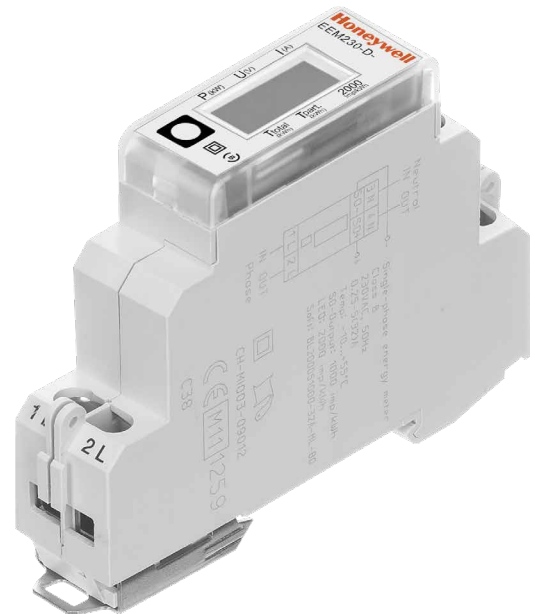


Electrical Energy Meter with integrated Serial Modbus interface EEM230-D-MO

Electrical energy meter with an integrated serial RS-485 Modbus interface allow direct reading of all relevant data, such as energy (total and partial), current, voltage, active and reactive power.

Main features

- Single-phase energy meter, 230 VAC 50 Hz
- Direct measurement up to 32 A
- Display of active power, voltage and current
- Modbus RTU interface to query the data
- Reactive power and $\cos\phi$ available through interface
- Up to 247 meters can be connected to the Modbus interface
- 7-digits display
- Lead seal possible with cap as accessory
- Accuracy class B according to EN50470-3, accuracy class 1 according to IEC62053-21



Order Number

Standard Version: EEM230-D-MO
 MID Version: EEM230-D-MO-MID
 Sealing caps: EEM230-SEALCAP
 (Bulk with 20 units)

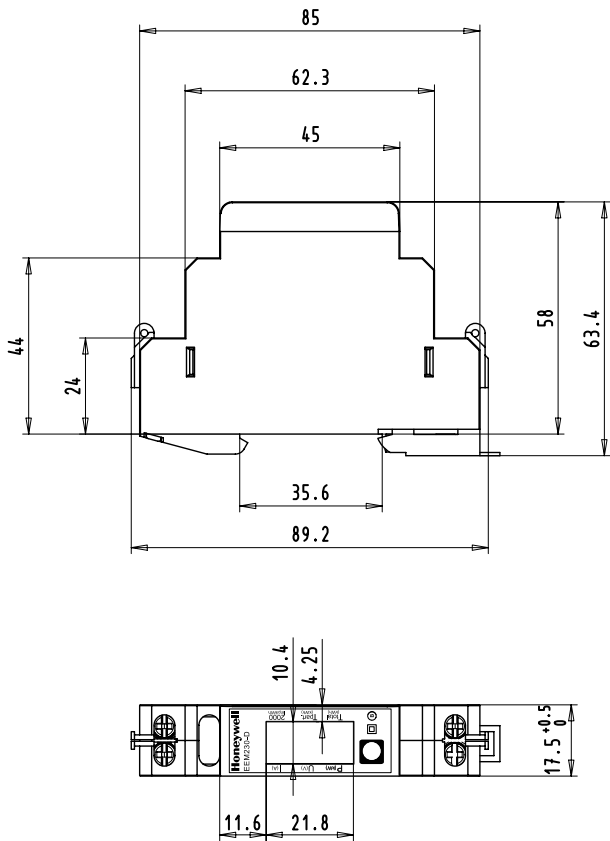
Technical data

Precision class	B according to EN50470-3 1 according to IEC62053-21
Operating voltage	230 VAC, 50 Hz Tolerance -20% / +15%
Reference/maximum current	$I_{ref} = 5 \text{ A}$, $I_{max} = 32 \text{ A}$
Starting/minimum current	$I_{st} = 20 \text{ mA}$, $I_{min} = 0.25 \text{ A}$
Power consumption	Active 0.4 W
Counting range	00000.00 ... 99999.99 100000.0 ... 999999.9
Pulses per kWh	LC-Display 2000 Imp./kWh

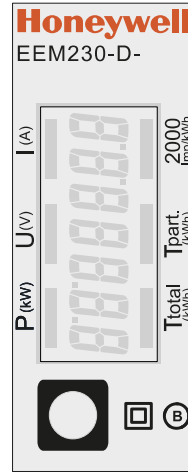
Mounting

Mounting	On 35 mm rail, according to EN60715TH35
Terminal connections main circuit	Conductor cross-section max. 6 mm ² , screwdriver pozidrive no. 1, Slot no. 1, torque: 1.2 Nm
Terminal connections control circuit	Conductor cross-section max. 2.5 mm ² , screwdriver pozidrive no. 0, Slot no. 1, torque: 0.5 Nm
Insulation characteristics	4 kV / 50 Hz test according to VDE0435 for energy meter part 6 kV 1.2 / 50 μs surge voltage according to IEC255-4 2 kV / 50 Hz test according to VDE0435 for Interface Device protection class II
Ambient temperature	-25°...+55°C
Storage temperature	-30°...+85°C
Environment	Mechanical M2 Electromagnetic E2
Relative humidity	95% at 25°...+40°C, without condensation
EMC/interference immunity	Surge voltage according to IEC61000-4-5 at main circuit 4 kV, at Modbus interface, 1 kV Burst voltage according to IEC61000-4-4 at main circuit 4 kV, at Modbus interface 1 kV ESD according to IEC61000-4-2, contact 8 kV, air 15 kV

Dimension diagram

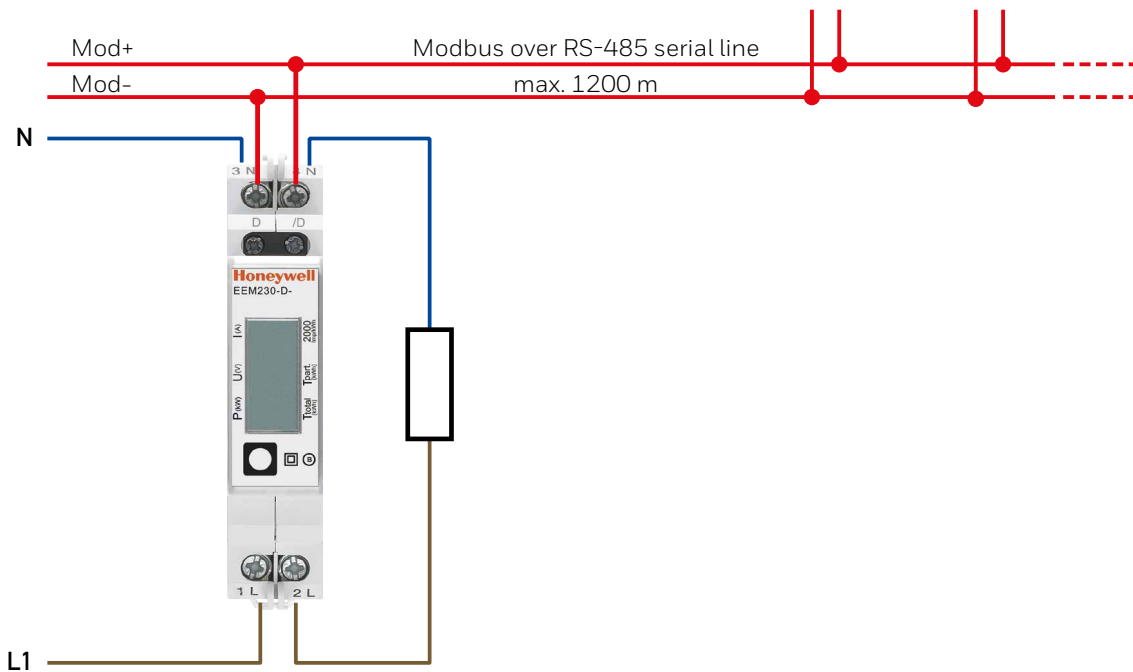


Display elements, direct measurement



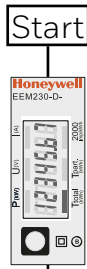
- T total (kWh) Indicates the total consumption
- T part (kWh) Indicates the partial consumption. This value can be reset
- P (kW) Indicates the instantaneous power
- U (V) Indicates the voltage
- I (A) Indicates the current
- 2000 pulses/kWh Pulsates according to the amount of used power. Error indication (Line 1L/2L inverted) pulsating with 600/600 ms

Wiring Diagram

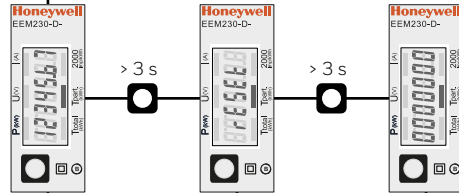


Menu to display the value on LC

T total
Total consumption



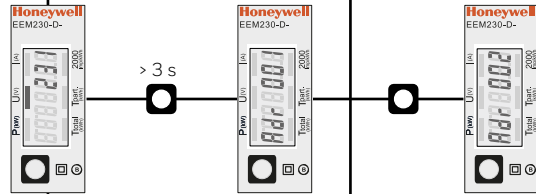
Tpart.
Partial consumption



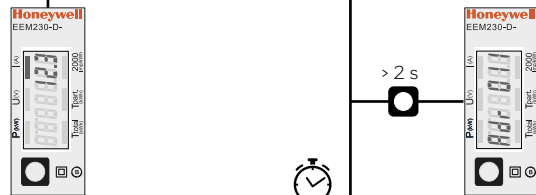
P
Instantaneous power



U
Voltage



I
Current



Back to Start

Back to Start

Technical data Modbus

Protocol	Modbus RTU according to IEC 60870-6 specification
Bus system	RS-485 Serial line
Transmission rate (bps)	4800-9600-19'200-38'400-57'600-115'200. The transmission Baud rate is automatically detected
Transmission mode	Even parity: 8 data bits, 1 stop bit Odd parity: 8 data bits, 1 stop bit No parity: 8 data bits, 2 stop bits The transmission Mode is automatically detected The parity is automatically detected
Bus cable	Twisted, shielded, 2 × 0.5 mm ² , 1200 m max.
Response time (to system response)	Write: up to 60ms Read: up to 60ms

- The communication is ready 30 s after the 'Power On'.
- Refresh time for the data is 5 s. Therefore the delay between reads of the same data should be at least 5 s.
- The use of energy meters in bus with intensive communication can increase the data refresh time.
- 247 devices can be connected to the Modbus. Over 128 devices, a repeater should be used.
- The interface don't have a terminal resistor, this should be provided external.
- For a description of the used registers please look at the 'Register Page'.

Data transmission

- Only «Read Holding Registers [03]/ Write Multiple Registers [16]» instructions are recognized.
- Up to 20 registers can be read at a time.
- The device supports broadcast messages.
- In accordance with the Modbus protocol, a register R is numbered as R - 1 when transmitted.
- The device has a voltage monitoring system. In case of voltage loss, registers are stored in EEPROM (transmission rate, etc.)

Exception Responses

- ILLEGAL FUNCTION [01]: The function code is not implemented.
- ILLEGAL DATA ADDRESS [02]: The address of some requested registers is out of range or more than 20 registers have been requested.
- ILLEGAL DATA VALUE [03]: The value in the data field is invalid for the referenced register.

Change the Modbus address direct on device

- In the menu, go for «U»
- Push long (≥ 3 sec) → «Adr»
- Push short → address +1, push long → address +10
- Once the desired address is selected wait, to validate, till the root menu to come back

Registers

For double registers (4 – 5, 16 – 17, 28 – 29, 30 – 31) the high register is sent first (big-Endian).
Partial counter (30 – 31) can be reset by writing 0 in both registers in the same message.

R	Read	Write	Description	Unit
1	X		Firmware-Version	Ex: 11 = FW 1.1
2	X		Number of supported registers	Will give 40
3	X		Number of supported flags	Will give 0
4-5	X		Baudrate	Ex: Baudrate High = 1 Baudrate Low = 49'664 $1 \times 65'536 + 49'664 = 115'200$ bps
6	X		Not Used	Will give 0
7	X		Type / ASN function	Will give «EE»
8	X		Type / ASN function	Will give «M2»
9	X		Type / ASN function	Will give «30»
10	X		Type / ASN function	Will give «_-»
11	X		Type / ASN function	Will give «D-»
12	X		Type / ASN function	Will give «MO»
13	X		Type / ASN function	Will give « » for non MID or «-M» for MID Version
14	X		Type / ASN function	Will give « » for Non MID or «ID» for MID Version
15	X		HW vers. Modif.	Ex: 11 = HW 1.1
16-17	X		Serial number Low	Unique ASCII serial number
18	X		Serial number High	Unique ASCII serial number
19	X		Not Used	Will give 0
20	X		Not Used	Will give 0
21	X		Not Used	Will give 0
22	X		Status / Protect	0 = no problem 1 = problem with last communication request
23	X		Modbus Timeout	ms
24	X	X ¹⁾	Modbus Address	Range 1-247
25	X		Error register	0 : No error 1 : Error
26	X		Not Used	Will give 0
27	X		Not Used	Will give 0
28-29	X		WT1 total Counter Energy Total Tariff 1	10^{-2} kWh (multiplier 0,01) Ex: WT1 total High = 13 WT1 total Low = 60'383 $13 \times 65'536 + 60'383 = 91'2351 = 9123.51$ kWh
30-31	X	X	WT1 partial Counter Energy Partial Tariff 1	10^{-2} kWh (multiplier 0,01) Ex: WT1 partial High = 13 WT1 partial Low = 60'383 $13 \times 65'536 + 60'383 = 91'2351 = 9123.51$ kWh
32	X		Not Used	Will give 0
33	X		Not Used	Will give 0
34	X		Not Used	Will give 0
35	X		Not Used	Will give 0
36	X		URMS Effective Voltage	V Ex: 230 = 230 V
37	X		IRMS Effective Current	10^{-1} A (multiplier 0,1) Ex: 314 = 31.4 A
38	X		PRMS Effective active Power	10^{-2} kW (multiplier 0,01) Ex: 1545 = 15,45 kW
39	X		QRMS Effective reactive Power	10^{-2} kvar (multiplier 0,01) Ex: 1545 = 15,45 kvar
40	X		cos phi	10^{-2} (multiplier 0,01) Ex: 67 = 0,67

¹⁾ The Modbus Address register is not writable with a broadcast message.



EAC Mark of Conformity for Machinery Exports to Russia, Kazakhstan or Belarus.

Honeywell

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