OY1410 Pulse meter manual

This manual offers a simple 5-step guide for getting started with the sensor, as well as configuration with Talkpool's Sensepool visualization layer and information for advanced users.

The OY1400 Industrial communication and control unit is designed with focus on ease-of-use and reliable operation in LoRaWAN networks. The product is dedicated to be used together with BMeters' IWM sensor. Normal users will only need to read the 5-step guide at the beginning of this manual.

Digital activation

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

Standard devices are configured with the AppEUI (a.k.a. JoinEUI) 70-B3-D5-D7-2F-F8-14-02. It is possible to order a batch of devices configured with a customer unique AppEUI from the Talkpool OUI.

Upon receiving your OY1400 Industrial Control and communication unit you should first provision it to your network server. The product comes with the following:

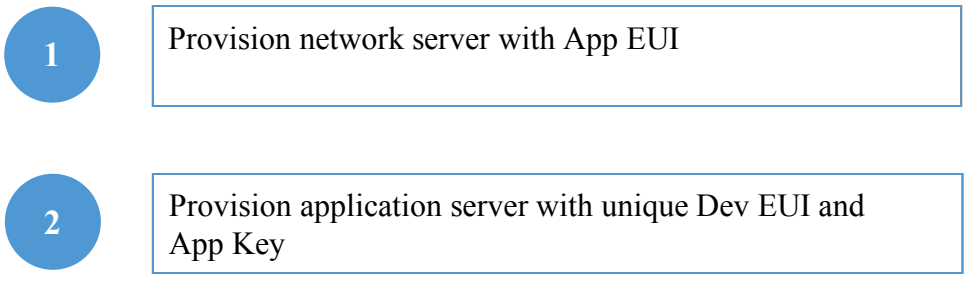
1. Dev EUI (also can be found on the outside of the unit)
2. App Key

These codes are unique for each sensor. The Dev EUI can be seen as a simple identification code, the App Key is a securely generated authentication code.

The first step you should take is to simply provision the network server, this can be Talkpool's solution called Sensepool or any other system that you would like to integrate the sensor with, with your App EUI.

The second step is to provision the application server with your unique Dev EUI and App Key.

Digital activation process



After the digital activation the sensor has to be physically activated and installed.

Physical installation

When the sensors have been digitally configured it is time to physically activate and install them. The OY1410 is dedicated to use together with BMeters' IWM-PL3 or IWM-PL4 units.

First install and configure the IWM-PL3 or IWM-PL4 unit according to BMeters' instruction. It is important to configure it according to the table below:

Setting	**Value**
K index	Set depending on watermeter, see table below
Pulse ratio X	Set to same a K-index
OUT3	Absolute count
Pulse length	80

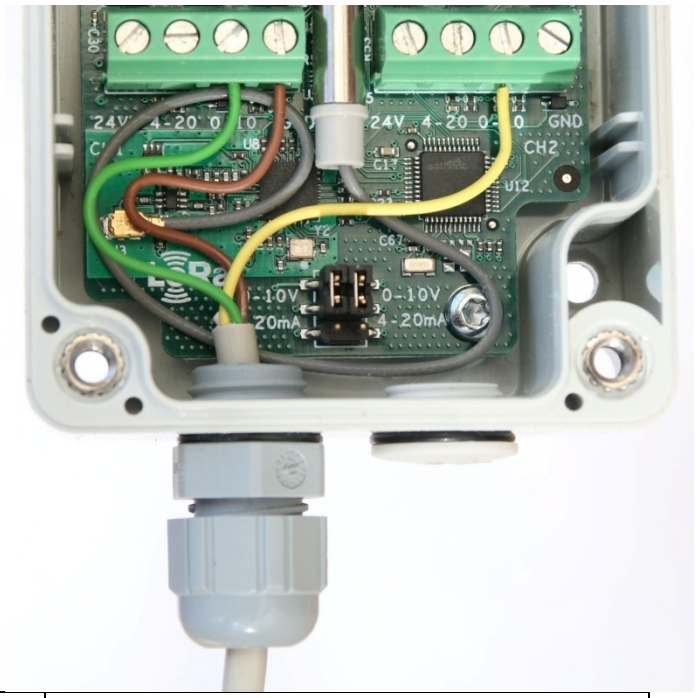
The K-index and Pulse ratio X defines the number of liters per pulse. It is important that the Oy1410 is configured with the same setting. The table below shows the settings for different watermeter models:

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 (up to DN125)	10	10	10
WDE-K50 AF (DN150 and DN200)	100	100	100
WDE-K50 AC (up to DN125)	10	10	10
WDE-K50 AC (DN150 and DN200)	100	100	100

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.

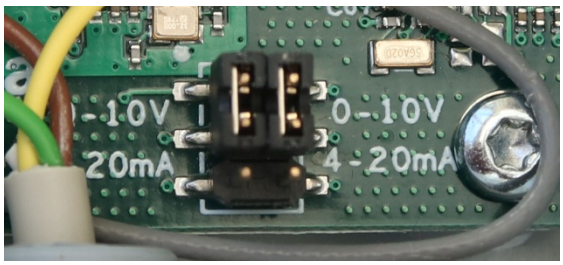
The cable from IWM-PL3 and IWM-PL4 has four wires. Cut the white wire since it will not be used and might cause short circuits if it is left unconnected inside the OY1410. Feed the cable though the left cable gland.

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



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 below.



After that you install the (replaceable) batteries, which activates the unit, you close the box and start measuring your data!

Physical installation process

3. Open the unit, connect the sensor and verify the jumper settings.

4. Install batteries, activating the OY1410

5. Close unit and install in location, you can now view the first data coming in on your application server

If you require further support, please contact IoT.support@talkpool.com or your vendor. If you require more advanced information on the OY1410 Pulse meter, please check the next sections.

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.

Protocol

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 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 0x02: Query 0x03: Action	
Index	1	xx	Command Index	
Data			As defined for Command Index	

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/ LSB	0-3.6V	Query	No	Read CPU voltage. Max/min ranges depend on battery chemistry.	
0x0A	CPU temperature	Uint16 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 1 = LoV application	
0x26	Reporting interval	Uint16 Big endian	Minutes	1-10080	Query Set	No	Measurement interval in minutes	Setting measurement interval resets the measurement timer.
0x2B	IWM data Counter Status	Uint32 *followed by* Uint8 Big endian	Count *followed by* Bitfield	0- 4294967295 *followed by* 0-3	Query	Yes	Current count and status	Status bitfield: Bit 0: Reset detected Bit 1: Fraud detected Bit 2: Reserved Bit 3: Reserved Bit 4: Reserved Bit 5: Reserved Bit 6: Reserved Bit 7: Reserved
0x2C	IWM set counter	Uint32 Big endian	Count	0- 4294967295	Set	No	Set counter to a predefined value	
0x2D	IWM reset status	Uint8	Bitfield	-	Set	No	Resets the selected alarm status bits.	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 Set	No	Liters of water per pulse	

Command examples

Uplink: 012B0000123401
Current counter value is 1234_{HEX} = 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