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of motor control



ESD2

VARIABLE SPEED DRIVES USER MANUALS

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PREFACE

First of all, thank you for purchasing ESD2 series frequency converters of our company!

ESD2 series frequency converter is a simple and smart frequency converter, which can control AC asynchronous motor by V/F, and is suitable for simple places such as assembly line and fan. This manual introduces the configuration function and usage of ESD2 series frequency converters.

Please understand the safety precautions before using this product. When using it for the first time (installation, operation, maintenance, inspection, etc.)

Please read this manual before series frequency converters. Equipment supporting manufacturers please send this manual to the end user along with it for subsequent reference.

Notes:

- In order to illustrate the details of the product, the legends in this manual sometimes show the state of removing the housing or safety cover.
- When using this product, please be sure to install the shell or cover as required, and operate according to the instructions.
- The legend in this instruction manual is for illustration only and may differ from the product you ordered.
- Due to product upgrade or specification change, and in order to improve the convenience and accuracy of the manual, the contents of this manual will be changed in time.
- If you need to order the instruction manual due to damage or loss, please contact our regional agents or contact our customer service center directly

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Chapter 1 Introduction of Frequency Conversion

1.1 Name of each part of frequency converter

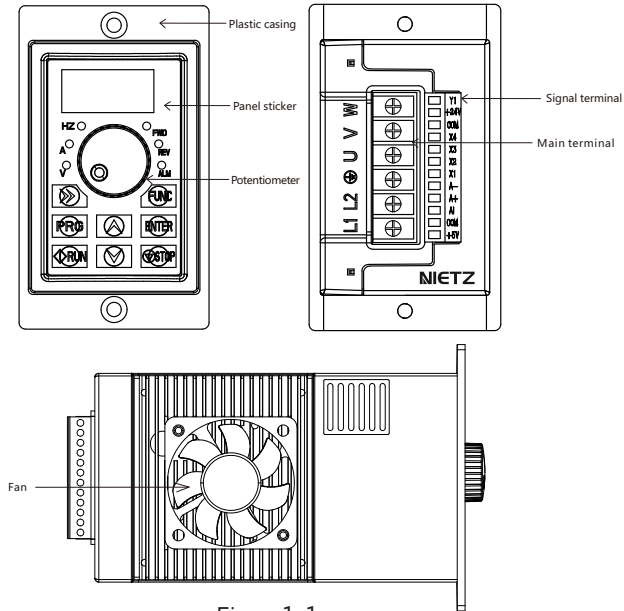


Figure 1-1

Table 1-1 Frequency Converter Model and Technical Data

| Inverter Model | Power supply capacity KVA | Input Current A | Output Current A | Adaptive motor KW |
|---|------------------------------|--------------------|---------------------|----------------------|
| Single phase power supply : 200~240VAC , 50/60Hz | | | | |
| ESD2-0R2G1; 0.2kw | 3.0 | 2.3 | 1.6 | 0.2 |
| ESD2-0R4G1; 0.4kw | 3.8 | 3.2 | 2.1 | 0.4 |
| ESD2-0R7G1; 0.75kw | 5.6 | 4.0 | 3.7 | 0.75 |
| ESD2-1R1G1; 1.1kw | 9.9 | 8.3 | 5.5 | 1.1 |

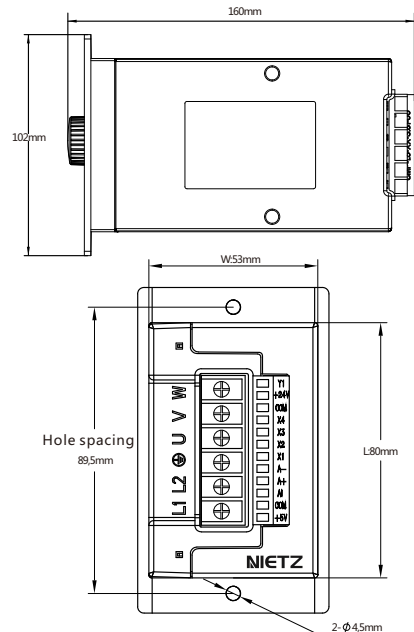
1.2 Inverter Model and Technical Data

ESD2 series frequency converter has convenient speed regulation, good hand feeling of potentiometer knob, optimized structure, forced air cooling, strong electromagnetic compatibility, complete parameter functions, instrument installation, external operation panel, large low frequency torque, optimized P W M complete protection function and fast response.

1.3 Technical Features of Frequency Converter

- The output frequency range is 0-300 Hz;
- The operation panel has its own speed regulating potentiometer;
- Built-in P I D regulator can realize closed-loop regulation;
- Built-in P I D regulator can realize closed-loop regulation;
- Multifunctional open collector output;
- Support analog input 0-5 V ;
- The V/F curve function can be set arbitrarily to meet the requirements of special occasions;
- Use the Shift key to view real-time parameters,
- Adopt a new generation I P M module with complete protection functions;

1.4 Installation Dimensions of Frequency Converter



Chapter 2 Description of Control Loop

2.1 Control Loop Wiring Diagram

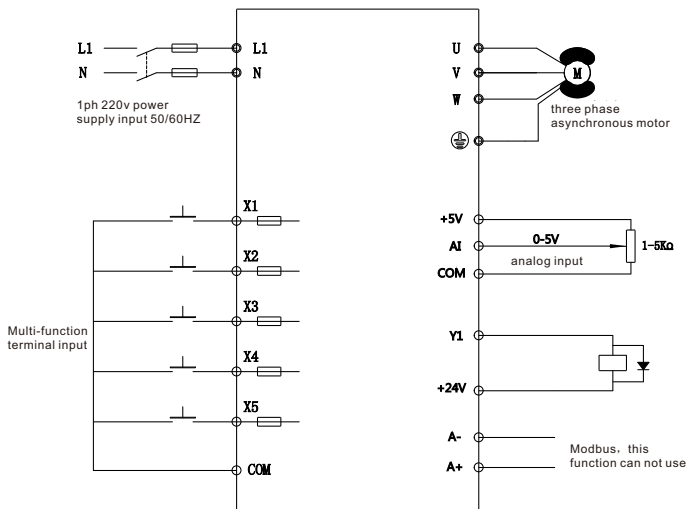


Figure2-1

Table 2-1 Inverter Main Circuit Description

| Terminal marking | Name | Description |
|------------------|---------------------------------|---|
| L1, N | Single-phase power supply input | Single phase 2 2 0 VAC power connection point |
| U, V, W | Frequency converter output | Connect three-phase AC motor |
| | Grounding terminal | Grounding terminal |

2.2 Control Terminals and Function Description

Table2-1 -2 Control Loop Terminal Description

| Category | Terminal Symbol | Function Description | Specifications |
|-------------------------|-----------------|--|---|
| Power interface | + 24 V | +24 V Digital signal input terminal power supply | Maximum output 100mA |
| | + 5 V | + 5V Analog Input Terminal Power Supply | Maximum output 20mA |
| | COM | Analog, Digital, + 5V and + 24V Ground Reference | Analog quantity and digital quantity share land |
| Analog Input | AI | AI only receives voltage quantity input (reference ground: COM) | INPUT, input voltage range: 0 ~ 5V |
| Multifunction Input | X1 | X (X1, X2, X3, X4, X5) to COM Active when intermittent shorting (Common side: COM) | INPUT, 0-10V level signal, Active low, 5mA. |
| | X2 | | |
| | X3 | | |
| | X4 | | |
| | X5 | | |
| Digital Output | Y1 | Multifunctional programmable open collector output, programmable The process is defined as a switching value output terminal with multiple functions, Common side: COM | OUTPUT, maximum load current No more than 50mA. |
| Communication Interface | A + | Rs485 Signal + Terminal | Standard Rs485 communication interface |
| | A - | Rs485 Signal-Terminal | |

2.3 Terminal Screen Printing

2.3.1 Screen printing of external control terminals

| | | | | | | | | | | | |
|-----|-----|----|----|----|----|----|----|----|-----|------|----|
| +5V | COM | AI | A+ | A- | X1 | X2 | X3 | X4 | COM | +24V | Y1 |
|-----|-----|----|----|----|----|----|----|----|-----|------|----|

2.3.2 Screen printing of power board terminals

| | | | | | |
|----|----|---|---|---|---|
| L1 | L2 | G | U | V | W |
|----|----|---|---|---|---|

Chapter 3 Key Description

3.1 Introduction to Operation and Display Interface

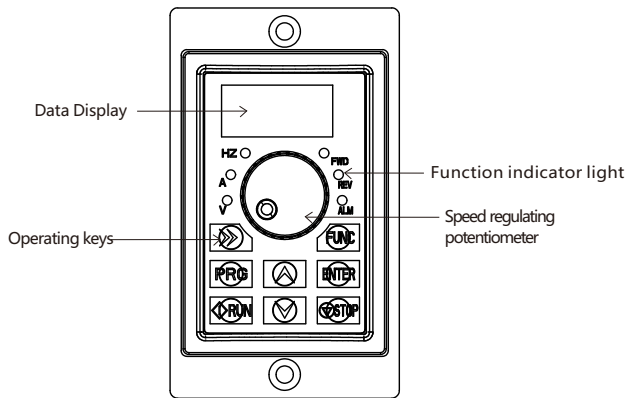


图3-1

3.2 Description of Function Indicator

Table 3-1 indicator function list

| Name | escription | |
|----------------------|--|---|
| Status indicator | FWD | Forward rotation operation indicator The light is on to indicate that the frequency converter is in a forward running state |
| | REV | Reverse running indicator The light is on to indicate that the frequency converter is in reverse operation |
| | ALM | Fault indicator lamp When the frequency converter is in a fault state, the lamp lights up and goes out in a normal state |
| Unit indicator | Hz | Frequency unit |
| | A | Unit of current |
| | V | Voltage unit |
| Digital tube display | 8Paragraph4BitsLEDDisplay, display frequency, current, voltage and other information | |
| Analog potentiometer | Panel potentiometer regulates frequency | |

3.3 Key Function Description

Table 3-1 Key Function Description

| Name | Description |
|-------|--|
| PRG | Function Settings Enter Key, Exit Key |
| FUNC | Ink key |
| ENTER | Setting Parameter Confirmation |
|)) | Under the shutdown display interface and the operation display interface, you can move right to cycle and select display parameters; When modifying parameters, You can select the modification bit of the parameter |
| △ | Up key, data setting up key |
| ▽ | Down key, data setting down key |
| RUN | In keyboard operation mode, used for patrol operation |
| STOP | When running, this key can be used to stop the running operation; In case of fault alarm state, the control mode can be used in many control modes Press the key to reset the operation |

Chapter 4 Function Parameter Table

The symbols in the menu are described as follows

- × : Indicates the parameter that can be modified in any state;
- : Indicates the parameter that cannot be modified in the running state;
- ◆ : Indicates that the parameter is actually detected and cannot be modified;
- ◇ : Indicates that the parameter is "Manufacturer Parameter" and can only be modified by the manufacturer. Modification is prohibited by the user.

| Function Code | Name | Content | Set Range | Factory Settings | Change |
|---|-----------------------------------|--|---|------------------|--------|
| F 0 Group-Basic Operating Parameters | | | | | |
| F0.00 | Motor control mode | 0: vector control 1: Reserved 2: V/F Control Note: This parameter cannot be initialized please modify it manually | 0 ~ 2 | 2 | × |
| F0.01 | Command Source Selection | 0: Operation Panel Run Command Channel 1: Terminal Operation Command Channel 2: communication run command channel | 0 ~ 2 | 0 | ○ |
| F0.02 | Main Frequency Source X Selection | 0: given number 1 (preset frequency F0.03, operation panel key ▲, ▼ can be modified) 1: The number is given 2 (preset frequency F0.03, terminal UP/DOWN can be modified) 2: AI1 analog (0 ~ 20mA/0 ~ 5V) 3: Reservation 4: panel potentiometer 5: Reserved 6: Multi-speed 7: Reserved 8: PID 9: given communication | 0 ~ 9 | 4 | ○ |
| F0.03 | Preset frequency | The set value is a given initial value of the frequency number | 0.00 ~ upper limit frequency | 50.00 | ○ |
| F0.04 | Running direction | 0: In the same direction 1: Opposite direction | 0 ~ 1 | 0 | × |
| F0.05 | Maximum Frequency | The maximum output frequency is the highest frequency allowed by the frequency converter and is the reference for acceleration and deceleration setting. | MAX { 50.00, F0.06 } ~ 300.0 } | 50 | × |
| F0.06 | Upper limit frequency | The operating frequency cannot exceed this frequency | Lower limit frequency "F0.07" ~ Maximum frequency "F0.05" | 50.00 | × |
| F0.07 | Lower limit frequency | The operating frequency cannot be lower than this frequency | 0.00 ~ upper limit frequency "F0.06" | 0.00 | × |

| Function Code | Name | Content | Set Range | Factory Settings | Change |
|---|---|--|--|------------------|---------------|
| F0.08 | Carrier frequency | For occasions requiring silent operation, appropriate mention can be made The high carrier frequency meets the requirements, but the carrier frequency is increased The rate will increase the calorific value of the frequency converter. | 2.0 ~ 16.0KHz 0.05 ~ 4.0KW 6.0KHz 5.5 ~ 11.0KW 4.5KHz 15.0 ~ 30.0KW 3.0KHz | Model Setting | ○ |
| F0.09 | Acceleration time | The frequency converter accelerates from zero frequency to the maximum output frequency Take time | 0.1 ~ 6000.0S 0.05 ~ 4.0KW 7.5S 5.5 ~ 11.0KW 15.0S 15.0 ~ 30.0KW 30.0S | Model Setting | ○ |
| F0.10 | Deceleration time | The frequency converter decelerates from the maximum output frequency to the zero frequency station Take time | 0.1 ~ 6000.0S 0.05 ~ 4.0KW 7.5S 5.5 ~ 11.0KW 15.0S 15.0 ~ 30.0KW 30.0S | Model Setting | ○ |
| F0.11 | Runtime frequency instruction UP/DOWN Benchmark | 0: Operating Frequency 1: Set Frequency | 0 ~ 1 | 0 | × |
| F 1 Group-Motor Parameters | | | | | |
| F1.00 | Motor rated power | Setting motor parameters | 0.05 ~ 99.99KW | Model Setting | × |
| F1.01 | Rated voltage of motor | | 0 ~ 999V | Model Setting | × |
| F1.02 | Motor rated current | | 0.1 ~ 600.00A | Model Setting | × |
| F1.03 | Motor rated frequency | | 0.01Hz ~ maximum frequency | 50.00 | × |
| F1.04 | Rated speed of motor | | 0 ~ 60000RFM | Model Setting | × |
| F1.05 | Stator resistance of asynchronous motor | | Setting stator resistance of asynchronous motor | 0.001 ~ 20.000Ω | Model Setting |
| F1.06 | No-load current of asynchronous motor | Setting no-load current of asynchronous motor | 0.1 ~ rated current of motor | Model Setting | × |
| F 2 Group Auxiliary Operation Parameters | | | | | |
| F2.00 | Inching operation frequency setting | Set inching forward rotation operating frequency | 0.00 ~ upper limit frequency | 10.00 | ○ |
| F2.01 | Inching acceleration time setting | Set inching acceleration time | 0.1 ~ 6000.0S 0.05 ~ 4.0KW 7.5S 5.5 ~ 11.0KW 15.0S 15.0 ~ 30.0KW 30.0S | Model Setting | ○ |
| F2.02 | Setting of inching deceleration time | Set inching deceleration time | 0.1 ~ 6000.0S 0.05 ~ 4.0KW 7.5S 5.5 ~ 11.0KW 15.0S 15.0 ~ 30.0KW 30.0S | Model Setting | ○ |
| F2.03 | Shutdown mode | 0: Slow down and stop 1: Free shutdown | 0 ~ 1 | 0 | × |
| F2.04 | Start frequency of shutdown DC braking | | 0.00 ~ upper limit frequency | 0.00 | ○ |
| F2.05 | Stop DC Braking Waiting Time | | 0.0 ~ 6000.0s | 0.0 | ○ |
| F2.06 | Stop DC brake voltage | | 0.0 ~ 50.0% * motorRated voltage | 0.0 | ○ |
| F2.07 | Stop DC braking time | | 0.0 ~ 100.0s | 0.0% | ○ |

| Function Code | Name | Content | Set Range | Factory Settings | Change |
|---------------|--|---|--|------------------|--------|
| F2.08 | Hopping frequency | Set hopping frequency, hopping frequency range | 0.00~Upper limit frequency | 0.00 | ○ |
| F2.09 | Hop frequency range | | 0.00~Upper limit frequency | 0.00 | ○ |
| F2.10 | Torque lift setting | The amount of manual torque increase, which is set relative to the Percentage of motor rated voltage. | 0.0~30.0% | Model Settings | × |
| F2.11 | Torque lift cutoff frequency | 0.00~Motor rated frequency.. | 0.00~Motor rated frequency.. | 15.00 | × |
| F2.12 | The set frequency is below the lower limit frequency 0: Zero frequency operation 1: Shutdown | 0: Operate at the lower frequency limit 1: Zero frequency operation 2: Shutdown | 0~2 | 0 | × |
| F2.13 | FDTHorizontal Setting | | 0.00 Hz~Upper limit frequency | 10.00 | ○ |
| F2.14 | FDTHysteresis value | | 0.00 Hz~Upper limit frequency | 1.00 | ○ |
| F2.15 | Frequency arrival FARDetectionWidth | Positive and negative detection width of output frequency at set frequency (terminal and Terminal Output Valid Signal (Low level)). | 0.00~Upper limit frequency | 5.00 | ○ |
| F2.16 | Multi-speed frequency 0 | Set multi-speed frequency 0 | ~Upper limit frequency ~ up Limited frequency | 5.00 | ○ |
| F2.17 | Multi-speed frequency 1 | Set multi-speed frequency 1 | ~Upper limit frequency ~ up Limited frequency | 10.00 | ○ |
| F2.18 | Multi-speed frequency 2 | Set multi-speed frequency 2 | ~Upper limit frequency ~ up Limited frequency | 15.00 | ○ |
| F2.19 | Multi-speed frequency 3 | Set multi-speed frequency 3 | ~Upper limit frequency ~ up Limited frequency | 20.00 | ○ |
| F2.20 | Multi-speed frequency 4 | Set multi-speed frequency 4 | ~Upper limit frequency ~ up Limited frequency | 25.00 | ○ |
| F2.21 | Multi-speed frequency 5 | Set multi-speed frequency 5 | ~Upper limit frequency ~ up Limited frequency | 37.50 | ○ |
| F2.22 | Multi-speed frequency 6 | Set multi-speed frequency 6 | ~Upper limit frequency ~ up Limited frequency | 50.00 | ○ |
| F2.23 | Multi-speed frequency 7 | Set multi-speed frequency 7 | ~Upper limit frequency ~ up Limited frequency | 0.00 | ○ |
| F2.24 | Operation Monitoring Parameter Item Selection | By changing the setting value of the function code, it can be changed Monitoring items in the main monitoring interface, such as setting4, i.e., select the output currentID-04The default display item n the main monitoring interface is the current output current value | 0~31 | 0 | ○ |
| F2.25 | Shutdown Monitoring Parameter Item Selection | | 0~31 | 1 | ○ |
| F2.26 | Display Mode | LED Bits: Adjust the frequency, PID Display selection for given amount 0: Display frequency, PID Quantity given 1: Show only status monitoring parameters LED Ten: Reserved LED Hundred: Reserved LED Thousands: Reserved | 0-0001H | 0 | ○ |
| F2.27 | Oscillation suppression selection | 0: Invalid 1: Effective | 0~1 | 0 | ○ |

| Function Code | Name | Content | Set Range | Factory Settings | Change |
|---|-------------------------------------|--|-----------|------------------|--------|
| F2.28 | Oscillation suppression coefficient | In case of motor oscillation, set F2.28 to select effective, turn on the oscillation suppression function, and then adjust by setting the oscillation suppression coefficient. Generally, The oscillation amplitude is large, and the oscillation suppression coefficient is increased by F2.29 | 0~1000 | 100 | ○ |
| F2.29 | Cooling Fan Control | 0: Automatic control mode 1: The power-on process runs all the time 2: Fan action with temperature higher than 50 °CThe fan does not operate below 45 °C. | 0~2 | 0 | ○ |
| F2.30 | PWM Mode Selection | 0: full frequency seven segments 1: Full-frequency five-band 2: 7 to 5 | 0~2 | 0 | × |
| F2.31 | AVR Functions | 0: Invalid 1: The whole process is effective 2: Invalid only when decelerating | 0~2 | 2 | × |
| F2.32 | Parameter Initialization | 0: No action 1: All user parameters are restored to factory settings 2: clear fault record | 0~2 | 0 | × |
| F Group 3-Input/Output Terminals | | | | | |
| F3.00 | Input Terminal X1 Function | 0: The control end is idle 1: Forward Rotation Control (FWD) 2: Inversion Control (REV) 3: Three-wire operation control 4: Forward rotation inching control 5: Reverse inching control 6: frequency increment instruction (UP) 7: Frequency Decrease Command (DOWN) 8: Free shutdown control 9: External Reset Signal Input (RST) 10: Reserved 11: External Fault Normally Open Input : Multi-speed selection S1 : multi-speed selection S2 : multi-speed selection S3 15-17: retain : frequency source switch 19: UP/DOWN frequency clear 20: run command channel force to terminal 21: Acceleration and deceleration are prohibited 22: to 47: retain 48: external shutdown signal input (STOP) 49: Stop DC Brake Command 50: Reserved 51: run command channel force to communication 52-61: retain | 0~51 | 1 | × |
| F3-01 | Input Terminal X2 Function | | 0~51 | 2 | × |
| F3.02 | Input Terminal X3 Function | | 0~51 | 0 | × |
| F3.03 | Input Terminal X3 Function | | 0~51 | 0 | × |
| F3.04~F3.05 | Reservation | — | — | — | ◆ |
| F3.06 | FWD/REV Terminal Control Mode | 0: 2-wire control mode 1 1: 2-wire control mode 2 2: 3-wire control mode 1 3: 3-wire control mode 2 | 0~3 | 0 | × |

| Function Code | Name | Content | Set Range | Factory Settings | Change |
|---------------|--|---|--------------------------------|------------------|--------|
| F3.07 | Terminal function detection selection at power-up | 0: Terminal Run command invalid on power-up 1: Terminal Run Command Valid on Power-on | 0 ~ 1 | 0 | ○ |
| F3.08 | UP/DOWN Terminal Frequency Modification Rate | This function code is to set the frequency modification rate when the UP/DOWN terminal sets the frequency, that is, the UP/DOWN terminal is shorted to the COM terminal by 1T The magnitude of the frequency change in seconds. | 0.01 ~ 50.00Hz/S | 1.00 | ○ |
| F3.09 | Input Terminal Valid Logic Setting (X1-X4) | LED bits: X1 logic select LED ten bits: X2 logic select LED hundred bits: X3 logic select LED thousand bits: X4 logic select 0 indicates positive logic, i.e. the connection between the Xi terminal and the common terminal is valid, and the disconnection is invalid. 1: Indicates inverse logic, that is, the communication between the Xi terminal and the common terminal is invalid, and the disconnection is valid | 0000 ~ 1111 | 0 | ○ |
| F3.10 | Reservation | — | — | — | ◆ |
| F3.11 | Ai1 Input Lower Limit | Set Ai1 Lower Limit | 0.00V/0.00mA~ 5.00V/20.00mA | 0.00 | ○ |
| F3.12 | Ai1 Lower Limit Corresponding Setting | The lower limit of Ai1 is set to correspond to the setting, which corresponds to Percentage of upper limit frequency | -100.0%~100.0% | 0.0% | ○ |
| F3.13 | Ai1 Input Upper Limit | Set Ai1 upper limit | 0.00V/0.00mA~ 5.00V/20.00mA | 5.00 | ○ |
| F3.14 | Ai1 Upper Limit Corresponding Setting | Set the Ai1 upper limit corresponding setting, which corresponds to Percentage of upper limit frequency | -100.0%~100.0% | 100.0% | ○ |
| F3.15 | Ai1 Analog Input Signal Filtering/Wave time constant | This parameter is used where the Ai1 input signal is filtered Reason, in order to eliminate the influence of interference. | 0.1~5.0s | 0.1s | ○ |
| F3.16 ~ F3.20 | Reservation | — | — | — | ◆ |
| F3.21 | Open Collector Output Terminal Y Setting | 0: Idle 1: Frequency converter in operation 2: Frequency Converter Fault 3: Frequency/Speed Level Detection Signal (FDT) 4: Frequency/Speed Arrival Signal (FAR) 5: The frequency converter is running at zero speed 6: Frequency converter overload pre-alarm 7: The frequency converter is ready for operation 8: Output frequency reaches upper limit 9: Output frequency reaches lower limit 10: Communication Settings 11: Alarm Output (Continue) 12: external failure shutdown 12 to 18: retain | 0 ~ 18 | 2 | × |
| F3.22 | Reservation | — | — | — | ◆ |
| F3.23 | Reservation | — | — | — | ◆ |
| F3.24 | Y Output Delay Time | Delay from the change of the state of the switching value output terminal Y to the change of the output | 0.0 ~ 255.0s | 0.0 | × |
| F3.25 | Y OFF Delay Time | — | 0.0 ~ 255.0s | 0.0 | × |
| F3.16 ~ F3.20 | Reservation | — | — | — | ◆ |

| Function Code | Name | Content | Set Range | Factory Settings | Change |
|---|---|---|----------------------|------------------|--------|
| F 4 Group-Protection Parameters | | | | | |
| F4.00 | Voltage limiting factor | This parameter is used to adjust the ability of the frequency converter to suppress overvoltage during deceleration. Encountered the motor coefficient setting 101 with large inertia | 0: off, 1 to 101 | 20 | × |
| F4.01 | Overvoltage limit level | The overvoltage limit level defines the time of overvoltage stall protection Operating voltage of | 350 ~ 600/400 ~ 850V | 370/700V | × |
| F4.02 | Accelerating current limiting coefficient | This parameter is used to adjust the frequency converter during acceleration Ability to suppress overcurrent | 0: off, 1-100 | 20 | × |
| F4.03 | Accelerating current clipping level | The current limiting level defines the current threshold for automatic current limiting, and its set value is the percentage relative to the rated current of the frequency converter. | 50% ~ 250% | 160% | × |
| F4.04 | Fault automatic reset times | When the number of obstacle resets is set to 0, there is no automatic reset function, only manual reset, and 10 means that the number of times is not limited, i.e. countless times. | 0 ~ 10 | 0 | × |
| F4.05 | Automatic fault reset interval Time | Set Automatic Failure Reset Interval | 0.5 ~ 25.0s | 3.0s | × |
| F4.06 | Output phase-out protection coefficient | Setting Input Phase Default Protection Factor | 0.0 ~ 20.00 | 10.00 | ○ |
| F4.07 | Constant speed current limiting coefficient | This parameter is used to adjust the ability of frequency converter to suppress overcurrent in constant speed process. | 0 : off , 1 ~ 5000 | 0 | × |
| F4.08 | Undervoltage protection level | This function code specifies the allowable lower limit voltage of DC bus when the frequency converter works normally. | 50 ~ 280/50 ~ 480V | 180/360V | × |
| F4.09 | Overload pre-alarm level of frequency converter | The current threshold of overload pre-alarm action of frequency converter is set as a percentage relative to the rated current of frequency converter. | 0 ~ 150% | 0 ~ 150% | ○ |
| F4.10 | Overload Prealarm Delay of Frequency Converter | The delay time between the output current of the frequency converter continuously exceeding the amplitude of the overload pre-alarm level (F4.09) and the output of the overload pre-alarm signal. | 0.0 ~ 15.0s | 5.0s | × |
| Group F 5-PID control parameters | | | | | |
| F5.00 | PID given quantity input channel | 0: given by number The PID assign amount is given by a number and set by that function code F5.01 1: Ai1 2-6: retain 7: given pressure (MPa, Kg) 8: panel potentiometer | 0 ~ 8 | 7 | ○ |
| F5.01 | Set a given number | Use the operating keyboard to set the given amount of PID control. This function is valid only when the PID given channel selection number is given (F5.00 is 0 or 8). If F5.00 is 8, use as pressure Given the force, this parameter is consistent with the unit of F5.04. | 0.0 ~ 100.0% | 50.0% | ○ |
| F5.02 | PID Feedback Input Channel | 0 Ai1 1: Reserved | 0 ~ 1 | 0 | ○ |

| Function Code | Name | Content | Set Range | Factory Settings | Change |
|--|---------------------------------|---|--------------------------------|------------------|--------|
| F5.03 | PIDRegulation characteristic | 0: Positive effect When the feedback signal is greater thanPIDThe given quantity and requirement of Inverter Output Frequency Decreases (i. e., reduce that feedback signal). 1: Negative effects When the feedback signal is greater than PIDThe given quantity and requirement of Inverter Output Frequency Rise (i. e., reduce that feedback signal). | 0 ~ 1 | 0 | ○ |
| F5.04 | Sensor range | 0.0 ~ 6000.0 (MPa, Kg) | 0.0 ~ 6000.0 (MPa, Kg) | 10.0 | ○ |
| F5.05 | Proportional gainKp1 | PIDThe speed of adjustment is increased by proportion The two parameters of benefit and integration time should be set to For fast adjustment speed, it is necessary to increase proportional gain and decrease Small integration time requires slow adjustment speed and needs to be reduced Small proportional gain increases integration time. General sentiment In this case, the differential time is not set. | 0.01 ~ 10.00 | 2.00 | ○ |
| F5.06 | Integration timeTi1 | | 0.00 ~ 10.00s | 0.10s | ○ |
| F5.07 | PIDSleep selection | 0: Invalid 1: Normal sleep This method needs to be setF5.08~F5.11Such as specific Parameters. | 0 ~ 1 | 1 | ○ |
| F5.08 | Sleep threshold coefficient | If the actual feedback value is greater than the set value, and And the frequency output by the frequency converter reaches the lower limit frequency When the frequency converter passes byF5.10Defined After delaying the waiting time, enter the sleep state (i.e. running at zero speed); The value isPID Percentage of the setpoint. | 0.0 ~ 150.0% | 100.0% | ○ |
| F5.09 | Allen Su threshold coefficient | If the actual feedback value is less than the set value Inverter PassF5.11After the defined delay waiting time, get out of sleep and start working; The value isPIDPercentage of the setpoint | 0.0 ~ 150.0% | 90.0% | ○ |
| F5.10 | Sleep delay time | Set sleep delay time | 0.0 ~ 6000.0s | 100.0s | ○ |
| F5.11 | Allen Su delay time | Set awakening delay time | 0.0 ~ 6000.0s | 1.0s | ○ |
| F5.12 | PIDSleep frequency | SettingsPIDSleep frequency | 0.00 Hz~ Upper limit frequency | 20.00 | × |
| F5.13 | PIDPressure given | F5.00~7Time asPIDSetting quantity | 0 ~ 10.0 | 5.0 | ○ |
| F 6Group-R S 4 8 5 Communication Parameters | | | | | |
| F6.00 | Protocol Selection | 0: CompatibleMD380Agreement 1: Compatible with DeltaMAgreement | 0 ~ 1 | 1 | ○ |
| F6.01 | Communication baud rate setting | 0~4:Reservation 5:9600BPS 6: Reserved7: Reserved | 0 ~ 7 | 5 | × |
| F6.02 | Data Format | 0: No verification (N,8,2)For RTU 1: even check (E,8,1)For RTU 2: odd check (O,8,1)For RTU | 0 ~ 2 | 0 | × |
| F6.03 | Local Address | Set the local address 0Is the broadcast address | 0 ~ 247 | 1 | × |

| Function Code | Name | Content | Set Range | Factory Settings | Change |
|---------------|--------------------------------------|---|--------------|------------------|--------|
| F6.04 | Communication Timeout Detection Time | If this machine exceeds the time defined by this function code During the interval, the correct data signal was not received. Then the machine thinks that the communication is out of order, and the frequency converter It will be determined according to the setting of communication failure action mode Whether to protect or maintain the current operation; This value setting For0.0When, don't do iR5485 | 0.1 ~ 100.0s | 10.0s | × |
| F6.05 | Proportional linkage coefficient | This function code is used to set the frequency converter as a slave PassR5485Weight of frequency instruction received by interface Coefficient, the actual operating frequency of this machine is equal to the local work Energy code value multiplied byPassR5485Received by the interface Frequency setting command value. In linkage control, this The function code can set the operating frequency of multiple frequency convertersThe proportion of. | 0.01 ~ 10.00 | 1.00 | ○ |

Monitoring Parameters

| Function Code | Name | Set Range | Minimum unit | Factory Settings | Change |
|--|---|---|--------------|------------------|--------|
| Group D-Monitoring Parameter Group and Fault Record | | | | | |
| d-00 | Output Frequency | 0.00 ~ Max Output Frequency | 0.01Hz | 0 | ◆ |
| d-01 | Set Frequency | 0.00 ~ Max Output Frequency | 0.01Hz | 0 | ◆ |
| d-02 | Output Voltage | 0 ~ 999V | 1V | 0 | ◆ |
| d-03 | Bus Voltage (V) | 0 ~ 999V | 1V | 0 | ◆ |
| d-04 | Output Current | 0.0 ~ 6000.0A | 0.1A | 0 | ◆ |
| d-05 | Motor speed (RPM/min) | 0 ~ 36000 (RPM/min) | 1 | 0 | ◆ |
| d-06 | Analog Input AI1 (V/mA) | 0.00V/0.00mA ~ 10.00V/20.00mA | 0.01 | 0 | ◆ |
| d-07 | Analog Input AI2 (V) (Reserved) | 0.00 ~ 10.00V | 0.01V | 0 | ◆ |
| d-08 | Analog Output AO1 (V/ MA) (Reserved) | 0.00 ~ 10.00V | 0.01V | 0 | ◆ |
| d-09 | Pulse Input Frequency (Khz) (Reserved) | 0 ~ 60.00KHz | 0.01KHz | 0KHz | ◆ |
| d-10 | PID Setpoint (V) | 0.00 ~ 10.00V | 0.01V | 0.00 | ◆ |
| d-11 | PID Feedback (V) | 0.00 ~ 10.00V | 0.01V | 0.00 | ◆ |
| d-12 | Current Count Value (Reserved) | 0 ~ 65535 | 1 | 0 | ◆ |
| d-13 | Current Timing Value (S) (Reserved) | 0 ~ 65535S | 1S | 0 | ◆ |
| d-14 | Input Terminal Status | 0 ~ FH Note: When expanded into binary, it means from high to low Sub-X4/X3/X2/X | 1 | 0 | ◆ |
| d-15 | Output Terminal Status | 0 ~ 1H Note: 1 indicates that output terminal Y is active | 1 | 0 | ◆ |
| d-16 | Module temperature °C | 0.0°C ~ +110.0°C | 0.1°C | 0 | ◆ |
| d-17 | Operating state of frequency converter | 0 ~ FFFFH BIT0: Run/Stop BIT1: Forward/Reverse BIT2: Inching BIT3: DC braking BIT4: Reserved BIT5: Overvoltage Limit BIT6: Constant Speed Down BIT7: Overcurrent Limit BIT8 ~ 9: 00-Zero Speed/01-Acceleration/10-Deceleration/11-Uniform BIT10: Overload Prealarm BIT11: Reserved BIT12 ~ 15: Operation Command Channel: 00-Panel/01-Terminal /10-Reserved BIT14 ~ 15: Bus Voltage Status: 00-Normal/01-Low Voltage Protection/ 10-Overpressure Protection | 1 | 0 | ◆ |
| d-18 | Accumulation of inverter operation Time (h) | 0 ~ 65535h | 1 | 0 | ◆ |
| d-19 | Software Upgrade Date (Year) | 2019 ~ 2039 | 1 | 0 | ◆ |

| Function Code | Name | Set Range | Minimum unit | Factory Settings | Change |
|---------------|--|---|--------------|------------------|--------|
| d-20 | Software Upgrade Date(Month,Day) | 0 ~ 1231 | 1 | 0 | ◆ |
| d-21 | Reservation | — | — | 0 | ◆ |
| d-22 | Type of third failure | 0~21 | 1 | 0 | ◆ |
| d-23 | Second Failure Type | 0~21 | 1 | 0 | ◆ |
| d-24 | Latest Failure Type | 0~21 | 1 | 0 | ◆ |
| d-25 | Operating Frequency at Current Failure | 0.00~Upper limit frequency | 0.01Hz | 0 | ◆ |
| d-26 | Output Current at Current Fault | 0.0~6553.5A | 0.1A | 0 | ◆ |
| d-27 | Bus voltage at current fault | 0~999V | 1V | 0 | ◆ |
| d-28 | Module temperature at current fault°C | 0.0°C ~ +110.0°C | 0.1°C | 0 | ◆ |
| d-29 | Inverter status at current fault | Inverter status at current fault~FFFFH BIT0: Run/Shutdown BIT1: Forward rotation/Reverse BIT2: Inching BIT3: DC brake BIT4: Reserved BIT5: PassVoltage limit BIT6: Constant speed frequency reduction BIT7:Overcurrent Limit BIT8 ~ 9:00-Zero speed/01-Accelerate/ 10-Deceleration/11-Uniform velocity BIT10: Overload pre-alarm BIT11: Reserved BIT 12 ~ 13:Run command channel:00-Panel/01-Terminal/10-Reservation BIT 14 ~ 15:Bus voltage state:00-Normal/01-Low voltage protection/10-Overpressure protection | 1 | 0 | ◆ |
| d-30 | PIDPressure setting | 0.0 ~ 100.0 (bar/Kg) | 0.1 | 0 | ◆ |
| d-31 | PIDPressure feedback | 0.0 ~ 100.0 (bar/Kg) | 0.1 | 0 | ◆ |

Chapter 5 Error Codes

| Fault code | Name |
|------------|--|
| Fault Code | |
| Err01 | Power Module Failure |
| Err02 | Overcurrent in accelerated operation |
| Err03 | Overcurrent in deceleration operation |
| Err04 | Overcurrent in uniform operation |
| Err05 | Overvoltage in accelerated operation |
| Err06 | Overvoltage in deceleration operation |
| Err07 | Overvoltage in uniform operation |
| Err08 | Overvoltage during shutdown |
| Err09 | Undervoltage in operation |
| Err10 | Frequency converter overload |
| Err11 | Motor overload |
| Err12 | Reservation |
| Err13 | Out-of-phase on output side |
| Err14 | Radiator overheating |
| Err15 | External Device Failure |
| Err16 | R S 4 8 5 Communication failure |
| Err17 | Reservation |
| Err18 | Current Sense Fault |
| Err19 | C P U Failure |
| Err21 | E E P R O M Reading and writing errors |

Chapter 6 Communication Protocol (the following data are all hexadecimal)

6.1 RTU Mode and Format

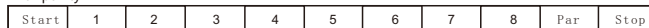
When the controller communicates on Modbus bus in RTU mode, every 8-bit byte in the information is divided into 2 4-bit hexadecimal characters. The main advantage of this mode is that the density of characters transmitted is higher than that of ASCII mode at the same baud rate, and each information must be continuously transmitted.

6.1.1 Format per byte in RTU mode

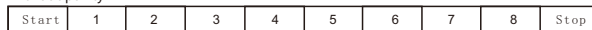
Coding system: 8-bit binary, hexadecimal 0-9, A-F.
Data bit: 1 bit start bit, 8 bits of data (low bit first sent),
stop bit occupies 1 bit, parity bit can be selected.
(Refer to RTU data frame as sequence diagram)
Error Check Area: Cyclic Redundancy Check (CRC)

6.1.2 RTU data frame sequence diagram

with parity



without parity



6.2 Description of Read-Write Function Code

| Function Code | Function Description |
|---------------|----------------------|
| 03 | Read Register |
| 06 | Write register |

6.3 Description of parameter address of communication protocol

| function instruction | address definition | data meaning instruction | R/W |
|---|--------------------|--|-----|
| Communication Control Command | 2000H | 0001H : Shutdown | W |
| | | 0012H : Forward rotation operation | |
| | | 0013H : Forward rotation inching operation | |
| | | 0022H : Reverse operation | |
| | | 0023H : Reverse inching operation | |
| Communication set frequency address | 2001H | The set frequency range of communication is-10000 ~10000. Note: The communication set frequency is relative to the most Percentage of large frequencies, ranging from-100.00%~ 100.00%. | W |
| Communication Control Command | 2002H | 0001H: External fault input | W |
| | | 0002H: Fault reset | |
| Read Run/Shutdown Parameter Description | 2102H | Set frequency (two decimal places) | R |
| | 2103H | Output Frequency (2 Decimal) | R |
| | 2104H | Output Current (1 Decimal) | R |
| | 2105H | Bus Voltage (1 Decimal) | R |

| function instruction | address definition | data meaning Instruction | R/W |
|--|--------------------|---|-----|
| Read Run/Shutdown Parameter Description | 2106H | Output Voltage (1 Decimal) | R |
| | 2107H | Analog InputAI(two decimal places) | R |
| | 2108H | Reservation | R |
| | 2109H | Reservation | R |
| | 210AH | Motor speed | R |
| | 210BH | Reservation | R |
| | 210CH | Reservation | R |
| | 210DH | Inverter Temperature (1 Decimal) | R |
| | 210EH | PIDFeedback value (two decimal places) | R |
| | 210FH | PIDSet value (two decimal places) | R |
| | 2110H | Reservation | R |
| | 2111H | Reservation | R |
| | 2112H | Current Failure | R |
| | 2113H | Reservation | R |
| | 2114H | Input Terminal Status | R |
| | 2115H | Input Terminal Status | R |
| | 2116H | BIT0: Run/Shutdown BIT1: Forward rotation/Reverse BIT2: inchingBIT3: DC brake BIT4: ReservedBIT5: Overvoltage Limit BIT6: Constant speed frequency reduction BIT7:Overcurrent Limit BIT8 ~ 9:00-Zero speed/01-Accelerate /10-Deceleration/11-Uniform velocity BIT10: Overload pre-alarmBIT11: Reserved BIT 12 ~ 13Run command channel:00-Panel /01-Terminal/10-Communication BIT 14 ~ 15Bus voltage state:00-Normal /01-Low voltage protection /10-Overpressure protection | R |
| | 2101H | BIT0: RunBIT1: Shutdown BIT2: inching BIT3: Forward rotation BIT4: Reverse BIT5 ~ BIT7: Reserved BIT8: given communication BIT9: Analog Signal Input BIT10: Communication Run Command Channel BIT11: Parameter Lock BIT12: Running BIT13: a little move command BIT14 ~ BIT15: Reserved | R |

| function instruction | address definition | data meaning Instruction | R/W |
|--------------------------------------|--------------------|---|-----|
| Read out trouble code description | 2100H | 00: No exception 01: Module Failure 02: overvoltage 03: Temperature fault 04: Frequency converter overload 05: Motor overload 06: External fault 07 ~ 09: Reserved 10: overcurrent dure acceleration 11: overcurrent dure deceleration 12: over-current in constant speed 13: Reserved 14: undervoltage | R |

6.4 03Read Function Mode

Inquiry information frame format:

| | |
|-----------------------|-----|
| Address | 01H |
| Function | 03H |
| Starting data address | 21H |
| | 02H |
| Data(2Byte) | 00H |
| | 02H |
| CRC CHK Low | 6FH |
| CRC CHK High | F7H |

Data analysis of this section: 01H is the address of the frequency converter
 03H is read function code
 2102H is the start address
 0002H is the number of read addresses, and 2102H and 2103H F76FH are 16-bit CRC validation codes

Response information frame format:

| | |
|--------------|-----|
| Address | 01H |
| Function | 03H |
| DataNum*2 | 04H |
| Data1[2Byte] | 17H |
| | 70H |
| Data2[2Byte] | 00H |
| | 00H |
| CRC CHK Low | FEH |
| CRC CHK High | 5CH |

Chapter 7 Warranty Agreement

Analysis of this data:
 01H is the address of the inverter
 03H is read function code
 04H is the product of read entries * 2
 1770H is read 2102H (set frequency) data
 0000H is reading data of 2103H (output frequency)
 5CFEH is a 16-bit CRC check code

6.5 Write Function Mode

Inquiry information frame format:

| | |
|-----------------------|-----|
| Address | 01H |
| Function | 06H |
| Starting data address | 20H |
| | 00H |
| Data(2Byte) | 00H |
| | 01H |
| CRC CHK Low | 43H |
| CRC CHK High | CAH |

Analysis of this data:
 01H is the address of the inverter
 06H is write function code
 2000H is the control command address
 0001H is the shutdown command
 43CAH is a 16-bit CRC validation code

Response information frame format:

| | |
|-----------------------|-----|
| Address | 01H |
| Function | 06H |
| Starting data address | 20H |
| | 00H |
| Number of Data(Byte) | 00H |
| | 01H |
| CRC CHK Low | 43H |
| CRC CHK High | CAH |

Analysis of this data: If the setting is correct, the same input data will be returned.

- This product will be guaranteed for 18 months (except for exported/non-standard machine products) under normal use environment (without moisture and dust) from the date of purchase by the user from the manufacturer.
- This product will enjoy paid lifelong service from the date when the user purchases it from the manufacturer.
- During the warranty period, a certain maintenance fee will be charged for damage caused by the following reasons:
 - Machine damage caused by errors in use and unauthorized maintenance and renovation;
 - Do not operate correctly according to the procedures listed in the "Product Manual" provided by our company;
 - Product damage caused by force majeure such as earthquake, fire, feng shui disaster, lightning strike, abnormal voltage or other natural disasters;
 - Product damage caused by improper selection of transportation mode or invasion of other external forces during transportation after the user purchases the product;
 - Failures and damages caused by obstacles other than machines (such as external equipment factors);
- The manufacturer has the right not to provide warranty service under the following circumstances:
 - When the user fails to pay off the purchase price according to the Purchase and Sale Contract signed by both parties;
 - The user intentionally conceals the bad use of the product during installation, wiring, operation, maintenance or other processes from the manufacturer's after-sales service provider.
- If you have any problems during use, please contact our agent or our company in time.

Chapter 8 Product Warranty Card

| | | |
|---------------------|-------------------------------|-----------------|
| Customer Name | Unit Address: | |
| | Company Name: | Contact: |
| | Postal Code: | Contact number: |
| Product Information | Part No.: | |
| | Body bar code (pasted here): | |
| | Dealer Name: | |
| Fault Information | Maintenance time and content: | |
| | Repairman: | |
