MODBUS RTU PROTOCOL FOR EFAN-230 CONTROLLER

Configuration

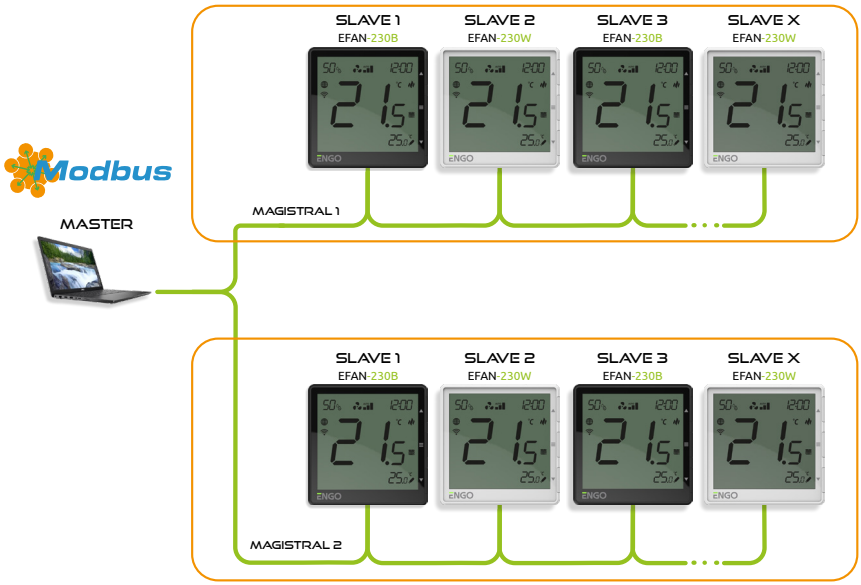
Configuration must be carried out by a qualified person with the appropriate authorization and technical knowledge, in accordance with the standards and regulations of the country and the EU. The manufacturer will not be held responsible for any conduct not in accordance with the instructions.

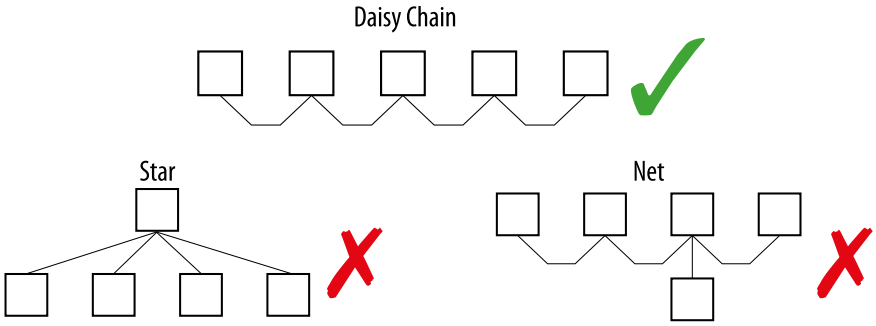
ATTENTION:

There may be additional protection requirements for the entire installation and configuration, which the installer/ programmer is responsible for maintaining.

General information about MODBUS RTU

The MODBUS RTU structure uses a master-slave system to exchange messages. It allows a maximum of 247 slaves, but only one master. The master controls the operation of the network and only it sends the request. Slaves do not undertake transmissions on their own. Each communication begins with the master making a request to the Slave, which responds to the master with what it has been asked. The master (computer) communicates with slaves (controllers) in two-wire RS-485 mode. This uses data lines A+ and B- for data exchange, which MUST be one twisted pair .





No more than two wires can be connected to each terminal, ensuring that a “Daisy Chain” (in series) or “straight line” (direct) configuration is used. Star or network (open) connection is not recommended, as reflections within the cable can cause data corruption.

MODBUS RTU network operation - Slave mode

Engo’s MODBUS controller has the following features when operating as a slave in a MODBUS RTU network:
- Network connection via RS485 serial interface.
- Address, communication speed and byte format determined by hardware configuration.
- Allows access to all tags and data used in the controller’s ladder program.
- 8-bit slave address
- 32-bit data size (1 address = 32-bit data return)
- Each MODBUS data register has a size of 2 bytes.

ATTENTION:

Before the controller is connected to the RS-485 network, it must first be properly configured.
The communication settings are configured in the service parameters of the regulator (device).

ATTENTION:

Connecting unconfigured controllers to the RS-485 network will result in improper operation.

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RS-485 communication settings

Pxx	Function	Value	Description	Default value
Addr	MODBUS Slave device address (ID).	1 - 247	MODBUS Slave device address (ID).	1
BAUD	Baud	4800	Bitrate (Baud)	9600
		9600		
		19200		
		38400		
PARI	Parity bit - sets data parity for error detection	None	None	None
		Even	Even	
		Odd	Odd	
STOP	StopBit	1	1 stop bit	1
		2	2 stop bit	

Supports the following function codes:

#03 - reading n registers (Holding Registers)
#04 - reading n registers (Input Registers)
#06 - write 1 register (Holding Register)

INPUT registers - read only

Adress		Access	Description	Value range	Means	Default
Dec	Hex					
0	0x0000	R (#03)	Engo MODBUS Model ID	1-247	MODBUS Slave (ID)	1
1	0x0001	R (#03)	Firmware-Version	0x0001-0x9999	0x1110=1.1.10 (BCD code)	
2	0x0002	R (#03)	Working-state		0b00000010=Idle, switch OFF 0b00000000=Idle, room meet temperature 0b10000001=Heating 0b10001000=Cooling 0b00001000=Idle, sensor error	
3	0x0003	R (#03)	Value of the Integrated temperature sensor, °C	50 - 500	N-> temp=N/10 °C	
5	0x0005	R (#03)	Value of the External temperature sensor S1, °C	50 - 500	0 = Open (sensor break)/ contact open 1 =Closed (sensor short circuit)/ contact closed N-> temp=N/10 °C	
6	0x0006	R (#03)	Value of the External temperature sensor S2, °C	50 - 500	0 = Open (sensor break)/ contact open 1 =Closed (sensor short circuit)/ contact closed N-> temp=N/10 °C	
7	0x0007	R (#03)	Fan state	0b00000000 - 0b00001111	0b00000000= OFF 0b00000001= I Fan stage low 0b00000010= II Fan stage medium 0b00000100= III Fan state high 0b00001000= Auto - OFF 0b00001001= Auto - I low 0b00001010= Auto - II medium 0b00001100= Auto - III high	
8	0x0008	R (#03)	Valve 1 stat	0 - 1000	0 = OFF (valve closed) 1000 = ON / 100% (valve open)	
9	0x0009	R (#03)	Valve 2 state	0 - 1000	0 = OFF (valve closed) 1000 = ON / 100% (valve open)	
10	0x000A	R (#03)	Humidity measurement (with 5% indication accuracy)	0 - 100	N-> humidity=N %	

HOLDING registers – for reading and writing

Adress		Access	Description	Value range	Means	Default
Dec	Hex					
0	0x0000	R/W (#04)	Engo MODBUS Model ID	1-247	MODBUS Slave (ID)	1
234	0x00EA	R/W (#06)	Fancoil type	1 - 6	1 = 2 pipe - only heating 2 = 2 pipe - only cooling 3 = 2 pipe - heating & cooling 4 = 2 pipe - underfloor heating 5 = 4 pipe - heating & cooling 6 = 4 pipe - underfloor heating & cooling by fancoil	0
235	0x00EB	R/W (#06)	S1-COM input configuration (P01 install parameter)	0	Input inactive. Change between heating and cooling with the buttons.	0
				1	Input used to change heating/cooling via external contact connected to S1-COM: - S1-COM open --> HEAT mode - S1-COM shorted --> COOL mode	
				2	Input used to AUTOMATICALLY change heating/cooling based on PIPE TEMPERATURE in a 2-pipe system. The controller switches between heating and cooling modes based on the pipe temperature set in parameters P17 and P18.	
				3	Allow fan operation dependent on the temperature measurement on the pipe. For example, if the temperature on the pipe is too low, and the controller is in heating mode - the pipe sensor will not allow the fan to run. The change of heating/cooling is done manually - using the buttons. Values for fan control based on pipe temperature are set in parameters P17 and P18.	
				4	Activation of the floor sensor in the floor heating configuration.	
236	0x00EC	R/W (#06)	S2-COM input configuration (P02 install parameter)	0	Input disabled	0
				1	Occupancy sensor (when contacts are opened, activate ECO mode)	
				2	External temperature sensor	
237	0x00ED	R/W (#06)	Selectable ECO mode (Installer Parameters -P07)	0	NO - Disabled	0
				1	YES - Active	
238	0x00EE	R/W (#06)	ECO mode temperature value for heating (Installer parameters -P08)	50 - 450	N-> temp=N/10 °C	150
239	0x00EF	R/W (#06)	ECO mode temperature value for cooling (Installer parameters -P09)	50 - 450	N-> temp=N/10 °C	300
240	0x00F0	R/W (#06)	Algorithm delta FAN in heating mode The parameter determines the width of the temperature range, in which the fan operates in heating mode. If the room temperature drops then: 1. when the value of delta FAN is small, the faster the response of the fan to a change in temperature - faster increase in speed 2. when high value of Delta FAN, the slower the fan increases speed (Installer parameters -P10)	5 - 50	N-> temp=N/10 °C	20

Adress		Access	Description	Value range	Means	Default
Dec	Hex					
241	0x00F1	R/W (#06)	Fan on temperature for heating The fan will start working if the temperature in the room drops below the preset by the value of the parameter (Installer parameters -P11	0 - 50	N-> temp=N/10 °C	50
242	0x00F2	R/W (#06)	Control algorithm (TPI or hysteresis) for the heating valve (Installer parameters -P12)	0 - 20	0 = TPI 1 = ±0,1C 2 = ±0,2C... N-> temp=N/10 °C (±0,1...±2C)	5
243	0x00F3	R/W (#06)	FAN delta algorithm for cooling The parameter determines the width of the temperature range in which the fan operates in cooling mode. If the room temperature increases then: 1. when a small value of Delta FAN, the faster the response of the fan to a change in temperature temperature - faster increase in speed. 2. when large value of Delta FAN, the slower the fan increases speed. (Installer parameters -P13)	5 - 50	N-> temp=N/10 °C	20
244	0x00F4	R/W (#06)	Fan on temperature for cooling. The fan will start working if the temperature in the room rises above the the setpoint by the value of the parameter. (Installer parameters -P14)	0 - 50	N-> temp=N/10 °C	50
245	0x00F5	R/W (#06)	Hysteresis value for the cooling valve (Installer parameters -P15)	1 - 20	N-> temp=N/10 °C (±0,1...±2C)	5
246	0x00F6	R/W (#06)	Dead zone of switching heating/cooling In a 4-pipe system.The difference between the Set temperature and room temperature, at which the controller will automatically change the heating/cooling operation mode. (Installer parameters -P16)	5 - 50	N-> temp=N/10 °C	20
247	0x00F7	R/W (#06)	The switching temperature value from heating to cooling - 2-pipe system. In a 2-pipe system, below this value the system switches to cooling mode and allows the fan to start. (Installer parameters -P17)	270 - 400	N-> temp=N/10 °C	300
248	0x00F8	R/W (#06)	The value of the switching temperature from cooling into heating - 2-pipe system. In a 2-pipe system, above this value the system switches to heating mode and allows the fan to start. (Installer parameters -P18)	100 - 250	N-> temp=N/10 °C	100
249	0x00F9	R/W (#06)	Cooling ON delay. A parameter used in 4-pipe systems with automatic switching between heating and cooling. This avoids too frequent switching between heating and cooling modes and oscillation of the room temperature. (Installer parameters -P19)	0 - 15 min		0
250	0x00FA	R/W (#06)	Maximum floor temperature To protect the floor, heating will be turned off, when the floor sensor temperature rises above the maximum value. (Installer parameters -P20)	50 - 450	N-> temp=N/10 °C	350

Adress		Access	Description	Value range	Means	Default
Dec	Hex					
251	0x00FB	R/W (#06)	Minimum floor temperature To protect the floor, heating will be switched on, when the floor sensor temperature drops below the minimum value. (Installer parameters -P21)	50 - 450	N-> temp=N/10 °C	150
254	0x00FE	R/W (#06)	PIN code for installer settings (Installer Parameters -P23)	0 - 1	0 = disabled 1 = PIN (First default code 0000)	0
255	0x00FF	R/W (#06)	Requiring a PIN code to unlock the keys (Installer Parameters -P24)	0 - 1	0 = NIE 1 = TAK	0
256	0x0100	R/W (#06)	Fan operation (Installer parameters -FAN)	0 - 1	0 = NO - Inactive - output contacts for fan control are completely disabled 1 = YES	1
257	0x0101	R/W (#06)	Power on/off - switching off the regulator	0,1	0=OFF 1=ON	1
258	0x0102	R/W (#06)	Operation mode	0,1,3	0=Schedule 1=Manual 3=FROST - anti-freeze mode	0
260	0x0104	R/W (#06)	Fan speed setting		0b000000= OFF - fan off 0b00000001= I (low) fan gear 0b000010= II (medium) fan gear 0b00000100= III (high) fan gear 0b00001000= Automatic fan speed - OFF 0b00001001= Automatic fan speed - 1st gear 0b00001010= Automatic fan speed - 2nd gear 0b00001100= Automatic fan speed - 3rd gear	
262	0x0106	R/W (#06)	Key lock	0,1	0=unlocked 1=Locked	0
263	0x0107	R/W (#06)	Display brightness (Installer Parameters -P22)	0-100	N-> Brightness =N%	30
268	0x010C	R/W (#06)	Clock - minutes	0-59	Minutes	0
269	0x010D	R/W (#06)	Clock - hours	0-23	Hours	0
270	0x010E	R/W (#06)	Clock - Day of the week (1=Monday)	1~7	Day of the week	3
273	0x0111	R/W (#06)	Set temperature in schedule mode	50-450	N-> temp=N/10 °C	210
274	0x0112	R/W (#06)	Set temperature in manual mode	50-450	N-> temp=N/10 °C	210
275	0x0113	R/W (#06)	Set temperature in FROST mode	50	N-> temp=N/10 °C	50
279	0x0117	R/W (#06)	Maximum setpoint temperature	50-450	N-> temp=N/10 °C	350
280	0x0118	R/W (#06)	Minimum setpoint temperature	50-450	N-> temp=N/10 °C	50
284	0x011C	R/W (#06)	Accuracy of displayed temperature	1, 5	N-> temp=N/10 °C	1
285	0x011D	R/W (#06))	Correction of displayed temperature	-3.0... 3.0°C	in steps of 0.5C	0
288	0x0120	R/W (#06)	Selection of system type - heating / cooling (dependent on the setting of input S1)	0,1	0 = Heating 1 = Cooling	0