CLOSE TO THE FUTURE


# Ethergate 3

## Interface Ethernet/RS485. User Manual

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# Index

## Overview of Characteristic

- Cortex-M3 MCU with 2MB Flash and 128KB SRAM
- FreeRTOS operating system
- TCP/IP Stack with TCP/UDP/MQTT/HTTP/WebSocket support
- Modbus TCP to RTU. Modbus Master function.
- RS485 port with programmable speed up to 460800 bps.
- 10/100M Ethernet with Auto-Negotiation.
- Configuration via internal web portal (Web-server).
- Supports security protocols like AES/DES3.
- Supports Heartbeat and Register Packet function
- Remote internal firmware upgrade via OTA connection.
- Industrial temperature range: -40 to +85˚ C
- Model with AC auxiliary power supply: Ethergate 3-AC：100～240VAC@50～60Hz
- Model with DC auxiliary power supply: Ethergate 3-DC：9～48VDC@1A
- Size: 97.60 x 64.95 x 27.50 mm (L x W x H)， mounting on C45 rail.

# 1. PRODUCT OVERVIEW

## 1.1. General Description

Ethergate 3 provides an interface between an RS485 port and an Ethernet port. The Ethergate 3 integrates a TCP/IP controller, memory, a 10/100M Ethernet transceiver, an RS485 port and a complete TCP/IP protocol stack. It is based on the FreeRTOS operating system. The Ethergate 3 also includes an integrated web server for device configuration.

Using a highly integrated hardware and software platform, the Ethergate 3 is optimized for all types of applications in industrial control, smart grid, personal medical and remote control, where lower data rates and infrequent data transmission or reception are required.

## 1.2. Key Application

The Ethergate 3 device connects serial devices to Ethernet networks using the TCP/IP protocol. Possible applications include

- Remote monitoring of equipment
- Asset tracking and telemetry
- Security applications
- Industrial sensors and controllers
- Medical devices
- ATM machines
- Data collection devices
- Universal power supply management units (UPS)
- Telecommunications equipment
- Data display equipment
- Portable instruments
- Modems
- Clocks and attendance terminals

## 1.3. Device Parameters

Table1. Ethergate 3 Technical Specifications

| Item | Parameters |
|---|---|
| **System Information** | |
| Processor/Frequency | Cortex-M3/96MHz |
| Flash/SDRAM | 2MB/128KB |
| Operating System | FreeRTOS |
| **Ethernet Port** | |
| Port Number | 1 |
| Interface Standard | 10/100 Base-T Auto-Negotiation |
| Transformer | Integrated |
| Network Protocol | IP，TCP，UDP，DHCP，DNS，HTTP Server/Client，ARP, AutoIP，ICMP， Telnet, NTP, Modbus TCP |
| Security Protocol | AES 128Bit DES3 |
| **RS485 Serial Port** | |
| Port Number | 1 |
| Data Bits | 5,6,7,8 |
| Stop Bit | 1,2 |
| Parity bit | None, Even, Odd |
| Baud Rate | TTL: 600 bps~460800 bps |
| Flow Control | No Flow Control<br>Software Xon/ Xoff flow control |
| **Software** | |
| Web Pages | Http Web Configuration |
| Configuration | Web CLI<br>XML import<br>Telnet<br>IOTService PC Software UART<br>Fast Config |
| Firmware Upgrade | Webpage, IOTService Tools |
| **Basic Parameter** | |
| Size | 97.60mm x 64.95mm x 27.50mm |
| Operating Temp. | -40 ~ 85°C |
| Storage Temp. | -45 ~ 105°C, 5 ~ 95% RHno condensation） |
| Input Voltage | Ethergate 3-AC：100～240VAC@50～60Hz<br>Ethergate 3-DC：9～48VDC@1A |
| Working Current | ~100mA |
| Power | <400mW |

# 2. HARDWARE INTRODUCTION

The Ethergate 3 unit is a complete solution for serial port device connecting to network. This powerful device supports a 10/100BASE-T Ethernet connection, a reliable and proven operating system stored in flash memory, an embedded web server, a full TCP/IP protocol stack, and standards- based (AES) encryption.

Through Ethernet cable connect router with Ethergate 3 serial server for data transfer, which makes the data transformation very simple.


Figure 1. Ethergate 3 Appearance

## 2.1. Ethergate 3 Pins Definition


Figure 2. Ethergate 3 Interface

Table 2. Ethergate 3-AC Interface Definition

| Pin | Description | Net Name | Signal Type | Comment |
|---|---|---|---|---|
| 1 | AC Power Input | L | Power | 100～240VAC Input |
| 2 | AC Power Input | N | Power | |
| 5 | | RS485_B- | IO | RS485 B- |
| 6 | COM Signal | COM | Power | It is used to prevent interference, left floating. In case of connection, connect to ground at only one point. |
| 7 | | RS485_A+ | IO | RS485 A+ |
| RJ45 | Ethernet | RJ45 | I/O | |
| Reload | Restore to factory setting button | Reload | I | Press down for more than 3 seconds and loose to restore factory setting. |
| Reset | Reset button | Reset | I | Hardware reset button |
| Net | Network status LED | Net | O | On: Ethernet connection is OK Off: No Ethernet connection |
| Active | UART Data Transfer | Active | O | Off: No data transfer<br>0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection. |
| Power | Power LED | Power | O | On: Power input OK Off: Power input NG. |
| Link | Server connection LED | Link | O | On: netp Socket connection OK. Off: no netp Socket connection. |

Table3. Ethergate 3-DC Interface Definition

| Pin | Description | Net Name | Signal Type | Comment |
|---|---|---|---|---|
| 1 | DC Power Input | VCC+ | Power | 9～48VDC@1A Input |
| 2 | DC Power Input | GND- | Power | |
| 5 | | RS485_B- | IO | RS485 B- |
| 6 | COM Signal | COM | Power | Used for RS485 GND, usually leave it unconnected |
| 7 | | RS485_A+ | IO | RS485 A+ |
| | | | | |
| RJ45 | Ethernet | RJ45 | I/O | |
| Reload | Restore to factory setting button | Reload | I | Press down for more than 3 seconds and loose to restore factory setting. |
| Reset | Reset button | Reset | I | Hardware reset button |
| Net | Network status LED | Net | O | On: Ethernet connection is OK Off: No Ethernet connection |
| Active | UART Data Transfer | Active | O | Off: No data transfer<br>0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection. |
| Power | Power LED | Power | O | On: Power input OK Off: Power input NG. |
| Link | Server connection LED | Link | O | On: netp Socket connection OK. Off: no netp Socket connection. |

**<Notes>**
**I — Input; O — Output; I/O: Digital I/O; Power—Power Supply**

## 2.2. RS485 Interface

The RS485 port uses two wires, A(DATA+), B(DATA-). Connect all A(+) devices to the A(+) terminal and all B(-) devices to the B(-) terminal to communicate. To avoid possible noise in the cables, it is recommended to use shielded cables and to connect the shield at a single point to the protective earth.

The RS485 interface supports a maximum of 32 RS485 devices. The maximum cable length is 1200 metres. If the length exceeds 300 metres, it is necessary to add a 120 Ohm terminating resistor.

## 2.3. RJ45 Interface

Ethernet port is 10M/100M adaptive, support AUTO MDI/MDIX which means it support direct connecting to PC with Ethernet cable.

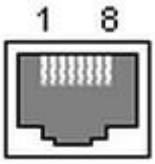


Figure 3. RJ45 Pin Defination

Table 4. RJ45 Interface

| Pin Number | Name | Description |
|---|---|---|
| 1 | TX+ | Transfer Data+ |
| 2 | TX- | Transfer Data- |
| 3 | RX+ | Receive Data+ |
| 4 | PHY-VCC | Transformer Tap Voltage |
| 5 | PHY-VCC | Transformer Tap Voltage |
| 6 | RX- | Receive Data- |
| 7 | N.C. | None Connect |
| 8 | N.C. | None Connect |

**Note**: If the device is unable to obtain an IP address via DHCP within the specified range, it will default to one of the following IP addresses:

169.254.173.207
255.255.0.0
169.254.1.1

## 2.4. Mechanical Size

The dimensions of Ethergate 3 are defined as following picture (mm):

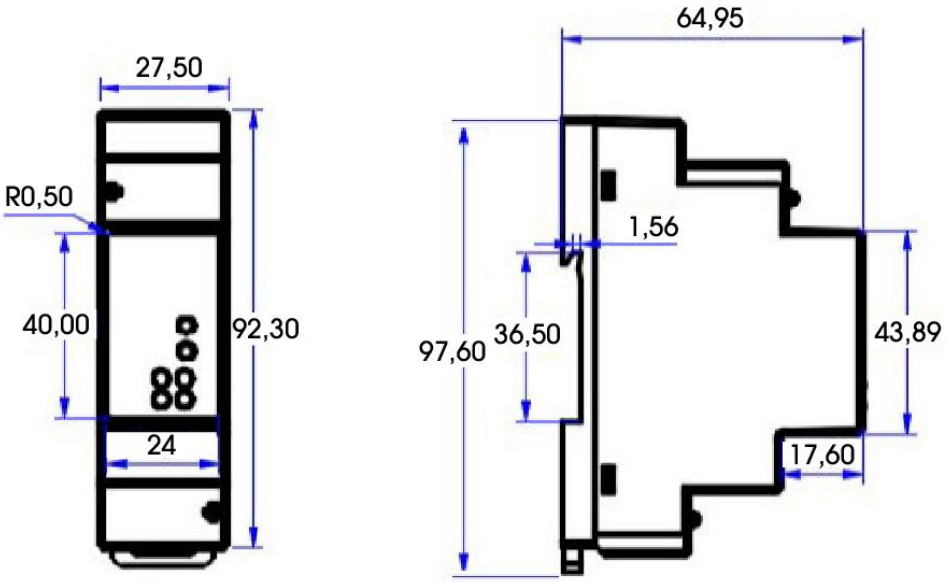


Figure 4. Ethergate 3 Mechanical Dimension

## 2.5. Product Installation


Figure 5. Product Installation