

MM2000 – Installation and User Manual

Declaration

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1. Version history

Date	Version	Change
1/15/2026	Version 1.0	Initial commit
1/19/2026	Version 1.1	Add LED indicators for digital inputs
6/1/2026	Version 1.2	Add LED indicators for network state; typo fixes
6/7/2026	Version 1.3	Add digital input wiring section and installation diagram



2. Overview

The MM2000 is an industrial gateway designed to collect data from field devices and reliably transmit it to a remote server. It acts as a central communication hub, aggregating measurements, statuses, and events from connected equipment.

The device features a built-in UPS, allowing it to remain operational for several seconds after a power outage. This ensures the gateway can notify the backend of the power loss and perform a safe and controlled shutdown, preventing data corruption and incomplete transmissions.

To support a wide range of industrial use cases, the MM2000 is available in multiple hardware variants. Each model is equipped with a specific set of peripherals—such as communication interfaces and I/O options—tailored to different requirements. The exact hardware configuration is encoded in the device serial number, allowing easy identification of the installed peripherals.

Serial Number Structure

Each MM2000 device is identified by a structured serial number that encodes the hardware model, revision, and installed peripherals.

Example: MM2 R01 IOM 0001

- MM2 – Model: Identifies the device as an MM2000 series gateway.
- R01 - Hardware Revision: Indicates the hardware revision of the device (e.g. R01 = first revision).
- IOM - Peripherals: Encodes the installed peripheral set:
 - I - Digital Inputs
 - O - Digital Outputs
 - M - Modbus Interface
- 0001 - Device Serial Number: Unique sequential identifier for the device.

3. Physical dimensions and connectors

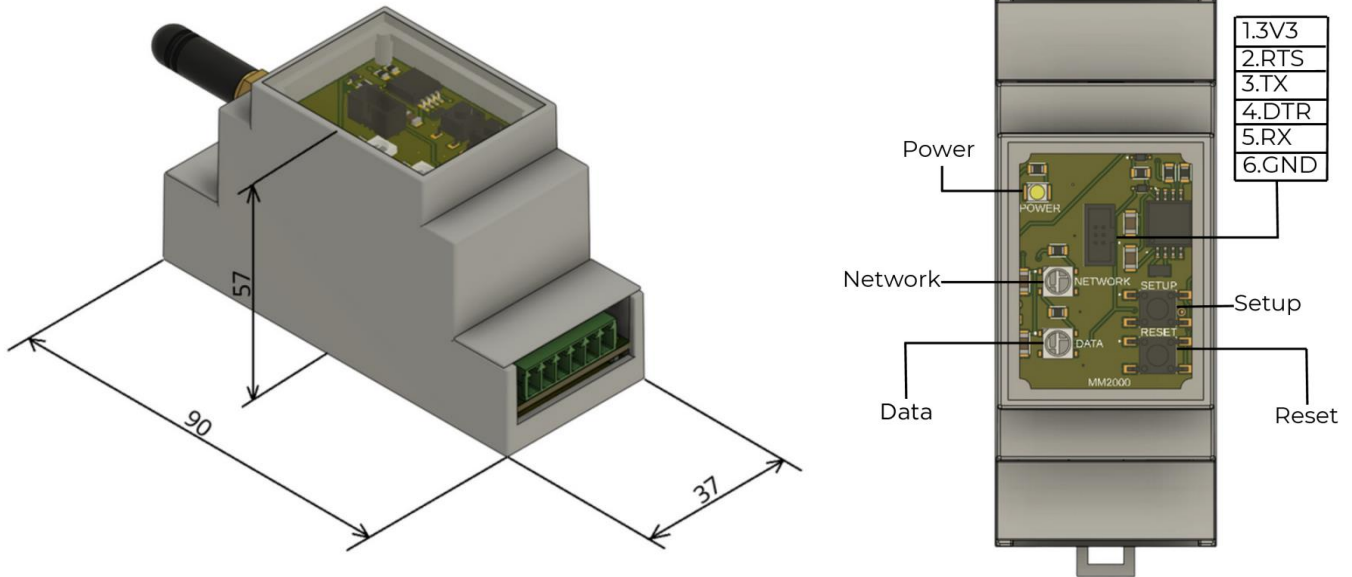


Illustration 1- 3D model (units are in cm) and top view

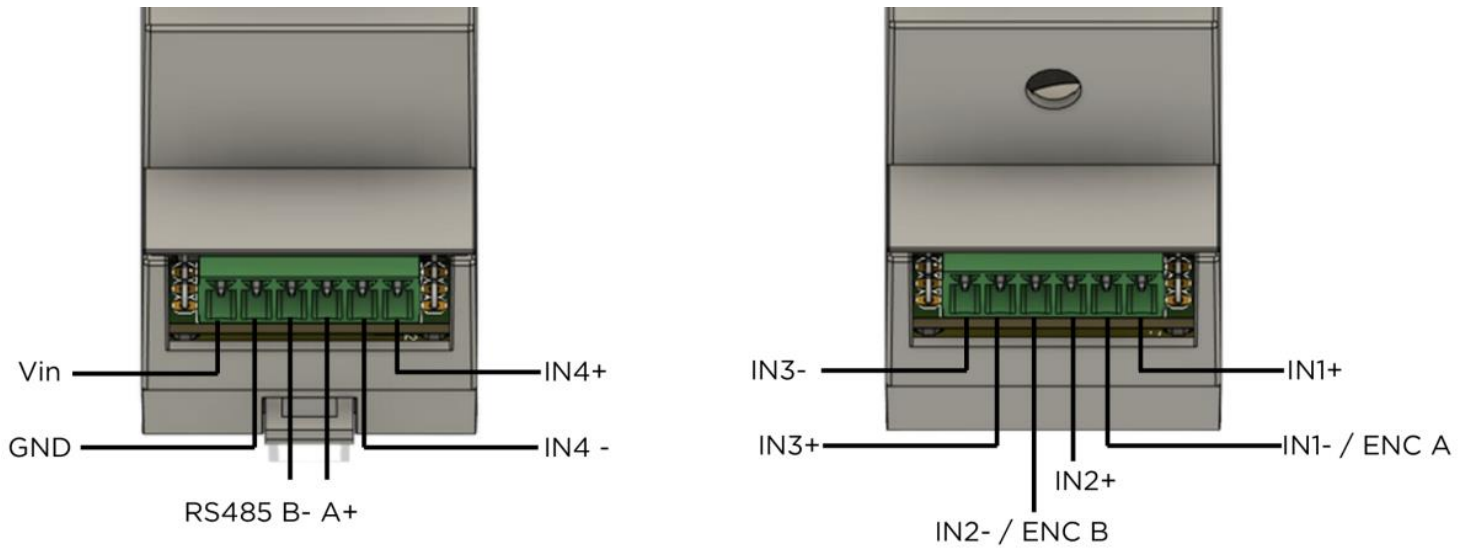


Illustration 2 - Lower and upper side connectors

4. Digital input wiring

The MM2000 digital inputs are voltage-sensing inputs referenced to the device GND terminal. INx* and INx belong to the same input channel and may be used interchangeably. The '*' marking is not a polarity indicator.

MM2000 – DIGITAL INPUTS

OVERVIEW

MM2000 digital inputs are voltage-sensing inputs referenced to GND.

- ✓ Activated when voltage ≥ 1 VDC is applied between input terminal and GND.
- ✓ Maximum input voltage: 30 VDC.
- ✓ INx* and INx are the same input. Either terminal may be used.
- ✓ The * is not a polarity indicator.
- ✓ The unused terminal may remain unconnected.

TOP (DIGITAL INPUTS 1–3)



BOTTOM (POWER, RS485, DIGITAL INPUT 4)



TERMINAL FUNCTIONS

IN1* / IN1	Digital Input 1 (same input)
IN2* / IN2	Digital Input 2 (same input)
IN3* / IN3	Digital Input 3 (same input)
+24V	Power supply +24 VDC
GND	Power supply 0 V / Reference
RS485 A	RS485 communication A
RS485 B	RS485 communication B
IN4* / IN4	Digital Input 4 (same input)



IMPORTANT

INx* and INx do not indicate positive (+) and negative (-) terminals. Both terminals correspond to the same input channel and may be used interchangeably.

INPUT SPECIFICATIONS

Activation voltage:	≥ 1 VDC (typ.)
Maximum input voltage:	30 VDC
Input impedance:	High impedance
Reference:	Device GND

SUPPORTED SIGNAL SOURCES

- PNP sensor outputs
- PLC digital outputs
- Active DC voltage signals (1–30 VDC)
- Relay contacts switching an external DC voltage source

NOTES

- All signal sources connected to the MM2000 inputs must share a common reference (GND) with the device.
- The unused terminal of the same input channel may remain unconnected.

5. Specification

Parameter	Description
Product Name	MM2000
Product Type	Programmable industrial communication gateway
Supply Voltage	12–24 VDC
Current Consumption	~100 mA @ 24 VDC
Built-in UPS	Approx. 5 seconds backup for power-loss notification and safe shutdown
Processor / Chipset	ESP32
Connectivity	2.4 GHz Wi-Fi
Communication Interfaces	1 × RS-485 (Modbus RTU)
Discrete Inputs	3 × digital inputs
Input Signal Types	Digital, Encoder (up to 5 kHz), Sinusoidal (24 Vpp max)
Input Voltage – Logic 1 (Guaranteed)	2.5 V – 30 V
Input Voltage – Logic 0 (Guaranteed)	0 V – 2.5 V
Ingress Protection	IP42
Operating Temperature Range	0 °C to +85 °C
LED Indicators	1 × Green (Power), 2 × RGB (Data, Network status)
Control Buttons	Reset, Setup
Enclosure Material	ABS plastic
Mounting	DIN rail
Dimensions (W × H × D)	37 × 57 × 90 mm

6. Configuration

Wi-Fi Provisioning

To enable communication with a remote server, the MM2000 must be provisioned with valid Wi-Fi credentials.

Follow the steps below to configure the device:

1. Power the Device

- Connect the MM2000 to a power source using either:
 - **12–24 VDC** on the **V+ / V-** terminals, or
 - a **USB power connection**.

2. Verify Provisioning Mode

- Wait a few seconds after power-up.



- The **Data LED** will begin **blinking purple**, indicating that the device is ready for Wi-Fi provisioning (Access Point mode).
- 3. Connect to the Device Access Point**
- The device will broadcast a Wi-Fi network named after its serial number (e.g. *MM2R02IM0001*).
 - Using a mobile phone, tablet, or PC, connect to this network.
 - No password is required.
 - On Android devices, confirm **“Yes”** when prompted to connect to a network without internet access.
- 4. Access the Configuration Interface**
- Open a web browser and navigate to: **http://mm.local**
 - The MM2000 configuration page will be displayed.

Note: *If mm.local is not reachable, ensure the client device is connected to the MM2000 Wi-Fi network and retry.*

- 5. Enter Wi-Fi Credentials**
- Enter the target Wi-Fi SSID and password.
 - Click Submit to apply the settings.
- 6. Device Restart**
- The device will automatically restart within approximately 4 seconds.
- 7. Verify Connection Status**
- After reboot, observe the **Network LED**:
 - **Green blinking** — Device successfully connected to the Wi-Fi network.
 - **Red blinking** — Connection failed (e.g. incorrect SSID or password).

LED Indicators

The MM2000 device is equipped with a multi-color LED to indicate the status of the digital inputs. Each digital input corresponds to a specific LED color. When an input is active, the LED will blink in the assigned color:

Digital Input	LED Color
Input 1	Green
Input 2	Blue
Input 3	Purple
Input 4	White



Network LED States

The Network LED indicates the device's connectivity status through both blink timing (which connection stage the device is in) and color (which reflects the strength of the Wi-Fi signal).

Table — *Blink timing (connection stage):*

Connection state	On time	Off time	Period
Attempting to connect to Wi-Fi (after power-up or after a disconnect)	200 ms	600 ms	800 ms
Wi-Fi connected, server connection not yet established	1000 ms	2500 ms	3500 ms
Full operation — Wi-Fi connected and server connection active	100 ms	2500 ms	2600 ms

Table — *LED color (Wi-Fi signal strength while the device is connected):*

Signal strength (RSSI)	Quality	LED color
Wi-Fi not connected	—	red
above -67 dBm	excellent	green
-67 to -77 dBm	good	yellow
-77 to -87 dBm	weak	orange
below -87 dBm	very weak	red
RSSI not readable	error	white

Note: During provisioning mode (before the first Wi-Fi connection) the Data LED blinks purple — see Wi-Fi Provisioning.

Factory Reset

If the Wi-Fi credentials are incorrect, or if the target access point changes, perform a factory reset to restore default settings.

Reset Procedure

1. Remove the Plastic Cap

- Expose the reset button by removing the device's plastic cap

2. Power on the Device

3. Press and hold the reset button.

- Release the button after the device starts blinking orange on the Network LED.

4. Restart Status:

- The device will blink the Data LED in purple, indicating it has reverted to factory settings.



7. Troubleshooting

Common Issues

1. Fast Red Blinking Network LED

- Cause:
The configured Wi-Fi SSID is unavailable or out of range.
- Solution:
 - Verify that the Wi-Fi access point is powered on and broadcasting.
 - Ensure the MM2000 is within sufficient signal range of the access point.
 - If the SSID has changed, perform a factory reset and re-provision the device.

Additional Notes

After entering new Wi-Fi credentials, allow up to 30 seconds for the device to complete the connection attempt.



8. Contact Us

For technical support, integration assistance, or general inquiries, please contact **Factory Dynamics** using one of the channels below:

- **Email:** office@factorydynamics.io
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