

AC SERVO SYSTEM FOR MOTION CONTROL INDUSTRY

HSD-E6-20/30



AUCTECH Automation

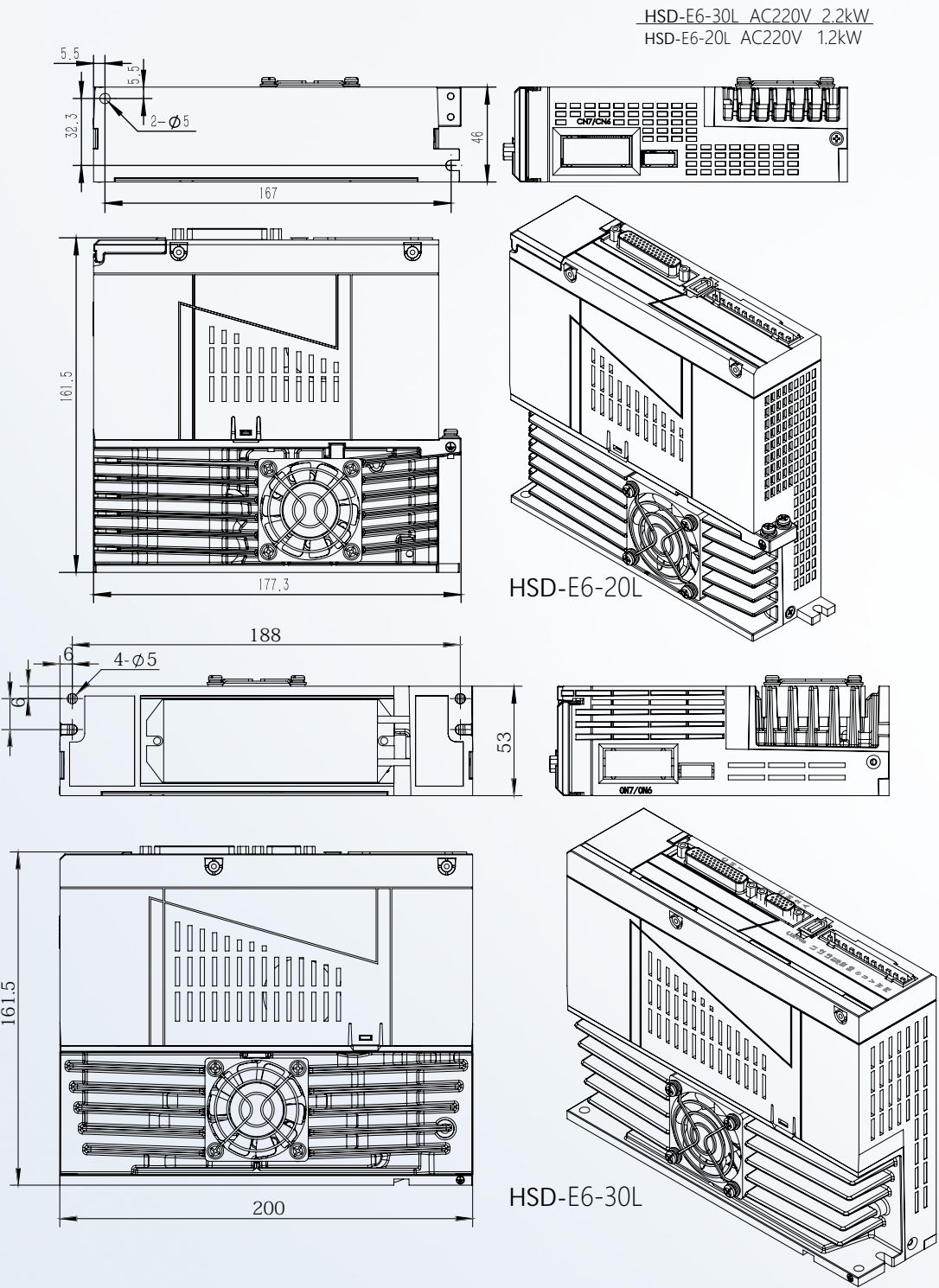
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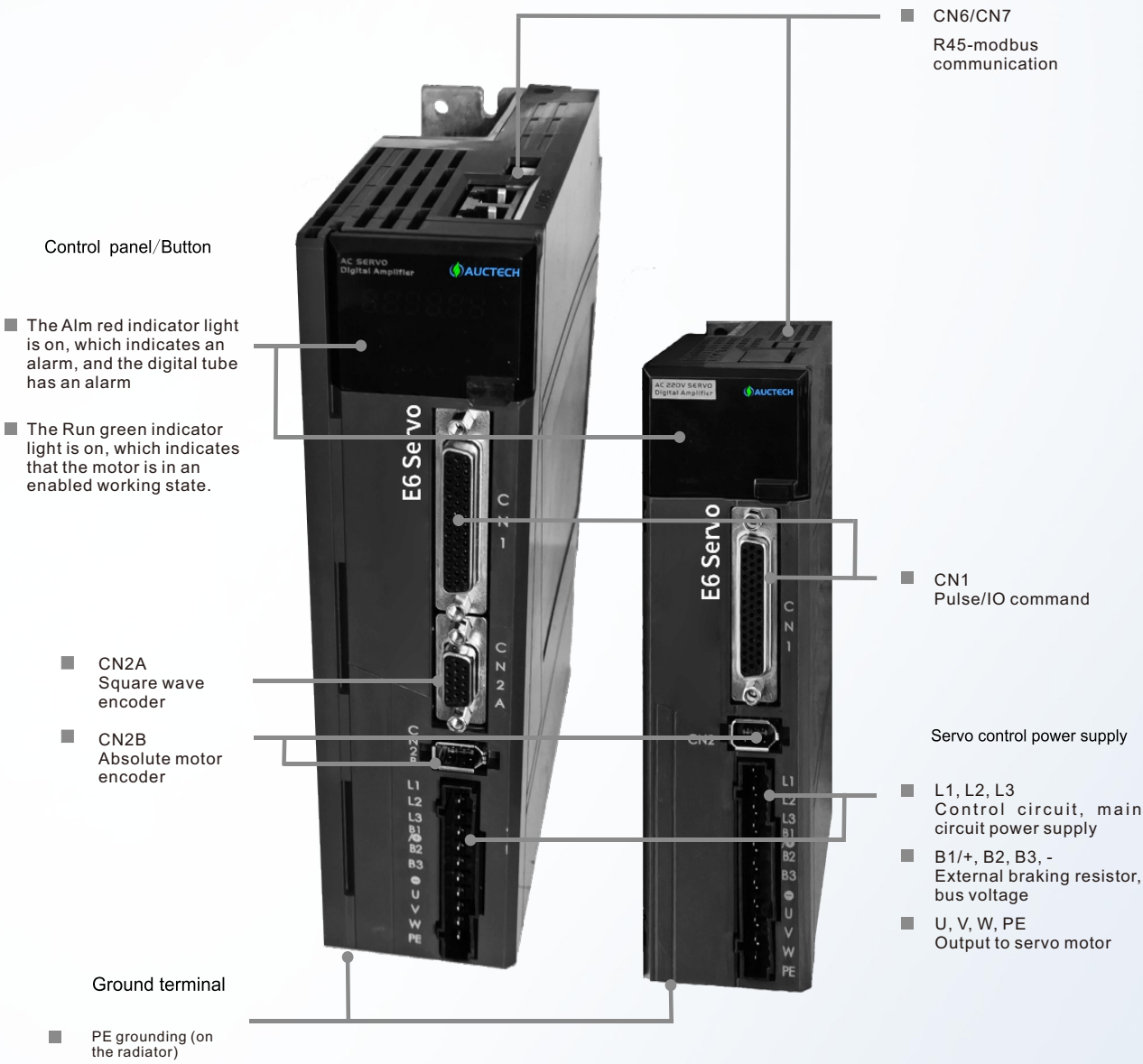
Model Selection

The HSD-E6 full series servo is widely used in economic servo systems for automated transmission for packaging, conveying and shearing and so on, with characteristics such as small size, low power consumption, stability and reliability.

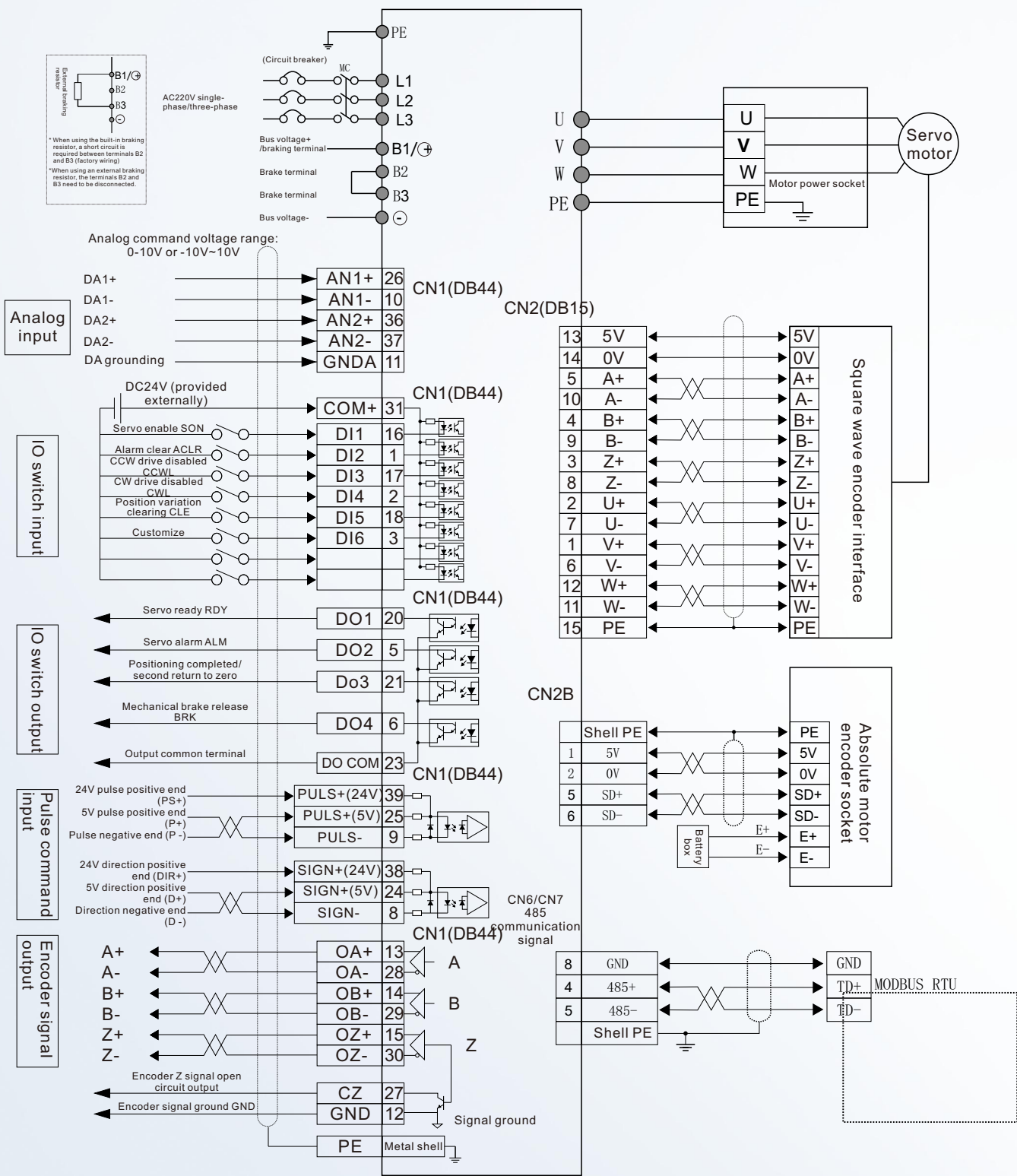


Interface Definition

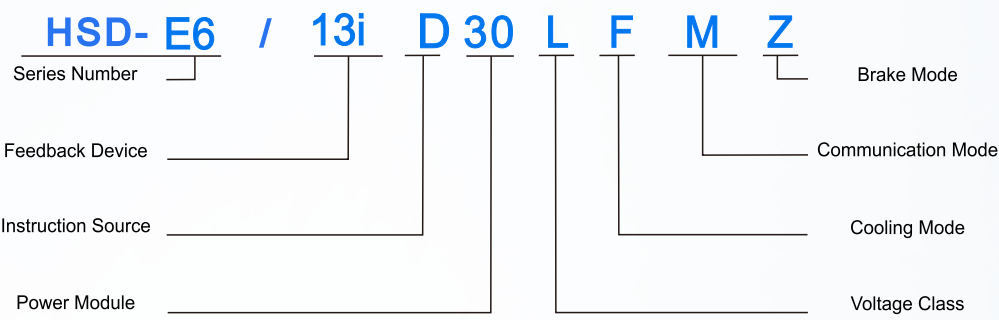
| | |
|------------------------------------|--|
| One-board design | Overheat/overvoltage/overload protection |
| R45-Modbus communication | I/O customization |
| Separate the heat dissipation duct | Vibration suppression |
| Low power consumption | Small size and economic type |



Connection Diagram

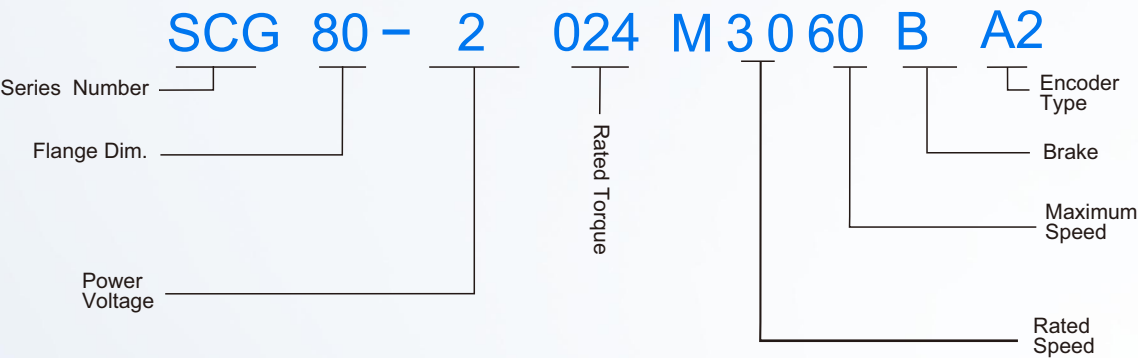
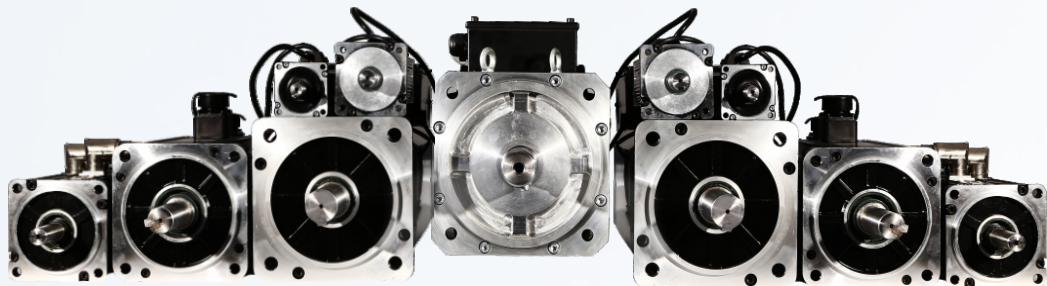


Model Selection



- Series Number**
Classified by Features of Product and Profession
HSD-DO series: Standard Universal Servo
HSD-C7 series: Cutting precision servo
HSD-M7 series: Synchronous High-speed Spindle Servo
HSD-A7 series: Inductive Asynchronous Servo
HSD-F7 series: Common Bus Multi-axis Servo
HSD-E7 series: Economy specific servo
HSD-G7 series: Special servo for grinding
HSD-C8 series: Precision cutting application servo
HSD-C12 series: Dual axis bus application servo
HSD-E6 series: Automation application servo
- Feedback Device**
1000:2500C/T; 13i: 17bit; 23i: 23bit; R: Resolver
B: biss protocol;
C: Magnetic type
H: Heidenhain; N: Nikon
- Instruction Source**
c: Functions of Position/Speed/Torque
a: Bus-based Protocol
d: Double Pulses
- Power Module**
30: 30A; 100:100A;
- Voltage Class**
L: single-phase/three-phase 220V
H: three-phase 380V
B: three-phase 220V
- Cooling Mode**
W: Natural cooling; F: Air cooling; S: Liquid cooling
- Communication Mode**
W: None
M: Modbus
M2: MECHATROLINK II
M3: MECHATROLINK III
C: CANOPEN
E: ETHERNET CAT
- Brake Mode**
W: Built-in braking; Z: External braking

Model Selection



Series Number

SCG Series Servo motor

Flange Dim.

80: 80mm
130: 130mm

Rated Torque

Three-dig number x0.1N.m

Rated/Maximum Speed

15:1500rpm 20:2000rpm
30:3000rpm 50:5000rpm
60:6000rpm

Power Voltage

2: AC220V
4: AC380V

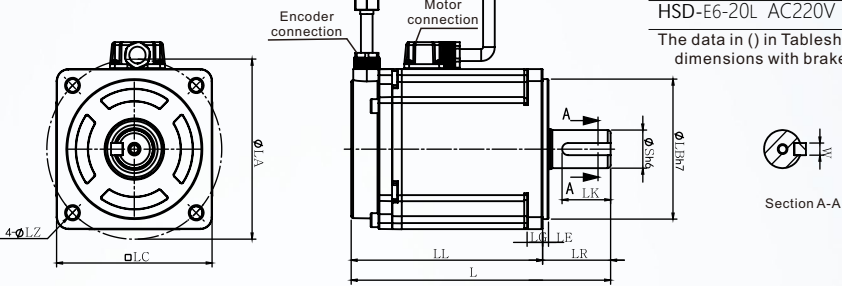
Brake

B: With brake

Encoder Type

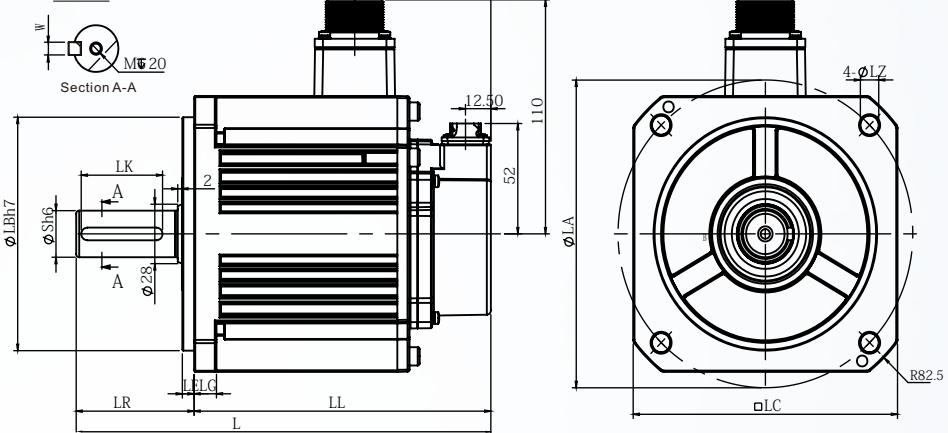
A: 23-bit absolute
A2:17-bit absolute

60/80 :

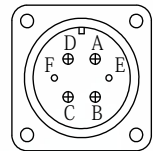


HSD-E6-30L AC220V 2.2kW
HSD-E6-20L AC220V 1.2kW
The data in () in Tables shows the dimensions with brakes

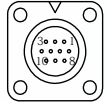
130 :



Power line 18-6Z socket



Encoder wire CMV1-R10P socket



| | | Power line | | | | | | |
|--|--|---------------|---|---|---|----|---|---|
| | | Socket number | A | B | C | D | E | F |
| | | | U | V | W | PE | / | / |

| Encoder feedback line | | | | | | | | | | |
|-----------------------|---|-------|-------|--------|-------|------|-----|---|---|--------|
| Socket number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Signal Definition | / | E- | E+ | SD- | 0V | SD+ | 5V | / | / | PE |
| Cable color | / | White | Brown | Yellow | Black | Blue | Red | / | / | Shield |

| Adaptive drive | Motor model | L | LL | LR | LE | LG | LC | LA | LZ | φS | LB | W | LK |
|----------------|-------------------|----------|----------|----|----|----|-----|-----|-----|----|-----|---|----|
| HSD-E6-20L | SCG80-2-024M**50 | 167(197) | 132(162) | 35 | 3 | 10 | 80 | 90 | 6 | 19 | 70 | 6 | 25 |
| HSD-E6-20L | SCG80-2-033M**50 | 185(218) | 150(183) | 35 | 3 | 10 | 80 | 90 | 6 | 19 | 70 | 6 | 25 |
| HSD-E6-30L | SCG130-2-054M**30 | 212(234) | 155(177) | 57 | 6 | 12 | 130 | 145 | 8.5 | 22 | 110 | 6 | 40 |
| HSD-E6-30L | SCG130-2-084M**30 | 232(254) | 175(197) | 57 | 6 | 12 | 130 | 145 | 8.5 | 22 | 110 | 6 | 40 |

Incremental motor code

| Model code | Adaptive drive (AC220V) | Adaptive motor | Power (Kw) | Rated current (A) | Rated torque (Nm) |
|------------|-------------------------|----------------------|------------|-------------------|-------------------|
| 25/28 | HSD-E6-30L | SCG80-2-024M**30-A2 | 0.75 | 4.2 | 2.4 |
| 26/29 | HSD-E6-30L | SCG80-2-033M**30-A2 | 1.0 | 4.2 | 3.3 |
| 35 | HSD-E6-30L | SCG110-2-040M**30-A2 | 1.2 | 5 | 4 |
| 36 | HSD-E6-30L | SCG110-2-050M**30-A2 | 1.5 | 6 | 5 |
| 38 | HSD-E6-30L | SCG110-2-060M**30-A2 | 1.8 | 8 | 6 |
| 44 | HSD-E6-30L | SCG130-2-040M**25-A2 | 1 | 4 | 4 |
| 45 | HSD-E6-30L | SCG130-2-050M**25-A2 | 1.3 | 5 | 5 |
| 46 | HSD-E6-30L | SCG130-2-060M**25-A2 | 1.5 | 6 | 6 |
| 47 | HSD-E6-30L | SCG130-2-077M**20-A2 | 1.6 | 6 | 7.7 |
| 48 | HSD-E6-30L | SCG130-2-077M**25-A2 | 2.0 | 7.5 | 7.7 |
| 49 | HSD-E6-30L | SCG130-2-100M**15-A2 | 1.5 | 6 | 10 |
| 50 | HSD-E6-30L3 | SCG130-2-100M**25-A2 | 2.6 | 10 | 10 |

Note: Model code 28/29 matches with the photoelectric incremental line-less encoder;



Safety Precautions

I. Personnel safety

- This product is a high-voltage and high current product, ensuring that personnel are in a safe area of the movement mechanism when powered on.
- This product is a high voltage and high current product. Incorrect operation may cause accidents such as arc burns and electric shock.
- It is prohibited to operate, make the wiring and power on without following the instructions.

II. Workplace safety

- This product is a high voltage and high current product. It is prohibited to use it with electricity in place with flammable or corrosive gases, otherwise it may cause fire and explosion.
- It is prohibited to use it with electricity in places where flammable and explosive materials fall, as it may cause fire and explosion.
- It is prohibited to use in high humidity, with water vapor, metal powder, etc., as it may cause dangerous situations such as electric shock to oneself and others and other hazards.

III. Product and equipment safety

- This product is a high-voltage and high current product, and incorrect connection can cause product damage.
- The PE terminal must be grounded to ensure reliable grounding.
- The L series of this product is suitable for AC220V power supply; The H series is suitable for AC380V power supply, and they should not be connected incorrectly.
- Products U, V, and W should be connected to the motor as output. Do not connect to input power.
- Products U, V, and W are three-phase outputs. Do not connect them in the wrong order, wrong order may cause motor overspeed, equipment damage, and overcurrent damage to this product.
- Tighten all terminals and select all wiring specifications strictly according to power.
- Do not distribute power or touch terminals when the driver is powered on.
- Do not touch the terminals within 5 minutes of power outage.
- Do not touch the motor or cables while the motor is running to prevent accidental injuries such as burns and sprains.

Display and operation

The panel operation

Panel consists of 6 LED digital tube displays and 4 keys " Δ ", ∇ , \leftarrow , SET ", a red light "Alm" and a green light "Run", and is used to display various system states, set parameters, etc.

The operation is a hierarchical operation, and is described as follows:

Δ Key represents the backward, exit, and cancel of the hierarchy, and long press for 1 second to shift.

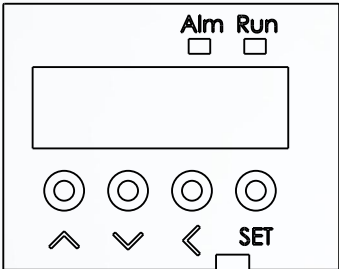
SET Key represents advancing, entering, and confirming the hierarchy.

Δ , ∇ Keys represent increasing or decreasing the order number or numerical values.

The red indicator light Alm lights up, indicating an alarm, and the digital tube also displays an alarm

The green indicator light Run lights up, indicating that the motor is in an enabled working state. When the decimal in the bottom right corner of the digital tube lights up, it indicates that the current parameter value is in a modified state.

If the Alm red light is on and the alarm number "Err - xx" is flashing, it is drive alarm, it is necessary to power off and investigate the cause of the alarm in a timely manner.



Parameter management mode operation

| | | | | |
|---------|-------------------------|---|-----|-------------------------------|
| EE--SET | Saving parameters | → | SET | Press for more than 3 seconds |
| EE--RD | Reading parameters | → | SET | Press for more than 3 seconds |
| EE--BA | Backing up parameters | → | SET | Press for more than 3 seconds |
| EE--RS | Restoring backups | → | SET | Press for more than 3 seconds |
| EE--DEF | Restoring default value | → | SET | Press for more than 3 seconds |

Setting method for restoring default value

| Step | Panel display | Key | Operation |
|------|---------------|------------------------------------|---|
| 1 | EE | Δ ∇ \leftarrow SET | Press the Δ key twice to select the function. If the parameter number is not displayed as EE, press Δ . |
| 2 | EE | Δ ∇ \leftarrow SET | Press the SET key and then press the Δ key to display "EE-DEF". |
| 3 | EE | Δ ∇ \leftarrow SET | Press and hold the SET key for 3 seconds, then display "FINISH" |

Setting method for parameter saving

| Step | Panel display | Key | Operation |
|------|---------------|------------------------------------|---|
| 1 | EE | Δ ∇ \leftarrow SET | Press the Δ key twice to select the function. If the parameter number is not displayed as EE, press Δ . |
| 2 | EE | Δ ∇ \leftarrow SET | Press the SET key and then press the Δ key to display "EE-SET". |
| 3 | EE | Δ ∇ \leftarrow SET | Press and hold the SET key for 3 seconds, then display "FINISH" |

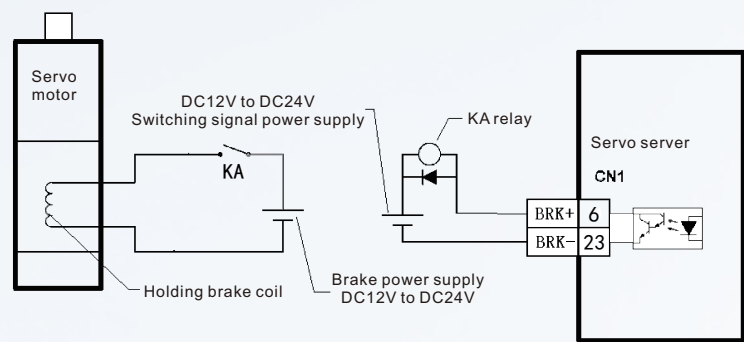
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Operation of JOG jog running mode (Jr --)

| Step | Panel display | Key | Operation |
|------|---------------|------------------------------------|---|
| 1 | PA | Δ ∇ \leftarrow SET | Press the Δ key twice to select the function. If the parameter number does not display as "PA", press Δ . |
| 2 | PA | Δ ∇ \leftarrow SET | Press the SET key and then press the Δ key to display as "PA-4". |
| 3 | PA | Δ ∇ \leftarrow SET | Press the SET key to set the value "0" to "3" by pressing Δ , press SET key to confirm. |
| 4 | PA | Δ ∇ \leftarrow SET | Press the Δ key to select the function. |
| 5 | PA | Δ ∇ \leftarrow SET | Press the Δ key to display "PA-53". |
| 6 | PA | Δ ∇ \leftarrow SET | Press the SET key to set the value "0" to "1", press SET key to confirm. |
| 10 | PA | Δ ∇ \leftarrow SET | Press the Δ key twice to select the Δ function, press the Δ key to select "Jr", and press the SET key to confirm. |
| 11 | PA | Δ ∇ \leftarrow SET | Press the Δ key to perform forward and reverse rotation of the motor. |

| | | | |
|---------|---|----------|-----------------------------------|
| DP-SPD | Motor speed | → r1000 | --1000 rpm |
| DP-POS | Low position of current position | → P 9999 | --9999 pulses |
| DP-POS. | High position of current position | → P. 11 | --110000 pulses |
| DP-CPO | Low position of positioncommand | → C 9999 | --9999 pulses |
| DP-CPO. | High position of positioncommand | → C. 22 | -- 220000 pulses |
| DP-EPO | Low position of position deviation | → E 9 | --9 pulses |
| DP-EPO. | High position of position deviation | → E 0 | -0 pulse |
| DP-TRQ | Motor torque (%) | → T 60 | --Motor torque 70% |
| DP-I | Motor current (A) | → I 2.15 | --Motor current 2.15A |
| DP-ABS | Single turn low position, | → 1072 | --1072 pulses |
| DP-ABS. | Single turn high position | → 13 | --13 * 10000 pulses |
| DP-ABM | Multiple turns absolute position | → 65536 | --65536 turns |
| DP-CS | Speed command | → r.35 | --Speed command 35 rpm |
| DP-Ct | Torque command | → t.70 | --torque command 20% |
| DP-APO | Increment encoder rotor absolute position | → A 2500 | --2500 pulses |
| DP--IN | Input terminal state | → Inhlhl | --input terminal status |
| DP-Out | Output terminal state | → outlhl | -- output terminal status |
| DP-COD | Encoder UVW input | → codlh | --encoder signal |
| DP-rn | Operating status | → rn-on | --motor is running |
| DP-Err | Alarm mode | → Err39 | --Err 39 |
| DP-PLS | External pulse count low position | → P 9999 | --9999 pulses |
| DP-PLS. | External pulse count high position | → P. 11 | --110000 pulses |
| DP-Frq | External pulse real-time frequency | → 100000 | --100khz |
| DP-dir | Cw or ccw direction | → cw | --cw direction |
| DP-EId | Encoder bit monitoring | → 17 | -- encoder bit |
| DP-pn | DC bus real-time voltage | →335 | --335 |
| DP-pn. | Highest voltage | →339 | --339 |
| DP-rES | Digital tube display monitoring | → 888888 | --digital tube incomplete display |

Servo motor holding brake wiring diagram



| Motor pin number | Motor pin identification | Function description |
|------------------|--------------------------|--------------------------------------|
| 1 | DC+ | DC power supply positive pole DC24V+ |
| 2 | DC- | DC power supply negative pole 0V |
| 3 | PE | Shell ground |

Gain related parameters

| Parameter number | Parameter name | Functions in detail | Parameter range [default] |
|------------------|---|--|---------------------------|
| 5 | Speed proportional gain | a. Enhancerigidity, setthe proportional gain of the speed turn regulator; b. the larger the setting value, the higher the gain and the greater the rigidity. The parameter values are determined according to the specific servo drive system model and load, in general, the larger the load inertia, the larger the setting value; c, set as large a value as possible under the condition that the system does not oscillate; | 10~2000 [150] |
| 6 | Velocity Integration Time Constant | a. Set the integration time constant of the speed turn regulator; b. it can inhibit motor overshoot, the smaller the setting value, the faster the integration speed; too small, to produce overshoot, too big, response slows down; c, set according to the specific drive model and load inertia, the larger the load inertia, the larger the setting value; | 1~5000 [100] |
| 7 | Torque filters | a. De-noise, set torque command filter characteristics; b. the larger the value, the smaller the cut-off frequency, the smaller the vibration and noise generated by the motor. Too large a value results in a slower response. | 20~3000 [40] |
| 8 | Speed Detection Filter | a. de-noising, set speed detection filter characteristics; b. the larger the value, the smaller the cut-off frequency and the less noise the motor produces. Too large a value results in a slower response. | 20~3000 [40] |
| 9 | Position proportional gain | a. Set the proportional gain of the position turn regulator; b. the larger the setting value, the higher the gain, the greater the rigidity, and the smaller the positional hysteresis under the same frequency command pulse condition. However, too large a value may cause oscillation or overshoot; c. the parameter values are determined according to the specific servo drive system model and load conditions; | 1~500 [80] |
| 60 | Current loop proportional gain | The drive automatically adjusts this parameter according to the specifications of the motor being read. | 100~5000 [600] |
| 68 | Speed proportional gain factor | The drive automatically adjusts this parameter according to the specifications of the motor being read; this parameter is a factor of the PA5 parameter; Servo motor gain = PA5*PA68; | 0~1000 [100] |
| 88 | Position Proportional Gain Factor | The position proportional gain is PA9*PA88: | 20~300 [100] |
| 93 | Speed proportional gain factor scaling factor | Speed proportional gain PA5*PA93: | 20~300 [100] |
| 94 | Current loop proportional gain scaling factor | Current loop proportional gain PA60*PA94: | 20~300 [100] |
| 98 | Current loop integration time constant scaling factor | Current loop integration time constant PA61*PA98: | 20~300 [100] |

Gain related parameters

| | | | |
|-----|---|---|----------------|
| 12 | Position Command Pulse Frequency Division numberator | a. If the system is programmed to travel 5mm (5000 pulses), one motor revolution is required: $\frac{PA\ 12}{PA\ 13} = \frac{\text{Pulse numerator}}{\text{Pulse denominator}} = \frac{\text{Actual feedback}}{\text{Command pulse}}$ $= \frac{\text{Motor encoder wire number (2500 wires) x frequency doubling number (4)}}{\text{Command pulse number (5000)}}$ | 1~32767 [1] |
| 13 | Position command pulse frequency division denominator | $= \frac{10000}{5000} = \frac{2}{1}$ b. If the motor is directly connected to the screw, the screw pitch is 6 mm: $\frac{PA\ 12}{PA\ 13} = \frac{10}{\text{Screw pitch (6)}} = \frac{5}{3}$ Note: CNC machines can be set up more intuitively by referring to b. Gear ratio range: 1/100≤G≤100 | 1~32767 [1] |
| 14 | Position command pulse input method | Three pulse input forms can be set: 0: Pulse + symbol; 1: CCW pulse/CW pulse; 2: Two phase quadrature pulse input; | 0~2 [0] |
| 15 | Position command pulse direction reversal | 0: Default direction; 1: The direction is reversed; | 0~1 [0] |
| 19 | Position command smoothing filter | Mainly for when the host has no acceleration or deceleration and does not have an exponential form of acceleration or deceleration, this parameter smoothes and filters the command pulse and optimizes the acceleration and deceleration. This filter does not lose pulses; there may be a delay in execution speed. | 0~3000 [0] |
| 36 | Command pulse signal filter coefficient | PA4=0, valid for position control The higher the setting value, the stronger the immunity to command pulses and the smaller the received pulse frequency, and it may also display as unable to receive pulses. Adjustments can be made for pulse and direction signal timing speed -up or lags. | 0~3 [1] |
| 37 | Command Direction Signal Filter coefficient | PA4=0, valid for position control Adjustments can be made for pulse and direction signal timing speed -up or lags. | 0~3 [0] |
| 74 | Receiving pulse frequency doubling switching | Servo Drive Received Pulse Frequency Doubling Factor Switching 0: PA12/PA13 are 1/1 servo receiving 10,000 pulses/turn; 1: PA12/PA13 is 1/1 servo receiving 131072 pulses/turn; 2: Setting the pulse number setting via PA110, PA111 | 0~2 [2] |
| 110 | Specified single-turn pulse low position | At default parameters Pa12/pa13, electronic gear ratio = 1/1 and PA74=2. The servo receives PA110+PA111*10000 pulses to run 1 turn. Note that the electronic gear ratio and customized pulse functions are in effect at the same time. | 0~9999 [0] |
| 111 | Specified single-turn pulse high position | | 0~13 [1] |

Multi-function terminal selection

| Parameter number | Parameter name | Functions in detail | Parameter range [Default] |
|------------------|--|--|---------------------------|
| 42 | Multi-function output terminals | 0: Alarm 15 active/1: Alarm 15 blocked; [0001] 0: Selection of second return to zero/1: positioning selection completed; [0010] 0: at torque, PA50 parameter limits maximum speed/1: at torque, second analogue limits the maximum speed; [0100] | 0000~1111 [0001] |
| 53 | Forced ON input for the low 4-bit input terminal | The following functions can be turned on and off by changing the parameters 0 and 1 without using an external circuit, PA53 and PA54 are operated in the same way. SON: servo enable; [0001] A-CLR: Alarm clear; [0010] FSTP: CCW driver disabled; [0100] RSTP: CW drive disabled; [1000] | 0000~1111 [0000] |
| 57 | Output terminal logical reversal | With the change of parameters 0 and 1, achieve the reversal of function (i.e. the original external switching output circuit is reversed, normally open to normally closed, normally closed to normally open.) SRDY: servo ready; [0001] ALM: servo alarm; [0010] COIN: positioning completed/speed arrival; [0100] BRK: Motor holding brake; [1000] | 0000~1111 [0010] |

Torque Mode Parameters

| | | | |
|----|---|---|-------------------|
| 29 | Analogue torque command input gain | a. Setting the proportionality between the analogue torque input voltage and the actual motor running torque; b. The unit of setting value is 0.1V/100%; c. The default value is 50, which corresponds to 5V/100%, i.e. the input 5V voltage produces 100% of the rated torque; | 10~100 [50] |
| 33 | Torque command direction reversal | Reverse the polarity of the analogue torque input. 0: When the analogue torque command is positive, the torque direction is CCW; 1: When the analogue speed command is positive, the torque direction is CW; | 0~1 [0] |
| 38 | External torque limitation | PA4 = 6, when pin 14 or 15 of CN1 is connected with 0V: CCW, CW Torque Percentage Limit; Forward and Reverse are effective at the same time. PA38 is less than set values of PA34 and PA35. | 0~300 [100] |
| 39 | Analogue torque command zero drift compensation | The amount of zero-drift compensationfor analogue torqueinputs, i.e. positive and negative offsets. | -5000~5000 [0] |
| 50 | Speed limit under torque control | a: For torque control: corresponds to the maximum speed limit. Note: Prone to overspeed when unloaded; b: For torque control: revolution corresponding to 10Vand the second analogue is switched by PA42 to limit the maximum revolution; | 1~5000 [2500] |

Speed Mode Related Parameters

| | | | |
|----|--|---|----------------------|
| 22 | Internal and external speed selection | 0: Takes the internal speed; 1: Take external analogue (-10V to +10V); 2: Take external analogue (0 to +10V; pins 14 and 15 control positive and negative); | 0~2 [1] |
| 24 | Internal speed 1 | WhenPA4=1,PA22=0: WhenCNISC1 pin is OFF and SC2 pin is OFF, internal speed 1; | -3000~3000 [0] |
| 25 | Internal speed 2 /zero setting current | a. WhenPA4=1,PA22=0: Internal speed 2 when CNISC1 pin is ON and SC2 pin is OFF; b. When PA4=4, set the motor zero current percentage; | -3000~3000 [100] |
| 26 | Internal speed 3 | WhenPA4=1,PA22=0: When CNISC1 pin is OFF and SC2 pin is ON, for internal speed 3 | -3000~3000 [300] |
| 27 | Internal speed 4 | WhenPA4=1,PA22=0: When CNISC1 pin is ON and SC2 pin is ON, for internal speed 4 | -3000~3000 [-100] |
| 28 | Speed of arrival | Non -positional mode: When the motor speed is greater than this setting value, COIN: ON, otherwise OFF. This parameter is only for motor speed judgement, does not have direction. | 0~3000 [500] |
| 40 | Acceleration time constant | The set value is to indicate the acceleration time of the motor from 0 to 1000r/min. The linear acceleration and deceleration characteristics are only used in the speed control mode. If the host has acceleration and deceleration characteristics, this parameter should be set to 1. | 1~10000 [100] |
| 41 | Deceleration time constant | The set value is to indicate the deceleration time of the motor from 1000 to 0r/min. Linear acceleration and deceleration characteristics are used only in the speed control mode. If the host has acceleration and deceleration characteristics, this parameter should be set to 1. | 1~10000 [100] |
| 44 | Reverse direction of analogue speed command | Reverse polarity for analogue speed inputs 0: When the analogue speed command is positive, the speed direction is CCW; 1: When the analogue speed command is positive, the speed direction is CW; | 0~1 [0] |
| 45 | Zero drift compensation for analogue speed command | The amount of zero -drift compensation for the analogue speed input, i.e. positive and negative offsets. The value of this parameter is automatically changed and saved during analogue auto -zeroing. | -5000~5000 [0] |
| 46 | Analogue speed command filter | Low -pass filter for analogue speed inputs. The larger the setting, the faster the response to the speed input analogue, more noisy; the smaller the setting, the slower the response and the less noise; | 0~1000 [300] |
| 49 | Analogue voltage threshold speed control | For speed control: set the analogue positive and negative voltage threshold values. | 1~5000 [0] |

485 Communication Related Parameters

| | | | |
|----|------------------------------------|---|----------------|
| 80 | 485 communication shaft address | a. For 485 communication modbusrtu protocol, it represents address: 1, 2, 3..... b. For machine tools, when reading absolute position, it corresponds to: X -axis, Y -axis, Z-axis | 1~32767 [1] |
| 81 | 485 communication baud rate | Corresponding baud rates 0: 4800; 1: 9600; 2: 19200; 3: 38400; Data bit is 8; stop bit is 1; RTU format; maximum reading length is 10; | 0~3 [2] |
| 82 | 485 communication Parity Selection | 0: odd parity; 1: even parity; 2: no parity | 0~2 [0] |
| 99 | Multi -turn Encoder Clear | 1: Multi -turn encoder battery loss of power alarm is cleared 2: Multi -turn encoder undergoes multi -turn clearing, and 485 reading position zero point is set | 0~10 [0] |

485 position reading for adaptive multi-turn motors

| MODBUS address | Meaning of a parameter | Unit | Reading and writing | Description |
|---|------------------------------|--|---------------------|--|
| 500 | Current position | Low 16-bit pulse | R | With multi -turn absolute value motor, read the current position |
| 501 | Current position | High 16 -bit pulse | R | |
| Parameter address | Parameter name | Unit | Range | default value |
| PA99 | Multi -turn encoder clearing | 1: Battery loss of power alarm is cleared 2: Multi -turn clearing and set to zero point | 0~2 | 0 |
| Description: All PA parameter modbus addresses are decimal parameter numbers. Example: PA99modbus address is decimal 99. The address after 500 is communication specific without corresponding PA parameters, and the format is in decimal. | | | | |

Troubleshooting

| Alarm number | Alarm name | Operation state | Causes | Solution |
|-------------------------------|-------------------------------------|--|---|---|
| 1 | Over -speed | When powered on | ■ Drive or motor failure | ■ Replacement of drives |
| | | | ■ Checking parameters | ■ Check whether it is internally enabled or not |
| | | | ■ Short circuit between motor UWW | ■ Check motor wiring |
| | | When enabled | ■ Encoder 0 bit deviation | ■ Motor encoder zeroing |
| | | | ■ Incorrect servo parameters | ■ Restore servo parameters |
| | | | During motor operation | ■ Short -circuit motor connector |
| | | ■ Command speed is too fast | | ■ Reduce command speed |
| | | ■ Unsteady acceleration and deceleration | | ■ Adjust acceleration and deceleration constants |
| | | ■ Excessive load | | ■ Reduce load |
| 2 | main circuit overvoltage | When powered on | ■ High supply voltage | ■ Reduce the power supply voltage |
| | | | ■ Power supply waveform is not normal | ■ Replacement of power supply |
| | | | ■ Server failure | ■ Replacement of servers |
| | | During operation | ■ Circuit board failure | ■ Replacement of servers |
| | | | ■ Brake circuit failure | ■ Check the braking resistor |
| | | | 3 | main circuit Under -voltage |
| ■ Circuit board failure | ■ Replacement of servers | | | |
| ■ Soft -start circuit failure | ■ Replacement of servers | | | |
| During operation | ■ Insufficient transformer capacity | ■ Increase the capacity of transformer | | |
| | ■ Loose power supply wiring | ■ Fasten connecting terminals | | |
| | ■ Circuit board failure | ■ Replacement of servers | | |
| 4 | The location is out of tolerance | During operation | ■ Command speed are too fast | ■ Reduce command speed |
| | | | ■ Input voltage is too low | ■ Check R/S/T power supply |
| | | | ■ PA 17 parameter is too small | ■ Appropriate increase in parameters |
| | | | ■ Loose or overloaded wiring | ■ Check and fasten the connecting wires |
| 6 | Motor stalling | During operation | ■ The transmission part is stuck | ■ Disengagement of mechanical parts |
| | | | ■ Excessive load | ■ Reduce load |
| | | | ■ Motor failure | ■ Replacement of motors |
| 7 | Exceptions of disabled | When powered on | ■ Check parameters and wiring | ■ PA20, CW and CWW wiring |
| 9 | Encoder Failure | When powered on | ■ Encoder ABZ wiring disconnection | ■ Incorrect wiring |
| | | | ■ Damaged encoder | ■ Fragile items, need to be replaced |
| | | | ■ Encoder 5V/voltage is low | ■ Shorten the wire or change the driver |
| | | During operation | ■ Poor contact with CN2 plug | ■ Fasten the CN2 plug |
| | | | ■ Hidden hazard of cable faulty soldering | ■ Replacement of cables |
| 11 | IPM module failure | When powered on | ■ Circuit Board Chip Failure ■ Circuit board failure | ■ Check for interference and replace the server ■ Replacement of servers |
| | | | ■ Short circuit between motor UWW | ■ Check the wires and replace the motor |
| | | During operation | ■ Motor failure | ■ Check the wires and replace the motor |
| | | | ■ Poor power supply connection | ■ Checking lines, anti -interference |
| 12 | Overcurrent | When energized or in operation | ■ Motor failure. | ■ Replacement of motors |
| | | | ■ Short circuit between UWW | ■ Check wiring and replace server |
| | | | ■ Overload | ■ Replacement with high -power drive motors |
| 13 | Overload | When powered on | ■ Water ingress and motor damage | ■ Replacement of motors |
| | | | ■ Circuit board failure | ■ Replacement of servers |
| | | During operation | ■ Excessive mechanical load | ■ Reduce load |
| | | | ■ Mechanical transmission is not smooth | ■ Inspection of mechanical transmission components |
| | | | ■ Short circuit between UWW | ■ Check the cables |
| | | | ■ The brake is not released. | ■ Ensure stable power supply for the holding brake |
| 14 | Brake failure | When powered on | ■ Circuit board failure | ■ Replacement of servo |
| | | During operation | ■ Braking resistor failure | ■ Check brake resistor wiring |
| | | | ■ Insufficient brake capacity | ■ Extend acceleration and deceleration time |
| | | | ■ Excessive mechanical inertia | ■ Reduction of mechanical inertia |
| | | | ■ Incorrect UWW connection of encoder | ■ Check connecting wires and make replacement |
| | | | ■ Encoder power supply instability | ■ Requires 5V to be stable |
| | | | ■ Incorrect number of encoder wires | ■ Adjustment number of wires corresponding to parameters |

| Alarm number | Alarm name | Operation state | Causes | Solution |
|------------------------------------|--|------------------|--|---|
| 16 | Motor thermal overload | When powered on | ■ Error in servo parameters | ■ Restore factory values |
| | | During operation | ■ Poor mechanical transmission | ■ Increase lubrication, reduce load |
| | | | ■ Long overload time | ■ Smooth start/stop with load reduction |
| 17 | speed response failure | During operation | ■ Excessive error for long time | ■ Adjustment of parameter position feed -forward |
| | | | ■ Start -stop time is too short | ■ Adjust acceleration and deceleration time |
| 20 | ROM Alarm | During operation | ■ Parameter storage alarm | ■ Restore parameters and replace servo |
| 22 | Bad D/A chip | When powered on | ■ Replacement of the control board | ■ Restore parameters and replace servo |
| 29 | Insufficient torque | During operation | ■ Exceeding the set torque | ■ Check parameters PA30, PA31 |
| | | | ■ Check motor type selection | ■ Re-adaptation of motors |
| | | | ■ Mechanical overload | ■ Disconnect the load and try again |
| 30 Note: Incremental encoder | Loss of encoder Z-pulse | During operation | ■ Z -pulse is not present | ■ Replacement of the encoder |
| | | | ■ Cable welding wire error | ■ Check the solder wires |
| | | | ■ Voltage 5V is unstable | ■ Shorten the wire to reduce attenuation |
| | | | ■ Poor shielding, with interference | ■ Good grounding of the shielding layer |
| 31 Note: Incremental encoder | Disconnection of encoder U/V signal | When powered on | ■ No U/V signal | ■ Replacement of the encoder |
| | | | ■ Cable U/V welding wire is disconnected | ■ Check solder wires |
| | | | ■ Voltage 5V is unstable | ■ Shorten the wire to reduce attenuation |
| | | | ■ Poor shielding, with interference | ■ Good grounding of the shielding layer |
| 32 Note: Incremental encoder | Angular misalignment of encoder U/V signal | When powered on | ■ U/V pulse all 0, all 1 | ■ Replacement of the encoder |
| | | | ■ Incorrect encoder type | ■ Check the encoder model |
| | | | ■ U/V misalignment of welding lines | ■ Check solder wires |
| | | | ■ Voltage 5V is unstable | ■ Shorten the wire to reduce attenuation |
| | | | ■ Poor shielding, with interference | ■ Good grounding of the Good grounding of the shielding layer |
| 35 | communication error | When powered on | ■ CRC verification error | ■ Check communication parameters and connection lines of CN3 and the host |
| 36 | Bus encoder receiving error | When powered on | ■ encoder wire disconnected | ■ Fasten the encoder wire |
| | | | ■ Encoder failure | ■ Replacement of the encoder |
| | | | ■ Encoder wire error | ■ Replace with the correct encoder wire |
| 37 | Bus encoder data verification error | When powered on | ■ encoder wire disconnected | ■ Fasten the encoder wire |
| | | | ■ Encoder failure | ■ Replacement of the encoder |
| | | | ■ Encoder wire error | ■ Replace with the correct encoder wire |
| 39 | Bus encoder feedback disconnection | When powered on | ■ encoder wire disconnected | ■ Fasten the encoder wire |
| | | | ■ Encoder failure | |
| | | | ■ Replacement of encoder | |
| | | | ■ Incorrect encoder wire | |
| 40 | Bus encoder battery loss of power | When powered on | ■ Replace with correct encoder wire | |
| | | | ■ Loose battery wire | |
| | | | ■ Check battery wire | |
| | | | ■ Battery life expires | |
| | | | ■ Battery replacement | |
| 42 | Motor parameter reading error | When powered on | ■ Encoder failure | |
| | | | ■ Replacement of encoder | |
| | | | ■ Loose encoder wire | |
| | | | ■ Replacement of encoder wire | |
| 45 | MODBUS communication abnormalities | When powered on | ■ Detect the RS485 communication baud rate and parity bit settings; 2. Detect whether the station address setting for RS485 communication from the slave station is repeated or not; ■ 3. Detect whether the baud rate of the slave station is the same as that of the master station or not; 4. Whether the communication cable is shielded with double -ended shielding or not; | |
| | | During operation | ■ Detect RS485 communication baud rate and parity bit settings. ■ Detect whether the station address setting for RS485 communication from the slave station is repeated or not; ■ Detect whether the baud rate of the slave station is the same as that of the master station or not; 4. Whether the communication cable is shielded with double -ended shielding or not; | |
| 95 | Overcurrent detection | running | ■ Excessive current occurs during operation ■ Check motor and power cables | |
| 106 | Power density overload | running | ■ Drive is under heavy load for a long time | ■ Reduce the load |
| | | | | ■ Inspect the machinery |