

EMHEATER

User Manual

EM12-Z Series Servo Drive



EMHEATER®

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China EM Technology Limited







1. Safety Information and Precautions







In this manual, the notices are graded based on the degree of danger:

| | |
|---|---|
|  Danger | Indicates that failure to comply with the notice will result in severe personal injury or even death. |
|  Warning | Indicates that failure to comply with the notice will result in personal injury or property damage. |

Read this manual carefully so that you have a thorough understanding. Installation, commissioning or maintenance may be performed in conjunction with this chapter. EMHEATER will assume no liability or responsibility for any injury or loss caused by improper operation.

1.1 Safety Information

| | | |
|----------------------------|---|---|
| Before installation |  Danger | <ul style="list-style-type: none"> Do not use damaged or missing components frequency inverter. Failure to comply will result in personal injury. Please use the electric motor with upper B insulation class. Failure to comply will result in personal injury. |
| During installation |  Danger | <ul style="list-style-type: none"> Install the frequency inverter on incombustible objects such as metal, and keep it away from combustible materials. Failure to comply may result in a fire. |
| |  Warning | <ul style="list-style-type: none"> When two frequency inverters are laid in the same cabinet, arrange the installation positions properly to ensure the enough cooling effect. Do not drop wire residue or screw into the frequency inverter. Failure to comply will result in damage to the frequency inverter. |
| Wiring |  Danger | <ul style="list-style-type: none"> Wiring must be performed only by qualified personnel under instructions described in this manual. Failure to comply may result in unexpected accidents. A circuit breaker must be used to isolate the power supply and the frequency inverter. Failure to comply may result in a fire. Ensure that the power supply is cut off before wiring. Failure to comply may result in electric shock. Connect the frequency inverter to ground properly by standard. Failure to comply may result in electric shock. |
| |  Warning | <ul style="list-style-type: none"> Never connect the power supply cables to the output terminals (U, V, W) of the Frequency inverter. Failure to comply will result in damage to the frequency inverter. Make sure that all the connecting wires comply with the requirement of EMC and the safety standard in the region. Use wire sizes recommended in the manual. Failure to comply may result in accidents. Never connect the braking resistor between the DC bus terminals (P+) and (P-). Failure to comply may result in a fire. |
| Before power-on |  Danger | <ul style="list-style-type: none"> Check that the following requirements comply with: The voltage class of the power supply is consistent with the rated voltage class of |

| | | |
|-------------------------|---|---|
| | Danger | <p>the frequency inverter. The input terminals (R, S, T) and output terminals (U, V, W) are properly connected. No short-circuit exists in the peripheral circuit. The wiring is fastened. Failure to comply will result in damage to frequency inverter.</p> <ul style="list-style-type: none"> ● Cover the frequency inverter properly before power-on to prevent electric shock. |
| Before power-on |  Warning | <ul style="list-style-type: none"> ● Do not perform the voltage resistance test on any part of the frequency inverter because such test has been done in the factory. Failure to comply will result in accidents. ● All peripheral devices must be connected properly under the instructions described in this manual. Failure to comply will result in accidents. |
| After power-on |  Danger | <ul style="list-style-type: none"> ● Do not open the frequency inverter's cover after power-on to prevent from electric shock. ● Do not touch the frequency inverter with wet hand and its peripheral circuit to prevent from electric shock. ● Do not touch the terminals of the frequency inverter (including the control terminals). Failure to comply may result in electric shock. ● Do not touch the U, V, W terminal or motor connecting terminals when frequency inverter automatically does safety testing for the external high-voltage electrical circuit. Failure to comply may result in electric shock. |
| |  Warning | <ul style="list-style-type: none"> ● Note the danger during the rotary running of motor when check the parameters. Failure to comply will result in accidents. ● Do not change the factory default settings of the frequency inverter. Failure to comply will result in damage to the frequency inverter. |
| During operation |  Danger | <ul style="list-style-type: none"> ● Do not go close to the equipment when selected the restart function. Failure to comply may result in personal injury. ● Do not touch the fan or the discharging resistor to check the temperature. Failure to comply will result in personal injury. ● Signal detection must be performed only by qualified personal during operation |
| |  Warning | <ul style="list-style-type: none"> ● Avoid objects falling into the frequency inverter when it is running. Failure to comply will result in damage to frequency inverter. ● Do not start/stop the frequency inverter by turning the contactor ON/OFF. Failure to comply will result in damage to the frequency inverter. |
| Maintenance |  Danger | <ul style="list-style-type: none"> ● Do not repair or maintain the frequency inverter at power-on. Failure to comply will result in electric shock. ● Repair or maintain the frequency inverter only after the charge light on frequency inverter is powered off. This allows for the residual voltage in the capacitor to discharge to a safe value. Failure to comply will result in personal injury. ● Repair or maintenance of the frequency inverter may be performed only by qualified personnel. Failure to comply will result in personal injury or damage to the frequency inverter. |

2. Product Information

2.1 Designation Rules

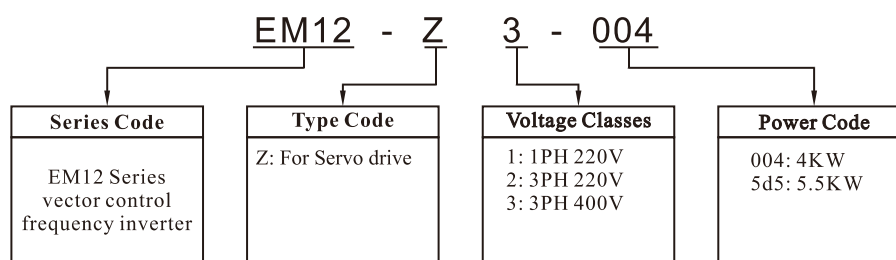


Diagram 2-1 Designation rules

2.2 Model parameter comparison table

| Model | Power Capability (KVA) | Input Current (A) | Output Current (A) | Adaptable Motor | | Thermal Power Consumption (KW) |
|----------------------------|------------------------------|-------------------------|--------------------------|-----------------|------|--------------------------------------|
| | | | | (KW) | (HP) | |
| Single-phase:220V, 50/60Hz | | | | | | |
| EM12-Z1-d75 | 1.5 | 8.2 | 4 | 0.75 | 1 | 0.030 |
| EM12-Z1-1d5 | 3 | 14 | 7 | 1.5 | 2 | 0.055 |
| EM12-Z1-2d2 | 4 | 23 | 9.6 | 2.2 | 3 | 0.072 |
| Three-phase:220V, 50/60Hz | | | | | | |
| EM12-Z2-d75 | 3 | 5 | 3.8 | 0.75 | 1 | 0.030 |
| EM12-Z2-1d5 | 4 | 5.8 | 5.1 | 1.5 | 2 | 0.055 |
| EM12-Z2-2d2 | 5.9 | 10.5 | 9 | 2.2 | 3 | 0.072 |
| EM12-Z2-004 | 8.9 | 14.6 | 13 | 3.7 | 5 | 0.132 |
| EM12-Z2-5d5 | 17 | 26 | 25 | 5.5 | 7.5 | 0.214 |
| EM12-Z2-7d5 | 21 | 35 | 32 | 7.5 | 10 | 0.288 |
| EM12-Z2-011 | 30 | 46.5 | 45 | 11 | 15 | 0.489 |
| EM12-Z2-015 | 40 | 62 | 60 | 15 | 20 | 0.608 |
| EM12-Z2-018 | 57 | 76 | 75 | 18.5 | 25 | 0.716 |
| EM12-Z2-022 | 69 | 92 | 91 | 22 | 30 | 0.887 |
| EM12-Z2-030 | 85 | 113 | 112 | 30 | 40 | 1.11 |
| EM12-Z2-037 | 114 | 157 | 150 | 37 | 50 | 1.32 |
| EM12-Z2-045 | 134 | 180 | 176 | 45 | 60 | 1.66 |
| EM12-Z2-055 | 160 | 214 | 210 | 55 | 75 | 1.98 |
| EM12-Z2-075 | 231 | 307 | 304 | 75 | 100 | 2.02 |
| Three-phase:380V, 50/60Hz | | | | | | |
| EM12-Z3-d75 | 3 | 5 | 2.1 | 0.75 | 1 | 0.050 |
| EM12-Z3-1d5 | 4 | 5.8 | 3.8 | 1.5 | 2 | 0.066 |
| EM12-Z3-2d2 | 5.9 | 10.5 | 5.1 | 2.2 | 3 | 0.120 |
| EM12-Z3-004 | 8.9 | 14.6 | 9 | 3.7 | 5 | 0.195 |
| EM12-Z3-5d5 | 11 | 20.5 | 13 | 5.5 | 7.5 | 0.262 |
| EM12-Z3-7d5 | 17 | 26 | 17 | 7.5 | 10 | 0.445 |

| Model | Power Capability (KVA) | Input Current (A) | Output Current (A) | Adaptable Motor | | Thermal Power Consumption (KW) |
|-------------|------------------------|-------------------|--------------------|-----------------|------|--------------------------------|
| | | | | (KW) | (HP) | |
| EM12-Z3-011 | 21 | 35 | 25 | 11 | 15 | 0.553 |
| EM12-Z3-015 | 24 | 38.5/ | 32 | 15 | 20 | 0.651 |
| EM12-Z3-018 | 30 | 46.5 | 37 | 18.5 | 25 | 0.807 |
| EM12-Z3-022 | 40 | 62 | 45 | 22 | 30 | 1.01 |
| EM12-Z3-030 | 57 | 76 | 60 | 30 | 40 | 1.20 |
| EM12-Z3-037 | 69 | 92 | 75 | 37 | 50 | 1.51 |
| EM12-Z3-045 | 85 | 113 | 91 | 45 | 60 | 1.80 |
| EM12-Z3-055 | 114 | 157 | 112 | 55 | 75 | 1.84 |
| EM12-Z3-075 | 134 | 180 | 150 | 75 | 100 | 2.08 |
| EM12-Z3-090 | 160 | 214 | 176 | 90 | 125 | 2.55 |
| EM12-Z3-110 | 192 | 256 | 210 | 110 | 150 | 3.06 |
| EM12-Z3-132 | 231 | 307 | 253 | 132 | 200 | 3.61 |
| EM12-Z3-160 | 250 | 385 | 304 | 160 | 250 | 4.42 |
| EM12-Z3-200 | 280 | 430 | 377 | 200 | 280 | 4.87 |
| EM12-Z3-220 | 355 | 468 | 426 | 220 | 300 | 5.51 |
| EM12-Z3-250 | 396 | 525 | 465 | 250 | 370 | 6.21 |
| EM12-Z3-280 | 445 | 590 | 520 | 280 | 400 | 7.03 |
| EM12-Z3-315 | 500 | 665 | 585 | 315 | 420 | 7.81 |
| EM12-Z3-355 | 565 | 785 | 650 | 355 | 500 | 8.51 |
| EM12-Z3-400 | 630 | 883 | 725 | 400 | 530 | 9.23 |
| EM12-Z3-450 | 650 | 920 | 820 | 450 | 600 | 9.52 |

2.3 Product appearance and installation dimension

2.3.1 Product appearance

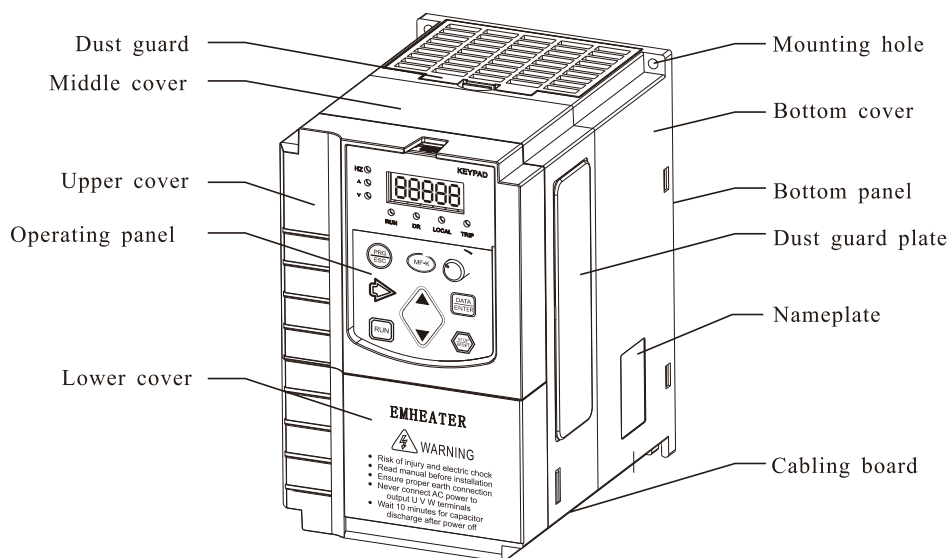
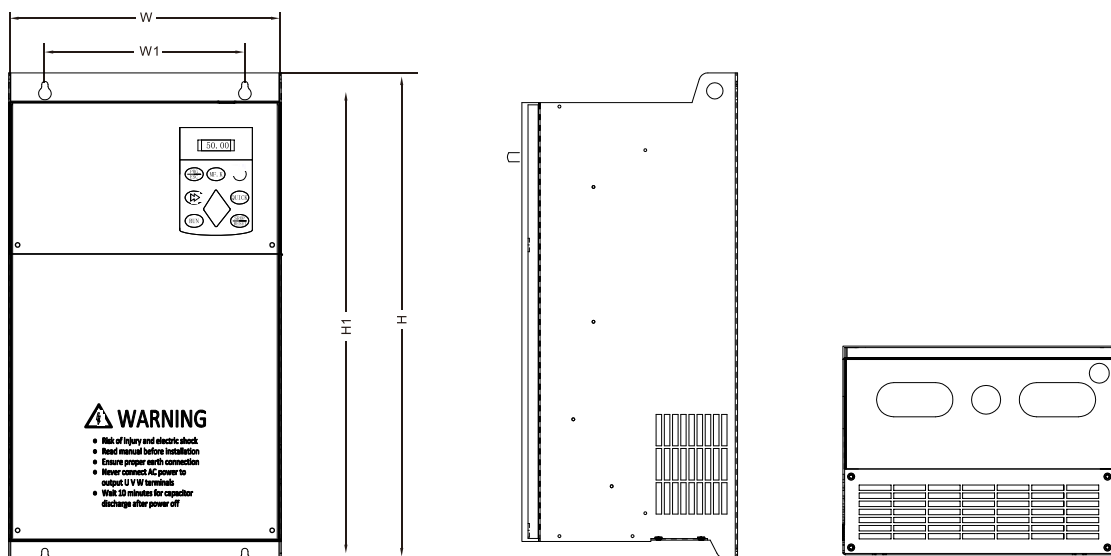


Diagram 2-3 Product appearance (With potentiometer)

Diagram 2-4 Appearance and installation dimension (Plastic housing structure)



2.3.2 Appearance and Installation Hole Dimension (mm)

| Model | Appearance and installation dimension（mm） | | | | | | |
|-------------------|---|-------|-----|-------|-----|----|------|
| | W | W1 | H | H1 | D | D1 | Φd |
| Single-phase 220V | | | | | | | |
| EM12-Z1-d75 | 118 | 106.5 | 185 | 175.5 | 157 | -- | Φ4.5 |
| EM12-Z1-1d5 | | | | | | | |
| EM12-Z1-2d2 | | | | | | | |
| Three-phase 220V | | | | | | | |
| EM12-Z2-d75 | 118 | 106.5 | 185 | 175.5 | 157 | -- | Φ4.5 |
| EM12-Z2-1d5 | | | | | | | |
| EM12-Z2-2d2 | | | | | | | |
| EM12-Z2-004 | 160 | 148 | 247 | 235 | 177 | -- | Φ5.5 |
| EM12-Z2-5d5 | | | | | | | |
| EM12-Z2-7d5 | 220 | 205 | 320 | 305 | 198 | -- | Φ5.5 |
| EM12-Z2-011 | | | | | | | |
| EM12-Z2-015 | 300 | 220 | 540 | 500 | 240 | -- | Φ7 |
| EM12-Z2-018 | | | | | | | |
| EM12-Z2-022 | 340 | 260 | 580 | 540 | 270 | -- | Φ10 |
| EM12-Z2-030 | | | | | | | |
| EM12-Z2-037 | 410 | 260 | 610 | 575 | 280 | -- | Φ12 |
| EM12-Z2-045 | | | | | | | |
| EM12-Z2-055 | 460 | 320 | 710 | 690 | 335 | -- | Φ12 |
| EM12-Z2-075 | 535 | 360 | 885 | 830 | 370 | -- | Φ12 |
| Three-phase 380V | | | | | | | |
| EM12-Z3-d75 | 118 | 106.5 | 185 | 175.5 | 157 | -- | Φ4.5 |
| EM12-Z3-1d5 | | | | | | | |
| EM12-Z3-2d2 | | | | | | | |
| EM12-Z3-004 | | | | | | | |
| EM12-Z3-5d5 | | | | | | | |
| EM12-Z3-7d5 | 160 | 148 | 247 | 235 | 177 | -- | Φ5.5 |
| EM12-Z3-011 | | | | | | | |
| EM12-Z3-015 | 220 | 205 | 320 | 305 | 198 | -- | Φ5.5 |
| EM12-Z3-018 | | | | | | | |
| EM12-Z3-022 | | | | | | | |
| EM12-Z3-030 | 300 | 220 | 540 | 500 | 240 | -- | Φ7 |
| EM12-Z3-037 | | | | | | | |
| EM12-Z3-045 | 340 | 260 | 580 | 540 | 270 | -- | Φ10 |
| EM12-Z3-055 | | | | | | | |
| EM12-Z3-075 | 410 | 260 | 610 | 575 | 280 | -- | Φ12 |
| EM12-Z3-090 | | | | | | | |
| EM12-Z3-110 | 460 | 320 | 710 | 690 | 335 | -- | Φ12 |
| EM12-Z3-132 | | | | | | | |
| EM12-Z3-160 | 535 | 360 | 885 | 830 | 370 | -- | Φ12 |

| Model | Appearance and installation dimension (mm) | | | | | | |
|-------------|--|-----|------|------|-----|----|-----|
| | W | W1 | H | H1 | D | D1 | Φd |
| EM12-Z3-185 | 650 | 360 | 1040 | 985 | 415 | -- | Φ12 |
| EM12-Z3-200 | | | | | | | |
| EM12-Z3-220 | | | | | | | |
| EM12-Z3-250 | | | | | | | |
| EM12-Z3-280 | 815 | 600 | 1350 | 1250 | 445 | -- | Φ12 |
| EM12-Z3-315 | | | | | | | |
| EM12-Z3-355 | | | | | | | |
| EM12-Z3-400 | | | | | | | |
| EM12-Z3-450 | | | | | | | |

2.3.3 Appearance and installation dimension of external keypad (keypad tray)

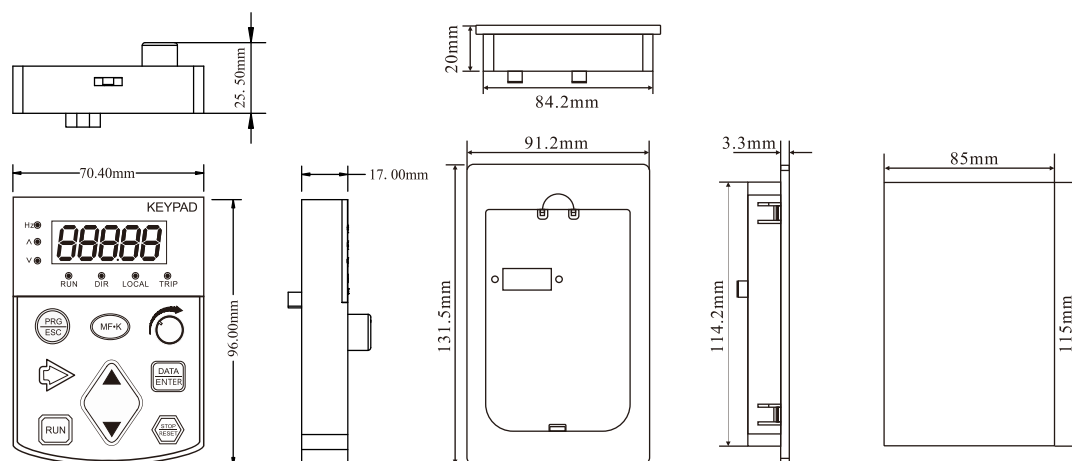


Diagram 2-7 Appearance and installation dimension of external keypad (keypad tray)

3. Installation of Frequency Inverter

3.1 Installation environment

1. The place with indoor vents or ventilation devices.
2. The environment temperature shall be $-10^{\circ}\text{C}\sim 40^{\circ}\text{C}$. If the temperature is over 40°C but less than 50°C , better to take down the cover of frequency inverter or open the front door of cabinet to facilitate heat dissipation.
3. Try to avoid high temperature and wet place; the humidity shall be less than 90% without frost deposit.
4. Avoid direct sunlight.
5. Keep away from flammable, explosive and corrosive gas and liquid.
6. No dust, floating fiber and metal particles.
7. Install on the place without strongly vibration. And the vibration should be not over 0.6G, Especially pay attention to far away from the punching machine, etc.
8. Keep away from electromagnetic interference source.

3.2 Installation direction and space

In order to not affect the service life of frequency inverter and reduce its performance, note for its installation direction and space and correctly fasten it.

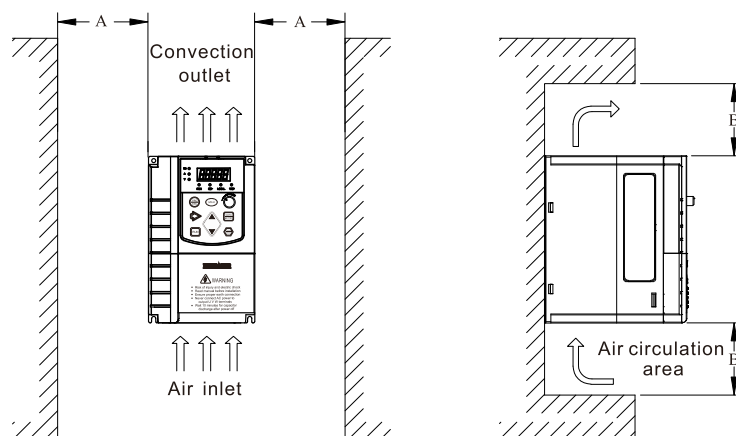



Diagram3-1 Ventilating duct installation dimension diagram of frequency inverter

Please install the frequency inverter vertically, to send out the heat upward, and pay attention to direction of frequency inverter to avoid inversion.

If there are several units of frequency inverter installed, please install them side by side, do not to install up and down.

3.3 Sketch and Description of Main Circuit Terminals

| Terminal symbol | Function description |
|------------------|--|
| L/R、 N/T | Single-phase AC power input terminals |
| R/L1、 S/L2、 T/L3 | Three-phase AC power input terminals |
| P+、 PB | Braking resistor connecting |
| ⊕1、 ⊕2 | External DC reactor connecting terminals,shorted by bronze before delivery |
| P+、 P-/⊖ | DC power input terminals |

| Terminal symbol | Function description |
|---|---------------------------------------|
|  Or E/PE | Grounding terminal |
| U/T1、V/T2、W/T3 | Three-phase AC power output terminals |

3.4 Control Circuit and Main Circuit Terminals Description

3.4.1 Control Circuit and Main Circuit Wiring

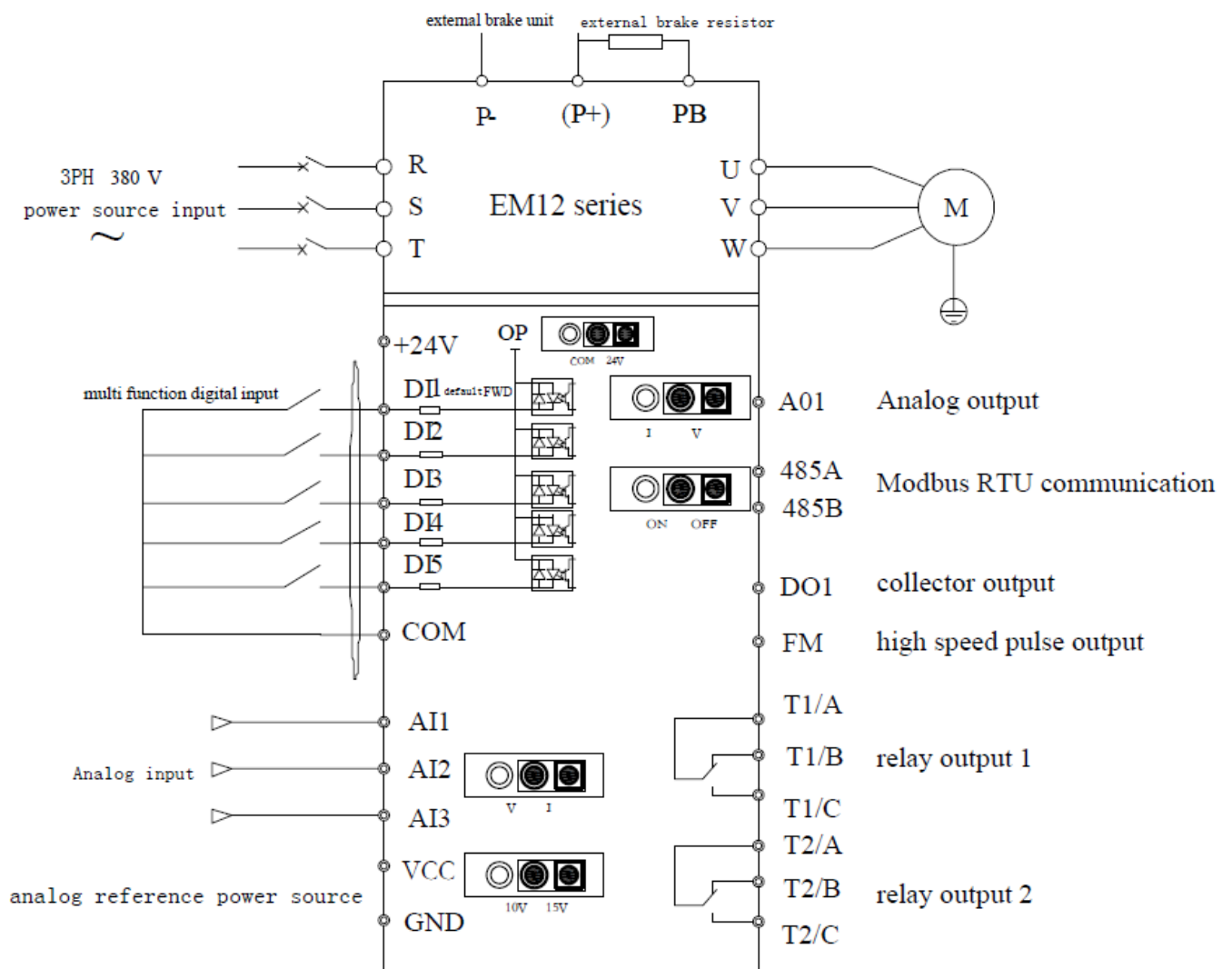


Diagram 3-2 Control Circuit and Main Circuit Wiring

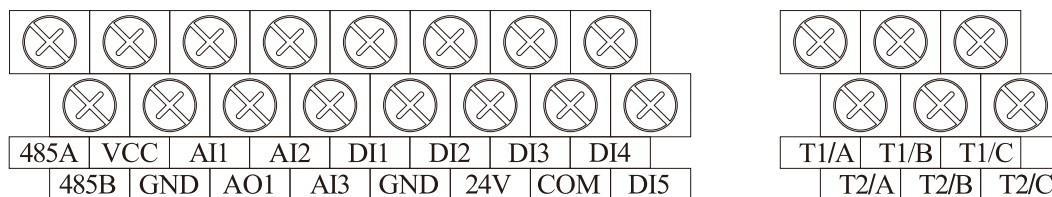
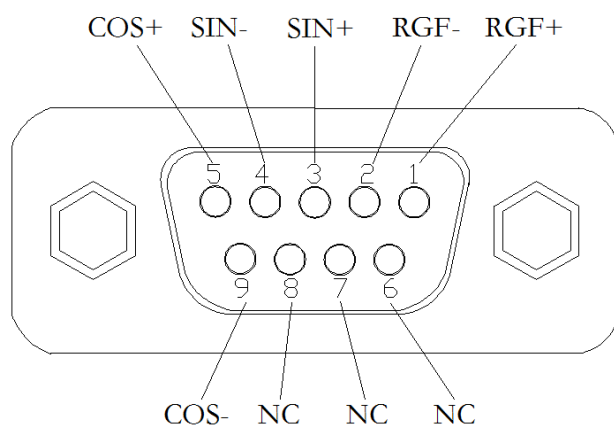


Diagram 3-3 EM12 Control Circuit Terminal Sketch

| Terminal Symbol | Terminal Name | Terminals function description |
|------------------------|----------------------------|---|
| +24V-COM | External +24V power supply | Provide +24 V power supply to external unit. Generally, it provides power supply to DI/DO terminals and external sensors. Maximum output current: 200 mA |
| AI1-GND | Analog input 1 | 1. Input range: DC 0V~10V/ 0mA~20mA(decided by jumper AI2/AI3 on the control board); AI1: DC -10V~+10V 2. Impedance: 22 k Ω (voltage input), 500 Ω (current input) |
| AI2-GND | Analog input 2 | |
| AI3-GND | Analog input 3 | |
| DI1 | Digital input 1 | 1. Optical coupling isolation, compatible with dual polarity input 2. Input Impedance: 2.4 k Ω 3. Voltage range for level input: 9V~30 V |
| DI2 | Digital input 2 | |
| DI3 | Digital input 3 | |
| DI4 | Digital input 4 | |
| DI5 | Digital input 5 | |
| AO1-GND | Analog output 1 | Voltage or current output is decided by jumper AO1. Output voltage range: 0V~10 V Output current range: 0mA~20 mA |
| T1/A-T1/B T2/A-T2/B | NC terminal | Contact driving capacity: 250 VAC, 3 A, COS ϕ = 0.4 DC 30 V, 1 A |
| T1/A-T1/C T2/A-T2/C | NO terminal | |

3.5 Encoder board terminal wiring and definition



4. Operation and display

4.1 Instruction of operation and display

With the operation panel, the inverter can be used to modify the function parameters, the inverter working status monitoring and the inverter running control (starting, stopping). The appearance and function are as follows:

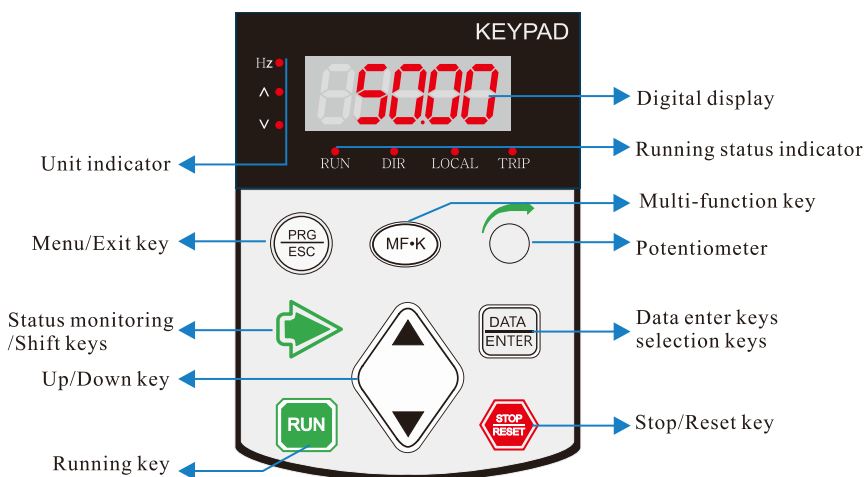


Diagram 4-1 Operation panel

1. Description of indicator:

RUN: OFF indicates that the frequency inverter is in the stop state and ON indicates that the frequency inverter is in the running state.

LOCAL: It indicates whether the frequency inverter is operated by operation keypad, terminals or remoter (communication). OFF indicates keypad operation control state; ON indicates terminals operation control state; Blinking indicates remote operation control state.

DIR: It is Forward/Reversal indicator, ON indicates forward rotation.

TRIP: Tunning/ Torque Control/Fault indicator

When the indicator is ON, it indicates torque control mode. When the indicator is blinking slowly, it indicates the auto-tuning state. When the indicator is blinking quickly, it indicates the fault state.

2. Unit indicator:

Hz: frequency unit; **A:** Current unit; **V:** Voltage unit

3. Digital display area:

The 5-digit LED display is able to display the set frequency, output frequency, monitoring data and fault codes.

4. Description of Keys on the Operation panel (keypad)

| Key | Name | Function |
|---------------|--------------|--|
| PRG/ESC | Programming | Enter or exit menu level I. |
| DATA ENTER | Confirmation | Enter the menu interfaces level by level, and confirm the parameter setting |
| ▲ | Increment | Increase data or function code. |
| ▼ | Decrement | Decrease data or function code. |
| ↔ | Shift | Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters. |
| RUN | RUN | Start the frequency inverter in the operation panel control mode. |

| Key | Name | Function |
|----------------------|----------------|---|
| <u>STOP</u> RESET | Stop/Reset | Stop the frequency inverter when it is in the running state and perform the reset operation when it is in the fault state. The functions of this key are restricted by b9-00. |
| MF·K | Multi-function | Perform function switchover according to the setting of P9-01 |

Chapter 5. Simple parameter list

Table Symbol Description:

“√” - indicates that the parameter can be changed in the process of stopping and running.

“×” - indicates that the parameter can be changed in stop mode, can not be changed during running;

“●” - Indicates that the initial parameters related to the drives model

“*” Factory setting, it is not allow setting by user.

| Code | Name | Setting range | Default | Property |
|-------------------------------------|---|---|-----------|----------|
| P0 Basic function parameters | | | | |
| P0-00 | GP model display | 1: G type (Heavy duty) 2: P type (pumps, fans load duty) | Per model | ● |
| P0-01 | The first motor control mode | 0:VF control 1:Sensorless vector control without PG card feedback 2: Sensor vector control with PG card feedback | 0 | × |
| P0-02 | Command mode | 0: Keypad (LED OFF) 1:Terminal command (LED ON) 2: RS485 communication (LED flash) | 0 | √ |
| P0-03 | Main frequency reference source X | 0: Set by P0-08 of keypad, UP/DOWN setting not saved after power down. 1: Set by P0-08 of keypad, UP/DOWN setting memorized power down. 2: Analog AI1 3: Analog AI2 4: Keypad potentiometer 5: PULSE trains frequency reference (DI5) 6: Multiple step command reference 7: Simple PLC 8: PID 9: RS485 communication | 0 | × |
| P0-04 | Auxiliary frequency reference source Y | As same as P0-03 (main frequency reference source X) | 0 | × |
| P0-05 | The auxiliary frequency source Y range basic reference when superposition | 0:Relative to the maximum frequency 1:Relative to frequency source X | 0 | √ |
| P0-06 | The auxiliary frequency source Y range when superposition | 0% ~ 150% | 100% | √ |
| P0-07 | Frequency source selection when superposition | Unit's digit:frequency source selection 0: main frequency source 1:Arithmetic result of main and auxiliary operation (arithmetic relationship operation depends on ten's digit) 2: Switchover between main frequency X source and auxiliary source Y 3: Switchover between main source X and | 00 | √ |

| | | | | |
|-------|--|---|-----------|---|
| | | arithmetic operation between of main source X and auxiliary source Y. 4: Switchover between auxiliary source Y and arithmetic operation between of main source X and auxiliary source Y Ten's digit : The arithmetic operation relationship between main and auxiliary. 0: main + auxiliary 1: main – auxiliary 2: Maximum of X and Y 3: Minimum of X and Y | | |
| P0-08 | Preset frequency | 0.00Hz~Maximum (P0-10) | 50.00Hz | √ |
| P0-09 | Running direction | 0: the same direction 1: the opposite direction | 0 | √ |
| P0-10 | Maximum frequency | 50.00Hz~600.00Hz | 50.00Hz | × |
| P0-11 | Upper limit frequency source | 0:P0-12 1:AI1 2:AI2 3:potentiometer of kaypad 4:PULSE trains 5:Rs485 communication | 0 | × |
| P0-12 | Upper limit frequency source | Lower limit frequency P0-14~Maximum frequency P0-10 | 50.00Hz | √ |
| P0-13 | Upper limit frequency offset | 0.00Hz~Maximum frequency P0-10 | 0.00Hz | √ |
| P0-14 | Lower limit frequency | 0.00Hz~Maximum frequency P0-12 | 0.00Hz | √ |
| P0-15 | Carrier frequency | 0.5kHz~16.0kHz | Per model | √ |
| P0-16 | Carrier frequency auto adjusting with temperature | 0: Not 1: Yes | 1 | √ |
| P0-17 | Acceleration time 1 | 0.00s~650.00s(P0-19=2) 0.0s~6500.0s(P0-19=1) 0s~65000s(P0-19=0) | Per model | √ |
| P0-18 | Deceleration time 1 | 0.00s~650.00s(P0-19=2) 0.0s~6500.0s(P0-19=1) 0s~65000s(P0-19=0) | Per model | √ |
| P0-19 | Unit of acceleration /deceleration time | 0:1s 1:0.1s 2:0.01s | 1 | × |
| P0-21 | The offset of auxiliary frequency source when performsuperposition | 0.00Hz~Maximum frequency F0-10 | 0.00Hz | √ |
| P0-22 | Frequencyresolution | 1:0.1Hz 2:0.01Hz | 2 | × |
| P0-23 | Memory selection when frequency reference is set by digital | 0:Not save 1:save | 0 | √ |
| P0-24 | Motor parameter group | 0:Motor parameters group 1 1:Motor parameters group 2 | 0 | × |
| P0-25 | The reference frequency of Acceleration/ deceleration time | 0:Maximum frequency (P0-10) 1: setting frequency 2:100Hz | 0 | × |

| | | | | |
|---------------------------------------|---|---|-------------|---|
| P0-26 | UP/DOWN of reference | 0: Running frequency 1: Set frequency | 0 | × |
| P0-27 | Frequency source and command binding | Unit digit: Frequency source is bound by keypad command 0: No bonding 1: frequency is set by digital 2:AI1 3:AI2 4:potentiometer of keypad 5:PULSE train (DI5) 6:multi-step frequency 7:Simple PLC 8:PID 9:Communication Ten digit: Frequency source is bound by terminals Hundreds digit: Frequency source is bound by communication Thousands of digit: Automatic run Binding frequency source selection | 0000 | √ |
| P0-28 | Serial communication protocol selection | 0:Modbus protocol | 0 | √ |
| P1 Firstmotor parameters group | | | | |
| P1-00 | Motor type | 0:general asynchronous motor 1: variable frequency asynchronous motor 3. Permanent magnet synchronous motor | 0 | × |
| P1-01 | Rated power of motor | 0.1KW~1000.0KW | Per model | × |
| P1-02 | Rated voltage of motor | 1V~2000V | Per model | × |
| P1-03 | Rated current of motor | Inverter power <= 55KW:0.01A~655.35A Inverter power> 55KW:0.1A~6553.5A | Per model | × |
| P1-04 | Rated frequency of motor | 0.01Hz~Maximum frequency | Per model | × |
| P1-05 | Rated speed of motor | 1rpm~65535rpm | Per model | × |
| P1-06 | Asyn. Motor Stator resistance | Inverter power<= 55KW:0.001Ω~65.535Ω Inverter power> 55KW: 0.0001Ω~6.5535Ω | Auto tuning | × |
| P1-07 | Asyn. motor rotor resistance | Inverter power<= 55KW:0.001Ω~65.535Ω Inverter power> 55KW : 0.0001Ω~6.5535Ω | Auto tuning | × |
| P1-08 | Asyn. motor Motor leakage inductance | Inverter power<= 55KW:0.01mH~655.35mH Inverter power> 55KW:0.001mH~65.535mH | Auto tuning | × |
| P1-09 | Asyn. motor mutual inductance | Inverter power<= 55KW:0.1mH~6553.5mH Inverter power> 55KW:0.01mH~655.35mH | Auto tuning | × |
| P1-10 | Asyn. otor no-load current | Inverter power<= 55KW: 0.01A~F1-03 Inverter power> 55KW:0.1A~F1-03 | Auto tuning | × |
| P1-16 | Synchronous motor stator resistance | Inverter power<= 55KW:0.001Ω~65.535Ω Inverter power> 55KW:0.0001Ω~6.5535Ω | Auto tunin | × |

| | | | | |
|---|--|--|-------------|---|
| P1-17 | Synchronous motor D-axis inductance | Inverter power≤ 55KW:0.01mH～655.35mH Inverter power> 55KW : 0.001mH～65.535mH | Auto tuning | × |
| P1-18 | Synchronous motor Q axis inductance | Inverter power≤ 55KW:0.01mH～655.35mH Inverter power> 55KW : 0.001mH～65.535mH | Auto tuning | × |
| P1-20 | Synchronous motor back electromotive force | 0.1V～6553.5V | Auto tuning | × |
| P1-27 | Number of encoder lines | 1～65535 | 1024 | × |
| P1-28 | Encoder type | 0:ABZ incremental encoder 1:UVW incremental encode 2:Rotary transformer 3:Sine and cosine encoders 4:Provincial line UVW encoder | 0 | × |
| P1-30 | ABZ incremental encoder phase sequence | 0:Forward 1:Reverse | 0 | × |
| P1-31 | Encoder installation angle | 0.0～359.9° | 0.0° | × |
| P1-32 | Reserve | 0 | 0 | × |
| P1-33 | Reserve | 0 | 0 | × |
| P1-34 | Number of pole pairs of rotary transformers | 1～65535 | 1 | × |
| P1-36 | Speed feedback PG disconnection Detection time | 0.0:on operation 0.1s～10.0s | 0.0 | × |
| P1-37 | Auto tuning mode selection | 0: no operation 1: Asynchronous motor still tunes 2: Asynchronous motor complete tuning 11: Synchronous motor tuning with load 12: Synchronous motor with no-load tuning | 0 | × |
| P2 group The first motor vector control parameters | | | | |
| P2-00 | Speed loop proportional gain 1 | 1～100 | 30 | √ |
| P2-01 | Speed loop integral time 1 | 0.01s～10.00s | 0.50s | √ |
| P2-02 | Switching frequency 1 | 0.00～P2-05 | 5.00Hz | √ |
| P2-03 | Speed loop proportional gain 2 | 1～100 | 20 | √ |
| P2-04 | Speed loop integral time 2 | 0.01s～10.00s | 1.00s | √ |
| P2-05 | Switching frequency 2 | P2-02～Maximum frequency | 10.00Hz | √ |
| P2-06 | Slip compensation coefficient | 50%～200% | 100% | √ |
| P2-07 | Speed loop filter time constant | 0.000s～0.100s | 0.000s | √ |
| P2-08 | Vector control over excitation gain | 0～200 | 64 | √ |
| P2-09 | Upper limit of torque source selection in speed control mode | 0:set by P2-10 1:AI1 2:AI2 3:Potentiometer of keypad 4:PULSE train 5:communication | 0 | √ |

| | | | | |
|--|--|--|-----------|---|
| | | 6:MIN(AI1,AI2) 7:MAX(AI1,AI2) The full range of 1-7 option is correspond to P2-10 | | |
| P2-10 | Upper limit of torque digital setting in speed control mode | 0.0% ~ 200.0% | 150.0% | √ |
| P2-13 | Excitation adjustment proportional gain | 0 ~ 60000 | 2000 | √ |
| P2-14 | Excitation adjustment integral gain | 0 ~ 60000 | 1300 | √ |
| P2-15 | Torque adjustment proportional gain | 0 ~ 60000 | 2000 | √ |
| P2-16 | Torque adjustment integral gain | 0 ~ 60000 | 1300 | √ |
| P2-17 | Speed loop integral attribute | Bit: integral separation 0:Disable 1:Valid | 0 | √ |
| P2-18 | Synchronous motor weakmagnetic mode | 0: weak magnetic 1: Direct calculation mode 2: Auto adjustment mode | 1 | √ |
| P2-19 | Synchronous magnetic weak depth | 50% ~ 500% | 100% | √ |
| P2-20 | Maximum weak magnetic current | 1% ~ 300% | 50% | √ |
| P2-21 | Weak magnetic auto adjusting gain | 10% ~ 500% | 100% | √ |
| P2-22 | Weak magnetic integral factor | 2 ~ 10 | 2 | √ |
| P3 group V/F control parameters | | | | |
| P3-00 | VF curve setting | 0:Linear V / F curve 1:Multi-point V / F curve 2:Square V / F curve 3: 1.2 power V / F 4: 1.4 power V / F 6: 1.6 power V/F 8: 1.8 power V/f 10: VF completely separation mode 1 11:VF Semi-separated separation mode 2 | 0 | × |
| P3-01 | Torque booster | 0.0%: (Automatic torque boost) 0.1% ~ 30.0% | Per model | √ |
| P3-02 | Torque boost cut-off frequency | 0.00Hz ~ Maximum frequency | 50.00Hz | × |
| P3-03 | Multipoint VF frequency point 1 | 0.00Hz ~ P3-05 | 0.00Hz | × |
| P3-04 | Multipoint VF voltage point 1 | 0.0% ~ 100.0% | 0.0% | × |
| P3-05 | Multipoint VF frequency point 2 | P3-03 ~ P3-07 | 0.00Hz | × |
| P3-06 | Multipoint VF voltage point 2 | 0.0% ~ 100.0% | 0.0% | × |
| P3-07 | Multipoint VF frequency point 3 | P3-05 ~ Motor rated frequency(F1-04) | 0.00Hz | × |
| P3-08 | Multipoint VF voltage point 3 | 0.0% ~ 100.0% | 0.0% | × |
| P3-09 | VF Slip compensation gain | 0.0% ~ 200.0% | 100.0% | √ |

| | coefficient | | | |
|---------------------------------|-------------------------------------|---|------|---|
| P3-10 | VF over excitation gain | 0~200 | 100 | √ |
| P3-11 | VF oscillation suppression gain | 0~100 | 50 | √ |
| P3-13 | VF separate voltage source | 0: set by digital (F3-14) 1:AI1 2:AI2 3:Potentiometer of keypad 4:PULSE train (DI5) 5:Multiple speed command 6:Simple PLC 7:PID 8:Communication Note: 100.0% corresponds to the motor rated voltage | 0 | √ |
| P3-14 | VF separate voltage digital setting | 0V~Rated motor voltage | 0V | √ |
| P3-15 | acceleration time of VF separate | 0.0s~1000.0s Note: Indicates the deceleration time when 0V changes to the motor rated voltage | 0.0s | √ |
| P4 group Input terminals | | | | |
| P4-00 | DI1 terminals function selection | 0:no operation 1: Forward running or running command 2: Reverse running REV or forward/reverse running direction selection (note: when set for 1 or 2 parameter, please reference to P4-11 function introduction) 3: 3 line control mode 4: Forward Jog (FJOG) 5: Reverse Jog (RJOG) 6: Terminal UP 7: Terminal DOWN 8: Free stop 9: Fault reset (RESET) 10: Run pause 11: External fault normal open input 12: Multiple step terminals 1 13: Multiple step terminals 2 14: Multiple step terminals 3 15: Multiple step terminals 4 16: Acceleration/ deceleration selection terminals 1 17: Acceleration/ deceleration selection terminals 2 18: Frequency source switch 19: UP/DOWN setting reset (terminals or keypad) 20: Running command terminals switch 21: Acceleration/deceleration forbidden 22: PID pause 23:PLC status reset 24: Swing frequency pause 25: Counter input 26: Counter reset | 1 | × |
| P4-01 | DI2 terminals function selection | | 4 | × |
| P4-02 | DI3 terminals function selection | | 9 | × |
| P4-03 | DI4 terminals function selection | | 12 | × |
| P4-04 | DI5 terminals function selection | | 13 | × |
| P4-05 | Reserve | | 0 | × |
| P4-06 | Reserve | | 0 | × |
| P4-07 | Reserve | | 0 | × |
| P4-08 | Reserve | | 0 | × |
| P4-09 | Reserve | | 0 | × |

| | | | | |
|-------|--|--|----------|---|
| | | 27: length counting input 28: length reset 29: Torque control forbidden 30: PULSE train frequency input (only for DI5 valid) 31: Reserve 32: Starting DC braking 33: External fault normal close input 34: Frequency change enable 35: Change PID direction 36: External parking terminal 1 37: Control commands switchover terminal 2 38: PID integral pause 39: Switchover between frequency source X and preset frequency 40: Switchover between frequency source Y and preset frequency 41: Motor selection terminals 1 42: Motor selection terminals 2 43: PID parameter switchover 44: User define fault 1 45: User define fault 2 46: Speed control /Torque control switchover 47: Emergency stop 48: External parking terminal 2 49: DC braking in deceleration 50: current running time res | | |
| P4-10 | DI filter time | 0.000s~1.000s | 0.010s | √ |
| P4-11 | Terminals command mode | 0: Two line control 1 1: Two line control 2 2: 3 line control 1 3: 3 line control 2 | 0 | × |
| P4-12 | Terminals UP/DOWN Change ratio | 0.001Hz/s~65.535Hz/s | 1.00Hz/s | √ |
| P4-13 | AI curve 1 minimum input | 0.00V~P4-15 | 0.00V | √ |
| P4-14 | AI curve 1 minimum input corresponding setting | -100.0%~+100.0% | 0.0% | √ |
| P4-15 | AI curve 1 Max. input | P4-13~+10.00V | 10.00V | √ |
| P4-16 | AI curve 1 Max input corresponding setting | -100.0%~+100.0% | 100.0% | √ |
| P4-17 | AI1 filter time | 0.00s~10.00s | 0.10s | √ |
| P4-18 | AI curve 2 minimum input | 0.00V~P4-20 | 0.00V | √ |
| P4-19 | AI curve 2 minimum input corresponding setting | -100.0%~+100.0% | 0.0% | √ |
| P4-20 | AI curve 2 Max. input | P4-18~+10.00V | 10.00V | √ |
| P4-21 | AI curve 2Max input corresponding setting | -100.0%~+100.0% | 100.0% | √ |
| P4-22 | AI2 filter time | 0.00s~10.00s | 0.10s | √ |

| | | | | |
|-------|--|---|----------|---|
| P4-23 | AI curve 3 minimum input | -10.00V~P4-25 | -10.00V | √ |
| P4-24 | AI curve 3 minimum input corresponding setting | -100.0%~+100.0% | -100.0% | √ |
| P4-25 | AI curve 3 Max. input | P4-23~+10.00V | 10.00V | √ |
| P4-26 | AI curve 3Max input corresponding setting | -100.0%~+100.0% | 100.0% | √ |
| P4-27 | AI3 filter time | 0.00s~10.00s | 0.10s | √ |
| P4-28 | PULSE Min. input | 0.00kHz~P4-30 | 0.00kHz | √ |
| P4-29 | PULSE Min. input corresponding setting | -100.0%~100.0% | 0.0% | √ |
| P4-30 | PULSE Maximum input | P4-28~100.00kHz | 50.00kHz | √ |
| P4-31 | PULSE Max. Input corresponding setting | -100.0%~100.0% | 100.0% | √ |
| P4-32 | PULSE filter time | 0.00s~10.00s | 0.10s | √ |
| P4-33 | AI Curve selection | Units' digit:AI1 curve selection 1: Curve 1 (2 point, see P4-13~P4-16) 2: Curve 2 (2 point, see P4-18~P4-21) 3: Curve 3 (2 point, see P4-23~F4-26) 4: Curve 4 (4 point, see A6-00~A6-07) 5: Curve 5 (4 point, see A6-08~A6-15) Ten's digit:AI2 curve selection, as above Hundred's digit: Curve set by potentiometer of keypad, as above | 321 | √ |
| P4-34 | When AI input is less than minimum setting selection | Units' digit: AI 1 is less than minimum input Set selection 0:Corresponds to the minimum input setting 1:0.0% Ten's digit: A2 is less than minimum input Set selection, as above Hundred's digit: Potentiometer less than Min. Input selection, as above | 000 | √ |
| P4-35 | DI1 Relay time | 0.0s~3600.0s | 0.0s | × |
| P4-36 | DI2 Relay time | 0.0s~3600.0s | 0.0s | × |
| P4-37 | DI3 Relay time | 0.0s~3600.0s | 0.0s | × |
| P4-38 | DI terminal effective mode choose 1 | 0:Enable in High level 1:Enable in low level Digits:DI1 Ten's:DI2 Hundred's: DI3 Thousand's:DI4 Ten thousand's: DI5 | 00000 | × |
| P4-39 | DI terminal effective mode choose 2 | 0:Enable in High level 1:Enable in low level Digits:DI6 Ten's:DI7 Hundred's: DI8 Thousand's: DI9 Ten thousand's: DI10 | 00000 | × |

| P5 Group Output terminals | | | | |
|---------------------------|-------------------------------------|---|---|---|
| P5-00 | FM terminals output mode selection | 0: High speed pulse output (FMP) 1: Digital output (FMR) | 0 | √ |
| P5-01 | FMR output function selection | 0: No output 1: Frequency inverter running | 0 | √ |
| P5-02 | Relay 1 function selection | 2: Fault output (Free stop fault) 3: FDT1 Frequency level detect output 4: Frequency reach | 2 | √ |
| P5-03 | Relay 2 function selection | 5: Zero speed running (no output when stop) 6: Motor overload pre-alarm | 0 | √ |
| P5-04 | DO1 output function selection | 7: Inverter overload pre-alarm 8: Preset counting reach 9: Specify counting reach | 1 | √ |
| P5-05 | Extension card DO2 Output selection | 10: Length reach 11: PLC cycle running finish 12: Cumulative run time arrives 13: Frequency limit 14: Torque limit 15: Ready to run 16: AI1>AI2 17: Upper limit frequency arrives 18: Lower limit frequency arrives (relative to running) 17: Upper limit frequency arrives 18: Lower limit frequency arrives 19: Under voltage status output 20: Communication setting 21: Positioning finish (reserve) 22: Positioning approach (Reserve) 23: Zero speed running 2(output when in stop as well) 24: Accumulated power up time arrives 25: Frequency level detection FDT2 output 26: Output when frequency 1 reaches 27: Output when frequency 2 reaches 28: Output when current 1 reaches 29: Output when current 2 reaches 30: Output when timing up 31: AI1 input over limit 32: Under loading 33: reverse running 34: Zero current state 35: Module temperature arrives 36: Output current is exceeded 37: Lower frequency arrival (output when stop as well) 38: Alarm output (all faults) 39: Motor overtemperature warning 40: Current running time arrives 41: Fault output (for free stop failure and undervoltage is not output) | 4 | √ |
| P5-06 | FMP output function selection | 0: Running frequency 1: Setting frequency | 0 | √ |
| P5-07 | AO1 output function selection | 2: Output current 3: Output torque (Absolute value of torque) | 0 | √ |

| | | | | |
|--|---|---|----------|---|
| P5-08 | AO2 output function selection | 4: Output power 5: Output voltage 6: Pulse input (100% corresponds to 100.0Hz) 7: AI1 8: AI2 9: Keyboard potentiometer 10: Length 11: Count value 12: Communication settings 13: Motor speed 14: Output current (100.0% corresponds to 1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Output torque (torque actual value) | 1 | √ |
| P5-09 | FMP maximum frequency | 0.01kHz~100.00kHz | 50.00kHz | √ |
| P5-10 | AO1 zero bias coefficient | -100.0% ~+100.0% | 0.0% | √ |
| P5-11 | AO1 gain | -10.00~+10.00 | 1.00 | √ |
| P5-12 | AO2 zero bias | -100.0% ~+100.0% | 0.0% | √ |
| P5-13 | AO2 gain | -10.00~+10.00 | 1.00 | √ |
| P5-17 | FMR output relay time | 0.0s~3600.0s | 0.0s | √ |
| P5-18 | RELAY1 output relay time | 0.0s~3600.0s | 0.0s | √ |
| P5-19 | RELAY2 output relay time | 0.0s~3600.0s | 0.0s | √ |
| P5-20 | DO1 output relay time | 0.0s~3600.0s | 0.0s | √ |
| P5-21 | DO2 output relay time | 0.0s~3600.0s | 0.0s | √ |
| P5-22 | DO output terminal valid state selection | 0: Positive logic 1: Negative logic Bits: FMR Ten's bit: RELAY1 Hundreds's bit: RELAY2 Thousands's bits: DO1 Ten thousands's bit;s: DO2 | 00000 | √ |
| P6 Group start and stop control | | | | |
| P6-00 | Starting mode | 0: Directly start 1: start after speed tracking 2: Pre-excitationstart (AC asynchronous machine)- | 0 | √ |
| P6-01 | Speed tracking mode | 00: starts from stop frequency 1: starts at zero speed 2: Starting from the maximum frequency | 0 | × |
| P6-02 | The speed of speed tracking | 1~100 | 20 | √ |
| P6-03 | Starting speed | 0.00Hz~10.00Hz | 0.00Hz | √ |
| P6-04 | Starting speed keeping time | 0.0s~100.0s | 0.0s | × |
| P6-05 | Start DC braking current / pre-excitation current | 0% ~ 100% | 0% | × |

| | | | | |
|--------------------------------------|--|---|--------|---|
| P6-06 | Start DC braking time / pre-excitation time | 0.0s~100.0s | 0.0s | × |
| P6-07 | Acceleration and deceleration mode | 0: Linear acceleration / deceleration 1: S curve acceleration / deceleration A 2: S curve acceleration and deceleration B | 0 | × |
| P6-08 | S curve starting section time ratio | 0.0%~(100.0%-P6-09) | 30.0% | × |
| P6-09 | S curve finishing section time ratio | 0.0%~(100.0%-P6-08) | 30.0% | × |
| P6-10 | Stop mode | 0: Deceleration stop 1: free parking | 0 | √ |
| P6-11 | start frequency when in stop with DC braking | 0.00Hz~Maximum frequency | 0.00Hz | √ |
| P6-12 | Waiting time of stop with DC braking | 0.0s~100.0s | 0.0s | √ |
| P6-13 | Braking current when Stop with DC braking | 0%~100% | 0% | √ |
| P6-14 | DC braking time when stop | 0.0s~100.0s | 0.0s | √ |
| P6-15 | Brake usage ratio | 0%~100% | 100% | √ |
| P7 Group keyboard and display | | | | |
| P7-01 | MF.K function button option | 0: MF.K is invalid 1: Switchover between Operation panel command channel and remote command channel (terminal command channel or communication command channel) 2: Forward and reverse switching 3: Forward Jog 4: Reverse Jog | 0 | × |
| P7-02 | STOP/RESET function | 0: STOP/RES button enable only in operation panel control mode 1: STOP/RES button enable in any control mode | 1 | √ |
| P7-03 | LED display parameters 1 in running mode | 0000~FFFF Bit00: Running frequency 1(Hz) Bit01: Setting frequency (Hz) Bit02: DC bus voltage (V) Bit03: Output voltage (V) Bit04: Output current (A) Bit05: Output power (KW) Bit06: Output torque (%) Bit07: DI input status Bit08: DO output status Bit09: AI1 voltage (V) Bit10: AI2 voltage (V) Bit11: Voltage of potentiometer(V) Bit12: Counting Bit13: Length Bit14: Load speed display Bit15: PID setting | 1F | √ |
| P7-04 | LED display parameters 2 in running mode | 0000~FFFF Bit00: PID feedback Bit01: PLC stage Bit02: PULSE input pulse train frequency | 0 | √ |

| | | | | |
|------------------------------------|---|--|-----------|---|
| | | (kHz) Bit03: Running frequency 2 (Hz) Bit04: Rest running time Bit05: AI1 before correction voltage (V) Bit06: AI2 before correction voltage (V) Bit07: operation panel potentiometer before correction voltage (V) Bit08: Line speed Bit09: Current power-on time (Hour) Bit10: Current running time (Min) Bit11: PULSE train input pulse frequency (Hz) Bit12: Communication setpoint Bit13: Encoder feedback speed (Hz) Bit14: Main frequency X display (Hz) Bit15: Auxiliary Frequency Y Display (Hz) | | |
| P7-05 | LED display in stop mode | 0000 ~ FFFF Bit00: Set frequency (Hz) Bit01: Bus voltage (V) Bit02: DI input status Bit03: DO output status Bit04: AI1 voltage (V) Bit05: AI2 voltage (V) Bit06: Operation panel potentiometer voltage (V) Bit07: Count value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: PULSE train input pulse frequency (kHz) | 33 | √ |
| P7-06 | Load speed display factor | 0.0001~6.5000 | 1.0000 | √ |
| P7-07 | Heat sink of Inverter IGBT model temperature | 0.0°C~100.0°C | - | ● |
| P7-08 | Heat sink of Inverter Rectifier temperature | 0.0°C~100.0°C | - | ● |
| P7-09 | Cumulative run time | 0h~65535h | - | ● |
| P7-10 | Products serial No. | - | - | ● |
| P7-11 | Software version No. | - | - | ● |
| P7-12 | The number of decimal places of load speed Displays | 0: 0 decimal places 1: 1 decimal place 2: 2 decimal places 3: 3 decimal places | 1 | √ |
| P7-13 | Accumulated time since power on | 0~65535 hour | - | ● |
| P7-14 | Cumulative power consumption | 0~65535 KWh | - | ● |
| P8 group Auxiliary function | | | | |
| P8-00 | Jog running frequency | 0.00Hz~Maximum frequency | 2.00Hz | √ |
| P8-01 | Jog acceleration | 0.0s~6500.0s | 20.0s | √ |
| P8-02 | Jog deceleration | 0.0s~6500.0s | 20.0s | √ |
| P8-03 | Acceleration time 2 | 0.0s~6500.0s | Per model | √ |

| | | | | |
|-------|--|---|-----------|---|
| P8-04 | Deceleration time 2 | 0.0s~6500.0s | Per model | √ |
| P8-05 | Acceleration time 3 | 0.0s~6500.0s | Per model | √ |
| P8-06 | Deceleration time 3 | 0.0s~6500.0s | Per model | √ |
| P8-07 | Acceleration time 4 | 0.0s~6500.0s | Per model | √ |
| P8-08 | Deceleration time 4 | 0.0s~6500.0s | Per model | √ |
| P8-09 | Jumping frequency 1 | 0.00Hz~Maximum frequency | 0.00Hz | √ |
| P8-10 | Jumping frequency 2 | 0.00Hz~Maximum frequency | 0.00Hz | √ |
| P8-11 | Jump frequency range | 0.00Hz~Maximum frequency | 0.01Hz | √ |
| P8-12 | Dead zone time of forward to reverse | 0.0s~3000.0s | 0.0s | √ |
| P8-13 | Reverse running enable | 0: Allow 1: Forbidden | 0 | √ |
| P8-14 | Running mode when setting frequency is less than the lower limit frequency | 0: Run at lower limit frequency 1: stop 2: Zero speed running | 0 | √ |
| P8-15 | Drop control | 0.00Hz~10.00Hz | 0.00Hz | √ |
| P8-16 | Set the cumulative power-up arrival time | 0h~65000h | 0h | √ |
| P8-17 | Set the cumulative running arrival time | 0h~65000h | 0h | √ |
| P8-18 | Start protection selection | 0: Disable 1: Enable | 0 | √ |
| P8-19 | Frequency detection value (FDT1) | 0.00Hz~Maximum frequency | 50.00Hz | √ |
| P8-20 | Frequency detection hysteresis (FDT1) | 0.0%~100.0% (FDT1 voltage level) | 5.0% | √ |
| P8-21 | Frequency arrival detection amplitude | 0.0%~100.0% (Maximum frequency) | 0.0% | √ |
| P8-22 | Whether the jump frequency is valid during acceleration / deceleration | 0: Invalid 1: Valid | 0 | √ |
| P8-25 | Switch over point between acceleration time 1 to acceleration time 2 | 0.00Hz~Maximum frequency | 0.00Hz | √ |
| P8-26 | Switch over point between deceleration time 1 to deceleration time 2 | 0.00Hz~Maximum frequency | 0.00Hz | √ |
| P8-27 | Terminal control prior | 0: Invalid 1: Valid | 0 | √ |
| P8-28 | Frequency detection value (FDT2) | 0.00Hz~Maximum frequency | 50.00Hz | √ |
| P8-29 | Frequency detection hysteresis (FDT2) | 0.0%~100.0% (FDT2 voltage level) | 5.0% | √ |
| P8-30 | Any arrival frequency detection value 1 | 0.00Hz~Maximum frequency | 50.00Hz | √ |

| | | | | |
|--------------------------------------|---|--|---------|---|
| P8-31 | Any arrival frequency detection amplitude 1 | 0.0% ~ 100.0% (Maximum frequency) | 0.0% | √ |
| P8-32 | Any arrival frequency detection value 2 | 0.00Hz ~ Maximum frequency | 50.00Hz | √ |
| P8-33 | Any arrival frequency detection amplitude 2 | 0.0% ~ 100.0% (Maximum frequency) | 0.0% | √ |
| P8-34 | Zero current detection level | 0.0% ~ 300.0% 100.0% corresponds to the motor rated current | 5.0% | √ |
| P8-35 | Zero current detection delay time | 0.01s ~ 600.00s | 0.10s | √ |
| P8-36 | Output current over limit | 0.0% (No detect) 0.1% ~ 300.0% (Rated current) | 200.0% | √ |
| P8-37 | Output current over limit detect relay time | 0.00s ~ 600.00s | 0.00s | √ |
| P8-38 | Any arrival current 1 | 0.0% ~ 300.0% (Motor rated current) | 100.0% | √ |
| P8-39 | Any arrival current 1 detect amplitude | 0.0% ~ 300.0% (Motor rated current) | 0.0% | √ |
| P8-40 | Any arrival current 2 | 0.0% ~ 300.0% (Motor rated current) | 100.0% | √ |
| P8-41 | Any arrival current 2 detect amplitude | 0.0% ~ 300.0% (Motor rated current) | 0.0% | √ |
| P8-42 | Timing function selection | 0: Invalid 1: Valid | 0 | √ |
| P8-43 | Timing of run time selection | 0: Set by P8-44 1: AI1 2: AI2 3: Potentiometer of operation panel The range of analog input corresponds to P8-44 | 0 | √ |
| P8-44 | Timing value setting of running time | 0.0Min ~ 6500.0Min | 0.0Min | √ |
| P8-45 | Lower limit of AI1 input voltage protection | 0.00V ~ P8-46 | 3.10V | √ |
| P8-46 | Upper limit of AI1 input voltage protection | P8-45 ~ 10.00V | 6.80V | √ |
| P8-47 | IGBT Module temperature arrives | 0°C ~ 100°C | 75°C | √ |
| P8-48 | Cooling fan control | 0: Working in running 1: Working after power up | 0 | √ |
| P8-49 | Wake up frequency | Sleep frequency (P8-51) ~ Maximum (P0-10) | 0.00Hz | √ |
| P8-50 | Wake up delay time | 0.0s ~ 6500.0s | 0.0s | √ |
| P8-51 | Sleep frequency | 0.00Hz ~ Wake up frequency (P8-49) | 0.00Hz | √ |
| P8-52 | Sleep relay time | 0.0s ~ 6500.0s | 0.0s | √ |
| P8-53 | Current running arrival time setting | 0.0 ~ 6500.0 mins | 0.0Min | √ |
| P9 group Fault and protection | | | | |
| P9-00 | Motor overload protection selection | 0: Prohibited 1: Allow | 1 | √ |
| P9-01 | Motor overload protection gain | 0.20 ~ 10.00 | 1.00 | √ |

| | | | | |
|-------|---|--|------|---|
| P9-02 | Motor overload pre-warning coefficient | 50% ~ 100% | 80% | √ |
| P9-03 | Overvoltage stall gain | 0 ~ 100 | 100 | √ |
| P9-04 | Overvoltage stall protection voltage | 120% ~ 150% | 135% | √ |
| P9-05 | Over-current stall gain | 0 ~ 100 | 20 | √ |
| P9-06 | Overcurrent stall protection current | 100% ~ 200% | 150% | √ |
| P9-07 | Ground short circuit protection options when power on | 0: Invalid 1: Valid | 1 | √ |
| P9-09 | Number of automatic reset times | 0 ~ 20 | 0 | √ |
| P9-10 | DO (digital output) when fault alarm auto reset | 0: No action 1: Action | 0 | √ |
| P9-11 | Fault auto reset interval time | 0.1s ~ 100.0s | 1.0s | √ |
| P9-12 | Input phase loss/ contactor pull protection selection | Bit: Input phase loss protection selection Ten: Contactor pull protection options 0: Prohibited 1: Allow | 11 | √ |
| P9-13 | Output phase loss protection | 0: Prohibited 1: Allow | 1 | √ |
| P9-14 | First failure alarm type | 0: No fault 1: Reserved 2: Overcurrent in acceleration 3: Over current in deceleration 4: Over current in constant speed during 5: Over voltage in acceleration 6: Over voltage in deceleration 7: Over voltage in constant speed during 8: Buffer resistance overload 9: Undervoltage 10: Inverter overload 11: Motor overload 12: Input phase loss 13: Output phase loss 14: Igbt Module overheating 15: External fault 16: Communication error 17: Contactor is abnormal 18: Current detection is abnormal 19: Motor tuning abnormal 20: Encoder / PG card is abnormal 21: Parameter read and write exception 22: Inverter hardware abnormality 23: Motor to ground short circuit 24: Reserved 25: Reserved 26: Running time arrives 27: User defined fault 1 28: user defined fault 2 29: Power-up time arrives | — | ● |
| P9-15 | Second fault alarm type | | — | ● |
| P9-16 | The third (latest one) type of failure | | — | ● |
| | | | | |

| | | | | |
|-------|--|--|---|---|
| | | 30: Under load 31: PID feedback is missing in running 40: Fast current limit timeout 41: Motor switch in running 42: The speed deviation is too big 43: Motor over speed 45: Motor overtemperature 51: Initial position error | | |
| P9-17 | Frequency at when the third (last) failure frequency | — | — | ● |
| P9-18 | Current at when the third (last) failure frequency | — | — | ● |
| P9-19 | DC bus voltage at when the third (last) failure frequency | — | — | ● |
| P9-20 | Input terminals status at when the third (last) failure frequency | — | — | ● |
| P9-21 | Output terminals status at when the third (last) failure frequency | — | — | ● |
| P9-22 | Inverter status when the third (last) failure frequency | — | — | ● |
| P9-23 | Power up time when the third (last) failure frequency | — | — | ● |
| P9-24 | Running time when the third (last) failure frequency | — | — | ● |
| P9-27 | Frequency at when the second failure | — | — | ● |
| P9-28 | Current at when the second failure | — | — | ● |
| P9-29 | DC bus voltage at when the second failure | — | — | ● |
| P9-30 | Input terminals status at when the second failure | — | — | ● |
| P9-31 | Output terminals status at when the second failure | — | — | ● |
| P9-32 | Inverter status at when the second failure | — | — | ● |
| P9-33 | Power up time when the second failure | — | — | ● |
| P9-34 | Running time when the second failure | — | — | ● |
| P9-37 | Frequency at when the third failure | — | — | ● |

| | | | | |
|-------|---|---|-------|---|
| P9-38 | Current at when the third failure | — | — | ● |
| P9-39 | DC bus voltage at when the third failure | — | — | ● |
| P9-40 | Input terminals status at when the third failure | — | — | ● |
| P9-41 | Output terminals status at when the third failure | — | — | ● |
| P9-42 | Inverter status at when the third failure | — | — | ● |
| P9-43 | Power up time when the third failure | — | — | ● |
| P9-44 | Running time when the third failure | — | — | ● |
| P9-47 | Fault protection action selection 1 | Bit: Motor overload (11) 0: Free stop 1: Stop by stop mode setting 2: Continue to run Ten: Input missing (12) Hundreds: Output phase loss (13) Thousands of bits: external failure (15) Million: communication anomaly (16) | 00000 | √ |
| P9-48 | Fault protection action selection 3 | Bit: Encoder / PG card exception (20) 0: Free stop Ten: Function code read and write exception (21) 0: Free stop 1: Stop by stop mode setting Hundred places: reserved Thousands: Motor overheating (25) Million: run time arrival (26) | 00000 | √ |
| P9-49 | Fault protection action selection 3 | Bit: User defined fault 1 (27) 0: Free stop 1: Stop by stop mode 2: Continue to run Ten: User Defined Fault 2 (28) 0: Free Stop 1: Stop by stop mode 2: Continue to run Hundreds: Power-up time arrives (29) 0: Free stop 1: Stop by stop mode 2: Continue to run Thousands of bits: (30) 0: Free stop 1: Deceleration stop 2: Skip to 7% of the rated motor frequency to continue running, restore to run with setting frequency after no missing load Million: PID feedback lost in running (31) 0: Free parking 1: Stop by stop mode 2: Continue to run | 00000 | √ |
| P9-50 | Fault protection action selection 4 | Bit: the speed deviation is too large (42) 0: Free stop | 00000 | √ |

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|------------------------------|--|---|--------|---|
| | | 1: Stop by stop mode 2: Continue to run Ten: Motor over speed (43) Hundred places: initial position error (51) | | |
| P9-54 | Running frequency of continue running when fault alarm | 0: Run at the current operating frequency 1: Run at set frequency 2: Run at the upper limit frequency 3: Run at the lower limit frequency 4: Run at an abnormal standby frequency | 0 | √ |
| P9-55 | An abnormal standby frequency | 0.0% ~ 100.0% (100.0% corresponds to the maximum frequency P0-10) | 100.0% | √ |
| P9-56 | Motor temperature sensor type | 0: No temperature sensor 1: PT100 2: PT1000 | 0 | √ |
| P9-57 | Motor overheat protection threshold | 0°C ~ 200°C | 110°C | √ |
| P9-58 | Motor overheat pre-warning threshold | 0°C ~ 200°C | 90°C | √ |
| P9-59 | Working action of Instantaneous power fail selection | 0: Invalid 1: Deceleration 2: Deceleration stop | 0 | √ |
| P9-60 | Judgment voltage of instantaneous power fail pause | 80.0% ~ 100.0% | 90.0% | √ |
| P9-61 | Voltage recovery judgment time when instantaneous power fail | 0.00s ~ 100.00s | 0.50s | √ |
| P9-62 | Judgment voltage of instantaneous power failure action | 60.0% ~ 100.0% (Standard bus voltage) | 80.0% | √ |
| P9-63 | Load miss protection | 0: Disable 1: Enable | 0 | √ |
| P9-64 | Load miss detection level | 0.0 ~ 100.0% | 10.0% | √ |
| P9-65 | Load miss detection time | 0.0 ~ 60.0s | 1.0s | √ |
| P9-67 | Over speed detection | 0.0% ~ 50.0% (Max frequency) | 20.0% | √ |
| P9-68 | Over speed detection time | 0.0s: No detect 0.1 ~ 60.0s | 1.0s | √ |
| P9-69 | Detection value of the speed deviation is too big | 0.0% ~ 50.0% (Max frequency) | 20.0% | √ |
| P9-70 | Detection time of speed deviation is too big. | 0.0s: No detect 0.1 ~ 60.0s | 5.0s | √ |
| PA Group PID function | | | | |
| PA-00 | PID reference source | 0: PA-01 1: AI1 2: AI2 3: Keyboard potentiometer 4: PULSE train setting (DI5) | 0 | √ |

| | | | | |
|-------|---|---|--------|---|
| | | 5: Communication reference 6: Multi-step instructions reference | | |
| PA-01 | PID value setting | 0.0% ~ 100.0% | 50.0% | √ |
| PA-02 | PID feedback source | 0: AI1 1: AI2 2: Keyboard potentiometer 3: AI1-AI2 4: PULSE pulse setting (DI5) 5: Communication reference 6: AI1 + AI2 7: MAX (AI1 , AI2) 8: MIN (AI1 , AI2) | 0 | √ |
| PA-03 | PID working direction | 0: Positive effect 1: Reverse effect | 0 | √ |
| PA-04 | PID reference feedback range | 0 ~ 65535 | 1000 | √ |
| PA-05 | Proportional gain Kp1 | 0.0 ~ 100.0 | 20.0 | √ |
| PA-06 | Integral time Ti1 | 0.01s ~ 10.00s | 2.00s | √ |
| PA-07 | Differential time Td1 | 0.000s ~ 10.000s | 0.000s | √ |
| PA-08 | PID reversal cutoff frequency | 0.00 ~ Maximum frequency | 2.00Hz | √ |
| PA-09 | PID deviation limit | 0.0% ~ 100.0% | 0.0% | √ |
| PA-10 | PID differential limiting | 0.00% ~ 100.00% | 0.10% | √ |
| PA-11 | PID reference given change time | 0.00 ~ 650.00s | 0.00s | √ |
| PA-12 | PID feedback filter time | 0.00 ~ 60.00s | 0.00s | √ |
| PA-13 | PID output filter time | 0.00 ~ 60.00s | 0.00s | √ |
| PA-14 | Reserve | - | - | √ |
| PA-15 | Proportional gain Kp2 | 0.0 ~ 100.0 | 20.0 | √ |
| PA-16 | Integral time Ti2 | 0.01s ~ 10.00s | 2.00s | √ |
| PA-17 | Derivative time Td2 | 0.000s ~ 10.000s | 0.000s | √ |
| PA-18 | PID parameter switching condition | 0: Do not switch 1: Switch via DI terminal 2: Automatic switching according to the deviation | 0 | √ |
| PA-19 | PID parameter switching deviation 1 | 0.0% ~ PA-20 | 20.0% | √ |
| PA-20 | PID parameter switching deviation 2 | FA-19 ~ 100.0% | 80.0% | √ |
| PA-21 | PID initial value | 0.0% ~ 100.0% | 0.0% | √ |
| PA-22 | PID initial value hold time | 0.00 ~ 650.00s | 0.00s | √ |
| PA-23 | The maximum value of positive deviations for two output | 0.00% ~ 100.00% | 1.00% | √ |
| PA-24 | The maximum value of reverse deviations for two output | 0.00% ~ 100.00% | 1.00% | √ |

| | | | | |
|---|---|---|-------|---|
| PA-25 | PID integral property | Bit: Integral separation 0: Invalid 1: Valid Ten: Whether to stop the integral working after outputting to the limit 0: Continue integral working 1: Stop integral working | 00 | √ |
| PA-26 | PID feedback loss detection value | 0.0%: Do not judge feedback loss 0.1% ~ 100.0% | 0.0% | √ |
| PA-27 | PID feedback loss detection time | 0.0s ~ 20.0s | 0.0s | √ |
| PA-28 | PID calculating when stop | 0: Don't execute calculating when stop 1: Execute PID calculating when stop | 0 | √ |
| PB Group Wobble, Length and Count | | | | |
| Pb-00 | Wobble setting mode | 0: Relative to center frequency 1: Relative to maximum frequency | 0 | √ |
| Pb-01 | Wobble amplitude | 0.0% ~ 100.0% | 0.0% | √ |
| Pb-02 | Sudden jump frequency range | 0.0% ~ 50.0% | 0.0% | √ |
| Pb-03 | Wobble cycle | 0.1s ~ 3000.0s | 10.0s | √ |
| Pb-04 | Wobble of the triangular wave rise time | 0.1% ~ 100.0% | 50.0% | √ |
| Pb-05 | Set length | 0m ~ 65535m | 1000m | √ |
| Pb-06 | Actual length | 0m ~ 65535m | 0m | √ |
| Pb-07 | Number of pulses per meter | 0.1 ~ 6553.5 | 100.0 | √ |
| Pb-08 | Set the count value | 1 ~ 65535 | 1000 | √ |
| Pb-09 | Specify the count value | 1 ~ 65535 | 1000 | √ |
| PC Group multi-step instructions, simple PLC | | | | |
| PC-00 | Multi - step instructions 0 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-01 | Multi - step instructions 1 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-02 | Multi - step instructions 2 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-03 | Multi - step instructions 3 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-04 | Multi - step instructions 4 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-05 | Multi - step instructions 5 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-06 | Multi - step instructions 6 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-07 | Multi - step instructions 7 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-08 | Multi - step instructions 8 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-09 | Multi - step instructions 9 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-10 | Multi - step instructions 10 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-11 | Multi - step instructions 11 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-12 | Multi - step instructions 12 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-13 | Multi - step instructions 13 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-14 | Multi - step instructions 14 | -100.0% ~ 100.0% | 0.0% | √ |

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|-------|--|---|---------|---|
| PC-15 | Multi - step instructions 15 | -100.0% ~ 100.0% | 0.0% | √ |
| PC-16 | Simple PLC running mode | 0: Single run to end and stop 1: Single run to end and keep final value 2: Continue to run in loop | 0 | √ |
| PC-17 | Simple PLC power loss memory selection | Bit: Power off memory options 0: No memory power-off 1: Power off memory Ten: Stop memory selection 0: Stop no memory 1: Stop memory | 00 | √ |
| PC-18 | Simple PLC 0 step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-19 | Resvd | 0~3 | 0 | √ |
| PC-20 | Simple PLC 1st step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-21 | Resvd | 0~3 | 0 | √ |
| PC-22 | Simple PLC 2nd step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-23 | Resvd | 0~3 | 0 | √ |
| PC-24 | Simple PLC 3rd step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-25 | Resvd | 0~3 | 0 | √ |
| PC-26 | Simple PLC 4th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-27 | Resvd | 0~3 | 0 | √ |
| PC-28 | Simple PLC 5th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-29 | Resvd | 0~3 | 0 | √ |
| PC-30 | Simple PLC 6th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-31 | Resvd | 0~3 | 0 | √ |
| PC-32 | Simple PLC 7th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-33 | Resvd | 0~3 | 0 | √ |
| PC-34 | Simple PLC 8th step running time | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PC-35 | Resvd | 0~3 | 0 | √ |
| PC-36 | Simple PLC 9th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-37 | Resvd | 0~3 | 0 | √ |
| PC-38 | Simple PLC 10th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-39 | Resvd | 0~3 | 0 | √ |
| PC-40 | Simple PLC 11th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-41 | Resvd | 0~3 | 0 | √ |
| PC-42 | Simple PLC 12th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-43 | Resvd | 0~3 | 0 | √ |
| PC-44 | Simple PLC 13th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |

| | | | | |
|---|--|---|---------|---|
| PC-45 | Resvd | 0~3 | 0 | √ |
| PC-46 | Simple PLC 14th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-47 | Resvd | 0~3 | 0 | √ |
| PC-48 | Simple PLC 15th step running time | 0.0s(h)~6553.5s(h) | 0.0s/h | √ |
| PC-49 | Resvd | 0~3 | 0 | √ |
| PC-50 | Simple PLC run time unit | 0:s (2) 1:h (hour) | 0 | √ |
| PC-51 | Multi-step instruction 0 step given mode | 0: set by FC-00 1:AI1 2:AI2 3: Keyboard potentiometer 4: PULSE train 5: PID 6: Preset frequency (F0-08) is given, UP / DOWN can be modified | 0 | √ |
| PE Group Simple PLC Acceleration and deceleration time | | | | |
| PE-00 | Acc time of 0 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-01 | Dec time of 0 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-02 | Acc time of 1 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-03 | Dec time of 1 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-04 | Acc time of 2 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-05 | Dec time of 2 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-06 | Acc time of 3 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-07 | Dec time of 3 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-08 | Acc time of 4 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-09 | Dec time of 4 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-10 | Acc time of 5 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-11 | Dec time of 5 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-12 | Acc time of 6 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-13 | Dec time of 6 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-14 | Acc time of 7 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |

| | | | | |
|-------------------------------|---|---|---------|---|
| PE-15 | Dec time of 7 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-16 | Acc time of 8 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-17 | Dec time of 8 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-18 | Acc time of 9 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-19 | Dec time of 9 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-20 | Acc time of 10 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-21 | Dec time of 10 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-22 | Acc time of 11 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-23 | Dec time of 11 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-24 | Acc time of 12 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-25 | Dec time of 12 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-26 | Acc time of 13 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-27 | Dec time of 13 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-28 | Acc time of 14 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-29 | Dec time of 14 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-30 | Acc time of 15 th Step of Simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| PE-31 | Dec time of 15 th Step of simple PLC | 0.0s(h)~6553.5s(h) | 0.0s(h) | √ |
| Pd Group communication | | | | |
| Pd-00 | Communication baud rate | bit:MODBUS 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS Ten: Profibus-DP 0:115200BPs 1:208300BPs 2:256000BPs 3:512000Bps Hundred places: reserved | 6005 | √ |

| | | | | |
|--|--|--|-----|---|
| Pd-01 | MODBUS data format | 0: No parity (8-N-2) 1: Even check (8-E-1) 2: Odd parity (8-O-1) 3: No parity (8-N-1) (MODBUS active) | 0 | √ |
| Pd-02 | Local address | 0: Broadcast address 1~249 (MODBUS、Profibus-DP、CANlink enable) | 1 | √ |
| Pd-03 | MODBUS respond relay | 0~20ms (MODBUS enable) | 2 | √ |
| Pd-04 | Serial communication timeout | 0.0: Disable 0.1~60.0s (MODBUS, Profibus-DP, CANopen enable) | 0.0 | √ |
| PP Group Function code management | | | | |
| PP-00 | User password | 0~65535 | 0 | √ |
| PP-01 | Parameter initialization | 0: On operation 1: Restore parameters to factory setting except motor parameters 2: Clear record information | 0 | √ |
| PP-02 | Function parameter group display selection | Bit: U group monitoring parameters 0: Not displayed 1: Display Ten: Advanced parameters 0: Not displayed 1: display | 01 | × |
| PP-03 | Personality parameter group show selection | Bit: User custom parameter group display selection 0: Not displayed 1: Display Ten: User Change Parameter Group Display Selection 0: Not displayed 1: Display | 00 | √ |
| PP-04 | Function code modification attribute | 0: Enable modification 1: Not allow to modify | 0 | √ |
| PP-05 | Distributor unlock password | 0 - 65535 | | |
| PP-06 | Factory unlock password | 0 - 65535 | | |

Monitor parameters :

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|-------|------------------------|--------|
| U0-00 | Running frequency (Hz) | 0.01Hz |
| U0-01 | Setting frequency (Hz) | 0.01Hz |
| U0-02 | DC Bus voltage (V) | 0.1V |
| U0-03 | Output voltage (V) | 1V |
| U0-04 | Output current (A) | 0.01A |
| U0-05 | Output Power(KW) | 0.1KW |
| U0-06 | Output Torque (0.1%) | 0.1% |
| U0-07 | DI input status | 1 |
| U0-08 | DO output status | 1 |
| U0-09 | AI1 | 0.01V |

| | | |
|-------|-----------------------|--------|
| U0-10 | AI2 | 0.01V |
| U0-11 | KAI | 0.01V |
| U0-12 | Counter Value | 1 |
| U0-13 | Length Value | 1 |
| U0-14 | Load Speed | 1 |
| U0-15 | PID Reference | 1 |
| U0-16 | PID Feedback | 1 |
| U0-17 | PLC Step | 1 |
| U0-18 | Input pulse frequency | 0.01Hz |
| U0-19 | Speed feed back | 0.01Hz |

Chapter9. Troubleshooting and Countermeasures

The below table listed EM15 inverter all types of faults possibly occurs. Before contacting manufacturer for technical support, you can first determine the fault type through following table description and records your done treating process and phenomena. if the fault can not be resolved, please seek for the manufacturer service support.

Troubleshooting table

| Fault code | Display | Possible reason | Countermeasures |
|--|---------|---|---|
| Inverter unit protection | Err01 | 1, The inverter output circuit short circuit 2, the motor and inverter wiring is too long 3, the module overheating 4.The inverter wiring is loose 5, The circuit board abnormal 6, inverter module exception | 1, Excluding the external fault 2, Install the reactor or output filter 3, Check the air duct is blocked; 4, Plug all the cable 5, Seek technical support |
| Over current in acceleration | Err02 | 1, Motor to ground short circuit 2, Not perform auto tuning 3, The acceleration time is too short 4, Torque boost is not appropriate 5, The grid voltage is low 6, Loading suddenly in acceleration 7, The using Inverter capacity (rated power is small | 1, Excluding the external fault 2, Perform motor ID auto tuning 3, Increase the acceleration time 4, Adjust the torque boost or V / F curve 5, Adjust voltage of power supply to normal 6, Adjust the load 7, Select big power inverter instead |
| Over current in deceleration | Err03 | 1, Output short circuit or output to ground 2, No performance ID auto tuning for carrying vector control 3, The deceleration time is too short 4, The voltage is low 5, Loading suddenly when deceleration 6, No installing of brake unit and brake resistor | 1, Excluding the external fault 2, Perform motor ID auto tuning 3, Increase the acceleration time 4, Adjust voltage of power supply to normal 5, Cancel the suddenly adding load 6, Install braking unit or braking resistor |
| Over current in constant speed running | Err04 | 1, The inverter output short circuit or phase to ground 2, No performance ID auto tuning for carrying vector control 3, The voltage of grid is low 4, Whether there is a sudden load in running 5, The using Inverter capacity (rated power is small | 1, Excluding the external fault 2, Perform motor ID auto tuning 3, Cancel the sudden loading 4, Cancel the suddenly adding load 5. Select big power inverter instead |

| | | | |
|---------------------------------------|-------|---|--|
| Over voltage in acceleration | Err05 | 1, The input voltage is high 2, The acceleration process there is an external drag motor running 3, The acceleration time is too short 4, No brake unit and brake resistor | 1, Adjust voltage to the normal range Cancel the additional force or install braking resistor 3, Increase the acceleration time 4, Install the braking unit or braking resistor |
| Deceleration overvoltage | Err06 | 1, The input voltage is high 2, The process of deceleration there is an external drag motor running 3, Deceleration time is too short 4, No brake unit and brake resistor | 1, Adjust voltage to normal range 2, Cancel the additional force or install braking resistor 3, Increase acceleration time 4, Install the braking unit or braking resistor |
| Over voltage in constant speed | Err07 | 1, Input voltage is high 2, The process of deceleration there is an external drag motor running | 1. Increase voltage go normal range 2. Cancel external force or install braking resistor |
| Fault of control section power supply | Err08 | 1. Input voltage is out of limit | Adjust voltage to normal range |
| Under voltage fault | Err09 | 1, Instantaneous power failure 2, Input voltage is out of limit DC bus voltage is abnormal 4, rectifier bridge and buffer resistance is not normal | 1, Reset the fault 2, Adjust the voltage to the normal range 3, seek technical support |
| Inverter over load | Err10 | 1.. If load is too big, or motor is blocked or not 2. Using inverter capacity is too small | 1. Reduce the load and check the motor and machine condition 2. Select bigger one capacity of motor |
| Motor overload | Err11 | 1, The motor protection parameter P9-01 set is appropriate 2, The load is too large or motor is blocked 3, Using the power of inveter too small | 1. Set correct parameter 2. Reduce load or check motor and driving machine 3. Select bigger power inverter |
| Input phase loss | Err12 | 1, Three-phase input power is not normal 2, The driving board exception 3, Lightning board abnormalities 4, The main control board exception | 1, Check and eliminate the problems in the external lines 2, Seek technical support |
| Output phase loss | Err13 | 1, The inverter wiring is damaged 2, 3 phase output is not balance of inverter when motor running 3, Driving board is abnormal 4, Igbt model is abnormal | 1, Excluding the external fault 2, Check the motor three-phase winding is normal and troubleshooting 3, seek technical support |
| IGBT module is | Err14 | 1, The ambient temperature is too | 1, Reduce the ambient temperature |

| | | | |
|---------------------------------|-------|--|---|
| over heat | | high 2, Air duct blockage 3, The fan is damaged 4, IIGBT module thermistor is damage 5, The inverter module is damaged | 2, Clean up the duct 3, Replace the fan 4, Replace the thermistor 5, Replace the inverter module |
| External device fault | Err15 | 1, Through the multi-function terminal DI input external fault signal 2, Through the virtual IO function input external fault signal | 1, Reset 2, Reset |
| communication fail | Err16 | 1, The host computer is not working properly 2, The communication line is not normal 3, Communication parameters PD group settings are not correct | 1, Check the host computer wiring 2, Check the communication cable 3, Set the communication parameters correctly |
| Contactor failure | Err17 | 1, The driving board and power supply is not normal 2, Contactor is not normal | 1, Replace the drive board or power board 2, Replace the contactor |
| Current detection failure | Err18 | 1, Check the Hall device exception 2, The driving board exception | 1, Replace the Hall device 2, Replace the driver board |
| Motor tuning fault | Err19 | 1, The motor parameters are not set by nameplate 2, Parameter identification process timeout | Set motor parameters according to motor nameplate |
| Encoder fault | Err20 | 1, The encoder model does not match 2, The encoder connection error 3, The encoder is damaged 4, PG card exception | 1, Check the encoder parameters 2, Excluding line wiring failure 3, Replace the encoder 4, Replace the PG card |
| EEPROM read and write failures | Err21 | 1, EEPROM IC broken | 1, Replace the controller board |
| Inverter hardware failure | Err22 | 1, there is overvoltage 2, there is overcurrent | 1, trouble shooting as over voltage 2, trouble shooting as over current |
| Short to ground | Err23 | 1, Motor to ground short circuit | 1, Change motor cable or motor |
| The cumulative run time arrives | Err26 | 1, The cumulative run time is over the set the value | 1, Clear the record with parameters initialization |
| User Defined Fault 1 | Err27 | 1, User define fault signal 1 with multi-function terminals. 2, User define fault signal 1 with virtual IO function | 1, Reset 2, Reset |
| User Defined Fault 2 | Err28 | 1, User define fault signal 2 with multi-function terminals. | Reset Reset |

| | | | |
|--------------------------------------|-------|--|--|
| | | 2, User define fault signal 2 with virtual IO function | |
| The cumulative power up time arrives | Err26 | 1, The cumulative power up is over the set the value | 1, Clear the record with parameters initialization |
| Load missing | Err30 | 1, The running current of inveter less than P9-64 | Check the load condition |
| PID feedback loss | Err31 | 1, PID feedback value less than PA-26 | Check the PID feedback signal or set PA-26 value correct |
| wave by wave current limit fault | Err40 | 1, The load is too large 2, The inverter selection is too small | 1, Check the load 2, Zoom in the inverter power level; |
| Motor switchover fault | Err41 | 1, Change the current motor selection through the terminal during the inverter operation | Switch motor in stop mode of inverter |
| The speed deviation is too large | Err42 | 1, The encoder parameter setting is not correct 2, No perform motor auto tuning 3, The speed deviation is too large , P9-69, P9-60 setting is unreasonable | 1, Correct set encoder parameters 2, Motor auto tuning 3, Set correct value for P9-69, P9-60 per filed condition |

Note:

The EM12 inverter can able to record the three latest three fault code, fault information such as output frequency, current, voltage, DC voltage, input terminals status and output terminals status with P9-14 to P9-44. These information can help user resolve problem.

Appendix

5.1 Group b0 electro-hydraulic servo drive function parameters

| Code | Parameter Name | Description | Defult | Property |
|-------|------------------------|--|--------|----------|
| b0-00 | Hydraulic Mode | 0:Disabled (speed mode) 1:Individual pump/Master servo 2:Reserved 3:Muti-pump salve 4:Internal multi-funtion | 0 | ★ |
| b0-01 | Pressure command path | 0:Digital setting 1:AI1 2:AI2 3:AI3 4:485 communication 5:Can communication 6: Muti-stage pressure /Given flow | 1 | ★ |
| b0-02 | Flow command path | | 2 | ★ |
| b0-03 | Pressure feedback path | | 3 | ★ |

| | | | | |
|-------|----------------------------------|---|---------|---|
| b0-04 | Sensor type | 0: 0 - 10V 1: 4 - 20mA 2: 1.5V - 10V 3: 1.5V - 5V | 0 | ★ |
| b0-05 | Pressure sensor range | 0.0 - 500.0 kg/cm ² | 250.0 | ★ |
| b0-06 | System pressure | 0.0 - 500.0 kg/cm ² | 150.0 | ★ |
| b0-07 | Flow standard speed | 1 - 9999rpm | 2000rpm | ★ |
| b0-09 | Bottom pressure | 0.0 - 500.0 kg/cm ² 0.0% - 100.0% | 3.0kg | ★ |
| b0-10 | Bottom flow | 0 - b0-07 0.0% - 100.0% | 30rpm | ★ |
| b0-11 | Off pressure reverse speed | 0 - b0-07 0.0% - 100.0% | 200rpm | ☆ |
| b0-13 | Pressure command digital setting | 0.0 - 500.0 kg/cm ² 0.0% - 100.0% | 30.0kg | ☆ |
| b0-14 | Flow command digital setting | 0 - b0-07 0.0% - 100.0% | 1000rpm | ☆ |
| b0-15 | Detection time of Sensor break | 0.00 - 10.00sec | 0.00sec | ☆ |
| b0-16 | Pressure command rise time | 0 - 5000ms | 100ms | ☆ |
| b0-17 | Pressure command fall time | 0 - 5000ms | 20ms | ☆ |
| b0-18 | Flow command rise time | 0 - 5000ms | 100ms | ☆ |
| b0-19 | Flow command fall time | 0 - 5000ms | 20ms | ☆ |
| b0-21 | Pressure PID1 gain Kp | 0 - 999.9% | 100.0% | ☆ |
| b0-22 | Pressure PID1 integral Ti | 0 - 999.9ms | 30.0ms | ☆ |
| b0-23 | Pressure PID1 differential Td | 0 - 999.9ms | 0.0ms | ☆ |
| b0-24 | Overshoot detection 1 | 0 - 999.9% | 3.0% | ☆ |
| b0-25 | Overshoot suppression 1 | 0.0 - 10.0 | 3.0 | ☆ |
| b0-26 | Pressure PID2 gain Kp | 0 - 999.9% | 100.0% | ☆ |
| b0-27 | Pressure PID2 integral Ti | 0 - 999.9ms | 30.0ms | ☆ |
| b0-28 | Pressure PID2 differential Td | 0 - 999.9ms | 0.0ms | ☆ |
| b0-29 | Overshoot detection 2 | 0 - 999.9% | 3.0% | ☆ |
| b0-30 | Overshoot suppression 2 | 0.0 - 10.0 | 3.0 | ☆ |
| b0-31 | Pressure PID3 gain Kp | 0 - 999.9% | 100.0% | ☆ |
| b0-32 | Pressure PID3 integral Ti | 0 - 999.9ms | 30.0ms | ☆ |
| b0-33 | Pressure PID3 differential Td | 0 - 999.9ms | 0.0ms | ☆ |
| b0-34 | Overshoot detection 3 | 0 - 999.9% | 3.0% | ☆ |
| b0-35 | Overshoot suppression 3 | 0.0 - 10.0 | 3.0 | ☆ |
| b0-36 | Pressure PID4 gain Kp | 0 - 999.9% | 100.0% | ☆ |
| b0-37 | Pressure PID4 integral Ti | 0 - 999.9ms | 30.0ms | ☆ |
| b0-38 | Pressure PID4 differential Td | 0 - 999.9ms | 0.0ms | ☆ |
| b0-39 | Overshoot detection 4 | 0 - 999.9% | 3.0% | ☆ |
| b0-40 | Overshoot suppression 4 | 0.0 - 10.0 | 3.0 | ☆ |
| b0-41 | Pressure PID selection | 0: PIDsegmentation switching 1: Terminals selectrion 2: PID1 3: PID2 4: PID3 5: PID4 | 0 | ☆ |
| b0-42 | PID1/PID2 Switching point | 0.10% | 0.00% | ☆ |

| | | | | |
|-------|----------------------------------|---|-------|---|
| b0-43 | PID2/PID3 Switching point | 0.10% | 0.00% | ☆ |
| b0-44 | PID3/PID4 Switching point | 0.10% | 0.00% | ☆ |
| b0-46 | Master-slave communication mode | 0:Disable 1:CAN communication 2:485 communication | 0 | ☆ |
| b0-47 | Slave servo switching low speed | 0 - 1000rpm | 0 | ☆ |
| b0-48 | Slave servo switching high speed | 0 - 1000rpm | 0 | ☆ |
| b0-49 | Slave servo start/stop command | 0:Master servo given 1:Terminal given | 0 | ☆ |

5.2 Group b1 Pressure setting parameters

| Code | Name | Description | Default | Propetry |
|-------|--|--|---------------|----------|
| b1-00 | Multi-stage pressure 1 | 0.0 - b0-06 0.0 - 100.0% | 0.1kg 0.1% | ☆ |
| b1-01 | Multi-stage flow 1 | 0.0 - 100.0% | 0.1% | ☆ |
| b1-02 | Multi-stage pressure 2 | 0.0 - b0-06 0.0 - 100.0% | 0.1kg 0.1% | ☆ |
| b1-03 | Multi-stage flow 2 | 0.0 - 100.0% | 0.1% | ☆ |
| b1-04 | Multi-stage pressure 3 | 0.0 - b0-06 0.0 - 100.0% | 0.1kg 0.1% | ☆ |
| b1-05 | Multi-stage flow 3 | 0.0 - 100.0% | 0.1% | ☆ |
| b1-06 | Multi-stage flow 4 | 0.0 - b0-06 0.0 - 100.0% | 0.1kg 0.1% | ☆ |
| b1-07 | Multi-stage flow4 | 0.0 - 100.0% | 0.1% | ☆ |
| b1-08 | Multi-stage flow 5 | 0.0 - b0-06 0.0 - 100.0% | 0.1kg 0.1% | ☆ |
| b1-09 | Multi-stage flow 5 | 0.0 - 100.0% | 0.1% | ☆ |
| b1-10 | Multi-stage flow 6 | 0.0 - b0-06 0.0 - 100.0% | 0.1kg 0.1% | ☆ |
| b1-11 | Multi-stage flow 6 | 0.0 - 100.0% | 0.1% | ☆ |
| b1-12 | Multi-stage flow 7 | 0.0 - b0-06 0.0 - 100.0% | 0.1kg 0.1% | ☆ |
| b1-13 | Multi-stage flow 7 | 0.0 - 100.0% | 0.1% | ☆ |
| b1-14 | Multi-stage flow 8 | 0.0 - b0-06 0.0 - 100.0% | 0.1kg 0.1% | ☆ |
| b1-15 | Multi-stage flow 8 | 0.0 - 100.0% | 0.1% | ☆ |
| b1-16 | Given method 1 of multi-stage pressure command | 0: b1-00 1: AI1 2: AI2 3: AI3 4: RS485 communication 5: Can communication | 0 | ★ |
| b1-17 | Given method 1 of multi-stage flow command | 0: b1-01 1: AI1 2: AI2 3: AI3 4: RS485 communication 5: Can communication | 0 | ★ |

| | | | | |
|-------|--------------------------------------|---|-------|---|
| b1-20 | Pressure arrival detection source | 0:b1-21 setting (unit is determined by b0-08) 1:AI1 2:AI2 3: AI3 | 0 | ☆ |
| b1-21 | Pressure arrival detection source | 0.0 - b0-06 | 100.0 | ☆ |
| b1-22 | Pressure arrival detection source | 0 - 9999ms | 0ms | ☆ |