

LINOVISION

IOT-R32W Router

DI/DO Instructions



Chapter 1 Purpose

IOT-R32W support 1x DI (digital input) and 1x DO (digital output).

It supports to set linkage between DI and DO. When DI receive the signal, it trigger the action of DO.

Besides the DO action, it also supports the linkage action of SMS, Email and Cellular UP from DI.

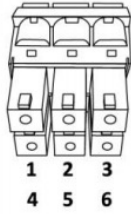
Chapter 2 Applications

For example, DI can connect some sensors, like door opening sensor, temperature measurement sensor, etc. DO can connect some alarming devices, like warning light, alarm bell, etc.

So, when the door is opened or temperature is high, we can receive alarm information.

Chapter 3 Connection Diagram

3.1 PIN definition of IOT-R32

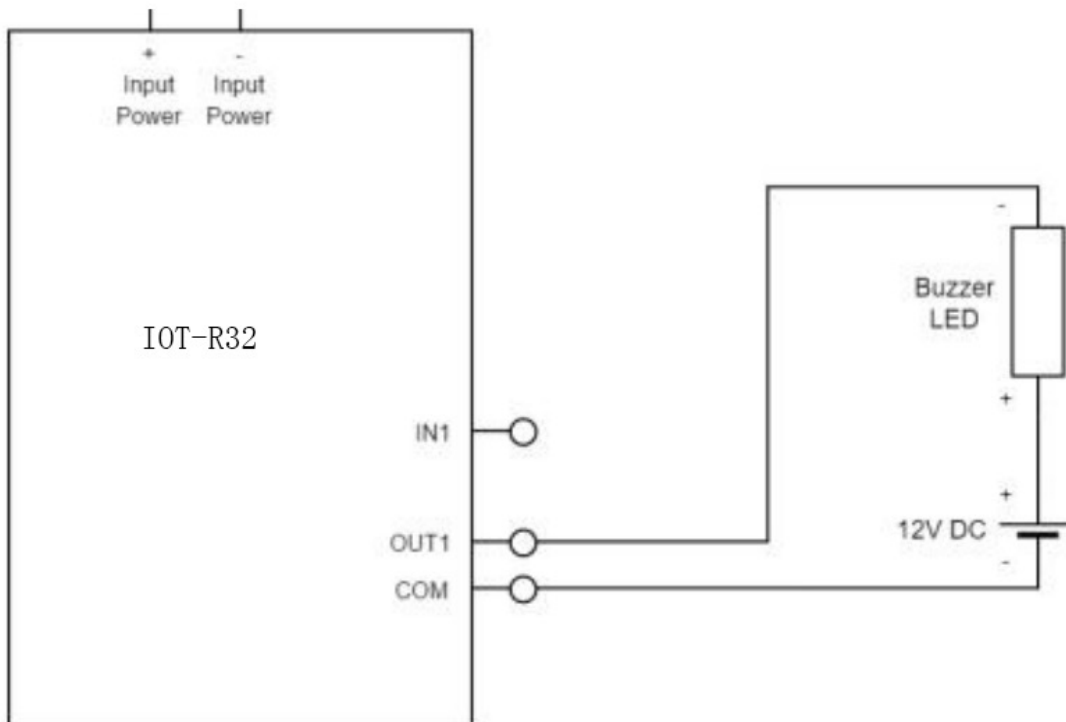


PIN	RS232	DI	DO	Description
1	---	---	OUT	Digital Output
2	---	IN	---	Digital Input
3	GND	---	---	Ground
4	---	COM	COM	Common Ground
5	RXD	---	---	Receive Data
6	TXD	---	---	Transmit Data

3.2 Example of DO wiring

Connect the warning light to the OUT and COM ports of the router and then power on the router for testing.

COM port-negative pole of power supply-positive pole of power supply-positive pole of warning light-negative pole of warning light-OUT



Chapter 4 Device List

Test Tools	Quantity	Description
Warning Light	1	Observe the DO port changes visually
Power Supply	1	12V DC
Computer	1	Login router WEB interface to set configuration
IOT-R32	1	Main test equipment

Chapter 5 Instructions

5.1 After the connection is completed according to the connection diagram, Log in to the web page of IOT-R32 for configuration

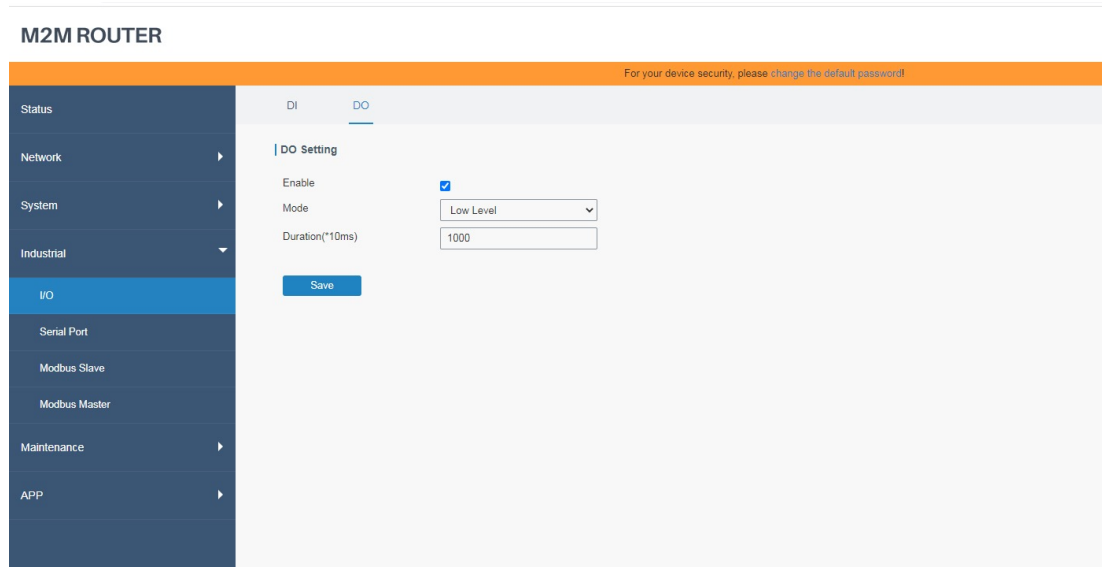
5.2 Check DO linkage trigger, DI is high by default, and detected as low when DI is grounded.

The screenshot shows a web browser window with the address bar displaying "192.168.1.1/#industrial/io/di". The page title is "M2M ROUTER". A navigation menu on the left includes "Status", "Network", "System", "Industrial", "I/O", "Serial Port", "Modbus Slave", "Modbus Master", "Maintenance", and "APP". The "I/O" section is expanded, showing "DI" and "DO" sub-sections. The "DI Setting" page is active, featuring a "Save" button and the following configuration options:

- Enable:
- Mode: High Level (dropdown menu)
- Duration(ms): 100 (input field)
- Action: SMS, Email, DO, Cellular UP

A security notice at the top right of the interface reads: "For your device security, please change the default password!"

5.3 You can configure DO to be low by default and Duration: 1000*10ms. At this time, the LED is off.



5.4 When DI-IN receives a switch signal, it will be linked to DO. After DO is output, the LED will turn on for 10s, and then turn off.

Common problems and troubleshooting methods

The warning light is always off during the test

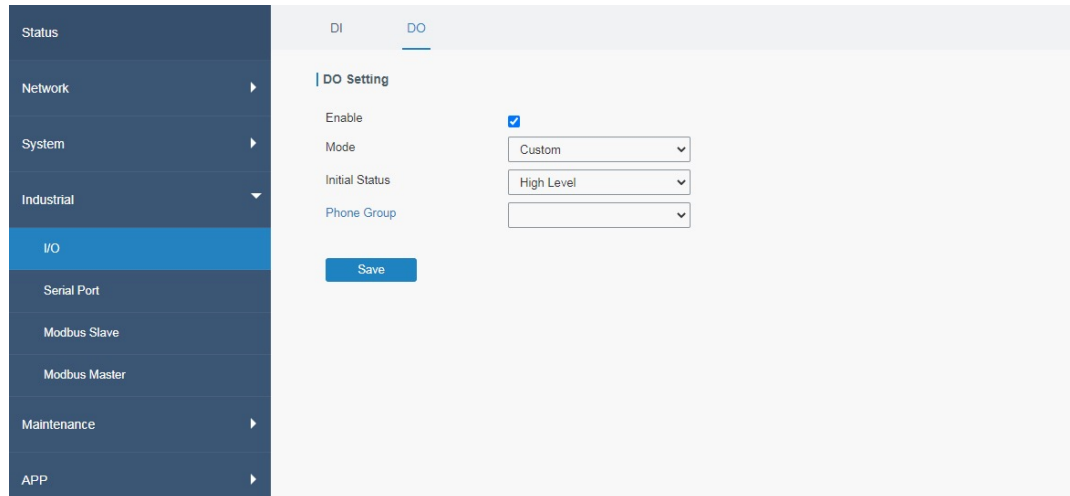
1. Check whether the warning light is on or not when the warning light is connected to the power supply, make sure the warning light is working well.
2. Check whether the Modbus Slave function is enabled or not. If enabled, please turn off these functions before testing.
3. After change the settings, please make sure click save and apply, or the settings will not take effect.
4. Check whether the connected port is correct or not.

The light stays on during this test

1. Check whether there is a short circuit in the wiring.
2. Check whether the COM and OUT ports are connected reversely.
3. Check if Modbus Slave is closed.

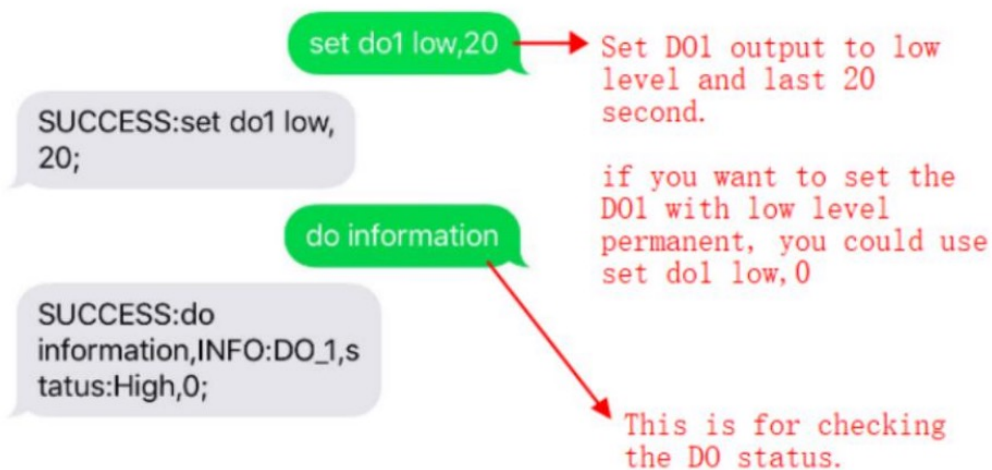
Chapter 6 Other ways to control DO port

6.1 Besides triggering the DO linkage by DI, you can also control DO through SMS. At this time, the working mode needs to be selected as Custom.



Message content: set **do1 low,20** //20 means the time of DO output low level, the unit is second; when the time is set to 0, it means it remains constant
When DO wants to stay low, send set **do1 low,0**
Send when DO is to be kept high: **set do1 high,0**
Query the current DO status: **do information**

The following figure is an example of sending control SMS and router reply SMS content:



6.2 Control via CLI

The DO port status can be controlled through the CLI command as shown in the figure. After modification, you need to use no shutdown to enable.

```
ROUTER> en
ROUTER# conf t
ROUTER(config)# industrial-io-output 1
ROUTER(config-output_io)# mode-out low
```

```
ROUTER> en
ROUTER# conf t
ROUTER(config)# industrial-io-output 1
ROUTER(config-output_io)# mode-out low           //DO Change to low level mode
ROUTER(config-output_io)# no shutdown
ROUTER(config-output_io)# mode-out high          //DO Change to high level mode
ROUTER(config-output_io)# no shutdown
```

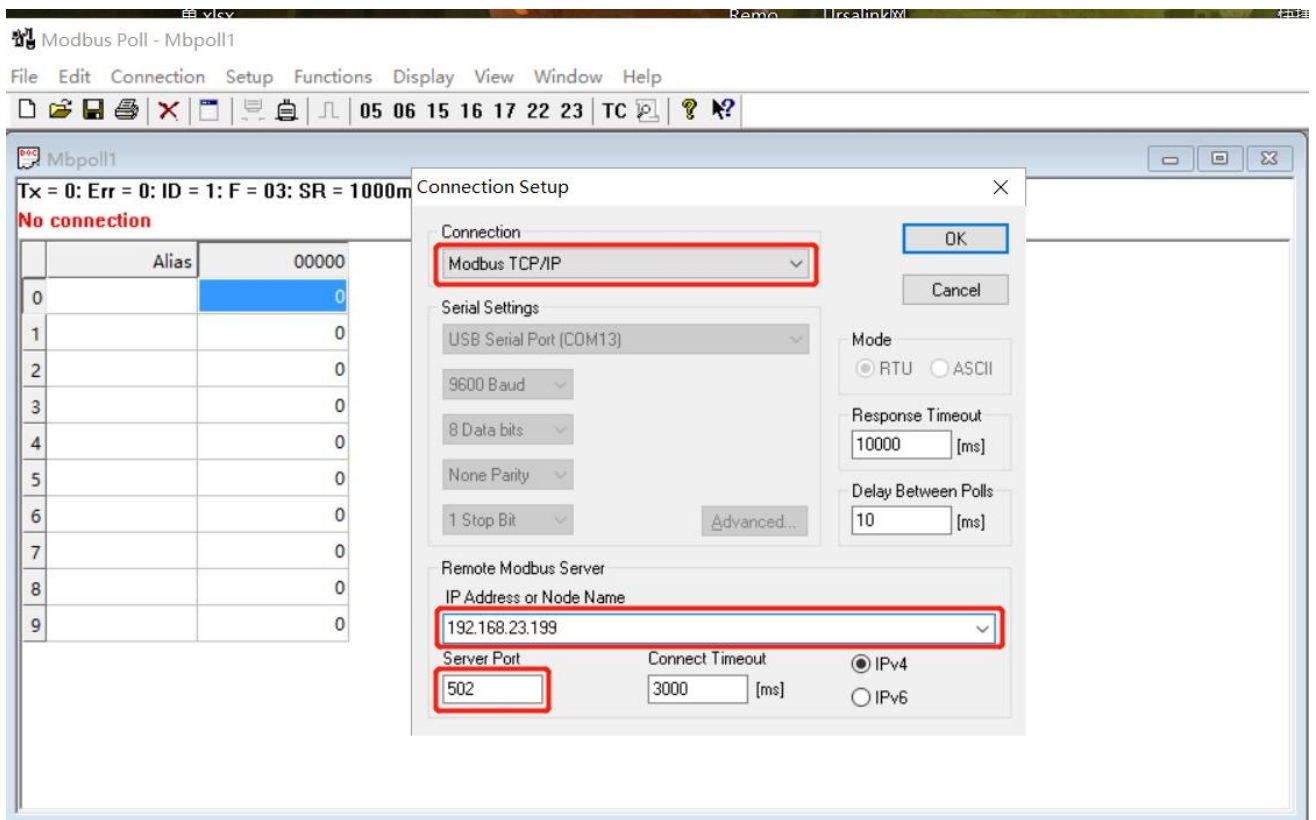
```
ROUTER> en
ROUTER# conf t
ROUTER(config)# industrial-io-output 1
ROUTER(config-output_io)# mode-out low
ROUTER(config-output_io)# no shutdown
ROUTER(config-output_io)# mode-out high
ROUTER(config-output_io)# no shutdown
ROUTER(config-output_io)#
```

6.3 Control DO via Modbus TCP

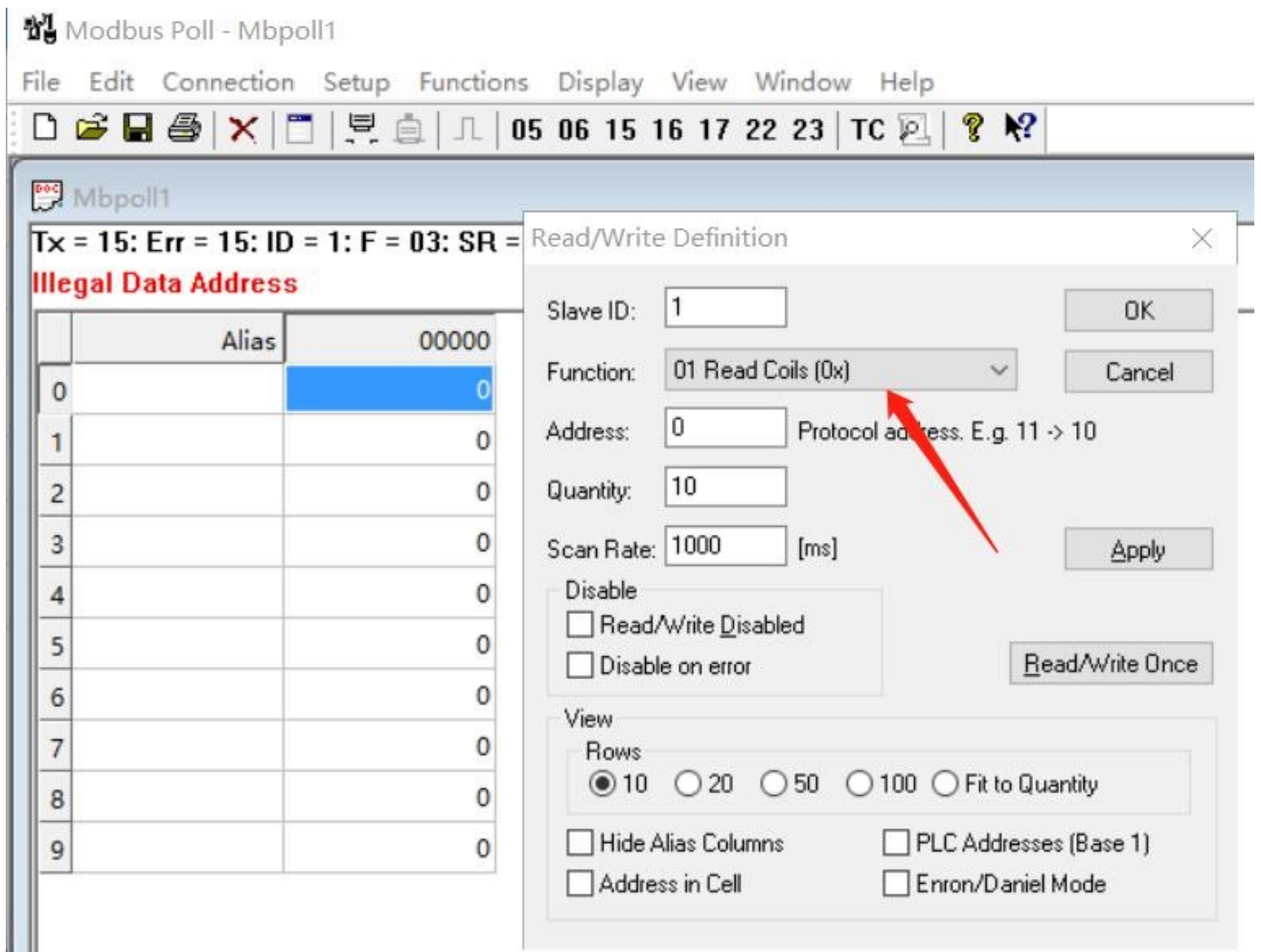
a. Enable Modbus TCP, click save, apply.

Status	Modbus TCP	Modbus RTU	Modbus RTU Over TCP
Network	Modbus TCP		
System	Enable	<input checked="" type="checkbox"/>	
Industrial	Port	<input type="text" value="502"/>	
I/O	DI Address	<input type="text" value="0"/>	
Serial Port	DO Address	<input type="text" value="0"/>	
Modbus Slave	<input type="button" value="Save"/>		
Modbus Master			
Maintenance			
APP			

b. Open the Modbus Poll tool, select Modbus TCP/IP when connecting, fill in the router IP and port (default 502) and click ok to connect.



c. Set the function code of the data to 01 Read Coil (0x), otherwise there will be an error report of the wrong data address.



d. View the current DO port status according to the output address bit set on the router (DI port needs to be read with function code 02).

The screenshot shows the Modbus software interface. On the left, the 'Modbus TCP' settings are displayed:

- Modbus TCP: 启用
- 端口: 502
- 数字输入地址: 0
- 数字输出地址: 0
- 保存 (Save) button

On the right, the 'Mbpoll1' window shows a table of DO port status:

Alias	00000
0	1
1	0
2	0
3	0
4	0
5	0
6	0

e. To control the DO status, double-click the corresponding register bit, and click Send after setting.

0 means low level mode, the light is on at this time

1 stands for high level mode, the light is off at this time

The screenshot shows the 'Mbpoll1' window with a table of DO port status and a 'Write Single Coil' dialog box open over it.

Alias	00000
0	1
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0

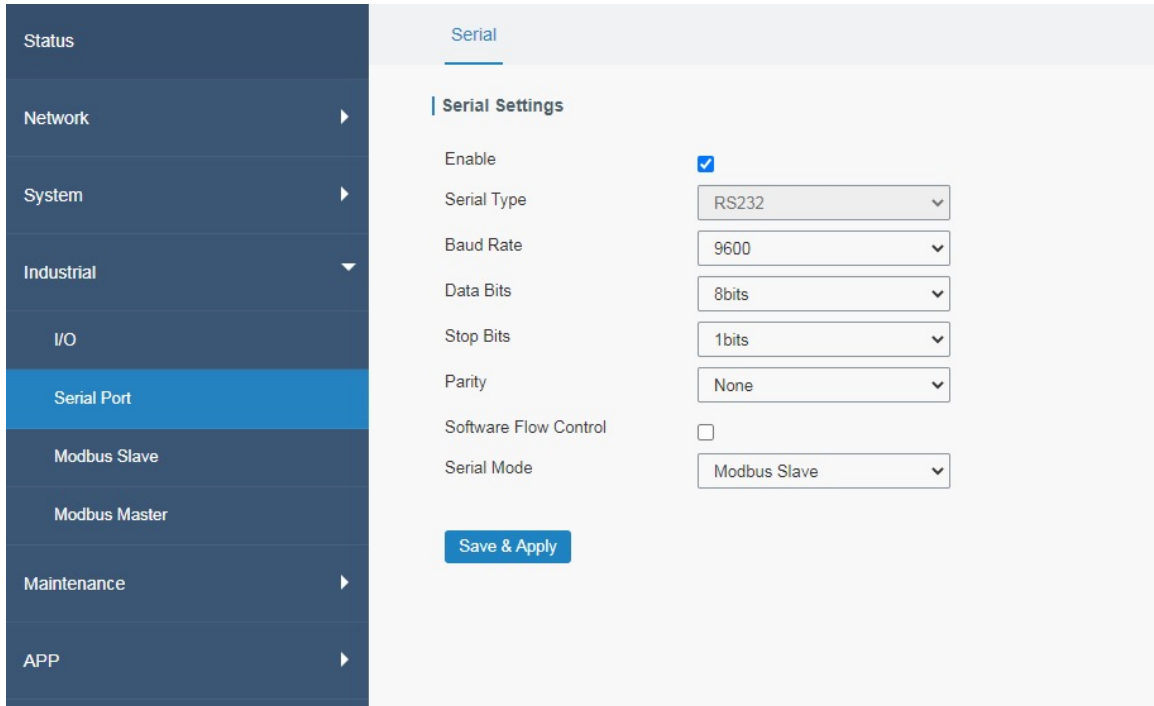
The 'Write Single Coil' dialog box contains the following settings:

- Slave ID: 1
- Address: 0
- Value: Off (indicated by a red arrow)
- Result: N/A
- Close dialog on "Response ok"
- Use Function: 05: Write single coil
- 15: Write multiple coils

The 'Send' button is highlighted with a red box.

6.4 Control DO via Modbus RTU

- Connect the RS485/RS232 interface of the router to the computer via a USB converter.
- Enable the serial port to be used on the serial port interface and set the serial port mode to Modbus Slave.

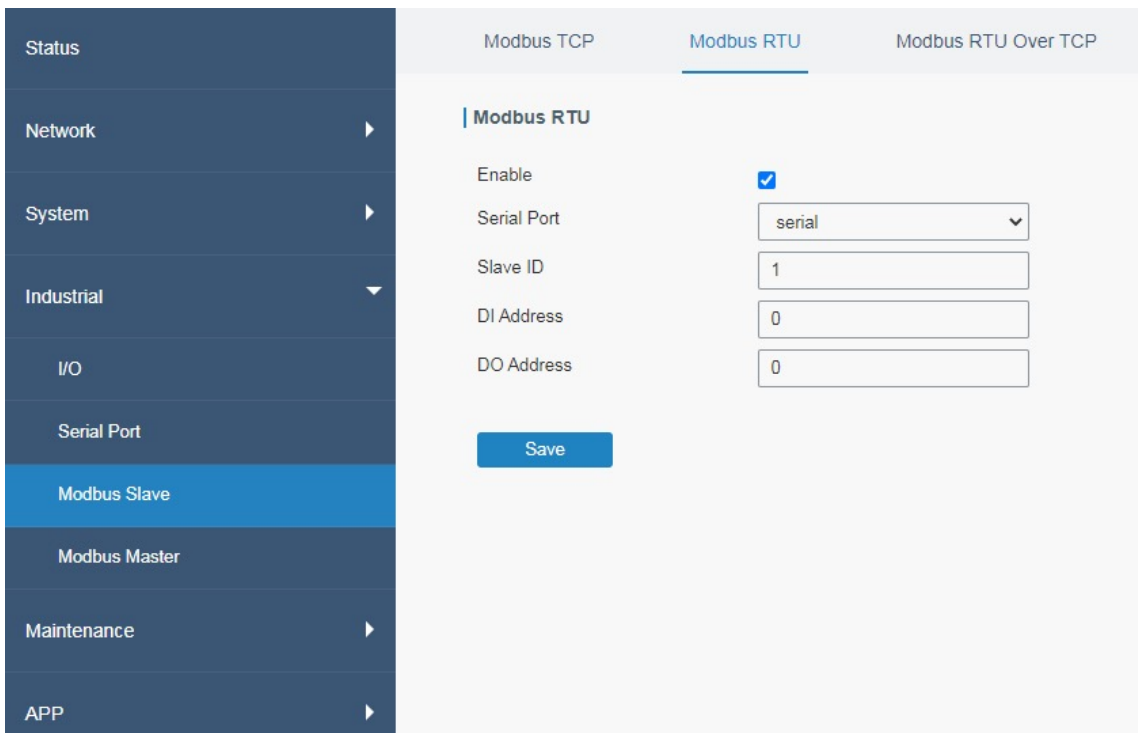


The screenshot shows the 'Serial' configuration page. On the left is a dark blue sidebar with menu items: Status, Network, System, Industrial, I/O, Serial Port (highlighted in blue), Modbus Slave, Modbus Master, Maintenance, and APP. The main content area is titled 'Serial' and contains 'Serial Settings'. The settings are as follows:

Setting	Value
Enable	<input checked="" type="checkbox"/>
Serial Type	RS232
Baud Rate	9600
Data Bits	8bits
Stop Bits	1bits
Parity	None
Software Flow Control	<input type="checkbox"/>
Serial Mode	Modbus Slave

A 'Save & Apply' button is located at the bottom of the settings area.

- Enable Modbus RTU function and select the corresponding serial port.



The screenshot shows the 'Modbus RTU' configuration page. The sidebar is identical to the previous screenshot, but 'Modbus Slave' is highlighted in blue. The main content area has three tabs: 'Modbus TCP', 'Modbus RTU' (selected), and 'Modbus RTU Over TCP'. The 'Modbus RTU' settings are as follows:

Setting	Value
Enable	<input checked="" type="checkbox"/>
Serial Port	serial
Slave ID	1
DI Address	0
DO Address	0

A 'Save' button is located at the bottom of the settings area.

- Start the Modbus Poll tool, set to serial port mode, select the corresponding serial port and connect.

Tx = 0: Err = 0: ID = 1: F = 03: SR = 1000
No connection

	Alias	00000
0		0
1		0
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0

Connection Setup

Connection: Serial Port

Serial Settings: USB Serial Port (COM13)
 9600 Baud
 8 Data bits
 None Parity
 1 Stop Bit

Mode: RTU ASCII

Response Timeout: 10000 [ms]
 Delay Between Polls: 10 [ms]

Remote Modbus Server: IP Address or Node Name: 192.168.23.199
 Server Port: 502
 Connect Timeout: 3000 [ms]
 IPv4 IPv6

e. The value can be viewed on the register and the DO port can be modified.

Tx = 125: Err = 4: ID = 1: F = 01: SR = 1000ms

	Alias	00000
0		1
1		0
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0

Write Single Coil

Slave ID: 1 Send

Address: 0 Cancel

Value: On Off

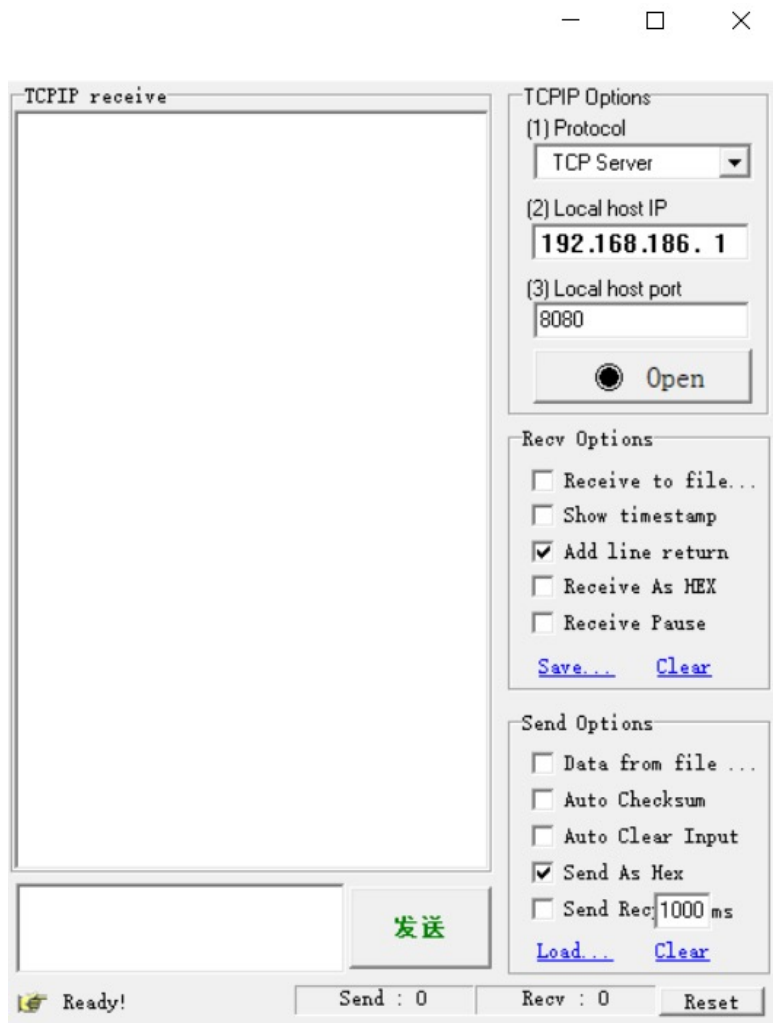
Result: N/A

Close dialog on "Response ok"

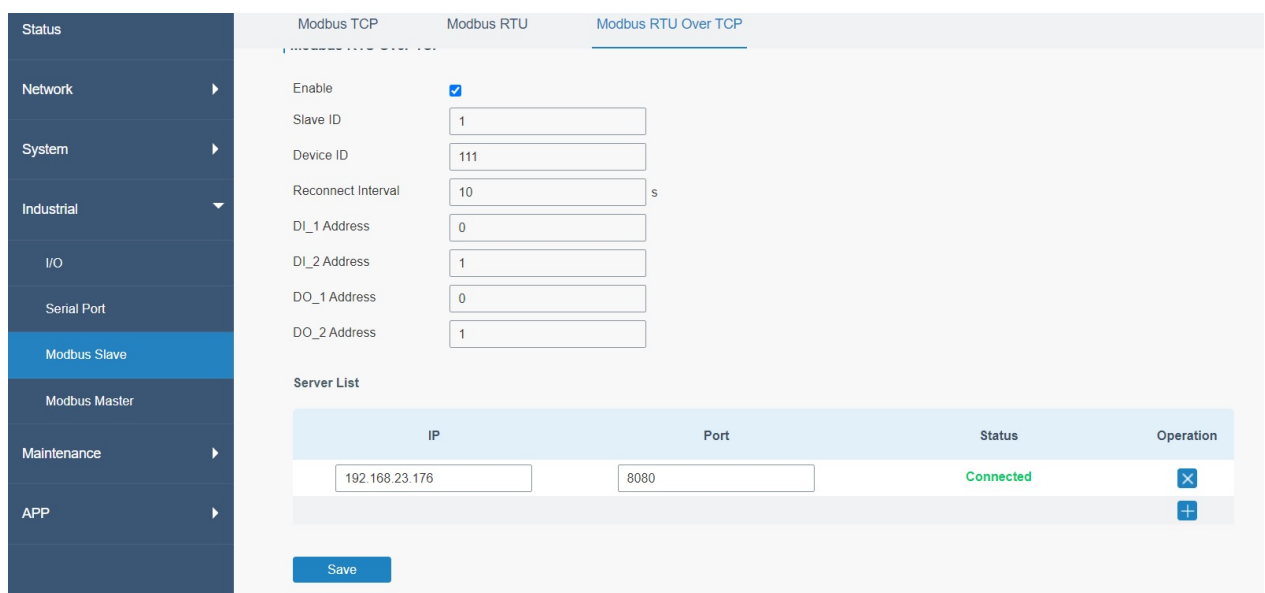
Use Function: 05: Write single coil 15: Write multiple coils

6.5 Control DO via Modbus RTU over TCP

a. After creating the TCP server through Netassist, open it, and note that you need to set the display and sending to hexadecimal.



b. Enable Modbus RTU Over TCP and set the server list. When the connection is successful, it will appear as shown in the figure.



c. The DO status can be modified by issuing a command on the server side, and the router will reply the same command when the sending is successful.

The screenshot shows a TCPIP interface with a 'TCPIP receive' window on the left and configuration options on the right. The receive window displays a sequence of hex commands and responses:

```
[Receive from 192.168.22.106 : 48656]#  
01 05 00 00 FF 00 8C 3A  
[2021-05-13 20:58:55.651 SEND]# 01 05 00  
00 FF 00 8C 3A  
[2021-05-13 20:58:55.653 RECV]# 01 05 00  
00 FF 00 8C 3A  
  
[2021-05-13 20:58:57.482 SEND]# 01 05 00  
00 FF 00 8C 3A  
[2021-05-13 20:58:57.484 RECV]# 01 05 00  
00 FF 00 8C 3A
```

The configuration options on the right include:

- TCPIP Options:** (1) Protocol: TCP Server; (2) Local host IP: 192.168.23.176; (3) Local host port: 8080. A 'Disconnect' button is present.
- Recv Options:** Receive to file...; Show timestamp; Add line return; Receive As HEX; Receive Pause. Buttons: Save... Clear.
- Send Options:** Data from file ...; Auto Checksum; Auto Clear Input; Send As Hex; Send Recv: 1000 ms. Buttons: Load... Clear.

At the bottom, there is a 'Peers:' dropdown set to '192.168.22.106:4', a 'Send' button, and a status bar showing 'Ready!', 'Send : 24', 'Recv : 48', and a 'Reset' button.

Command interaction example

The issued command will change according to the slave ID and read address. The slave ID is 1, and the read register is 0 as an example.

DO changed to 1

```
01 05 00 00 FF 00 8C 3A
```

DO changed to 0

```
01 05 00 00 00 00 CD CA
```