EnOcean Equipment Profiles

REVISION HISTORY

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D2-30: Floor Heating Controls and Automated Meter Reading

Floor heating controls and automated meter reading gateway may appear combined in one device, but the metering functionality can also be absent.

The floor heating control unit controls a number of valves for separate heating circuits (e.g. for separate heating of single rooms). It measures the common hot water supply temperature as well as the return water temperatures of each single circuit.

The automated meter reading gateway is a device that connects to various counters such as heating, water, gas or electrical energy meters. The meters may be connected to the gateway by one or several of these interface types: M-Bus, D0, S0 (see appendix). The gateway reports the continuous energy or flow volume meter reading of each of the connected metering devices. Typically the measured variables consist of a momentary value and an accumulated value. The transmission of separated consumption import and export values is supported, too.

Data exchange

Direction: bidirectional
Addressing: ADT inbound, broadcast outbound
Communication trigger: event- & time-triggered
Communication interval: minimum 1-1000 s, maximum 1000 s
Trigger event: heartbeat 1000 s, value change in "Position", "Return Temperature", "Status/Error", "Supply Temperature", "Meter Reading" while respecting the minimum reporting interval
Tx delay: 500 ms (maximum response time, first telegram)
Rx timeout: 0 ms (minimum time between two received messages)
Teach-in method: Universal teach-in (outbound)
Encryption required : no
Security level format : 0

EEP Family Table

Type	0x00	0x01	0x02	0x03	0x04	0x05	0x06
Number of heating channels/valves	4	8	8	8	8	6	12
Channel return temperature	X	X	X	X	X	-	-
Global return temperature	X	X	X	X	X	-	-
Global supply temperature	X	X	X	X	X	-	-
Number of supported MBUS meters	0	0	8	10	10	0	0
Number of supported S0 meters	0	0	0	0	1	0	0
Number of supported D0 meters	0	0	0	0	0	0	0

Description of the meter interfaces

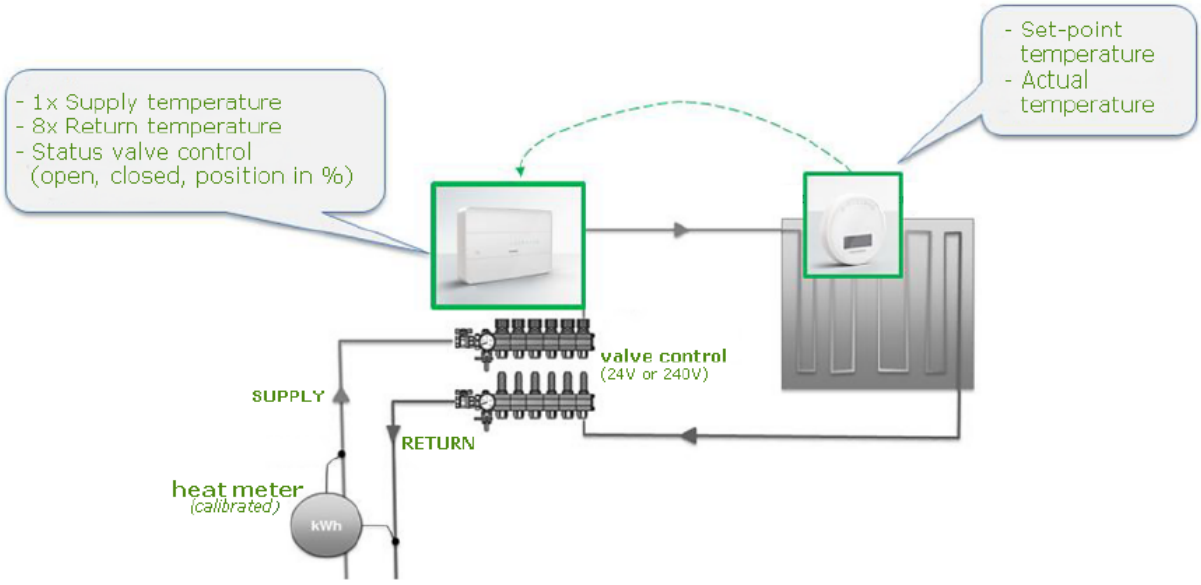
S0-Interface:
The S0-Interface is a two-wire connection designed for the transmission of monotonously rising measurement data. The standard is defined in EN 62053-31. The meter device transmits a fixed number of pulses per physical meter unit. The number of pulses per unit is defined by the meter manufacturer and depends on the necessary precision of the meter system. The pulses are output as currency variations, where a value lower than 3 mA corresponds to a logical 0. The sender output is mostly realized by a transistor or an opto-coupler, which needs to be supplied by a voltage of 27-30 V. Polarity must be respected.

D0-Interface:
The D0-interface is an optical metering interface defined in EN62056-61. It allows the unidirectional readout of metering data at a rate of 9600 Baud, using telegrams with start bit, 7 data bits, parity and a stop bit. One of the

protocols SML (Smart Message Language) or DLMS (Device Language Message Specification, EN62056-21) can be used for coding the data. A D0-Meter can deliver consumption data as well as various system data. The source and type of a data point is indicated by the standardized OBIS-codes.

MBUS-Interface:
The M-Bus (Meter-Bus) is a bidirectional field bus for the communication with consumption meters. It is described in standard EN13757. Typically there can be connected up to 250 devices in one M-Bus network. There is a common master in the network, who periodically collects the meter data from its slaves. The network may be implemented either as two-wire cable network allowing remote powering of the slaves or as wireless network. The protocol operates at 300 to 9600 Baud and codes the data bytes with start bit, 8 data bits, parity and a stop bit. The data records sent by a metering slave deliver in their header field the coding information of the following data field (value size, measurement medium, unit, multiplier). The master can address a single slave by its primary address (1...250), which must be assigned during network configuration, or by its secondary address, which is a unique device identification number assigned by the device manufacturer.

Application example for floor heating controls



References:
M-Bus documentation: www.m-bus.com
SML specification: www.vde.com/de/fnn/arbeitsgebiete/messwesen/Sym2/Seiten/default.aspx
DLMS User Association: www.dlms.com

RORG	D2	VLD Telegram
FUNC	30	Floor Heating Controls and Automated Meter Reading
TYPE	02	Type 0x02 (description: see table)

Submitter: MSR-Solutions

CMD 0x1 - Set heating controls output

This message is sent to a floor heating actuator. It controls the valve position of one channel or of all channels of the floor heating controls.

Sender: controller; send type: broadcast or addressed; expected response: CMD 0x3

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Valve control period / PWM signal interval	PERIOD	Total on-off time for two-position valve controller (T valve open + T valve closed)	Enum: 0: Local default / no change 1: 1 s 2: 2 s 3: 5 s 4: 10 s 5: 20 s 6: 50 s 7: 100 s 8: 200 s 9: 500 s 10: 1000 s 11...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x01: ID 01		
8	2	Not Used (= 0)					
10	1	Valve type	VTYP	Type of connected valve	Enum: 0: Valve normally closed (N.C.) 1: Valve normally open (N.O.)		
11	5	Heating channel	HCH	The heating channel that should be set	Enum: 0...15: A valid channel number 16...30: Reserved 31: All valid channels		
16	1	Run init sequence	RIN	Measure and store the valve zero point	Enum: 0: No action 1: Run init sequence		
17	7	Valve position set point	POS	Valve set point 0...100% (0=closed, 100=open)	0...100	0...100	%

CMD 0x2 - Heating controls status query

This message is sent to a floor heating actuator. It requests the status of one channel or the status of the global control unit of an actuator.

Sender: controller; send type: broadcast or addressed; expected response: CMD 0x3

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x02: ID 02		
8	3	Not Used (= 0)					
11	5	Heating channel	HCH	The heating channel that should be reported	Enum: 0...15: A valid channel number 16...28: Reserved 29: All valid channels 30: All valid channels and global device status 31: Global device status only		

CMD 0x3 - Heating controls status response / CH = 0...15

This message is sent by a floor heating controls if one of the following events occurs:
- Message 'status query' has been received (CMD 0x2).
- Status of one channel or temperature has changed.

Sender: actuator; send type: broadcast; maximum send delay 1 s.

If the response is for single channel data (CH = 0...15):

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x03: ID 03		
8	3	Status / Error	STATUS	Status / Error indication of given channel	Enum: 0: No fault 1: General error 2: Init sequence running 3: Channel not available 4: Temperature sensor error 5: Valve error 6: Temperature sensor and valve error 7: Reserved		
11	5	Heating channel	HCH	The heating channel that is reported	Enum: 0...15: A valid channel number 16...31: Reserved		
16	1	Not Used (= 0)					
17	7	Valve position	POS	Actual valve position 0...100% (0=closed, 100=open)	0...100	0...100	%
24	8	Return temperature	TEMPRET	The current return temperature of the channel	0...180	0...90	°C

CMD 0x3 - Heating controls status response / CH = 31

If the response is for global floor heating controls unit data (CH = 31):

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x03: ID 03		
8	3	Status / Error	STATUS	Global unit status	Enum: 0: No fault 1: General error 2: Supply temperature error 3: Return temperature error 4: Error on both sensors 5...7: Reserved		
11	5	Heating channel	HCH	The heating channel that is reported (=global unit)	Enum: 31: Unit status only		
16	8	Supply temperature	TSUP	The current supply temperature of the unit	0...180	0...90	°C
24	8	Return temperature	TRET	The current common return temperature	0...180	0...90	°C

CMD 0x6 - Set meter configuration / MBUS (BUS = 1)

This message is sent to a metering device gateway to configure the meter settings for one channel.

Sender: controller; send type: broadcast or addressed.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					
18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured)		

					1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		
24	8	Primary Address	ADDR	The primary MBUS address of the meter	1...250	1...250	1
32	40	Not Used (= 0)					

CMD 0x6 - Set meter configuration / S0 (BUS = 2)

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					

18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter
21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter
24	2	Factor of number of pulses	FACP	The factor for the number of pulses per value in UNIT1	Enum: 0: 1 1: 0.1 2: 0.01 3: 0.001
26	14	Number of pulses	NOP	The number of pulses per value in UNIT1* FACP	Enum: 0: Do not change the current setting of NOP 1...16383: Number of pulses per unit (EEP 2.6.5: 1 ... 16383 ~~... 65535~~)
40	32	Preset value	RST	Preset the accumulated value to this value	Enum: 0...4294967294: New preset value 0xFFFFFFFF: Do not change the current value

CMD 0x6 - Set meter configuration / D0 (BUS = 3)

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Report measurement	RM	Minimum auto reporting interval	Enum: 0: No auto reporting 1: Min. 1 s interval 2: Min. 3 s interval 3: Min. 10 s interval 4: Min. 30 s interval 5: Min. 100 s interval 6: Min. 300 s interval 7: Min. 1000 s interval 8...15: Reserved		
4	4	Command ID	CMD	Command identifier	Enum: 0x06: ID 06		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus that should be configured	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that should be configured	0...30	0...30	1
16	2	Not Used (= 0)					
18	3	Meter 1 units	UNIT1	Physical units of first measured quantity (imported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter		

21	3	Meter 2 units	UNIT2	Physical units of second measured quantity (exported value)	Enum: 0: No reading (unconfigured) 1: Current value W, accumulated value kWh 2: Current value W, accumulated value Wh 3: Accumulated value kWh only 4: Current value m3/h, accumulated value m3 5: Current value dm3/h, accumulated value dm3 6: Accumulated value m3 only 7: Digital counter
24	8	D0 Protocol	PROT	The D0 protocol that should be used for that meter	Enum: 0: Auto detect 1: SML (Smart Message Language) 2: DLMS (Device Language Message Specification) 3...255: Reserved
32	40	Not Used (= 0)			

CMD 0x7 - Meter Status Query

This message is sent to a metering device gateway to query the status of a meter.
Sender: controller; send type: broadcast or addressed; expected response: CMD 0x8.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	4	Not Used (= 0)					
4	4	Command ID	CMD	Command identifier	Enum: 0x07: ID 07		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The meter bus type that is queried	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter channel of given bus that status is queried	Enum: 0...30: Meter channel 31: All valid channels		

CMD 0x8 - Meter reading report / status response

This message is sent by a metering device gateway to report the meter values for each configured channel. It is sent if one of the following events occurs:
- Message 'meter status query' has been received (CMD 0x7)
- Status or meter reading of one channel has changed and auto reporting was configured by signal RM.

Sender: sensor; send type: broadcast; maximum send delay 1 s.

Offset	Size	Data	ShortCut	Description	Valid Range	Scale	Unit
0	1	Not Used (= 0)					
1	3	Meter status / error	MSTAT	Meter channel status	Enum: 0: No fault 1: General error 2: Bus unconfigured 3: Bus unconnected 4: Bus shortcut 5: Communication timeout 6: Unknown protocol or configuration mismatch 7: Bus initialization running		
4	4	Command ID	CMD	Command identifier	Enum: 0x08: ID 08		
8	1	Not Used (= 0)					
9	2	Meter bus type	BUS	The used bus of the meter status response	Enum: 0: Reserved 1: MBUS 2: S0 3: D0		
11	5	Meter channel index	MCH	The meter number of given bus that status is reported	0...30	0...30	1
16	3	Not Used (= 0)					
19	2	Value selection	VSEL	The selection of the reported value	Enum: 0: Meter 1 Current value 1: Meter 1 Accumulated value 2: Meter 2 Current value 3: Meter 2 Accumulated value		
21	3	Value unit	VUNIT	The unit of the reported value	Enum: 0: W 1: Wh 2: kWh 3: m3/h 4: dm3/h 5: m3 6: dm3 7: 1 (digital counter)		
24	32	Meter reading value	VAL	The reported value	0...4294967295	0...4294967295	According to VUNIT