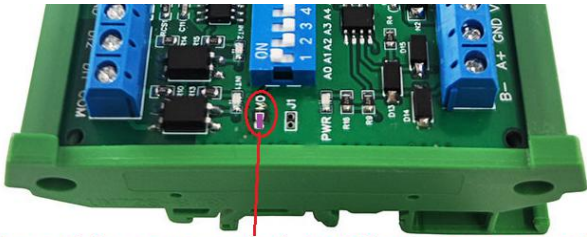# 23IOXXX Modbus RTU Command 2

Jumper M0 Connected (Soldered)

When using this command, M0 jumper must be soldered

MODBUS command (function code 05/06/15/16 is Control command,01/02/03 is Read status command)

M0 jumper must be shorted when using this command

Note :

1 MODBUS command must be HEX

2 Slave ID (device address) must be correct, the default slave address is 01, and the Slave ID is set by DIP switch.

3 If you don't remember the Slave ID, use the command Read Slave ID : FF 03 00 FD 00 01

00 24

4 M0 jumper must be shorted when using this command

The baud rate is 9600 , 8 data bits, one stop bit, and no parity bit.

Product Type

Channles	Product Model	Product ID	Input Type
8	23IOA08	2308	NPN/PNP
16	23IOB16	2316	NPN
24	23IOC24	2324	NPN
32	23IOD32	2332	NPN/PNP
48	23IOE48	2348	NPN

Supported function codes:

Function Code	Modbus Address (PLC)	Register Address	Describe
01:	00001	0x0000-0x002F (0-7/15/23/31/47)	Read DO digital output status (relay)
05:	00001	0x0000-0x002F (0-7/15/23/31/47)	Write a single DO digital output (relay)
15:	00001	0x0000-0x002F (0-7/15/23/31/47)	Write multiple DO digital output (relay)
02:	10001	0x0000-0x002F (0-7/15/23/31/47)	Read DI digital input (optical isolation input)
03	40001		
		0x0080-0x00FF (128-255)	Read special function registers (baud rate 485 address, etc.)
06	40001		
		0x0080-0x00FF (128-255)	Write a single special function register (baud rate 485 address, etc.)
16(0x10)	40001		
		0x0080-0x00FF (128-255)	Write multiple special function registers (baud rate 485 address, etc.)

All states are mapped into 4xxxx range registers. The user can monitor the input and output status of the module by reading or modifying the value of the 4xxxx interval register (03 06 16 function code)

Register address	Register contents	Register value	Remarks	R/W
0x0080-0X0082 (128-130)	DO digital output	0X0080: 0-15 Channels 0X0081: 16-31 Channels 0X0082: 32-47 Channels One bit one channel only supports ON/OFF Command: 1 ON; 0 OFF		R/W
0x0090-0x0092 (144-146)	DI digital input	0X0090: 0-15 Channels 0X0091: 16-31 Channels 0X0092: 32-47 Channels 1 has Input; 0 has no Input		R

Special Function Register:				
0X00F5 (245)	Remote IO Sending	Unit: 0.2 seconds 0 Disable; 1-255 : Send once every 0.2-51 seconds		R/W
0X00F6 (246)	Remote IO Receive	0 Disable; 1 Enable;		R/W
0x00F7 (247)	Product ID	SKU ID 23IOA08 2308 23IOB16 2316 23IOC24 2324 23IOD32 2332 23IOE48 2348		R/W
0x00F8 (248)	Automatic reporting of digital input(DI) status	0X00C0-0X00C2 register is automatically reported 0: Query function (default) 1-255: Automatically report, the unit is second. 1: Report every 1 second 2: Report every 2 seconds 10: Report every 10 seconds Maximum interval of 255 seconds		R/W
0x00FA (250)	Input and output relationship（DI-DO relationship）	0x0000 Unrelated(default) 0x0001 Self-locking 0x0002 Interlocking(all ch) 0x0003 Momentary 0x0004 Interlocking(2 ch) 0x0005 Output=Input Other values are the same as 0		R/W
0x00FB (251)	Factory Reset Enter the following command at the current baud rate: FF 06 00 FB 00 00 ED E5			R/W
0x00FC (252)	Command Return Time	0-25	Time interval for command return (unit: 40MS) Setting value: 0-25	R/W
0x00FD (253)	RS485 address (Station address)	Products with DIP switches can only read Read address：FF 03 00 FD 00 01 00 24;		R
0x00FE (254)	Baud rate	0-7	0:1200 1:2400 2:4800 3:9600 （default） 4:19200 5:38400 6:57600 7:115200	R/W

			Others: Factory reset	
0x00FF (255)	Parity	0-2	0 None Parity 1 Even Parity 2 Odd Parity	R/W

9600 Band ,8 Data bits,None Parity,1 Stop Bit。

MODBUS commands you can use "Modbus Poll" input, as shown below
（CRC check generated automatically）
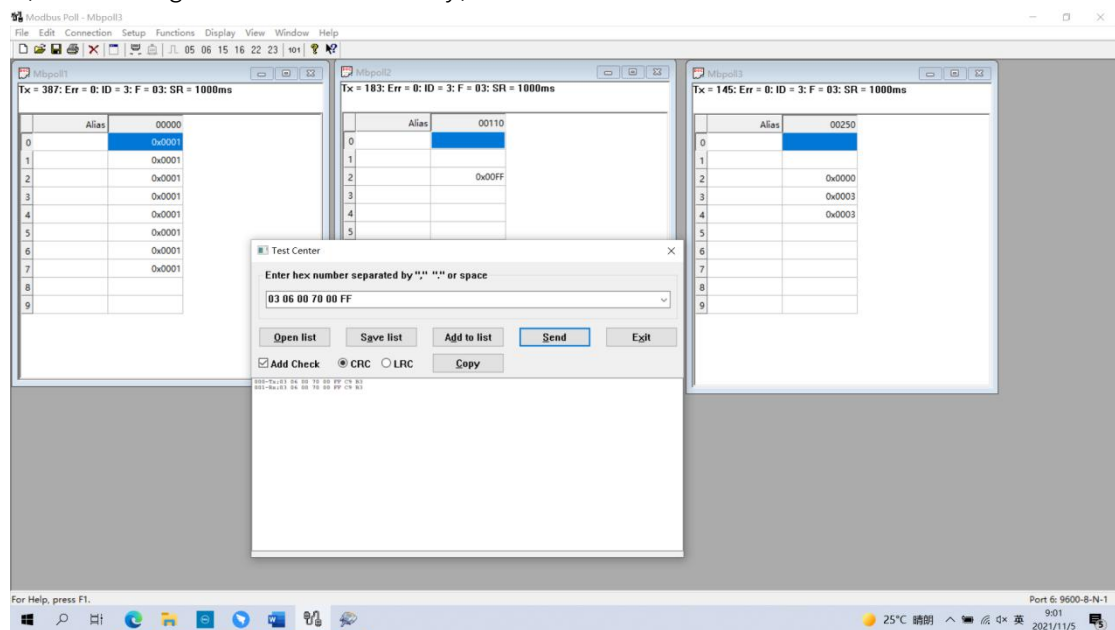
You can also use HyperTerminal serial input, as shown below
（Manually add CRC check）

1. Read DI digital input status (NPN/PNP photoelectric isolation input): Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC)：10001-10008
RS485 address : 0x01~0x3F
Function code: 0x02
Register address:0x0000-0x0007
Read number :0x0001-0x0008

For example, read the status of DI digital input of channel 0-7:
Send data(address 1): 01 02 00 00 00 08 79 CC
Return data   : 01 02 01 89 60 2E
01 RS485 address, 02 function code, 01 length, 89 refers to the current DI digital input status, converted to binary 10001001, indicating that 0/3/7 channels have input, and other channels have no input.

In addition, the DI digital input is also mapped to the 40000 interval register. The user can read the value of the DI digital input through the 03 function code.

Modbus Address(PLC)：40145
RS485 address : 0x01~0x3F
Function code:0x03
Register address:0x0090
Read number: 0x0001

For example, read the status of DI digital input of channel 0-7:
Send data(address 1): 01 03 00 90 00 01 84 27
Return data   : 01 03 02 00 56 38 7A
01 RS485 address, 03 function code, 02 length, 0056 refers to the current DI digital input status, converted to binary 01010110, indicating that 1/2/4/6 channels have input, and other channels have no input.

2. Read DO digital output status :

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC)：00001-00008
RS485 address : 0x01~0x3F
Function code: 0x01
Register address:0x0000-0x0007
Read number :0x0001-0x0008

For example, read the status of DO digital output of channel 0-7:
Send data(address 1): 01 01 00 00 00 08 3D CC
Return data   : 01 01 01 B8 51 FA
01 RS485 address, 01 function code, 01 length, B8 refers to the current DO digital output status, converted to binary 10111000, indicating that 7/5/4/3 channels have output, and other channels have no output.

In addition, the DO digital output is also mapped to the 40000 interval register. The user can read the value of the DO digital output through the 03 function code.

Modbus Address(PLC)：40129
RS485 address : 0x01~0x3F
Function code:0x03
Register address:0x0080
Read number: 0x0001

For example, read the status of DO digital output of channel 0-7:
Send data(address 1): 01 03 00 80 00 01 85 E2
Return data   : 01 03 02 00 38 B9 96
01 RS485 address, 03 function code, 02 length, 0038 refers to the current DO digital output status, converted to binary 00111000, indicating that 3/4/5 channels have output, and other channels no output.

3. Write single DO digital output status :

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC)：00001-00008
RS485 address : 0x01~0x3F
Function code:0x05
Register address:0x0000-0x0007

For example 1, Write channel 0 to ON, others OFF:
Send data(address 1):01 05 00 00 FF 00 8C 3A
Return data   :01 05 00 00 FF 00 8C 3A

For example 2, Write channel 5 to ON, others OFF:

Send data(address 1):01 05 00 05 FF 00 9C 3B
Return data   :01 05 00 05 FF 00 9C 3B

For example 3, Write channel 7 to ON, others OFF:
Send data(address 1):01 05 00 07 FF 00 7C 0B
Return data   :01 05 00 07 FF 00 7C 0B

In addition, the DO digital output is also mapped to the 40000 interval register. The user can write the DO digital output value through the 06/16 function code.

Modbus Address(PLC)：40129
RS485 address :0x01~0x3F
Function code:0x06/0x10
Register address:0x0080

For example, Write channel 0/3 to ON, others OFF:
Send data(address 1):01 06 00 80 00 09 48 24
Return data   :01 06 00 80 00 09 48 24

4.Write multiple DO digital output status (relay output):

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC)：00001-00008
RS485 address :0x01~0x3F
Function code:0x0F
Register address:0x0000-0x0007

For example 1, Write channel 0-7 to OFF:
Send data(address 1):01 0F 00 00 00 08 01 00 FE 95
Return data   :01 0F 00 00 00 08 54 0D

For example 1, Write channel 0-7 to ON:
Send data(address 1):01 0F 00 00 00 08 01 FF BE D5
Return data   :01 0F 00 00 00 08 54 0D

For example 3, Write channel 0/1/3/7 to ON, others OFF:
Send data(address 1):01 0F 00 00 00 08 01 8B BE F2
Return data   :01 0F 00 00 00 08 54 0D

In addition, the DO digital output is also mapped to the 40000 interval register. The user can write the DO digital output value through the 06/16 function code.

Modbus Address(PLC)：40129
RS485 address :0x01~0x3F
Function code:0x06/0x10
Register address:0x0080

For example, Write channel 0/3 to ON, others OFF:
Send data(address 1):01 06 00 80 00 09 48 24
Return data   :01 06 00 80 00 09 48 24

Special function Register

1.Set the 485 address(Slave ID)

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC): 40254
RS485 address :0x01~0Xf8/0XFF
Function code:Write Read 0x03
Register address:0x00FD(253)
Value: 2 bytes (values 1-248)

For example 1: Set the current device address to 0x02
Turn the second bit of the DIP switch to ON, and the other to OFF

For example 2: Read device address,only one RS485 device can be connected
Send data   : FF 03 00 FD 00 01 00 24
Return data : 01 03 02 00 01 79 84

Note: With this command, there can be only one module on the bus 485,
More than one will go wrong!

2.Write baud rate

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC)：40255
RS485 address :0x01~0x3F
Function code:Write 0x06/0x16;Read 0x03
Register address:0x00FE(254)
Value: 2 bytes (values 0-7)

For example 1, Change the baud rate to 4800bps:
Send data(address 1):01 06 00 FE 00 02 69 FB
Return data   :01 06 00 FE 00 02 69 FB

Baud rate corresponds to the number: 0:1200 1:2400 2:4800 3:9600
4:19200 5:38400 6:57600 7: 115200 8: Factory reset
Note: 1 The baud rate will be updated only when the module is powered on
        again when this command is used!
     2 When the number corresponding to the baud rate is 8, the factory
       settings can be restored
       For example:01 06 00 FE 00 08 E9 FC

For example 2 Read the current baud rate:
Send data(address 1):01 03 00 FE 00 01 E5 FA
Return data   :01 03 02 00 03 F8 45

01 RS485 address，03 Function,02 length,F8 45 crc16,03 means the current
baud rate is 9600bps

   Baud rate corresponds to the number: 0:1200 1:2400 2:4800 3:9600
   4:19200 5：38400 6:57600 7: 115200

3. Set digital input and output relationship (DI-DO relationship):
Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC):40251
RS485 address :0x01~0x3F
Function code:Write 0x06/0x16;Read 0x03

Register address:0x00FA(250)
Value: 2 bytes (values 0-5)

For example, set the input and output to be unrelated, and change the register value to 0X0000:
Send data(address 1):01 06 00 FA 00 00 A9 FB
Return data   :01 06 00 FA 00 00 A9 FB

Register value:
0x0000 Unrelated(default)
0x0001 Self-locking relationship
0x0002 Interlocking relationship(all channels)
0x0003 Momentary relationship
0x0004 Interlocking relationship(2 channels)
0x0005 Output=Input
Other values are the same as 0x0000

For example: read the current input-output relationship
Send data(address 1):01 03 00 FA 00 01 A4 3B
Return data   :01 03 02 00 01 79 84
01 RS485 address, 03 Function,02 length 0001is Self-locking relationship
,15 FA crc16

4. Set DI digital input status to automatically report (8/16/24/32/48 channels are set at the same time):(Automatic reporting of digital input(DI) status)

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC): 40249
RS485 address :0x01~0x3F
Function code:Write 0x06/0x16;Read 0x03
Register address:0x00F8(248)
Value: 2 bytes (values 0-255)

For example : For example, the current query function should be changed to automatic reporting:

1 second automatic report : 01 06 00 F8 00 01 C9 FB
2 second automatic report : 01 06 00 F8 00 02 89 FA
3 second automatic report : 01 06 00 F8 00 03 48 3A
4 second automatic report : 01 06 00 F8 00 04 09 F8
5 second automatic report : 01 06 00 F8 00 05 C8 38
10 second automatic report : 01 06 00 F8 00 0A 88 3C

Disable reporting function(Query function): 01 06 00 F8 00 00 08 3B

5. Set Remote IO Sender:

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC):40246
RS485 address :0x01~0x3F
Function code:Write 0x06/0x16;Read 0x03
Register address:0x00F5(245)
Value: 2 bytes (values 0-255)

Configure this register, the 23IOXX board will actively send the input status of IN1-IN8/16/24/32/48 through RS485 Port, and control the output ports 01-08/16/24/32/48 of another 23IOXX board (the RS485 address of the two boards should be the same).

The unit is 0.2 seconds. 0 Disable,1-255 means 0.2-51 seconds to send once

For example, if remote IO sending is currently disable, it should be changed to allow remote IO sending:
0.2 seconds, send data(RS485 address is 1): 01 06 00 F5 00 01 58 38
0.4 seconds, send frame (address is 1) 01 06 00 F5 00 02 18 39

0.6 seconds, send frame (address is 1) 01 06 00 F5 00 03 D9 F9
0.8 seconds, send frame (address is 1) 01 06 00 F5 00 04 98 3B
1 second, send frame (address is 1) 01 06 00 F5 00 05 59 FB
Disable remote IO sending: send frame (address is 1) 01 06 00 F5 00 00
99 F8

6. Set Remote IO Receive Enable:

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC):40247
RS485 address :0x01~0x3F
Function code:Write 0x06/0x16;Read 0x03
Register address:0x00F6(246)
Value: 2 bytes (values 0-255)

When enable Remote IO Sender, please configure this register to 1.

For example,
Enable Remote IO Receive:
send frame (address is 1) 01 06 00 F6 00 01 A8 38
Disable Remote IO Receive:
send frame (address is 1) 01 06 00 F6 00 00 69 F8

Note: When this register is configured as 1, register 0x0080-0x0082 does
not Read

7. Set Command(Date) Return Time

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

(1)				

Modbus Address(PLC)：40253
RS485 address :0x01~0x3F
Function code:Write 0x06/0x16;Read 0x03
Register address:0x00FC(252)
Value: 2 bytes (values 0-25)

For example, set the data return delay to 200ms
Send data(address 1):01 06 00 FC 00 05 89 F9
Return data   :01 06 00 FC 00 05 89 F9
Return the delay time calculation formula:X = 05 * 40 = 200MS

Note: The maximum can be set to 1000MS. If it exceeds 1000MS, that is, the setting value is greater than 25, and the data return delay will be initialized.
That is: 01 06 00 FC 00 20 48 22 can make the data return delay to restore initialization 0

8.Set Parity
Send data

RS485 address (Station address) (1)	Functio n (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Functio n (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC)：40256
RS485 address :0x01~0x3F
Function code:Write 0x06/0x16;Read 0x03
Register address:0x00FF(255)
Value: 2 bytes (values 0-2)

For example, set the parity to Even parity
Send data(address 1):01 06 00 FF 00 01 78 3A
Return data   :01 06 00 FF 00 01 78 3A
0 None Parity 1 Even Parity 2 Odd Parity
Note: 1. When using this command, the module is powered on again, and the check digit will be updated!
     2. When the setting is greater than 2, the default value will be restored to 0 after powering on again, and there will be no verification.

9. Factory reset:

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Modbus Address(PLC): 40252
RS485 address : 0x01~0x3F
Function code:Write 0x06;
Register address:0x00FB(251)
Send data(address 1):FF 06 00 FB 00 00 ED E5
Return data   :FF 06 00 FB 00 00 ED E5

Hardware reset: short the RESET/RST jumper of the board for 5

seconds, then power on again.