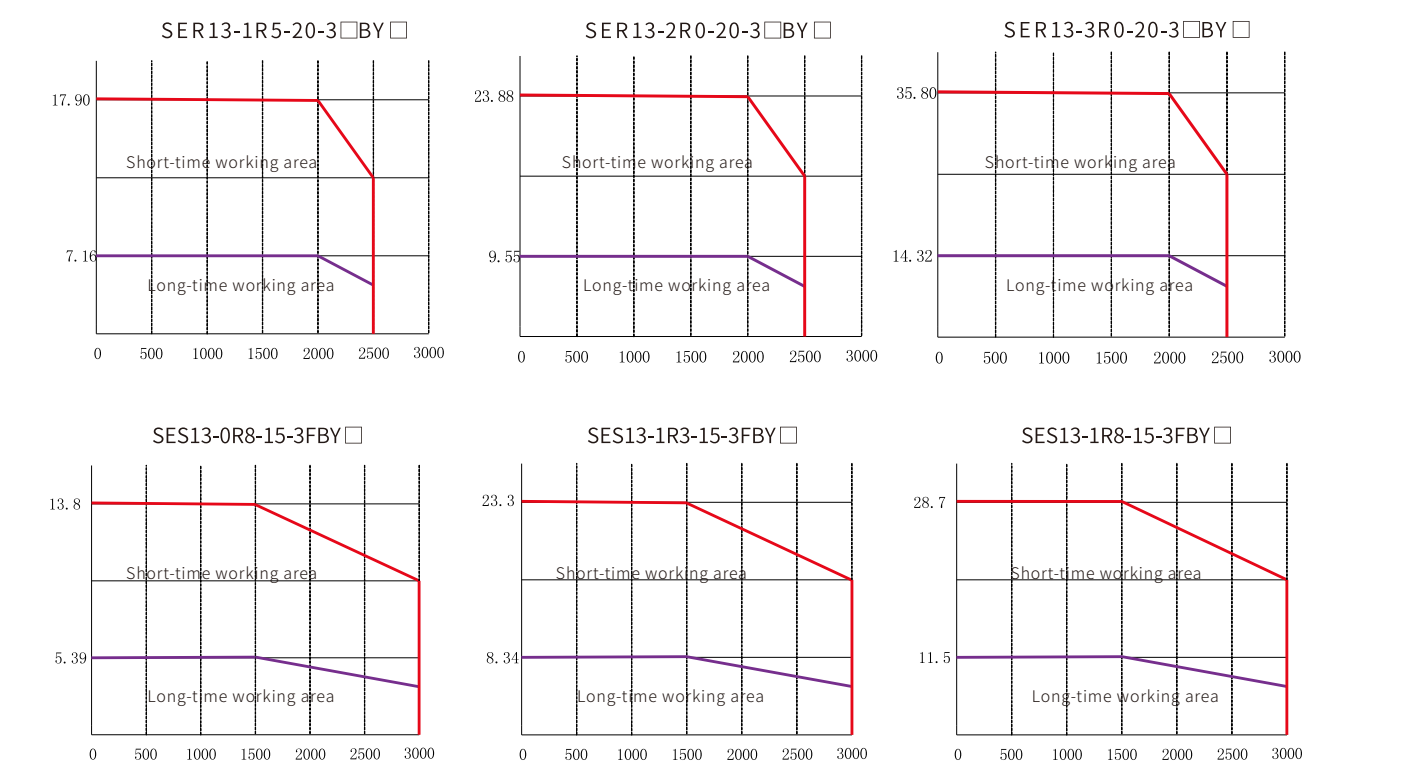


Torque-speed characteristic curve of Series SER/SES servo motors

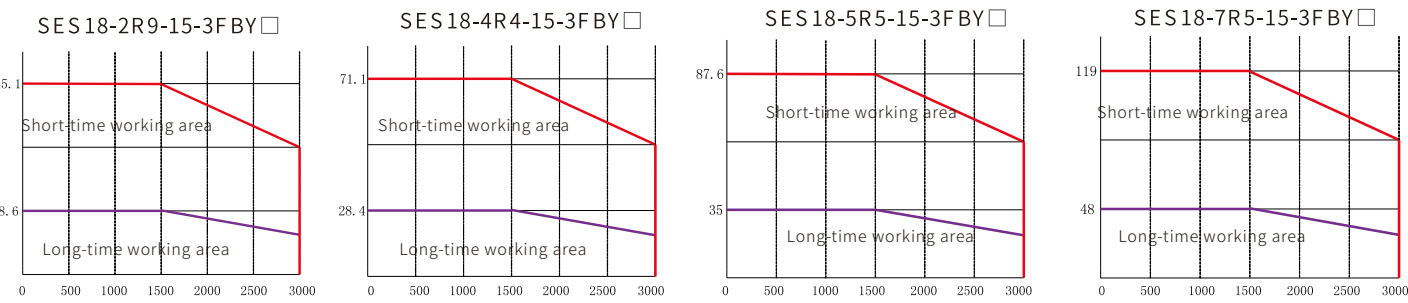
• Torque-speed characteristic curve of 40, 60 & 80 servo motors with flanges



• Torque-speed characteristic curve of 130 servo motors with flanges



• Torque-speed characteristic curve of 180 servo motors with flanges





Parameter table of SER series servo motor

| Servo motor model                                                                                                                    | Voltage class<br>V | Rated power<br>W | Rated rotating speed<br>rpm | Maximum rotating speed<br>rpm | Rated current<br>A | Maximum instantaneous current<br>A | Rated torque<br>Nm | Maximum instantaneous torque<br>Nm | Torque constant<br>Nm/A | Rotating inertia<br>Kg.cm <sup>2</sup> •10 <sup>-4</sup> | Adaptable Drive |
|--------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------|-----------------------------|-------------------------------|--------------------|------------------------------------|--------------------|------------------------------------|-------------------------|----------------------------------------------------------|-----------------|
| SER11-1R0-20-2 □ BY □                                                                                                                | AC220V             | 1000             | 2000                        | 2500                          | 5.0                | 15.0                               | 5.0                | 15.00                              | 1.0                     | 7.22(7.24)                                               | 6R2-2 □         |
| SER11-1R2-30-2 □ BY □                                                                                                                |                    | 1200             | 3000                        | 3500                          | 4.9                | 14.7                               | 4.0                | 12.00                              | 0.82                    | 5.54(5.56)                                               |                 |
| SER11-1R8-30-2 □ BY □                                                                                                                |                    | 1800             | 3000                        | 3500                          | 6.6                | 19.8                               | 6.0                | 18.00                              | 0.91                    | 8.55(8.57)                                               | 011-2 □         |
| SER13-1R0-10-2 □ BY □                                                                                                                |                    | 1000             | 1000                        | 1500                          | 4.72               | 14.2                               | 9.55               | 28.65                              | 2.02                    | 17.14(17.16)                                             | 6R2-2 □         |
| SER13-1R0-20-2 □ BY □                                                                                                                |                    |                  | 2000                        | 2500                          | 4.72               | 14.2                               | 4.77               | 14.31                              | 1.01                    | 8.71(8.73)                                               |                 |
| SER13-1R0-30-2 □ BY □                                                                                                                |                    |                  | 3000                        | 3500                          | 4.96               | 14.9                               | 3.27               | 9.81                               | 0.66                    | 6.17(6.19)                                               |                 |
| SER13-1R5-10-3 □ BY □                                                                                                                | AC 380             | 1500             | 1000                        | 1500                          | 5.4                | 13.5                               | 14.32              | 35.80                              | 2.65                    | 25.58(25.6)                                              | 5R6-3 □         |
| SER13-1R5-20-3 □ BY □                                                                                                                |                    |                  | 2000                        | 2500                          | 4.1                | 10.3                               | 7.16               | 17.90                              | 1.75                    | 12.08(12.1)                                              |                 |
| SER13-1R5-30-3 □ BY □                                                                                                                |                    |                  | 3000                        | 3500                          | 4.2                | 10.5                               | 4.78               | 11.95                              | 1.14                    | 8.71(8.73)                                               |                 |
| SER13-2R0-20-3 □ BY □                                                                                                                |                    | 2000             | 2000                        | 2500                          | 6.5                | 16.3                               | 9.55               | 23.88                              | 1.47                    | 17.14(17.16)                                             | 8R5-3 □         |
| SER13-2R0-30-3 □ BY □                                                                                                                |                    |                  | 3000                        | 3500                          | 5.8                | 14.5                               | 6.5                | 16.25                              | 1.12                    | 12.08(12.1)                                              |                 |
| SER13-3R0-20-3 □ BY □                                                                                                                |                    | 3000             | 2000                        | 2500                          | 9.6                | 24.0                               | 14.32              | 35.80                              | 1.49                    | 25.58(25.6)                                              | 013-3 □         |
| SER13-3R0-30-3 □ BY □                                                                                                                |                    |                  | 3000                        | 3500                          | 8.3                | 20.8                               | 9.55               | 23.88                              | 1.15                    | 17.14(17.16)                                             |                 |
| Note 1: Value in () is the value in case a brake is provided;<br>2: When an oil seal is provided, it shall be derated by 10% for use |                    |                  |                             |                               |                    |                                    |                    |                                    |                         |                                                          |                 |



Parameter table of SES series servo motor

| Servo motor model                                              | Voltageclass<br>V | Rated power<br>W | Rated rotating speed<br>rpm | Maximum rotating speed<br>rpm | Rated current<br>A | Maximum instantaneous current<br>A | Rated torque<br>Nm | Maximum instantaneous torque<br>Nm | Torque constant<br>Nm/A | Rotating inertia<br>Kg.cm2*10-4 | Adaptable Drive<br>EA180- |
|----------------------------------------------------------------|-------------------|------------------|-----------------------------|-------------------------------|--------------------|------------------------------------|--------------------|------------------------------------|-------------------------|---------------------------------|---------------------------|
| SES04-005-30-2 □ AY □                                          | AC 220            | 50               | 3000                        | 6000                          | 0.6                | 1.8                                | 0.16               | 0.48                               | 0.26                    | 0.02(0.02)                      | 0R9-1 □                   |
| SES04-0R1-30-2 □ AY □                                          |                   | 100              | 3000                        | 6000                          | 1.1                | 3.3                                | 0.32               | 0.96                               | 0.29                    | 0.04(0.04)                      | 1R6-1 □                   |
| SES06-0R2-30-2 □ BY □                                          |                   | 200              | 3000                        | 6000                          | 1.6                | 4.8                                | 0.64               | 1.92                               | 0.44                    | 0.29(0.34)                      | 1R6-1 □                   |
| SES06-0R4-30-2 □ BY □                                          |                   | 400              | 3000                        | 6000                          | 2.3                | 6.9                                | 1.27               | 3.81                               | 0.59                    | 0.56(0.61)                      | 2R5-1 □                   |
| SES08-0R7-30-2 □ BY □                                          |                   | 750              | 3000                        | 5000                          | 4.0                | 12                                 | 2.4                | 7.2                                | 0.653                   | 1.56(1.66)                      | 4R8-2 □                   |
| SES08-1R0-30-2 □ BY □                                          |                   | 1000             | 3000                        | 5000                          | 6.0                | 18                                 | 3.2                | 9.6                                | 0.538                   | 2.03(2.13)                      | 6R2-2 □                   |
| SES13-0R8-15-2FBY □                                            |                   | 850              | 1500                        | 3000                          | 6.9                | 17                                 | 5.39               | 13.8                               | 1.72                    | 13.95(16.1)                     | 011-2B                    |
| SES13-1R1-20-2 □ BY □                                          |                   | 1100             | 2000                        | 4000                          | 7.2                | 18.9                               | 5.39               | 14.15                              | 0.75                    | 13.95(16.1)                     | 011-2B                    |
| SES13-1R7-30-2 □ BY □                                          |                   | 1700             | 3000                        | 5000                          | 9.2                | 24.1                               | 5.39               | 14.15                              | 0.69                    | 13.95(16.1)                     | 011-2B                    |
| SES13-0R8-15-3FBY □                                            | AC 380            | 850              | 1500                        | 3000                          | 3.5                | 8.5                                | 5.39               | 13.8                               | 1.72                    | 13.95(16.1)                     | 5R6-3B                    |
| SES13-1R7-30-3 □ BY □                                          |                   | 1700             | 3000                        | 5000                          | 5.3                | 13.9                               | 5.39               | 14.15                              | 1.02                    | 13.95(16.1)                     | 5R6-3B                    |
| SES13-1R1-20-3 □ BY □                                          |                   | 1100             | 2000                        | 4000                          | 4.3                | 11.3                               | 5.39               | 14.15                              | 1.25                    | 13.95(16.1)                     | 5R6-3B                    |
| SES13-1R3-15-3FBY □                                            |                   | 1300             | 1500                        | 3000                          | 5.4                | 14                                 | 8.34               | 23.3                               | 1.78                    | 19.95(22.1)                     | 5R6-3B                    |
| SES13-1R7-30-3 □ BY □                                          |                   | 1700             | 2000                        | 4000                          | 7.5                | 22.5                               | 8.34               | 25                                 | 1.11                    | 19.95(22.1)                     | 8R5-3B                    |
| SES13-2R6-30-3 □ BY □                                          |                   | 2600             | 3000                        | 5000                          | 8                  | 22.35                              | 8.34               | 23.3                               | 1.04                    | 19.95(22.1)                     | 8R5-3B                    |
| SES13-1R8-15-3FBY □                                            |                   | 1800             | 1500                        | 3000                          | 8.4                | 20                                 | 11.5               | 28.7                               | 1.5                     | 26.1(28.1)                      | 8R5-3B                    |
| SES13-2R4-20-3 □ BY □                                          |                   | 2400             | 2000                        | 4000                          | 8.9                | 22.2                               | 11.5               | 28.7                               | 1.29                    | 26.1(28.1)                      | 013-3B                    |
| SES13-3R6-30-3 □ BY □                                          |                   | 3600             | 3000                        | 5000                          | 10.8               | 27                                 | 11.5               | 28.7                               | 1.07                    | 26.1(28.1)                      | 013-3B                    |
| SES18-2R9-15-3FBY □                                            |                   | 2900             | 1500                        | 3000                          | 11.9               | 28                                 | 18.6               | 45.1                               | 1.7                     | 46.0 (53.9)                     | 013-3B                    |
| SES18-4R4-15-3FBY □                                            |                   | 4400             |                             |                               | 16.5               | 40.5                               | 28.4               | 71.1                               | 1.93                    | 67.5 (75.4)                     | 017-3B                    |
| SES18-5R5-15-3FBY □                                            |                   | 5500             |                             |                               | 20.8               | 52                                 | 35                 | 87.6                               | 1.8                     | 89.0(96.9)                      | 022-3B                    |
| SES18-7R5-15-3FBY □                                            |                   | 7500             |                             |                               | 25.7               | 65                                 | 48                 | 119                                | 1.92                    | 125.0(133)                      | 028-3B                    |
| SES18-3R6-20-3FBY □                                            |                   | 3600             | 2000                        | 2500                          | 9.5                | 28.5                               | 16.7               | 50.16                              | 2.1                     | 46.0(53.9)                      | 013-3B                    |
| Note: 1: Value in () is the value in case a brake is provided; |                   |                  |                             |                               |                    |                                    |                    |                                    |                         |                                 |                           |



# CNC machine tool

## ◎ Industrial demand

Machines and equipment have become a part of human production and life. Where machines and equipment are used, machine tools are needed. Machine tools can machine parts with high precision and surface roughness requirements by casting, forging, welding, pressing, extruding or otherwise for manufacture of equipment. Manufacturing is a pillar industry for economic development of a country. Strength of the machine tool industry is one of the key indicators that reflect the manufacturing development level of the country. CNC machines tools have become a mainstream development trend of modern machine tools due to their high precision, good flexibility, high work efficiency, compound functions, intelligent control and other features.

## ◎ Highlights of the scheme

- Adaptable to multiple motor types
- Different types of interfaces for connection to CNC systems of different brands
- Accommodated to multiple types of machining processes: 6,000~24,000 r high-speed precision machining, C-axis function, low-speed heavy cutting machining, rigid tapping, independent positioning function, spindle swing function

## ◎ Scheme composition

- Multi-axis synchronous control approach
- Electric screw press approach





# Semiconductor, silicon wafer machining

## © Industrial demand

Multi wire cutting is a new cutting method that can cut semiconductor or other hard and brittle materials (such as silicon plate, sapphire, ruby, neodymium iron boron, ferrite and so on) into several hundred of thin sheets at a time by high-speed reciprocating movement of metal wires. It has become a major method of cutting silicon wafers and magnetic materials.

## © Highlights of the scheme

- It has high work efficiency, capable of producing several hundred of products at a time
- It has high precision and small cutting loss in product machining
- It features a constant swing bar output torque, steady tension of metal wires and swing bar jitter angle of less than  $\pm 1^\circ$
- Stably operating FPC can realize automatic deviation rectification and direction switching
- Spindles are directly coupled to realize synchronous closed-loop control between the spindles without additional linking mechanism and fast dynamic response
- The maximum linear cutting speed is 2000 m/min

## © Scheme composition

Comprising three parts, i.e. touch screen, motion controller and servo motor



# Stage lighting



## ◎ Industrial demand

As consumption level constantly improves and recreational activities diversify, new performance venues and forms emerge one after another in the market, large-scale stage machinery and theater equipment of high technology are introduced, and equipment used is generally becoming more complicated. To render spectators better visual experience requires diversified stage performances and innovation, which can not only promote creativity conversion and art presentation, but also enhance the overall effect of stage scenes and treat the spectators with a feast of aesthetic enjoyment. SINEE stage control systems, featuring high safety, diversity, flexibility and easy operation, are powerful aids for stage scenes and actions.

## ◎ Highlights of the scheme

- Support multi-mode switch control
- Support multiple protection functions
- Easy and simple cable connection
- Support storage of massive formula data with stable communication

## ◎ Scheme composition

EA180 series servo system