JAF22014 型·温控交流调压器

JAF22014 Type of temperature-controlled AC voltage regulator

用户手册 v2.00

User Manual v2.00

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版本信息

Version information

版本号 version number	主要变更内容 Main change content	日期 date
V1.00	初始版本 The initial version	2022-12-05
V2.00	增加一键开关机功能 Add one click on/off function	2024-10-15

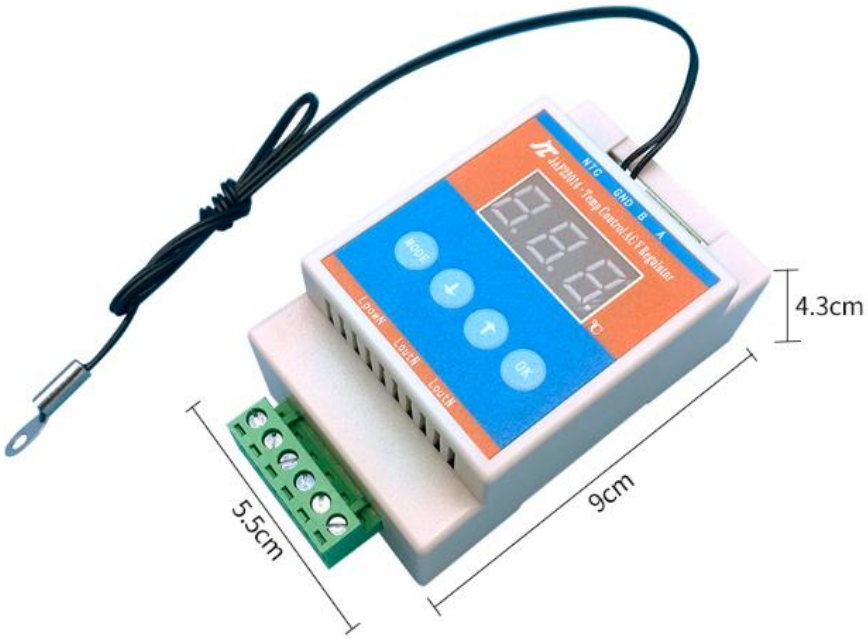
1. 功能概述/Function overview:

此款 JAF22014 型温控交流调压调速器集成数字可控硅调压技术，1000W 超大功率输出，调压输出完全受温度自动控制，温度和输出电压的关系可自由设置（正/反比），
支持 RS485 通信功能（Modbus-RTU 协议），工业级标准，质量可靠，稳定耐用。
适用于各种室内外机箱机柜的温控散热/加热、以及其他基于温控交流调压输出的场合。
This JAF22014-type temperature control AC voltage regulator integrated digital silicon voltage regulation technology, 1000W super power output, The voltage regulating output is completely controlled by temperature, the relationship between temperature and output voltage can be set freely (positive / reverse), Support RS485 communication function (Modbus-RTU protocol), industrial grade standard, reliable quality, stable and durable. It is suitable for temperature control of indoor and outdoor cabinet cabinets / heating, and other occasions based on

2. 产品性能/技术参数/Product performance / technical parameters

1. 工业级方案，集成高压大电流可控硅芯片，输出功率最大 1000W
Industrial scheme, integrated high voltage high current silicon CR, with maximum output power of 1000W
2. 宽电压设计，自适应 220V / 110V / 50HZ / 60HZ 的交流电
Wide voltage design, adaptive 220V / 110V / 50 HZ / 60 HZ AC current
3. 带 LED 数码管指示，实时显示温度，配合按键，可便捷的设置各项参数
With LED digital tube indication, real-time display of temperature, with the button, can easily set the parameters
4. 内置保险丝，RC 浪涌吸收电流，电源防短路保护电路
Built-in fuse, RC surge absorption current, power supply against short circuit protection circuit
5. 支持正/反两种温控逻辑
Support both positive / negative temperature control logic
6. 支持 RS485 串口通信，Modbus-RTU 协议
Support RS485 serial port communication, Modbus-RTU protocol
7. 测温范围： -9~99℃，测温精度：±1℃
Temperature measurement range-9~99℃, temperature measurement accuracy ± 1℃
8. 35mm 导轨式安装
35mm guide rail type installation
9. 支持一键开关机功能
Supports one click power on/off function
10. 工作温度：-30~80℃
Working temperature: -30~80 ℃
11. 支持定制
Support customization
12. 净重：120g
Net weight: 120g

3. 产品尺寸/product size



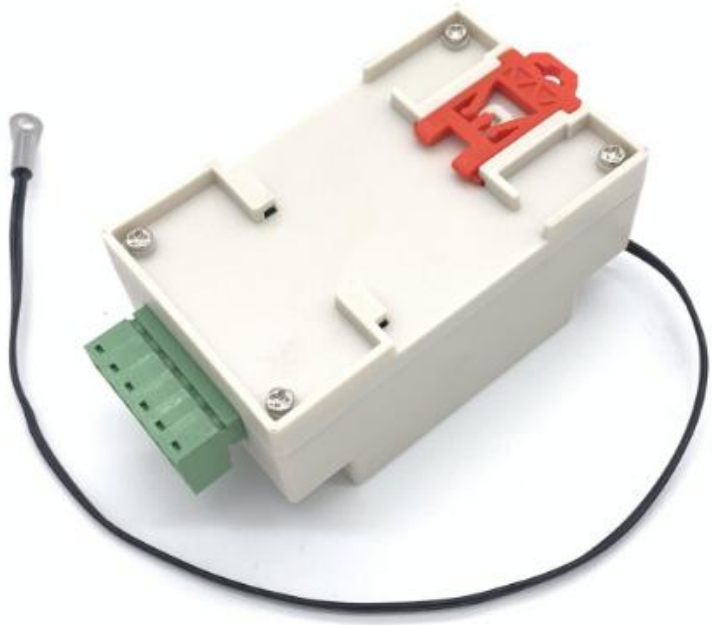
*温度线默认为 50cm 长，也可选配其他长度

* The default temperature line is 50cm long, and other lengths are also optional

产品背面图/Photo on the back of the product:

设备需采用导轨安装，标准 DN-35MM

Equipment shall be installed with guide rail, standard DN-35MM



4. 接线使用/Wiring use

1. 按照接口指示接好电源和负载的接线
Connect the power supply and load wiring according to the interface instructions
2. 将温度探头插接到调压器上，将探头的金属部分固定在发热部位
Plug the temperature probe into the voltage regulator and secure the metal portion of the probe to the heating area
3. 开启电源，调压器将根据温度探头检测到的温度来调节风扇转速
Turn on the power supply and the voltage regulator will adjust the fan speed according to the temperature detected by the temperature probe
4. 安装过程中注意检查接线是否正确
Check whether the wiring is correct during installation

*以调压器出厂默认的参数为例：
调压器出厂默认的温度下限=30℃、上限=50℃、正比输出、关停模式：当温度大于 30℃时，调压器按线性比例调输出电压，温度越高输出电压越高，当温度大于 50℃时，输出电压=输入电压,当温度降低到 28℃（L-2）时，调压器输出 0V.
* Take the factory default parameters of the voltage regulator as an example:
The default temperature of the regulator =30℃, upper limit =50℃, proportional output, shutdown mode: when the temperature is greater than 30℃, the regulator adjusts the output voltage according to linear proportion, the higher the temperature is higher, the higher the output voltage, when the temperature is greater than 50℃, the output voltage = input voltage, when the temperature decreases to 28℃ (L-2), the regulator output 0V.

*调压器的供电电压要和负载的额定电压要一致，负载是多少伏，电源就得用多少伏！
* The power supply voltage of the regulator should be consistent with the rated voltage of the load. How much volt as the load is, the power supply should be used!

4.1 注意事项/matters need attention:

1. 调压器必须要在输出端接上“用电设备”才能正常调压输出。
The voltage regulator must be connected to "electrical equipment" at the output end to normal voltage output.
2. “用电设备”只支持纯阻性负载(电阻、热水棒、钨丝灯、小太阳取暖器等)和纯感性负载（交流风机风扇、单相电机、水泵等），不支持 LED 灯、电源适配器等电子设备接入
"Electrical equipment" only supports pure resistance load (resistance, hot water rod, tungsten lamp, small sun heater, etc.) and pure perceptual load (AC fan, single phase generator, water pump, etc.), and does not support LED lights, power adapter and other electronic equipment access
3. 部分带有启动电容的电机/风扇可能会用不了，以实测为准
Some motor / fan with the starting capacitor may not be used, subject to the actual measurement
4. 使用时，需注意安全，检测接线无误后再通电
When using, attention should be paid to safety, and power on after the wiring is correct
5. 此设备仅支持交流电(100V~250V)接入使用，不支持直流电。
This device only supports AC (100V~250V) access to use, does not support direct current.
6. **检修/接插线时必须断开输入电源再操作，即使调压器输出 0V 也不要带电接线。**
When repairing / connecting the cable, the input power must be disconnected before operation. Even if the regulator output is 0V, the wiring should not be charged.

5. 按键使用说明/Instructions for key use

调压器自带数码显示器，待机时实时显示当前温度

The regulator comes with a digital display to displays the current temperature in real time when standby

带 4 个按键，通过按键可以设置/查看调压器的所有参数

With 4 keys, you can set / view all the parameters of the voltage regulator

待机状态下，按 MODE 键可进入配置/切换参数项，配置时按↕键可以调整数值，OK 键确认

In standby state, press MODE to enter the configuration / switch parameter items, press ↕ to adjust the value, OK to confirm

*设置参数时，调整好参数值后（改变了参数值），必须按 OK 键确认，否则参数不会保存。

* When setting the parameter, after adjusting the parameter value (the parameter value is changed), you must press OK to confirm, otherwise the parameter will not be saved.

数显参数项如下表/Digital display parameter items are as below:

数显代号 Number of code	参数释义 Parameter definition	参数说明 parameter declaration
Lxx	下限温度 Lower limit temperature	设置下限温度值 Set the lower limit temperature value 设置范围：1~99℃，默认为 30 Set the range: 1~99℃, the default is 30
Hxx	上限温度 ceiling temperature	设置上限温度值 Set the upper limit temperature value 设置范围：1~99℃，H 的值必须大于 L 的值，默认为 50 Set the range: 1~99℃, the value of H must be greater than the value of L, the default is 50
Axx	RS485 地址 RS485 address	设置调压器的 485 串口 MODBUS-RTU 的地址 Set the address of the 485 serial port MODBUS-RTU of the voltage regulator 设置范围：1~254 Setting range: 1~254
Pxx	工作模式 work pattern	设置调压器的工作模式 用于配置调压器最小输出值是否可以输出 0V Set up the operating mode of the voltage regulator Use to configure whether the minimum output value of the regulator can output 0V 设置范围：0/1 =0 时，为关停模式，最小输出=0V， =1 时，为不关停模式，最小输出电压=输出下限 Setting range: 0 / 1 At =0, for the shutdown mode, the minimum output =0V, =1, for the non-shutdown mode, the minimum output voltage = lower output limit

Exx	输出下限 bottoming	设置调压器的最小有效输出档位（百分比） 调压器最小有效输出电压值由此参数决定， Set the minimum effective output gear (percentage) The minimum effective output voltage value is determined by this parameters, 设置范围：20~70 参数值仅代表档位不是电压值，默认为 55≈AC180V Setting range: 20~70 The parameter value only represents the gear is not the voltage value, the default is 55 AC180V
Cxx	温控逻辑 Temperature control logic	设置温控逻辑 Set temperature control logic 设置范围：0/1 =0 时，正比输出，温度越高输出电压越大,多用于温控散热 =1 时，反比输出，温度越高输出电压越小,多用于温控加热 Setting range: 0 / 1 =0, proportional to the output, the higher the temperature, the greater the output voltage, more used for temperature control and heat dissipation =1, the inverse output, the higher the temperature, the smaller the output voltage, more used for temperature control heating
dxx	零点校准 Zero point calibration	高级参数，一般保持默认即可 Advanced parameters, generally keep the default can be

5.1 设置上限/下限温度/Set the upper / lower limit temperature

待机状态下，面板显示当前的温度值，按 1 下 MODE 键，数码管显示 L30,L 代表下限温度，30 表示温度值，按上下键可以调整启动温度值，调整完成后，按 ok 键确认，
In the standby state, the panel shows the current temperature value, press 1 MODE key, the digital tube shows L30, L represents the lower limit temperature, 30 represents the temperature value, press the upper and lower keys to adjust the start temperature value, after the adjustment is completed, press the OK button to confirm,

待机状态下，面板显示当前的温度值，按 2 下 MODE 键，数码管显示 H50,H 代表上限温度，50 表示温度值，按上下键可以调整全速温度值，调整完成后，按 ok 键确认
In standby state, the panel shows the current temperature value, press the MODE key 2, the digital tube shows H50, H represents the upper temperature, 50 represents the temperature value, press the upper and lower keys to adjust the full speed temperature value, after the adjustment is completed, press the k key to confirm
*温度设置完成，调压器将根据新设置的温度参数来自动控制输出电压。
* The temperature setting is complete, and the voltage regulator will automatically control the output voltage according to the newly set temperature parameters.

5.2 设置 RS485 地址/Set up the RS485 address

待机状态下，按 3 下 MODE 键，数码管显示 A01，此时按上下键可以调整数值，按 OK 键确认此参数主要是用于 RS485 串口通信，不用 485 功能可以忽略次参数

In standby state, press MODE for 3 times, the digital tube displays A01, press up and down key to adjust the value and press OK to confirm This parameter is mainly used for RS485 serial port communication, and the secondary parameters can be ignored without the 485 function

5.3 设置调压器的工作模式/Set up the operating mode of the voltage regulator

调压器支持两种工作模式，一种是关停模式，另一种是不关停模式；

The regulator supports two working modes, one is shutdown mode, the other is non-shutdown mode;

关停模式：当温度小于下限温度-2℃时（正比逻辑）或大于上限温度 H+2℃时（反比逻辑）调压器输出 0V（负载会断电）；

Close down mode: when the temperature is less than the lower limit temperature-2℃ (proportional logic) or greater than the upper limit temperature H + 2℃ (inverse logic) the regulator output 0V (load will power off);

不关停模式：当温度小于下限温度-2℃时（正比逻辑）或大于上限温度 H+2℃时（反比逻辑）调压器会维持最小输出电压，不会使负载断电；

Non-shutdown mode: when the temperature is less than the lower limit temperature-2℃ (proportional logic) or greater than the upper limit temperature H + 2℃ (inverse logic), the voltage regulator will maintain the minimum output voltage and will not power off the load;

待机状态下，按 4 下 MODE 键，数码管显示 P01,此时按上下键可以调整主板的工作模式，P00 代表关停模式，P01 代表最小转速模式，按 OK 键确认

In the standby state, press the MODE key for 4 times, the digital tube displays P01, then press the up and down keys to adjust the working mode of the motherboard, P00 represents the shutdown mode, P01 represents the minimum speed mode, press OK to confirm

5.4 设置输出下限（设置调压器最小有效输出电压档位/输出起始电压）

Set lower output limit (set regulator minimum effective output voltage gear / output start voltage)

调压器可以设定输出下限，也就是可以设置调压器最小起始输出电压

待机状态下，按 5 下 MODE 键，数码管显示 Exx，xx 就代表设置的最小输出电压档位

*不同的“用电设备”，最小工作电压不一样，有的需要很高的电压，有的又比较低，实际使用时就可以调整此参数来匹配不同的“用电设备”，这样就可以保证在整个温控调压区间内“用电设备”都可以稳定可靠的工作。

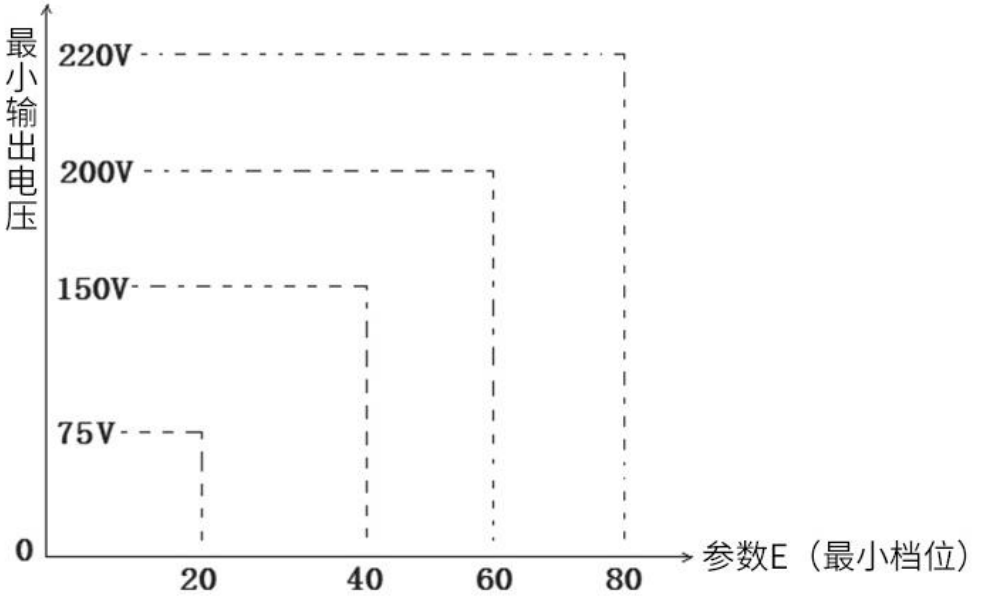
The regulator can set the lower output limit, that is, the minimum starting output voltage of the regulator In the standby state, press the MODE key for 5 times, the digital tube displays Exx, and xx represents the minimum output voltage gear set * Different "electrical equipment", the minimum working voltage is different, some

need very high voltage, some are relatively low, in the actual use, this parameter can be adjusted to match different "electrical equipment", so as to ensure that the "electrical equipment" can work in the whole temperature control and pressure regulation range stably and reliably.

特别注意：E 参数值越小，输出电压变化的区间就越大，获得的调压输出效果就越明显
Special note: the smaller the E parameter value, the larger the range of the output voltage change, and the more obvious the voltage regulation output effect obtained

E 参数值越大，输出电压变化的区间就越小，获得的调压输出效果就越不明显
The larger the value of E, the smaller the interval of output voltage change, and the less obvious the voltage regulation output effect

参数E的值与最小输出电压关系 示意图:



*上图 E 参数对应的输出电压仅供参数，实际输出电压受负载和输入电压影响！
* The output voltage corresponding to the parameter E in the figure above is only for the parameters, and the actual output voltage is affected by the load and the input voltage!

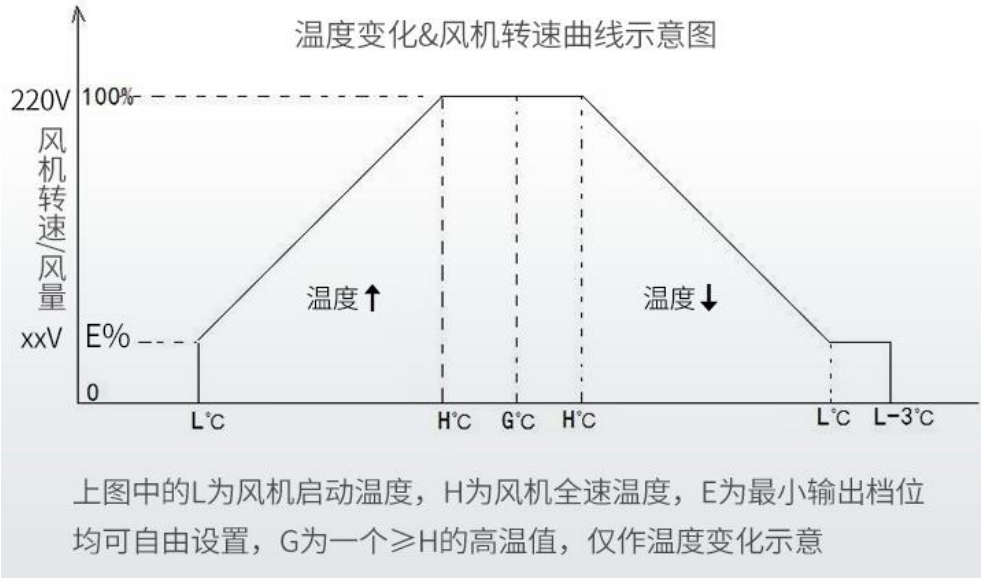
5.5 设置温控逻辑/Set temperature control logic

调压器支持设置正/反两种温控逻辑，
待机状态下，按 6 下 MODE 键，数码管显示 Cxx，xx 就代表温控逻辑
C00:正比输出，温度越高输出电压越大,多用于温控散热
C01:反比输出，温度越高输出电压越小,多用于温控加热
The voltage regulator supports setting both positive / negative temperature control logic, In the standby state, press the MODE key for 6 times, and the digital tube shows Cxx, and xx represents the temperature control logic C00: proportional to the output, the higher the temperature, the greater the output voltage, more used for

temperature control and heat dissipation C01: Inverse output, the higher the temperature, the smaller the output voltage, used for temperature control heating.

*以 AC220V 输入，正比输出，调压器控制风机散热为例，逻辑关系如下图：

* Take AC220V input, proportional output, voltage regulator control heat dissipation of the fan as an example, the logical relationship is as follows:

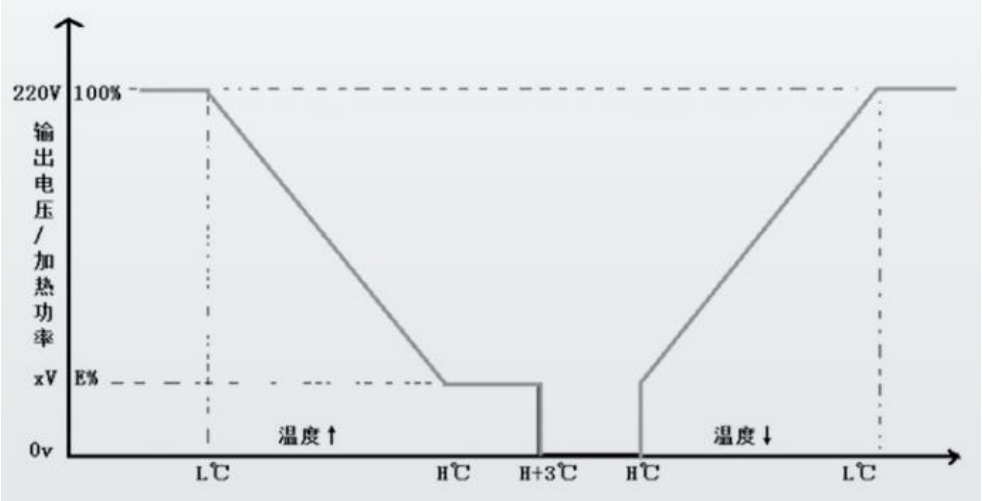


L 为下限温度，H 为上限温度，H>L，E 为最小输出电压档位

L is the lower limit temperature, H is the upper limit temperature, H> L, and E is the minimum output voltage gear.

*以 AC220V 输入，反比输出，调压器控制加热器加热为例，逻辑关系如下图：

* Take AC220V input, inverse output, voltage regulator control heater heating as an example, the logical relationship is as follows:



L 为下限温度，H 为上限温度，H>L，E 为最小输出电压档位

L is the lower limit temperature, H is the upper limit temperature, H> L, and E is the minimum output voltage gear.

5.6 交流过零点校准（校准调压效果）

AC zero point calibration (calibration pressure regulation effect)

调压器的核心技术是采用可控硅来实现的调压输出，可控硅调压必须要采集交流过零点，使用时，有可能因负载或电网的原因，出现过零点采集偏移，导致调压效果不好，故调压器可手动校准交流过零点，

待机状态下，按 7 下 MODE 键，数码管显示 d10，按上下键可以调整数值

The core technology of the regulator is the use of SCR to achieve the voltage regulation output, the silicon voltage regulation must collect the AC zero, when use, it may be due to the load or the power grid, the zero acquisition offset, resulting in poor voltage regulation effect, so the regulator can manually calibration of the AC zero, In the standby state, press the MODE key for 7 times, the digital tube displays d10, and press the up and down keys to adjust the value

*此参数只有在调压效果出现异常时才去调整，出厂默认是 d10,如果使用时没有出现不能调压的情况，不要去调整此参数！

* This parameter is only adjusted when the pressure regulation effect is abnormal. The default factory is d10. If there is no pressure regulation when using, do not adjust this parameter!

5.7 一键开关机 one click on/off function

待机状态下，长按“OK”键 3 秒，可实现按键开关机，关键状态下，按键失效并关闭输出，数码管显示“OFF”,开关机状态具有断电记忆功能，设备断电重启后会维持断电前的状态。

In standby mode, long press the "OK" button for 3 seconds to turn on and off the device. In critical mode, if the button fails and the output is turned off, the digital display will show "OFF". The on/off state has a power-off memory function, and the device will maintain its pre power-off state after power failure and restart.

6. 使用场景 usage scenario

7.RS485 串口通信协议说明

RS485 serial port communication protocol description

7.1 本协议遵守 MODBUS-RTU 通信协议,调压器作为从机，被动接收主机的指令。

This protocol complies with the MODBUS-RTU communication protocol, and the voltage regulator acts as the 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

7.2.串口参数/Serial port parameters

波特率 9600，无校验,8 位数据,1 位停止位

Porter rate 9600, no check, 8 bit data, 1 bit stop bit

7.3 寄存器地址表/Register address table

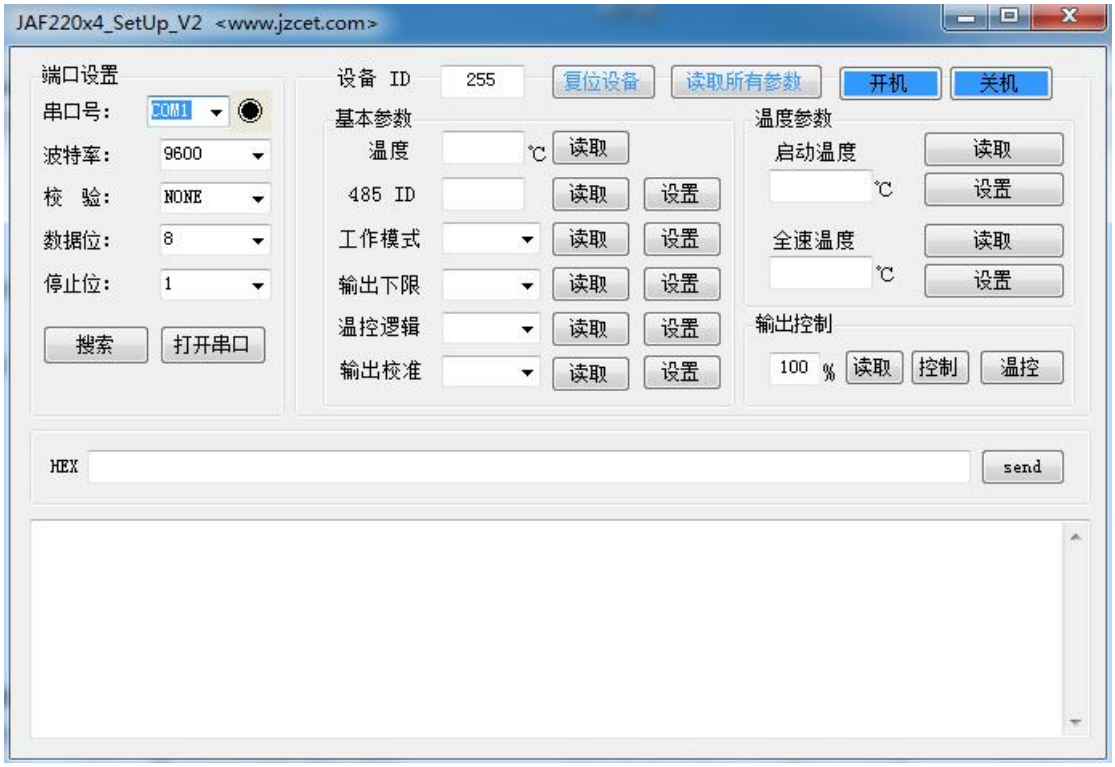
寄存器地址 Register address	说明 explain	允许操作 Allow operation	功能码 function code
0x0000	当前温度 The current temperature 正偏移 40，实际温度值=解析值-40 Positive offset of 40, actual temperature value = analytic value-40	只读 read only	0x03
0x0001	温度下限 Temperature lower limit 取值范围：0x002A~0x008A Value range: 0x002A~0x008A 正偏移 40，实际值=数据值-40 Positive offset of 40, actual value = data value-40	读/写 Read / write	0x03/0x06
0x0002	温度上限 The upper limit of temperature 取值范围：0x002B~0x008B Value range: 0x002B~0x008B	读/写 Read / write	0x03/0x06

	正偏移 40，实际值=数据值-40 Positive offset of 40, actual value = data value-40		
0x0003	MODBUS-485 地址，出厂默认为 01 MODBUS-485 address, the factory default is 01 取值范围：0x0001~0x00FE Value range: 0 x 0001 to 0 x 00 FE *读取时支持 FFFF 广播地址 * The FFFF broadcast address is supported when read	读/写 Read / write	0x03/0x06
0x0004	工作模式 work pattern =0x0000 风机关停模式 =0x0000 fan shutdown mode =0x0001 风机不关停模式 =0x0001 fan Not shutdown mode	读/写 Read / write	0x03/0x06
0x0005	输出下限 bottoming 调压器最小有效输出档位（类似电压百分比） Minimum effective output gear (similar voltage percentage) 取值范围：0x0014~0x0050 Value range: 0x0014~0x0050	读/写 Read / write	0x03/0x06
0x0006	温控逻辑 Temperature control logic =0x0000 正比输出 =0x0000 is proportional to the output =0x0001 反比输出 =0x0001 inverse output	读/写 Read / write	0x03/0x06
0x0007	输出校准 Output calibration 参数范围：0x0000、000a、000f、0014 Parameter ranges: 0x0000, 000a, 000f, 0014	读/写 Read / write	0x03/0x06
0x0008	输出档位 Output gear 为写时，串口强制控制输出电压，温控失效； For writing, the serial port forced control of the output voltage, temperature control failure; 写 FFFF 时，恢复到温控	读/写 Read / write	0x03/0x06

	When writing the FFFF, return to the temperature control 取值范围：0x0000、0x0014~0x0050、0xFFFF Value range: 0x0000, 0x0014~0x0050, and 0xFFFF		
0x0009	开关机控制 On/off control =0x0000 设备关机 Device OFF =0x0001 设备开机 Device operation	读/写 Read / write	0x03/0x06
0x0020	复位重启 Resume restart 参数范围:0x00AA Parameter range: 0x00AA 0x0020 寄存器地址写 0x00AA 可以使整机复位 0x0020 register address write 0x00AA can make the whole machine reset	只写 write only	0x06

*特别注意：读取参数时，一次只能读取一个寄存器或一次读取全部的寄存器，写参数时，一次只能写一个寄存器。

*我司可买免费提供配套的调试软件，如有需要可向客服索取或到官网下载，软件界面如下
* Our company can buy free supporting debugging software. If necessary, you can get it from the customer service or download it on the official website. The software interface is as follows



7.4. RS485 串口协议使用实例/RS485 Use Example (Hex)

7.4.1 查询当前温度（03 功能码，寄存器地址 0000）

Query the current temperature (03 function code, register address 0000)

指令格式：调压器地址 03 00 00 00 01 CRC16

Instruction format: voltage regulator address 03 00 00 00 01 CRC16

调压器返回：调压器地址 03 02 00 xx CRC16

Regulator return: the regulator address 03 02 00 xx CRC16

xx 为温度数据内容，HEX 格式，需要换算成十进制，

xx is temperature data content, HEX format, needs to be converted to decimal,

实际的温度（℃）=换算出的十进制值-40

Actual temperature (℃) = the converted decimal value of-40

以 modbus 地址 01、当前温度为 31℃为例

Take the modbus address 01, the current temperature is 31℃

主机发送：01 03 00 00 00 01 84 0A

Host sent: 01 03 00 00 00 01 84 0A

调压器应答：01 03 02 00 47 F8 76 (0x0047 换成 10 进制=71, 71-40=31℃)

Governor Response: 01 03 02 00 47 F8 76 (0x0047 to 10 M =71,71-40=31℃)

7.4.2 读取当前输出档位 (03 功能码，寄存器地址 0008)

Read the current output gear position (03 function code, register address 0008)

指令格式：调压器地址 03 00 08 00 01 CRC16

Instruction format: voltage regulator address 03 00 08 00 01 CRC16

调压器返回：调压器地址 03 02 00 xx CRC16

The regulator returns: The voltage regulator address 03 02 00 xx CRC16

*XX 换成十进制就是当前输出档位

* XX to decimal is the current output gear

7.4.3 强制控制输出档位（进入串口调压模式，温控失效）(06 功能码，寄存器地址 0008)

Forced control output gear (enter serial port voltage control mode, temperature control failure) (06 function code, register address 0008)

指令格式：调压器地址 06 00 08 00 xx CRC16

Instruction format: voltage regulator address 06 00 08 00 xx CRC16

调压器返回：调压器地址 06 00 08 00 xx CRC16

The regulator returns: The voltage regulator address 06 00 08 00 xx CRC16

*XX 换成十进制就是需要控制的输出档位，取值范围 0x0000、0x0014~0x0050、0x0064.

* XX to decimal is the output gear to be controlled, the value range is 0x0000, 0x0014~0x0050, 0x0064

*调压器收到此指令后，将直接按收到的档位数值来控制输出电压，温控暂时失效，
* After receiving this instruction, the voltage regulator will directly control the output voltage according to the received gear value, and the temperature control will temporarily fail,
*此控制仅实时生效，不保存，调压器复位重启后将自动恢复到温控
* This control only works in real time and is not saved

7.4.4 退出串口控制模式（回到温控模式）(06 功能码，寄存器地址 0008)
Exit the serial port control mode (back to temperature control mode) (06 function code, register address 0008)
指令格式：调压器地址 06 00 02 FF FF CRC16
Instruction format: voltage regulator address 06 00 02 FF FF CRC16
调压器返回：调压器地址 06 00 02 FF FF CRC16
The regulator returns: The voltage regulator address 06 00 02 FF FF CRC16

7.4.5 读取全部参数 (03 功能码，寄存器地址 0000~0009)
Read all parameters (03 function code, register address 0000~0009)
为方便使用，调压器除支持单个参数分次读取外，还支持一次读取全部参数
For convenience, the regulator supports all parameters read at once in addition to a parameter read
指令格式：调压器地址 03 0000 000a CRC16
Instruction format: voltage regulator address 03 0000 000a CRC16
0x0000：寄存器起始地址，0x000a：读取 10 个寄存器
0x0000: Register starting address, 0x000a: Read 10 registers
调压器返回：
Returns of the regulator:
01 03 14 0047 0052 14byte CRC16
0x14:返回数据长度,共 20 个字节(读 10 个寄存器,每个寄存器的数据占 2 个字节,10*2=20)
0x12: Return data length, a total of 18 bytes (read 9 registers, each register data occupies 2 bytes, 10 * 2=20)
0x0047 对应寄存器 0000 的值，0x0052 对应寄存器 0001 的值，以此类推…
0x0047 corresponds to the value of register 0000,0x0052 corresponds to the value of register 0001, and so on...

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