Modbus RTU/ASCII to Modbus TCP Protocol Converter

ODOT Series Gateways

ODOT-S4E2 User Manual

ODOT Automation System Co., Ltd.

2020-09-20

Version information

Revision records：

DATE	Version number	Modify content	The author
2016-02-20	V1.0	First release	SXL
2016-07-14	V1.1	Software configuration upgrade version	JPL
2017-06-06	V1.3	Modify version	CCL
2018-08-01	V2.0	Hardware Updating	CCL
2019-06-27	V2.1	Updating Serial Port Dialing Method	CCL
2020-09-20	V2.2	Hardware Updating	CCL

Ownership information

Without the consent of the copyright owner, the whole or part of this document do not be republished as paper or electronic document.

Disclaimer

This document is only used to assist readers for using products. The company is not responsible for loss or mistake because of using this document. The text and product described in this document is constantly developing and improving.

Sichuan ODOT Automation System Co., Ltd. has the right to modify this document without notifying users.

Contents

1. Product Overview

1.1 Product Functions

ODOT-S4E2, developed by Sichuan ODOT Automation System Co., Ltd., is a Modbus RTU to Modbus TCP/IP protocol converter based on market demand and years of experience.

By applying ODOT-S4E2, all the Modbus RTU/ASCII slave devices with RS485/RS422/RS232 port could connect to Modbus TCP/IP network and communicate with TCP clients. It could realize high speed data transmission by connecting the low speed serial device to the high-speed Ethernet. This protocol converter provides two working modes of transparent transmission and mapping mode, which could achieve the maximum system compatibility.

1.2 Main features

◆9-36V wide range voltage input, anti-reverse connection protection.

◆Communication terminal isolation processing, 1500V isolation voltage

◆Dual Ethernet port, with switch function, support cascading.

◆2 kV network port isolation protection, 10/100Mbps auto-negotiation and Auto-MDI /MDIX.

◆Support address mapping mode, realize fast response to TCP client request.

◆Connect up to 5 clients request.

◆Mapping mode supports function code:0x01,0x02,0x03,0x04,0x05,0x06,0x0F,0x10.

◆Transmission mode supports all public function code and customized function code.

◆10KB huge data buffer area, larger data transmission capacity.

◆4*RS485 serial ports real time refresh, short scan period, better loading capability.

◆RTU and ASCII master and slave is optional, with stronger adaptability.

◆Watchdog could be enabled, watchdog time could be set.

◆Supports IAP download, and it could update and upgrade firmware program in product through network port.

◆Built-in terminal resistance and bias circuit, strong stability.

◆The data packet sending interval could be adjusted freely, and the use is more flexible.

◆The device carries with powerful diagnostic function to monitor the communication status of the slave device in real time.

◆Support one key reset function to restore factory Settings.

◆35mm standard DIN-rail.

◆EMC complies EN 55022:2010 & EN55024:2010 international standard.

1.3 Technical parameters

The relevant technical parameters of this product are shown in Table 1. Please use this product within the parameters of this product in order to obtain better performance.
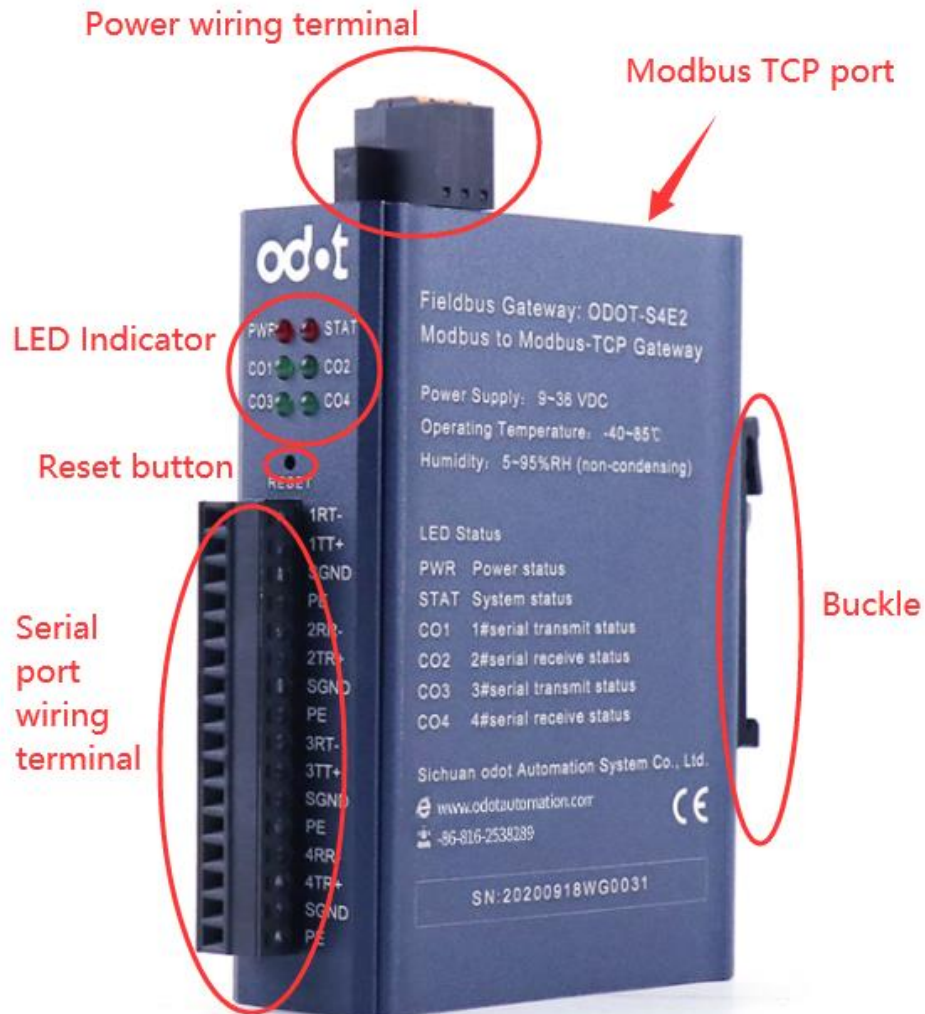
Table1 Technical Parameters

Environment Parameter	
Operating temperature	-40~85℃
Storage temperature	-55~125℃
Humidity	5%~95% (no condensing)
Power parameter	
Number of power terminal	1 way
Power range	9~36VDC
Consumption	Max.200mA@24V

2. Hardware description

2.1 Product appearance

2.2 LED indicator description

There are total 6 LED status indicators. The symbol definition and status description are shown in "Table 2".

Table 2 LED indicator description

Symbol	Definition	Status	Description
PWR	Power supply indicators	ON	Power is supplied to the unit
		OFF	No power is supplied to the unit
ETH	Network fault indicators	ON	TCP gateway communication error
		OFF	TCP gateway communication normal
CO1	Series port 1sending & receiving indicator	Flashing	Series port 1 is sending & receiving data
		ON	Series port 1 is not sending & receiving data
CO2	Series port 2sending & receiving indicator	Flashing	Series port 2 is sending & receiving data
		ON	Series port 2 is not sending & receiving data
CO3	Series port 3sending & receiving indicator	Flashing	Series port 3 is sending & receiving data
		ON	Series port 3 is not sending & receiving data
CO4	Series port 4sending & receiving indicator	Flashing	Series port 4 is sending & receiving data
		ON	Series port 4 is not sending & receiving data

Note: * ——In normal communication, the status of the ODOT-S4E2 gateway indicator

2.3 Terminal definition

1. The equipment wiring adopts 16Pin 3.81mm pitch plug-in terminal. The terminal definition of RS485/RS232/RS422 interface is shown in "Table 3".

Table 3 Terminal definition

No.	Symbol	RS485 Wiring Definition	RS232 Wiring Definition	RS422	Wiring Definition
1	1RT-	Serial Port1 RS485-	Serial Port1 RS232_RX	RS422 Channel1	RS422 Sending Negative Terminal
2	1TT+	Serial Port1 RS485+	Serial Port1 RS232_TX		RS422 Sending Positive Terminal
3	SGND	Signal Grounded	Signal Grounded		Signal Grounded
4	PE	Shield Earthing	Shield Earthing		Shield Earthing
5	2RR-	Serial Port2 RS485-	Serial Port2 RS232_RX		RS422 Receiving Negative Terminal
6	2TR+	Serial Port2 RS485+	Serial Port2 RS232_TX		RS422 Receiving Positive Terminal
7	SGND	Signal Grounded	Signal Grounded		Signal Grounded
8	PE	Shield Earthing	Shield Earthing		Shield Earthing
9	3RT-	Serial Port3 RS485-	Serial Port3 RS232_RX	RS422 Channel 2	RS422 Sending Negative Terminal
10	3TT+	Serial Port3 RS485+	Serial Port3 RS232_TX		RS422 Sending Positive Terminal
11	SGND	Signal Grounded	Signal Grounded		Signal Grounded
12	PE	Shield Earthing	Shield Earthing		Shield Earthing
13	4RR-	Serial Port4 RS485-	Serial Port4 RS232_RX		RS422 Receiving Negative Terminal
14	4TR+	Serial Port4 RS485+	Serial Port4 RS232_TX		RS422 Receiving Positive Terminal
15	SGND	Signal Grounded	Signal Grounded		Signal Grounded
16	PE	Shield Earthing	Shield Earthing		Shield Earthing

2. Power terminals are defined as follows

No.	Symbol	Definition
1	PE	Grounding terminal
2	V-	Power Input Negative
3	V+	Power Input Positive

2.4 Reset button

The device has a system RESET button (RESET). When the user forgets the IP address and configured port number of the device and cannot connect to the gateway, the RESET button can be triggered. System parameters will be restored to factory Settings and the device will be restarted. Click the reset button with a paper clip, and all the indicator lights will shine once to indicate successful reset. So the gateway reset is successful. The technical parameters of the gateway are as follows:

Parameter Name		Defaults
Ethernet Side	Protocol converter IP	192.168.1.254
	Subnet mask	255.255.255.0
	LAN gateway IP	192.168.1.1
	Modbus TCP data port	502
	Configure the port	1024
	Modbus-TCP watchdog time	30S
	The enabling of Modbus-TCP watch dog	enabling

|		
	Gateway work mode	Transparent transmission Mode
	Gateway station Number	247
Serial port side	Serial port mode	Master station mode
	Protocol type of Modbus	Modbus RTU
	Serial port baud rate	9600bps
	Check digit	No check
	Data bits	8bit
	Stop bit	1bit
	Receive character interval	3.5t
	Message sent?	0
	Timeout processing	Data retention
	Slave response timeout	500ms

2.5 External terminal resistance

According to the site situation, the gateway serial port side needs an external 120 Ω terminal resistance. The RS485 bus supports a maximum of 32 nodes without relay,

The "daisy chain" connection is used between nodes, and terminal resistors are required at both ends of the communication cable, and their resistance is required to be approximately equal to the characteristic impedance of the transmission cable. In short-distance transmission, no terminating resistor is required, that means no terminating resistor is generally required below 300 meters. The terminating resistor is connected to the two ends of the transmission cable.

When the gateway is used in the site, if the site RS485 bus is far away and the site interference is large, so it is necessary to add 120Ω terminal resistance at both ends of the RS485 bus to prevent the reflection of the serial signal.

Note: 120 Ω resistance attached to the package, please check.
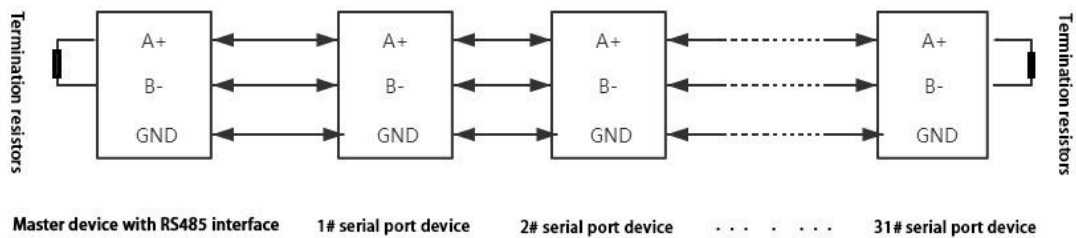
2.6 Installation dimension

3. HOW TO USE THE PROTOCOL CONVERTER

3.1．The description of protocol converter

3.1.1．Serial working mode

There are two types of working modes: **Master mode and slave mode**.

When the serial port works in master mode, the serial port can connect up to 31 Modbus RTU/ASCII slave devices without relaying. This mode is mainly used for data communication between Modbus TCP master and Modbus RTU/ASCII Slaves

When the serial port works in slave mode, the serial port can connect to one Modbus RTU/ASCII master device. This mode can be applied as follows:

(1)Data communication Between Modbus TCP Client and Modbus RTU/ASCII Master;

(2)Data communication between Modbus RTU/ASCII master;

(3)Modbus TCP client and Modbus RTU/ASCII master could communicate with one Modbus RTU/ASCII slave at the same time.

3.1.2．Gateway working mode

There are two types of working modes: transparent mode and mapping mode, and the "Transparent" mode is the factory setting. The "Transparent" mode is without data cache and no need for editing the address mapping table. The gateway directly sends the instructions of the TCP/IP clients to Modbus RTU/ASCII slave equipment, and it waits for the slave station devices response after getting the instructions from the Modbus TCP/IP clients. After the response of the slave, the data will directly be sent back to the TCP clients.

"Mapping" mode adopts the way of data cache and it need for editing the station address mapping table. The gateway polls each of the slave after powered on, and stores the data in the buffer cache. The gateway will read the data directly from the data buffer, and then send

it back to the TCP clients after receiving Modbus TCP/IP clients instructions. This method can greatly reduce the waiting time for the client to access to the station and improves the refresh rate.

3.1.3. Data storage area

Data storage is divided into five parts.

　　Part 1. "Coil" (DO) storage area, 8192 points in total.
　　Part 2. "Discrete magnitude input" (DI) storage area,8192 points in total.
　　Part 3. "Input register" (AI)storage area, 2048 points in total.
　　Part 4. "Hold register"(AO) storage area, 2048 points in total.
　　Part 5. "System diagnostic" (DO) storage area, it stores the station equipment working status, 263 points in total. And it could access to the "system diagnostic" area and obtain the slave information. This could be used for setting the disconnection alarm.
The distribution of the data storage area and the scope of the address coding are shown in below.

<center>Table 3.1 Data store address table</center>

Item	Storage type	Description	Storage capability	Address range
1	Area 0	Coil	8192 Bit	0x0000~0x1FFF
2	Area 1	Discrete magnitude input	8192 Bit	0x0000~0x1FFF
3	Area 3	Input register	2048 Word	0x0000~0x07FF
4	Area 4	Hold register	2048 Word	0x0000~0x07FF
5	Area 3	System diagnostic	263 Word	0x2000~0x2106

3.1.4 System diagnostic area

The diagnosis system is divided into two parts. For the first part: The address 0x2000-0x200F is in total of 16 words that is 256 bits as the "slave error indicator area". The number 1-247 are respectively corresponding to slave 1-247and 248-256 are reserved. When the error occurs from the station communication, the corresponding bit of the station address is set to 1. The corresponding error indicator bit will have zero clearing automatically after the slave is back to normal. Its data encoding format is shown in Table 3.2.

Table 3.2 Slave error indicating area encoding format

	BIT	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
Address 0x2000	Bit Number	16	15	14	13	12	11	10	9
	BIT	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
	Bit Number	8	7	6	5	4	3	2	1
address 0x2001	BIT	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
	Bit Number	32	31	30	29	28	27	26	25
	BIT	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
	Bit Number	24	23	22	21	20	19	18	17
.									
.									
.									
	BIT	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8

Address 0x200F	Bit Number	x	x	x	x	x	x	x	x
	BIT	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
	Bit Number	x	247	246	245	244	243	242	241

The second part :Address 0x2010-0x2106 Word ,total 247 words, as " the slave status indicator" area. Reading the area could obtain the slave current working status, the data encoding format is as shown in Table 3.3.

Table 3.3 Slave status indicating area encoding format

Address 0x2010	Slave 1	Byte1	Byte0
		Function code	Error code
Address 0x2011	Slave 2	Byte1	Byte0
		Function Code	Error code
.			
.			
.			
Address0x 2106	Slave 247	Byte1	Byte0
		Function Code	Error code

Each Word is divided into high and low bytes, Byte1 is the high byte, indicating the currently executed function code mapped to the slave. Byte0 is the low byte, indicating the current error code of the salve communication. The specific meaning of the error code of the slave is as shown in table 3.4.

Table 3.4 Slave error code description

Error code	Error Description	Troubleshooting method
0x00	Slave stations operates normally	No
0x01	Illegal function code	The device does not support the current function code, please refer to the slave manual to select the corresponding function code module
0x02	Illegal data address	The device data exceeds its address range, please refer to the slave manual to modify the data start address or data length
0x03	Illegal data value	The data length is wrong, the data

		length exceeds the maximum allowable value of 125 (Word) or 2000 (Bit), it needs to modify the length
0x04	Data processing error	Check whether the data value range meets the requirements of the slave
0x05	Application layer length does not match	Increase the receiving character interval and check the communication parameter settings
0x06	Protocol ID error	Check the sender message
0x07	Buffer address error	Device internal error
0x08	Bit offset error	Device internal error
0x09	The slave ID number does not match	Increase the timeout period, check the hardware connection status, and check the communication parameter settings
0x0A	CRC check error	CRC error, check the communication line
0x0B	LRC error	LRC error, check the communication line
0x0C	Response function code does not match	Check hardware connection status
0x0D	Response address does not match	Check hardware connection status
0x0E	Response data length does not match	Check hardware connection status
0x0F	Communication timeout	Increase the timeout period, check the hardware connection status, and check the communication parameter settings
0x10	ASCII mode start character error	':' Colon start character error
0x11	ASCII mode ending character error	CR/LF carriage return and line feed terminator error
0x12	ASCII mode non-character	The data contains non-hexadecimal ASCII codes
0x13	Wrong number of characters in ASCII mode	Slave response length error

3.2. Default parameters

The default factory configuration of the gateway is as follows:

Table 3.5 The default factory configuration

Parameter name		Defaults
Ethernet Side	Protocol converter IP	192.168.1.254
	Subnet mask	253.253.253.0
	LAN gateway IP	192.168.1.1
	Modbus TCP data port	502
	Configure the port	1024
	Modbus-TCP watchdog time	30S
	The enabling of Modbus-TCP watch dog	Enabling
	Gateway working mode	Transparent mode
	Gateway station number	247

Serial Port side	Serial operating mode	Master mode
	Modbus protocol type	Modbus RTU/ASCII
	Serial baud rate	9600bps
	Check digit	No check
	Data bits	8bit
	Stop bit	1bit
	Receive character interval	3.5t
	Message sent	0
	Timeout processing	Data retention
	Slave response timeout	500ms

Note: The gateway is factory-set to work in transparent transmission mode and can be used without configuration. At this time, all request data of the TCP client is sent to the serial port 1. To configure the parameters of the gateway, please use the software "ODOT MGCC Config" for configuration.

3.3 Gateway IP address modification

First, powering 24VDC to the gateway, connect the network cable to the gateway and the computer, change the computer's local network card IP address to the 192.168.1.* network segment, then open the configuration software MGCC Config, click upload gateway configuration, and ensure normal communication with the gateway (can be normal Upload and download gateway configuration).
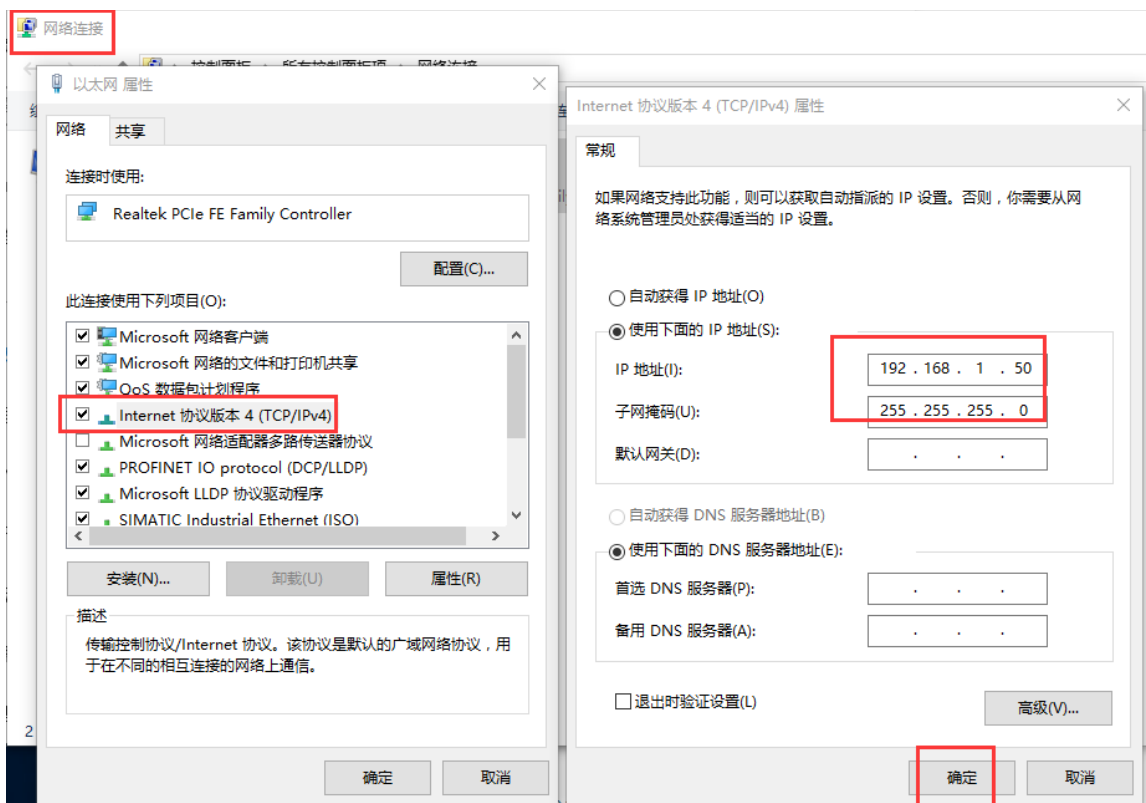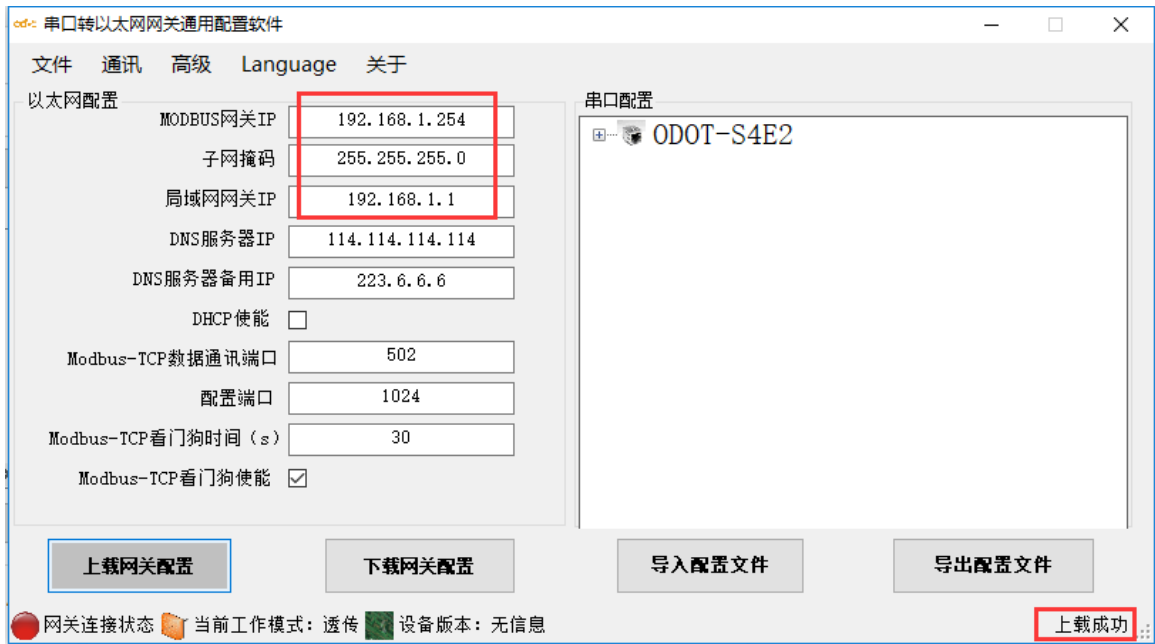
Modify the gateway IP address of the configuration software interface to: 192.168.10.12 (cross-network segment), and the LAN gateway IP to: 192.168.10.1. After the modification is completed, click to download the gateway configuration directly, and a warning box will pop up to confirm whether to modify the IP address. Click OK, you can see the download is successful in the lower right corner.
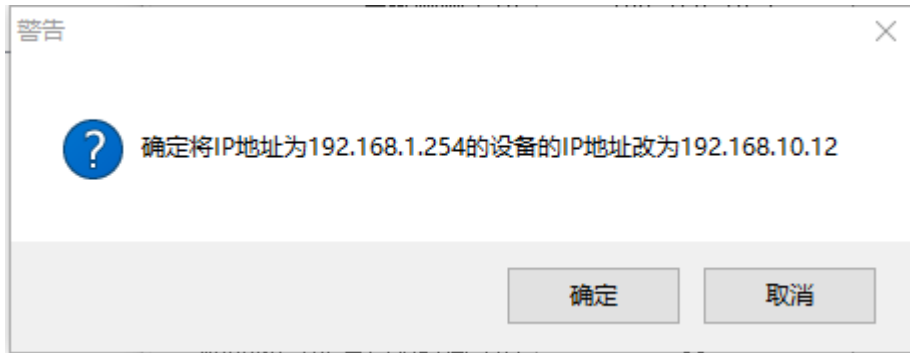
After the IP address is successfully modified, you need to change the computer's IP address to: 192.168.10.* network segment.
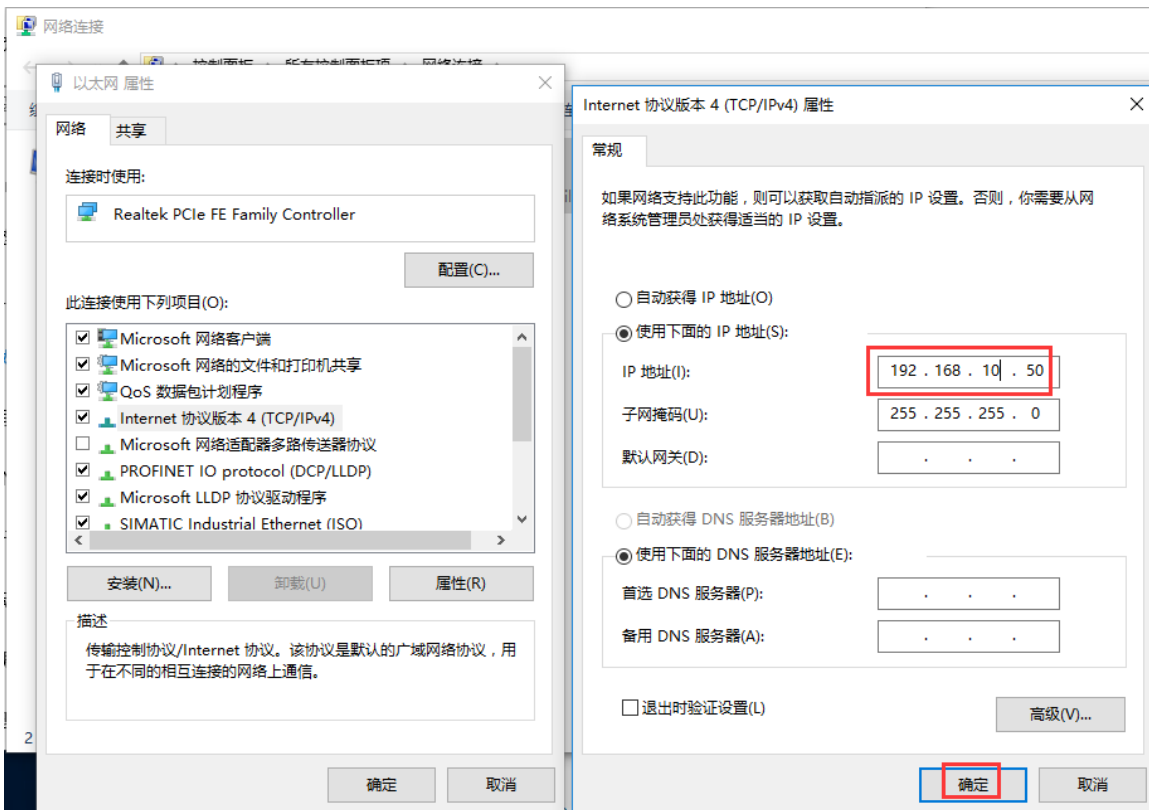
Click Upload Gateway Configuration on the configuration software MGCC Config interface. After the upload is successful, you can see the upload success in the lower right

corner.

3.4 Typical application description

3.4.1 Realize communication between Modbus TCP client and Modbus RTU/ASCII slave

3.4.1.1 Application topology
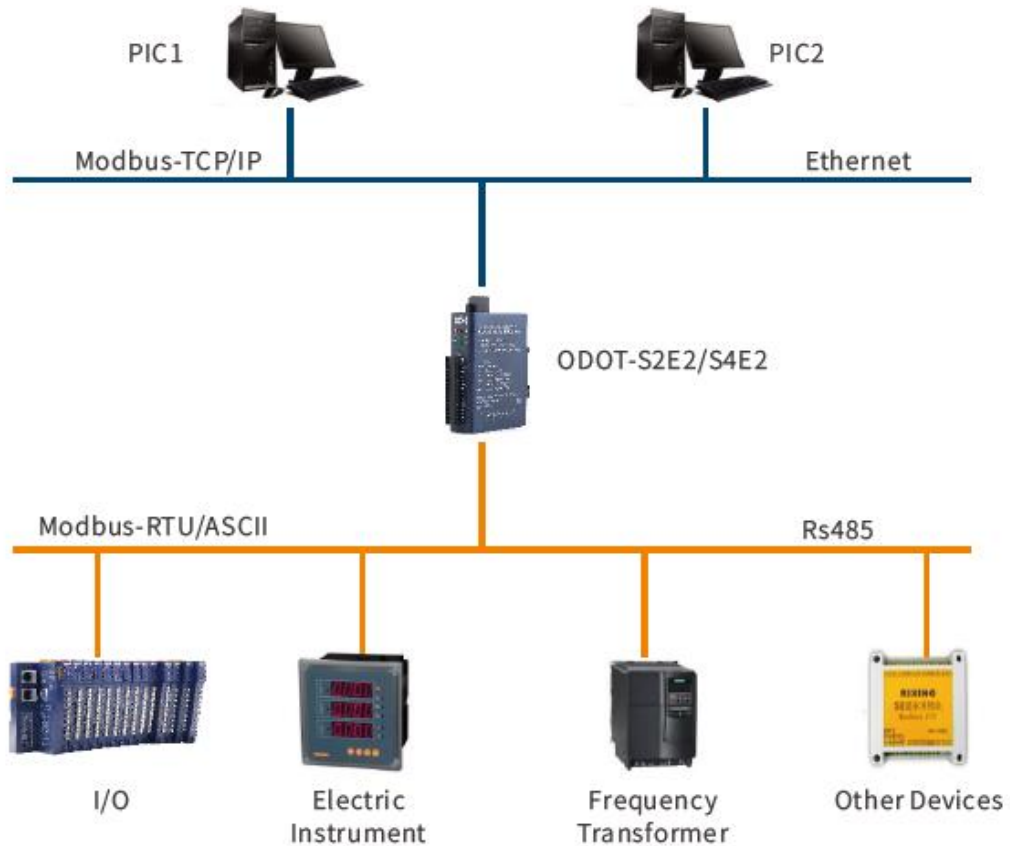
3.4.1.2 Transparent transmission mode configuration

3.4.1.2.1. Open the software configuration software "odot MGCC Config", right-click the slave configuration page and select "Add Device", and add "ODOT-S4E2".
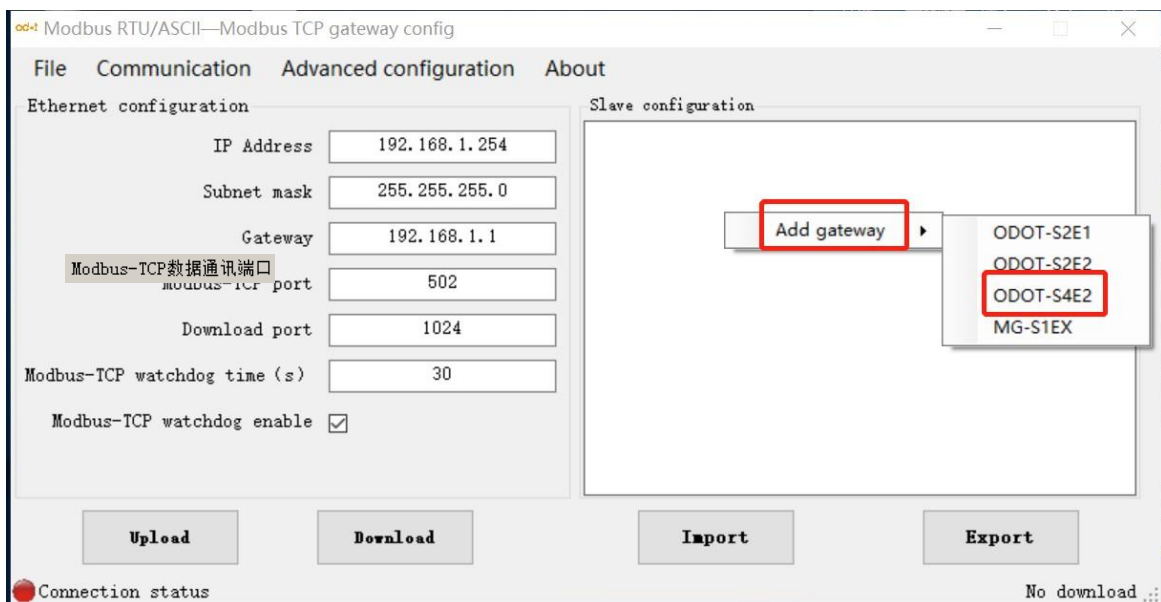
3.4.1.2.2.Double-click "ODOT-S4E2" or right-click "ODOT-S4E2", Select "common device attributes", Set the gateway working mode to Transparent in the popup page.
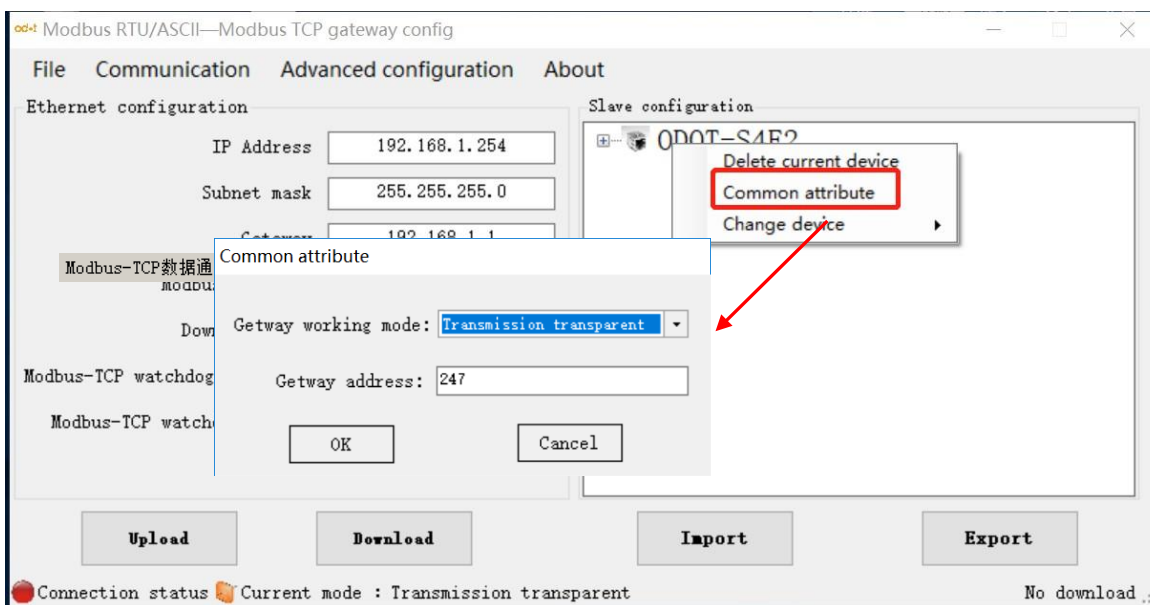
3.4.1.2.3.Double-click "COM1" , "COM2" ,"COM3" , "COM4"or right-click "COM1" , "COM2" ,"COM3" , "COM4" and click "Serial Properties", then "Serial Settings" window is popped up. After setting the communication parameters, click the "OK" button to save and return. Take COM1 as an example.

The meaning of each parameter is as follows：

Operating mode：

It is used to set up gateway as master or slave in the network.

Default is master mode.

Modbus protocol type：

It is used to set up the gateway's protocol type of the network between the communication of the serial port and other connected devices. It can choose Modbus-RTU or Modbus-ASCII. Please set this parameter to be consistent with the device to which the serial port is connected.

Baud rate：

Serial port baud rate: optional range is 1200~115200bps and default is 9600bps, please set this parameter to be consistent the device that is connected to the serial port.

Check Digit：

It could select none, odd, even parity, and none is set as default. Please set this parameter to be consistent with the device to which the serial port is connected.

Stop bit：

It could choose stop bit 1 or stop bit 2. And default is stop bit 1. Please set this parameter to be consistent with the device to which the serial port is connected.

Receive character interval：

When receiving message the frame interval detection time can be chose from 1.5t to 200t. Default is 3.5t. (T is the transmission time of a single character, and it is related with baud rate). In general, there is no need to change this parameter.

Packet transmission interval：

Interval time for sending Modbus commands (Delayed time from receiving the slave response message to sending the next command) can be set from 0ms-65535ms. Default is 0ms. It is recommended to set 100ms and this could prevent connected devices from communication failure due to slow response.

Timeout processing：

Read data from slave station. Data processing mode can choose "data clear" or "data retention" when slave station response is timeout. Default is "Data Hold mode". This parameter is only valid for Modbus read command. Please set this value according to actual needs.
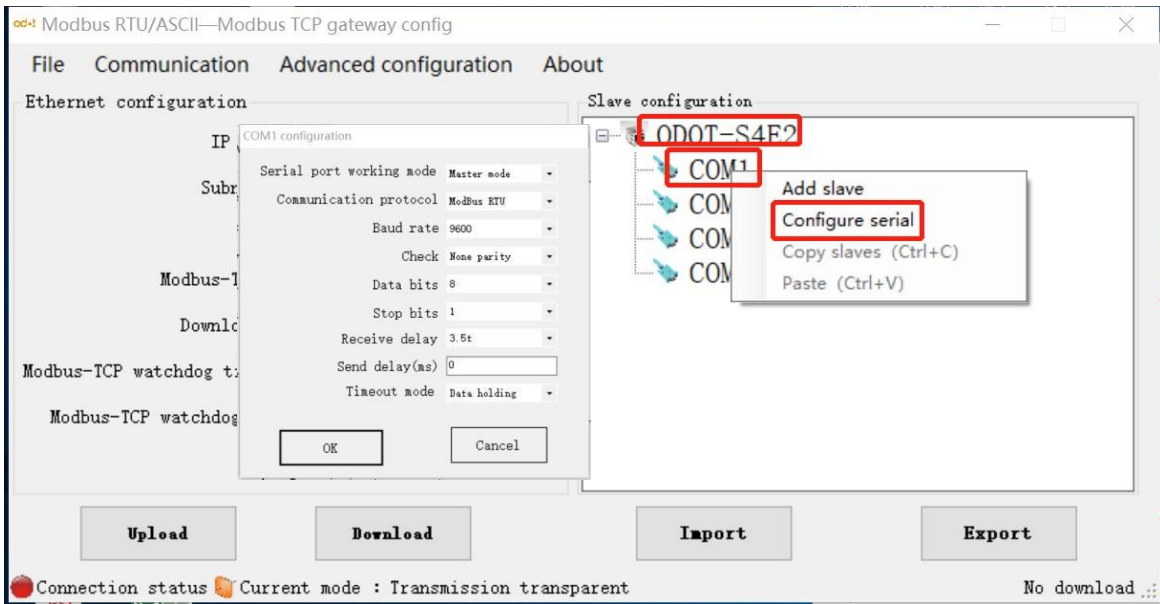
3.4.1.2.4.Select "COM1" , "COM2" ,"COM3" , "COM4".Take COM1 as an example .

Right click to select Add Slave, input "Slave Name", fill in "Slave Number" and slave "Response Timeout" time, click "Confirm" to return. The station number of the slave cannot be the same with each other and the device itself too. Range of the slave address should be between 1 and 247 and the name of slave cannot be the same under the same serial port too. The "Response timeout" time needs to be checked from the manual of the device. It is recommended to set up above 500ms and click "Confirm".
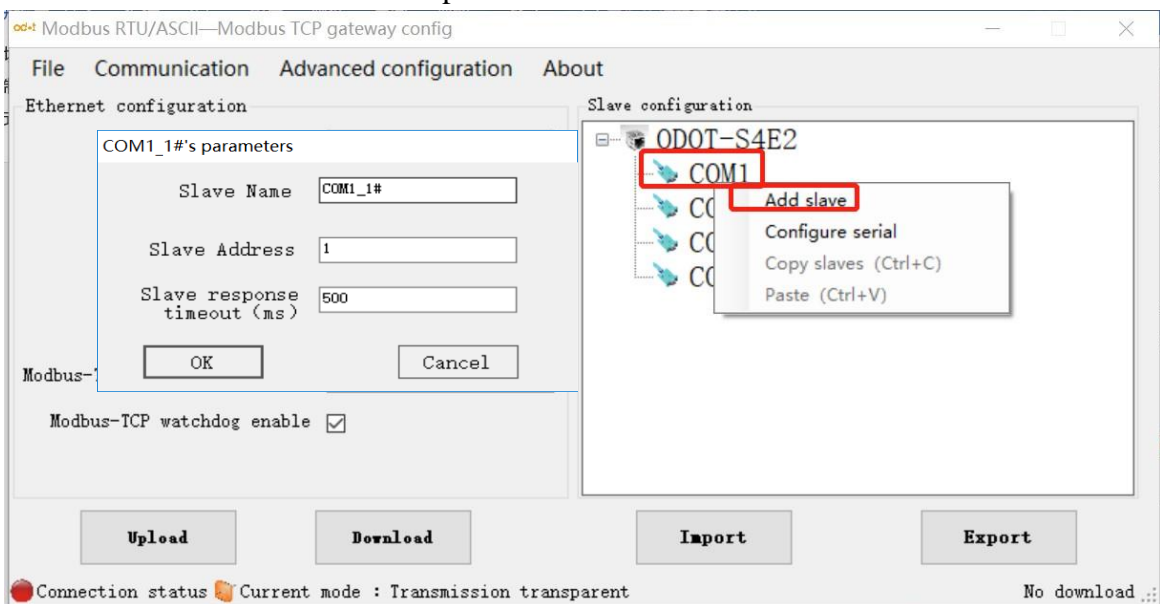
3.4.1.2.5.Configure the Ethernet parameters of the gateway by configuring the "Ethernet Configuration" on the left half of the software.

Some of the parameters are as follows：

Modbus gateway IP：The gateway IP address; ?设备还是网关？

Subnet mask：Subnet mask of the gateway;

**LAN gateway IP**：Gateway IP address of the network where the device resides;

Modbus-TCP data communication port：Generally it is 502；

Configure the port：The configuration software could be used for downloading the configuration to the device through this port of the device；

Modbus-TCP watchdog time：The time interval from when the gateway receives the last Modbus TCP packet to the automatic restart;

 Note: Automatic restart of the gateway can release connection resources that have not been used for a long time in time;
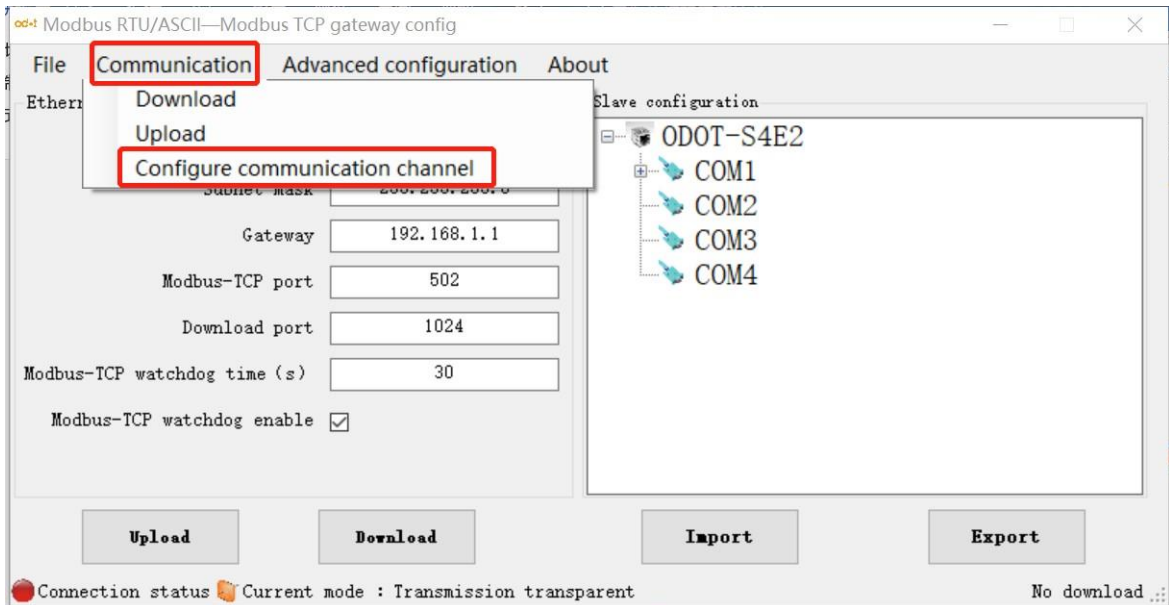
Modbus-TCP watchdog enable：Whether the watchdog function is enabled.
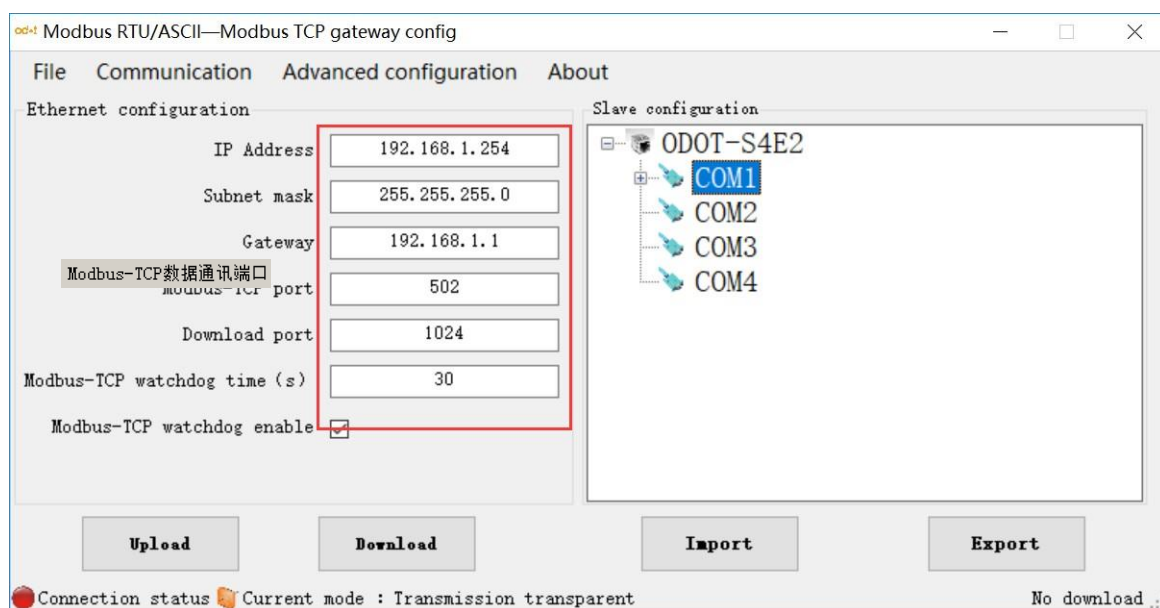
3.4.1.2.6.Set the target gateway address that you want to download.

And it could set the download communication port number through
"Communication"→"Configure communication channel" too. The gateway factory
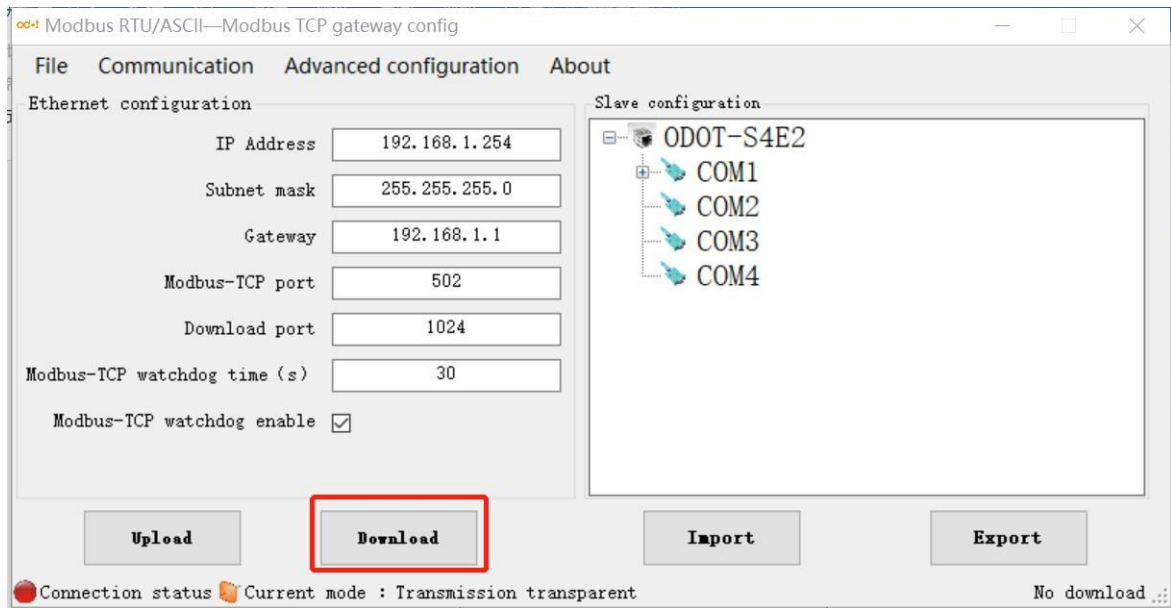default IP is 192.168.1.254 and port number is 1024.

3.4.1.2.7.Click the button "Download Gateway Configuration " to. download configuration parameters to the gateway.

After the download is successful, the "Download successful" prompt appears in
the Status Bar at the lower right. After the download is successful, the gateway restarts
automatically and then the it goes into running state.

If the download fails, please check out whether the computer IP address and
gateway IP address are in the same network segment. Then check whether the gateway
IP address is set correctly. If the gateway IP address is lost, please reset the gateway
through the reset button. After reset, the gateway IP address will be the factory default
IP address.

Click "Import Profile" and "Export Profile" and it could import or save the
configuration file to the local disk. Click "Upload Gateway Configuration" and it could
upload the current gateway configuration to the software.

Note: When downloading and uploading, please ensure that the computer and the gateway are in the same network segment.


3.4.1.2.8. After completing the above settings, it could operate as fellow.

After the settings are completed, the Modbus TCP client can use the Modbus TCP protocol to access the slave device 16DI which the station number is 1 though the gateway IP address 192.168.1.254, the Modbus data communication port 502 and the slave number 1.?
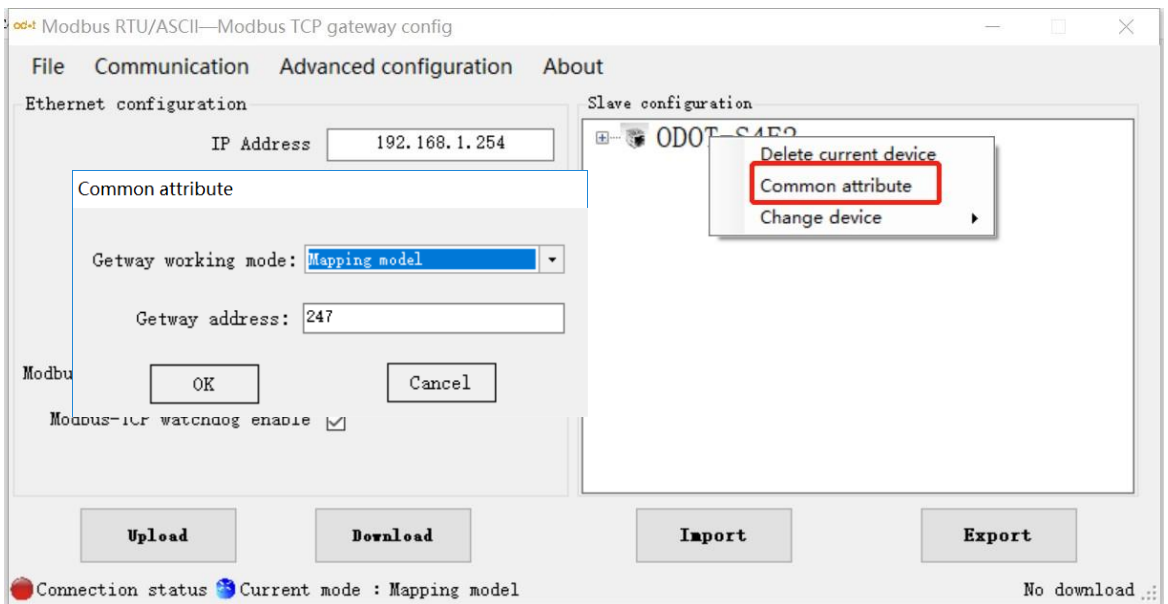
3.4.1.3 Mapping mode configuration

3.4.1.3.1. Open the configuration software "ODOT MGCC Config". Right-click on the configuration page of slave and select "Add Device" ,then add "ODOT-S4E2".
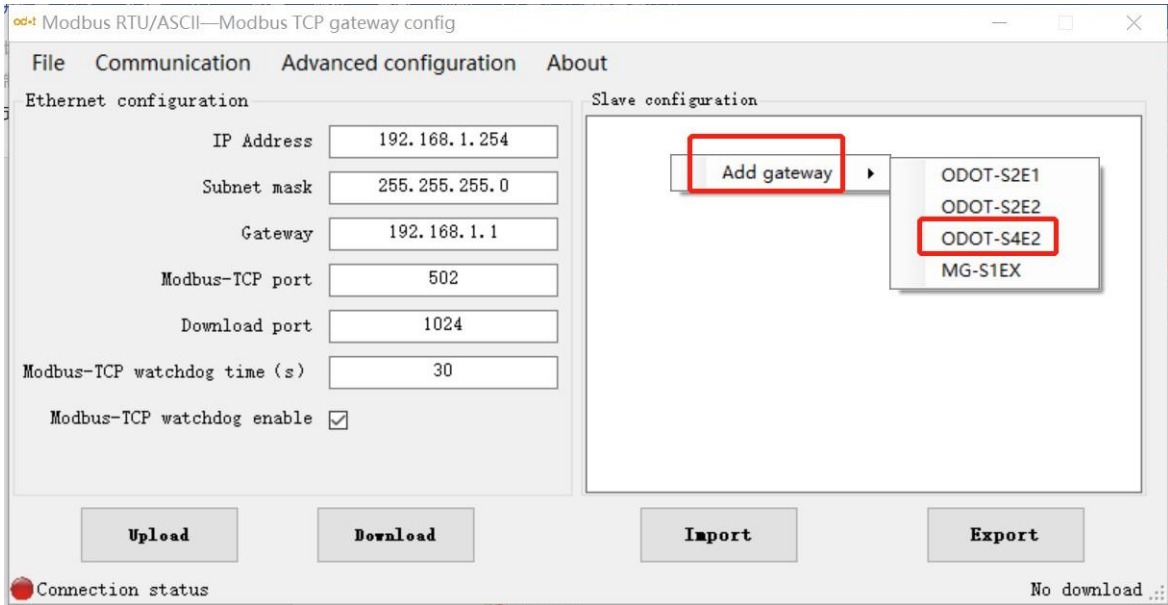
3.4.1.3.2.Double-click "ODOT-S4E2", or right-click "ODOT-S4E2", and select "Common attribute".

It could set the gateway working mode to "Mapping Mode" in the popup setting

page.

3.4.1.3.3.Double-click "COM1", "COM2" , "COM3" "COM4"or right-click "COM1", "COM2", "COM3" "COM4" .

And click "Serial Properties" to bring up the "Configure serial" window. Set up the communication parameters, then click the "OK" to save and return.

The meaning of each parameter is as follows：

Operating mode：

It is used to set up gateway as master station or slave station in the network.
Default is set as master mode.

Modbus protocol type：

It is used to set up the gateway protocol type of the network between the communication of the serial port and other connected devices.
It can choose either Modbus-RTU or Modbus-ASCII. Please set this parameter to be consistent with the device to which the serial port is connected.

Baud rate：

Serial port baud rate: optional range is 1200~115200bps and default is 9600bps. Please set this parameter to be consistent with the device to which the serial port is connected.

Check Digit：

It could choose none, odd, even and default is set as none. Please set this parameter to be consistent with the device to which the serial port is connected.

Stop bit：

It can choose stop bit 1 or stop bit 2. The default is set as stop bit 1. Please set this parameter to be consistent with the device to which the serial port is connected.

Receive character interval：

When receiving message the frame interval detection time can be chose from 1.5t to 200t. Default is 3.5t. (T is the transmission time of a single character, and it is related with baud
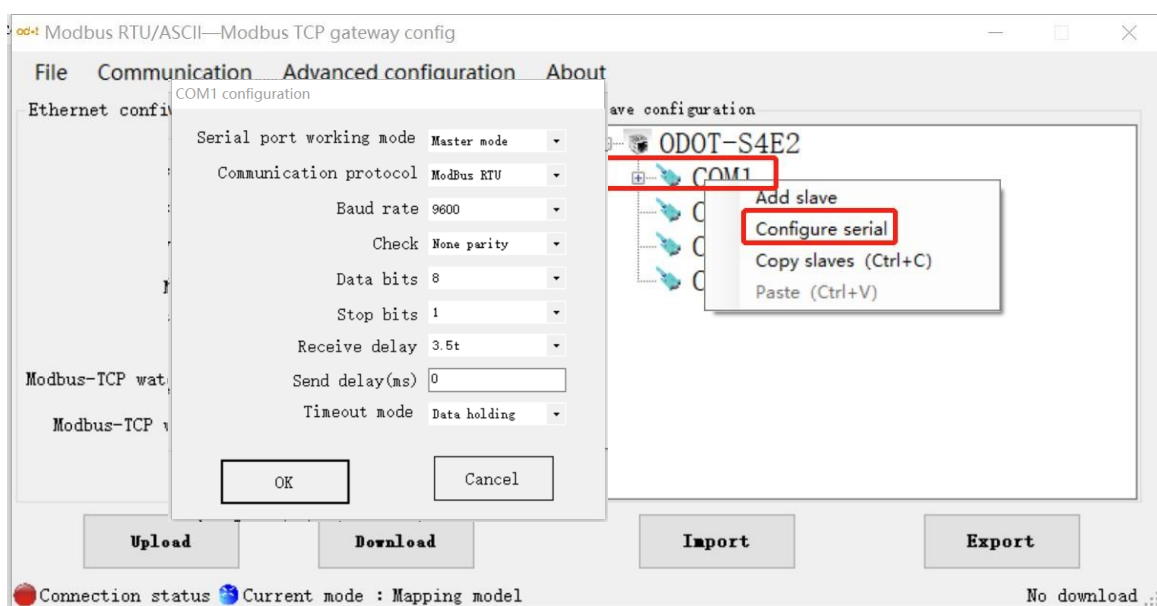
rate). In general, there is no need to change this parameter.

Packet transmission interval：

Interval time for sending Modbus commands (Delayed time from receiving the slave response message to sending the next command) can be set from 0ms-65535ms. Default is 0ms. It is recommended to set 100ms and this can prevent connected devices from communication failure due to slow response.
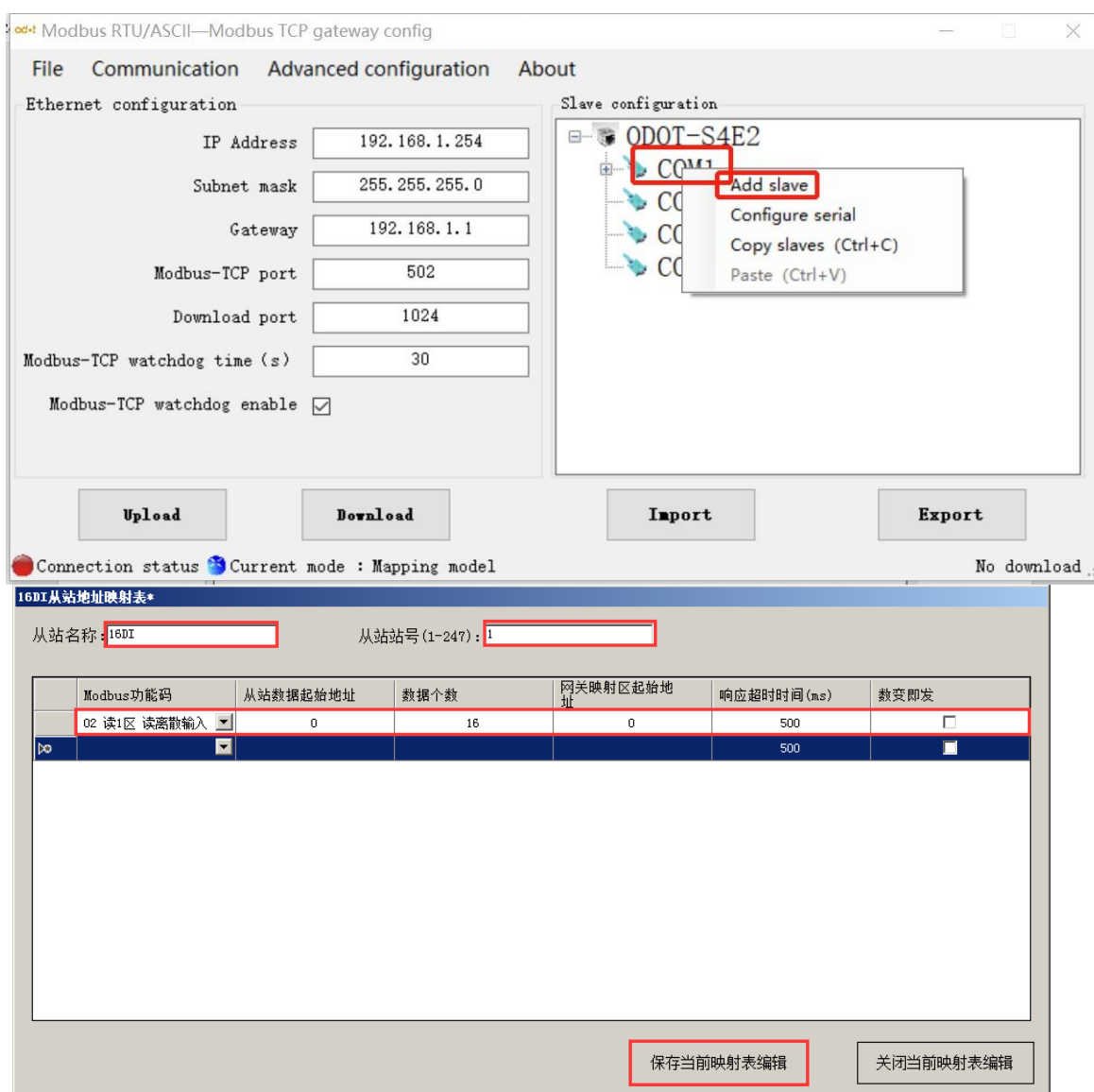
Timeout processing：

Read data from slave station. Data processing mode can choose "data clear" or "data retention" when slave station response is timeout. Default is "Data Hold mode". This parameter is only valid for Modbus read command. Please set this value according to actual needs.

3.4.1.3.4.Select "COM1" or "COM2", and right-click to select "Add Slave".

It could then input "Slave name" and fill in "slave station number". Then it could configure Modbus function code, start address of slave data, number of data, start address of gateway mapping area and response timeout time and if "event output"(only when the data changes, the gateway will execute this command once, this parameter is only valid for write commands) according to the communication manual of slave equipment. Under the same

serial port, the station number of the slave cannot be the same with each other and the device itself too. Range of the slave station address is between 1 and 247. Under the same serial port the slave name cannot be the same. After completing the settings, click "Save Current Mapping Table Edit". ?编译需要英文截图

3.4.1.3.5.Configuring the Ethernet parameters of the gateway by the "Ethernet Configuration" on the left of the software.

Some of the parameters are as follows：

Modbus gateway IP：The gateway IP address; ？？网关还是设备的 IP?

Subnet mask：Subnet mask of the device;

LAN gateway IP：Gateway IP address of the network where the device resides;
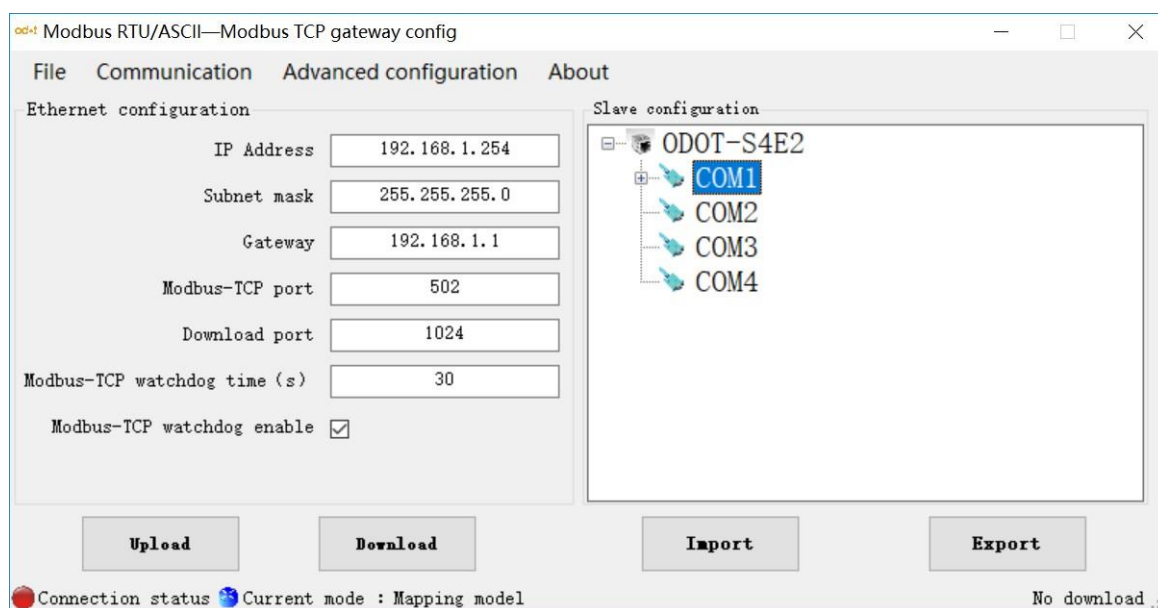
Modbus-TCP data communication port：Generally it is 502；

Configure the port：The configuration software could be used for downloading the configuration to the device through this port of the device；

Modbus-TCP watchdog time：The time interval from when the gateway receives the last Modbus TCP packet to the automatic restart.
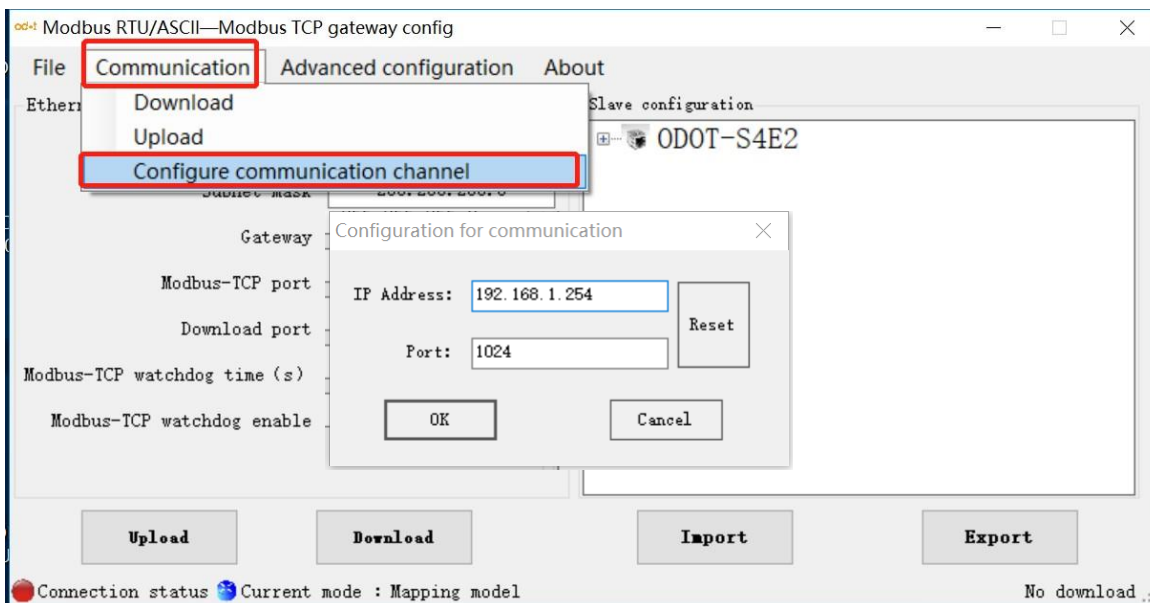
Note: The automatic restart of the gateway can release connection resources that have not been used for a long time in time;

Modbus-TCP watchdog enable：Whether the watchdog function is enabled.

3.4.1.3.6.Set the target gateway address that you want to download.

And it could set the download communication port number through "Communication"→"Configure communication channel" too. The gateway factory default IP is 192.168.1.254 and port number is 1024.
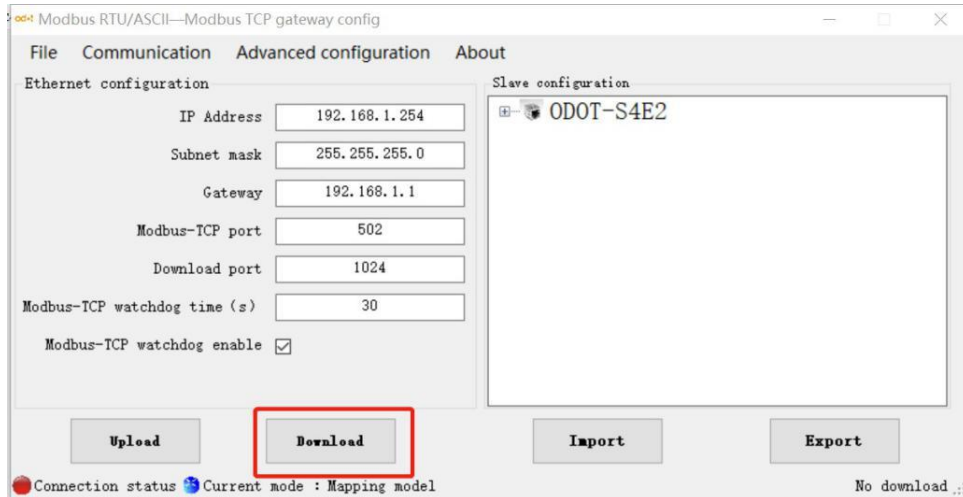
3.4.1.3.7.Click the button "Download Gateway Configuration " to. download configuration parameters to the gateway.

After the download is successful, the "Download successful" prompt appears in the Status Bar at the lower right. After the download is successful, the gateway restarts automatically and then the it goes into running state.

If the download fails, please check out whether the computer IP address and gateway IP address are in the same network segment. Then check whether the gateway IP address is set correctly. If the gateway IP address is lost, please reset the gateway through the reset button. After reset, the gateway IP address will be the factory default IP address.

Click "Import Profile" and "Export Profile" and it could import or save the configuration file to the local disk. Click "Upload Gateway Configuration" and it could upload the current gateway configuration to the software.

Note: When downloading and uploading, please ensure that the computer and the gateway are in the same network segment.

3.4.1.3.8. After completing the above settings, it could operate as fellow.

After the settings are completed, the Modbus TCP client can use the Modbus TCP protocol to access the slave device 16DI which the station number is 1 though the gateway IP address 192.168.1.254, the Modbus data communication port 502 and the slave number X(0<X<248 and X cannot be the device station number of the gateway).
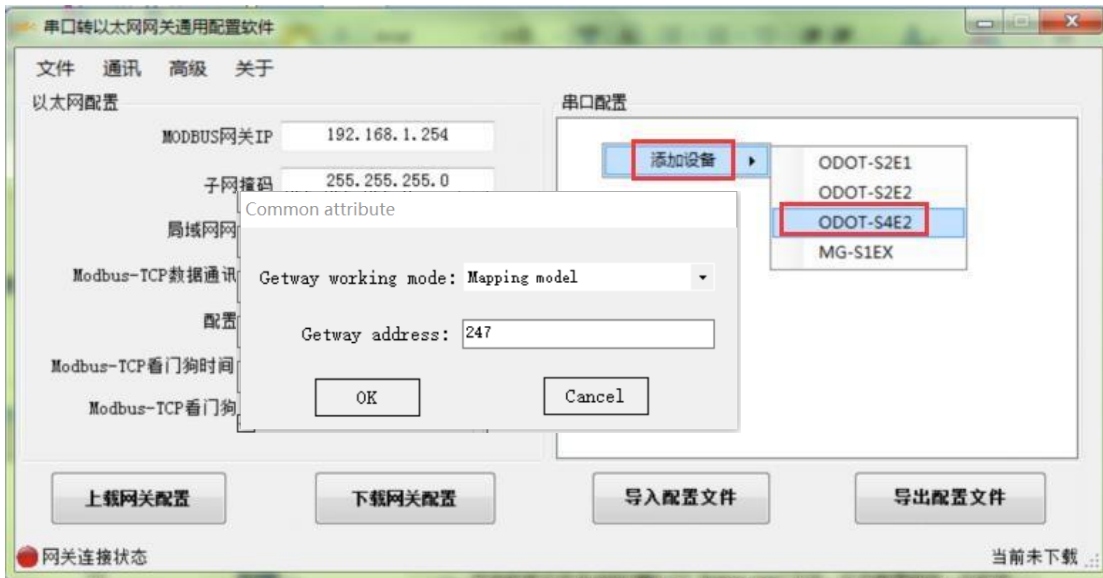
3.4.2 Simple configuration

3.4.2 .1.Open the configuration software "ODOT MGCC Config".

Right-click on the configuration page of slave and select "Add Device" ,then add "ODOT-S4E2".
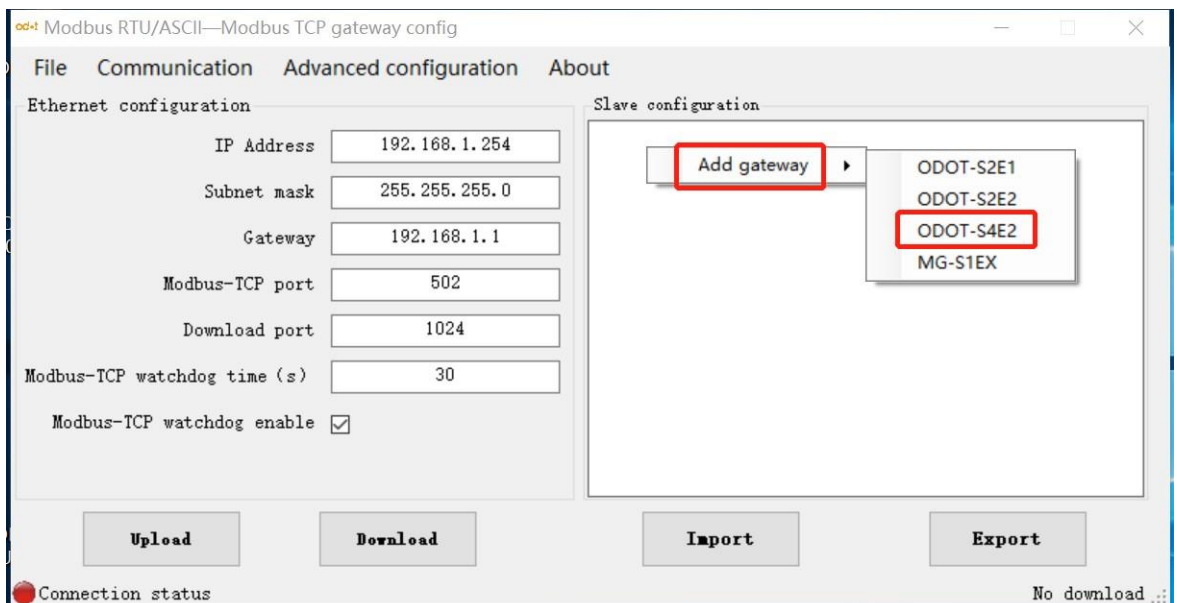
3.4.2 .2.Double-click "ODOT-S4E2" or right-click "ODOT-S4E2", Select "Common attribute".

It could set the gateway working mode to "Mapping Mode" in the popup setting

page.

3.4.2.3.Double-click "COM1", "COM2" , or right-click "COM1", "COM2".

And click "Serial Properties" to bring up the "Configure serial" window. Set up the

communication parameters, then click the "OK" to save and return. (For this example, it

selects COM1 as master mode).

The meaning of each parameter is as follows：

Operating mode：

It is used to set up gateway as master station or slave station in the network.
Default is set as master mode.

Modbus protocol type：

It is used to set up the gateway protocol type of the network between the communication of

the serial port and other connected devices.

It can choose either Modbus-RTU or Modbus-ASCII. Please set this parameter to be

consistent with the device to which the serial port is connected.

Baud rate：

Serial port baud rate: optional range is 1200~115200bps and default is 9600bps. Please set this parameter to be consistent with the device to which the serial port is connected.

Check Digit：

It could choose none, odd, even and default is set as none. Please set this parameter to be consistent with the device to which the serial port is connected.

Stop bit：

It can choose stop bit 1 or stop bit 2. The default is set as stop bit 1. Please set this parameter to be consistent with the device to which the serial port is connected.

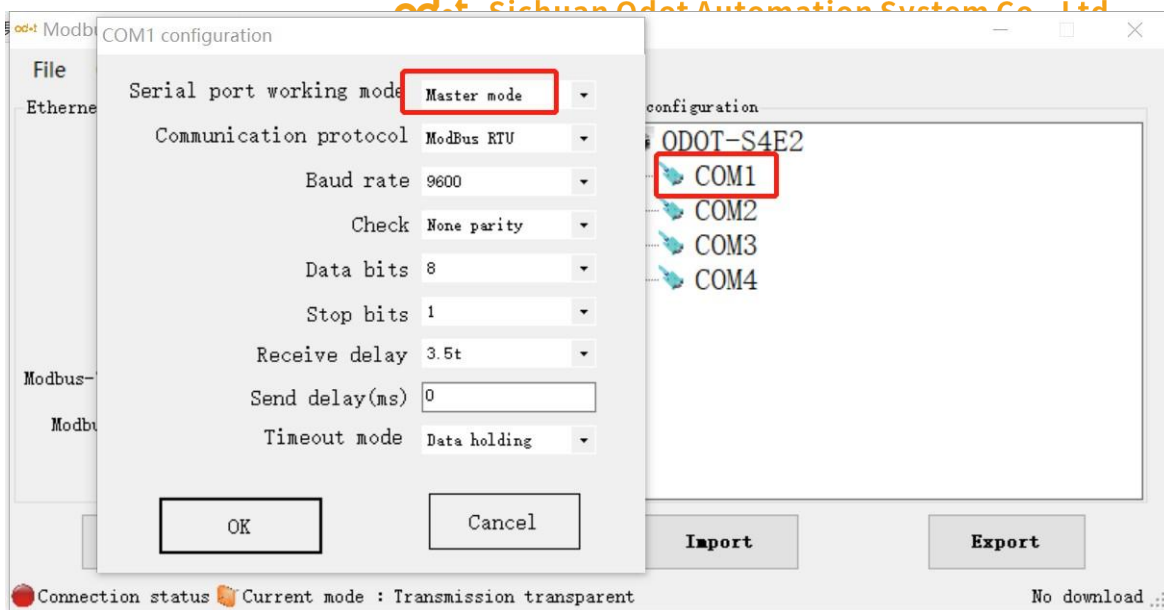**Receive character interval：**

When receiving message the frame interval detection time can be chose from 1.5t to 200t. Default is 3.5t. (T is the transmission time of a single character, and it is related with baud rate). In general, there is no need to change this parameter.

Packet transmission interval：

Interval time for sending Modbus commands (Delayed time from receiving the slave response message to sending the next command) can be set from 0ms-65535ms. Default is 0ms. It is recommended to set 100ms and this can prevent connected devices from communication failure due to slow response.
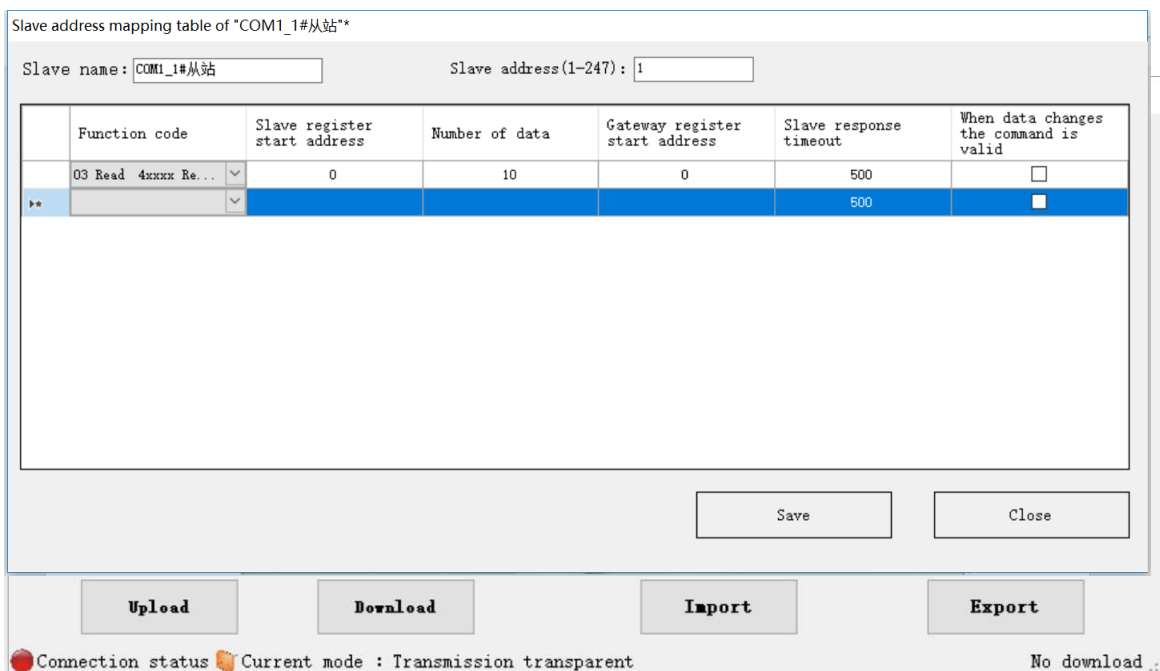
Timeout processing：

Read data from slave station. Data processing mode can choose "data clear" or "data retention" when slave station response is timeout. Default is "Data Hold mode". This parameter is only valid for Modbus read command. Please set this value according to actual needs.

3.4.2.4.Select "COM1" or "COM2" （In this example, it is COM1）, and right-click to select "Add Slave".

It could then input "Slave name" and fill in "slave station number". Then it could configure Modbus function code, start address of slave data, number of data, start address of gateway mapping area and response timeout time and if "event output"(only when the data changes, the gateway will execute this command once, this parameter is only valid for write commands) according to the communication manual of slave equipment. Under the same serial port, the station number of the slave cannot be the same with each other and the device itself too. Range of the slave station address is between 1 and 247. Under the same serial port the slave name cannot be the same. After completing the settings, click "Save Current Mapping Table Edit". 编译需要英文截图

3.4.2.5.Double-click "COM2" , or right-click "COM2".

And click "Serial Properties" to bring up the "Configure serial" window. Set up the communication parameters. And it sets the serial port working mode as slave mode, then click the "OK" to save and return. (For this example, it selects COM2).

The meaning of each parameter is as follows：

Operating mode：

It is used to set up gateway as master station or slave station in the network.
Default is set as master mode.
In this example, it is set as slave mode.

Modbus protocol type：

It is used to set up the gateway protocol type of the network between the communication of the serial port and other connected devices.
It can choose either Modbus-RTU or Modbus-ASCII. Please set this parameter to be consistent with the device to which the serial port is connected.

Baud rate：

Serial port baud rate: optional range is 1200~115200bps and default is 9600bps. Please set this parameter to be consistent with the device to which the serial port is connected.

Check Digit：

It could choose none, odd, even and default is set as none. Please set this parameter to be consistent with the device to which the serial port is connected.
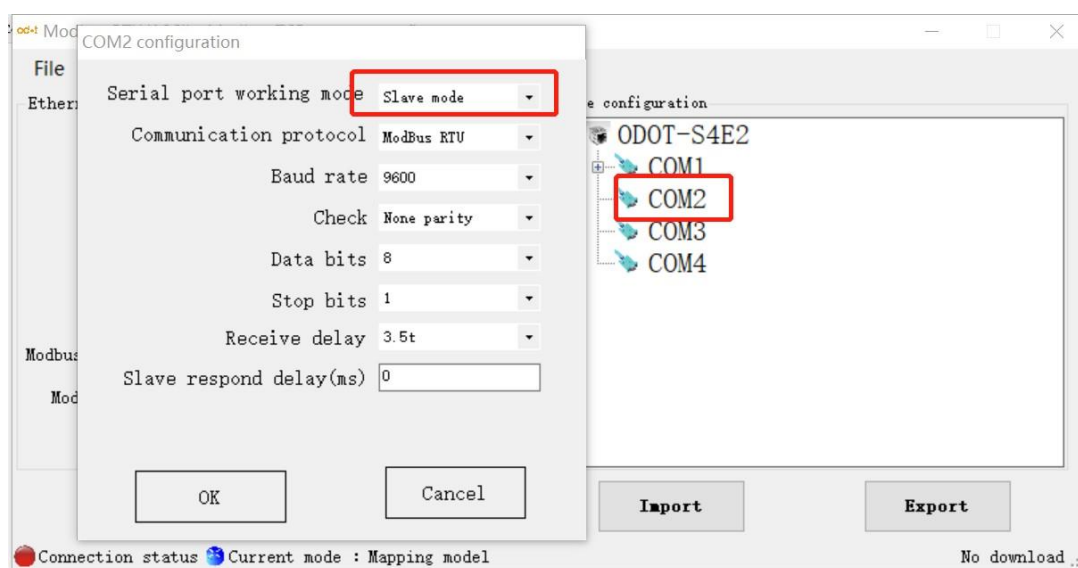
Stop bit：

It can choose stop bit 1 or stop bit 2. The default is set as stop bit 1. Please set this parameter to be consistent with the device to which the serial port is connected.

Receive character interval：

When receiving message the frame interval detection time can be chose from 1.5t to 200t. Default is 3.5t. (T is the transmission time of a single character, and it is related with baud rate). In general, there is no need to change this parameter.

Timeout processing： The gateway serves as the Modbus RTU/ASCII slave. And it is the time interval between receiving a message from the master and sending a reply message. This is related to the master performance.

3.4.2.6.Configuring the Ethernet parameters of the gateway by the "Ethernet Configuration" on the left of the software.

Some of the parameters are as follows：

Modbus gateway IP：The gateway IP address; ？？网关还是设备的 **IP**？

Subnet mask：Subnet mask of the device;

LAN gateway IP：Gateway IP address of the network where the device resides;

Modbus-TCP data communication port：Generally it is 502；

Configure the port：The configuration software could be used for downloading the configuration to the device through this port of the device；

Modbus-TCP watchdog time：The time interval from when the gateway receives the last Modbus TCP packet to the automatic restart.

Note: The automatic restart of the gateway can release connection resources that have not been used for a long time in time;

Modbus-TCP watchdog enable：Whether the watchdog function is enabled.

3.4.2. 7.Set the target gateway address that you want to download.

And it could set the download communication port number through "Communication"→"Configure communication channel" too. The gateway factory default IP is 192.168.1.254 and port number is 1024.

3.4.2.8.Click the button "Download Gateway Configuration " to. download configuration parameters to the gateway.

After the download is successful, the "Download successful" prompt appears in the Status Bar at the lower right. After the download is successful, the gateway restarts automatically and then the it goes into running state.

If the download fails, please check out whether the computer IP address and gateway IP address are in the same network segment. Then check whether the gateway IP address is set correctly. If the gateway IP address is lost, please reset the gateway through the reset button. After reset, the gateway IP address will be the factory default IP address.

Click "Import Profile" and "Export Profile" and it could import or save the configuration file to the local disk. Click "Upload Gateway Configuration" and it could upload the current gateway configuration to the software.

Note: When downloading and uploading, please ensure that the computer and the gateway are in the same network segment.

3.4.2.9.In this example, after the above setup is completed.

It could connect the Modbus RTU/ASCII slave to COM1, and connect the Modbus RTU/ASCII master to COM2.

Then it could connect the Modbus TCP client to the gateway via Ethernet. The gateway will automatically refresh the underlying Modbus RTU/ASCII slave data from COM1, and the Modbus RTU/ASCII master and Modbus TCP clients indirectly access the Modbus RTU/ASCII slave by accessing the internal data store area of the gateway.

Odot Automation System Co., Ltd.

Add: No.6 Hongsheng Road, Hi-Tech District, Mianyang, Sichuan, China.

Tel: +86-0816-2538289

Zip Code: 621000

Email:sales@odotautomation.com

Web: www.odotautomation.com