



JPF4828 4 - wire PWM DC fan temperature control and speed regulation terminal

User Manual V2.0



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Version Information

| version number | Main changes | date |
|-----------------------|--|---------|
| V1.00 Initial version | V1.01 Text | 2021-10 |
| description details | optimization V1.02 Added | 2022-06 |
| 9.4.7 Description | about reading all parameters at once | 2022-08 |
| V2.0 | Add an independent temperature control switch (relay), The temperature measurement range is extended to -20~120℃, and the PWM frequency can be set. Other details optimization | 2023-04 |



1. Overview:

Industrial-grade quality, dual temperature probes for real-time temperature measurement, the speed regulator controls the fan speed (air volume) through the detected temperature; the fan speed is proportional to the temperature: the higher the temperature, the faster the fan speed, the lower the temperature, the slower the fan speed, automatically balancing the temperature and fan speed, truly achieving the effect of on-demand heat dissipation, energy saving and noise reduction, and extending the life of the fan. In addition, a temperature control switch (relay) independent of the fan control is integrated, and the temperature control parameters can be freely set. This

function can be applied to high and low temperature alarms and heating/cooling control. The speed regulator supports fan speed detection, fault alarm, RS485 communication and other functions. RS485 fo

2. Product performance/technical

parameters: 1. Industrial-grade solution, wide voltage design, supports DC 9-60V power supply, maximum drive current 12A, 2. With digital tube display window and buttons, you can easily and quickly set/view various parameters, 3. Power supply anti-reverse protection

design, communication interface anti-surge design, 4. Fan start-up and full-speed temperature can be freely set,

support minimum speed and shut down the fan two working modes, 5. Support fan speed detection, fan fault detection and dry contact alarm output (relay, maximum load current 10A), 6. Support

RS485 serial communication, standard modbus-

Rtu protocol, 7. Support 8 4-wire PWM fans access, 8. PWM

output frequency can be configured, output amplitude 5V/10V, 9. Dual sensor temperature measurement, temperature measurement range: -20~120 y , temperature measurement

accuracy: $\pm 1\text{y}$, 10. Integrated one independent temperature

control switch (relay, maximum load current 10A), 11. Support two installation methods: guide rail and screw fixing. 12. Working temperature: -30~80 y .

3. Product size:



整机外形尺寸: 145*90*45mm, 安装孔尺寸: 135*70mm



4. Interface description:



Terminal 1: Regulator power supply + pole interface; Terminal 2: Regulator power supply - pole interface,

Terminal 3: RS485 serial port A / D +; Terminal 4: RS485 serial port B / D -, Terminal 5

connects to fan power line -, Terminal 6 connects to fan power line +, Terminal 7 connects to fan FG speed signal, Terminal 8

connects to fan PWM control line, *Terminals 5-8 are mainly for the convenience of fan wiring without plugs, and the 4-

pin plug of interface 13 is straight-through, Interface 9: No. 1 temperature sensor interface,

Interface 10: No. 2 temperature sensor interface, Terminal 11: Fan fault

alarm output indication (relay) port, Next to interface 10 is the LED indicator light, POW is the power indicator

light of the whole machine, and FAN is the fan start indicator light, Interfaces 13-20: 1st-8th fan interface, standard

KF2510-4P Socket (line sequence: Fv-, Fv+, FG,

PWM), Interface 21: Temperature control switch (relay) interface. **Full function wiring diagram: (In**

actual use, ignore the wiring of unused functions) * Try not to plug or

unplug the fan with power on, otherwise the speed regulator may be damaged * The voltage of the DC power supply must be consistent with the rated volta



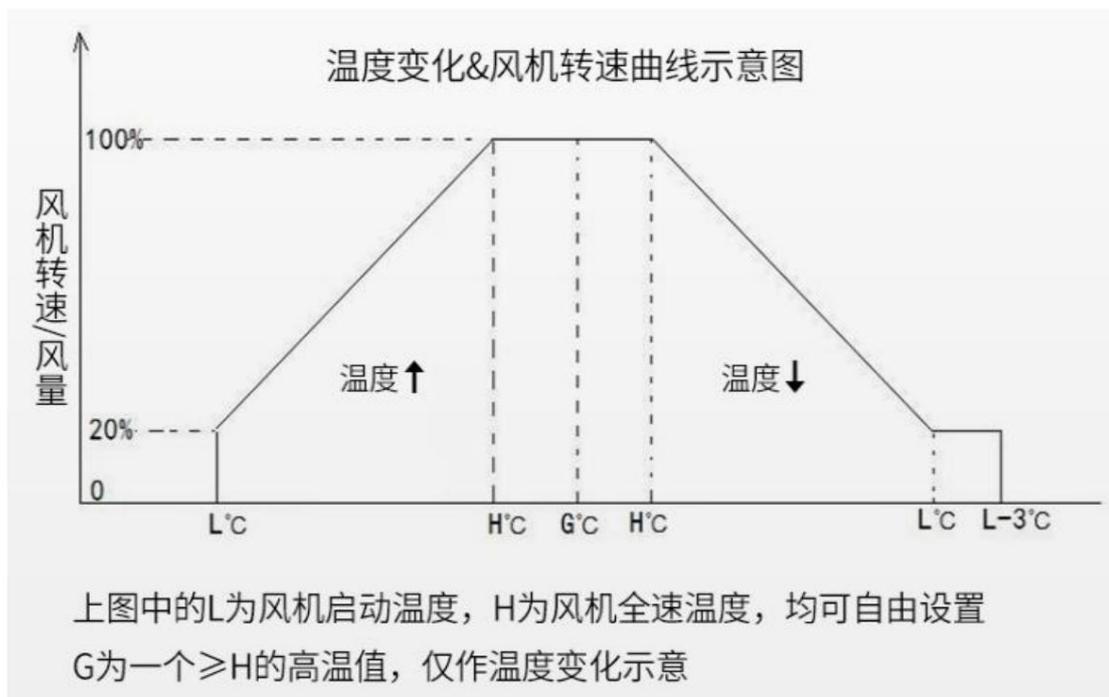


5. Basic Instructions 5.1

Connect the cables according to the interface

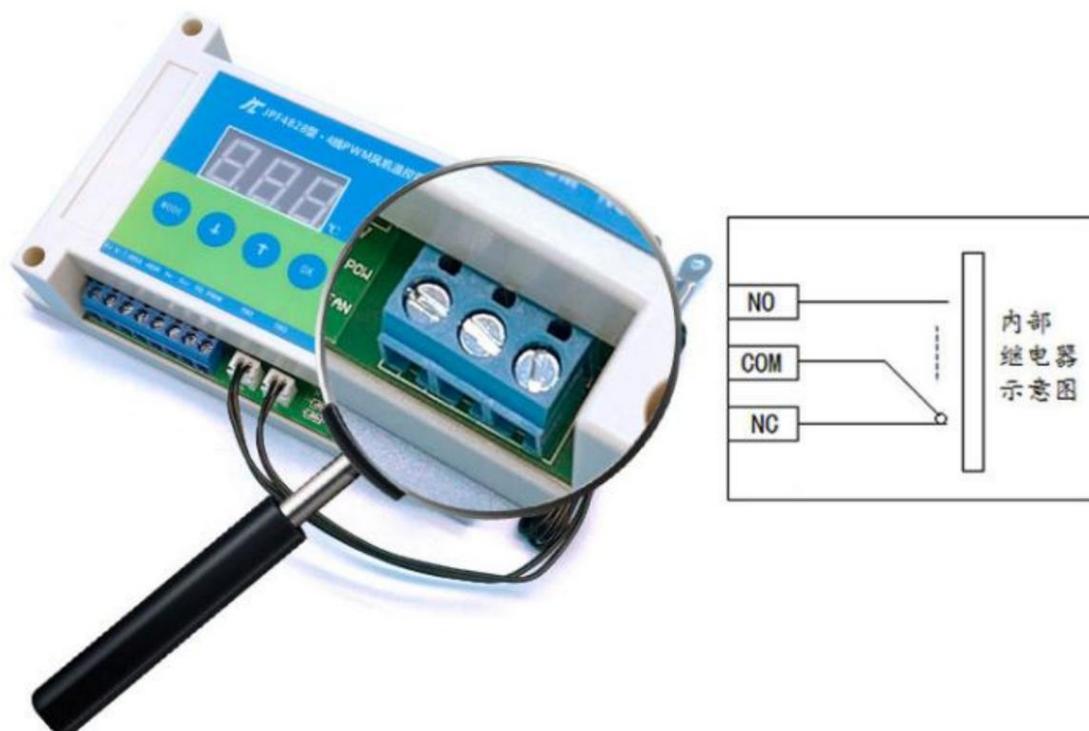
instructions. 5.2 After the power supply is normal, the POW light on the mainboard will light up, and the speed regulator will start to identify the temperatures detected by the two temperature sensors. The temperature value of the higher temperature will be used to adjust the speed of the fan. Taking the factory default temperature range of the speed regulator as an example, the factory default temperature range of the speed regulator is $L=30^{\circ}\text{C}$, $H=50^{\circ}\text{C}$. When the current temperature detected by one of the temperature sensors is greater than or equal to 30°C , the speed regulator adjusts the speed of the fan in a linear proportion. As the temperature rises, the fan speed will also increase. When the temperature is 50°C , the fan will become full speed. When the temperature drops to 27°C ($L-3$), the speed regulator sets the fan to the minimum speed/or shuts down the fan.

Fan speed & temperature relationship diagram:





6. About the use of fan fault alarm indication relay (interface 11) A low-power relay (dry contact) is integrated inside the speed regulator, which is mainly used to indicate abnormal fan stop. It can be connected to the switch input port of PLC/dynamic ring as an indication signal, and can also be directly used as a switch to directly control other low-power devices. Relay parameters: AC250V/DC30V, maximum load current 10A. When the fan is normal, the relay is disconnected (COM and NO are disconnected, and NC is connected). When an abnormal fan stop is detected, the relay will be closed (COM and NO are connected, and NC is disconnected). * The relay itself does not have a voltage output, it is just a physical switch. 6.1 The schematic structure is as follows:



6.2 Example of use: As a switch to directly control the alarm, when the fan fails, the alarm will sound





7. Regarding the selection of PWM control signal voltage

amplitude, the speed regulator supports two voltages of PWM

signal output, 5V/10V. Generally, the mainstream domestic 4-wire fans can use 5V voltage PWM signals. Some imported brand fans and most EC fans may require 10V PWM signals for speed regulation. Users can adjust the PWM voltage of the speed regulator according to actual conditions.

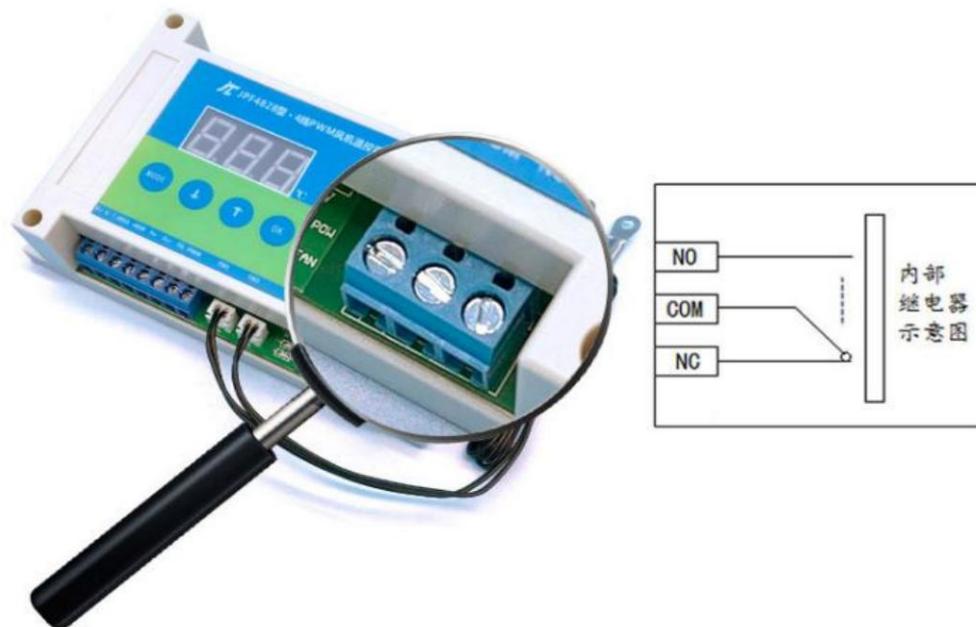


*If you are not sure what voltage control signal the fan needs to adjust its speed, you can first turn the PWM voltage switch to 5V (the factory default is generally 5V). If the speed cannot be adjusted normally, turn the switch to 10V.



8. About the use of temperature control switch (relay) (interface 21) The speed regulator integrates an independent temperature control switch relay, which can be used as a high/low temperature alarm indication signal to connect to the switch input port of PLC/dynamic ring, and can also be directly used as a switch to control other high-power equipment. Relay parameters: AC250V/DC30V/ maximum load current 10A, When the relay is closed (disconnected): COM1 and NO1 are disconnected and connected with NC1, When the relay is opened (closed): COM1 and NO1 are connected and disconnected with NC1, *The on/off of the relay can be automatically controlled by temperature or forced controlled through the RS485 serial port. For details, see the relevant instructions on the next page. *The relay itself does not have a voltage output, it is just a physical switch.

8.1 The schematic structure is as follows:



8.2 Example 1: As a switch to

control the heater for automatic temperature control heating, when the cabinet temperature is lower than the temperature control relay opening temperature (b parameter value), the heating is automatically turned on; when the cabinet temperature is higher than the temperature control relay closing temperature (C parameter value), the heating is automatically turned off, so as to maintain the cabinet constant temperature/anti-condensation.





9. Digital panel operation instructions

The digital panel displays the current temperature in real time (displays the highest

temperature value), with 4 buttons, through which all parameters of the speed regulator

can be set. In standby mode, press the \bar{y} key to manually switch the display of the temperature values detected by the

two temperature sensors. In standby mode, press the MODE key to enter the configuration/switch parameter item. During configuration, press the \bar{y} key to adjust the value, and press the OK key

| Digital display code | parameter interpretation | Parameter Description |
|----------------------|---|--|
| Lxx | Fan start temperature | Set the fan startup (lower limit) temperature value. Setting range: -20~120 \bar{y} Set the fan |
| Hxx | Fan full speed temperature | full speed (upper limit) temperature value. Setting range: -20~120 \bar{y} , the H value must be greater than the L value Set the 485 serial |
| Axx | MODBUS Address | port MODBUS protocol address of the speed regulator. Setting range: 1-254 Set the speed |
| Pxx | Operating Mode | regulator's working mode When the temperature is lower than the set startup temperature -3 \bar{y} , use this parameter to set whether the speed regulator controls the fan to turn off or maintain the fan at the minimum (20%) speed. Setting range: 00/01; 01 means maintain the minimum speed, 00 means turn off the fan Set the number |
| Fxx | Number of fans | of fans connected to the speed regulator The value of this parameter must be consistent with the actual number of fans connected, and when connecting the fans, the fans must be connected in the order of FAN1~FAN8. If the setting is 01, then when the fan is actually connected, the fan must be connected to the fan1 port. If the setting is 02, then when the fan is actually connected, 2 Each fan must be connected to fan1, fan2, and so on. If it is not connected according to this requirement, the fan fault detection function will fail. Setting range: 0~8 (setting to 0 means that the fan fault detection function is not enabled) *If the fan fault detection function is not used, this parameter can be ignored. If the set b value is greater than |
| bxx | Temperature control relay opening temperature | the C value: when the temperature is \bar{y} the b value, the temperature control relay is turned on, and when the temperature is \bar{y} the C value, the temperature control relay is turned off. This item can be used for high temperature |
| Cxx | Temperature control relay shut-off temperature | alarm or control of high-power cooling; If the set b value is less than the C value: when the temperature is \bar{y} the b value, the temperature control relay is turned on, and when the temperature is \bar{y} the C value, the temperature control relay is turned off. This item can be used for low temperature alarm or control of heater heating; Setting range: -20~120 \bar{y} |

*Take the fan startup and full speed temperature as an example

In standby mode, the panel displays the current temperature value. Press the MODE key once, and the digital tube displays Lxx, where L represents the start

temperature and xx represents the currently set temperature value. Press the up and down keys to adjust the parameter value. After the adjustment is completed, press the OK key to save.

After the setting is completed, the speed regulator will automatically control the fan speed according to the newly set temperature

parameters. The settings of other parameters are similar to the above steps.

*In addition to being able to use the buttons to set all the above parameters, you can also use the RS485 serial port to configure/query. For details on the protocol, see the next page



10. RS485 serial communication protocol description 10.1

This protocol complies with the MODBUS-RTU communication protocol. The speed regulator acts as a slave and passively receives instructions from the host.

协议格式如下 (hex):***主机读取**

| MODBUS 地址 | 功能码 | 寄存器地址 | 寄存器数量 | CRC16 校验 |
|-----------|------|-------|-------|----------|
| 1byte | 0x03 | 2byte | 2byte | 2byte |

控制器应答读取

| MODBUS 地址 | 功能码 | 数据值的字节数 | 数据值 | CRC16 校验 |
|-----------|------|---------|-------|----------|
| 1byte | 0x03 | 1byte | nbyte | 2byte |

***主机写 (配置参数), 一次只可以写单个寄存器的数据**

| MODBUS 地址 | 功能码 | 寄存器地址 | 数据值 | CRC16 校验 |
|-----------|------|-------|-------|----------|
| 1byte | 0x06 | 2byte | 2byte | 2byte |

控制器应答写

| MODBUS 地址 | 功能码 | 寄存器地址 | 数据值 | CRC16 校验 |
|-----------|------|-------|-------|----------|
| 1byte | 0x06 | 2byte | 2byte | 2byte |

10.2. Serial port

parameters Baud rate 9600, no check, 8 data bits, 1 stop

bit 10.3. Register address

| table Register address | illustrate | Allow operation | function code |
|------------------------|---|-----------------|-----------------|
| 0x0000 | TM1 temperature value, positive offset 40, actual temperature value = | Read-only | 0x03 |
| 0x0001 | analytical value - 40 TM2 temperature value, positive offset 40, actual | Read-only | 0x03 |
| 0x0002 | temperature value = analytical value - 40 Fan speed (percentage) When writing, the serial port forces the fan speed to be controlled. When the temperature control fails and FFFF is written, the fan | Read/write | 0x03/0x06 |
| 0x0003 | speed is restored to the temperature control value range: 0x0000-0x0064, 0xFFFF Fan operation status, after the data content is converted to binary, the lowest bit | Read-only | 0x03 |
| 0x0004 | represents fan1, the second lowest bit represents fan2...; 1 indicates that the fan is running, and 0 indicates that the fan is stopped Fan fault code, using bits to indicate | Read-only | 0x03 |
| 0x0005 | whether the 8 fans are faulty The lowest bit represents fan1, the second lowest bit represents fan2...; 1 indicates that the fan is | Read/Write | 0x03/0x06 |
| 0x0006 | normal, and 0 indicates that the fan is faulty Fan start temperature value range: Value range: 0x0014-0x00A0 Positive | Read/write | 0x03/0x06 |
| 0x0007 | offset 40, actual value = data value - 40 Fan full speed temperature value range: Value range: | Read/write | 0x03/0x06 Read/ |
| 0x0008 | 0x0014-0x00A0 Positive offset 40, actual value = data value - 40 Speed regulator | Read/write | 0x03/0x06 |



| | | | |
|----------------------|--|-------------------|------------------|
| 0x0009 | MODBUS-485 address, value range: 0x0001-0x00FE *Supports FFFF broadcast address when reading | Read/write | 0x03/0x06 |
| 0x000a~0x0011 | Real-time speed (RPM) of 8 fans The speed of Fan1 corresponds to the value of 0x000a... *The speed regulator collects the speed pulse of the fan approximately every 10 seconds and calculates the speed, with an accuracy of >95% (self-test data) *The speed regulator uses the formula $RPM=N*60/2$ to calculate the fan speed. N is the number of fan speed pulses collected by the speed regulator per second, / 2 means that the fan will generate 2 pulses for one rotation. This formula is suitable for most fans on the market. The speed of a very small number of special | Read-only | 0x03 |
| 0x0012 | fans needs to be recalculated according to the fan data/characteristics PWM output frequency selection value range: 0x0000-0x0005, the default is 0005 0=500Hz,1=1KHz,2=2K,3=5K,4=10K,5=25K *This parameter generally does not need to be changed, the factory default is 25K, which is suitable for more than 90% of PWM fans | Read/write | 0x03/0x06 |
| 0x0013 | on the market. The temperature control relay opens the temperature range: 0x0014-0x00A0 *Positive offset 40, setting | Read/write | 0x03/0x06 |
| 0x0014 | value = data value-40 The temperature control relay closes the temperature range: 0x0014-0x00A0 *Positive offset | Read/write | 0x03/0x06 |
| 0x0015 | 40, setting value = data value-40 The temperature control relay state is written when the serial port forces the relay to turn on/off, and the temperature control fails 0=off, 1=on, write FFFF to restore to temperature control *This control is only effective in real time and is not saved. After the | Read/write | 0x03/0x06 |
| 0x0020 | device is restarted, the control of the relay will be restored to the temperature control range: 0x0000/0x0001/0xFFFF Reset and restart control range: 0x00AA Write 00AA to reset and restart the sp | just write | 0x06 |



*Our company can provide free debugging software. If necessary, you can ask customer service or download it from the official website. The software interface is as follows





10.4 RS485 serial port protocol usage example (Hex)

10.4.1 Query the temperature of sensor No. 1 (03 function code, register address 0000) Command format:

Speed controller address 03 00 00 01 CRC16 Speed controller returns: _____

Speed controller address 03 02 00 xx CRC16 xx is the temperature data _____

content, HEX format, needs to be converted to decimal, actual temperature (ȳ) = _____

converted decimal value - 40 Take modbus address 01 and current

temperature of 31ȳ as an example The host sends: 01 03 00 00 01

84 0A Speed controller responds: 01 03 02 00 47 F8 76 (0x0047

converted to decimal = 71, 71-40 = 31ȳ) _____

10.4.2 Query the current fan operation status (03 function code, register address 0003) Instruction format:

speed regulator address 03 00 03 01 CRC16 speed regulator returns: speed

regulator address 03 02 00 xx CRC16 00xx is the data content, HEX format, _____

need to be converted to binary, the low byte corresponds to 8 fans, from right to left, the rightmost bit corresponds to fan No. 1, the 8th bit corresponds

to fan No. 8; 0 means the fan is stopped, 1 means the fan is running

With modbus address 01, fan No. 1 is running, and fan No. 2345678 is stopped. The host

sends: 01 03 00 03 01 74 0A. The speed regulator responds:

01 03 02 00 01 79 84 (0001 converted to binary = 0000 0001) *The query result here is the fan operating status detected

by the current speed regulator in real time.

10.4.3 Query fan fault information (03 function code, register address 0004) Instruction format:

Speed controller address 03 00 04 01 CRC16 Speed controller returns: _____

Speed controller address 03 02 00 xx CRC16 00xx is the data content, HEX _____

format, needs to be converted to binary, the low byte corresponds to 8 fans, from right to left, the rightmost bit corresponds to fan No. 1, the 8th bit

corresponds to fan No. 8; 0 indicates fan failure, 1 indicates fan normal

*The information returned here is the conclusion of whether the fan is damaged, which is actually determined by the speed regulator based on multiple parameters such as "number of fans", fan switch status, and "fan operation status". It is different from register 0003, which only expresses whether the fan is currently running.

*This function must be used in conjunction with the "number of fans" parameter and the fans must be plugged in according to the sequence requirements to work properly.

Take modbus address 01, the number of fans is 4; fan No. 3 is faulty and fan No. 124 is operating normally as an example. The host

sends: 01 03 00 04 01 C5 CB. The speed regulator responds:

01 03 02 00 FB F9 C7 (FB=11111011, which means fan No. 3 is in faulty state)

10.4.4 Read the current fan speed percentage (03 function code, register address 0002) Instruction format:

speed regulator address 03 00 02 01 CRC16 speed regulator returns: speed

regulator address 03 02 00 xx CRC16 *XX converted to decimal is the fan _____

speed percentage, the value range is 0x00-0x64



10.4.5 Serial port forced control of fan speed (percentage) (temperature control failure) (06 function code, register address 0002) Command format: speed regulator address 06 00 02 00 xx

CRC16 Speed regulator returns: speed regulator address 06 00 03 00 xx CRC16

*XX is the percentage of fan speed in decimal, with a value range of 0x00-0x64. *After receiving this command,

the speed controller will directly control the fan speed according to the received percentage, and the temperature control will be temporarily invalid.

*This control is only effective in real time and is not saved. After the speed controller is reset and restarted, it will automatically return to the temperature control

10.4.6 Exit serial port control mode (temperature control takes effect) (06 function code, register address 0002) Command format: speed controller address 06 00

02 FF FF CRC16 Speed controller returns: speed controller address 06 00 02 FF FF CRC16

10.4.7 Read all parameters (03 function code, register address 0000~0015) For ease

of use, the speed regulator supports reading all parameters at once in addition to reading a single parameter

in batches. Instruction format: Speed regulator address 03 00 00

00 16 CRC16 Speed regulator returns: Speed regulator address 03

2c 44byte CRC16 0x0000: register start address, 0x0016: read 22 registers

continuously

Speed regulator returns: Speed regulator address 03 2c byte1 byte2 CRC16

byte3 byte4 ... 0x2c: return data length, a total of 44 bytes (read 22 registers, each register's data occupies 2 bytes, 22*2=44) byte1

byte2 corresponds to the value of register 0000, byte3 byte4 corresponds to the value of register 0001, and so on...



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