



# IWM-LR3 – IWM-LR4

## User Manual



This manual offers a simple guide for getting started with the module, as well as configuration and information for advanced users. The **IWM-LR3 - IWM-LR4** module is designed with focus on ease-of-use and reliable operation in LoRaWAN networks.

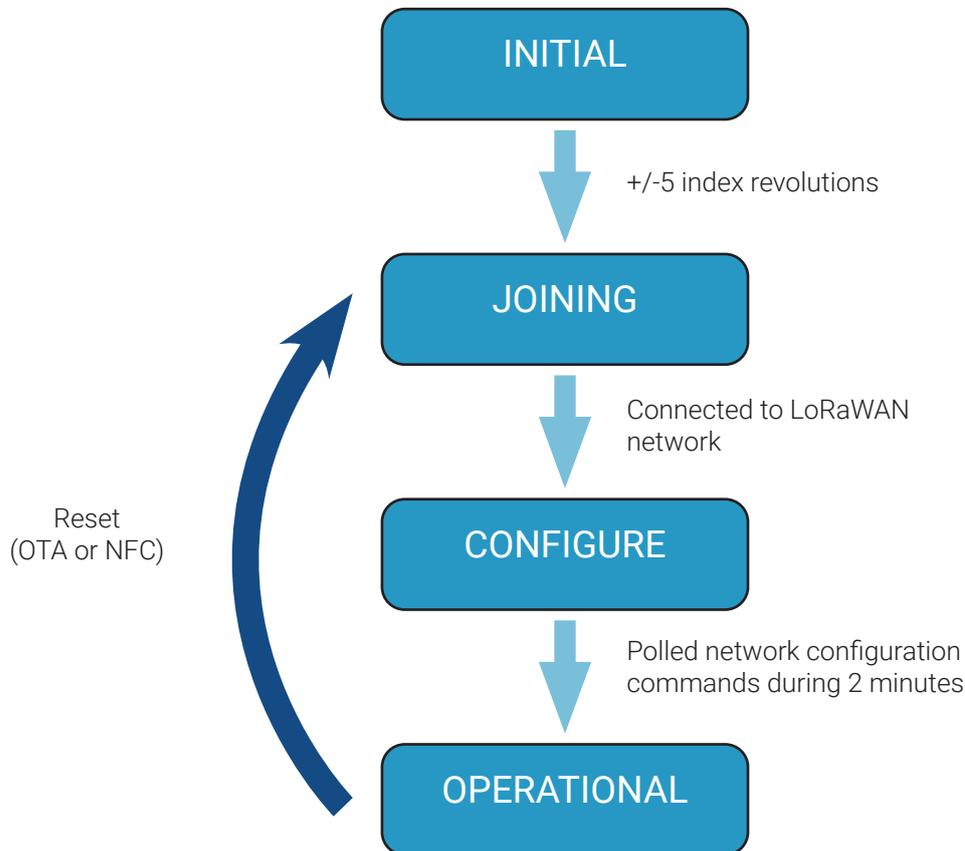
The unit is shipped in sleep mode. All functions, including radio, are deactivated. The device activates when it is mounted on the meter and the rotating inductive index on the meter completes +/- 5 revolutions. This equals to +/- 5 liters on the **IWM-LR3** (thus the meters **CPR-M3-I**, **GMDM-I**, **GMB-RP-I** and **GMB-I**) and +/- 50 liters on the **IWM-LR4** on the meter **WDE-K50** from DN50 to 125 and +/- 500 liters on the **IWM-LR4** on the meter **WDE-K50** from DN150 to 200.

The following safety precautions must be observed during all phases of the operation, usage, service or repair of this product.

- **Read the product manual.**
- **Do not modify the product.**
- **The product should not be exposed to extreme heat or open flame.**
- **The device must not be exposed to harsh chemicals or solvents.**
- **The labelling of the product may not be changed, removed or made unrecognizable.**

## Module status and state check

The sensor has four status: Initial, Joining, Configure and Operational state.



### Start-up Sequence

When the device has joined the network, startup transmissions are performed to make it easier to configure the device using downlink commands. When the startup sequence is completed normal operation is started.

The full joining procedure should take maximum 20 minutes.

The module starts transmitting with Spreading Factor (SF) 12, for maximum performance. It will then automatically adjust the SF up to a minimum of SF7 in order to balance performance and energy consumptions.

## Correct module startup - Summary

1. Module provisioning on the network server - Activation on the network
2. Physical installation of the module on the meter
3. Joining procedure start-up (+/- 5 rotating index revolutions)
4. Verification of the module join procedure completion

### 1. Module provisioning – Activation on the network

Standard devices are configured as OTAA (Over The Air Activation). It is possible to order a batch of devices configured as ABP (Activation By Personalization).

Standard devices are configured with the AppEUI (a.k.a. JoinEUI) E41E0A90000FFFFFF. It is possible to order a batch of devices configured with a custom unique AppEUI. For this contact B METERS support.

Upon receiving your **IWM-LR3 - IWM-LR4** you can request from B METERS the necessary information to connect it to your network server. This consists of the following:

- **DevEUI**
- **AppKey**

These codes are unique for each device. The DevEUI can be seen as a unique identification code, the AppKey is a securely generated authentication code.

The first step you should take is to simply provision the network server. This can be any LoRa system that you would like to integrate the sensor with the AppEUI.

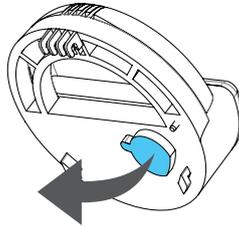
The second step is to provision the application server with your unique DevEUI and AppKey.

### Digital activation process

- **Provision network server with AppEUI**
- **Provision application server with unique DevEUI and AppKey**

## 2. Physical installation

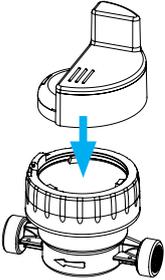
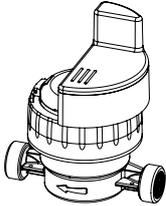
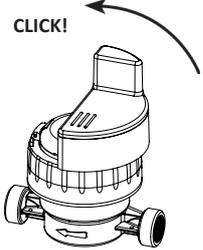
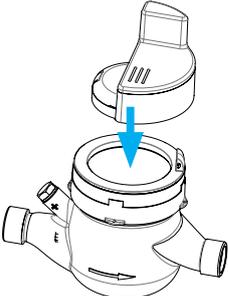
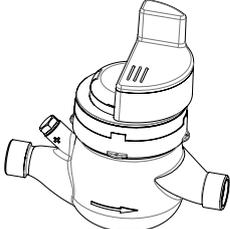
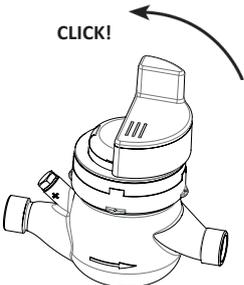
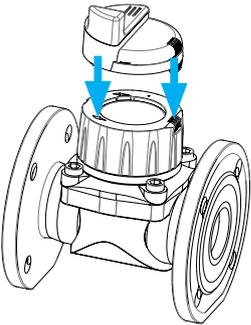
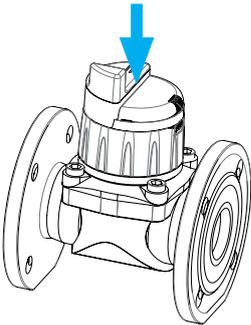
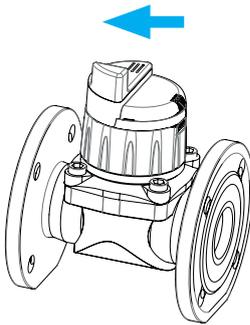
When the meter has been digitally configured into your Lora network it is time to physically activate and install it. Prior to the installation of the **IWM-LR3 - IWM-LR4** unit on the meter, remember to remove the protective metal sticker from the module.



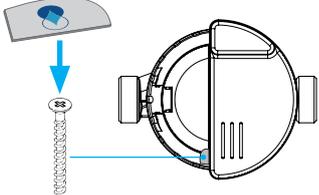
You can then proceed with the module mounting on the meter.

### Physical installation process

#### Phase 1. Mount **IWM-LR3 - IWM-LR4** unit on the water meter

<p><b>IWM-LR3</b> module + <b>CPR-M3-I</b> meter</p>	 Step 1	 Step 2	 Step 3
<p><b>IWM-LR3</b> module + <b>GMDM-I</b> <b>GMB-RP-I</b> <b>GMB-I</b> meter</p>	 Step 1	 Step 2	 Step 3
<p><b>IWM-LR4</b> module + <b>WDE-K50</b> meter</p>	 Step 1	 Step 2	 Step 3

## Phase 2. Mount the locking screw and adhesive seal

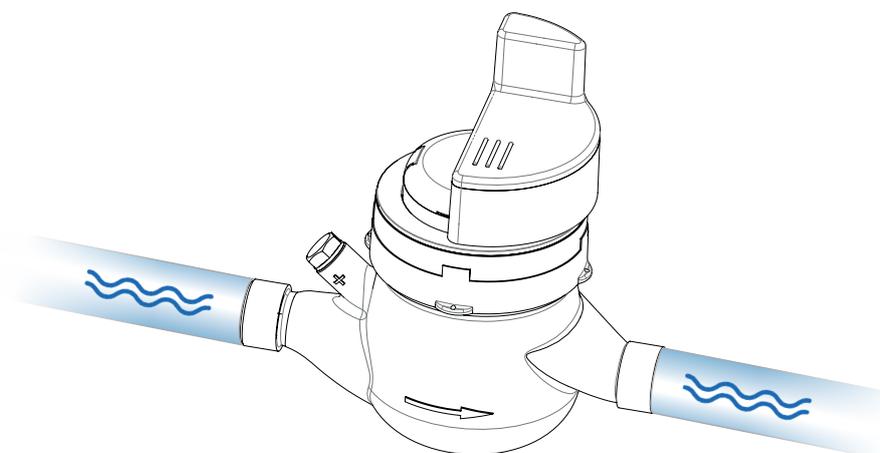
 <p><b>CPR-M3-I</b></p>	<p><b>GMDM-I   GMB-RP-I   GMB-I</b></p>	<p><b>WDE-K50</b></p>
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## 3. Joining procedure start-up

Let water flow in the meter, in order to make the rotating index spin.

To initialize the module and send joining requests to the desired network server, it is necessary to let the inductive index of the dial rotate for +/-5 revolutions:

- On the **GM** and **CPR-M3-I** models, this corresponds to +/- 5 liters.
- On the **WDE-K50** models, this corresponds to +/- 50 or 500 liters, depending on the K value set.



## 4. Verification of the module join procedure completion

Verify on the network server that the module has joined correctly.

If you require further support, please contact [ticket@bmeters.com](mailto:ticket@bmeters.com) or your local distributor.

## Alarms

The **IWM-LR3 - IWM-LR4** LoRa module have several alarm functions built in.

When an alarm is detected the corresponding alarm flag in the status data is set. When an alarm flag is set the status data is included in every report.

The alarm flag can be reset manually using a Downlink command or via NFC.

### **MAGNETIC ALARM**

If a magnetic field is detected for 10 minutes, the magnetic alarm is triggered.

### **REMOVAL ALARM**

It occurs when there is a condition of three uncovered coils at the same time (=module was dismantled from the meter).

### **SENSOR FRAUD ALARM**

Occurs when there is a condition of three coils simultaneously covered or transitions of state not allowed (=foreign object is obstructing the rotating index/coils communication).

### **LEAKAGE ALARM**

If the passage of minimum 3 liters in an hour is detected (for K = 1) or 10 liters in an hour (for K = 10) or 100 liters in an hour (for K = 100), the alarm is recorded for a number of consecutive hours equal to 12.

If the leakage is considered resolved (=the flow stops), the loss alarm is reset.

### **REVERSE FLOW ALARM**

It occurs when there is a condition of reverse flow passage of more than 20 liters.

### **LOW BATTERY ALARM**

The battery alarm is set when the battery voltage, measured at the end of a radio transmission, is lower than the threshold set in EEPROM (Low Battery Threshold). For the alarm to be activated, the measurement must be less than the threshold for 5 consecutive measurements.

## Specification

### Versions

IWM-LR3 - IWM-LR4 LoRaWAN modules

### Operations

Operating temperature 1°C to +55°C

### Connectivity

Network LoRaWAN  
Frequency bands 868 MHz  
Provisioning OTAA (default) & ABP (on request)

### Security

Algorithms AES-128  
Hardware Cryptographic co-processor

### Battery life

Battery life length max. 10 years (at 12-hour intervals, at SF12)  
Primary cell Lithium-Manganese 3.0V  
Capacity 2.4 Ah

### Method

Meter readout Inductive

### Weight

Weight 124 g (LR3); 167 g (LR4)

### Configuration

Transmission intervals 12 hours, configurable via NFC  
Starting value Configurable over the air and via NFC

*Unique App EUI available upon request*

### Alarm functions

1. Module removal
2. Magnetic fraud attempt
3. Leak detection
4. Low battery
5. Reverse flow
6. Sensor fraud

### Enclosure

IP68

### Certifications

CE  
LoRaWAN

## Protocol

The protocol consists of different types of data

- LoRaWAN v.1.0.1 standard commands
- Unsolicited uplink status commands during configure state
- Periodic measurement reports
- Downlink commands and queries
- Uplink query response

Note 0x denotation means hexadecimal encoded.

## Payload description

The payload is made up of a total of 13 bytes (15 bytes if temperature control is enabled):

Application code	44
Absolute value of the counters (byte 1/4)	XX
Absolute value of the counters (byte 2/4)	XX
Absolute value of the counters (byte 3/4)	XX
Absolute value of the counters (byte 4/4)	XX
Reverse flow counter (byte 1/4)	YY
Reverse flow counter (byte 2/4)	YY
Reverse flow counter (byte 3/4)	YY
Reverse flow counter (byte 4/4)	YY
Index K	KK
Medium	MM
VIF	VV
Alarms	LL
Temperature (byte 1/2)	TT
Temperature (byte 2/2)	TT

Where by absolute value of the counters is meant:  $ABS(\text{Direct flow counter} - \text{Reverse flow counter})$

## Vif and management of counters

If the index  $K = 1$  (liters) [where  $K=1$  means **CPR-M3-I, GMDM-I, GMB-RP-I, GMB-I**;  $K=10$  **WDE-K50** up to DN125 included;  $K=100$  **WDE-K50** DN150 and DN200], the initial value of VIF = 0x13 (liters) is considered. If the meter exceeds the maximum number of countable liters (99.999.999), the counter is incremented and not reset (100,000,000 liters) and the new counting value will be 10,000,000 decaliters with VIF = 0x14 (decaliters). Consequently, the counter will be increased by one unit every 10 turns of the target.

If the index  $K = 10$  (liters), the initial value of VIF = 0x14 (decaliters) is considered. If the meter exceeds the maximum number of countable decaliters (99.999.999), the counter is increased and not reset to zero (100,000,000 decalitres) and the new count value will be 10,000,000 hectoliters with VIF = 0x15 (hectoliters). If  $K = 100$  (liters) I transmit with VIF = 0x15 (hectoliters) and then use VIF = 0x16 (m<sup>3</sup>) at the time of the counter overflow.

In the case of further overflows, the VIF is decreased by a size and the counter reset to 0.

There are 3 K indices (1,10,100) based on the mechanical counter on which the module is mounted.

The interpretation is as follows:

If the byte relating to K is 00 then the indication K is equal to 1

If the byte relating to K is 01 then the indication K is equal to 10

If the byte relating to K is 02 then the indication K is equal to 100

The  $K = 1$  index is always linked to the IWM-LR3 while for the IWM-LR4 the K index can take the value 10 or 100 based on the mechanical counter installed.

## Alarm byte coding

Bit 0: Magnetic

Bit 1: Removal

Bit 2: Sensor fraud

Bit 3: Leakage

Bit 4: Reverse flow

Bit 5: Low battery

## Temperature byte coding (extra)

Temperature reading can be enabled with a 0x26 SET\_ALARM\_PAR command (NFC or LORA). The parameter is in the most significant byte of block 6A of the EEPROM.

Eg. **26 00 00 00 09 04 00 00 00 01 00 00 00 00** → **Enable**

Eg. **26 00 00 00 09 04 00 00 00 00 00 00 00 00** → **Disable**

**N.B:** Pay attention to the meaning of the other parameters (for example the last 4 bytes are the low battery threshold). Refer to the supplement 'integrators' document: request it directly from B METERS.

In the payload with Temperature parameter enabled there are at the bottom two additional bytes that indicate the temperature. Refer to the example below.

Eg. **01 1b** (HEX) means 283 (decimal) which, like the rest of the fields by convention, must be interpreted as 28.3 (therefore +28.3° C).

The negative temperature value is indicated by the most significant bit at 1 of the first (from left to right) of the two bytes that give the temperature value (0x80 in the example below). The remaining 15 bits indicate the absolute value.

Eg. **80 be** (HEX) → be → 19 (decimal) so -19° C

## Payload example

44	74200100	34010000	00	00	13	02	00	14
Application code							44	44
Absolute value of the counters (byte 1/4)							XX	74
Absolute value of the counters (byte 2/4)							XX	20
Absolute value of the counters (byte 3/4)							XX	01
Absolute value of the counters (byte 4/4)							XX	00
Reverse flow counter (byte 1/4)							YY	34
Reverse flow counter (byte 2/4)							YY	01
Reverse flow counter (byte 3/4)							YY	00
Reverse flow counter (byte 4/4)							YY	00
Index K							KK	00
Medium							MM	00
VIF							VV	13
Alarms							LL	02
Temperature (byte 1/2)							TT	00
Temperature (byte 2/2)							TT	14

### Payload example description

Application code	44
Absolute value	00012074, formally these are 12074 liters
Reverse flow	00000134 so 134 liters
Index	0 (1 liter)
Medium	0 (water)
VIF	13 (liters)
Alarms	(0x02) = Module removed
Temperature	00 14 (hex) is 20 (decimal) so +2,0°C

## LoRa Commands

The **IWM-LR3 - IWM-LR4** can be controlled over by sending down link commands.

### 1. Acronims

**R2H:** Reader To Host H2R:

**H2R:** Host To Reader

**Fw:** Firmware

**Reader:** transceiver LoRa

### 2. List of commands available:

Code	Name	Description
0x07	<i>GET_FW_VERSION</i>	Read the fw version
0x0a	<i>Reset</i>	Command used to restart the microcontroller that manages the device
0x14	<i>SET_DATE_AND_TIME</i>	Command used for set data and time
0x15	<i>GET_DATE_AND_TIME</i>	Command used for read data and time
0x16	<i>SET_REVOLUTION_COUNTERS</i>	Command used for set the intial consumption of water meter
0x17	<i>GET_REVOLUTION_COUNTERS</i>	Command used for read the intial consumption of water meter
0x1A	<i>SET_METER_PAR</i>	Command used to set physical counter parameters
0x1B	<i>GET_METER_PAR</i>	Command used to read the physical parameters of the counter
0x26	<i>SET_ALARM_PAR</i>	Command used to set alarm detection parameters
0x27	<i>GET_ALARM_PAR</i>	Command used to read alarm detection parameters
0x28	<i>GET_ALARM_DATA</i>	Command used to read detected and stored alarm data
0x29	<i>SET_ALARM_DATA</i>	Command used to set the flags relating to the detected alarms

**C/R/A field:**

Code	Description
0x00	C – Command
0x01	R - Answer
0x02	A – Acknowledge frame

**Error field:**

Code	Description
0x00	No errors
0x03	Wrong request. Used when an incorrect password is present.
0x04	Error Length
0x07	Data Error

### 3. Command list descriptions (downlink)

This describes the payload data that is sent to and from the application server. All downlink application communication is done on LoRaWAN **port 1**.

#### 3.1 GET\_FW\_VERSION (0x07)

The command used to read the version of the FW loaded on the card.  
R2H:

HEADER property				
Fct	C/R/A	Err	Chain	Len
1 byte	1 byte	1 byte	1 byte	1 byte
0x07	0	0	0	0x00

H2R (ANSWER):

HEADER property					Date	
Fct	C/R/A	Err	Chain	Len	Device Type	Fw Version
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	3 bytes
0x07	0	0	0	0x04	0x04	0x000008

The Device Type field indicates the type of device.

The Err field in the answer can take on the following meanings:

0x00 - No Error

0x03 - Incorrect request, password was not presented

0x04 - Length Error

### 3.2 RESET (0x0A)

A command used to reset the microcontroller. The effect of the reset is immediate.  
R2H:

HEADER property					Date
Fct	C/R/A	Err	Chain	Len	Device Type property
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
0x0a	0	0	0	0x01	0x04

H2R:  
There is no response because the microcontroller resets and the mailbox is re-initialized. For example, you can use this command to force the microcontroller to restart in order to perform a new join procedure to the network after changing the LoRajoinmode. Once the command has been received, the module temporarily saves the current date/time and consumption, resets and restores the previously saved values.

### 3.3 SET\_DATE\_AND\_TIME (0x14)

Command end to set the date and time.  
R2H:

HEADER property					Date							
Fct	C/R/A	Err	Chain	Len	Device Type property	Day	Day of the week	Month	Year	Hours	Minutes	Seconds
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
0x14	0	0	0	0x08	0x04	1	1	1	18	10	30	0

H2R:

HEADER property				
Fct	C/R/A	Err	Chain	Len
1 byte	1 byte	1 byte	1 byte	1 byte
0x14	0	0	0	0x00

The Date field is as follows:

Name	Type	Default	Minimal	Maximum	Date Index
Day	Uin8_t	1	1	31	1
Day of the week (0 <sup>th</sup> Sunday, 1 <sup>st</sup> Monday ...)	Uin8_t	0	0	6	2
Month (1 <sup>st</sup> January, 2 <sup>nd</sup> February...)	Uin8_t	1	1	12	3
Year	Uin8_t	18	18	100	4
Hours	Uin8_t	0	0	23	5
Minutes	Uin8_t	0	0	59	6
Seconds	Uin8_t	0	0	59	7

The Err field in the answer can take on the following meanings:

- 0x00 - No Error
- 0x01 - Invalid date error
- 0x02 - Device TypeError. The device type is incorrect.
- 0x03 - Incorrect request, password was not presented
- 0x04 - Length Error

### 3.4 GET\_DATE\_AND\_TIME (0x15)

Command used to read the date and time.

R2H:

HEADER property					Date		

H2R:

HEADER property					Date							
Fct	C/R/A	Err	Chain	Len	Device Type property	Day	Day of the week	Month	Year	Hours	Minutes	Seconds
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
0x15	0	0	0	0x08	0x04	1	1	1	18	10	30	0

The Date field is as follows:

Name	Type	Default	Minimal	Maximum	Date Index
Day	UInt8_t	1	1	31	1
Day of the week (0 <sup>th</sup> Sunday, 1 <sup>st</sup> Monday ...)	UInt8_t	0	0	6	2
Month (1 <sup>st</sup> January, 2 <sup>nd</sup> February...)	UInt8_t	1	1	12	3
Year	UInt8_t	18	18	100	4
Hours	UInt8_t	0	0	23	5
Minutes	UInt8_t	0	0	59	6
Seconds	UInt8_t	0	0	59	7

The Err field in the answer can take on the following meanings:

- 0x00 - No Error
- 0x01 - Invalid date error
- 0x02 - Device TypeError. The device type is incorrect.
- 0x03 - Incorrect request, password was not presented
- 0x04 - Length Error

### 3.5 SET\_REVOLUTION\_COUNTERS (0x16)

The command used to set the initial value of the counters. Data fields larger than bytes will be represented in MSB first.

R2H:

Fct	C/R/A	Err	Chain	Len	Device Type property	Forward counter	Reset Backward
1 byte	4 bytes	1 byte					
0x16	0	0	0	0x06	0x04		

H2R:

Fct	C/R/A	Err	Chain	Len
1 byte				
0x16	0	0	0	0x00

The Date field is as follows:

Name	Type	Minimal	Maximum
Forward counter	Uint32_t	0	9.9999.9999
Reset Backward	Uint8_t	0 - Do not reset	1 - Reset counter

The 31 and 30 bits of the Forward counter field have the following meaning:

- 0b00 - Counter expressed in Litres (value is allowed only if the setting of the K is 1)
- 0b01 - Counter expressed in decalitres (value is allowed only if the setting of The K is 10)
- 0b10 - Counter in hectolitres (the value is allowed only if the setting of the K is 100)
- 0b11 - Not allowed

The Err field in the answer can take on the following meanings:

- 0x00 - No Error
- 0x01 - Out-of-range counter error
- 0x02 - Device TypeError. The device type is incorrect.
- 0x03 - Incorrect request, password was not presented
- 0x04 - Length Error

### 3.6 GET\_REVOLUTION\_COUNTERS (0x17)

The command used to read counters. Data fields larger than bytes will be represented in MSB first.

R2H:

HEADER property					Date
Fct	C/R/A	Err	Chain	Len	Device Type property
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
0x17	0	0	0	0x01	0x04

H2R:

HEADER property					Date		
Fct	C/R/A	Err	Chain	Len	Device Type	Forward counter	Backward Counter
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	4 bytes	1 byte
0x17	1	0	0	0x09	0x04		

The 31 and 30 bits of the Forward counter field have the following meaning:

- 0b00 - Meter expressed in Litres
- 0b01 - Decalitres express counter
- 0b10 - Hectolitres counter
- 0b11 - Not allowed

The backward counter field is always expressed in liters.

The Err field in the answer can take on the following meanings:

- 0x00 - No Error
- 0x02 - Device TypeError. The device type is incorrect.
- 0x03 - Incorrect request, password was not presented
- 0x04 - Length Error

### 3.7 SET\_METER\_PAR (0x1A)

The command used to set the physical parameters of the counter. Data fields larger than bytes will be represented in MSB first.

R2H:

HEADER property					Date				
Fct	C/R/A	Err	Chain	Len	Device Type property	Active	K Index	Medium	Reserved, For
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
0x1A property	0	0	0	0x05	0x04				0x00

H2R:

HEADER property				
Fct	C/R/A	Err	Chain	Len
1 byte	1 byte	1 byte	1 byte	1 byte
0x1A property	0	0	0	0x00

The Date field is as follows:

Name	Type	meaning
Active	UInt8_t	0 Inactive count 1 Active Count
K Index	UInt8_t	0 1 litre 1 10 litres 2 100 litres
Medium	UInt8_t	0 Water 1 Hot water

The Err field in the answer can take on the following meanings:

- 0x00 - No Error
- 0x01 - Out-of-range parameters error
- 0x02 - Device TypeError. The device type is incorrect.
- 0x03 - Incorrect request, password was not presented
- 0x04 - Length Error
- 0x05 - EEPROM Write Error

### 3.8 GET\_METER\_PAR (0x1B)

A command used to read the physical parameters of the counter.

R2H:

Fct	C/R/A	Err	Chain	Len	Device Type property
1 byte					
0x1B	0	0	0	0x01	0x04

H2R:

HEADER property					Date				
Fct	C/R/A	Err	Chain	Len	Device Type	Active	K Index	Medium	Reserved, For
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
0x1B	0	0	0	0x05	0x04				0x00

In the date field, the fields have the same meaning as the previous SET\_METER\_PAR command.

The Err field in the answer can take on the following meanings:

- 0x00 - No Error
- 0x02 - Device TypeError. The device type is incorrect.
- 0x03 - Incorrect request, password was not presented
- 0x04 - Length Error

### 3.9 SET\_ALARM\_PAR (0x26)

The command used to set alarm detection parameters. Data fields larger than bytes will be represented in MSB first.

R2H:

HEADER property					Date	
Fct	C/R/A	Err	Chain	Len	Device Type property	AlarmPar, lsm
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	8 bytes
0x26	0	0	0	0x09	0x04	

H2R:

HEADER property				
Fct	C/R/A	Err	Chain	Len
1 byte	1 byte	1 byte	1 byte	1 byte
0x26	1	0	0	0x00

The AlarmPar field is as follows:

Name	Type	Default	Minimal	Maximum	Description	Date Index
Alarm Threshold Reverse	Uin8_t	0x00	0x00	2	0 20 litres 1 50 litres 2 100 litres	1
Loss Control Time	Uin8_t	0x00	0x00	3	0 6 hours 1 12 hours 2 <sup>nd</sup> 24 hours 3 plus 48 hours	2
Transmission VIF	Uin8_t	0x00	0x00	0x0FFF property	0 litres (0x13) 1 Decalitres (0x14) 2 hectolitres (0x15) 3 m <sup>3</sup> (0x16)	3
Temperature	Uin8_t	0x00	0x00	0x00	0 disable; 1 enable	4
Low battery threshold	Uin32_t	2200	0x00000000	0xffffffff	Threshold in mV	5 – 8

The Err field in the answer can take on the following meanings:

- 0x00 - No Error
- 0x01 - Out-of-range parameters error
- 0x02 - Device TypeError. The device type is incorrect.
- 0x03 - Incorrect request, password was not presented
- 0x04 - Length Error
- 0x05 - EEPROM Write Error

### 3.10 GET\_ALARM\_PAR (0x27)

A command used to read alarm detection parameters.

R2H:

HEADER property					Date
Fct	C/R/A	Err	Chain	Len	Device Type property
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
0x27	0	0	0	0x01	0x04

H2R:

HEADER property					Date	
Fct	C/R/A	Err	Chain	Len	Device Type	AlarmPar, lsm
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	8 bytes
0x27	0	0	0	0x09	0x04	

In the AlarmPar field, the data has the same meaning as the previous SET\_ALARM\_PAR command.

The Err field in the answer can take on the following meanings:

- 0x00 - No Error
- 0x02 - Device TypeError. The device type is incorrect.
- 0x03 - Incorrect request, password was not presented
- 0x04 - Length Error

### 3.11 GET\_ALARM\_DATA (0x28)

A command used to read alarm detection parameters.

R2H:

HEADER property					Date
Fct	C/R/A	Err	Chain	Len	Device Type property
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte
0x28	0	0	0	0x01	0x04

H2R:

HEADER property					Date	
Fct	C/R/A	Err	Chain	Len	Device Type	AlarmData, In
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	28 bytes
0x28	0	0	0	0x1D property	0x04	

The AlarmData field is as follows:

Name	Type	Default	Minimal	Maximum	Description	Index Finger Date
Alarm Flags	Uin32_t	0x0000000000	0x0000000000	0x3F property	Bit 0: magnetic Bit 1: Removal Bit 2: Blinding Bit 3: Loss bit Bit 4: Reverse stream Bit 5: Low battery	1 – 4
Magnetic Alarm Date	Uin32_t	0x0000000000	0x0000000000	0xffffffff	dd/mm/yy	5 – 8
Form Removal Alarm Date	Uin32_t	0x0000000000	0x0000000000	0xffffffff	dd/mm/yy	9 – 12
Blinding Alarm Date	Uin32_t	0x0000000000	0x0000000000	0xffffffff	dd/mm/yy	13 – 16
Date Detection/Loss Resolution	Uin32_t	0x0000000000	0x0000000000	0xffffffff	dd/mm/yy	17 – 20
Reverse Flow Alarm Date	Uin32_t	0x0000000000	0x0000000000	0xffffffff	dd/mm/yy	21 – 24
Low battery alarm date	Uin32_t	0x0000000000	0x0000000000	0xffffffff	dd/mm/yy	25 – 28

The Err field in the answer can take on the following meanings:

0x00 - No Error

0x02 - Device TypeError. The device type is incorrect.

0x03 - Incorrect request, password was not presented

0x04 - Length Error

### 3.12 SET\_ALARM\_DATA (0x29)

Command used to set the flags relating to the detection of alarms.

R2H:

HEADER property					Date	
Fct	C/R/A	Err	Chain	Len	Device Type	AlarmFlags
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	4 bytes
0x29	0	0	0	0x05	0x04	

H2R:

HEADER property				
Fct	C/R/A	Err	Chain	Len
1 byte	1 byte	1 byte	1 byte	1 byte
0x29	1	0	0	0x00

The AlarmData field is as follows:

Name	Type	Default	Minimal	Maximum	Description	Index Finger Date
Alarm Flags	Uint32_t	0x0000000000	0x0000000000	0x0000003F	Bit 0: magnetic Bit 1: Removal Bit 2: Blinding Bit 3: Loss Bit 4: Reverse stream Bit 5: Low battery	1 – 4

The Err field in the answer can take on the following meanings:

0x00 - No Error

0x01 - Parameter error out of range

0x02 - Device TypeError. The device type is incorrect.

0x03 - Incorrect request, password was not presented

0x04 - Length Error

## 4. Examples

### GET FW VERSION (0x07)

R2H: 0x07, 0x00, 0x00, 0x00, 0x00  
H2R: 0x07, 0x01, 0x00, 0x00, 0x04, 0x01, FW1, FW2, FW3

### GET FW VERSION (0x07) with incorrect length

R2H: 0x07, 0x00, 0x00, 0x00, 0x01, 0x00  
H2R: 0x07, 0x01, 0x04, 0x00, 0x00

### RESET (0x0a)

R2H: 0x0a 0x00 0x00 0x00 0x01 0x04  
H2R: empty

### SET\_REVOLUTION\_COUNTERS (0x16) → 864 liters as initial consumption

R2H: 0x16 0x00 0x00 0x00 0x06 0x04 0x00 0x00 0x03 0x60 0x00  
H2R: 0x16 0x01 0x00 0x00 0x00

### SET\_ALARM\_PAR (0x26) → Temperature bytes enabled.

R2H: 0x26 0x00 0x00 0x00 0x09 0x04 0x00 0x00 0x00 0x01 0x02 0x02 0x00 0x00  
H2R: 0x26 0x01 0x00 0x00 0x00

### SET\_ALARM\_DATA (0x29) reset all alarms

R2H: 0x29 0x00 0x00 0x00 0x05 0x04 0x00 0x00 0x00 0x00  
H2R: 0x29, 0x01, 0x00, 0x00, 0x00

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