

Wi-Fi Transparent Transmission Module

Enertrek C20 Series

Product Manual

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1 Product Information and Applications

1.1 Product Overview

The Enertrek_C20 WiFi Transparent Transmission Module is a WiFi communication module designed for networked communication with RS485 Modbus RTU devices. The module connects to Modbus RTU devices via RS485 for downstream communication and connects to a platform or server via a WiFi network for upstream communication, enabling remote reading, remote control, data monitoring, and networking of field devices.

By default, the module supports Modbus RTU pass-through mode, forwarding Modbus commands issued by the platform or host computer to field devices and uploading the devices' response results back to the platform.

1.2 Product Positioning

Type	Positioning	Description
Transparent Transmission Module	Data Forwarding Channel	Primarily responsible for data forwarding between the network side and the RS485 side; does not actively parse business data.
Data Acquisition Gateway	Edge Data Collection Device	Can actively poll downstream devices, parse the data, and upload it to the platform.
Enertrek_C20 Current Position	Primarily uses transparent transmission, with expandable data collection capabilities	Used by default for Modbus RTU transparent transmission; polling data collection can be expanded later based on platform requirements.

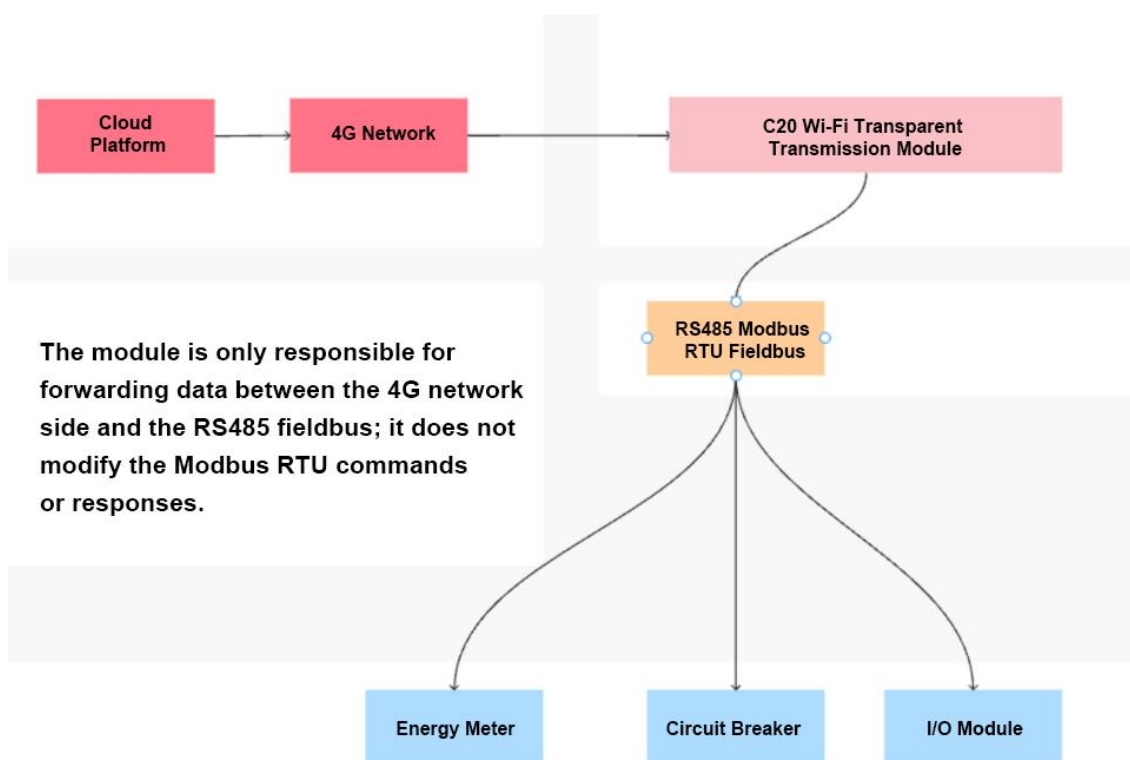
1.3 Typical Applications

Application Scenarios	Description
Smart Power Distribution Systems	Connects to RS485 devices such as electricity meters, circuit breakers, and I/O modules.

Energy Monitoring System	Upload data such as voltage, current, power, energy consumption, and alarm status.
Industrial Automation	Remotely read data from field devices such as PLCs, meters, and controllers.
Building Power Distribution Monitoring	Enables centralized data collection from multiple devices and platform-based management.
Outdoor Device Networking	Suitable for sites with Wi-Fi networks but without wired networks or Wi-Fi coverage.
Remote Operation and Maintenance	Remotely issue Modbus read or control commands via the platform.

2 System Architecture

2.1 System Architecture Diagram



2.2 Communication Logic

Direction	Communication Link	Description
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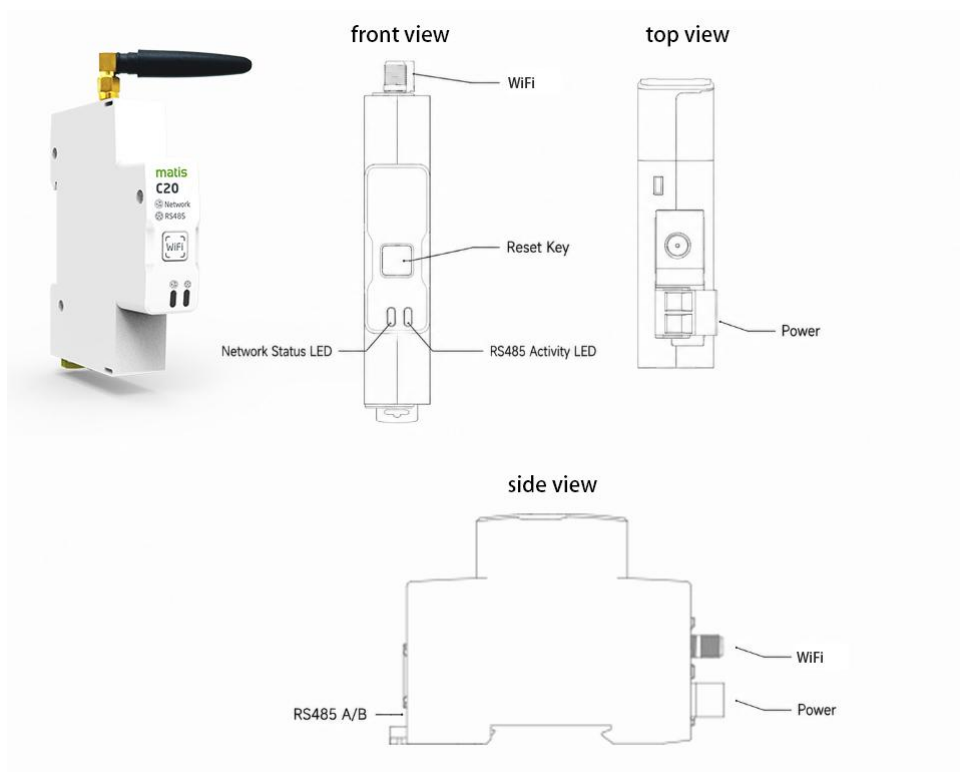
Uplink	RS485 Device → Enertrek_C20 → Wi-Fi → Platform	Uploads device response data, status data, or collected data.
Downlink	Platform → Wi-Fi → Enertrek_C20 → RS485 Device	Send Modbus read, set, or control commands.
Local Configuration	PC Configuration Tool → RS485/Serial Port → Enertrek_C20	Configure APN, server, MQTT topic, serial port parameters, etc.

2.3 Device Role

Category	Role	Description
Wi-Fi / Platform-side	MQTT Client / Communication Terminal	Connects to a server or cloud platform to complete registration, startup, and data transmission and reception.
RS485 Side	Modbus RTU Master or Pass-Through Channel	Connects downstream to Modbus RTU slave devices.
Downstream Devices	Modbus RTU Slave	Electric meters, circuit breakers, I/O modules, sensors, controllers, etc.

3 Product Ports

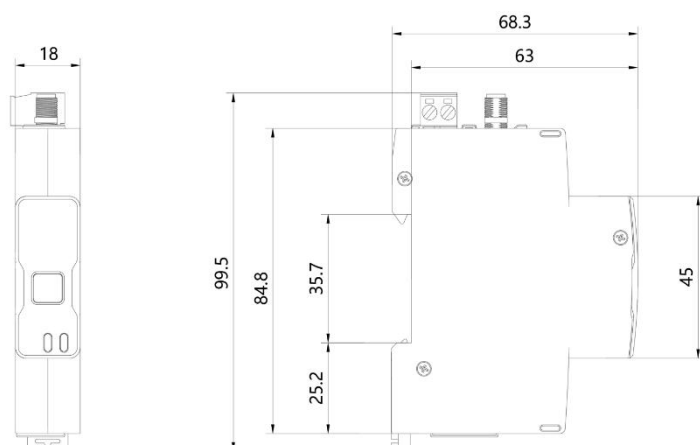
3.1 Product Port Diagram



3.2 Port Description

Port Name	Type	Function Description
Power	Terminal Block	Module power supply input.
RS485 A/B	Terminal block	Connects Modbus RTU slave devices.
WiFi ANT	SMA / IPEX Antenna Connector	Connects to an external Wi-Fi antenna.
Reset Key	Physical Button	Restores the default RS485/UART communication parameters.
Network Status LED	Status Indicator	Displays the Wi-Fi network connection status.
RS485 Activity LED	Status Indicator	Displays the RS485 communication status.
Product Label / QR Code	Identification	Used to identify the SN, IMEI, model, and platform binding information.

3.3 Dimensions



4 Technical Parameters

Item	Parameter
Product Type	Wi-Fi Pass-Through Communication Module
Uplink Communication	Wi-Fi
Downlink Interface	RS485
Downlink Protocol	Modbus RTU
Antenna Interface	External Wi-Fi antenna interface
Operating Modes	Modbus RTU pass-through; polling data acquisition (extended based on software version)
Default Serial Port Parameters	9600, 8, NONE, 1
Supported Baud Rates	1,200–115,200 bps
Number of Subdevices	Supports up to 32 Modbus slave devices
Configuration Method	Host computer configuration tool
OTA Upgrade	Supports remote updates
Operating Temperature	-10 °C to +55 °C
Relative Humidity	5% to 95%, non-condensing
Mounting Method	DIN rail mounting; to be confirmed based on the final configuration
Protection Rating	IP20

5 Installation Requirements

5.1 DIN Rail Installation

1. Snap the Enertrek_C20 module onto the DIN rail and ensure the device is securely

fastened.

2. Insert the Nano SIM card and install the Wi-Fi antenna.
3. Connect the power terminals and the RS485 A/B terminals.
4. Before powering on, check the power supply specifications, RS485 polarity, and the downstream device address.
5. After powering on, observe the status of the Network Status and RS485 Activity indicator lights.

5.2 Wiring Requirements

Item	Requirement
Power Supply	Ensure the power is disconnected before wiring.
RS485 Polarity	A to A, B to B; if communication fails, check for reversed connections.
Communication Cable	We recommend using shielded twisted-pair cable; lay power and signal cables separately.
Terminating Resistor	For long-distance buses or poor communication quality, it is recommended to install 120Ω terminating resistors at both ends of the bus.
Antenna	The antenna should be securely connected and should not be completely shielded by metal enclosures.

6 Product Functions

6.1 LED Indicator

Indicator Lights	Status	Appearance	Meaning
Network Status	Normal	Solid green light	Registered with the Wi-Fi network; connection is normal.
	Registering	Green light flashing slowly (approx. 1 second)	Registering or continuously attempting to connect to a Wi-Fi network.
RS485 Activity	Communicating	Green light flashing	Modbus RTU communication in progress.
	No communication	Light is off	No downstream device activity detected or the device is offline.

6.2 Button Functions

Operation	Function	Indicator Status
Press and hold for 5 seconds	Reset Wi-Fi Configuration	Green light flashes slowly; enters Wi-Fi configuration mode
Press and hold for 10 seconds	Restore default RS485 communication parameters	The green light flashes rapidly, indicating a successful reset

Note:

- **Press and hold for 5 seconds:** Clears the current Wi-Fi network configuration; the device enters a network reconfiguration state. RS485 communication parameters remain unchanged.
- **Press and hold for 10 seconds:** Restore RS485 communication parameters to their default values to facilitate reconfiguration of serial communication.

6.3 Working Mode

6.3.1 Transparent Transmission Mode

The module acts as a data forwarding device, transmitting Modbus RTU commands issued by the platform or host computer via RS485 to field devices, and returning the devices' response results to the platform unchanged. This mode is suitable for remote meter reading, remote control, device debugging, and status retrieval.

6.3.2 Polling Mode

The module reads register data from downstream Modbus RTU devices at regular intervals according to a preset polling table and parses the protocol based on the configured register mapping.

The parsed data can be encapsulated in JSON format as required by the platform and uploaded, enabling the periodic collection and display of data such as voltage, current, power, energy, temperature, switch status, and alarm status.

This mode is suitable for application scenarios where the platform needs to directly obtain structured data rather than receive raw Modbus messages.

Note: This feature must be configured or customized in advance based on project requirements. Users must confirm the Modbus protocol, register mapping, field names, scaling factors, units, upload intervals, and JSON data format for downstream devices

with the manufacturer. Specific support details are subject to the actual software version and the configuration file confirmed by both parties.

6.4 OTA Upgrade

The module supports remote OTA upgrades. During the upgrade process, the module downloads the firmware, writes the program, and automatically reboots. Do not disconnect the power during the upgrade. The upgrade duration depends on network quality and firmware size; in a test environment, it takes approximately 1–2 minutes to complete.

7 Parameter Configuration

7.1 Configuration Methods

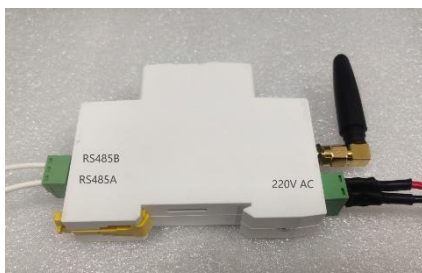
The configuration tool is used for factory configuration, on-site debugging, and batch parameter configuration of the module. It allows you to read and modify settings such as the server address, MQTT topic, RS485 communication parameters, and sub-device parameters.

7.2 Configuration Tool Connection

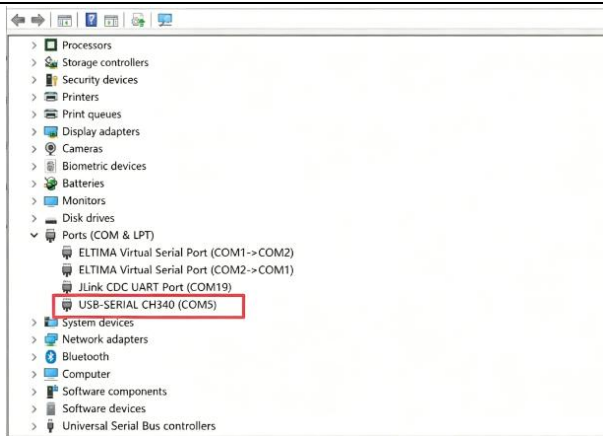
1. Use an RS485-to-USB adapter to connect the computer to the Enertrek_C20 module.



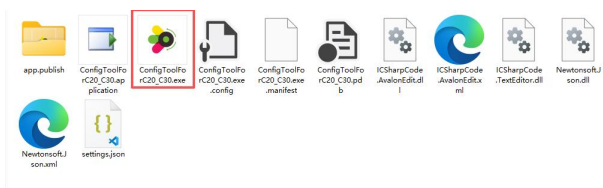
2. Connect the Enertrek_C20 to a power source and verify that the device powers on normally.



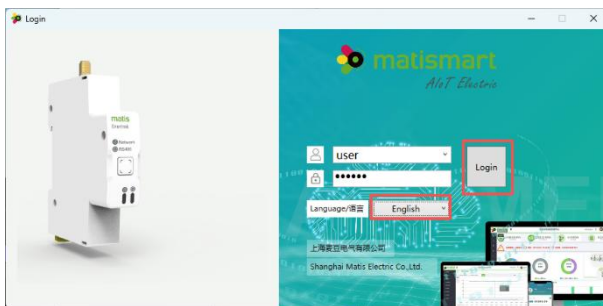
3. Verify the current serial port number on the computer.



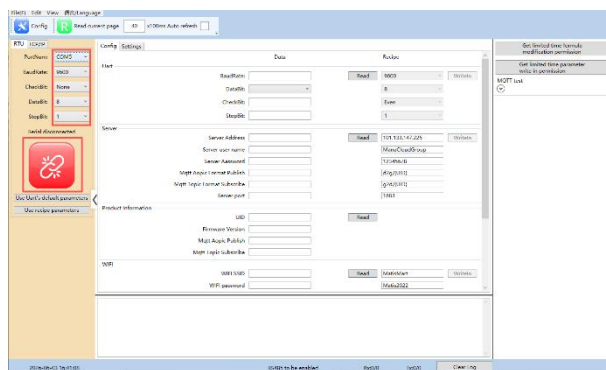
4. Unzip and open the C20/Enertrek_C20 Configuration Tool.



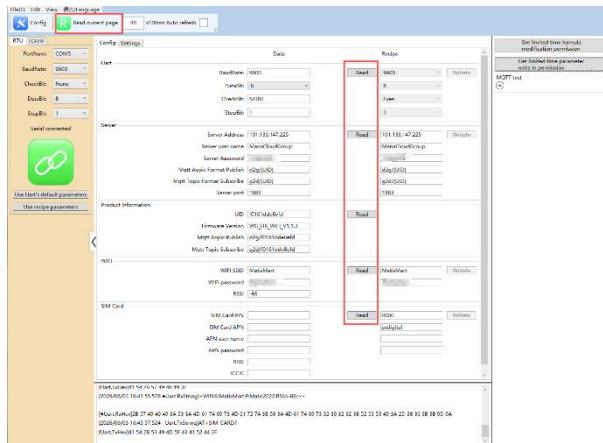
5. Select a language and log in.



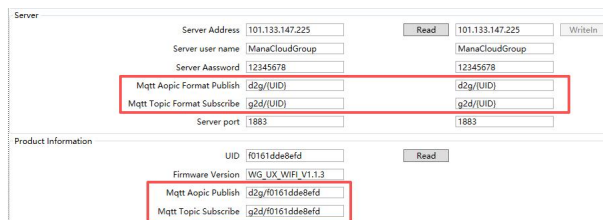
6. Select the RTU parameters and open the serial port.



7. Click "Read Current Page" or the corresponding read button to retrieve the device's current parameters.



8. If you need to modify parameters, first obtain temporary write permission, then modify the parameters and click “Write.”



7.3 WiFi / APN Parameter Configuration

Parameter Name	Parameter Description	Property
WiFi SSID	WiFi network name, used to select or enter the wireless network you want to connect to	Configurable
Wi-Fi Password	Wi-Fi network password, used for the device to connect to the wireless network	Configurable
RSSI	Wi-Fi signal strength, used to determine the quality of the current wireless network	Read-only

The device connects to the network via Wi-Fi; users can configure Wi-Fi network parameters to enable the device to connect to the network and communicate with the platform.

7.4 MQTT Server Configuration

Parameters	Description
Server IP / Domain	MQTT server address; can be an IP address or a domain name.
UserName	MQTT username.
Password	MQTT password.
Publish Topic	The topic the device publishes to, used by the module to upload data to the platform.
Subscribe Topic	Device subscription topic, used by the platform to send commands to the module.

7.5 MQTT Topic and UID Rules

MQTT Topics support either fixed topics or dynamic topics with a UID. When a topic contains {UID}, the module automatically replaces {UID} with the device's unique identifier after it comes online. The Wi-Fi version typically uses the IMEI as the UID.

Configuring the Topic	Example of an Actual Topic
d2g/{UID}	d2g/867156067806820
g2d/{UID}	g2d/867156067806820
d2g/{UID}/123	d2g/867156067806820/123
d2g/123	d2g/123

7.6 RS485 / UART Parameter Configuration

Parameter	Default Value	Description
Baud Rate	9600	Can be set according to the downstream device; the supported range depends on the software version.
Data Bits	8	As defined by DataBits; does not include parity bits.
Check Digit	NONE	Set to No Parity, Odd Parity, or Even Parity according to device requirements.
Stop Bits	1	Typically 1.
Protocol	Modbus RTU	Used for downlink RS485 device communication.
Device Role	RS485 Master / Pass-through Channel	Operates in pass-through or polling mode.

8 Operation Procedure

8.1 Installing the Device

1. Install the module on a DIN rail or inside an equipment enclosure.
2. Install the Wi-Fi antenna.
3. Connect the power supply.
4. Connect the RS485 A/B cables.

5. Verify that the RS485 device address, baud rate, and parity bit settings match.

8.2 Device Online

1. Power on the module.
2. The module automatically registers with the Wi-Fi network.
3. During network registration, the green "Network Status" LED flashes slowly.
4. Once the network connection is established, the green "Network Status" LED remains lit.
5. The platform displays that the device is online.

8.3 Connecting RS485 Devices

1. Set the Modbus address for the downstream device.
2. Confirm the baud rate, data bits, parity bit, and stop bits.
3. Add a sub-device to the platform.
4. Send a read command to test communication.
5. The RS485 Activity indicator flashes during RS485 communication.

8.4 Start Transparent Transmission

1. The platform sends a Modbus command.
2. The Enertrek_C20 forwards the command to the field device via RS485.
3. The downstream device returns response data.
4. The Enertrek_C20 uploads the response data to the platform via the Wi-Fi network.

9 Commissioning

9.1 Commissioning Preparation

- Enertrek_C20 Wi-Fi transparent transmission module.
- WiFi antenna.
- RS485-to-USB adapter.
- C20/Enertrek_C20 configuration tool.
- Modbus test equipment, electricity meter, or circuit breaker.

- Platform account, server parameters, or MQTT testing tools.

9.2 Network Verification

- Check if the “Network Status” indicator is steadily lit green.
- Can RSSI / CSQ signal quality be read?
- Does the platform show the device as online?
- Are the server address, port, username, and password correct?

9.3 RS485 Verification

- Are the RS485 A and B pins connected in reverse?
- Is there a duplicate address for the downstream device?
- Are the baud rate, data bits, parity bit, and stop bits consistent?
- Is the RS485 Activity indicator flashing?
- Does the Modbus read register respond?

9.4 Platform Communication Verification

- Is the MQTT server address accessible?
- Are the MQTT port, username, and password correct?
- Are the Publish Topic and Subscribe Topic configured correctly?
- Has {UID} been replaced with the device’s actual UID/IMEI?
- Can the platform send commands and receive responses from the device?

9.5 Device Information Verification

Information Fields	Description
UID	Unique device identifier; for Wi-Fi versions, this is typically the IMEI.
FW	Firmware version number.
PUB	Device publishes a topic.
SUB	Device subscription topic.
UART	Current RS485/UART communication parameters.

10 Document Revision History Table

Version	Date	Section	Revision Description	Reason for Revision	Prepared by	Reviewed by	Approved by	Remarks
V1.0	2026-07-17	Full Doc	Initial release.	New document creation.	Wynn Zhang			

Filling Instructions:

1. It is recommended to use version numbers in the format V1.0, V1.1, V2.0, etc.; minor revisions should use minor version numbers, while major structural or functional changes should use major version numbers.
2. The description of revisions should clearly state “what was changed,” and the reason for the revision should clearly state “why it was changed.”
3. Before a controlled document is released, the drafting, review, and approval processes must be completed, and a revision history must be maintained.