BM-2.0 RS485 Communication Protocol

MODBUS-RTU Meter Reading and Register Addresses

Product	BM-2.0	**Document No.**	PB-BM20-MB-001
Seller	Phenbo	**Revision**	1.0
Interface	RS485 / Modbus-RTU	**Date**	November 2026

Overview

The BM-2.0 is a single-phase energy meter with an RS485 interface. It is fully supported by Radius IoT endnodes and software, which handle meter communication automatically. This document describes the underlying Modbus-RTU protocol and register map for integrators who want to read or configure the meter directly.The protocol follows the **MODBUS-RTU** standard, which specifies the coding format, checksum and data transmission mode.

- **Character format:** 8 data bits, even parity, 1 stop bit
- **Default baud rate:** 9600 bps (1200, 2400 and 4800 bps also selectable)
- **Meter address and baud rate:** configurable with the provided software or via Modbus (see Sections 1.4 and 1.5)

1 MODBUS-RTU Communication Protocol

1.1 Frame Format

```
Address + Function Code + Data + CRC Check Code
```

All examples in this document use the standard Modbus CRC-16, transmitted low byte first.

1.2 Example: Reading Meter Parameters

To read the phase voltage (register start address `00 00`) from the meter at address `01`, send the following request:

Data	Description
`01`	Meter (slave) address
`04`	Function code: read the meter's internal (input) registers
`00 00`	Start register address
`00 02`	Number of registers: 2 words (4 bytes)
`71 CB`	CRC checksum of the preceding bytes

Response: `01 04 04 43 6B 58 0E 25 D8`

Data	Description
01	Meter address
04	Function code (echoed)
04	Byte count: 4 bytes of data follow
43 6B 58 0E	Returned data (4 bytes)
25 D8	CRC checksum

1.3 Data Format

Measurement data inside the meter is stored as a 32-bit (4-byte) single-precision floating-point number according to **IEEE-754**, sent most significant byte first. For example, the returned value `43 6B 58 0E` decodes to 235.34 V.

1.4 Modifying the Meter Address

To change the meter address from `01` to `02`, send:

```
01 10 00 08 00 02 04 40 00 00 00 E7 C9
```

Data	Description
01	Current meter address
10	Function code: write multiple registers
00 08	Start register address
00 02	Number of registers: 2 words
04	Byte count: 4 bytes
40 00 00 00	New meter address as IEEE-754 float (2.0)
E7 C9	CRC checksum

Response: `01 10 00 08 00 02 C0 0A`

1.5 Modifying the Communication Rate

To change the baud rate to 1200 bps, send:

```
01 10 00 00 00 02 04 44 96 00 00 07 73
```

Data	Description
01	Meter address
10	Function code: write multiple registers
00 00	Start register address
00 02	Number of registers: 2 words
04	Byte count: 4 bytes
44 96 00 00	New baud rate as IEEE-754 float (1200.0)
07 73	CRC checksum

Response: `01 10 00 00 00 02 41 C8`

2 Register Addresses

2.1 Measurement Registers (Function Code 0x04)

Use function code 0x04 to read measurement data. Each value occupies 2 registers (4 bytes).

Address (Hex)		Description	Unit	Format	Mode
HI	LO				
00	00	Voltage	V	Float	Read only
00	08	Current	A	Float	Read only
00	12	Active power	kW	Float	Read only
00	2A	Power factor	cosφ	Float	Read only
00	36	Frequency	Hz	Float	Read only
01	00	Total active energy	kWh	Float	Read only

2.2 Configuration Registers (Function Codes 0x03 / 0x10)

Use function code 0x03 to read meter parameters, or 0x10 to modify them.

Address (Hex)		Bytes	Format	Description	Unit	Mode
HI	LO					
00	00	4	Float	Baud rate (1200, 2400, 4800, 9600)	bps	R/W
00	02	4	Float	Parity (0: even, 1: odd, 2: none)	–	R/W
00	08	4	Float	Communication address (1–247)	–	R/W

3 Product Image



Figure 1: BM-2.0 LCD digital display energy meter

Models: BM-2.0, BM-2.0 LCD Digital Display Energy Meter
© November 2026 Phenbo. Specifications are subject to change without notice.