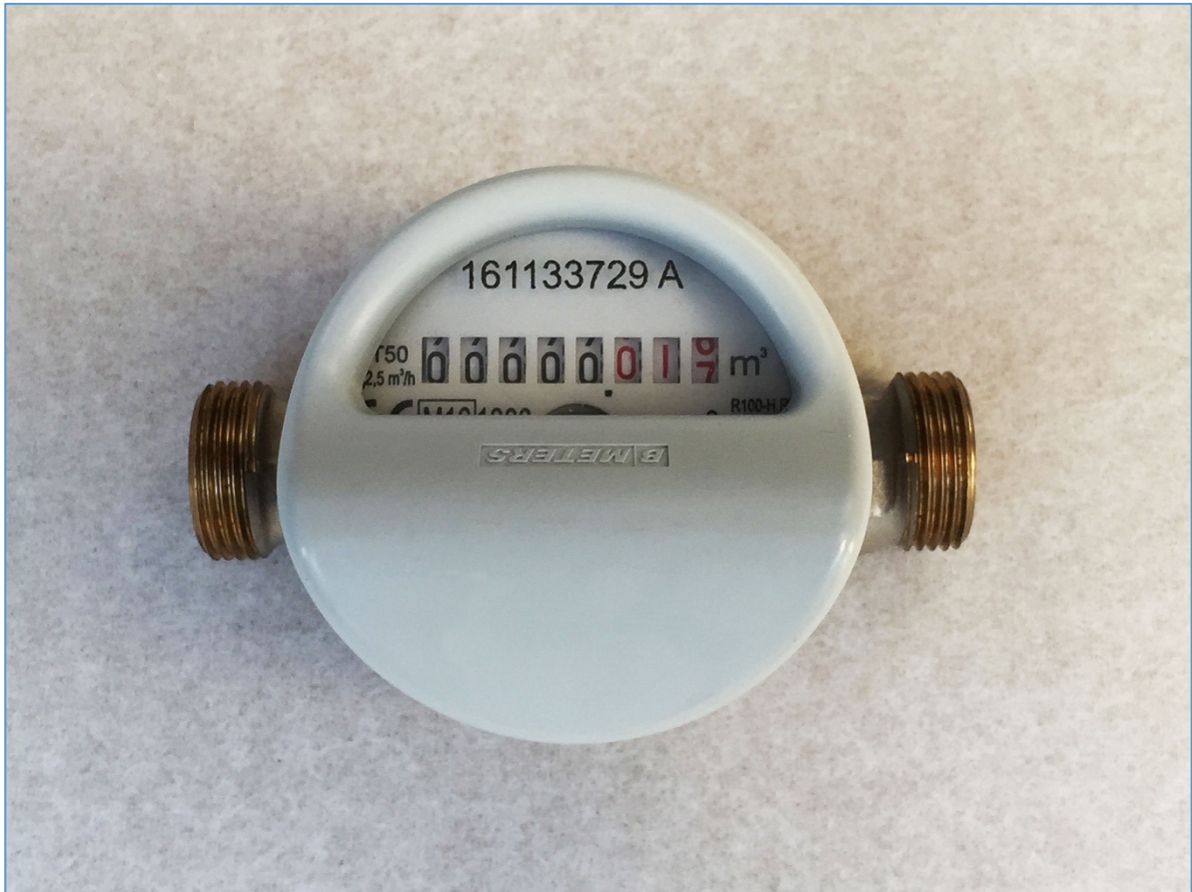




OY1310 / OY1320 LoRa Water meter AMR manual



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

The OY1310/OY1320 Water meters are designed with focus on ease-of-use and reliable operation in LoRaWAN networks. The product is designed for measuring hot and cold water consumption.

The OY1310 LoRa Water meter AMR unit supports the B Meters GSD8-RFM water meters and the OY1320 LoRa Water meter AMR unit supports the B Meters GMDM-RFM water meters.

Activation with the app

Installation is made easy with the installation application. The application is sent on request from Talkpool. The installer opens the installation app, scans the AMR unit barcode and enters device friendly name and location and initial meter reading. The device location is registered by the installation application and submitted to the viewing layer.



Physical installation

When the meter has been digitally configured it is time to physically activate and install it. The installer mounts the LoRa AMR unit on the GSD8-RFM or GMDM-RFM mechanical water meter from B Meters, and mounts the locking pin and seal.

Physical installation process

- 1 Mount LoRa AMR unit on the water meter
- 2 Mount the locking pin and seal

If you require further support, please contact IoT.support@talkpool.com or your vendor. If you require more advanced information on the OY1310/OY1320 Water meter, please check the next sections.

Activating on another network

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-F8-13-00. It is possible to order a batch of devices configured with a customer unique AppEUI from the Talkpool OUI.

Upon receiving your OY1310/OY1320 Water meters you can request from Talkpool the necessary information to connect it to your network server. This consists of the following:

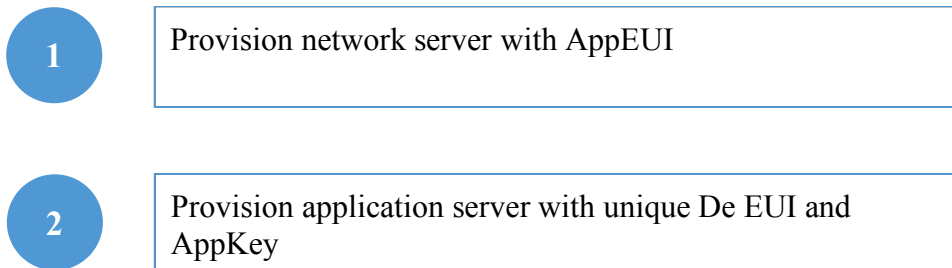
1. DevEUI
2. AppKey

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, with the AppEUI.

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

Digital activation process



SensePool

The OY1310/OY1320 can connect to any LoRa network that follows the LoRa Alliance standard and works over 868MHz. Talkpool supports integration into your own customer server to view the data but also offers its own solution. Sensepool is Talkpool's customer server solution, a visual layer where you can view your data coming in, as an extra service. The Sensepool visualization layer is used to display the collected data graphically and convert the raw data format to water meter readings.

Configuring Sensepool

If you are making use of the Sensepool solution, follow the instructions how you can set it up. From the application server forward the measurement data with HTTP POST to:
<https://sensepool.talkpool.com/saveLoraData>

The following json format shall be used:

```
{
  "deviceEui": "AB-38-36-35-54-35-67-13",
  "seqno": 59765,
  "port": "17",
  "time": "2016-09-16 16:47:44.739",
  "data": "01 21 00 00 1A 46 "
}
```

- The "seqno", "port" are optional parameters, they just give some sort of reference to identify a unique sensor reading.
- The deviceEui is in the hyphenated format.
- The time is summed up as "yyyy-MM-ddHH:mm:ss.SSS", and should be in GMT

Display of data

Sensepool can be accessed at the following web address:
<https://sensepool.talkpool.com>

First, create an account. Then, the devices are added, modified and deleted under "Device".
Select type of device: Water meter

Alarms

The OY1310/OY1320 LoRa Water meter AMR has several alarm functions built in.

When an alarm is detected the corresponding alarm flag in the status data is set. When any alarm flag is set the status data is included in every report. The alarm flag must be reset manually using a Downlink command.

Module removed

If the module is removed from the water meter after activation this alarm flag is set.

Magnetic fraud attempt

The module has a detector that can sense if a magnet is used to manipulate the function of a dry dial water meter. If a magnet is sensed the alarm flag is set.

Flow exceeds Q3

If the flow exceeds Q3 for more than 10 minutes the alarm flag is set. Q3 depends on the water meter (based on pipe) and should be configured using a Downlink command. The default Q3 value is based on the largest Q3 for the specific series.

Leak detection

If a continuous flow has been detected for 24 hours the alarm flag is set. Two configuration parameters are used for this alarm, Leak window size and Leak zero tolerance, and these can be configured using Downlink commands. The leak window size defines how long it should be between the detected water meter movements to consider no flow. Leak zero tolerance defines how many electric pulses that are required to consider a flow. The default values are 2 minutes and 2 pulses (0.25 liter for OY1310 and 2.5 liter for OY1320).

Alarm reset

The alarm flags are reset by setting the Status data with a Downlink command. The supplied data is used as a mask. Setting it to 0 resets all alarms. Setting it to 0xFE resets alarm flag 0.

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.	
0x20	Status	UInt8	Bitfield		Query Set	Yes	Bit 7: Flow exceeds Q3 at least for 10 min Bit 6: - Bit 5: Magnetic fraud attempt Bit 4: - Bit 3: Module removed Bit 2: - Bit 1: - Bit 0: Leakage during last 24 hours	
0x21	Volume	UInt32 Big endian	Liter		Query	Yes	Volume as indicated on meter x 0.001 m3	
0x22	Reporting interval	UInt16 Big endian	Minutes	1-10080	Set Query	No	Reporting interval in minutes	
0x25	Starting value	UInt32 Big endian	Liter		Set Query	No	Volume as indicated on meter x 0.001 m3	
0x27	Back flow volume	UInt32 Big endian	Liter		Query	No	Volume as indicated on meter x 0.001 m3	
0x2B	Q3MaxFlow	UInt16 Big endian	Liters per hour	0-65535	Query Set	No	Corresponds to mechanical meter Q3 (based on pipe)	
0x2C	Leak Window size	UInt8	Number of 15 seconds samples	1-255	Query Set	No	The size, in units of 15 seconds sample windows, in which we expect flow below “zero tolerance” to reset leak detection	
0x2D	Leak Zero tolerance	UInt8	Opto phase changes	0-255	Query Set	No	Zero tolerance, max number of shaft phase changes considered “not moving”.	

Examples

Uplink: 012100001738
Normal Volume with the meter reading 5944 liter

Uplink: 012100001738012008
Normal Volume with the meter reading 5944 liter combined with Status data indicating Module removed alarm flag

Downlink: 012000
Uplink: 012000
Resets all alarm flags

Downlink: 012205A0
Uplink: 012205A0
Sets the Reporting interval to 1440 minutes = 24 hours.

Downlink: 0227
Uplink: 012700000017
Query the Back flow volume. The reply is 23 liter.

Commands

LoRa MAC Command

The OY1310 / OY1320 can be controlled over by sending down link commands.

The following MAC commands per LoRaWAN specification 1.0.2

CID	Command	Transmitted by	Short Description
0x02	<i>LinkCheckReq</i>	End-device	Used by an end-device to validate its connectivity to a network.
0x02	<i>LinkCheckAns</i>	Gateway	Answer to LinkCheckReq command. Contains the received signal power estimation indicating to the end-device the quality of reception (link margin).
0x03	<i>LinkADRReq</i>	Gateway	Requests the end-device to change data rate, transmit power, repetition rate or channel.
0x03	<i>LinkADRAns</i>	End-device	Acknowledges the LinkRateReq.
0x04	<i>DutyCycleReq</i>	Gateway	Sets the maximum aggregated transmit duty-cycle of a device
0x04	<i>DutyCycleAns</i>	End-device	Acknowledges a DutyCycleReq command
0x05	<i>RXParamSetupReq</i>	Gateway	Sets the reception slots parameters
0x05	<i>RXParamSetupAns</i>	End-device	Acknowledges a RXSetupReq command
0x06	<i>DevStatusReq</i>	Gateway	Requests the status of the end-device
0x06	<i>DevStatusAns</i>	End-device	Returns the status of the end-device, namely its battery level and its demodulation margin
0x07	<i>NewChannelReq</i>	Gateway	Creates or modifies the definition of a radio channel
0x07	<i>NewChannelAns</i>	End-device	Acknowledges a NewChannelReq command
0x08	<i>RXTimingSetupReq</i>	Gateway	Sets the timing of the of the reception slots
0x08	<i>RXTimingSetupAns</i>	End-device	Acknowledges RXTimingSetupReq command