User Manual

P1MB

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Document information

Version:	1.13
Status:	Official Release
Version date:	05/01/2026
Filename:	User Manual P1MB 1.13.docx
Number of pages:	26

History of changes

VERSION	DATE	DESCRIPTION
1.9	30/06/2025	Alle user manuals variants are merged
1.10	01/10/2025	Xemex layout
1.11	06/10/2025	Added power supply maximum power
1.12	04/11/2025	Modbus address Default settings for different versions
1.12	05/01/2026	Physical layers properties Default settings for different versions

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1. Introduction

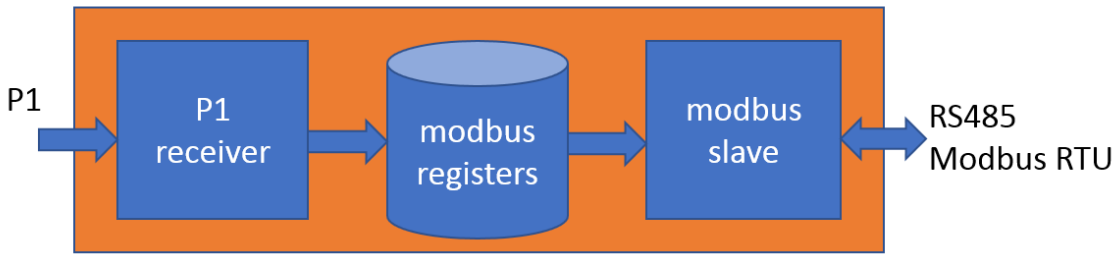
Thank you for purchasing this P1 converter. Xemex has a wide product range of devices. We have introduced a variety of meters and converters. For more information on other products visit our website at Home - Xemex | Smart Energy Communicator or contact our sales department on sales@xemex.eu.

The P1MB module is a DIN-sized converter module, converting Smart Meter P1 messages to Modbus RTU over RS485. The module supports P1 according to DSMR4.2 and later. It is also compatible with the E-MUCS specification. The P1MB is connected to the P1 port of the Smart Meter via a **cross** cable with RJ12 connectors on both ends. The Modbus of the module is acting as slave device to a Modbus master.
The P1MB will be powered via the power present on the P1 port of the Smart Meter (DSMR5.0 and higher). External power supply, via external power adapter, needs to be added for meters using DSMR4.2

P1MB can be used in combination with the Xemex Dingate, KWHIQ meter, LEWIZ, and other Modbus masters. These devices log standard information such as import / export energy values. The logging of other information is dependent on the Modbus map implemented. Contact us for an overview of all available Modbus maps.

1.1. Scope

This manual is applicable to P1MB, a device which interfaces to the P1 port of a smart meter and transforms the data and make it available on its Modbus slave interface to be read out via a Modbus RTU.



Please read this document carefully before installation and operating.

1.2. Target group

The installation and the operation of this device and any maintenance must be conducted by a qualified person in accordance with specific local standards and safety regulations.

1.3. Intended usage

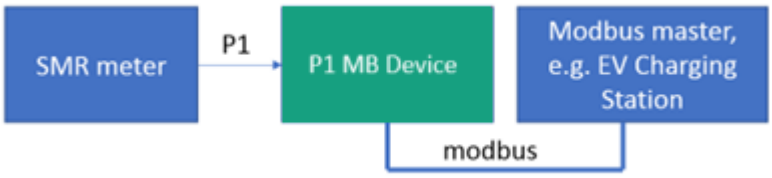
The P1MB is ideal for use in solutions developed for monitoring energy flow or communication with an EV charger with data retrieved from residential smart meters.

1.3.1. NOM Monitoring application

In a “Null-Op-de-Meter” monitoring application, one of the measured items is the Total E-energy Consumption. This value can be acquired via different means: via ODA/P4, via an extra E-meter for Total E-energy Consumption or via the P1 interface of an existing smart meter. In the latter case, the P1MB device can be used to make the NOM Total E-energy Consumption available for the DNG MON data collector.

1.3.2. EV Charging Station

To charge an electrical vehicle as quickly as possible, a residential charging station needs to know how much power of the total available grid connection is in use by the household appliances and how much is available for charging. Using the P1MB device, the charging station can get this information through a Modbus interface from a smart meter.



DSMR 4.x does not contain the Voltages found in obis-codes 32.7.0, 52.7.0, and 72.7.0 (L1, L2, and L3) for this case the obis code cannot be empty. That’s is why you need DSMR 5.0 protocol or higher, Instantaneous voltage L1, L2 and L3 are available and these are the registers the EV charger uses.

1.4. Used symbols

The following symbols are used in this document and/or are marked on the product:

	Alternating current
	Three-phase alternating current
	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION
	Caution, possibility hazard of electric shock.
	Caution

1.5. Abbreviations and acronyms

V AC:	AC-voltage
V DC:	DC-voltage
EV:	Electrical Vehicle
(D)SMR:	(Dutch) Smart Meter Requirements
E-MUCS:	Extended Multi-Utility Companion Specification
LED:	Light Emitting Diode
USB:	Universal Serial Bus
UI:	User Interface

1.6. Safety precautions

Always adhere to the following checklist:

1. Only qualified personnel or licensed electricians should install the Xemex P1MB.
2. Follow all applicable local, national electrical and safety codes.
3. Install the P1MB device in an electrical enclosure (panel or junction box) or in a limited access electrical room.
4. Verify that circuit voltages and currents are within the proper range for the meter model.
5. Equipment must be disconnected from the HAZARDOUS LIVE voltages before access.
6. Before applying power, the installer must check that all the wires are securely fixed by tugging on each wire.
7. Do not install the P1MB where the temperatures can be below –25°C or above 75°C, excessive moisture, dust, salt spray, or other contamination. The device requires an environment no worse than pollution degree 2 (normally only non-conductive pollution; an occasionally temporary conductivity caused by condensation must be expected).
8. Do not drill mounting holes in the device. Click the module on a DIN Rail instead.
9. When the P1MB is installed incorrectly, the safety protections may be impaired.

1.7. Certifications

Date	Accreditation Centre	IP Code	Kind
2020-12-08	De Nayer	EN 61326-1:2013	Class B
		EN 55011 (2016) +am1	
		EN 61000-4-2	
		EN 61000-4-3	
		EN 61000-4-4	
		EN 61000-4-5	
		EN 61000-4-6	
		EN 61000-4-8	

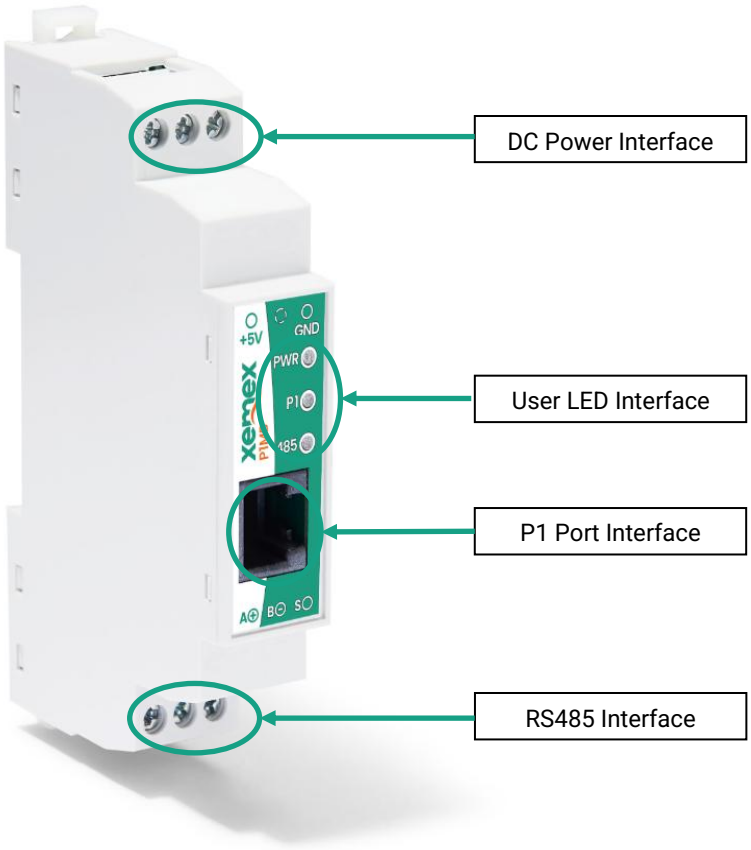
2. Technical description

2.1. General description

The Xemex P1MB is a compact Modbus interface module that connects to the P1 port of a smart meter. It reads and converts P1 telegrams into a Modbus RTU memory map that can be accessed via its RS485 interface.

Interfaces:

- 5V DC Power Input
- User LED interface
- P1 Port Interface (RJ12)
- RS485 Interface (Modbus RTU)

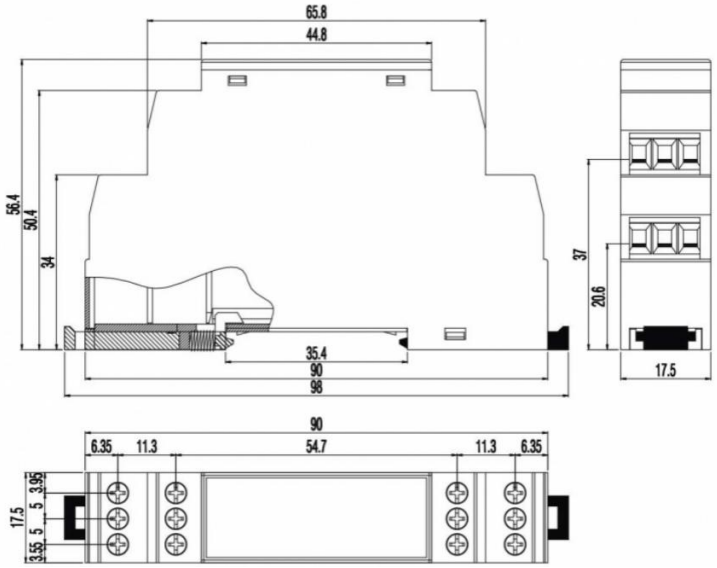


The device is typically powered via the P1 port. If the connected smart meter does not provide power, an optional external +5V DC adapter can be used.

The P1MB automatically enables the data request line on the smart meter and updates the Modbus register map every second with the latest P1 data. It functions as a Modbus RTU slave and can be queried by a master over the RS485 bus.

2.2. Form factor

Parameter	Value
Housing	DIN 43880 – 1 DIN unit
Dimensions	90 x 17.5 x 56.4 mm (H x W x D)



2.3. Environmental conditions

Parameter	Value
Protection Class	Class II
Operating Temperature	–25 °C to +75 °C
Storage Temperature	–40 °C to +85 °C
Humidity	< 75 % year's average at 21 °C < 95 % less than 30 days/year, at 25 °C
Pollution Degree	2
Altitude	< 2000 m
Application Area	Indoor use only – in a suitable residential meter cabinet

2.4. P1 port Interface

Communication via the P1 interface is unidirectional: the smart meter sends data telegrams containing energy measurements and status information to the P1MB. The P1MB reads these telegrams, processes them, and stores the values in its internal Modbus memory registers.

Parameter	Value
Protocol	P1 protocol conform DSMR4/DSMR5 (NL) and eMUCS (BE)
Max Cable Length	3 meters
Connector	RJ12 – 6 pin (female connector)
Polarity Protection	Yes (reverse polarity protected)

The pin definition of the RJ12 port of the P1MB is as follows:

Pin #	Signal name	Description	Remark
1	Power GND	Power ground	
2	Data	Data line	Input. Current source PU.
3	n.c.	Not connected	
4	Data GND	Data ground	
5	Data Request	Data Request	Output for P1MB device
6	+5V	+5V power supply	Power input for P1MB device

No data is delivered to the P1MB if the data request line is held low. When the data request is high, the P1MB receives data at intervals depending on the meter type—every 1 or 10 seconds.

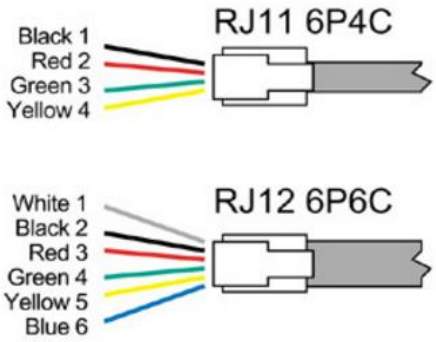
The +5 V output is a SELV (Safety Extra-Low Voltage) power supply, which is double insulated and fully isolated from all meter ports to prevent tampering or fraud. This power output is current limited to 10 mA to ensure safety.

The data line is implemented as an open collector output, also current limited, ensuring safe and reliable communication without risk of damage.

2.4.1. P1 Cable Specifications and power considerations

This RJ12 port is the main interface for receiving smart meter data and optionally powering the P1MB. Cable choice (4-wire vs 6-wire) determines whether external power is required:

- 6-wire cable (RJ12): Used when the smart meter provides +5V. This allows the P1MB to be powered directly through the P1 cable.
- 4-wire cable (RJ11): Used when the smart meter does not provide +5V. In this case, you must power the P1MB externally via the DC power interface (see section 2.5).



2.5. DC Power Interface

If the smart meter does not provide power through the P1 port (i.e. a voltage-free port), the P1MB must be supplied with power via the external DC power source.

WARNING

Only use the external power interface if the P1MB is not powered by the smart meter's P1 port.

DANGER

Use SELV-rated (Safety Extra Low Voltage) power supplies only, with an available power limited to 15 W

Incorrect use may result in severe injury, death, or equipment damage.

Parameter	Value
Connector Type	Screw terminal for 0V and +5V DC
Voltage Range	5V DC (–10% / +10%)
Max Current Draw	50 mA
Max Cable Length	3 meters
Polarity Protection	Yes (reverse polarity protected)

2.6. Modbus Interface (RS485 communication)

The data read from the P1 port is translated by the P1MB into a Modbus register map, which is made available via the RS485 interface (more information about Modbus register maps: see section 5.1).

Parameter	Value
Connector Type	Screw terminal connector for A, B and Shield
Bus termination	120 Ohm, switchable on/off
Communication protocol	Modbus RTU over RS485
Max Cable Length	Up to 30 meters under standard RS485 conditions.
Recommended cabling	Use a shielded twisted pair (STP) or armored twisted pair with a drain wire for optimal signal integrity. Conductor cross-section: 0.20 mm² to 0.50 mm².

NOTE

Ensure correct polarity (A/B) across all devices on the RS485 bus. Only enable termination on devices at the end of the bus.

2.7. User LED Interface

The P1MB is equipped with three LED indicators that provide visual feedback on power status, P1 communication, and Modbus activity. The table below explains the meaning of each LED and its behaviour.

LED	Colour	Status	Description
Power (PWR)	Yellow	On	P1MB is powered (via P1 port or external power supply).
		Off	No power. Check P1 cable or external power source.
P1	Green	On	Valid telegram received from the smart meter via the P1 port.
		Blinking	Invalid telegram received from the smart meter (invalid CRC).
		Off	No communication with the smart meter.
Modbus (485)	Red	On	Modbus request received via RS485 interface.
		Off	No active Modbus communication.

3. Installation instructions

3.1. Guidelines for safety and installation

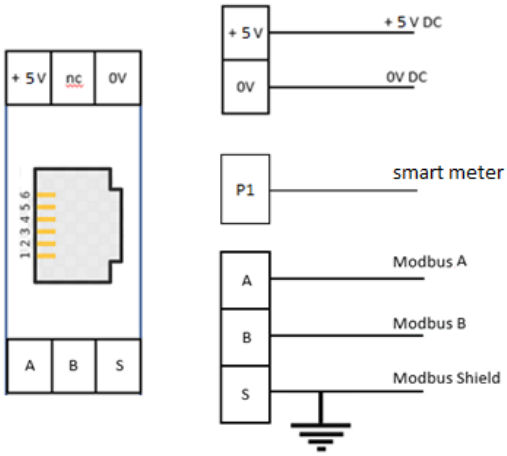
This installation guide must be consulted in all cases when manipulating parts which are marked with the Caution symbol.
The installation and the operation of this device and any maintenance must be carried out by a qualified person in accordance with specific local standards and safety regulations.

Failing to obey the ”Guidelines for safety and installation”, the guarantee no longer applies.

3.2. Mounting

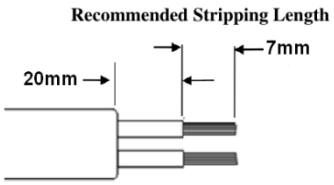
Mount the device in a DIN rail cabinet.

3.3. Electrical wiring



3.4. Wire stripping

Each wire should be stripped bare from one end over the length of 7mm. The secondary insulation (individual insulation over each individual wire may be visible up to 20mm from the end. After those 20mm, the second insulation (around all wires) should be present at all times.



3.5. Notes

The Modbus Shield must only be connected to the Modbus master side. The Modbus Shield connection is also connected to the protected earth of the building.

4. Maintenance

There are no serviceable parts inside. Clean the unit with a dry cloth.

5. Software

5.1. Modbus mapping

The Modbus register map defines which data elements from the P1 interface of the smart meter are mapped to which Modbus registers. The specific mapping depends on the variant of the P1MB in use. Each variant emulates a particular energy meter model, and the register layout is designed to match that meter's structure.

The following P1MB variants are available, each with its own Modbus register map:

- Inepro Pro380
- Acrel ACR10RH
- Eastron SDM630
- Xemex variant

Detailed register maps for each variant can be found in **Annex I** of this manual.

When using a P1MB, make sure to select the variant that matches the meter type expected by the Modbus, master (e.g., the charging station). Using the correct variant ensures full compatibility with the master's register expectations.

Note:

The Modbus register map of the P1MB is predefined at the time of purchase and cannot be changed afterwards. This means the selected variant (and its corresponding register structure) is permanently configured for that specific device.
If you are unsure which Modbus mapping your P1MB is using, you can contact support@xemex.eu. Please include the serial number of the P1MB so that the correct configuration can be identified. The serial number can be found on the side of the module.

5.1.1. Modbus properties

The P1MB supports the following Modbus function codes:

Function Codes
03 – Read Holding Registers
04 – Read Input Registers
06 – Write Single Register

Note:

- Every modbus register map only contains data read from the P1 port of the smart meter. Only values from available P1 objects are stored in the Modbus map. Registers that are not defined in the selected map will return the value 0x0000 (0) rather than a Modbus error.
- Registers for which P1 data is not available (yet) will also return 0x0000 (0) or 0xFF.
- Some register values are fixed.
- Changes made via Modbus become active only after rebooting the device. This can be done by writing to the Reboot register.

5.1.2. Physical layers properties

The default Physical Layers properties depend on the P1MB variant. The default values listed below apply only to the Xemex P1MB variant. The default Physical Layers properties for the other variants (Inepro Pro380, Acrel ACR10RH and Eastron SDM630) are provided in the Appendix.

Parameter	Options	Default
Baud rate	1200 … 115200	9600
Line setting	8 Data bits, no parity, 1 stop bit = 8N1, 8 Data bits, even parity, 1 stop bit = 8E1	8E1
Line termination resistor	On/off	Off

The physical layer properties can be modified using a specific cable and the P1MB Configuration Tool. Both are available for purchase by contacting our sales department at sales@xemex.eu.

5.1.3. Data link layer properties

Parameter	Options	Default
Modbus device address	1 … 247	16 (Xemex variant) 1 (Inepro Pro380) 1 (Acrel ACR10RH) 2 (Eastron SDM630)

The data link layer properties can be modified using a specific cable and the P1MB Configuration Tool. Both are available for purchase by contacting our sales department at sales@xemex.eu.

5.2. Configuration

Special tooling is needed to change the physical layer parameters. This is done during the production of the device, or afterwards by using the P1MB configuration tool.

1. **Connect the device to your PC**
   Connect the device to your PC with the cable that matches the communication port of the device and your PC. Make sure the connection is secure. Kindly note that the cable is not included in the price and must be purchased separately.

2. **Open the Xemex P1MB configurator on your PC**
   Open the Xemex P1MB configuration application on your PC. If the input fields are gray and therefore not editable, go to step 3. If the input fields are white and therefore editable, continue to step 5.

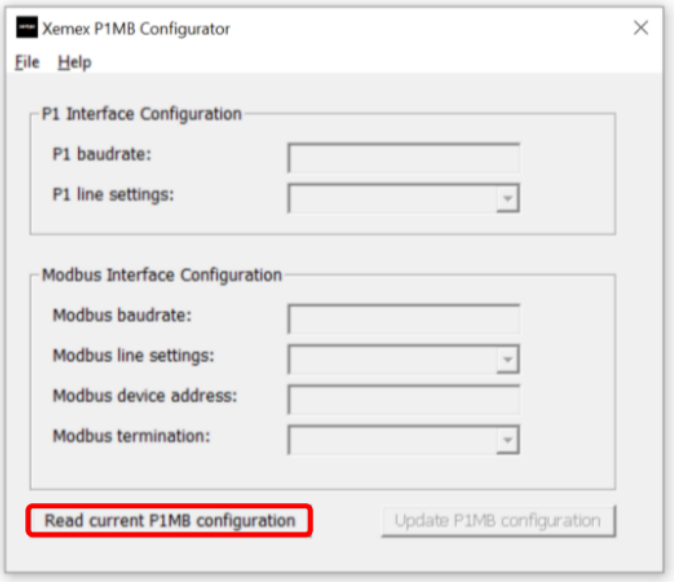
3. **Identify the port number**
   The USB serial port adapter you connected is assigned a serial port number by your PC. Go to *Device Manager* on your PC to identify this serial port number.

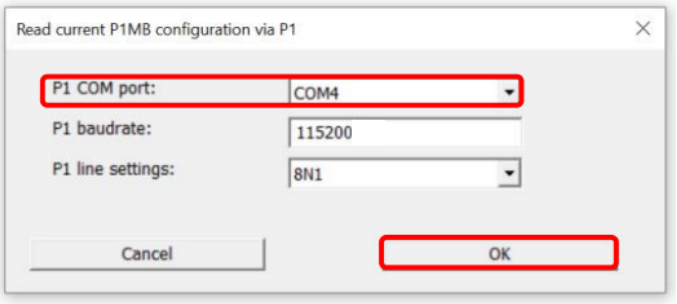
   Note: If the assigned COM port is COM10 or higher, it must be changed to a lower number.
   To do this:
   a. Open Device Manager.
   b. Locate the assigned COM port under Ports (COM & LPT).
   c. Right-click on the port and select *Properties*.
   d. Go to the *Port Settings* tab.
   e. Click on the Advanced button.
   f. In the COM Port Number dropdown, select a port number lower than COM10 (e.g., COM3 or COM4).
   g. Click OK to confirm.

   Your COM port is now reassigned to a lower number and ready for use.

4. **Configure the communication settings of the device with those of your PC**

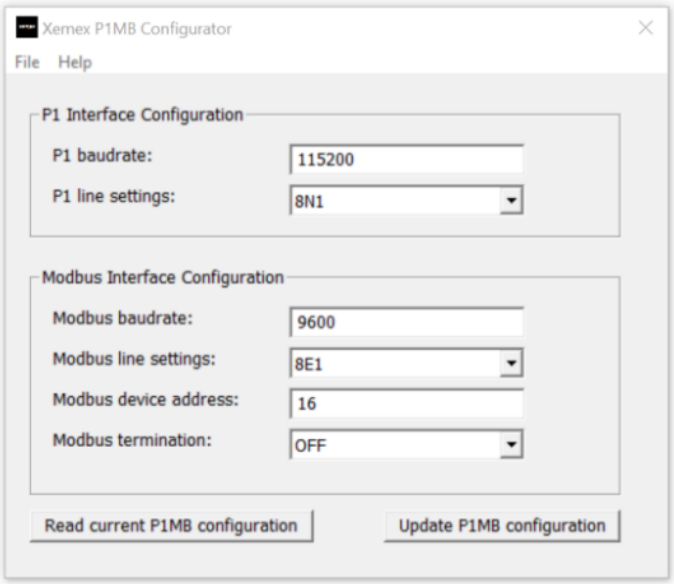
   Click '*read current P1MB configuration*'. In the pop-up window '*Read current P1MB configuration via P1*', at '*P1 COM port*', read the communication port that the device communicates with. It should be the same as the port number identified in step 3 in *Device Manager*. If not, change the communication port in this pop-up window. Click *OK* to save your changes.





5. **Enter the desired parameters**

You can now enter the desired parameters in the fields. Do not change the parameters *P1 baud rate* and *P1 line settings*. Changing these parameters will prevent the operation of the P1MB.



Modbus baud rate

Enter the desired baud rate (range: 1200 ... 115200). All devices connected to the bus must use the same baud rate. The protocol itself does not specify a specific baud rate.

Modbus line settings

Options:

- 8N1 = 8 data bits, no parity, 1 stop bit
- 8E1 = 8 data bits, even parity, 1 stop bit

Modbus device address

Configure the modbus address in this input box. The range is 1 to 247.

Modbus termination

The P1MB is equipped with a line terminator resistor. The Modbus termination is not activated by default.

After modifying the desired parameters, be sure to click '*Update P1MB Configuration*' to save and apply the changes.

6. Accessories

6.1. P1MB Configurator Cable Connection (optional)

A P1MB Configurator cable is optional.

This cable supports a USB type A connection on one side and an RJ12 connection on the other. It is mainly used to change the default settings of communication parameters.

Technical Parameters

Connection Type	USB Type A
Cable length	1.85m
Working Voltage	5V

7. Troubleshoot

Issue/fault	Possible Cause	Solution
PWR LED is off (Yellow)	P1MB is not powered	If powered via P1: - Ensure a 6-wire cable is used with power on pin 1 (+5V) and pin 6 (GND). - If the P1 cable is longer than 3 meters, use a 4-wire cable and connect a 5V DC power adapter. If powered via external adapter: - Make sure a 4-wire RJ11 cable is used without power on the P1 port. Avoid dual power sources!
P1 LED is off (Green)	No P1 message received or invalid CRC	- Check RJ12 cable between P1MB and smart meter. - Ensure smart meter is powered and actively sending DSMR/SMR telegrams. - Verify the meter supports DSMR4/5 or eMUCS - Try using a shorter or verified working cable.
MB LED is off (Red)	No Modbus activity	- Ensure Modbus master is polling the correct slave address (default: 16). - Check RS485 wiring (A ↔ A, B ↔ B). - Verify that baud rate and Modbus settings match (default: 9600, 8E1).
MB LED blinking	Data received, but no valid Modbus request	- Verify that the Modbus master requests only supported registers, based on the register map of your specific P1MB variant. - Ensure all devices on the RS485 bus are connected in a daisy-chain topology to avoid signal reflections or bus collisions. - Ensure all line settings are correct.
Modbus reading 0x0000 for some registers	P1 data not available for these registers	This is normal for unsupported registers; check register map for supported ones (Annex I)

8. Disposal & Decommisioning

This section explains the disconnection of the P1MB from the system and its correct disposal.

8.1. Decommissioning

The decommissioning must be carried out by a qualified person in accordance with specific local standards and safety regulations.

Remove the P1MB as follows:

1. Switch of the voltage of the P1MB by disconnecting the P1 port cable on the P1 interface and, if installed, disconnecting the external adapter connected to the DC power interface. The yellow Power status LED (PWR) turns off.
2. Remove the connecting wires of the Modbus RTU master connected to the RS485 interface.
3. Use a flat-tip screwdriver (≤ 6.5 mm / 0.25 in) to lower the locking mechanism and release the meter from the DINrail.

8.2. Disposal

For disposal of the P1MB, observe the local disposal and environmental protection regulations in effect without fail.

Components	Disposal
Circuit boards	Electronical waste: disposal according to local regulations
Metal parts	Sorted and taken to collective materials disposal point
Plastic components	Sorted and taken to recycling (regranulation) plant

9. Technical Support Contact Information

For any technical issues or inquiries, our dedicated support team is available to assist you. Please use the following contact methods to reach out for assistance:

9.1. Email Support

For general inquiries, troubleshooting, or technical assistance, please email our support team at: support@xemex.eu Please provide a detailed description of the issue, serial number, along with any relevant screenshots or error messages to expedite the resolution process.

9.2. Phone Support

If you prefer to speak directly with a technician, you can reach us at:
+32 32 01 95 95
Our phone support is available Monday to Friday within regular business hours. If your request falls outside of business hours, please leave a ticket throughout our support portal.

9.3. Support Portal

For access to FAQs, troubleshooting guides, and ticket submission, visit our dedicated support portal at: https://xemex-support.freshdesk.com/nl/support/home

9.4. Social Media

For any non technical related information visit us via our official social media channels:
Website: www.xemex.eu
Linkedin: https://www.linkedin.com/company/xemex/posts/?feedView=all