

## EnOcean / RS 232, RS 485 Modbus RTU Gateway

ENOCLEAN-GWY-MOD

868 MHz

User Manual V1.19

English



## OBSAH

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**TERMS AND ABBREVIATIONS**

| <b>Term/Abbr.</b>        | <b>Explanation</b>  |
|--------------------------|---|
| 1BS .....                | EnOcean 1 Byte Communication                                      |
| 4BS .....                | EnOcean 4 Byte Communication                                      |
| Channel number (CH)..... | Identifier of EnOcean device within the gateway                   |
| EEP.....                 | EnOcean Equipment Profiles  |
| ERP .....                | EnOcean Radio Protocol  |
| EURID .....              | EnOcean Unique Radio Identifier                                   |
| Label.....               | User-friendly name of EnOcean device                              |
| MSC.....                 | EnOcean Manufacturer Specific Communication                       |
| RORG .....               | Radio ORG = organization, number for EnOcean radio telegram types |
| RPS .....                | EnOcean Repeated Switch Communication                             |
| RX .....                 | Incoming  |
| Teach-in.....            | Pairing of EnOcean devices  |
| Telegram .....           | EnOcean message   |
| TX .....                 | Outgoing  |
| Value index.....         | Identifier of a data unit within the channel                      |
| VLD .....                | EnOcean Variable Length Data telegram                             |

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## 1 INTRODUCTION

### 1.1 Device description

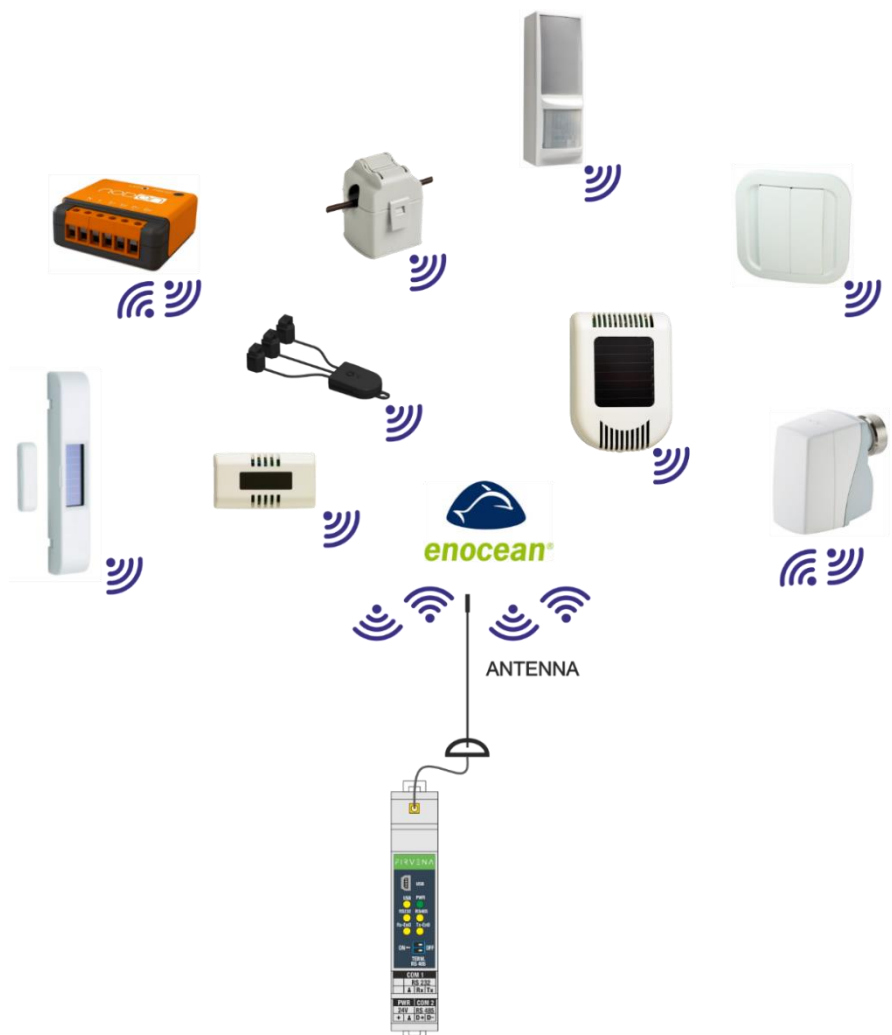
The ENOCEAN-GWY-MOD is a bidirectional gateway that allows wirelessly listening and controlling EnOcean elements via RS232 or RS485 MODBUS RTU. The EnOcean technology is characterized by very low power consumption and reducing battery use by harvesting light, kinetic or thermal energy. Modbus communication protocol is simple to implement and is widely used in building automation systems. The gateway is designed for a wide spectrum of elements, for example temperature, humidity, motion, CO2 sensors, electric current sensors, door/window opening sensors, wall switches, blind controllers, light controllers, relay switches, dimmers, heating valve controllers...

Thanks to wireless technology, this solution finds its use in objects where the operation has already been started and where new cables cannot be laid, or if there is temporary rental space and the owner wants to take the device and elements with.

The gateway is able to receive/transmit all telegrams as raw data of supported RORG types RPS, 1BS, 4BS, VLD and MSC according to the EEP specification. Content of these telegrams is copied to registers. It is required for data in such format (raw data) knowledge of telegram composition and decoding of contained values, which burdens the superior system. To simplify the use, conversion of values is made for selected products – see chapters 6 and 7. Supported products are being expanded according to actual needs of our customers.

The gateway can serve up to 40 EnOcean elements and is standardized for frequency 868 MHz. Possible option is also frequency 902 MHz.

The first part of the manual describes the hardware. Chapter 4 describes the Modbus interface and explains how EnOcean devices are mapped to Modbus registers. Chapters 6 and 7 contain the list of supported devices.



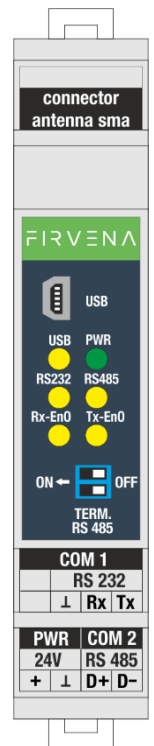
## 1.2 Hardware Overview

Front side of gateway for EnOcean / RS 232, RS 485 Modbus RTU has six LED diodes. Green LED diode marked with the symbol *PWR* is used for indication, if supply voltage is connected. For supply voltage connection, it lights green permanently. Yellow LED diodes indicate communication. Diode marked with USB indicates communication via USB interface. Diode marked with RS 232 indicates communication on the line RS 232. Diode marked with RS 485 indicates communication on the line RS 485 with the protocol MODBUS RTU. Diodes marked with Rx-EnO (receiving) and Tx-EnO (transmitting) are used for communication indication of EnOcean elements.





The gateway has two slide-out connectors. One is intended for DC supply and RS 485 communication and the other for RS 232 communication only. The gateway has also Mini USB connector.

The gateway contains SMA connector for antenna connection.

Double DIP switch is used to balance idle state of the line RS 485 MODBUS RTU. For more information see chapter 3.



## 1.3 Product conformity and certification

|   |   |
|---|---|
|  | <p><b>ROHS Directive</b><br/>The device is manufactured in accordance with the directive 2015/863/EU (RoHS 3) of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.</p> |
|  | <p><b>EMC - Declaration of Conformity</b><br/>The device is compliant with the directive 2014/53/EU.<br/>Approvals tests ČSN EN 55032, ČSN EN 6100-4-2, ČSN EN 6100-4-3, ČSN EN 6100-4-4, ČSN EN 6100-4-5, ČSN EN 6100-4-6, ČSN EN IEC 6100-6-2.</p>                  |
|  | <p><b>UK Conformity Assessed (UKCA)</b><br/>The device is compliant with the British Legislation UK Conformity Assessed (UKCA) and meets all relevant requirements.</p>   |
|  | <p><b>EnOcean Technology</b><br/>The device is fully compatible with the EnOcean radio protocol and as such is certified by the EnOcean Alliance Level 2.</p>   |

## 1.4 Technical data

| Category                    | Parameter                                    | Value   |
|-----------------------------|--|---|
| <b>Electrical data</b>      | rated voltage                                | 24 V DC (recommended value for power supply)                                    |
|                             | range possibility for power supply           | 10 – 25 V DC  |
|                             | own consumption of device                    | 80 mA   |
|                             | power consumption                            | 1.92 W  |
| <b>Communication RS 232</b> | protocol                                     | MODBUS RTU slave  |
|                             | supported functions                          | 3, 6, 16  |
|                             | baudrate                                     | optional from 1.2 kBd to 115.2 kBd  |
|                             | number of bits                               | 8   |
|                             | stopbit                                      | 1, 2  |
|                             | parity                                       | no, even, odd   |
|                             | delay between received and sent message      | basic + optional 0...200ms  |
|                             | adjustable addresses                         | 1...247   |
|                             | max. number of device on the line            | 1   |
|                             | indication                                   | yes, LED yellow colour RS 232   |
| <b>Communication RS 485</b> | protocol                                     | MODBUS RTU slave  |
|                             | supported functions                          | 3, 6, 16  |
|                             | baudrate                                     | optional from 1.2 kBd to 115.2 kBd  |
|                             | number of bits                               | 8   |
|                             | stopbit                                      | 1, 2  |
|                             | parity                                       | no, even, odd   |
|                             | delay between received and sent message      | basic + optional 0...200ms  |
|                             | adjustable addresses                         | 1...32 247  |
|                             | max. number of device on the line            | 32  |
|                             | indication                                   | yes LED yellow colour RS 485  |
| <b>Communication USB</b>    | protocol                                     | MODBUS RTU slave  |
|                             | supported functions                          | 3, 6, 16  |
|                             | baudrate                                     | 115.2 kBd   |
|                             | number of bits                               | 8   |
|                             | stopbit                                      | 1   |
|                             | parity                                       | no  |
|                             | adjustable addresses                         | 1   |
|                             | max. number of device on the line            | 1   |
|                             | indication                                   | yes LED yellow colour USB   |
| <b>EnOcean</b>              | frequency                                    | 868 MHz   |
|                             | maximum number of EnOcean elements per 1 GWY | 40 receiving channels<br>60 transmitting channels<br>20 Smart Ack devices       |
|                             | supported formats of communication           | RAW DATA: RPS, 1BS, 4BS, VLD, MSC<br>Individual EEP support – see chapters 6, 7 |
| <b>Operating conditions</b> | cover  | IP 20   |
|                             | operating temperature                        | -20 ... +70 °C  |
|                             | relative air humidity                        | max. 80 %   |
| <b>Dimensions in mm</b>     | without antenna, width x height x depth      | 17,5 x 56,4 x 102   |
| <b>Weight in g</b>          | without antenna                              | 53  |

## 1.5 Safety information and warnings



Please follow the general safety regulations. This device may only be installed by a qualified person (accredited electrician) and after reading these instructions. Improper installation can result in health, property or equipment damage.

The product meets the general safety regulations. The protection Cover IP 20 allows installation only in normal, dry space.

The gateway must be powered from a safe voltage source that meets the requirements for input voltage range and must be installed in accordance with national and general safety standards.

Follow the safety instructions and applicable standards for the country and location of installation. The product may only be used in accordance with this manual.

To avoid the risk of electrical shock or fire, the maximum operating parameters of the gateway must not be exceeded.

Use only unmodified products.

Only cable types with sufficient cross-section and insulation properties may be used for the connection.

### STORAGE

The device must be stored in a temperature range 0-40 °C and a relative humidity of up to 80 %, and non-condensing spaces. Products must not be exposed shock, harmful vapors or gases.

### REPAIRS

Products are repaired by the manufacturer. Products to be repaired are shipped in a package that ensures shock absorption and protects the products against damage during shipment.

### WARRANTY

The product is warranted 24 months from the date of delivery that is mentioned on the delivery note. The manufacturer only guarantees properties and parameters that are explicitly described in the technical documentation. Claims, complaints and returns must be directed exclusively to the manufacturer. The complaint must contain the exact product identification, delivery note number and defects description. The manufacturer is not responsible for defects caused by improper storage, improper external connection, damages caused by external influences especially due to unacceptable size, incorrect adjustment, improper installation, incorrect operation or normal wear and tear.

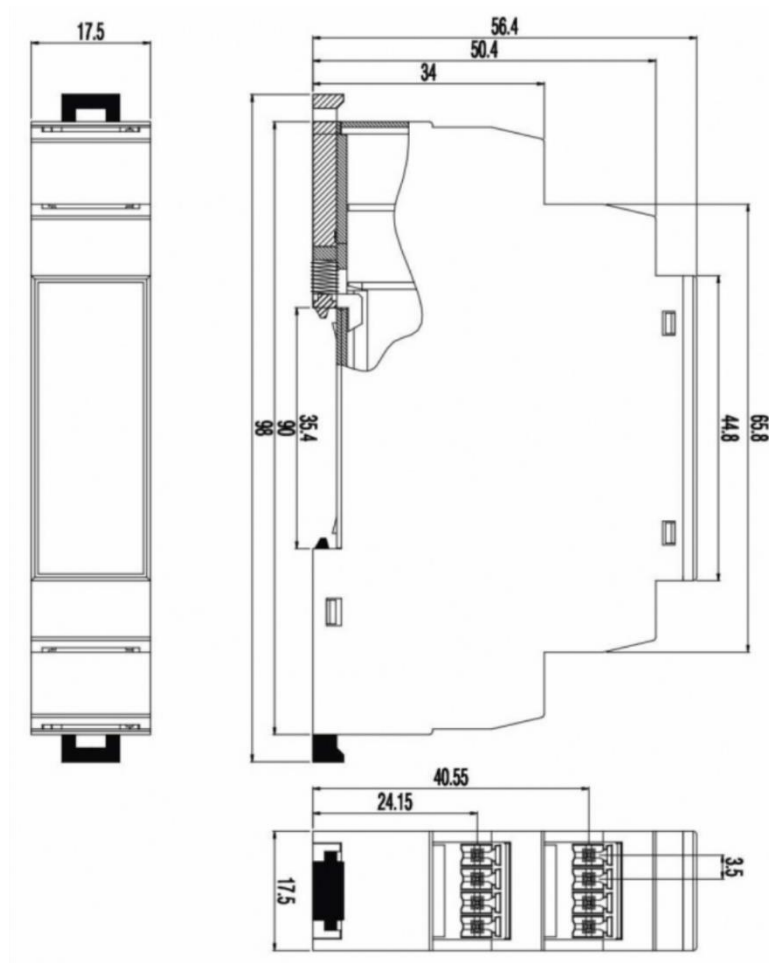
### PRODUCT DISPOSAL



The product does not belong to municipal waste. The product must be disposed to the separate waste collection with the possibility of recycling, according to local regulations and legislation. The product contains electronic components.



### 1.6 Gateway dimensions (in mm)



### 1.7 Package content

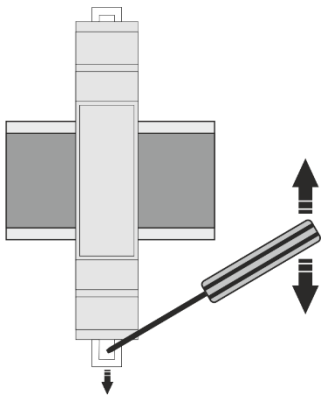
The package contents gateway ENOCEAN-GWY-MOD, external antenna with 2 m long cable and magnetic base, quick installation guide, USB mini cable (number of cables may be reduced with higher gateway supplies).

### 1.8 Firmware upgrade

Please, pay attention to the current firmware version. A new version of firmware is released from time to time due to continuous improvements of the product. Firmware can be upgraded via RS485, RS232 or Mini USB port using the EnOcean Tools application. See the application manual for details or press F1 for help in the application. Download the latest **firmware**, **application EnOcean Tools** and **application manual** at [www.firvena.com](http://www.firvena.com) -> SUPPORT/DOWNLOAD/ENOCEAN-GWY-MOD.

2 DEVICE INSTALLATION

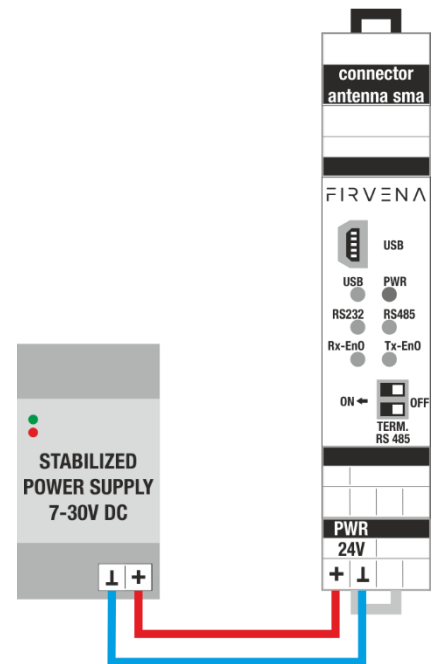
2.1 Installation instructions



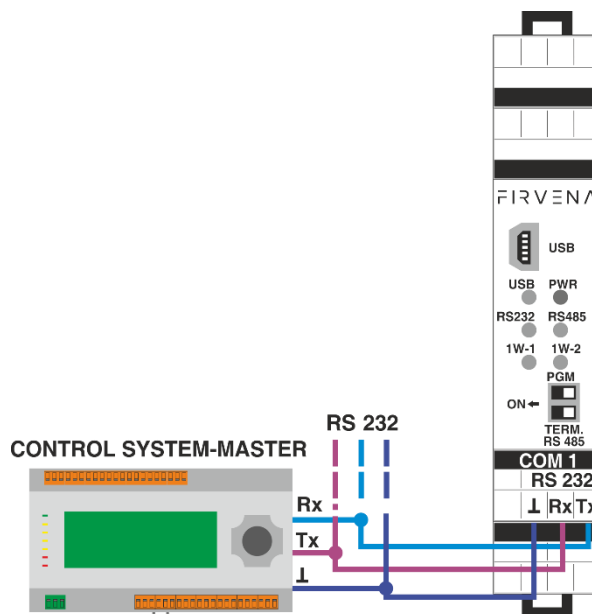
The gateway is most commonly installed into the control cabinet on a DIN rail. The gateway is fixed to the DIN rail by using plastic locks which are located on the top and bottom. See the picture. The gateway is delivered including external antenna with 2 m long cable and magnetic base which is installed outside the control cabinet.

2.2 Electrical installation

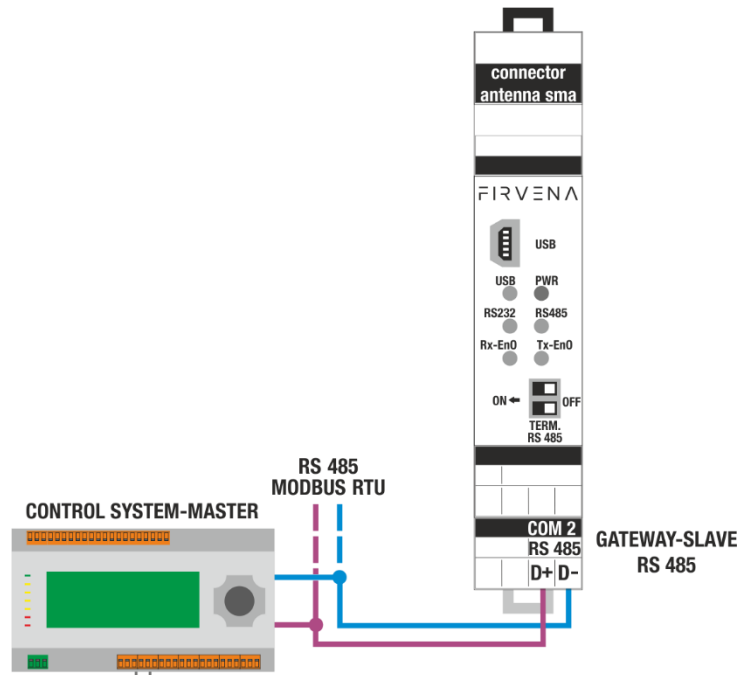
After device installation, wires are connected to terminals. Example for connection of stabilized DC supply voltage:



Example for connection of communication through serial line RS 232:

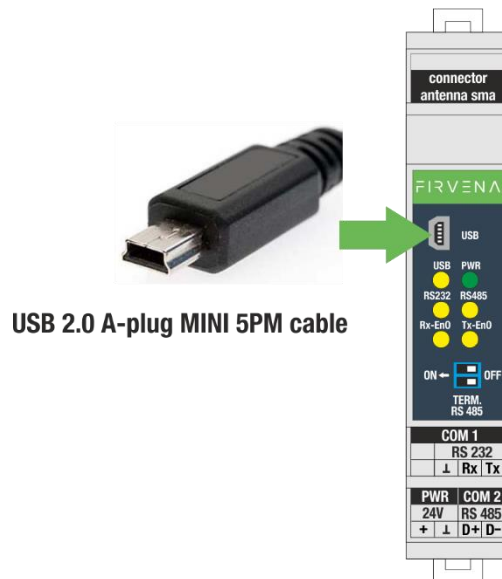


Example for connection of communication through serial line RS 485:



Note: If communication does not run on RS 232, RS 485, we recommend swapping the wires for RS 232 (Rx with Tx) or for RS 485 (D+ with D-) due to different specifications by control system manufacturers.

Example for connection of communication through USB interface:



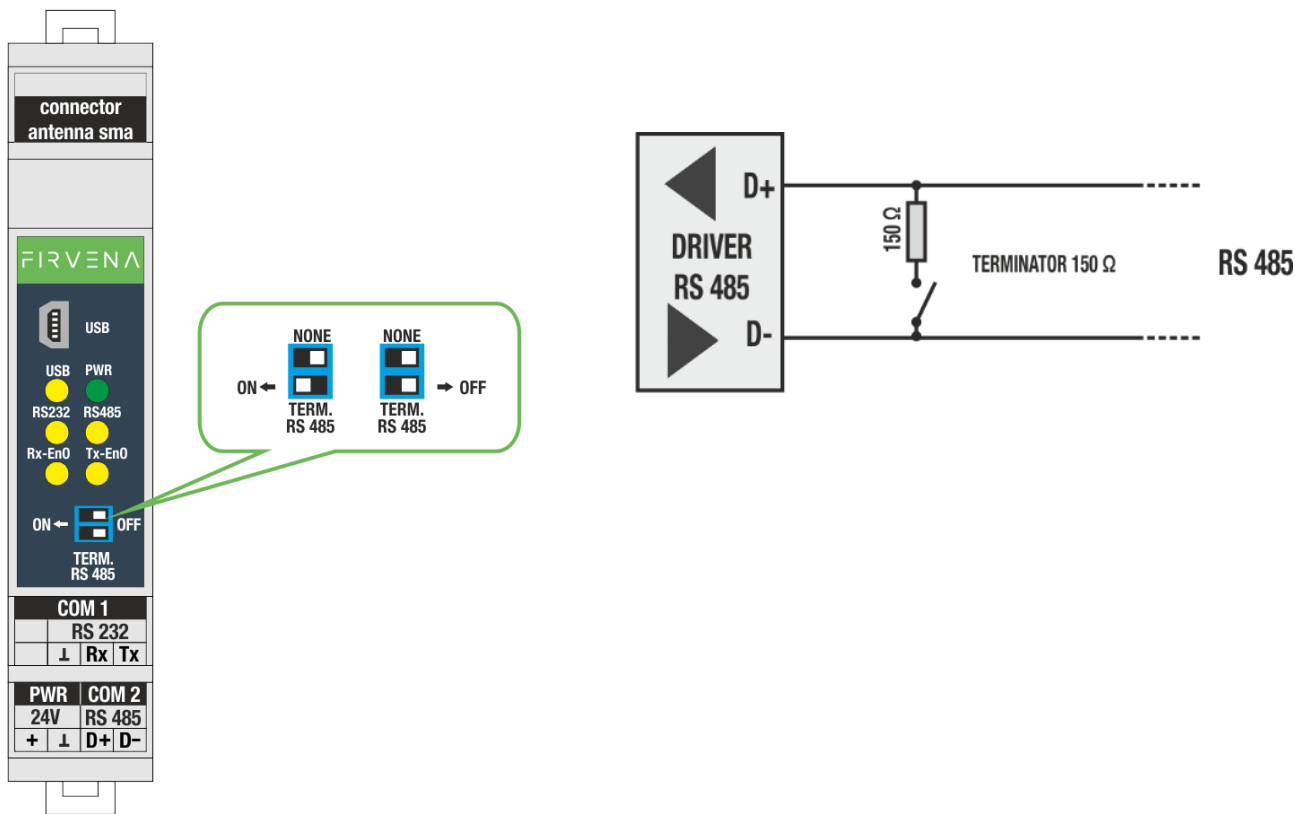
Note: For testing purposes and settings, the gateway can be powered via USB.

3 RS 485 COMMUNICATION SETTINGS

**Balance of idle state of the line RS 485 MODBUS RTU:**

Communication serial line RS 485 MODBUS RTU in idle state, when no device transmits and all devices are to receive, the line is especially sensitive to induced voltage (faults) that may appear as incoming erroneous data.

For this reason, it is important to balance the idle state of the line by connection of appropriate resistors or terminators to one location on the line. It is implemented terminator in the device that is connected to the circuit with double DIP switch. For long lines, we recommend to connect cable shield to GND.



**4 MODBUS RTU COMMUNICATION DESCRIPTION**

Gateway receives data on frequency 868 MHz during its activity. It checks and processes these data. Valid data are saved into prepared registers. These registers are readable by MODBUS RTU protocol.

**4.1 Register map**

The registers are divided into several areas according to their use. All registers can be read by Modbus function 3 or 4. Readonly registers are marked as “R”, writable registers are marked as “R/W”.

| Register map    |             |     |                                    |
|-----------------|-------------|-----|------------------------------------|
| Area            | No          | R/W | Description                        |
| Rx data         | 0           | R   | Device 0                           |
|                 | 10          | R   | Device 1                           |
|                 | 20          | R   | Device 2                           |
|                 | ...         |     |                                    |
|                 | 399         | R   | Device 39                          |
| Rx config       | 400         | R/W | Device 0                           |
|                 | 410         | R/W | Device 1                           |
|                 | 420         | R/W | Device 2                           |
|                 | ...         |     |                                    |
|                 | 799         | R/W | Device 39                          |
|                 | ...         |     |                                    |
| Telegram log    | 900         | R   | The log of received/sent telegrams |
|                 | ...         |     |                                    |
| Service data    | 1000 - 1054 | R/W | Gateway settings and status        |
|                 | ...         |     |                                    |
| Rx raw data     | 2000        | R/W | Device 0                           |
|                 | 2010        | R/W | Device 1                           |
|                 | 2020        | R/W | Device 2                           |
|                 | ...         |     |                                    |
|                 | 2399        | R/W | Device 39                          |
|                 | ...         |     |                                    |
| Rx Pressac data | 3000        | R/W | Device 0                           |
|                 | 3010        | R/W | Device 1                           |
|                 | 3020        | R/W | Device 2                           |
|                 | ...         |     |                                    |
|                 | 3399        | R/W | Device 39                          |
|                 | ...         |     |                                    |
| Tx data         | 5000        | R/W | Device 0                           |
|                 | 5020        | R/W | Device 1                           |
|                 | 5040        | R/W | Device 2                           |
|                 | ...         |     |                                    |
|                 | 6199        | R/W | Device 59                          |
|                 | ...         |     |                                    |
| Rx data 2       | 8000        | R   | Device 0                           |
|                 | 8050        | R   | Device 1                           |
|                 | 8100        | R   | Device 2                           |
|                 | ...         |     |                                    |
|                 | 9999        | R   | Device 39                          |

|                       |       |     |                        |
|-----------------------|-------|-----|------------------------|
| <b>Channel labels</b> | 10000 | R/W | Device Rx 0 (40 chars) |
|                       | 10100 | R/W | Device Rx 1            |
|                       | ...   |     |                        |
|                       | 14000 | R/W | Device Tx 0 (40 chars) |
|                       | ...   |     |                        |
|                       | 19900 | R/W | Device Tx 59           |

### 4.1.1 Register map – Rx data

Each device has 10 registers in which measured and converted values of supported sensors are saved, then there are saved information about signal strength, number of received telegrams, time from the last receiving, and indication of error.

#### Value1...Value6:

These registers contain the data decoded according to the EEP configured in registers RORG, FUNC and TYPE in *Rx config*. These include for example: measured values of temperature, humidity, CO2, state of contact, etc.

#### Signal strength:

The receiver measures signal strength during receiving of messages and it adds this value to the message. Then it is possible to find out how much is the signal from different transmitters damped. This value is dependent on distance, number of barriers, etc. Information about quality of received signal is very useful for change of receiver or transmitters position or for antenna selection.

#### Time from the last receiving:

The gateway counts time from the last received message for each position. It is possible to find out from this information for example, how outdated the temperature data are and if sensor did not stop to transmit. In case of use more receivers that receive the same transmitters, these data are decisive for selection of valid value. The value is in seconds.

| Register map – Rx data |    |     |                              |
|------------------------|----|-----|------------------------------|
|                        | No | R/W | Description                  |
| <b>Device 0</b>        | 0  | R   | Value 1                      |
|                        | 1  | R   | Value 2                      |
|                        | 2  | R   | Value 3                      |
|                        | 3  | R   | Value 4                      |
|                        | 4  | R   | Value 5                      |
|                        | 5  | R   | Value 6                      |
|                        | 6  | R   | Signal strength              |
|                        | 7  | R   | Number of received telegrams |
|                        | 8  | R   | Time from the last receiving |
|                        | 9  | R   | Error                        |
| <b>Device 1</b>        | 10 | R   | Value 1                      |
|                        | 11 | R   | Value 2                      |
|                        | 12 | R   | Value 3                      |
|                        | 13 | R   | Value 4                      |
|                        | 14 | R   | Value 5                      |
|                        | 15 | R   | Value 6                      |
|                        | 16 | R   | Signal strength              |
|                        | 17 | R   | Number of received telegrams |
|                        | 18 | R   | Time from the last receiving |

|           |     |   |                              |
|-----------|-----|---|------------------------------|
|           | 19  | R | Error                        |
|           | ... |   |                              |
| Device 39 | 390 | R | Value 1                      |
|           | 391 | R | Value 2                      |
|           | 392 | R | Value 3                      |
|           | 393 | R | Value 4                      |
|           | 394 | R | Value 5                      |
|           | 395 | R | Value 6                      |
|           | 396 | R | Signal strength              |
|           | 397 | R | Number of received telegrams |
|           | 398 | R | Time from the last receiving |
|           | 399 | R | Error                        |

| Rx data – Error register |  |
|--------------------------|--|
| Value                    | Meaning of value   |
| 0 – OK                   | Telegram OK, data has been stored in Values                                |
| 3 – NOT SUPPORTED        | Unsupported device type, data cannot be converted to Values. <sup>1)</sup> |
| 7 – TIMEOUT              | 120 minutes without a telegram received                                    |
| 255 – FREE               | The channel is not configured, no device assigned                          |

1) The raw data are copied to Values instead, the format is the same as for profiles F6-3F-7F, A5-3F-7F, D2-FF-FF.

### 4.1.2 Register map – Rx config

The *Rx config* table starts at the address 400. Device identification data are stored here. Ten registers are reserved for each device. Registers can be written separately using the F-06 function or in bulk using the F-16 function. F-16 can write multiple records, e.g. 100 registers from address 400 to 499, unused registers have any value.

**ID0 – ID3 (SenderID):** It determines the EnOcean ID of connected device.

**RORG. FUNC, TYPE:** It configures the type of the device (EEP).

**RORG:** It determines format of the EnOcean message (e.g.: RPS, 1BS, 4BS, VLD).

RORG can be set to values: 0xF6, 0xD5, 0xA5, 0xD2, 0xD1.

**FUNC:** It determines function of the device (e.g.: temperature sensor, humidity sensor, gas sensor, light sensor, motion sensor, switching contacts, switches, etc.).

**TYPE:** It determines type of device (e.g.: gas sensor – CO2, temperature sensor – from 0 to +40 °C, from -20 to +60 °C, etc.).

| Register map – Rx config |     |     |             |
|--------------------------|-----|-----|-------------|
|                          | No  | R/W | Description |
| Device 0                 | 400 | R/W | ID0         |
|                          | 401 | R/W | ID1         |
|                          | 402 | R/W | ID2         |
|                          | 403 | R/W | ID3         |
|                          | 404 | R/W | RORG        |
|                          | 405 | R/W | FUNC        |
|                          | 406 | R/W | TYPE        |
|                          | 407 | R/W |             |
|                          | 408 | R/W |             |
|                          | 409 | R/W |             |
| Device 1                 | 410 | R/W | ID0         |
|                          | 411 | R/W | ID1         |
|                          | 412 | R/W | ID2         |
|                          | 413 | R/W | ID3         |
|                          | 414 | R/W | RORG        |
|                          | 415 | R/W | FUNC        |
|                          | 416 | R/W | TYPE        |
|                          | 417 | R/W |             |
|                          | 418 | R/W |             |
|                          | 419 | R/W |             |
|                          | ... |     |             |
| Device 39                | 790 | R/W | ID0         |
|                          | 791 | R/W | ID1         |
|                          | 792 | R/W | ID2         |
|                          | 793 | R/W | ID3         |
|                          | 794 | R/W | RORG        |
|                          | 795 | R/W | FUNC        |
|                          | 796 | R/W | TYPE        |
|                          | 797 | R/W |             |
|                          | 798 | R/W |             |
|                          | 799 | R/W |             |

### 4.1.3 Register map – Telegram log

This table allows to monitor all received or sent telegrams, it consists of several sub-tables of different meanings.

**Rx data queue:** a queue (FIFO memory) containing the last received telegrams, the capacity is 40 telegrams. *Rx data*, *Rx config* and *Rx raw data* registers capture information in the same format as used in the main tables – Ch. 4.1.1, 4.1.2, 4.1.5. The device number (Rx channel number) that the actual record belongs to is indicated by register 900. The next record is shown by reading the register 901.

**Tx data queue:** the queue (FIFO memory) containing the last sent telegrams, the capacity is 40 telegrams. *Tx data* registers capture information in the same format as used in the main tables – Ch. 4.1.7. The Tx channel number is indicated by register 960. Reading the register 961 moves to the next record.

**Rx data iterator:** these registers iterates through the *Rx data* table. It moves with every read of register 949.



**Notes:**

The entire *Telegram log* table can be read with a single query using function 3, thus getting the actual records and moving the queues in a single step.

When using the *Rx data* or *Rx raw data* table, a message may be lost if the time between two consecutive telegrams is shorter than refresh period of the Modbus client. *Rx data queue* ensures that no telegram is lost. It is a FIFO memory (first-in first-out), the oldest telegram is read first.

Using *Telegram log* also allows faster response if it is polled instead of *Rx data* or *Rx raw data* registers. It also allows more precise measurement of telegram timestamps.

| Register map – Telegram log |     |     |  |  |
|-----------------------------|-----|-----|--|--|
|                             | No  | R/W | Description  |  |
| Rx data queue               | 900 | R   | Device number (0-39; 0xFF – queue empty, all new messages are read)        |  |
|                             | 901 | R   | Value 1 (reading this value moves the queue)                               |  |
|                             | 902 | R   | Value 2  |  |
|                             | 903 | R   | Value 3  |  |
|                             | 904 | R   | Value 4  |  |
|                             | 905 | R   | Value 5  |  |
|                             | 906 | R   | Value 6  |  |
|                             | 907 | R   | Signal strength  |  |
|                             | 908 | R   | Number of received telegrams   |  |
|                             | 909 | R   | Time from the last receiving   |  |
|                             | 910 | R   | Error  |  |
|                             | 911 | R   | ID0  |  |
|                             | 912 | R   | ID1  |  |
|                             | 913 | R   | ID2  |  |
|                             | 914 | R   | ID3  |  |
|                             | 915 | R   | RORG   |  |
|                             | 916 | R   | FUNC   |  |
|                             | 917 | R   | TYPE   |  |
|                             | 918 | R   | Number of messages remaining in the queue 0-40                             |  |
|                             | 919 | R   | Time from receiving this message in tens of ms – max. 65000 ms             |  |
|                             | 920 | R   | (1) if the queue overflowed, (0) if not                                    |  |
|                             | 921 | R   | Message serial number  |  |
|                             | ... |     |  |  |
|                             | 930 | R   | Rx raw data 0  |  |
|                             | 931 | R   | Rx raw data 1  |  |
|                             | 932 | R   | Rx raw data 2  |  |
|                             | 933 | R   | Rx raw data 3  |  |
|                             | 934 | R   | Rx raw data 4  |  |
|                             | 935 | R   | Rx raw data 5  |  |
|                             | 936 | R   | Rx raw data 6  |  |
|                             | 937 | R   | Rx raw data 7  |  |
|                             | 938 | R   | Rx raw data 8  |  |
|                             | 939 | R   | Rx raw data 9  |  |
| ...                         |     |     |  |  |
| ...                         |     |     |  |  |
|                             | 945 | R   | Number of channel where the settings have just changed (0xFF – no channel) |  |
|                             | ... |     |  |  |
|                             | ... |     |  |  |

|                  |     |   |   |                                |
|------------------|-----|---|---|--------------------------------|
| Rx data iterator | 949 | R   | Device number (0-39) (reading this value moves the iterator)        | Rx data from registers 0...399 |
|                  | 950 | R   | Value 1   |                                |
|                  | 951 | R   | Value 2   |                                |
|                  | 952 | R   | Value 3   |                                |
|                  | 953 | R   | Value 4   |                                |
|                  | 954 | R   | Value 5   |                                |
|                  | 955 | R   | Value 6   |                                |
|                  | 956 | R   | Signal strength   |                                |
|                  | 957 | R   | Number of received telegrams  |                                |
|                  | 958 | R   | Time from the last receiving  |                                |
|                  | 959 | R   | Error   |                                |
| Tx data queue    | 960 | R   | Device number (0-59; 0xFF – queue empty, all new messages are read) | Tx data                        |
|                  | 961 | R   | Source ID0 (reading this value moves the queue)                     |                                |
|                  | 962 | R   | Source ID1  |                                |
|                  | 963 | R   | Source ID2  |                                |
|                  | 964 | R   | Source ID3  |                                |
|                  | 965 | R   | Dest. ID0   |                                |
|                  | 966 | R   | Dest. ID1   |                                |
|                  | 967 | R   | Dest. ID2   |                                |
|                  | 968 | R   | Dest. ID3   |                                |
|                  | 969 | R   | RORG  |                                |
|                  | 970 | R   | FUNC  |                                |
|                  | 971 | R   | TYPE  |                                |
|                  | 972 | R   | VALUE1  |                                |
|                  | 973 | R   | VALUE2  |                                |
|                  | 974 | R   | VALUE3  |                                |
|                  | 975 | R   | VALUE4  |                                |
|                  | 976 | R   | VALUE5  |                                |
|                  | 977 | R   | VALUE6  |                                |
|                  | 978 | R   | VALUE7  |                                |
|                  | 979 | R   | Learn   |                                |
| 980              | R   | Number of messages remaining in the queue 0-40                    | Tx queue state  |                                |
| 981              | R   | Time from transmitting this message in tens of ms – max. 65000 ms |   |                                |
| 982              | R   | (1) if the queue overflowed, (0) if not                           |   |                                |
| 983              | R   | Message serial number   |   |                                |

#### 4.1.4 Register map – Service data

These registers contain gateway settings, status information and communication statistics. Registers can be written using the function F-06.

| Register map – Service data |      |     |                                      |         |       |       |
|-----------------------------|------|-----|--------------------------------------|---------|-------|-------|
|                             | No   | R/W | Description                          |         |       |       |
|                             |      |     |                                      | Default |       |       |
| Service registers           | 1000 | R   | SW Version (e.g. 115 => V1.15)       |         |       |       |
|                             | 1001 | R/W | MODBUS address 1...247               |         |       | COM2  |
|                             | 1002 | R/W | Baudrate kBd x10 (1152 => 115.2 kBd) |         | RS485 |       |
|                             | 1003 | R/W | MODBUS address 1...247               |         |       | COM1  |
|                             | 1004 | R/W | Baudrate kBd x10 (1152 => 115.2 kBd) |         | RS232 |       |
|                             | 1005 | R/W | Stopbit (1:ONE; 2:TWO)               |         |       | COM2  |
|                             | 1006 | R/W | Parity (0: none, 1:ODD, 2:EVEN)      |         |       | RS485 |
|                             | 1007 | R/W | Stopbit (1:ONE; 2:TWO)               |         |       | COM1  |

|      |     |  |  |            |
|------|-----|--|--|------------|
| 1008 | R/W | Parity (0: none, 1:ODD, 2:EVEN)  | none                                   | RS232      |
| 1009 | R   | HW version   |  |            |
| 1010 | R/W | <b>Command</b> (see table below)   |  |            |
| 1011 | R   | <b>Status</b> (see table below)  |  |            |
| 1012 | R   | ID 0   | New device<br>(Last teach-in telegram) |            |
| 1013 | R   | ID 1   |  |            |
| 1014 | R   | ID 2   |  |            |
| 1015 | R   | ID 3   |  |            |
| 1016 | R   | RORG   |  |            |
| 1017 | R   | FUNC (9999 if not available)   |  |            |
| 1018 | R   | TYPE (9999 if not available)   |  |            |
| 1019 | R   | Manufacturer ID (9999 if not available)  |  |            |
| 1020 | R   | Signal strength  |  |            |
| 1021 | R   | Telegram counter 0-65000 (65534:no data; 0:ID changed – new device, after reading this 0, value 1 is set)              |  |            |
| 1022 |     |  |  |            |
| 1023 |     |  |  |            |
| 1024 | R   | Transceiver ID0  | EnOcean transceiver                    |            |
| 1025 | R   | Transceiver ID1  |  |            |
| 1026 | R   | Transceiver ID2  |  |            |
| 1027 | R   | Transceiver ID3  |  |            |
| 1028 | R   | Transceiver APP version  |  |            |
| 1029 | R   | Transceiver API version  |  |            |
| 1030 | R   | Number of received messages  | PORT RS485                             |            |
| 1031 | R   | Number of sent messages  |  |            |
| 1032 | R   | Number of error messages   |  |            |
| 1040 | R   | Number of received messages  | PORT RS232                             |            |
| 1041 | R   | Number of sent messages  |  |            |
| 1042 | R   | Number of error messages   |  |            |
| 1050 | R   | Number of received messages  | PORT USB                               |            |
| 1051 | R   | Number of sent messages  |  |            |
| 1052 | R   | Number of error messages   |  |            |
| 1053 | R/W | Added delay between request and response<br>0-200 ms   | 0 ms                                   | PORT RS485 |
| 1054 | R/W | Added delay between r request and response<br>0-200 ms   | 0 ms                                   | PORT RS232 |
| 1060 | R/W | Repeater<br>0:OFF (default);<br>1:LEVEL1 (only original telegrams);<br>2:LEVEL2 (original and once repeated telegrams) |  |            |
| 1065 | R/W | Turns off MODBUS CRC check, for debug only (1:CRC ON (default); 0:CRC OFF)   |  |            |

### Register map – Service data – Address 1010 – COMMAND

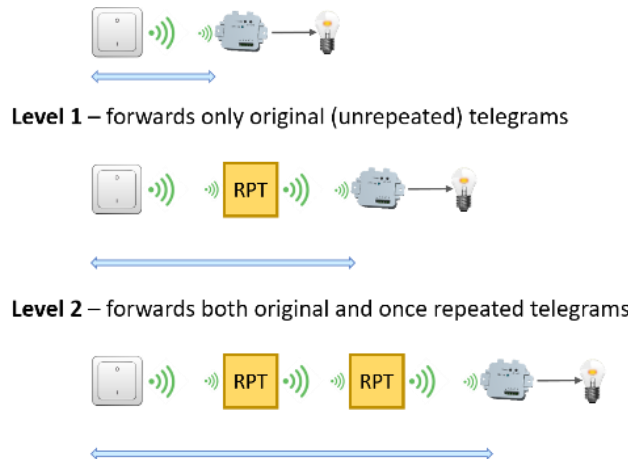
| Value  | Meaning of value  |
|--------|---|
| 0x0Fxx | Delete Device in <i>Rx config</i> (0x0F00 – position 0, 0x0F01, ... 0x0F27 – position 39)   |
| 0x1Fxx | Delete Device in <i>Tx data</i> (0x1F00 – position 0 ... 0x1F3B – position 59)  |
| 0x09xx | Save new device to <i>Rx config</i> (0x0900 – position 0, 0x0901, ... 0x0927 – position 39)<br>Last received teach-in data (address 1012) will be saved to the position in <i>Rx config</i> . |
| 0x11AA | Software reset of the gateway   |

| Register map – Service data – Address 1011 – Status |  |                     |
|---|--|---------------------|
| Value   | Meaning of value   |                     |
| 0x1100  | Start – without reprogramming                                    |                     |
| 0x1101  | Start – reprogramming failed (CRC does not match or other error) |                     |
| 0x1102  | Start – new program is the same as the current one               |                     |
| 0x1103  | Start – reprogramming successful                                 |                     |
| 0xFFFF  | Command was executed successfully                                |                     |
| 0xEEE1  | Error – Unknown position   |                     |
| 0xEEE2  | Error – Unknown command  |                     |
|   |  | Startup code        |
|   |  | Command result code |

**EnOcean REPEATER**

The repeater mode is changed by register 1060. If repeater is enabled, it forwards received telegrams in the EnOcean network, which can extend the signal range of surrounding devices. This can be used when there are two EnOcean devices that talk directly with each other and the gateway lies between them. The main function of the gateway is not affected by the repeater function.

Level 2 repeating should only be activated after careful study of the radio conditions. Otherwise, the function of the system may be compromised by collisions of telegrams.



**4.1.5 Register map – Rx raw data**

These registers contain the payload bytes as received in the last telegram from the assigned device. The EnOcean ID of the device is also included. Ten registers are reserved for each device. The length of the data varies depending on the telegram type, which is identified by the RORG byte.

VLD and MSC telegrams have variable data length up to 14 bytes for unaddressed telegrams (broadcast) and 9 for addressed telegrams. The information about their length is not provided here, the unused bytes are zero.

In most cases, it is not necessary to use these registers and *Value* registers in *Rx data* should be used instead.

Example 4BS: EEP A5-02-05, ID 05-87-21-D2, temperature 22 °C

Example RPS: EEP F6-02-01, ID FE-E3-18-CE, button B-I pressed

Example VLD: EEP D2-01-0B, ID 05-01-7F-50, CMD 4 – turned on 100 %

| Register map – Rx raw data |      |     |                            |         |
|----------------------------|------|-----|----------------------------|---------|
|                            | No   | R/W | Description                | Example |
| Device 0 (4BS)             | 2000 | R   | ID 0                       | 0xD2    |
|                            | 2001 | R   | ID 1                       | 0x21    |
|                            | 2002 | R   | ID 2                       | 0x87    |
|                            | 2003 | R   | ID 3                       | 0x05    |
|                            | 2004 | R   | RORG = 0xA5                | 0xA5    |
|                            | 2005 | R   | DB 0                       | 0x08    |
|                            | 2006 | R   | DB 1                       | 0x73    |
|                            | 2007 | R   | DB 2                       | 0x00    |
|                            | 2008 | R   | DB 3                       | 0x00    |
|                            | 2009 | R   | Status byte                | 0x00    |
| Device 1 (RPS, 1BS)        | 2010 | R   | ID 0                       | 0xCE    |
|                            | 2011 | R   | ID 1                       | 0x18    |
|                            | 2012 | R   | ID 2                       | 0xE3    |
|                            | 2013 | R   | ID 3                       | 0xFE    |
|                            | 2014 | R   | RORG = 0xF6 or 0xD5        | 0xF6    |
|                            | 2015 | R   | DB 0                       | 0x50    |
|                            | 2016 | R   |                            |         |
|                            | 2017 | R   |                            |         |
|                            | 2018 | R   |                            |         |
|                            | 2019 | R   | Status byte                | 0x30    |
|                            | ...  |     |                            |         |
| Device 39 (VLD, MSC)       | 2390 | R   | Hi byte ID 1; Lo Byte ID 0 | 0x7F50  |
|                            | 2391 | R   | Hi byte ID 3; Lo Byte ID 2 | 0x0501  |
|                            | 2392 | R   | RORG = 0xD2 or 0xD1        | 0xD2    |
|                            | 2393 | R   | Hi DB1; Lo DB0             | 0x60E4  |
|                            | 2394 | R   | Hi DB3; Lo DB2             | 0x0004  |
|                            | 2395 | R   | Hi DB5; Lo DB4             | 0x0000  |
|                            | 2396 | R   | Hi DB7; Lo DB6             | 0x0000  |
|                            | 2397 | R   | Hi DB9; Lo DB8             | 0x0000  |
|                            | 2398 | R   | Hi DB11; Lo DB10           | 0x0000  |
|                            | 2399 | R   | Hi DB13; Lo DB12           | 0x0000  |

#### 4.1.6 Register map – Rx Pressac data

Customer solution for the company Pressac Communications Ltd. It is used to monitor electric current with A.C. Current Clamps (EEP D2-32-00, 01, 02). Kept for legacy applications, use *Rx data* for new applications.

| Register map – Rx Pressac data |      |     |  |  |
|--------------------------------|------|-----|--|--|
|                                | No   | R/W | Description  |  |
| Device 0                       | 3000 | R   | ID 3 Hi , ID2 Lo                                   |  |
|                                | 3001 | R   | ID 1 Hi , ID0 Lo                                   |  |
|                                | 3002 | R   | Telegram type (0,1,2)                              |  |
|                                | 3003 | R   | Power fail (1,0)                                   |  |
|                                | 3004 | R   | Divisor (1,0)                                      |  |
|                                | 3005 | R   | 0 (reserved)                                       |  |
|                                | 3006 | R   | Value 1 (Type 0, Type 1, Type 2)                   |  |
|                                | 3007 | R   | Value 2 (Type 1, Type 2) (0xFFFF for Type 0)       |  |
|                                | 3008 | R   | Value 3 (Type 2) (0xFFFF for Type 0, Type1)        |  |
|                                | 3009 | R   | Reserved (0xFFFF for Type 0, Type1) (0 for Type 2) |  |

|           |      |   |  |
|-----------|------|---|--|
| Device 1  | 3010 | R | ID 3 Hi , ID2 Lo                                   |
|           | 3011 | R | ID 1 Hi , ID0 Lo                                   |
|           | 3012 | R | Telegram type (0,1,2)                              |
|           | 3013 | R | Power fail (1,0)                                   |
|           | 3014 | R | Divisor (1,0)                                      |
|           | 3015 | R | 0 (reserved)                                       |
|           | 3016 | R | Value 1 (Type 0, Type 1, Type 2)                   |
|           | 3017 | R | Value 2 (Type 1, Type 2) (0xFFFF for Type 0)       |
|           | 3018 | R | Value 3 (Type 2) (0xFFFF for Type 0, Type1)        |
|           | 3019 | R | Reserved (0xFFFF for Type 0, Type1) (0 for Type 2) |
|           | ...  |   |  |
| Device 39 | 3390 | R | ID 3 Hi , ID2 Lo                                   |
|           | 3391 | R | ID 1 Hi , ID0 Lo                                   |
|           | 3392 | R | Telegram type (0,1,2)                              |
|           | 3393 | R | Power fail (1,0)                                   |
|           | 3394 | R | Divisor (1,0)                                      |
|           | 3395 | R | 0 (reserved)                                       |
|           | 3396 | R | Value 1 (Type 0, Type 1, Type 2)                   |
|           | 3397 | R | Value 2 (Type 1, Type 2) (0xFFFF for Type 0)       |
|           | 3398 | R | Value 3 (Type 2) (0xFFFF for Type 0, Type1)        |
|           | 3399 | R | Reserved (0xFFFF for Type 0, Type1) (0 for Type 2) |

#### 4.1.7 Register map – Tx data

Registers starting from address 5000 are used for telegram transmission. There are 60 transmitting channels, each channel has 20 registers where telegram data is prepared and sent. Registers can be written separately using the F-06 function or in bulk using the F-16 function. F-16 can write multiple records. Transmit commands are written by F-06 to *Send option* register, F-16 can write only *Send option* = 0 or 3.

**SenderID:** ID of this device, it means gateway. Possible values are:

- EURID of the gateway (registers 1024...1027), write 00-00-00-00 to use EURID.
- One of the 127 IDs derived from Base ID, write ID from range FF-FF-FF-01...7F.  
*Example: Base ID is FF-90-E9-00, written SenderID value FF-FF-FF-1A, the channel will use ID = Base ID + 1A = FF-90-E9-1A.*  
*In the current version the base ID is fixed FF-FF-FF-00 and cannot be changed.*

EURID is unique, BaseID is not. Base ID enables device simulation, because the gateway can transmit under different IDs.

**DestinationID:** ID of the target device, e.g. controlled relay switch.

- Addressed communication: set the ID of the target EnOcean device. In bidirectional communication, it is the same as ID of the assigned device in Rx channels.
- Unaddressed communication (Broadcast): use 00-00-00-00 or FF-FF-FF-FF, both sends FF-FF-FF-FF.

**EEP:** It configures the type of the device (EEP).

**Values1...Values7:** these registers contain the data to be encoded according to the EEP configured in registers RORG, FUNC and TYPE.

**Learn button:** when ticked and RORG is A5 or D5, the channel will send a teach-in telegram.

**Send option:** this register is used to control sending of the telegram. The option 4 – *UTE response once* enables UTE teach-in mode for the channel.

| Register map – Tx data |      |  |                 |
|------------------------|------|--|-----------------|
|                        | No   | R/W  | Description     |
| Device 0               | 5000 | R/W  | Sender ID0      |
|                        | 5001 | R/W  | Sender ID1      |
|                        | 5002 | R/W  | Sender ID2      |
|                        | 5003 | R/W  | Sender ID3      |
|                        | 5004 | R/W  | Destination ID0 |
|                        | 5005 | R/W  | Destination ID1 |
|                        | 5006 | R/W  | Destination ID2 |
|                        | 5007 | R/W  | Destination ID3 |
|                        | 5008 | R/W  | RORG            |
|                        | 5009 | R/W  | FUNC            |
|                        | 5010 | R/W  | TYPE            |
|                        | 5011 | R/W  | VALUE1          |
|                        | 5012 | R/W  | VALUE2          |
|                        | 5013 | R/W  | VALUE3          |
|                        | 5014 | R/W  | VALUE4          |
|                        | 5015 | R/W  | VALUE5          |
|                        | 5016 | R/W  | VALUE6          |
|                        | 5017 | R/W  | VALUE7          |
|                        | 5018 | R/W  | Learn button    |
| 5019                   | W    | Send option<br>1 – Send now<br>2 – Response on received once (Destination ID must be set)<br>3 – Response on received always (Destination ID must be set) <sup>1)</sup><br>4 – UTE response once<br>101 – Send this now and next after 100ms <sup>2)</sup><br>102 – Send this now and next after 150ms<br>103 – Send this now and next after 200ms<br>104 – Send this now and next after 250ms<br>105 – Send this now and next after 300ms<br>106 – Send this now and next after 350ms<br>107 – Send this now and next after 400ms<br>108 – Send this now and next after 450ms<br>109 – Send this now and next after 500ms<br>110 – Send this now and next after 550ms<br>111 – Send this now and next after 600ms |                 |
| Device 1               | 5020 | R/W  | Sender ID0      |
|                        | 5021 | R/W  | Sender ID1      |
|                        | 5022 | R/W  | Sender ID2      |
|                        | 5023 | R/W  | Sender ID3      |
|                        | 5024 | R/W  | Destination ID0 |
|                        | 5025 | R/W  | Destination ID1 |
|                        | 5026 | R/W  | Destination ID2 |
|                        | 5027 | R/W  | Destination ID3 |
|                        | 5028 | R/W  | RORG            |
|                        | 5029 | R/W  | FUNC            |
|                        | 5030 | R/W  | TYPE            |
|                        | 5031 | R/W  | VALUE1          |
|                        | 5032 | R/W  | VALUE2          |
|                        | 5033 | R/W  | VALUE3          |
|                        | 5034 | R/W  | VALUE4          |

|                  |      |     |              |
|------------------|------|-----|--------------|
|                  | 5035 | R/W | VALUE5       |
|                  | 5036 | R/W | VALUE6       |
|                  | 5037 | R/W | VALUE7       |
|                  | 5038 | R/W | Learn button |
|                  | 5039 | W   | Send option  |
|                  | ...  |     |              |
| <b>Device 59</b> | 6180 | R/W | Sender ID0   |
|                  | ...  |     |              |
|                  | 6199 | W   | Send option  |

- 1) Automatic response used for heating valves A5-20-01, A5-20-06. Destination ID is the ID of the valve.
- 2) These options are used to simulate RPS communication. Two adjacent channels are sent, e.g. This TxCh1 ->delay 300 ms -> Next TxCh2.

### 4.1.8 Register map – Channel labels

These registers serve to store short descriptions of channels. The total number of labels is 100, 40 for Rx channels and 60 for Tx channels. 100 registers are reserved for each channel in the range of 10000...19999. Registers can only be written using function F-16. The whole text must be written. The text length is derived from the position of the null character or from the number of registers in the F-16 request. The maximum length is 40 characters.

| Register map – Channel labels |       |     |                             |                             |
|-------------------------------|-------|-----|-----------------------------|-----------------------------|
|                               | No    | R/W | Description                 | Example                     |
| <b>Device Rx 0</b>            | 10000 | R   | Index                       | 0                           |
|                               | 10001 | R   | Length of the text (0...40) | 12                          |
|                               | 10002 | R/W | Text[0]                     | „T“ (First ascii char 0x54) |
|                               | 10003 | R/W | Text[1]                     | „e“ (0x65)                  |
|                               | ...   | R/W |                             | „mperatu“                   |
|                               | 10011 | R/W | Text[9]                     | „r“ (0x72)                  |
|                               | 10012 | R/W | Text[10]                    | „e“ (0x65)                  |
|                               | 10013 | R/W | Text[11]                    | „1“ (0x31)                  |
|                               | ...   | R/W | 0                           |                             |
|                               | 10099 | R   | 0                           |                             |
| <b>Device Rx 1</b>            | 10100 | R   | Index                       | 1                           |
|                               | 10101 | R   | Length of the text (0...40) | 12                          |
|                               | 10102 | R/W | Text[0]                     | „T“ (First ascii char 0x54) |
|                               | 10103 | R/W | Text[1]                     | „e“ (0x65)                  |
|                               | ...   | R/W |                             | „mperatu“                   |
|                               | 10111 | R/W | Text[9]                     | „r“ (0x72)                  |
|                               | 10112 | R/W | Text[10]                    | „e“ (0x65)                  |
|                               | 10113 | R/W | Text[11]                    | „2“ (0x32)                  |
|                               | ...   | R/W | 0                           |                             |
|                               | 10199 | R   | 0                           |                             |
|                               | ...   |     |                             |                             |
| <b>Device Rx 39</b>           | 13900 | R   | Index                       | 39                          |
| <b>Device Tx 0</b>            | 14000 | R   | Index                       | 40                          |
|                               | ...   |     |                             |                             |
| <b>Device Tx 59</b>           | 19900 | R   | Index                       | 99                          |
|                               | ...   | R/W |                             |                             |
|                               | 19999 | R   |                             |                             |



4.1.9 Register map – Rx data 2

There can be devices with more than six values, for example, D2-14-5C has 9 values. The values in *Rx data* are truncated for such devices because there are only six value registers in *Rx data*. The full array of values can be read here. Each device has 50 registers in which measured and converted values of supported sensors are saved.

| Register map – Rx data 2 |      |       |                              |            |
|--------------------------|------|-------|------------------------------|------------|
|                          | No   | R/W   | Description                  |            |
| Device 0                 | 8000 | R     | Value 1                      |            |
|                          | 8001 | R     | Value 2                      |            |
|                          | 8002 | R     | Value 3                      |            |
|                          | ...  | R     |                              |            |
|                          | 8019 | R     | Value 20                     |            |
|                          | ...  | R     |                              |            |
|                          | 8040 | R     | bits [15:8]                  | Sender ID3 |
|                          |      |       | bits [8:0]                   | Sender ID2 |
|                          | 8041 | R     | bits [15:8]                  | Sender ID1 |
|                          |      |       | bits [8:0]                   | Sender ID0 |
|                          | 8042 | R     | 0                            |            |
|                          | 8043 | R     | 0                            |            |
|                          | 8044 | R     | Signal strength              |            |
|                          | 8045 | R     | Number of received telegrams |            |
|                          | 8046 | R     | Time from the last receiving |            |
|                          | 8047 | R     | 0                            |            |
| 8048                     | R    | 0     |                              |            |
| 8049                     | R    | Error |                              |            |
| Device 1                 | 8050 | R     | Value 1                      |            |
|                          | ...  | R     |                              |            |
|                          | 8096 | R     | Time from the last receiving |            |
|                          | 8097 | R     | 0                            |            |
|                          | 8098 | R     | 0                            |            |
| 8099                     | R    | Error |                              |            |
|                          | ...  |       |                              |            |
| Device 39                | 9950 | R     | Value 1                      |            |
|                          | ...  | R     |                              |            |
|                          | 9996 | R     | Time from the last receiving |            |
|                          | 9997 | R     | 0                            |            |
|                          | 9998 | R     | 0                            |            |
|                          | 9999 | R     | Error                        |            |

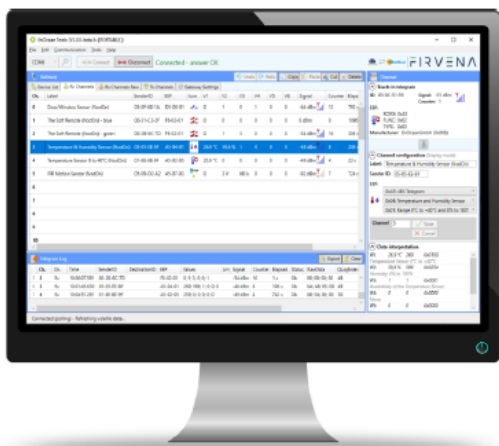
## 4.2 Supported functions

According to the application layer specification, a client can read a maximum of 125 registers and write a maximum of 123 registers in a single request.

Inside the defined areas, the server allows reading any register, it returns zeros for unused registers. Outside these areas, all requests returns zero too.

| Code      | Name                     | Description   |
|-----------|--------------------------|---|
| 3 (0x03)  | Read Holding Registers   | Reads a continuous block of registers starting at a given address. Zero values are returned for unused registers. |
| 6 (0x06)  | Write Single Register    | Writes any writable register.   |
| 16 (0x10) | Write Multiple Registers | Writes a block of writable registers, behavior may differ depending on the area.                                  |

## 5 SOFTWARE TOOL ENOCEAN TOOLS



The tool is prepared for simple administration of all elements serviced with gateway through you can connect or disconnect EnOcean elements to and from gateway, monitor their states, values, communication intervals and signal strength. Another useful function is the possibility to control EnOcean elements from the gateway side. When there are installed more gateways, the tool enables to monitor and compare on which gateway each element has better signal and to assign the element with better signal to its gateway. You can assign the elements on position with use of ID number manually or automatically. The type of communication (RS 232, RS 485, USB) and baud rate can be set with this software.

The baud rate for USB is fixed at 115.2 kBd.

Download the latest EnOcean Tools application and user manual at [www.firvena.com](http://www.firvena.com) -> SUPPORT/DOWNLOAD/ENOCEAN-GWY-MOD.

## 6 SUPPORTED EEPs FOR RECEIVING DATA

Following tables list supported device types (EEP) for receiving data. The support includes decoding of data points from received raw data bytes and writing them to registers *Value1...Value6* in *Rx data* and *Value1...Value20* in *Rx data 2*. The gateway can also handle the bidirectional communication of heating valves (A5-20-01, A5-20-06) – automatic response. If the EEP lacks a description of the values, then the order and meaning of values is the same as in the EEP specification.

For unsupported EEPs, raw data is displayed in *Value* registers. The format is described in universal profiles F6-3F-7F, D5-3F-7F, A5-3F-7F, D2-FF-FF and D1-FF-FF. Universal profiles can also be set for any device manually.

Sometimes we encounter devices using more than one EEP (different RORGs) concurrently, with the same or different Sender ID. The solution is to use one channel for each EEP. The telegram is only received if its RORG equals to the RORG of the Rx channel.

6.1 Supported RPS telegrams

| F6-01-xx Push button |           |  |
|----------------------|-----------|--|
| EEP                  | Registers | Description  |
| F6-01-01             | Value1    | Actual button state (0:released; 1:pressed)                          |
|                      | Value2    | Previous button state  |
|                      | Value3    | Before previous button state   |
|                      | Value4    | reserved   |
|                      | Value5    | Energy bow (0: released; 1: pressed < 500 ms; 2: pressed > 500 ms)   |
|                      | Value6    | Number of incoming telegrams from the last Modbus read of V1 (0...3) |

| F6-02-xx Rocker switch, 2 Rocker |           |  |
|----------------------------------|-----------|--|
| EEP                              | Registers | Description  |
| F6-02-01<br>F6-02-02<br>F6-02-04 | Value1    | Actual button code (0...4)<br>0: Button released<br>1: Button A-I<br>2: Button A-0<br>3: Button B-I<br>4: Button B-0   |
|                                  | Value2    | Previous button code   |
|                                  | Value3    | Before previous button code  |
|                                  | Value4    | Second action valid (0/1)  |
|                                  | Value5    | Energy bow (0: released; 1: pressed < 500 ms; 2: pressed > 500 ms)   |
|                                  | Value6    | Number of incoming telegrams from the last Modbus read of V1 (0...3)   |
| F6-02-03                         | Value1    | Actual button code<br>0x30: Button A-0: Set the controller in automatic mode<br>0x10: Button A-I: Set the controller in manually mode and toggles between switch light on and switch light off<br>0x70: Button B-0: Dim light up<br>0x50: Button B-I: Dim light down |
|                                  | Value2    | Previous button code   |
|                                  | Value3    | Before previous button code  |
|                                  | Value4    | 2Before previous button code   |
|                                  | Value5    | Energy bow (0: released; 1: pressed < 500 ms; 2: pressed > 500 ms)   |
|                                  | Value6    | Number of incoming telegrams from the last Modbus read of V1 (0...4)   |

| F6-03-xx Rocker switch, 4 Rocker |           |  |
|----------------------------------|-----------|--|
| EEP                              | Registers | Description  |
| F6-03-01<br>F6-03-02             | Value1    | Actual button code (0...4)<br>0: Button released<br>1: Button A-I<br>2: Button A-0<br>3: Button B-I<br>4: Button B-0<br>5: Button C-I<br>6: Button C-0<br>7: Button D-I<br>8: Button D-0 |
|                                  | Value2    | Previous button code   |
|                                  | Value3    | 2Before previous button code   |
|                                  | Value4    | Second action valid (0/1)  |
|                                  | Value5    | Energy bow (0: released; 1: pressed < 500 ms; 2: pressed > 500 ms)   |
|                                  | Value6    | Number of incoming telegrams from the last Modbus read of V1 (0...3)   |

| F6-04-xx Card switch |           |                                       |
|----------------------|-----------|---------------------------------------|
| EEP                  | Registers | Description                           |
| F6-04-01<br>F6-04-02 | Value1    | Card state<br>(0:removed; 1:inserted) |
|                      | Value2    | Last value                            |
|                      | Value3-6  | 0                                     |

| F6-05-xx Detectors   |           |                                   |
|----------------------|-----------|-----------------------------------|
| EEP                  | Registers | Description                       |
| F6-05-00<br>F6-05-02 | Value1    | Alarm Triggered (0:false; 1:true) |
|                      | Value2    | Battery Low (0:false; 1:true)     |
| F6-05-01             | Value1    | Water Alert (0:false; 1:true)     |

| F6-10-xx Window handle |           |  |
|------------------------|-----------|--|
| EEP                    | Registers | Description                              |
| F6-10-00<br>F6-10-01   | Value1    | Handle Position (0:Closed; 1:Open; 2:Up) |
|                        | Value2    | DB0                                      |

| F6-3F-7F Universal |           |                   |
|--------------------|-----------|-------------------|
| EEP                | Registers | Description       |
| F6-3F-7F           | Value1    | DB0: DataBytes[0] |
|                    | Value2    | Status byte       |

## 6.2 Supported 1BS telegrams

| D5-00-xx Door/Window contact |           |   |
|------------------------------|-----------|---|
| EEP                          | Registers | Description   |
| D5-00-01                     | Value1    | Actual Contact State (0:open; 1:closed)                                   |
|                              | Value2    | Last contact state  |
|                              | Value3    | Before last contact state   |
|                              | Value4    | 2Before last contact state  |
|                              | Value5    | 3Before last contact state  |
|                              | Value6    | Number of incoming messages from the last reading of the value 1 (max. 5) |

| D5-3F-7F Universal |           |                   |
|--------------------|-----------|-------------------|
| EEP                | Registers | Description       |
| D5-3F-7F           | Value1    | DB0: DataBytes[0] |

## 6.3 Supported 4BS telegrams

| A5-02-xx Temperature sensors |           |                                  |
|------------------------------|-----------|----------------------------------|
| EEP                          | Registers | Description                      |
| A5-02-01                     | Value1    | Temperature -40 ... 0 °C (x10)   |
| A5-02-02                     | Value1    | Temperature -30 ... +10 °C (x10) |
| A5-02-03                     | Value1    | Temperature -20 ... +20 °C (x10) |

|          |        |                                    |
|----------|--------|------------------------------------|
| A5-02-04 | Value1 | Temperature -10 ... +30 °C (x10)   |
| A5-02-05 | Value1 | Temperature 0 ... +40 °C (x10)     |
| A5-02-06 | Value1 | Temperature +10 ...+50 °C (x10)    |
| A5-02-07 | Value1 | Temperature +20 ... +60 °C (x10)   |
| A5-02-08 | Value1 | Temperature +30 ... +70 °C (x10)   |
| A5-02-09 | Value1 | Temperature +40 ... +80 °C (x10)   |
| A5-02-0A | Value1 | Temperature +50 ... +90 °C (x10)   |
| A5-02-0B | Value1 | Temperature +60 ... +100 °C (x10)  |
| A5-02-10 | Value1 | Temperature -60 ... +20 °C (x10)   |
| A5-02-11 | Value1 | Temperature -50 ... +30 °C (x10)   |
| A5-02-12 | Value1 | Temperature -40 ... +40 °C (x10)   |
| A5-02-13 | Value1 | Temperature -30 ... +50 °C (x10)   |
| A5-02-14 | Value1 | Temperature -20 ... +60 °C (x10)   |
| A5-02-15 | Value1 | Temperature -10 ... +70 °C (x10)   |
| A5-02-16 | Value1 | Temperature 0 ... +80 °C (x10)     |
| A5-02-17 | Value1 | Temperature +10 ... +90 °C (x10)   |
| A5-02-18 | Value1 | Temperature +20 ... +100 °C (x10)  |
| A5-02-19 | Value1 | Temperature +30 ... +110 °C (x10)  |
| A5-02-1A | Value1 | Temperature +40 ... +120 °C (x10)  |
| A5-02-1B | Value1 | Temperature +50 ... +130 °C (x10)  |
| A5-02-20 | Value1 | Temperature -10 ... +41,2 °C (x10) |
| A5-02-30 | Value1 | Temperature -40 ... +62,3 °C (x10) |

### A5-04-xx Temperature and humidity sensors

| EEP      | Registers | Description   |
|----------|-----------|---|
| A5-04-01 | Value1    | Temperature 0 ... +40 °C (x10)                      |
|          | Value2    | Relative humidity 0 ... 100 % (x10)                 |
|          | Value3    | Temperature sensor: 1 - available 0 - not available |
| A5-04-02 | Value1    | Temperature -20 ... +60 °C (x10)                    |
|          | Value2    | Relative humidity 0 ... 100 % (x10)                 |
|          | Value3    | Temperature sensor: 1 - available 0 - not available |
| A5-04-03 | Value1    | Temperature -20 ... +60 °C (x10) - resolution 10bit |
|          | Value2    | Relative humidity 0 ... 100 % (x10)                 |
|          | Value3    | Telegram type: 1 – Event triggered 0 - heartbeat    |

### A5-05-xx Pressure sensors

| EEP      | Registers | Description   |
|----------|-----------|---|
| A5-05-01 | Value1    | Pressure 500 ... 1150 hPa                           |
|          | Value2    | Telegram type:<br>1 – Event triggered 0 - heartbeat |
|          | Value3    | Temperature sensor: 1 - available 0 - not available |

### A5-06-xx Light sensors

| EEP      | Registers | Description                                   |
|----------|-----------|---|
| A5-06-01 | Value1    | Supply voltage 0... 5.1 V (x100)              |
|          | Value2    | Illumination 300-60000lx (/10) value 300-6000 |
|          | Value3    | Range   |
| A5-06-02 | Value1    | Supply voltage 0... 5.1V (x100)               |
|          | Value2    | Illumination 0-1020lx                         |
|          | Value3    | Range   |

|          |        |   |
|----------|--------|---|
| A5-06-03 | Value1 | Supply voltage 0... 5.1 V (x100)          |
|          | Value2 | Illumination 0-1000lx                     |
| A5-06-04 | Value1 | Temperature -20°C ... 60°C                |
|          | Value2 | Illumination 0-65535lx (/10) value 0-6553 |
|          | Value3 | Energy storage 0...100%                   |
|          | Value4 | Valid temperature data 0 ... 1            |
|          | Value5 | Valid storage data 0 ... 1                |
| A5-06-05 | Value1 | Supply voltage 0...5.1 V (x100)           |
|          | Value2 | Illumination 0-10200lx                    |
|          | Value3 | Range                                     |

### A5-07-xx PIR sensors

| EEP      | Registers | Description  |
|----------|-----------|--|
| A5-07-01 | Value1    | 0 - PIR off ... 1 – PIR on   |
|          | Value2    | Supply voltage 0... 5.0V (x10)   |
|          | Value3    | Supply voltage availability:<br>0 – Supply voltage is not supported 1- Supply voltage is supported |
| A5-07-02 | Value1    | 0 – Uncertain of occupancy status ... 1 – Motion detect  |
|          | Value2    | Supply voltage 0... 5.0 V (x10)  |
| A5-07-03 | Value1    | 0 - PIR off ... 1 – PIR on   |
|          | Value2    | Supply voltage 0... 5.0 V (x10)  |
|          | Value3    | Illumination 0...1000 lx   |

### A5-08-xx Light, temperature and PIR sensors

| EEP      | Registers | Description                             |
|----------|-----------|---|
| A5-08-01 | Value1    | 0 - PIR off ... 1 – PIR on              |
|          | Value2    | Supply voltage 0... 5.1 V (x10)         |
|          | Value3    | Button occupancy 1 – preset 0- released |
|          | Value4    | Illumination 0 ... 510 lx               |
|          | Value5    | Temperature 0 ... 51 °C (x10)           |
| A5-08-02 | Value1    | 0 - PIR off ... 1 – PIR on              |
|          | Value2    | Supply voltage 0... 5.1 V (x10)         |
|          | Value3    | Button occupancy 1 – preset 0- released |
|          | Value4    | Illumination 0 ... 1020 lx              |
|          | Value5    | Temperature 0 ... 51 °C (x10)           |
| A5-08-03 | Value1    | 0 - PIR off ... 1 – PIR on              |
|          | Value2    | Supply voltage 0... 5.1 V (x10)         |
|          | Value3    | Button occupancy 1 – preset 0- released |
|          | Value4    | Illumination 0 ... 1530 lx              |
|          | Value5    | Temperature -30 ... 50 °C (x10)         |

### A5-09-xx Environmental sensors VOC, CO, CO<sub>2</sub>, dust, radon

| EEP      | Registers | Description   |
|----------|-----------|---|
| A5-09-02 | Value1    | CO conc. 0...1020ppm  |
|          | Value2    | Supply voltage 0... 5.1 V (x10)                                   |
|          | Value3    | Temperature 1...51°C (x10)  |
|          | Value6    | 0 - Temper. Sensor not available 1 – Temperature sensor available |
| A5-09-04 | Value1    | CO <sub>2</sub> conc. 0...2550ppm increment = 10ppm               |
|          | Value2    | Relative Humidity 0...100% (x10) res. 0,5%                        |
|          | Value3    | Temperature 1...51°C (x10)  |

|          |        |   |                     |                                 |
|----------|--------|---|---------------------|---------------------------------|
|          | Value4 | 0   |                     |                                 |
|          | Value5 | 0 - Humidity Sensor not available 1 – Humidity sensor available   |                     |                                 |
|          | Value6 | 0 - Temper. Sensor not available 1 – Temperature sensor available |                     |                                 |
| A5-09-05 | Value1 | VOC con. 0 ...65535 ppb   |                     |                                 |
|          | Value2 | VOC ID  |                     |                                 |
|          |        | 0: VOCT (total)   | 10: Methanol        | 20: Ammoniac                    |
|          |        | 1: Formaldehyde   | 11: Ethanol         | 22: Hydrogen Sulfide            |
|          |        | 2: Benzene  | 12: 1 – Pentanol    | 23: Dimethylsulfide             |
|          |        | 3: Styrene  | 13: Acetone         | 24: 2 – Butanol (butyl Alcohol) |
|          |        | 4: Toluene  | 14: ethylene Oxide  | 25: 2 – Methylpropanol          |
|          |        | 5: Tetrachloroethylene  | 15: Acetaldehyde ue | 26: Diethyl ether               |
|          |        | 6: Xylene   | 16: Acetic Acid     | 27: VOC-Index                   |
|          |        | 7: n-Hexane   | 17: Propionice Acid | 255: ozone                      |
|          |        | 8: n-Octane   | 18: Valeric Acid    |                                 |
|          |        | 9: Cyclopentane   | 19: Butyric Acid    |                                 |
|          | Value3 | Scale Multiplier  | 2: 1                |                                 |
|          |        | 0: 0.01   | 3: 10               |                                 |
|          |        | 1: 0.1  |                     |                                 |
| A5-09-06 | Value1 | Radon activity 0 ...1023 Bq/m <sup>3</sup>                        |                     |                                 |
| A5-09-07 | Value1 | Dust less than 10 µm (PM10) 0...511 0...511 µg/m <sup>3</sup>     |                     |                                 |
|          | Value2 | Dust less than 2.5 µm (PM2.5) 0...511 0...511 µg/m <sup>3</sup>   |                     |                                 |
|          | Value3 | Dust less than 1 µm (PM1) 0...511 0...511 µg/m <sup>3</sup>       |                     |                                 |
|          | Value4 | 0: PM10 not active 1: PM10 active                                 |                     |                                 |
|          | Value5 | 0: PM2.5 not active 1: PM2.5 active                               |                     |                                 |
|          | Value6 | 0: PM1 not active 1: PM1 active                                   |                     |                                 |
| A5-09-08 | Value1 | CO <sub>2</sub> 0 – 2000 ppm (Pure sensor)                        |                     |                                 |
| A5-09-09 | Value1 | CO <sub>2</sub> 0 – 2000 ppm (Pure sensor)                        |                     |                                 |
|          | Value2 | Power failure detection (0/1)                                     |                     |                                 |
| A5-09-0A | Value1 | Hydrogen conc. 0...65535 ppm                                      |                     |                                 |
|          | Value2 | Temperature -20...60 °C (x10)                                     |                     |                                 |
|          | Value3 | Supply Voltage 2...5 V (x10)                                      |                     |                                 |
|          | Value4 | Temperature available (0/1)                                       |                     |                                 |
|          | Value5 | Supply voltage available (0/1)                                    |                     |                                 |
| A5-09-0B | Value1 | Radioactivity 0...65535   |                     |                                 |
|          | Value2 | Multiplier  |                     |                                 |
|          | Value3 | Supply Voltage 2...5 V (x10)                                      |                     |                                 |
|          | Value4 | Unit  |                     |                                 |
|          | Value5 | Supply voltage available (0/1)                                    |                     |                                 |
| A5-09-0C | Value1 | VOC Concentration 0...65535                                       |                     |                                 |
|          | Value2 | VOC Type  |                     |                                 |
|          | Value3 | Multiplier  |                     |                                 |
|          | Value4 | Unit  |                     |                                 |

### A5-10-xx Room Operating Panel

| EEP      | Registers | Description  |
|----------|-----------|--|
| A5-10-01 | Value1    | Actual temperature 0...+40°C (x10)   |
|          | Value2    | Setpoint 0-255   |
|          | Value3    | Button occupancy 1 – preset 0- released  |
|          | Value4    | Turn-switch for fan speed Enum:<br>210...255: Stage Auto<br>190...209: Stage 0<br>165...189: Stage 1<br>145...164: Stage 2 |

|          |        |   |   |
|----------|--------|---|---|
|          |        |   | 0...144: Stage 3  |
|          | Value5 | Stage 0,1,2,3, (255=AUTO)   |   |
|          | Value6 | Reserved  |   |
| A5-10-02 | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | Slide switch or Slide switch Day/Night 1 – day(sw1) 0- night(sw0) |   |
|          | Value4 | Turn-switch for fan speed Enum                                    | 210...255: Stage Auto<br>190...209: Stage 0<br>165...189: Stage 1<br>145...164: Stage 2<br>0...144: Stage 3 |
|          | Value5 | Stage 0,1,2,3, (255=AUTO)   |   |
|          | Value6 | reserved  |   |
| A5-10-03 | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | reserved  |   |
|          | Value4 | reserved  |   |
|          | Value5 | reserved  |   |
|          | Value6 | reserved  |   |
| A5-10-04 | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | reserved  |   |
|          | Value4 | Turn-switch for fan speed Enum                                    | 210...255: Stage Auto<br>190...209: Stage 0<br>165...189: Stage 1<br>145...164: Stage 2<br>0...144: Stage 3 |
|          | Value5 | Stage 0,1,2,3, (255=AUTO)   |   |
|          | Value6 | reserved  |   |
| A5-10-05 | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | Button occupancy 1 – preset 0- released                           |   |
|          | Value4 | reserved  |   |
|          | Value5 | reserved  |   |
|          | Value6 | reserved  |   |
| A5-10-06 | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | slide switch or Slide switch Day/Night                            | 0: Position I / Night /Off<br>1: Position O / Day /On   |
|          | Value4 | reserved  |   |
|          | Value5 | reserved  |   |
|          | Value6 | reserved  |   |
| A5-10-07 | Value1 | Actual tempetature 0...+40°C (x10)                                |   |
|          | Value2 | reserved  |   |
|          | Value3 | reserved  |   |
|          | Value4 | Turn-switch for fan speed Enum:                                   | 210...255: Stage Auto<br>190...209: Stage 0<br>165...189: Stage 1<br>145...164: Stage 2<br>0...144: Stage 3 |
|          | Value5 | Stage 0,1,2,3, (255=AUTO)   |   |
|          | Value6 | Reserved  |   |
| A5-10-08 | Value1 | Actual tempetature 0...+40°C (x10)                                |   |



|          |        |   |   |
|----------|--------|---|---|
|          | Value2 | Reserved  |   |
|          | Value3 | Button occupancy 1 – preset 0- released                           |   |
|          | Value4 | Turn-switch for fan speed Enum                                    | 210...255: Stage Auto<br>190...209: Stage 0<br>165...189: Stage 1<br>145...164: Stage 2<br>0...144: Stage 3 |
|          | Value5 | Stage 0,1,2,3, (255=AUTO)   |   |
|          | Value6 | reserved  |   |
| A5-10-09 | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | reserved  |   |
|          | Value3 | Slide switch or Slide switch Day/Night 1 – day(sw1) 0- night(sw0) |   |
|          | Value4 | Turn-switch for fan speed Enum                                    | 210...255: Stage Auto<br>190...209: Stage 0<br>165...189: Stage 1<br>145...164: Stage 2<br>0...144: Stage 3 |
|          | Value5 | Stage 0,1,2,3, (255=AUTO)   |   |
|          | Value6 | reserved  |   |
| A5-10-0A | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | Contact state 0 – Close; 1- Open                                  |   |
|          | Value4 | Reserved  |   |
|          | Value5 | Reserved  |   |
|          | Value6 | Reserved  |   |
| A5-10-0B | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Reserve   |   |
|          | Value3 | Button occupancy 1 – preset 0- released                           |   |
|          | Value4 | reserved  |   |
|          | Value5 | reserved  |   |
|          | Value6 | reserved  |   |
| A5-10-0C | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | slide switch or Slide switch Day/Night                            | 0: Position I / Night /Off<br>1: Position O / Day /On   |
|          | Value4 | reserved  |   |
|          | Value5 | reserved  |   |
|          | Value6 | reserved  |   |
| A5-10-0D | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | reserved  |   |
|          | Value3 | slide switch or Slide switch Day/Night                            | 0: Position I / Night /Off<br>1: Position O / Day /On   |
| A5-10-10 | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | Button occupancy 1 – preset 0- released                           |   |
|          | Value4 | Humidity 0...100%   |   |
|          | Value5 | Reserved  |   |
|          | Value6 | Reserved  |   |
| A5-10-11 | Value1 | Actual temperature 0...+40°C (x10)                                |   |
|          | Value2 | Setpoint 0-255  |   |
|          | Value3 | Slide switch or Slide switch Day/Night 1 – day(sw1) 0- night(sw0) |   |
|          | Value4 | Humidity 0...100%   |   |
|          | Value5 | Reserved  |   |

|                             |        |  |
|-----------------------------|--------|--|
|                             | Value6 | Reserved   |
| A5-10-12                    | Value1 | Actual temperature 0...+40°C (x10)                 |
|                             | Value2 | Setpoint 0-255                                     |
|                             | Value3 | Reserved   |
|                             | Value4 | Humidity 0...100%                                  |
|                             | Value5 | Reserved   |
|                             | Value6 | Reserved   |
| A5-10-13                    | Value1 | Actual temperature 0...+40°C (x10)                 |
|                             | Value2 | Reserved   |
|                             | Value3 | Button occupancy 1 – preset 0- released            |
|                             | Value4 | Humidity 0...100%                                  |
|                             | Value5 | Reserved   |
|                             | Value6 | Reserved   |
| A5-10-14                    | Value1 | Actual temperature 0...+40°C (x10)                 |
|                             | Value2 | Reserved   |
|                             | Value3 | Button occupancy 1 – preset 0- released            |
|                             | Value4 | Humidity 0...100%                                  |
|                             | Value5 | Reserved   |
|                             | Value6 | Reserved   |
| A5-10-20                    | Value1 | Actual temperature 0...+40°C (x10)                 |
|                             | Value2 | Setpoint 0...255                                   |
|                             | Value3 | Heating mode 0, 1, 2, 3 Reserved                   |
|                             | Value4 | Battery change needed 1: battery low 0 :battery ok |
|                             | Value5 | Reserved   |
|                             | Value6 | Reserved   |
| A5-10-15<br>...<br>A5-10-23 |        |  |

### A5-11-xx Controller status

A5-11-01

### A5-12-xx Automated meter reading

A5-12-00 ... A5-12-04, A5-12-10

### A5-13-xx Environmental applications

A5-13-01 ... A5-13-04

### A5-14-xx Multi-func sensor

A5-14-01 ... A5-14-0A

### A5-30-xx Digital input

| EEP   | Registers | Description                |
|---|-----------|----------------------------|
| A5-30-01  | Value1    | Contact (0:open; 1:closed) |
|   | Value2    | Battery low (0:ok; 1:low)  |
| A5-30-02 ... A5-30-06 Value order and meaning same as EEP definitions.<br>Temperature is (x10), Supply voltage (x100) |           |                            |

| A5-20-xx Actuators |  |   |  |
|--------------------|--|---|--|
| EEP                | Registers  | Description   |  |
| A5-20-01           | Value1   | Actuator position 0...100 %   |  |
|                    | Value2   | Actual temperature from actuator 0...+40°C (x10)  |  |
|                    | Value3   | 1-Service on  |  |
|                    | Value4   | 1-Detection Window open   |  |
|                    | Value5   | 1 Energy input enabled (MVA004 Active energy harvesting (valve is hot))<br>10 Energy storage (MVA004 - Energy storage sufficiently filled)  |  |
|                    | Value6   | 1 Failure temperature sensor<br>10 Actuator obstructed (MVA004 motor failure)<br>100 Cover open<br>1000 Batery – change battery next day<br>1111 + Batery – change battery next day + Cover open + Actuator obstructed + Failure temperature sensor |  |
| A5-20-04           | Value1   | Actuator position 0...100 %   |  |
|                    | Value2   | Room Temperature 10...30 °C   |  |
|                    | Value3   | Feed Temperature 20 .. 80°C   |  |
|                    | Value4   | Temperature Set Point 10 .. 30°C  |  |
|                    | Value5   | Status byte<br>0000 ... 1111  | Failure Code<br>Button Lock Status<br>Measurement Status<br>Status Request |
| Value6             | Failure Code 0...255<br>0...16: Reserved<br>17: Measurement error<br>18: Battery empty<br>19: Reserved<br>20: Frost protection<br>21 ...32: Reserved<br>33: Blocked valve<br>34 ...35: Reserved<br>36: End point detection error | 37 ...39: Reserved<br>40: No valve<br>41 ...48: Reserved<br>49: Not taught in<br>50 ... 52: Reserved<br>53: No response from controller<br>54: Teach-in error<br>55 ... 255: Reserved   |  |

| A5-20-06 Harvesting-powered Actuator with Local Setpoint Control   |  |   |
|--|--|---|
| DIRECTION-1: Data received from actuator   |  |   |
| Registers  | Description  |   |
| Value1   | Actual Position 0...100 %  |   |
| Value2   | Local Offset (absolute) 0...40 °C (x10)<br>Local Offset (relative) -5...5 °C (x10) | 1)  |
| Value3   | Temperature (ambient) 0...40 °C (x10)  | 2)  |
| Value4   | Temperature (feed) 0...80 °C (x10)   |   |
| Value5   | Reserved   |   |
| Value6   | Flags (single-bit values occurring in EEP telegram)                                |   |
| <b>Flags (16 bits)</b>   |  | 3)  |
| 8 bits [15:8]  | Reserved   |   |
| bit7 (MSB)   | Local Offset Mode  | 0:Relative; 1:Absolute                    |
| bit6   | Temperature Selection  | 0:Ambient; 1:Feed                         |
| bit5   | Harvesting Status  | 0:Not harvesting; 1:Harvesting active     |
| bit4   | Charge Level   | 0:Low; 1:Sufficient                       |
| bit3   | Window Open  | 0:False; 1:True                           |
| bit2   | Radio Error  | 0:False; 1:True (>= 6 consecutive errors) |
| bit1   | Signal Strength  | 0:Strong; 1:Weak                          |
| bit0 (LSB)   | Actuator Obstructed  | 0:False; 1:True                           |
| <b>Note</b>  |  |   |
| 1) The meaning of Value2 is defined by <b>Local Offset Mode</b> (Value6.bit7).   |  |   |
| 2) <b>Temperature Selection</b> (Value6.bit6) defines if Value3 or 4 was updated by the last telegram, the second value stays unchanged. |  |   |
| 3) Bits are numbered from LSB to MSB, e.g. Flags = 128 (0x80) => bit7 = 1 (Local Offset Mode = 1:Absolute)                               |  |   |

| A5-3F-7F Universal |           |                  |
|--------------------|-----------|------------------|
| EEP                | Registers | Description      |
| A5-3F-7F           | Value1    | DB3: DataByte[0] |
|                    | Value2    | DB2: DataByte[1] |
|                    | Value3    | DB1: DataByte[2] |
|                    | Value4    | DB0: DataByte[3] |

6.4 Supported VLD telegrams

| D2-01-XX Actuators, Dimmers |               |   |
|-----------------------------|---------------|---|
| EEP                         | Registers     | Description   |
| <i>CMD = 0x01</i>           | <b>Value1</b> | <b>CMD = 1 Actuator Set Output</b>  |
|                             | Value 2       | Output value:<br>0: Output value 0% or OFF<br>1...100: Output value 1% to 100% or ON<br>101...126: Not used<br>127: Output value not valid / not applicable   |
|                             | Value3        | Dim value:<br>0: Switch to new output value<br>1: Dim to new output value – dim timer 1<br>2: Dim to new output value – dim timer 2<br>3: Dim to new output value – dim timer 3<br>4: Stop dimming<br>5...7: not used |
|                             | Value4        | I/O channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Input channel (from mains supply)   |
| <i>CMD = 0x04</i>           | <b>Value1</b> | <b>CMD = 4 Actuator Status Response</b>   |
|                             | Value2        | Output value:<br>0: Output value 0% or OFF<br>1...100: Output value 1% to 100% or ON<br>101...126: Not used<br>127: Output value not valid / not applicable   |
|                             | Value3        | I/O channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Input channel (from mains supply)   |
|                             | Value4        | 0: Local control disabled / not supported<br>1: Local control enabled   |
|                             | Value5        | 100 Power Failure Detection enabled<br>10 Power Failure Detected<br>1 Over current switch off: executed   |
|                             | Value6        | Error level<br>0: Error level 0: hardware OK<br>1: Error level 1: hardware warning<br>2: Error level 2: hardware failure<br>3: Error level not supported  |
| <i>CMD = 0x07</i>           | <b>Value1</b> | <b>CMD = 7 Actuator Measurement Response</b>  |
|                             | Value2        | Value – low 16 bytes  |
|                             | Value3        | Value – high 16 bytes   |
|                             | Value4        | I/O channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Input channel (from mains supply)   |
|                             | Value5        | Unit<br>0: Energy [Ws]<br>1: Energy [Wh]<br>2: Energy [KWh]<br>3: Power [W]   |

|                   |                |  |                 |                |        |              |            |              |        |  |
|-------------------|----------------|--|-----------------|----------------|--------|--------------|------------|--------------|--------|--|
|                   |                | 4: Power [KW]<br>5... 7: Not used  |                 |                |        |              |            |              |        |  |
| <b>CMD = 0x0A</b> | <b>Value1</b>  | <b>CMD = 10 Actuator Pilot Wire Mode Response</b>  |                 |                |        |              |            |              |        |  |
|                   | Value2         | <table border="1"> <tr> <td>Pilot wire mode</td> <td>3: Anti-freeze</td> </tr> <tr> <td>0: Off</td> <td>4: Comfort-1</td> </tr> <tr> <td>1: Comfort</td> <td>5: Comfort-2</td> </tr> <tr> <td>2: Eco</td> <td></td> </tr> </table> | Pilot wire mode | 3: Anti-freeze | 0: Off | 4: Comfort-1 | 1: Comfort | 5: Comfort-2 | 2: Eco |  |
| Pilot wire mode   | 3: Anti-freeze |  |                 |                |        |              |            |              |        |  |
| 0: Off            | 4: Comfort-1   |  |                 |                |        |              |            |              |        |  |
| 1: Comfort        | 5: Comfort-2   |  |                 |                |        |              |            |              |        |  |
| 2: Eco            |                |  |                 |                |        |              |            |              |        |  |
| <b>CMD = 0x0D</b> | <b>Value1</b>  | <b>CMD = 13 Actuator External Interface Settings Response</b>  |                 |                |        |              |            |              |        |  |
|                   | Value2         | I/O channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Input channel (from mains supply)  |                 |                |        |              |            |              |        |  |
|                   | Value3         | Auto OFF Timer   |                 |                |        |              |            |              |        |  |
|                   | Value4         | Delay OFF Timer  |                 |                |        |              |            |              |        |  |
|                   | Value5         | External Switch/Push Button  |                 |                |        |              |            |              |        |  |
|                   | Value6         | 2-State Switch   |                 |                |        |              |            |              |        |  |

| D2-03-XX        |                        |  |               |               |                 |                        |                 |  |
|-----------------|------------------------|--|---------------|---------------|-----------------|------------------------|-----------------|--|
| EEP             | Registers              | Description  |               |               |                 |                        |                 |  |
| D2-03-00        | Value1                 | Actual button code (0...4)<br>0: Button released<br>1: Button A-I<br>2: Button A-0<br>3: Button B-I<br>4: Button B-0   |               |               |                 |                        |                 |  |
|                 | Value2                 | Previous button code   |               |               |                 |                        |                 |  |
|                 | Value3                 | Before previous button code  |               |               |                 |                        |                 |  |
|                 | Value4                 | Second action valid (0/1)  |               |               |                 |                        |                 |  |
|                 | Value5                 | Energy bow (0: released; 1: pressed < 500 ms; 2: pressed > 500 ms)   |               |               |                 |                        |                 |  |
|                 | Value6                 | Number of incoming telegrams from the last Modbus read of V1 (0...3)   |               |               |                 |                        |                 |  |
| D2-03-0A        | Value1                 | <table border="1"> <tr> <td>Button Action</td> <td>3: long press</td> </tr> <tr> <td>1: simple press</td> <td>4: long press released</td> </tr> <tr> <td>2: double press</td> <td></td> </tr> </table> | Button Action | 3: long press | 1: simple press | 4: long press released | 2: double press |  |
| Button Action   | 3: long press          |  |               |               |                 |                        |                 |  |
| 1: simple press | 4: long press released |  |               |               |                 |                        |                 |  |
| 2: double press |                        |  |               |               |                 |                        |                 |  |
|                 | Value2                 | Battery Autonomy 0 ... 100%  |               |               |                 |                        |                 |  |
| D2-03-10        | Value1                 | Handle Position (0:Closed; 1:Open; 2:Up)   |               |               |                 |                        |                 |  |

| D2-05-XX Blinds Control for Position and Angle |               |   |
|--|---------------|---|
| EEP  | Registers     | Description   |
| D2-05-00                                       |               |   |
| <b>CMD = 0x04</b>                              | <b>Value1</b> | <b>CMD index = 4 Reply Position and Angle</b>   |
|  | Value2        | Channel address Channel 1   |
|  | Value3        | Current vertical position<br>0...100: 0...100 %<br>127: Position unknown, will be known after the next goto cmd |
|  | Value4        | Current rotation angle<br>0...100: 0...100 %<br>127: Angle unknown, will be known after the next goto cmd       |
|  | Value5        | Current locking mode  |

|  |        |  |
|--|--------|--|
|  |        | 0: Normal (no lock)<br>1: Blockage mode<br>2: Alarm mode<br>3 ... 7:Reserved |
|  | Value6 | 0  |

**Note**

- 1) The same mapping is valid for D2-05-00, D2-05-01, D2-05-02 and D2-05-03.
- 2) D2-05-03 partial support, only CMD1 to 4.

| D2-07-XX Door Locks |                   |  |                               |
|---------------------|-------------------|--|-------------------------------|
| EEP                 | Registers         | Description                              |                               |
| D2-07-00            | Value1            | Bolt State (0:non-blocking; 1:blocking)  |                               |
|                     | Value2            | Catch State (0:non-blocking; 1:blocking) |                               |
| D2-07-01            | Value1            | Lock Number                              |                               |
|                     | Value2            | 3 bits [15:13]                           | Lock State                    |
|                     |                   | 1 bit [12]                               | DND State                     |
|                     |                   | 4 bits [11:8]                            | Event Type                    |
|                     |                   | 4 bits [7:4]                             | Key Type                      |
| 4 bits [3:0]        | Type of actuation |  |                               |
|                     | Value3            | 1 bit [15]                               | Alarm State                   |
|                     |                   | 7 bits [14:8]                            | Reason for rejection          |
|                     |                   | 8 bits [7:0]                             | Actuation Identifier (AID B6) |
|                     | Value4            | Actuation Identifier (AID B5B4)          |                               |
|                     | Value5            | Actuation Identifier (AID B3B2)          |                               |
|                     | Value6            | Actuation Identifier (AID B1B0)          |                               |

| D2-11-XX Bidirectional Room Operating Panel |           |   |               |   |
|---|-----------|---|---------------|---|
| MSG ID 2: Data from panel                   |           |   |               |   |
| EEP   | Registers | Description   |               |   |
| D2-11-01                                    | Value1    | Temperature 0...40 °C (x10)                             |               |   |
|   | Value2    | Setpoint offset 0...255                                 |               |   |
| ...<br>D2-11-08                             | Value3    | Humidity  |               |   |
|   | Value4    | Fan speed   |               |   |
|   | Value5    | Occupancy   |               |   |
|   | Value6    | 1 bit [14]  | Setpoint type | 1 |
|   |           | 2 bits [13:12]  | Telegram type | 2 |
| 4 bits [11:8]                               |           | Valid temperature correction (scale of Setpoint offset) | 3             |   |
| 8 bits [7:0]                                |           | Setpoint base 15...30 °C                                | 21 (0x15)     |   |
|   |           |   | 0x6315        |   |

**Note**

- 1) The presence of Humidity, Fan speed and Occupancy values depends on the individual EEP.
- 2) MSG ID 0 is ignored
- 3) Interpretation of Value2 depends on the other values, see EEP specification.

| D2-14-40 Multisensor: Temperature, Humidity, XYZ Acceleration, Illumination                 |                               |
|---|-------------------------------|
| D2-14-41 Multisensor: Temperature, Humidity, XYZ Acceleration, Illumination, Window Contact |                               |
| Registers   | Description                   |
| Value1  | Temperature -40...60 °C (x10) |
| Value2  | Humidity 0...100 % (x10)      |
| Value3  | Illumination 0...65535 lx     |
| Value4  | Contact (0: Open, 1: Closed)  |

|  |   |
|--|---|
| Value5   | Accelerometer data (HI)   |
| Value6   | Accelerometer data (LO)   |
| <b>Accelerometer data (32 bits)</b>  |   |
| 2 bits [31:30]   | Telegram type (0: Periodic, 1: Threshold 1 exceeded, 2: Threshold 2 exceeded) |
| 10 bits [29:20]  | Acceleration X 0...1000   |
| 10 bits [19:10]  | Acceleration Y 0...1000   |
| 10 bits [9:0]  | Acceleration Z 0...1000   |
| <b>Note</b>  |   |
| 4) Value4 is valid for D2-14-41 only.  |   |
| 5) Value5 and 6 contains compressed accelerometer data as it is transferred in the telegram.<br>Acceleration conversion (0...1000 -> -2500...2500 mG): $g = raw * 5 - 2500$ [mG] |   |
| 6) Encryption is not supported   |   |

| D2-14-XX Multisensor |           |                                 |
|----------------------|-----------|---------------------------------|
| EEP                  | Registers | Description                     |
| D2-14-5C             | V1...V9   | Full values in <i>Rx data 2</i> |
| D2-14-5D             | V1...V4   |                                 |

| D2-32-XX Current sensors |           |   |
|--------------------------|-----------|---|
| EEP                      | Registers | Description   |
| D2-32-00                 | Value1    | Input 1 0 ... 4095 0 ... 409,5 A (without battery current sensor - clamp) |
|                          | Value2    | 0   |
|                          | Value3    | 0   |
|                          | Value4    | 0   |
|                          | Value5    | 0 ...1 Divisor  |
|                          | Value6    | 0 ... 1 Power Fail  |
| D2-32-01                 | Value1    | Input 1 0 ... 4095 0 ... 409,5 A (without battery current sensor - clamp) |
|                          | Value2    | Input 2 0 ... 4095 0 ... 409,5 A (without battery current sensor - clamp) |
|                          | Value3    | 0   |
|                          | Value4    | 0   |
|                          | Value5    | 0 ...1 Divisor  |
|                          | Value6    | 0 ... 1 Power Fail  |
| D2-32-02                 | Value1    | Input 1 0 ... 4095 0 ... 409,5 A (without battery current sensor - clamp) |
|                          | Value2    | Input 2 0 ... 4095 0 ... 409,5 A (without battery current sensor - clamp) |
|                          | Value3    | Input 3 0 ... 4095 0 ... 409,5 A (without battery current sensor - clamp) |
|                          | Value4    | 0   |
|                          | Value5    | 0 ...1 Divisor  |
|                          | Value6    | 0 ... 1 Power Fail  |

| D2-FF-FF Universal |           |                                      |
|--------------------|-----------|--------------------------------------|
| EEP                | Registers | Description                          |
| D2-FF-FF           | Value1    | (DataBytes[0] << 8) + DataBytes[1]   |
|                    | Value2    | (DataBytes[2] << 8) + DataBytes[3]   |
|                    | Value3    | (DataBytes[4] << 8) + DataBytes[5]   |
|                    | Value4    | (DataBytes[6] << 8) + DataBytes[7]   |
|                    | Value5    | (DataBytes[8] << 8) + DataBytes[9]   |
|                    | Value6    | (DataBytes[10] << 8) + DataBytes[11] |



## 6.5 Supported MSC telegrams

| Pressac three-channel temperature sensor |           |   |
|--|-----------|---|
| EEP                                      | Registers | Description   |
| D1-03-C1                                 | Value1    | Temperature 1 (the most updated) -20... 100 °C (x10)  |
|  | Value2    | Temperature 2 (the most updated) -20... 100 °C (x10)  |
|  | Value3    | Temperature 3 (the most updated) -20... 100 °C (x10)  |
|  | Value4    | 1 range -20 ... 100 °C  |
|  | Value5    | Indoor temperature -20... 100 °C (x10)  |
|  | Value6    | Repeating the sending 30, 60, 120 a 300s<br>Solar cell (+1) battery (+0)<br>e.g. 31 repeating the sending after 30s, solar power supply |
| D1-03-C2                                 | Value1    | Temperature 1 (the most updated) 0... 85 °C (x10)   |
|  | Value2    | Temperature 2 (the most updated) 0... 85 °C (x10)   |
|  | Value3    | Temperature 3 (the most updated) 0... 85 °C (x10)   |
|  | Value4    | 2 range 0 ... 85 °C   |
|  | Value5    | Indoor temperature 0... 85 °C (x10)   |
|  | Value6    | Repeating the sending 30, 60, 120 a 300s<br>Solar cell (+1) battery (+0)<br>e.g. 31 repeating the sending after 30s, solar power supply |
| <b>Note</b>                              |           |   |
| New sensors use EEP D2-0A-xx             |           |   |

| D1-FF-FF Universal |           |                                      |
|--------------------|-----------|--------------------------------------|
| EEP                | Registers | Description                          |
| D1-FF-FF           | Value1    | (DataBytes[0] << 8) + DataBytes[1]   |
|                    | Value2    | (DataBytes[2] << 8) + DataBytes[3]   |
|                    | Value3    | (DataBytes[4] << 8) + DataBytes[5]   |
|                    | Value4    | (DataBytes[6] << 8) + DataBytes[7]   |
|                    | Value5    | (DataBytes[8] << 8) + DataBytes[9]   |
|                    | Value6    | (DataBytes[10] << 8) + DataBytes[11] |

## 7 SUPPORTED EEPs FOR TRANSMITTING DATA

Following tables list supported device types (EEP) for transmitting data. The support includes encoding of data points written to registers *Value1...Value7* in *Tx data* into raw data bytes. The gateway can also handle the bidirectional communication of heating valves (A5-20-01, A5-20-06) – automatic response (use Send option = 3:Response on received always).

For unsupported EEPs, raw data are expected in *Value* registers. The format is described in universal profiles F6-3F-7F, D5-3F-7F, A5-3F-7F, D2-FF-FF and D1-FF-FF. Universal profiles can also be set for any device manually.

### 7.1 Supported RPS telegrams

| F6-02-xx |           |   |
|----------|-----------|---|
| EEP      | Registers | Description   |
| F6-02-02 | Value1    | Rocker 1st action<br>0: Button A1: "Switch light on" or "Dim light up" or "Move blind open"<br>1: Button A0: "switch light off" or "Dim light down" or "Move blind closed"<br>2: Button B1: "Switch light on" or "Dim light up" or "Move blind open"<br>3: Button B0: "Switch light off" or "Dim light down" or "Move blind closed" |
|          | Value2    | 2nd action  |
|          | Value3    | Energy Bow: 0 – released; 1 – pressed   |
|          | Value7    | It is copied directly to STATUS byte  |

| F6-3F-7F Universal |           |                   |
|--------------------|-----------|-------------------|
| EEP                | Registers | Description       |
| F6-3F-7F           | Value1    | DB0: DataBytes[0] |
|                    | Value2    | Status byte       |

### 7.2 Supported 1BS telegrams

| D5-00-xx Contacts |           |   |
|-------------------|-----------|---|
| EEP               | Registers | Description   |
| D5-00-01          | Value1    | 0: OPEN (without battery door/window contact)<br>1: CLOSE |
|                   | Learn     | 0: Data telegram<br>1: Learn mode                         |

| D5-3F-7F Universal |           |                   |
|--------------------|-----------|-------------------|
| EEP                | Registers | Description       |
| D5-3F-7F           | Value1    | DB0: DataBytes[0] |

### 7.3 Supported 4BS telegrams

| A5-02-xx |           |                              |
|----------|-----------|------------------------------|
| EEP      | Registers | Description                  |
| A5-02-01 | Value1    | X 10 Temperature -40...0 °C  |
| A5-02-02 | Value1    | X 10 Temperature -30...10 °C |
| A5-02-03 | Value1    | X 10 Temperature -20...20 °C |
| A5-02-04 | Value1    | X 10 Temperature -10...30 °C |
| A5-02-05 | Value1    | X 10 Temperature 0...40 °C   |
| A5-02-06 | Value1    | X 10 Temperature 10...50 °C  |
| A5-02-07 | Value1    | X 10 Temperature 20...60 °C  |
| A5-02-08 | Value1    | X 10 Temperature 30...70 °C  |
| A5-02-09 | Value1    | X 10 Temperature 40...80 °C  |
| A5-02-0A | Value1    | X 10 Temperature 50...90 °C  |
| A5-02-0B | Value1    | X 10 Temperature 60...100 °C |
| A5-02-10 | Value1    | X 10 Temperature -60...20 °C |
| A5-02-11 | Value1    | X 10 Temperature -50...30 °C |

|          |        |      |                         |
|----------|--------|------|-------------------------|
| A5-02-12 | Value1 | X 10 | Temperature -40...40 °C |
| A5-02-13 | Value1 | X 10 | Temperature -30...50 °C |
| A5-02-14 | Value1 | X 10 | Temperature -20...60 °C |
| A5-02-15 | Value1 | X 10 | Temperature -10...70 °C |
| A5-02-16 | Value1 | X 10 | Temperature 0...80 °C   |
| A5-02-17 | Value1 | X 10 | Temperature 10...90 °C  |
| A5-02-18 | Value1 | X 10 | Temperature 20...100 °C |
| A5-02-19 | Value1 | X 10 | Temperature 30...110 °C |
| A5-02-1A | Value1 | X 10 | Temperature 40...120 °C |
| A5-02-1B | Value1 | X 10 | Temperature 50...130 °C |

| A5-04-xx |           |             |  |
|----------|-----------|-------------|--|
| EEP      | Registers | Description |  |
| A5-04-01 | Value1    | x 10        | Temperature 0...40 °C (0...400)                    |
|          | Value2    | x 10        | Humidity 0...100% (0...1000)                       |
|          | Value3    |             | Temperature sensor available (1) not available (0) |
|          | Value 4-7 |             | Not used   |
| A5-04-02 | Value1    | x 10        | Temperature -20...60 °C (-200...600)               |
|          | Value2    | x 10        | Humidity 0...100% (0...1000)                       |
|          | Value 3-7 |             | Not used   |
| A5-04-03 | Value1    | x 10        | Temperature -20...60 °C (-200...600)               |
|          | Value2    | x 10        | Humidity 0...100% (0...1000)                       |
|          | Value3    |             | Type of telegram 0: Heartbeat 1: Even Triggered    |
|          | Value 4-7 |             | Not used   |

| A5-05-xx |           |             |   |
|----------|-----------|-------------|---|
| EEP      | Registers | Description |   |
| A5-05-01 | Value1    |             | Air pressure 500-1150hPa                        |
|          | Value2    |             | Type of telegram 0: Heartbeat 1: Even Triggered |
|          | Value 3-7 |             | Not used  |

| A5-20-xx |           |             |  |
|----------|-----------|-------------|--|
| EEP      | Registers | Description |  |
| A5-20-01 | Value1    |             | Actuator position 0...100 or temperature 0...400 (0...40°C)  |
|          | Value2    |             | Actual room temperature from GWY to actuator   |
|          | Value3    |             | Meaning of value 1<br>0 – Actuator position<br>1 – Temperature   |
|          | Value4    |             | 1 – run unit sequence<br>2 – lift set<br>3 – run unit sequence+left set  |
|          | Value5    |             | 1 – valve open maintenance<br>2 – valve closed<br>10 – set point inverse<br>11 – valve open maintenance + set point inverse<br>12 – valve closed + set point inverse |
|          | Value6    |             | 0 – nothing 1 – summer mode  |
|          | Value7    |             | 0 – RCU 1 – Service on   |
|          | Teach-in  |             | 0: Data telegram<br>1: Learning mode   |

|          |          |  |              |                                       |                  |
|----------|----------|--|--------------|---------------------------------------|------------------|
| A5-20-04 | Value1   | Actuator position 0...100% ( Valve Position)   |              |                                       |                  |
|          | Value2   | Temperature Set Point 10...30°C  |              |                                       |                  |
|          | Value3   | Wake-up Cycle  |              |                                       |                  |
|          |          | 0: 10 sec  | 18: 570 sec  | 35: 1080 sec                          | 50: 3 hrs        |
|          |          | 1: 60 sec  | 19: 600 sec  | 36: 1110 sec                          | 51: 6 hrs        |
|          |          | 2: 90 sec  | (10min)      | 37: 1140 sec                          | 52: 9 hrs        |
|          |          | 3: 120 sec   | 20: 630 sec  | 38: 1170 sec                          | 53: 12 hrs       |
|          |          | 4: 150 sec   | 21: 660 sec  | 39: 1200 sec                          | 54: 15 hrs       |
|          |          | 5: 180 sec   | 22: 690 sec  | (20min)                               | 55: 18 hrs       |
|          |          | 6: 210 sec   | 23: 720 sec  | 40: 1230 sec                          | 56: 21 hrs       |
|          |          | 7: 240 sec   | 24: 750 sec  | 41: 1260 sec                          | 57: 24 hrs       |
|          |          | 8: 270 sec   | 25: 780 sec  | 42: 1290 sec                          | 58: 27 hrs       |
|          |          | 9: 300 sec   | 26: 810 sec  | 43: 1320 sec                          | 59: 30 hrs       |
|          |          | (5min)   | 27: 840 sec  | 44: 1350 sec                          | 60: 33 hrs       |
|          |          | 10: 330 sec  | 28: 870 sec  | 45: 1380 sec                          | 61: 36 hrs       |
|          |          | 11: 360 sec  | 29: 900 sec  | 46: 1410 sec                          | 62: 39 hrs       |
|          |          | 12: 390 sec  | (15min)      | 47: 1440 sec                          | 63: 42 hrs (max) |
|          |          | 13: 420 sec  | 30: 930 sec  | 48: 1470 sec                          |                  |
|          |          | 14: 450 sec  | 31: 960 sec  | 49: 1500 sec                          |                  |
|          |          | 15: 480 sec  | 32: 990 sec  | (25min)                               |                  |
|          |          | 16: 510 sec  | 33: 1020 sec |                                       |                  |
|          |          | 17: 540 sec  | 34: 1050 sec |                                       |                  |
|          | Value4   | Measurement Control 0: Disable 1:Enable<br>Control the temperature measurement (feed temperature + room temperature) |              |                                       |                  |
|          | Value5   | Button Lock Control 0: Unlocked 1: Locked  |              |                                       |                  |
|          | Value6   | Display Orientation  |              | 0: 0°<br>1: 90°<br>2: 180°<br>3: 270° |                  |
|          | Value7   | Reserved   |              |                                       |                  |
|          | Teach-in | 0: Data telegram<br>1: Learning mode   |              |                                       |                  |

| A5-20-06 Harvesting-powered Actuator with Local Setpoint Control |   |                                 |                                     |                        |
|--|---|---------------------------------|-------------------------------------|------------------------|
| DIRECTION-2: Data and commands sent to actuator                  |   |                                 |                                     |                        |
| Registers  | Description   |                                 |                                     |                        |
| Value1   | Valve Position 0...100 %                            |                                 |                                     | 1)                     |
| Value2   | Temperature Setpoint 0...40 °C (x10)                |                                 |                                     |                        |
| Value3   | Temperature from RCU 0...40 °C (x10)                |                                 |                                     |                        |
| Value4   | Reserved  |                                 |                                     |                        |
| Value5   | Reserved  |                                 |                                     |                        |
| Value6   | Radio Interval                                      | 0:Auto;<br>1:2 min;<br>2:5 min; | 3:10 min;<br>4:20 min;<br>5:30 min; | 6:60 min;<br>7:120 min |
| Value7   | Flags (single-bit values occurring in EEP telegram) |                                 |                                     |                        |
| <b>Flags (16 bits)</b>   |   |                                 |                                     | 2)                     |
| 8 bits [15:8]  | Reserved  |                                 |                                     |                        |
| 3 bits [7:5]   | Reserved  |                                 |                                     |                        |
| bit4 (MSB)   | Reference Run                                       | 0:False; 1:True                 |                                     |                        |
| bit3   | Summer Mode   | 0:False; 1:True                 |                                     |                        |
| bit2   | Setpoint Selection                                  | 0:Valve position; 1:Temperature |                                     |                        |

|  |                       |                   |
|--|-----------------------|-------------------|
| bit1   | Temperature Selection | 0:Ambient; 1:Feed |
| bit0 (LSB)   | Standby Mode          | 0:False; 1:True   |
| <b>Note</b>  |                       |                   |
| 1) <b>Setpoint Selection</b> (Value7.bit2) defines if Value1 or 2 is used, the second value has no effect.   |                       |                   |
| 2) Bits are numbered from LSB to MSB, e.g. Flags = 4 (0x04) => bit2 = 1 (Setpoint Selection = 1:Temperature) |                       |                   |

| A5-38-08 |               |  |
|----------|---------------|--|
| EEP      | Registers     | Description  |
| COM ID 1 | <b>Value1</b> | <b>Command ID = 1 Switching</b>  |
|          | Value2        | SW Switching Command ON/OFF Enum:<br>0: Off<br>1: On   |
|          | Value3        | Time (in 1/10 second)<br>0= no time specified<br>1...65535: 0,1 ... 6553,5s  |
|          | Value4        | Duration (Execute switching command immediately and switch back after duration)<br>1 = Delay (Execute switching command after delay)<br>0: Duration<br>1: Delay  |
|          | Value5        | 0: Unlock<br>1: Lock<br>Lock for duration time if time >0, unlimited time of no time specified. Locking may be cleared with „unlock“. During lock phase no other commands will be accepted or executed |
|          | Teach-in      | 0: Data telegram<br>1: Learning mode   |
| COM ID 2 | <b>Value1</b> | <b>Command ID = 2 Dimming</b>  |
|          | Value2        | SW Switching Command ON/OFF Enum:<br>0: Off<br>1: On   |
|          | Value3        | Dimming value (absolute [0...255] or relative [0...100]) 0...255 0...100 %   |
|          | Value4        | Dimming Range EDIM R Dimming Range<br>0: Absolute value<br>1: Relative value   |
|          | Value5        | Ramping time RMP Ramping time in seconds, 0 = no ramping,<br>1... 255 = seconds to 100% 0...255 0...255 s  |
|          | Value6        | Store final value STR Store final value<br>0: No<br>1: Yes   |
|          | Teach-in      | 0: Data telegram<br>1: Learning mode   |

| A5-3F-7F Universal |           |                  |
|--------------------|-----------|------------------|
| EEP                | Registers | Description      |
| A5-3F-7F           | Value1    | DB3: DataByte[0] |
|                    | Value2    | DB2: DataByte[1] |
|                    | Value3    | DB1: DataByte[2] |
|                    | Value4    | DB0: DataByte[3] |

## 7.3.1 BIDIRECTIONAL TEACH-IN (4BS TEACH-IN – VARIATION 3)

The pairing procedure for valve actuators (e.g. MD15-FTL-HE) is in the form query – answer. The gateway makes this process automatically. It is necessary to follow this procedure in registers for transmitting channels (*Tx data*):

1. Fill in actuator ID to *Destination ID* registers.
2. Fill in RORG, TYPE, FUNC.
3. Set register *Learn button* to 1.
4. For valve actuators, set *Send option* = 3 – *Response on received always*, otherwise *Send option* = 2.
5. Press button on actuator (or follow steps for teach-in activation), the teach-in process will start.
6. Set register *Learn button* to 0 when pairing is done.

You can get the actuator ID and EEP from the previous teach-in query:

1. Press button on actuator
2. The last teach-in query is shown in the *New device* registers (see Ch. 4.1.4, registers 1012 up)
3. Copy the New device ID end EEP to the desired channel

### Notes:

- 1) To use the BaseID, fill in the Source ID registers prior to the teach-in procedure.

## 7.4 Supported VLD telegrams

| D2-01-XX   |               |  |
|------------|---------------|--|
| EEP        | Registers     | Description  |
| CMD – 0x01 | <b>Value1</b> | <b>CMD = 1 Actuator Set Output</b>   |
|            | Value2        | Output value: 0 – 100% (0=OFF; 100=ON)   |
|            | Value3        | I/O Channel 0 – 29    30 = All channels    31 = Input channel (from mains supply)  |
|            | Value4        | Dimming<br>0x00: Switch to new output value<br>0x01: Dim to new output value – dim timer 1<br>0x02: Dim to new output value – dim timer 2<br>0x03: Dim to new output value – dim timer 3<br>0x04: Stop dimming |
|            | Value5-7      | Not Used   |
|            | Teach-in      | 0  |
| CMD – 0x02 | <b>Value1</b> | <b>CMD = 2 Actuator Set Local</b>  |
|            | Value 2       | I/O channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Input channel (from mains supply)  |
|            | Value 3       | Dim timer 1 - fast<br>0: Not used<br>1...15: Dim timer 1 [0,5 ... 7,5s / steps 0,5s]   |
|            | Value4        | Dim timer 2 - medium<br>0: Not used<br>1...15: Dim timer 1 [0,5 ... 7,5s / steps 0,5s]   |
|            | Value5        | Dim timer 3 - slow<br>0: Not used<br>1...15: Dim timer 1 [0,5 ... 7,5s / steps 0,5s]   |
|            | Value6        | 0: Disable taught-in devices (with different EEP)  |

|            |               |   |
|------------|---------------|---|
|            |               | <p>1: Enable taught-in devices (with different EEP)<br/>                 0: Over current shut down: static off<br/>                 10: Over current shut down: automatic restart<br/>                 0: Reset over current shut down: not active<br/>                 100: Reset over current shut down: trigger signal<br/>                 0: Disable local control<br/>                 1000: Enable local control<br/>                 Sample: 1011<br/>                 Enable local control; Reset over current shut down: not active; Over current shut down: automatic restart; Enable taught-in devices (with different EEP)</p> |
|            | Value7        | <p>Default state DS<br/>                 0: Default state: 0% or OFF<br/>                 1: Default state: 100% or ON<br/>                 2: Default state: remember previous state<br/>                 3: Not used<br/>                 0: Disable Power Failure Detection<br/>                 10: Enable Power Failure Detection<br/>                 0: User interface indication: day operation<br/>                 100: User interface indication: night operation<br/>                 Sample: 103<br/>                 User interface indication: night operation; Disable Power Failure Detection; Default state: Not used</p> |
|            | Teach-in      | 0   |
| CMD – 0x03 | <b>Value1</b> | <b>CMD = 3 Actuator Status Query</b>  |
|            | Value 2       | <p>I/O channel<br/>                 0...29: Output channel (to load)<br/>                 30: All output channels supported by the device<br/>                 31: Input channel (from mains supply)</p>  |
|            | Value3-7      | Not Used  |
|            | Teach-in      | 0   |
| CMD – 0x05 | <b>Value1</b> | <b>CMD = 5 Actuator Set Measurement</b>   |
|            | Value2        | <p>I/O channel<br/>                 0...29: Output channel (to load)<br/>                 30: All output channels supported by the device<br/>                 31: Input channel (from mains supply)</p>  |
|            | Value3        | <p>Unit UN<br/>                 0: Energy [Ws]<br/>                 1: Energy [Wh]<br/>                 2: Energy [KWh]<br/>                 3: Power [W]<br/>                 4: Power [KW]</p>  |
|            | Value4        | <p>Measurement delta to be reported<br/>                 0...4095: 0...4095</p>   |
|            | Value5        | <p>Maximum time between two subsequent actuator messages MAT<br/>                 Measurement Response messages [10s]<br/>                 1...255: 10...2550s</p>  |
|            | Value6        | <p>Minimum time between two subsequent actuator messages MIT Measurement<br/>                 Response messages[s]<br/>                 1...255: 1...255s</p>   |
|            | Value7        | <p>0: Report measurement: query only<br/>                 1: Report measurement: query /auto reporting<br/>                 0: Reset measurement: not active<br/>                 10: Reset measurement: trigger signal<br/>                 0: Energy measurement</p>  |

|                   |               |  |
|-------------------|---------------|--|
|                   |               | 100: Power measurement   |
|                   | Teach-in      | 0  |
| <b>CMD – 0x06</b> | <b>Value1</b> | <b>CMD = 6 Actuator Measurement Query</b>  |
|                   | Value2        | I/O channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Input channel (from mains supply)                              |
|                   | Value3        | 0: Query energy<br>1: Query power  |
|                   | Value4-7      | Not Used   |
|                   | Teach-in      | 0  |
| <b>CMD – 0x08</b> | <b>Value1</b> | <b>CMD = 8 Actuator Set Pilot Wire Mode</b>  |
|                   | Value2        | Pilotwire mode<br>0: Off<br>1: Comfort<br>2: Eco<br>3: Anti-freeze<br>4: Comfort-1<br>5: Comfort-2   |
|                   | Value3-7      | Not Used   |
|                   | Teach-in      | 0  |
| <b>CMD – 0x09</b> | <b>Value1</b> | <b>CMD = 9 Actuator Pilot Wire Mode Query</b>  |
|                   | Value2-7      | Not Used   |
|                   | Teach-in      | 0  |
| <b>CMD – 0x0A</b> | <b>Value1</b> | <b>CMD = 11 Actuator Set External Interface Settings</b>   |
|                   | Value2        | I/O channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Input channel (from mains supply)                              |
|                   | Value3        | Auto OFF Timer<br>0: Timer deactivated<br>1...65534: 0.1...6553.4 s<br>65535: Does not modify saved value  |
|                   | Value4        | Delay OFF Timer<br>0: Timer deactivated<br>1...65534: 0.1...6553.4 s<br>65535: Does not modify saved value   |
|                   | Value5        | External Switch/Push Button (External interface mode)<br>0: Not applicable<br>1: External Switch<br>2: External Push Button<br>3: Auto detect                            |
|                   | Value6        | 2 – state switch - Switching state<br>0: Change of key state sets ON or OFF<br>1: Specific ON/OFF positions.<br>ON when contacts are closed. OFF when contacts are open. |
|                   | Value7        | Not Used   |
|                   | Teach-in      | 0  |
| <b>CMD – 0x0C</b> | <b>Value1</b> | <b>CMD = 12 Actuator External Interface Settings Query</b>   |
|                   | Value2        | I/O channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Input channel (from mains supply)                              |
| <b>CMD – 0x0F</b> | <b>Value1</b> | <b>CMD = 15 Actuator Set Dimming Limits</b>  |
|                   | Value2        | ECID – Extended Command<br>ID = 0 Setting min, max<br>ID=1 Actuator dimming limits query   |



|  |        |   |
|--|--------|---|
|  | Value3 | Output channel<br>0...29: Output channel (to load)<br>30: All output channels supported by the device<br>31: Reserved |
|  | Value4 | (only ECID = 0) MAXV Set dimming maximum value (Maximum value is set to 100%)   |
|  | Value5 | (only ECID = 0) MINV Set dimming minimum value (Minimum value is set 0%)  |

| D2-05-XX Blinds Control for Position and Angle |               |  |
|--|---------------|--|
| EEP  | Registers     | Description  |
| D2-05-00                                       |               |  |
| CMD – 0x01                                     | <b>Value1</b> | <b>CMD = 1 Goto command</b>  |
|  | Value2        | Channel address Channel (1)  |
|  | Value3        | Vertical position<br>0...100: 0...100 %<br>127: Do not change  |
|  | Value4        | Rotation angle Enum:<br>0...100: 0...100 %<br>127: Do not change   |
|  | Value5        | How to adjust the internal positioning tracker before going to the new position<br>0: Go directly to POS/ANG<br>1: Go up (0%), then to POS/ANG<br>2: Go down (100%), then to POS/ANG<br>3 ... 7:Reserved |
|  | Value6        | LOCK Set/reset locking modes<br>0: Do not change<br>1: Set blockage mode<br>2: Set alarm mode<br>3 ... 6:Reserved<br>7: Deblockage   |
|  | Value7        | Not used   |
|  | Teach-in      | 0  |
| CMD – 0x02                                     | <b>Value1</b> | <b>CMD = 2 Stop</b>  |
|  | Value 2       | Channel address Channel (1)  |
|  | Value3...7    | Not used   |
|  | Teach-in      | 0  |
| CMD – 0x03                                     | <b>Value1</b> | <b>CMD = 3 Query Position and Angle</b>  |
|  | Value 2       | Channel address Channel (1)  |
|  | Value3...7    | Not used   |
|  | Teach-in      | 0  |
| CMD – 0x05                                     | <b>Value1</b> | <b>CMD = 5 Set parameters</b>  |
|  | Value 2       | Channel address Channel (1)  |
|  | Value3        | Measured duration of a vertical run<br>0 ... 499: Reserved<br>500...30 000: 5000...300000 ms (500 = 5s... 30 000 = 300s)<br>32767 (0x7FFF): -> No change   |
|  | Value4        | Measured duration of rotation<br>1...254: 10...2540 ms (1 = 0,01s ... 254 = 2,54s)<br>0: No rotation<br>255: -> No change  |
|  | Value5        | Set alarm action<br>Besides locking all other commands entering the alarm mode results in<br>0: No action<br>1: Immediate stop   |

|   |          |   |
|---|----------|---|
|   |          | 2: Go up (0%)<br>3: Go down (100%)<br>4 ... 6:Reserved<br>7: -> No change |
|   | Value6-7 | Not used  |
|   | Teach-in | 0   |
| <b>Note</b>   |          |   |
| 1) The same mapping is valid for D2-05-00, D2-05-01, D2-05-02 and D2-05-03. |          |   |
| 2) D2-05-03 partial support, only CMD1 to 4.                                |          |   |

| D2-11-XX Bidirectional Room Operating Panel  |                   |   |                           |
|--|-------------------|---|---------------------------|
| MSG ID 1: Data to panel  |                   |   |                           |
| EEP  | Registers         | Description   |                           |
| D2-11-01   | Value1            | Setpoint type   |                           |
| ...  | Value2            | Setpoint offset (Temperature correction) 0...255        |                           |
| D2-11-08   | Value3            | Setpoint base 15...30 °C                                |                           |
|  | Value4            | Valid temperature correction (scale of Setpoint offset) |                           |
|  | Value5            | Fan speed   |                           |
|  | Value6            | Occupancy   |                           |
|  | Value7<br>Symbols | 1 bit [2]   | Heating symbol on/off     |
|  |                   | 1 bit [1]   | Cooling symbol on/off     |
|  |                   | 1 bit [0]   | Window open symbol on/off |
|  |                   |   | 0x0005                    |
| <b>Note</b>  |                   |   |                           |
| 1) Interpretation of Value2 depends on the other values, see EEP specification.  |                   |   |                           |
| 2) For parameters that are not to be changed, the corresponding values last received from the panel must be copied here. |                   |   |                           |

| D2-FF-FF Universal |           |   |
|--------------------|-----------|---|
| EEP                | Registers | Description   |
| D2-FF-FF           | Value1    | Length of data 1...12 (1...9 for addressed telegrams) |
|                    | Value2    | (DataBytes[0] << 8) + DataBytes[1]                    |
|                    | Value3    | (DataBytes[2] << 8) + DataBytes[3]                    |
|                    | Value4    | (DataBytes[4] << 8) + DataBytes[5]                    |
|                    | Value5    | (DataBytes[6] << 8) + DataBytes[7]                    |
|                    | Value6    | (DataBytes[8] << 8) + DataBytes[9]                    |
|                    | Value7    | (DataBytes[10] << 8) + DataBytes[11]                  |

## 7.4.1 BIDIRECTIONAL TEACH-IN (UTE TEACH-IN)

The pairing procedure for actuators using VLD is in the form query – answer. UTE telegram type is used. The gateway makes this process automatically. It is necessary to follow this procedure in registers for transmitting channels (*Tx data*):

1. Set *Send option = 4 – UTE response once*.
2. Press button on actuator (or follow steps for teach-in activation), the teach-in process will start.
3. The ID and EEP of the actuator appears in the Destination ID and EEP registers (see Ch. 4.1.7)

### Notes:

- 1) To use the BaseID, fill in the Source ID registers prior to the teach-in procedure.

- 2) The changes happening in the point 3. are not persistent (are lost after power off). Write the Tx channel by Modbus function 16 to make it persistent.

**UTE MESSAGE (UNIVERSAL TEACH-IN)**

The UTE query or response can also be written to registers and sent.

| D4-XX-XX UTE |           |   |
|--------------|-----------|---|
| EEP          | Registers | Description   |
|              | Value1    | DB6.7<br>0b0 Unidirectional communication (EEP operation)<br>0b1 Bidirectional communication (EEP operation)<br>DB6.6<br>0b0 EEP Teach-In-Response message expected<br>0b1 No EEP Teach-In-Response message expected<br>DB6.5 ... DB6.4<br>0b00 Teach-in request<br>0b01 Teach-in deletion request<br>0b10 Teach-in or deletion of teach-in, not specified<br>0b11 Not used |
|              | Value 2   | DB_5 Number of individual channel to be taught in   |
|              | Value3    | DB_4 MID (8LSB) Manufacturer-ID (8LSB)  |
|              | Value4    | DB_3 MID (3MSB) Manufacturer-ID (3MSB)  |
|              | Value5    | DB_2 TYPE   |
|              | Value6    | DB_1 FUNC   |
|              | Value7    | DB_0 RORG   |

**7.4.2 Smart Ack teach-in**

The Smart ACK (Smart Acknowledge) protocol enables bidirectional communication with energy self-sufficient devices. For example, Room Operating Panels D2-11-XX utilize the Smart ACK communication to receive data, which is used to show symbols on the display or override some parameters.

The Smart ACK protocol is described [here](#). When a message is sent to a Smart ACK Sensor, a device called “Post Master” stores it in a “Mailbox” until the sensor is ready to receive telegrams. When the sensor wakes up, it checks the Mailbox. The Post Master sends the message buffered in the Mailbox or Mailbox Empty message if the Mailbox is empty. The sensor receives the response from Post Master and returns to sleep mode. The Post Master is selected (and the Mailbox is established in Post Master) during teach-in process.

The gateway does not support the teach-in with repeaters, there must be a direct connection between the gateway and the Smart ACK device, i.e. Post Master and Mailbox are located in the gateway.

To Smart Ack teach-in:

1. Set *Send option = 4 – UTE response once*.
2. Press teach-in button on the device (or follow steps for teach-in activation), the teach-in process will start.
3. The ID and EEP of the device appears in the Destination ID and EEP registers (see Ch. 4.1.7)

**Notes:**

- 1) If the Sender ID is changed, the mailbox is deleted and the teach-in must be repeated.
- 2) The changes happening in the point 3. are not persistent (are lost after power off). Write the Tx channel by Modbus function 16 to make it persistent.

7.5 Supported MSC telegrams

| D1-FF-FF Universal |           |   |
|--------------------|-----------|---|
| EEP                | Registers | Description   |
| D1-FF-FF           | Value1    | Length of data 1...12 (1...9 for addressed telegrams) |
|                    | Value2    | (DataBytes[0] << 8) + DataBytes[1]                    |
|                    | Value3    | (DataBytes[2] << 8) + DataBytes[3]                    |
|                    | Value4    | (DataBytes[4] << 8) + DataBytes[5]                    |
|                    | Value5    | (DataBytes[6] << 8) + DataBytes[7]                    |
|                    | Value6    | (DataBytes[8] << 8) + DataBytes[9]                    |
|                    | Value7    | (DataBytes[10] << 8) + DataBytes[11]                  |
|                    |           |   |

## REVISION HISTORY

| Date                            | Version | Description  |
|---------------------------------|---------|--|
| 2nd March 2018                  | V1.3    | Supported 4BS telegrams (chapter 7.1)<br>Supported 4BS telegrams (chapter 8.3) |
| 10th October 2018               | V1.4    | Repair connection RS 232, text corrections                                     |
| 25th October 2018               | V1.5    | Enlargement of supported MSC telegrams for PRESSAC 3 channel temperature       |
| 17th December 2018              | V1.6    | Repair of technical information  |
| 22nd February 2019              | V1.7    | The protocol D2-01-0C added  |
| 4th March 2019                  | V1.8    | The protocol D2-01-0F (page....) added   |
| 10th May 2019                   | V1.9    | EEP protocols and description of saving channel descriptions added             |
| 13th August 2019                | V1.10   | Transmitting protocols A5-04-(01,02,03) a A5-05-01 added                       |
| 21st May 2020                   | V1.11   | D2-03-0A added   |
| 30th January 2023               | V1.12   | Text corrections   |
| 9th June 2023                   | V1.13   | Added description of D2-14-40,41   |
| 1st August 2023                 | V1.14   | Added description of A5-20-06  |
| 14 <sup>th</sup> September 2023 | V1.15   | Text corrections   |
| 18 <sup>th</sup> January 2024   | V1.16   | General corrections, conversion to new graphical format                        |
| 30 <sup>th</sup> January 2024   | V1.17   | Adding package contents, firmware upgrade, installation instructions           |
| 1 <sup>st</sup> March 2024      | V1.18   | Updated to firmware V1.15  |
| 11 <sup>th</sup> December 2024  | V1.19   | Updated to firmware V1.17  |