

Water Meter Modularis M-Bus

Documentation M-Bus Protocol

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1. M-Bus protocol

The Modularis M-Bus module is always ready to communicate with the M-Bus master. Communication can be done with 300 or 2400 baud with 8 data bits, 1 parity bit and 1 stop bit straight. The baud rate can be changed via the M-Bus. The firmware supports the primary, and the secondary address (with wildcards too).

The enhanced secondary addressing is also possible by including the fabrication number additionally.

Below the M-Bus telegram used are described. For more details we refer to the EN1434-3 and the documentation of the M-Bus User Group Version 4.8.

With FCB (Frame Count bit) in the REQ-UD2 2 different messages can be selected. At FCB = 0 a short data message is sent. At FCB = 1, a long telegram is sent, which includes the addition of the 12 month values. Each memory value is transmitted with a time stamp (storage number 2 to 13)

1.1 RSP_UD-Telegram (FCB Reset C = 5Bh)

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|---|----|-----|-----|-----|-----|------|------|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Name | Start | Length | Length | Start | C | A | CI | ID1 | ID2 | ID3 | ID4 | MAN1 | MAN2 |
| Content | 68 | 34 | 34 | 68 | 08 | | 72 | | | | | 52 | 38 |

| | | | | | | | | | | | | | |
|---------|-----|-----|----|--------|------|------|------|------|------|------|------|------|------|
| Byte | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| Name | GEN | MED | TC | Status | SIG1 | SIG2 | DIF1 | VIF1 | Vol1 | Vol2 | Vol3 | Vol4 | DIF2 |
| Content | 02 | 07 | | | 00 | 00 | 04 | 13 | | | | | 04 |

| | | | | | | | | | | | | | |
|---------|------|------|------|------|------|------|------|-------|-------|------|------|---------|---------|
| Byte | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
| Name | VIF2 | ADT1 | ADT2 | ADT3 | ADT4 | DIF3 | VIF3 | STag1 | STAG1 | DIF4 | VIF4 | VStore1 | VStore2 |
| Content | 6D | | | | | 42 | 6C | | | 44 | 13 | | |

| | | | | | | | | | | | | | |
|---------|---------|---------|------|------|-------|--------|--------|------|------|--------|---------|---------|---------|
| Byte | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |
| Name | VStore3 | VStore4 | DIF5 | VIF5 | VIFE5 | FSTag1 | FSTag2 | DIF6 | VIF6 | FabNo1 | FabNo 2 | FabNo 3 | FabNo 4 |
| Content | | | 42 | EC | 7E | | | 0C | 7B | | | | |

| | | | | | | | | | | | | | |
|---------|------|---------|---------|---------|----|------|--|--|--|--|--|--|--|
| Byte | 53 | 54 | 55 | 56 | 57 | 58 | | | | | | | |
| Name | DIF7 | Impuls1 | Impuls2 | Protect | CS | Stop | | | | | | | |
| Content | 0F | | | | | 16 | | | | | | | |

(FCB Set C = 7Bh)

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|---|----|-----|-----|-----|-----|------|------|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Name | Start | Length | Length | Start | C | A | CI | ID1 | ID2 | ID3 | ID4 | MAN1 | MAN2 |
| Content | 68 | C4 | C4 | 68 | 08 | | 72 | | | | | 52 | 3B |

| | | | | | | | | | | | | | |
|---------|-----|-----|----|--------|------|------|------|------|------|------|------|------|------|
| Byte | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| Name | GEN | MED | TC | Status | SIG1 | SIG2 | DIF1 | VIF1 | Vol1 | Vol2 | Vol3 | Vol4 | DIF2 |
| Content | 01 | 07 | | | 00 | 00 | 04 | 13 | | | | | 04 |

| | | | | | | | | | | | | | |
|---------|------|------|------|------|------|------|------|-------|-------|------|------|--------|--------|
| Byte | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
| Name | VIF2 | ADT1 | ADT2 | ADT3 | ADT4 | DIF3 | VIF3 | Stag1 | Stag1 | DIF4 | VIF4 | Store1 | Store2 |
| Content | 6D | | | | | 42 | 6C | | | 44 | 13 | | |

| | | | | | | | | | | | | | |
|---------|---------|---------|------|------|-------|--------|--------|------|------|--------|---------|---------|---------|
| Byte | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |
| Name | Vstore3 | Vstore4 | DIF5 | VIF5 | VIFE5 | FSTag1 | FSTag2 | DIF6 | VIF6 | FabNo1 | FabNo 2 | FabNo 3 | FabNo 4 |
| Content | | | 42 | EC | 7E | | | 0C | 78 | | | | |

| | | | | | | | | | | | | | |
|---------|------|-------|------|--------|--------|------|-------|------|---------|---------|---------|---------|------|
| Byte | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 |
| Name | DIF7 | DIFE7 | VIF7 | VM2TAG | VM2TAG | DIF8 | DIFE8 | VIF8 | VM2_Vol | VM2_Vol | VM2_Vol | VM2_Vol | DIF9 |
| Content | 82 | 01 | 6C | DF | 01 | 84 | 01 | 13 | | | | | C2 |

| | | | | | | | | | | | | | |
|---------|-------|------|--------|--------|-------|--------|-------|---------|---------|---------|---------|-------|--------|
| Byte | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 |
| Name | DIFE9 | VIF9 | VM3TAG | VM3TAG | DIF10 | DIFE10 | VIF10 | VM3_Vol | VM3_Vol | VM3_Vol | VM3_Vol | DIF11 | VIFE11 |
| Content | 01 | 6C | DC | 02 | C4 | 01 | 13 | | | | | 82 | 02 |

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|--------|-------|---------|---------|---------|---------|-------|--------|--------|
| Byte | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 |
| Name | VIF11 | VM4TAG | VM4TAG | DIF12 | DIFE12 | VIF12 | VM4_Vol | VM4_Vol | VM4_Vol | VM4_Vol | VIF13 | DIFE13 | VIFE13 |
| Content | 6C | DF | 03 | 84 | 02 | 13 | | | | | | | |

usw.

| | | | | | | | | | | | | | |
|---------|-------|--------|-------|---------|---------|-------|--------|-------|----------|----------|----------|----------|-------|
| Byte | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 |
| Name | DIF29 | DIFE29 | VIF29 | VM13TAG | VM13TAG | DIF30 | DIFE30 | VIF30 | VM13_Vol | VM13_Vol | VM13_Vol | VM13_Vol | DIF31 |
| Content | | | | | | | | | | | | | 0F |

| | | | | | | | | | | | | | |
|---------|---------|---------|---------|-----|------|--|--|--|--|--|--|--|--|
| Byte | 198 | 199 | 200 | 201 | 202 | | | | | | | | |
| Name | Impuls1 | Impuls2 | Protect | CS | Stop | | | | | | | | |
| Content | | | | | 16 | | | | | | | | |

- each content is specified in hexadecimal
- empty fields in the "Contents" line are variable
- index one always indicates the lowest byte

Status: The following table shows the use of the status bits. The first line specifies the number of the bit. The second line specifies the definition in the EN1434-3. The third line specifies the special using of these bits. A bit set indicates the error.

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|--------------------------|--------------------------|--------------------------|---------------------|-----------------|-----------|----------|----------|
| Specific to Manufacturer | specific to manufacturer | specific to manufacturer | temporary error | permanent error | power low | reserved | reserved |
| 0 | manipulation | Info Flash error | communication error | Modul error | 0 | 0 | 0 |

A corresponding error is indicated by the bit set

Vol: Current flow meter 32 bit integer in liters.

ADT: Current date and time data type F.

STAG: timestamp (date) of the following memory value Vstore data type G

VStore: Volume count 32-bit integer in liters at the time of stag.

FSTag: timestamp (date) next deadline storage data type G

Pulse: pulse value of the optional pulse output 16-bit integer

VMxTAG: timestamp data type G values for the previous month

VMxVol: Volume meter to 32-bit integer month values in litres

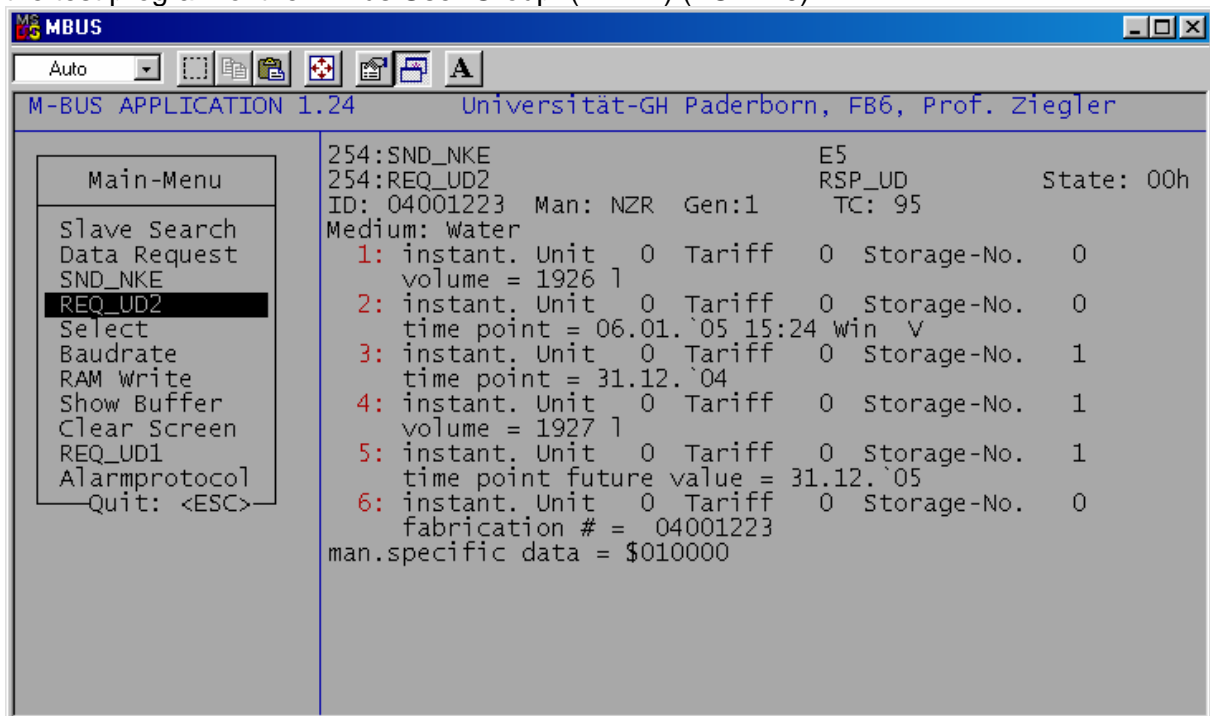
Protect:

Bit 0 manufacturer specific

Bit 1 = 1: write protection enabled (meter readings and dates can not be changed via the M-Bus). Cancellation only when resetting the module.

Bit 2 .. 7 reserved

Example telegram: The example following shows a reading of Modularis M-Bus module with the test program of the M-Bus User Group: (V 1.24) (FCB = 0)



Example telegram: The example following shows a reading of Modularis M-Bus module with the Mbus application of Michel Rac: (V 1.17)

Show Buffers
_ □ ×

Request Request: ? Resize Close

REQ_UD2: C=5B A=FE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|---|
| 000x | 10 | 5B | FE | 59 | 16 | | | | | | | | | | | |

Answer

Long: C=08 A=05 Cl=72 12345678 NZR 02 Warm_Water 09 00 0000 [+ 7 DR(s)]

| Unit | Tariff | Storage | Data | Value | Funct. | VIB |
|------|--------|---------|---------|------------------|--------|---------------------------------------|
| 0 | 0 | 0 | INT4 | | 4 | Inst. Volume [l] |
| 0 | 0 | 0 | INT4 | 10.03.2005 15:15 | | Inst. Time Point [Date+Time] |
| 0 | 0 | 1 | INT2 | 31.12.2004 | | Inst. Time Point [Date] |
| 0 | 0 | 1 | INT4 | | 0 | Inst. Volume [l] |
| 0 | 0 | 1 | INT2 | 31.12.2005 | | Inst. Time Point [Date]->Future Value |
| 0 | 0 | 0 | BCD8 | 05000289 | | Inst. Fabrication Number |
| 0 | 0 | 0 | Special | 01 00 00 | | Inst. |

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|------|----|----|----|-----|-----|----|----|----|-----|-----|----|----|----|----|-----|-----|
| 000x | 68 | 34 | 34 | 68 | 08 | 05 | 72 | 78 | 56 | 34 | 12 | 52 | 3B | 02 | 06 | 09 |
| 001x | 00 | 00 | 00 | 04 | 13 | 04 | 00 | 00 | 00 | 04 | 6D | 0F | 0F | AA | 03 | 142 |
| 002x | 6C | 9F | 0C | 144 | 13 | 00 | 00 | 00 | 00 | 142 | EC | 7E | BF | 0C | 10C | 78 |
| 003x | 89 | 02 | 00 | 05 | 10F | 01 | 00 | 00 | 1D3 | 16 | | | | | | |

Example telegram: The example following shows a reading of a Modularis M-Bus module with the MBus application of Michel Rac: (V 1.17) FCB = 1

Show Buffers

Request:

REQ_UD2: C=7B A=FE

| | | | | | | | | | | | | | | | | |
|------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 000x | 10 | 7B | FE | 79 | 16 | | | | | | | | | | | |

Answer

Long: C=08 A=4E C1=72 06000378 NZR 02 Water 07 00 0000 [+ 31 DR(s)]

| Unit | Tariff | Storage | Data | Value | Funct. | VIB |
|------|--------|---------|------|------------------|--------|---------------------------------|
| 0 | 0 | 0 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 0 | INT4 | 06.07.2006 09:30 | Inst. | Time Point [Date+Time] |
| 0 | 0 | 1 | INT2 | 31.12.2005 | Inst. | Time Point [Date] |
| 0 | 0 | 1 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 1 | INT2 | 31.12.2006 | Inst. | Time Point [Date]->Future Value |
| 0 | 0 | 0 | BCD8 | 06000378 | Inst. | Fabrication Number |
| 0 | 0 | 2 | INT2 | 31.01.2006 | Inst. | Time Point [Date] |
| 0 | 0 | 2 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 3 | INT2 | 28.02.2006 | Inst. | Time Point [Date] |
| 0 | 0 | 3 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 4 | INT2 | 31.03.2006 | Inst. | Time Point [Date] |
| 0 | 0 | 4 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 5 | INT2 | 30.04.2006 | Inst. | Time Point [Date] |
| 0 | 0 | 5 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 6 | INT2 | 31.05.2006 | Inst. | Time Point [Date] |
| 0 | 0 | 6 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 7 | INT2 | 30.06.2006 | Inst. | Time Point [Date] |
| 0 | 0 | 7 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 8 | INT2 | 31.07.2005 | Inst. | Time Point [Date] |
| 0 | 0 | 8 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 9 | INT2 | 31.08.2005 | Inst. | Time Point [Date] |
| 0 | 0 | 9 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 10 | INT2 | 30.09.2005 | Inst. | Time Point [Date] |
| 0 | 0 | 10 | INT4 | 0 | Inst. | Volume [l] |
| 0 | 0 | 11 | INT2 | 31.10.2005 | Inst. | Time Point [Date] |

| | | | | | | | | | | | | | | | | |
|------|-----|-----|----|-----|-----|-----|----|----|-----|-----|----|----|-----|-----|-----|-----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 000x | 68 | C4 | C4 | 68 | 08 | 4E | 72 | 78 | 03 | 00 | 06 | 52 | 38 | 02 | 07 | 07 |
| 001x | 00 | 00 | 00 | 104 | 13 | 00 | 00 | 00 | 00 | 104 | 6D | 1E | 09 | C6 | 07 | 142 |
| 002x | 6C | BF | 0C | 144 | 13 | 00 | 00 | 00 | 00 | 142 | EC | 7E | DF | 0C | 10C | 78 |
| 003x | 78 | 03 | 00 | 06 | 182 | 01 | 6C | DF | 01 | 184 | 01 | 13 | 00 | 00 | 00 | 00 |
| 004x | 1C2 | 01 | 6C | DC | 02 | 1C4 | 01 | 13 | 00 | 00 | 00 | 00 | 182 | 02 | 6C | DF |
| 005x | 03 | 184 | 02 | 13 | 00 | 00 | 00 | 00 | 1C2 | 02 | 6C | DE | 04 | 1C4 | 02 | 13 |
| 006x | 00 | 00 | 00 | 00 | 182 | 03 | 6C | DF | 05 | 184 | 03 | 13 | 00 | 00 | 00 | 00 |
| 007x | 1C2 | 03 | 6C | DE | 06 | 1C4 | 03 | 13 | 00 | 00 | 00 | 00 | 182 | 04 | 6C | BF |
| 008x | 07 | 184 | 04 | 13 | 00 | 00 | 00 | 00 | 1C2 | 04 | 6C | BF | 08 | 1C4 | 04 | 13 |
| 009x | 00 | 00 | 00 | 00 | 182 | 05 | 6C | BE | 09 | 184 | 05 | 13 | 00 | 00 | 00 | 00 |
| 00Ax | 1C2 | 05 | 6C | BF | 0A | 1C4 | 05 | 13 | 00 | 00 | 00 | 00 | 182 | 06 | 6C | BE |
| 00Bx | 0B | 184 | 06 | 13 | 00 | 00 | 00 | 00 | 1C2 | 06 | 6C | BF | 0C | 1C4 | 06 | 13 |
| 00Cx | 00 | 00 | 00 | 00 | 10F | 01 | 00 | 00 | 169 | 16 | | | | | | |

1.2 Configuration telegram

The following variables and parameters can be set with M-Bus telegrams:

| Variable | Value range | Default setting |
|-----------------------|--|---------------------------------|
| Adress (primary) | 0 to 250 | 0 |
| Identification number | 00000000 to 99999999 | 00000000 |
| Medium | 06h, 07h , 16h | 07h |
| Volume | 00000000 bis 99999999 | Current meter reading in liters |
| VStore | 00000000 bis 99999999 | meter reading on the date STag |
| STag | Date Typ G | time of last saved |
| FSTag | Date Typ G | time of the next storage |
| ADT | Date / Time Type F | Current date / time |
| IPA | 1 to 1000 16-bit integer Lower Byte first | pulse value of output in liters |
| RES (GEN 02) | 00h | No function |

SND_UD Telegramm: Change parameters

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|-------|--------|--------|-------|----|---|----|------|------|-------|-------|-------|-------|
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | VIF1 | Vol 1 | Vol 2 | Vol 3 | Vol 4 |
| Content | 68 | 22 | 22 | 68 | 53 | | 51 | 04 | 13 | | | | |

| Byte | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|---------|------|------|-------|-------|-------|-------|------|------|------|------|------|------|------|
| Name | DIF2 | VIF2 | Vol 1 | Vol 2 | Vol 3 | Vol 4 | DIF3 | VIF3 | ADT1 | ADT2 | ADT3 | ADT4 | VIF4 |
| Content | | | | | | | | | | | | | |

| Byte | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
|---------|------|-------|-------|------|------|-------|--------|--------|-----|------|------|-----|----|
| Name | VIF4 | STag1 | STag2 | DIF5 | VIF5 | VIFE5 | FSTag1 | FStag2 | DIF | IPA1 | IPA2 | RES | S |
| Content | 6C | | | 42 | EC | 7E | | | 0F | | | 00 | |

| Byte | 40 | | | | | | | | | | | | |
|---------|------|--|--|--|--|--|--|--|--|--|--|--|--|
| Name | Stop | | | | | | | | | | | | |
| Content | 16 | | | | | | | | | | | | |

The telegram described above summarizes the parameters volume, VStore, STag, FSTag, ADT and IPA to one telegram. However, single blocks (VIF + DIF + Data), which are not to be changed, could be omitted. The sequence of these blocks is not fixed. If the manufacturer specific data block (VIF 0F) is used, it must always be at the end. It need not be present in each SND_UD telegram.

SND_UD telegram: Set write protection

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|---|----|------|-------|----|------|--|--|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | |
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | Prot. | CS | Stop | | |
| Content | 68 | 05 | 05 | 68 | 53 | | 51 | 0F | 55 | | 16 | | |

If this telegram is received by a valid primary address the write protection is enabled.

(Counters and data can not be changed via the M-Bus)

Caution! A reset can only be done directly on the device.

SND_UD telegram: Change primary address

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|---|----|------|------|------|----|------|--|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | VIF1 | PAdr | CS | Stop | |
| Content | 68 | 05 | 06 | 68 | 53 | | 51 | 01 | 7A | | 16 | | |

SND_UD Telegram: Change ID number (secondary address)

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|---|----|------|------|-----|-----|-----|-----|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | VIF1 | ID1 | ID2 | ID3 | ID4 |
| Content | 68 | 09 | 09 | 68 | 53 | | 51 | 0C | 79 | | | | |

| | | | | | | | | | | | | | |
|---------|----|------|--|--|--|--|--|--|--|--|--|--|--|
| Byte | 14 | 15 | | | | | | | | | | | |
| Name | CS | Stop | | | | | | | | | | | |
| Content | | 16 | | | | | | | | | | | |

SND_UD Telegram: Change Secondary address (ID) and medium

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|---|----|------|------|-----|-----|-----|-----|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | VIF1 | ID1 | ID2 | ID3 | ID4 |
| Content | 68 | 0D | 0D | 68 | 53 | | 51 | 0C | 79 | | | | |

| | | | | | | | | | | | | | |
|---------|------|------|-----|-----|----|------|--|--|--|--|--|--|--|
| Byte | 14 | 15 | 16 | 17 | 18 | 19 | | | | | | | |
| Name | MAN1 | MAN2 | GEN | MED | CS | Stop | | | | | | | |
| Content | FF | FF | FF | | | 16 | | | | | | | |

Examples to change the output pulse value (primary address 5)

SND_UD Telegram: Change the output pulse value to 1 liter

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|----|----|------|------|------|-----|----|------|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | IPA1 | IPA2 | RES | CS | STOP |
| Content | 68 | 07 | 07 | 68 | 53 | 05 | 51 | 0F | 01 | 00 | 00 | B9 | 16 |

SND_UD Telegram: Change the output pulse value to 10 liter

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|----|----|------|------|------|-----|----|------|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | IPA1 | IPA2 | RES | CS | STOP |
| Content | 68 | 07 | 07 | 68 | 53 | 05 | 51 | 0F | 0A | 00 | 00 | E2 | 16 |

SND_UD Telegram: Change the output pulse value to 100 liter

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|----|----|------|------|------|-----|----|------|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | IPA1 | IPA2 | RES | CS | STOP |
| Content | 68 | 07 | 07 | 68 | 53 | 05 | 51 | 0F | 64 | 00 | 00 | 3C | 16 |

SND_UD Telegram: Change the output pulse value to 1000 liter

| | | | | | | | | | | | | | |
|---------|-------|--------|--------|-------|----|----|----|------|------|------|-----|----|------|
| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Name | Start | Length | Length | Start | C | A | CI | DIF1 | IPA1 | IPA2 | RES | CS | STOP |
| Content | 68 | 07 | 07 | 68 | 53 | 05 | 51 | 0F | E8 | 03 | 00 | A3 | 16 |

1.3 Data Backup

The parameter data (address, ID, output pulse value, date etc) are backed together with a checksum after configuration in info flash. After resetting the processor, these data are read again and accepted when checksum is correct into the appropriate variables. When the checksum is incorrect, the default values are set.