Third generation upgraded CNC voltage buck power supply color screen

Model: ZK-6522C

Product parameters

Product name: CNC DC buck power supply（Color screen） Product model: ZK-6522C
Input voltage: 6.0-75.00V Output voltage: 0.0-65.00V
Output current: 0-22A Output voltage accuracy: ± 0.3%+3 words (Calibratable)
Output power: 0-1430W; Output current accuracy: ± 0.5%+3 words (Calibratable)
Voltage resolution: 0.01V Current resolution: 0.01A
Data group storage: 11 groups Silicon rubber keypads: 5
Screen size: Upgraded 1.8-inch large screen, 36 * 29mm visible range Buzzer: Yes
Cooling fan on conditions:Temperature>45 ℃ or current>2A or power>30W
Product size: Product shell 83x48x29.4mm; (Height does not include rotary encoder)
Product motherboard:124x71x42mm
Product weight: Net weight of motherboard 210g, Net weight of the entire set 243g, The entire set includes a packaging weight of 296g

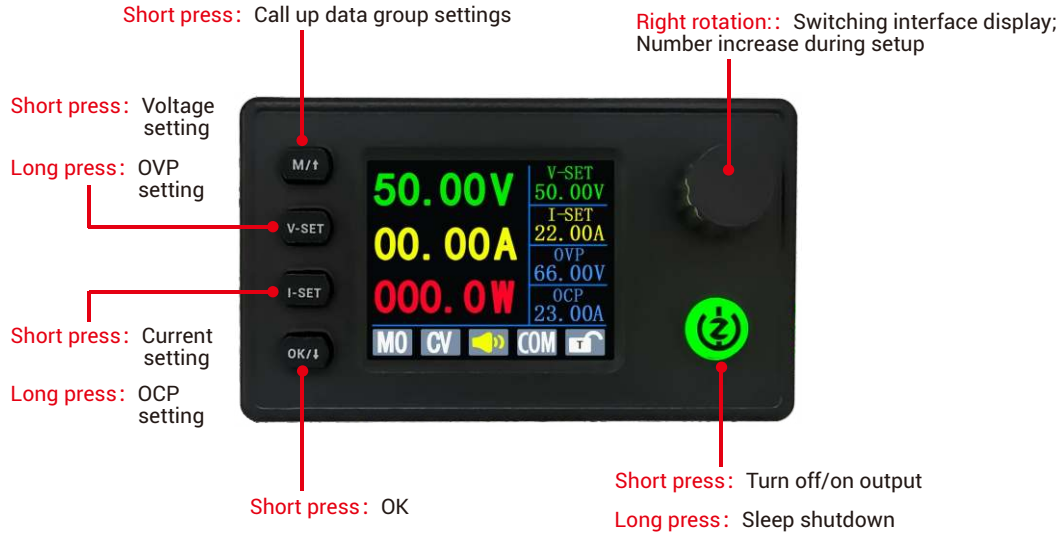
Protection mechanism:

Input undervoltage protection (LUP): 5.5-64V adjustable, factory default value of 5.5V
Output overvoltage protection (OUP): 1-66V adjustable, factory default value 66V
Output overcurrent protection (OCP): 0.01-23A adjustable, factory default value 23A
Output overpower protection (OPP): 1-1450W adjustable, factory default value 1450W
Over temperature protection (OTP): 30-99 ℃ adjustable, factory default value of 60℃
Timeout protection (OHP): 1-99 hours and 59 minutes, factory default off
Overcapacity protection (OAH): 0.001-9999Ah, factory default off
Superenergy protection (OWH): 0.001-4000KWh, factory default off

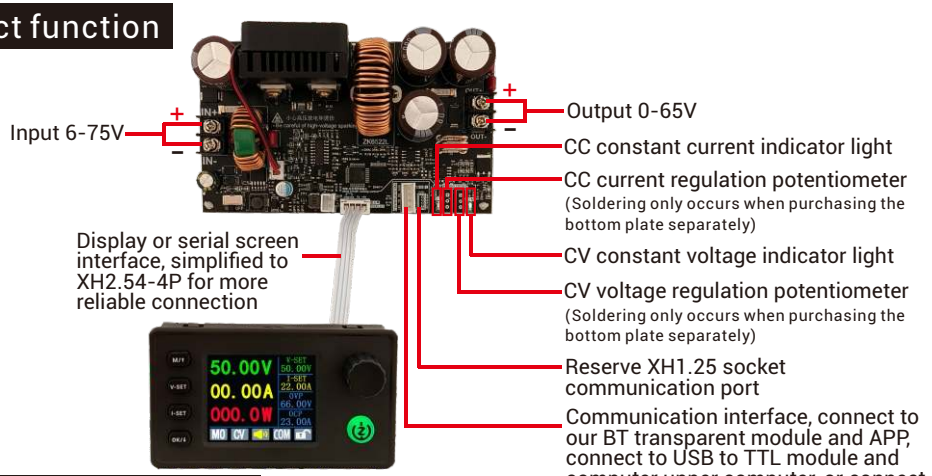
Notes：

1. It is not allowed to input AC power, let alone connect to 220V mains power.
2. The maximum allowable input voltage is 75V, and overvoltage input or reverse polarity connection is not allowed.
3. The output cannot fully guarantee anti backflow. When connecting the battery, it is necessary to ensure that the output voltage of the power module is always higher than the battery voltage, or to connect a diode in series with a unidirectional conduction at the output positive pole to prevent battery voltage backflow from burning out the power supply.
4. When connecting the output terminal to the battery, be careful not to reverse the positive and negative poles.
5. The product is a voltage reduction module, maximum output voltage = the input voltage * 0.95-1V.

Key functions

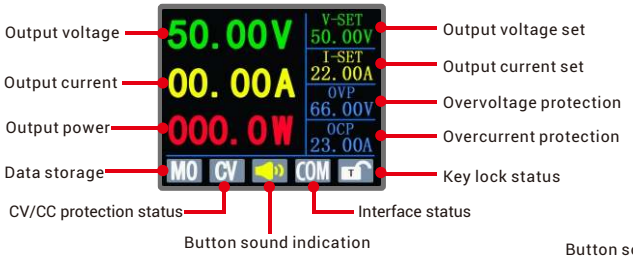


Product function

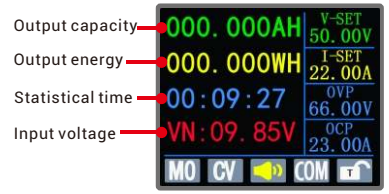


Interface Introduction

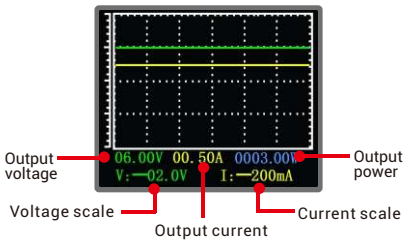
Main interface of power supply



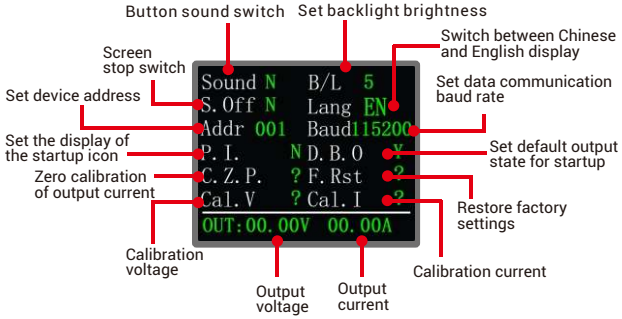
Statistics Interface

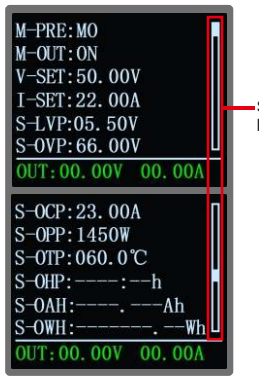


Curve display interface



Menu interface





Data group setting interface

M-PRE: Select data group M0-M10
M-OUT: Set the default switch when calling out the corresponding data group
V-SET: Set the output voltage value for the corresponding data group
I-SET: Set the output current value for the corresponding data group
S-LVP: Set the input undervoltage protection value for the corresponding data group, with a default of 5.5V
S-OVP: Set the output overvoltage protection value for the corresponding data group, default to 66V
S-OCP: Set the output overcurrent protection value for the corresponding data group, with a default of 23A
S-OPP: Set the output overpower protection value for the corresponding data group, with a default of 1450W
S-OTP: Set the over temperature protection value for the corresponding data group, default to 60℃
S-OHP: Set the timeout protection time for the corresponding data group, which is disabled by default
S-OAH: Set the over capacity protection value for the corresponding data group, which is disabled by default

Shell size



Suggested opening size

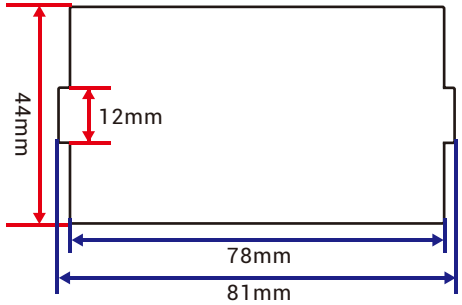
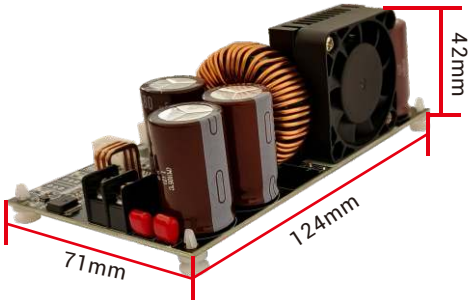
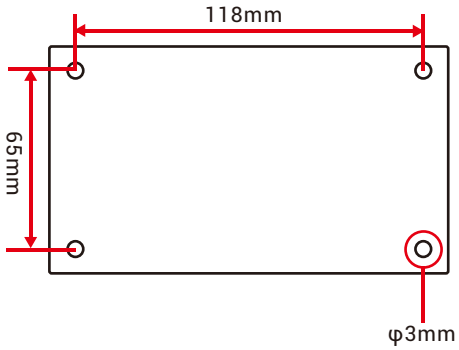


Plate size



Bottom plate installation hole size



Independent use of motherboard

Output current 0-22A adjustable, output voltage 0-65V adjustable



Tip: When selling the ZK6522B motherboard separately, it is necessary to solder the voltage and current adjustment potentiometers and plug in the jumper cap. If it is a serial screen or APP/ Upper computer control, the jumper cap must be unplugged and powered on again..



Voltage regulation potentiometer

Current regulation potentiometer

Short circuit RX GND is required for analog potentiometer control, otherwise digital commun-ication control is required



Instructions for use

Call out data group



Press M/↑ to call up the data group settings, rotate the encoder to switch to data group M0-M10;
Press OK/↓ to confirm and exit

Set voltage and current



Short press V-SET to enter the voltage setting, short press to rotate the encoder to shift and adjust the size.
After setting up, press V-SET or OK/↓ again to exit the setup.



Short press I-SET to enter the current setting, short press to rotate the encoder to shift and adjust the size.
After setting up, press I-SET or OK/↓ again to exit the setup.

Quick settings OVP/OCP

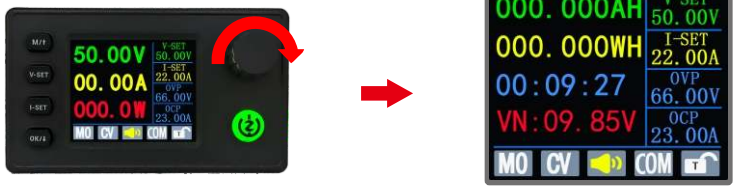


Long press V-SET to enter OVP settings, short press the rotary encoder to shift, rotate to adjust size.
After setting up, press V-SET or OK/↓ again to exit the setup.



Long press I-SET to enter OCP settings, short press the rotary encoder to shift, rotate to adjust size.
After setting up, press I-SET or OK/↓ again to exit the setup.

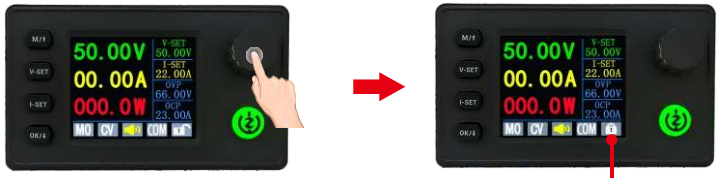
Switch display interface



Rotation encoder switch interface display



Locking function



Show lock symbols

On the normal display interface, long press and hold the rotary encoder for 2 seconds to lock the set voltage and current to prevent accidental operation; After locking, press and hold the encoder for 2 seconds to unlock. After locking, the power button can still operate normally, ensuring that the power can be disconnected at any time.

Introduction to parameter setting operations

On the normal interface, the rotary encoder switch interface displays

Curve display interface



Press OK/↓ to set the voltage scale (display V:—02.0V), rotate the encoder to switch size, then press OK/↓ to switch to the current scale (display I:—200mA), rotate the encoder to switch size, and then press OK/↓ to exit; Short press the rotary encoder to pause.

Press M/↑ to call out the data group



Rotating encoder switching data group M0-M10;
Press OK/↓ to confirm and exit

Press V-SET to bring up the settings interface



Can set voltage, current, overvoltage protection, overcurrent protection

Press I-SET to bring up the settings interface



Can set voltage, current, overvoltage protection, overcurrent protection

Menu interface

Short press M/↑ to select the settings option



1. Sound N : Rotating encoder on/off
2. S.Off N : Turn the rotary encoder on/off and set the screen rest time
3. Addr 001 : Set communication address for rotary encoder
4. P.I. N : Rotating encoder on/off
5. C.Z.P. ? : Short press OK/↓ to pop up the calibration zero point dialog box



Short press M/↑ to cancel and exit,Short press OK/↓ to confirm and exit.

6. Cal.V ? : Short press OK/↓ to pop up the calibration voltage dialog box



Short press M/↑ in the dialog box to cancel calibration and exit.

Calibration steps:

1. Use a multimeter to measure the actual voltage at the current output terminal (output terminal unloaded, measure the power terminal) and input it.
2. Short press OK/↓ to display voltage 2.
3. Use a multimeter to measure the actual voltage at the current output terminal again and input it.
4. Short press OK/↓ to complete the calibration.

If calibration is successful, it will display "CALI Success" and exit; otherwise, it will display "CALI Failed" and exit. If it fails, you can try calibrating again.

7. B/L 5 : Rotate the encoder to adjust the backlight brightness; 0-5 levels
8. Lang EN : Rotating encoder switching between Chinese and English
9. Baud 115200 : Rotation encoder switching communication rate size
10. D.B.O Y : Rotate the encoder to adjust the default output on/off during startup
11. F.Rst ? : Short press OK/↓ to pop up the calibration and factory reset dialog box



Short press M/↑ to cancel and exit,Short press OK/↓ to confirm and exit.

12. Cal.I ? : Short press OK/↓ to pop up the calibration current dialog box



Short press M/↑ in the dialog box to cancel calibration and exit.

Calibration steps:

1. Use a multimeter current range or electronic load to short circuit the output terminals and measure the current actual current and input it.
2. Short press OK/↓ to display current 2.
3. Use a multimeter to measure the actual current at the current output terminal again and input it.
4. Short press OK/↓ to complete the calibration.

If calibration is successful, it will display "CALI Success" and exit; otherwise, it will display "CALI Failed" and exit. If it fails, you can try calibrating again.

Data group setting interface

Short press M/↑ to select the settings option, and once the settings are complete, short press OK/↓ to confirm and exit.





1. M-PRE:M0 : Set up data groups
   Rotating encoder selection data group
2. M-OUT:ON : Set default on/off when calling out
   Default on/off when calling up rotary encoder settings
3. V-SET:50.0 0V : Set output voltage
   Short press the encoder to shift, rotate the encoder to adjust size
4. I-SET:22.0 0A : Set output current
   Short press the encoder to shift, rotate the encoder to adjust size
5. S-LVP:05.5 0V : Set input undervoltage protection
   Short press the encoder to shift, rotate the encoder to adjust size
6. S-OVP:66.0 0V : Set output overvoltage protection
   Short press the encoder to shift, rotate the encoder to adjust size
7. S-OCP:23.0 0A : Set output overcurrent protection
   Short press the encoder to shift, rotate the encoder to adjust size
8. S-OPP:145 0W : Set output overpower protection
   Short press the encoder to shift, rotate the encoder to adjust size
9. S-OTP:060.0 °C : Set up over temperature protection
   Short press the encoder to shift, rotate the encoder to adjust size
10. S-OHP:----:-0h : Set timeout protection
    Long press the encoder to turn on/off
    S-OHP:0000:01h Short press the encoder shift in the open state, rotate the encoder to adjust size
11. S-OAH:----.--0Ah : Set up over capacity protection
    Long press the encoder to turn on/off
    S-OAH:0000.001Ah Short press the encoder shift in the open state, rotate the encoder to adjust size
12. S-OWH:-------.-0Wh : Set up over energy protection
    Long press the encoder to turn on/off
    S-OWH:0000000.01Wh Short press the encoder shift in the open state, rotate the encoder to adjust size

一. Protocol Introduction

Using TTL serial transmission interface and MODBUS-RTU communication protocol, this product only supports function codes 0x03, 0x06, and 0x10.

2、 Introduction to Communication Protocol:

Information transmission is asynchronous, and Modbus RTU mode is based on 11 bit bytes

Starting position	1 digit
Data bits	8 digits
Parity check bit	nothing
Stop bit	1 digit

Data frame structure:

Data frame interval	Address code	Function code	Data area	CRC verification
3.5 bytes or more	1 byte	1 byte	N bytes	2 bytes

Before sending data, it is required that the data bus rest time, i.e. no data transmission time, be greater than 3.5 (for example, 5ms at a baud rate of 9600). Message transmission must start with a pause interval of at least 3.5 bytes, and the entire message frame must be treated as a continuous data transmission stream. If there is a pause time of more than 3.5 bytes before the frame is completed, the receiving device will refresh the incomplete message and assume that the next byte is the address domain of a new message. Similarly, if a new message starts with the previous message within less than 3.5 characters, the receiving device will consider it a continuation of the previous message.

1.1 Address Code:

The address code is the first byte (8 bits) of each communication information frame, ranging from 1 to 255 (initially set to 1,0 and also the broadcast address). This byte indicates that the slave set by the user will receive information sent by the host. Each slave must have a unique address code, and only slaves that match the address code can respond to feedback messages. When the slave sends back information, the returned data starts with their respective address codes. The address code sent by the host indicates the slave address to be sent, while the address code returned by the slave indicates the slave address to be returned. The corresponding address code indicates where the information comes from.

1.2 Function code:

The function code is the second byte transmitted in each communication information frame, and the ModBus communication protocol can define function codes ranging from 1 to 127. Sent as a host request, telling the slave what action to take through a function code. As a response from the slave, the function code returned by the slave is the same as the function code sent from the master, and indicates that the slave has responded to the master and performed relevant operations. This machine only supports function codes 0x03, 0x06, and 0x10.

Function code	Definition	Operation (binary)
0x03	Read register data	Read data from one or more registers
0x06	Write a single register	Write a set of binary data into a single register
0x10	Write multiple registers	Write multiple sets of binary data into multiple registers

1.3 Data Area

The data area includes what information or actions need to be returned by the slave, which can be data (such as switch inputs/outputs, analog inputs/outputs, registers, etc.), reference addresses, etc. For example, if the host tells the slave through function code 03 to return the value of the register (including the starting address of the register to be read and the length of the read register), the returned data includes the length and content of the register. (The data within a single register address is double byte data)

0x03 Read function host format

Address code	Function code	Register Start Address	Number of register addresses n (1-32)	CRC verification code
1 byte	1 byte	2 bytes	2 bytes	2 bytes
01	03	00 00	00 10	44 06

0x03 Read Function Slave Return Format

Address code	Function code	Return the number of registers n	Register data	CRC verification code
1 byte	1 byte	1 byte	2*n 个字节	2 bytes
01	03	04	2*n	

0x06 Write Single Register Function Host Format

Address code	Function code	Register Start Address	Register data	CRC verification code
1 byte	1 byte	2 bytes	2 bytes	2 bytes
01	06	00 12	00 01	E8 0F

0x06 Write Single Register Function Slave Return Format

Address code	Function code	Register Start Address	Register data	CRC verification code
1 byte	1 byte	2 bytes	2 bytes	2 bytes
01	06	00 12	00 01	E8 0F

0x10 Write Multiple Registers Function Host Format

Address code	Function code	Register Start Address	Number of register addresses n (1-32)	Write Bytes 2*n	Register data	CRC verification code
1 byte	1 byte	2 bytes	2 bytes	1 byte	2*n 字节	2 bytes

0x10 Write multiple registers in slave host format

Address code	Function code	Register Start Address	Number of register addresses n (1-32)	CRC verification code
1 byte	1 byte	2 bytes	1 byte	2 bytes

Introduction to Protocol Registers (Data within a Single Register Address is Double Byte Data)

name	explain	Byte count	decimal point	unit	Reading and	Register Address

					writing	
V-SET	Voltage setting	2	2	V	R/W	0000H
I-SET	Current setting	2	2	A	R/W	0001H
VOUT	Output voltage display value	2	2	V	R	0002H
IOUT	Output current display value	2	2	A	R	0003H
POWER	Output power display value	2	1	W	R	0004H
UIN	Input voltage display value	2	2	V	R	0005H
AH-LOW	Output AH low 16 bits	2	0	maH	R	0006H
AH-HIGH	Output AH high 16 bits	2	0	maH	R	0007H
WH-LOW	Output WH low 16 bits	2	0	mwH	R	0008H
WH-HIGH	Output WH high 16 bits	2	0	mwH	R	0009H
OUT-H	Opening duration - hours	2	0	H	R	000AH
OUT-M	Start time in minutes	2	0	M	R	000BH
OUT-S	Opening time - seconds	2	0	S	R	000CH
T.IN	Internal temperature value	2	1	C	R	000DH
T.EX	External temperature value	2	1	C	R	000EH
LOCK	Key lock	2	0	-	R/W	000FH
PROTECT	Protection status	2	0	-	R/W	0010H
CVCC	Constant voltage and constant current state	2	0	-	R	0011H
ONOFF	Switch output	2	0	-	R/W	0012H
F-C	Temperature symbol	2	0	-	R	0013H
B-LED	Backlight brightness level	2	0	-	R/W	0014H
SLEEP	Screen rest time	2	0	M	R/W	0015H
MODEL	Product model	2	0	-	R	0016H
VERSION	Firmware Version	2	0	-	R	0017H
SLAVE-ADD	Slave address	2	0	-	R/W	0018H
BAUDRATE-L	Baud rate	2	0	-	R/W	0019H
T-IN-OFFSET	Internal temperature correction	2	1	C	R/W	001AH
T-EX-OFFSET	External temperature correction	2	1	C	R/W	001BH
BUZZER	Buzzer switch	2	0	-	R/W	001CH
EXTRACT-M	Quick access to data groups	2	0	-	R/W	001DH
DEVICE	Device status	2	0	-	R/W	001EH
V-SET	Voltage setting	2	2	V	R/W	001FH
V-SET	Voltage setting	2	2	V	R/W	0050H
I-SET	Current setting	2	2	A	R/W	0051H
S-LVP	Low voltage protection value	2	2	V	R/W	0052H
S-OVP	Overvoltage protection value	2	2	V	R/W	0053H
S-OCP	Overcurrent protection value	2	2	A	R/W	0054H
S-OPP	Overpower protection value	2	1	W	R/W	0055H
S-OHP_H	Maximum output duration - hours	2	0	H	R/W	0056H
S-OHP_M	Maximum output duration in minutes	2	0	M	R/W	0057H
S-OAH.L	Maximum output AH low 16 bits	2	0	maH	R/W	0058H
S-OAH_H	Maximum output AH high 16 bits	2	0	maH	R/W	0059H
S-OWH.L	Maximum output WH low 16 bits	2	0	10mwH	R/W	005AH
S-OWH.H	Maximum output WH high 16 bits	2	0	10mwH	R/W	005BH
S-OTP	Over temperature protection value	2	1	F/C	R/W	005CH
S-INI	Power on output switch	2	0	-	R/W	005DH
S-O-CLOSE	The last switch state of the outdated over capacity and over energy switch Obsolete Over capacity 1000000000000 100 Overpower 000000 10000000	2	0	-	R/W	005EH
Restore Factory	Restore factory settings	2	0		W	0020H
ZERO	Zeroing	2	0	-	W	0021H
Reset	restart	2	0		W	002FH

Note 1: This product is designed with 11 storage data groups of M0-M10, each with a total of 14 data groups numbered 00-0D. The M0 data group is the default data group called by the product when powered on, and the starting address calculation method for the data group is: 0050H+data group number * 0010H. For example, the starting address for the M3 data group is 0050H+3 * 0010H=0080H.

Note 2: The reading and writing values for the key lock function are 0 and 1, where 0 is non locked and 1 is locked.

Note 3: The read value for protection status is 0-11:

0: Normal operation, 1: OVP, 2: OCP, 3: OPP, 4: LVP, 5: OAH, 6: OHP, 7: OTP, 8: OEP, 9: OWH, 10: ICP. 11: IVP

Note 4: The reading values for constant voltage and current state are 0 and 1, where 0 is the CV state and 1 is the CC state.
Note 5: The read and write values for the switch output function are 0 and 1, with 0 being the off state and 1 being the on state.
Note 6: The reading and writing range of the backlight brightness level is 0-5, with level 0 being the darkest and level 5 being the brightest.
Note 7: The quick access data group function writes values from 0 to 10, and after writing, the corresponding data group data will be automatically retrieved.

1.4 Error Check Code (CRC Check):

The host or slave can use a checksum to determine whether the received information is correct. Due to electronic noise or other interferences, errors may sometimes occur during the transmission of information. Error check codes (CRC) can verify whether the information of the host or slave during communication data transmission is correct. Incorrect data can be discarded (whether sent or received), which increases the security and efficiency of the system. The CRC (Redundant Cyclic Code) of MODBUS communication protocol contains 2 bytes, which is a 16 bit binary number. The CRC code is calculated by the transmitting device (host) and placed at the end of the transmitted information frame. The receiving device (slave) recalculates the CRC of the received information and compares whether the calculated CRC matches the received CRC. If the two do not match, it indicates an error. When sending CRC checksum, the low bit is in front and the high bit is in the back.

Calculation method for CRC code:

(1) Set one 16 bit register as hexadecimal FFFF (i.e. all are 1); Call this register CRC register;
(2) Distinguish the first 8-bit binary data (i.e. the first byte of the communication information frame) from the lower 8 bits of the 16 bit CRC register, and place the result in the CRC register;
(3) Shift the content of the CRC register to the right by one bit (towards the low bit) and fill the highest bit with 0, and check the shifted out bit after the right shift;
(4) If the displacement is 0: repeat step 3 (move one position to the right again); If the removal bit is 1: CRC register XOR with polynomial A001 (1010 0000 0000 0001);
(5) Repeat steps 3 and 4 until shifted 8 times to the right, so that the entire 8-bit data has been processed;
(6) Repeat steps 2 to 5 to process the next byte of the communication information frame;
(7) After calculating all bytes of the communication information frame according to the above steps, swap the high and low bytes of the 16 bit CRC register obtained;
(8) The final CRC register obtained is the CRC code.

3、 Communication

Example 1: The host reads the displayed values of output voltage and output current

Message format sent by the host:

Host sending	Byte count	Message sent	Remarks
Slave address	1	01	Sent to slave with address 01
Function code	1	03	Read Register
Register Start Address	2	0002H	Register Start Address
Number of register addresses	2	0002H	2 bytes in total
CRC code	2	65CBH	CRC code calculated by the host

For example, if the current displayed value is 05.00V, 2.00A, the format of the message returned by the slave response is:

Slave response	Byte count	Information returned	Remarks
Slave address	1	01	From slave 01
Function code	1	03	Read Register
Read Bytes	1	04	1 byte in total
The content of register with address 0002H	2	01F4H	Output voltage display value
The content of register with address 0003H	2	00C8H	Output current display value
CRC code	2	BBABH	CRC code calculated by slave machine

Example 2: The host needs to set the voltage to 12. 00V

Message format sent by the host:

Host sending	Byte count	Message sent	Remarks
Slave address	1	01H	From slave 01
Function code	1	06H	Write a single register
Register Address	2	0000H	Register Address
The content of register with address 0000H	2	04B0H	Set output voltage value
CRC code	2	8ABEH	CRC code calculated by the host

The format of the message returned by the response received by the slave is:

Slave response	Byte count	Information returned	Remarks
Slave address	1	01H	Sent to slave with address 01
Function code	1	06H	Write a single register
Register Address	2	0000H	Register Start Address
The content of register with address 0000H	2	04B0H	Set output voltage value
CRC code	2	8ABEH	CRC code calculated by slave machine

Example 3: The host needs to set the voltage to 24.00V and the current to 15.00A.

Message format sent by the host:

Host sending	Byte count	Message sent	Remarks
Slave address	1	01H	From slave 01
Function code	1	10H	Write Register
Register Start Address	2	0000H	Register Start Address
Number of register addresses	2	0002H	2 bytes in total
Write Bytes	1	04H	1 byte in total
The content of register with address 0000H	2	0960H	Set output voltage value
The content of register 0001H with address	2	05DCH	Set output current value

CRC code	2	F2E4H	CRC code calculated by the host

The format of the message returned by the response received by the slave is:

Slave response	Byte count	Information returned	Remarks
Slave address	1	01H	Sent to slave with address 01
Function code	1	10H	Write Register
Register Start Address	2	0000H	Register Start Address
Number of register addresses	2	0002H	2 bytes in total
CRC code	2	41C8H	CRC code calculated by slave machine