Communication Protocol

RTU-ES-WG01-EV03.1

Remote Terminal (RTU) ES-WG01

For Industrial WiFi/Wireless Serial to Ethernet Converter

1. Brief Introduction

ES-WG01 RTU acts as a remote monitoring and control device that interfaces with various pressure/ temperature sensors, instruments, and equipment in a field environment. It collects data and sends it to a central system, often over a wireless network.

ES-WG01 features a robust embedded low-power hardware platform that ensures reliable performance and stability across a wide temperature range.

It supports multiple communication protocols, including **Modbus RTU/ASCII/TCP, and offers various interfaces such as RS-232, RS-485,** and Ethernet. Optional built-in communication modules like **GPRS, CDMA, 433, and WiFi** enhance connectivity options.

To maintain data integrity, the device includes watchdog and power failure protection mechanisms that safeguard settings and historical data over the long term.

It's designed to meet industrial standards and can be easily mounted on **DIN rails** for field installation.

Constructed with high-quality industrial-grade components, advanced electrical design, and compact integrated circuits, the device provides excellent electrical isolation and electromagnetic shielding.

This significantly improves its resistance to interference and overall reliability. It operates effectively in extreme temperatures ranging from **-40 to 85°C** and can withstand relative humidity levels of up to **95%**, making it suitable for harsh outdoor environments.

2. Key Features

1. **Connectivity Options**:

   RS-485/RS-232: These serial communication standards are commonly used for connecting to sensors and other devices. RS-485 is preferred for long-distance communication due to its differential signaling which reduces noise.

   Modbus RTU/TCP: ES-WG01 utilize the Modbus protocol for communication between devices. Modbus RTU is suitable for serial communication, while Modbus TCP is used over Ethernet, providing versatility in network design.

   Wireless Protocols: ES-WG01 support wireless communication standards such as **ZigBee and LoRa.**

   ZigBee is suitable for short-range networking with low power consumption, while LoRa is designed for long-range communication, making it ideal for IoT applications.

2. **Data Acquisition**:

   ES-WG01 can acquire data from diverse sensors and devices, monitoring parameters like temperature, pressure, and flow rates. They convert analog signals from sensors into digital data for processing and transmission.

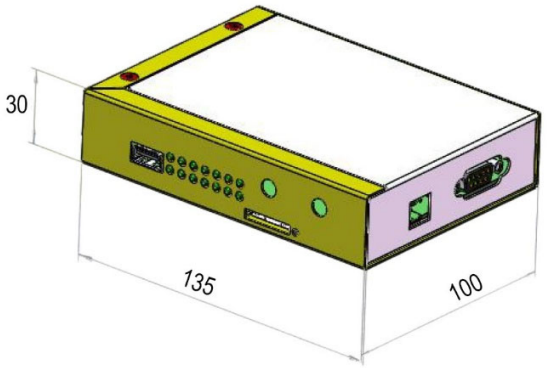
3. **Remote Monitoring and Control**:

   ES-WG01 facilitate the remote monitoring of equipment, allowing operators to check system status and perform controls without being physically present. This is particularly valuable in harsh or inaccessible environments.

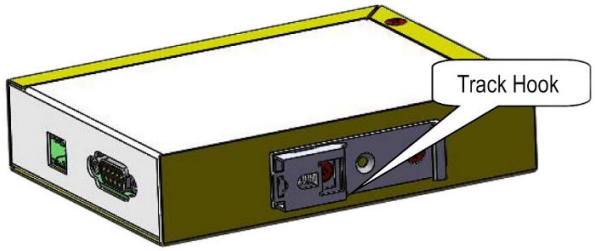
3. Technical Data

Items	Data
RS-485 interface	1
RS-232 interface	1
Ethernet interface	1
USB interface	1
SIM interface	1
Communication protocol	MODBUS RTU/ASCII/TCP; customization available
Data transmission	GPRS/CDMA/Ethernet/WiFi/433M/PLC/RS-485/232
Power supply	24V DC
Power consumption	≤2W
Working temperature	-40℃ ～ +80℃
Working humidity	≤2W
Dimension	100mm*135mm*30mm
Packing size	180mm*150mm*100mm
Packing Weight	1.5kg

3. Drawing & Installation



The dimensions (without packaging): 100mm*135mm*30mm



The standard DIN Guide Rail installation

4 Setting

1). Communication parameters

- RS232 Default Baud Rate: 115200 8N1
- RS485 Default Baud Rate: 115200 8N1
- Ethernet Default IP and Port: 192.168.10.100 7000 Protocol TCP

2). Communication parameters

The multiple instruments access the data stored in the RTU according to the following register definitions:

Register Add	Instrument No.	Storage Type	Instrument Group No.:
44620-44621	Serial No. 1	Single Precision Float	Group No. 1
44622-44623	Serial No. 2		
44624-44625	Serial No. 3		
44626-44627	Serial No. 4		
44628-44629	Serial No. 5		
44630-44631	Serial No. 6		
44632-44633	Serial No. 7		
44634-44635	Serial No. 8		
44636-44651	No. 1- No. 8		Group No. 2
44652-44667	No. 1- No. 8		Group No. 3
44668-44683	No. 1- No. 8		Group No. 4
44684-44699	No. 1- No. 8		Group No. 5
44700-44715	No. 1- No. 8		Group No. 6
44716-44731	No. 1- No. 8		Group No. 7
44732-44747	No. 1- No. 8		Group No. 8
44748-44763	No. 1- No. 8		Group No. 9
44764-44779	No. 1- No. 8		Group No. 10

3). LED indicator instruction

The status of the indicator light is as follows.	
Power	The power indicator light is steady on when the power is normal.
RUN	The CPU light blinks when the CPU is operating normally.
RX RS232	The RS232 receive indicator blinks when data is received.
TX RS232	The RS232 transmit indicator blinks when data is sent.
RX RS485	The RS485 receive indicator blinks when data is received.
TX RS485	The RS485 transmit indicator blinks when data is sent.
Line	Lights up when online.
Link	Lights up when connected.
DWN	Lights up during program update download.
4G signal	Displays the signal strength of the 4G wireless reception.

5. Note

1. The grounding terminal of the RTU chassis must be reliably grounded.
2. The variation in the RTU operating power supply should not exceed its input range.
3. If any abnormal phenomena such as smoke, unusual sounds, or odors are observed, please disconnect the power immediately.
4. In case of problems, users should not disassemble the device at will; it must be handled by technical personnel from the manufacturer or maintenance staff trained by the manufacturer. Please note that

plugging and unplugging modules should not be done while powered on, and to prevent static damage to the chips, do not touch the chips with your hands.

6. Quick Diagnosis Guide

When the RTU malfunctions, users can perform a simple check based on the key points in the table below before maintenance. If the fault persists, please contact the manufacturer.

Fault Phenomenon	Analysis	Solution
Power indicator light not on	Loose working power input terminal	Re-fix the power terminal
	PCB power failure	Replace the RTU
Operation indicator light not blinking	Program freeze	Power off and then back on, or use the configuration software's "Reset" function
Unable to communicate with the master station	Incorrect communication parameter settings	Reset uplink communication parameters

After-Sales Service

This product has a one-year warranty period, provided that the user fully complies with the specified instructions, uses the product correctly, and there is no human damage.