# FRECON

# SD300 Series
## Servo Drive

# FRECON

SD300 series is FRECON new generation servo drive , with thin and light appearance design, superior performance, and multiple interfaces. Widely used in CNC machine, woodworking, laser, packaging, robots, 3C and other industries.
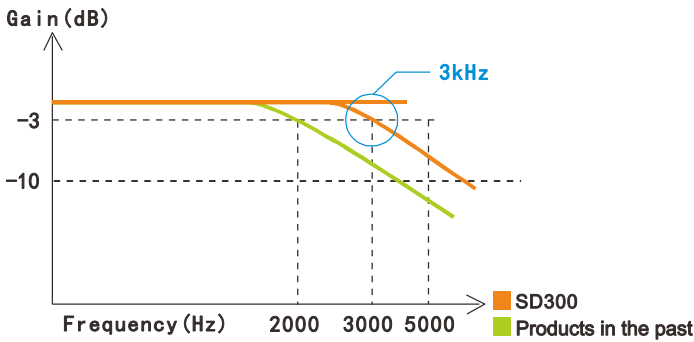
## Equipped with 23bit absolute encoder

With high resolutions encoders to meet the different application requirement.

8388608P/r

Over 800 times

131072P/r

F1M motor
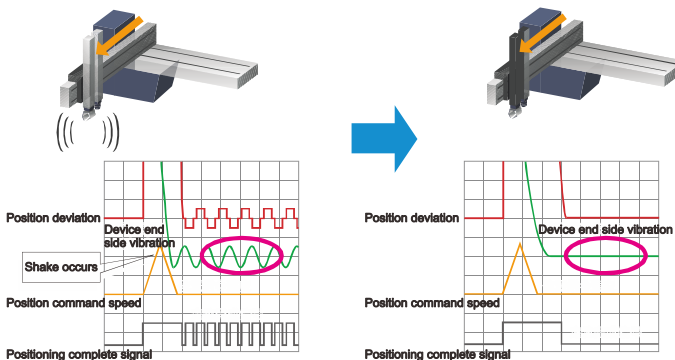
Motors in the past

10, 000P/r
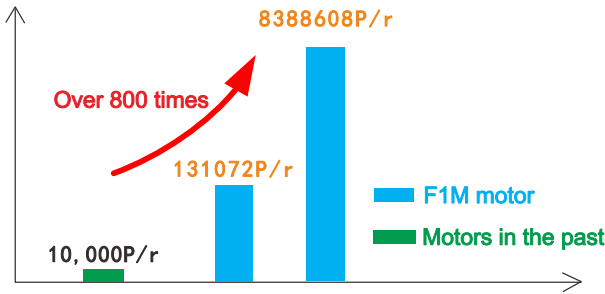
## Superior performance

With 23bit encoder, the speed loop bandwidth up to 3 kHz. Based on position feed forward for high-response control, to reduce response latency, the position tuning time can be as low to 1 ms.

Gain(dB)

3kHz

−3

−10

Frequency(Hz)    2000   3000  5000

SD300

Products in the past

## PC debug software

Support parameter read/write, parameter upload/download, and terminal state monitor, makes parameter debugging more easy.

## Suppress device vibration

There are two vibration components at the end of the device. The SD300 series servo drive can simultaneously suppress the two vibrations at the end of the device, which can bring higher mechanical response.

Position deviation

Device end side vibration

Shake occurs

Position command speed

Positioning complete signal

Position deviation

Device end side vibration

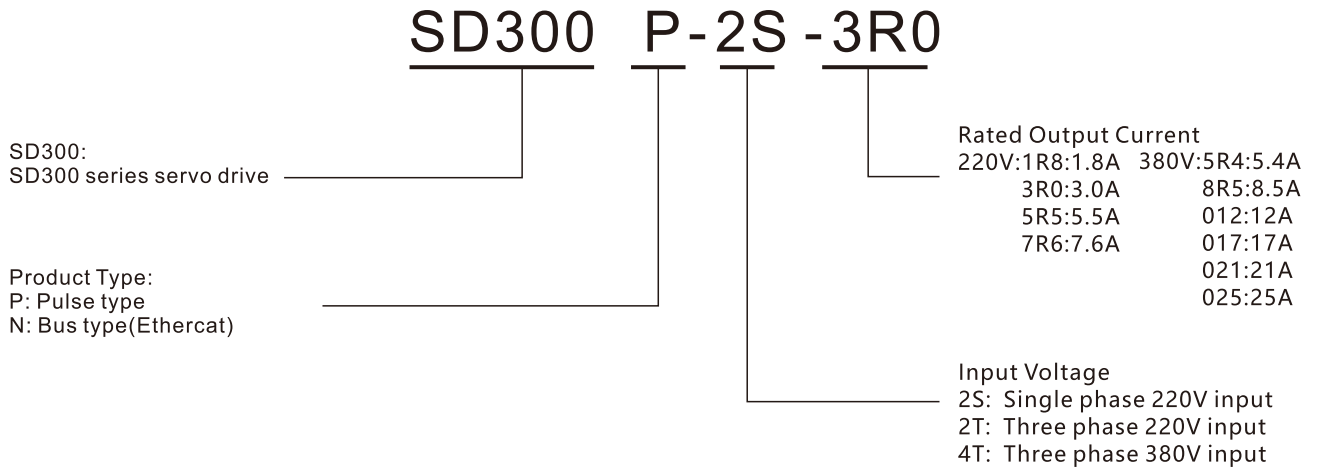Position command speed

Positioning complete signal

## Powerful bus functionality

Standard Type-C Host Interface
Standard RS485 Communication
Optional EtherCAT Communication

Modbus

EtherCAT

## Model description

SD300  P - 2S - 3R0

SD300:
SD300 series servo drive

Product Type:
P: Pulse type
N: Bus type(Ethercat)

Rated Output Current
220V:1R8:1.8A    380V:5R4:5.4A
     3R0:3.0A        8R5:8.5A
     5R5:5.5A       012:12A
     7R6:7.6A       017:17A
                    021:21A
                    025:25A

Input Voltage
2S: Single phase 220V input
2T: Three phase 220V input
4T: Three phase 380V input

## Drive model data

| Frame | Model | Input Voltage(V) | Rated Current(A) | Maximum Current(A) |
|---|---|---|---|---|
| Size A | SD300□-2S-1R8 | Single phase 220V | 1.8 | 5.4 |
| | SD300□-2S-3R0 | | 3 | 9 |
| | SD300□-2S-5R5 | | 5.5 | 14 |
| Size B | SD300□-2T-7R6 | Three phase 220V | 7.6 | 18 |
| | SD300□-4T-5R4 | Three phase 380V | 5.4 | 14 |
| Size C | SD300□-2T-012 | Three phase 220V | 12 | 32 |
| | SD300□-4T-8R5 | Three phase 380V | 8.5 | 19 |
| | SD300□-4T-012 | Three phase 380V | 12 | 30 |
| Size D | SD300□-4T-017 | Three phase 380V | 17 | 40 |
| | SD300□-4T-021 | Three phase 380V | 21 | 50 |
| | SD300□-4T-025 | Three phase 380V | 25 | 60 |

## Drive frame



| Frame | Model | Product size（mm） | | | | | |
|---|---|---|---|---|---|---|---|
| | | L | W | H | a | b | d |
| Size A | SD300□-2S-1R8 | 166 | 45 | 160 | 34.5 | 161 | 5 |
| | SD300□-2S-3R0 | | | | | | |
| | SD300□-2S-5R5 | | | | | | |
| Size B | SD300□-2T-7R6 | 172 | 66 | 167 | 54.5 | 157.2 | 5 |
| | SD300□-4T-5R4 | | | | | | |
| Size C | SD300□-2T-012 | 170 | 83 | 167 | 71.5 | 157.2 | 5 |
| | SD300□-4T-8R5 | | | | | | |
| | SD300□-4T-012 | | | | | | |
| Size D | SD300□-4T-017 | 230 | 85 | 250 | 73.5 | 240.2 | 5.5 |
| | SD300□-4T-021 | | | | | | |
| | SD300□-4T-025 | | | | | | |

## SD300 drive general technical specifications

| | | |
|---|---|---|
| Control method | | IGBT PWM Control, sine wave current drive method, 220V, 380V: single-phase or three-phase full-wave rectification |
| Environ ment | Temperature | Working/Storage: 0°C ~ 55°C (the ambient temperature is above 45°C, derate by 10% for every 5°C increase) /-20°C ~ 70°C |
| | Humidity | Working/Storage: Below 90%RH (no condensation) |
| | Vibration | 4.9m/s² / 19.6m/s² |
| | Atmospheric pressure | 86kPa ~ 106kPa |
| IP grade | | IP20 |
| Altitude | | Maximum altitude is up to 2000m. No derating is required for use at 1000m and below. Derating by 1% for every 100m above 1000m. |
| Feedback method | | Single-turn/multi-turn absolute encoder (Tamagawa protocol) |

## SD300P drive technical specifications

| | | | | |
|---|---|---|---|---|
| Position Mode | Input signal | Pulse command | Input pulse type | Three command formats:Direction + Pulse; A, B Phase Quadrature Pulse; Forward/Reverse Pulse |
| | | | Input Mode | Differential input, Collector Open Circuit |
| | | | Input Frequency | Low speed：≤500kHz（differential input） ; ≤200kHz（single-ended input） High speed：≤4MHz（differential input） |
| | Position output | Output mode | | A phase, B phase: differential output Z phase: differential output or open collector output |
| | | Frequency division ratio | | Any frequency division ratio |
| Speed Mode | Analog command input | | | -10V ~ +10V, Input impedance10kΩ,0~10V |
| | Command acceleration and deceleration | | | Parameter set |
| | Command source | | | Analog 、Parameter set |
| Torque Mode | Analog command input | | | -10V ~ +10V, Input impedance10kΩ,0~10V |
| | Speed limit | | | Parameter set |
| | Source of command | | | Analog 、Parameter set |
| Input and output signals | Digital input signal | Input signal function selection | | 7 DI DI1 ~ DI5 Digital signal inputs with a maximum frequency of 1kHz (frequency may decrease when the current-limiting resistance is greater than 2.4kΩ). DI8 ~ DI9 Digital signal inputs with hardware delay less than 1ms (current-limiting resistance is 2.4kΩ). DI functions are as follows: Servo enable, Alarm reset/clear,Forward drive disable, Reverse drive disable, Forward torque limit, Reverse torque limit, Emergency stop, Electronic gear selection 1,Electronic gear selection 2,Clear position deviation, Disable pulse input |
| | Digital output signal | Output signal function selection | | 5DO, programmable output terminal (photoelectric isolation) DO functions are as follows: Servo ready, alarm, positioning completed, speed reached, electromagnetic brake, torque limit, etc. |
| | Analog input signal | | | Voltage input specifications: -10V ~ +10V; maximum allowable voltage: ±12V |

## SD300P drive technical specifications

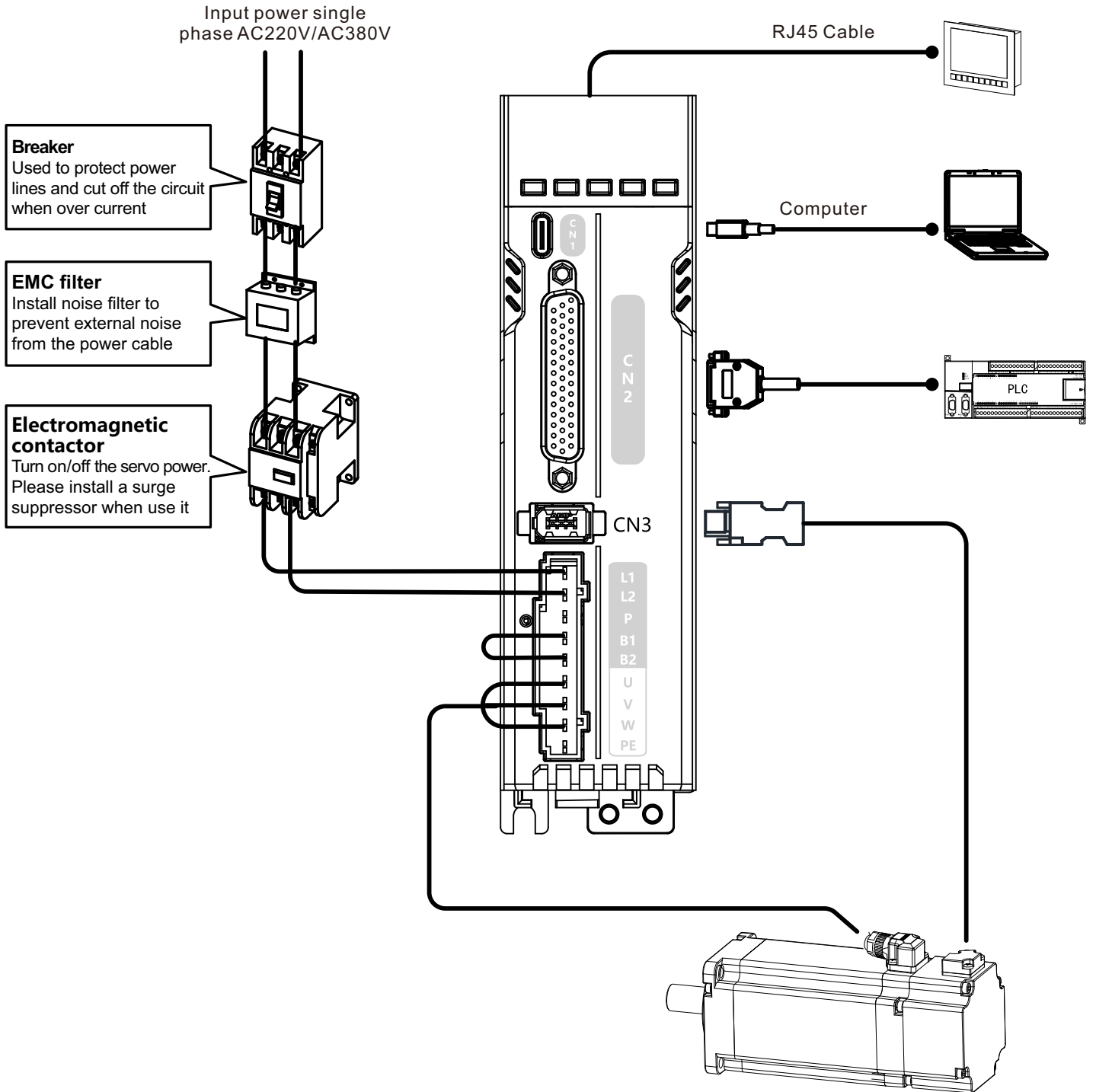| Built-in function | Overtravel (OT) prevention function | P-OT, N-OT stops immediately when operate |
|---|---|---|
| | Electronic gear ratio | Numerator and denominator：1-32767/1-32767 |
| | LED display | 5 digit LED display |
| | Monitoring function | Speed, current position, position deviation, motor torque, motor current, command pulse frequency, bus voltage, module internal temperature, etc. |
| | Protective function | Overspeed, overvoltage, overcurrent, overload, abnormal braking, abnormal encoder, abnormal position, etc. |
| | Communication | Modbus RTU |
| | Host computer interface | USB, support parameter reading and writing, online upgrade |

## SD300N drive technical specifications

| Input and output signals | Digital input signals | | 4 programmable input DI terminals (photoelectric isolation)<br>2 high-speed optocoupler input DI terminals (high-speed latch), supporting up to 200kHz<br>DI functions as follows:<br>Servo enable, Alarm reset, Gain switch, Mode switch 1, Mode switch 2, Zero-point fix enable, Forward over travel switch, Reverse over travel switch, Zero command, Positive external torque limit, Forward jog, Reverse jog, Electronic gear selection, Command direction setting, Home switch, Home return enable, Emergency stop, Clear position deviation, Set current position as home |
|---|---|---|---|
| | Digital output signals | | 4 programmable output DO terminals, DO load capacity 50mA, voltage range 5V ~ 30V<br>DO functions as follows:<br>Servo ready for output, zero speed, positioning completed, approaching position, torque limit, speed limit, brake engaged output, warning output, fault output, home return completed, electrical home return output, torque reached output, speed reached output, DB brake output. |
| Location mode | Performance | Feedforward compensation | 0～100% |
| | Input signal | Position command input | EtherCAT communication mode: CSP (Cyclic Synchronous Position Mode) / PP (Profile Position Mode) / HM (Home Mode) |
| Speed torque control mode | Speed control range | | 1: 5000 (the lower limit of the speed control range is the condition for non-stop at rated torque load) |
| | Torque control accuracy | | ±2% |
| | Input signals | Speed command input | EtherCAT communication mode：CSV（cycle sync speed mode）/ PV（contour speed mode） |
| | | Torque command input | EtherCAT communication mode：CSV（cycle sync speed mode）/ PV（contour speed mode） |
| Built-in function | Overtravel prevention function | | P-OT、N-OT stop immediately when moving |
| | Protection | | Overcurrent, overvoltage, undervoltage, overload, main circuit detection abnormality, radiator overheating, overspeed, encoder abnormality, CPU abnormality, parameter abnormality |
| | LED display function | | 5 digit LED display |
| | Communication | | EtherCAT，Maximum number of slaves 255 |
| | Other functions | | Gain adjustment, alarm recording, JOG operation, dynamic braking |

## EtherCAT Slave communication technical specifications

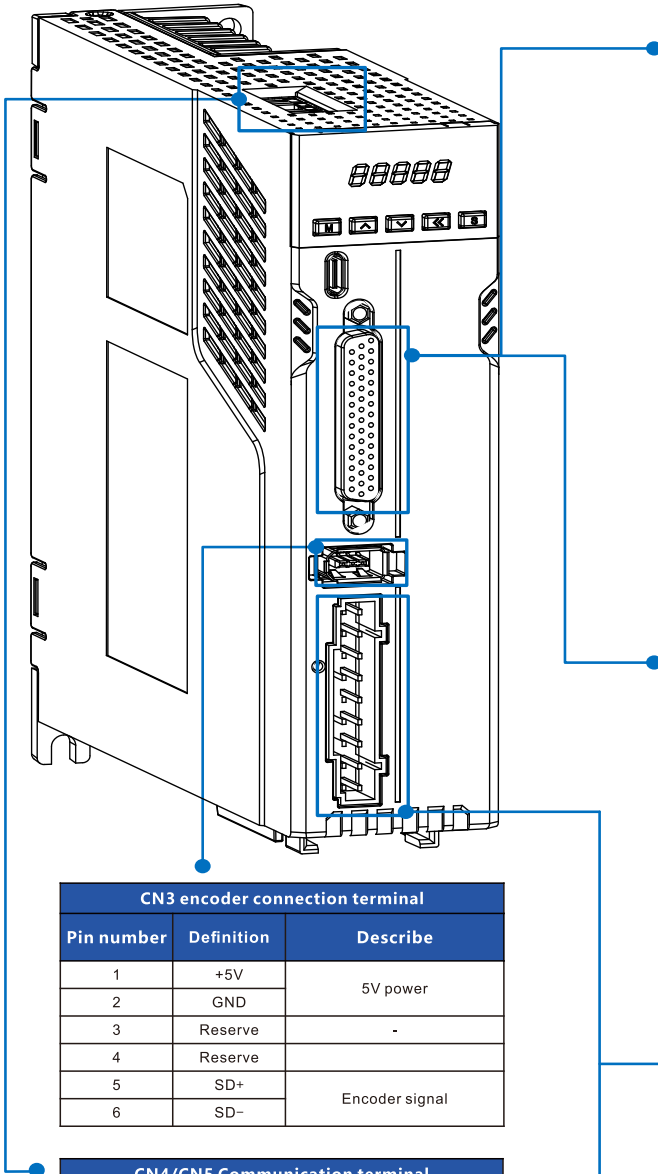| | |
|---|---|
| Communication protocol | EtherCAT |
| Support services | CoE（PDO、SDO） |
| Synchronously | DC-Distributed Clock |
| Physical layer | 100BASE-TX |
| Baud Rate | 100 Mbit/s (100Base-TX) |
| Duplex mode | Full-duplex |
| Topology | Linear |
| Transmission medium | Shielded Category 5 or electrical performance specification Category 6 or higher cable |
| Transmission distance | Less than 100M between two nodes (good environment, excellent cable) |
| Number of slave stations | Protocol supports up to 65535, actual usage does not exceed 100 units |
| EtherCAT frame length | 44 bytes to 1498 bytes |
| Process data | Maximum size of a single Ethernet frame is 1486 bytes |
| Sync Jitter between Two Slaves | <1us |
| Refresh time | Approximately 30us for 1000 digital input/output switches; approximately 100us for 100 servo axes; different refresh times are defined for different interfaces |

■ SD300P drive wiring



**Breaker**
Used to protect power lines and cut off the circuit when over current

**EMC filter**
Install noise filter to prevent external noise from the power cable

**Electromagnetic contactor**
Turn on/off the servo power. Please install a surge suppressor when use it

Input power single phase AC220V/AC380V

RJ45 Cable

Computer

PLC

L1
L2
P
B1
B2
U
V
W
PE

CN3

**Note:** For three-phase input, the power input terminals are L1, L2, and L3.
The control power supply needs to select any two lines as the control power input L1C, L2C.

| CN2 Control terminal definition | | | |
|---|---|---|---|
| Signal name | Default function | Pin number | Terminal function |
| DI1 | S-ON | 9 | Servo enable |
| DI2 | ALM-RST | 10 | Alarm fault reset |
| DI3 | P-OT | 24 | Forward overtravel |
| DI4 | N-OT | 8 | Reverse overtravel |
| DI5 | ClrPosErr | 33 | Clear position deviation |
| DI8 | Reserve | 30 | – |
| DI9 | Reserve | 12 | – |
| COM+ | | 11 | DI input terminal common end |
| DO1+ | S-RDY+ | 7 | Servo ready |
| DO1- | S-RDY- | 6 | |
| DO2+ | COIN+ | 5 | Positioning completed |
| DO2- | COIN- | 4 | |
| DO3+ | ZERO+ | 3 | Zero speed signal |
| DO3- | ZERO- | 2 | |
| DO4+ | ALM+ | 1 | Fault output |
| DO4- | ALM- | 26 | |
| DO5+ | HomeAttain+ | 28 | Home return completion |
| Do5- | HomeAttain- | 27 | |

Universal terminal signal

| Signal name | Pin number | Terminal function |
|---|---|---|
| PULSE+ | 41 | Input pulse command mode: Differential drive input, collector open circuit. Input pulse form: Direction + pulse, A, B phase orthogonal pulse, CW/CCW pulse |
| PULSE- | 43 | |
| SIGN+ | 37 | |
| SIGN- | 39 | |
| HPULSE+ | 38 | High-speed input pulse command |
| HPULSE- | 36 | |
| HSIGN+ | 42 | |
| HSIGN- | 40 | |
| PULLHI | 35 | External power input interface for command pulse |
| GND | 29 | Signal ground |

Position command

| CN3 encoder connection terminal | | |
|---|---|---|
| Pin number | Definition | Describe |
| 1 | +5V | 5V power |
| 2 | GND | |
| 3 | Reserve | - |
| 4 | Reserve | |
| 5 | SD+ | Encoder signal |
| 6 | SD- | |

| Main circuit terminal definition (Size A) | |
|---|---|
| Terminal identification | Terminal function |
| L1、L2 | Control circuit power input terminal |
| P、B1、B2 | When use external brake resistor, disconnect between B1 and B2, and connect the external brake resistor across P and B1, not connected to B2 |
| U、V、W | Output to motor U V W power |
| PE | PE motor ground terminal |

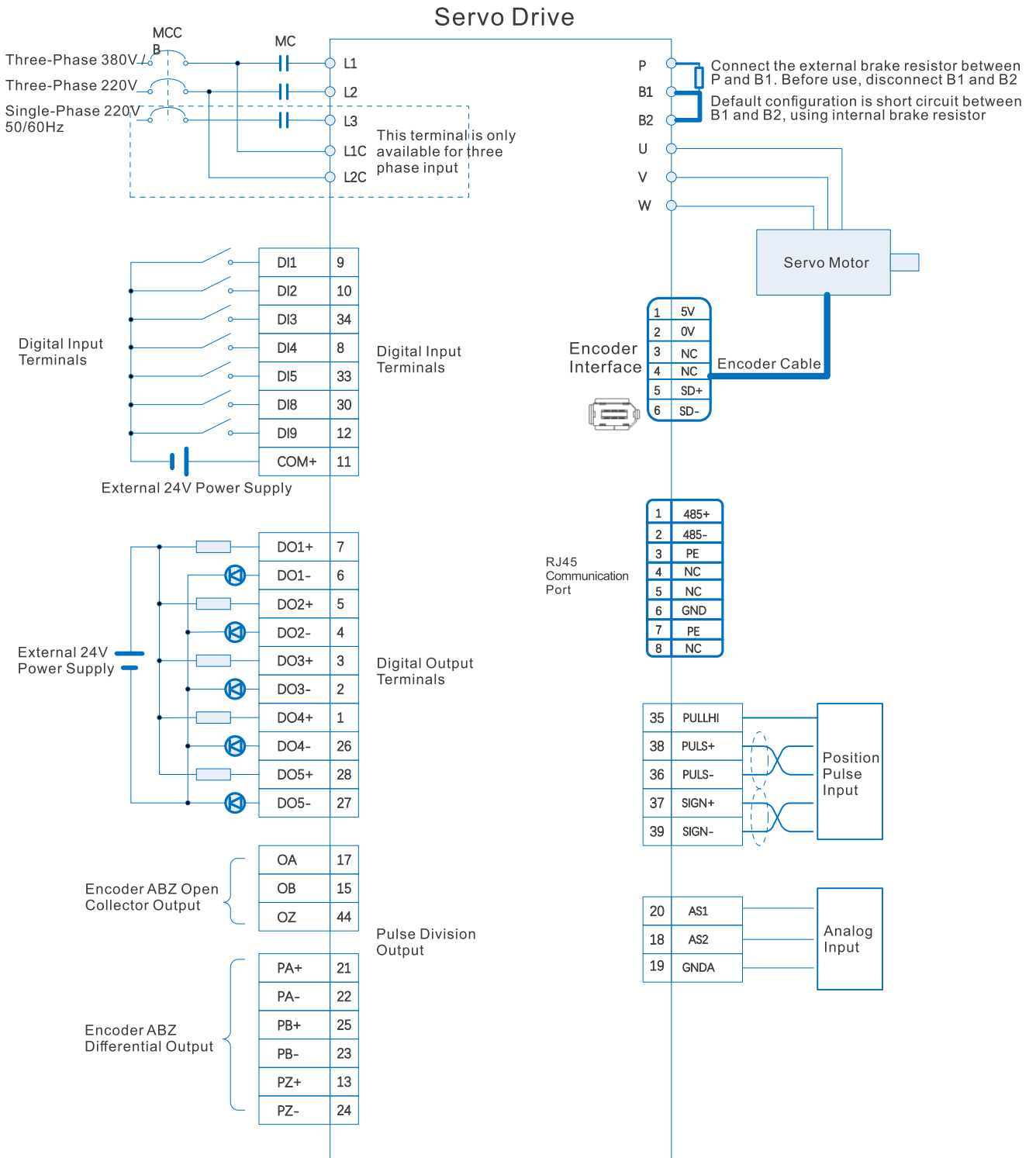| CN4/CN5 Communication terminal | | |
|---|---|---|
| Pin number | Signal name | Terminal function |
| 1 | MBS- | Modubus Communication data negative terminal |
| 2 | MBS+ | Modbus communication data positive terminal |
| 3 | PE | Ground terminal |
| 4 | NC | Reserve |
| 5 | NC | Reserve |
| 6 | GND | Internal power ground |
| 7 | PE | The drive is grounded and connected to the power supply and motor ground terminals |
| 8 | NC | Reserve |

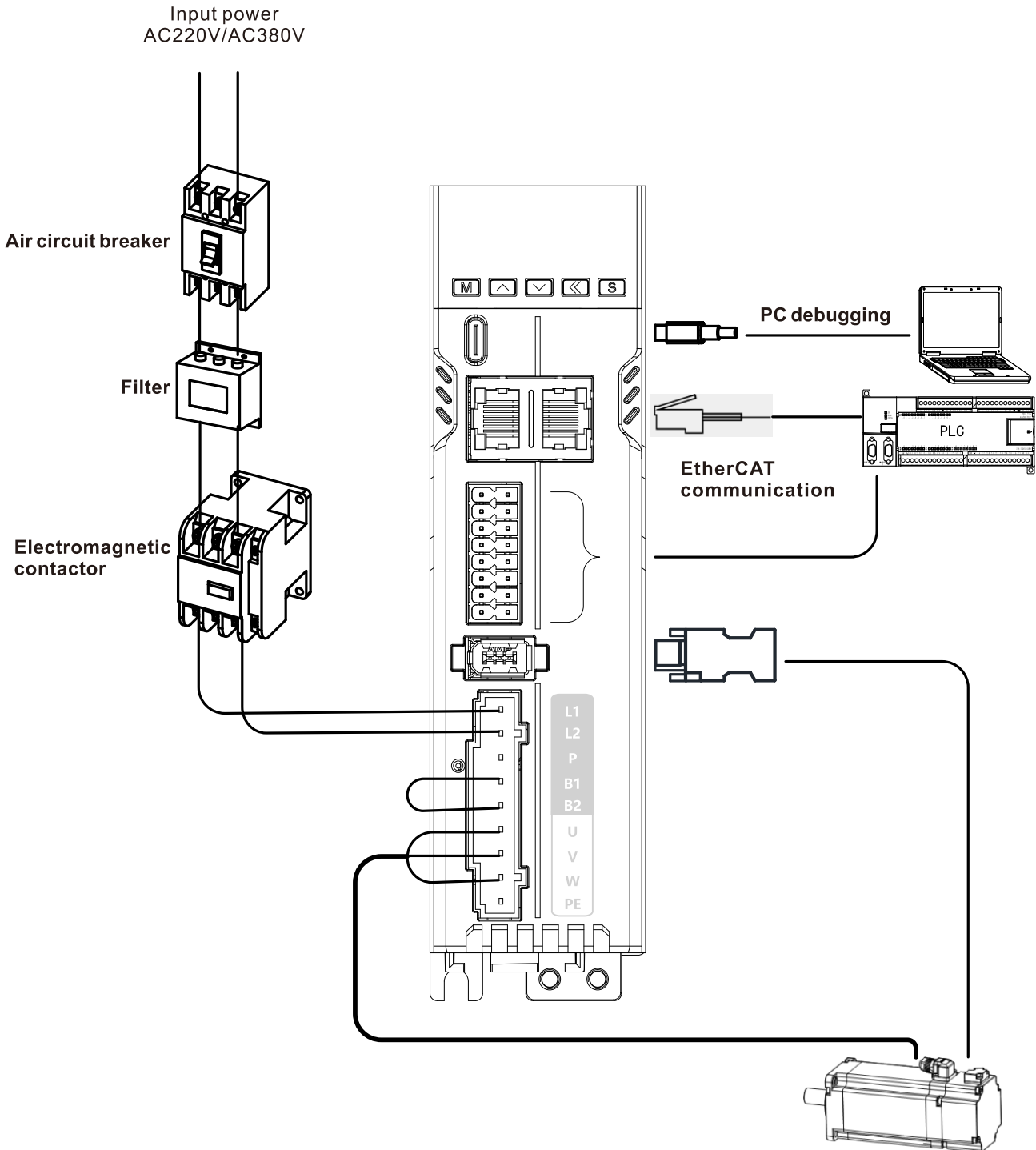| Main circuit terminal definition(Size B/Size C/Size D) | |
|---|---|
| Terminal identification | Terminal function |
| L1C、L2C | Control circuit power input terminal |
| L1、L2、L3 | Main circuit power input terminal |
| P+、N- | Servo bus terminal |
| P、B1、B2 | When use external brake resistor, disconnect between B1 and B2, and connect the external brake resistor across P and B1, not connected to B2 |
| U、V、W | Output to motor U V W power |
| PE | PE motor ground terminal |

# FRECON

## Servo Drive

Three-Phase 380V
Three-Phase 220V
Single-Phase 220V 50/60Hz

MCCB
MC

L1
L2
L3
L1C
L2C

This terminal is only available for three phase input

P
B1
B2
U
V
W

Connect the external brake resistor between P and B1. Before use, disconnect B1 and B2

Default configuration is short circuit between B1 and B2, using internal brake resistor

Servo Motor

| | DI1 | 9 |
| | DI2 | 10 |
| | DI3 | 34 |
| | DI4 | 8 |
| | DI5 | 33 |
| | DI8 | 30 |
| | DI9 | 12 |
| | COM+ | 11 |

Digital Input Terminals

Digital Input Terminals

External 24V Power Supply

**Encoder Interface**

| 1 | 5V |
| 2 | 0V |
| 3 | NC |
| 4 | NC |
| 5 | SD+ |
| 6 | SD- |

Encoder Cable

| | DO1+ | 7 |
| | DO1- | 6 |
| | DO2+ | 5 |
| | DO2- | 4 |
| | DO3+ | 3 |
| | DO3- | 2 |
| | DO4+ | 1 |
| | DO4- | 26 |
| | DO5+ | 28 |
| | DO5- | 27 |

External 24V Power Supply

Digital Output Terminals

RJ45 Communication Port

| 1 | 485+ |
| 2 | 485- |
| 3 | PE |
| 4 | NC |
| 5 | NC |
| 6 | GND |
| 7 | PE |
| 8 | NC |

| 35 | PULLHI |
| 38 | PULS+ |
| 36 | PULS- |
| 37 | SIGN+ |
| 39 | SIGN- |

Position Pulse Input

Encoder ABZ Open Collector Output

| OA | 17 |
| OB | 15 |
| OZ | 44 |

Pulse Division Output

| 20 | AS1 |
| 18 | AS2 |
| 19 | GNDA |

Analog Input

Encoder ABZ Differential Output

| PA+ | 21 |
| PA- | 22 |
| PB+ | 25 |
| PB- | 23 |
| PZ+ | 13 |
| PZ- | 24 |

**Note:**
Use twisted pair shield cable for pulse input.

# FRECON

Input power
AC220V/AC380V

**Air circuit breaker**

**Filter**

**Electromagnetic contactor**

M ⌃ ⌄ ⟪ S

**PC debugging**

**EtherCAT communication**

PLC

L1
L2
P
B1
B2
U
V
W
PE

**Note:** For three-phase input, the input power terminals are L1, L2, and L3.
The control power supply needs to select any two lines as the control power input L1C, L2C.
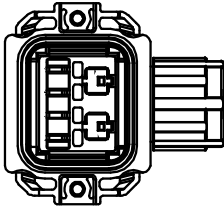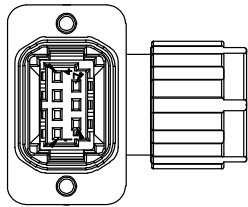
## SD300N drive port definition

| Cn4 control terminal definition | | | |
|---|---|---|---|
| Signal name | Default function | Pin number | Terminal function |
| Universal terminal signal | Di1 | S-ON | 1 | Servo enable |
| | DI2 | ALM-RST | 3 | Alarm fault reset |
| | DI3 | P-OT | 11 | Forward over range |
| | DI4 | N-OT | 13 | Reverse over range |
| | COM+ | 9 | Digital input common |
| | HDI1 | 5 | High speed digital input 1 |
| | HDI2 | 7 | High speed digital input 2 |
| | D01+,COM- | S-RDY | 8, 10 | Servo ready |
| | DO2+,COM- | ALM | 6, 10 | Fault output |
| | DO3+,DO3- | BK | 3, 2 | Brake |
| | DO4+,COM- | Reserve | 12, 10 | - |
| | COM- | - | 10 | DO output common terminal |

| Main circuit terminal definition (Size A) | |
|---|---|
| Terminal identification | Terminal function |
| L1、L2 | Main circuit power input terminal |
| P、B1、B2 | When use external brake resistor, disconnect between B1 and B2, and connect the external brake resistor across P and B1, not connected to B2 |
| U、V、W | Output to motor U V W power |
| PE | PE motor ground terminal |

| Main circuit terminal definition(Size B/Size C/Size D) | |
|---|---|
| Terminal identification | Terminal function |
| L1C、L2C | Control circuit power input terminal |
| L1、L2、L3 | Main circuit power input terminal |
| P+、N- | Servo bus terminal |
| P+、B1、B2 | When use external brake resistor, disconnect between B1 and B2, and connect the external brake resistor across P and B1, not connected to B2 |
| U、V、W | Output to motor U V W power |
| PE | PE motor ground terminal |

| Cn3 encoder connection terminal | | |
|---|---|---|
| Pin number | Terminal description | Function description |
| 1 | +5V | 5V power |
| 2 | GND | |
| 3 | Reserve | - |
| 4 | Reserve | |
| 5 | SD+ | Encoder signal |
| 6 | SD− | |

| CN2, CN3EtherCAT communication terminal | | | |
|---|---|---|---|
| A | | B | |
| Pin number | Signal name | Pin number | Terminal function |
| 1 | TD+ | 1 | TD+ |
| 2 | TD- | 2 | TD- |
| 3 | RD+ | 3 | RD+ |
| 4 | - | 4 | |
| 5 | - | 5 | |
| 6 | RD- | 6 | |
| 7 | - | 7 | |
| 8 | - | 8 | |
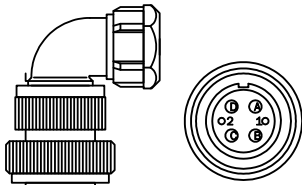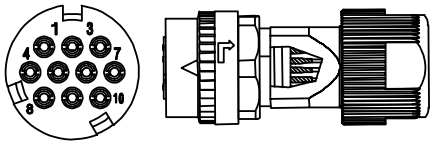
## SD300 servo motor

| 40/60/80 flange motor side terminal definition | Power side cable 6P connector | | Power side encoder 7-pin connector | |
|---|---|---|---|---|
|  |  | |  | |
| | Pin number | Signal name | Pin number | Signal name |
| | 1 | W | 1 | 5V |
| | 2 | V | 2 | 0 |
| | 3 | U | 3 | SD+ |
| | 4 | PE | 4 | SD− |
| | A | BK+ | 5 | PE |
| | B | BK− | 6 | BAT+ |
| | | | 7 | BAT− |

| 130/180 flange motor side terminal definition | Power side cable with 6-pin aviation connector | | Power side encoder with 10-pin aviation connector | |
|---|---|---|---|---|
|  |  | |  | |
| | Pin number | Signal name | Pin number | Signal name |
| | A | W | 1 | / |
| | | | 2 | E− |
| | B | V | 3 | E+ |
| | | | 4 | SD− |
| | C | U | 5 | 0V |
| | | | 6 | SD+ |
| | D | PE | 7 | 5V |
| | | | 8 | / |
| | 1 | BK+ | 9 | / |
| | 2 | BK− | 10 | PE |

# Cable selection

## Cable model description

LPG - 0 0750 - 3.0 - G
①  ② ③ ④  ⑤  ⑥

LEG - 0 0 - 3.0 - G
①  ② ③  ④  ⑤

**①Motor power cable**
LPG: General 4-core power
LPB: Power cable with brake

**②Drive Side Plug Type**
0: U-shaped type terminal
1: Needle type terminal

**③Wire diameter(mm²)**
050:0.5
075:0.75
100:1.0
150:1.5
250:2.5
…

**④Motor side plug type**
0:4-core Amp head
1: SC-MC6S (Gecko Head)
2:6P-core aviation head

**⑤Cable length**
3.0:3m
5.0:5m
10.0:10m
…

**⑥Cable type**
G: General Cable
H: Super High-flex Cable
(Bend endurance over 10 million cycles)

**①Encoder cables**
LEG: Universal absolute encoder cables
LEB: Battery-powered absolute encoder cables

**②Drive side plug type**
O:1394 plug
1: DB15 plug
2: DB9 plug

**③Motor side plug type**
1:SC-MC7S （Gecko Head）
2:10P-core aviation plug

**④Cable length**
3.0:3m
5.0:5m
10.0:10m
…

**⑤Cable type**
G: General Cable
H: Super High-flex Cable
(Bend endurance over 10 million cycles)

## Cable selection table

| Motor model | Cable name | Cable model | Length(m) | Cable appearance diagram |
|---|---|---|---|---|
| F1M terminal type motor （40/60/80 flange motor） | Power cable without brake | LPG-10501-3.0-G | 3 |  |
| | | LPG-10501-5.0-G | 5 | |
| | | LPG-10501-10.0-G | 10 | |
| | Power cable with brake | LPB-10501-3.0-G | 3 |  |
| | | LPB-10501-5.0-G | 5 | |
| | | LPB-10501-10.0-G | 10 | |
| | Single-turn absolute encoder cable | LEG-01-3.0-G | 3 |  |
| | | LEG-01-5.0-G | 5 | |
| | | LEG-01-10.0-G | 10 | |
| | Multi-turn absolute encoder cable | LEB-01-3.0-G | 3 |  |
| | | LEB-01-5.0-G | 5 | |
| | | LEB-01-10.0-G | 10 | |
| F1M aviation plug motor （130 flange, 1.5kW and below） | Without brake power cable | LPG-11002-3.0-G | 3 |  |
| | | LPG-11002-5.0-G | 5 | |
| | | LPG-11002-10.0-G | 10 | |

| | | | | |
|---|---|---|---|---|
| F1M aviation plug motor (130 flange, 1.5kW and below) | With brake power cable | LPB−11002−3.0−G | 3 |  |
| | | LPB−11002−5.0−G | 5 | |
| | | LPB−11002−10.0−G | 10 | |
| | Single-turn absolute encoder cable | LEG−02−3.0−G | 3 |  |
| | | LEG−02−5.0−G | 5 | |
| | | LEG−02−10.0−G | 10 | |
| | Multi-turn absolute encoder cable | LEB−02−3.0−G | 3 |  |
| | | LEB−02−5.0−G | 5 | |
| | | LEB−02−10.0−G | 10 | |
| F1M aviation plug motor (130 flange, >1.5kW, ≤3.0kW) | Without brake power cable | LPG−11502−3.0−G | 3 |  |
| | | LPG−11502−5.0−G | 5 | |
| | | LPG−11502−10.0−G | 10 | |
| | With brake power cable | LPB−11502−3.0−G | 3 |  |
| | | LPB−11502−5.0−G | 5 | |
| | | LPB−11502−10.0−G | 10 | |
| | Single-turn absolute encoder cable | LEG−02−3.0−G | 3 |  |
| | | LEG−02−5.0−G | 5 | |
| | | LEG−02−10.0−G | 10 | |
| | Multi-turn absolute encoder cable | LEB−02−3.0−G | 3 |  |
| | | LEB−02−5.0−G | 5 | |
| | | LEB−02−10.0−G | 10 | |
| F1M aviation plug motor (180 flange, >3.0kW, ≤7.5kW) | Without brake power cable | LPG−12502−3.0−G | 3 |  |
| | | LPG−12502−5.0−G | 5 | |
| | | LPG−12502−10.0−G | 10 | |
| | With brake power cable | LPB−12502−3.0−G | 3 |  |
| | | LPB−12502−5.0−G | 5 | |
| | | LPB−12502−10.0−G | 10 | |
| | Single-turn absolute encoder cable | LEG−02−3.0−G | 3 |  |
| | | LEG−02−5.0−G | 5 | |
| | | LEG−02−10.0−G | 10 | |
| | Multi-turn absolute encoder cable | LEB−02−3.0−G | 3 |  |
| | | LEB−02−5.0−G | 5 | |
| | | LEB−02−10.0−G | 10 | |

## Servo motor selection

■ **Motor model description**

$$\underline{F1}\ \underline{M}\ -\ \underline{40A}\ \underline{30}\ \underline{L}\ \underline{1}\ -\ \underline{A3}\ \underline{60}$$
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| ①Product Series | ④Rated speed(Rpm) | ⑦Encoder type |
|---|---|---|
| F1:F1 series motor<br>F2:F2 series motor | 15=1500rpm<br>20=2000rpm<br>25=2500rpm<br>30=3000rpm | A: Magnetic Encoder<br>B: Optical Encoder<br><br>1: 17-bit Absolute Value Single-turn<br>2: 17-bit Absolute Value Multi-turn<br>3: 23-bit Absolute Value Single-turn<br>4: 23-bit Absolute Value Multi-turn |
| **②Rotor inertia** | **⑤Input voltage(V)** | |
| H:high inertia<br>M:medium inertia<br>S:low inertia | L : AC 220V<br>H : AC 380V | **⑧Motor flange** |
| **③Rated power(W)** | **⑥Brake** | 40:40 flange<br>60:60 flange<br>80:80 flange<br>13:130 flange<br>18:180 flange |
| A:×10<br>B:×100<br>For example:40A=400W<br>… | 1:Without brake<br>2:With brake | |

■ **Motor selection table**

| Motor model | Rated output (kW) | Voltage (V) | Rated torque (N.m) | Rated current (A) | Rotor inertia (x10-4kg.m²) | Rated speed/ Maximum speed(rpm) |
|---|---|---|---|---|---|---|
| F1M-10A30L□-B440 | 100W | 220V | 0.318 | 1.1 | 0.066 | 3000/6000 |
| F1M-20A30L□-B460 | 200W | 220V | 0.64 | 1.7 | 0.28 | 3000/6000 |
| F1M-40A30L□-B460 | 400W | 220V | 1.27 | 2.5 | 0.52 | 3000/6000 |
| F1M-60A30L□-B460 | 600W | 220V | 1.91 | 3.6 | 0.76 | 3000/6000 |
| F1M-75A30L□-B480 | 750W | 220V | 2.39 | 4.4 | 1.48 | 3000/6000 |
| F1M-10B30L□-B480 | 1000W | 220V | 3.18 | 5.8 | 1.97 | 3000/6000 |
| F1M-85A15L□-B413 | 850W | 220V | 5.41 | 4.6 | 12.1 | 1500/3000 |
| F1M-85A15H□-B413 | 850W | 380V | 5.41 | 3.1 | 12.1 | 1500/3000 |
| F1M-13B15L□-B413 | 1300W | 220V | 8.28 | 7.7 | 17.5 | 1500/3000 |
| F1M-13B15H□-B413 | 1300W | 380V | 8.28 | 5.1 | 17.5 | 1500/3000 |
| F1M-18B15L□-B413 | 1800W | 220V | 11.46 | 9.8 | 23.7 | 1500/3000 |
| F1M-18B15H□-B413 | 1800W | 380V | 11.46 | 6.3 | 23.7 | 1500/3000 |
| F1M-23B15L□-B413 | 2300W | 220V | 14.64 | 12.4 | 31.2 | 1500/3000 |
| F1M-23B15H□-B413 | 2300W | 380V | 14.64 | 8.5 | 31.2 | 1500/3000 |
| F1M-30B15H□-B413 | 3000W | 380V | 14.64 | 8.5 | 31.2 | 1500/3000 |
| F1M-30B15H−B418 | 3000W | 380V | 19.1 | 11.6 | 47.2 | 1500/3500 |
| F1M-45B15H□-B418 | 4500W | 380V | 28.65 | 16.6 | 69.3 | 1500/3500 |
| F1M-55B15H□-B418 | 5000W | 380V | 35 | 21.4 | 94.1 | 1500/3500 |
| F1M-75B15H□-B418 | 7500W | 380V | 47.76 | 26.7 | 135.6 | 1500/3500 |

**Note:**
1) □:1 (without brake) , 2 (with brake)
2) If need 40 flange motor, please contact FRECON.

![FRECON logo]

### 60 flange

| Model | L(mm) | Brake |
|---|---|---|
| F1M-20A30L1-B460 | 73 | Without |
| F1M-20A30L2-B460 | 102.5 | With |
| F1M-40A30L1-B460 | 90 | Without |
| F1M-40A30L2-B460 | 119.5 | With |
| F1M-60A30L1-B460 | 107 | Without |
| F1M-60A30L1-B460 | 136.5 | With |
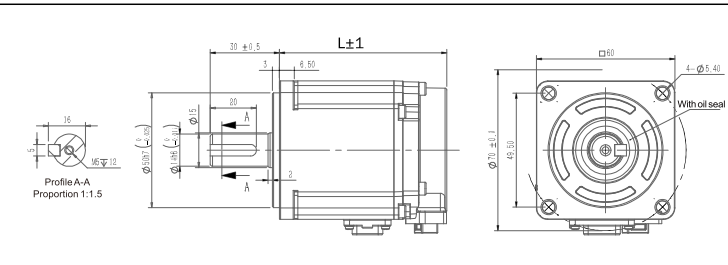
**Note:** If need other encoder types, please contact FRECON.

### 80 flange

| Model | L(mm) | Brake |
|---|---|---|
| F1M-75A30L1-B480 | 96.5 | Without |
| F1M-75A30L2-B480 | 130.5 | With |
| F1M-10B30L1-B480 | 109.5 | Without |
| F1M-10B30L2-B480 | 143.5 | With |
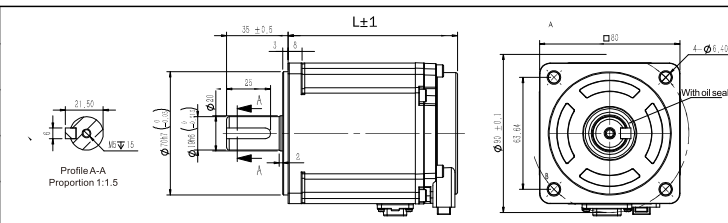
**Note:** If need other encoder types, please contact FRECON.

### 130 flange

| Model | L(mm) | Brake |
|---|---|---|
| F1M-85A15□1-B413 | 130 | Without |
| F1M-85A15□2-B413 | 155.5 | With |
| F1M-13B15□1-B413 | 146 | Without |
| F1M-13B15□2-B413 | 171.5 | With |
| F1M-18B15□1-B413 | 164 | Without |
| F1M-18B15□2-B413 | 189.5 | With |
| F1M-23B15□1-B413 | 186 | Without |
| F1M-23B15□2-B413 | 211.5 | With |
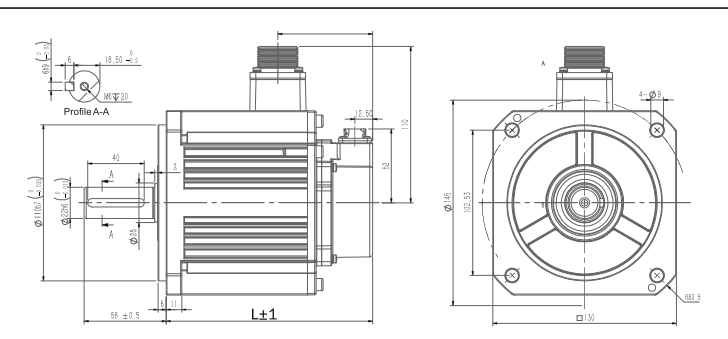
**Note:** 1.If need other encoder types, please contact FRECON.
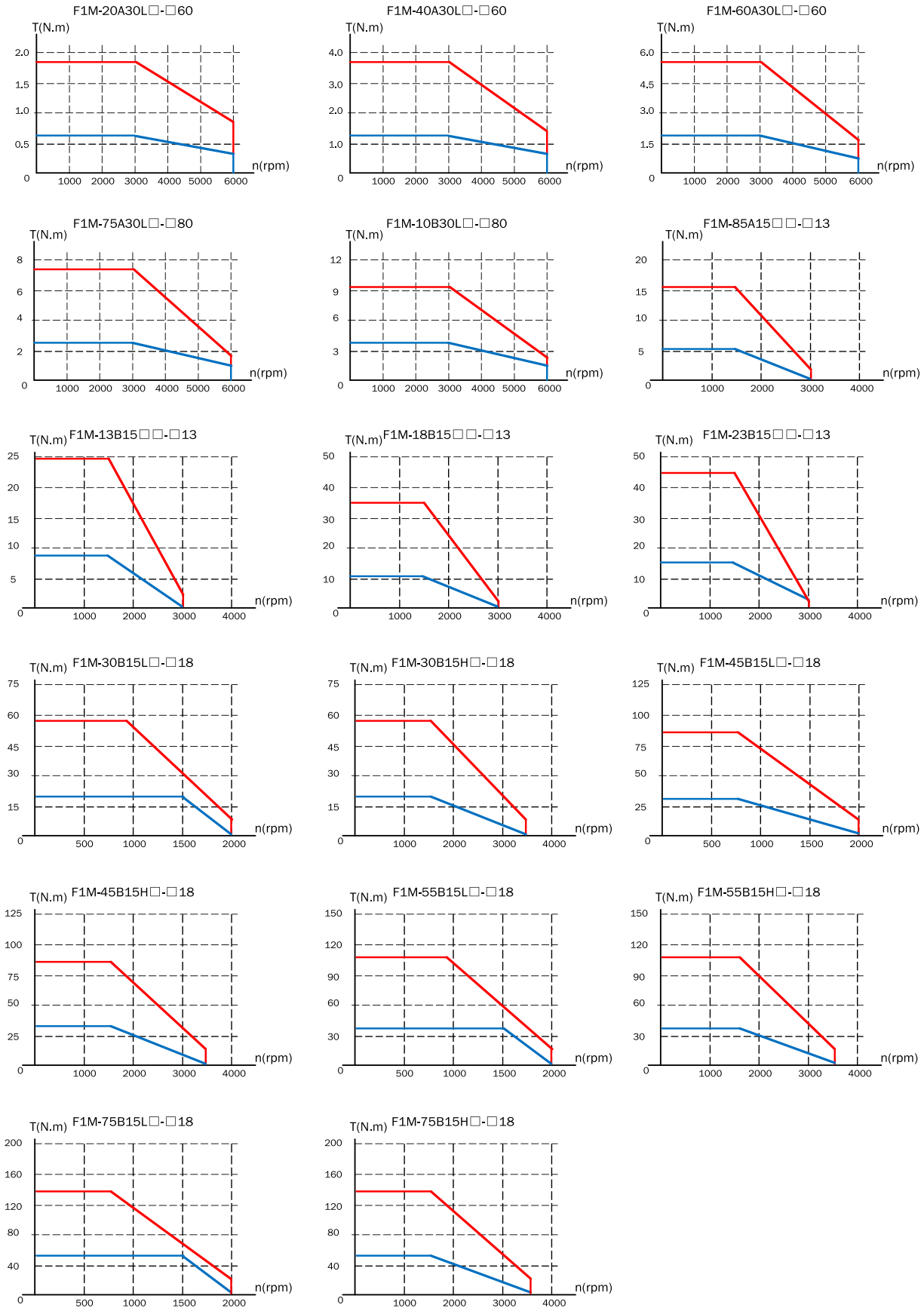   2.□:H(380V),L(220V)

### 180 flange

| Model | L(mm) | Brake |
|---|---|---|
| F1M-30B15H1-B418 | 156 | Without |
| F1M-30B15H2-B418 | 193 | With |
| F1M-45B15H1-B418 | 180 | Without |
| F1M-45B15H2-B418 | 217 | With |
| F1M-55B15H1-B418 | 205 | Without |
| F1M-55B15H2-B418 | 242 | With |
| F1M-75B15H1-B418 | 250 | Without |
| F1M-75B15H2-B418 | 287 | With |
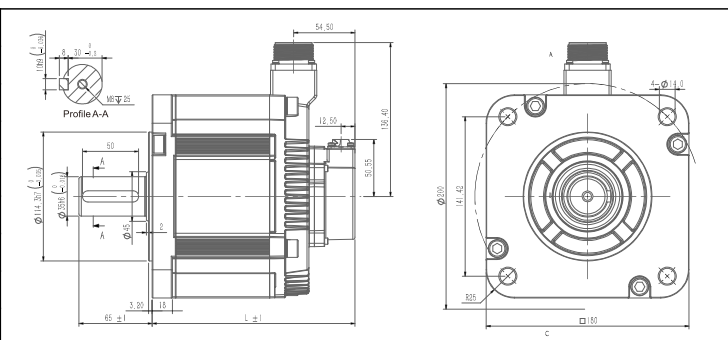
**Note:** If need other encoder types, please contact FRECON.

# Servo motor characteristic curve



**Note:** The blue line is for rated torque, the red line is for instantaneous torque.

## SD300 configuration table

| Motor model | Flange | Rated current (A) | Rated torque (N.m) | Voltage (V) | Adapter drive | Encoder cable | Power cable |
|---|---|---|---|---|---|---|---|
| F1M-20A30L□-B460 | 60 | 1.7 | 0.64 | 220V | SD300□-2S-1R8 | LEG-01-3.0-G (Without battery) LEB-01-3.0-G (With battery) | LPG-10501-3.0-G LPB-10501-3.0-G (With brake) |
| F1M-40A30L□-B460 | | 2.5 | 1.27 | | SD300□-2S-3R0 | | |
| F1M-60A30L□-B460 | | 3.6 | 1.91 | | SD300□-2S-5R5 | | |
| F1M-75A30L□-B480 | 80 | 4.4 | 2.39 | | | | |
| F1M-10B30L□-B480 | | 5.8 | 3.18 | | SD300□-2T-7R6 | | |
| F1M-85A15L□-B413 | 130 | 4.6 | 5.41 | 220V | | LEG-02-3.0-G (Without battery) LEB-02-3.0-G (With battery) | LPG-11002-3.0-G LPB-11002-3.0-G (With brake) |
| F1M-85A15H□-B413 | | 3.1 | 5.41 | 380V | SD300□-4T-5R4 | | |
| F1M-13B15L□-B413 | | 7.7 | 8.28 | 220V | SD300□-2T-012 | | |
| F1M-13B15H□-B413 | | 5.1 | 8.28 | 380V | SD300□-4T-5R4 | | |
| F1M-18B15L□-B413 | | 9.8 | 11.46 | 220V | SD300□-2T-012 | | LPG-11502-3.0-G LPB-11502-3.0-G (With brake) |
| F1M-18B15H□-B413 | | 6.3 | 11.46 | 380V | SD300□-4T-8R5 | | |
| F1M-23B15L□-B413 | | 12.4 | 14.64 | 220V | SD300□-2T-012 | | |
| F1M-23B15H□-B413 | | 8.5 | 14.64 | 380V | SD300□-4T-012 | | |
| F1M-30B15H□-B418 | 180 | 11.6 | 19.1 | 380V | SD300□-4T-012 | | LPG-12502-3.0-G LPB-12502-3.0-G (With brake) |
| F1M-45B15H□-B418 | | 16.6 | 28.65 | 380V | SD300□-4T-017 | | |
| F1M-55B15H□-B418 | | 21.4 | 35 | 380V | SD300□-4T-021 | | |
| F1M-75B15H□-B418 | | 26.7 | 47.76 | 380V | SD300□-4T-025 | | |

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