MDIM-485-WL USER MANUAL

Technical support and assistance

1. For the latest updates, manuals, and resources related to the MDIM-485-WL, please visit our official support portal at https://www.machdatum.com/devices/interface/mdim485.
2. If additional help is required, you may contact your local distributor, authorized sales representative, or MachDatum's customer service team.
3. To ensure faster assistance, please have the following details ready when contacting support:
    - Product model and serial number
    - Details of connected devices and peripherals
    - Software environment (operating system, firmware version, and application)
    - Clear description of the issue and any troubleshooting steps already taken

Safety Instructions

1. Please read these instructions thoroughly before operating the MDIM-485-WL.
2. Keep this manual accessible for future reference.
3. Disconnect the device from its power source before cleaning. Use a dry or slightly damp cloth. Avoid using sprays, solvents, or liquid cleaners.
4. For plug-in versions, ensure that the power socket is close to the device and easily reachable.
5. Keep the device away from moisture, condensation, and direct water exposure.
6. Always install the unit on a stable, vibration-free surface. Sudden impacts may damage the internal components.
7. Ensure proper airflow around the enclosure. Do not block ventilation openings to prevent overheating.
8. Verify the input voltage range matches the device's rated power requirements before connecting.
9. Route power cables so they are protected from foot traffic or crushing by heavy objects.
10. Pay attention to all warning labels and notices marked on the device.
11. If the device will remain unused for a long period, disconnect it from the power supply to protect it against power surges or transient voltages.
12. Prevent liquids or conductive objects from entering any openings in the device.
13. Do not attempt to open or service the equipment yourself. Only qualified service personnel should perform repairs.
14. Do not store the MDIM-485-WL in environments outside its rated temperature range (-40 °C to +80 °C). Use only in controlled environments suitable for industrial equipment

Overview

The MDIM-485-WL Gateway is designed to extend RS485 networks into IP communication systems with the flexibility of 10/100 Mbps Ethernet and 2.4 GHz Wi-Fi (150 Mbps). It functions as a transparent bridge, delivering accurate and real-time Modbus RTU to Modbus TCP conversion so supervisory systems and SCADA platforms can communicate with multiple RTU slaves without hardware changes. Setup is simplified through the dedicated Configuration Application, which provides quick access to network parameters and device settings. With dual DC power input support, a wide operating voltage range, and built-in surge and ESD protection, the gateway ensures reliable performance in demanding industrial conditions.

Product features

- **Selectable Network Support** – The MDIM-485-WL can be configured to operate over either 10/100 Mbps Ethernet or 2.4 GHz Wi-Fi (150 Mbps), allowing deployment in both wired and wireless environments.
- **Seamless Modbus Bridging** – Provides transparent conversion from Modbus RTU to Modbus TCP/IP, enabling easy integration of RS485 devices into IP-based supervisory systems.
- **Multi-Slave Device Support** – Allows multiple RS485 slave devices to be connected and managed through a single gateway for efficient communication.
- **Low-Latency Communication** – Ensures fast and stable data exchange, making it suitable for time-sensitive industrial applications.
- **Configurable Network Switchover** – Users can easily switch between Ethernet and Wi-Fi operation depending on the network requirements of their system.
- **Dedicated Configuration Application** – Includes a simple software interface for setting parameters, monitoring status, and managing network configurations.
- **Advanced Electrical Protection** – Built-in safeguards against surges, ESD, and voltage fluctuations help maintain reliable operation in harsh environments.
- **Industrial-Grade Compact Design** – Designed for durability and space-saving installation, supporting DIN-rail and panel mounting options.

Product Applications

The MDIM-485-WL is designed for a wide range of industrial and commercial applications, including:

- **Factory Automation** – Connecting PLCs, sensors, and controllers to centralized SCADA systems over Ethernet or Wi-Fi.
- **Building Management Systems (BMS)** – Integrating HVAC, lighting, and access control devices with IP-based monitoring platforms.
- **Energy and Utilities** – Bridging Modbus RTU meters, solar inverters, and power monitoring equipment to supervisory networks.
- **Process Control** – Linking field instruments and control panels to Ethernet/Wi-Fi networks for real-time monitoring.

Specifications

Ethernet communication	
Protocol Support	Modbus TCP
Data Rate	10 Mbps
Network Interface	1 x Ethernet (RJ45)
Compatibility	IEEE 802.3, IEEE 802.3U
Wireless LAN communication	
Compatibility	IEEE 802.11a/b/g/n
Network range/Speed	2.4 GHz, 150Mbps
Free space range	Open space 100m
Serial communications	
Port type	RS485
Port connector	Plug-in screw terminal block
No of ports	1
Baud rate	50bps – 921.6kbps
Data bits	7, 8
Parity	None, Even, ODD
Stop bits	1, 2
Data signals	RS-485: Data+, Data-, GND
Protection	Surge protection, ESD protection
Terminator	120 ohms
LED Indicators	Serial: Tx, Rx
Modbus RTU	
Mode	Modbus RTU - Master
Functions supported	1, 2, 3, 4, 5, 6, 15, 16, 23
Max.no.of.commands	128
Modbus TCP	
Mode	Modbus TCP - Server
Functions supported	1, 2, 3, 4, 5, 6, 15, 16, 23
Max.no.of.commands	128
Electrical specifications	
Input supply - Screw terminal	6VDC – 28VDC
Input supply – Power jack	6VDC – 28VDC
Operating current	600mA
Power consumption	3W @ 300mA
Physical dimensions	
Housing	Metal
Dimensions	52.48 x 82 x 25 mm (L x W x H)
Weight	160.4g
Environment limits	
Operating temperature	-40 to 75 °C
Storage temperature	-40 to 85 °C

MDIM-485-WL

LED Indicators

The device includes four LED indicators that provide visual clues for power status, communication activity, and configuration behaviour:

1. **Power LED (Red)**
   Indicates that the device is powered ON.
   Remains steadily lit when power is supplied.
2. **Transmit LED (Green)**
   Blinks during Modbus data transmission.
   Confirms that the device is actively transmitting data over Modbus TCP server.
3. **Receive LED (Red)**
   Blinks when Modbus data is being received.
   Indicates successful reception of data from connected devices.
4. **Status LED (White)**
   Displays boot and configuration status through blink patterns:
   - **3 Blinks** – Device is starting with the **default configuration**.
   - **5 Blinks** – Device is starting with a **previously saved configuration**.
   - **3 Blinks (Initial)** – Also blinks 3 times immediately on power-up as part of the self-check routine.

Device Installation and Wiring Instructions

Device Installation

Follow the steps below to properly install and power the MDIM-485 Modbus RTU to TCP gateway:

1. **Connect Power Supply (Dual Input Options – Use Only One)**
    - The MDIM-485 supports dual power input options, but only one input should be used at a time:
    - Pluggable Screw Terminal: Connect a DC power supply (ranging from 6 VDC to 36 VDC) to the marked terminals, ensuring correct polarity.
    - DC Power Jack: Alternatively, you can use a DC barrel jack input with the same 6 VDC to 36 VDC range. **Do not connect power to both inputs simultaneously, as this may damage the device.**
2. **Connect Communication Interfaces**
    - Use a serial RS-485 cable to connect the MDIM-485 to your Modbus RTU device.
    - Connect a standard Ethernet cable to link the MDIM-485 with your Modbus TCP network.
3. **Mount the Device**

    The MDIM-485 supports flexible installation methods:

    - **DIN-Rail Mounting**: Align the mounting clip with the DIN rail, press downward until the unit securely snaps into place.
    - **Screw Mounting**: Use M3 screws (minimum length: 10 mm) to attach the device firmly to a panel or wall using the provided mounting holes.
4. **Verify LED Indicators**

    Once power is applied, observe the Power, Status, Transmit, and Receive LEDs.

    - Refer to the LED Indicators section for interpretation of blink patterns and operational status.

WIRING INSTRUCTIONS

1. Supplying Power to the MDIM-485

The MDIM-485 supports dual input power sources—a pluggable screw terminal and a DC power jack, both rated for 6 to 36 VDC. Connect to either the terminal block or the power jack. Do not use both simultaneously.

To power the device via the terminal block:

1. Turn OFF the external power source.
2. Loosen the screws on the terminal block.
3. Connect the +V and GND wires from your power supply (6–36 VDC) to the appropriate terminals.
4. Tighten the screws firmly to secure the wires.
5. Switch the power source ON.

Note: The MDIM-485 has no manual power switch. Once powered, the Red Power LED will turn on automatically.

2. Linking RS-485 Serial Devices

The MDIM-485 communicates with Modbus RTU devices through its RS-485 serial interface.

Safety Tip: Ensure the device is powered OFF before connecting or disconnecting serial lines.

To connect serial devices:

1. Locate the RS-485 terminals (A, B, and GND) on the device.
2. Connect the corresponding wires from your Modbus RTU slave.
3. Double-check polarity (A ↔ A, B ↔ B) to ensure reliable communication.
4. Power on the device and verify activity via the Transmit (Green) and Receive (Red) LEDs.

3. Integrating with an Ethernet Network

The MDIM-485 features a 10/100 Mbps Ethernet port for connecting to Modbus TCP networks or SCADA systems.

To set up Ethernet communication:

1. Insert one end of a CAT5e/CAT6 Ethernet cable into the MDIM-485's LAN port.
2. Connect the other end to a switch, router, or control server.

Ethernet LED Behaviour:

- **Link LED**: Indicates active connection
- **Activity LED**: Blinks during data transmission.

Initial Setup Instructions

Follow the steps below to perform the initial setup of the **MDIM-485-WL Gateway**.

1. Powering On the Device

1. Connect the MDIM-485-WL to the appropriate power source.
2. Upon startup, the **White LED will blink twice**, indicating the device is powering on.
3. If the device continues with the previously saved configuration, the **White LED will blink five times**.
4. On first use, the device starts with its **default configuration**.

2. Configuring the Device

1. Connect your computer to the device using the **default IP configuration**.
2. Launch the **Configuration Application** and establish a connection with the gateway.
3. Set the required configurable parameters according to your network and system requirements.
4. Once parameters are set, **reset the device** using the reset option provided in the application.

5. The initial setup is now complete.

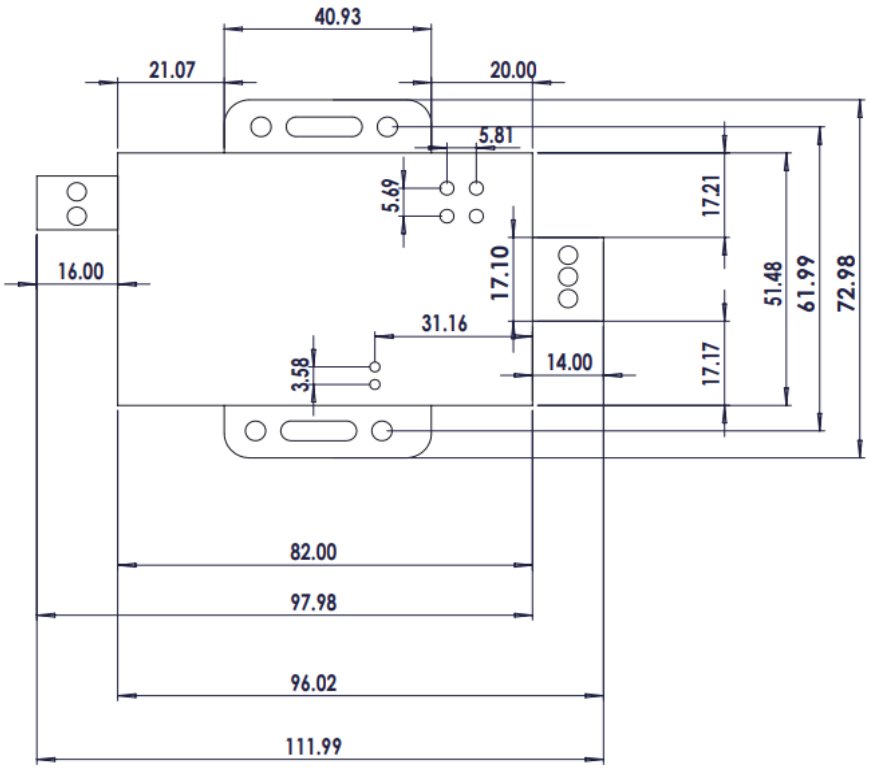
3. Restoring Factory Default Settings

If you need to revert the MDIM-485-WL to its default settings:

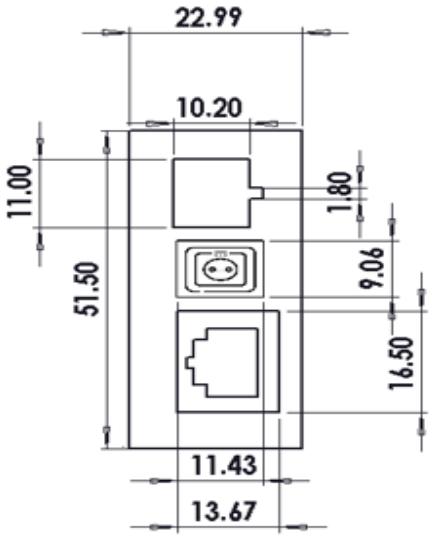
1. Reset the device using the application or hardware reset option.
2. When the **White LED blinks twice** , press and hold the **BOOT button for 5 seconds**.
3. Once restored successfully, the **White LED will blink three times**.
4. Reset the device again to finalize the process.
5. The device is now restored to its **factory default configuration**.

SYSTEM DIMENSIONS

Top View



Side view (Left)



Side View (Right)