

## OY1410 LoRaWAN® Pulse meter

### Product manual

version 1.0

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# OY1410 LoRaWAN® Pulse meter

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# OY1410 LoRaWAN® Pulse meter

## 1 Disclaimer

This document represents information on products at the time of publication and is subject to change without prior notice due to product improvements or other reasons. Nordic Propeye makes no warranties based on the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Nordic Propeye reserves all rights to this document and the information contained herein.

### 1.1 Technical support

Please visit [www.nordicpropeye.com](http://www.nordicpropeye.com) for additional information, or contact [support@propeye.se](mailto:support@propeye.se)

#### EC DECLARATION OF CONFORMITY

certify that the design and manufacturing of this product

PULSE TRANSMITTER /

IMPULSSENDER /

PULSGIVARE /

PULSGIVER /

PULSZENDER

**OY1410 868**

conforms to the following directives and standards

The Radio Equipment Directive (2014/53/EU),

EN 300 220-1 V2.4.1, EN 300220-2 V2.4.1,

EN 301 489-1 V1.9.2, EN 301 489-3 V1.6.1,

EN 60950-1:2006+A11+A1+A12+A2

RoHS Directive 2011/65/EU

This product was CE marked in year -19



2019-01-01

Managing Director

**Stefan Lindgren**

# OY1410 LoRaWAN® Pulse meter

## 2 Warnings

The following safety precautions must be observed during all phases of the operation, usage, service or repair of this Nordic Propeye 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 chemical agents or solvents.
- The labelling of the product may not be changed, removed or made unrecognizable.

## OY1410 LoRaWAN<sup>®</sup> Pulse meter

### 3 Environmental



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste by taking it to a collection point designated for the recycling of electrical and electronic appliances. Separate collection and recycling of your waste at the time of disposal will contribute to conserving natural resources and guarantee recycling that respects the environment and human health. For further information concerning your nearest recycling center, please contact your nearest local authority/town hall offices, your household waste collection company or the shop where you bought the product.

## OY1410 LoRaWAN<sup>®</sup> Pulse meter

### 4 Product Description



The OY1410 Pulse meter is dedicated to be used together with B Meters' IWM-PL3/IWM-PL4 sensors. The total setup consists of the OY1410 Pulse meter, IWM-PL unit as well as a water meter, on which the IWM-PL unit will be mounted.

## OY1410 LoRaWAN<sup>®</sup> Pulse meter

### 5 Installation and activation

#### 5.1 LoRaWAN Configuration

Configuration on the network server is done with the AppEUI. It is possible to order a batch of devices configured with a customer unique AppEUI from the Nordic Propeye OUI range.

The device is configured with device unique DevEUI and AppKey. The device is default configured for OTA provisioning. Contact the Nordic Propeye team for ABP configuration. The device follows the LoRaWAN standard related Join configuration parameters, such as RX1 and RX2 windows, RX2 downlink frequency etc. The default setting is ADR enabled.

#### 5.2 Physical activation

Open the OY1410 using a screwdriver. Replace the right cable gland with the supplied blind plug. The enclosure has two openings that can be used for wall mounting.

The cable from IWM-PL3 and IWM-PL4 has four wires. **Cut the white wire** since it will not be used and might cause short circuits if it is left unconnected inside the OY1410. Feed the cable through the left cable gland.

Connect the IWM-PL3 or IWM-PL4 according to the table below as illustrated by the picture to the right.

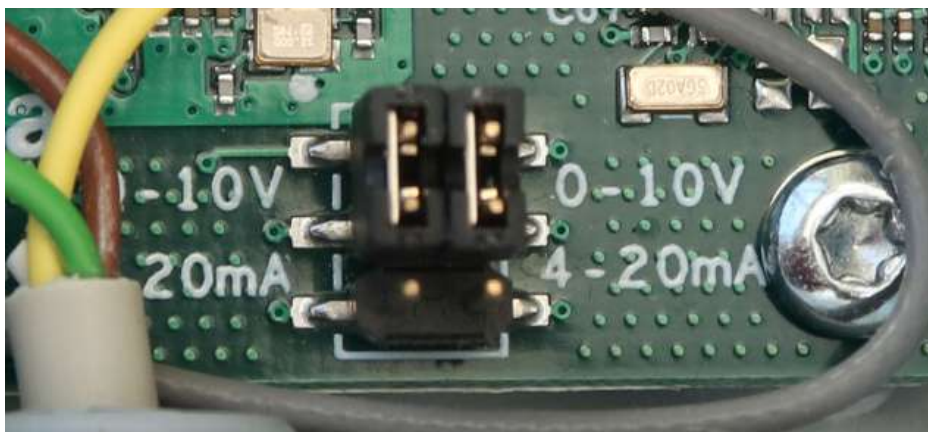


## OY1410 LoRaWAN<sup>®</sup> Pulse meter

|              |           |
|--------------|-----------|
| White cable  | Cut       |
| Yellow cable | Ch2 0-10V |
| Green cable  | Ch1 0-10V |
| Brown cable  | GND       |

Make sure that both jumpers are set to 0-10V as illustrated by the picture to the right.

After that you install the (replaceable) batteries, which activates the unit, and you close the box.



When the actions above have been taken it is time to proceed with the on-site installation. Assuming you have the mechanical water meter installed (if not, follow B Meter's instruction to do so), we will proceed with the mounting of the IWM-PL unit onto the water meter and configuring it with the B Meters app.

### 5.3 Mounting IWM-PL on to Water meter

Mount the IWM-PL unit on to the water meter by putting it on and twisting it so it locks. Place the screw, that came with the package, in the opening to fixate it.

### 5.4 IWM-PL configuration

The next step is to set the IWM-PL3 or IWM-PL4 unit. In order to do this, download the B Meters app named: "B-Meters – NFC IWM Config" (Google Playstore only). Open the app and bring your phone next on to the unit so it can connect (through NFC). In the app, select PL3/PL4 and fill in the following:

| Setting          | Value  |
|------------------|--|
| Water meter type | Select your water meter                      |
| K index          | Set depending on watermeter, see table below |
| Pulse ratio X    | Set same as K-index                          |
| Pulse ratio Y    | Leave open, not used                         |
| OUT3             | Absolute count                               |
| Pulse length     | 80   |



## OY1410 LoRaWAN® Pulse meter

The K-index and Pulse ratio X defines the number of liters per pulse. It is important that the Oy1410 is configured with the same setting. The table below shows the settings for different water meter models:

| Watermeter model                | K index | Pulse Ratio X | IWM Pulse Ratio on OY1410 |
|---------------------------------|---------|---------------|---------------------------|
| GMDM-I AF                       | 1       | 1             | 1                         |
| GMDM-I AC                       | 1       | 1             | 1                         |
| GMB-I                           | 1       | 1             | 1                         |
| WDE-K50 AF<br>(up to DN125)     | 10      | 10            | 10                        |
| WDE-K50 AF<br>(DN150 and DN200) | 100     | 100           | 100                       |
| WDE-K50 AC<br>(up to DN125)     | 10      | 10            | 10                        |
| WDE-K50 AC<br>(DN150 and DN200) | 100     | 100           | 100                       |

After you have filled this in in the app, press the WRITE button. You have now successfully configured your OY1410 Pulse meter setup and can measure data.

If you require further support, please contact [support@propeye.se](mailto:support@propeye.se) or your vendor. If you require more advanced information on the OY1410 Pulse meter, please check the next sections.

# OY1410 LoRaWAN® Pulse meter

## 6 Function description

The OY1410 counts the pulses output by the IWM-PL3 or IWM-PL4. The corresponding water volume depends on the set “Pulse ratio X”-value in the IWM-PL3 or IWM-PL4, which in turn depends on the type of water meter used. To get the OY1410 to report water volume in liter it is required to set the IWM Pulse Ratio to the same value as Pulse Ratio X in the IWM-PL3 or IWM-PL4.

The OY1410 also supervises the fraud signal from the IWM-PL3 or IWM-PL4. If a fraud condition is detect based on the output from the IWM unit the fraud detection indicator in the LoRa uplink message will be set in coming reports until the fraud detection indicator has been explicitly cleared using a LoRa downlink request.

The OY1410 also detects if the batteries are replaced, since it will not be able to count the pulses from the IWM-PL3 or IWM-PL4 while the batteries are not inserted. When the batteries have been replaced the reset detection indicator in the LoRa uplink message will be set in the coming reports until the reset detection indicator has been explicitly cleared using a LoRa downlink request. Note: The reset signal is also set during the first startup.

It is possible to set the counter value in the OY1410 to a preset value using a LoRa downlink request.

## 7 Protocol

### 7.1 Payload Data

This describes the payload data that is sent to and from the application server.

| Uplink command device => network |       |       |  |      |
|----------------------------------|-------|-------|--|------|
| Field                            | Bytes | Value | Description  | Note |
| Type                             | 1     | xx    | 0x01: Data<br>0x02: Command NACK                   |      |
| Index                            | 1     | xx    | Command Index                                      |      |
| Data                             |       |       | As defined for Command Index (only for Type: Data) |      |

| Downlink command network => device |       |       |  |      |
|------------------------------------|-------|-------|--|------|
| Field                              | Bytes | Value | Description                              | Note |
| Type                               | 1     | xx    | 0x01: Set<br>0x02: Query<br>0x03: Action |      |
| Index                              | 1     | xx    | Command Index                            |      |
| Data                               |       |       | As defined for Command Index             |      |

## OY1410 LoRaWAN® Pulse meter

### 7.2 Startup sequence

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

There are at least five startup transmissions. The Status command (index 0x20) is sent unless a reply to a downlink is sent. If no replies are sent the Status commands are sent with increasing intervals starting with 15 seconds and ending with two minutes.

## 7.3 Commands

| Index | Description             | Datatype  | Encoding                                | Valid range                                   | Access       | Unsolicited | Description   | Note   |
|-------|-------------------------|---|---|---|--------------|-------------|---|--|
| 0x03  | FW build hash           | 6 x UInt8   |   |   | Query        | No          | Unique number that identifies the firmware version                          |  |
| 0x05  | Device reset            |   |   |   | Action       | No          | Reset of device   |  |
| 0x06  | CPU voltage             | UInt8   | 25mV/<br>LSB                            | 0-3.6V  | Query        | No          | Read CPU voltage. Max/min ranges depend on battery chemistry.               |  |
| 0x0A  | CPU temperature         | UInt16<br>Big endian                                | 0.01C / LSB                             | -50- +125 C                                   | Query        | No          | Temperature from CPU sensor with 50 °C offset. Approximately 5 °C accuracy. |  |
| 0x25  | Application type        |   | -                                       | 0-1   | Query        | No          | 0 = Standard application<br>1 = LoV application                             |  |
| 0x26  | Reporting interval      | UInt16<br>Big endian                                | Minutes                                 | 1-10080                                       | Query<br>Set | No          | Measurement interval in minutes   | Setting measurement interval resets the measurement timer.   |
| 0x2B  | IWM data Counter Status | UInt32<br><i>followed by</i><br>UInt8<br>Big endian | Count<br><i>followed by</i><br>Bitfield | 0-<br>4294967295<br><i>followed by</i><br>0-3 | Query        | Yes         | Current count and status  | Status bitfield:<br>Bit 0: Reset detected<br>Bit 1: Fraud detected<br>Bit 2: Reserved<br>Bit 3: Reserved<br>Bit 4: Reserved<br>Bit 5: Reserved<br>Bit 6: Reserved<br>Bit 7: Reserved |
| 0x2C  | IWM set counter         | UInt32<br>Big endian                                | Count                                   | 0-<br>4294967295                              | Set          | No          | Set counter to a predefined value   |  |
| 0x2D  | IWM reset status*       | UInt8   | Bitfield                                | -   | Set          | No          | Resets the selected alarm status bits for the OY1410.                       | When a bit in the request is not set (=0) the corresponding bit in the status is cleared.  |
| 0x2E  | IWM pulse ratio         | UInt16  | Liters/pulse                            | 1-10000                                       | Query<br>Set | No          | Liters of water per pulse   |  |

## OY1400 LoRaWAN® converter 0-10V, 4-20 mA

### 7.4 Examples

Uplink: 012B0000123401

Current counter value is 1234HEX = 4660. Status bit 0 is set indicating a reset has been detected.

- Setting the reporting interval to 1440 minutes = 24 hours.

Downlink command: 012605A0

- Reset the Status bits.\*

Downlink command: 012D00

- Set counter value to 100000

Downlink command: 012C000186A0

- Downlink: 0305

Uplink: -

This resets the device, bringing it back to an inactive state

\*The IWM-PL unit needs to have its own alarm cleared manually, please follow B Meters' instructions for this.