

Operating guide

# Modbus RTU Slave Module for energy meter SonoMeter 40



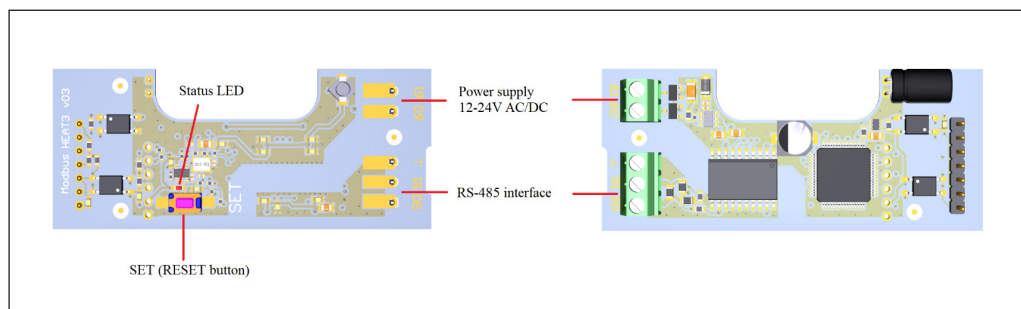
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**1. Description**

Modbus RTU is a master-slave communication protocol, able to support up to 247 slaves connected in a bus or a star network. The protocol uses a simplex connection on a single line. In this way, the communication messages move on a single line in two opposite directions. The module has a separate, independent processor for retrieving data from the meter by configuring it at a selected interval. Later, the processed data is transmitted to the reading systems via the RS485 interface.

**2. Connection**



Polarity independent connection for SELV power supply	60 and 61 connectors
Voltage	12-24 V AC/DC
Max power consumption	2 W
Typical current supply	50 mA

Connectors	(90) Line A+, (91) Line B- (GND optional, for serial communication)
Communication protocol	Modbus RTU
Slave address	1 – 247 (default address – last 2 digits of serial number or according to meter's "M-Bus 2"- address)
Baud rate	1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200
Data format	8E1 (8 data bits, Even parity, 1 stop bit) – default 8O1 (8 data bits, Odd parity, 1 stop bit) 8N2 (8 data bits, None parity, 1 stop bit)
Communication with energy meter	2400 baud rate, 8 data bits, Even parity, 1 stop bit (not configurable)

**3. Status LED and SET (RESET) button functionality**

Status LED is signaling every Modbus communication event. Status LED is blinking every time during communication request and even to response messages.

The SET (RESET) button is used when it is necessary to reset the module parameters after a failed configuration, forgotten address, baud rate, etc. To reset module, procedure is this:

- Turn off module from power supply (wait about 10 sec until module discharge)
- Press and hold the SET (RESET) button. Then, turn on module power supply
- Wait until Status LED starts blinking frequently (after about 12 sec.) and stop holding SET (RESET) button

**4. List of Modbus Data Registers**

Designation	Modbus Register	Modbus Register Type	Modbus Address	Data Value Range	Unit	Read only (RO) Read/write (R/W)
Heating Energy	30001 or 40001	Input or Holding	0	Int32	-	RO
Heating Energy (Unit factor)	30003 or 40003	Input or Holding	2	UInt16	-	RO
Heating Energy (Unit)	30004 or 40004	Input or Holding	3	4 char ASCII	-	RO
Heating Energy (Float)	30006 or 40006	Input or Holding	5	IEEE754	MWh, GJ	RO
Cooling Energy	30008 or 40008	Input or Holding	7	Int32	-	RO
Cooling Energy (Unit factor)	30010 or 40010	Input or Holding	9	UInt16	-	RO
Cooling Energy (Unit)	30011 or 40011	Input or Holding	10	4 char ASCII	-	RO
Cooling Energy (Float)	30013 or 40013	Input or Holding	12	IEEE754	MWh, GJ	RO
Tariff Energy 1	30015 or 40015	Input or Holding	14	Int32	-	RO
Tariff Energy 1 (Unit factor)	30017 or 40017	Input or Holding	16	UInt16	-	RO
Tariff Energy 1 (Unit)	30018 or 40018	Input or Holding	17	4 char ASCII	-	RO
Tariff Energy 1 (Float)	30020 or 40020	Input or Holding	19	IEEE754	MWh, GJ	RO
Tariff Energy 2	30022 or 40022	Input or Holding	21	Int32	-	RO
Tariff Energy 2 (Unit factor)	30024 or 40024	Input or Holding	23	UInt16	-	RO
Tariff Energy 2 (Unit)	30025 or 40025	Input or Holding	24	4 char ASCII	-	RO
Tariff Energy 2 (Float)	30027 or 40027	Input or Holding	26	IEEE754	MWh, GJ	RO
Volume	30029 or 40029	Input or Holding	28	Int32	-	RO
Volume (Unit factor)	30031 or 40031	Input or Holding	30	UInt16	-	RO
Volume (Unit)	30032 or 40032	Input or Holding	31	4 char ASCII	-	RO
Volume (Float)	30034 or 40034	Input or Holding	33	IEEE754	m <sup>3</sup>	RO
Pulse Input Volume 1	30036 or 40036	Input or Holding	35	Int32	-	RO
Pulse Input Volume 1 (Unit factor)	30038 or 40038	Input or Holding	37	UInt16	-	RO
Pulse Input Volume 1 (Unit)	30039 or 40039	Input or Holding	38	4 char ASCII	-	RO
Pulse Input Volume 1 (Float)	30041 or 40041	Input or Holding	40	IEEE754	m <sup>3</sup>	RO
Pulse Input Volume 2	30043 or 40043	Input or Holding	42	Int32	-	RO
Pulse Input Volume 2 (Unit factor)	30045 or 40045	Input or Holding	44	UInt16	-	RO
Pulse Input Volume 2 (Unit)	30046 or 40046	Input or Holding	45	4 char ASCII	-	RO
Pulse Input Volume 2 (Float)	30048 or 40048	Input or Holding	47	IEEE754	m <sup>3</sup>	RO
Power	30050 or 40050	Input or Holding	49	Int32	-	RO
Power (Unit factor)	30052 or 40052	Input or Holding	51	UInt16	-	RO
Power (Unit)	30053 or 40053	Input or Holding	52	4 char ASCII	-	RO
Power (Float)	30055 or 40055	Input or Holding	54	IEEE754	kW	RO
Flow	30057 or 40057	Input or Holding	56	Int32	-	RO
Flow (Unit factor)	30059 or 40059	Input or Holding	58	UInt16	-	RO
Flow (Unit)	30060 or 40060	Input or Holding	59	4 char ASCII	-	RO
Flow (Float)	30062 or 40062	Input or Holding	61	IEEE754	m <sup>3</sup> /h	RO
Forward temperature (Fixed)	30064 or 40064	Input or Holding	63	Int32	0.01 °C	RO
Forward temperature (Float)	30066 or 40066	Input or Holding	65	IEEE754	°C	RO
Return temperature Fixed)	30068 or 40068	Input or Holding	67	Int32	0.01 °C	RO
Return temperature (Float)	30070 or 40070	Input or Holding	69	IEEE754	°C	RO
Temperature difference (Fixed)	30072 or 40072	Input or Holding	71	Int32	0.01 °C	RO
Temperature difference (Float)	30074 or 40074	Input or Holding	73	IEEE754	°C	RO
Heat Meter Serial Number (Fixed)	30076 or 40076	Input or Holding	75	UInt32	-	RO
Heat Meter Serial Number (ASCII)	30078 or 40078	Input or Holding	77	8 char ASCII	-	RO
Error Code	30082 or 40082	Input or Holding	81	UInt32	-	RO



5. Read/Write parameters

Designation	Modbus Register	Modbus Register Type	Modbus Address	Data Value Range	Unit	Read/write (R/W)
Modbus Slave ID <sup>1</sup>	41001	Holding	1000	UInt16	-	R/W
Update Rate Data from Meter <sup>2</sup>	41002	Holding	1001	UInt16	x100 ms	R/W
Baud Rate	41003	Holding	1002	UInt32	-	R/W
Data Bits	41005	Holding	1004	UInt16	-	R/W
Parity <sup>3</sup>	41006	Holding	1005	UInt16	-	R/W
Stop Bits	41007	Holding	1006	UInt16	-	R/W

<sup>1</sup> Slave ID can be set up between 1 – 247 addresses. The value 256 allows to have address same as meter M-Bus address.

<sup>2</sup> "Update Rate Data from Meter" can be set according to request (default 600s). Entered value is multiplied by 100ms. Example: If Register 41002 is set to 1000 it means 100000ms (= 100s). For 5 minutes the register must be set to the value 3000 (= 300000ms = 300s = 5 min).

<sup>3</sup> The parity register is set by the ASCII char value – 'Even' parity (69 dec or 45 hex), 'Odd' parity (79 dec or 4F hex) and 'None' parity (78 dec or 4E hex).

6. Error code definitions

Error designation	Error Code value in 30082 or 40082 Modbus Register is sum of following values of each error	Error code indicates on the LCD <Er####>
Hardware status flag Er02	0x00000004	8000
Hardware status flag Er03	0x00000008	8000
End of battery live time	0x00000010	1000
Hardware status flag Er05	0x00000020	0008
Hardware status flag Er06	0x00000040	0008
Flow sensor is empty	0x00000400	0001
Reverse direction of the flow	0x00000800	0002
Temperature 1 error (short circuit or sensor not connected)	0x00010000	0080
Temperature sensor 1 error (disconnected)	0x00020000	0080
Temperature 1 < 0°C	0x00040000	00C0
Temperature 1 > 180°C	0x00080000	0080
Temperature 2 error (short circuit or sensor not connected)	0x00100000	0800
Temperature sensor 2 error (disconnected)	0x00200000	0800
Temperature 2 < 0°C	0x00400000	0C00
Temperature 2 > 180°C	0x00800000	0800
Hardware status flag Er30	0x01000000	0880
Temperature difference < 3°C	0x04000000	4000
Temperature difference > 150°C	0x08000000	2000
Flow rate greater 1.2qs	0x10000000	0004
Hardware status flag Er35	0x20000000	8000
Hardware status flag Er37	0x80000000	8000

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